Personal Communications for Windows, Version 5.5

IBM

Administrator's Guide and Reference

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First Edition (September 2001)

This edition applies to Version 5.5 of IBM Personal Communications (program number: 5639–I70) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About This Book

Beginning with Version 5.5, IBM® Personal Communications for Windows® reference books were separated into four volumes: a 3270 Emulator User's Reference, a 5250 Emulator User's Reference, a VT Emulator User's Reference and an Administrator's Guide and Reference. These volumes provide information for using IBM Personal Communications AS/400® for Windows operating systems (hereafter called PC400) and IBM Personal Communications for Windows operating systems. In this book, *Windows* refers to Windows 95, Windows 98, Windows NT, Windows Me, and Windows 2000. When information is applies only to a specific operating systems, this is indicated in the text. *PC/3270* refers to the 3270 portion of the combined package. Throughout this book, *workstation* refers to all supported personal computers. When only one model or architecture of the personal computer is referred to, only that type is specified.

Who Should Read This Book

This book is intended for administrators of Personal Communications.

How to Use This Book

This book contains reference information that you might need to refer to when installing or operating Personal Communications.

Personal Communications is designed to use various communication adapters and to work with other workstation and host system software. Refer to the appropriate documentation for the products you use.

Command Syntax Symbols

Parentheses, brackets, ellipses, and slashes have the following meanings or uses:

( )   Parentheses enclose operands that govern the action of certain command options.

[ ]   Brackets indicate an optional command argument. If you do not use the optional item, the program selects a default.

...   Ellipsis after an argument indicates that you can repeat the preceding item any number of times.

/   For 3270, a slash must precede the Time Sharing Option Extensions (TSO/E) password. A slash must also precede parameters of DOS commands entered from the command line. For 5250, a slash must precede parameters of IBM DOS commands entered from the command line.

****   A backslash is included as part of any directory name. An initial backslash indicates the first-level directory, and an additional backslash is inserted in the directory name to indicate another level.

All directives, operands, and other syntax can be typed in either uppercase or lowercase, unless otherwise indicated.

Where to Find More Information

Online Help

The help facility describes how to install, configure, and use Personal Communications. Online help is very extensive and includes information about every aspect of configuring and using Personal Communications.

Use help to obtain the following information:
- Menu choices
- Operation procedures
- Operations in windows
- Meanings of the terms displayed in windows
- Causes of errors and the corresponding actions to take
- Mouse-based operations
- Operation without a mouse
- Detailed explanations of specific terms
- Further technical information about Personal Communications
- Detailed explanations of operator information area (OIA) messages

To display online help, select choices from the **Help** menu or press **F1**.

You can use Personal Communications online help just as you use the online help for Windows.

Messages and Alerts

Online messages are displayed by Personal Communications, but a message does not always mean an error occurred. For example, a message might tell you that an operation is in progress or has been completed. A message can also prompt you to wait for the completion of an operation.

Messages That Appear in Pop-Up Windows
While using Personal Communications, you may see messages appear in popup windows, but not necessarily as a direct result of your actions. These messages can appear for a number of reasons, outlined in the following sections.

System-Fault Messages: For Windows NT®, if a message does appear in a pop-up window, you can paste its contents into the Windows NT clipboard. To do this:
1. Click **Details** on the pop-up window.
2. Mark the text that you want to copy.
3. Click the marked text with the right mouse button and then click **Copy**.
4. Start an editor, such as Notepad, and click **Paste** from the **Edit** menu.
5. Save the file in case an IBM Service Representative needs this information to diagnose your problem.

Security-Related Messages: Personal Communications optionally utilizes Secure Sockets Layer (SSL) to establish sessions with servers; this may require input from you (for example, a password). See "Chapter 8. Configuring and Using SSL Security for Personal Communications" on page 75 for details.

System-Policy-Related Messages: Your Personal Communications workstation configuration can be controlled centrally using facilities for managing system policies. See "Chapter 7. System Policy Support" on page 67 for details.

OIA Messages

Personal Communications displays messages in the operator information area
(OIA) or in a pop-up window. Messages from Personal Communications are
displayed in the message window; messages from the host system regarding the
condition of the session are displayed in the OIA of the session window.

The OIA is the bottom line of the session window. An OIA message indicates the
status of Personal Communications as well as information about the workstation,
host system, and attachment method.

All of the OIA indicators, reminders, and messages are described in the online
help. To view this information:
1. Click **Index** from the **Help** menu.
2. Select **The operator information area messages**.

   To look up a specific OIA message, select **Search**. When the Search window
   appears, type the letters that appear in the OIA. For example, `MACH` or `PROG`. If a
   lightning bolt appears, type `COMM`.
3. Double-click the index entry that matches your search.
4. Scroll through the window until you find the number that appears in your
   OIA.

Alerts
Alerts may be generated which correspond to specific Personal Communications
messages. See "Appendix D. Alerts" on page 353 for more information.

Personal Communications Library

The Personal Communications library includes the following publications:
- *IBM Personal Communications for Windows, Version 5.5 CD-ROM Guide to
  Installation*, GC31-8079-06
- *IBM Personal Communications AS/400 for Windows, Version 5.5 CD-ROM Guide to
  Installation*, GC31-8080-06
- *IBM Personal Communications for Windows, Version 5.5 Quick Beginnings*,
  GC31-8679-02
- *IBM Personal Communications for Windows, Version 5.5 Access Feature*, SC31-8684-02
- *IBM Personal Communications for Windows, Version 5.5 5250 Emulator User's
  Reference*, SC31-8837-00
- *IBM Personal Communications for Windows, Version 5.5 3270 Emulator User's
  Reference*, SC31-8838-00
- *IBM Personal Communications for Windows, Version 5.5 VT Emulator User's
  Reference*, SC31-8839-00
- *IBM Personal Communications for Windows, Version 5.5 Administrator's Guide and
  Reference*, SC31-8840-00
- *IBM Personal Communications for Windows, Version 5.5 Emulator Programming*,
  SC31-8478-05
- *IBM Personal Communications for Windows, Version 5.5 Client/Server
  Communications Programming*, SC31-8479-05
- *IBM Personal Communications for Windows, Version 5.5 System Management
  Programming*, SC31-8480-05
- *IBM Personal Communications for Windows, Version 5.5 CM Mouse Support User's
  Guide and Reference*
- *IBM Personal Communications for Windows, Version 5.5 Host Access Class Library*,
  SC31-8685-02

- *IBM Personal Communications for Windows, Version 5.5 Configuration File Reference,* SC31-8655-04

These books are also available (except in DBCS versions) in PDF format and are optionally installed or viewed from the CD-ROM.

In addition to the printed books, there are HTML documents provided with Personal Communications:

Host Access Class Library for Java
> This HTML document describes how to write an ActiveX/OLE 2.0–compliant application to use Personal Communications as an embedded object.

Host Access Beans for Java
> This HTML document describes Personal Communications emulator functions delivered as a set of JavaBeans™.

Open Host Interface Objects for Java
> This HTML document describes how to write an OHIO-compliant application to use Personal Communications as an embedded object.

Part 1. General Information

Chapter 1. Personal Communications Highlights

Personal Communications brings the power of personal networking to your workstation by providing a variety of connectivity options supporting local area network (LAN) and wide area network (WAN) environments. Whether you need host terminal emulation, client/server applications, or connectivity, Personal Communications offers a robust set of communications, networking, and administrative features.

Personal Communications is a full-function emulator package with an easy-to-use graphical interface, which includes many useful features such as file transfer and dynamic configuration, and emulator APIs including the IBM Host Access Class Library.

Personal Communications also provides a variety of SNA-based client application programming interfaces (APIs). You can create applications that use the peer-to-peer client APIs, which are based on LU 6.2 (and provided by Personal Communications). Using these APIs you can simultaneously access and process information on peer workstations.

With Personal Communications, you can participate in Advanced Peer-to-Peer Networking® (APPN®) as an end node, and use the advanced network features, high-performance routing (HPR), and dependent LU requester (DLUR).

Personal Communications provides the following functions:

- **System/390® Connections**
  LAN LAN via IEEE 802.2
  3270 NWSAA or Communications Server for Windows NT
  Telnet3270
  3270 via AS/400
  APPC 3270 via LAN
  Microsoft® SNA client over FMI
  Dependent Logical Unit Requester (DLUR)
  VT-over-Telnet (TCP/IP)
  3174 Peer Communication
  COAX SNA Distributed Function Terminal
  Non-SNA Distributed Function Terminal
  COM port
  Telnet 3270
  SNA-over-Async
  IBM Global Network® (not in Japan)
  Home3270
  IBM Global Network - SNA-over-Async
  Dependent Logical Unit Requester (DLUR) via

  SNA-over-Async

  Hayes AutoSync
  APPC 3270 via SNA-over-Async
  APPC 3270 via Hayes AutoSync
  VT-over-Async
  VT-over-Telnet (TCP/IP)
  X.25 Hayes AutoSync
  X.25 DLUR via Hayes AutoSync

X.25 APPC 3270 via Hayes AutoSync
5250   3270 via AS/400
Dependent Logical Unit Requester (DLUR)
SDLC Synchronous Data Link Control
3270 via AS/400 (passthru)
APPC 3270 via SDLC
Dependent Logical Unit Requester (DLUR)
SNA/IP
LU 0, 1, 2, 3
APPC 3270
LU 0, 1, 2, 3 via DLUR
IBM ISA/MCA WAC
Synchronous Data Link Control
3270 via AS/400 (passthru)
APPC 3270 via SDLC
Dependent Logical Unit Requester (DLUR)
X.25 Qualified Logical Link Control
X.25 3270 via AS/400
APPC 3270 via X.25
X.25 DLUR
API Client
NetWare for SAA® Client
Communications Server Client
Communications Server
IBM-EEDLC
LU (0, 1, 2, 3) via DLUR
APPC 3270
OEM   LU (0, 1, 2, 3)
3270 via AS/400 (passthru)
APPC 3270
Dependent LU Requester (DLUR)

- **AS/400 Connections**
  LAN   LAN via IEEE 802.2
  Telnet5250 over TCP/IP
  VT over Telnet
  Telnet5250 over IPX/SPX
  5250   Twinaxial Data Link Control (APPC)
  Twinaxial Data Link Control (Console)
  COM port
  SNA-over-Async
  Hayes AutoSync
  SNA-over-Async (Console)
  VT over Async
  VT over Telnet
  Telnet 5250
  X.25 Hayes AutoSync
  SDLC Synchronous Data Link Control
  SNA/IP
  5250
  IBM ISA/MCA WAC
  Synchronous Data Link Control (WAC)
  X.25 Qualified Logical Link Control
  IBM-EEDLC
  5250
  OEM   APPC 5250

- **ASCII Emulator Connections**
  LAN VT over Telnet
  COM port
          VT-over-Async
          VT over Telnet
- **S/3X Emulator Connections**
  5250 Twinaxial Data Link Control (Console)
- **Client/Server Connections**
  LAN LAN via IEEE 802.2
  Twinaxial
          Twinaxial Data Link Control (APPC)
  COM port
          SNA-over-Async
          Hayes AutoSync
          X.25
  SDLC Synchronous Data Link Control
  IBM WAC
          Synchronous Data Link Control
          X.25
  AnyNet® SNA over TCP/IP
          APPC
  Enterprise Extender
          HPR over IP
- **Configuration of SNA Node (APPN) Sessions**
  – Emulator
  – Client/server applications
- **SNA Node Operations**
  – Starting and stopping resources
  – Deleting resources
  – Displaying resource information
  – Changing session limits
  – Initiation of path switches
- **Log Viewer**
  – View Message Log, Trace Log, and Merged Log files
  – Summary and Detail views
  – Set default Message Log size and location
  – Filter and search Log files
  – Message Log entries Help
- **Trace Capability**
  – 3270/5250 emulator data
  – APPN and APPC API data
  – Connectivity data, such as LAN or SDLC
  – User services data, such as node initialization
- **APPC Applets**
  – Display SNA sense data (GETSENSE)
  – Transfer files (AFTP and AFTPD)
  – Check connection (APING)
- **Sample Programs**

  – Located in \Personal Communications\samples subdirectory
- **Installation and Configuration**
  – Partial installation option
  – Program sharing on a network server
  – Automatic detection of installed communication adapters

- – Dynamic change of communication configurations
- – Automatic Dial Facility (Async (IGN), SDLC, Home3270, SNA-A)
- – Silent Installation
- – ASCII SNA-node configuration
- – Verification of ASCII configuration

- • **OEM Adaptor Cards**

  An open API enables vendors and other equipment manufacturers (OEMs) to provide adapter cards that allow for additional connectivity options, for example, additional X.25, ISDN, SDLC or twinax support.

- • **Host Session Function**
  - – Up to 26 sessions
  - – Variable screen size and automatic font scaling
  - – Function settings (of the host code page, for example) for each session

- • **Host Graphics Support**
  - – Built-in vector graphics support for GDDM® and other graphics applications

- • **File Transfer Function**
  - – Easy operation through graphical user interface (GUI) windows
  - – Batch transfer of multiple files
  - – Concurrent file transfer through multiple sessions
  - – Background file transfer
  - – File transfer invocation by macro
  - – OfficeVision/MVS™ Import/Export functions
  - – VT File Transfer (XModem and YModem)

- • **Edit (Cut and Paste) Function**

  You can use the clipboard to cut, copy, and paste a selected areaIn addition, you can paste data in other applications, such as spreadsheet programs, that support the PasteLink function.
  - – Support of spreadsheet data format (Sylk, Biff3, Wk3 formats)
  - – Copy Append
  - – Paste Next
  - – Paste to Trim Rectangle
  - – Paste Stop at Protected Line

- • **Graphical User Interface (GUI)**
  - – Customizable 3D iconic tool bar
  - – 3D-button hotspots
  - – Pop-up keypad
  - – Macro function, including record and play
  - – VBScripts, including record and play
  - – Keyboard-function setup and remapping
  - – Mouse-button-function setup and remapping
  - – Display setup (cursor type, graphics, sound, colors, for example)
  - – Automatic font size adjustment or fixed font size
  - – Window-appearance setup
  - – Menu-bar customization
  - – 3270 Light Pen emulation by using a mouse
  - – Status bar with history
  - – Page setup (Text and Graphics)
  - – Revised Configuration Dialog
  - – Online help

- • **Print Function**
  - – Printer session (for PC/3270: SCS, LU 3, or non-SNA)
  - – Graphics local print
  - – Printing with the Windows NT printer drivers
  - – Print function by printer definition table (PDT)

- Multiple host-print functions in multiple sessions
- Print-job control by SNA bracket timeout
- PDF-to-PDT conversion tool
- PC400 print function by OS/400® Host Print Transform (HPT)
- PC400 printing supported by the AS/400 Advanced Print Support Utility
- ZipPrint
- **Programming Interfaces**
  - 16/32-bit Emulator High-Level Language Application Programming Interface (EHLLAPI)
  - 16/32-bit Dynamic Data Exchange (DDE)
  - 32-bit Node Operations Facility (NOF)
  - 16/32-bit Personal Communications API (PCSAPI)
  - 32-bit Advanced Program-to-Program Communication (APPC)
  - 32-bit Common Programming Interface for Communications (CPI-C)
  - 32-bit Automation Object API
  - 32-bit ActiveX/OLE 2.0
  - Host Access Beans for Java™
  - ActiveX Controls
- **PC400 Client Function**
  - Data transfer
  - PC Organizer
  - Text Assist
  - Enhanced Programmable Terminal User Interface (ENPTUI)

Chapter 2. Problem Analysis

This chapter describes the information that will help you analyze problems with Personal Communications, and ways to report a problem to IBM. For detailed information about contacting IBM, refer to *Quick Beginnings*.

For information about Personal Communications and support, refer to the following Web sites:

- The Personal Communications home page provides access to general product information, and download services. To view this page, go to the following Internet address:

  http://www.ibm.com/software/network/pcomm

- The Personal Communications support page provides links to code fixes, tips, newsgroups, support options, and services. To view this page or to submit a software defect report, go to the following Internet address:

  http://www.ibm.com/software/network/pcomm/support

Personal Communications provides several utilities to help you with problem analysis. They can be invoked by selecting their icons from the **Programs → IBM Personal Communications** > **Administrative and PD Aids** subfolder on the Windows **Start** menu.

The following sections describe these utilities and how to use them.

Log Viewer

The Personal Communications log viewer utility enables you to view, merge, sort, search, and filter information contained in message and trace logs. Use the log viewer during problem analysis to work with message and trace log entries. The default name of the message log output file is PCSMSG.MLG; its file extension must be .mlg. The file extension for trace logs must be .tlg.

To view message or trace logs:

1. From the **Administrative and PD Aids** subfolder, click **Log Viewer**; or, from an active session, click **Launch → Log Viewer** from the **Actions** menu.
2. From the list of logged messages, double-click a message to display the message text.

For more information, refer to the information on log viewer functions in the User's Reference for the specific emulator type.

Trace Facility

The Personal Communications trace facility enables you to log trace information for certain Personal Communications functions.

To start a trace, perform the following steps:

1. From the **Administrative and PD Aids** folder, click **Trace Facility**; or, from an active session, select **Launch → Trace Facility** from the **Actions** menu. The trace status on the title bar displays the current state:

Active Trace data is being collected by the trace facility.

Inactive
No trace data is being collected.

2. From the main dialog box, click **Set Up** to set the desired trace system parameters.

3. Click **OK** to return to the main trace dialog box.

4. From the main trace dialog box, select the type of data you want to trace from the **Function Name**, **Component Name**, and **Trace Option** list boxes.

Function Name
A specific set of Personal Communications features, such as 3270/5250 Emulator or User Services.

Component Name
The name of a specific part of a function, such as API data (for the 3270/5250 Emulator function) or Node Initialization (for the User Services function).

Trace Options
The options associated with a particular component, such as EHLLAPI (for the API component) or API trace (for the Node Initialization component).

5. Start tracing data by clicking **Start**, or apply changes to the trace options by clicking **Apply**.

6. Run the operation that you want to trace.

7. Optionally, stop the trace by clicking **Stop**.

8. Save the trace data to your hard disk by clicking **Save**.

9. Click **Format** to specify a formatted trace file name and to format the trace data. The Information Bundler utility should be used immediately after the trace is complete to ensure that the correct information is gathered.

> **Note:** If you have changed the path for the formatted trace file, the Information Bundler will not find the trace information. Copy the trace files to the Personal Communications private subdirectory.

10. Click **OK**.

11. Click **Clear** to clear the trace buffer where you saved a trace.

12. Use the log viewer to view the formatted trace log.

The Trace Facility can also be operated remotely. See "Chapter 6. Tivoli Support" on page 53 for more information.

Information Bundler

The Personal Communications Information Bundler utility gathers system files, trace and log files, and registry information and creates a self-extracting .EXE file. This .EXE file is sent to support personnel using FTP for problem resolution. This utility should be executed immediately after the trace is complete to ensure that the correct information is gathered. To use the information bundler utility:

1. From the **PD Aids** folder in the Personal Communications program group, double-click the **Information Bundler** icon; or, from an active session, click **Launch → Information Bundler** from the **Actions** menu.

2. A .EXE file containing system and Personal Communications information is created in the Personal Communications directory. By default this file is called 12345.EXE.

Internet Service

The Internet Service utility enables you to send the .EXE file containing diagnostic data collected by the Information Bundler to an FTP server. This utility will not work unless TCP/IP is configured and you have a direct connection to the internet. To use Internet Service:

1. Double-click the **Internet Service** icon located in the Personal Communications program group; or, from an active session, click **Actions → Launch → Internet Service**.

   The Internet Service window contains four data fields that must have valid values before you can submit your problem report.

2. Verify that the FTP Address field contains the default address **testcase.software.ibm.com**. This is the service anonymous FTP server.

3. Type your e-mail address in the field provided.

4. In the Problem Determination Filename field, type the file name and path of the .EXE file created with the Information Bundler. This file is located in the Personal Communications installation directory.

5. In the PMR Number field, type the PMR number that you received as a result of contacting IBM support personnel.

6. When all fields in the window have been filled with valid values, click **Transmit** to submit your problem determination information.

Checking for APARs and CSDs

Authorized users can use the Product Update Tool to download, test, and commit APARs and CSDs. Authorized Program Analysis Reports (APARs) are single module product fixes for Personal Communications, while CSDs are full Personal Communications product updates.

To access the APAR and CSD GUI:

1. Click **Administrative and PD Aids** from the Personal Communications start menu.

2. Select **Product Update Tool**.

3. Select **WebUpdate Configuration** to change connection and proxy options.

WebUpdate Configuration

The WebUpdate configuration panel automatically appears when the Product Update Tool is first run after installation. After the initial configuration settings are entered or confirmed, the update panel does not appear automatically each subsequent time. If changes to the configuration are necessary, click the **WebUpdate Configuration** button on the main panel.

You can specify the following WebUpdate configuration options:

Connection Method
> If connecting through a modem, select the dialup connection name from the drop-down list.

Proxy Connection Settings
> During installation, Personal Communications automatically checks the Internet browser proxy settings and configures WebUpdate to use those settings. If no proxy settings are available, Personal Communications defaults the settings to blank (no settings). Select **Uses Proxy Connection**

to add or change the proxy settings for WebUpdate. If you use an HTTP proxy server, you can enter the user name and password.

APARs

An APAR should always be tested before it is committed. Once an APAR is committed, it becomes part of the installed product and no backup copy of Personal Communications is available. (Specifically, the Windows Installer MSI package is altered by the APAR installation.) Thus, the APAR cannot be removed and Personal Communications must be reinstalled. If Personal Communications is reinstalled on a machine, any prior APARs must be recommitted

Administrative Installation

You can apply APARs to an install image by using the command line parameter

`/p APAR.msp`

where `APAR` is the name of the APAR. This parameter may be used in conjunction with the `/a` parameter, so that the APAR is committed when you perform an administrative installation. Refer to the *CD-ROM Guide to Installation* for more information about administrative installation and command line parameters.

You should always test an APAR on an administrative installation before pushing the new image and/or the APAR to other machines. The administrative installation on which APARs are tested and the administrative install image should always be synchronized.

Product Update Tool Options

The WebUpdate utility has three options for APARs:

Test an APAR
This option allows you to test the APAR before it is actually installed. Testing indicates conflict between APARs and should always be done before the **Commit** option is used.

When you test an APAR, an APAR package (bundled as a self-extracting executable) is downloaded and executed. Once you have selected what APARs you would like to test, a copy of the files being updated will be made in the appropriate directory. For Windows 95, 98, and Me, the directory is:

X:\Application Data\All Users\IBM\PCOMM\APAR\[APAR Name]

where X is the drive on which the operating system resides. If the operating system is Windows NT or Windows 2000, the directory is:

X:\All Users\Application Data\All Users\IBM\PCOMM\APAR\[APAR Name]

Remove an APAR
If an APAR test is unsuccessful, this option removes the APAR and restores Personal Communications to its prior settings. The backup files are copied back to their original location.

Commit an APAR
Use this option only after a successful APAR test. When you select to commit an APAR, an APAR package (bundled as a self-extracting executable) is downloaded and executed. Once you have selected what APARs you would like to commit, the corresponding .msp file is launched silently. Since the changes are permanent, no backup copy is made. You can then distribute one or more .msp files across the network.

If the operating system is Windows 95 or 98, the .msp file is saved in

X:\<drive>\Application Data\IBM\Personal Communications\APARs\[APAR Name]

where X:\<drive> is the directory in which the operating system resides.
For Windows NT, the .msp file is saved in

X:\<drive>\Profiles\All Users\Application Data\IBM\Personal Communications\APA

For Windows 2000, the .msp file is saved in

X:\<drive>\Documents and Settings\All Users\Application Data\IBM\Personal Comn

For Windows Me, the .msp file is saved in

X:\<drive>\Application Data\IBM\Personal Communications\APARs\[APAR Name]

Note: In the subdirectory

...\Personal Communications\APARs\

there is a file named pcommaparinfo.txt. This file contains a list of
the APARs that have been installed as well as their status (tested or
committed). This file must not be edited or moved, because it is
essential for the proper tracking of APARs.

Corrective Service Distributions

To check for CSDs, click **Check for CSDs** in the Product Update Tool. If CSDs are
available, you will be prompted to go to the registration Web pages for CSDs. A
popup panel notifies you if there are no CSDs available for the current version.

Part 2. Advanced Configuration, Management, and Operations

Chapter 3. Advanced Configuration

This chapter describes facilities useful for deploying Personal Communications in large networks. Some of these facilities are handled by features of Personal Communications itself, while others are provided by external products, augmented with facilities provided by Personal Communications.

Configuration Files

The following sections describe the advanced configurations that you can make with the built-in files of Personal Communications. Advanced configurations enable you to easily configure and distribute common keywords and parameters to your client base, and include the following:

- Initial Configuration Definitions
- Configuration with Template and Update Files

Initial Configuration Definitions

Personal Communications enables network administrators to create an initial configuration definitions file that contains common configuration definitions for their clients. By using an initial configurations file, the administrator can distribute preconfigured definitions and have them automatically preloaded whenever a new configuration is created on a client.

The first step is to create a configuration using SNA node configuration, Start or Configure Sessions, or an ASCII editor. For detailed information on configuring sessions, refer to *Quick Beginnings*.

After you create the configurations file, rename the file to the appropriate reserved name. For SNA node configuration files (*.ACG), the file name is PCSINIT.AC$. For workstation profiles (*.WS), the file name is PCSINIT.WS$. For emulator configurations using SNA communication, you should use both a PCSINIT.WS$ and a PCSINIT.AC$ file.

After you rename the files, they can be distributed to client workstations. Put the files in the configuration files directory. The definitions in the files will be preloaded whenever a user creates a new configuration.

Note: The initial configuration file does not override parameter defaults for new definitions in new configurations, but preloads complete definitions into new configurations. Users can modify these definitions to get custom parameter values; however, the original initial configuration file remains unchanged.

Configuration File and Emulator Profile Directories

The default directory for configuration files is specified during installation. Configuration files can be used for all users or a specific user. Refer to the *CD-ROM Guide to Installation* for details on specifying the initial default directory.

By default, Personal Communications searches for emulator profiles in the configuration files directory. You can use the **User Preference Manager** utility to indicate a different location for profiles.

Using Template and Update Files

When creating configurations for a large number of clients to implement, you can create a template configuration file that represents the common configuration elements for all clients. Using an update file with only those changes necessary for each client, you can distribute the template and update file and merge the two to create the target configuration.

The Personal Communications Server template and update files enable you to create or modify a configuration using an ASCII editor. You can configure all of the Personal Communications configuration keywords and parameters with update files. Both the template and update files have the same format as Personal Communications configuration (.ACG) files.

Template files can ease the mass distribution of configurations to remote clients. A template file can specify the keywords which are common to several clients. For example, if you have multiple clients to configure as SNA clients, many of the keywords will be identical. You can create a template configuration file that reflects those common keywords.

You can use update files to add, modify, or delete keywords in a template file. The original template configuration file is left unchanged. An update file is merged into a template file by specifying the INCLUDE keyword at the end of the template file. For example, if an update file is named myconfig.chg, the last line of the template file that will use the update file is INCLUDE=myconfig.chg. When the template file and the update file are merged, you can give the resulting configuration file a name with the .ACG extension that distinguishes it from other .ACG files.

When you create configurations using template and update files, the verification utility searches directories in the following order:
1. The local directory where the verification utility is being invoked
2. The Personal Communications private subdirectory

To ensure that the verification utility can locate the template and update files, you should store them in the Personal Communications private subdirectory, which is also where the configuration (.ACG) files are stored.

Key Fields
The key field is the parameter in a keyword that names the keyword and uniquely identifies it from other keywords of the same type.

Some keywords do not have key fields because they can only be specified once in a configuration file. An example of a keyword that can only be specified once is the NODE keyword.

Adding Keywords to a Template File
When using an update file to add a new keyword definition, you must provide the entire keyword. The key field must be provided along with a unique value. If any subfields are omitted from the keyword, the defaults for those fields are used. For example, to add a MODE keyword to the configuration, the update file might contain the following keyword:

```
MODE=(
    MODE_NAME=MYMODE
    COS_NAME=#INTER
    CRYPTOGRAPHY=NONE
    DEFAULT_RU_SIZE=1
```

```
          MAX_NEGOTIABLE_SESSION_LIMIT=128
          MAX_RU_SIZE_UPPER_BOUND=4096
          MIN_CONWINNERS_SOURCE=15
)
```

The content of the update file assumes that a MODE keyword with the parameter of MODE_NAME=MYMODE does not exist in the template. If it does, the parameters will be updated with the values provided in the update file.

If the MODE_NAME parameter is omitted from the update file, an error will occur during the configuration verification because the MODE_NAME parameter cannot be uniquely identified. Not all parameters available for the MODE keyword are specified in the update file. The remaining parameters use the defaults as specified in the *Configuration File Reference*. The resulting addition to the configuration will look like this:

```
MODE=(
          MODE_NAME=MYMODE
          AUTO_ACT=0
          COMPRESSION=PROHIBITED
          COS_NAME=#INTER
          CRYPTOGRAPHY=NONE
          DEFAULT_RU_SIZE=1
          MAX_NEGOTIABLE_SESSION_LIMIT=128
          MAX_RU_SIZE_UPPER_BOUND=4096
          MIN_CONWINNERS_SOURCE=15
          PLU_MODE_SESSION_LIMIT=32
          RECEIVE_PACING_WINDOW=1
)
```

Modifying a Keyword in a Template File

When using the update file to modify an existing keyword definition, the original keyword should exist in the template file. If it does not exist in the template file, the update file adds an entry to the new configuration. You must specify the key parameter in the update file to identify the target keyword. Only those parameters specified in the update file keyword are updated in the template file's keyword. Parameters not specified in the update file are left unchanged. For example, if the following MODE keyword is in the template file:

```
MODE=(
          MODE_NAME=#INTER
          AUTO_ACT=0
          COMPRESSION=PROHIBITED
          COS_NAME=#INTER
          CRYPTOGRAPHY=NONE
          DEFAULT_RU_SIZE=1
          MAX_NEGOTIABLE_SESSION_LIMIT=256
          MAX_RU_SIZE_UPPER_BOUND=4096
          MIN_CONWINNERS_SOURCE=128
          PLU_MODE_SESSION_LIMIT=256
          RECEIVE_PACING_WINDOW=20
)
```

and the following keyword is specified in the update file:

```
MODE=(
          MODE_NAME=#INTER
          AUTO_ACT=10
)
```

the resulting configuration would have the following MODE keyword definition:

```
MODE=(
          MODE_NAME=#INTER
          AUTO_ACT=10
```

```
             COMPRESSION=PROHIBITED
             COS_NAME=#INTER
             CRYPTOGRAPHY=NONE
             DEFAULT_RU_SIZE=1
             MAX_NEGOTIABLE_SESSION_LIMIT=256
             MAX_RU_SIZE_UPPER_BOUND=4096
             MIN_CONWINNERS_SOURCE=128
             PLU_MODE_SESSION_LIMIT=256
             RECEIVE_PACING_WINDOW=20
)
```

Deleting a Keyword from a Template File

When using the update file to delete a keyword from the template, you must
specify the key parameter and value that identify the keyword, along with the
keyword DELETE. For example, if the template file specifies the following
keyword:

```
MODE=(
             MODE_NAME=#INTER
             AUTO_ACT=0
             COMPRESSION=PROHIBITED
             COS_NAME=#INTER
             CRYPTOGRAPHY=NONE
             DEFAULT_RU_SIZE=1
             MAX_NEGOTIABLE_SESSION_LIMIT=256
             MAX_RU_SIZE_UPPER_BOUND=4096
             MIN_CONWINNERS_SOURCE=128
             PLU_MODE_SESSION_LIMIT=256
             RECEIVE_PACING_WINDOW=20
)
```

and the response file contains the following keyword:

```
MODE=(
             MODE_NAME=#INTER
             DELETE
)
```

the resulting configuration does not contain the #INTER mode definition.

The DELETE keyword can appear after a *parameter=value* specification or on a line
by itself, either preceding or following the parameter. For example, the following
uses of the DELETE keyword are valid:

```
MODE=(
             MODE_NAME=#INTER
             DELETE
)
MODE=(
             DELETE
             MODE_NAME=#INTER
)
```

The DELETE keyword cannot appear in front of a *parameter=value* specification on
the same line. For example, the following uses of the DELETE keyword are not
valid:

```
MODE=(
             DELETE MODE_NAME=#INTER
)

MODE=(
             MODE_NAME=#INTER DELETE
)
```

To delete all keywords of a particular type, or to delete one keyword that does not have a key field, only the keyword and the DELETE keyword are necessary. For example,

```
MODE=(
     DELETE
)
```

Note: Not all keywords can be deleted; only those which are not listed as required can be deleted—refer to the *Configuration File Reference* for details.

Applying Updates to Configuration Files

To update or change an existing SNA configuration file using an update file, do the following:

1. Using a text editor, create an update file that contains keywords to be added, deleted, or changed in an existing SNA node configuration file.
2. Add an include statement at the bottom of the existing SNA node configuration or template indicating the name of the update file.
3. Invoke the SNA Configuration Verification utility by typing the following on the command line:

   ```
   vacgcon config.acg newconfig.chg
   ```

   config.acg
   > The existing configuration file

   newconfig.chg
   > The new configuration file

   You must remove the include statement to reuse your template as a configuration file.

Note: When an update file does not contain a complete, usable configuration, it is recommended that you use an extension other than .ACG.

Automatic Device Name Generation (5250 Only)

The Telnet 5250 client function can generate a new and non-arbitrary DEVice NAME (DEVNAME) for a session without requiring per-session profile (*.WS) customization or a user exit.

You can use keywords and special characters in the WorkStationID (WID) field (in the [5250] stanza of the Workstation profile) to cause some or all of the following information to be substituted into the DEVice NAME value that is sent to the TN5250 server:

- Computer name or user name
- Short session ID
- Session type ID
- Collision avoidance ID

When specified, the Collision Avoidance ID enables the generation of a new DEVice NAME if the Telnet server rejects a submitted name (which can occur when the old name is already in use on the AS/400). The ability to have a variety of names generated allows multiple sessions to the same AS/400 from one or more clients using just one WorkStation Profile (.WS) file. The definition of the existing .WS file parameter WorkStationID in the [5250] stanza is extended to accomplish this.

Substitution Characters

You can use special substitution characters in the WID field to control the placement of the generated information into the DEVNAME field. One substitution character is used in the WID for each generated character. This reserves space in the DEVNAME for each generated character and indicates where each generated character is to be placed. The three special substitution characters are:

Short Session ID

(value range: A–Z) The special character signifying this in the WID is the asterisk (*).

Example:

If the WorkstationID is configured as 123* and the short ID of the first session is A, then the device names generated for the first three sessions will be 123A, 123B, and 123C.

Session Type ID

(possible values: S for diSplay or P for Printer) The special character signifying this in the WID is the percent sign (%).

Example: If the Workstation ID is configured as %123* and the session type is Printer, then the first three device names generated would be P123A, P123B, and P123C.

Collision Avoidance ID

(value range: 1–9, A–Z) The Collision Avoidance ID (CAID) is used by the device name collision (DNC) function (see "Device Name Collision Processing" on page 23) to generate a new DEVice NAME when the old name is rejected by the Telnet server as already being in use. The special character signifying this in the WID is the equals sign (=).

Example: If the Workstation ID is configured as %ABC=, the session type is Display, and the device name SABC1 is already in use on the AS/400, then the first generated device name (SABC1) will be rejected by the server, but the second name (SABC2) will be accepted.

Client Naming Function

If you specify a Client Naming (CN) substitution keyword in the Workstation ID (WID) field, then an external name is retrieved and used when generating the DEVice NAME.

The CN keywords are prefixed with the ampersand character (&), followed by a five character identifier. Two keywords are supported:

&COMPN

Windows COMPuter Name for the client

&USERN

USER Name specified during logon to the Windows computer where the emulator executes

A name whose length exceeds the space remaining in the 10 character long DEVNAME field will have that excess trimmed from the left side by default. Excess characters can alternatively be trimmed from the right side by prefixing the CN keyword with a plus sign (+) character (for example, +&COMPN).

Notes:

1. If the specified name cannot be obtained, then the message `Unable to get the local "x" name` (where ″x″ is COMPN or USERN) is displayed in the status bar.
2. If a client naming keyword is specified in the WID, then characters other than those defined for this feature are ignored.
3. A numeric character in the first position of a DEVNAME is invalid, and may be converted by the AS/400 to the pound (or number) character (#).

Example A: If the Workstation ID is &COMPN* and the name of the local computer is `clientaccess1`, then the device names generated for the first three sessions would be `ntaccess1A`, `ntaccess1B`, and `ntaccess1C`.

Example B: If the Workstation ID is +&COMPN*% and the name of the USER logon for the local computer is `clientaccess1`, then the device names generated for the first three sessions would be `clientaccA`, `clientaccB`, and `clientaccC`.

Device Name Collision Processing

Device name collision occurs when a Telnet client sends the Telnet server a virtual device name, but that device name is already in use on the server. When this occurs, the Telnet server sends a request to the client asking it to send a different DEVNAME.

Device name collision (DNC) processing handles requests from the server for a different DEVNAME. If the collision avoidance ID (CAID) substitution character is present in the WID, the CAID is incremented and sent as part of the new DEVNAME to the server.

If the server requests a different DEVNAME and the CAID is not present in the WID, then the error message `Device Name "x" is invalid or already in use on the server` is displayed on the status bar and the session is disconnected.

Support for Systems Policies

Administrators can set up centrally controlled sets of policies for use by Personal Communications workstation users; these policies can restrict access to certain functions.

See "Chapter 7. System Policy Support" on page 67 for further information.

Support for Management by Tivoli®

Personal Communications provides facilities to integrate with the Tivoli Enterprise™ Management set of products, thus allowing access to many product features from management consoles.

See "Chapter 6. Tivoli Support" on page 53 for further information.

Commands for Emulator Functions

Personal Communications provides the following commands for managing Personal Communications sessions. These commands can be used to facilitate remote access (for example, by the Tivoli console):

PCOMSTRT
Start a Personal Communications session

PCOMSTOP
Stop a Personal Communications session

PCOMQRY
Query Personal Communications sessions

Start a Personal Communications Session

The command PCOMSTRT has the following parameters:

/p   Name of workstation profile to start (required). The syntax is
/p=*workstation-profile*. You can specify the workstation profile as either the
path (drive, directory, and file name) or just the file name, in which case
the location of the workstation profile file is the Personal Communications
private subdirectory, or the user's LDAP directory entry.

/s   Session letter of the session to start. The syntax is /s=*session-letter*. This is
optional. If omitted, the first available session letter is used.

/w   Session window startup state. The syntax is /w={0|1|2|3}.

      0   Hidden

      1   Normal (default)

      2   Minimized

      3   Maximized

/q   Quiet mode. In quiet mode, PCOMSTRT does not write any messages to
stdout.

/nowait
Do not wait for session to start. The /nowait option tells PCOMSTRT to
complete execution without waiting until the emulator session is started.
There is no /wait option; the default is to wait until the session is started.

/c   Convert output to Windows code page for output. The /c option is
intended to be used when the Tivoli IBMPCOMM Plus module task
invokes the PCOMSTRT program. It is not intended to be used when a
user starts the program from an MS-DOS prompt.

/?   Displays help information.

Returns: DOS Error level is set for use when this command is invoked by a
program. When the command is directly entered, a message indicating the session
is starting is displayed.

Stop a Personal Communications Session

The command PCOMSTOP has the following parameters:

/s   Session letter of session to stop. The syntax is /s=*session-letter*. This is
optional. If omitted, the first available session letter is used.

/all   Stops all sessions

/q   Quiet mode. In quiet mode, PCOMSTOP does not write any messages to
stdout.

/nowait
Do not wait for session to stop. The /nowait option tells PCOMSTOP to

complete execution without waiting until the emulator session is stopped. There is no /wait option; the default is to wait until the session is stopped.

/c   Convert output to Windows code page for output. The /c option is intended to be used when the Tivoli IBMPCOMM Plus module task invokes the PCOMSTOP program. It is not intended to be used when a user starts the program from an MS-DOS prompt.

/?   Displays help information.

Returns: DOS Error level is set for use when this command is invoked by a program. When the command is directly entered, a message is displayed indicating the session is stopping.

Query Personal Communications Sessions

The command PCOMQRY has the following parameters:

/s   Session letter of session to query, The syntax is /s=*session-letter*. This is optional. If omitted, the first available session letter is used.

/all   Queries all sessions.

/q   Quiet mode. In quiet mode, PCOMQRY does not write any messages to stdout.

/nowait

Do not wait for session to query. The /nowait option tells PCOMQRY to complete execution without waiting until the emulator session is queried. There is no /wait option; the default is to wait until the session is queried.

/c   Convert output to Windows code page for output. The /c option is intended to be used when the Tivoli IBMPCOMM Plus module task invokes the PCOMQRY program. It is not intended to be used when a user starts the program from an MS-DOS prompt.

/?   Displays help information.

Chapter 4. Configuring Multiple Links

Many customers must attach to multiple AS/400 and S/390® mainframe systems. Personal Communications allows this type of configuration. The following sections explain how to do this.

Note: You do not need to read this section if you want to create multiple sessions on the same host.

Configuring a Second 3270 Emulation Link

> **Recommendation**
>
> If you want a second SNA connection (link) to run concurrently, we strongly recommend that you configure it in the same .PCG file as the first one; this will avoid any possible conflict of settings.

Perform the following steps to configure a second 3270 emulation link. You can make the configuration even if the first link is active.

1. Double-click the **Start or Configure Sessions** icon to start a new session; or click **Configure** from the **Communication** menu.
2. Choose the host, interface, and attachment type, as usual.
3. Configure the session parameters, then click **Configure Link**.
4. In the Configure Local System panel, check that the default .PCG file is the one in which you saved the configuration for the first link. If not, click **Existing** and choose the correct file from the list.
5. Check that the settings for the PC Location Name are correct. Click **Next**.
6. The LAN Device Connection panel appears. Under Device Selection, be sure that the device used for the first link is displayed. Under Connection Selection, select **New Connection**. Notice that the connection name has changed to show a new link name. Click **Next**.
7. The Configure LAN Connection panel is displayed. The Destination Address field will show 400000000000. Enter the Destination Address for the second link, and change the additional parameters if needed.
8. Click **Advanced**.
9. The Advanced dialog panel shows the default values for block ID and PU ID. Change them as necessary to the values for the second link. Click **OK.**
10. Click **Next**, then **Finish**, and save the .ACG file (replace the existing file). Then click **OK** until you return to the session window. If you have done everything correctly, and if the gateway or controller is running, you should get a connection.

You can add further 3270 links in the same way.

Configuring a Second 5250 Emulation Link

The steps you should follow to configure a second 5250 emulation link are almost the same as for 3270. You can make the configuration even if the first link is active.

1. Double-click the **Start or Configure Sessions** icon to start a new session; or click **Configure** from the **Communication** menu.
2. Choose the host, interface, and attachment type, as usual.
3. Configure the session parameters, then click **Configure Link.**
4. In the Configure Local System panel, check that the default .PCG file is the one in which you saved the configuration for the first link. If not, click **Existing** and choose the correct file from the list.
5. Check that the settings for the first link are correct. Click **Next.**
6. The Configure Logical Connection panel appears, showing the settings for the first link. If you are going to connect to a different AS/400, change the System Location Name. Click **Next.**
7. The Configure LAN Connection panel appears. If the Link Station Name has not changed, change it.
8. Change the Destination Address (and the other parameters if necessary). If you want to change the Local SAP number or the Receive Buffer Count, (which is unlikely), click **Advanced.** If not, click **Next**, then **Finish**, and save the .ACG file (replace the existing file), then click **OK** until you return to the session window.

You can add further 5250 links in the same way.

Configuring a Second Link of a Different Kind

The procedure for configuring other links is similar to those for the configurations for 3270 and 5250 link configurations. This procedure applies whether you are going to configure two (or more) links that use the same connection type, or links that use different connection types. In this example, assume that you have already configured a 3270 connection and now want to add a 5250 connection. As before, you can make the configuration even if the first link is active.

1. Double-click the **Start or Configure Sessions** icon to start a new session; or click **Configure** from the **Communication** menu.
2. Choose AS/400, the LAN interface and the IEEE 802.2 attachment type.
3. Configure the session parameters, then click **Configure Link.**
4. In the Configure Local System panel, check that the default .ACG file is the one in which you saved the configuration for the 3270 link. If not, click **Existing** and choose the correct file from the list. Notice that the PC Location Name is already there. Click **Next.**
5. The Configure Logical Connection panel appears. Enter the System Location Name and click **Next**.
6. Notice that the Link Station Name has changed. Enter the Destination Address of the AS/400. Click **Next**, then **Finish**, and save the .ACG file (replace the existing file); then click **OK** until you return to the session window.

Configuring to Perform 3270 and 5250 Emulation to Multiple Hosts

To configure Personal Communications to perform 3270 and 5250 emulation to multiple hosts:

1. Click **Actions → Launch → SNA Node Configuration** of your active session; or click **SNA Node Configuration** from the **Program → IBM Personal Communications** folder on the Windows **Start** menu.
2. Configure the node information:
   a. Click **Configure Node** from the list of Configuration options.

b. Click **New**.

c. In the **Fully qualified CP name** field, enter the Network ID and CP name that is defined for you on the AS/400 (APPN.TEST, for example).

   Note: If the AS/400 is performing automatic configuration, the value you enter here is ignored. However, it is still necessary to enter a value in the field to close the panel.

d. Click **OK**.

3. Configure the device information:

   a. Click **Configure Devices** from the list of Configuration options.

   b. Click **LAN** from the list of available DLCs.

      Note: These instructions are based on the LAN DLC; the field names and tabs might be slightly different if you are configuring another type of DLC.

   c. Click **New**.

   d. Specify the adapter number for the connection.

   e. Click **OK**.

4. Configure the connection information:

   a. Click **Configure Connections** from the list of **Configuration options**.

   b. Click **LAN** from the list of available **DLC**s.

   c. Click **New**.

   d. Enter the Link station name (default is LINK0000) and click the device (for example, LANX_04) that you defined in step 3 from the **Device Name** list. This link will be defined for the 5250 session to the AS/400.

   e. Enter the LAN destination address of the AS/400.

   f. Click the **Advanced** tab.

   g. Verify that **Activate at startup** is checked.

   h. Verify that **APPN support** is checked.

   i. If you plan to use 3270 passthrough on this connection, click **Solicit SSCP sessions**.

   j. Click **OK** to save the information.

5. Configure the second link for the 3270 session:

   a. Click **New**.

   b. Enter the Link station name (default is LINK0001) and select the same device you used to define the 5250 session (for example, LANX_04). This link will be defined for the 3270 session to the host.

   c. Enter the LAN destination address of the host.

   d. Click the **Advanced** tab.

   e. Verify that **Activate at startup** is checked.

   f. Verify that **APPN support** is checked.

   g. Click **Solicit SSCP sessions**.

   h. In the **Local Node ID** field, enter the Block ID and Physical Unit ID that identifies the device.

   i. Click the **Adjacent Node** tab.

   j. Click **HOST-XID3** from the list of **Adjacent CP** types.

   k. Click **OK**.

6. Configure the Partner LU 6.2 information:

   a. Click **New**.

b. Enter the Partner LU name, such as APPN.S101010. This is the name of the AS/400; this information can be obtained by running a DSPNETA on the AS/400.

c. Click OK.

7. Save the configuration information:

a. On the SNA Node Configuration window, click **Save As** from the **File** menu.

b. Enter a file name with an .ACG file extension (4.2 users) or a .PCG file extension (4.1 users), such as TEST.ACG. Click **Yes** to make this configuration the default.

c. Click **Exit** on the **File** menu.

8. Start the 5250 emulator session:

a. Click **Start or Configure Sessions** from the **Program → IBM Personal Communications** folder of the Windows **Start** menu.

b. Click the **AS/400 host**, the **LAN interface**, and the **IEEE 802.2 attachment**.

c. Click **Configure**.

d. Click **Configure Link**.

e. Click **Existing**.

f. Click the configuration you saved in step 7 from the list and click **Open**.

g. Click **Next**.

h. Verify that the System location name matches the name you specified in step 6. Click **Next**.

i. In the **Device name** field, select the device name you defined in step 3. Click **Next**.

j. In the **Link station** name field, select the name you defined in step 4, such as LINK0000. Click **Next**.

k. Click **Finish**.

l. Click **Save** and then click **Yes** to overwrite the existing file.

m. Click **OK** to close the Customize Communication - 5250 Host window and then click **OK** to close the Customize Communication window and start the 5250 session.

9. Save the workstation profile for the 5250 session:

a. Click **Save As** from the **File** menu on the emulator window.

b. Enter a file name with a .WS extension and click **OK**.

c. If you want the ability to start this session separately, click **Yes** to create an icon; otherwise, click **No**.

d. Click **OK**.

10. Start the 3270 emulator session:

a. Click **Start or Configure Sessions** from the **Program → IBM Personal Communications** folder of the Windows **Start** menu.

b. Click the **S/390 host**, the **LAN interface**, and the **IEEE 802.2 attachment**.

c. Click **Configure**.

d. Click **Configure Link**.

e. Click **Existing**.

f. Select the configuration you saved in step 7 from the list and click **Open**.

g. Click **Next**.

h. In the **Device name** field, select the device name you defined in step 3. Click **Next**.

i. In the **Link station name** field, select the name you defined in step 5, such as LINK0001.

j. Click **Advanced**.

k. Deselect **APPN support** and click **OK**.

l. Click **Next**.

m. Click **Finish**.

n. Click **Save** and then click **Yes** to overwrite the existing file.

o. Click **OK** to close the Customize Communication - 3270 Host window and then click **OK** to close the Customize Communication window and start the 3270 session.

11. Save the workstation profile for the 3270 session:

   a. Click **Save As** from the **File** menu on the emulator window.

   b. Enter a file name with a .WS extension and click **OK**.

   c. If you want to start this session separately, click **Yes** to create an icon; otherwise, click **No**.

   d. Click **OK**.

12. Create a batch file to start both the 5250 session and the 3270 session at the same time:

   a. Close both running emulator sessions.

   b. Click **Programs → IBM Personal Communications → Utilities → Multiple Sessions** from the Windows **Start** menu.

   c. From the list of workstation profile files, select the .WS file for the 5250 session (step 9). Click **Add**.

   d. From the list of workstation profile files, select the .WS file for the 3270 session (step 11). Click **Add**.

   e. Click **Save As** from the **File** menu and enter a file name with a .BCH extension to save the batch file. Click **OK**.

   f. Click **Yes**. Verify that the folder is the DESKTOP and select both check boxes. Click **OK**.

   g. Click **Exit** from the **File** menu.

13. To start the 5250 and 3270 emulator sessions together, double-click the **Batch File** icon on your Desktop.

Chapter 5. Attachment Considerations

This chapter describes factors you should consider when configuring Personal Communications for the following attachment types:

- "COAX Attachment"
- "LAN via IEEE 802.2 Attachment" on page 35
- "TCP/IP Connection" on page 35
- "SDLC MPA Attachment" on page 37
- "IBM Global Network - SNA over Async Attachment" on page 39
- "IBM Global Network Connection Attachment" on page 39
- "Home3270 Attachment" on page 40
- "3270 Attachment via the AS/400 System" on page 41
- "IBM PC720 Modem Initialization (Japan Only)" on page 41
- "Twinax Attachments" on page 41
- "IBM SDLC PCMCIA Adapter and Modem (Japan Only)" on page 42
- "IBM PCI Multiprotocol Adapter" on page 43
- "WAC Attachments" on page 44
- "3174 Peer Communications Support (LAN over Coax)" on page 45
- "Twinaxial Console" on page 46
- "Asynchronous Console" on page 46

Note: Support for Windows 2000 Plug-and-Play may differ somewhat from that for Windows 95 and Windows 98.

COAX Attachment

This section describes factors you should consider when configuring Personal Communications with a coaxial attachment.

Note: The APPC and CPI-C APIs, provided with Personal Communications, do not support coaxial connections.

Avoiding Machine Check 207

Patch the microcode of the 3174 control unit. The following list shows the relationship between 3174 control unit microcode levels and patch IDs:

Microcode Level	Patch ID
S0503	PCA53D1
S0504	PCA53D2
A0503	PCA53D3
A0504	PCA53D4
B0200	PCA53D5
B0401	PCA53D6
B0402	PCA53D8
C0101	PCA53D7

In addition, if you have a 3174 with Configuration Support B or higher, you can set the following parameters:
- 3174 customization **Q126 digit 2=1** to change the COAX timeout from 50 to 100 microseconds.
- 3174 customization **Q125 digit 4=1** to set command chaining off.

Polling Feature

Your workstation may have been configured so that an IBM coax adapter cannot acquire an interrupt request line (IRQ) that it needs in order to function. This situation occurs because other devices have been configured to use these IRQs, so that the IRQs are no longer available. This situation can occur in Windows 95, Windows 98, Windows NT, Windows Me, or Windows 2000.

In such a situation, the IBM coax adapter may or may not be able to use another available IRQ. The IBM 3278/79 Emulation Adapter (ISA bus) can use only IRQ 9. Other IBM coax adapters, such as the IBM 3270 Credit Card adapter, can use other IRQs than IRQ 9, but all these other usable IRQs may also have been reserved for other devices in the system.

If this happens, you can use the polling feature to enable the IBM coax adapter to function without using an IRQ. To activate the polling feature, add the **Poll=Y** parameter to the [CSDFT] or h[CNDFT] section of your workstation profile (*.WS) as follows:
- SNA/DFT attachment

  ```
  [CSDFT]
  Poll=Y          <-- add
  ```
- Non SNA/DFT attachment

  ```
  [CNDFT]
  Poll=Y          <-- add
  ```

For an IBM 3270 Credit Card adapter, the polling feature is automatically activated, without Poll=Y being added to the .WS file.

Configuring a Non-Plug-and-Play Coax Adapter (ISA)

See "Adapter Setup Hints and Tips" on page 47 for more information on configuring all the IBM 5250 adapters.

Restrictions

When your workstation is configured to use a DFT attachment, the following functions and capabilities of the IBM 3174 or 3274 Control Units are not supported:
- Programmed symbols on attached workstations
- Attachment to port 0 on attached workstations
- Database operations
- 3270 Diagnostic Reset Dump
- Patch facility

PCMCIA and PCI Configuration for a DFT Attachment

Using a Plug-and-Play Coax Adapter (PCMCIA or PCI)

If your workstation has an IBM 3270 Emulation Plug-and-Play Adapter (3270 PnP) installed, Personal Communications uses it in the same way as the IBM 3278/79 Emulation or 3270 Connection Adapter.

You cannot use multiple 3270 PnP adapters; nor can you use a 3270 PnP at the same time as a 3278/79 Emulation or 3270 Connection Adapter. Before you can use a PCMCIA or PCI adapter under Windows 95, Windows 98, or Windows 2000, you must first install drivers for it. Refer to "Adapter Setup Hints and Tips" on page 47 for more information.

Coax Adapters and ROM Shadowing

Personal Communications maps the shared RAM of the 3270 connection adapter on the PC. The default values for the adapters as follows:

- Adapter #0 CE000h - CFFFFh
- Adapter #1 D0000h - D1FFFh
- Adapter #2 D2000h - D3FFFh
- Adapter #3 D4000h - D5FFFh

PCs that support ROM shadowing in BIOS may use these areas for ROM shadowing by default (IBM PC350 P100, for example). Check the ROM shadowing settings before installing an adapter and disable the range for the adapter you are going to install.

LAN via IEEE 802.2 Attachment

Following is a description of preinstallation considerations for installing Personal Communications for use on a LAN. For more detailed information, refer to *IBM Local Area Network Technical Reference*.

PIU Size

This value is negotiated between your workstation and the host system, unless `XID=No` is defined on the PU, or the Adjacent CP type has been changed to `Host - XID0` in SNA Node Configuration. If this value is not negotiated, the `Maximum PIU Size` must match the `MAXDATA` value defined on the host system.

Receive Window Count

This value is negotiated between your workstation and the host system, unless `XID=No` is defined on the PU, or the Adjacent CP type has been changed to `Host - XID0` in SNA Node Configuration. If this value is not negotiated, the `Receive Window Count` must match the `MAXOUT` value defined on the host system.

Using a PCMCIA Token-Ring or Ethernet Card

PC/3270 supports the IBM Token-Ring and Ethernet credit card adapters in the same way as it does the full-size adapters.

TCP/IP Connection

This section provides information, considerations, and restrictions for Personal Communications TCP/IP connections.

TCP/IP Protocol Driver

You must set up your Windows environment for the TCP/IP network. To verify that the TCP/IP protocol is installed on your workstation, double-click **Network** in your Control Panel and see if `TCP/IP` appears in the list of network components. Double-click **TCP/IP** to specify your IP address and other TCP/IP properties.

Screen Size

The following four screen sizes are supported for TN3270:
> 24 x 80
> 32 x 80
> 43 x 80
> 27 x 132

The following two screen sizes are supported for TN5250:
> 24 x 80
> 27 x 132

Screen size 48X80, 62X160, and 24X132 are supported if your server/host supports the TN3270E protocol.

Terminal Type to Be Negotiated with TN3270

The terminal type to be negotiated is set to IBM-3278-2-E, IBM-3278-3-E, IBM-3278-4-E, or IBM3278-5-E according to the screen size that is specified on the Customize Communication - 3270 Host panel. If you need to specify IBM-3279-2-E or IBM-3279-3-E (for graphics), add the following line to the [Telnet3270] section in the workstation profile (.WS):

```
TerminalType=3279
```

TN3287 and TN3270E Connection

TN3287 (defined in RFC 1646) and TN3270E (defined in RFC 1647) were tested with following Telnet servers:

- Communications Server for Windows NT
- Communications Server for OS/2®
- TN3287 Brixton PU2.1 V3.0
  - SNA Client Access™ for AIX® Version1 Release 2
  - IBM Communications Server for OS/2 Warp
- TN3270E Brixton PU2.1 V3.0
  - SNA Client Access for AIX Version1 Release 2
  - IBM Communications Server for OS/2 Warp
- Microsoft SNA Server

Other TCP/IP Functions

The following sections describe enhancements made to TCP/IP connections for Personal Communications Version 5.5.

Backup Server/Host with LU Name and Port Number
Personal Communications enables you to specify up to two backup host or server names to connect to. This provides easier connections when the primary host or server cannot be reached. You can also specify a specific LU name or port number unique to that server or host.

Service Location Protocol
Personal Communications enables connection to SLP servers that are RFC 2165 compliant. This function eliminates the need for users to know the name of a network host supporting a specific service. SLP implementation for a Personal Communications client allows load balancing and dynamic location of a specific LU or LU pool across a group of servers. Netware for SAA (IWSAA) 4.0 and IBM Communications Server (CS/NT) 6.1 currently support SLP. This support can be used in conjunction with SSL support.

Security - SSL

Personal Communications enables you to connect to a server that supports SSL V3.0 or higher for TN3270(E), TN5250 or VT emulation. This allows you to encrypt the data flowing on the network, and can be configured on a per session basis. This support can be used in conjunction with SLP support.

Additional function is provided in Version 5.5 for Client Certificate Authentication.

Connect Timeout

Personal Communications uses non-blocking sockets when connecting to a remote system. Personal Communications waits three seconds, by default, to establish the socket connection. The default can be changed by adding the following line to the Telnet3270 or Telnet5250 section of the workstation profile:

```
InactiveTimeout=xx
```

where xx is the time in seconds.

TN5250 Enhancements

Personal Communications enables you to emulate a TN5250 printer session if the Host carries OS/400 V4.2 or higher. A Workstation ID for display and printer emulation sessions can also be specified.

SDLC MPA Attachment

This section describes factors you should consider when configuring Personal Communications with an SDLC attachment.

Line Speed

For the SDLC attachment, a line speed up to 28.8 Kbps is supported. However, actual line speed will vary depending on the carrier speed the modem supports.

V.25bis Autodial

Personal Communications only supports the bit-oriented protocol for V.25bis call control messages. Modems must support an ASCII-coded character set consisting of 7-bit coded ASCII characters with odd parity.

Personal Communications supports the following adapters:
- Multiprotocol (MPA) interface compatible adapters, for example:
  - IBM Multiprotocol Communications Adapter (73G7099)
  - IBM Multiprotocol Adapter/A (645114 or later)
  - IBM SDLC/Asynch Communications Adapter (ASCA) (42H4332)
- IBM SDLC PCMCIA adapter (Japanese only)
- IBM SDLC PCMCIA modem (Japanese only)
- IBM PCI Multiprotocol Adapter (12J2981)

Performance Considerations

If you use multiple sessions in a high-speed and high-load configuration with an SDLC attachment, the connection to the host might fail. In this case, set the host's timeout value to be greater than that of Personal Communications.
- To change the host timeout value, modify the following NCP parameters:

REPLYTO

The maximum duration in seconds that the host waits for a reply from the terminal. The default is 1 second.

RETRIES=(m,t,n)

The number of recovery attempts for errors occurring during transmission over the link. Repetitive retries are called a retry sequence. The maximum number of retries is specified as m, which can be from 0 to 128. NCP pause (the time between the retry sequences) is specified as *t* and can be from 1 to 255 seconds. The maximum number of retry sequences is specified by *n* and can be from 1 to 127. For example:

```
REPLYTO=1, RETRIES=(3,4,5)
(( 1(seconds) x 3(times) + 4(seconds)) x 5(times)
= 35 (seconds)
```

Note: In this example, the host waits 35 seconds for the terminal to reply.

For more details, ask your system personnel.

- To change the Personal Communications timeout value, type a new value in the Inactivity timer field on the Performance page of the Connections property sheet in SNA Node Configuration.

  The value is in seconds and can be from 40 to 160. The default is 80.

PIU Size

This value is negotiated between your workstation and the host system, unless `XID=No` is defined on the PU, or the Adjacent CP type has been changed to `Host - XID0` in SNA Node Configuration. If this value is not negotiated, the `Maximum PIU Size` must match the `MAXDATA` value defined on the host system.

Receive Window Count

This value is negotiated between your workstation and the host system, unless `XID=No` is defined on the PU, or the Adjacent CP type has been changed to `Host - XID0` in SNA Node Configuration. If this value is not negotiated, the `Receive Window Count` must match the `MAXOUT` value defined on the host system.

Preventing Conflicts with Non-PCI MPA Adapters

The multiprotocol adapters use system resources that, in some cases, cannot be shared. Therefore, you must make sure there are no conflicts with the following resources:
- DMA level
- I/O addresses (MPA0 uses X'380'–X'38F' and MPA1 uses X'3A0'–X'3AF')
- IRQ level (ISA bus only)

The IBM Multiprotocol interface adapters use the following system resources:
- The AT-bus SDLC adapters require the use of IRQ3 and DMA channel 1 and only the MPA0 communication port is supported.
- The MPA for ISA can be supported using mode 4 (IRQ3 and DMA1 channel 1) or mode A (IRQ4 and DMA channel 1). IRQ level send/receive of 3 or 4 is supported. The ASCA can be supported using mode 4 (IDQ3 or IRQ5 or IRQ4 or IRQ7 and DMA channel 1) or mode A (IRQ4 or IRQ7 and DMA channel 1). IRQ level send/receive or 3, 4, 5, or 7 is supported. The interrupt level setting on the configuration panel in Personal Communications must match the value on the adapter card.

Note: When the MPA is configured for mode 4, the device is not allowed to use the other IRQ even though only one interrupt is claimed.

Personal Communications supports the MPA0 or MPA1 communication ports. Some sound cards use an I/O address within the range X'380'–X'38F'. MPA1 should be used to avoid a conflict.

- The MPA/A for a microchannel-bus workstation uses IRQ3, and the DMA level can be configured. Both the MPA0 and MPA1 communication ports can be active at the same time and the interrupt is claimed as sharable.

IBM Global Network - SNA over Async Attachment

IBM Global Network - SNA over Async is supported using 8-bit no parity; SNA session-level compression and decompression is not supported.

Line Speed

Line speeds up to 115.2 Kbps are supported. However, the maximum usable line speed depends on the speed of the processor or communication port. If communication stops or becomes exceedingly slow, reduce the line speed.

Updating Phone List

To update the phone number list for IBM Global Network SNA over Async, do the following:

1. Click the **Used Phone Book** button on the Define a Com Port Connection panel.
2. Click the **Download Phone Numbers** button.

   Personal Communications FTPs to the IGN server and downloads the phone number file and converts it to the correct format.

   Note: Sockets over SNA or Proxy must be configured in order for this procedure to work.

IBM Global Network Connection Attachment

Note: This attachment type is not available in Japan.

IBM Global Network Connection supports only a single communication port.

Line Speed

IBM Global Network Connection supports up to 115.2 kbps as the line speed. However, the maximum usable line speed depends on the speed of the processor or communication port. If communication stops or becomes exceedingly slow, reduce the line speed.

Updating Phone List

To update the phone number list for IBM Global Network SNA over Async, click the **Download Phone Numbers** button from the **Configuration** panel. When this button is selected, Personal Communications FTPs to the IGN server and downloads the phone number file and converts it to the correct format.

Note: Sockets over SNA or Proxy must be configured in order for this procedure to work.

Restrictions

You cannot use the following functions:
- Import/Export
- Host graphics
- Host print
- Server-Requester Programming Interface (SRPI)
- Concurrent multiple file transfers

Home3270 Attachment

Because Home3270 supports only a single COM port, only one session is available for use at a time.

Setting the Screen Colors in a Home3270 Session

Because protocol converters translate the 3270 (EBCDIC) data stream into an ASCII data stream, the original information about the 3270 fields is lost, and all the field attributes of the 3270 screen are treated as extended attributes. Because of this, you must select the **Extended Color** category in order to change the colors of characters on the screen. Changing base colors will have no effect.

For example, if you want to change the color of characters that appear in green on a black background, select **Extended Color** - **Green**, then click or drag-and-drop the color you want for the characters (and for the background if you wish). Do not change the appropriate **Base Color** because the change will have no effect.

Line Speed

Line speeds up to 115,200 bps are supported. However, characters might be lost on high-speed lines, depending on the processor speed. If communication stops or becomes exceedingly slow, reduce the line speed.

Unsupported Character Sequences

The following character sequences are valid for the Home3270 attachment. However, they perform no function.
- ESC P 1 (Block cursor command)
- ESC P 0 (Underline cursor command)
- DLE DC2 (Printer start command)
- DLE DC4 (Printer end command)

Conditions for Communication Check 50x

Home3270 requires both Data Set Ready (DSR) and Carrier Detect (CD) to determine the state of the attachment with the host system. If DSR is not recognized, communication check 501 appears in the operator information area. When DSR is recognized and CD is not recognized, communication check 504 appears in the operator information area.

When you select ROLMphone with DCM in the Home3270 configuration, communication check 504 does not appear.

Home3270 and OIA message COMM 504

If you run Home3270 sessions at a speed of 28.8 kbps or higher and the session disconnects with a COMM504 in the OIA, try lowering the port speed to equal the line speed of the Protocol Converter you are connecting to.

Note: DBCS is not available with this attachment.

Restrictions

The following functions are not available with this attachment:
- Host graphics
- Host print
- Server Requester Programming Interface

3270 Attachment via the AS/400 System

This section provides information, considerations, and restrictions for PC/3270 connections through an AS/400 system.

AS/400 System Setup

PC/3270 can connect to a host computer through one or more AS/400 systems by using the passthrough function (usable with OS/400 Version 2.2.0 or later).

To use this function, set the following communication configuration descriptions in the AS/400 system to **on** (Vary On):
- Line description
- Controller description
- Printer description

Error Messages from the AS/400 System

When this system is connected to an S/390 host system through the AS/400 system, the following message might appear on the screen.

```
AS/400 CPI5xxx
```

The message might appear for the following reasons:
- Line error between the AS/400 system and the host system
- Communication configuration description error in the AS/400 system
- The communication configuration description in the AS/400 system is set to off (Vary Off)

When this message appears, detailed error information is saved in the AS/400 system operator message queue. Refer to the error message that corresponds to the number displayed on the screen and then correct the cause of the error.

IBM PC720 Modem Initialization (Japan Only)

In the Japanese version of Personal Communications, if you use an IBM PC720 and connect it via a dial connection, the error message "COMDIA15 Unable to initialize modem" may appear at startup. To correct this condition, increase the value of **Retries** in **Initialization** to more than 1 by using the **Modem Information** panel.

Twinax Attachments

Twinax Adapter Types

Personal Communications classifies twinax adapters under five adapter types:
- IBM 5250 Plug-and-Play Adapters
    - IBM 5250 Emulation PCMCIA Adapter
    - IBM 5250 PCMCIA Adapter (DBCS-unique adapter)
    - IBM 5250 Emulation PCI Adapter

    – IBM 5250 Express ISA Adapter, *when the adapter's Plug-and-Play BIOS is enabled*

    – IBM 5250 Express PC Card

    – IBM 5250 Express PCI Adapter

• IBM 5250 MicroChannel Adapters

    – IBM System36/38 Workstation Emulation Adapter /A (DBCS-unique adapter)

    – IBM 5250 Emulation Adapter /A

• IBM 5250 ISA Adapters

    – IBM Enhanced 5250 Display Station Emulation Adapter

    – IBM 5250 Express ISA Adapter, *when the adapter's Plug-and-Play BIOS is disabled*

• IBM 5250 ISA Adapter (Asia-Pacific)

    – IBM AT-Bus Communication Adapter (DBCS-unique adapter)

• Other Twinax Adapter

    – OEM 5250 adapters

See "Using Twinax (5250) Adapters" on page 48 for details on these adapters.

Using IBM 5250 Plug-and-Play Adapters

Before you can use one of the IBM 5250 Plug-and-Play adapters under Windows 95, Windows 98, or Windows 2000, you must first install a driver for the adapter. See "Adapter Setup Hints and Tips" on page 47 for more information on configuring all the IBM 5250 adapters.

OEM Twinax Adapter Cards

Developers of software drivers for OEM twinax cards that are seeking to implement support for Personal Communications on an OEM twinax adapter, should obtain a copy of the document *Twinax OEM Interface Specification for Windows NT and Windows 95*, as well as associated program materials. You can download these at www.ibm.com/software/network/pcomm/about/api/twinax.html.

The documented interface is completely functional for Windows 98 and Windows 2000 Professional, as well as for Windows 95 and Windows NT. However, it does not support the Microsoft Windows Driver Model (WDM) for Windows 98 and Windows 2000.

IBM SDLC PCMCIA Adapter and Modem (Japan Only)

For Windows 95 and Windows 98: The support uses the Configuration Manager for Plug-and-Play support, which automatically configures IRQ number, I/O ports, and memory addresses as required. IBMSDLC.INF (installed in the Personal Communications installation directory) describes the SDLC PCMCIA cards to the operating system. When you insert the PCMCIA card, Windows 95 and Windows 98 prompt you for the adapter drivers. You must specify the Personal Communications installation directory and click **OK**. To verify that the adapter is functioning properly, select the appropriate PCMCIA adapter under **Other Devices** on the **Device Manager** property page of the **System** Windows control panel applet.

For Windows NT: Plug-and-Play is not supported. During installation the registry is updated, using default parameters. When the configuration is started and an incoming or outbound connection is enabled, the device attempts to load, using the

stored parameters from the registry. If a card is found and a conflict is detected, the registry is updated with values that do not conflict and you are notified to restart the system.

Note: The system must be restarted for these values to take effect.

Only one SDLC PCMCIA card can be used at a time. Because a common driver supports both SDLC PCMCIA and MPA interface cards, an MPA cannot be used concurrently with SDLC PCMCIA.

IBM SDLC PCMCIA Adapter

The IBM SDLC PCMCIA adapter supports:
- Leased and switched connections
- Speeds up to 19.2 Kbps
- Switched and Constant Request To Send (RTS)
- NRZ and NRZI encoding schemes

The IRQ number on the device page's adapter property sheet is ignored.

IBM SDLC PCMCIA Modem

The IBM SDLC PCMCIA modem supports:
- Switched V.26bis connections only
- Speeds up to 2400 baud
- Switched RTS only

The configured value on the constant RTS and IRQ level send/receive device page's adapter property sheet are ignored.

IBM PCI Multiprotocol Adapter

Refer to the *Quick Installation Guide* in the *PCI Multiprotocol Adapter User's Guide* for instructions on installing this adapter under Windows 95, Windows 98, and Windows NT.

Two IBM PCI Multiprotocol Adapters can operate concurrently. The configuration specifies one adapter with Communication Port MPA0 and the second adapter with Communication Port MPA1. When the link is activated, MPA0 is the first PCI Multiprotocol Adapter that the operating system finds and MPA1 is the second adapter found. If more than one PCI Multiprotocol adapter is installed on a machine and you are unsure which adapter the operating system will find first, you may want to perform an isolated test to determine which adapter is connected to which Communication Port. One suggestion is to disconnect the modems connected to the adapter from the telephone line and then try to start each link individually. By watching the modems, you should be able to determine which modem is connected to which Communication Port. Then the modems can be attached to the proper network. If a single PCI Multiprotocol Adapter is used, the configuration file must specify MPA0 as the Communication Port.

Note: If a Personal Communications configuration is using this adapter, and a PCI MPA adapter is added or removed from the system, Personal Communications may have to be reconfigured.

An ISA-bus MPA and IBM PCI Multiprotocol Adapter can be used concurrently, as long as the ISA-bus MPA adapter is configured as MPA1.

The IBM PCI Multiprotocol Adapter supports:
- Leased and switched connections
- Speeds up to 56 kbps
- Switched and Constant Request To Send (RTS)
- NRZ and NRZI encoding schemes

The IRQ number on the device page adapter property sheet is ignored.

WAC Attachments

This section describes factors you should consider when configuring Personal Communications to communicate through a Wide Area Connector (WAC) adapter.

EIB Support

All available Electrical Interface Boards (EIBs) are supported for the WAC adapter.

Supported Adapters

The IBM WAC adapters for bus types ISA and MCA are supported.

Note: At this time, the new IBM PCI bus WAC adapter is *not* supported by Personal Communications.

Potential Configuration Issues

When configuring both ports (upper and lower) on a single WAC adapter, you must create two logical devices, using the configuration utility. Be careful to configure the same Shared Ram Address for both devices, using the same adapter number. If you do not do this, the Shared Ram Address for the first device activated will be used for the second device.

For ISA systems, the adapter number is obtained from the interpretation of the on-board DIP switch settings. Switches 1-3 determine the Interrupt level, and switches 4-7 (read in reverse order) determine the adapter number. Please consult the adapter installation publication for additional information. Adapter numbers 0 and 1 are logically the same. This is also true for adapter numbers 8 and 9.

On some IBM ValuePoint systems, intermittent problems can occur. If you are using one of these systems and are having problems, ensure that the adapter's DIP switch settings are such that Interrupt Level 9 is being used.

If you intend to use the WAC adapter in a system and you also plan on using Hayes AutoSync function, then you might experience problems with your async connection. To find appropriate Shared Memory values, you should use the adapter diagnostic disk provided with the adapter.

For MCA systems, the adapter number is the slot number in which the adapter physically resides. You can easily obtain this number via the MCA Configuration utility that was provided with your system. For IBM systems, you can determine this number by looking at the back of the system unit and providing the number displayed for the selected slot.

System Resources

The Wide Area Connector adapter utilizes the following system resources per each adapter installed:

- 32 bytes of IO addresses (differs depending upon the adapter number used on ISA; see **Help** on the Configuration panel for additional information, or through MCA adapter configuration)
- Interrupt level (1 level can be used on MCA if all adapters share the same, ISA adapters must have unique interrupt numbers)
- 16 KB of shared memory

For ISA adapters, you should consult your WAC installation publication for information concerning the IRQ used and the adapter number configured, both of which are configured through the adapter's DIP switches.

3174 Peer Communications Support (LAN over Coax)

The LAN over Coax function provides peer-to-peer communication for workstations connected to an IBM 3174 Control Unit through an IBM 3270 communication adapter. It provides support for any NDIS protocol stack capable of utilizing the IEEE 802.5 (token-ring) frame format, such as IEEE 802.2 (SNA), NETBIOS, TCP/IP, or LLC2. This function is not supported for Windows 2000.

Installing LAN Over Coax

Under Windows 95 or Windows 98:

1. On the network Control Panel, choose to install a new adapter.
2. Select the **Have Disk** option when prompted.
3. Install the program in the XLNCOAX subdirectory in the Personal Communications installation directory.

For Windows 95 and Windows 98, the .INF file installs the new adapter support and binds the adapter to all valid protocol stacks. To utilize the new adapter, after installing and rebooting, configure Personal Communications to utilize a LAN adapter, and enter the adapter number that corresponds to the 3174 Peer Communications adapter number found under the LLC Protocol for this adapter. The 3174 Peer Communications RPQ is also required on the 3174.

Configuring LAN Over Coax

For Windows 95 and Windows 98, configure by using the Network Control Panel **Properties** button for the selected adapter.

Options

Network Address
Overrides the burned-in adapter address.

Queued Transmits
Number of queued transmit elements to support.

Slot Number
Required for MCA bus systems, not applicable to others; indicates the adapter to use in a specific MCA slot.

On Micro Channel® workstations, you can use up to 4 type-B 3270 Connection Adapters (but only 1 type A). When you configure Personal Communications, you must specify the physical slot in which each adapter is installed.

System Resources
On ISA Bus systems, the following system resources are used:

- Interrupt Level 2
- IO address 0x2d0 through 0x2df
- Shared memory address 0xce000

These resources are not changeable. On MCA systems, these resources are configured via the MCA adapter configuration, with the exception for the Interrupt number, which is Interrupt 2.

Multiple Adapter Coexistence

If you use type-B adapters, you can use one or more for DFT connections concurrently with 3174 Peer Communications. If you want to do this, the Peer Communications adapters must be in higher-numbered slots than the DFT adapters because DFT connections will, by design, use the first adapters they find, searching from slot 1.

Twinaxial Console

You can configure Personal Communications to act as the console for an AS/400. If you want to use full-function 5250 emulation, you must not use the console attachment; you must use Twinaxial Data Link Control (APPC).

Restrictions:
- The **Setup API functions** of the **File** menu cannot be used.
- **Copy** is the only editing function available.
- The file transfer function cannot be used.
- The session type cannot be set to Printer. (AS/400)
- Multiple console sessions cannot be used.
- The Enhanced Non-programmable Terminal User Interface (ENPTUI) cannot be transferred from the host system.
- The PC Organizer cannot be used.
- The screen size is always 24 x 80, even if 27 x 132 is specified.
- The cursor position cannot be moved by the mouse.

Asynchronous Console

For the asynchronous console attachment, you must have a 2609 or 2612 adapter for the Multiple Function I/O Processor (MFIOP) on the AS/400 system. This connection also requires a special cable. The part numbers for the cables are 46G0450 (6m) and 46G0479 (2.5m).

Note: The AS/400 Advanced Portable Model P02 does not support the asynchronous console attachment.

An asynchronous console has the following restrictions:
- Multiple console sessions cannot be used.
- APIs are not supported
- The session type cannot be set to the **Printer**.
- The file transfer functions is not supported.
- The PC Organizer cannot be used.

Adapter Setup Hints and Tips

The following sections provide additional information about configuring adapters, including PCMCIA and PCI cards.

Using Coax (3270) Adapters

Personal Communications supports IBM AT-bus, Micro Channel (MCA), and Plug and Play coax adapters; the configuration of each is described in the following sections.

3278/79 Emulation Adapter (ISA-Bus)

This adapter has a fixed I/O-port address and interrupt level (IRQ), but you have to set the memory address, which you can do only through the Personal Communications configuration.

The buffer address must be set. The default is CE000. If you happen to know that this address is already being used by another device, you should change it, but, when you first try to connect, Personal Communications will check the registry to find an available address anyway.

Under Windows 2000, if Personal Communications cannot acquire a system resource (that is, an IRQ, a memory address, or an I/O address) needed by this adapter, Personal Communications displays an error panel identifying the unavailable resource. For an IRQ conflict (this adapter uses IRQ 9 only), Personal Communications automatically tries to activate the polling feature instead of using IRQ 9; if this succeeds then no error panel is displayed. For a memory address conflict, you should use the Personal Communications coax adapter configuration panel to select another memory address. For an I/O address conflict, you should reconfigure the device that is using the I/O address to use some other I/O address.

IBM 3270 Connection Adapter (Micro Channel)

Micro Channel adapters need the same types of resource as AT-bus but configuration is much easier because the resources are all set by the workstation's hardware configuration and Personal Communications is able to read them.

Configure Personal Communications in the normal way. The default buffer address will be the one set in the system configuration. You should not change it.

Plug-and-Play Adapters

Configure Personal Communications in the normal way. The **Plug-and-Play** radio button is active and you do not have to configure the buffer address.

The first time that you insert the 3270 Emulation Credit Card Adapter into a PCMCIA slot or start your PC with the PCI card installed, Windows 95 or Windows 98 or Windows 2000 will prompt you for the location of the .INF file for the card. The .INF file is located in the directory where Personal Communications is installed. Under Windows 2000, the file is named IBM3270X.INF. Under Windows 95 and Windows 98, the file is named IBM3270.INF.

Note: Removing the card while you have an active connection will have unpredictable results.

3270 ISA-Bus and MCA Adapters and ROM Shadowing

These adapters use 8KB of workstation memory; the default values for the memory addresses are as follows:

- Adapter #0 CE000h - CFFFFh
- Adapter #1 D0000h - D1FFFh
- Adapter #2 D2000h - D3FFFh
- Adapter #3 D4000h - D5FFFh

Some types of workstation may use these areas, by default, for ROM shadowing in BIOS (the IBM PC350 for example). You should check the ROM-shadowing settings before installing an adapter, and disable the range that will be used by the adapter that you are going to install.

OEM Adapters

Personal Communications has an open API that enables vendors and other equipment manufacturers (OEMs) to provide adapter cards that allow for additional connectivity options, for example, additional X.25, ISDN, SDLC. or twinax support. After installing the OEM adapter, you can begin to configure it in the usual manner described in *Quick Beginnings*. However, at some point in the configuration process you may need to provide information required by the manufacturer of the OEM adapter card.

Using Twinax (5250) Adapters

The configuration of each IBM adapter type is described in the following sections. All the IBM adapters are supported; OEM adapters are supported if their manufacturer has created a device driver that is compatible with the IBM driver. For a list of adapter types, see "Twinax Adapter Types" on page 41.

IBM 5250 Plug-and-Play Adapter

In Personal Communications, set the **Adapter Type** to IBM 5250 Plug-and-Play Adapter. You do not have to set the **Interrupt Level**, **I/O Address**, or **Memory Address** fields; these fields are grayed out. Personal Communications automatically reads the interrupt level, I/O address, and memory address from the adapter card.

The first time that you insert the 5250 PCMCIA or PC Card adapter into a PCMCIA slot, or start your PC with the 5250 PCI card or 5250 ISA Express card (with Plug-and-Play BIOS enabled) installed, Windows 95, or Windows 98 or Windows 2000 prompts you for the location of the .INF file for the card. The .INF file is located in the directory where Personal Communications is installed. Under Windows 2000, the file is named IBM5250X.INF. Under Windows 95 and Windows 98, the file is named IBM5250.INF.

If you experience problems getting a host connection with the 5250 Emulation PCI Adapter and you have an IBM personal computer, upgrading the BIOS might solve the problem. You can find the date of your system BIOS by using your system setup when you boot your personal computer. Then you can look on the Internet to see if there is a later version for your personal computer. The IBM File Library Web site that has the latest BIOS upgrade files is located at: www.pc.ibm.com/listfiles.html

From there you can search for your specific IBM personal computer. If there is a flash BIOS upgrade date later than that on your personal computer, download the file to your personal computer and follow the instructions that come with the file. For non-IBM personal computers, contact the manufacturer of your personal computer for BIOS upgrade information.

IBM 5250 MicroChannel Adapter

In Personal Communications, set the adapter type to IBM 5250 MicroChannel Adapter. You do not have to set the **Interrupt Level**, **I/O Address**, or **Memory Address** fields; these fields are grayed out. Personal Communications automatically reads the interrupt level, I/O address, and memory address from the adapter card.

IBM 5250 ISA Adapter

In Personal Communications, set the adapter type to IBM 5250 ISA Adapter. You must then set the interrupt level, I/O address, and Memory address to match the values set on the adapter card. For a new configuration, Personal Communications shows the default settings.

To view or change the settings on the adapter card, use the adapter configuration utility provided with the adapter. For the IBM Enhanced 5250 Display Station Emulation Adapter only, change the I/O address using switches on the adapter itself.

Under Windows 2000, if Personal Communications cannot acquire a system resource (that is, an I/O address, a memory address, or an IRQ) needed by this adapter, Personal Communications displays an error panel identifying the unavailable resource. To resolve this resource conflict, use the Personal Communications configuration panel to select another I/O address, memory address, or IRQ. If a conflict still exists, reconfigure the device that is currently using the resource to use some other resource.

Note: Removing a 5250 PCMCIA card or 5250 PC Card, or stopping a PCMCIA adapter slot containing a 5250 PCMCIA card or 5250 PC Card, will have unpredictable results.

IBM 5250 ISA Adapter (Asia-Pacific)

In Personal Communications, set the adapter type to IBM 5250 ISA Adapter (Asia-Pacific). You must then set the interrupt level and memory address to match the values set on the adapter card. For a new configuration, Personal Communications shows the default settings. The **I/O Address** field is grayed out; you do not need to set this field. Personal Communications automatically reads the I/O address from the adapter card.

To change the I/O address on the adapter card, use the switches on the adapter itself. To view the I/O address, or to view or change the interrupt level or memory address on the adapter card, use the adapter configuration utility provided with the adapter.

Twinax Connections Through a 5494 Controller to an AS/400

To set up a twinaxial connection to an AS/400 through a 5494 controller:

1. Click **Programs → IBM Personal Communications** > **SNA Node Configuration** from the Windows **Start** menu.
2. Click **Configure Connections** from the list of **Configuration options** and then click **Twinaxial** from the list of DLCs.
3. Click an entry from the list of configured twinaxial connections and click **View → Change → Add**.
4. Check **Link to preferred NN server**.
5. Click the Security tab.

6. In the **Adjacent CP name** field, enter the network ID and CP name of the 5494 controller.

7. Click **OK** to save the connection information.

8. Click **Configure Partner LU 6.2** from the list of **Configuration options**.

9. Click an entry from the list of **Partner LU 6.2** definitions and click **View → Change → Add**.

10. In the **Partner LU name** field, enter the CP name of the AS/400 system. The CP name is also known as the system location name.

11. In the **Fully qualified CP name** field, enter the network ID and CP name of the 5494 controller.

12. Click **OK** to save the Partner LU 6.2 information.

13. Click **Save As...** from the **File** menu.

14. Enter a file name with an .ACG file extension, such as `CFG5494.ACG.` Click **Yes** to make this configuration the default.

Note: To enable this configuration, configure the 5494 controller as a network node (NN).

Installing Devices When Upgrading Personal Communications

If you have upgraded from Personal Communications Version 4.3 to Personal Communications Version 5.0 in Windows 2000, you may receive the following error message when trying to use some IBM Plug-and-Play adapters.

```
"PCSCOAX051 - The 3270 Plug and Play Adapter could not be found.
Please check that the adapter device drivers and the card are
correctly installed."
```

This message appears because Personal Communications 5.0 uses the Other devices category of device driver in Windows 2000, while Personal Communications 4.3 uses the Multifunction adapters category. Also, Windows 2000 does not provide a Have Disk option if it already has a .inf file that matches the adapter and the new .inf specifies an adapter of a different category. Certain IBM Plug-and-Play adapters that were used and devices that were supported by Personal Communications 4.3 in Windows 2000 will be affected if Personal Communications 5.0 is installed. The adapters are as follows:

- IBM 3270 Emulation PCI Adapter
- IBM 5250 Express PCI Adapter
- IBM 5250 PCI Adapter
- IBM 5250 Express ISA Adapter, when the adapter's Plug-and-Play BIOS is enabled
- IBM PCI Multiprotocol SDLC Adapter

The following procedure should be used when installing IBM Plug-and-Play adapters under Windows 2000 when upgrading from Personal Communications 4.3 to Personal Communications 5.0. The IBM 3270 Emulation PCI Adapter is used as an example in this procedure.

1. Add a new device (from Personal Communications 5.0) for the adapter.

   This step prompts Windows 2000 to make a private copy of the Personal Communications 5.0 .inf file for this adapter.

   a. Begin adding the new device, using the **Add/Remove Hardware** option in the Control Panel.

   b. Click **Add a new device** in the Choose a Hardware Device panel.

   c. Click **No, I want to select the hardware from a list** in the Find New Hardware panel.

   d. Scroll down the list in the Hardware Type panel and select **Other devices**.

   e. When selecting the device driver, do not use the manufacturers or models listed. Instead, click **Have Disk** and specify the directory in which Personal Communications 5.0 was installed. The default directory is C:\Program Files\Personal Communications.

   f. The Select a Device Driver panel lists the IBM Plug-and-Play adapters supported by Personal Communications 5.0. Select **IBM PCI 3270 Emulation Adapter** from the list and click **Next**.

   g. Click **Next** in the Start Hardware Installation panel.

   h. Click **Finish** in the Completing the Add/Remove Hardware wizard panel.

   i. Do not restart the computer when prompted. If you accidentally restart the computer, continue with step 2 after rebooting.

2. Delete both the old device (from Personal Communications 4.3) and the new device (from Personal Communications 5.0) for this adapter. This step ensures that the new device can be installed properly.

   a. Click the **System** icon in the Control Panel.

   b. Select the Hardware tab in the System Properties panel.

   c. Click **Device Manager**.

   d. Delete the old Personal Communications 4.3 device for this adapter, using the following steps.

     1) Expand the **Multifunction adapters** entry in the list of devices in the Device Manager.

     2) Select **IBM PCI 3270 Emulation Adapter** in the list and then press mouse button 2.

     3) Select **Uninstall** from the list of options.

     4) Complete the removal. The list of devices in the Device Manager will be updated.

   e. Delete the new Personal Communications 5.0 device for this adapter, using the following steps.

     1) Expand the **Other devices** entry in the list of devices in the Device Manager.

     2) Select **IBM PCI 3270 Emulation Adapter** in the list and then press mouse button 2.

     3) Select **Uninstall** from the list of options.

     4) Complete the removal. The list of devices in the Device Manager will be updated.

   f. Close the Device Manager and exit the System Properties panel.

3. Reinstall a new device (from Personal Communications 5.0) for this adapter.

   a. Begin adding the new device, using the **Add/Remove Hardware** option in the Control Panel.

   b. The Add/Remove Hardware wizard will begin the installation process. Click **Next** in the Welcome to the Found New Hardware panel.

   c. Click **Display a list of known drivers for this device so that I can choose a specific driver** in the Install Hardware Device Drivers panel.

   d. The Select a Device Driver panel displays a Models listbox. Select **IBM PCI 3270 Emulation Adapter** and click **Next**.

   e. The Start Device Driver Installation panel will be displayed.

> **Note:** The name of the adapter should be displayed with a big yellow question mark icon, indicating that this device belongs to the class called Other devices. If this is case, click **Next**. However, if the big yellow question mark icon does not appear, you have selected the wrong device driver. You should then click **Back** and go to the Select a Device Driver panel. You should then choose another device driver from the Models listbox.

   f. Click **Finish** in the Completing the Found New Hardware wizard panel.

   g. Reboot the system when prompted to do so.

4. You now should be able to use the adapter under Personal Communications 5.0.

Chapter 6. Tivoli Support

Personal Communications is Tivoli-Ready certified. It is integrated with Tivoli Enterprise as a Desktop application, and provides a Plus module for its application management. The Plus module, called IBMPCOMM Plus, includes event management, software distribution, and administrative tasks. Personal Communications also includes an inventory signature file. This chapter describes the remote installation using Tivoli/Courier®, IBMPCOMM Plus module, and the inventory signature file.

Remote Installation of Personal Communications Using Tivoli Courier

Personal Communications can be installed using Tivoli/Courier, a Tivoli Software Distribution product. Tivoli requires that the installation software run in silent or unattended mode.

To install Personal Communications using Tivoli/Courier, do the following:

1. Copy the installable image from the CD-ROM to a local or shared network drive by typing the following command:

   ```
   xcopy d1:\install\pcomm\*.* /s d2:\pcomm
   ```

   d1   The CDROM drive letter

   d2   The local or shared network drive

2. Copy the sample pcomm.fp, instpcom.bat, and applicable typical .ini, custom .ini files, or both from the CD-ROM by typing the following commands:

   ```
   copy d1:\install\admin\distrib\pcomm.fp d2:\pcomm
   ```

   ```
   copy d1:\install\admin\distrib\instpcom.bat d2:\pcomm
   ```

   ```
   copy d1:\install\admin\distrib\typical.ini d2:\pcomm
   ```

   ```
   copy d1:\install\admin\distrib\custom.ini d2:\pcomm
   ```

3. From the Tivoli Profile Manager, create a file package by doing the following:

   a. Create a profile named pcomm (the file package for Personal Communications).

   b. Import the pcomm.fp file into the Personal Communications package created in step a.

   c. Go to the properties for the file package and update the following as necessary:

   - Source host (the name of the Tivoli Administration Server)
   - Source directory (d2:\pcomm from step 1)

   d. From the **Edit** menu, click **Platform Specific Options**, then click either **Windows 95 Options** or **Windows NT Options** and update the following as necessary:

   - Destination Directory Path (the location of Personal Communications install package on the target workstation, which requires approximately 300 MB of free disk space)
   - After Distribution (the location on the source host of the instpcom.bat file (d2:\pcomm from step 1)

   e. Distribute the Personal Communications file package to the target nodes.

   f. When the install process has completed successfully, you may want to remove the file package from target machines to free disk space.

IBMPCOMM Plus Module for Personal Communications

If you use Tivoli to centrally manage devices and applications in your network, IBMPCOMM Plus module enables you to manage Personal Communications functions on nodes installed with Personal Communications, from the Tivoli desktop. The IBMPCOMM Plus module can be installed on the Tivoli Management Region (TMR) server and other managed nodes using the \install\admin\plus\images\IBMPCOMMPlus.image file on the Personal Communications CD-ROM. It can then be viewed on the Tivoli desktop.

To access installed IBMPCOMM Plus functions, double-click the **TivoliPlus** icon from the Desktop for Administrator panel. Then double-click the **IBMPCOMM Plus for Tivoli** icon. The IBMPCOMM Plus for Tivoli panel appears, displaying task icons. Double-click these icons (or right-click and click **run** on the resulting pop-up menu) to perform the following actions on Personal Communications nodes:

- Start, stop, and query the SNA node
- Display and modify SNA node resources
- List configuration files
- Start, stop, and query emulator sessions
- Start, stop, and save traces for problem determination
- Manage client system events
- Distribute and install Personal Communications

The IBMPCOMM Plus for Tivoli panel also includes the **Subscriber_List_of_PCOMM_Nodes** icon. Right-click this icon and click the **Subscribers** menu item to configure the list of Personal Communications nodes to which the administrative tasks apply.

The IBMPCOMM Plus for Tivoli panel also includes the **Create_Subscriber_List** icon. This icon is used to create one or more custom subscriber-list tasks for management of PCOMM nodes, where the nodes are related for a given management task or set of tasks. For example, you can create a list of nodes on which to install just 5250 emulation, and another list for installing 3270 emulation and IBM SNA protocols. The choice of how to use this task is up to you. After you create the subscriber-list task, you can select the subscriber list when running the management task or tasks.

Most tasks include a dialog in which you can enter information needed to run the task. When you double-click an applicable icon in the IBMPCOMM Plus for Tivoli panel, enter information in the fields of the dialog box presented. Help is available for each dialog.

The following sections provide more information about the IBMPCOMM Plus module tasks.

Task Administration

This section describes the administrative tasks available for use on the Tivoli desktop. Each task is represented by an icon on the IBMPCOMM Plus for Tivoli panel. Tivoli tasks perform a specific function on one or more Personal Communications nodes. By default, the tasks use the nodes in the default

subscription list, which is specified by the task Subscriber_List_of_PCOMM_Nodes. When executing a task, you can select other subscribed Personal Communications nodes you want to execute the task on.

Note: If two or more tasks target the same nodes, each must be run to completion before starting another; otherwise results can be unpredictable. This is a known, but not well documented, Tivoli restriction.

Plus Module Administrative Tasks

The following list describes Plus Module administrative tasks:

- **About_IBMPCOMM Plus** displays information about the IBMPCOMM Plus module installed on the TMR server, or other managed nodes.
- **Subscriber_List_of_PCOMM_Nodes** is the administrator-defined list of Personal Communications nodes. Before any IBMPCOMM Plus module administrative task can be used, you must subscribe the Personal Communications nodes you wish to manage with the IBMPCOMM Plus module. This is where the Subscriber_List_of_PCOMM_Nodes task is used; or you can use a different subscriber list, created using the Create_Subscriber_List task.
- **Create_Subscriber_List** allows you to build additional customized lists of Personal Communications nodes; for instance, you might set up different lists, based on geography, or types of user, or based on PCOMM installation options. For example, you can create one subscriber list for installing PCOMM with 5250 Emulation and Services only. Another for installing PCOMM with 3270 Emulation and Services plus IBM SNA Protocols. These are options you choose during the install process. Since the Personal Communications install task uses silent install via a initialization file, the initialization file must match exactly what is intended to be installed.

  For the two install choices above, two initialization files are needed. You can create these initialization files, and create corresponding subscriber lists, for installing Personal Communications. Since there are many install choices (and potentially many initialization files), the Create_Subscriber_List task is a way for you to coordinate all this.

Personal Communications Administrative Tasks

Issuing DOS Commands

Use the Issue_Command task to execute any valid MS-DOS command-line entry, provided it does not prompt the user for input; double-clicking on the icon for this task opens a dialog for you to enter the command.

Notes:

1. You should not issue the following Personal Communications commands manually with this task: CSSTART.EXE, CSSTOP.EXE, CSQUERY.EXE, CSDSPY.EXE, CSMODIFY.EXE, PCOMSTRT.EXE, PCOMSTOP.EXE, CSTRACE.EXE, and PCOMQRY.EXE. These programs are intended for use by other administrative tasks of the IBMPCOMM Plus module. For example, the task Start_SNA_Node uses the CSSTART.EXE program. If any of these programs are specified for the Issue_Command task, the result can be unpredictable.

2. Be aware of the use of the PCOMM_ROOT environment variable in the DIR command; when Personal Communications is installed on a node, this environment variable is set as a system environment variable. The IBMPCOMM Plus module tasks use this variable to identify where Personal Communications is installed on each node. For example, specifying dir

%PCOMM_Root%\private*.* for the Issue_Command task returns a list of all files in the \private subdirectory of the directory in which Personal Communications is installed.

Launching Personal Communications Programs

Right-click the **Launch@<*TMR_Server_Node*>** icon, where *<TMR_Server_Node>* is the name of the local TMR server node on which the Plus module is installed; select one of the following menu items:

Launch_Emulator
> This can also be performed using the **Launch_Emulator** icon. The icon executes the module PCSWS.EXE. This is not a remote operation, and is only available if Personal Communications is installed on the TMR server.

Launch_SNA_Node_Operations
> This can also be performed using the **Launch_SNA_Node_Operations** icon. This icon executes the module PCSNOPS.EXE. This is not a remote operation, and is only available if Personal Communications is installed on the TMR server.

Note: For both **Launch_Emulator** and **Launch_SNA_Node_Operations**, you must be at the TMR server machine on which Personal Communications is installed. That is, the launch works only from a Tivoli desktop running on the local TMR server. Also, the TMR server must be running on Windows NT or Windows 2000.

Emulator Administration

The IBMPCOMM Plus module includes the following administrative (operational) tasks for the emulator:

- List_Emulator_Configuration_Files
- Query_Emulator_Session_Status
- Start_Emulator_Session
- Stop_Emulator_Session

List_Emulator_Configuration_Files
> This task returns a list of the emulator configuration files. These files include the workstation profile (.WS) files, keyboard remap (.KMP) files, macro (.MAC) files, and others located in the Personal Communications workstation profile directory.

Query_Emulator_Session_Status
> This task queries the status of one or all active emulator sessions. You are presented with a dialog box for you to specify the session letter for the query; you can select either a specific session letter or all sessions. The task executes the module PCOMQRY.EXE on the target nodes and returns the resulting information to the Tivoli desktop. The status SESSION_OFFLINE means the session window is open but it has no connection to a host. The status SESSION_ONLINE means the session window is open and a connection to a host exists.

Start_Emulator_Session
> This task starts an emulator session. You are presented with a dialog box with which to specify the workstation profile, session letter, and session window for starting the session; you can select either a specific session letter or the first one available. The task executes the module PCOMSTRT.EXE on the target nodes and returns the resulting information to the Tivoli desktop.

Stop_Emulator_Session

This task stops one or all emulator sessions; it presents a dialog box for you to specify the session letter for the session to stop. You can select either a specific session letter or all sessions. The task executes the module PCOMSTOP.EXE on the target nodes and returns the resulting information to the Tivoli desktop.

SNA Node Administration

The IBMPCOMM Plus module includes the following administrative (operational) tasks for remotely operating SNA nodes:

- List_SNA_Configuration_Files
- Start_SNA_Node
- Stop_ SNA_Node
- Display_SNA_Node_Resource
- Modify_SNA_Node_Resource
- Query_SNA_Node_Status

List_SNA_Configuration_Files

This task returns a list of the SNA node configuration files (.ACG) located in the Personal Communications SNA node configuration files directory.

Start_SNA_Node

This task starts an SNA node; the task presents a dialog box for you to optionally specify an SNA configuration file and an action to be performed. It uses the Personal Communications command-line program CSSTART.EXE on the Personal Communications target nodes to start the specified SNA node configuration file, and displays the results on the Tivoli desktop.

The actions presented are as follows

Start configuration

Starts an SNA node using the specified configuration file or, if no name is specified, starts the SNA node with the default configuration file.

Set Start at boot time

Sets up an automatic service that starts the SNA node when the system is booted, using the default or specified SNA configuration file.

Reset Start at boot time

Resets the automatic service back to a manual service so that the node will no longer be automatically started at bootup. A reboot is needed to enable this.

Set default configuration

Sets the specified configuration file to be the default configuration file. If no file name is specified, the task returns an error.

Stop_SNA_Node

This task stops the SNA node. The task executes the module CSSTOP.EXE on the Personal Communications target nodes to stop the SNA node, and displays the result.

Display_SNA_Node_Resource

This task displays attributes of an SNA resource; the task presents a dialog box for you to select the resource type, optionally specify the specific resource, and select the level of detail (the number of attributes) to be

displayed. The task executes the module CSDSPY.EXE on the Personal Communications target nodes, and returns the requested information.

Select the type of resource you want to display; you can enter the optional (case-sensitive) resource ID and select the output-detail level. If you leave the resource ID blank, information on all resources of the type selected is displayed.

Modify_SNA_Node_Resource
This task modifies attributes of an SNA resource; the task presents a dialog box for you to select the resource type, specify the specific resource, and select the action (modification) to be performed. The task executes the module CSMODIFY.EXE on the Personal Communications target nodes, and displays the returned information.

Select the type of resource you want to change, followed by the (case-sensitive) resource ID, and select the action to be performed.

Query_SNA_Node_Status
This task queries the status of the SNA node. The task executes the module CSQUERY.EXE on the Personal Communications target nodes, and displays the result.

Problem Determination Using Integrated Trace Facility
The IBMPCOMM Plus module includes three tasks that support problem determination. The tasks use the Integrated Trace Facility on target Personal Communications nodes. These tasks allow the administrator to remotely set up, start, and terminate the trace facility, and format and package trace results at the target Personal Communications nodes

The three tasks are as follows:

Start_Trace
This task starts tracing. It opens an input dialog in which you specify a trace options file. The trace options file defines the functions, components, and options for the trace. The task then executes the module CSTRACE.EXE on the target nodes to start tracing.

Stop_Trace
This task stops tracing. It opens an input dialog in which you specify the name of the existing unformatted trace file where the trace output is stored. The dialog includes a check box for indicating whether to append the trace output to the unformatted trace file. Leave the check box unchecked to indicate the unformatted trace file is to be replaced. If no file name is specified, the Trace Facility's default unformatted trace file is used. The task executes the module CSTRACE.EXE on the target nodes to stop tracing and save the trace output.

Format_Trace
This task formats and packages the trace output. It opens an input dialog in which you specify the name of the unformatted trace file to be formatted into human-readable form. The task executes the module CSTRACE.EXE on the target nodes to format the trace output. It then executes the module PCSPD.EXE on the target nodes to package the formatted trace output.

Event Management

The following sections describe the facilities provided for the detection and management of events recognized by Personal Communications.

Personal Communications Events

The Tivoli enterprise console (TEC) is a rules-based event management application that collects, processes, and automatically responds to common management events, such as the starting or stopping of a managed application or network connection.

Events are formatted messages sent to an event server. The event server presents the events to the administrator at the event console. An event adapter formats the event messages in a form that the event server understands. See "Event Adapter" on page 62 for more information about formatting messages into events. The IBMPCOMM Plus module includes the following event classes:

IBMPCOMMBase class
> Parent for all PCOMM event classes

PCOMM_Unknown_Message class
> Formats unrecognized PCOMM events

PCOMM_Base class
> Parent class for formatting PCOMM events

PCOMM_Base_1 class
> Parent class for formatting PCOMM emulator events

PCOMM_Base_2 class
> Parent class for formatting PCOMM non-emulator events

PCOMM_Error class
> Parent for PCOMM error event classes

PCOMM_Attention class
> Parent for PCOMM attention event classes

PCOMM_Warning class
> Parent for PCOMM warning event classes

PCOMM_Information class
> Parent for PCOMM informational event classes

PCOMM_PCS_Error class
> Formats PCOMM non-emulator PCS error events

PCOMM_PCS_Attention class
> Formats PCOMM non-emulator PCS attention events

PCOMM_PCS_Information class
> Formats PCOMM non-emulator PCS informational events

PCOMM_ANY_Error class
> Formats PCOMM non-emulator ANY error events

PCOMM_ANY_Attention class
> Formats PCOMM non-emulator ANY attention events

PCOMM_ANY_Warning class
> Formats PCOMM non-emulator ANY warning events

PCOMM_ANY_Information class
> Formats PCOMM non-emulator ANY informational events

Notes:

1. The *parent* classes are used only to define common attributes for other classes in the class hierarchy. The *formatting* classes are the lowest-level classes, which

the Tivoli TEC NT Adapter uses to format the NT-event-log messages into events suitable for sending to the Tivoli event server.

2. The _PCS_ and _ANY_ notation distinguishes messages issued by Personal Communications with the form of PCScccc and ANYccccc, respectively.

3. Personal Communications records in the NT event log only error messages. So only the *_Error classes apply for formatting events, and thus only the error events get sent to the Tivoli event server.

4. All these classes are defined for the IBMPCOMM Plus module (in the pcomm_plus.baroc file). All classes are listed for your reference. You may refer to these class definitions in the pcomm_plus.baroc and pcomm_plus.fmt files when, for example, you want to add event filters to the NT event adapter configuration (.conf) file. More information on filtering Personal Communications events is given in "Event Adapter" on page 62.

Each event contains a *header* message and a *subject* message.

The header message text is `PCS3008E IBM Personal Communications logged the following message.`

The subject message is divided into the message ID, probe information, and entire text; these are the same as what is logged in the Personal Communications message log.

At the Tivoli event console, the subject message parts appear in the event attributes, as follows:

msg   Header message

msg_sub_1   Subject message ID

msg_sub_2   Probe information

msg_sub_3   Text

Event Management Tasks

Setup_Rule_Base
Setup_Rule_Base configures the Tivoli Event Console (TEC) rule base to receive and handle Personal Communications events; it ensures that Personal Communications classes and rules are defined in a new or existing rule base, and it ensures that the Personal Communications event sources are assigned to the desired administrator's event console.

This event management task also creates an IBMPCOMMPlus Event Group, which filters all of the generated events. It also filters the Tivoli/Sentry® events outside of Personal Communications; Personal Communications does not include monitors.

This task can be modified to run on selected subscribers. By default the task is run on the TEC server.

When running Setup_Rule_Base, a dialog is presented where you can enter the rule base name and related information; refer to the help for details.

There are two basic options: add the Personal Communications event classes and rules to an existing rule base, or add them to a new rule base. In either case, you can also specify the name of the event console for which you want to configure the rule base.

Note: You should run this task only once after installing the IBMPCOMM Plus module. If you need to run it again, you should first delete the rule base or the Personal Communications class and rules files, and then run this task again.

Initialize_NT_Adapter

Initialize_NT_Adapter initializes the Windows NT event adapter to forward Personal Communications events to the TEC server. Click **Continue** to initialize the Windows NT event adapter at the Windows NT and Windows 2000 nodes on which Personal Communications is installed. This task adds the format statements from the Personal Communications event format file (pcomm_plus.fmt) to the end of the Windows NT event format file (tecad_nt.fmt). The Windows NT adapter uses the Personal Communications format statements in the tecad_nt.fmt file to recognize Personal Communications events in the Windows NT and Windows 2000 event logs, and to format those events and forward them to the event server.

This event management task stops the event adapter, if it is running, and starts it again after updating the tecad_nt.fmt file. Therefore, make sure the Personal Communications nodes are in a state that will not be adversely affected by stopping and starting the Windows NT adapter.

When running Initialize_NT_Adapter, a dialog is presented where you can click the **Continue** button, or the **Cancel** button. Click the **Help** button for further guidance.

Event Rules

Some events may require you to take an action. The rules supplied with the IBMPCOMM Plus module (defined in pcomm_plus.rls) are simple rules. They close events after a certain amount of time has elapsed since the receipt of the events. For example, Personal Communications error events are closed after 24 hours, if the administrator has done nothing with them (that is, they are still in the OPEN state).

You can use the Tivoli Setup_Rule_Base task to instantiate the rules and classes to the event server. You can tailor the rules—for instance, to add an action to forward the event to another event server, or to add some other applicable action; to do this, you must create the rules and rule base using the **Event Server** icon on the main Tivoli desktop, or by using an appropriate text editor. The Tivoli TEC books describe how to do this.

Event correlation rules are specified in event correlation rules (.rls) files. Event class definition (.baroc) files specify the classes of events that the event server is configured to receive. The IBMPCOMM Plus module includes a default class (pcomm_plus.baroc) file.

The IBMPCOMM Plus module includes a default rules (pcomm_plus.rls) file. It defines a set of simple rules for the Personal Communications classes, as follows:

Rule 1 Close PCOMM Information events that are still OPEN after 15 minutes.

Rule 2 Close PCOMM Attention and PCOMM Warning events that are still OPEN after 60 minutes.

Rule 3 Close PCOMM Error events that are still OPEN after 24 hours.

Rule 4 Close PCOMM Unknown Message events that are still OPEN after 24 hours.

Note: Only Rule 3 (for error-type events) is actively used.

Event Adapter

An event adapter collects information, performs local filtering, converts relevant events into a format that can be used by the event server, and sends the formatted event messages to the event server.

The Tivoli enterprise console provides a ready-made event adapter for Windows NT and Windows 2000, which checks the event log. It uses the following files:

tecad_nt.baroc
Defines event classes the event adapter sends. This file is not used by the event adapter itself, but serves as a mandatory link between the adapter and the event server which must load this file before it is able to understand the event messages it receives from the adapter.

tecad_nt.conf
Defines global configuration options that apply to many event adapters. This file specifies the event server location. It also may include optional attributes that define the behavior of the event adapter, such as the event classes to filter, whether to buffer events, the maximum size (length) of the event message, the name of the log file, and how often to poll the log file for new events.

tecad_nt.err
Defines error logging and tracing options. Runtime debugging facilities are built into all Tivoli-supplied adapters to allow tracing of each event, from the time it enters the adapter until it is discarded or successfully sent to the event server. The administrator uses this to ensure the adapter is working correctly, especially when updating the configuration (.conf) or format (.fmt) file.

tecad_nt.fmt
Defines the format of system log messages and their mappings to event classes.

Personal Communications also includes the following files:

pcomm_plus.fmt
For the Initialize_NT_Adapter task

pcomm_plus.baroc
For the Setup_Rule_Base task

pcomm_plus.rls
For the Setup_Rule_Base task

Note: The IBMPCOMM Plus module uses the Tivoli-supplied event adapter. Because the Tivoli event adapter is available only for Windows NT and Windows 2000, no events can be sent from Personal Communications nodes installed on Windows 95 and Windows 98 systems.

The IBMPCOMM Plus module includes each of the pcomm_plus_* files. The tecad_nt.* files are part of, and installed with, the Tivoli NT event adapter. You can modify some of them—for example, the configuration (.conf) file—to suit the requirements of the managed enterprise. This is done in conjunction with the Initialize_NT_Adapter and Setup_Rule_Base tasks.

The association between the Initialize_NT_Adapter and Setup_Rule_Base tasks is as follows:

1. You must first run the Initialize_NT_Adapter task so that the target Windows NT or Windows 2000 nodes can send PCOMM events. This task must also be run after you make changes to the .conf file, such as adding or changing PCOMM filters. This task stops the NT adapter, combines the PCOMM event format definitions in pcomm_plus.fmt with the NT adapter definitions in tecad_nt.fmt, and restarts the NT adapter.

2. You must then run the Setup_Rule_Base task in order for the TEC server to process incoming PCOMM events. This task stops the event server, instantiates the PCOMM classes in pcomm_plus.baroc and the PCOMM rules in pcomm_plus.rls with the ones in the rule base the user specifies (or the default rule base), and restarts the event server.

You must run both these tasks before PCOMM events can be forwarded to the TEC console.

The pcomm_plus.baroc file defines the classes and attributes that can be used for filtering.

In order to add filtering, you must understand the event attributes for Personal Communications. Typically, you define filters based on the class, to filter out all events for a given class at the source (NT adapter) side, such as:

Filter:Class=PCOMM_Emul_PCS_Error

Or, to filter out one or more specific messages, for example, you could add the following filtering:

FilterMode=OUT
Filter:Class=PCOMM_Unknown_Message
Filter:Class=PCOMM_PCS_Error;msg_sub_1=PCS6003E

Note: The FilterMode=OUT statement is optional; OUT is the default.

Personal Communications logs error-class messages to the Windows NT or Windows 2000 event log file.

The Tivoli NT event adapter gets information from the Windows event log file at configurable intervals.

Software Distribution

Tivoli software distribution enables software to be installed and updated across a multiplatform network. It uses file packages to define the distribution and installation requirements of an application. The IBMPCOMM Plus module includes setup and run tasks (icons) that allow you to create a file package and distribute it.

The IBMPCOMM Plus module includes tasks to create and distribute three file packages; they are used to:
• Distribute and Install Personal Communications
• Distribute the SNA Node Configuration Files
• Distribute the Emulator Configuration Files

Distribute and Install Personal Communications

This file package includes the Personal Communications install image and initialization files. You must manually tailor the initialization files for installation. The Create_File_Package_for_Install task allows you to specify the location of the Personal Communications install image and the initialization file; it creates the file package (.fp) file. The install image location (path) can be on a Tivoli server or a managed node, or on a LAN server to which the target nodes have access. The initialization file must be located on the local managed node (the node on which the IBMPCOMM Plus module is running). If you want, you can modify the initialization file (or create a new one) for a customized install. This would be useful, for instance, to install only a subset of the languages Personal Communications supports. The Personal Communications CD-ROM includes sample initialization files for a typical installation and a custom installation. The file names are typical.ini and custom.ini, respectively. The typical installation is equivalent to accepting all the defaults. The custom installation specifies a user-chosen installation directory and a national language (French). You may compare these two files to see how they differ. The File_Package_for_Install task is used to distribute the install-image files and invoke the silent install.

For Personal Communications Version 5.5, the Create_File_Package_for_Install task dialog has a check box for restarting the target nodes; the default is unchecked. Selecting this check box allows you to restart the target nodes following successful completion of the installation. If the option is not selected, no reboot occurs. In addition, the restart capability of Windows Installer will not be used, because this would prematurely terminate the after-program and the Tivoli agent before processing has finished.

Refer to *CD-ROM Guide to Installation* for more information about silent installation.

Distribute the SNA Node Configuration Files

This file package may include one or more .ACG files and an optional user-exit file (a program or batch file). The administrator must supply the user-exit file. The Create_File_Package_for_SNA_Node task allows you to specify the location of the .ACG files to be distributed and the user-exit file name; it creates the file package (.fp) file. The .ACG files may be located on a Tivoli server or managed node. The user-exit file must be located on the local managed node. The user exit file can be used to tailor the .ACG files for the target machines—for example, to change the local CP name to the target machine name. The online help advises you to run the verification utility before distributing the .ACG files. The File_Package_for_SNA_Node task is used to distribute the .ACG files, copy them to the SNA node configuration files directory, and invoke the user exit.

Distribute the Emulator Configuration Files

This file package may include one or more emulator configuration (.WS, .KMP, .MAP, etc.) files and an optional user-exit file. The Create_File_Package_for_Emulator task allows you to specify the location of the emulator configuration files to be distributed and the user-exit file name; it creates the file package (.fp) file. The configuration files may be located on a Tivoli server or managed node. The user-exit file must be located on the local managed node. The user exit file can be used to tailor the configuration files for the target machines—for example, to add target-specific information. It can also be used to call the migration utility, for example to add session icons to the Window Start

menu. The File_Package_for_Emulator task is used to distribute the configuration files, copy them to the workstation profile directory, and invoke the user exit.

Signature (Inventory) Information

Tivoli provides an inventory database. Each inventory record in the database consists of a signature file name, its size, and related information about the corresponding software product such as its name and version. The signature file is one whose name and size remain constant for the life of the related information. You use the database and its inventory functions to determine what applications, and versions of applications, are installed in the enterprise.

The Tivoli inventory database includes a signature file for Personal Communications Versions 4.3 and higher. The signature file for Personal Communications Version 5.5 is named PCSINVTY.SYS. The information includes the file name, size, and related product name, version number, and, if applicable, CSD identification.

Note: This signature file is not part of the IBMPCOMM Plus module.

Chapter 7. System Policy Support

System policies allow you to control the actions that a user is permitted to perform.

A policy can be defined by any application or component. The policy appears in the administrator user interface; information that you set about the policy migrates to the local computer's registry. The application or component that defines a policy must check the registry to enforce its own policy.

Policy information is typically added to a local registry in the following sequence:

1. Categories, policies, and parts are described in a policy template (*.ADM) file. Windows 95 ships with an ADMIN.ADM file containing all the policies that the system supports. The *Microsoft Resource Kit* and Windows NT Server Version 4.0 and higher include three policy template files: WINNT.ADM, COMMON.ADM, and WINDOWS.ADM. Applications or components can also provide their own policy template files.

   Note: Personal Communications supplies a policy template for each language currently supported. The templates are on the installation CD-ROM in the admin\policy directory. For example, the policy template for the US English language is named ENUPOL.ADM and the policy template for the French language is named FRAPOL.ADM.

2. You run the policy editor, which reads one or more policy templates, and lists the available categories and policies. You set up the desired policies, and the policy editor uses registry functions to save the work to a policy (*.POL) file. The system policy editor is supplied with Microsoft NT Server; documentation about its use can be found at http://www.microsoft.com.

3. After the user logs on (and user profiles are reconciled if they are enabled), the policy downloader determines where to find the file on the network, opens the policy file, and merges the appropriate computer, user, and user group policies into the local registry.

IBM Personal Communications provides its own policy template file (PCSPOL.ADM). It contains one category of type USER.

Within the IBM Personal Communications category are the following policies:

Configuration
   Contains policy information related to configuration

Execution
   Contains policy information related to execution

Installation
   Contains policy information related to uninstallation

Configuration Policy

Use the configuration policy to define user access to the following configurations:

Communication

Controls the user's ability to change configuration information pertaining to communication. This includes both emulator configuration (modified by selecting the **Communication → Configure** menu) and the SNA node configuration utility (PCSCFG.EXE).

Menu Controls the user's ability to read and change configuration information pertaining to the menu.

Multiple Session

Controls the user's ability to read, execute, and change configuration information pertaining to multiple sessions with the multiple sessions utility (PCSBAT.EXE).

Toolbar

Controls the user's ability to read and change configuration information pertaining to the toolbar.

Keyboard

Controls the user's ability to read and change configuration information pertaining to the keyboard.

Mouse

Controls the user's ability to read and change configuration information pertaining to the mouse.

Communication Configuration

The Communication Configuration drop-down list contains the following options.

Read The user can only read preconfigured communication information. However, this does not prevent the user from changing the communication configuration information by manually editing the *.WS file, the *.ACG file, or both. This is the most restrictive level of control.

Write The user can read preconfigured communication information, and can make temporary and permanent changes to the communication configuration information. This is the least restrictive, and is equivalent to the level of control in which users operate without policy support.

The default for the communication configuration part is *Write*.

Menu Configuration

The Menu Configuration drop-down list contains the following options.

No Access

The user has no access to menu configuration information; that is, the user cannot read preconfigured menu configuration information or change menu configuration information. This means that any menu configuration information contained in the .WS file (specifically, in the [Menu] stanza) or the PCSWIN.INI file (modified by selecting the **View → Show → Menu** menu) is ignored, and the user cannot execute the menu bar customization utility (PCSMENU.EXE).

The difference between this item and the **Read** item is that this item ignores updates to the menu configuration information that the user may have made while manually editing the .WS file or PCSWIN.INI file. This means that the user can use only the product default menu configuration, and that you cannot set up modified menu configurations to be used by users who have No Access. This is the most restrictive level of control.

Read The user can only read preconfigured menu information. This means that menu configuration information contained in the .WS file (specifically, in the [Menu] stanza) and the PCSWIN.INI file (modified by selecting the **View → Show → Menu** menu) is *not* ignored, but the user cannot update the menu by selecting **View → Show → Menu** or the menu bar customization utility (PCSMENU.EXE). The difference between this item and the **No Access** item is that this item does not prevent the user from updating the menu configuration information by hand editing the .WS file or the PCSWIN.INI file. However, unlike the **No Access** item, this item allows an administrator to set up modified menu configurations to be used by users who have *Read* access. This is less restrictive than **No Access**.

Write The user can read preconfigured menu information, and can make permanent changes to the menu configuration information. This is the least restrictive item, and is equivalent to the level of control in which users operate without policy support.

The default for the menu configuration part is *Write*.

Multiple Session Configuration

The Multiple Session Configuration drop-down list contains the following options.

No Access
The user has no access to multiple session configuration information; that is, the user cannot read or execute preconfigured multiple session configuration information or change multiple session configuration information. This means that the user cannot execute the multiple sessions utility (PCSBAT.EXE). This is the most restrictive level of control.

Read The user can only read and execute preconfigured multiple session information. This means that the user can execute the multiple sessions utility (PCSBAT.EXE) to read multiple session configuration information, or execute the multiple sessions utility (PCSBAT.EXE) to execute preconfigured multiple session information. However, the user cannot save any changes made to the multiple session configuration information. This is less restrictive than **No Access**.

Write The user can read and execute preconfigured multiple session information, and can make permanent changes to multiple session configuration information. This is the least restrictive item, and is equivalent to the level of control in which users operate without policy support.

The default for the multiple session configuration part is *Write*.

Toolbar Configuration

The Toolbar Configuration drop-down list contains the following options.

No Access
The user has no access to toolbar configuration information; that is, the user cannot read preconfigured toolbar configuration information or change (temporarily or permanently) toolbar configuration information. This means that any toolbar configuration information contained in the *.WS file (specifically, in the [Toolbar] stanza) or the PCSWIN.INI file (modified by selecting the **View → Show → Tool Bar** menu) is ignored. The difference between this item and the **Read** item (described later) is that this item ignores updates to the toolbar configuration information that the user may have made while manually editing the .WS file or the PCSWIN.INI

file. This means that the user can use only the product default toolbar configuration, and that you cannot set up modified toolbar configurations to be used by users who have **No Access**. This is the most restrictive level of control.

Read   The user can only read preconfigured toolbar information. This means that toolbar configuration information contained in the .WS file (specifically, in the [Toolbar] stanza) and the PCSWIN.INI file (the results of manipulating the **View → Show → Tool Bar** menu) is *not* ignored, but the user cannot change (temporarily or permanently) the toolbar configuration information. The difference between this item and the **No Access** item is that this item does not prevent the user from updating the toolbar configuration information by hand editing the .WS file or the PCSWIN.INI file. However, unlike the **No Access** item, this item allows an administrator to set up modified toolbar configurations to be used by users who have **Read** access. This is less restrictive than **No Access**.

Write   The user can read preconfigured toolbar information, and can make temporary or permanent changes to the toolbar configuration information. This is the least restrictive item, and is equivalent to the level of control in which users operate without policy support.

The default for the toolbar configuration part is *Write*.

Keyboard Configuration

The Keyboard Configuration drop-down list contains the following options.

No Access
The user has no access to keyboard configuration information; that is, the user cannot read preconfigured keyboard configuration information or change (temporarily or permanently) keyboard configuration information. This means that any keyboard configuration information contained in the .WS file (specifically, in the [Keyboard] stanza) is ignored. The difference between this item and the **Read** item is that this item ignores updates to the keyboard configuration information that the user may have made while manually editing the .WS file or the PCSWIN.INI file. This means that the user can only use the product default keyboard configuration, and that your cannot set up modified keyboard configurations to be used by users who have **No Access**. This is the most restrictive level of control.

Read   The user can only read preconfigured keyboard information. This means that keyboard configuration information contained in the .WS file (specifically, in the [Keyboard] stanza) and the PCSWIN.INI file is *not* ignored, but the user cannot change (temporarily or permanently) the keyboard configuration information. The difference between this item and the **No Access** item is that this item does not prevent the user from updating the keyboard configuration information by manually editing the .WS file or the PCSWIN.INI file. However, unlike the **No Access** item, this item allows an administrator to set up modified keyboard configurations to be used by users who have **Read** access. This is less restrictive than **No Access**.

Write   The user can read preconfigured keyboard information, and can make temporary or permanent changes to the keyboard configuration information. This is the least restrictive item, and is equivalent to the level of control in which users operate without policy support.

The default item for the keyboard configuration part is *Write*.

Mouse Configuration

The Mouse Configuration drop-down list contains the following options

No Access
> The user has no access to mouse configuration information; that is, the user cannot read preconfigured mouse configuration information or change (temporarily or permanently) mouse configuration information. This means that any mouse configuration information contained in the .WS file (specifically, in the [Mouse] stanza) is ignored. The difference between this item and the **Read** item is that this item ignores updates to the mouse configuration information that the user may have made while manually editing the .WS file or the PCSWIN.INI file. This means that the user can use only the product default mouse configuration, and that you cannot set up modified mouse configurations to be used by users who have **No Access**. This is the most restrictive level of control.

Read   The user can only read preconfigured mouse information. This means that mouse configuration information contained in the .WS file (specifically, in the [Mouse] stanza) and the PCSWIN.INI file is not ignored, but the user cannot change (temporarily or permanently) the mouse configuration information. The difference between this item and the **No Access** item is that this item does not prevent the user from updating the mouse configuration information by hand editing the .WS file or the PCSWIN.INI file. However, unlike the **No Access** item, this item allows an administrator to set up modified mouse configurations to be used by users who have **Read** access. This is less restrictive than **No Access**.

Write   The user can read preconfigured mouse information, and can make temporary or permanent changes to the mouse configuration information. This is the least restrictive item, and is equivalent to the level of control in which users operate without policy support.

The default for the mouse configuration part is *Write*.

Execution Policy

Use the execution policy to define the user's access to the following:

Dynamic Menu Modification
> Controls whether or not applications executed by the user are permitted to dynamically add themselves to the menu of an active session.

Java Applet
> Controls the user's ability to execute Java applets from the **Actions → Run Java Applet** menu.

Macro Play/Record
> Controls the user's ability to play and record macros.

Session Execution
> Controls the user's ability to start an emulator session.

File Transfer
> Controls the user's ability to receive files from or send files to the host system.

Dynamic Menu Modification

The Dynamic Menu Modification checkbox indicates the following:

Checked

Applications executed by the user can dynamically add themselves to the menu of an active session. This is the least restrictive level of control, and is equivalent to the level of control in which users operate without policy support.

Unchecked

Applications executed by the user cannot dynamically add themselves to the menu of an active session. This is the most restrictive level of control.

The default for the dynamic menu modification part is *Checked.*

Java Applet

The Java applet checkbox indicates the following:

Checked

The user can execute a Java applet from the **Actions → Run Java Applet** menu. This is the least restrictive level of control, and is equivalent to the level of control in which users operate without policy support.

Unchecked

The user cannot execute a Java applet from the **Actions → Run Java Applet** menu. This is the most restrictive level of control.

The default for the Java applet part is *Checked.*

Macro Play/Record

The Macro Play/Record drop-down list indicates the following:

No Access

The user has no access to macros; that is, the user cannot play or record macros. This is the most restrictive level of control.

Play   The user can play macros.

Record

The user can play and record macros.

The default for the macro play/record part is *Record.*

Session Execution

The session execution checkbox indicates the following:

Checked

The user can start an emulator session. This is the least restrictive level of control, and is equivalent to the level of control in which users operate without policy support.

Unchecked

The user cannot start an emulator session. This is the most restrictive level of control.

The default for the session execution part is *Checked.*

File Transfer

Use the file transfer option to control the user's ability to do the following:

Send   Controls the user's ability to send files to the host system.

Receive

Controls the user's ability to receive files from the host system.

Send

The Send checkbox indicates the following:

Checked

The user can send files to the host system.

Unchecked

The user cannot send files to the host system.

The default for send is *Checked.*

Receive

The Receive checkbox indicates the following:

Checked

The user can receive files from the host system.

Unchecked

The user cannot receive files from the host system.

The default for receive is *Checked.*

Installation Policy

Use the installation policy to control the user's ability to do the following:

Uninstall

Controls the user's ability to uninstall IBM Personal Communications.

The Uninstall checkbox indicates the following:

Checked

The user can uninstall IBM Personal Communications.

Unchecked

The user cannot uninstall IBM Personal Communications.

Chapter 8. Configuring and Using SSL Security for Personal Communications

The purpose of basing communications on Secure Sockets Layer (SSL) is to provide privacy and integrity during communication over an unsecured TCP/IP connection between a client and a target server. This chapter briefly describes how to configure the Personal Communications client to use this mode.

Personal Communications provides several ways to manage certificates:
- "Using Certificate Wizard" on page 80
- "Using Certificate Management" on page 81
- "Using the Command-line Mode for Managing Certificates" on page 85

What is SSL?

SSL is an industry standard protocol that provides X.509 certificate based authentication and encryption for unsecured connections. Personal Communications supports client and server side certificate-issuer authentication and encryption of emulation sessions in compliance with the SSL V3 standard. Server side certificate-issuer authentication means that the target server presents its X.509 certificate for the Personal Communications client to inspect for certificate-issuer authenticity before initiating an encrypted session.

SSL client authentication allows a server to confirm a user's identity. Using the same techniques as those used for server authentication, SSL-enabled server software can check that a client's certificate and public ID are valid and have been issued by a certificate authority (CA) listed in the server's list of trusted CAs. This confirmation might be important if the server, for example, is a bank sending confidential financial information to a customer; in that case it is important to check the recipient's identity.

Privacy and integrity are mediated by X.509 certificates, which act as electronic ID cards. Usually these are issued by external Certificate Authorities (CAs), whose business is the issuing of Internet certificates. Some of these CAs are widely trusted because of their vetting protocols and performance records. That is, those CAs are thorough in verifying the identity of a certificate requester before issuing a commercial use certificate. Also, the operations of the CAs are secure enough to prevent theft of encryption keys and other materials that can be used to counterfeit their certificates.

Preparation for SSL Communication

There is a division of labor for SSL configuration tasks. The configurations of the client and the server are coordinated to achieve the required compatibility. The following sections describe the preparation tasks required for client configuration and server configuration.

Server and Related Client Configuration

The administrator of a target server must have completed at least one of the following:

- **Equip the server with an appropriate class X.509 certificate from a well-known Certificate Authority (CA).** The administrator will have created a public/private key pair, submitted a request to the CA for a certificate, and received and activated that server certificate. By definition a *well-known CA* is one whose root certificates are already stored in the Personal Communications PCommClientKeyDb.kdb database file—see "Configuring SSL for Connecting to a Server Using a Certificate from a Well-Known CA" on page 81 for a list of these.

  Note: You must also equip the client PCommClientKeyDb.kdb database file with an X.509 personal certificate from the same certificate authority (CA) to enable client authentication.

- **Equip the server with an appropriate class X.509 certificate from an unknown CA.** The procedure is the same as the step above with the added necessity of obtaining the root certificate from the *unknown* CA. Usually the administrator of the target server will distribute the appropriate root certificate which must then be added to the PCommClientKeyDb.kdb database file.

  Note: You must also equip the client PCommClientKeyDb.kdb database file with an X.509 personal certificate from the same certificate authority (CA) to enable client authentication.

- **Equip the server with a self-signed X.509 certificate.** The administrator of the target server can do this as an interim measure while waiting for a CA's certificate. A copy of that certificate must be added to the client PCommClientKeyDb.kdb database file. The distribution must be done in a secure manner to guard the privacy and integrity offered by SSL.

  Notes:
  1. You must also equip the client PCommClientKeyDb.kdb database file with a X.509 self-signed personal certificate from the same certificate authority (CA) to enable client authentication.
  2. You must also add a copy of this certificate to the server's key database.

Client Configuration

The following elements must be configured on the client side to enable SSL:

- **PCommClientKeyDb.kdb** is a certificate management database that is automatically created in the Personal Communications private subdirectory when Personal Communications is installed. It is password protected. The default password is *pcomm* and is generated when PCommClientKeyDb.kdb is initially created by Personal Communications. To assure the continued integrity of PCommClientKeyDb.kdb, change the default password to a password or passphrase that is not easily guessed. See "Changing the Password of a Client's Key Database" on page 80 for instructions on changing the password. As installed, this database contains a list of well known CAs and their root certificates that will be sufficient for the majority of SSL client users for server side authentication. If the target server uses a certificate from one of those well known CAs, the client user does not need to modify the PCommClientKeyDb.kdb other than to change the default password for server side authentication. See the notes in "Server and Related Client Configuration" on page 75.

- **PCommClientKeyDb.sth** is a password stash file that is automatically created when Personal Communications is installed. The password or passphrase used to protect PCommClientKeyDb.kdb is encrypted and stored in this stash file for use by Personal Communications. Every time the password is changed on

PCommClientKeyDb.kdb, this stash file must be regenerated. Otherwise, the SSL-mode will not operate. See "Changing the Password of a Client's Key Database" on page 80 for instructions on changing the password.

Notes:

1. The use of a password stash file is strongly discouraged; the protection for these files is not strong.

2. **Using Password for ClientKeyDb.kdb instead of PCommClientKeyDb.sth**: Personal Communications allows the option to not use the PCommClientKeyDb.sth password stash file. To operate in this manner, erase the PCommClientKeyDb.sth file from the Personal Communications private subdirectory; then, during SSL session configuration, select the **Prompt for Password Once** radio button from the **Advanced Security Setup** property page.

- The **Enable Security** checkbox must be set in the telnet configuration of Personal Communications to operate in SSL mode. A client operating in SSL mode cannot establish a connection with a server that is operating in ordinary Telnet mode. Likewise, a client operating in ordinary Telnet mode cannot establish a connection with a server operating in SSL mode. See "Configuring Personal Communications for SSL Support" on page 78 for information on enabling security.

- Check the **Send Personal Certificate to Server if Requested** check box on the **Advanced Security Setup** property page for client authentication. If this field is not checked, only server side authentication is performed. See "Opening a Key Database and Adding a Root Certificate" on page 82 for details.

Establishing an SSL-Based Session

Upon establishing a preliminary connection with a target server, the Personal Communications client is presented a certificate by that server; if you have enabled client certificate authentication, your certificate is likewise presented to the server. The digital signature of the CA is authenticated using a published *root* certificate of the issuing CA. The client automatically decrypts certain information on the presented certificate using a *public* key on the CAs root certificate. This step is successful only when the presented certificate was encrypted using a well guarded, unique, and corresponding *private* key, known only to the CA. This process can detect (and reject) intentional alterations (forgeries) and the rare garbling that can occur over data circuits.

Personal Communications also allows users to use self-signed certificates for this purpose.

Once this certificate-issuer authentication step succeeds, the client and server negotiate to agree on an encryption key to be used during the ensuing data exchange session.

Secure Session Icon

When an SSL connection is established, a padlock icon is displayed in the Personal Communications status bar. Depending on the level of encryption, the icon is accompanied by a number (0, 40, 56, 128, 168). If the session is not SSL-based, the icon shows as unlocked.

You can display information about the security aspects of your session by clicking **Security** → **Client** from the **Communication** menu, or **Security** → **Server** from the **Communication** menu.

Configuring Personal Communications for SSL Support

Whether you are configuring a TN3270, TN5250 or VT session, a single restriction is that the underlying protocol must be TCP/IP. Once you have selected the Connection to Host for your configuration, do the following to enable SSL:

1. Start a workstation profile from the Session Manager; or, from an active session, click **Configure** from the **Communication** menu. When the dialog box appears, click **Configure**.
2. In the Customize Communication panel, choose the appropriate Type of Host, Interface and Attachment values for the desired Telnet host.
3. Click **Link Parameters**
4. Depending on the host type and transport selected, there will be property page tabs for:

   Host Definition

   Automatic Host Location

   Advanced Security Setup

Host Definition

For the **Host Definition** property page:

1. Specify the normal host name and LU parameters under **Primary**.
2. Specify the **Port Number** under **Primary**. It is likely that it will not be the default port value for Telnet. The administrator of the destination server might have set up a specific port number to handle SSL service.
3. Click **Enable Security**.

   Note: If the **Enable Security** checkbox is greyed out, then SSL support is not installed. Check Personal Communications Installation information to see if an error occurred during product installation.

4. For server authentication only, no additional setup is required. For client authentication, click on the tab for the **Advanced Security Setup** property page. Select the desired radio button for key database password option. Check the **Send Personal Certificate to Server if Requested** check box and select the desired radio button to select or be prompted for the personal certificate. Click **OK**.
5. Click **OK**.
6. Click **OK**.

The connection will start after a few moments.

Automatic Host Location

For the **Automatic Host Location** property page:

1. Click **Enable SLP**.
2. Click **Enable Security**.

   Note: If the **Enable Security** checkbox is greyed out, then SSL support is not installed. Check Personal Communications Installation information to see if an error occurred during product installation.

3. Fill in **Scope** and **LU or Pool Name** information, according to instructions from your network administrator.

4. For server authentication only, no additional setup is required. For client authentication, click on the tab for the **Advanced Security Setup** property page. Select the desired radio button for key database password option. Check the **Send Personal Certificate to Server if Requested** check box and select the desired radio button to select or be prompted for the personal certificate. Click **OK**.

5. Fill out the remainder of the parameters in the standard way.

6. Click **OK**.

7. Click **OK**.

   The connection will start after a few moments.

Note: The default TCP/IP parameter for packet multicast has changed for Windows Me and 2000, to disable this function.

To enable SLP support for Windows 2000, the following **Value Name** needs to be defined or updated in the system registry:

Key Under `HKEY_LOCAL_MACHINE\SYSTEM\`, CurrentControlSet\Services\Tcpip\Parameters

Value Type
 REG_DWORD-Boolean

Valid Range
 Set the value to 0.

To enable SLP support for Windows Me, the following **Value Name** needs to be defined or updated in the system registry:

Key Under `HKEY_LOCAL_MACHINE\SYSTEM\`, CurrentControlSet\Services\Class\VxD\MSTCP

Value Type
 REG_DWORD-Boolean

Valid Range
 Set the value to 0.

Advanced Security Setup

For the **Advanced Security Setup** property page:

1. In the **Key Database Password** group box, you can choose whether or not to use the key database password stash file. Select the **Use Password Stash (STH) File** radio button to use key database stash file and not be prompted for the key database file password. You can use this option with or without the Client Authentication function.

2. In the **Personal Client Certificate from Key database** group box, you determine when and how the client certificate will be chosen for sending to the server. If you want to enable client authentication and have the personal client certificate from the key database file sent to the server when requested, check the **Send Personal Certificate to Server if Requested** check box. Select the **Send Personal Certificate Trusted by Server** radio button if one do not want to be prompted to select a Personal Client Certificate from Key Database file. Personal Communications will send the Personal Client Certificate trusted by Server.

If you want to choose the personal client certificate, select the **Select or Prompt for Personal Client Certificate** radio button; you will be prompted to select a personal client certificate during session establishment, when the server requests the client certificate.

To preselect a personal client certificate during configuration, select on the **Select now** radio button; the Enter Key Database Password screen is displayed. Enter the **Key Database Password** and select from the **Personal Certificate Label** drop-down list, and click **OK**.

3. Click **Apply**.
4. Click **OK**.
5. Click **OK**.

The connection will start after a few moments.

Pop-up Messages

During session establishment, your workstation may display pop-up messages in order to solicit from you:

- The password for accessing the PCommClientKeyDb.kdb database
- The location of the PCommClientKeyDb.kdb

If you chose to be prompted for personal client certificate information (see "Advanced Security Setup" on page 79), the Select Client Personal Certificate Label Name screen is displayed at connection time, when the server requests the client personal certificate. The **Server Certificate Information** list box displays the information about the certificate issued to the server, as well as the issuer. Information includes common name, organization, locality and e-mail. This is provided for information purpose only; none of the information can be selected. The **Server Trusted Root List** list box displays the information about the trusted root supported by the server. This is also provided for information purpose only; none of the information can be selected. Click the **Select Personal Certificate Label Name** drop-down list and select the personal certificate to be sent to the server for client authentication. Click **OK** after selection.

If you chose to be prompted once for the key database password (see "Advanced Security Setup" on page 79), the Enter Key Database Password screen is displayed at connection time, when the server requests the client personal certificate. Enter the key database password and click **OK**.

Changing the Password of a Client's Key Database

The key database file created when Personal Communications is installed has a default set of root certificates that will handle a majority of server certificates without modification to the file. This initial file is accessible using certificate management. The default password *pcomm*.

Certificates can be managed using Certificate Wizard, Certificate Manager, or using the command-line mode. For information on using the command-line mode, see "Using the Command-line Mode for Managing Certificates" on page 85.

Using Certificate Wizard

The wizard is provided to allow users to easily change a password or add a certificate to a key database file. To access the Certificate Wizard, do the following:

1. From the **Start → Programs → IBM Personal Communications → Utilities** menu, select **Certificate Wizard**.
2. Select the **Change the password to your key database** radio button on the Welcome to the Personal Communications Certificate Wizard panel, click **Next**, and proceed through the wizard following the instructions on each panel.

Using Certificate Management

To change the password using Certificate Management, do the following:

1. From the **Start → Programs → IBM Personal Communications → Utilities** menu, select **Certificate Management**.
2. From the **Key Database File** menu, select **Open**.
3. Select the PCommClientKeyDb.kdb file from the Personal Communications private subdirectory.
4. Click **Open**.
5. Type the current password for the file in the Password entry field.
6. From the **Key Database File** menu, select **Change Password**.

   Follow the guidelines issued by your network manager for selecting a password or passphrase that is not easily guessed.
7. Type the new password in the New Password entry field.
8. Type the new password again in the Confirm New Password entry field.
9. To set a password expiration time, click **Set expiration time** and enter the number of days until expiration.
10. Click **Stash the password** to *stash* the password of the current database encrypted.

    Note: Personal Communications cannot access the certificates in your file if this checkbox is not selected.
11. Click **OK**.

Configuring SSL for Connecting to a Server Using a Certificate from a Well-Known CA

The following CA signed root certificates are already stored in the key database and marked as trusted certificates:

- Thawte Personal Premium CA
- Thawte Personal Freemail CA
- Thawte Personal Basic CA
- Thawte Premium Server CA
- Thawte Server CA
- RSA Secure Server CA
- VeriSign Class 3 Public Primary CA
- VeriSign Class 2 Public Primary CA
- VeriSign Class 1 Public Primary CA

Following is a summary of the steps required for connecting to a server using a certificate issued by a well-known CA:

1. Confirm that the server you want to connect to has a certificate from a well-known CA.

2. Configure Personal Communications for SSL support. See "Configuring Personal Communications for SSL Support" on page 78 for details.

Configuring SSL for Connecting to a Server Using a Certificate from an Unknown CA

The procedures in this section explain how to configure security for connecting to a server using a certificate issued by an unknown CA; that is, a CA that is not already defined in the PCommClientKeyDb.kdb file.

Following is a summary of the steps required:
1. Confirm that the server you want to connect with has a certificate from an unknown CA.
2. Request the root certificate for the unknown CA from your server administrator.
3. Open the PCommClientKeyDb.kdb file and add the root certificate to it.
4. For client authentication, obtain a personal certificate from this unknown CA and add it to the PCommClientKeyDb.kdb file.

Opening a Key Database and Adding a Root Certificate

When you get the root certificate file from your server administrator, make sure that it is in one of the following formats, based on the normal file extensions:

.ARM   Base64-encoded ASCII data (armored 64 format)

.DER   Binary DER data

Only a certificate in one of these formats can be added to the keyring database.

Note: In many cases, instead of providing a root certificate file, the server administrator may create the key database file and password stash file at the server. After adding the root certificate, the server administrator can copy the files to each client. If you do this, it is important that the names and location match as follows:
- Key database file: PCommClientKeyDb.kdb
- Password stash file: PCommClientKeyDb.sth

These files are located in the Personal Communications private subdirectory.

If the server administrator provided only a root certificate file, use the certificate wizard or certificate management utility to open the key database file and add the root certificate.

Certificates can be managed using certificate wizard, certificate management, or command-line mode. For information on using the command-line mode, see "Using the Command-line Mode for Managing Certificates" on page 85.

Using Certificate Wizard
The wizard is provided to allow users to easily change a password or add a certificate to a key database file. To use the certificate wizard, do the following:
1. From the **Start → Programs → IBM Personal Communications → Utilities** menu, select **Certificate Wizard**.
2. Select one of the following radio buttons on the Welcome to the Certificate Wizard panel:

> **Import a certificate**
>
> **Create a self-signed certificate**
>
> 3. Click **Next** and proceed through the wizard following the instructions on each panel.
>
> ## Using Certificate Management
> To use certificate management to open a key database and add a root certificate, do the following:
>
> 1. From the **Start ⭢ Programs ⭢ IBM Personal Communications ⭢ Utilities** menu, select **Certificate Management**.
> 2. From the **Key Database File** menu, click **Open**.
> 3. Select the PCommClientKeyDb.kdb file.
> 4. Click **Open**.
> 5. Type the password in the **Password** entry field and click **OK**.
> 6. Select **Signer Certificates** from the drop-down listbox.
> 7. Click **Add** to receive the certificate.
>   The Add CA's Certificate from a File panel appears.
> 8. Select the format dictated by your server administrator from the **Data Type** listbox.
> 9. Type the full path to the root certificate file in the **Certificate file name** entry field.
> 10. Click **Browse**, open the certificate file, and click **OK**.
> 11. Enter a label for the certificate and click **OK**.
> 12. Click **View/Edit**.
> 13. Activate the **Set the certificate as a trusted root**, and click **OK**.

Opening a Key Database and Adding a Personal Certificate

> When you get the personal certificate file from your server administrator or a CA, make sure that it is in one of the following formats:
>
> - PKCS12 file
> - CMS key database file
> - Keyring file
> - Base64-encoded ASCII data (armored 64 format)
> - Binary DER data
>
> Only a certificate in one of these formats can be added to the keyring database.
>
> **Notes:**
>
> 1. In many cases, instead of providing a personal certificate file, the server administrator may create the key database file and password stash file at the server. After adding the personal certificate, the server administrator can copy the files to each client. If you do this, it is important that the names and location match as follows:
>
>   **Key database file**
>   PCommClientKeyDb.kdb
>
>   **Password Stash file**
>   PCommClientKeyDb.sth
>
>   These files are located in the Personal Communications private subdirectory.

2. If the server administrator provided only a personal certificate file, use the certificate management to open the key database file and add the root certificate.

Using Certificate Management

To use certificate management to open a key database and add a personal certificate, do the following:

1. From the **Start → Programs → IBM Personal Communications → Utilities** menu, select **Certificate Management**.
2. From the **Key Database File** menu, click **Open**.
3. Select the PCommClientKeyDb.kdb file.
4. Click **Open**.
5. Type the password in the **Password** entry field and click **OK**.
6. Select **Personal Certificates** from the drop-down listbox.
7. Click **Import for KDB, DYR and P12 format files** to import the certificate.

   The Import Key panel appears.
8. Select the format dictated by your server administrator from the **Key file Type** listbox.
9. Type the full path to the root certificate file in the **Certificate file name** entry field.
10. Click **Browse**, open the certificate file, and click **OK**.
11. Enter the **Key Label**, or accept the default, and click **OK**.
12. Click **Receive for ARM and DER format files**.

    The Add CA's Certificate from a File panel appears.
13. Select the format dictated by your server administrator from the **Data Type** listbox.
14. Type the full path to the root certificate file in the **Certificate file name** entry field.
15. Click **Browse**, open the certificate file, and click **OK**.
16. Enter a label for the certificate and click **OK**.

Using Certificate Wizard

The wizard is provided to allow users to easily change a password or add a certificate to a key database file. To use the certificate wizard, do the following:

1. From the **Start → Programs → IBM Personal Communications → Utilities** menu, select **Certificate Wizard**.
2. Select the **Import a certificate** radio button on the Welcome to the Personal Communications Certificate Wizard panel, click **Next**.
3. Select the **Import a client certificate** radio button on the Import Certificate panel, click **Next** and proceed through the wizard following the instructions on each panel.

Note: The certificate wizard only supports importing a PKCS12 file.

Obtaining a Personal ID Certificate from a Known Certificate Authority (CA)

A personal ID certificate uniquely identifies you, and can be obtained from known certificate authorities. One such certificate authority is VeriSign. To obtain a Personal ID certificate from VeriSign:

1. Open the VeriSign web page at http://digitalid.verisign.com/.

2. Select **Personal IDs** from the page.
3. Follow the instructions on the next web page to install a **Digital ID** (either **full-service** or **trial**) in your web browser.

After the certificate has been installed in your browser, you must store it in the key database:
1. From the browser, export the certificate into a new key file.
2. Open the Personal Communications client key database file.
3. Click on **Export/Import** to import the certificate. The **Export/Import Key** dialog appears.
4. Click the **Key** button.

   Note: The key file type must be PKCS12 file.
5. Enter the name of the file in the first field, the path to the file in the second field; click **OK**.
6. At the password prompt, enter your password and click **OK**.

Configuring SSL for Connecting to a Server Using a Self-Signed Certificate

Although using self-signed certificates is not recommended, a server administrator can use them while waiting on a purchased CA certificate. Once the CA certificate is available, the server and all clients should be reconfigured to switch from the self-signed certificate to the purchased one.

Following is a summary of the steps required:
1. Confirm that the server you want to connect with has a self-signed certificate.
2. Request from your server administrator the root certificate for the self-signed certificate.
3. Open the PCommClientKeyDb.kdb file and add the root certificate to it.

The steps required by a client in this scenario are the same as those for the Unknown CA scenario. See "Opening a Key Database and Adding a Root Certificate" on page 82 for the steps involved.

Using the Command-line Mode for Managing Certificates

The command-line mode for managing certificates allows users to create batch files to change a password or add a certificate for a large number of key database files.

Note: Before using the command-line mode, be sure to make backup copies of the following files:

PCommClientKeyDb.kdb
    The key database

PCommClientKeyDb.sth
    The stash file where the password is stashed

Pcsgsk.pro
    A sample profile.

From the command prompt, the command-line mode has the following syntax:

```
pcsgsk [-h | -?] <filename>.pro | -e | -g
```

The options have the following significance:

-h or -?
> Displays the command-line mode syntax.

<filename>.pro
> Based on the information specified in *<filename>*.pro, change the password of a key database, add a certificate to the key database, or both.
>
> The *<filename>*.pro must be a fully qualified path, or the name of a file that exists in the Personal Communications private subdirectory. A default profile PCSGSK.PRO has been provided in the \private subdirectory.

-e   Displays a list of possible error codes and their associated messages.

-g   Launches the Certificate Wizard instead of the command-line mode.

The following examples show the different ways to invoke the command-line mode:

pcsgsk -?
> Displays the syntax.

pcsgsk pcsgsk.pro
> Action performed depends on the keyword content of the text file pcsgsk.pro which resides in the Personal Communications private subdirectory. For example, if the file contains **NewPwd=**, then the password of a key database will be changed. If **CertFile=** or **CertLabel=** are included, these certificate files will be imported.

pcsgsk -e
> Displays the possible error codes and the associated messages on the screen.

pcsgsk -g
> Launches the Certificate Wizard.

A sample profile, PCSGSK.PRO, is provided in the Personal Communications private subdirectory.

The rules for specifying parameters in the profile are as follows:

1. The file must contain a `-----BEGIN PROFILE-----` line with 5 hyphens before and 5 hyphens after BEGIN PROFILE, and must also contain a succeeding `-----END PROFILE-----` line with 5 hyphens before and 5 hyphens after END PROFILE.

   Active parameter information must be between `-----BEGIN PROFILE-----` and `-----END PROFILE-----`. Everything prior to the BEGIN PROFILE line and after the END PROFILE line is ignored.

   Note: The BEGIN PROFILE line, all active parameters, and the END PROFILE line *must* be in English.

2. Each parameter must be specified on a separate line of the profile. A parameter line must have the following form:
   ```
   Keyword=String
   ```

   Valid keywords are:

   KdbFile=
   > Used to specify the name of a key database. This parameter is required.

KdbFilePwd=
Used to specify the current password of the key database. This parameter is required.

Note: As default behavior, leading and trailing spaces in a password string are not treated as part of the password. However, imbedded spaces are retained. For example,
```
NewPwd= Multi-word password
```

The password is: *Multi-word password.*

To retain leading and trailing spaces, use the PwdSpaces= keyword.

NewPwd=
Used to specify the new password to be set.

Note: As default behavior, leading and trailing spaces in a password string are not treated as part of the password. However, imbedded spaces are retained. For example,
```
NewPwd= Multi-word password
```

The password is: *Multi-word password.*

To retain leading and trailing spaces, use the PwdSpaces= keyword.

PwdSpaces=
Set this parameter to **Yes** only if you want any leading or trailing spaces to be included in the passwords specified for KdbFilePwd= or NewPwd=. Normally, you will *not* want to set this parameter to **Yes**. For example:
```
NewPwd= Multi-word password
```

If PwdSpaces= is not set to Yes, the password is Multi-word password.

If PwdSpaces= is set to Yes, the password begins with the string *"Multi-word password"* with five leading spaces plus any trailing spaces.

> **Warning**
> Many ASCII editors can leave trailing spaces at the end of lines without giving any obvious indication.

CertFile=
Used to specify the fully qualified path of a certificate file to be added to the database. This must be a fully qualified path name.

CertLabel=
Used to provide a label to identify the certificate being added to the database.

3. One operation (changing the password or adding a certificate), or both, can be specified.

If the **NewPwd=** parameter is specified, the password will be changed to the new password.

If the **CertFile=** and the **CertLabel=** parameters are specified, the certificate is added to the key database.

4. A line is treated as a comment if it is not the first line or last line and if it is not a keyword line.

5. To preserve the security of passwords, both the new password and the old password are deleted from the profile during processing. This is true even if the attempted operation fails. For example, if the program cannot find the specified key database, and therefore cannot change the password, the old password and the new password are deleted from the profile.

6. After processing, two lines are added to the end of the profile, after the `-----END PROFILE-----` line, that specify the results of the attempted operation. These lines are as follows:

ResultPwd=nnnn
> Specifies the status of the change-password operation.

ResultCert=nnnn
> Specifies the status of the add-certificate operation.

The values possible for *nnnn* can be found by invoking PCSGSK with the -e option, as previously described, which causes the possible error codes and the associated messages to be displayed on the screen.

Security References

Personal Communications supports server and client authentication. The following publications are available on the World Wide Web and provide more information:

- *SSL-Talk FAQ Version 1.0.3*

  http://www.consensus.com/security/ssl-talk-faq.html

- *Introduction to SSL*

  http://www.camb.opengroup.org/˜fjh/Papers/cook/ssl_intro.html

- *SSL Version 3.0 Specification*

  http://home.netscape.com/eng/ssl3/index.html

For an introduction to and a history of public key cryptography and privacy, refer to *Simson Garfinkel, PGP: Pretty Good Privacy, O'Reilly and Associates, 1995*; ISBN: 1565920988.

Problem Determination

Following is some information to help you avoid problems that might be related to SSL configuration.

- With server side authentication, the common name in the sever's certificate is always compared to the name you type in the Host Name field on the client. These names must match exactly. You cannot:
  - Type the IP address in one place and the host name in the other
  - Type wrt05306 in one place and WTR5306 in the other
  - Type wtr05036 in one place and wtr05036.raleigh.ibm.com in the other

  Note: This information is available only from the target server administrator.
- Make sure that SSL is enabled in both the Personal Communications client and the SSL server.

- Makes sure that the port number in the Advanced configuration panel on the client matches the port number defined in the server.
- For each different server using a self-signed certificate, you must add a copy of each of the server certificates to your keyring.
- Be sure there is a root certificate of the proper class to correspond with the class and issuer of the certificate on the server.

Note: Notify your server administrator of any problems prior to contacting IBM Service.

Smart Card Support

Personal Communications Version 5.5 includes Smart Card support. A Smart Card is a small electronic device that contains electronic memory and can be used to store a certificate. You can keep the certificate in a local or network accessed file, in Netscape PKCS#11 format. You can specify the location of the certificate in the session preferences, or prompt for the personal client certificate. You can control the timing of prompts for client certificates. You can choose to prompt each time a connection is made to the server, or only the first time after starting Personal Communications. In addition, if your client stores preferences locally, you can choose to be prompted once, and all subsequent connections will use information stored in the local preferences. You can also store the password for the certificate on your local client, if you store preferences on your local client. You can allow the client to access its certificate before connecting to the server, whether the server requests a certificate or not.

Table 1 displays the supported Smart Card drivers and their filename.

Table 1. Supported Smart Card Drivers

Smart Card Drivers	File names
IBM SecureWay® Smartcard	w32pk2ig.dll
GemPlus/GemSoft Smartcard	w32pk2ig.dll
IBM Netfinity® PSG Chip[1]	ibmpkcss.dll
Rainbow Ikey 1000	Cryptoki22.dll
Schlumberger Cryptoflex	acpkcs.dll *or* slbck.dll
SCW PKCS 3GI 3-G International	3gp11csp.dll
Data Key	Dkck232.dll
Fortezza Module	fort32.dll

[1]The system boards in some IBM systems are preconfigured with a Promise of Value (POV) card, a 256-bit encrypted security chip daughtercard attached to the motherboard. If an attempt is made to remove the POV card from the board and install it into another system, the cryptographic key material will be erased, rendering it unusable. This security feature is by design and prevents the cryptographic key migration from one system to another. Therefore, moving this security chip from one board to another is not a supported option. If an attempt is made to move the POV card from one system to another, it may hang on boot and display an error message referring to an invalid machine type and serial number.

Enabling Smart Card Support

Smart Card is only used for the personal certificate and can only hold one personal certificate and does not hold the signer certificates. The signer certificate or the root and any intermediate certificate of the personal certificate on the Smart Card should be added in the PCommClientKeyDb.kdb file.

To enable Smart Card support when configuring a session, do the following:

1. Select **Enable Security** in the Host Definition tab panel.

2. In the Advanced Security Setup tab panel, select **Send Personal Certificate to Server if Requested**.

3. Select **Cryptographic Support (PKCS#11)**.

4. In the Cryptographic Support Setup panel, choose the Netscape Compatible PKCS#11 driver name from the drop-down list. If a driver software provider was not found by Personal Communications, you must enter a Smart Card driver name.

5. If the driver loaded successfully, the **Cryptographic Token Label** list is displayed. Enter the Cryptographic Token Password for the selected Cryptographic Token Label; this provides access to the PKCS#11 Cryptographic device and displays the PKCS#11 Certificate Label Name. If PKCS#11 Cryptographic support is enabled and a password for the PKCS#11 cryptographic module is not defined during configuration, the user will be prompted for the password

Chapter 9. ODBC Drivers and Database Access Utility

This chapter contains information about ODBC drivers and the Database Access utility. Should you require more detailed information, refer to the following guides:

- *IBM DB2 Connect Personal Edition Quick Beginnings* — S10J-8162–00
- *IBM DB2 Connect User's Guide* — S10J-8163–00

You can also find additional information in the online help.

Overview of Open Database Connectivity (ODBC)

ODBC is an industry standard application program interface (API) that provides a solution to a common problem—how to write programs that access a Database Management System (DBMS) without making them dependent on specific DBMS designs. ODBC provides API access to SQL-accessible databases, allowing application programs to use SQL to access data from many kinds of sources. The independence of the access method from the original design of the database means that developers can design and produce a single version of an application that can work with, for example, DB2 Connect™, Oracle, or Sybase data, without requiring a separate version for each DBMS. Users simply add database drivers to link the application to their choice of DBMS.

ODBC is a component of the Windows Open Services Architecture (WOSA). Personal Communications Version 5.5 supports ODBC 2.0, for development of 32-bit applications for Windows 95, Windows 98, Windows NT, Windows Me, and Windows 2000.

An ODBC driver provides an application program with standard and uniform SQL access to a DBMS database. An ODBC driver allows the designers and users of the application program to ignore the SQL differences between various DBMS systems.

Figure 1 shows an overview of the Personal Communications Database Access utility and the ODBC DB2® drivers.
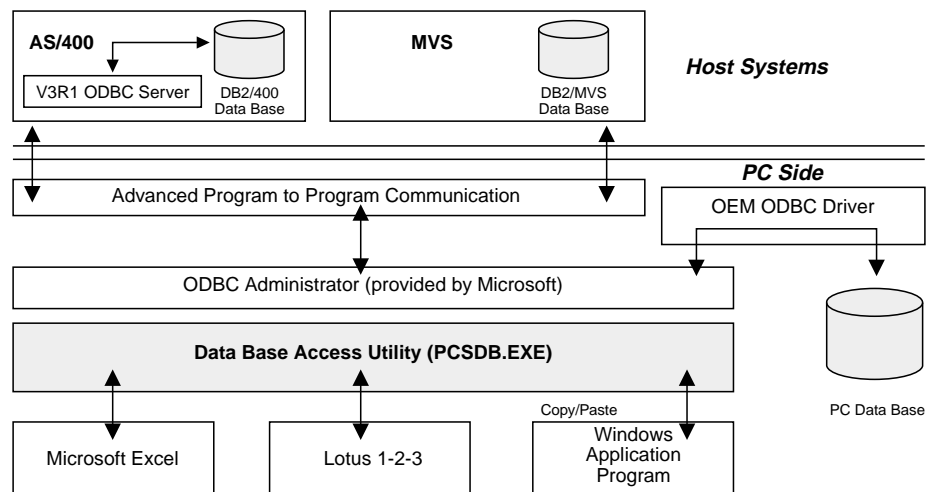
Figure 1. Database Access Overview

Components of ODBC

There are four components in the ODBC architecture:

- The **application** component defines and performs the work to be accomplished. It calls the ODBC API functions that submit SQL statements and retrieve results.
- The **driver manager** component loads drivers on behalf of an application.
- The **driver** component processes ODBC function calls, submits SQL requests to a specific data source, and passes results to the application. The driver transforms the application's SQL syntax into the syntax expected by the driver's associated DBMS.
- The **data source** component is the data to be accessed and the means for doing so, including the associated operating system, DBMS and network platform.

From the application program's perspective, the driver manager and the driver appear to be a single unit for processing ODBC function calls. Figure 2 shows the relationship between the four components:
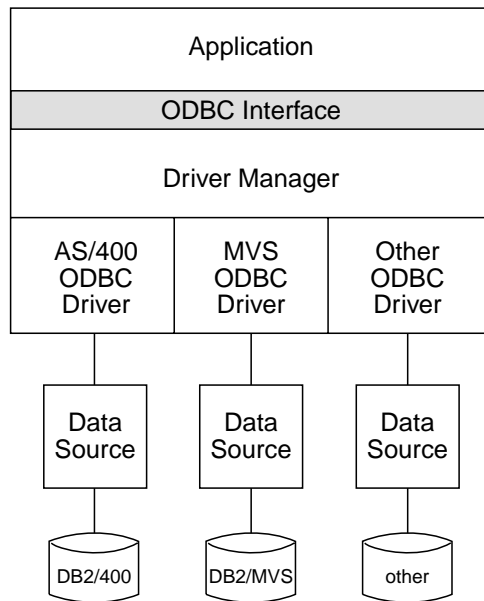
Figure 2. ODBC Components

Application Component

An application using ODBC performs the following tasks:

- Requests a session (connection) with a data source.
- Sends SQL requests to the data source.
- Defines storage areas and data formats for the results of the SQL requests.
- Requests the results of the defined query.
- Processes errors.
- Requests commit or rollback operations for transaction control.
- Terminates the session with the data source.

Any program that accesses a DBMS, such as a spreadsheet, a mail server, or a report generator, can be designed to use ODBC.

Driver Manager

The driver manager is a dynamic link library (DLL), the purpose of which is to load drivers. It also performs the following functions:

- Maps a data source name to a specific driver DLL.
- Processes ODBC initialization calls.
- Provides the entry points to the ODBC functions for each driver.
- Provides parameter and sequence validation for ODBC calls.

Driver

A driver is a DLL that implements ODBC function calls and interacts with a data source.

The driver manager loads a driver when the application calls the **SQLBrowseConnect**, **SQLConnect**, or **SQLDriverConnect** function.

A driver performs the following tasks in response to ODBC function calls from an application:

- Establishes a connection to a data source.
- Submits requests to the data source.
- Translates data to or from other formats, if requested by the application.
- Returns results to the application.
- Formats errors into standard error codes and returns them to the application.
- Declares and manipulates cursors if necessary. This operation is invisible to the application unless there is a request for access to a cursor name.
- Initiates transactions of the data source. This operation is invisible to the application.

Data Source

A data source is an instance of a DBMS product and any remote operating system and the protocol required to access it.

Database Access Utility

Database Access lets you access host or PC databases and retrieve data, using ODBC drivers. If you specify the conditions for accessing data in each window, the desired query can be created automatically. See the online help for extensive information on using the Database Access utility with the Personal Communications ODBC drivers.

From Database Access, you can perform any of the following actions:

- You can see and modify the SQL statements that are created automatically.
- You can see available database table lists.
- You can copy spreadsheet data to the clipboard
- You can show data in the grid in the main window spreadsheet, send data to other applications (for example Lotus® 1-2-3® or Microsoft Excel), or send data to a printer.
- If you want to know the meaning of items in the windows, you can see an explanation when you click on the item and then click help.

Accessing an ODBC Data Source

To access an ODBC data source, do one of the following:

- Click on the **Data Source** button on the toolbar.

- Select **Data Source** from the query pull-down menu.

The SQL Data Source window appears.

Select the data source you want to access; then click OK.

Note: Before using Database Access, you must install the 32-bit ODBC administrator and set up the ODBC data source you wish to use.

Selecting Database Tables
To select database tables, do one of the following:

- Click on the **Tables** button on the toolbar.

- Select **Tables** from the Query pull-down.

The Tables window appears.

Joining Conditions for Multiple Tables
To join conditions for multiple tables, do one of the following:

- Click on the **Join Conditions** button on the toolbar.

- Select **Join** from the Query pull-down menu.

The Join By window appears.

Selecting Database Columns
To select database columns, do one of the following:

- Click on the **Columns** button on the toolbar.

- Select **Columns** from the Query pull-down menu.

The Columns window appears.

Selecting Query Conditions
To select query conditions for the data, do one of the following:

- Click on the **Query Conditions** button on the toolbar.

- Select **Query Conditions** from the Query pull-down menu.

The Query Conditions window appears.

Selecting Sort Conditions
To select sort conditions for each column, do one of the following:

- Click on the **Order** button on the toolbar.

- Select **Order** from the Query pull-down menu.

The Order By window appears.

Viewing the Current SQL Statement

To view the current SQL statement, do one of the following:

- Click on the **SQL Statement** button on the toolbar.

- Select **SQL Statement** from the Query pull-down menu.
- Click the SQL button in any window selected from the Query pull-down menu.

The SQL Statement window appears.

Database Size Limit

When you use Database Access, the maximum number of each value that can be displayed in the spreadsheet is as follows:

Number of columns	400
Number of rows	16350
Column length	2048 bytes
Row length	2048 bytes
SQL statement's length	32766 bytes

Note: The values shown are standard, but your PC's available resources (such as memory) can result in other limits.

When you use another application (for example Lotus 1-2-3), refer to the manual for that application because the limit might be different.

Chapter 10. Express Logon Feature

The Express Logon Feature allows a Personal Communications Telnet 3270 user to securely logon to a host application without sending the User ID and password. One advantage of using this function is that it reduces the time you spend maintaining host user IDs and passwords. It also reduces the number of user IDs and passwords that the users have to remember.

To use Express Logon, the host session must be configured for SSL and client authentication. This means the client must have a valid client certificate. The SSL connection must be made to one of the supported Telnet 3270 servers.

Using Express Logon

When starting a session using Express Logon, Personal Communications establishes an SSL client authentication session with the Telnet 3270 server. During the logon process, a macro with the Express Logon information is played. Once the session is established, Personal Communications sends the application ID for the application that the user is accessing to the Telnet 3270 server. This information is contained in the logon macro. The Telnet 3270 server uses certificate information from the SSL connection and the application ID received from Personal Communications, and requests the user ID and passticket (a temporary password) from the host access control program (such as RACF®).

Personal Communications uses the macro function to put predefined substitute strings in the user ID and password fields. The Telnet 3270 server substitutes the user ID and passticket in the appropriate place in the 3270 datastream. The logon is completed.

After an ELF macro is recorded, it can be distributed to multiple users for playback without further modification.

Preparing to Configure the Express Logon Feature

Before you configure an Express Logon macro, you need to have the following information.

- Host application name

  Name of the host application the user is logging onto. For example, the name entered on the USSMSG10 screen.

- Host access application ID

  This name must match the RACF PTKTDATA (Passticket Data Profile) application name that is configured on the OS/390® (V2R10 or later) or z/OS host. This name could be the same as the application name that the user is logging onto (for example, the name on USSMSG10). When creating PTKTDATA profiles for applications such as TSO, the application name portion of the profile will most likely not be the same. For example, RACF requires that the application ID portion of the profile name be TSO+SID. Refer to the *OS/390 V2R10.0 SecureWay Security Server RACF Security Administrator's Guide* or the *z/OS V1R1.0 SecureWay Security Server RACF Security Administrator's Guide* to determine the correct profile naming.

- User ID and password for the application that you are logging on to.

During macro recording, the actual user ID and password are used. They are not recorded in the macro; only the predefined substitute strings are recorded in the macro. The Telnet 3270 server replaces the predefined substitute strings with the actual user ID and password during the logon process.

- Client Security Certificate

  The security certificate for the client must be stored in RACF using the RACF RACDCERT command.

  - For information about using digital certificates with RACF, refer to the following books:
    - For OS/390, refer to *OS/390 V2R10.0 SecureWay Security Server RACF Security Administrator's Guide* and *OS/390 V2R10.0 SecureWay Security Server RACF Command Language Reference.*
    - For z/OS, refer to *z/OS V1R1.0 SecureWay Security Server RACF Security Administrator's Guide* and *z/OS V1R1.0 SecureWay Security Server RACF Command Language Reference.*

  - For information about configuring DCAS to use RACF certificates, refer to the following books:
    - For OS/390, refer to *OS/390 V2R10.0 IBM Communication Server IP Migration.*
    - For z/OS, refer to *z/OS V1R1.0 IBM Communication Server IP Migration.*

Configuring Express Logon

Recording the Macro

You must record a macro for each host application that you want to access. You cannot log on to multiple applications with one macro. You do not have to configure SSL, and client authentication is not required on the telnet servers and OS/390 or z/OS before recording the logon macro, but you must do this before you can play the macro.

Manual Configuration of an ELF Macro

You can manually configure an existing Macro format file for ELF use. The procedure is as follows:

1. From the Action Bar, open the macro file containing the recorded keystrokes by selecting **Edit → Preferences → Macro/Script**.
2. Select the macro file you just recorded and then select **Customize**.
3. Replace the UserID recorded in the macro with two tags: the ELF Application ID and the ELF UserID placeholder. The Application ID tag consists of three words, each separated by a blank character: `elf`, `applid`, and the identifier of the host application that will be logged onto. The UserID placeholder is `)USR.ID(`.

   For example, replace "myUserID with ")USR.ID(.

4. Replace the Password recorded in the macro with the ELF Password placeholder tag `)PSS.WD(`.

   For example, replace "myPassword with ")PSS.WD(.

Limitations of the Logon Macro

- Automatic insertion of the user ID and password placeholders into the recorded macro requires that the password be typed into the first non-display input field. The user ID is assumed to have been entered just prior to the password. The

Modified Data Tag attribute of each formatted input field is assumed to be **ON** only when the field has been modified by the operator.

- There is a short delay while the Telnet 3270 server acquires the passticket from the host access control facility. The amount of time is probably less than the usual delay incurred when the user enters a user ID and password. However, the user can see the macro proceed through the screens during the logon process.
- Logon Express recording requires that the host program uses 3270 field attributes to define the password field on the screen.

Problem Determination

If the client logon fails and displays the messages `)USR.ID( NOT IN CP DIRECTORY`, `INVALID USERID`, `)USR.ID(, PASSWORD NOT AUTHORIZED` or any similar messages, check the Telnet 3270 server log for details.

Possible reasons for failures are:
- The application ID defined in the macro is not valid.
- The Telnet 3270 server could not connect to DCAS. The host might be down.
- The client certificate is not defined in RACF or it is not valid.
- The passticket has expired and could not be used to log on.
- The Telnet 3270 server completed scanning of data stream without replacing the user ID or password.
- The Telnet 3270 server or the host does not support the Express Logon Feature.

Part 3. SNA and AnyNet Topics

Chapter 11. SNA Client/Server Concepts

Terminology

Advanced Program-to-Program Communication (APPC)
> An implementation of the SNA LU 6.2 protocol that allows interconnected systems to communicate and share the processing of programs.

Advanced Peer-to-Peer Networking (APPN)
> An enhancement for Systems Network Architecture (SNA) networks featuring:
> - Dynamic exchange of network topology information that simplifies connections, route selection, network definition, and reconfiguration
> - Automated resource registration and directory lookup
> - Greater distributed network control that helps to isolate the effects of single points of failure

Common Programming Interface for Communications (CPI-C)
> Personal Communications provides support for the Common Programming Interface for Communications (CPI-C) 2.0 industry standard interface from X/Open. The CPI-C interface enables greater application portability across different platforms. By using CPI-C 2.0, APPC programming is simplified, resulting in reduced cycle time, and enhanced client/server computing capability. This support provides the capability for distributed parts of an application to converse with one another. The implementation is consistent with the Conversational function described in the IBM Open Blueprint®.

Logical Unit Address (LUA)
> System software and interfaces that supply input/output (I/O) service routines to support communications that use LU types 0, 1, 2, and 3 SNA protocols. These protocols support user defined data streams, SNA character streams, and SNA 3270 data streams. LUA services include only those services that support data communications. LUA does not supply any device emulation facilities.

Node An endpoint of a link, or a junction, common to two or more links in a network. Nodes can be linked to host processors, communication controllers, cluster controllers, terminals, or workstations.

End Node
> Provides directory and routing services for a workstation on an APPN network.
>
> If the workstation will not be connecting from an end node to a network node server, you need to define an SNA connection.

APPC Concepts

Personal Communications provides Advanced Peer-to-Peer Networking (APPN) end node support for workstations, allowing them to communicate more flexibly with other systems in the network.

Personal Communications provides advanced program-to-program communications (APPC) to support communications between distributed

processing programs, called *transaction programs* (TPs). APPN extends this capability to a networking environment. The TPs can be located at any node in the network that provides APPC.

Introducing APPC and CPI-C

Advanced Program-to-Program Communication (APPC), also known as LU 6.2, is software that enables high-speed communications between programs on different computers, from portables and workstations to midrange and host computers. APPC software is available for many different IBM and non-IBM operating systems, either as part of the operating system or as a separate software package.

APPC serves as an interface between application programs and the network. When the communications application on your workstation passes information to the APPC software, APPC takes the information and sends it on to a network interface, such as a token ring adapter card. The information travels across the network to another computer, where the APPC software receives the information from the network interface. APPC puts the information back into its original format and passes it to the corresponding communications application.

APPC provides a consistent set of functions for program-to-program communications across different platforms. But, the architecture did not specify a common application programming interface (API) for implementing these functions. As a result, each operating system that supports APPC developed its own API, a set of verbs that closely resemble the operating system itself. These differences do not pose a problem if you are writing programs for two computers that use the same operating system. Most client/server applications run on different types of computers, however, to take advantage of the strengths of each computer. So, if you are designing programs for different operating systems, you must learn how to use two or more different sets of verbs.

The Common Programming Interface for Communications (CPI-C) eliminates this problem. CPI-C provides one standard set of verbs, known as CPI-C calls, for all systems that support CPI-C. As a result, you learn only one set of calls to write client/server applications for different systems.

What Is a Transaction Program?

The part of the communications application that initiates or responds to APPC communications is called a transaction program. A transaction program is not an entire, stand-alone program. Instead, it is the part of the program that handles transactions (exchanges of data) with another program.

When people talk with each other, we say that they are having a conversation. Likewise, the communication between two transaction programs is called a conversation.

A conversation between two programs is similar to a conversation between two people. When you have a conversation with another person, you follow unwritten rules that govern how you begin and end the conversation, take turns speaking, and exchange information. Similarly, APPC is called a protocol because it provides the rules that govern how conversations between transaction programs start and stop, which program "speaks" first, and how data is exchanged. Computers need complete and rigid rules for conversations between programs. For that reason, APPC consists of a set of well-defined and thorough rules to cover all possible communications situations.

An APPC program may have several conversations active at one time, with the same transaction program or with different transaction programs.

Every transaction program needs a partner to communicate with. Thus, transaction programs are developed in pairs called partner transaction programs.

People use different parts of speech to communicate with each other. Transaction programs are more limited in their communications; they use only verbs to communicate with each other. The verbs are the programming language you use to start, stop, and control conversations.

A transaction program consists of APPC and CPI-C verbs such as:

ALLOCATE (CMALLC in CPI-C)
    Starts a conversation with another transaction program

SEND_DATA (CMSEND in CPI-C)
    Sends data to the partner transaction program

RECEIVE (CMRCV in CPI-C)
    Receives data from the partner transaction program

DEALLOCATE (CMDEAL in CPI-C)
    Ends a conversation with another transaction program.

The APPC verbs make up the application programming interface (API) for APPC and CPI-C. In other words, these verbs represent the interface between the transaction program and the APPC software.

What Is the Difference between APPC and APPN?

APPC is a communications protocol that enables programs on different computers to "talk to" each other. APPC provides the interface between the programs and the networking hardware and software and defines the rules that programs use to exchange information.

Advanced Peer-to-Peer Networking (APPN) is the underlying networking protocol that routes APPC traffic through intermediate nodes in the network. For instance, when Program A uses APPC to talk to Program B, APPN finds the node where Program B is located and directs the APPC traffic through the network.

APPN includes several features that help reduce the amount of configuration required to set up and maintain a network. These features automate many tasks that are time-consuming, complicated, and error-prone. For example, if you're installing a new workstation that uses APPN, you don't have to set up configuration information for every workstation you want to communicate with. You simply provide the name of the computer and the address of the intermediate node that handles your traffic. APPN takes care of the rest of the information needed to route APPC traffic to and from your workstation.

If you connect to an APPN network, you simplify your own configuration and make it easier for other computers in the network to find you.

Side Information Definitions

Before starting a conversation with a partner program, a CPI-C program requires the following information:
• The name of the partner program
• The name of the LU on the remote computer

- The type of session used by the program
- Security information

If the CPI-C partner program uses a blank symbolic destination name, a side information definition is not necessary.

Improving Productivity Using APPC

The advanced features of APPC help speed the development of robust client/server applications and keep development costs low.

Client/server applications often prove to be especially challenging to the programmer. It's not enough to understand the details about the computer and operating system that your application uses. If you're designing client/server applications, you have to deal with computers used by both sides of the application, as well as the intervening network. For instance, implementing effective security measures is more important and more complicated, since you must ensure security throughout the network. In addition, synchronization and error reporting are often problematic in a distributed environment, because both sides of the application must coordinate their work.

One reason that APPC has become so widely used in client/server applications is that it furnishes a complete set of useful functions like security, synchronization, and error reporting. If you use other protocols, you must build these functions in every application you write. For example, if you use NetBIOS, you must design and implement a strategy for security for each application. Not only does this approach require additional work, it may result in a number of incompatible security systems in your network. By contrast, APPC includes a common set of security services that are consistent across all APPC platforms.

Similarly, most protocols do not include synchronization functions. Synchronization is required by any program that cannot continue processing data until the data sent to the partner program has been received and processed. Rather than writing your own synchronization routine, APPC provides a Confirm call that you can use to handle synchronization between two programs.

Improving Productivity Using CPI-C

Because many client/server applications are distributed between mainframe systems and workstations, host programmers and workstation programmers must work together to develop partner applications. CPI-C bridges the gap between these programmers by providing a common language for designing the communications part of the applications. CPI-C also enables you to write the communications portion of an application without knowing the details of the operating system. After you write a CPI-C application, you can easily move the programs from one operating system to another with few changes. So, by using the CPI-C interface, you can port both your applications and your programming skills from one system to another, quickly and cost-effectively.

What Is a Logical Unit?

Every TP gains access to an SNA network through a *logical unit* (LU). An LU is SNA software that accepts verbs from your programs and acts on those verbs. A TP issues APPC verbs to its LU. These verbs cause commands and data to flow across the network to a partner LU. An LU also acts as an intermediary between

the TPs and the network to manage the exchange of data between TPs. A single LU can provide services for multiple TPs. Multiple LUs can be active in the node simultaneously.

LU Types

Personal Communications supports LU types 0, 1, 2, 3, and 6.2. LU types 0, 1, 2, and 3 support communication between host application programs and different kinds of devices, such as terminals and printers.

LU 6.2 supports communications between two programs located at type 5 subarea nodes, type 2.1 peripheral nodes, or both, and between programs and devices. APPC is an implementation of the LU 6.2 architecture.

Communication occurs only between LUs of the same LU type. For example, an LU 2 communicates with another LU 2; it does not communicate with an LU 3.

When Personal Communications is configured, your local and partner LUs are defined once for each machine. When you design programs, you must understand the capabilities supported by the LU in the particular machines you plan to use.

Dependent and Independent LUs

A *dependent LU* depends on a system services control point (SSCP) to activate a session. A dependent LU needs an active SSCP-LU session, which the dependent LU uses to start an LU-LU session with an LU in a subarea node. A dependent LU can have only one session at a time with the subarea LU. For communications with a TP at a subarea node, each dependent LU can have only one conversation at a time, and each dependent LU can support communications for only one TP at a time.

An *independent LU* does not depend on an SSCP to activate a session. An independent LU supports multiple concurrent sessions with other LUs in a subarea node, so you can have multiple conversations and support multiple TPs for communications with subarea TPs. LUs between peripheral nodes also use this support.

The distinction between a dependent LU and an independent LU is meaningful only when discussing a session between an LU in a peripheral node and an LU in a subarea node. Otherwise, dependent and independent LUs both support multiple concurrent sessions and conversations when communicating between type 2.1 peripheral nodes, for example, between two Windows NT workstations. A Personal Communications LU can support a single session with a dependent LU or multiple sessions with an independent LU.

What Is a Session?

Before TPs can communicate with each other their LUs must be connected in a mutual relationship called a *session.* A session connects two LUs, so it is called an *LU-LU* session. Figure 3 on page 108 illustrates this communication relationship. Multiple, concurrent sessions between the same two LUs are called *parallel* LU-LU sessions.
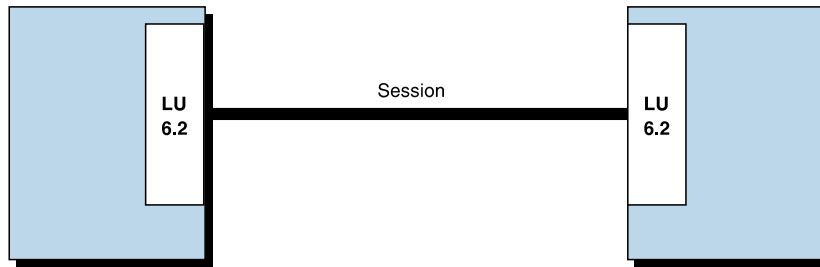
Figure 3. A Session between Two LUs

Sessions act as conduits that manage the movement of data between a pair of LUs in an SNA network. Specifically, sessions deal with things such as the quantity of data transmitted, data security, network routing, and traffic congestion.

Sessions are maintained by their LUs. Normally, your TPs do not deal with session characteristics. You define session characteristics when you:
- Configure your system
- Use the Session Services function in the Subsystem Management windows
- Use the management verbs

What Is a Conversation?

The communication between TPs is called a *conversation.* Conversations occur across LU-LU sessions. A conversation starts when a TP issues an APPC verb or CPI-C call that allocates a conversation. The conversation style associated with the conversation indicates the style of data transfer to be used, two-way alternate or two-way simultaneous. A conversation that specifies a two-way alternate style of data transfer is also known as a *half-duplex* conversation. A conversation that specifies a two-way simultaneous style of data transfer is referred to as a *full-duplex* conversation.

When a half-duplex conversation is allocated to a session, a send-receive relationship is established between the TPs connected to the conversation, and a two-way alternate data transfer occurs where information is transferred in both directions, one direction at a time. Like a telephone conversation, one TP calls the other, and they "converse", one TP talking at a time, until a TP ends the conversation. One TP issues verbs to send data, and the other TP issues verbs to receive data. When it finishes sending data, the sending TP can transfer send control of the conversation to the receiving TP. One TP decides when to end the conversation and informs the other when it has ended.

When a full-duplex conversation is allocated to a session, both TPs connected to the conversation are started in send-and-receive state, and a two-way simultaneous data transfer occurs where information is transferred in both directions at the same time. Both TPs may issue verbs to send and receive data simultaneously with no transfer of send control required. The conversation ends when both TPs indicate they are ready to stop sending data, and each TP has received the data sent by the partner. If an error condition occurs, one TP may decide to end both sides of the conversation abruptly.

Conversations can exchange control information and data. The TP should select the conversation style best suited for its application.

A Conversation between Two TPs

Figure 4 shows a conversation between two TPs as it occurs over a session.
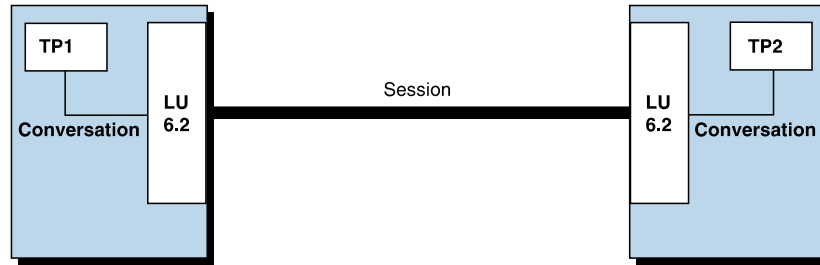
Figure 4. A Conversation between Two TPs

A session can support only one conversation at a time, but one session can support many conversations in sequence. Because multiple conversations can reuse sessions, a session is a long-lived connection compared to a conversation. When a program allocates a conversation and all applicable sessions are in use, the LU puts the incoming Attach (allocation request) on a queue. It completes the allocation when a session becomes available.

Two LUs can also establish parallel sessions with each other to support multiple concurrent conversations. A parallel session occurs when either TP allocates a conversation, and a session exists but is being used by a conversation. The LU can request a new session to satisfy the allocation.

Parallel Sessions between LUs

Figure 5 shows three parallel sessions between two LUs; each session carries a conversation.
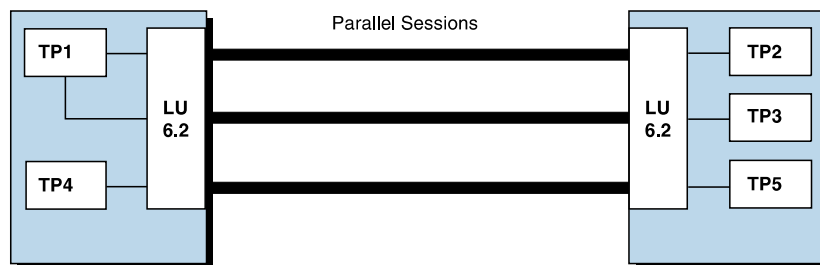
Figure 5. Parallel Sessions between LUs

SNA Communications

Personal Communications supports Systems Network Architecture (SNA) type 2.1 nodes (including SNA type 2.0 and SNA type 2.1 support for LUs other than SNA LU 6.2). This support lets you write programs to communicate with many other IBM SNA products.

You can write programs without knowing the details of the underlying network. All you need to know is the name of the partner LU; you do not need to know its location. SNA determines the partner LU location and the best path for routing data. A change to the underlying network, such as a physical address change, the

addition of a new adapter, or the relocation of a machine, does not affect APPC programs. A program might, however, need to establish link connections over switched SDLC connections.

When Personal Communications starts, it establishes local LU and logical link definitions, which are stored in a configuration file. The system management application programming interface (API) provides functions that control configuration definition and adapter and link activation.

SNA Node Operations

With SNA Node Operations, either a user or system administrator can display information or take action on node resources that are known to the active node.

The following tasks are supported:
- Starting and stopping resources
- Deleting resources
- Displaying resource information
- Changing session limits
- Initiating path switches

Refer to the information about SNA node operations in *3270 Emulator User's Reference*, or *5250 Emulator User's Reference*, or the online help for information on using SNA node operations.

Chapter 12. AnyNet SNA over TCP/IP

This chapter describes the AnyNet SNA over TCP/IP function of Personal Communications.

What Does AnyNet SNA over TCP/IP Do?

SNA over TCP/IP is one of the IBM AnyNet software offerings. AnyNet software enables application programs to communicate over different transport networks and across interconnected networks. Using AnyNet, you can reduce the number of transport networks and therefore reduce operational complexity. These benefits are gained without modification to your existing application programs or hardware.

The AnyNet function in Personal Communications enables SNA applications to communicate over an IP network. This includes the Personal Communications emulators, both 3270 and 5250, as well as APPC and CPI-C applications.

The following network configurations illustrate how SNA over TCP/IP access nodes and gateways can be used.

Running APPC or CPI-C Applications over a TCP/IP Network

Figure 6 illustrates how you can use the AnyNet SNA over TCP/IP function of Personal Communications to enable communication between SNA applications over an IP network. Configuration information for a similar configuration is provided in *Quick Beginnings*.
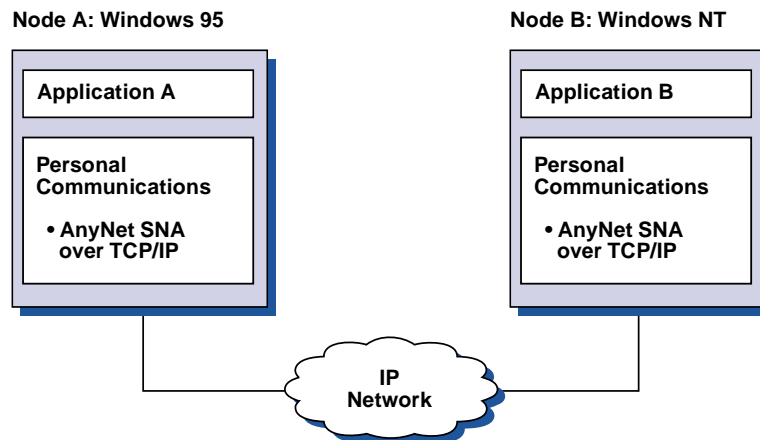
Figure 6. Running APPC or CPI-C Applications over a TCP/IP Network

Using AnyNet to Connect SNA Applications on Different Platforms

Figure 7 on page 112 illustrates some of the many products with AnyNet SNA over TCP/IP function. AnyNet gateways (Node F) allow SNA applications to communicate across a combination of TCP/IP and SNA networks.
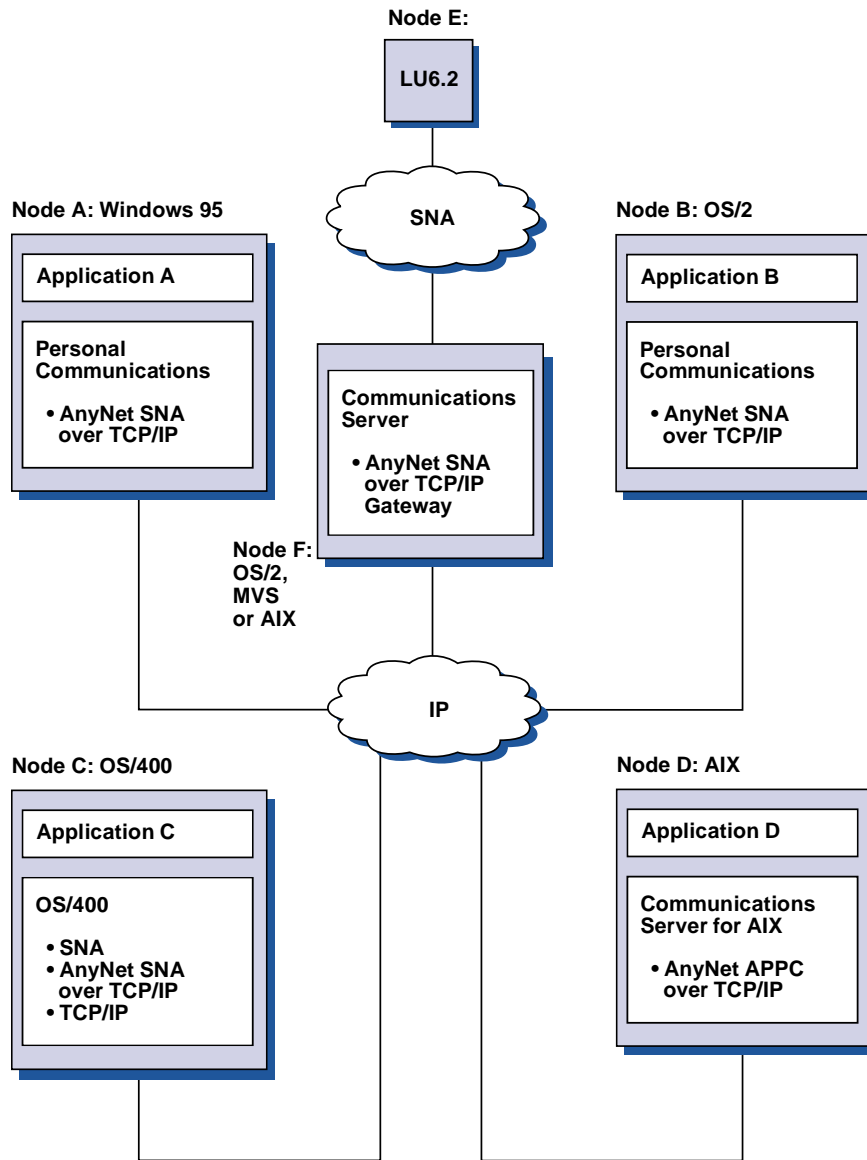
Figure 7. Using AnyNet to Connect SNA Applications on Different Platforms

Chaining Gateways to Connect Multiple SNA and IP Networks

Chained gateways enable the SNA network to connect multiple IP networks.

Note: While Figure 8 on page 113 shows three networks connected, the number of networks that can be concatenated is unlimited.
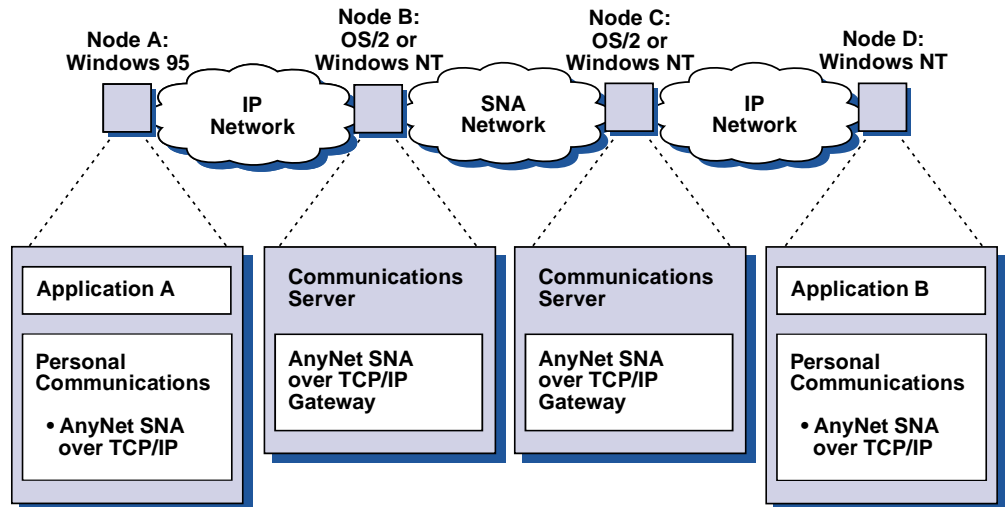
Figure 8. Chaining Multiple Gateways to Connect Multiple IP Networks

5250 Emulation over a TCP/IP Network

Figure 9 illustrates how AnyNet enables 5250 emulation over a TCP/IP network. Configuration instructions for this example are provided in *Quick Beginnings*.
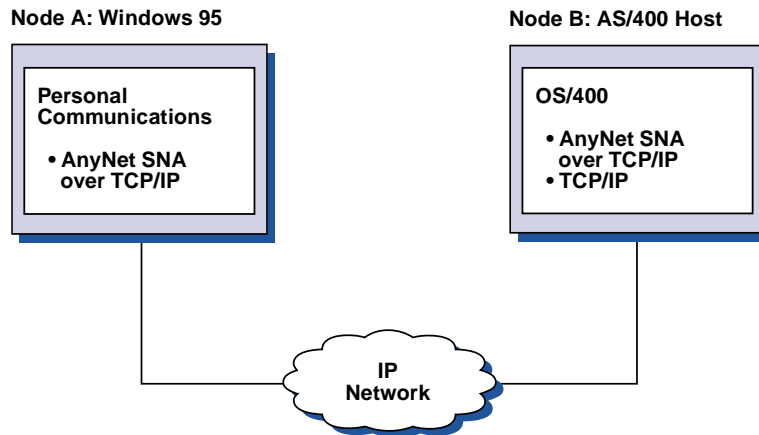
Figure 9. 5250 Emulation over a TCP/IP Network

APPC3270 Emulation over a TCP/IP Network

AnyNet also enables APPC3270 emulation over a TCP/IP network. See Figure 10 on page 114. Configuration instructions for this example are given in *Quick Beginnings*.

Node A: VTAM   Node B: Windows 95

VTAM

• AnyNet SNA
  over TCP/IP

Personal
Communications

• AnyNet SNA
  over TCP/IP

IP
Network
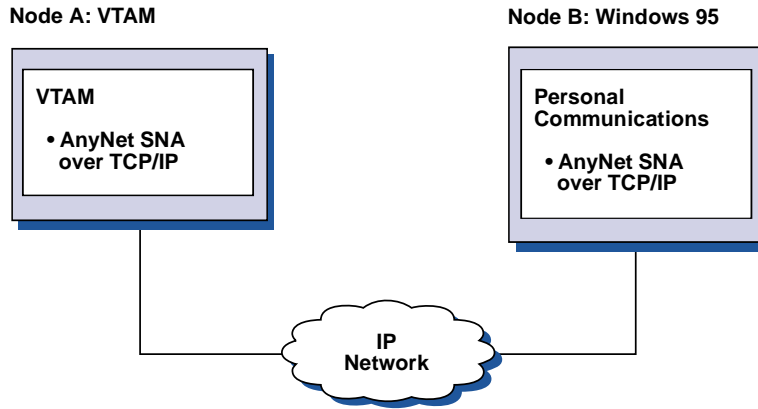
Figure 10. APPC3270 Emulation over a TCP/IP Network

3270 Emulation via DLUR over a TCP/IP Network

Figure 11 illustrates how you can use the AnyNet SNA over TCP/IP function of
Personal Communications to enable 3270 emulation over a TCP/IP network. Node
B, an access node, is defined as a dependent LU requester (DLUR). Configuration
instructions for this example are provided in *Quick Beginnings*.

Node A: VTAM   Node B: Windows NT

VTAM

• AnyNet SNA
  over TCP/IP
• DLUS

Personal
Communications

• DLUR
• AnyNet SNA
  over TCP/IP

IP
Network
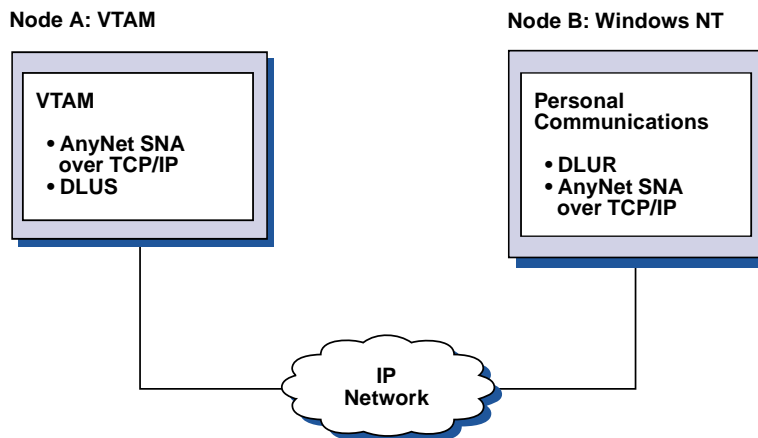
Figure 11. 3270 Emulation via DLUR over a TCP/IP Network

3270 Emulation over a TCP/IP Network via an SNA Gateway to a VTAM® Host on an SNA Network

Figure 12 on page 115 illustrates a configuration that supports dependent LU
communications for downstream workstations to a subarea host. In this example,
Node B is configured for dependent LU communication over AnyNet to an S/390
host. Configuration instructions for this example are provided in *Quick Beginnings*.
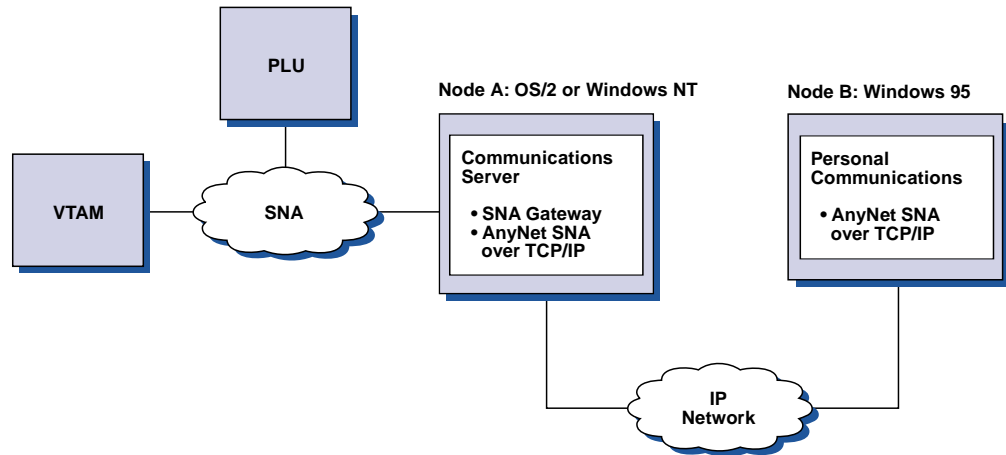
Figure 12. 3270 Emulation over a TCP/IP Network via an SNA Gateway to a VTAM Host on an SNA Network

3270 Emulation over a TCP/IP Network via an SNA Gateway to a VTAM Host on an APPN Network

Figure 13 illustrates a configuration that supports dependent LU communication for downstream workstations to an APPN host. The configuration of Node C is the same as that of Node B in the previous example, but the VTAM host and the OS/2 gateway are connected to an APPN network.
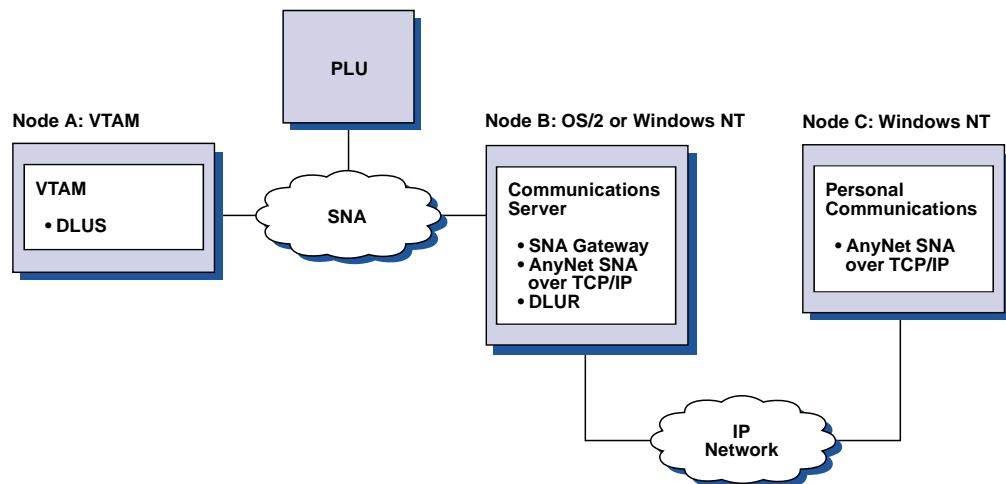
Figure 13. 3270 Emulation over a TCP/IP Network via an SNA Gateway to a VTAM Host on an APPN Network

3270 Emulation via an SNA Gateway over a TCP/IP Network

Figure 14 on page 116 illustrates a configuration that supports dependent LU communication for downstream workstations over a single IP network. All three machines are running AnyNet SNA over TCP/IP. As in the previous example, Node A is a dependent LU server (DLUS), and Node B is a dependent LU requester (DLUR). Configuration instructions for this example are given in *Quick Beginnings*.

Node A: VTAM

VTAM

- **AnyNet SNA over TCP/IP**
- **DLUS**

Node B: OS/2 or Windows NT

Communications Server

- **SNA Gateway**
- **DLUR**
- **AnyNet SNA over TCP/IP**

Node C: Windows NT

Personal Communications

- **AnyNet SNA over TCP/IP**
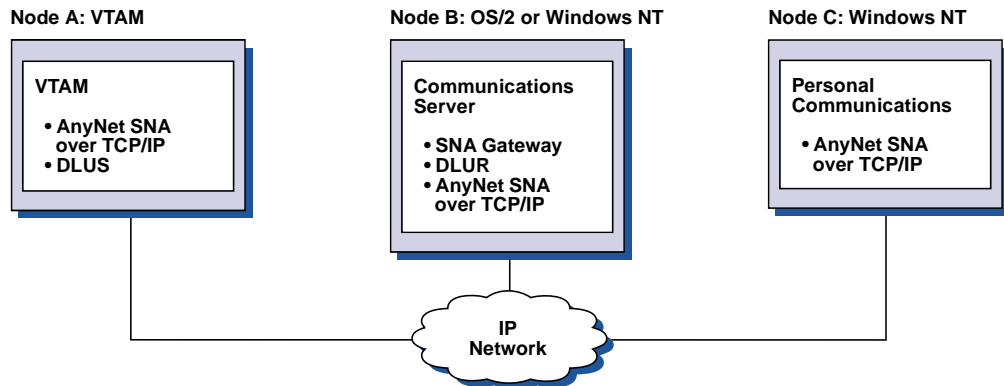
IP Network

Figure 14. 3270 Emulation via an SNA Gateway over a TCP/IP Network

How Does SNA over TCP/IP Work?

SNA over TCP/IP uses protocols that bypass the lower transport layers of the SNA architecture. This process is transparent to the SNA application program. Using a supported API, an application program passes data to the presentation services of Personal Communications. This data, in turn, is passed through the SNA architectural layers and presented to SNA over TCP/IP at the data link control level. When Personal Communications initiates a session for an application program, SNA over TCP/IP translates the SNA routing information (network-qualified name) into IP routing information (IP address) and uses the IP address to create a TCP connection to the appropriate system.

Figure 15 on page 117 illustrates how an SNA over TCP/IP access node enables SNA application programs to communicate over IP networks.

Windows NT
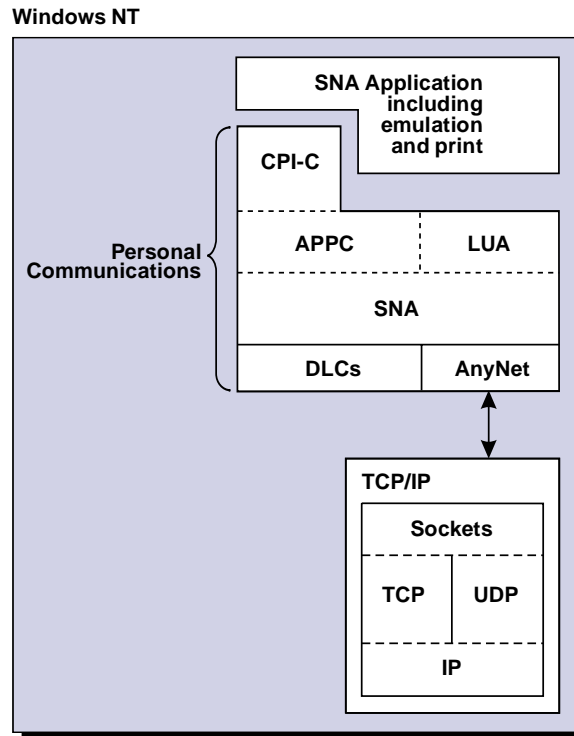
Figure 15. Structure of SNA over TCP/IP for Personal Communications

The configuration information you define enables SNA over TCP/IP to determine:

- Whether to route the data using SNA or to route the data using IP
- The IP address associated with the network-qualified LU name

SNA over TCP/IP uses both stream (TCP) and datagram (UDP) sockets that are bound to the well-known port (397). Any information received over this port is routed to AnyNet.

Mapping SNA Resources to IP Addresses

SNA over TCP/IP access nodes must determine the IP address of the partner before an SNA session can be established. The SNA identifier of the partner is mapped to an IP address using the following steps:

1. SNA over TCP/IP receives the SNA identifier from Personal Communications in one of the following formats:
   - For LU names, `netid.luname`
   - For CP names, `netid.cpname`
2. SNA over TCP/IP takes the identifier and generates a domain name:
   - For LU names, `luname.netid.snasuffix`
   - For CP names, `cpname.netid.snasuffix`

   Note: The default value for `snasuffix` is **SNA.IBM.COM**. For additional information on the SNA domain name suffix, refer to the online help.

Figure 16 on page 118 shows examples of domain names generated by SNA over TCP/IP.
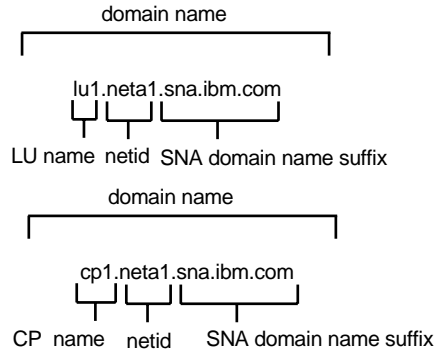
Figure 16. Formats of the Domain Names That SNA over TCP/IP Builds

3. SNA over TCP/IP requests that the domain name be translated into an IP address.

4. TCP/IP uses the HOSTS file or domain name server to translate the domain name into an IP address (for example, `9.67.192.28`).

When the IP network includes SNA over TCP/IP gateways, consider the following additional address mapping issue:

    If the partner LU can be reached through a gateway, the domain name of the partner must be mapped to the IP address of the gateway. If there are parallel gateways, the domain name should be mapped to each gateway IP address.

Defining Domain Names and IP Addresses

This section describes the TCP/IP name resolution function, used by AnyNet to map SNA resources to IP addresses. This function queries both the local HOSTS file and any domain name servers to convert a domain name (for example, `lu1.neta1.sna.ibm.com`) into an IP address (for example, 10.1.1.1).

HOSTS File
    You can use TCP/IP HOSTS files to define domain names and IP addresses for your network. However, as your network becomes larger and maintaining the HOSTS file on each user workstation becomes too time-consuming, it is recommended that you use a domain name server.

    The HOSTS file lists:
    • IP address
    • Domain name
    • Other aliases for the domain name

      Note: For Windows/NT this resides in the drivers\etc subdirectory of your NT system. For Windows 95 and Windows 98, this is in your Windows system directory.

    For example, if your IP address is 10.1.1.1, network ID is NETA1, SNA resource name is LUA1, and SNA domain name suffix is the default (`sna.ibm.com`), enter the following in your HOSTS file:

```
10.1.1.1     lua1.neta1.sna.ibm.com
```

Domain Name Server
    Domain names and IP addresses can also be defined in the domain name server database.

Each SNA identifier is mapped to a corresponding IP address by a domain name server. The location of these servers is configured in the Network section of the Control Panel.

For more information on HOSTS files and domain name servers, refer to your TCP/IP documentation. If your workstation is using the TCP/IP support in Windows 95, Windows 98, Windows NT, Windows Me, or Windows 2000, refer to the online TCP/IP documentation that is included with the Windows 95, Windows 98, Windows NT, Windows Me, or Windows 2000 product.

Defining Unique CP Names and Connection Network Names

For configurations that have two or more SNA over TCP/IP gateways connecting an SNA network with two or more IP networks, you must define a unique SNA control point (CP) name and a unique SNA connection network name for each IP network.

All LUs that reside on access nodes in the IP network appear to reside on a node with this CP name.

Use the reverse data file of the domain name server or the HOSTS file to define the CP name and the connection network name for a given IP network. Map the IP address 127.0.0.3 to the CP name and map the IP address 127.0.0.4 to the connection network name.

The following example shows entries in the reverse data file. For an IP network with SNA network ID NETA, CP name MYCPNAME, and connection network name MYCNET, you would define the following entries:

```
127.0.0.3       NETA.MYCPNAME.
127.0.0.4       NETA.MYCNET.
```

Notes:

1. A period is required at the end of the name only if the definition is in the DNS reverse data file. No period is used in HOSTS file definitions.

2. Do not include the SNA domain name suffix.

The AnyNet SNA over TCP/IP function of Personal Communications provides a default CP name ($ANYNET.$GWCP) and a default connection network name ($ANYNET.$GWCNET). In configurations with one IP network, you can use the default by not defining a CP name or a connection network name. In configurations with multiple gateways connecting multiple IP networks, one IP network can use the default. You must, however, define a unique CP name and connection network name for all other IP networks.

Figure 17 on page 120 shows how to define the CP name and the connection network name for a configuration with two IP networks. An example is provided in *Quick Beginnings*.
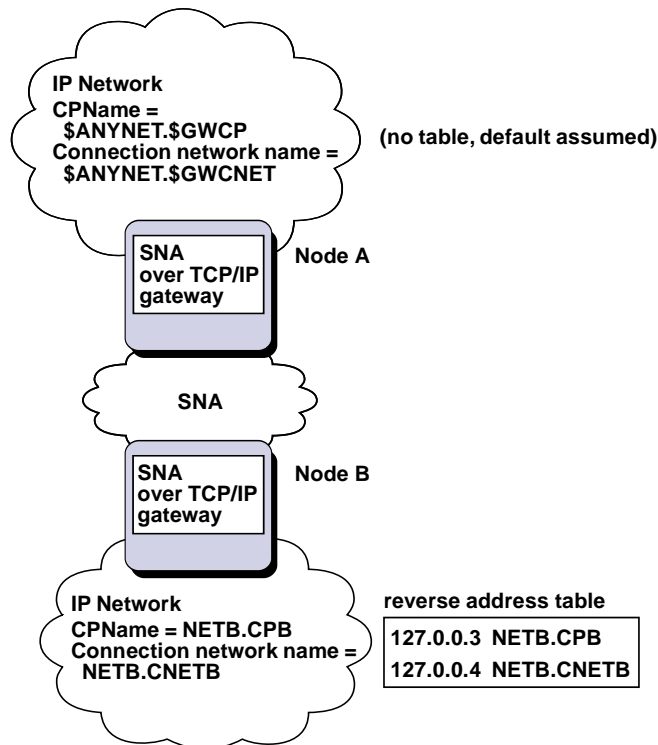
Figure 17. Defining a CP Name and a Connection Network Name

Setting and Modifying the Routing Preference Protocol

When an SNA application initiates a session, Personal Communications must first determine which transport to use, either SNA, IP, or a combination of the two.

Personal Communications uses the default routing preference for the session unless there is a specific routing preference set for the partner LU. Personal Communications then sets up a session for the partner LU using the preferred transport.

If the partner is not available through the preferred transport, Personal Communications can reroute the session request over the other available transport, depending on the setting in the routing preference table. For example, if the setting in the routing preference table for the destination LU is nonnative first, Personal Communications will attempt to set up the session over TCP/IP. If the partner is not available through TCP/IP, Personal Communications will route the session over SNA. However, if the setting in the routing preference table for the destination LU is nonnative only, Personal Communications will attempt to set up the session over TCP/IP. If TCP/IP is not available, Personal Communications will not route the session over SNA, because the setting allows only Personal Communications to use nonnative transport.

The routing preference table is used only for new sessions. Previously existing sessions use the same transport; they are not brought down and rerouted if the routing preference table is changed.

You can set or modify the default routing preference to one of the following:

Native first

Requests are routed over SNA. If no SNA route is available, requests are routed over TCP/IP.

Nonnative first

Requests are routed over TCP/IP. If no TCP/IP route is available, requests are routed over SNA.

Native only

Requests are routed only over SNA. If no SNA route is available, the connection will fail.

Nonnative only

Requests are routed only over TCP/IP. If no TCP/IP route is available, the connection will fail.

Helpful Hints

This section contains helpful hints on tuning, TCP/IP connectivity via SLIP or PPP, and dynamic IP addresses.

Tuning

If you can access an LU through multiple SNA over TCP/IP gateways, and you have mapped that LU name to multiple IP addresses, increase the Connection retry duration and Connection wait time limit when configuring the AnyNet base parameters. This ensures that TCP attempts to connect to all possible adapters and gateways. It can take as long as 90 seconds for a TCP connection to fail to an inactive IP address.

Connecting to AS/400

If you are unable to connect to AS/400 using SNA over TCP/IP, use the following procedure:

1. Make sure that the ANYNET support on the AS/400 is activated. Issue the command **DSPNETA** on the AS/400 and make sure the ANYNET status is yes.
2. Edit the HOSTS file on the PC, mapping the IP address to the CP name of the AS/400.
3. Reboot the PC; the SNA over TCP/IP connection is then activated.

Dynamic IP Addresses

Generally, AnyNet SNA over TCP/IP depends on SNA resources (for example, LU names, CP names, or idblk/num) being statically mapped to IP addresses. However, depending on your configuration and how your connections are initiated, you might be able to use AnyNet SNA over TCP/IP in environments where IP addresses are dynamically assigned (for example, DHCP).

APPC or CPI-C Applications

An SNA over TCP/IP access node with a dynamically assigned IP address may always initiate sessions to another SNA over TCP/IP access node or gateway with a static IP address.

The only way an SNA over TCP/IP access node or gateway with a static IP address (node A) can initiate a session to a partner with a dynamic IP address (node B) is:

- Node B initiated a session to or through node A first.
- The session initiated in Step 1 is still active.

Dependent LU Applications

Note: The information in this section applies to LU 0, 1, 2, 3, or dependent 6.2 applications.

SNA over TCP/IP access nodes with dynamically assigned IP addresses can support dependent LU communications if the following criteria are met.

- Dependent LU communication is occurring through an SNA gateway either through:
  - Communications Manager/2 V5 or later
  - Communications Server for Windows NT 5.0 or later
- The SNA over TCP/IP access node with a dynamically assigned IP address initiates connections to an SNA gateway with a static IP address.

Dependent LU communication through DLUS/DLUR over AnyNet SNA over TCP/IP is not supported if the DLUR node has a dynamically assigned IP address.

AnyNet Configuration Examples

This section includes examples of AnyNet running SNA over IP connections.The following configuration instructions are complete only for the Windows NT and Windows 95 operating systems. In all examples, the SNA domain name suffix is SNA.IBM.COM.

Notes:

1. In the following examples, Windows 95 is shown; Windows 98 can be treated the same.
2. Windows NT is shown; Windows 2000 can be treated the same.

For more information about AnyNet as part of Personal Communications, refer to the *3270 Emulator User's Reference* or *5250 Emulator User's Reference.*

Example 1. 5250 Emulation Over a TCP/IP Network

Node A: Windows 95

CP name: NETA.CPNAME2
IP address: 10.2.1.1

Personal Communications
- AnyNet SNA over TCP/IP

Node B: AS/400 Host

CP name: NETA.CPNAME1
IP address: 10.1.1.1

OS/400
- AnyNet SNA over TCP/IP
- TCP/IP
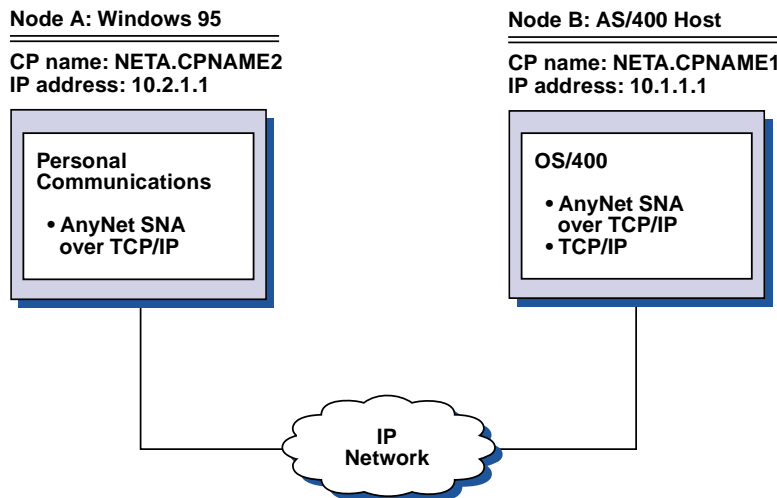
IP Network

Figure 18. 5250 Emulation Over a TCP/IP Network

Follow these steps to establish communication between the Windows 95 workstation (Node A) and the AS/400 host (Node B).

For Windows 95 Node A, do as follows:

1. Add the following entries to the local HOSTS file:

   ```
   10.1.1.1 CPNAME1.NETA.SNA.IBM.COM
   ```

2. Create a workstation profile using the Personal Communications configuration tool:

   a. Click the **Start/Configure Session** icon; or click **Configure** from the **Communication** menu. The Customize Communication window is displayed.

   b. Select the following options:
      - **Host: AS/400**
      - **Interface: AnyNet**
      - **Attachment: TCP/IP 5250**

   c. Click **Configure**.

   d. Click **Configure Link**.

   e. On the Configure Local System window, enter:

      PC Location Name: NETA.CPNAME2

      On the Configure Logical Connection Windows, enter:

      System Location Name: NETA.CPNAME1

   f. Save your workstation profile.

For AS/400 Node B, add the following entry to the local HOSTS file:

```
10.2.1.1 CPNAME2.NETA.SNA.IBM.COM
```

Example 2. Running APPC or CPI-C Applications over a TCP/IP Network
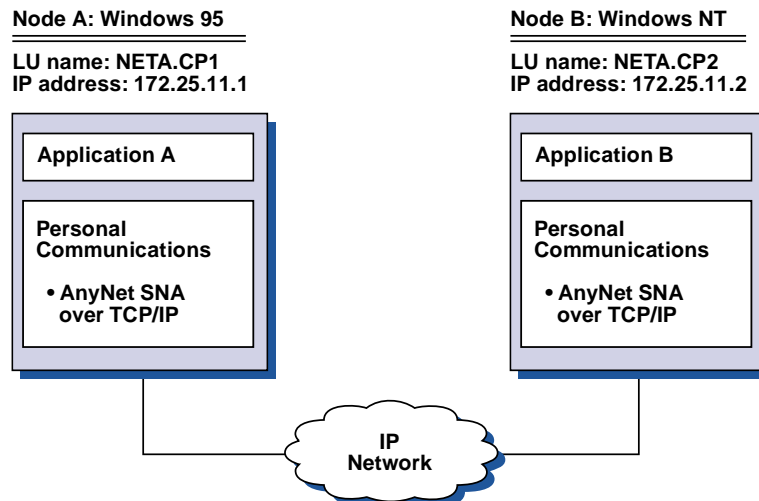
Figure 19. Running APPC or CPI-C Applications over a TCP/IP Network

Follow these steps to establish communication between a Windows NT node and a Windows 95 node. Note that in this example, the CP names are used as LU names.

For Windows 95 Node A, do as follows:

1. Add the following entry to the local HOSTS file:

   ```
   172.25.11.2  CP2.NETA.SNA.IBM.COM
   ```

2. Create a configuration using the Personal Communications configuration tool:
   a. Click the **SNA Node Configuration** icon; or click **Actions → Launch → SNA Node Configuration**. The Personal Communications SNA Node Configuration window is displayed.
   b. In the Configuration Options list, choose **Configure Node** and click **New**.
   c. On the Define the Node window on the Basic tab, enter:

      Fully qualified CP name: `NETA.CP1`

      Click **OK** to complete node configuration.
   d. Choose **Configure Devices**. In the **DLCs** list, choose **AnyNet SNA/IP** and click **New**.
   e. On the Define an AnyNet SNA over TCP/IP Device window on the Basic tab, enter:

      SNA domain name suffix: `SNA.IBM.COM`
   f. Click the **Routing Preferences** tab:

      Default Routing Preference: Nonnative only

      Click **OK** to complete configuration of the AnyNet device.
   g. From the Personal Communications SNA Node Configuration window, click **File**. Click **Save as...** and enter the desired file name to save.

For Windows NT Node B, do as follows:
1. Add the following entry to the local HOSTS file:

   `172.25.11.1  CP1.NETA.SNA.IBM.COM`
2. Create a configuration using the Personal Communications configuration tool:
   a. Click the **SNA Node Configuration** icon; or click **Actions → Launch → SNA Node Configuration**. The Personal Communications SNA Node Configuration window is displayed.
   b. In the Configuration Options list, choose **Configure Node** and click **New**.
   c. On the Define the Node window on the Basic tab, enter:

      Fully qualified CP name: `NETA.CP2`

      Click **OK** to complete node configuration.
   d. Choose **Configure Devices**. In the DLCs list, choose **AnyNet SNA/IP** and click **New**.
   e. On the Define an AnyNet SNA over TCP/IP Device window on the Basic tab, enter:

      SNA domain name suffix: `SNA.IBM.COM`
   f. Click the **Routing Preferences** tab:

      Default Routing Preference: Nonnative only

      Click **OK** to complete configuration of the AnyNet device.
   g. From the Personal Communications SNA Node Configuration window, click **File**. Click **Save as...** and enter the desired file name to save.
3. Start Personal Communications on each machine.
4. Start your applications (for example APING).

Example 3. APPC3270 Emulation over a TCP/IP Network

Node A: VTAM

LU name: NETA.LUNAME1
IP address: 10.2.1.1

Node B: Windows 95

LU name: NETA.LUNAME2
IP address: 10.2.1.2

VTAM

• AnyNet SNA
  over TCP/IP

Personal
Communications

• AnyNet SNA
  over TCP/IP

IP
Network
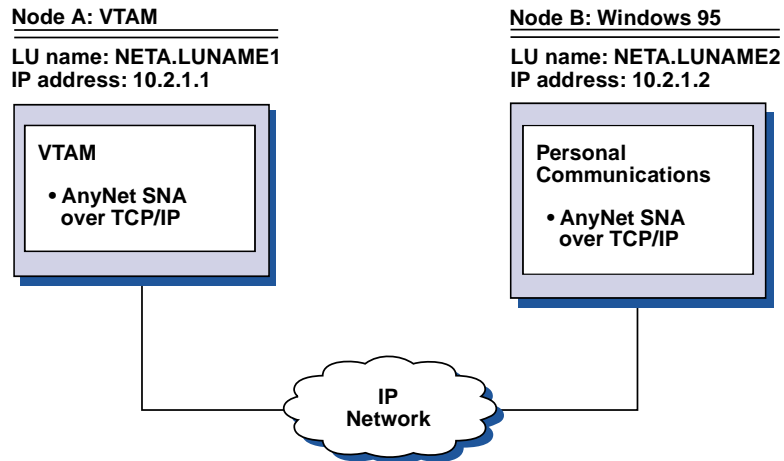
Figure 20. APPC3270 Emulation over a TCP/IP Network

Follow these steps to establish communication between the VTAM host (Node A) and the Windows 95 (Node B).

For VTAM Node A, add the following entry to the local HOSTS file:

```
10.2.1.2  LUNAME2.NETA.SNA.IBM.COM
```

For Windows 95 Node B, do as follows:

1. Add the following entry to the local HOSTS file:

   ```
   10.1.1.1  LUNAME1.NETA.SNA.IBM.COM
   ```

2. Create a workstation profile using the Personal Communications configuration tool:

   a. Click the Start/Configure Session icon; or click **Configure** from the **Communication** menu. The Customize Communication window is displayed.

   b. Select the following options:

      • **Host: S/390**

      • **Interface: AnyNet**

      • **Attachment: APPC3270**

   c. Click **Configure**.

   d. Click **Configure Link**.

   e. On the Configure Local System window, enter:

      PC Location Name: NETA.LUNAME2

   f. On the Configure Logical Connection window, enter:

      • **System location name:** NETA.LUNAME1

      • **Routing Preference:** Nonnative only

   g. On the Configure AnyNet Connection window, enter:

      SNA domain name suffix: SNA.IBM.COM

   h. Save your workstation profile.

Example 4. 3270 Emulation via DLUR over a TCP/IP Network
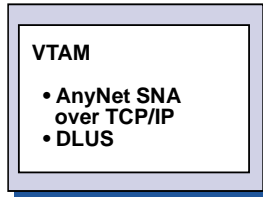
```
Node A: VTAM                              Node B: Windows 95

CP name: NETA.CP1                         CP name: NETA.CP2
IP address: 192.168.7.8                   IP address: 192.168.7.10
                                          Dependent LU name: NETA.DEPLU1
```

VTAM
- AnyNet SNA over TCP/IP
- DLUS

Personal Communications
- DLUR
- AnyNet SNA over TCP/IP
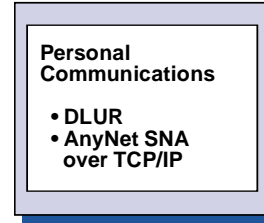
IP Network

Figure 21. 3270 Emulation via DLUR over a TCP/IP Network

Follow these steps to establish communication between the VTAM Host (Node A) and the Windows 95 workstation (Node B).

For VTAM Node A, add the following entry to the HOSTS file:

```
192.168.7.10  CP2.NETA.SNA.IBM.COM
192.168.7.10  DEPLU1.NETA.SNA.IBM.COM
```

For Windows 95 Node B, do as follows:

1. Add the following entry to the local HOSTS file:

   ```
   192.168.7.8   CP1.NETA.SNA.IBM.COM
   ```

2. Create a workstation profile using the Personal Communications configuration tool:

   a. Click on the **Start/Configure Session** icon; or click **Configure** from the **Communication** menu. The Customize Communication window is displayed.

   b. Select the following options:
      - **Host: S/390**
      - **Interface: AnyNet**
      - **Attachment: TCP/IP LU 0,1,2,3 via DLUR**

   c. Click **Configure**.

   d. Click **Configure Link**.

   e. On the Configure Local System window, enter:

      PC Location Name: NETA.CP2

   f. On the Configure DLUR window, enter:
      - **DLUS name: NETA.CP1**
      - **Routing Preference:** Nonnative only

   g. On the Configure AnyNet Connection window, enter:

      SNA domain name suffix: SNA.IBM.COM

   h. Save your workstation profile.

Example 5. 3270 Emulation over a TCP/IP Network via a SNA Gateway to a VTAM Host on a SNA Network
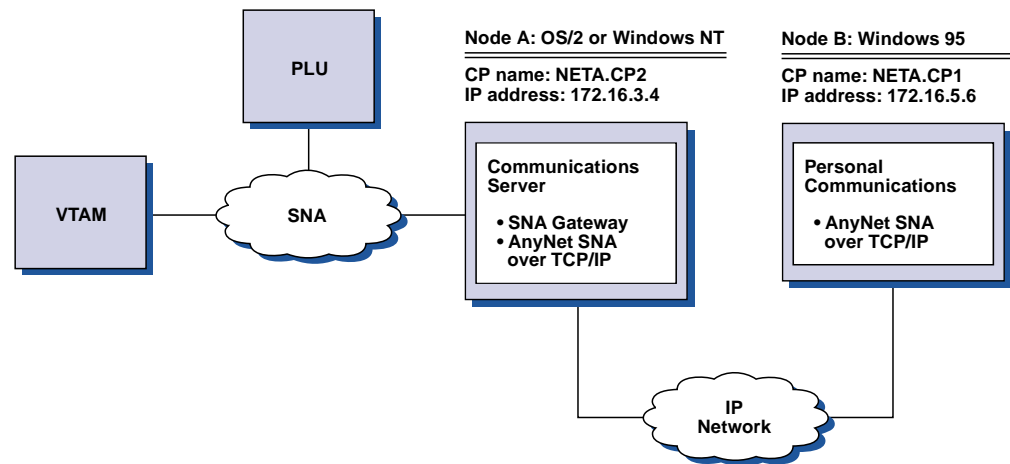
Figure 22. 3270 Emulation over a TCP/IP Network via a SNA Gateway to a VTAM Host on a SNA Network

For OS/2 (or Windows NT) Node A, add the following entry to the HOSTS file:

```
172.16.5.6  CP1.NETA.SNA.IBM.COM
```

Follow these steps to establish communication between the Windows 95 workstation (Node B) and the VTAM host.

For Windows 95 Node B, do as follows:

1. Add the following entry to the local HOSTS file:

   ```
   172.16.3.4  CP2.NETA.SNA.IBM.COM
   ```

2. Create a workstation profile using the Personal Communications configuration tool:

   a. Click on the **Start/Configure Session** icon; or click **Configure** from the **Communication** menu. The Customize Communication window is displayed.

   b. Select the following options:
      - **Host: S/390**
      - **Interface: AnyNet**
      - **Attachment: TCP/IP LU 0,1,2,3**

   c. Click **Configure**.

   d. Click **Configure Link**.

   e. On the Configure Local System window, enter:

      PC Location Name: NETA.CP1

   f. On the Configure AnyNet Connection window, enter:
      - **SNA domain name suffix: SNA.IBM.COM**
      - **Fully qualified CP name: NETA.CP2**

   g. Save your workstation profile.

Example 6. 3270 Emulation via an SNA Gateway over a TCP/IP Network
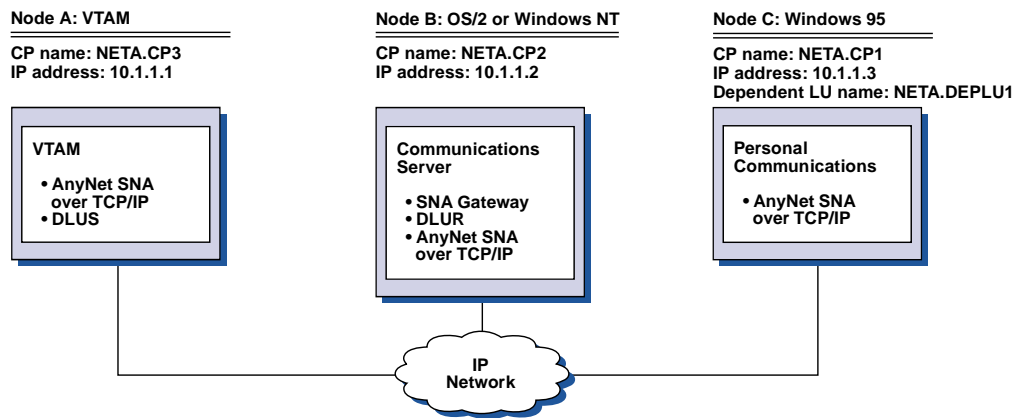
Figure 23. 3270 Emulation via an SNA Gateway over a TCP/IP Network

Follow these steps to establish communication between the Windows 95 Workstation (Node C) and the VTAM host (Node A).

For VTAM Node A, add the following entry to the HOSTS file:

```
10.1.1.2   CP2.NETA.SNA.IBM.COM
10.1.1.2   DEPLU1.NETA.SNA.IBM.COM
```

For OS/2 (or Windows NT) Node B, add the following entry to the HOSTS file:

```
10.1.1.3   CP1.NETA.SNA.IBM.COM
10.1.1.1   CP3.NETA.SNA.IBM.COM
```

For Windows 95 Node C, do as follows:

1. Add the following entry to the local HOSTS file:

   ```
   10.1.1.2   CP2.NETA.SNA.IBM.COM
   ```

2. Create a workstation profile using the Personal Communications configuration tool:

   a. Click the **Start/Configure Session** icon; or click **Configure** from the **Communication** menu. The Customize Communication window is displayed.

   b. Select the following options:
      - **Host: S/390**
      - **Interface: AnyNet**
      - **Attachment: TCP/IP LU 0,1,2,3**

   c. Click **Configure**.

   d. Click **Configure Link**.

   e. On the Configure Local System window, enter:

      PC Location Name: NETA.CP1

   f. On the Configure AnyNet Connection window, enter:
      - **SNA domain name suffix: SNA.IBM.COM**
      - **Fully qualified CP name: NETA.CP2**

   g. Save your workstation profile.

Example 7. 3270 Emulation over a TCP/IP Network via an AnyNet SNA/IP Gateway to a VTAM Host on an APPN Network
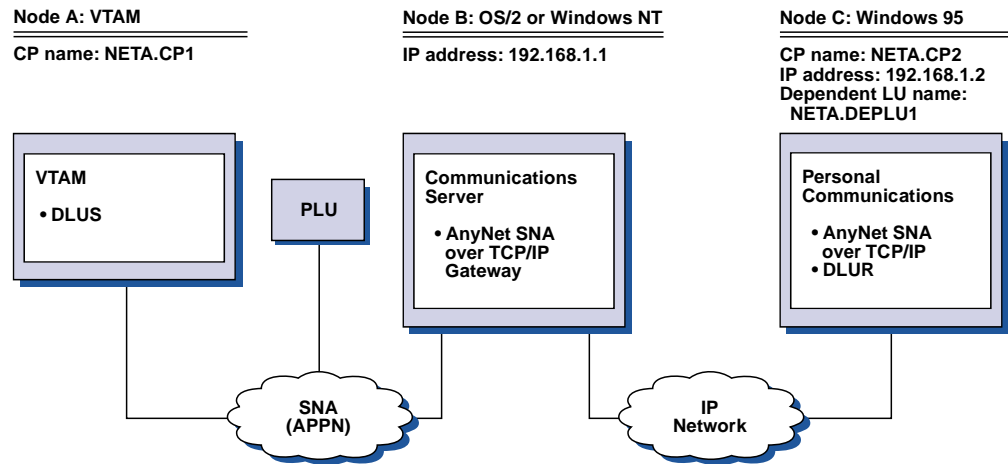
Figure 24. 3270 Emulation over a TCP/IP Network via an AnyNet SNA/IP Gateway to a VTAM Host on an APPN Network

Follow these steps to establish communication between the OS/2 (or Windows NT) workstation (Node B) and the Windows 95 workstation (Node C).

For OS/2 (or Windows NT) Node B, add the following entries to the HOSTS file:

```
192.168.1.2 CP2.NETA.SNA.IBM.COM
127.0.0.2   DEPLU1.NETA.SNA.IBM.COM
192.168.1.2 DEPLU1.NETA.SNA.IBM.COM
```

For Windows 95 Node C, do as follows:

1. Add the following entry to the local HOSTS file:

   ```
   192.168.1.1 CP1.NETA.SNA.IBM.COM
   ```

2. Create a workstation profile using the Personal Communications configuration tool:

   a. Click the **Start/Configure Session** icon; or click **Configure** from the **Communication** menu. The Customize Communication window is displayed.

   b. Select the following options:
      - **Host: S/390**
      - **Interface: AnyNet**
      - **Attachment: TCP/IP LU 0,1,2,3 via DLUR**

   c. Click **Configure**.

   d. Click **Configure Link**.

   e. On the Configure Local System window, enter:

      PC Location Name: `NETA.CP2`

   f. On the Configure DLUR window, enter:
      - **DLUS name: NETA.CP1**
      - **Routing Preference:** Nonnative only

   g. On the Configure AnyNet Connection window, enter:

      SNA domain name suffix: SNA.IBM.COM

h. Save your workstation profile.

Example 8. 3270 Emulation from a Windows NT Workstation and a Windows 95 Workstation on Different IP Networks
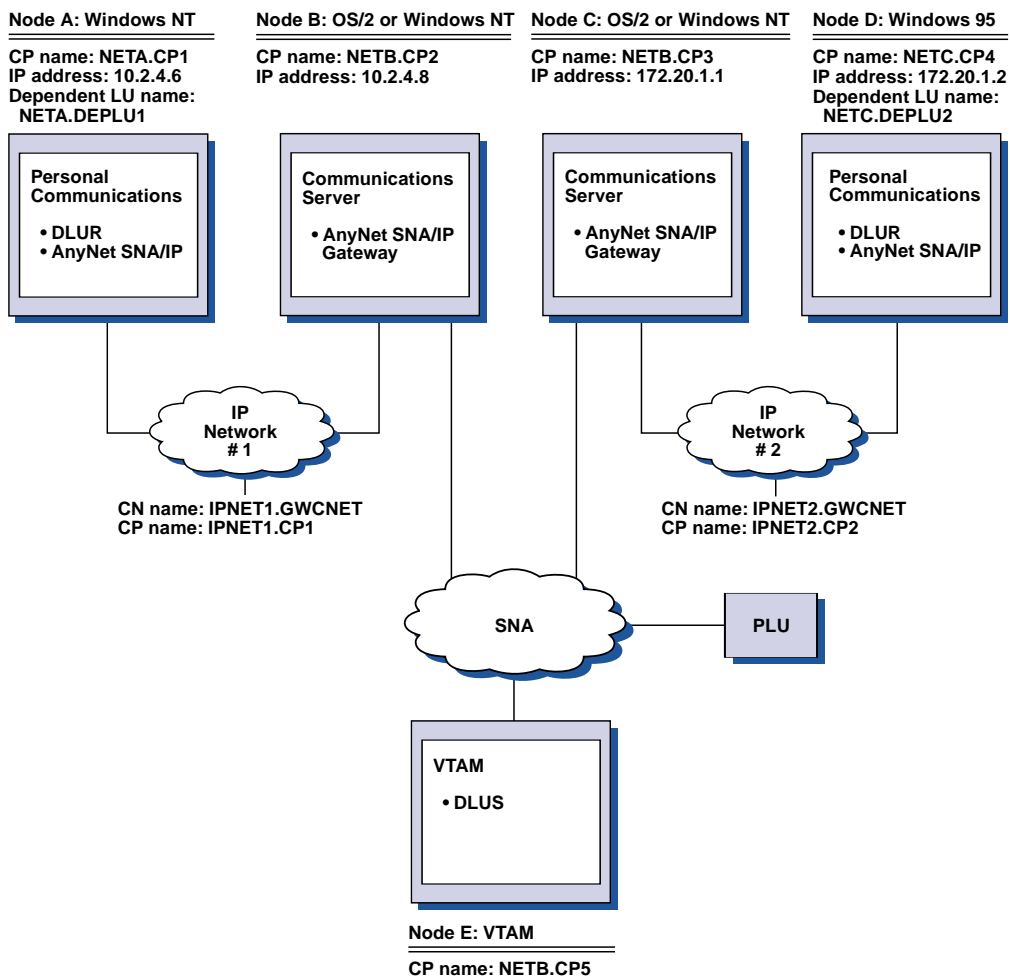
Figure 25. 3270 Emulation on Different IP Networks

Follow these steps to establish communication from the Windows NT workstation (Node A), and from Windows 95 (Node D), to the VTAM Host (Node E).

For Windows NT Node A, do as follows:

1. Add the following entries to the local HOSTS file:

```
10.2.4.8    CP5.NETB.SNA.IBM.COM
127.0.0.4   IPNET1.GWCNET
127.0.0.3   IPNET1.CP1
```

2. Create a workstation profile using the Personal Communications configuration tool:

   a. Click on the **Start/Configure Session** icon; or click **Configure** from the **Communication** menu. The Customize Communication window is displayed.

   b. Select the following options:

      • **Host: S/390**

- **Interface: AnyNet**
- **Attachment: TCP/IP LU 0,1,2,3 via DLUR**

c. Click on **Configure**.

d. Click on **Configure Link**.

e. On the Configure Local System window, enter:

   PC Location Name: NETA.CP1

f. On the Configure DLUR window, enter:

   - **DLUS name:** NETB.CP5

   - **Routing Preference:** Non-native only

g. On the Configure AnyNet Connection window, enter:

   SNA domain name suffix: SNA.IBM.COM

h. Save your workstation profile.

For OS/2 (or Windows NT) Node B, add the following entries to the HOSTS file:

```
10.2.4.6    CP1.NETA.SNA.IBM.COM
127.0.0.2   DEPLU1.NETA.SNA.IBM.COM
10.2.4.6    DEPLU1.NETA.SNA.IBM.COM
127.0.0.4   IPNET1.GWCNET
127.0.0.3   IPNET1.CP1
```

For OS/2 (or Windows NT) Node C, add the following entries to the HOSTS file:

```
172.20.1.2  CP4.NETC.SNA.IBM.COM
127.0.0.2   DEPLU2.NETC.SNA.IBM.COM
172.20.1.2  DEPLU2.NETC.SNA.IBM.COM
127.0.0.4   IPNET2.GWCNET
127.0.0.3   IPNET2.CP2
```

For Windows 95 Node D, do as follows:

1. Add the following entry to the local HOSTS file:

   ```
   172.20.1.1  CP5.NETB.SNA.IBM.COM
   127.0.0.4   IPNET2.GWCNET
   127.0.0.3   IPNET2.CP2
   ```

2. Create a workstation profile using the Personal Communications configuration tool:

   a. Click the **Start/Configure Session** icon; or click **Configure** from the **Communication** menu. The Customize Communication window is displayed.

   b. Select the following options:

      - **Host: S/390**

      - **Interface: AnyNet**

      - **Attachment: TCP/IP LU 0,1,2,3 via DLUR**

   c. Click **Configure**.

   d. Click **Configure Link**.

   e. On the Configure Local System window, enter:

      PC Location Name: NETC.CP4

   f. On the Configure DLUR window, enter:

      - **DLUS name: NETB.CP5**

      - **Routing Preference:** Nonnative only

   g. On the Configure AnyNet Connection window, enter:

      SNA domain name suffix: SNA.IBM.COM

h. Save your workstation profile.

Part 4. National Language Support

Chapter 13. Multiple-Language Support

Personal Communications Version 5.5 multiple-language support provides the capability to allow users to interact with more than a single language on their workstations. Prior versions allowed for different languages to be displayed in emulator sessions; now, the Windows graphical user interface elements of the Personal Communications user interface can be tailored to the languages of users, allowing more flexibility in configuring and using Personal Communications.

This chapter provides a basic description of these facilities. Refer to *Quick Beginnings* for a description of the procedures for changing your configured user interface language. The particulars of installing the support are described in the *CD-ROM Guide to Installation.*

Overview

There are two system-related factors which govern the usage of multiple languages by Personal Communications users:

System Locale
> This is set in the Windows Regional Settings (Regional Options for Windows 2000) control panel applet; it determines what system user interface languages can be viewed.

Language Groups
> Each system locale is associated with a language group; some groups have only one language; others support several, allowing for simultaneous viewing of applications in more than one language.

System Locale

When you choose a language on the Regional Settings (or Options) screen, a system locale is established as the basis for interacting with the system; Windows interactions of certain applications (such as Personal Communications) are governed by this setting.

Notes:

1. Windows common dialogs, such as file open and print, may not change to match the system locale; they will be displayed in the language chosen when Windows was installed.

2. The actions needed to switch system locales depend on the languages installed and the version of Windows. Refer to your Windows documentation for details.

Language Groups

The system locale set when Windows is started determines which Windows/ANSI code page is used by applications; in turn, this code page determines which language group an application can use. The language groups and languages supported for Personal Communications user interface are:

Cyrillic
> Russian

Japanese
> Japanese

Latin 1

- Brazilian-Portuguese
- Danish
- Dutch
- English
- Finnish
- French
- German
- Italian
- Norwegian
- Portuguese
- Spanish
- Swedish

Latin 2

- Czech
- Hungarian
- Polish
- Slovenian

Turkish

Turkish

Notes:

1. English text can be displayed for any system locale without significant corruption. Therefore, English is an implicit member of each language group.
2. There are additional languages supported for host emulation sessions; these groups only concern user interface language.

Personal Communications User Interface Languages

It is important to understand how Personal Communications uses the capability for supporting multiple languages. Like other applications, Personal Communications can use any language within the language group for which the current system locale is set. As an administrator, you have the ability to change that locale, using the Windows Regional Settings control panel applet.

There are several considerations to keep in mind:

- There is a default Personal Communications user interface language; this is set at installation, and applies to every user of the Windows system.

  Note: This default is set to match the Windows user default locale.

- The Personal Communications user interface language is a preference that is stored per user; thus, a shared workstation can support users of different languages.
- If a user does not have a user interface language preference defined, Personal Communications uses the Personal Communications default language for that machine.
- If the user's language preference cannot be displayed (because of a language group mismatch) the user interface is in the Personal Communications default language; a warning is displayed.

- If the Personal Communications default language is incompatible with the system language, English is used as the default.
- Each user in a client/server or Windows Terminal Server (WTS) environments can have his own Personal Communications user interface language.

Multiple Sessions

It is possible to open multiple Personal Communications emulation sessions simultaneously; in previous versions of Personal Communications these sessions could interact with hosts of different languages.

With Version 5.5 it is also possible to have simultaneous sessions with different user interface languages; this is only possible for languages within a language group. In order to do this, you start a session in one language, then change the Personal Communications configuration to another language; when you then start a new session, it will use the newly selected language.

Other Considerations

To prevent the generation of log files in several languages the Personal Communications log file is recorded in the default Personal Communications user interface language.

Some of the Personal Communications components (such as LLC2 drivers) do not require multiple-language support; they only use the default Personal Communications language.

Some Personal Communications components (the keyboard customizer, keypad, play/record, copy/paste and macro components, for example) record, store, and insert language-sensitive text into Personal Communications sessions. It should be noted that text created in one language group may be corrupted and meaningless when inserted in a session running under another language group. For instance, keyboard customizer text created on a Japanese Personal Communications configuration will not be readable on a French configuration.

Chapter 14. Country Codes and Character Sets

This chapter contains information useful in providing national language support for a network station or a gateway.

Table 2. Supported Keyboard Types

Keyboard Type (Characteristics)	Figure
Space Saving (single row of function keys; no numeric keypad)	
Enhanced and Microsoft Natural (single row of function keys; numeric keyboard)	
5576-001 (Japanese keyboard with double row of function keys; numeric keypad)	
5576-002 (Japanese keyboard with single row of function keys; numeric keypad)	
5576-003 (Japanese keyboard with single row of function keys; no numeric keypad)	
5576-A01 (Japanese keyboard with single row of function keys; numeric keypad)	

Keyboard Country ID and Shift Support

Table 3 shows the keyboard country ID and shift support for each country.

Table 3. Keyboard Country ID and Shift Support

Keyboard Country	Enhanced Keyboard ID	Enhanced Keyboard-Lock Mode
Arabic-speaking	238, 239, 240, 253, 254	C
Austria	129	S
Baltic Estonia Latvia Lithuania	 442 463 449	 C C C
Belgium	120	S
Brazil	275	C
Canada (Bilingual)	058	C
Canada (445)	445	C
Cyrillic Bulgaria Belarus FYR Macedonia Russia (441) Russia (443) Serbia / Montenegro Ukraine	 442 463 449 441 443 450 465	 C C C C C C C
Denmark	159	C
Finland	153	C
France (120)	120	C
France (189)	189	S
Germany	129	S
Greece	319	C
Iceland	197	C
Israel	115	C
Italy (141)	141	C
Italy (142/293)	142	C
Japan	–	C
Laos	466	C
Latin America (Spanish)	171	C
Latin 1 (Open Systems)	1047	697
Latin 2 Bosnia / Herzegovina (Latin) Croatia Czech Republic Hungary Poland Romania (Moldavia) Slovakia Slovenia	 234 234 243 208 457, 214 446 245 234	 C C C C C C C C C

Table 3. Keyboard Country ID and Shift Support (continued)

Keyboard Country	Enhanced Keyboard ID	Enhanced Keyboard-Lock Mode
Netherlands	143	C
Norway	155	C
Portugal	163	C
Spain	173	C
Sweden	153	C
Switzerland (French)	150F	C
Switzerland (German)	150G	C
Turkey (179/402)	179	C
Turkey (440)	440	C
U.K. (166)	166	C
U.K. (168)	168	C
U.S. (English)	101G	C
Vietnam	461	C
Note: – Not selectable **S** Shift lock on key 30 **C** Caps lock on key 30		

IBM Japanese Character Set (2-Byte Codes)

The IBM Japanese character set defines characters that consist of 2-byte codes.

Character Types

The following characters are included in this character set:

- Basic kanji set
- Basic non-kanji set: alphabet, numerals, Katakana, Hiragana, symbols, and space
- Extended kanji set
- New extended kanji set
- New extended non-kanji set
- Extended non-kanji set: Roman numerals, Greek alphabet, and Russian alphabet

In addition to these characters, you can define up to 1880 (6205 for extended Unicode subset) user-defined characters.

Character Size

A kanji character is displayed on the screen using the area of two SBCS characters; it is usually enclosed with the shift characters hex 0E and hex 0F. Similarly, when a kanji character is printed, it uses the area of two SBCS printed characters. This size is equivalent to double the area used by alphabetic, numeric, and Katakana characters when they are displayed or printed.

IBM Kanji Codes

The following tables show the relationship between kanji and IBM kanji codes.

Table 4. The IBM Japanese Character Set and IBM Kanji Codes

1st byte (hex)		2nd byte (hex)	
	40	**41...**	**...FE**
40	space	Reserved area	
41		Extended non-kanji set	134 characters
42 . . 44		Basic kanji set (includes space)	416 characters
45 . . 55		Basic kanji set	3226 characters
56 . . 68		Extended kanji set	3487 characters
69 . . 7F		User-defined characters	1880 characters
80 . . FE		Reserved area	

Table 5. The IBM Japanese Character Set and IBM Kanji Codes (Extended for Unicode Subset)

1st byte (hex)		2nd byte (hex)	
	40	**41...**	**...FE**
40	space	Reserved area	
41		Extended non-kanji set	134 characters
42 . . 44		Basic kanji set (includes space)	416 characters
45 . . 55		Basic kanji set	3226 characters
56 . . 68		Extended kanji set	3478 characters
69 . . B7		User-defined characters	6205 characters
B8 . . A5		New extended kanji set	5522 characters
A6 . . E9		New extended non-kanji set	2035 characters
EA . . FE		Reserved area	

Note: These tables do not show that all characters have a kanji code assigned. Each kanji character has a kanji number is addition to the IBM kanji code A kanji number is a decimal number up to five digits in length, which is used for entering a kanji-like symbol from keyboards that do not have "YOMI".

Following is the relationship between IBM kanji codes and kanji numbers:

```
kanji number = converted value of ((IBM kanji code) - x'4000')
```

All kanji characters can be entered using kanji numbers.

IBM Traditional Chinese Character Set

Table 6. IBM Traditional Chinese Host Code

	Number of Characters	Code Range	Low-Byte Range
DBCS Space	1	X'4040'	
DBCS Symbols	1003	X'4141' - X'4959'	X'41' - X'FD', skipping X'7F'
Primary Chinese	5402	X'4C41' - X'68CB'	X'41' - X'FD', skipping X'7F'

Table 6. IBM Traditional Chinese Host Code (continued)

	Number of Characters	Code Range	Low-Byte Range
Secondary Chinese	7654	X'6941' - X'91C7'	X'41' - X'FD', skipping X'7F'
User-Defined Area	6204	X'C241' - X'E2FD'	X'41' - X'FD', skipping X'7F'

IBM Simplified Chinese Character Set, GBK Code

Table 7. IBM Simplified Chinese Character Set, GBK Code

	Number of Characters	Host Code Range	PC Code Range
DBCS Space	1	X'4040'	X'A1A1'
GB 2312-80 Non-Chinese Character Set (GBK/1)		X'4141'-X'47FE' (737)	X'A1A1'-X'A9FE' (846)
GB 2312-80 Chinese Character Set (GBK/2)		X'4841'-X'6CFE' (6763)	X'B0A1'-X'F7FE' (6768)
ISO 10646-1 CJK unified ideographs (GBK/3)	6080	X'8141'-X'A0FE', X'A141'-X'A181'	X'8140'-X'A0FE' (Note 1)
ISO 10646-1 CJK unified ideographs ISO 10646-1 CJK compatibility (GBK/4)	8160	X'A182'-X'A1FE', X'A241'-X'CCFE', X'CE41'-X'CEFE'	X'AA40'-X'FEA0' (Note 1)
Big-5 Symbol Compatibility Ideographic Structure Symbols (GBK/5)		X'CD41'-X'CDFE' (148)	X'A840'-X'A9A0' (192) (Note 1)
User Definable Characters Area (UDC 1 to 3)	1894	X'7641'-X'80FE'	X'AAA1'-X'AFFE', X'F8A1'-X'FEFE', X'A140'-X'A7A0' (Note 1)
Note 1: X'7F' of second byte is excluded.			

IBM Hangeul Character Set

Table 8. IBM Hangeul Host Code (833)

	Number of Characters	Code Range	Low-Byte Range
DBCS Space	1	X'4040'	
DBCS Symbols	939	X'4141' - X'4BFD'	X'41' - X'FD', skipping X'7F'

Table 8. IBM Hangeul Host Code (833) (continued)

	Number of Characters	Code Range	Low-Byte Range
Hanja Set	5265	X'5041' - X'6C45'	X'41' - X'FD', skipping X'7F'
Hangeul and Jamo Set	2672	X'8441' - X'D3B7'	X'41' - X'FD', skipping X'7F'
User-Defined Area	1880	X'D441' - X'DDFD'	X'41' - X'FD', skipping X'7F'

Table 9. IBM Hangeul Host Code (1364)

	Number of Characters	Code Range	Low-Byte Range
DBCS Space	1	X'4040'	
Non-Hangeul/Hanja Set	1181	X'4141' - X'4E92'	X'41' - X'FE'
Hanja Set	5265	X'5041' - X'6C45'	X'41' - X'FE'
Hangeul and Jamo Set	11224	X'8441' - X'D3BD'	X'41' - X'FE'
User-Defined Area	1880	X'D441' - X'DDFD'	X'41' - X'FE'

Thai Language Support

Thai Display Mode Selection
Select menu **Appearance** on emulator session, and then select **Thai Compose Mode...**

Switching Keyboard Between Thai and Latin
Press either Alt+left shift or Alt+right shift to toggle the keyboard between Thai and Latin.

Language Shift Status
The status line of each emulator session shows a language shift indicator. If keyboard is in Thai language shift, an indicator **TH** will appear in the status line.

Thai Display Composed Mode

Mode 1 - **Non-compose mode**
No character composition occurs in this mode.

Mode 2 - **Composed mode**
Thai characters are auto-composed in this mode. No column realignment is performed.

Mode 3 - **Composed with space alignment**
In this mode of composing, three consecutive spaces cause column realignment. The realignment occurs whenever composing routine finds three consecutive spaces. Thus if all fields have at least three trailing spaces, then all fields of all records will be properly aligned.

Mode 4 - **Composed with EOF alignment**
In this mode of composing, the EOF character (Hexadecimal 'EA') also causes column realignment. Whenever the composing routine finds a single

EOF, it deletes the EOF and performs column realignment. If two consecutive EOFs are found, no realignment occurs, one EOF is deleted, and one EOF is treated as data.

Mode 5 - **Composed with space and EOF alignment**
This mode of composing performs the column realignment function of both mode 3 and mode 4.

Printer Space Adjustment

If your printer needs space adjustment for Thai printing, add the following statement to PCSWIN.INI, which resides in the Personal Communications private subdirectory

```
[Thai]
PrintAdjust=x
```

The value of x can be:

0   no adjustment (same as no PrintAdjust statement)

1   Perform adjustment when found three consecutive spaces

2   Perform adjustment when found EOF character

3   Perform adjustment when found three consecutive spaces or EOF character (combine 1 and 2)

Thai Scalable (Truetype) Font support on Printers

Personal Communications provides a Thai Truetype font, ThaiPhuket. To print Thai characters, you can install a Thai scalable (Truetype) font as follows:

1. Open the **Control Panel** Folder.
   a. Click **Start** on the task bar.
   b. Move pointer to **Settings** and click **Control Panel**.
2. Open the **Fonts** Folder (Double-click the Fonts icon).
3. On the file menu, select **Install New Font**.
4. Click the drive and folder where Personal Communications is installed.
5. Double-click on **ThaiPhuket**.

Chapter 15. Bidirectional Language Support (Arabic and Hebrew)

Considerations for Printing

PDT printing mode requires the IBM Arabic 864 code page font to be installed, and the IBM Hebrew 862 code page font for Hebrew printing.

Printing in Arabic

To enable printing in Arabic, you need to do the following :

- For 5250 sessions, using Host Print Transform, you should install the 864 Arabic printer fonts or the AFP fonts on the AS/400 system.
- For 3270 sessions, using PDF files, do the following:
  1. Install the 864 Arabic printer fonts.
  2. Modify the PDF files as follows:
     a. Define the escape sequences of the fonts that you want to use, as in the following example.

        ```
        /*  Naseem ( 1 0 V ( s 0 p 1 5 h 9 v 0 s 0 b 3 T    */
        NSM   EQU 1B 28 31 30 56 1B 28 73 30 70 31 35 68 39 76 30 73 30 62 33 54
        ```

        Note: You can get the font escape sequences by printing out the font names from the printer menus.
     b. Add the escape sequence of the font that you want to use to the START_JOB escape sequence, as in the following example.

        ```
        START_JOB=CUL CBP NSM    /* Switch to Arabic Font   */
        ```
  3. Compile the PDF to get the PDT file.

DAT File for 5250 Arabic

For Arabic 5250 print sessions, selecting the 420 host code page prompts Personal Communications to load the PCSPDA.DAT file. This file ensures that the host-specified fonts map properly to the **Typing Arabic** print font.

If the 037 (U.S.) host code page is selected in a Win32 OS session, the PCSPD.SAM file is loaded automatically. This file replaces the Courier font with Courier New. For 5250 sessions in OS/2, Personal Communications uses the original PCSPD.DAT file, since Euro support is implemented in Courier in OS/2, not in Courier New (as in Windows).

The user can specify the DAT file using the .ws parameter

```
DATFILE=xxxx
```

where xxxx is the name of the preferred DAT file.

Bidirectional Arabic Support

Limitations

The Bidirectional Text Assist Function is not supported in the Personal Communications AS/400 component. As a result, the user cannot run Bidirectional OfficeVision/400™.

Installation Tips

To set up an Arabic workstation, do the following:

1. Select **420 Arabic Speaking** as the host code page in the **Customize Communication** panel.
2. Select **Arabic Speaking** as the keyboard layout.
3. In the **Select Display Font** panel, choose **ARB3270** at the Automatic Sizing list box or at the Fixed size font selection.
4. In the **API Settings** panel, select **864** as the DDE/EHLLAPI PC code page.
5. Choose **Typing Arabic** as the font in the **Page Setup** panel.

   Note: For Personal Communications for Windows 95 you can also select **ARB3270** for printers with drivers that allow bitmap fonts. For example, printing through **PDT** requires the IBM Arabic 864 font to be available on the printer.

To set up for Numeric Swapping or Symmetric Swapping:

1. Select **Display Setup** from the **Edit → Preferences → Appearance** pull-down list.
2. Select **Swapping** from the list box at the left, where the settings for numerics and symmetric characters is displayed. Changes are immediately reflected on the active session.

   Note: Numeric Swapping is a 3270-only feature. This function will not be selectable if the session is an AS/400 session.

The supported Arabic fonts are:

- ARB3270, which is found in the PCSANSIA.FON, or MFIANSIA.FON. To use the MFIANSIA.FON:
   1. Rename the file PCSANSIA.FON to PCSANSIA.ORG.
   2. Copy MFIANSIA.FON to PCSANSIA.FON.
- Typing Arabic, which is found in the file TYPEARB.TTF.

The Arabic font files are located on the product CD-ROM in the FONT subdirectory.

Bidirectional Keyboard Functions for 3270

The keys unique to Bidirectional 3270 are:

- **Language selection**: This function is activated by the key combination Alt+Shift and allows you to change the language layer. If the language layer is Latin, pressing the Alt+RightShift key combination changes the language layer to Arabic. If the language layer is Arabic, pressing the Alt+LeftShift key combination changes the language layer to Latin.
- **Screen Reverse**: This function is activated by the key combination Alt+NewLine and reverses the screen image. If the screen orientation is left-to-right, pressing

this key combination reverses the screen image right-to-left. If the screen orientation is right-to-left, pressing this key combination reverses the screen image to left-to-right.

Note that the operator information area is not reversed by this operation.

When the screen orientation is changed, the language layer is changed to the default language of the new screen orientation. If the screen is reversed to right-to-left, then the language is changed to Arabic. If the screen is reversed to left-to-right, then the language is changed to one using Latin characters.

If the swapping of symmetric characters is enabled, the inversion of the screen causes directional characters to be replaced by their counterparts.

If the swapping of numeric characters is enabled, the inversion of the screen causes Hindi numerals to be replaced by their Arabic counterparts and the Arabic numerals to be replaced by their Hindi counterparts.

- **Field Reverse**: This function is activated by the key combination Alt+NumLock and toggles the field orientation to either opposite to or the same as the screen orientation. The text in the field is not inverted. The cursor orientation is set equal to the new field orientation and the language layer is selected accordingly.

  If the cursor is in the first logical position of a field or line, when you select the field reverse function, the cursor skips to the other side of that field or line, which becomes the first logical position. If the cursor was not in the first position of the field or line, when selecting the field reverse function, the cursor remains in its position and allows natural and correct editing of existing text.

- **Auto Field Reverse**: This function is activated by the key combination Alt+NumPad5, which toggles the auto field reverse mode for the current screen orientation.

  Auto field reverse affects the automatic selection of the field orientation of unprotected fields:

  - When auto field reverse is disabled, upon initial entry to a field (whether numeric or alphanumeric), the field orientation is always set equal to the screen orientation.

  - When auto field reverse is enabled, upon initial entry to an alphanumeric field, the field orientation will be set to right-to-left (for both left-to-right and right-to-left screen orientations).

  - When auto field reverse is enabled, upon initial entry to a numeric field, the field orientation will be set to left-to-right (for both left-to-right and right-to-left screen orientations).

- **Push/End Push**: This function is activated by the key combination Shift+NumLock and allows the entering and editing of text whose direction is opposite from the field direction. When this function is activated, the cursor orientation is reversed, the language layer is changed accordingly, and a push segment is created.

  The PUSH function has two secondary modes:

  - Boundary mode: This mode is activated upon entering push mode. In this mode, the cursor remains in its position, and the typing of additional characters pushes the text in the direction opposite from the field direction. To indicate this boundary mode, the cursor has a block shape.

  - Edit mode: This mode is activated when the cursor is moved from its boundary position into the PUSH SEGMENT area. In this mode, you can edit the text within the PUSH segment, while typing in the field's natural direction.

END PUSH, activated by the Shift+NumLock key sequence, terminates the push mode.

Note: In Windows mode, END PUSH is activated by the Shift+Numpad/ key sequence.

The cursor jumps to the end of the PUSH segment, and its direction changes to the original direction. You can also perform END PUSH by pressing any field exit keys (for example, Cursor Up or Cursor Down) or an AID key (for example, Enter)

- **AutoPush**: This function is activated by the key combination Alt+NumPad/ and assists the terminal operator in typing mixed left-to-right and right-to-left text. When enabled, reversed segments are automatically initiated and terminated, according to the entered character or the selected language layer. This mode relieves the operator from manually pressing Push, as it is automatically invoked.
  - In right-to-left fields, typing a digit or a Latin letter causes the automatic initiation of Push, without language change. Further Latin letters or digits will continue the push mode; any other character automatically terminates push mode. This feature allows you to type Arabic text with imbedded numbers or Latin words without using Push/End Push.
  - In left-to-right fields, typing an Arabic character or special character causes the automatic initiation of Push, without language change. Typing any digit or Latin character causes the automatic termination of the mode. This allows the user to type Latin text with imbedded Arabic words using language layer selection rather than Push/End Push.

Arabic Character Shape Selection Functions

There are five shape selection keys: one for Contextual Shape Determination (CSD), and 4 for Specific Shaping modes (Base/Isolated, Initial, Middle, Final). The default Shaping Mode is CSD.

The keys unique to Bidirectional 3270 are:

- **Contextual Shape Determination (CSD) key**: Pressing this key sets the shaping mode to Contextual Shape Determination (CSD), which is the default. Note that contextual shape determination is performed only for right-to-left text entered or modified by the operator. This key toggles between CSD and Base mode.

  Pressing any of the Specific shape selection keys disables CSD.

  The character Alef-Madda

  آ

  in the operator information area indicates that CSD is selected.

  This function is initiated by the key combination Alt+NumPad4.
- **Specific Shape Selection keys**:
  - Base/Isolated: initiated by the key combination Alt+NumPad2
  - Initial: initiated by the key combination Alt+NumPad1
  - Final: initiated by the key combination Alt+NumPad7
  - Middle: initiated by the key combination Alt+NumPad8

  Pressing one of the above keys disables CSD, and sets shaping mode to the selected value. Arabic letters typed from then on will have the selected shape.

Note: Some Arabic characters do not have middle, initial, or final shapes. In this case, if the user enters one of those characters where the requested shape does not exist, then the closest shape is selected according to the following rules:

- – Instead of initial, isolated is selected.
- – Instead of final, isolated is selected.
- – Instead of middle, final (if it exists) or isolated is selected.

The selected Shaping Mode is shown in the operator information area:
- – Isolated GHEIN

  غ

  indicates Base/Isolated Shaping Mode
- – Initial GHEIN

  غـ

  indicates Initial Shaping Mode
- – Middle GHEIN

  ـغـ

  indicates Middle Shaping Mode
- – Final GHEIN

  ـغ

  indicates Final Shaping Mode
- **Field Shape key**: Pressing the key combination Alt+NumPad+ causes the shaping of the Arabic data present in the current field or line. The cursor position remains unchanged.
- **Field De-Shape key**: The key combination Alt+NumPad Enter de-shapes the Arabic data present in the current field or line. All Arabic letters are converted to their Base/Isolated shapes.

Personal Communications AS/400

The keys unique to Bidirectional PC400 are:
- **Language selection**: This function is activated by the key combination Alt+Shift and allows the changing of the language layer. If the language layer is Latin, by pressing the Alt+RightShift key combination, the language layer will change to Arabic. If the language layer is Arabic, by pressing the Alt+LeftShift key combination, the language layer will change to Latin.
- **Screen Reverse**: This function is activated by the key combination Alt+NewLine and reverses the screen image. If the screen orientation is left-to-right, by pressing this key combination the screen image will be reversed to right-to-left. If the screen orientation is right-to-left, pressing this key combination reverses the screen image to left-to-right.

  Note that the operator information area is not reversed by this operation.

  When the screen orientation is changed, the language layer is changed to the default language of the new screen orientation. If the screen is reversed to right-to-left, the language is changed to Arabic. If the screen is reversed to left-to-right, the language is changed to one using Latin characters.

The inversion of the screen causes directional characters to be replaced by their counterparts.

- **Field Reverse**: This function is activated by the key NumLock and toggles the field orientation to either left-to-right or right-to-left. The text in the field is not inverted. The cursor orientation is set equal to the new field orientation and the language layer is selected accordingly.

  If the cursor is in the first logical position of a field or line, when selecting field reverse function, the cursor skips to the other side of that field or line, which now becomes the first logical position. If the cursor was not in the first position of the field or line, when selecting field reverse function, the cursor remains in its position and allows natural and correct editing of existing text.

- **Close**: This function is activated by the key combination NumPad/ and is provided so that the data entered in one keying direction can be concatenated with the data that was previously entered in the opposite direction. It operates as follows:
  - All embedded nulls are removed from the current line.
  - Concatenated text is moved to the right boundary of the field (if the field direction is right-to-left) or to the left boundary (if the field direction is left-to-right).
  - The cursor direction is set to the field direction.
  - The language layer is set to the default for the field direction.
  - If the screen orientation is now left-to-right, the cursor is positioned at the first null to the right of the concatenated text.
  - If the screen orientation is now right-to-left, the cursor is positioned at the first null to the left of the concatenated text.

- **Base**: This function is activated by the key combination Ctrl+Home; it is a toggle key that activates or deactivates the Automatic Shape determination function for Arabic RTL text. It is valid only when processing RTL Arabic text. If it is pressed in an LTR field, an operator error 0027 results.

Bidirectional Hebrew Support

The Bidirectional Hebrew support in 3270 enables the program to emulate an English/Hebrew 3270 display terminal. Special Language and Bidirectional functions are added to the list of standard functions supported by the emulation program.

Bidirectional Functions for 3270

Table 10. Bidirectional Key-Combinations for 3270

Function	Combination
Hebrew Language	Alt+RightShift
English Language	Alt+LeftShift
Screen Reverse	Alt+Enter
Field Reverse	Alt+NumLock
Auto Field Reverse	Alt+NumPad5
Push	Shift+NumLock
End Push	Shift+NumPad/
Autopush	Alt+NumPad/

The 3270 host system can run as a native Windows application. The layout and user interface functions in the Windows-based product conform to the IBM user interface standard (SAA/CUA®); they are similar to the layout and functions implemented in other IBM products (for example, OS/2).

- **Language Selection**: The key combination Alt+Shift allows you to change the language layer. If the language layer is Latin, pressing Alt+RightShift changes the language layer to Hebrew. If the language layer is Hebrew, pressing Alt+LeftShift changes the language layer to Latin.

- **Screen Reverse**: This function, activated by the Alt+Enter key sequence, reverses the screen image. If the screen direction is left-to-right, the screen image is inverted and displayed from right-to-left. Pressing this hotkey again returns the screen to its original direction, left-to-right. When the screen orientation is changed, the language layer is changed to the default language of the new screen orientation. If the screen is changed to right-to-left, the language changes to Hebrew. If the screen is changed to left-to-right, the language changes to Latin.

  Note that the status line (OIA) never reverses. It always displays from left to right.

- **Field Reverse**: In most cases, the field direction is the same as the general screen direction. However, sometimes it is necessary to have a field whose direction is the opposite of the screen direction. The Field Reverse function, activated by the Alt+NumLock key sequence, allows such transitions. When this function is activated, the typing direction is reversed, but the existing text in the field and the screen image does not change. This function creates a temporary change which stays in effect as long as the cursor remains within the field, or until Field Reverse is activated again.

  If the function is activated while the cursor is at the beginning of a line or field, the cursor jumps to the end of the line or field, so that the reversed field begins logically from that position. Otherwise, the cursor remains in its position and allows natural and correct editing of existing texts whose direction is the opposite of the screen direction.

- **Auto Field Reverse**: This function sets the field orientation for you, when you are entering data for mixed applications (Hebrew and English). This is done by automatically activating the Field Reverse function. The Auto Field Reverse mode is activated by the Alt+NumPad5 key sequence, and can be applied independently for each screen orientation, left-to-right or right-to-left.

  - If the Auto Field Reverse option is activated on a right-to-left screen, the Field Reverse function is automatically activated every time the cursor moves to a numeric field. The cursor then jumps to the leftmost position of the numeric field, to allow left-to-right typing of numbers.

  - If the Auto Field Reverse option is activated on a left-to-right screen, the Field Reverse function is automatically activated only when the cursor moves to an alphanumeric field. The cursor then jumps to the rightmost position of the field, to allow right-to-left typing of Hebrew.

  Initially, the Auto Field Reverse option is enabled when the screen direction is right-to-left, and is not enabled when the screen direction is left-to-right. To terminate the Auto Field Reverse mode, press Alt+NumPad5 again.

- **Push** and **End Push**: These functions allow you to type or edit text whose direction is the opposite of the field direction. When this function is activated the cursor orientation is reversed, the language layer is changed accordingly, and a push segment is created.

The Push function is activated by the Shift+NumLock key sequence. The Push function has two secondary modes:

– Boundary Mode: This mode is activated upon entering the Push mode. In this mode, the cursor remains in its position, and the typing of additional characters pushes the text in the direction opposite to the field direction. To indicate this boundary mode, the cursor shape is changed.

– Edit Mode: This mode is activated when the cursor is moved from its boundary position into the Push Segment area. In this mode, you can change the text within the Push segment, while typing in the text's natural direction.

End Push, activated by the Shift+NumPad/ key sequence, terminates the temporary mode. The cursor jumps to the end of the Push segment, and its direction reverts to that of the field.

- **Autopush**: The Autopush mode makes work easier and more efficient when typing Hebrew and English mixed text. When this mode is enabled, reverse segments initiate and terminate automatically, according to the entered character or the selected language layer. It relieves the operator from manually selecting Push and End Push. Autopush is especially useful for typing digits in Hebrew fields (right-to-left fields). The Autopush mode is activated by the Alt+NumPad/ key sequence; it can be applied independently to fields whose direction is left-to-right or right-to-left. In this mode, the Push and End Push functions are automatically activated according to the language of the text being typed. There is no need to worry about activating and terminating the Push mode manually.

  – In right-to-left fields, typing a digit or a Latin letter causes the automatic initiation of Push, without language change. Additional Latin letters or digits will continue the push mode; any other character automatically terminates push mode. This feature allows you to type Hebrew text with imbedded numbers or Latin words without using Push/End Push.

  – In left-to-right fields, typing a Hebrew character causes the automatic initiation of Push. Typing any digit or Latin character causes the automatic termination of the mode. This allows the user to type Latin text with imbedded Hebrew words by using language layer selection rather than Push/End Push.

Keyboard Layout

Two Hebrew keyboard templates (Bulletin and Old Code) are supplied with the product. The Old-Code template is similar to the Bulletin template, with the following exceptions:

- Shift of "6" (s-6) produces the Greek Delta symbol (ASCII 235, hex EB), representing the old Israeli Lira, instead of the regular Cent symbol.
- Shift of "7" (s-7) does not produce anything (the Ampersand symbol is not available in Old Code).
- In English language mode, unshifted English letters produce uppercase letters (A-Z), rather than lower case letters (a-z), whether Caps Lock is ON or OFF.

Configuration

To set up a Hebrew workstation, do the following:

1. Select **424 Hebrew (Bulletin Code)** or **803 Hebrew (Old Code)** as the host code page in the **Customize Communication** panel.
2. Select **Hebrew (Bulletin Code)** or **Hebrew (Old Code)** as the keyboard layout.
3. Select **Transfer** from the **Edit → Preferences** pull-down menu.
4. From the General tab, select **862**, **916**, or **1255** from the **PC Code-Page** list.

5. In the **API Settings** panel, select **862**, **916**, or **1255** as the DDE/EHLLAPI PC code page.
6. In the **Select Display Font** panel, choose **HEB3270** at the Automatic Sizing list box or at the Fixed size font selection.
7. Select **Page Setup** from the **File** pull-down menu.
8. In the **Text** tab, choose **(Courier Heb)** printer font.

Font

If you are accustomed to a traditional Display Station such as IBM InfoWindow® 3472, you may not prefer the Personal Communications font. You can try an alternative font by changing the font files as follows:

1. Rename PCSANSIH.FON file to BASANSIH.FON
2. Copy ALTANSIH.FON to PCSANSIH.FON

In order to use the ALTANSIH.FON file, you must order the needed diskette separately.

File Transfer With 862 Code Page

PC code page 862 is the IBM number for the Hebrew code page. Microsoft Windows (Hebrew) uses a code page based on (but not identical to) the ISO code page, and quite different from code page 862.

Apart from the differences in code points, Microsoft Windows for Hebrew works with logical text. This means that Windows applications are expected to store text in logical order (that is, the same order as typed but not as displayed). Accordingly, the text that is displayed on the screen is different from the text that is processed by the application.

Therefore, when transferring files with translation to and from code page 862, there may be unexpected results (such as a different order of Hebrew text), in some cases. To overcome such problems, it is recommended after conversion of EBCDIC text to code page 862 to consider using the CONVERT program, provided as part of Microsoft Windows, which is capable of converting between logical text and visual text.

Bidirectional Functions for 5250

Table 11. Bidirectional Key-Combinations for 5250

Function	Combination
Hebrew Language	Alt+RightShift
English Language	Alt+LeftShift
Reverse	NumLock
Close	NumPad/
Screen Reverse	Alt+Enter

- **Hebrew Language**: same meaning as in "Bidirectional Functions for 3270" on page 152
- **English Language**: same meaning as in "Bidirectional Functions for 3270" on page 152
- **Reverse**: Pressing this key allows the operator to reverse the current cursor direction. It functions as follows:

- The cursor is repositioned according to the current cursor direction. When right-to-left, the cursor is placed at the current left boundary location. When left-to-right, the cursor is placed at the current right boundary location.
- The cursor direction is then reversed; the Keyboard Layer you get depends on the new cursor direction.
- Insert mode is reset.
- **Close**: By pressing this key, data entered in one key direction is joined with data that was previously entered in the opposite direction:
  - All embedded null characters are removed from the current line (or field, if the field is contained on one line).
  - Joined text is moved to the right boundary of the field if the field direction is right-to-left, or to the left boundary if the field direction is left-to-right.
  - The remainder of the line (or the field, if contained on one line) is padded with null characters.
  - The cursor direction is set to the field direction.
  - If the cursor direction is now left-to-right, the cursor is positioned at the first null character to the right of the joined text. If the cursor direction is now right-to-left, the cursor is positioned at the first null character to the left of the joined text.
  - Insert mode is reset.
- **Screen Reverse**: same meaning as in "Bidirectional Functions for 3270" on page 152

Bidirectional Support for VT

The bidirectional support in VT enables the program to emulate English/Arabic or English/Hebrew VT 340 7-bit, VT 340 8-bit, VT 100, VT 52, and VT ANSI display terminals. Special language and bidirectional functions are added to the list of standard functions supported by the emulation program.

Configuring VT Emulation for Arabic or Hebrew

To set up an Arabic or Hebrew workstation for VT emulation, do the following:

1. Click **Configure** from the **Communication** pull-down menu.
2. Select **ASCII** for the host type.
3. Click the **Session Parameters** button.
4. Select the **National** host code page type.
5. Select the host code page
   - If configuring for Arabic, choose Arabic ASMO 708 for 8-bit code page or Arabic ASMO 449 for 7-bit code page.
   - If configuring for Hebrew, choose Hebrew ISO or Hebrew NRCS.
6. Select the font by going to the **Edit** pull-down menu and selecting **Preferences → Appearance → Font**.
7. Select **Face Name**.
   - If configuring for Hebrew, select **HEB3270**.
   - If configuring for Arabic, select **AVT3270**.

File Transfer

Automatic code page conversion occurs during file transfer. However, this is only valid for 8-bit code pages.

For Arabic workstations, the conversion is from Arabic ASMO 708 to 1256 when sending. The code page conversion is reversed when receiving.

For Hebrew workstations, the conversion is from Hebrew ISO to 1255 when sending. The code page conversion is reversed when receiving.

Copy and Paste

Automatic code page conversion occurs during copy and paste operations. For Arabic, the conversion is from the current host code page to 1256, and vice versa. For Hebrew, the conversion is from the current host code page to 1255, and vice versa.

Print Screen

To print a screen in an Arabic or Hebrew session, do the following:

1. Click **Page Setup** from the **File** menu.
2. For an Arabic session, select the **Typing Arabic VT** font. For a Hebrew session, select the **Courier Heb** font.

Remapping BiDi Keys

You can customize the keyboard to map BiDi functions. The following functions are available for a VT BiDi session:

- Screen Reverse (for Logical sessions only)
- National Keyboard Layer
- Latin Keyboard Layer
- Set/reset right-to-left cursor direction (for Hebrew session and visual text type only)
- Toggle between 7-bit and 8-bit character set modes (for Hebrew session only)
- Adjust the column heading (for Arabic session only)

Bidirectional Functions for VT

Table 12. Bidirectional Key-Combinations for VT

Function	Combination
Language Selection (Hebrew or Arabic)	Alt+RightShift
English Language	Alt+LeftShift
Screen Reverse (Hebrew Logical Text Mode and Arabic only)	Alt+NewLine
Adjust Column Heading (Arabic only)	Alt+K
Toggle Cursor Direction (Visual Hebrew only)	Alt+D
Toggle 7–bit and 8–bit Character Set Modes (Hebrew only)	Alt+B

- **Language Selection**: Same meaning as in "Bidirectional Functions for 3270" on page 152
- **English Language**: Same meaning as in "Bidirectional Functions for 3270" on page 152
- **Screen Reverse**: Same meaning as in "Bidirectional Functions for 3270" on page 152
- **Adjust Column Heading**: Column Heading mode causes blanks between columns of text to break insertions. Thus, the English titles for columns of data maintain their correct position.

- **Toggle Cursor Direction**: If current cursor direction is left-to-right, pressing Alt+D changes it to right-to-left, and back again. When the cursor direction is set to right-to-left, this does not affect cursor addressing , moving, inserting, and deleting characters, erasing in line or erasing in display.

  The following functions are affected by the right-to-left cursor direction setting:
  – Backspace (the cursor moves one position to the right)
  – Carriage return (the cursor moves to the rightmost position on the current line)
  – Line feed (the cursor moves to the rightmost position of the next line)
  – Typing in the auto wrap mode (current line is continued from rightmost position of the next line)
- **Toggle 7–bit and 8–bit Character Set Modes**: This function allows switching between 7-bit and 8-bit character sets. If the current character set is ISO Hebrew (8-bit), pressing Alt+B changes the character set to Hebrew NRCS (7-bit).

Arabic Support for ASMO 449 7-bit Code Page

The following Control Sequences are supported for ASMO 449 7-bit code page.

Table 13. Control Sequences for Arabic VT Support

Control Sequence	Description
Arabic Mode and State Controls	
DECSABM	• Arabization disabled • BiDi with Text Controls • BiDi without Text Controls
DDECSNL	Start new Arabic/Latin language
DECVTCM	• Invisible Text Controls • Visible Text Controls
DECSAPV	Numerals displayed in Arabic/Hindi, according to context
Arabic Imaging Controls	
DECBDOCPD	Set the direction of the screen (Document Presentation Direction)
Arabic Text Controls	
SLR	Start LTR direction
SRL	Start RTL direction
SDD	SDD start default direction

Chapter 16. Unicode Support

For Windows NT and 2000, Personal Communications Version 5.5 supports Unicode for Hindi and 1390/1399 Japanese code pages.

For a description of the procedure for configuring Personal Communications Hindi support, refer to *Quick Beginnings*. Installation information is described in the *CD-ROM Guide to Installation*.

1390/1399 Code Pages

The following features are supported in Unicode for 1390/1399 Japanese character processing.

- Print Screen
- Record and play macros
- Data and file transfer
- Copy, Cut, and Paste
- EHLLAPI. Refer to *Emulator Programming* for information about 1390/1399 transfer APIs.
- Keyboard Customization

See the following list for more information about specific 1390/1399 support issues.

DBCS Translation Table

Personal Communications maps 1390/1399 code pages as follows:

- 1390-->UCS2
- UCS2-->1390
- 1399-->UCS2
- UCS2-->1399
- 1399-->943
- 943-->1390

Personal Communications loads a different translation table for display.

Personal Communications handles the Unicode printing both for GDI mode and PDT mode.

Data and File Transfer

File transfer uses the EBCDIC<-->UNICODE (or EBCDIC<-->ASCII) translation for Host to PC. The user can save as an ASCII file or as a Unicode file.

User Defined Area (UDA) Support

Personal Communications handles EBCDIC<-->UNICODE (UDC), which is different from EBCDIC <--> ASCII. The DBCS UDA mapping table editor handles UNICODE<--> EBCDIC UDA.

Hindi Support

The following features are supported in Unicode for Hindi.

- Print Screen
- Data transfer. File transfer is not supported.
- Copy, Copy Append, Cut, and Paste. Copy Link is not supported.
- EHLLAPI. Refer to *Emulator Programming* for information about Hindi data transfer APIs.
- Trace

See the following list for more information about specific Hindi support issues.

Code Page
> The host code page for Hindi is 1137. The Unicode PC code page is 1200. Personal Communications uses a predefined translation table to map these code pages.

Record and Play Macros
> Hindi enablement is limited to macro scripts only. Customization of the macro file is disabled in Hindi sessions. VB scripts are not supported.

Fonts   Only True Type Fonts are used for Hindi for display and printing. The TTF file is enumerated by Personal Communications and is displayed in the **Page Setup** pull-down menu. This font file has to be selected for printing the characters in Hindi. The Hindi font file is installed along with other font files.

Keyboard
> The English keyboard layout is mapped to the Hindi layout. This is accomplished by loading the two key mapping tables corresponding to Hindi from the PCSKBD.DLL file. The first table maps the Windows virtual key number to the IBM key number. The second key mapping table maps the IBM key number to the Unicode value of the corresponding character.

Keyboard Customization
> When a key is selected in the **Keyboard Customization** dialog, the edit control window displays the corresponding Hindi character. The user can change the mapping by selecting a new character from the list box. If the user attempts to directly edit the edit control window, the characters from the current input character set appear.

Copy/Move/Swap and Find keys
> The function of these keys is similar to that of the existing SBCS languages. The only difference is that the Hindi characters are stored as Unicode characters instead of single-byte characters.

Switching from Hindi to English
> Hindi language support also includes toggling between Hindi and English using the ALT+left Shift key.

OIA Display
> The Operator Information Area displays functions differently for Windows NT and 2000.

> **Windows NT**
>> When a user is working in the Hindi compose mode, **HI** is displayed in columns 36 and 37 of the OIA display; when working in English compose mode, **E** is displayed. The user can toggle between Hindi and English using ALT+left Shift key.

Windows 2000

In Windows 2000, **HI** is displayed in the OIA when working in Hindi mode. There is no display when the user shifts from Hindi mode.

Part 5. Building a Printer Definition Table (PDT)

Chapter 17. Building a Printer Definition Table (PDT) for PC/3270

This chapter, in combination with "Chapter 18. Building a Printer Definition Table (PDT) for PC400" on page 175, explains how to customize a printer definition table (PDT file) for PC/3270. "Chapter 18. Building a Printer Definition Table (PDT) for PC400" on page 175 contains basic information about creating and changing PDTs; this chapter contains specific information about creating PC/3270 PDTs. PDTs for PC/3270 and PC400 differ only slightly; if you use a common PDT (used for both PC/3270 and PC400), the additional statements for PC400 are ignored for PC/3270 processing. Similarly, statements unique to PC/3270 are ignored for PC400 processing.

ASCII_PASSTHRU? and EBCDIC_PASSTHRU?

The ASCII_PASSTHRU? and EBCDIC_PASSTHRU? PDF statements are new options available for PC/3270. See "Transparent Print Capability" on page 179 for details.

Supplemental Explanation of PDF Statements for PC/3270

The following PDF statements have functions that differ from those for PC400. All statements are listed in "Field Names of Printer Definition Files" on page 191.

MAXIMUM_PAGE_LENGTH
> Printed lines per page. If you change this value, you must change the value in the SET_PAGE_LENGTH=SFL value statement (see "Session parameters" on page 177) to be the same.

MAXIMUM_PRINT_POSITION
> Printed characters per line.

COMPRESS_LINE_SPACING?
> (For LU 3 only) Whether blank or null lines are to be printed if all characters on that line are nulls.

FORM_FEED_ANY_POSITION?
> Whether a form feed is to be valid in any position. If NO, a form feed will be valid only in the following positions:
> * First print-position of the buffer
> * After a valid new line operation
> * First print-position of a line

OVERRIDE_FORMATTED_PRINT?
> Whether nulls are to be printed as blanks.

INTERV_REQ_TIMER
> This statement is ignored.

INTERV_TIMER_ON_PE_ONLY?
> This statement is ignored.

RESELECT_TIME_EXCPT_5204
> This statement is ignored.

ESC/P_LINE_FEED?
> If YES, the line feed (LF) function is emulated when the line feed

command is received. This is useful when you do not want a line feed accompanied by a carriage return (CR) on a printer using the ESC/P printer language. If NO, the value defined in the LINE_FEED statement is sent to the printer.

IGNORE_FORM_FEED_AT_FIRST_POS?
If YES, the form feed (FF) function is ignored at the first position (for LU 2, LU 3, and non-SNA sessions) or at the beginning of the print job (for LU 1 sessions). Using this option eliminates extra blank pages at the beginning of each print job.

FORM_FEED_TAKES_POSITION?
If YES, the form feed (FF) function is effective if followed by data (LU 2, LU 3, and non-SNA sessions only).

KANJI_CODE?
If YES, kanji codes (JIS or SHIFT_JIS) have been used. This value cannot be changed.

ZENKAKU_SPACE
The size (adjustment unit) of a user-defined character and a HANKAKU character. This value cannot be changed.

SBCS_FONT_LOAD
Registration of a HANKAKU GAIJI. This value cannot be changed.

DBCS_FONT_LOAD
Registration of a ZENKAKU GAIJI. This value cannot be changed.

SET_LOCAL_FONT
Set a font set of user-defined characters. Remove it when user-defined characters are not loaded to a printer.

RESET_LOCAL_FONT
Reset a font set of user-defined characters. Remove it when user-defined characters are not loaded to a printer.

KANJI_ON
Set kanji mode.

KANJI_OFF
Reset kanji mode.

ATTRIBUTE_GRID_LINE
Set to grid-line print. This value cannot be changed.

START_DOUBLE_WIDTH_CHARACTER
Set a double-width character.

END_DOUBLE_WIDTH_CHARACTER
Reset a double-width character.

Notes:

1. When using IBM5577.PDF, change FORM_FEED=EJC to FORM_FEED in the file when a continuous form job does not feed correctly.

2. When using ESC_P.PDF, DBCS (2-byte) characters are placed to the left of the character box, not in the center. To place DBCS characters in the center of the character box, change the IBM-supplied values in ESC_P.PDF:

```
P10 EQU 1B 50 1B 20 00 1C 53 00 0C 1C 54 00 00
P12 EQU 1B 4D 1B 20 00 1C 53 00 06 1C 54 00 00
P13 EQU 1B 67 1B 20 01 1C 53 00 03 1C 54 00 01
P15 EQU 1B 67 1B 20 00 1C 53 00 00 1C 54 00 00
```

to the following:

```
P10 EQU 1B 50 1B 20 00 1C 53 06 06 1C 54 00 00
P12 EQU 1B 4D 1B 20 00 1C 53 03 03 1C 54 00 00
P13 EQU 1B 67 1B 20 01 1C 53 02 01 1C 54 00 01
P15 EQU 1B 67 1B 20 00 1C 53 00 00 1C 54 00 00
```

SCS TAB Setting

A PC/3270 printer session LU type 1 can accept any number of tab positions, and the host printer session can send any number of tabs to the printer session. However, the workstation printer you are using might support fewer tab positions than the host application sets; for example, the IBM Proprinter supports 27 tab positions.

If the number of tab positions that the host application sets exceeds the maximum number of positions that the printer supports, your printed output will not look as you expect it to. You can avoid this situation by modifying the PDF file and reconfiguring PC/3270 as follows:

1. Modify the SET_HORIZONTAL_TABS statement as follows:

   SET_HORIZONTAL_TABS=*number*

2. Save the file under a new name.
3. Convert the PDF file (with the procedure described in "Chapter 18. Building a Printer Definition Table (PDT) for PC400" on page 175).
4. Select the new PDT file created in Step 2.

Printer Color Mixing

Some printers, such as the IBM 5182, compose certain colors by mixing colors. Colors are mixed by printing the text in one color and then printing over the same text in another color on a second pass.

PC/3270 will compose a color if the color is not defined in the printer definition table of a color printer that is capable of mixing colors. Therefore, if you are using a printer that composes some colors by mixing two colors, leave the definition of the composed colors blank in the printer definition file. Only the composite colors defined in Table 14 are created by double-printing the primary colors.

Table 14. Color Mixes

Composite Color	Primary Colors
Red	yellow, magenta
Green	yellow, cyan
Blue	magenta, cyan

For example, to create red, you must define yellow and magenta. The primary colors must be defined in the printer definition table.

Printer Session Data Stream Support

There are two types of host-directed print data streams supported by PC/3270: the 3270 data stream and the SNA character string (SCS) data stream.

3270 Data Stream

The 3270 data stream is a buffer-oriented data stream. The print data is formatted as if it were going to be displayed on a screen. The host system sends commands to format the presentation space. These commands can change the presentation space in any location at any time. Once the host system completes formatting the presentation space, it issues a START PRINT command and the presentation space is printed as accurately as the printer hardware allows. The 3270 data stream can be sent to PC/3270 workstations over an SNA LU 3 session or a non-SNA DFT printer session.

Table 15 lists the commands that can be sent in the 3270 data stream.

Table 15. 3270 Data Stream Commands

Command	Meaning
W	Write
EW	Erase/Write
EWA	Erase/Write Alternate
RB	Read Buffer
RM	Read Modified
RMA	Read Modified All
EAU	Erase All Unprotected
WSF	Write Structured Field

The RB, RM, and RMA commands cannot be used with an SNA attachment.

Table 16 lists the orders that can be sent in the 3270 data stream.

Table 16. 3270 Data Stream Orders

Order	Meaning
SBA	Start Buffer Address
SF	Start Field
IC	Insert Cursor
PT	Program Tab
RA	Repeat to Address
EUA	Erase Unprotected to Address
SFE	Start Field Extended
SA	Set Attribute
MF	Modify Field

The last three orders in the preceding table manage the color, extended highlighting, and programmed symbols attributes for fields and individual characters. The programmed symbols attribute is not supported by PC/3270.

In addition to the commands and orders in the two preceding tables, there are special printer formatting control codes that can be included in the 3270 data stream.

The following table lists the control codes that can be sent in the 3270 data stream.

Table 17. 3270 Data Stream Format Control Codes

Code	Description
NL	New Line control code moves the print position to the left margin and down one line.
CR	Carriage Return control code moves the print position to the left margin.
EM	End of Message control code ends the print operation.
FF	Form Feed control code moves the print position to the left margin at the top of the next page.

Note: NL, CR, and EM are valid only if a line-length format specified by the WCC is not used. The FF code is valid in any buffer position.

PC/3270 printer support interprets each 3270 attribute and printer control code and translates them into a sequence of one or more workstation printer control codes. For more information about the 3270 data stream, refer to *IBM 3270 Information Display Data Stream Programmer's Reference.*

SCS Data Stream

The SCS data stream is a sequential data stream that is oriented toward line printers. The characters are translated according to the host system code page and printed according to the attributes and formatting specified by the control commands. The way in which SCS characters are printed depends only on the control codes that precede them. Therefore, it is not necessary to buffer the characters before they are printed. The SCS data stream flows across the SNA LU 1 session only.

The valid SCS control codes supported by PC/3270 are listed in Table 18.

Table 18. Supported SCS Control Codes

Code	Value	Command
NL	X'15'	New Line
LF	X'25'	Linefeed (Index)
CR	X'0D'	Carriage Return
FF	X'0C'	Form Feed
BS	X'16'	Backspace
BEL	X'2F'	Bell Function
IRS	X'1E'	Interchange-Record Separator
SA	X'28'	Set Attribute
TRN	X'35'	Transparent
NUL	X'00'	Null
HT	X'05'	Horizontal Tab
VT	X'0B'	Vertical Tab
SHF	X'2B C1'	Set Horizontal Format
SVF	X'2B C2'	Set Vertical Format

Table 18. Supported SCS Control Codes (continued)

Code	Value	Command
SLD	X'2BC 6'	Set Line Density
SPD	X'2BD2 xx29'	Set Print Density
VCS	X'04 xx'	Vertical Channel Select
ENP	X'14'	Enable Presentation
INP	X'24'	Inhibit Presentation
GE	X'08'	Graphic Escape
PPM	X'2BD2 xx48'	Page Presentation Media
SO	X'0E'	Shift Out
SI	X'0F'	Shift In
RNL	X'06'	Required New Line
RCR	X'06'	Required Carriage Return
SPS	X'09'	Superscript
WUS	X'23'	Word Underscore
IR	X'33'	Index Return
PP	X'34'	Presentation Position
EBS	X'36'	Expanded Backspace
NBS	X'36'	Numeric Backspace
SBS	X'38'	Subscript
IT	X'39'	Indent Tab
RFF	X'3A'	Required Form Feed
RPE	X'3A'	Required Page End
RSP	X'41'	Required Space
NSP	X'E1'	Numeric Space
ESP	X'E1'	Expandable Space
SH	X'CA'	Syllable Hyphen

Note: The ENP and INP commands are accepted, but are ignored, in an LU 1 session.

For more information about the SCS printer data stream, refer to *IBM Systems Network Architecture - Sessions Between Logical Units.*

Delimiting Print Jobs

Many print jobs can be sent over a single PC/3270 printer session. PC/3270 allows multiple sessions and applications to share a single workstation printer on a between-jobs basis. PC/3270 needs to know when each print job starts and ends so that printers can be shared properly and begin and end job strings can be sent at the appropriate times. The emulator recognizes a number of different methods of delimiting print jobs:

By Session
        PC/3270 printer support assumes, by default, that all print jobs are

delimited by sessions. That is, in the absence of all other indicators, PC/3270 assumes that a print job begins when a printer session is started and ends when it is reset.

Time-Out Interval
On non-SNA DFT sessions, print jobs can be delimited by a user-specified timeout interval. A print job on a non-SNA DFT printer session begins when the first host-outbound data for that job is received, and ends when no host-outbound data is received for a period of time exceeding the user-specified non-SNA DFT timeout interval. For PC/3270, this interval is specified during configuration.

By Brackets
On an SNA session with an LU 1 or LU 3 host application, PC/3270 can use bracket indicators to delimit print jobs. The emulator opens the printer when it receives the begin bracket, then it processes and prints data. The emulator closes the printer after it receives an end bracket.

When the emulator receives another begin bracket, it again opens a printer and begins processing a print job.

Structured Fields
The host can use structured fields to indicate to the device that a new file is beginning or that the current file is completed. PC/3270 delimits print jobs with Begin of File and End of File structured fields (SF) to perform host-directed printing. Structured fields are described in "Structured Fields".

Structured Fields

The host uses Begin of File and End of File structured fields to indicate to a device that a file is beginning or ending.

Begin/End of File Query Reply

The Begin/End of File query reply indicates that a device supports Begin of File and End of File to delineate print jobs. The PC/3270 sends a query reply, as shown in Table 19, to the host in response to a Read Partition General query.

Table 19. Begin/End of File Query Reply Format

Byte	Contents	Description
0–1	X'0005'	The length of this structure
2	X'81'	Query reply
3	QCODE X'9F'	Begin/End of File
4	FLAGS	Reserved; must be set to 0's

Begin/End of File Structured Fields

Begin/End of File structured fields are accepted on either LU 1 or LU 3 sessions. Table 20 shows the format of the Begin/End of File structured fields.

Table 20. Begin/End of File Structured Field Format

Byte	Bit	Contents	Description
0–1		X'0007'	The length of this structure
2–3		X'0F85'	Begin/End of File

Table 20. Begin/End of File Structured Field Format (continued)

Byte	Bit	Contents	Description
4		PID	Partition ID
5	0–1	FLAG1[1] B'00' B'01' B'10' B'11'	Reserved End of File is being sent Begin of File is being sent Reserved
	2–7		Reserved
6		FLAG2	Reserved; must be set to 0's.
:			

[1]This byte indicates whether Begin of File or End of File is being sent

Processing Begin or End of File Structured Fields

When the Begin or End of File structured fields are used with brackets or non-SNA timeout intervals, the Begin or End of File SFs take precedence over the brackets or timeout intervals in determining when a print job begins or ends. See the following examples:

- Begin or End of File structured fields overriding brackets:

```
Begin Bracket, Begin of File Structured Field, ...Data...,
End Bracket
```

  The device will wait indefinitely until the End of File structured field is received before ending the print job.

- Begin or End of File structured fields overriding non-SNA timeout intervals:

```
Begin of File structured fields, ...Data..., pause > timeout value
```

  The device will wait indefinitely until the End of File structured fields is received before ending the print job.

- Inconsistent use of Begin or End of File structured fields and brackets:

```
Begin Bracket, ...Data1...,
Begin of File Structured Fields,...Data2..,
End of File Structured Fields, ...Data3...,
End Bracket
```

  When you use the Begin of File and End of File structured fields inconsistently with brackets, the results are unpredictable. In the preceding example, the device might process Data1, Data2, and Data3 as separate jobs or combine two or more of them into one file.

For predictable results, each data block must be enclosed by a Begin of File structured field and an End of File structured field. The following example shows three print jobs all delimited by Begin or End of File structured fields:

```
Begin Bracket, Begin of File Structured Field, ...Data1...,
End of File Structured Field,(job1)
Begin of File Structured Field, ...Data2..., End of File Structured Field, (job2)
Begin of File Structured Field, ...Data3..., End of File Structured Field,
End Bracket(job3)
```

PC/3270 always keeps track of brackets and timeout intervals. After the emulator receives a Begin of File structured field, it takes no action on Begin Brackets, End Brackets, or timeout until it receives an End of File structured field. After a valid

End of File SF is processed, the emulator defaults to delimiting jobs by brackets or timeout intervals until it receives the next Begin of File structured field.

Begin or End of File Structured Field Error Conditions

PC/3270 does not accept transmission of data belonging to two separate print jobs in the same chain. To be accepted by the emulator, Begin of File structured fields must be the first structured field of a chain and End of File structured fields must be the last structured field of a chain.

PC/3270 rejects transmission in the following instances:

- The emulator receives an End of File structured field without first receiving a Begin of File structured field.
- The emulator receives a second Begin of File structured field without receiving an intervening End of File structured field.
- The emulator receives a Begin of File structured field that is not the first structured field following a **write structured field** command (LU 2, LU 3, and non-SNA sessions) or a Function Management Header 1 (LU 1 sessions).
- The emulator receives an End of File structured field that is not the last structured field following a **write structured field** command (LU 2, LU 3, and non-SNA sessions) or a Function Management Header 1 (LU 1 sessions).

Processing SCS Data Streams

When processing an SCS data stream, PC/3270 treats Begin or End of File structured fields as follows:

- A Begin of File structured field indicates that all SCS data in the same transmission until an End of File structured field is received is part of a new print job.
- An End of File structured field indicates that any SCS data received in the same chain as the End of File structured field is the last data of the current print job.

Processing 3270 Data Streams

When processing a 3270 data stream, PC/3270 treats Begin or End of File structured fields as follows:

- A Begin of File structured field indicates that the next presentation space print (initiated by a **write type** command with the start print bit turned on in the write control character) is the first in a print job.
- An End of File structured field indicates that the last presentation space print was the last of the current print job. The emulator immediately sends a terminate string to the printer to close the printer session.

If PC/3270 receives a Begin of File structured field and an End of File structured field without at least one presentation space separating them, it ignores the structured fields.

Chapter 18. Building a Printer Definition Table (PDT) for PC400

This chapter explains how to create and change the printer definition table (PDT file) used for PC400. "Chapter 17. Building a Printer Definition Table (PDT) for PC/3270" on page 165 contains specific information about creating PC/3270 PDTs. PDTs for PC/3270 and PC400 differ only slightly; if you use a common PDT (used for both PC/3270 and PC400), the additional statements for PC400 are ignored for PC/3270 processing. Similarly, statements unique to PC/3270 are ignored for PC400 processing.

The PDT file is created by converting the printer definition file (PDF file). The PDF and PDT define the transmission of characters and control codes to the printer and the format of printer output. To change an existing PDF (the recommended method) or create a new one, use a text editor that can produce or update an ASCII file.

Using the Printer Definition Table (PDT) File

To use the PDT file:
1. Select **File** from the menu bar of the workstation window.
2. Select **Printer Setup** from the **File** menu.
   The Printer Setup window appears.
3. Select the **Use PDT file** check box and **Select PDT**.
   The Select PDT file window appears.

To build the PDT file (required only if the PDF has been changed or created):
1. Select **Convert PDF**. Select the PDF file to be converted from the list in the Convert PDF to PDT window; then select **Convert**. The PDF File Converter window appears. After the file has been converted, click on **Close**, then click **Close** in the Convert PDF to PDT window.
2. Click **OK** in the Select PDT file window.
3. Click **OK** on the Printer Setup window.
   After printer setup is complete, the Printer Setup window is closed.

Printer Definition File (PDF File) Format

A PDF contains 3 main sections:
- Macro definitions
- Formatting controls
- Character definitions using EBCDIC_xx keywords

Macro Definitions

This section of a PDF contains user-defined macros. A macro is a single mnemonic that stands for a control code or a sequence of control codes. A mnemonic simplifies defining control sequences for PC printers and makes it easier to read the information in the PDF.

The following table shows the structure of a macro definition statement. A macro definition is composed of four parts:

1	2	3	4
name	EQU	PC Printer Control Codes	Comments

For example:

```
   FFF    EQU   0C                /* Form Feed */
```

The first part is the user-defined mnemonic or macro name. This name must be exactly three characters long and must not begin with a number. It is helpful to define a meaningful mnemonic, such as P17 for 17.1 pitch.

The second part, EQU, stands for equate and must be coded as EQU.

The third part is the hexadecimal control code, which is specific to a PC printer. Each PC printer manufacturer can define different control codes for the same printer function. For example, the IBM 4019 LaserPrinter uses control codes defined by the IBM Personal Printer Data Stream (PPDS). Hewlett-Packard printers use control codes defined by the Hewlett-Packard Printer Control Language (PCL). These control codes are usually defined in the manual that comes with the printer.

Some PC printer manuals describe control sequences as a string of ASCII symbols, such as ESC J 1 K: others use hexadecimal numbers, such as 1B 57 01; while others use decimal values, such as 27 28 1. The printer definition table compiler accepts any of these formats.

The control codes in the macro definitions section can be any of the following:
- Single characters that are interpreted as their ASCII value
- Two-digit numbers that are interpreted as hexadecimal values
- Three-digit numbers that are interpreted as decimal values

If you leave the control code section blank or if you delete it, the character or control code is interpreted as a null string. If a character or control code is defined more than once in the file, the last definition is used.

The fourth part is the comment section. The symbols /* indicate the beginning of a comment and the symbols */ indicate the end of a comment. Comments can be coded at any point in the printer definition file and are ignored by the printer definition table compiler.

The following is an example macro definition statements that are specific to the IBM 4019 LaserPrinter.

```
LFF EQU 0A                        /* Line Feed                */
VTB EQU 0B                        /* Vertical Tab             */
FFF EQU 0C                        /* Form Feed                */
CRR EQU 0D                        /* Carriage Return          */
P05 EQU 1B 57 01                  /* 5 Pitch-Characters/inch  */
P10 EQU 12                        /* 10 Pitch-Characters/inch */
CDW EQU 1B 57 00                  /* Cancel Double Wide contin. */
P17 EQU 12 0F                     /* 17.1 Pitch-Character/inch */
LL8 EQU 1B 41 09 1B 32            /* Set line length 8 lines/inch*/
P12 EQU 1B 3A                     /* 12 Pitch-characters/inch */
RES EQU 1B 5B 4B 07 00 05 31 01 A4 00 00 90
                                  /* The above macro resets the */
                                  /* printer using the factory  */
```

```
                              /* defaults.  See the IBM Laser*/
                              /* Printer Technical Reference */
                              /* manual.                     */
```

To illustrate how macros are coded, consider this example. To have the host print job printed in double-wide characters, you must know what control code turns on double-wide printing on your PC printer. On the IBM 4019 LaserPrinter, the control code to turn on double-wide printing is X'1B5701'. This would be coded as:

```
BDW EQU 1B 57 01
```

where BDW stands for Begin Double Wide.

This alone would not cause 3270 host print to send this control to the printer. The mnemonic would have to be included in a control code statement, such as START_JOB which is described in the control codes section of the file.

Note: The IBM 4019 LaserPrinter printer definition file that comes with IBM Personal Communications already has this control code defined as the P05 macro. See line 9 of the sample IBM 4019 LaserPrinter Macro Definition Statements ("IBM4019.PDF File Contents" on page 181).

Macro Name Examples

The following are example mnemonics or macros. The control codes are for the IBM 4019 LaserPrinter:

```
LND       EQU 1B 26 6C 31 4F              /* LANDSCAPE   */
POR       EQU 1B 26 6C 30 4F              /* PORTRAIT    */
P12       EQU 1B 28 73 31 32 2E 30 30 48  /* PITCH_12.00 */
T10       EQU 1B 28 73 31 30 2E 30 56     /* POINT_10.0  */
LTR       EQU 1B 26 6C 32 41              /* LETT_PAPER  */
G66       EQU 1B 26 6C 36 36 50           /* PG_LENGTH_66 */
```

Formatting Controls

The controls section of a PDF contains the following:

- Session parameters
- Control codes
- Color specifications
- Highlight specifications

Session parameters
MAXIMUM_PAGE_LENGTH, MAXIMUM_PRINT_POSITION, and SET_PAGE_LENGTH

The parameter to the left of the equal sign is a keyword and *must* be coded exactly as shown. The keyword is used to define a statement. The values to the right of the equal sign are macros or control codes. Because the values to the right of the equal sign can be both macros and control codes, they will sometimes be referred to as parameters.

The MAXIMUM_PAGE_LENGTH, MAXIMUM_PRINT_POSITION, and SET_PAGE_LENGTH parameters specify the dimensions of the output job. The number specified in the MAXIMUM_PAGE_LENGTH parameter is used in the SET_PAGE_LENGTH parameter and is substituted for the value keyword. In other words, if SET_PAGE_LENGTH and MAXIMUM_PAGE_LENGTH are coded as follows:

```
 MAXIMUM_PAGE_LENGTH=066 /* Printed lines per page */
 SET_PAGE_LENGTH=SFL 066
```

The results would be:

SET_PAGE_LENGTH=SFL 066

Because SFL is coded as X'1B 43' in the macro section, the actual control code that would be sent to the printer to set the maximum page length is:

X'1B 43 42'

where X'42' is decimal 66.

Note: Setting MPL=255 causes suppression of form feeds (FFs).

Control Codes

The control codes section of a PDF is used by the PDT function to determine what specific PC printer control code is to be sent to the PC printer when an SCS control code is received. Some of the statements used by Communications Manager are shown in the following example.

```
START_JOB=SEL CDW CDL CUL CDS CP8 CS2
END_JOB=CAT CDW CDL CUL CDS CP4 FFF
SET_PAGE_LENGTH=SFL value
SET_VARIABLE_LINE_DENSITY=ESC A value ESC 2
SET_10_CHARACTERS_PER_INCH=P10
```

Note: The above example lines come from the IBM 4019 LaserPrinter PDF.

START_JOB and END_JOB

The control codes associated with START_JOB are sent at the start of each host print job. It is best to set all printer options to a known or desired state at the beginning of each host print job. The PC printer changes its state or changes the options selected only when instructed to do so by control codes. Therefore, the previous PC application could have left the printer in portrait mode with a Courier font selected, and unless your job changed them, these would be the printer options used.

Even though the START_JOB and END_JOB control codes are the ones shipped with the IBM4019.PDF, many users change them to be more like the ones below:

```
START_JOB=RES P12 LL8
END_JOB=RES
```

In this example, the RES, P12 and LL8 macros are used on the START_JOB statement (these macros are defined in "IBM4019.PDF File Contents" on page 181). This translates into the following control codes being sent to the printer at the beginning of your print job:

X'1B 5B 4B 07 00 05 31 01 A4 00 00 90 1B 3A 1B 41 09 1B 32'

This sequence of control codes:
- Resets the printer to the IBM PPDS factory default settings (RES)
- Begins printing in 12 pitch (P12)
- Begins printing at 8 lines per inch (LL8)

The END-JOB statement sends the following control code to the printer at the end of your job:

X'1B 5B 4B 07 00 05 31 01 A4 00 00 90'

This control code resets the printer to IBM PPDS factory default settings (RES).

SET_VARIABLE_LINE_DENSITY

The SET_VARIABLE_LINE_DENSITY statement is used in combination with the panel where you can select the number of lines per inch (LPI), which can be either 6 or 8.

The PDT process uses whatever is selected in the lines per inch field, and substitutes this number for the value keyword in the SET_VARIABLE_LINE_DENSITY parameter. In other words, if lines per inch is set to 8, the SET_VARIABLE_LINE_DENSITY parameter is

```
SET_VARIABLE_LINE_DENSITY=ESC A 09 ESC 2
```

where the 09 comes from 72/8. The number of typographic points in 1 inch is 42; thus a value of 12 points would indicate six lines to an inch.

The control code that is sent to the printer to set the line density is:

```
X'1B 41 09 1B 32'
SET_10_CHARACTERS_PER_INCH
```

On most printers, the default pitch is 10 characters per inch. In most PDTs, Personal Communications uses this same convention and sends the control code found on the SET_10_CHARACTERS_PER_INCH statement. This is usually coded in the PDF as:

```
SET_10_CHARACTERS_PER_INCH=P10
```

where P10 is coded in the macro definition section as:

```
P10 EQU 12
```

Transparent Print Capability

ASCII_PASSTHRU? Keyword Support

If you add the following line to your PDF, Personal Communications will send host data without any translation:

```
ASCII_PASSTHRU? = YES
```

This option is for special host applications that generate PC printer control codes directly.

Even if ASCII_PASSTHRU? is set, control codes defined START_JOB and END_JOB are sent to the printer at the start and the end of a print job respectively. To remove those commands, you need to rebuild the PDT file after removing the PDF keyword definitions for START_JOB and END_JOB.

If ASCII_PASSTHRU? is set, all character definition lines, for example, EBCDIC_xx, are ignored.

If both ASCII_PASSTHRU? and EBCDIC_PASSTHRU? are set, ASCII_PASSTHRU? has priority.

EBCDIC_PASSTHRU? Keyword Support

If you add the following line to your PDF, Personal Communications will ignore all SCS commands and send data to the printer after EBCDIC-to-ASCII translation:

```
EBCDIC_PASSTHRU? = YES
```

For example, the default EBCDIC-ASCII translation table used for U.S. English host code page 037 is as follows:

```
Hex │  0 1   2 3   4 5   6 7   8 9   A B   C D   E F
-----+----------------------------------------------
  0 │ 2020  2020  2020  2020  2020  2020  2020  2020
 10 │ 2020  2020  2020  2020  2020  2020  2020  2020
 20 │ 2020  2020  2020  2020  2020  2020  2020  2020
 30 │ 2020  2020  2020  2020  2020  2020  2020  2020
 40 │ 20FF  8384  85A0  C686  87A4  BD2E  3C28  2B7C
 50 │ 2682  8889  8AA1  8C8B  8DE1  2124  2A29  3BAA
 60 │ 2D2F  B68E  B7B5  C78F  80A5  DD2C  255F  3E3F
 70 │ 9B90  D2D3  D4D6  D7D8  DE60  3A23  4027  3D22
 80 │ 9D61  6263  6465  6667  6869  AEAF  D0EC  E7F1
 90 │ F86A  6B6C  6D6E  6F70  7172  A6A7  91F7  92CF
 A0 │ E67E  7374  7576  7778  797A  ADA8  D1ED  E8A9
 B0 │ 5E9C  BEFA  B8F5  F4AC  ABF3  5B5D  EEF9  EF9E
 C0 │ 7B41  4243  4445  4647  4849  F093  9495  A2E4
 D0 │ 7D4A  4B4C  4D4E  4F50  5152  FB96  8197  A398
 E0 │ 5CF6  5354  5556  5758  595A  FDE2  99E3  E0E5
 F0 │ 3031  3233  3435  3637  3839  FCEA  9AEB  E9FF
```

You can modify this code page using EBCDIC_xx keywords. Note that the EBCDIC_PASSTHRU? line precedes any EBCDIC_xx lines in your PDF file because Personal Communications reinitializes the EBCDIC-to-ASCII translation table when it finds that EBCDIC_PASSTHRU? is set.

Even if EBCDIC_PASSTHRU? is set, control codes defined START_JOB and END_JOB are sent to the printer at the start and the end of a print job respectively. To remove those commands, you need to rebuild the PDT file after removing PDF keyword definitions for START_JOB and END_JOB.

EBCDIC_xx Keyword Support

EBCDIC_xx keywords are used to remap entries of EBCDIC-to-ASCII translation table for printer sessions that receive SNA character string (SCS) data streams. For example, if you want to print host space characters using ASCII X'1B', add the following line to your PDF file and recompile to update the PDT file:

```
EBCDIC_40 = 1B
```

You can specify two or more characters for one EBCDIC character. The following definition:

```
EBCDIC_F1 = 1 2 3
```

translates EBCDIC X'F1' into ″123″ in ASCII.

You can also remap EBCDIC code points (X'00'-X'3F') which are normally assigned to SCS control characters. The following line:

```
EBCDIC_15 = 0C
```

overrides the SCS new line function with X'0C', which normally works as a form feed function. If you remap a code point that is not used for a SCS command (for example, X'27') Personal Communications sends the defined code to the printer and does *not* send SNA sense data to the host. The following example

```
EBCDIC_27 = 1B
```

defines EBCDIC code point X'27' as ASCII X'1B', which is used as an escape character on most personal computer printers.

If you do not need to use any SCS command processing but still need EBCDIC-to-ASCII translation, the EBCDIC_PASSTHRU? is a better solution. If you do not need any SCS command processing or EBCDIC-to-ASCII translation, ASCII_PASSTHRU? is an easier solution.

Printer Definition Tables

Standard printer definition table file names are of the form **IBM**nnnnn**.PDT**, and PDT's ASCII-to-ASCII character definitions are of the form **PRN**nnnnn**.PDT**, where nnnnn is a machine type. See character definition descriptions for more details.

See the help panel or the specific 5250, 3270, or VT emulator User's Reference for a list of the PDT files provided by Personal Communications.

The PDT files contained in the PC400 installation diskette can be used as is. However, you might want to do special formatting by changing the definitions of some fields. To do so, copy an existing PDF file, modify it, and then convert it to a new PDT file.

Example PDF files are shown in "Example Printer Definition Files". Do not attempt to change the statements in a field for which modification is specifically prohibited. If you use a PDT file created from a changed PDF file, the results of printing cannot be guaranteed.

Example Printer Definition Files

The following examples are annotated versions of printer definition files for the IBM LaserPrinter 4019 (for SBCS sessions) and for the IBM 5577 Printer (for DBCS sessions). These are examples only; the actual files may differ.

IBM4019.PDF File Contents

```
/**********************************************************************/
/*                                                                    */
/*    PRINTER SESSION DEFINITION FILE FOR: LaserPrinter 4019/4019-E   */
/*                                                                    */
/**********************************************************************/
/**********************************************************************/
/*                      Macro Definitions                            */
/* Define values here that will be used commonly throughout your      */
/* definitions.  Then use the left hand side of the equate as you     */
/* define your characters and control strings.  The printer compiler  */
/* will substitute the right hand side of the equate for each         */
/* occurrence of the left hand side throughout the file.              */
/*                                                                    */
/* Macro names must be at least three characters long and may not     */
/* begin with a number.                                               */
/*                                                                    */
/* Format                                                             */
/* A Macro Name is associated with a value or string of values by the */
/* EQU statement.  The right hand side of an EQU statement must be a   */
/* string of zero or more two digit hexadecimal numbers.  If a macro  */
/* definition is more than one line long, you may extend it to the    */
/* next line by ending the first line with a comma.  In this manner   */
/* you may define a macro which is many lines long by terminating each*/
```

```
                /* line except the last with a comma.  No macro names are allowed on  */
                /* right hand side.                                                    */
                /**********************************************************************/
                BEGIN_MACROS
                /* The following values are standard for most printers.  Check your    */
                /* printer manual to verify that these are correct for your printer    */
                NUL EQU 00             /* Nul character                               */
                BEL EQU 07             /* Beeper                                      */
                BAK EQU 08             /* Back Space                                  */
                TAB EQU 09             /* Tab                                         */
                LFF EQU 0A             /* Line Feed                                   */
                VTB EQU 0B             /* Vertical Tab                                */
                FFF EQU 0C             /* Form Feed                                   */
                CRR EQU 0D             /* Carriage Return                             */
                P05 EQU 1B 57 01       /* 5 Pitch-Characters/inch                     */
                                       /* Same as Double Wide                         */
                SEL EQU 11             /* Select Printer                              */
                P10 EQU 12             /* 10 Pitch-Characters/inch                    */
                CDW EQU 1B 57 00       /* Cancel Double Wide contin.                  */
                CDL EQU 14             /* Cancel Double Wide line                     */
                ESC EQU 1B             /* Escape                                      */
                CAN EQU 18             /* Cancel Data                                 */
                SPA EQU 20             /* Space                                       */
                P17 EQU 12 0F          /* 17.1 Pitch-Characters/inch                  */
                CS2 EQU 1B 36          /* Select Character Set 2                      */
                CS1 EQU 1B 37          /* Select Character Set 1                      */
                P12 EQU 1B 3A          /* 12 Pitch-characters/inch                    */
                SVT EQU 1B 42          /* Set Vertical Tabs                           */
                SFL EQU 1B 43 00       /* Set Form Length                             */
                SHT EQU 1B 44          /* Set Horizontal Tabs                         */
                SDS EQU 1B 47          /* Start Double Strike                         */
                CDS EQU 1B 48          /* Cancel Double Strike                        */
                SSP EQU 1B 4E          /* Set skip perforation                        */
                CSP EQU 1B 4F          /* Cancel skip perforation                     */
                CAT EQU 1B 52          /* Cancel all tabs Clears VT                   */
                                       /* and sets HT every 8 position                */
                CSS EQU 1B 54          /* Cancel Subscript or Superscript             */
                SSO EQU 1B 53 00       /* Set Superscript over                        */
                SSU EQU 1B 53 01       /* Set Subscript under                         */
                SUL EQU 1B 2D 01       /* Start Underline                             */
                CUL EQU 1B 2D 00       /* Cancel Underline                            */
                SCP EQU 1B 5B 54 04 00 00 00 /* ESC T - select code page             */
                CP8 EQU 1B 5B 54 04 00 00 00 03 52     /* select code page 850        */
                CP4 EQU 1B 5B 54 04 00 00 00 01 B5     /* select code page 437        */
                LL2 EQU 1B 41 24 1B 32 /* Setline length 2 lines/inch                 */
                LL3 EQU 1B 41 18 1B 32 /* Setline length 3 lines/inch                 */
                LL4 EQU 1B 41 12 1B 32 /* Setline length 4 lines/inch                 */
                LL6 EQU 1B 41 0C 1B 32 /* Set line length 6 lines/inch                */
                LL8 EQU 1B 41 09 1B 32 /* Set line length 8 lines/inch                */
                LL0 EQU 1B 41 07 1B 32 /* Set line length 10 lines/inch               */
                                       /* actually 7/72 inch                          */
                SD1 EQU 1B 5B 46 05 00 00 01 01 00 00 /* Select Drawer 1              */
                SD2 EQU 1B 5B 46 05 00 00 01 02 00 00 /* Select Drawer 2              */
                ENV EQU 1B 5B 46 05 00 00 02 00 00 00 /* Select Envelope              */
                FRM EQU 1B 64          /* Forward Relative Movement                   */
                VLF EQU 1B 4A          /* Vertical Line Feed 1/216 inch units         */
                SPO EQU 1B 6B          /* Set Portrait Orientation                    */
                SLO EQU 1B 6C          /* Set Landscape Orientation                   */
                SFG EQU 1B 5B 49 08 00 /* Set Font Global                             */
                END_MACROS
                /*                     Session Parameters                             */
                /* These parameters determine the way in which output will be         */
                /* formatted for your printer.                                        */
                /* Numeric Parameters                                                 */
                /* These parameters should be defined with a two digit hex number     */
                /* or a three digit decimal number.  The range of the number is zero  */
                /* to 255 (decimal).                                                  */
```

```
MAXIMUM_PAGE_LENGTH=066                 /* Printed lines per page     */
MAXIMUM_PRINT_POSITION=080              /* Printed characters per line  */
INTERV_REQ_TIMER=001
RESELECT_TIME_EXCPT_5204=001
INTERV_TIMER_ON_PE_ONLY?=NO
HORIZONTAL_PEL=120
VERTICAL_PEL=216
LINE_SPACING_RATIO=072
PAGE_LENGTH_TYPE?=INCH                  /* SET_PAGE_LENGTH "value" is  */
                                        /* values                      */
/* YES/NO Parameters                                                   */
/* These parameters should be defined with either "YES" or "NO" on the*/
/* right hand side of the '='                                         */
COMPRESS_LINE_SPACING?=NO               /* Should blank or null lines  */
                                        /* be printed?                 */
FORM_FEED_ANY_POSITION?=YES             /* Should the form feed be     */
                                        /* valid in any position?      */
OVERRIDE_FORMATTED_PRINT?=YES           /* Should nulls be printed as  */
                                        /* blanks?                     */
AUTO_NEWLINE_AT_MAX_POS?=NO
/*                     Control Codes                                   */
/* These definitions tell the emulator what control strings to send to*/
/* your printer to issue control commands.                            */
/*                                                                     */
/* Format                                                              */
/* The name of the control command should always be at the beginning  */
/* of a line followed by a '=' and then a definition string.          */
/* A Definition String is any combination of macro names, hexadecimal */
/* numbers, and characters separated by blanks.  A macro must have    */
/* previously defined in the macro definitions section above. A       */
/* hexadecimal number must be two digits (0,..,F) long. and a         */
/* character must be preceded and followed by a blank.  If a          */
/* definition string will not fit on a line, it may be continued      */
/* as many lines as you wish by ending each line except the last with */
/* a comma;  ','.   You made add any comments you wish to by including*/
/* them between a slash*  and a *slash where slash is the symbol /.   */


/* START_JOB is the control string which will be sent to your printer */
/* at the beginning of each print job.                                */
START_JOB=SEL CDW CDL CUL CDS CP8 CS2
/* END_JOB is the string which will be sent to your printer at the end*/
/* of each print job.                                                 */
END_JOB=CAT CDW CDL CUL CDS CP4 FFF
BACKSPACE=BAK
BEL=BEL
CARRIAGE_RETURN=CRR
NEW_LINE=CRR LFF
LINE_FEED=LFF
FORM_FEED=FFF
HORIZONTAL_TAB=TAB
VERTICAL_TAB=VTB
START_SUBSCRIPT=SSU
END_SUBSCRIPT=CSS
START_SUPERSCRIPT=SSO
END_SUPERSCRIPT=CSS
DUP=*
FIELD_MARK=;
/* The following commands specify control codes for which most PC     */
/* printers require command strings which contain a variable value    */
/* or values somewhere in the middle of the string.                   */
/* Place the word "value(s)" in the position of your definition       */
/* string where the Personal Communications 5250 should fill in       */
/* the hexadecimal value(s) indicated.                                */
/* For example, on the IBM Proprinter, the SET_HORIZONTAL_TABS        */
/* definition is:                                                     */
/* SET_HORIZONTAL_TABS=ESC D values NUL                               */
SET_HORIZONTAL_TABS=SHT values NUL   /* "values" are the tab stops    */
```

```
                                               /* in column numbers        */
            SET_VERTICAL_TABS=SVT values NUL    /* "values" are the tab stops */
                                               /* in line numbers          */
            SET_HORIZONTAL_MARGINS=
            SET_PAGE_LENGTH=SFL value           /* "value"=inch of the page  */
            SET_AUTO_PERFORATION_SKIP=SSP value
                                               /* "value"=number of lines to */
                                               /* skip over the perforation  */
                                               /* between pages.  Used to set */
                                               /* top and bottom margins.    */
            SET_VARIABLE_LINE_DENSITY=ESC A value ESC 2
                                               /* "value"=number of points.  */
                                               /* A point is                */
                                               /* 1/(LINE_SPACING_RATIO) inch.*/
            SET_CHARACTER_SET=
            /*SET_CHARACTER_SET=ESC I NULL  selects the normal font        */
            /*SET_CHARACTER_SET=ESC I 02  selects the NLQ (near letter quality)  */
            /*SET_CHARACTER_SET=ESC I 04  selects the normal downloaded font  */
            /*SET_CHARACTER_SET=ESC I 06  selects the NLQ downloaded font    */
            /*SET_CHARACTER_SET=CS1       selects the Character set 1         */
            /*SET_CHARACTER_SET=CS2       selects the Character set 2         */

            /* These control codes set the printer lines per inch and characters */
            /* per inch to fixed amounts.                                  */
            /* If your printer does not support setting the line density in points*/
            /* then you can enter control strings for the following commands.  */
            /* When Personal Communications 5250 gets a command from the host to */
            /* set the lines per  inch, it will round it to the closest line per */
            /* inch setting that you provide.  Note that if you provide a command */
            /* for the SET_VARIABLE_LINE_DENSITY command above that it will be  */
            /* used and any control strings you provide for the set lines per inch*/
            /* commands below will not be used.                            */

            SET_2_LINES_PER_INCH=LL2
            SET_3_LINES_PER_INCH=LL3
            SET_4_LINES_PER_INCH=LL4
            SET_6_LINES_PER_INCH=LL6
            SET_8_LINES_PER_INCH=LL8
            SET_10_LINES_PER_INCH=LL0          /* 7/72 inch or 9/96 inch    */
            SET_10_CHARACTERS_PER_INCH=P10
            SET_12_CHARACTERS_PER_INCH=P12
            SET_13_CHARACTERS_PER_INCH=        /*                           */
            SET_15_CHARACTERS_PER_INCH=        /* The proprinter does not    */
                                               /* support 15 pitch except in */
                                               /* graphic mode              */
            SET_17_CHARACTERS_PER_INCH=P17     /* Condensed mode            */
            SET_20_CHARACTERS_PER_INCH=
            START_DOUBLE_WIDTH_CHARACTERS=P05
            END_DOUBLE_WIDTH_CHARACTERS=CDW

            /* These control codes are used to select the source drawer number  */
            /* when your printer has the dual drawer sheetfeed option.        */
            SELECT_DRAWER1=SD1
            SELECT_DRAWER2=SD2
            SELECT_DRAWER3=
            SELECT_ENVELOPE=ENV                /* Envelope                  */

            /* These control codes select the print mode (quality of print).  */
            SELECT_DRAFT_QUALITY=
            SELECT_LETTER_QUALITY=
            SELECT_ENHANCED_QUALITY=
            SELECT_SETUP_QUALITY=

            /* These control codes                                         */
            SET_DUPLEX=
            SET_DUPLEX_TUMBLE=
            RESET_DUPLEX=
```

```
/* These control codes set page orientation                         */
SET_PORTRAIT_ORIENT=SPO
SET_LANDSCAPELEFT_ORIENT=SLO
SET_PORTRAITUPDWN_ORIENT=SPO
SET_LANDSCAPERGHT_ORIENT=SLO

/* These control codes move the print position (Horizontal/Vertical)  */
FORWARD_HORIZONTAL_SKIP=FRM word-value(LH)
FORWARD_VERTICAL_STEP_FEED=VLF byte-value

/* These control codes select the printer font via global font ID     */
SET_FONT_GLOBAL=
SET_GFID_0003=SFG 00 03 00 90 01 01 03 52 CDW    /* OCR-B.10            */
SET_GFID_0005=SFG 00 05 00 90 01 01 03 52 CDW    /* Orator.10           */
SET_GFID_0011=SFG 00 0B 00 90 01 01 03 52 CDW    /* Courier.10          */
SET_GFID_0012=SFG 00 0C 00 90 01 01 03 52 CDW    /* Prestige.10         */
SET_GFID_0013=SFG 00 0B 00 90 01 01 03 52 CDW    /* Artisan.10          */
SET_GFID_0018=SFG 00 12 00 90 01 01 03 52 CDW    /* Courier.Italic.10   */
SET_GFID_0019=SFG 00 13 00 90 01 01 03 52 CDW    /* OCR-A.10            */
SET_GFID_0020=SFG 00 14 00 90 01 01 03 52 CDW    /* Pica.10             */
SET_GFID_0030=SFG 00 1E 00 90 01 01 03 52 CDW    /* Math-Symbol.10      */
SET_GFID_0038=SFG 00 26 00 90 01 01 03 52 CDW    /* Orator.Bold.10      */
SET_GFID_0039=SFG 00 27 00 90 01 01 03 52 CDW    /* Gothic.Bold.10      */
SET_GFID_0040=SFG 00 28 00 90 01 01 03 52 CDW    /* Gothic-Text.10      */
SET_GFID_0041=SFG 00 29 00 90 01 01 03 52 CDW    /* Roman-text.10       */
SET_GFID_0042=SFG 00 2A 00 90 01 01 03 52 CDW    /* Serif-text.10       */
SET_GFID_0043=SFG 00 2B 00 90 01 01 03 52 CDW    /* Serif-text.Italic.10*/
SET_GFID_0044=SFG 00 2C 00 90 01 01 03 52 CDW    /* Katakana-gothic.10  */
SET_GFID_0045=SFG 00 2D 00 90 01 01 03 52 CDW    /* APL.10              */
SET_GFID_0046=SFG 00 2E 00 90 01 01 03 52 CDW    /* Courier.Bold.10     */
SET_GFID_0050=SFG 00 32 00 90 01 01 03 52 CDW    /* Shalom.10           */
SET_GFID_0066=SFG 00 42 00 78 01 01 03 52 CDW    /* Gothic-text.12      */
SET_GFID_0068=SFG 00 44 00 78 01 01 03 52 CDW    /* Gothic-text.Italic.12*/
SET_GFID_0069=SFG 00 45 00 78 01 01 03 52 CDW    /* Gothic.Bold.12      */
SET_GFID_0070=SFG 00 46 00 78 01 01 03 52 CDW    /* Serif-text.12       */
SET_GFID_0071=SFG 00 47 00 78 01 01 03 52 CDW    /* Serif-text.Italic.12*/
SET_GFID_0072=SFG 00 48 00 78 01 01 03 52 CDW    /* Serif.Bold.12       */
SET_GFID_0080=SFG 00 73 00 78 01 01 03 52 CDW    /* Math-Symbol.12      */
SET_GFID_0084=SFG 00 54 00 78 01 01 03 52 CDW    /* Script.12           */
SET_GFID_0085=SFG 00 55 00 78 01 01 03 52 CDW    /* Courier.12          */
SET_GFID_0086=SFG 00 56 00 78 01 01 03 52 CDW    /* Prestige.12         */
SET_GFID_0087=SFG 00 57 00 78 01 01 03 52 CDW    /* Letter-gothic.12    */
SET_GFID_0091=SFG 00 70 00 78 01 01 03 52 CDW    /* Light.Italic.12     */
SET_GFID_0107=SFG 00 55 00 78 01 01 03 52 CDW    /* Courier.12          */
SET_GFID_0110=SFG 00 6E 00 78 01 01 03 52 CDW    /* Letter-Gothic.Bold.12*/
SET_GFID_0111=SFG 00 6F 00 78 01 01 03 52 CDW    /* Prestige-Elite.Bold.12*/
SET_GFID_0112=SFG 00 70 00 78 01 01 03 52 CDW    /* Prestige.Italic.12  */
SET_GFID_0115=SFG 00 73 00 78 01 01 03 52 CDW    /* Math-Symbol.12      */
SET_GFID_0155=SFG 00 9B 00 78 02 01 03 52 CDW    /* Boldface.Italic.PSM */
SET_GFID_0158=SFG 00 9E 00 78 02 01 03 52 CDW    /* Modern.PSM          */
SET_GFID_0159=SFG 00 9F 00 78 02 01 03 52 CDW    /* Document.PSM        */
SET_GFID_0160=SFG 00 A0 00 78 02 01 03 52 CDW    /* Essay.PSM           */
SET_GFID_0162=SFG 00 A2 00 78 02 01 03 52 CDW    /* Essay.Italic.PSM    */
SET_GFID_0163=SFG 00 A3 00 78 02 01 03 52 CDW    /* Essay.Bold.PSM      */
SET_GFID_0168=SFG 00 A8 00 78 02 01 03 52 CDW    /* Barak.PSM           */
SET_GFID_0173=SFG 00 AD 00 78 02 01 03 52 CDW    /* Essay.Light.PSM     */
SET_GFID_0175=SFG 00 AF 00 78 02 01 03 52 CDW    /* Document.PSM        */
SET_GFID_0176=SFG 00 B0 00 78 02 01 03 52 CDW    /* Boldface.PSM        */
SET_GFID_0177=SFG 00 9B 00 78 02 01 03 52 CDW    /* Boldface.Italic.PSM */
SET_GFID_0193=SFG 00 73 00 78 01 01 03 52 CDW    /* Math-Symbol.12      */
SET_GFID_0198=SFG 00 1E 00 90 01 01 03 52 CDW    /* Math-Symbol.10      */
SET_GFID_0204=SFG 00 CC 00 6C 01 01 03 52 CDW    /* Gothic-text.13      */
SET_GFID_0221=SFG 00 DD 00 60 01 01 03 52 CDW    /* Prestige.15         */
SET_GFID_0222=SFG 00 E6 00 60 01 01 03 52 CDW    /* Gothic-text.15      */
SET_GFID_0223=SFG 00 DF 00 60 01 01 03 52 CDW    /* Courier.15          */
SET_GFID_0225=SFG 00 E1 00 60 01 01 03 52 CDW    /* Math-symbol.15      */
```

```
SET_GFID_0229=SFG 00 E5 00 60 01 01 03 52 CDW    /* Serif-text.15      */
SET_GFID_0230=SFG 00 E6 00 60 01 01 03 52 CDW    /* Gothic-text.15     */
SET_GFID_0245=SFG 00 2E 00 90 01 01 03 52 P05    /* Courier.Bold.5     */
SET_GFID_0252=SFG 00 FC 00 54 01 01 03 52 CDW    /* Courier.15         */
SET_GFID_0253=SFG 00 FD 00 54 01 01 03 52 CDW    /* Courier.Bold.17    */
SET_GFID_0254=SFG 00 FE 00 55 01 01 03 52 CDW    /* Courier.17         */
SET_GFID_0280=SFG 01 18 00 48 01 01 03 52 CDW    /* APL.20             */
SET_GFID_0281=SFG 01 19 00 48 01 01 03 52 CDW    /* Gothic-text.20     */
SET_GFID_0290=SFG 01 22 00 36 01 01 03 52 CDW    /* Gothic-text.27     */
SET_GFID_0751=SFG 11 37 00 A0 01 03 03 52 CDW    /* Sonoran-serif.8pt  */
SET_GFID_1051=SFG 11 37 00 C8 01 03 03 52 CDW    /* Sonoran-serif.10pt */
SET_GFID_1053=SFG 11 4B 00 C8 01 03 03 52 CDW    /* Sonoran-serif.bold.10pt*/
SET_GFID_1056=SFG 11 B7 00 C8 01 03 03 52 CDW    /* Sonoran-serif.italic.10pt*/
SET_GFID_1351=SFG 11 37 00 F0 01 03 03 52 CDW    /* Sonoran-serif.12pt  */
SET_GFID_1653=SFG 11 4B 01 40 01 03 03 52 CDW    /* Sonoran-serif.Bold.16pt*/
SET_GFID_2103=SFG 11 4B 01 E0 01 03 03 52 CDW    /* Sonoran-serif.Bold.24pt*/

/*                    Color Specifications                        */
START_COLOR_BLUE=
END_COLOR_BLUE=
START_COLOR_GREEN=
END_COLOR_GREEN=
START_COLOR_CYAN=
END_COLOR_CYAN=
START_COLOR_RED=
END_COLOR_RED=
START_COLOR_MAGENTA=
END_COLOR_MAGENTA=
START_COLOR_YELLOW=
END_COLOR_YELLOW=
START_COLOR_BLACK=
END_COLOR_BLACK=
START_COLOR_WHITE=
END_COLOR_WHITE=

/*                    Highlight Specifications                    */
/* These definitions will determine how things which are sent by the  */
/* host to be displayed or printed as underlined, reverse video, or   */
/* blinking will be highlighted on your printer.                      */

START_HIGHLIGHT_INTENSE=SDS              /* This is double strike       */
END_HIGHLIGHT_INTENSE=CDS
START_HIGHLIGHT_UNDERLINE=SUL
END_HIGHLIGHT_UNDERLINE=CUL
START_HIGHLIGHT_REVERSE_VIDEO=
END_HIGHLIGHT_REVERSE_VIDEO=
START_HIGHLIGHT_BLINK=
END_HIGHLIGHT_BLINK=

/*                    Character Definitions                       */
SPACE=SPA
EXCLAMATION_POINT=21
QUOTATION_MARKS=22
NUMBER_SIGN=23
DOLLAR_SIGN=24
PERCENT_SIGN=25
AMPERSAND=26
APOSTROPHE=27
LEFT_PARENTHESIS=28
RIGHT_PARENTHESIS=29
ASTERISK=2A
PLUS_SIGN=2B
COMMA=2C
HYPHEN=2D
PERIOD=2E
SLASH=2F
ZERO=0
```

```
ONE=1
TWO=2
THREE=3
FOUR=4
FIVE=5
SIX=6
SEVEN=7
EIGHT=8
NINE=9
COLON=3A
SEMICOLON=3B
LESS_THAN_SIGN=3C
EQUAL_SIGN=3D
GREATER_THAN_SIGN=3E
QUESTION_MARK=3F
AT_SIGN=40
A_CAPITAL=A
B_CAPITAL=B
C_CAPITAL=C
D_CAPITAL=D
E_CAPITAL=E
F_CAPITAL=F
G_CAPITAL=G
H_CAPITAL=H
I_CAPITAL=I
J_CAPITAL=J
K_CAPITAL=K
L_CAPITAL=L
M_CAPITAL=M
N_CAPITAL=N
O_CAPITAL=O
P_CAPITAL=P
Q_CAPITAL=Q
R_CAPITAL=R
S_CAPITAL=S
T_CAPITAL=T
U_CAPITAL=U
V_CAPITAL=V
W_CAPITAL=W
X_CAPITAL=X
Y_CAPITAL=Y
Z_CAPITAL=Z
LEFT_BRACKET=5B
BACKSLASH=5C
RIGHT_BRACKET=5D
CIRCUMFLEX_ACCENT=5E
UNDERLINE=5F
GRAVE_ACCENT=60
A_SMALL=a
B_SMALL=b
C_SMALL=c
D_SMALL=d
E_SMALL=e
F_SMALL=f
G_SMALL=g
H_SMALL=h
I_SMALL=i
J_SMALL=j
K_SMALL=k
L_SMALL=l
M_SMALL=m
N_SMALL=n
O_SMALL=o
P_SMALL=p
Q_SMALL=q
R_SMALL=r
S_SMALL=s
```

```
T_SMALL=t
U_SMALL=u
V_SMALL=v
W_SMALL=w
X_SMALL=x
Y_SMALL=y
Z_SMALL=z
LEFT_BRACE=7B
VERTICAL_BAR=7C
RIGHT_BRACE=7D
TILDE_ACCENT=7E
C_CEDILLA_CAPITAL=80
U_DIAERESIS_SMALL=81
E_ACUTE_SMALL=82
A_CIRCUMFLEX_SMALL=83
A_DIAERESIS_SMALL=84
A_GRAVE_SMALL=85
A_OVERCIRCLE_SMALL=86
C_CEDILLA_SMALL=87
E_CIRCUMFLEX_SMALL=88
E_DIAERESIS_SMALL=89
E_GRAVE_SMALL=8A
I_DIAERESIS_SMALL=8B
I_CIRCUMFLEX_SMALL=8C
I_GRAVE_SMALL=8D
A_DIAERESIS_CAPITAL=8E
A_OVERCIRCLE_CAPITAL=8F
E_ACUTE_CAPITAL=90
AE_DIPTHONG_SMALL=91
AE_DIPTHONG_CAPITAL=92
O_CIRCUMFLEX_SMALL=93
O_DIAERESIS_SMALL=94
O_GRAVE_SMALL=95
U_CIRCUMFLEX_SMALL=96
U_GRAVE_SMALL=97
Y_DIAERESIS_SMALL=98
O_DIAERESIS_CAPITAL=99
U_DIAERESIS_CAPITAL=9A
O_SLASH_SMALL=9B
POUND_SIGN=9C
O_SLASH_CAPITAL=9D
MULTIPLY_SIGN=9E
A_ACUTE_SMALL=A0
I_ACUTE_SMALL=A1
O_ACUTE_SMALL=A2
U_ACUTE_SMALL=A3
N_TILDE_SMALL=A4
N_TILDE_CAPITAL=A5
ORDINAL_INDICATOR_FEMININE=A6
ORDINAL_INDICATOR_MASCULINE=A7
QUESTION_MARK_INVERTED=A8
REGISTERED_TRADEMARK_SYMBOL=A9
LOGICAL_NOT=AA
ONE_HALF=AB
ONE_QUARTER=AC
EXCLAMATION_POINT_INVERTED=AD
LEFT_ANGLE_QUOTES=AE
RIGHT_ANGLE_QUOTES=AF
A_ACUTE_CAPITAL=B5
A_CIRCUMFLEX_CAPITAL=B6
A_GRAVE_CAPITAL=B7
COPYRIGHT_SYMBOL=B8
CENT_SIGN=BD
YEN_SIGN=BE
A_TILDE_SMALL=C6
A_TILDE_CAPITAL=C7
INTERNATIONAL_CURRENCY_SYMBOL=CF
```

```
                     ETH_ICELANDIC_SMALL=D0
                     ETH_ICELANDIC_CAPITAL=D1
                     E_CIRCUMFLEX_CAPITAL=D2
                     E_DIAERESIS_CAPITAL=D3
                     E_GRAVE_CAPITAL=D4
                     I_DOTLESS_SMALL=D5
                     I_ACUTE_CAPITAL=D6
                     I_CIRCUMFLEX_CAPITAL=D7
                     I_DIAERESIS_CAPITAL=D8
                     VERTICAL_LINE_BROKEN=DD
                     I_GRAVE_CAPITAL=DE
                     O_ACUTE_CAPITAL=E0
                     SHARP_S_SMALL=E1
                     O_CIRCUMFLEX_CAPITAL=E2
                     O_GRAVE_CAPITAL=E3
                     O_TILDE_SMALL=E4
                     O_TILDE_CAPITAL=E5
                     MICRO_SYMBOL=E6
                     THORN_ICELANDIC_SMALL=E7
                     THORN_ICELANDIC_CAPITAL=E8
                     U_ACUTE_CAPITAL=E9
                     U_CIRCUMFLEX_CAPITAL=EA
                     U_GRAVE_CAPITAL=EB
                     Y_ACUTE_SMALL=EC
                     Y_ACUTE_CAPITAL=ED
                     OVERLINE=EE
                     ACUTE_ACCENT=EF
                     SYLLABLE_HYPHEN=F0
                     PLUS_OR_MINUS_SIGN=F1
                     THREE_QUARTERS=F3
                     PARAGRAPH_SYMBOL=F4
                     SECTION_SYMBOL=F5
                     DIVIDE_SIGN=F6
                     CEDILLA=F7
                     DEGREE_SYMBOL=F8
                     DIAERESIS=F9
                     MIDDLE_DOT_ACCENT=FA
                     ONE_SUPERSCRIPT=FB
                     THREE_SUPERSCRIPT=FC
                     TWO_SUPERSCRIPT=FD
                     REQUIRED_SPACE=SPA
                     /********************************************************************/
                     /*               PC5250 Internal Data Area.                        */
                     /* Do not change these statements.                                 */
                     /********************************************************************/
                     TOP_MARGIN=
                     LEFT_MARGIN=
                     DYNAMIC_START_JOB=00 00 00 00 00 00 00 00 00 00 00
                     DYNAMIC_END_JOB=00 00
                     DYNAMIC_SET_PAGE_LENGTH=00 00 00
                     PRINTER_ID=40 19
                     /*               End of Definition File                    */
```

IBM5577.PDF File Contents

```
                     /********************************************************************/
                     /*    PDF FILE (PRINTER DEFINITION FILE) FOR: PS/55 Printer       */
                     /********************************************************************/
                     BEGIN_MACROS
                     NUL EQU 00
                     BEL EQU 07
                     BAK EQU 08
                     TAB EQU 09
                     LFF EQU 0A
                     VTB EQU 0B
                     FFF EQU 0C
                     CRR EQU 0D
```

```
                    SEL EQU 11
                    DC3 EQU 13
                    ESC EQU 1B
                    CAN EQU 18
                    SPA EQU 20
                    P10 EQU 1B 7E 02 00 01 32
                    P12 EQU 1B 7E 02 00 01 3C
                    P13 EQU 1B 7E 02 00 01 43
                    P15 EQU 1B 7E 02 00 01 4B
                    SDW EQU 1B 7E 0E 00 01 09
                    EDW EQU 1B 7E 0E 00 01 0A
                    SVT EQU 1B 7E 19
                    SHT EQU 1B 7E 18
                    CSS EQU 1B 7E 0E 00 01 0F
                    SSO EQU 1B 7E 0E 00 01 0D
                    SSU EQU 1B 7E 0E 00 01 0E
                    SUL EQU 1B 7E 11 00 01 01
                    CUL EQU 1B 7E 11 00 01 00
                    LL2 EQU 1B 7E 03 00 01 14
                    LL3 EQU 1B 7E 03 00 01 1E
                    LL4 EQU 1B 7E 03 00 01 28
                    LL6 EQU 1B 7E 03 00 01 3C
                    LL7 EQU 1B 7E 03 00 01 4B
                    LL8 EQU 1B 7E 03 00 01 50
                    SPL EQU 1B 7E 04 00 03 00
                    INZ EQU 1B 7E 01 00 00
                    EJC EQU 1B 7E 0E 00 01 06
                    END_MACROS
                    /********************************************************************/
                    /*                    Session Parameters                          */
                    /********************************************************************/
                    MAXIMUM_PAGE_LENGTH=066
                    MAXIMUM_PRINT_POSITION=132
                    DEFAULT_CPI?=010
                    DEFAULT_LPI?=006
                    COMPRESS_LINE_SPACING?=NO
                    FORM_FEED_ANY_POSITION?=YES
                    OVERRIDE_FORMATTED_PRINT?=YES
                    HORIZONTAL_PEL=180
                    VERTICAL_PEL=120
                    UNITS_OF_DRAW_LINE=
                    KANJI_CODE?=SHIFT_JIS
                    ZENKAKU_SPACE=
                    PAGE_LENGTH_TYPE?=6INCH
                    /********************************************************************/
                    /*                    Control Codes                               */
                    /********************************************************************/
                    START_JOB=INZ SEL LL6 P10
                    END_JOB=INZ
                    BACKSPACE=BAK
                    BEL=BEL
                    CARRIAGE_RETURN=CRR
                    NEW_LINE=CRR LFF
                    LINE_FEED=LFF
                    FORM_FEED=EJC
                    HORIZONTAL_TAB=TAB
                    VERTICAL_TAB=VTB
                    DESELECT=DC3
                    START_SUBSCRIPT=SSU
                    END_SUBSCRIPT=CSS
                    START_SUPERSCRIPT=SSO
                    END_SUPERSCRIPT=CSS
                    DUP=*
                    FIELD_MARK=;
                    SET_HORIZONTAL_TABS=SHT length(HL)-values
                    SET_VERTICAL_TABS=SVT length(HL)-values
                    SET_HORIZONTAL_MARGINS=
```

```
                    SET_PAGE_LENGTH=SPL word-value(HL)
                    SET_2_LINES_PER_INCH=LL2
                    SET_3_LINES_PER_INCH=LL3
                    SET_4_LINES_PER_INCH=LL4
                    SET_6_LINES_PER_INCH=LL6
                    SET_7.5_LINES_PER_INCH=LL7
                    SET_8_LINES_PER_INCH=LL8
                    SET_10_CHARACTERS_PER_INCH=P10
                    SET_12_CHARACTERS_PER_INCH=P12
                    SET_13.4_CHARACTERS_PER_INCH=P13
                    SET_15_CHARACTERS_PER_INCH=P15
                    START_DOUBLE_WIDTH_CHARACTERS=SDW
                    END_DOUBLE_WIDTH_CHARACTERS=EDW
                    IMAGE_TRANSMISSION=1B 25 31 length(HL)-images
                    FORWARD_HORIZONTAL_SKIP=1B 25 33 word-value(HL)
                    FORWARD_VERTICAL_STEP_FEED=1B 25 35 word-value(HL)
                    SET_FONT_SIZE=1B 7E 20 00 03 word-value(HL) 02
                    SET_TATEGAKI_MODE=1B 7E 0E 00 01 0B
                    RESET_TATEGAKI_MODE=1B 7E 0E 00 01 0C
                    SBCS_FONT_LOAD=1B 7E 81 00 28 F0 40 00 18 byte-values F0 40
                    DBCS_FONT_LOAD=1B 7E 81 00 4C F0 40 02 18 byte-values F0 40
                    SELECT_DRAWER=
                    SET_LOCAL_FONT=
                    RESET_LOCAL_FONT=
                    ABS_HORIZONTAL_COLUMN_SKIP=1B 7E 1C 00 02 00 byte-value
                    REL_HOR_COLUMN_SKIP_TO_RIGHT=1B 7E 1C 00 02 01 byte-value
                    SET_SOLID_LINE_TYPE=
                    SET_DOTTED_LINE_TYPE=
                    SET_LINE_WIDTH_THIN=
                    SET_LINE_WIDTH_BOLD=
                    DRAW_LINE=
                    KANJI_ON=
                    KANJI_OFF=
                    ATTRIBUTE_GRID_LINE=1B 7E 16 length(HL)-values
                    /*******************************************************************/
                    /*                 Highlight Specifications             */
                    /*******************************************************************/
                    START_HIGHLIGHT_INTENSE=ESC 7E 0E 00 01 17
                    END_HIGHLIGHT_INTENSE=ESC 7E 0E 00 01 18
                    START_HIGHLIGHT_UNDERLINE=1B 7E 11 00 01 01
                    END_HIGHLIGHT_UNDERLINE=1B 7E 11 00 01 00
                    /*******************************************************************/
                    /*                 Internal Data Area.                  */
                    /* Do not change these statement.                       */
                    /*******************************************************************/
                    TOP_MARGIN=
                    LEFT_MARGIN=
                    DYNAMIC_START_JOB=00 00 00 00 00 00 00 00 00 00 00
                    DYNAMIC_END_JOB=00 00
                    DYNAMIC_SET_PAGE_LENGTH=00 00 00
                    PRINTER_ID=55 77
                    /*                 End of Definition File               */
```

Field Names of Printer Definition Files

Table 21 lists the field names of the printer definition files (PDF files) and their meanings:

Table 21. Field Names of PDF Files

Field Name	Meaning	Remarks
MAXIMUM_PAGE_LENGTH	Default MPL	Default is 66
MAXIMUM_PRINT_POSITION	Default MPP	Default is 132
DEFAULT_CPI?	Default CPI	Default is 10

Table 21. Field Names of PDF Files (continued)

Field Name	Meaning	Remarks
DEFAULT_LPI?	Default LPI	Default is 6
COMPRESS_LINE_SPACING?	Specifies whether to print a line containing only space characters or nonprint characters.	
FORM_FEED_ANY_POSITION?	Specifies whether to validate the FF control code on the first line.	Do not change this field.
OVERRIDE_FORMATTED_PRINT?	Specifies whether to print NULL characters as blanks.	Do not change this field.
HORIZONTAL_PEL	FORWARD_HORIZONTAL_SKIP length unit	
VERTICAL_PEL	FORWARD_VERTICAL_SKIP length unit	
IMAGE_HORIZONTAL_PEL	IMAGE_TRANSMISSION horizontal length unit	
IMAGE_VERTICAL_PEL	IMAGE_TRANSMISSION vertical length unit	
LINE_SPACING_RATIO	SET_VARIABLE_LINE_DENSITY length unit	
PAGE_LENGTH_TYPE?	SET_PAGE _LENGTH page length parameter type	
FIRST_LEFT_POSITION	Distance from left paper edge	
FIRST_TOP_POSITION	Distance from top paper edge	
DRAWER1_ORIENTATION	Default page orientation for drawer 1	Default is COR
DRAWER2_ORIENTATION	Default page orientation for drawer 2	Default is COR
AUTOMATIC_ORIENTATION	Specifies whether to calculate the page orientation.	
START_JOB	Printer control code sent to a printer to start printing	If the control code specifying LPI/CPI is defined, also change DEFAULT_CPI, DEFAULT_LPI.
END_JOB	Printer control code sent to a printer when printing ends	
BACKSPACE	Backspace control code	
BEL	Bell control code	
CARRIAGE_RETURN	Carriage return control code	
NEW_LINE	New line (CR/LF) control code	
LINE_FEED	New line control code	
FORM_FEED	Form feed (FF) control code	
HORIZONTAL_TAB	Horizontal tab control code	
VERTICAL_TAB	Vertical tab control code	
DESELECT	Device control 3 control code	
START_SUBSCRIPT	Subscript character specification	
END_SUBSCRIPT	Subscript character specification release	
START_SUPERSCRIPT	Superscript character specification	

Table 21. Field Names of PDF Files (continued)

Field Name	Meaning	Remarks
END_SUPERSCRIPT	Superscript character specification release	
DUP	Character used for printing DUP codes	
FIELD_MARK	Character used for printing FIELD MARK characters	
SET_HORIZONTAL_TABS	Horizontal tab setup	Do not change this field.
SET_VERTICAL_TABS	Vertical tab setup	Do not change this field.
SET_HORIZONTAL_MARGINS	Right and left margin setup	Do not change this field.
SET_PAGE_LENGTH	Page length setup	Assign the unit used for the defined control code page length to the PAGE_LENGTH_TYPE field. When single sheets are to be used, delete this field.
SET_VARIABLE_LINE_DENSITY	Line density setup	Assign the unit used for the control code length defined to LINE_SPACING_RATIO field.
SET_2_LINES_PER_INCH	New line pitch (2LPI) setup	
SET_3_LINES_PER_INCH	New line pitch (3LPI) setup	
SET_4_LINES_PER_INCH	New line pitch (4LPI) setup	
SET_6_LINES_PER_INCH	New line pitch (6LPI) setup	
SET_8_LINES_PER_INCH	New line pitch (8LPI) setup	
SET_10_LINES_PER_INCH	New line pitch (10LPI) setup	
SET_10_CHARACTERS_PER_INCH	Character pitch (10CPI) setup	
SET_12_CHARACTERS_PER_INCH	Character pitch (12CPI) setup	
SET_13_CHARACTERS_PER_INCH	Character pitch (13CPI) setup	
SET_15_CHARACTERS_PER_INCH	Character pitch (15CPI) setup	
SET_17_CHARACTERS_PER_INCH	Character pitch (17CPI) setup	
SET_20_CHARACTERS_PER_INCH	Character pitch (20CPI) setup	
IMAGE_TRANSMISSION	Image data setup (vertical 24-dot image)	
SELECT_DRAWER1	Page tray (Primary) setup	
SELECT_DRAWER2	Page tray (Alternate) setup	
SELECT_ENVELOPE	Envelope tray setup	
SELECT_DRAFT_QUALITY	Draft print quality setup	
SELECT_LETTER_QUALITY	Letter print quality setup	
SELECT_ENHANCED_QUALITY	Enhanced print quality setup	
SET_DUPLEX	Duplex printing setup	
SET_DUPLEX_TUMBLE	Duplex (tumble) printing setup	
RESET_DUPLEX	Duplex printing release	
SET_PORTRAIT_ORIENT	Page orientation (Normal portrait (upright)) setup	

Table 21. Field Names of PDF Files (continued)

Field Name	Meaning	Remarks
SET_LANDSCAPELEFT_ORIENT	Page orientation (Landscape left (270 degree clockwise rotation of text)) setup	
SET_PORTRAITUPDWN_ORIENT	Page orientation (Portrait upside down (180 degree clockwise rotation of text)) setup	
SET_LANDSCAPERGHT_ORIENT	Page orientation (Landscape right (90 degree clockwise rotation of text)) setup	
FORWARD_HORIZONTAL_SKIP	Variable skip (relative position/dot unit)	Assign the unit of the defined control code length to the HORIZONTAL_PEL field.
FORWARD_VERTICAL_STEP_FEED	Variable line feed (relative position/dot unit)	Assign the unit of the defined control code length to the VERTICAL_PEL field.
SET_FONT_GLOBAL	Global font ID setup	Do not change this field.
SET_GFID_0003	GFID 3 (OCR-B) setup	
SET_GFID_0005	GFID 5 (Orator) setup	
SET_GFID_0011	GFID 11 (Courier 10) setup	
SET_GFID_0012	GFID 12 (Prestige Pica) setup	
SET_GFID_0013	GFID 13 (Artisan 10) setup	
SET_GFID_0018	GFID 18 (Courier Italic 10) setup	
SET_GFID_0019	GFID 19 (OCR-A) setup	
SET_GFID_0020	GFID 20 (Pica) setup	
SET_GFID_0030	GFID 30 (Math Symbol 10) setup	
SET_GFID_0038	GFID 38 (Orator Bold) setup	
SET_GFID_0039	GFID 39 (Gothic Bold 10) setup	
SET_GFID_0040	GFID 40 (Gothic Text 10) setup	
SET_GFID_0041	GFID 41 (Roman Text 10) setup	
SET_GFID_0042	GFID 42 (Serif Text 10) setup	
SET_GFID_0043	GFID 43 (Serif Italic 10) setup	
SET_GFID_0044	GFID 44 (Katakana 10) setup	
SET_GFID_0045	GFID 45 (APL 10) setup	
SET_GFID_0046	GFID 46 (Courier Bold 10) setup	
SET_GFID_0050	GFID 50 (Shalom 10) setup	
SET_GFID_0066	GFID 66 (Gothic Text 12) setup	
SET_GFID_0068	GFID 68 (Gothic Italic 12) setup	
SET_GFID_0069	GFID 69 (Gothic Bold 12) setup	
SET_GFID_0070	GFID 70 (Serif Text 12) setup	
SET_GFID_0071	GFID 71 (Serif Italic 12) setup	
SET_GFID_0072	GFID 72 (Serif Bold 12) setup	
SET_GFID_0080	GFID 80 (Math Symbol 12) setup	
SET_GFID_0084	GFID 84 (Script 12) setup	
SET_GFID_0085	GFID 85 (Courier 12) setup	

Table 21. Field Names of PDF Files (continued)

Field Name	Meaning	Remarks
SET_GFID_0086	GFID 86 (Prestige Elite) setup	
SET_GFID_0087	GFID 87 (Letter Gothic 12) setup	
SET_GFID_0091	GFID 91 (Light Italic 12) setup	
SET_GFID_0110	GFID 110 (Letter Gothic Bold 12) setup	
SET_GFID_0111	GFID 111 (Prestige Elite Bold) setup	
SET_GFID_0112	GFID 112 (Prestige Elite Italic) setup	
SET_GFID_0115	GFID 115 (Math Symbol 12) setup	
SET_GFID_0155	GFID 155 (Boldface Italic) setup	
SET_GFID_0158	GFID 158 (Modern) setup	
SET_GFID_0159	GFID 159 (Boldface) setup	
SET_GFID_0160	GFID 160 (Essay) setup	
SET_GFID_0162	GFID 162 (Essay Italic) setup	
SET_GFID_0163	GFID 163 (Essay Bold) setup	
SET_GFID_0168	GFID 168 (Barak PSM) setup	
SET_GFID_0173	GFID 173 (Essay Light) setup	
SET_GFID_0175	GFID 175 (Document) setup	
SET_GFID_0176	GFID 176 (Boldface) setup	
SET_GFID_0177	GFID 177 (Boldface Italic) setup	
SET_GFID_0193	GFID 193 (Math Symbol 12) setup	
SET_GFID_0198	GFID 198 (Math Symbol 10) setup	
SET_GFID_0204	GFID 204 (Gothic Text 13) setup	
SET_GFID_0221	GFID 221 (Prestige 15) setup	
SET_GFID_0222	GFID 222 (Gothic Text 15) setup	
SET_GFID_0223	GFID 223 (Courier 15) setup	
SET_GFID_0225	GFID 225 (Math Symbol 15) setup	
SET_GFID_0229	GFID 229 (Serif Text 15) setup	
SET_GFID_0230	GFID 230 (Gothic Text 15) setup	
SET_GFID_0245	GFID 245 (Courier Bold 5) setup	
SET_GFID_0252	GFID 252 (Courier 17) setup	
SET_GFID_0253	GFID 253 (Courier Bold 17) setup	
SET_GFID_0254	GFID 254 (Courier 17 (sub/super)) setup	
SET_GFID_0280	GFID 280 (APL 20) setup	
SET_GFID_0281	GFID 281 (Gothic Text 20) setup	
SET_GFID_0290	GFID 290 (Gothic Text 27) setup	
SET_GFID_0751	GFID 751 (Sonoran-Serif 8-pt Roman Medium) setup	
SET_GFID_1051	GFID 1051 (Sonoran-Serif 10-pt Roman Medium) setup	
SET_GFID_1053	GFID 1053 (Sonoran-Serif 10-pt Roman Bold) setup	

Table 21. Field Names of PDF Files (continued)

Field Name	Meaning	Remarks
SET_GFID_1056	GFID 1056 (Sonoran-Serif 10-pt Italic Medium) setup	
SET_GFID_1351	GFID 1351 (Sonoran-Serif 12-pt Roman Medium) setup	
SET_GFID_1653	GFID 1653 (Sonoran-Serif 16-pt Roman Bold) setup	
SET_GFID_2103	GFID 2103 (Sonoran-Serif 24-pt Roman Bold) setup	
START_HIGHLIGHT_INTENSE	Highlight printing setup	
END_HIGHLIGHT_INTENSE	Highlight printing release	
START_HIGHLIGHT_UNDERLINE	Underline setup	
END_HIGHLIGHT_UNDERLINE	Underline release	
TOP_MARGIN	Default top margin	Do not change this field.
LEFT_MARGIN	Default left margin	Do not change this field.
DYNAMIC_START_JOB	Printer control code sent to a printer to start printing (internal use)	Do not change this field.
DYNAMIC_END_JOB	Printer control code sent to a printer to stop printing (internal use)	Do not change this field.
DYNAMIC_SET_PAGE_LENGTH	Page length setup control code sent to a printer at the start of printing (internal use)	Do not change this field.
PRINTER_ID	Printer ID	Do not change this field.
KANJI_CODE?	Used kanji codes (JIS or SHIFT_JIS)	Do not change this field.
ZENKAKU_SPACE	The size (adjustment unit) of a user-defined character and a HANKAKU character	Do not change this field.
SBCS_FONT_LOAD	Registration of a HANKAKU GAIJI	Do not change this field.
DBCS_FONT_LOAD	Registration of a ZENKAKU GAIJI	Do not change this field.
SET_LOCAL_FONT	Set a font set of user-defined characters	Remove this field when user-defined characters are not loaded to a printer.
RESET_LOCAL_FONT	Reset a font set of user-defined characters	Remove this field when user-defined characters are not loaded to a printer.
KANJI_ON	Set kanji mode	
KANJI_OFF	Reset kanji mode	
ATTRIBUTE_GRID_LINE	Grid-line print	Do not change this field.
START_DOUBLE_WIDTH_CHARACTER	Set a double-width character	
END_DOUBLE_WIDTH_CHARACTER	Reset a double-width character	

Notes:

1. When using IBM5577.PDF, change FORM_FEED=EJC to FORM_FEED in the file when a continuous form job does not feed correctly.

2. When using ESC_P.PDF, DBCS (2-byte) characters are placed to the left of the character box, not in the center. To place DBCS characters in the center of the character box, change the IBM-supplied values in ESC_P.PDF:

```
P10 EQU 1B 50 1B 20 00 1C 53 00 0C 1C 54 00 00
P12 EQU 1B 4D 1B 20 00 1C 53 00 06 1C 54 00 00
P13 EQU 1B 67 1B 20 01 1C 53 00 03 1C 54 00 01
P15 EQU 1B 67 1B 20 00 1C 53 00 00 1C 54 00 00
```

to the following:

```
P10 EQU 1B 50 1B 20 00 1C 53 06 06 1C 54 00 00
P12 EQU 1B 4D 1B 20 00 1C 53 03 03 1C 54 00 00
P13 EQU 1B 67 1B 20 01 1C 53 02 01 1C 54 00 01
P15 EQU 1B 67 1B 20 00 1C 53 00 00 1C 54 00 00
```

The following table lists the session parameter field names and their effective values:

Table 22. Effective Values for PDF File Field Names

Field Name	Effective Value
MAXIMUM_PAGE_LENGTH	001 to 255
MAXIMUM_PRINT_POSITION	001 to 255
DEFAULT_CPI?	010/012/015
DEFAULT_LPI?	004/006/008
COMPRESS_LINE_SPACING?	YES/NO
FORM_FEED_ANY_POSITION?	YES/NO
OVERRIDE_FORMATTED_PRINT?	YES/NO
HORIZONTAL_PEL	FORWARD_HORIZONTAL_SKIP length unit
VERTICAL_PEL	FORWARD_VERTICAL_ STEP_FEED length unit
IMAGE_HORIZONTAL_PEL	IMAGE_TRANSMISSION horizontal unit
IMAGE_VERTICAL_PEL	IMAGE_TRANSMISSION vertical unit
LINE_SPACING_RATIO	SET_VARIABLE_LINE_DENSITY length unit
PAGE_LENGTH_TYPE?	LINE/INCH/6INCH*
FIRST_LEFT_POSITION	000 to 1440 in units of 1/1440 inch
FIRST_TOP_POSITION	000 to 1440 in units of 1/1440 inch
DRAWER1_ORIENTATION	LANDSCAPE/PORTRAIT/COR
DRAWER2_ORIENTATION	LANDSCAPE/PORTRAIT/COR
AUTOMATIC_ORIENTATION	YES/NO
* 6/INCH indicates that page length should be specified in units of 1/6 inch.	

Notes:

1. If one of the desired CPI/LPI settings is not exactly supported by the printer, set the nearest value. The results of printing might not be as desired.
2. If the units used to specify the control code length defined in FORWARD_HORIZONTAL _SKIP and FORWARD_VERTICAL _STEP_FEED are not the same as the units used to specify the HORIZONTAL_PEL and VERTICAL_PEL, the desired output will not be obtained.

3. If the units used to specify the control code length defined in SET_VARIABLE_LINE_DENSITY are not the same as the units used to specify the LINE_SPACING_RATIO, the desired output will not be obtained.

4. When FIRST_LEFT_POSITION and FIRST_TOP_POSITION are specified, their values are regarded as specifying the unprintable area in the page of the printer. These values are included in the top margin and the left margin specified by the AS/400 printer control code.

Symbols of Printer Definition Files

The following table lists the symbols that are defined for printer definition files.

Table 23. Printer Symbol Definitions

Field Name	Symbol
SPACE	
EXCLAMATION_POINT	!
QUOTATION_MARKS	"
NUMBER_SIGN	#
DOLLAR_SIGN	$
PERCENT_SIGN	%
AMPERSAND	&
APOSTROPHE	'
LEFT_PARENTHESIS	(
RIGHT_PARENTHESIS	)
ASTERISK	*
PLUS_SIGN	+
COMMA	,
HYPHEN	-
PERIOD	.
SLASH	/
ZERO	0
ONE	1
TWO	2
THREE	3
FOUR	4
FIVE	5
SIX	6
SEVEN	7
EIGHT	8
NINE	9
COLON	:
SEMICOLON	;
LESS_THAN_SIGN	<
EQUAL_SIGN	=
GREATER_THAN_SIGN	>

Table 23. Printer Symbol Definitions (continued)

Field Name	Symbol
QUESTION_MARK	?
AT_SIGN	@
A_CAPITAL	A
B_CAPITAL	B
C_CAPITAL	C
D_CAPITAL	D
E_CAPITAL	E
F_CAPITAL	F
G_CAPITAL	G
H_CAPITAL	H
I_CAPITAL	I
J_CAPITAL	J
K_CAPITAL	K
L_CAPITAL	L
M_CAPITAL	M
N_CAPITAL	N
O_CAPITAL	O
P_CAPITAL	P
Q_CAPITAL	Q
R_CAPITAL	R
S_CAPITAL	S
T_CAPITAL	T
U_CAPITAL	U
V_CAPITAL	V
W_CAPITAL	W
X_CAPITAL	X
Y_CAPITAL	Y
Z_CAPITAL	Z
LEFT_BRACKET	[
BACKSLASH	\
RIGHT_BRACKET	]
CIRCUMFLEX_ACCENT	ˆ
UNDERLINE	_
GRAVE_ACCENT	
A_SMALL	a
B_SMALL	b
C_SMALL	c
D_SMALL	d
E_SMALL	e
F_SMALL	f

Table 23. Printer Symbol Definitions (continued)

Field Name	Symbol
G_SMALL	g
H_SMALL	h
I_SMALL	i
J_SMALL	j
K_SMALL	k
L_SMALL	l
M_SMALL	m
N_SMALL	n
O_SMALL	o
P_SMALL	p
Q_SMALL	q
R_SMALL	r
S_SMALL	s
T_SMALL	t
U_SMALL	u
V_SMALL	v
W_SMALL	w
X_SMALL	x
Y_SMALL	y
Z_SMALL	z
LEFT_BRACE	{
VERTICAL_BAR	|
RIGHT_BRACE	}
TILDE_ACCENT	
C_CEDILLA_CAPITAL	Ç
U_DIAERESIS_SMALL	ü
E_ACUTE_SMALL	é
A_CIRCUMFLEX_SMALL	â
A_DIAERESIS_SMALL	ä
A_GRAVE_SMALL	à
A_OVERCIRCLE_SMALL	å
C_CEDILLA_SMALL	ç
E_CIRCUMFLEX_SMALL	ê
E_DIAERESIS_SMALL	ë
E_GRAVE_SMALL	è
I_DIAERESIS_SMALL	ï
I_CIRCUMFLEX_SMALL	î
I_GRAVE_SMALL	ì
A_DIAERESIS_CAPITAL	Ä
A_OVERCIRCLE_CAPITAL	Å

Table 23. Printer Symbol Definitions (continued)

Field Name	Symbol
E_ACUTE_CAPITAL	É
AE_DIPTHONG_SMALL	æ
AE_DIPTHONG_CAPITAL	Æ
O_CIRCUMFLEX_SMALL	ô
O_DIAERESIS_SMALL	ö
O_GRAVE_SMALL	ò
U_CIRCUMFLEX_SMALL	û
U_GRAVE_SMALL	ù
Y_DIAERESIS_SMALL	ÿ
O_DIAERESIS_CAPITAL	Ö
U_DIAERESIS_CAPITAL	Ü
O_SLASH_SMALL	ø
POUND_SIGN	£
O_SLASH_CAPITAL	Ø
MULTIPLY_SIGN	×
A_ACUTE_SMALL	á
I_ACUTE_SMALL	í
O_ACUTE_SMALL	ó
U_ACUTE_SMALL	ú
N_TILDE_SMALL	ñ
N_TILDE_CAPITAL	Ñ
ORDINAL_INDICATOR_FEMININE	a̲
ORDINAL_INDICATOR_MASCULINE	o̲
QUESTION_MARK_INVERTED	¿
REGISTERED_TRADEMARK_SYMBOL	
LOGICAL_NOT	¬
ONE_HALF	½
ONE_QUARTER	¼
EXCLAMATION_POINT_INVERTED	¡
LEFT_ANGLE_QUOTES	«
RIGHT_ANGLE_QUOTES	»
A_ACUTE_CAPITAL	Á
A_CIRCUMFLEX_CAPITAL	Â
A_GRAVE_CAPITAL	À
COPYRIGHT_SYMBOL	©
CENT_SIGN	¢
YEN_SIGN	¥
A_TILDE_SMALL	ã
A_TILDE_CAPITAL	Ã
E_CIRCUMFLEX_CAPITAL	Ê

Table 23. Printer Symbol Definitions (continued)

Field Name	Symbol
E_DIAERESIS_CAPITAL	Ë
I_ACUTE_CAPITAL	Í
I_CIRCUMFLEX_CAPITAL	Î
I_DIAERESIS_CAPITAL	Ï
VERTICAL_LINE_BROKEN	¦
I_GRAVE_CAPITAL	Ì
O_ACUTE_CAPITAL	Ó
O_CIRCUMFLEX_CAPITAL	Ô
O_GRAVE_CAPITAL	Ò
O_TILDE_SMALL	õ
O_TILDE_CAPITAL	Õ
MICRO_SYMBOL	μ
U_ACUTE_CAPITAL	Ú
U_CIRCUMFLEX_CAPITAL	Û
U_GRAVE_CAPITAL	Ù
ACUTE_ACCENT	´
SYLLABLE_HYPHEN	-
PLUS_OR_MINUS_SIGN	±
THREE_QUARTERS	¾
PARAGRAPH_SYMBOL	¶
SECTION_SYMBOL	§
DIVIDE_SIGN	÷
DEGREE_SYMBOL	°
ONE_SUPERSCRIPT	¹
THREE_SUPERSCRIPT	³
TWO_SUPERSCRIPT	²
REQUIRED_SPACE	
INTERNATIONAL_CURRENCY_SYMBOL	¤
ETH_ICELANDIC_SMALL	ð
ETH_ICELANDIC_CAPITAL	Đ
SHARP_S_SMALL	ß
THORN_ICELANDIC_SMALL	þ
THORN_ICELANDIC_CAPITAL	Þ
Y_ACUTE_SMALL	ý
Y_ACUTE_CAPITAL	Ý
OVERLINE	‾
CEDILLA	¸
DIAERESIS	..
MIDDLE_DOT_ACCENT	·

Using Printer Control Codes

This section explains the SNA Character String (SCS) control codes, or Final Form Text: Document Content Architecture (FFT DCA).

For details of AS/400 printer control codes, refer to *AS/400 Guide to Programming for Printing*.

Printer Control Code Format

Some printer control codes perform single, specific functions by themselves, while others perform multiple functions according to the parameters specified after the control code.

A printer control code with parameters has the following format:

Control Code	Count	Parameter 1	Parameter 2...
1 or 2 bytes	1 byte	1 or 2 bytes	1 or 2 bytes

A count consists of 1 byte, and indicates the length of the parameters (including the count) after the control code, in bytes. For example, a count and two 1-byte parameters is shown as X'03', because the count itself is included. Some control codes, such as the Printing Position (PP) control code, do not have counts.

A parameter can be 1 or 2 bytes in length. The number of bytes depends on the control codes. Not all control codes have parameters.

Note: In this manual, counts and parameters that are actually processed in binary are all expressed in hexadecimal (0–F) to improve readability.

Parameter Definition of Printer Control Codes

Some printer control codes require that parameters be specified. Pay particular attention when defining a parameter because how this is done depends on the parameter type. If the definition method for another type is used, the desired output will not be obtained.

The following table lists printer control code parameter types and their meanings:

Table 24. Printer Control Code Parameter Types

Parameter Type	Meaning
byte-value	One-byte parameter.
byte-values	Multibyte parameter. Used if operands are fixed.
word-value(HL)	One-word parameter (higher and lower bytes).
word-value(LH)	One-word parameter (lower and higher bytes).
length(HL)-values	Multibyte parameter requiring operands. An operand consists of a higher and lower byte. Used if operands are variable.
length(LH)-values	Multibyte parameter requiring operands. An operand consists of a lower and higher byte. Used if operands are variable.
length(HL)-images	Image data requiring operands. An operand consists of a higher and lower byte.

Table 24. Printer Control Code Parameter Types (continued)

Parameter Type	Meaning
length(LH)-images	Image data requiring operands. An operand consists of a lower and higher byte.
decimal-characters	Decimal characters parameter.

Supported Control Codes

Personal Communications supports all control codes for the 3812 printer.

Supported SCS Commands

Table 25. Supported SCS Commands

SCS Command	Abbreviation	Hexadecimal Code	Function
Character Attribute			
Set Font Size Scaling	SFSS	2BFDnn02xxyy	Specifies the font-size scaling for expansion.
Character Set Control			
Load Alternate Character (DBCS only)	LAC	2BFEnnmmee	Loads the alternate character font.
Set CGCS[1] Through Local ID	SCL	2BD1nn810B	Specifies the character set for each language.
Set Character Distance	SCD	2BD2nn29xxxx	Selects the pitch and font.
Set Font ID Through GFID[2]	SFG	2BD1nn05xxxxyyyyzz	Selects the font.
Set GCSGID[3] Through GCID[4]	SCG	2BD1nn01xxxxyyyy	Specifies the code page.
Set Presentation of Control Character	SPCC	2BFDnn03xxxx	Specifies the treatment of SO and SI.
Shift Out (DBCS only)	SO	0E	Start of DBCS field.
Shift In (DBCS only)	SI	0F	End of DBCS field.
Device Control			
Bell	BEL	2F	Ignored.
Null	NUL	00	Ignored.
Repeat	RPT	0A	Ignored.
Set Exception Action	SEA	2BD2nn85p1–pn	Specifies the explicit action.
Set Initial Conditions	SIC	2BD2nn45xx	Sets the environment of the EBCDIC transform.
Set Print Setup	SPSU	2BD2nn4Cp1–pn	Ignored.
Switch	SW	2A	Ignored.
Generation Control			
Begin Emphasis	BES	2BD1nn8Axx	Begins emphasis.
Begin Overstrike	BOS	2BD4nn72wwxxyyyyzzzz	Begins overstriking.
Begin Underscore	BUS	2BD4nn0Axxyy	Begins underscoring.

Table 25. Supported SCS Commands (continued)

SCS Command	Abbreviation	Hexadecimal Code	Function
Enable Presentation	ENP	14	Ignored.
End Emphasis	EES	2BD1nn8Exx	Ends emphasis.
End Overstrike	EOS	2BD4nn76	Ends overstriking.
End Underscore	EUS	2BD4nn0E	Ends underscoring.
Inhibit Presentation	INP	24	Ignored.
Justify Text Field	JTF	2BD2nn03xxxxyy	Justifies the following text.
Set Graphic Error Action	SGEA	2BC8nnxxyy	Specifies how to process a received unprintable character font.
Set Justify Mode	SJM	2BD2nn0Dxxyy	Justifies each line of text between the left and right margins.
Subscript	SBS	38	Subscript.
Substitute	SUB	3F	Synonym for the graphic exception character.
Superscript	SPS	09	Superscript.
Word Underscore	WUS	23	Underscore the entire word immediately preceding the control.
Grid Control			
Define Grid Line	DGL	2BFDnn00 xxyyG1~Gn	Specifies and prints the grid line
Print Format Control			
Form Feed	FF	0C	Moves the printing position to the next page.
Page Presentation Media	PPM	2BD2nn48ssssuuvv wwxxyyzz	Specifies the forms setting, the source drawer, the quality, and the duplex function.
Required Form Feed	RFF	3A	Moves the printing position to the next page and restores the indent level to the left margin.
Set Horizontal Format	SHF	2BC1nnxxyyzzt1–tn	Specifies the maximum print position, the left and right margins, and the horizontal tab stops in units of 1 character.
Set Horizontal Margins	SHM	2BD2nn11xxxxyyyy	Sets the left and right margins in units of 1/1440 inch.
Set IGC Type	SIT	2BFDnn010000	Specifies the pitch of DBCS characters
Set Presentation Page Size	SPPS	2BD2nn40xxxxyyyy	Specifies the presentation surface width and depth.
Set Text Orientation	STO	2BD3nnF6xxxxyyyy	Specifies the page rotation.
Set Vertical Format	SVF	2BC2nnxxyyzzt1–tn	Specifies the maximum print line, the top and bottom margins, and the vertical tab stops in units of 1 character.
Set Vertical Margins	SVM	2BD2nn49xxxxyyyy	Sets the top and bottom margins in units of 1/1440 inch.
Printing Position Control			
Backspace	BS	16	Moves the printing position to the left one font width.

Table 25. Supported SCS Commands (continued)

SCS Command	Abbreviation	Hexadecimal Code	Function
Carriage Return	CR	0D	Moves the printing position to the left margin.
Horizontal Tab	HT	05	Moves the printing position right to the next tab stop.
Indent Tab	IT	39	Moves the printing position right to the next tab stops and sets the indent level one tab stop further to the right.
Index Return	IRT	33	Synonym for "Required New Line."
Interchange Record Separator	IRS	1E	Synonym for "New Line."
Line Feed	LF	25	Moves the printing position one line vertically.
New Line	NL	15	Moves the printing position to the left margin of the next line.
Numeric Backspace	NBS	36	Synonym for "Backspace."
Presentation Position	PP	34fpxx	Moves the printing position.
Release Left Margin	RLM	2BD2nn0B	Ignored.
Required New Line	RNL	06	Moves the printing position to the left margin of the next line and resets any pending indent level.
Set Horizontal Tab Stops	STAB	2BD2nn01xxt1–tn	Specifies the tab stops.
Set Indent Level	SIL	2BD2nn07xx	Sets the indent level to the specific tab stop.
Set Line Density	SLD	2BC6nnxx	Specifies the line pitch in units of 1/72 inch.
Set Line Spacing	SLS	2BD2nn09xx	Specifies the number of lines spaced by a new line control.
Set Single Line Distance	SSLD	2BD2nn15xxxx	Specifies the line pitch in units of 1/1440 inch.
Unit Backspace	UBS	1A	Moves the printing position 1/60 inch to the left.
Vertical Tab	VT	0B	Moves the printing position down to the next tab stop.
Transparent Control			
ASCII Transparent	ATRN	03	Allows printer commands and ASCII data to be passed to the printer.
Transparent	TRN	35nn	Allows printer commands and ASCII data to be passed to the printer.
Note: **1** Coded Graphic Character Set **2** Global Font ID **3** Graphic Character Set Global Identifier **4** Graphic Character set ID			
Legend: nn: Count fp: Function parameter ee, gg, hh, il–ix, mm, nn, p1–pn, ss, t1–tn, uu, vv, ww, xx, yy, zz: Numeric parameter			

Programming Notes

This section briefly explains how a printer reacts if a partial control code is received, or if an incomplete control code is sent.

If the transmission of a control code is interrupted, the printer waits for the remaining part of the code. If the data stream (the series of data units and control codes) sent after the interruption is consistent with the data stream sent before the interruption, (that is, if one complete printer control code is restored by chaining), the control code is processed as is.

If the two parts of the data stream are inconsistent, an error occurs. A negative response to an "Invalid Printer Parameter" is sent to the host system, or treated as a no-op (no operation; ignored because of a meaningless code). Detailed information is not sent to the host system if an error occurs in a control code. After programming, the data stream must be checked thoroughly by repeating the printing test.

Restrictions and Notes for AS/400 Printer Commands and Printer Setup

This section provides supplementary notes and explains restrictions for printing.

Printer Control Codes

Table 26. Printer Control Codes

Printer Control Code	If *Use PDT file* is Selected:	If a Windows Printer Driver is Used:
SCD — Set the Character Density	Select the GFID for the valid character distance (CD) parameter as shown in Table 27 on page 208.	
	If the specified font is not supported, a substitution is provided. For example, when 15 CPI font is specified but the font is not supported, the supported 17 CPI font is substituted.	See "How to Determine PC400 Font" on page 208.
SFG — Set Font ID through GFID	Recognizable GFIDs are restricted. (See "Field Names of Printer Definition Files" on page 191.) If the specified GFID is not supported and it is out of the range from 154 through 200, the closest font width from the fonts shown in Table 28 on page 208 is substituted. If the specified GFID is not supported and it is between 154 and 200, the following font is substituted: **Font name:** Document; **GFID value:**175.	
		See "How to Determine PC400 Font" on page 208.
BUS — Begin Underscore		The selected font might not support the underscore.
BES — Begin Emphasis		The selected font might not support the emphasis.

Table 26. Printer Control Codes (continued)

Printer Control Code	If *Use PDT file* is Selected:	If a Windows Printer Driver is Used:
STO — Set Text Orientation		The page orientation can be changed to portrait or landscape. The direction, which is up, down, left, or right on the paper, depends on the Microsoft Windows printer driver. If the page orientation is changed, the current paper is ejected.
PPM — Page Presentation Media	The following parameters are supported for PDTs in DBCS mode: • Forms Control (FC) • Source Drawer (SD) • Duplex (DX) Other parameters are ignored.	

Table 27. SCD Parameter Values

CD Parameter	Character Pitch (normal)	GFID Value (COR)
000A	10 CPI	13 CPI 204
000B	Proportional	13 CPI 175
000C	12 CPI	15 CPI 86
000F	15 CPI	20 CPI 230
00FF	10 CPI	13 CPI 204

The following table lists only the most commonly used GFIDs. See Table 29 on page 209 for the complete list.

Table 28. Commonly Used SFG GFID Values

Font Name	GFID value
Courier Bold 5	245
Courier 10	11
Prestige Elite 12	86
Gothic-text 13	204
Gothic-text 15	230
Courier 17	252
Gothic-text 20	281
Gothic-text 27	290

When you use the Windows printer driver, the spooler must be on.

How to Determine PC400 Font

When a print job is created on AS/400, a certain font, identified by font ID (GFID), is associated with it. Such a font can be specified by the following parameters:

• Font family
• Pitch and family
• Character set
• Width
• Height

- Weight
- Style

System fonts are available with all print drivers, and more flexible device fonts are unique to each printer and printer driver. These fonts are also more fixed as to CPI, weight, code pages, and other criteria that can preclude use of it when matching to the host specified needs.

There are problems associated with mapping an AS/400 font to a PC font. When your PC has all of the fonts that you need, use the following table to determine the best font to use.

Table 29. AS/400 Font Parameters

Entry ID	Font Family	GFID	Pitch & Family	Character Set	Width	Height	Weight	Style
GFID0003	OCR-B	3	49	0	144	240	400	0
GFID0005	Orator	5	49	0	144	240	400	0
GFID0011	Courier	11	49	0	144	240	400	0
GFID0012	Prestige	12	49	0	144	240	400	0
GFID0013	Artisan	13	49	0	144	240	400	0
GFID0018	Courier Italic	18	49	0	144	240	400	255
GFID0019	OCR-A	19	49	0	144	240	400	0
GFID0020	Pica	20	49	0	144	240	400	0
GFID0030	Symbol	30	49	2	144	240	400	0
GFID0038	Orator	38	49	0	144	240	400	0
GFID0039	Gothic	39	49	0	144	240	800	0
GFID0040	Gothic	40	49	0	144	240	800	0
GFID0041	Roman	41	49	0	144	240	400	0
GFID0042	Serif	42	49	0	144	240	400	0
GFID0043	Serif	43	49	0	144	240	400	255
GFID0044	Katakana	44	49	0	144	240	400	0
GFID0045	APL	45	49	0	144	240	400	0
GFID0046	Courier Bold	46	49	0	144	240	800	0
GFID0050	Shalom	50	49	0	144	240	400	0
GFID0066	Gothic	66	49	0	144	240	400	0
GFID0068	Gothic	68	49	0	120	240	400	255
GFID0069	Gothic	69	49	0	120	240	800	0
GFID0070	Serif	70	49	0	120	240	400	0
GFID0071	Serif	71	49	0	120	240	400	255
GFID0072	Serif	72	49	0	120	240	800	0
GFID0080	Symbol	80	49	2	120	240	400	0
GFID0084	Script	84	49	0	120	240	400	0
GFID0085	Courier	85	49	0	120	240	400	0
GFID0086	Prestige	86	49	0	120	240	400	0

Table 29. AS/400 Font Parameters (continued)

Entry ID	Font Family	GFID	Pitch & Family	Character Set	Width	Height	Weight	Style
GFID0087	Letter-Gothic	87	49	0	120	240	400	0
GFID0091	Light	91	49	0	120	240	400	255
GFID0107	Courier	107	49	0	120	240	400	0
GFID0110	Letter-Gothic	110	49	0	120	240	800	0
GFID0111	Prestige	111	49	0	120	240	800	0
GFID0112	Prestige	112	49	0	120	240	400	255
GFID0115	Symbol	115	49	2	120	240	400	0
GFID0155	Boldface	155	18	0	120	240	400	0
GFID0158	Document	158	18	0	120	240	400	0
GFID0159	Boldface	159	18	0	120	240	800	0
GFID0160	Essay	160	34	0	120	240	800	0
GFID0162	Essay	162	34	0	120	240	800	255
GFID0163	Essay	163	34	0	120	240	800	0
GFID0168	Barak	168	18	0	120	240	400	0
GFID0173	Essay	173	34	0	120	240	400	0
GFID0175	Document	175	18	0	120	240	400	0
GFID0176	Boldface	176	18	0	120	240	800	0
GFID0177	Boldface	177	18	0	120	240	800	255
GFID0193	Symbol	193	49	2	120	240	400	0
GFID0198	Symbol	198	49	2	144	240	400	0
GFID0204	Gothic	204	49	0	108	210	400	0
GFID0221	Prestige	221	49	0	96	210	400	0
GFID0222	Gothic	222	49	0	96	210	400	0
GFID0223	Courier	223	49	0	96	210	400	0
GFID0225	Symbol	225	49	2	96	240	400	0
GFID0229	Serif	229	49	0	96	210	400	0
GFID0230	Gothic	230	49	0	96	210	400	0
GFID0245	Courier Bold	245	49	0	288	240	800	0
GFID0252	Courier	252	49	0	84	240	400	0
GFID0253	Courier Bold	253	49	0	84	240	800	0
GFID0254	Courier	254	49	0	84	120	400	0
GFID0280	APL	280	49	0	72	120	400	0
GFID0281	Gothic	281	49	0	72	120	400	0
GFID0290	Gothic	290	49	0	54	120	400	0
GFID0751	Sonoran-serif	751	18	0	54	162	400	0

Table 29. AS/400 Font Parameters (continued)

Entry ID	Font Family	GFID	Pitch & Family	Character Set	Width	Height	Weight	Style
GFID1051	Sonoran-serif	1051	18	0	66	198	400	0
GFID1053	Sonoran-serif	1053	18	0	66	198	800	0
GFID1056	Sonoran-serif	1056	18	0	66	198	400	255
GFID1351	Sonoran-serif	1351	18	0	84	240	400	0
GFID1653	Sonoran-serif	1653	18	0	108	312	800	0
GFID2103	Sonoran-serif	2103	18	0	162	480	800	0

Notes:

1. Default GFID from host is 011, we use Courier 10 CPI.

2. A print driver will change the font to its default if you ask for a font name that it does not recognize. Some drivers recognize Gothic, but the DeskJet drivers do not.

3. Most print drivers default to Courier New, instead of Courier. So Courier switched to Courier New works, but Gothic switched to Courier New changes the font family. Preferably, you should explicitly select Courier New.

4. Special fonts like CourHEB and GRCOUR869 (for Greek) has required them to be added to PCSPD.DAT to work. Note if the operating system properly or fully supports a language, that font could be the default font instead of Courier New.

Avoiding AS/400 System Dump

If you are running OS/400 Version 3 Release 1, and you attempt to perform a Telnet 5250 mode host print operation, you may experience an AS/400 system dump under certain conditions. To prevent this from occurring you should apply PTF SF35327 on OS/400.

This table matches the AS/400 table of fonts. PC400 builds a PC spool file with the selected font in it. The printer driver picks up the spool file and the font and sends it to the printer where the expected font is used. Refer to *Printer Device Programming (SC41–5713–01)* for additional information on other useful tables.

The following factors can produce unexpected results:

- Not all fonts are available on a PC or printer device.

  If the font that was selected from the table and incorporated into the spool file cannot be found on a PC or on a printer, the printer driver determines how to present the data on a printer. For example, HP printer drivers have the following order of considerations:

  – HP Font Priority Considerations:

    1. Symbol Set
    2. Spacing
    3. Pitch
    4. Height
    5. Style
    6. Stroke Weight
    7. Typeface Family

8. Resolution
9. Orientation
– Location: printer ROM, SIMM module ROM, cartridge ROM, printer RAM
  Priority of locations:
  1. Soft font (lowest ID first)
  2. Cartridge Font
  3. SIMM Font
  4. Internal Font
– 600 dpi has priority over 300 dpi

To avoid this uncertainty, it is recommended that you update the table so that only the fonts that are available in the given environment are used.

- NLS

  The AS/400 font has NLS characters in it, which are not part of a corresponding PC font. The IBM-supplied table does not support character sets other than ANSI, although it provides a field for them. In this case, PC400 builds a PC spool file with a font that doesn't recognize NLS.

  To fix the problem, it is recommended that you either change the font names in the table to the NLS enabled on a PC/printer, or if the font has the same name as the one in the table, update a Character Set value.

- After you decide to scale a printout which may be a result of CORig or BesFitting, you usually decrease the distance horizontally as well as vertically between characters. This can result in overlapping. PC400 attempts to adjust the given character size to a new one. A problem may occur when a font defined in the table is not a scalable font. Like GFID011, the most heavily used AS/400 font is mapped to Courier. Courier is a non-scalable font which has only a limited number of character box sizes. To avoid possible problems it is recommended that you use Courier New instead, which is a scalable TTF font.

PFT Migration Utility

The PFT migration utility converts the printer function table (PFT) for the PC Support/400 workstation feature to a printer definition file (PDF) for PC400.

This section describes the operator interface of the PFT migration utility.

For details of PFT, refer to *AS/400 PC Support: DOS and OS/2 Technical Reference* SC21-8091.

Using the PFT Migration Utility

The file name of the PFT Migration Utility program is PCSPFC.EXE. It is a Windows application, and you can execute it by doing the following:

1. Double-click the program name using the Windows Explorer utility.
2. Specify the program name (and parameters) in the Windows Run utility as follows:

```
PCSPFC [ [drive:] [path] PFT-file-name[.extension] ]
```

   If no parameter is specified, PCSPFC.EXE displays the Convert PFT to PDF dialog box.

If you omit a drive name and a directory name, PCSPFC.EXE uses the current drive and the current directory. If you omit an extension, PCSPFC.EXE adds .PFT to the PFT file name.

3. When you execute the PFT Migration Utility, the Convert PFT to PDF dialog box appears. On the Convert PFT to PDF dialog box, select a PFT file from the list box or type a specific PFT file name, and click **OK**. The PFT Migration Utility starts the conversion and displays the PFT File Converter dialog box to show the conversion status.

After the conversion, if you click **Save List** on the PFT File Converter dialog box, conversion messages in the dialog box are saved into a list file. The list file is created in the same directory and with the same name as the PFT file, except the extension. The extension of the list file is .LS2.

If the conversion was completed successfully, you can click **Convert PDF to PDT** from the PFT File Converter dialog box to convert the PDF file to a PDT file. You can also create a PDT file by selecting **Printer Setup** from the File pull-down menu as explained in "Using the Printer Definition Table (PDT) File" on page 175.

Migration Considerations
When the base PDF file already exists, the converted PDF fields are appended to the end of the base PDF file. The name of the base PDF file is decided as follows:

Table 30. PDF File Name

PFT File Name	Base PDF File Name
xxxxxxxx.PFT	xxxxxxxx.PDF
xxxxx.MNL	MNLxxxxx.PDF
zzzxxxxx.MNL*	zzzxxxxx.PDF*
: * "zzz" is not "IBM".	

Even if the same fields are already defined in the PDF file, the appended fields are effective because the last definition is always effective in a PDF file.

If the base PDF file does not exist in the directory, the PFT Migration Utilitycreates a new PDF file that has only the converted fields from the PFT file. In this case, you should append this file to an appropriate base file manually, because the fields converted from the PFT file do not cover all of the necessary PDF fields.

Therefore, it is recommended that you prepare both the PFT file and its base PDF file in the same directory before the conversion.

Details of Migration
This section describes how the PFT Migration Utility migrates the printer function table (PFT) to the printer definition file (PDF).

Migration from the Printer Function Table
The following table shows the target fields of the PDF for the data in the PFT.

Table 31. Migration from the Printer Function Table to the Printer Definition File

	PDF Field Name	
PFT Field Name	**Description**	
	INITIALIZATION AND RESET	

PFT Field Name	PDF Field Name
	Description
Initialization	
Initialization	START_JOB=
	When the data is defined in the Initialization field of PFT, the data is appended to the string START_JOB=.
Filename	
Filename	None
	This field is ignored.
Reset	
Reset	END_JOB=
	When the data is defined in the Reset field of PFT, the data is appended to the string END_JOB=.
VERTICAL LINE SPACING	
6 lines per inch	
6 lines per inch	SET_6_LINES_PER_INCH=
	When the data is defined in the 6 lines per inch field of PFT, the data is appended to the string SET_6_LINES_PER_INCH=.
8 lines per inch	
8 lines per inch	SET_8_LINES_PER_INCH=
	When the data is defined in the 8 lines per inch field of PFT, the data is appended to the string SET_8_LINES_PER_INCH=.
Variable line spacing	
Control Sequence	SET_VARIABLE_DENSITY=
	When the data is defined in the control sequence field of the PFT for the variable line spacing, the data is appended to the string SET_VARIABLE_DENSITY=. The parameter *n* in the control sequence is replaced with the PDF parameter type.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	LINE_SPACING_RATIO=
	When the data is defined in the X/Y field of the PFT for the variable line spacing, the value Y/X is appended to the string LINE_SPACING_RATIO= as three-digit or four-digit numbers to indicate the decimal number. For example, when Y/X is 72, the **072** is appended to the string LINE_SPACING_RATIO= and **LINE_SPACING_RATIO=072** is written to the output file. When the value is greater than 255, the four-digit number is migrated. When the value is less than 255, the three-digit number is migrated.
Indexing Functions	

PFT Field Name	PDF Field Name
	Description
Begin Superscript	START_SUPERSCRIPT=
	When the data is defined in the Begin Superscript field and End Superscript field of the PFT for the indexing functions, the data is appended to the string START_SUPERSCRIPT=. If the data for the End Superscript is not defined, the data for the Begin Superscript is ignored.
End Superscript	END_SUPERSCRIPT=
	When the data is defined in the End Superscript field and Begin Superscript field of the PFT for the indexing functions, the data is appended to the string END_SUPERSCRIPT=. If the data for the Begin Superscript is not defined, the data for the End Superscript is ignored.
Begin Subscript	START_SUBSCRIPT=
	When the data is defined in the Begin Subscript field and End Subscript field of the PFT for the indexing functions, the data is appended to the string START_SUBSCRIPT=. If the data for the End Subscript is not defined, the data for the Begin Subscript is ignored.
End Subscript	END_SUBSCRIPT=
	When the data is defined in the End Subscript field and Begin Subscript field of the PFT for the indexing functions, the data is appended to the string END_SUBSCRIPT=. If the data for the Begin Subscript is not defined, the data for the End Subscript is ignored.
Reverse 1/2 Index	START_SUPERSCRIPT= END_SUBSCRIPT=
	The data is appended to the START_SUPERSCRIPT= for all of the following conditions: • When the data is not defined in the Begin Superscript field in the PFT or when the data is not defined in the End Superscript field in the PFT. • When the data is defined in the Reverse 1/2 index and Forward 1/2 index field in the PFT. The data is appended to END_SUBSCRIPT= for all of the following conditions: • When the data is not defined in the Begin Subscript field in the PFT or when the data is not defined in the End Subscript field in the PFT. • When the data is defined in the Reverse 1/2 index and Forward 1/2 index field in the PFT.

Table 31. Migration from the Printer Function Table to the Printer Definition File (continued)

PFT Field Name	PDF Field Name
	Description
Forward 1/2 Index	END_SUPERSCRIPT= START_SUBSCRIPT=
	The data is appended to END_SUPERSCRIPT= for all of the following conditions: • When the data is not defined in Begin Superscript field in the PFT or when the data is not defined in End Superscript field in the PFT. • When the data is defined in the Reverse 1/2 index and Forward 1/2 index field in the PFT. The data is appended to START_SUBSCRIPT= for all of the following conditions: • When the data is not defined in the Begin Subscript field in the PFT or when the data is not defined in the End Subscript field in the PFT. • When the data is defined in the Reverse 1/2 index and Forward 1/2 index field in the PFT.
Reverse Index	None
	This field is ignored.
HORIZONTAL LINE SPACING	
5 pitch	
5 pitch	None
	This field is ignored.
8.55 pitch	
8.55 pitch	None
	This field is ignored.
10 pitch	
10 pitch	SET_10_CHARACTERS_PER_INCH=
	When the data is defined in the 10 pitch field of the PFT for the horizontal character spacing, the data is appended to the string SET_10_CHARACTERS_PER_INCH=.
12 pitch	
12 pitch	SET_12_CHARACTERS_PER_INCH=
	When the data is defined in the 12 pitch field of the PFT for the horizontal character spacing, the data is appended to the string SET_12_CHARACTERS_PER_INCH=.
15 pitch	
15 pitch	SET_15_CHARACTERS_PER_INCH=
	When the data is defined in the 15 pitch field of the PFT for the horizontal character spacing, the data is appended to the string SET_15_CHARACTERS_PER_INCH=.
17.1 pitch	
17.1 pitch	SET_17_CHARACTERS_PER_INCH=
	When the data is defined in the 17.1 pitch field of the PFT for the horizontal character spacing, the data is appended to the string SET_17_CHARACTERS_PER_INCH=.
Horizontal Motion Index	

PFT Field Name	PDF Field Name
	Description
Control Sequence	None
	This field is ignored.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	None
	This field is ignored.
HORIZONTAL RELATIVE MOVEMENT	
Forward Relative Movement	
Control Sequence	FORWARD_HORIZONTAL_SKIP=
	When the data is defined in the Forward Relative Movement field of PFT, the data is appended to the string FORWARD_HORIZONTAL_SKIP=. The parameter n in the control sequence is replaced with the PDF parameter type.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	HORIZONTAL_PEL=
	When the data is defined in the X/Y field of the PFT for the forward relative movement, the value Y/X is appended to the string HORIZONTAL_PEL= as three-digit or four-digit number to indicate the decimal number. For example, when Y/X is 120, **120** is appended to the string HORIZONTAL_PEL= and **HORIZONTAL_PEL=120** is written to the output file. When the value is greater than 255, the four-digit number is migrated. When the value is less than 255, the three-digit number is migrated.
Backward Relative Movement	
Control Sequence	None
	This field is ignored.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	None
	This field is ignored.
HIGHLIGHTING	
Begin Emphasis	
Begin Emphasis	START_HIGHLIGHT_INTENSE=
	When the data is defined in the Begin Emphasis of PFT, the data is appended to the string START_HIGHLIGHT_INTENSE=.

PFT Field Name	PDF Field Name
	Description
End Emphasis	
End Emphasis	END_HIGHLIGHT_INTENSE=
	When the data is defined in the End Emphasis of PFT, the data is appended to the string END_HIGHLIGHT_INTENSE=.
Begin Underline	
Begin Underline	START_HIGHLIGHT_UNDERLINE=
	When the data is defined in the Begin Underline of PFT, the data is appended to the string START_HIGHLIGHT_UNDERLINE=.
End Underline	
End Underline	END_HIGHLIGHT_UNDERLINE=
	When the data is defined in the End Underline of PFT, the data is appended to the string END_HIGHLIGHT_UNDERLINE=.
Begin Quality Print	
Begin Quality Print	None
	This field is ignored.
End Quality Print	
End Quality Print	None
	This field is ignored.
PAPER HANDLING	
Bottom Tray Feed	
Bottom Tray Feed	SELECT_DRAWER2=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control of the portrait orientation. For this, the PFT Migration Utility divides this control sequence into two parts and migrates the control sequence for the drawer select and paper feed. The control sequence of the portrait orientation is migrated to SET_PORTRAIT_ORIENT=. If no data is defined in any fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility migrates this control sequence to the SELECT_DRAWER2=. (See "Definition of PAPER HANDLING Migration" on page 233.)
Top Tray Feed	
Top Tray Feed	SELECT_DRAWER1=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control of the portrait orientation. For this, the PFT Migration Utility divides this control sequence into two parts and migrates the control sequence for the drawer select and paper feed. The control sequence of the portrait orientation is migrated to SET_PORTRAIT_ORIENT=. If no data is defined in any fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility migrates this control sequence to SELECT_DRAWER1=. (See "Definition of PAPER HANDLING Migration" on page 233.)
Envelope Feed	

PFT Field Name	PDF Field Name
	Description
Envelope Feed	SELECT_ENVELOPE=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control of the portrait orientation. For this, the PFT Migration Utility divides this control sequence into two parts and migrates the control sequence for the drawer select and paper feed. The control sequence of the portrait orientation is migrated to SET_PORTRAIT_ORIENT=. If no data is defined in any fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility migrates this control sequence to SELECT_ENVELOPE=. (See "Definition of PAPER HANDLING Migration" on page 233.)
	Manual Feed
Manual Feed	SELECT_DRAWER3=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control of the portrait orientation. For this, the PFT Migration Utility divides this control sequence into two parts and migrates the control sequence for the drawer select and paper feed. The control sequence of the portrait orientation is migrated to SET_PORTRAIT_ORIENT=. If no data is defined in any fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility migrates this control sequence to SELECT_DRAWER3=. (See "Definition of PAPER HANDLING Migration" on page 233.)
	Continuous Feed
Continuous Feed	None
	This field is ignored.
	Ignore Paper End Sensor
Ignore Paper End Sensor	None
	This field is ignored.
	Enable Paper End Sensor
Enable Paper End Sensor	None
	This field is ignored.
	Eject Automatic Cut Sheet
Eject automatic Cut Sheet	None
	This field is ignored.
	Eject Manual Cut Sheet
Eject Manual Cut Sheet	None
	This field is ignored.
	Collate
Collate	None
	This field is ignored.
	PAPER POSITIONING
	Continuous Forms

Table 31. Migration from the Printer Function Table to the Printer Definition File (continued)

PFT Field Name	PDF Field Name
	Description
Dist. from Top Paper Edge	None
	This field is ignored.
Dist. from Left Paper Edge	None
	This field is ignored.
Location of First Print Column	None
	This field is ignored.
Manual Feed	
Dist. from Top Paper Edge	None
	This field is ignored.
Dist. from Left Paper Edge	None
	This field is ignored.
Location of First Print Column	None
	This field is ignored.
Automatic Feed	
Dist. from Top Paper Edge	None
	This field is ignored.
Dist. from Left Paper Edge	None
	This field is ignored.
Location of First Print Column	None
	This field is ignored.
SET PAGE LENGTH (INCHES)	
Control Sequence	PAGE_LENGTH_TYPE?=INCH SET_PAGE_LENGTH=
	When the data is defined in the control sequence for SET PAGE LENGTH (INCHES) and if any of the data is not defined in the control sequence for SET PAGE LENGTH (LINES), this field is migrated.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	None
	This field is ignored.
Top Margin Size	None
	This field is ignored.
Bottom Margin Size	None
	This field is ignored.
SET PAGE LENGTH (LINES)	
Control Sequence	PAGE_LENGTH_TYPE?=LINE SET_PAGE_LENGTH=
	When the length is defined in the control sequence for SET PAGE LENGTH (LINES), this field is migrated.

PFT Field Name	PDF Field Name
	Description
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	None
	This field is ignored.
Top Margin Size	None
	This field is ignored.
Bottom Margin Size	None
	This field is ignored.
SET LEFT MARGIN (INCHES)	
Control Sequence	None
	This field is ignored.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	None
	This field is ignored.
SET LEFT MARGIN (COLUMNS)	
Control Sequence	SET_HORIZONTAL_MARGIN=
	When the data is defined in the control sequence field for SET LEFT MARGIN (COLUMNS), this field is migrated.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
CARRIER RETURN/LINE FEED	
Continuous Forms	

Table 31. Migration from the Printer Function Table to the Printer Definition File (continued)

PFT Field Name	PDF Field Name
	Description
Carrier Return (Continuous Forms)	CARRIAGE_RETURN=

	This field is migrated for the following cases:
	
	• Case 1
	  – The data is defined in the Carrier Return field for the Continuous Forms.
	  – Any of the data in the Carrier Return field is not defined for the Manual Feed and Automatic Feed.
	
	• Case 2
	  – The data is defined in the Carrier Return field for the Continuous Forms.
	  – The same data is defined in the Carrier Return field for the Manual Feed.
	  – Any of the data in the Carrier Return field is not defined for the Automatic Feed.
	
	• Case 3
	  – The data is defined in the Carrier Return field for the Continuous Forms.
	  – The same data is defined in the Carrier Return field for the Automatic Feed.
	  – Any of the data in the Carrier Return field is not defined for the Manual Feed.
	
	• Case 4
	  – The data is defined in the Carrier Return field for the Continuous Forms.
	  – The same data is defined in the Carrier Return field for the Automatic Feed and Manual Feed.

Line Feed (Continuous Forms)	LINE_FEED=

	This field is migrated for the following cases:
	
	• Case 1
	  – The data is defined in the Line Feed field for the Continuous Forms.
	  – Any of the data in the Line Feed Line field is not defined for the Manual Feed and Automatic Feed.
	
	• Case 2
	  – The data is defined in the Line Feed field for the Continuous Forms.
	  – The same data is defined in the Line Feed field for the Manual Feed.
	  – Any data is not defined in the Line Feed field for the Automatic Feed.
	
	• Case 3
	  – The data is defined in the Line Feed field for the Continuous Forms.
	  – The same data is defined in the Line Feed field for the Automatic Feed.
	  – Any data is not defined in the Line Feed field for the Manual Feed.
	
	• Case 4
	  – The data is defined in the Line Feed field for the Continuous Forms.
	  – The same data is defined in the Line Feed field for the Automatic Feed and Manual Feed.

Table 31. Migration from the Printer Function Table to the Printer Definition File (continued)

PFT Field Name	PDF Field Name
	Description
Manual Feed	
Carrier Return (Manual Feed)	CARRIAGE_RETURN=

	This field is migrated for the following cases:
	
	• Case 1
	  – The data is defined in the Line Feed field for the Manual Feed.
	  – Any of the data in the Line Feed Line field is not defined for the Continuous Forms and Automatic Feed.
	
	• Case 2
	  – The data is defined in the Line Feed field for the Manual Feed.
	  – The same data is defined in the Line Feed field for the Continuous Forms.
	  – Any data is not defined in the Line Feed field for the Automatic Feed.
	
	• Case 3
	  – The data is defined in the Line Feed field for the Manual Feed.
	  – The same data is defined in the Line Feed field for the Automatic Feed.
	  – Any data is not defined in the Line Feed field for the Continuous Forms.
	
	• Case 4
	  – The data is defined in the Line Feed field for the Manual Feed.
	  – The same data is defined in the Line Feed field for the Automatic Feed and Continuous Forms.

Table 31. Migration from the Printer Function Table to the Printer Definition File (continued)

PFT Field Name	PDF Field Name
	Description
Line Feed (Manual Feed)	LINE_FEED=
	This field is migrated for the following cases: • Case 1 – The data is defined in the Line Feed field for the Manual Feed. – Any of the data in the Line Feed Line field is not defined for the Continuous Forms and Automatic Feed. • Case 2 – The data is defined in the Line Feed field for the Manual Feed. – The same data is defined in the Line Feed field for the Continuous Forms. – Any data is not defined in the Line Feed field for the Automatic Feed. • Case 3 – The data is defined in the Line Feed field for the Manual Feed. – The same data is defined in the Line Feed field for the Automatic Feed. – Any data is not defined in the Line Feed field for the Continuous Forms. • Case 4 – The data is defined in the Line Feed field for the Manual Feed. – The same data is defined in the Line Feed field for the Automatic Feed and Continuous Forms.
Automatic Feed	

PFT Field Name	PDF Field Name
	Description
Carrier Return (Automatic Feed)	CARRIAGE_RETURN=
	This field is migrated for the following cases: • Case 1 　– The data is defined in the Carrier Return field for the Automatic Feed. 　– Any of the data in the Carrier Return field is not defined for the Continuous Feed and Manual Feed. • Case 2 　– The data is defined in the Carrier Return field for the Automatic Feed. 　– The same data is defined in the Carrier Return field for the Continuous Forms. 　– Any of the data in the Carrier Return field is not defined for the Manual Feed. • Case 3 　– The data is defined in the Carrier Return field for the Automatic Feed. 　– The same data is defined in the Carrier Return field for the Manual Feed. 　– Any of the data in the Carrier Return field is not defined for the Continuous Forms. • Case 4 　– The data is defined in the Carrier Return field for the Automatic Feed. 　– The same data is defined in the Carrier Return field for the Manual Feed and Continuous Forms.
Line Feed (Automatic Feed)	LINE_FEED=
	This field is migrated for the following cases: • Case 1 　– The data is defined in the Line Feed field for the Automatic Feed. 　– Any of the data in the Line Feed Line field is not defined for the Continuous Forms and Manual Feed. • Case 2 　– The data is defined in the Line Feed field for the Automatic Feed. 　– The same data is defined in the Line Feed field for the Continuous Forms. 　– Any data is not defined in the Line Feed field for the Manual Feed. • Case 3 　– The data is defined in the Line Feed field for the Automatic Feed. 　– The same data is defined in the Line Feed field for the Manual Feed. 　– Any data is not defined in the Line Feed field for the Continuous Forms. • Case 4 　– When the data is defined in the Line Feed field for the Automatic Feed. 　– The same data is defined in the Line Feed field for the Manual Feed and Continuous Forms.

PFT Field Name	PDF Field Name
	Description
MULTIPLE COPIES	
Print without Clearing Page from	
Top Tray	None
	This field is ignored.
Bottom Tray	None
	This field is ignored.
Envelope Tray	None
	This field is ignored.
Manual Tray	None
	This field is ignored.
Clear Page Buffer	None
	This field is ignored.
Multiple Copies Variable Control	
Control Sequence	None
	This field is ignored.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
LANDSCAPE PAPER HANDLING	
Bottom Tray Feed	
Bottom Tray Feed	SET_LANDSCAPELEFT_ORIENT=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control sequence for the landscape orientation. For this, the PFT Migration Utility divides the control sequence into two parts. The control sequence for the drawer select and paper feed is ignored because this control sequence is migrated when the data for PAPER HANDLING is processed. The control sequence for landscape orientation is migrated to SET_LANDSCAPE_ORIENT=. (See "Definition of PAPER HANDLING Migration" on page 233.)
Top Tray Feed	
Top Tray Feed	SET_LANDSCAPELEFT_ORIENT=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control sequence for the landscape orientation. For this, the PFT Migration Utility divides the control sequence into two parts. The control sequence for the drawer select and paper feed is ignored because this control sequence is migrated when the data for PAPER HANDLING is processed. The control sequence for landscape orientation is migrated to SET_LANDSCAPE_ORIENT=. (See "Definition of PAPER HANDLING Migration" on page 233.)

PFT Field Name	PDF Field Name
	Description
Envelope Feed	
Envelope Feed	SET_LANDSCAPELEFT_ORIENT=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control sequence for the landscape orientation. For this, the PFT Migration Utility divides the control sequence into two parts. The control sequence for the drawer select and paper feed is ignored because this control sequence is migrated when the data for PAPER HANDLING is processed. The control sequence for landscape orientation is migrated to SET_LANDSCAPE_ORIENT=. (See "Definition of PAPER HANDLING Migration" on page 233.)
Manual Feed	
Manual Feed	SET_LANDSCAPELEFT_ORIENT=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control sequence for the landscape orientation. For this, the PFT Migration Utility divides the control sequence into two parts. The control sequence for the drawer select and paper feed is ignored because this control sequence is migrated when the data for PAPER HANDLING is processed. The control sequence for landscape orientation is migrated to SET_LANDSCAPE_ORIENT=. (See "Definition of PAPER HANDLING Migration" on page 233.)
TYPESTYLE DEFINITION	
Default Typestyle Definition	
PC Character Set	None
	This field is ignored.
Initial Control Sequence	None
	This field is ignored.
Ending Control Sequence	None
	This field is ignored.
Individual Typestyle Definition	
Typestyle number	SET_GFID_
	This number is appended as a four-digit number after the string SET_GFID_. For example, when the typestyle number **9** is defined, **0009** is appended after the string SET_GFID_ and SET_GFID_0009= is migrated. And the numbers supported by PC400 are migrated. The numbers not supported by PC400 are ignored.
PC Character Set	None
	This field is ignored.
Initial Control Sequence	SET_GFID_xxxx=
	This control sequence is appended after the string SET_GFID_xxxx=, where xxxx is the four-digit number defined in the typestyle number field.

Table 31. Migration from the Printer Function Table to the Printer Definition File (continued)

PFT Field Name	PDF Field Name
	Description
Ending Control Sequence	None
	This field is ignored.
Characters	None
	This field is ignored.
Initial Control Sequence	None
	This field is ignored.
Ending Control Sequence	None
	This field is ignored.
Symbols	None
	This field is ignored.
Initial Control Sequence	None
	This field is ignored.
Ending Control Sequence	None
	This field is ignored.
Group Typestyle Definition	
Group Identifier	None
	This field is ignored.
Group Identifier Comment	None
	This field is ignored.
Typestyle number	SET_GFID_
	This number is appended as a four-digit number after the string SET_GFID_. For example, when the typestyle numbers 1, 2, 3, and 4 are defined, **0001**, **0002**, **0003**, and **0004** are appended after the string SET_GFID_ and SET_GFID_0001=, SET_GFID_0002=, SET_GFID_0003=, and SET_GFID_0004= are migrated because the PC400 does not have the group typestyle definition. The typestyle numbers that are not supported by the PC400 are not migrated.
PC Character Set	None
	This field is ignored.
Initial Control Sequence	SET_GFID_xxxx=
	This control sequence is appended after the string SET_GFID_xxxx=, where xxxx is the four-digit number defined in the typestyle number field.
Ending Control Sequence	None
	This field is ignored.
Characters	None
	This field is ignored.
Initial Control Sequence	None
	This field is ignored.
Ending Control Sequence	None
	This field is ignored.

PFT Field Name	PDF Field Name
	Description
Symbols	None
	This field is ignored.
Initial Control Sequence	None
	This field is ignored.
Ending Control Sequence	None
	This field is ignored.
Character Set Number	
Character Set Number	None
	This field is ignored.
SLOT SELECTION	
Slot 1 Sequence	
Slot 1 Sequence	None
	This field is ignored.
Slot 2 Sequence	
Slot 2 Sequence	None
	This field is ignored.
Slot 3 Sequence	
Slot 3 Sequence	None
	This field is ignored.
Stop Sequence	
Stop Sequence	None
	This field is ignored.
USER DEFINED CONTROL	
Parameters of SET ENVELOP SIZE Command	
Control Number: 984	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
ESC Sequence of SET ENVELOP SIZE Command	
Control Number: 985	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
Parameters of SET PAGE SIZE Command	

PFT Field Name	PDF Field Name
	Description
Control Number: 986	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
ESC Sequence of SET PAGE SIZE Command	
Control Number: 987	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
Printer Data Stream	
Control Number: 988	None
	This field is ignored.
Control Sequence	SET_FONT_GLOBAL=1B 5B 49 word-value(LH) word-value(HL) word-value(HL) byte-value word-value(HL)
	When **04** is defined in this field, SET_FONT_GLOBAL=1B 5B 49 ... word-value(HL) is migrated. When the other value is defined, this field is ignored. **04** means IBM Personal Printer Data Stream Level 2 or higher. When the migration is done for PAPER HANDLING, use this information. (See "Definition of PAPER HANDLING Migration" on page 233.)
Control Sequence File Name	None
	This field is ignored.
Duplex long edge	
Control Number: 989	None
	This field is ignored.
Control Sequence	SET_DUPLEX=
	When the data is defined in the control sequence for the duplex long edge, the data is appended to the string SET_DUPLEX=.
Control Sequence File Name	None
	This field is ignored.
Duplex short edge	
Control Number: 990	None
	This field is ignored.
Control Sequence	SET_DUPLEX_TUMBLE=
	When the data is defined in the control sequence for the duplex short edge, the data is appended to the string SET_DUPLEX_TUMBLE=.

PFT Field Name	PDF Field Name
	Description
Control Sequence File Name	None
	This field is ignored.
Simplex	
Control Number: 991	None
	This field is ignored.
Control Sequence	RESET_DUPLEX=
	When the data is defined in the control sequence for the simplex, the data is appended to the string RESET_DUPLEX=.
Control Sequence File Name	None
	This field is ignored.
Jog the output tray	
Control Number: 992	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
Normal portrait orientation	
Control Number: 993	None
	This field is ignored.
Control Sequence	SET_PORTRAIT_ORIENT=
	When the data is defined in the control field for the normal portrait orientation, the data is appended to the string SET_PORTRAIT_ORIENT=.
Control Sequence File Name	None
	This field is ignored.
Landscape left	
Control Number: 994	None
	This field is ignored.
Control Sequence	SET_LANDSCAPELEFT_ORIENT=
	When the data is defined in the control field for the landscape left, the data is appended to the string SET_LANDSCAPELEFT_ORIENT=.
Control Sequence File Name	None
	This field is ignored.
Portrait upside down orientation	
Control Number: 995	None
	This field is ignored.

PFT Field Name	PDF Field Name
	Description
Control Sequence	SET_PORTRAITUPDWN_ORIENT=
	When the data is defined in the control field for the portrait upside down orientation, the data is appended to the string SET_PORTRAITUPDWN_ORIENT=.
Control Sequence File Name	None
	This field is ignored.
Landscape right	
Control Number: 996	None
	This field is ignored.
Control Sequence	SET_LANDSCAPERGHT_ORIENT=
	When the data is defined in the control field for the landscape right, the data is appended to the string SET_LANDSCAPERGHT_ORIENT=.
Control Sequence File Name	None
	This field is ignored.
COR in 10 pitch	
Control Number: 997	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
COR in 12 pitch	
Control Number: 998	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
COR in 15 pitch	
Control Number: 999	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
FUNCTION SELECTION TEST RESPONSES	
Superscript /Subscript	None
	This data is ignored.

PFT Field Name	PDF Field Name
	Description
Underline	None
	This data is ignored.
Emphasis (Bold)	None
	This data is ignored.
Form Feed	None
	This data is ignored.
Back Space	BACKSPACE=
	This field is migrated when you type YES or NO in response to the prompt during the Backspace Function Selection Test.
Mid-line pitch change	None
	This data is ignored.
Horizontal Character spacing	None
	This data is ignored.
First character position	None
	This data is ignored.
PSM	None
	This data is ignored.
Cursor Draw	None
	This data is ignored.

Note: When you migrate IBM3812.PFT and IBM3812.MNL, the following fields are added to IBM3812.PDF:
- `FORWARD_VERTICAL_STEP_FEED=1B 5B 43 03 00 E3 word-value(LH)`
- `VERTICAL_PEL=240`

Definition of PAPER HANDLING Migration
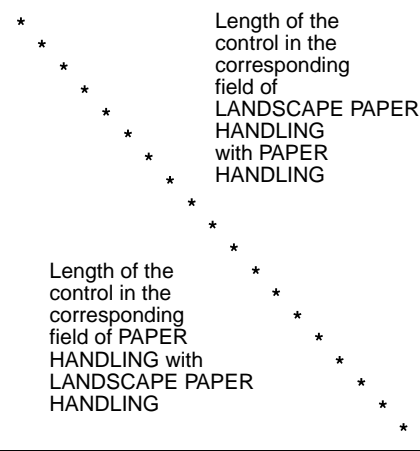
The PFT Migration Utility migrates the data for PAPER HANDLING and LANDSCAPE PAPER HANDLING as follows:

1. The PFT Migration Utility checks whether the LANDSCAPE PAPER HANDLING controls are defined.

2. If the LANDSCAPE PAPER HANDLING controls are defined, the PFT Migration Utility assumes that the PAPER HANDLING control sequences include controls to set the page orientation to portrait. Each LANDSCAPE PAPER HANDLING control sequence has the controls to set the page orientation to landscape in addition to the tray select and feed controls.

3. If the LANDSCAPE PAPER HANDLING controls are not defined, the PAPER HANDLING controls do not have the controls to set the page orientation to portrait. If a personal printer supports normal portrait, landscape left, portrait upside down, and landscape right orientation, the page orientation controls are defined in the appropriate user-defined controls.

If the LANDSCAPE PAPER HANDLING controls are not defined: When the PAPER HANDLING controls are not defined, the controls are migrated as follows:

PFT Fields			PDF Fields
Bottom	Tray	Select & Feed →	SELECT_DRAWER2=
Top	Tray	Select & Feed →	SELECT_DRAWER1=
Envelope	Tray	Select & Feed →	SELECT_ENVELOPE=
Manual		Select & Feed →	SELECT_DRAWER3=

If the LANDSCAPE PAPER HANDLING controls are defined: When the PAPER HANDLING controls are defined, these controls have the controls to set the page orientation to portrait. The LANDSCAPE PAPER HANDLING controls have the controls to set the page orientation to landscape. The PFT Migration Utility migrates the controls as follows:

Length of the control in the corresponding field of LANDSCAPE PAPER HANDLING with PAPER HANDLING / Length of the control in the corresponding field of PAPER HANDLING with LANDSCAPE PAPER HANDLING	(Length1) ==0	(Length1) > 0
(Length2) ==0	CASE 1	CASE 2
(Length2) > 0	CASE 3	Length1 != Length2 CASE 4 ——— Length1 == Length2 CASE 5

- **CASE 1**

  Since both of the fields are not defined, no data is migrated.

  Example: No data is migrated to SELECT_DRAWER2= under the following conditions. For this example, SELECT_DRAWER2= is not written in the output file.
  - No data is defined in the bottom tray select and feed for PAPER HANDLING.
  - No data is defined in the bottom tray select and feed for LANDSCAPE PAPER HANDLING.

- **CASE 2**

  Since no data is defined in the field for PAPER HANDLING, the PFT Migration Utility cannot compare the data in the corresponding field with the data for

LANDSCAPE PAPER HANDLING. The data for LANDSCAPE PAPER HANDLING is migrated to the drawer selection field of PDF regardless, including control of the landscape orientation.

Example: The control of the top tray select and feed for LANDSCAPE PAPER HANDLING is migrated to SELECT_DRAWER1= under the following conditions.
– No data is defined in the top tray select and feed for PAPER HANDLING.
– The control is defined in the top tray select and feed for LANDSCAPE PAPER HANDLING.

- **CASE 3**

  Since no data is defined in the field for LANDSCAPE PAPER HANDLING, the PFT Migration Utility cannot compare the data in the corresponding field with the data for PAPER HANDLING. The data for PAPER HANDLING is migrated to the drawer selection field of PDF regardless, including the control of the portrait orientation.

  Example: The control of the manual select and feed for PAPER HANDLING is migrated to SELECT_DRAWER3= under the following conditions.
  – The control is defined in the manual select and feed for PAPER HANDLING.
  – No data is defined in the top tray select and feed for LANDSCAPE PAPER HANDLING.

- **CASE 4**

  Since the length is different, no data is migrated.

  Example: No data is migrated to SELECT_DRAWER2= under the following conditions. For this example, SELECT_DRAWER2= is not written in the output file.
  – The data is defined in the bottom tray select and feed for PAPER HANDLING and the length is 8.
  – The data is defined in the bottom tray select and feed for LANDSCAPE PAPER HANDLING and the length is 10.

- **CASE 5**

  The PFT Migration Utility compares the data for PAPER HANDLING with the data for LANDSCAPE PAPER HANDLING as follows:

  – If a different value is found in the data, search the control backward for the escape character X'1B'.

  – If the escape character is found in the middle of the control, divide the control into two parts. The PFT Migration Utility assumes that the first part is the control for the tray select and feed, and the second part is the control for the page orientation. The PFT Migration Utility migrates the first part of the PAPER HANDLING control into the tray select and feed, the second part of the PAPER HANDLING control into the SET_PORTRAIT_ORIENT=, and the second part of the LANDSCAPE PAPER HANDLING control into SET_LANDSCAPELEFT_ORIENT=.

  – If the escape character is found at the top of the control and 03 (= HP PCL) is defined in the user-defined control 988, the PFT Migration Utility assumes that the controls are combined. For this, the control begins with the escape character and the two shared characters. For this, the PFT Migration Utility assumes that the last character of the first part is a lowercase letter and converts it to an uppercase letter to indicate that it is a terminating character.

The PFT Migration Utility divides the controls into the two parts as follows:

< Control for the PAPER HANDLING >

Migrated into SET_PORTRAIT_ORIENT=

| ESC | shared character | oo oo oo oo | XX | •• •• •• |

Different value

Converted uppercase

Migrated into the tray select and feed
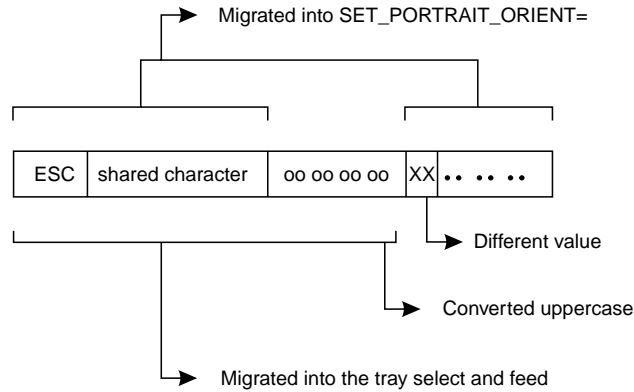
< Control for LANDSCAPE PAPER HANDLING >

Migrated into SET_LANDSCAPELEFT_ORIENT=

| ESC | shared character | oo oo oo oo | XX | :: :: :: |

Different value
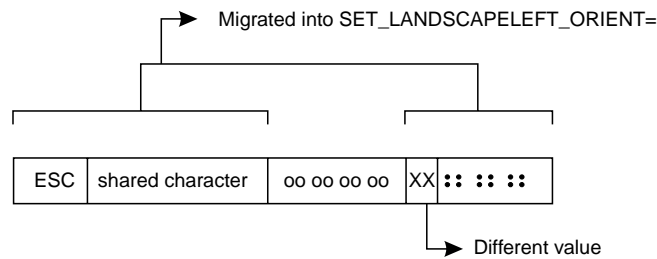
- If the escape character is found, but the data stream is not HP PCL, the PFT Migration Utility displays the error message to indicate that the PFT Migration Utility cannot migrate the data.
- If the escape character is not found, the PFT Migration Utility displays the error message to indicate that the PFT Migration Utility cannot migrate the data.
- If a different value is not found, the same control is defined for PAPER HANDLING and LANDSCAPE PAPER HANDLING.

The PFT Migration Utility migrates the data in the following order:
1. Top Tray Select and Feed
2. Bottom Tray Select and Feed
3. Manual Select and Feed
4. Envelope Tray Select and Feed

The migration stops for the page orientation, SET_PORTRAIT_ORIENT= and SET_LANDSCAPELEFT_ORIENT=, when the controls for the page orientation are found. For example, the controls for the page orientation are found when the data is migrated for the Bottom Tray Select and Feed. The PFT Migration Utility does not care about the page orientation when migrating the data Manual Select and Feed, and Envelop Tray Select and Feed.

Part 6. Appendixes

Appendix A. Keyboard Layouts

This appendix describes keyboard layouts supported by the host system. The keyboards are selected during installation or customization procedures. You can use keyboard layouts to locate character positions on the keyboard.

Different characters can appear in different key positions, depending on the country language selected. This appendix shows only U.S. keyboards. The function keys located across the top of the keyboard are not shown. Shaded areas show keys that are not available on some U.S. keyboards. Refer to your Windows documentation for more information about the country and code page options. **Ask your system administrator for information about host code pages.**

Personal Communications 5.5 includes .KMP keyboard map files for 3270 and 5250 sessions that map the standard Win32 hotkeys for Cut, Copy, and Paste to Ctrl+X, Ctrl+C and Ctrl+V, respectively.

For 5250 sessions, the default .KMP file is pcswinkb5.kmp. In this map file, the 5250 key values for the following functions have also been changed: Enter and New Line. The user can utilize the new keyboard map file, or may add these new key values to an existing map file. The remapping is given in the following table.

Table 32. New Keyboard Map Functions for a 5250 Layout

Function of Key	Key
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Enter	Enter
New Line	Right Ctrl

The PF7 and PF8 remain mapped to Roll Up and Roll Down, respectively.

For 3270 sessions, the default .KMP file is pcswinkb3.kmp. In this map file, the 3270 key values for the following functions have also been changed: Page Up, Page Down, Enter and New Line. The user may utilize the new keyboard map file, or may add these new key values to an existing map file. The remapping is given in the following table.

Table 33. New Keyboard Map Functions for a 3270 Layout

Function of Key	Key
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Page Up	PF7
Page Down	PF8
Enter	Enter
New Line	Right Ctrl

For keys with three or four characters shown, use the key combinations in Table 34 to produce the desired upper-right and lower-right characters. Lower-left characters require no additional keys. Use the shift key for upper-left characters.

Table 34. Key Combinations for Upper-Right and Lower-Right Characters

Country	Lower-Right Character Enhanced Template[1]	Upper-Right Character All Templates
Denmark	AltGr	Ctrl
Finland	AltGr	Ctrl
Norway	AltGr	Ctrl
Sweden	AltGr	Ctrl
All others	AltGr	None
Note:		
[1] Alt and AltGr keys produce the same character on the Enhanced keyboard in DOS mode.		

Local Edit Keys

Table 35 shows the keys used by local editing. These keys behave differently between the local editing mode and the interactive editing (ECHO) mode.

Table 35. Local Edit Keys

VT Key Mnemonics	Local Edit Function	Action in Local Edit Mode
VT Find	Home Cursor	Moves the cursor to the top left position on a page in memory.
VT Insert	Insert/Override	Selects whether new characters typed displace existing characters to the right, or replace existing characters.
VT Remove	Clear	Clears an unprotected field of all characters. Press in conjunction with the SHIFT key to clear all unprotected fields in the scrolling region.
VT Select	Edit	Press in conjunction with the SHIFT key to enter or exit local edit mode. The status line shows the current state.
VT Prev	PrevPage	Moves the cursor to the beginning of the previous page.
VT Next	NextPage	Moves the cursor to the beginning of the next page.

Table 35. Local Edit Keys (continued)

VT Key Mnemonics	Local Edit Function	Action in Local Edit Mode
VT PF1	Tab	Advances the cursor to the first occurrence of: • A tab stop at the beginning of an unprotected field • An unprotected field • The end of the scrolling region Pressing SHIFT with this key moves the cursor back to the first occurrence of: • The previous tab stop • The beginning of the current unprotected field • The beginning of the previous unprotected field • The beginning of the scrolling region
VT PF2	Insert Line	Adds a blank line on the screen and moves the following lines down. This key cannot be selected on a line containing a protected field.
VT PF3	DeleteLine	Deletes a line from the screen and moves the following lines up. This key cannot be selected on a line containing a protected field.
VT PF4	DeleteChar	Deletes an unprotected character at the cursor.
VT Numpad Enter Newline	Transmit	Sends a block of edited text to the host. Works like the Transmit key, if you select Line Transmit.

Keyboard Layouts

This section describes the keyboards supported by the host systems and Personal Communications. See the online helps for more information on keyboards. The function keys have the following shift statuses.

```
-Status-
BASE          BASE     : Normal shift
SHIFT         SHIFT    : Up shift by pressing Shift
CTRL          CTRL     : Control shift by pressing Ctrl
ALT           ALT      : Alternate shift by pressing Alt
ALTGR         ALTGR    : Shift by pressing Ctrl+Alt
CTRLSFT       CTRLSFT  : Shift by pressing Ctrl+Shift
```

Following are some abbreviations for the keys.
AltCur
	Alternate Cursor
AltView
	Alternate View
BackSp
	Back Space
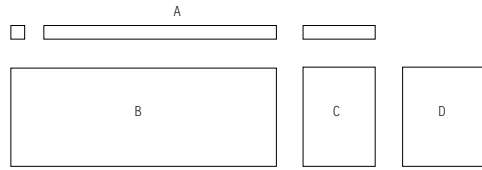
BackTb
>Backtab

BgnOLn
>Begin of Line

BotOPg
>Bottom of Page

BtbWord
>Backtab Word

CarRtn
>Carrier Return

ChgFmt
>Change Format

ChgScrn
>Change Screen

ChrAdv
>Character Advance

Ctrl   Control

CurBlink
>Cursor Blink

CurSel
>Cursor Select

DelWord
>Delete Word

DevCan
>Device Cancel

DspTxC
>Display TextCode

Dup   Duplicate

EditCop
>Edit Copy

EditPst
>Edit Paste

EditUnd
>Edit Undo

EndFld
>End of Field

EndOLn
>End of Line

ErEOF   Erase EOF

ErFld   Erase Field

ErInp   Erase Input

Fld-   Field-

Fld+   Field+

FldColor
>Field Color

FldExt   Field Exit

FldHigh
>Field Highlight

FldMark
>Field Mark

FldTrns
>Transparency Field Inherit

FastDn
>Fast Down

FastDow
>Fast Down

FastUp

>Fast Up

FieldCol

>Field Color

GrpCsr

>Graphic Cursor

HostPr

>Host Print

JmpNext

>Jump Next

JumpNxt

>Jump Next

MarkLef

>Mark Left

MkDown

>Mark Down

MkLeft

>Mark Left

MkRight

>Mark Right

MrkUp

>Mark Up

MarkDow

>Mark Down

MarkRig

>Mark Right

MoveDow

>Move Down

MoveLef

>Move Left

MoveRig

>Move Right

MvDown

>Move Down

MvLeft

>Move Left

MvRight

>Move Right

MvUp Move Up

NewLin

>New Line

ReqBSp

>Required Backspace

ReqTab

>Required Tab

RolDwn

>Roll Down

RollDow

>Roll Down

RolUp Roll Up

Rst/Ctrl

>Reset/Ctrl

RPause

>Record/Play Pause

SOSI   SOSI Display

SOSI/G
> SOSI Generate

SysAttn
> System Attention

SysReq
> System Request

TabFld
> Tab Field

TopOPg
> Top of Page

TransOp
> Transparency Opaque

TrnfldI
> Transparency Field Inherit

TrnOp Transparency Opaque

TstReq
> Test Request

Turquois
> Turquoise

UnderSc
> Underscore

UndScr
> Underscore

WdWrap
> Word Wrap

Enhanced Keyboard, Microsoft Natural Keyboard (3270 Only)

```
      ┌─┐  ┌───────────────────┐  A  ┌──────────┐
      └─┘  └───────────────────┘     └──────────┘

      ┌───────────────────────┐  ┌──────┐  ┌──────┐
      │                       │  │      │  │      │
      │           B           │  │  C   │  │  D   │
      │                       │  │      │  │      │
      └───────────────────────┘  └──────┘  └──────┘
```

Segment A assignment:

110	112	113	114	115
SysAttn	PF1	PF2	PF3	PF4
SysReq	PF13	PF14	PF15	PF16
-----	SOSI	-----	-----	-----
-----	Doc	WdWrap	CfgFmt	-----
-----	Doc	WdWrap	CfgFmt	-----
-----	Red	Pink	Green	Yellow

116	117	118	119
PF5	PF6	PF7	PF8
PF17	PF18	PF19	PF20
Record	Play	RPause	-----
-----	-----	-----	APL
-----	-----	-----	APL
Blue	Turq	White	FldColor

120	121	122	123
PF9	PF10	PF11	PF12
PF21	PF22	PF23	PF24
-----	-----	RTM	-----
CurSel	CurBlink	AltCur	+Cr
CurSel	CurBlink	AltCur	+Cr
-----	-----	-----	-----

124	125	126
-----	-----	Clear
-----	-----	-----
-----	-----	Break
-----	-----	-----
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	NUL	-----	-----	-----	RS	-----	-----	-----	-----	US	RS	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	EditUnd
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

16	17	18	19	20	21	22	23	24	25	26	27	28	29
TabFld	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	DC1	ETB	ENQ	DC2	DC4	EM	NAK	HT	SI	DLE	NUL	ESC	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

30	31	32	33	34	35	36	37	38	39	40	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine
-----	SOH	DC3	EOT	ACK	BEL	BS	LF	VT	FF	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

44	46	47	48	49	50	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	SUB	CAN	ETX	SYN	STX	SO	CR	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

58	60	61	62	64
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
-----	-----	-----	-----	-----
Quit	-----	-----	-----	-----
Quit	-----	-----	-----	-----
-----	-----	-----	-----	-----

```
Segment C assignment:          Segment D assignment:

┌────────┬────────┬────────┐   ┌───────┬────────┬────────┬───────┐
│   75   │   80   │   85   │   │  90   │  95    │  100   │  105  │
│ Insert │ Home   │ -----  │   │ ----- │ -----  │ -----  │ ----- │
│ Dup    │ FM     │ PA3    │   │ ----- │ -----  │ -----  │ ----- │
│ EditCop│ Rule   │ ChgScrn│   │ ----- │ -----  │ -----  │ ----- │
│ PA1    │ PA2    │ JmpNext│   │ ----- │ -----  │ Reverse│ ----- │
│ PA1    │ PA2    │ JmpNext│   │ ----- │ -----  │ Reverse│ ----- │
│ EditPst│ -----  │ -----  │   │ ----- │ TrnOp  │ -----  │ ----- │
├────────┼────────┼────────┤   ├───────┼────────┼────────┼───────┤
│   76   │   81   │   86   │   │  91   │  96    │  101   │  106  │
│ Delete │ ErEOF  │ -----  │   │ Home  │ Up     │ -----  │ ----- │
│ EditCut│ ErFld  │ EditPst│   │ ----- │ -----  │ -----  │ TabFld│
│ DelWord│ -----  │ Test   │   │ ----- │ MvUp   │ -----  │ ----- │
│ DelWord│ ErInp  │ -----  │   │ ----- │ FastUp │ -----  │ ----- │
│ DelWord│ ErInp  │ -----  │   │ ----- │ FastUp │ -----  │ ----- │
│ -----  │ -----  │ -----  │   │ ----- │ TrnFldI│ FldTrns│ ----- │
└────────┴────────┴────────┘   ├───────┼────────┼────────┼───────┤
                               │  92   │  97    │  102   │
                               │ Left  │ -----  │ Right  │
                               │ ----- │ -----  │ -----  │
                               │ MyLeft│ -----  │ MyRight│
                               │ ----- │ -----  │ UndScr │
              ┌────────┐       │ ----- │ -----  │ UndScr │
              │   83   │       │ ----- │ -----  │ -----  │
              │ Up     │       ├───────┼────────┼────────┼───────┤
              │ Mkup   │       │  93   │  98    │  103   │  108  │
              │ Mvup   │       │ EndFld│ Down   │ Esc J  │ Enter │
              │ FastUp │       │ ----- │ -----  │ -----  │ Enter │
              │ FastUp │       │ ----- │ MvDown │ -----  │ ----- │
              │ -----  │       │ ----- │ FastDn │ FldHigh│ ----- │
┌────────┬────┴────┬───┴────┐  │ ----- │ FastDn │ FldHigh│ ----- │
│   79   │   84    │   89   │  │ ----- │ -----  │ -----  │ ----- │
│ Left   │ Down    │ Right  │  ├───────┴────────┼────────┤
│ MkLeft │ MkDown  │ MkRight│  │      99        │  104   │
│ MvLeft │ MvDown  │ MvRight│  │   Insert       │ Delete │
│ BtbWord│ FastDn  │ TabWord│  │   -----        │ -----  │
│ BtbWord│ FastDn  │ TabWord│  │   -----        │ DelWord│
│ -----  │ -----   │ -----  │  │   -----        │ DelWord│
└────────┴─────────┴────────┘  │   -----        │ DelWord│
                               │   -----        │ -----  │
                               └────────────────┴────────┘
```

Enhanced Keyboard, Microsoft Natural Keyboard (5250 Only)

```
        ┌─┐  ┌──────────── A ─────────────┐  ┌──────────┐
        └─┘  └─────────────────────────────┘  └──────────┘

        ┌─────────────────────────┐  ┌──────┐  ┌──────┐
        │                         │  │      │  │      │
        │           B             │  │  C   │  │  D   │
        │                         │  │      │  │      │
        └─────────────────────────┘  └──────┘  └──────┘
```

Segment A assignment:

110		112	113	114	115		116	117	118	119		120	121	122	123
SysAttn		PF1	PF2	PF3	PF4		PF5	PF6	PF7	PF8		PF9	PF10	PF11	PF12
SysReq		PF13	PF14	PF15	PF16		PF17	PF18	PF19	PF20		PF21	PF22	PF23	PF24
-----		SOSI	-----	-----	-----		Record	Play	RPause	SOSI/G		-----	-----	-----	-----
-----		Help	-----	-----	-----		-----	-----	-----	-----		-----	CurBlink	AltCur	TestReq
-----		-----	-----	-----	-----		-----	-----	-----	SOSI/G		-----	CurBlink	AltCur	TestReq
-----		-----	-----	-----	-----		-----	-----	-----	FieldCol		-----	-----	-----	-----

124	125	126
-----	-----	Clear
-----	-----	-----
-----	-----	HostPr
-----	-----	TstReq
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	ReqBSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

16	17	18	19	20	21	22	23	24	25	26	27	28	29
TabFld	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BackTb	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ReqTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

30	31	32	33	34	35	36	37	38	39	40	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	FldExt
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLin
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	CarRtn
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

44	46	47	48	49	50	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

58	60	61	62	64
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
-----	-----	-----	-----	-----
Quit	-----	-----	-----	-----
Quit	-----	-----	-----	-----
-----	-----	-----	-----	-----

Segment C assignment:

```
 75        80        85
Insert    Home      RolDwn
Dup       FM        RolDwn
EditCop   Rule      -----
-----     -----     JmpNxt
-----     -----     JmpNxt
EditPst   -----     -----

 76        81        86
Delete    ErEOF     RolUp
EditCut   -----     EditPst
DelWord   -----     -----
DelWord   ErInp     -----
DelWord   ErInp     -----
-----     -----     -----

           83
           Up
           Mkup
           Mvup
           FastUp
           FastUp
           -----

 79        84        89
Left      Down      Right
MkLeft    MkDown    MkRight
MvLeft    MvDown    MvRight
BtbWord   FastDn    TabWord
BtbWord   FastDn    TabWord
-----     -----     -----
```

Segment D assignment:

```
 90      95      100     105
-----   -----   -----   Fld-
-----   -----   -----   Fld-
-----   -----   -----   CarRtn
-----   -----   -----   Fld-
-----   -----   -----   Fld-
-----   -----   -----   -----

 91      96      101     106
Home    Up      RolDwn  Fld+
-----   -----   -----   Fld+
-----   TopOPg  -----   CarRtn
-----   FastUp  -----   Fld+
-----   FastUp  -----   Fld+
-----   -----   -----   -----

 92      97      102
Left    -----   Right
-----   -----   -----
BgnOLn  -----   EndOLn
-----   -----   UndScr
-----   -----   UndScr
-----   -----   -----

 93      98      103     108
ErEOF   Down    RolUp   FldExt
-----   -----   -----   FldExt
-----   BotOPg  -----   -----
-----   FastDn  -----   -----
-----   FastDn  -----   -----
-----   -----   -----   -----

    99          104
   Ins         Delete
   -----       -----
   -----       DelWord
   -----       DelWord
   -----       DelWord
   -----       -----
```

Enhanced Keyboard, Microsoft Natural Keyboard (Combined 3270 and 5250)

```
                            A
  ┌─┐  ┌────────────────────────┐   ┌──────┐
  └─┘  └────────────────────────┘   └──────┘

  ┌────────────────────┐  ┌──────┐  ┌──────┐
  │                    │  │      │  │      │
  │          B         │  │  C   │  │  D   │
  │                    │  │      │  │      │
  └────────────────────┘  └──────┘  └──────┘
```

Segment A assignment:

110		112	113	114	115		116	117	118	119		120	121	122	123
SysAttn		PF1	PF2	PF3	PF4		PF5	PF6	PF7	PF8		PF9	PF10	PF11	PF12
SysReq		PF13	PF14	PF15	PF16		PF17	PF18	PF19	PF20		PF21	PF22	PF23	PF24
-----		SOSI	-----	-----	-----		Record	Play	RPause	-----		-----	-----	RTM	-----
-----		Doc	WdWrap	CfgFmt	-----		-----	-----	-----	APL		CurSel	CurBlink	AltCur	+Cr
-----		Doc	WdWrap	CfgFmt	-----		-----	-----	-----	APL		CurSel	CurBlink	AltCur	+Cr
-----		Red	Pink	Green	Yellow		Blue	Turq	White	FldColor		-----	-----	-----	-----

124	125	126
-----	-----	Clear
-----	-----	-----
-----	-----	Break
-----	-----	-----
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	ChrAdv
-----	-----	NUL	-----	-----	-----	-----	-----	-----	-----	-----	US	RS	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

16	17	18	19	20	21	22	23	24	25	26	27	28	29
TabFld	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	DC1	ETB	ENQ	DC2	DC4	EM	NAK	HT	SI	DLE	NUL	ESC	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

30	31	32	33	34	35	36	37	38	39	40	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine
-----	SOH	DC3	EOT	ACK	BEL	BS	LF	VT	FF	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

44	46	47	48	49	50	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	SUB	CAN	ETX	SYN	STX	SO	CR	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

58	60	61	62	64
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
-----	-----	-----	-----	-----
Quit	-----	-----	-----	-----
Quit	-----	-----	-----	-----
-----	-----	-----	-----	-----

```
Segment C assignment:

+--------+--------+--------+
|   75   |   80   |   85   |
| Insert | Home   | RolDwn |
| Dup    | FM     | PA3    |
| EditCop| Rule   | ChgScr |
| PA1    | PA2    | JmpNxt |
| PA1    | PA2    | JmpNxt |
| EditPst| -----  | -----  |
+--------+--------+--------+
|   76   |   81   |   86   |
| Delete | ErEOF  | RolUp  |
| EditCut| ErFld  | EditPst|
| DelWord| -----  | Test   |
| DelWord| ErInp  | -----  |
| DelWord| ErInp  | -----  |
| -----  | -----  | -----  |
+--------+--------+--------+

         +--------+
         |   83   |
         | Up     |
         | Mkup   |
         | Mvup   |
         | FastUp |
         | FastUp |
         | -----  |
+--------+--------+--------+
|   79   |   84   |   89   |
| Left   | Down   | Right  |
| MkLeft | MkDown | MkRight|
| MvLeft | MvDown | MvRight|
| BtbWord| FastDn | TabWord|
| BtbWord| FastDn | TabWord|
| -----  | -----  | -----  |
+--------+--------+--------+
```

```
Segment D assignment:

+--------+--------+--------+--------+
|   90   |   95   |  100   |  105   |
| -----  | -----  | -----  | -----  |
| -----  | -----  | -----  | -----  |
| -----  | -----  | -----  | -----  |
| -----  | -----  | Reverse| -----  |
| -----  | -----  | Reverse| -----  |
| -----  | TrnOp  | -----  | -----  |
+--------+--------+--------+--------+
|   91   |   96   |  101   |  106   |
| Home   | Up     | -----  | Field+ |
| -----  | -----  | -----  | TabFld |
| -----  | MvUp   | -----  | -----  |
| -----  | FastUp | -----  | -----  |
| -----  | FastUp | -----  | -----  |
| -----  |TrnFldI | Fldtrns| -----  |
+--------+--------+--------+--------+
|   92   |   97   |  102   |
| Left   | -----  | Right  |
| -----  | -----  | -----  |
| MvLeft | -----  | MvRight|
| -----  | -----  | UndScr |
| -----  | -----  | UndScr |
| -----  | -----  | -----  |
+--------+--------+--------+--------+
|   93   |   98   |  103   |  108   |
| EndFld | Down   | ESC J  | Enter  |
| -----  | -----  | -----  | Enter  |
| -----  | MvDown | -----  | -----  |
| -----  | FastDn | FldHigh| -----  |
| -----  | FastDn | FldHigh| -----  |
| -----  | -----  | -----  | -----  |
+--------+--------+--------+
|   99   |  104   |
| Insert | Delete |
| -----  | -----  |
| -----  | DelWord|
| -----  | DelWord|
| -----  | DelWord|
| -----  | -----  |
+--------+--------+
```

Enhanced Keyboard, Microsoft Natural Keyboard (VT Keyboard Layout)

Note: This keyboard layout does not include Personal Communications local function (for example, edit copy, edit paste, etc.).

Segment A assignment:

```
 110      112      113      114      115        116      117      118      119        120      121      122      123
 ESC      HldScrn  Compose  Help     Do         Break    F6       F7       F8         F9       F10      F11      F12
 ESC      F13      F14      F15      F16        F17      F18      F19      F20        -----    -----    -----    -----
 -----    -----    -----    -----    -----      -----    UsrF6    UsrF7    UsrF8      UsrF9    UsrF10   UsrF11   UsrF12
 -----    -----    -----    -----    -----      -----    -----    -----    -----      -----    -----    -----    -----
 -----    UsrF13   UsrF14   UsrF15   UsrF16     UsrF17   UsrF18   UsrF19   UsrF20     -----    -----    -----    -----

          124      125      126
          -----    -----    -----
          -----    -----    -----
          -----    -----    -----
          -----    -----    -----
          -----    -----    -----
```

Segment B assignment:

```
  1        2        3        4        5        6        7        8        9        10       11       12       13              15
  `        1        2        3        4        5        6        7        8        9        0        -        =        Backspace
  ansi7e   !        @        #        $        %        ^        &        *        (        )        _        +        Backspace
  -----    -----    NULL     -----    -----    -----    RS       -----    -----    -----    -----    US       -----    -----
  -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----
  -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----

  16          17       18       19       20       21       22       23       24       25       26       27       28        29
  Tab Field   q        w        e        r        t        y        u        i        o        p        [        ]         ansi 5c
  Backtab     Q        W        E        R        T        Y        U        I        O        P        {        }         |
  -----       DC1      ETB      ENQ      DC2      DC4      EM       NAK      HT       SI       DLE      ESC      GS        FS
  -----       -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----     -----
  -----       -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----     -----

   30         31       32       33       34       35       36       37       38       39       40       41              43
  -----       a        s        d        f        g        h        j        k        l        ;        '         Newline
  -----       A        S        D        F        G        H        J        K        L        :        "         Newline
  -----       SOH      DC3      EOT      ACK      BEL      BS       LF       VT       FF       -----    -----     -----
  -----       -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----     -----
  -----       -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----     -----

       44        46       47       48       49       50       51       52       53       54       55            57
  -----         z        x        c        v        b        n        m        ,        .        /            -----
  -----         Z        X        C        V        B        N        M        <        >        ?            -----
  -----         SUB      CAN      ETX      SYN      STX      SO       CR       -----    -----    -----        -----
  -----         -----    -----    -----    -----    -----    -----    -----    -----    -----    -----        -----
  -----         -----    -----    -----    -----    -----    -----    -----    -----    -----    -----        -----

   58          60                           61                              62                  64
  -----       -----                        Space                           -----               -----
  -----       -----                        Space                           -----               -----
  -----       -----                        -----                           -----               -----
  -----       -----                        -----                           -----               -----
  -----       -----                        -----                           -----               -----
```

Segment C assignment:

75 InsertHere	80 Select	85 PrevScn
-----	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----
76 Remove	81 Find	86 NextScn
-----	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----

	83 Up	

	-----	
79 Left	84 Down	89 Right
-----	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----

Segment D assignment:

90 PF1	95 PF2	100 PF3	105 PF4
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----
91 Select numpd 7	96 Up numpd 8	101 PrvScn numpd 9	106 numpd — numpd ,
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----
92 Left numpd 4	97 numpd 5	102 Right numpd 6	
-----	-----	-----	
-----	-----	-----	
-----	-----	-----	
-----	-----	-----	
93 Find numpd 1	98 Down numpd 2	103 NxPg numpd 3	108 numpd NewIn
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----
99 InsertHere numpd 0	104 Remove numpd .		
-----	-----		
-----	-----		
-----	-----		
-----	-----		

Enhanced Keyboard, Microsoft Natural Keyboard (VT Local Edit Mode Only)

Note: This keyboard layout does not include Personal Communications local function (for example, edit copy, edit paste, etc.).

```
        ┌──┐   ┌──────────────────────────────┐  ┌────────┐
        └──┘   │              A               │  └────────┘
        ┌──────┴──────────────────────────────┴─┐ ┌─────┐ ┌─────┐
        │                                        │ │     │ │     │
        │                 B                      │ │  C  │ │  D  │
        │                                        │ │     │ │     │
        └────────────────────────────────────────┘ └─────┘ └─────┘
```

Segment A assignment:

110		112	113	114	115		116	117	118	119		120	121	122	123
ESC		HldScrn	Compose	Help	Do		Break	F6	F7	F8		F9	F10	F11	F12
ESC		F13	F14	F15	F16		F17	F18	F19	F20		-----	-----	-----	-----
-----		-----	-----	-----	-----		-----	UsrF6	UsrF7	UsrF8		UsrF9	UsrF10	UsrF11	UsrF12
-----		-----	-----	-----	-----		-----	-----	-----	-----		-----	-----	-----	-----
-----		UsrF13	UsrF14	UsrF15	UsrF16		UsrF17	UsrF18	UsrF19	UsrF20		-----	-----	-----	-----

124	125	126
-----	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11	12	13	15
`	1	2	3	4	5	6	7	8	9	0	-	=	Backspace
ansi7e	!	@	#	$	%	^	&	*	(	)	_	+	Backspace
-----	-----	NULL	-----	-----	-----	RS	-----	-----	-----	-----	US	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		-----	-----

16	17	18	19	20	21	22	23	24	25	26	27	28	29
Tab Field	q	w	e	r	t	y	u	i	o	p	[	]	ansi 5c
Backtab	Q	W	E	R	T	Y	U	I	O	P	{	}	|
-----	DC1	ETB	ENQ	DC2	DC4	EM	NAK	HT	SI	DLE	ESC	GS	FS
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

30	31	32	33	34	35	36	37	38	39	40	41	43
-----	a	s	d	f	g	h	j	k	l	;	'	Newline/Transmit
-----	A	S	D	F	G	H	J	K	L	:	"	Newline/Transmit
-----	SOH	DC3	EOT	ACK	BEL	BS	LF	VT	FF	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

44	46	47	48	49	50	51	52	53	54	55	57
-----	z	x	c	v	b	n	m	,	.	/	-----
-----	Z	X	C	V	B	N	M	<	>	?	-----
-----	SUB	CAN	ETX	SYN	STX	SO	CR	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

58	60	61	62	64
-----	-----	Space	-----	-----
-----	-----	Space	-----	-----
-----	-----	-----	-----	-----
-----	-----	-----	-----	-----
-----	-----	-----	-----	-----
-----	-----	-----	-----	-----

Segment C assignment:

75 Insrt/Ovstrk ----- ----- ----- ----- -----	80 Select EDIT ----- ----- ----- -----	85 PrevPg ----- ----- ----- -----
76 ClrFld ClrPg ----- ----- ----- -----	81 HomeCur ----- ----- ----- -----	86 NextPg ----- ----- ----- -----

	83 Up ----- ----- ----- -----	
79 Left ----- ----- ----- -----	84 Down ----- ----- ----- -----	89 Right ----- ----- ----- -----

Segment D assignment:

90 BkTab TabFld ----- ----- -----	95 ----- InsrtLn ----- ----- -----	100 ----- DelLn ----- ----- -----	105 ----- DelChar ----- ----- -----
91 Select numpd 7 ----- ----- -----	96 Up numpd 8 ----- ----- -----	101 PrvPg numpd 9 ----- ----- -----	106 numpd − numpd , ----- ----- -----
92 Left numpd 4 ----- ----- -----	97 ----- numpd 5 ----- ----- -----	102 Right numpd 6 ----- ----- -----	
93 HmeCur numpd 1 ----- ----- -----	98 Down numpd 2 ----- ----- -----	103 NxPg numpd 3 ----- ----- -----	108 ----- Transmit ----- ----- -----
99 Insert/Overstrike numpd 0 ----- ----- -----		104 ClrFld numpd . ----- ----- -----	

Space-Saving Keyboard (3270 Only)

```
         ┌─┐  ┌─────────────A─────────────┐  ┌────────┐
         └─┘  └───────────────────────────┘  └────────┘

         ┌───────────────────────────┐  ┌────────┐
         │                           │  │        │
         │             B             │  │   C    │
         │                           │  │        │
         └───────────────────────────┘  └────────┘
```

Segment A assignment:

110		112	113	114	115		116	117	118	119		120	121	122	123
SysAttn		PF1	PF2	PF3	PF4		PF5	PF6	PF7	PF8		PF9	PF10	PF11	PF12
SysReq		PF13	PF14	PF15	PF16		PF17	PF18	PF19	PF20		PF21	PF22	PF23	PF24
-----		-----	-----	-----	-----		Record	Play	RPause	-----		-----	-----	RTM	-----
-----		Doc	WdWrap	CfgFmt	-----		-----	-----	-----	APL		CurSel	CurBlink	AltCur	+Cr
-----		Doc	WdWrap	CfgFmt	-----		-----	-----	-----	APL		CurSel	CurBlink	AltCur	+Cr
-----		Red	Pink	Green	Yellow		Blue	Turq	White	FldColor		-----	-----	-----	-----

124	125	126
-----	-----	Clear
-----	-----	-----
-----	-----	Break
-----	-----	-----
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

16	17	18	19	20	21	22	23	24	25	26	27	28	29
TabFld	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

30	31	32	33	34	35	36	37	38	39	40	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

44	46	47	48	49	50	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

58	60	61	62	64
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
-----	-----	-----	-----	-----
Quit	-----	-----	-----	-----
Quit	-----	-----	-----	-----
-----	-----	-----	-----	-----

```
Segment C assignment:
```

75	80	85
Insert	Home	-----
Dup	FM	PA3
-----	Rule	ChgScrn
PA1	PA2	JmpNext
PA1	PA2	JmpNext
-----	-----	-----
76	81	86
Delete	ErEOF	-----
Delete	ErFld	-----
DelWord	-----	Test
DelWord	ErInp	-----
DelWord	ErInp	-----
-----	-----	-----

	83	
	Up	
	Mkup	
	Mvup	
	FastUp	
	FastUp	

79	84	89
Left	Down	Right
MkLeft	MkDown	MkRight
MvLeft	MvDown	MvRight
BtbWord	FastDn	TabWord
BtbWord	FastDn	TabWord
-----	-----	-----

Space-Saving Keyboard (5250 Only)

```
            A
┌─┐ ┌──────────────────────┐  ┌────────┐
└─┘ └──────────────────────┘  └────────┘

    ┌──────────────────────┐  ┌────────┐
    │                      │  │        │
    │          B           │  │   C    │
    │                      │  │        │
    └──────────────────────┘  └────────┘
```

Segment A assignment:

110		112	113	114	115		116	117	118	119		120	121	122	123
SysAttn		PF1	PF2	PF3	PF4		PF5	PF6	PF7	PF8		PF9	PF10	PF11	PF12
SysReq		PF13	PF14	PF15	PF16		PF17	PF18	PF19	PF20		PF21	PF22	PF23	PF24
-----		-----	-----	-----	-----		Record	Play	RPause	-----		-----	-----	-----	-----
-----		Help	-----	-----	-----		-----	-----	-----	-----		-----	CurBlink	AltCur	-----
-----		-----	-----	-----	-----		-----	-----	-----	-----		-----	CurBlink	AltCur	-----
-----		-----	-----	-----	-----		-----	-----	-----	-----		-----	-----	-----	-----

124	125	126
-----	-----	Clear
-----	-----	-----
-----	-----	HostPr
-----	-----	TstReq
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	ReqBSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

16	17	18	19	20	21	22	23	24	25	26	27	28	29
TabFld	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BackTb	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ReqTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

30	31	32	33	34	35	36	37	38	39	40	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	FldExt
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLin
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	CarRtn
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

44	46	47	48	49	50	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

58	60	61	62	64
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
-----	-----	-----	-----	-----
Quit	-----	-----	-----	-----
Quit	-----	-----	-----	-----
-----	-----	-----	-----	-----

```
Segment C assignment:

┌────────┬────────┬────────┐
│   75   │   80   │   85   │
│ Insert │ Home   │ RolDwn │
│ Dup    │ FM     │ RolDwn │
│ DspTxC │ Rule   │ -----  │
│ -----  │ -----  │ JmpNxt │
│ -----  │ -----  │ JmpNxt │
│ -----  │ -----  │ -----  │
├────────┼────────┼────────┤
│   76   │   81   │   86   │
│ Delete │ ErEOF  │ RolUp  │
│ Delete │ -----  │ RolUp  │
│ DelWord│ -----  │ -----  │
│ DelWord│ ErInp  │ -----  │
│ DelWord│ ErInp  │ -----  │
│ -----  │ -----  │ -----  │
└────────┴────────┴────────┘


         ┌────────┐
         │   83   │
         │ Up     │
         │ Mkup   │
         │ Mvup   │
         │ FastUp │
         │ FastUp │
         │ -----  │
┌────────┼────────┼────────┐
│   79   │   84   │   89   │
│ Left   │ Down   │ Right  │
│ MkLeft │ MkDown │ MkRight│
│ MvLeft │ MvDown │ MvRight│
│ BtbWord│ FastDn │ TabWord│
│ BtbWord│ FastDn │ TabWord│
│ -----  │ -----  │ -----  │
└────────┴────────┴────────┘
```

Space-Saving Keyboard (Combined 3270 and 5250)

```
      ┌─┐  ┌────────────────────┐   ┌──────┐
      └─┘  └────────────────────┘   └──────┘
                      A
      ┌────────────────────────┐   ┌──────┐
      │                        │   │      │
      │            B           │   │  C   │
      │                        │   │      │
      └────────────────────────┘   └──────┘
```

Segment A assignment:

110 SysAttn SysReq ----- ----- ----- -----		112 PF1 PF13 ----- Doc Doc Red	113 PF2 PF14 ----- WdWrap WdWrap Pink	114 PF3 PF15 ----- CfgFmt CfgFmt Green	115 PF4 PF16 ----- ----- ----- Yellow		116 PF5 PF17 Record ----- ----- Blue	117 PF6 PF18 Play ----- ----- Turq	118 PF7 PF19 RPause ----- ----- White	119 PF8 PF20 ----- APL APL FldColor		120 PF9 PF21 ----- CurSel CurSel -----	121 PF10 PF22 ----- CurBlink CurBlink -----	122 PF11 PF23 RTM AltCur AltCur -----	123 PF12 PF24 ----- +Cr +Cr -----

124 ----- ----- ----- ----- ----- -----	125 ----- ----- ----- ----- ----- -----	126 Clear ----- Break ----- ----- -----

Segment B assignment:

1 ----- ----- ----- ----- -----	2 ----- ----- ----- ----- -----	3 ----- ----- ----- ----- -----	4 ----- ----- ----- ----- -----	5 ----- ----- ----- ----- -----	6 ----- ----- ----- ----- -----	7 ----- ----- ----- ----- -----	8 ----- ----- ----- ----- -----	9 ----- ----- ----- ----- -----	10 ----- ----- ----- ----- -----	11 ----- ----- ----- ----- -----	12 ----- ----- ----- ----- -----	13 ----- ----- ----- ----- -----	14 ----- ----- ----- ----- -----	15 BackSp ChrAdv ----- ----- -----

16 TabFld BackTab ----- ----- ----- -----	17 ----- ----- ----- ----- ----- -----	18 ----- ----- ----- ----- ----- -----	19 ----- ----- ----- ----- ----- -----	20 ----- ----- ----- ----- ----- -----	21 ----- ----- ----- ----- ----- -----	22 ----- ----- ----- ----- ----- -----	23 ----- ----- ----- ----- ----- -----	24 ----- ----- ----- ----- ----- -----	25 ----- ----- ----- ----- ----- -----	26 ----- ----- ----- ----- ----- -----	27 ----- ----- ----- ----- ----- -----	28 ----- ----- ----- ----- ----- -----	29 ----- ----- ----- ----- ----- -----

30 ----- ----- ----- ----- -----	31 ----- ----- ----- ----- -----	32 ----- ----- ----- ----- -----	33 ----- ----- ----- ----- -----	34 ----- ----- ----- ----- -----	35 ----- ----- ----- ----- -----	36 ----- ----- ----- ----- -----	37 ----- ----- ----- ----- -----	38 ----- ----- ----- ----- -----	39 ----- ----- ----- ----- -----	40 ----- ----- ----- ----- -----	41 ----- ----- ----- ----- -----	43 NewLine NewLine ----- ----- -----

44 ----- ----- ----- ----- -----	46 ----- ----- ----- ----- -----	47 ----- ----- ----- ----- -----	48 ----- ----- ----- ----- -----	49 ----- ----- ----- ----- -----	50 ----- ----- ----- ----- -----	51 ----- ----- ----- ----- -----	52 ----- ----- ----- ----- -----	53 ----- ----- ----- ----- -----	54 ----- ----- ----- ----- -----	55 ----- ----- ----- ----- -----	57 ----- ----- ----- ----- -----

58 Reset/Ctrl Reset/Ctrl ----- Quit Quit -----	60 ----- ----- ----- ----- ----- -----	61 ----- ----- ----- ----- -----	62 ----- ----- ----- ----- ----- -----	64 Enter/Ctrl Enter/Ctrl ----- ----- ----- -----

Segment C assignment:

```
+--------+--------+--------+
|   75   |   80   |   85   |
| Insert | Home   | RolDwn |
| Dup    | FM     | PA3    |
| -----  | Rule   | ChgScrn|
| PA1    | PA2    | JmpNxt |
| PA1    | PA2    | JmpNxt |
| -----  | -----  | -----  |
+--------+--------+--------+
|   76   |   81   |   86   |
| Delete | ErEOF  | RolUp  |
| Delete | ErFld  | -----  |
| DelWord| -----  | Test   |
| DelWord| ErInp  | -----  |
| DelWord| ErInp  | -----  |
| -----  | -----  | -----  |
+--------+--------+--------+
```

```
                  +--------+
                  |   83   |
                  | Up     |
                  | Mkup   |
                  | Mvup   |
                  | FastUp |
                  | FastUp |
                  | -----  |
         +--------+--------+--------+
         |   79   |   84   |   89   |
         | Left   | Down   | Right  |
         | MkLeft | MkDown | MkRight|
         | MvLeft | MvDown | MvRight|
         | BtbWord| FastDn | TabWord|
         | BtbWord| FastDn | TabWord|
         | -----  | -----  | -----  |
         +--------+--------+--------+
```

260 Personal Communications Administrator's Guide and Reference

5576-001 (3270 Only)

A

B   B   C   D

Segment A assignment:

-----	-----	CrBrk ----- ----- AltCr ----- -----	-----		-----	-----	-----	-----		ErEOF ----- ----- ErInp ----- -----	SysAttn ----- ----- CrSel ----- -----	PA1 ----- ----- DevCom ----- -----	PA2 ----- ----- PA3 ----- -----

112 PF1 PF13 SOSI Doc ----- -----	113 PF2 PF14 ----- WordWrap ----- -----	114 PF3 PF15 AltView CfgFmt ----- -----	115 PF4 PF16 ----- ----- ----- -----	116 PF5 PF17 ----- ----- ----- -----	117 PF6 PF18 ----- ----- ----- -----	118 PF7 PF19 ----- ----- ----- -----	119 PF8 PF20 APL ----- APL -----	120 PF9 PF21 ----- ----- ----- -----	121 PF10 PF22 ----- ----- ----- -----	122 PF11 PF23 ----- ----- ----- -----	123 PF12 PF24 ----- GrpCsr ----- -----

Segment B assignment:

Clear Clear SysReq ----- ----- -----	----- ----- ----- ----- ----- -----	1 SysAttn SysReq ----- ----- ----- -----	2 ----- ----- ----- ----- ----- -----	3 ----- ----- ----- ----- ----- -----	4 ----- ----- ----- ----- ----- -----	5 ----- ----- ----- ----- ----- -----	6 ----- ----- ----- ----- ----- -----	7 ----- ----- ----- ----- ----- -----	8 ----- ----- ----- ----- ----- -----	9 ----- ----- ----- ----- ----- -----	10 ----- ----- ----- ----- ----- -----	11 ----- ----- ----- ----- ----- -----	12 ----- ----- US ----- ----- -----	13 ----- ----- RS ----- ----- -----	14 ----- ----- ----- ----- ----- -----	15 BackSp BackSp ----- EditUnd -----

Play ----- ----- RPause ----- -----	----- ----- ----- ----- ----- -----	16 Tab BackTab ----- ----- -----	17 DCI	18 ETB	19 ENQ	20 DC2	21 DC4	22 EM	23 NAK	24 HT	25 SI	26 DLE	27 NUL	28 ESC	29 -----

----- ----- ----- ----- ----- -----	----- ----- ----- ----- ----- -----	30	31 SOH	32 DC3	33 EOT	34 ACK	35 BEL	36 BS	37 LF	38 VT	39 FF	40 -----	41 -----	----- GS	43 NewLine NewLine ----- NewLine -----

----- ----- ----- ----- ----- -----	----- ----- ----- ----- ----- -----	44 -----	46 SUB	47 CAN	48 ETX	49 SYN	50 STX	51 SO	52 CR	53 -----	54 -----	55 FS		57 -----

Reset Reset ----- Record ----- -----	----- ----- ----- ----- ----- -----	58 -----	60 -----	61 -----		62 -----	64 Entr/Ctl Entr/Ctl ----- -----

```
Segment C assignment:          Segment D assignment:

+-----+-----+-----+            +-----+-----+-----+-----+
| 75  | 80  | 85  |            | 90  | 95  | 100 | 105 |
|-----|-----|JmpNext|          | Dup |FldMark|-----|-----|
|-----|-----|JmpNext|          | Dup |FldMark|-----|-----|
|-----|-----|-----|            |-----|-----|-----|Break|
|-----|C1ngScr|-----|          |Reverse|Red |Pink |-----|
|-----|C1ngScr|-----|          |-----|-----|Reverse|-----|
|-----|-----|-----|            |-----|Trn0p|-----|-----|
+-----+-----+-----+            +-----+-----+-----+-----+
| 76  | 81  | 86  |            | 91  | 96  | 101 | 106 |
|Insert|DelChar|-----|         |-----|-----|-----|-----|
|EditPaste|EditCut|-----|      |-----|-----|-----|-----|
|EditCopy|-----|-----|         |-----|-----|-----|-----|
|-----|-----|-----|            |-----|Green|Yellow|-----|
|-----|-----|-----|            |-----|TrnFldI|-----|-----|
+-----+-----+-----+            +-----+-----+-----+-----+
                               | 92  | 97  | 102 |
                               |-----|-----|-----|
                               |-----|-----|-----|
                               |UnderSc|Blue|Turquoi|
                               |-----|-----|-----|
                               |-----|-----|-----|
            +-----+            +-----+-----+-----+-----+
            | 83  |            | 93  | 98  | 103 | 108 |
            | Up  |            |-----|-----|ESC_J|Enter|
            |MarkUp|           |-----|-----|-----|Enter|
            |MoveUp|           |FieldHi|-----|-----|-----|
            |-----|            |-----|White|-----|-----|
            |-----|            |-----|-----|-----|-----|
            |-----|            +-----+-----+-----+-----+
+-----+-----+-----+            | 99  | 104 |
| 79  | 84  | 89  |           |-----|-----|
| Left|Home |Right|           |-----|-----|
|MarkLef|Home|MarkRig|        |-----|-----|
|MoveLef|Rule|MoveRig|        |-----|FldColor|
|FastLef|-----|FastRig|       |-----|-----|
|-----|-----|-----|           |-----|-----|
+-----+-----+-----+           +-----+-----+
      | Down|
      |MarkDow|
      |MoveDow|
      |-----|
      |-----|
      |-----|
      +-----+
```

5576-001 (5250 Only)

```
                                          A
                            ┌─────────────────────────────┐
                            └─────────────────────────────┘
                            ┌─────────────────────────────┐
                            └─────────────────────────────┘

        ┌───────┐     ┌─────────────────────┐   ┌───────┐  ┌───────┐
        │       │     │                     │   │       │  │       │
        │   B   │     │          B          │   │   C   │  │   D   │
        │       │     │                     │   │       │  │       │
        └───────┘     └─────────────────────┘   └───────┘  └───────┘
```

Segment A assignment:

-----	-----	CrBrk	-----	-----	-----	SOSI	-----	ErEOF	SysAttn	-----	-----
-----	-----	-----	-----	-----	-----	SOSI	-----	-----	-------	-----	-----
-----	-----	AltCr	-----	-----	-----	----	-----	ErInp	TestReq	Quit	-----
-----	-----	-----	-----	-----	-----	----	-----	-----	TestReq	-----	-----
-----	-----	-----	-----	-----	-----	----	-----	-----	-------	-----	-----

112	113	114	115	116	117	118	119	120	121	122	123
PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12
PF13	PF14	PF15	PF16	PF17	PF18	PF19	PF20	PF21	PF22	PF23	PF24
SOSI	-----	AltView	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Segment B assignment:

Clear	-----
Clear	-----
SysReq	-----
-----	-----
-----	-----

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Newlin	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	CharBsp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Ansi 7E	-----	-----	-----	CharAdv
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Ansi A3	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Ansi AC	EditUnd
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Play	-----
-----	-----
RPause	-----
-----	-----
-----	-----

16	17	18	19	20	21	22	23	24	25	26	27	28	29
Tab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Ansi A2	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

-----	-----
-----	-----
-----	-----
-----	-----
-----	-----

30	31	32	33	34	35	36	37	38	39	40	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	FieldExt
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	FieldExt
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

-----	-----
-----	-----
-----	-----
-----	-----
-----	-----

44	46	47	48	49	50	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Ansi 5C	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Reset	-----
Reset	-----
-----	-----
Record	-----
-----	-----

58	60	61	62	64
-----	-----	-----	-----	Entr/Ctl
-----	-----	-----	-----	Entr/Ctl
-----	-----	-----	-----	-----
-----	-----	-----	-----	-----
-----	-----	-----	-----	-----

Segment C assignment:

75	80	85
RollDwn	Home	RollUp
RollDwn	FldMk	RollUp
-----	Rule	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----

76	81	86
Insert	DelChar	-----
EditPaste	-----	-----
EditCopy	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----

83
Up
MarkUp
MoveUp
FastUp

79	84	89
Left	Home	Right
MarkLef	Home	MarkRig
MoveLef	Rule	MoveRig
FastLef	-----	FastRig
-----	-----	-----
-----	-----	-----

84
Down
MarkDow
MoveDow
FastDow

Segment D assignment:

90	95	100	105
Dup	FldMark	-----	Field-
Dup	FldMark	-----	Field-
Dup	FldMark	-----	Field-
Dup	FldMark	-----	Field-
Dup	FldMark	-----	Field-
-----	-----	-----	-----

91	96	101	106
-----	-----	-----	Field+
-----	-----	-----	Field+
-----	-----	-----	Field+
-----	-----	-----	Field+
-----	-----	-----	Field+
-----	-----	-----	-----

92	97	102
-----	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----

93	98	103	108
-----	-----	-----	FldExt
-----	-----	-----	FldExt
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----

99	104
-----	-----
-----	-----
-----	-----
-----	-----
-----	-----

5576-001 (Combined 3270 and 5250)

```
                    A
            ┌─────────────────┐
            ├─────────────────┤
            └─────────────────┘

    ┌───┐ ┌───────────┐ ┌───┐ ┌───┐
    │ B │ │     B     │ │ C │ │ D │
    └───┘ └───────────┘ └───┘ └───┘
```

Segment A assignment:

-----	-----	CrBnk ----- AltCur -----	-----	Help Help -----	-----	SOSI SOSI -----	HostPrt -----	ErEOF ErInp	SysAttn ----- CrSel	PA1 ----- DevCom	PA2 ----- PA3

112 PF1 PF13 SOSI Doc	113 PF2 PF14 ----- WordWrap	114 PF3 PF15 AltView CfgFmt	115 PF4 PF16	116 PF5 PF17	117 PF6 PF18	118 PF7 PF19	119 PF8 PF20 APL ----- APL	120 PF9 PF21	121 PF10 PF22	122 PF11 PF23	123 PF12 PF24 ----- +Cr

Segment B assignment:

Clear Clear SysReq SysReq -----	-----
Play ----- ----- RPause	-----
-----	-----
-----	-----
Reset Reset ----- Record	-----

1 SysAttn	2	3	4	5	6	7	8	9	10	11 Ansi 7E	12 US Ansi A3	13 RS	14 Ansi A3	15 BackSp CharAdv
16 Tab BackTab	17 DCI	18 ETB	19 ENQ	20 DC2	21 DC4	22 EM	23 NAK	24 HT	25 SI	26 DLE	27 NUL Ansi A2	28 ESC	29	
30	31 SOH	32 DC3	33 EOT	34 ACK	35 BEL	36 BS	37 LF	38 VT	39 FF	40	41	42 GS	43 NewLine NewLine	
44	46 SUB	47 CAN	48 ETX	49 SYN	50 STX	51 SO	52 CR	53	54	55	Ansi 5C FS		57	
58	60			61			62	64 Entr/Ctl Entr/Ctl
---	---	---	---	---	---	---	---	---

Segment C assignment:

```
+--------+--------+--------+
|   75   |   80   |   85   |
| RollDwn| -----  | RollDwn|
| -----  | -----  | JmpNext|
| -----  | ChgScr | -----  |
| -----  | ChgScr | -----  |
| -----  | -----  | -----  |
+--------+--------+--------+
|   76   |   81   |   86   |
| Insert | DelChar| -----  |
|EditPaste|EditCut| -----  |
| EditCopy| -----  | -----  |
| -----  | -----  | -----  |
| -----  | -----  | -----  |
+--------+--------+--------+
         |   83   |
         |   Up   |
         | MarkUp |
         | MoveUp |
         | FastUp |
         | FastUp |
         | -----  |
+--------+--------+--------+
|   79   |   84   |   89   |
|  Left  |  Home  | Right  |
| MarkLef|  Home  | MarkRig|
| MoveLef|  Rule  | MoveRig|
| FastLef| -----  | FastRig|
| -----  | -----  | -----  |
| -----  | -----  | -----  |
+--------+--------+--------+
         |  Down  |
         | MarkDow|
         | MoveDow|
         | -----  |
         | -----  |
         | -----  |
         +--------+
```

Segment D assignment:

```
+--------+--------+--------+--------+
|   90   |   95   |  100   |  105   |
|  Dup   | FldMark| -----  | Field- |
|  Dup   | FldMark| -----  | Field- |
| -----  | -----  | -----  | Break  |
| Reverse|  Red   |  Pink  | -----  |
| -----  | -----  | -----  | -----  |
| -----  | Trn0p  | -----  | -----  |
+--------+--------+--------+--------+
|   91   |   96   |  101   |  106   |
| -----  | -----  | -----  | Field+ |
| -----  | -----  | -----  | Field+ |
| -----  | -----  | -----  | -----  |
| -----  | Green  | Yellow | -----  |
| -----  | -----  | -----  | -----  |
| -----  | FldTrns| -----  |        |
+--------+--------+--------+--------+
|   92   |   97   |  102   |
| -----  | -----  | -----  |
| -----  | -----  | -----  |
| -----  | -----  | -----  |
| UnderSc|  Blue  | Turquoi|
| -----  | -----  | -----  |
| -----  | -----  | -----  |
+--------+--------+--------+--------+
|   93   |   98   |  103   |  108   |
| -----  | -----  | ESC_J  | Enter  |
| -----  | -----  | -----  | Enter  |
| -----  | -----  | -----  | -----  |
| FieldHi|  White | -----  | -----  |
| -----  | -----  | -----  | -----  |
| -----  | -----  | -----  | -----  |
+--------+--------+--------+--------+
|   99   |  104   |
| -----  | -----  |
| -----  | -----  |
| -----  | -----  |
| -----  | FldCol |
| -----  | -----  |
| -----  | -----  |
+--------+--------+
```
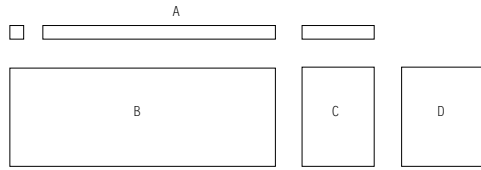
5576-A01 (3270 Only)

```
                      A
  □    ┌──────────────────────────┐    ┌────────┐
       └──────────────────────────┘    └────────┘

  ┌──────────────────────────┐  ┌──────┐  ┌──────┐
  │                          │  │      │  │      │
  │             B            │  │  C   │  │  D   │
  │                          │  │      │  │      │
  └──────────────────────────┘  └──────┘  └──────┘
```

Segment A assignment:

110	112	113	114	115		116	117	118	119		120	121	122	123
SysAttn	PF1	PF2	PF3	PF4		PF5	PF6	PF7	PF8		PF9	PF10	PF11	PF12
SysReq	PF13	PF14	PF15	PF16		PF17	PF18	PF19	PF20		PF21	PF22	PF23	PF24
-----	SOSI	-----	AltView	-----		Record	Play	RPause	APL		CrSel	CrBnk	RTM	-----
-----	Doc	WordWrap	CfgFmt	-----		-----	-----	-----	-----		-----	-----	AltCr	GrpCsr
-----	Doc	WordWrap	CfgFmt	-----		-----	-----	-----	APL		CrSel	CrBnk	AltCr	GrpCsr
-----	Red	Pink	Green	Yellow		Blue	Turq	White	FldColor		-----	-----	-----	-----

124	125	126
-----	-----	Clear
-----	-----	-----
-----	-----	Break
-----	-----	-----
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	NUL	-----	-----	-----	RS	-----	-----	-----	-----	US	RS	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	EditUnd
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

16	17	18	19	20	21	22	23	24	25	26	27	28	29
Tab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	DC1	ETB	ENQ	DC2	DC4	EM	NAK	HT	SI	DLE	NUL	ESC	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

30	31	32	33	34	35	36	37	38	39	40	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine
-----	SOH	DC3	EOT	ACK	BEL	BS	LF	VT	FF	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

44	46	47	48	49	50	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	SUB	CAN	ETX	SYN	STX	SO	CR	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

58	60	61	62	64
Reset/Ctrl	-----	-----	-----	Enter/Ctl
Reset/Ctrl	-----	-----	-----	Enter/Ctl
-----	-----	-----	-----	-----
Quit	-----	-----	-----	-----
Quit	-----	-----	-----	-----
-----	-----	-----	-----	-----

```
Segment C assignment:          Segment D assignment:

+-------+-------+-------+    +-------+-------+-------+-------+
|  75   |  80   |  85   |    |  90   |  95   |  100  |  105  |
|Insert |Home   |-----  |    |-----  |-----  |-----  |-----  |
|Dup    |FldMk  |PA3    |    |-----  |-----  |-----  |-----  |
|EditCop|Rule   |ChgScn |    |-----  |-----  |-----  |-----  |
|PA1    |PA2    |JmpNext|    |-----  |-----  |Reverse|-----  |
|PA1    |PA2    |JmpNext|    |-----  |-----  |Reverse|-----  |
|EditPst|-----  |-----  |    |-----  |TrnOp  |-----  |-----  |
+-------+-------+-------+    +-------+-------+-------+-------+
|  76   |  81   |  86   |    |  91   |  96   |  101  |  106  |
|Delete |ErEOF  |-----  |    |Home   |Up     |-----  |-----  |
|EditCut|ErFld  |EditPst|    |-----  |-----  |-----  |-----  |
|DelWd  |-----  |Test   |    |-----  |MoveUp |-----  |-----  |
|DelWd  |ErInp  |-----  |    |-----  |FastUp |-----  |-----  |
|-----  |ErInp  |-----  |    |-----  |FastUp |-----  |-----  |
|-----  |-----  |-----  |    |-----  |TrnFldI|-----  |-----  |
+-------+-------+-------+    +-------+-------+-------+-------+
                            |  92   |  97   |  102  |
                            |Left   |-----  |Right  |
                            |-----  |-----  |-----  |
                            |MovLeft|-----  |MoveRig|
                            |-----  |-----  |UnderSc|
                            |-----  |-----  |UnderSc|
                            |-----  |-----  |-----  |
                            +-------+-------+-------+
            +-------+       +-------+-------+-------+-------+
            |  83   |       |  93   |  98   |  103  |  108  |
            |Up     |       |EndFld |Down   |ESC J  |Enter  |
            |MarkUp |       |-----  |-----  |-----  |Enter  |
            |MoveUp |       |-----  |MoveDow|-----  |-----  |
            |FastUp |       |-----  |FastDow|FieldHi|-----  |
            |FastUp |       |-----  |FastDow|FieldHi|-----  |
            |-----  |       |-----  |-----  |-----  |-----  |
+-------+-------+-------+   +-------+-------+-------+-------+
|  79   |  84   |  89   |   |      99       |  104  |
|Left   |Down   |Right  |   |Insert         |Delete |
|MarkLef|MarkDow|MarkRig|   |-----          |-----  |
|MoveLef|MoveDow|MoveRig|   |-----          |DelWd  |
|BackWd |FastDow|FwdWd  |   |-----          |DelWd  |
|BackWd |FastDow|FwdWd  |   |-----          |-----  |
|-----  |-----  |-----  |   |-----          |-----  |
+-------+-------+-------+   +---------------+-------+
```

5576-A01 Keyboard (5250 Only)

Segment A assignment:

```
┌─────────┐ ┌──────┬──────┬──────┬──────┐ ┌──────┬──────┬──────┬─────────┐ ┌──────┬──────┬──────┬──────┐
│ 110     │ │ 112  │ 113  │ 114  │ 115  │ │ 116  │ 117  │ 118  │ 119     │ │ 120  │ 121  │ 122  │ 123  │
│ SysAttn │ │ PF1  │ PF2  │ PF3  │ PF4  │ │ PF5  │ PF6  │ PF7  │ PF8     │ │ PF9  │ PF10 │ PF11 │ PF12 │
│ SysReq  │ │ PF13 │ PF14 │ PF15 │ PF16 │ │ PF17 │ PF18 │ PF19 │ PF20    │ │ PF21 │ PF22 │ PF23 │ PF24 │
│ -----   │ │ SOSI │ -----│AltView│ -----│ │Record│ Play │RPause│ SOSI/G  │ │ -----│ -----│AltCur│ -----│
│ -----   │ │ Help │ -----│ -----│ -----│ │ -----│ -----│ -----│ -----   │ │ -----│ -----│ -----│TestReq│
│ -----   │ │ -----│ -----│ -----│ -----│ │ -----│ -----│ -----│ SOSI/G  │ │ -----│ -----│AltCur│TestReq│
│ -----   │ │ -----│ -----│ -----│ -----│ │ -----│ -----│ -----│ FieldCol│ │ -----│ -----│ -----│ -----│
└─────────┘ └──────┴──────┴──────┴──────┘ └──────┴──────┴──────┴─────────┘ └──────┴──────┴──────┴──────┘

            ┌──────┬──────┬──────┐
            │ 124  │ 125  │ 126  │
            │ -----│ -----│Clear │
            │ -----│ -----│ -----│
            │ -----│ -----│HostPr│
            │ -----│ -----│ -----│
            │ -----│ -----│ -----│
            │ -----│ -----│ -----│
            └──────┴──────┴──────┘
```

Segment B assignment:

```
┌────┬────┬────┬────┬────┬────┬────┬────┬────┬────┬──────┬──────┬────┬──────┬───────┐
│ 1  │ 2  │ 3  │ 4  │ 5  │ 6  │ 7  │ 8  │ 9  │ 10 │ 11   │ 12   │ 13 │ 14   │ 15    │
│----│----│----│----│----│----│----│----│----│----│----- │ -----│----│ -----│CharBsp│
│----│----│----│----│----│----│----│----│----│----│Ansi 7E│ -----│----│ -----│CharAdv│
│----│----│----│----│----│----│----│----│----│----│----- │ -----│----│ -----│ ----- │
│----│----│----│----│----│----│----│----│----│----│----- │Ansi A3│----│Ansi AC│EditUnd│
│----│----│----│----│----│----│----│----│----│----│----- │ -----│----│ -----│ ----- │
│----│----│----│----│----│----│----│----│----│----│----- │ -----│----│ -----│ ----- │
├────┴┬───┼───┬┴───┼──┬─┴──┬─┴──┬─┴──┬─┴──┬─┴──┬┴───┬─────┼──────┴┬───┴──────────────┤
│ 16  │17 │18 │19  │20│ 21 │ 22 │ 23 │ 24 │ 25 │ 26 │ 27    │ 28    │ 29              │
│ Tab │---│---│--- │--│----│----│----│----│----│----│ ----- │ ----- │ -----           │
│BackTab│-│---│--- │--│----│----│----│----│----│----│ ----- │ ----- │ -----           │
│ ----│---│---│--- │--│----│----│----│----│----│----│ ----- │ ----- │ -----           │
│ ----│---│---│--- │--│----│----│----│----│----│----│Ansi A2│ ----- │ -----           │
│ ----│---│---│--- │--│----│----│----│----│----│----│ ----- │ ----- │ -----           │
│ ----│---│---│--- │--│----│----│----│----│----│----│ ----- │ ----- │ -----           │
├─────┴──┬┴───┼───┬┴──┬┴──┬┴──┬┴──┬┴──┬┴──┬┴──┬──┴─┬──┴─────────────────────────────┤
│ 30     │ 31 │32 │33 │34 │35 │36 │37 │38 │39 │40  │41  │ 43                         │
│ -----  │----│---│---│---│---│---│---│---│---│----│----│ FieldExt                   │
│ -----  │----│---│---│---│---│---│---│---│---│----│----│ FieldExt                   │
│ -----  │----│---│---│---│---│---│---│---│---│----│----│ -----                      │
│ -----  │----│---│---│---│---│---│---│---│---│----│----│ -----                      │
│ -----  │----│---│---│---│---│---│---│---│---│----│----│ -----                      │
├────────┴─┬──┴─┬──┴┬─┴─┬─┴─┬─┴─┬─┴─┬─┴─┬─┴─┬─┴─┬─┴──┬──┴─────────────────────────┤
│ 44       │ 46 │47 │48 │49 │50 │51 │52 │53 │54 │55  │ 57                          │
│ -----    │----│---│---│---│---│---│---│---│---│----│ -----                       │
│ -----    │----│---│---│---│---│---│---│---│---│----│ -----                       │
│ -----    │----│---│---│---│---│---│---│---│---│----│ -----                       │
│ -----    │----│---│---│---│---│---│---│---│---│----│ -----                       │
│ -----    │----│---│---│---│---│---│---│---│---│----│ -----                       │
├──────────┴────┬─┴───────┬────────────────────────┬┴─────────────┬───────────────┤
│ 58            │ 60      │ 61                      │ 62           │ 64            │
│ Reset/Ctrl    │ -----   │ -----                   │ -----        │ Enter/Ctrl    │
│ Reset/Ctrl    │ -----   │ -----                   │ -----        │ Enter/Ctrl    │
│ -----         │ -----   │ -----                   │ -----        │ -----         │
│ Quit          │ -----   │ -----                   │ -----        │ -----         │
│ -----         │ -----   │ -----                   │ -----        │ -----         │
│ -----         │ -----   │                         │ -----        │ -----         │
└───────────────┴─────────┴─────────────────────────┴──────────────┴───────────────┘
```

```
     Segment C assignment:        Segment D assignment:

┌───────┬───────┬───────┐   ┌───────┬───────┬───────┬───────┐
│  75   │  80   │  85   │   │  90   │  95   │  100  │  105  │
│Insert │Home   │RollDwn│   │-----  │FldMk  │Dup    │Ansi 2D│
│Dup    │FldMk  │RollDwn│   │-----  │FldMk  │Dup    │Ansi 2D│
│EditCop│Rule   │-----  │   │-----  │FldMk  │-----  │Field- │
│-----  │-----  │JumpNxt│   │-----  │FldMk  │-----  │Field- │
│-----  │-----  │JumpNxt│   │-----  │FldMk  │-----  │Field- │
│EditPst│-----  │-----  │   │-----  │-----  │-----  │-----  │
├───────┼───────┼───────┤   ├───────┼───────┼───────┼───────┤
│  76   │  81   │  86   │   │  91   │  96   │  101  │  106  │
│Delete │ErEOF  │RollUp │   │Home   │Up     │RollDwn│Field+ │
│EditCut│-----  │EditPst│   │-----  │-----  │-----  │Field+ │
│DelWd  │-----  │-----  │   │-----  │MoveUp │-----  │Field+ │
│DelWd  │ErInp  │-----  │   │-----  │FastUp │-----  │Field+ │
│-----  │ErInp  │-----  │   │-----  │FastUp │-----  │Field+ │
│-----  │-----  │-----  │   │-----  │-----  │-----  │-----  │
└───────┴───────┴───────┘   ├───────┼───────┼───────┤───────┘
                            │  92   │  97   │  102  │
                            │Left   │-----  │Right  │
                            │-----  │-----  │-----  │
                            │MoveLft│-----  │MoveRig│
                            │-----  │-----  │-----  │
                            │-----  │-----  │-----  │
                            │-----  │-----  │-----  │
              ┌───────┐     ├───────┼───────┼───────┬───────┐
              │  83   │     │  93   │  98   │  103  │  108  │
              │Up     │     │ErEOF  │Down   │RollUp │FldExt │
              │MarkUp │     │-----  │-----  │-----  │FldExt │
              │MoveUp │     │-----  │MoveDow│-----  │-----  │
              │FastUp │     │-----  │FastDow│-----  │-----  │
              │FastUp │     │-----  │FastDow│-----  │-----  │
              │-----  │     │-----  │-----  │-----  │-----  │
┌───────┬───────┼───────┐   ├───────┴───────┼───────┴───────┘
│  79   │  84   │  89   │   │     99        │  104  │
│Left   │Down   │Right  │   │Insert         │Delete │
│MarkLef│MarkDow│MarkRig│   │-----          │-----  │
│MoveLef│MoveDow│MoveRig│   │-----          │DelWord│
│BackWd │FastDow│TabWord│   │-----          │DelWord│
│BackWd │FastDow│TabWord│   │-----          │-----  │
│-----  │-----  │-----  │   │-----          │-----  │
└───────┴───────┴───────┘   └───────────────┴───────┘
```

5576-A01 Keyboard (Combined 3270 and 5250)

```
                         A
  □    ┌─────────────────────────┐    ┌────────┐
       └─────────────────────────┘    └────────┘

  ┌─────────────────────────┐  ┌──────┐  ┌──────┐
  │                         │  │      │  │      │
  │            B            │  │  C   │  │  D   │
  │                         │  │      │  │      │
  └─────────────────────────┘  └──────┘  └──────┘
```

Segment A assignment:

110		112	113	114	115		116	117	118	119		120	121	122	123
Attn		PF1	PF2	PF3	PF4		PF5	PF6	PF7	PF8		PF9	PF10	PF11	PF12
SysReq		PF13	PF14	PF15	PF16		PF17	PF18	PF19	PF20		PF21	PF22	PF23	PF24
-----		SOSI	-----	AltView	-----		Record	Play	RPause	APL		-----	CrBnk	AltCur	-----
-----		Doc	WordWrap	CfgFmt	-----		-----	-----	-----	-----		CrSel	-----	-----	+Cr
-----		Doc	WordWrap	CfgFmt	-----		-----	-----	-----	APL		CrSel	CrBnk	AltCur	+Cr
-----		Red	Pink	Green	Yellow		Blue	Turquois	White	-----		-----	-----	-----	-----

124	125	126
-----	-----	Clear
-----	-----	-----
-----	-----	Break
-----	-----	-----
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	ANSI 7E	-----	-----	-----	BackSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	CharAdv
-----	-----	NUL	-----	-----	-----	-----	-----	-----	-----	-----	US	RS	ANSI AC	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	ANSI A3	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

16	17	18	19	20	21	22	23	24	25	26	27	28	29
Tab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	DC1	ETB	ENQ	DC2	DC4	EM	NAK	HT	SI	DLE	NUL	ESC	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	ANSI A2	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

30	31	32	33	34	35	36	37	38	39	40	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine
-----	SOH	DC3	EOT	ACK	BEL	BS	LF	VT	FF	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

44	46	47	48	49	50	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	SUB	CAN	ETX	SYN	STX	SO	CR	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

58	60	61	62	64
Reset/Ctrl	-----	-----	-----	Enter/Ctl
Reset/Ctrl	-----	-----	-----	Enter/Ctl
-----	-----	-----	-----	-----
Quit	-----	-----	-----	-----
Quit	-----	-----	-----	-----
-----	-----	-----	-----	-----

```
Segment C assignment:          Segment D assignment:

  75      80      85          90      95     100     105
Insert   Home   RollDwn      -----   -----   -----  ANSI 2D
 Dup    FieldMk  PA3         -----   -----   -----  ANSI 2D
EditCop  Rule    ChgScn      -----   -----  Reverse  -----
 PA1     PA2    JumpNxt      -----   -----  Reverse  -----
 PA1     PA2    JumpNxt      -----   TrnOp   -----   -----
EditPst  -----   -----       -----

  76      81      86          91      96     101     106
Delete   ErEOF  RollUp       Home     Up    -----   Field
EditCut  ErFld  EditPst      -----   -----  -----   -----
DelWord  -----   Test        -----  MoveUp  -----   -----
DelWord  ErInp   -----       -----  FastUp  -----   -----
 -----   ErInp   -----       -----  FastUp  -----   -----
 -----   -----   -----       -----  TrnFldI

                              92      97     102
                            Left    -----   Right
                            -----   -----   -----
                            MoveLet -----  MoveRig
                            -----   -----  UnderSc
          83                -----   -----  UnderSc
          Up                -----   -----   -----
        MarkUp
        MoveUp               93      98     103     108
        FastUp             EndFld   Down   ESC J   Enter
        FastUp             -----   -----   -----   Enter
        -----              -----  MoveDow  -----   -----
                           -----  FastDow FieldHi  -----
  79      84      89       -----  FastDow FieldHi  -----
Left    Down    Right      -----   -----   -----   -----
MarkLef MarkDow MarkRig
MoveLef MoveDow MoveRig       99            104
BackWd  FastDow FwdWd       Insert        Delete
BackWd  FastDow FwdWd       -----         -----
 -----   -----   -----      -----         DelWord
                            -----         DelWord
                            -----         -----
                            -----         -----
```
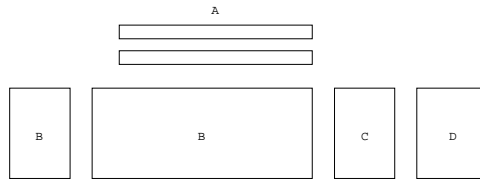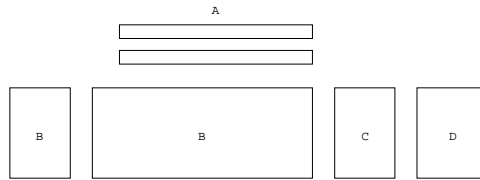
5576-002/003 (3270 Only)

A

B   C   D

Segment A assignment:

110	112	113	114	115	116	117	118	119	120	121	122	123
Sysattn	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12
SysRq	PF13	PF14	PF15	PF16	PF17	PF18	PF19	PF20	PF21	PF22	PF23	PF24
-----	SOSI	-----	AltView	-----	Record	Play	RPause	APL	CrSel	CrBnk	RTM	-----
-----	Doc	WordWrap	CfgFmt	-----	-----	-----	-----	-----	-----	-----	AltCr	GrpCsr
-----	Doc	WordWrap	CfgFmt	-----	-----	-----	-----	APL	CrSel	CrBnk	AltCr	GrpCsr
-----	Red	Pink	Green	Yellow	Blue	Turquois	White	FieldCol	-----	-----	-----	-----

124	125	126
-----	-----	Clear
-----	-----	-----
-----	-----	Break
-----	-----	-----
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	NUL	-----	-----	-----	RS	-----	-----	-----	-----	US	RS	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	EditUnd
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

16	17	18	19	20	21	22	23	24	25	26	27	28	29
Tab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	DC1	ETB	ENQ	DC2	DC4	EM	NAK	HT	SI	DLE	NUL	ESC	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

30	31	32	33	34	35	36	37	38	39	40	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine
-----	SOH	DC3	EOT	ACK	BEL	BS	LF	VT	FF	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

44	46	47	48	49	50	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	SUB	CAN	ETX	SYN	STX	SO	CR	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

58	60	61	62	64
Reset/Ctrl	-----	-----	-----	Entr/Ctrl
Reset/Ctrl	-----	-----	-----	Entr/Ctrl
-----	-----	-----	-----	-----
Quit	-----	-----	-----	-----
Quit	-----	-----	-----	-----
-----	-----	-----	-----	-----

```
       Segment C assignment:          Segment D assignment:

   ┌──────┬──────┬──────┐     ┌──────┬──────┬──────┬──────┐
   │  75  │  80  │  85  │     │  90  │  95  │ 100  │ 105  │
   │Insert│Home  │----- │     │----- │----- │----- │----- │
   │Dup   │FldMk │PA3   │     │----- │----- │----- │----- │
   │EditCop│Rule │ChgScn│     │----- │----- │----- │----- │
   │PA1   │PA2   │JmpNext│    │----- │----- │Reverse│----- │
   │PA1   │PA2   │JmpNext│    │----- │----- │Reverse│----- │
   │EditPst│----│ ----- │     │----- │TrnOp │----- │----- │
   ├──────┼──────┼──────┤     ├──────┼──────┼──────┼──────┤
   │  76  │  81  │  86  │     │  91  │  96  │ 101  │ 106  │
   │Delete│ErEOF │----- │     │Home  │Up    │----- │----- │
   │EditCut│ErFld│EditPst│    │----- │----- │----- │----- │
   │DelWd │----- │Test  │     │----- │MoveUp│----- │----- │
   │DelWd │ErInp │----- │     │----- │FastUp│----- │----- │
   │----- │ErInp │----- │     │----- │FastUp│----- │----- │
   │----- │----- │----- │     │----- │TrnFldI│----│----- │
   └──────┴──────┴──────┘     ├──────┼──────┼──────┼──────┘
                              │  92  │  97  │ 102  │
                              │Left  │----- │Right │
              ┌──────┐        │----- │----- │----- │
              │  83  │        │MovLeft│----│MoveRig│
              │Up    │        │----- │----- │UnderSc│
              │MarkUp│        │----- │----- │UnderSc│
              │MoveUp│        │----- │----- │----- │
              │FastUp│        ├──────┼──────┼──────┼──────┐
              │FastUp│        │  93  │  98  │ 103  │ 108  │
              │----- │        │EndFld│Down  │ESC J │Enter │
   ┌──────┬──────┬──────┐     │----- │----- │----- │Enter │
   │  79  │  84  │  89  │     │----- │MoveDow│----│----- │
   │Left  │Down  │Right │     │----- │FastDow│FieldHi│----│
   │MarkLef│MarkDow│MarkRig│  │----- │FastDow│FieldHi│----│
   │MoveLef│MoveDow│MoveRig│  │----- │----- │----- │----- │
   │BackWd│FastDow│FwdWd │     ├──────┴──────┼──────┴──────┘
   │BackWd│FastDow│FwdWd │     │     99      │ 104  │
   │----- │----- │----- │     │Insert       │Delete│
   └──────┴──────┴──────┘     │-----        │----- │
                              │-----        │DelWd │
                              │-----        │DelWd │
                              │-----        │----- │
                              │-----        │----- │
                              └─────────────┴──────┘
```

5576-002/003 Keyboard (5250 Only)

```
          A
□  ┌──────────────────────┐    ┌──────────┐
   └──────────────────────┘    └──────────┘

┌──────────────────────┐   ┌────────┐   ┌────────┐
│                      │   │        │   │        │
│          B           │   │   C    │   │   D    │
│                      │   │        │   │        │
└──────────────────────┘   └────────┘   └────────┘
```

Segment A assignment:

110		112	113	114	115		116	117	118	119		120	121	122	123
SysAttn		PF1	PF2	PF3	PF4		PF5	PF6	PF7	PF8		PF9	PF10	PF11	PF12
SysReq		PF13	PF14	PF15	PF16		PF17	PF18	PF19	PF20		PF21	PF22	PF23	PF24
-----		SOSI	-----	AltView	-----		Record	Play	Pause	SOSI/G		-----	-----	AltCur	-----
-----		Help	-----	-----	-----		-----	-----	-----	-----		-----	-----	-----	TestReq
-----		-----	-----	-----	-----		-----	-----	-----	SOSI/G		-----	-----	AltCur	TestReq
-----		-----	-----	-----	-----		-----	-----	-----	FieldCol		-----	-----	-----	-----

124	125	126
-----	-----	Clear
-----	-----	-----
-----	-----	HostPr
-----	-----	-----
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	CharBsp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Ansi 7E	-----	-----	-----	CharAdv
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	RS	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Ansi A3	-----	ANSI AC	EditUnd
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

16	17	18	19	20	21	22	23	24	25	26	27	28	29
Tab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Ansi A2	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

30	31	32	33	34	35	36	37	38	39	40	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	FieldExt
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	FieldExt
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

44	46	47	48	49	50	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

58	60	61	62	64
Reset/Ctl	-----	-----	-----	Entr/Ctl
Reset/Ctl	-----	-----	-----	Entr/Ctl
-----	-----	-----	-----	-----
Quit	-----	-----	-----	-----
-----	-----	-----	-----	-----
-----	-----	-----	-----	-----

```
Segment C assignment:

75       80       85
Insert   Home     RollDwn
Dup      FldMk    RollDwn
EditCop  Rule     -----
-----    -----    JumpNxt
-----    -----    JumpNxt
EditPst  -----    -----

76       81       86
Delete   ErEOF    RollUp
EditCut  -----    EditPst
DelWd    -----    -----
DelWd    ErInp    -----
-----    ErInp    -----
-----    -----    -----


         83
         Up
         MarkUp
         MoveUp
         FastUp
         FastUp
         -----

79       84       89
Left     Down     Right
MarkLef  MarkDow  MarkRig
MoveLef  MoveDow  MoveRig
BackWd   FastDow  TabWord
BackWd   FastDow  TabWord
-----    -----    -----
```

```
Segment D assignment:

90       95       100      105
Dup      FldMk    -----    ANSI 2D
Dup      FldMk    -----    ANSI 2D
Dup      FldMk    -----    -----
Dup      FldMk    -----    -----
Dup      FldMk    -----    -----
-----    -----    -----    -----

91       96       101      106
Home     Up       RollDwn  Field+
-----    -----    -----    Field+
-----    MoveUp   -----    Field+
-----    FastUp   -----    Field+
-----    FastUp   -----    Field+
-----    -----    -----    -----

92       97       102
Left     -----    Right
-----    -----    -----
MoveLft  -----    MoveRig
-----    -----    -----
-----    -----    -----
-----    -----    -----

93       98       103      108
ErEOF    Down     RollUp   FldExt
-----    -----    -----    FldExt
-----    MoveDow  -----    -----
-----    FastDow  -----    -----
-----    FastDow  -----    -----
-----    -----    -----    -----

   99            104
Insert        Delete
-----         -----
-----         DelWord
-----         DelWord
-----         -----
-----         -----
```

5576-002/003 Keyboard (Combined 3270 and 5250)

```
                    A
  ┌─┐  ┌──────────────────────┐   ┌──────────┐
  └─┘  └──────────────────────┘   └──────────┘

  ┌──────────────────────┐   ┌─────┐  ┌─────┐
  │                      │   │     │  │     │
  │          B           │   │  C  │  │  D  │
  │                      │   │     │  │     │
  └──────────────────────┘   └─────┘  └─────┘
```

Segment A assignment:

| 110
Attn
SysReq

----- | | 112
PF1
PF13
SOSI
Doc
Doc
Red | 113
PF2
PF14

WordWrap
WordWrap
Pink | 114
PF3
PF15
AltView
CfgFmt
CfgFmt
Green | 115
PF4
PF16

Yellow | | 116
PF5
PF17
Record

Blue | 117
PF6
PF18
Play

Turquois | 118
PF7
PF19
Pause

White | 119
PF8
PF20
APL

APL
----- | | 120
PF9
PF21

CrSel
CrSel
----- | 121
PF10
PF22
CrBnk

CrBnk
----- | 122
PF11
PF23
AltCur

AltCur
----- | 123
PF12
PF24

+Cr
+Cr
----- |

| 124

----- | 125

----- | 126
Clear

Break

----- |

Segment B assignment:

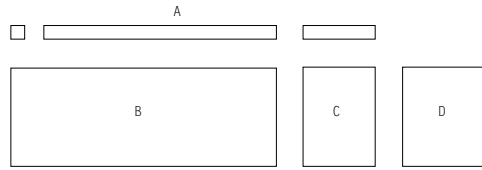| 1

----- | 2

----- | 3

NUL

----- | 4

----- | 5

----- | 6

----- | 7

----- | 8

----- | 9

----- | 10

----- | 11
ANSI 7E

----- | 12

US
ANSI A3

----- | 13

RS

----- | 14

ANSI AC

----- | 15
BackSp
CharAdv

----- |
16 Tab BackTab ----- ----- -----	17 ----- DC1 ----- ----- -----	18 ----- ETB ----- ----- -----	19 ----- ENQ ----- ----- -----	20 ----- DC2 ----- ----- -----	21 ----- DC4 ----- ----- -----	22 ----- EM ----- ----- -----	23 ----- NAK ----- ----- -----	24 ----- HT ----- ----- -----	25 ----- SI ----- ----- -----	26 ----- DLE ----- ----- -----	27 ----- NUL ANSI A2 ----- -----	28 ----- ESC ----- ----- -----		29 ----- ----- ----- ----- -----
30 ----- ----- ----- ----- -----	31 ----- SOH ----- ----- -----	32 ----- DC3 ----- ----- -----	33 ----- EOT ----- ----- -----	34 ----- ACK ----- ----- -----	35 ----- BEL ----- ----- -----	36 ----- BS ----- ----- -----	37 ----- LF ----- ----- -----	38 ----- VT ----- ----- -----	39 ----- FF ----- ----- -----	40 ----- ----- ----- ----- -----	41 ----- ----- ----- ----- -----			43 NewLine NewLine ----- ----- -----
44 ----- ----- ----- ----- -----	46 ----- ----- SUB ----- -----	47 ----- ----- CAN ----- -----	48 ----- ----- ETX ----- -----	49 ----- ----- SYN ----- -----	50 ----- ----- STX ----- -----	51 ----- ----- SO ----- -----	52 ----- ----- CR ----- -----	53 ----- ----- ----- ----- -----	54 ----- ----- ----- ----- -----	55 ----- ----- ----- ----- -----				57 ----- ----- ----- ----- -----
58 Reset/Ctl Reset/Ctl ----- Quit Quit -----		60 ----- ----- ----- ----- ----- -----		61 ----- ----- ----- ----- -----						62 ----- ----- ----- ----- -----		64 Entr/Ctl Entr/Ctl ----- ----- ----- -----

```
Segment C assignment:          Segment D assignment:

 75      80      85            90      95      100     105
Insert  Home    RollDwn        -----   -----   -----   ANSI 2D
Dup     FieldMk PA3            -----   -----   -----   ANSI 2D
EditCop Rule    ChgScn         -----   -----   Reverse -----
PA1     PA2     JumpNxt        -----   -----   Reverse -----
PA1     PA2     JumpNxt        -----   TrnOp   -----   -----
EditPst -----   -----

 76      81      86            91      96      101     106
Delete  ErEOF   RollUp         Home    Up      -----   Field+
EditCut ErFld   EditPst        -----   MoveUp  -----   -----
DelWord -----   Test           -----   FastUp  -----   -----
DelWord ErInp   -----          -----   FastUp  -----   -----
-----   ErInp   -----          -----   TrnFldI -----   -----
-----   -----   -----
                                92      97      102
                               Left    -----   Right
                               MoveLef -----   MoveRig
                               -----   -----   UnderSc
                               -----   -----   UnderSc
                               -----   -----   -----

         83                     93      98      103     108
         Up                    EndFld  Down    Esc J   Enter
         MarkUp                -----   -----   -----   Enter
         MoveUp                -----   MoveDow -----   -----
         FastUp                -----   FastDow FieldHi -----
         FastUp                -----   FastDow FieldHi -----
         -----                 -----   -----   -----   -----

 79      84      89                99              104
Left    Down    Right           Insert          Delete
MarkLef MarkDow MarkRig         -----           -----
MoveLef MoveDow MoveRig         -----           DelWord
BackWd  FastDow FwdWd           -----           DelWord
BackWd  FastDow FwdWd           -----           -----
-----   -----   -----           -----           -----
```

APL Keyboard Layouts (3270 Only)

This section shows the APL keyboard layouts for each country. Only APL characters are shown in each shift position (up/down/ALT).

Language	Type	Figure on
Austrian/German	1	page 279
Belgian	2	page 279
Canadian-Bilingual	1	page 279
Denmark	1	page 279
Finnish/Swedish	1	page 279
French AZERTY	2	page 279
Hangeul	4	page 280
Italian	1	page 279
Japanese	4	page 280
Latin American Spanish	1	page 279
Norwegian	1	page 279
Portuguese	1	page 279
Simplified Chinese	4	page 280
Spanish	1	page 279
Swiss-French	1	page 279
Swiss-German	1	page 279
Traditional Chinese	4	page 280
U.K. English	1	page 279
U.S. English	3	page 279
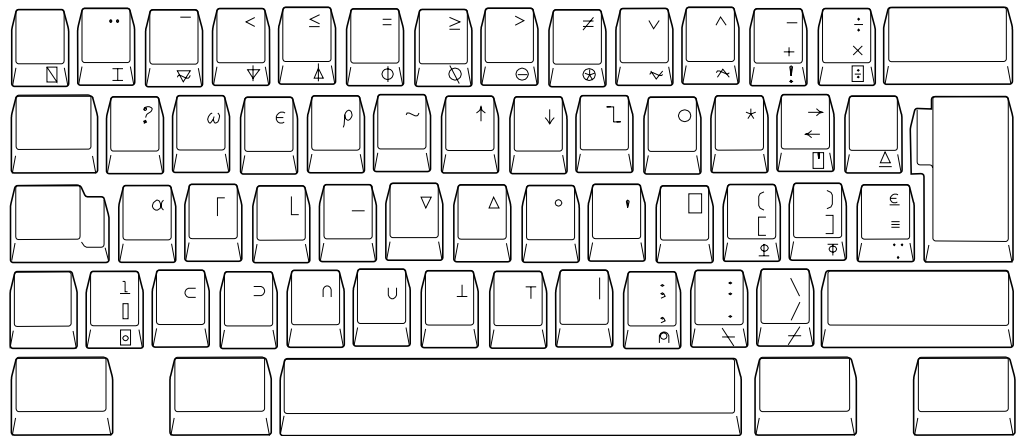
Figure 26. Type-1 APL Keyboard
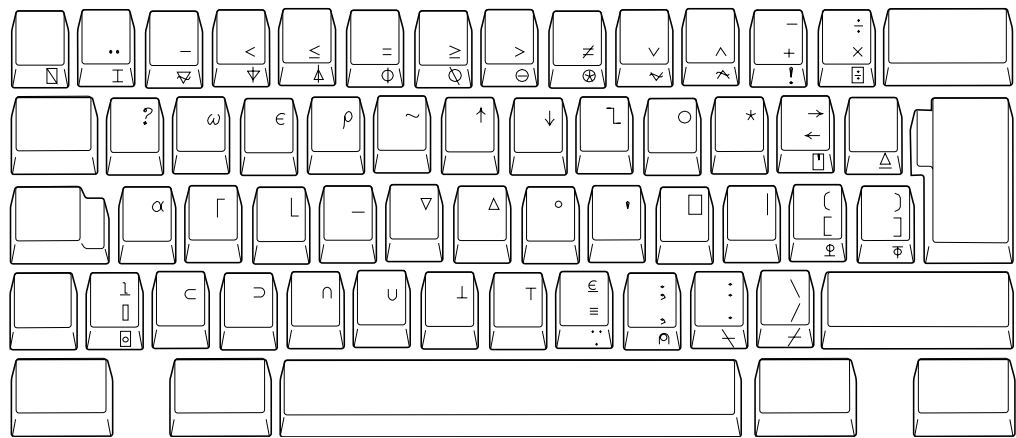
Figure 27. Type-2 APL Keyboard
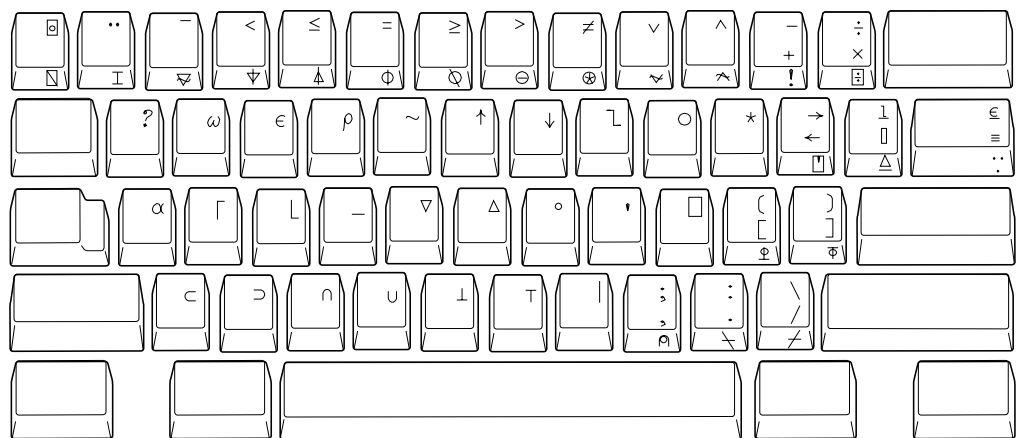
Figure 28. Type-3 APL Keyboard
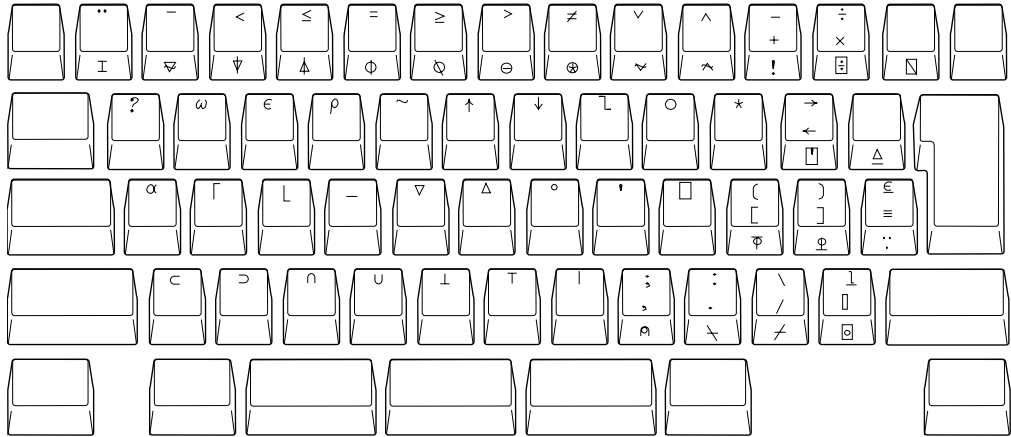
Figure 29. Type-4 APL Keyboard

Key Map for Home3270

This section shows the position of the following control codes:

NUL (X'00')
ESC (X'1B')
FS   (X'1C')
GS   (X'1D')
RS   (X'1E')
US   (X'1F')

The positions of these control codes are fixed and common for all languages (including U.S. English), regardless of the characters assigned to BASE and UP SHIFT positions of the keys. These control codes are positioned to the CONTROL positions of the keys shown in Figure 30 through Figure 31 on page 281.
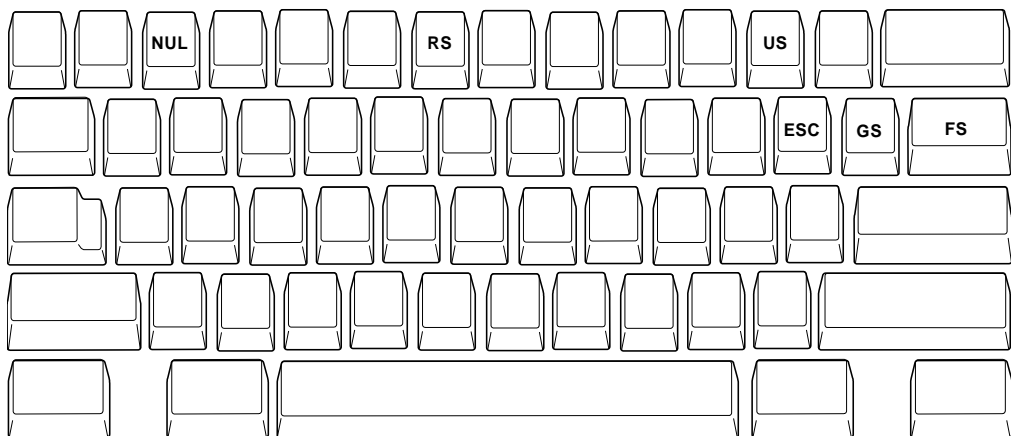
Figure 30. Common Control Code of Keyboard Core Segment for Non-Japanese Keyboard
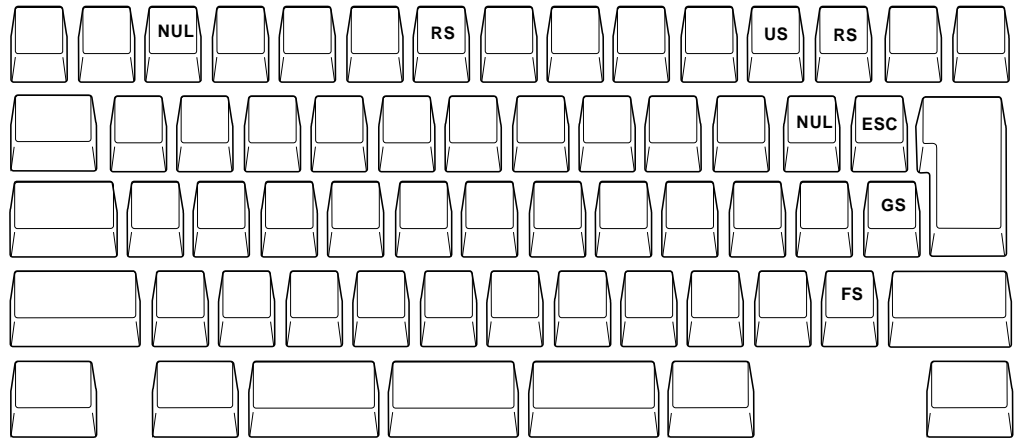
Figure 31. Common Control Code of Keyboard Core Segment for Japanese Keyboard

The positions of other control codes vary for each language. These control codes are positioned to the CONTROL position of the associated alphabetic key. Those control codes and the associated alphabetic characters are as follows.

Table 36. Other Control Code Map of Key Segment B

Control Code	Associated Letter
SOH (X'01')	a
STX (X'02')	b
ETX (X'03')	c
EOT (X'04')	d
ENQ (X'05')	e
ACK (X'06')	f
BEL (X'07')	g
BS (X'08')	h
HT (X'09')	i
LF (X'0A')	j
VT (X'0B')	k
FF (X'0C')	l
CR (X'0D')	m
SO (X'0E')	n
SI (X'0F')	o
DLE (X'10')	p
DC1(XON) (X'11')	q
DC2 (X'12')	r
DC3(XOF) (X'13')	s
DC4 (X'14')	t
NAK (X'15')	u
SYN (X'16')	v
ETB (X'17')	w
CAN (X'18')	x
EM (X'19')	y

Table 36. Other Control Code Map of Key Segment B (continued)

Control Code	Associated Letter
SUB (X'1A')	z

Following is an example of control-code mapping for the U.S. Enhanced Keyboard.
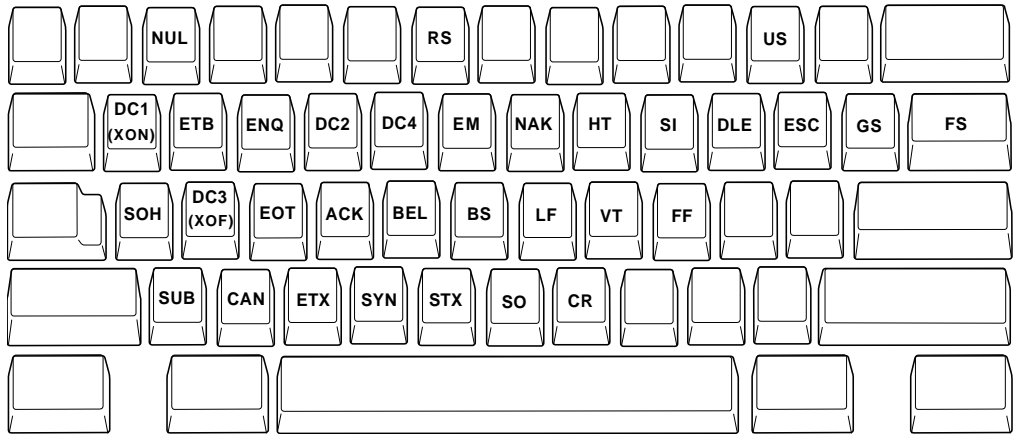
Figure 32. Control-Code Map of Keyboard Core Segment for U.S. Enhanced Keyboard

Appendix B. AS/400 Configuration Examples

To connect to an AS/400 system, you need to specify configuration information in the workstation profile that accurately corresponds to the information specified in the AS/400 system (referred to as the *device description*).

For example, the LAN attachment via IEEE 802.2 in the following figure shows how the configuration information specified in the AS/400 workstation profile corresponds to the configuration information in the AS/400 system.
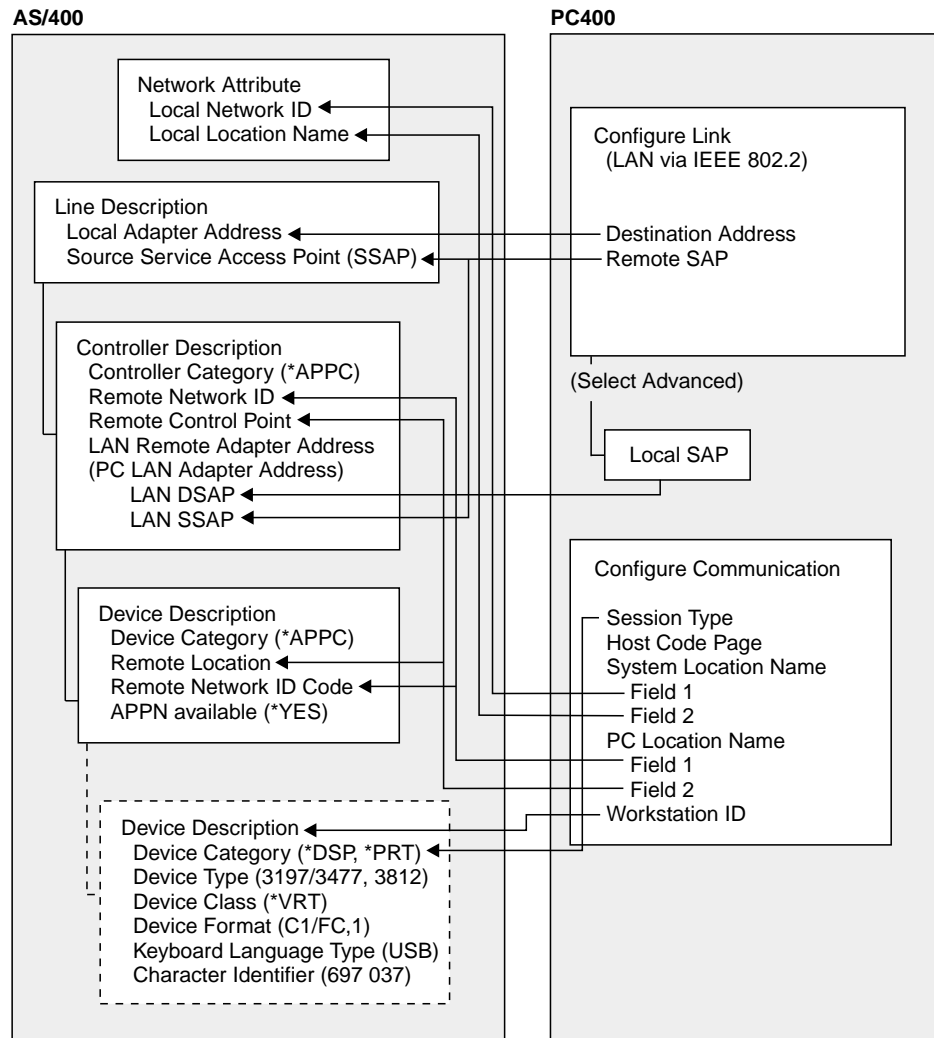
Figure 33. LAN Attachment via IEEE 802.2

AS/400 Device Description

To configure 5250 display or printer sessions, the following values must be set in the AS/400 device description:

AS/400 Device Description	Display Session		Printer Session
	24 x 80	27 x 132	
Device category	*DSP	*DSP	*PRT
Device class	*VRT	*VRT	*VRT
Device type	3197	3477	3812
Device model	C1	FC	1
Keyboard language type	USB[+]	USB[+]	-
Character identify code	697 037[+]	697 037[+]	-
[+] For SBCS, depends on the host code page selection.			

The following table applies to DBCS only.

AS/400 Device Description	Display Session		Printer Session
	Host Code Page 931	Host Code Page 939	
Device category	*DSP	*PRT	
Device class	*VRT	*VRT	
Device type	5555	5555	
C01	C01		
JUB	JPB	-	
Character identify code	101 037	-	
DBCS device feature	2424J0	2424J0	2424J0

5250 Sessions through One Link

If you want all your 5250 sessions to connect through one link to an AS/400 system, use the same **PC Location Name** and the same **Link Parameters** for all the sessions.

For example, you can configure two display sessions and one printer session connected to an AS/400 system using APPN.PC5250 as the **Location Name**.

```
Session A   :  Session Type          :  Display
(Display)      System Location Name   :  APPN.S7801234
               PC Location Name       :  APPN.PC5250
               Workstation ID         :  (not specified)

Session B   :  Session Type          :  Display
(Display)      System Location Name   :  APPN.S7801234
               PC Location Name       :  APPN.PC5250
               Workstation ID         :  (not specified)

Session C   :  Session Type          :  Printer
(Printer)      System Location Name   :  APPN.S7801234
               PC Location Name       :  APPN.PC5250
               Workstation ID         :  PCLOCALP1
```

In this example, the AS/400 network attributes are:

```
Local network ID : APPN
Local location   : S7801234
```

> **Tip**
> Enter **DSPNETA** from a 5250 session to display AS/400 network attributes.

AS/400 System Mode Description

PC400 initially uses mode description **QPCSUPP** on the AS/400 system. If the PC Support/400 program or Client Access/400 is installed on the AS/400 system, QPCSUPP need not be created. If mode description QPCSUPP does not exist on the AS/400 system, create the mode description:

1. Enter the following command on the command line of the main menu of the AS/400 system:

   CRTMODD

   The Creating Mode Description panel appears.

```
              Creating Mode Description (CRTMODD)

  Type the selected items, and push the Enter key.

  Mode Description................            Name
  Maximum Session................. 8          1-512
  Maximum number of interaction.... 8         1-512
  Number of Local Control Sessions. 4         0-512
  Number of Pre-joined Sessions.... 0         0-512
  Inbound Pacing Value............. 7         0-63
  Outbound Pacing Value............ 7         0-63
  Maximum Length of Request Unit... *CALC         241-16384, *CALC
  Text Description ................ *BLANK



                                                          End
   F3=Exit    F4=Prompt      F5=Reshow    F10=Add parameter  F12= Cancel
   F13=How to use this panel               F24=More key
```

2. Type the necessary values in each field, according to the following table.

Field Name	Input Value
Mode description	**QPCSUPP**
Maximum session	**64**
Maximum number of interactions	**64**
Number of local control sessions	**0**
Number of pre-joined sessions	**0**
Inbound pacing value	**7**
Outbound pacing value	**7**
Maximum length of request unit	***CALC**
Text description	This field is optional

3. After you type all the values, press the Enter key.

   This completes the creation of the mode description QPCSUPP.

AS/400 Device Description for Twinaxial Attachments (APPC) Example

If you want to use a twinaxial (TDLC) attachment, the AS/400 system requires that you specify a device description. When the automatic device configuration indicator (QAUTOCFG) is set to ON in the AS/400 system, the device description is created automatically. When the indicator is set to OFF, create the device description, as follows:

1. Enter the following command on the command line of the AS/400 system main menu:

   CRTDEVDSP

   The Creating Device Description (Display) panel appears.

```
                 Creating Device Description(Display)    (CRTDEVDSP)

   Type the selected item, and push Enter key.

   Device Description...    Name
   Device Class..........            *LCL, *RMT, *VRT, *SNPT
   Device Type...........            3101, 3151, 3161, 3162...
   Device Format........            0, 1, 2, 4, 11, 12, 23...




                                                                   End
      F3=Exit    F4=Prompt        F5=Reshow    F10=Add parameter  F12= Cancel
      F13=How to use this panel                F24=More key
```

2. Type the values in each field, according to the following table.

Field Name	Input Value
Device description	This is an optional field

Field Name	Input Value
Device class	*LCL
Device type	5150
Device format	2

3. After you type all values, press the Enter key.

   The following screen appears:

```
                Creating Device Description(Display)    (CRTDEVDSP)

  Type the selected item, and push Enter key.

  Device Description..........>TWXP0A1 Name
  Device Class................>*LCL      *LCL, *RMT, *VRT, *SNPT
  Device Type.................>5150      3101, 3151, 3161, 3162...
  Device Format...............>2      0, 1, 2, 4, 11, 12, 23...
  Port Number.................  _        0-17
  Switch Setting..............           0, 1, 2, 4, 5, 6
  Online when IPL.............>*YES      *YES,  *NO
  Controller to be attached...        Name
  Keyboard Word Type..........>*SYSVAL    *SYSVAL,AGB,AGI,BLI...
  Text Description............>*BLANK




  F3=Exit    F4=Prompt       F5=Reshow    F10=Add parameter   F12= Cancel
  F13=How to use this panel                F24=More key
```

4. Type the values for each field, according to the following table.

Field Name	Input Value
Port number	Number of the port to be attached
Switch setting	Device address
Controller to be attached	Descriptive name of the controller to be attached
Keyboard word type	USB[1]
[1] Depends on the host code page selection.	

5. After you enter all the values, press the Enter key.

   This completes the creation of the device description for the twinaxial attachment.

AS/400 Device Description for Asynchronous Attachment Example

If you want to use an asynchronous dial attachment, the AS/400 system requires that you specify configuration parameters for the controller/line/devices to be used.

The following sample is a typical configuration on the AS/400 system for an asynchronous dialed connection through an ASCII Workstation Controller.

1. Enter the following command on the command line of the AS/400 system main menu:

   ```
   WRKCFGSTS *CTL CTL03
   ```

   where *CTL03* is the name of your controller.

The Work with Configuration Status panel appears.

```
                    Work with Configuration Status


Position to . . . . . _____     Starting characters

Type options, press Enter
  1=Vary on 2=Vary off 5=Work with job 8=Work with description
  9-Display mode status ...

Opt    Description        Status        -------------Job--------------
8_     CTL03              ACTIVE
__        ADLCTST         VARY ON PENDING
__        ASYNC           VARY ON PENDING
__        ASYNCD          VARY ON PENDING
__        EZASYNC         VARY ON PENDING
__        ASYNCP0         VARY ON PENDING
__        ASYNRTR         ACTIVE

                                                                BOTTOM
Parameters or command
 ===>

F3=Exit F4=Prompt F12=Cancel F23=More options F24=More keys
```

2. Enter **8** in the **Opt** field to work with the controller description for CTL03.

   The Work with Controller Descriptions panel appears.

```
                    Work with Controller Descriptions


Position to . . . . . _____     Starting characters

Type options, press Enter
   2=Change 3=Copy 4=Delete 5=Display 6=Print 7=Rename
   8=Work with status 9=Retrieve source 12=Print device addresses

Opt    Controller    Type  Text
2_     CTL03         6141  CREATED BY AUTO-CONFIGURATION




                                                                BOTTOM
Parameters or command
 ===>
F3=Exit F4=Prompt F5=Refresh F6=Create F9=Retrieve F12=Cancel
F14=Work with status
```

3. Enter **2** in the **Opt** field to change the controller description for CTL03.

   The Change Controller Description panel appears.

```
                    Change Ctl Desc (local WS) (CHGCTLLWS)


 Controller Description . . . . . . : CTL03
 Option . . . . . . . . . . . . . . : *BASIC
 Category of controller . . . . . . : *LWS

 Controller type  . . . . . . . . . : 6141
 Controller model . . . . . . . . . : 1
 Resource name  . . . . . . . . . . : CTL03
 TDLC line  . . . . . . . . . . . . : QTDL429000
 Online at IPL  . . . . . . . . . . : *YES
 Auto-configuration controller  . . : *YES
 Text . . . . . . . . . . . . . . . : CREATED BY AUTO-CONFIGURATION
 Device wait timer  . . . . . . . . : 10




 Press Enter to continue.
   ===>
                                                                      BOTTOM
 F3=Exit  F4=Prompt  F5=Refresh  F12=Cancel  F13=How to use this display
 F24=More keys
```

4. Type the values in each field, according to the following table.

Field Name	Input Value
Controller description	CTL03
Resource name	CTL03
Online at IPL	*YES
Device wait timer	10
Auto-configuration controller	*YES
Text description	This field is optional

The Work with Controller Descriptions panel appears.

```
                  Work with Controller Descriptions


 Position to . . . . . _____     Starting characters

 Type options, press Enter
    2=Change 3=Copy 4=Delete 5=Display 6=Print 7=Rename
    8=Work with status 9=Retrieve source 12=Print device addresses

 Opt   Controller   Type  Text
  8_   CTL03        6141  Created by auto-configuration




                                                                      BOTTOM
 Parameters or command
   ===>
 F3=Exit F4=Prompt F5=Refresh F6=Create F9=Retrieve F12=Cancel
 F14=Work with status
```

5. Enter **8** in the **Opt** field to work with the configuration status.

The Work with Configuration Status panel appears.

```
                  Work with Configuration Status


Position to . . . . . _____     Starting characters

Type options, press Enter
  1=Vary on 2=Vary off 5=Work with job 8=Work with description
  9-Display mode status ...

Opt   Description       Status          ------------Job--------------
__    CTL03             ACTIVE
__      ADLCTST         VARY ON PENDING
__      ASYNCPERTH      VARY ON PENDING
__      ASYNCD          VARY ON PENDING
__      EZASYNC         VARY ON PENDING
__      ASYNCP0         VARY ON PENDING
8_      ASYNRTR         ACTIVE

                                                             BOTTOM
Parameters or command
 ===>

F3=Exit F4=Prompt F12=Cancel F23=More options F24=More keys
```

6. Enter **8** in the **Opt** field next to ASYNRTR to work with the display device
   description.

   The Work with Device Descriptions panel appears.

```
                  Work with Device Descriptions


Position to . . . . . _____     Starting characters

Type options, press Enter
   2=Change 3=Copy 4=Delete 5=Display 6=Print 7=Rename
   8=Work with status 9=Retrieve source

Opt   Controller    Type  Text
 2_   ASYNRTR       5150  FOR PC400




                                                             BOTTOM
Parameters or command
 ===>
F3=Exit F4=Prompt F5=Refresh F6=Create F9=Retrieve F12=Cancel
F14=Work with status
```

7. Enter **2** in the **Opt** field to change the device description.

   The Change Device Description panel appears.

```
                Change Device Desc (Display) (CHGDEVDSP)

 Type choices, press Enter.

 Device description . . . . . . . . > ASYNRTR     Name
 Port number  . . . . . . . . . . .   4           0-17, *SAME
 Switch setting . . . . . . . . . .   0           0-6, *SAME
 Online at IPL  . . . . . . . . . .   *YES        *SAME, *YES, *NO
 Keyboard language type . . . . . .   USI         *SAME, *SYSVAL, *NONE, AGB...

 Character identifier:
    Graphic character set  . . . . .   *KBDTYPE    1-32767, *KBDTYPE, *SYSVAL...
    Code page  . . . . . . . . . . .               1-32767
 Allow blinking cursor  . . . . . .   *YES        *SAME, *YES, *NO
 Print device . . . . . . . . . . .   *SYSVAL     Name, *SAME, *SYSVAL
 Output queue . . . . . . . . . . .   *DEV        Name, *SAME, *DEV
    Library  . . . . . . . . . . . .               Name, *LIBL, *CURLIB
 Printer file . . . . . . . . . . .   QSYSPRT     Name, *SAME
    Library  . . . . . . . . . . . .        *LIBL  Name, *LIBL, *CURLIB
                                                                      More...
 Press Enter to continue.
  ===>
 F3=Exit  F4=Prompt  F5=Refresh  F10=Additional parameters  F12=Cancel
 F13=How to use this display      F24=More keys
```

This completes the creation of the controller and display device descriptions for
an asynchronous dial attachment.

AS/400 VT Asynchronous Attachment Example

The following sample is a typical configuration on the AS/400 system for a VT
asynchronous dialed connection through an ASCII Workstation Controller. For
more details on AS/400 for VT asynchronous attachments, refer to *AS/400 ASCII
Workstation Reference (SA41-3130-00)*.

1. Enter the following command on the command line of the AS/400 system main
   menu:

   CRTDEVDSP

   The Create Device Description panel appears, in a first and second screen, as
   shown for the configuration of a VT100 device in the following screens. When
   filling in the panel, make sure that the name of the attached controller
   (arbitrarily shown as CTL05 here) matches the name of the twinaxial controller
   configured on your AS/400.

```
                     Create Device Desc (Display) (CRTDEVDSP)

 Type choices, press Enter.

 Device description . . . . . . . > VT100         Name
 Device class . . . . . . . . . . > *LCL          *LCL, *RMT, *VRT, *SNPT
 Device type  . . . . . . . . . . > V100          3101, 3151, 3161, 3162...
 Device model . . . . . . . . . . > *ASCII        0, 1, 2, 4, 5, 12, 23 ...
 Emulated twinaxial device  . . . > *TYPE         3196A2, 3197D2, *TYPE
 Port number  . . . . . . . . . . > 1             0-17
 Emulating ASCII device . . . . . > *NO           *NO, *YES
 Physical attachment  . . . . . . > *MODEM        *DIRECT, *PTT, *MODEM...
 Online at IPL  . . . . . . . . . > *YES          *YES, *NO
 Attached controller  . . . . . . > CTL05         Name
 Keyboard language type . . . . . > USB           *SYSVAL, AGB, AGI, ALI...
 Inactivity timer . . . . . . . . > *NOMAX        1-30, *ATTACH, *NOMAX...
 Line speed . . . . . . . . . . . > 19200         *TYPE, *CALC, 150, 300...
 Word length  . . . . . . . . . . > 8             *TYPE, *CALC, 7, 8
 Type of parity . . . . . . . . . > *NONE         *TYPE, *CALC, *EVEN, *ODD...
 Stop bits  . . . . . . . . . . . > 2             *TYPE, 1, 2
                                                                  More...
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display        F24=More keys
```

```
                     Create Device Desc (Display) (CRTDEVDSP)

 Type choices, press Enter.

 Text 'description' . . . . . . . > 'dec vt100 device description test'


                          Additional Parameters
 Character identifier:
   Graphic character set  . . . . > *KBDTYPE      1-32767, *SYSVAL, *KBDTYPE
   Code page  . . . . . . . . . .               1-32767
 Print device . . . . . . . . . . > *SYSVAL       Name, *SYSVAL
 Output queue . . . . . . . . . . > *DEV          Name, *DEV
   Library  . . . . . . . . . . .               Name, *LIBL, *CURLIB
 Printer file . . . . . . . . . . > QSYSPRT       Name
   Library  . . . . . . . . . . . >   *LIBL       Name, *LIBL, *CURLIB



                                                               Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display        F24=More keys
```

2. For a similar configuration for a VT220:

    Use the same command, CRTDEVDSP, on the command line of the AS/400
    system main menu. Again, the same kind of panels appear. You must make
    sure that the name of the attached controller matches the name of the twinaxial
    controller configured on your AS/400.

```
                   Create Device Desc (Display) (CRTDEVDSP)

Type choices, press Enter.

Device description . . . . . . .   VT220           Name
Device class . . . . . . . . . . > *LCL            *LCL, *RMT, *VRT, *SNPT
Device type  . . . . . . . . . . > V220            3101, 3151, 3161, 3162...
Device model . . . . . . . . . . > *ASCII          0, 1, 2, 4, 5, 12, 23
Emulated twinaxial device  . . . > *TYPE           3196A2, 3197D2, *TYPE
Port number  . . . . . . . . . . > 2               0-17
Emulating ASCII device . . . . . > *NO             *NO, *YES
Physical attachment  . . . . . . > *MODEM          *DIRECT, *PTT, *MODEM...
Online at IPL  . . . . . . . . . > *YES            *YES, *NO
Attached controller  . . . . . . > CTL05           Name
Keyboard language type . . . . . > USB             *SYSVAL, AGB, AGI, ALI...
Inactivity timer . . . . . . . . > *NOMAX          1-30, *ATTACH, *NOMAX...
Line speed . . . . . . . . . . . > 19200           *TYPE, *CALC, 150, 300...
Word length  . . . . . . . . . . > 8               *TYPE, *CALC, 7, 8
Type of parity . . . . . . . . . > *NONE           *TYPE, *CALC, *EVEN, *ODD...
Stop bits  . . . . . . . . . . . > 1               *TYPE, 1, 2
                                                                      More...
F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display        F24=More keys
```

```
                   Create Device Desc (Display) (CRTDEVDSP)

Type choices, press Enter.

Text 'description' . . . . . . . > 'dec vt220 device description test'


                           Additional Parameters

Character identifier:
  Graphic character set  . . . . > *KBDTYPE        1-32767, *SYSVAL, *KBDTYPE
  Code page  . . . . . . . . . .                   1-32767
Print device . . . . . . . . . . > *SYSVAL         Name, *SYSVAL
Output queue . . . . . . . . . . > *DEV            Name, *DEV
  Library  . . . . . . . . . . .                   Name, *LIBL, *CURLIB
Printer file . . . . . . . . . . > QSYSPRT         Name
  Library  . . . . . . . . . . . >  *LIBL          Name, *LIBL, *CURLIB



                                                                      Bottom
F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display        F24=More keys
```

AS/400 Configuration for SDLC Example

The following examples refer to SDLC and Hayes AutoSync.

Network Attributes

To display the network attributes for the AS/400 to which you are connecting,
enter the command **dspneta** on the AS/400 Main Menu.

```
MAIN                          AS/400 Main Menu
                                              System:   RALYAS4B
Select one of the following:

     1. User tasks
     2. Office tasks
     3. General system tasks
     4. Files, libraries, and folders
     5. Programming
     6. Communications
     7. Define or change the system
     8. Problem handling
     9. Display a menu
    10. Information Assistant options
    11. Client Access tasks

    90. Sign off

Selection or command
===> dspneta

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
F23=Set initial menu
```

Press Enter.

The Display Network Attributes screen is displayed.

```
                      Display Network Attributes

                                              System:   RALYAS4B
Current system name  . . . . . . . . . . . . . . :   RALYAS4B
  Pending system name  . . . . . . . . . . . . . :
Local network ID . . . . . . . . . . . . . . . . :   USIBMRA
Local control point name . . . . . . . . . . . . :   RALYAS4B
Default local location . . . . . . . . . . . . . :   RALYAS4B
Default mode . . . . . . . . . . . . . . . . . . :   BLANK
APPN node type . . . . . . . . . . . . . . . . . :   *NETNODE
Data compression . . . . . . . . . . . . . . . . :   *NONE
Intermediate data compression  . . . . . . . . . :   *NONE
Maximum number of intermediate sessions  . . . . :   200
Route addition resistance  . . . . . . . . . . . :   128
Server network ID/control point name . . . . . . :   *LCLNETID   *ANY




                                                       More...
Press Enter to continue.

F3=Exit   F12=Cancel
```

The network attributes include the AS/400 Network ID and CP name.

SDLC Leased Configuration

Several descriptions must be created on the AS/400; examples are given in this section.

Creating an SDLC Line Description

To create an SDLC leased line description, enter the command **crtlinsdlc** on the AS/400 Main Menu.

```
MAIN                              AS/400 Main Menu
                                                      System:   RALYAS4B
Select one of the following:

     1. User tasks
     2. Office tasks
     3. General system tasks
     4. Files, libraries, and folders
     5. Programming
     6. Communications
     7. Define or change the system
     8. Problem handling
     9. Display a menu
    10. Information Assistant options
    11. Client Access tasks

    90. Sign off

Selection or command
===> crtlinsdlc

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
F23=Set initial menu
```

Press F4 (Prompt).

The Create LIne Description panel is displayed. Enter the values for each
parameter on the panel.

```
                     Create Line Desc (SDLC) (CRTLINSDLC)

 Type choices, press Enter.

 Line description . . . . . . . . > PCOMMSDLCL     Name
 Resource names . . . . . . . . . > LIN021         Name
              + for more values
 Online at IPL  . . . . . . . . .   *YES           *YES, *NO
 Data link role . . . . . . . . .   *NEG           *NEG, *PRI, *SEC
 Physical interface . . . . . . .   *RS232V24      *RS232V24, *V35, *X21, ...
 Connection type  . . . . . . . .   *NONSWTPP      *NONSWTPP, *SWTPP, *MP, *SHM
 Switched network backup  . . . .   *NO            *NO, *YES
 Exchange identifier  . . . . . .   *SYSGEN        05600000-056FFFFF, *SYSGEN
 NRZI data encoding . . . . . . .   *YES           *YES, *NO
 Line speed . . . . . . . . . . .   9600           600, 1200, 2400, 4800...
 Modem type supported . . . . . .   *NORMAL        *NORMAL, *V54, *IBMWRAP...
 Maximum frame size . . . . . . .   521            265, 521, 1033, 2057
 Duplex . . . . . . . . . . . . .   *HALF          *HALF, *FULL
 Inactivity timer . . . . . . . .   300            *NOMAX, 150-4200 (0.1 sec)
 Poll response delay  . . . . . .   0              0-2048 (0.0001 seconds)
                                                                       More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

```
                     Create Line Desc (SDLC) (CRTLINSDLC)

 Type choices, press Enter.

 Nonproductive receive timer  . .   320            160-4200 (0.1 seconds)
 Idle timer . . . . . . . . . . .   30             5-300 (0.1 seconds)
 Connect poll timer . . . . . . .   30             2-300 (0.1 seconds)
 Poll cycle pause . . . . . . . .   0              0-2048 (0.0001 seconds)
 Frame retry  . . . . . . . . . .   7              0-64
 Text 'description' . . . . . . .   PCOMM SDLC leased line


                          Additional Parameters

 Attached nonswitched ctls  . . .                  Name
               + for more values
 Modem data rate select . . . . .   *FULL          *FULL, *HALF
 Error threshold level  . . . . .   *OFF           *OFF, *MIN, *MED, *MAX
 Modulus  . . . . . . . . . . . .   8              8, 128
 Maximum outstanding frames . . .   7              1-28
                                                                     More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Press Enter to save the line description pcommsdlcl.

SDLC Controller Description

To create the SDLC controller description for the line PCOMMSDLCL, enter
crtctlappc on the AS/400 Main Menu.

```
 MAIN                          AS/400 Main Menu
                                                      System:   RALYAS4B
 Select one of the following:

      1. User tasks
      2. Office tasks
      3. General system tasks
      4. Files, libraries, and folders
      5. Programming
      6. Communications
      7. Define or change the system
      8. Problem handling
      9. Display a menu
     10. Information Assistant options
     11. Client Access tasks

     90. Sign off

 Selection or command
 ===> crtctlappc

 F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
 F23=Set initial menu
```

Press F4 (Prompt). The Create Controller Description panel is displayed. Enter
values for each parameter on the following two panels.

```
                    Create Ctl Desc (APPC) (CRTCTLAPPC)

Type choices, press Enter.

Controller description . . . . . > PCOMMSDLCL    Name
Link type  . . . . . . . . . . . > *SDLC         *ANYNW, *FAX, *FR, *IDLC...
Online at IPL  . . . . . . . . .   *YES          *YES, *NO
Switched connection  . . . . . .   *NO           *NO, *YES
Switched network backup  . . . .   *NO           *NO, *YES
APPN-capable . . . . . . . . . .   *YES          *YES, *NO
Attached nonswitched line  . . . > PCOMMSDLCL    Name
Maximum frame size . . . . . . .   *LINKTYPE     265-16393, 256, 265, 512...
Remote network identifier  . . . > USIBMRA       Name, *NETATR, *NONE, *ANY
Remote control point . . . . . . > PCOMMCP       Name, *ANY
Exchange identifier  . . . . . .                 00000000-FFFFFFFF
Data link role . . . . . . . . .   *NEG          *NEG, *PRI, *SEC
Station address  . . . . . . . .   C1            00-FE
APPN CP session support  . . . .   *NO           *YES, *NO
APPN node type . . . . . . . . .   *LENNODE      *ENDNODE, *LENNODE...
APPN transmission group number     1             1-20, *CALC
                                                                More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

```
                    Create Ctl Desc (APPC) (CRTCTLAPPC)

Type choices, press Enter.

Autocreate device  . . . . . . .   *ALL          *ALL, *NONE
Autodelete device  . . . . . . .   1440          1-10000, *NO
User-defined 1 . . . . . . . . .   *LIND         0-255, *LIND
User-defined 2 . . . . . . . . .   *LIND         0-255, *LIND
User-defined 3 . . . . . . . . .   *LIND         0-255, *LIND
Text 'description' . . . . . . .   PCOMM SDLC Leased


                          Additional Parameters

Attached devices . . . . . . . .                 Name
                 + for more values
Character code . . . . . . . . .   *EBCDIC       *EBCDIC, *ASCII
SSCP identifier  . . . . . . . .                 000000000001-FFFFFFFFFFFF
IDLC window size . . . . . . . .   *LIND         1-31, *LIND
IDLC frame retry . . . . . . . .   *LIND         0-100, *LIND
                                                                More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Press Enter.

The APPC Device Description will create itself automatically.

SDLC Switched Configuration

The following examples contain information about the SDLC switched
configuration on the AS/400.

SDLC Line Description

To create an SDLC switched line definition on the AS/400, enter the command
crtlinsdlc on the AS/400 Main Menu.

```
MAIN                            AS/400 Main Menu
                                                        System:    RALYAS4B
Select one of the following:

     1. User tasks
     2. Office tasks
     3. General system tasks
     4. Files, libraries, and folders
     5. Programming
     6. Communications
     7. Define or change the system
     8. Problem handling
     9. Display a menu
    10. Information Assistant options
    11. Client Access tasks

    90. Sign off

Selection or command
===> crtlinsdlc

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
F23=Set initial menu
```

Press F4 (Prompt).

The Create Ctl Description panel is displayed. Enter values for each parameter on the panel.

```
                    Create Line Desc (SDLC) (CRTLINSDLC)

Type choices, press Enter.

Line description . . . . . . . . > PCOMSDLCSW    Name
Resource names . . . . . . . . . > LIN051        Name
              + for more values
Online at IPL  . . . . . . . . .   *YES          *YES, *NO
Data link role . . . . . . . . . > *PRI          *NEG, *PRI, *SEC
Physical interface . . . . . . .   *RS232V24     *RS232V24, *V35, *X21, ...
Connection type  . . . . . . . . > *SWTPP        *NONSWTPP, *SWTPP, *MP, *SHM
Vary on wait . . . . . . . . . .   *NOWAIT       *NOWAIT, 15-180 (1 second)
Autocall unit  . . . . . . . . .   *NO           *NO, *YES
Exchange identifier  . . . . . .   *SYSGEN       05600000-056FFFFF, *SYSGEN
NRZI data encoding . . . . . . .   *YES          *YES, *NO
Line speed . . . . . . . . . . .   9600          600, 1200, 2400, 4800...
Modem type supported . . . . . .   *NORMAL       *NORMAL, *V54, *IBMWRAP...
Switched connection type . . . .   *BOTH         *BOTH, *ANS, *DIAL
Autoanswer . . . . . . . . . . .   *YES          *YES, *NO
Autodial . . . . . . . . . . . .   *NO           *NO, *YES
                                                                   More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

```
                  Create Line Desc (SDLC) (CRTLINSDLC)

 Type choices, press Enter.

 Calling number . . . . . . . . .   *NONE
 Connect poll retry . . . . . . .   7             0-64
 Maximum frame size . . . . . . .   521           265, 521, 1033, 2057
 Duplex . . . . . . . . . . . . .   *HALF         *HALF, *FULL
 Nonproductive receive timer  . .   320           160-4200 (0.1 seconds)
 Idle timer . . . . . . . . . . .   30            5-300 (0.1 seconds)
 Connect poll timer . . . . . . .   30            2-300 (0.1 seconds)
 Poll cycle pause . . . . . . . .   0             0-2048 (0.0001 seconds)
 Frame retry  . . . . . . . . . .   7             0-64
 Data Set Ready drop timer  . . .   6             3-60 (seconds)
 Autoanswer type  . . . . . . . .   *DTR          *DTR, *CDSTL
 Remote answer timer  . . . . . .   60            30, 35, 40, 45 (seconds)...
 Text 'description' . . . . . . .   PCOMM SDLC switched line




                                                              More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Press Enter to save the description pcomsdlcsw.

SDLC Controller Description

To create the controller description for the switched SDLC line, enter **crtctlappc** on the AS/400 Main Menu.

```
 MAIN                         AS/400 Main Menu
                                                          System:    RALYAS4B
 Select one of the following:

      1. User tasks
      2. Office tasks
      3. General system tasks
      4. Files, libraries, and folders
      5. Programming
      6. Communications
      7. Define or change the system
      8. Problem handling
      9. Display a menu
     10. Information Assistant options
     11. Client Access tasks

     90. Sign off

 Selection or command
 ===> crtctlappc

 F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
 F23=Set initial menu
```

Press F4 (Prompt).

The Create Controller Description panel is displayed. Enter values for each parameter on the panel.

```
                   Create Ctl Desc (APPC) (CRTCTLAPPC)

 Type choices, press Enter.

 Controller description . . . . . > PCOMSDLCSW     Name
 Link type  . . . . . . . . . . > *SDLC          *ANYNW, *FAX, *FR, *IDLC...
 Online at IPL  . . . . . . . .   *YES           *YES, *NO
 Switched connection  . . . . . > *YES           *NO, *YES
 Short hold mode  . . . . . . .   *NO            *NO, *YES
 APPN-capable . . . . . . . . .   *YES           *YES, *NO
 Switched line list . . . . . . > PCOMSDLCSW     Name
               + for more values
 Maximum frame size . . . . . .   *LINKTYPE      265-16393, 256, 265, 512...
 Remote network identifier  . . . *NETATR        Name, *NETATR, *NONE, *ANY
 Remote control point . . . . . > JO             Name, *ANY
 Exchange identifier  . . . . . > 00000000       00000000-FFFFFFFF
 Initial connection . . . . . . > *ANS           *DIAL, *ANS
 Connection number  . . . . . . > 123
 Data link role . . . . . . . . > *SEC           *NEG, *PRI, *SEC
 Station address  . . . . . . .   01             00-FE
                                                              More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

```
                   Create Ctl Desc (APPC) (CRTCTLAPPC)

 Type choices, press Enter.

 APPN CP session support  . . . .   *NO          *YES, *NO
 APPN node type . . . . . . . . .   *LENNODE     *ENDNODE, *LENNODE...
 APPN transmission group number     1            1-20, *CALC
 APPN minimum switched status . .   *VRYONPND    *VRYONPND, *VRYON
 Autocreate device  . . . . . . .   *ALL         *ALL, *NONE
 Autodelete device  . . . . . . .   1440         1-10000, *NO
 User-defined 1 . . . . . . . . .   *LIND        0-255, *LIND
 User-defined 2 . . . . . . . . .   *LIND        0-255, *LIND
 User-defined 3 . . . . . . . . .   *LIND        0-255, *LIND
 Text 'description' . . . . . . .   PCOM SDLC switched line


                         Additional Parameters

 Attached devices . . . . . . . .                Name
               + for more values
                                                              More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Press Enter to save the controller description pcomsdlcsw.

The APPC Device Description will create itself automatically once Personal
Communications attaches to the AS/400 using the line and controller descriptions
that were just created.

LAN Configuration Example

This example assumes that a line description (token-ring or Ethernet) is already in
place. This is a shared configuration object—all connections on that adapter will
use the same line description. In the configuration example shown, the line
description name is TRN2619.

LAN Controller Description

The normal method would be to let the APPC controller create itself automatically. However, if preferred, the following command can be used to manually create the APPC controller.

To create a LAN controller description, enter **crtctlappc** on the AS/400 Main Menu.

```
MAIN                          AS/400 Main Menu
                                                      System:   RALYAS4B
Select one of the following:

     1. User tasks
     2. Office tasks
     3. General system tasks
     4. Files, libraries, and folders
     5. Programming
     6. Communications
     7. Define or change the system
     8. Problem handling
     9. Display a menu
    10. Information Assistant options
    11. Client Access tasks

    90. Sign off

Selection or command
===> crtctlappc

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
F23=Set initial menu
```

Press F4 (Prompt). The Create Controller Description panel will be displayed.

Enter values for each parameter on the panel.

```
                    Create Ctl Desc (APPC) (CRTCTLAPPC)

Controller description . . . . . > PCOMMLAN      Name
Link type  . . . . . . . . . . . > *LAN          *ANYNW, *FAX, *FR, *IDLC...
Online at IPL  . . . . . . . . .   *YES          *YES, *NO
APPN-capable . . . . . . . . . .   *YES          *YES, *NO
Switched line list . . . . . . . > TRN2619       Name
              + for more values
Maximum frame size . . . . . . .   *LINKTYPE     265-16393, 256, 265, 512...
Remote network identifier  . . .   *NETATR       Name, *NETATR, *NONE, *ANY
Remote control point . . . . . . > PEPE          Name, *ANY
Exchange identifier  . . . . . .                 00000000-FFFFFFFF
Initial connection . . . . . . .   *DIAL         *DIAL, *ANS
Dial initiation  . . . . . . . .   *LINKTYPE     *LINKTYPE, *IMMED, *DELAY
LAN remote adapter address . . .   400052005109  000000000001-FFFFFFFFFFFF
APPN CP session support  . . . .   *NO           *YES, *NO
APPN node type . . . . . . . . .   *LENNODE      *ENDNODE, *LENNODE...
APPN/HPR capable . . . . . . . .   *YES          *YES, *NO
                                                                   More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

```
                  Create Ctl Desc (APPC) (CRTCTLAPPC)

Type choices, press Enter.

APPN transmission group number     1              1-20, *CALC
APPN minimum switched status . .   *VRYONPND      *VRYONPND, *VRYON
Autocreate device  . . . . . . .   *ALL           *ALL, *NONE
Autodelete device  . . . . . . .   1440           1-10000, *NO
User-defined 1 . . . . . . . . .   *LIND          0-255, *LIND
User-defined 2 . . . . . . . . .   *LIND          0-255, *LIND
User-defined 3 . . . . . . . . .   *LIND          0-255, *LIND
Model controller description . .   *NO            *NO, *YES
Text 'description' . . . . . . .   PCOMM token-ring




                                                             Bottom
F3=Exit    F4=Prompt    F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display         F24=More keys
```

Press Enter to save the controller description pcommlan.

The APPC Device Description will create itself automatically. Personal
Communications attaches to the AS/400 using the controller description that was
just created.

Appendix C. Host Code Page Tables

The following tables show the host code page for each country.

Host Code Page 037-1/697-1 Brazil, Canada, Netherlands, Portugal, U.S., and 037/1175 Traditional Chinese

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	– SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	^ SD150000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¦ SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	 SM060000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	] SM080000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Đ LD620000	¬ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00037

Host Code Page 273-1/697-1 Austria, Germany

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	ä LA170000	ü LU170000	Ö LO180000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ß LS610000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	[SM060000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	~ SD190000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ä LA180000	Ü LU180000	ö LO170000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	¦ SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Ð LD620000	‾ SM150000	¦ SM650000	} SM140000	\ SM070000	] SM080000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	̦ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00273

Host Code Page 275-1/697-1 Brazil

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	õ LO190000	é LE110000	\ SM070000	0 ND100000
-1	(RSP) SP300000	} SM140000	/ SP120000	[SM060000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	` SD130000	î LI150000	@ SM050000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	¦ SM650000	ì LI130000	] SM080000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ã LA190000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	É LE120000	$ SC030000	ç LC410000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	Ç LC420000	, SP080000	Õ LO200000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ã LA200000	ð LD630000	æ LA510000	Ð LD620000	¯ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	‚ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	{ SM110000	ÿ LY170000	# SM010000	(EO)

Code Page 00275

Host Code Page 277-1/697-1 Denmark, Norway

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	¦ SM650000	@ SM050000	° SM190000	µ SM170000	¢ SC040000	æ LA510000	å LA270000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	# SM010000	¤ SC010000	ø LO610000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	Å LA280000	, SP080000	Æ LA520000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ø LO620000	ð LD630000	{ SM110000	Đ LD620000	¯ SM150000	ö LO170000	~ SD190000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	̦ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	[SM060000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00277

Host Code Page 278-1/697-1 Finland, Sweden

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	ä LA170000	å LA270000	É LE120000	0 ND100000
-1	(RSP) SP300000	` SD130000	/ SP120000	\ SM070000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	# SM010000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	[SM060000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	é LE110000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	§ SM240000	¤ SC010000	ö LO170000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	Å LA280000	, SP080000	Ä LA180000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ö LO180000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	¦ SM650000	~ SD190000	@ SM050000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	⸴ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00278

Host Code Page 280-1/697-1 Italy

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	[SM060000	µ SM170000	¢ SC040000	à LA130000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000	] SM080000	/ SP120000	É LE120000	a LA010000	j LJ010000	ì LI130000	# SM010000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	{ SM110000	} SM140000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	~ SD190000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ù LU130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	° SM190000	é LE110000	ò LO130000	: SP130000	« SP170000	ª SM210000	¡ SP030000	⌐ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	£ SC020000	» SP180000	º SM200000	¿ SP160000		SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Đ LD620000	¬ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	͵ SD410000	Ý LY120000	¨ SD170000	¦ SM650000	` SD130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00280

Host Code Page 284-1/697-1 Latin America, Spain

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	¨ SD170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	¦ SM650000	ß LS610000	# SM010000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	ñ LN190000	: SP130000	« SP170000	ª SM210000	¡ SP030000	^ SD150000	‾ (SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	$ SC030000	, SP080000	Ñ LN200000	» SP180000	º SM200000	¿ SP160000	! SP020000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	¬ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	~ SD190000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00284

Host Code Page 285-1/697-1 United Kingdom

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	{ SM110000	} SM140000	\\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	¯ SM150000	[SM060000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	$ SC030000	! SP020000	¦ SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	^ SD150000	‾(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	£ SC020000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	] SM080000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Đ LD620000	~ SD190000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	‚ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00285

Host Code Page 290 Japan (Katakana) Extended

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	[SM060000	] SM080000	ソ JS500000	~ SD190000	^ SD150000	{ SM110000	} SM140000	$ SC030000	0 ND100000
-1	｡ JQ700000	エ JE010000	/ SP120000	i LI010000	ア JA000000	タ JT100000	‾ SM150000	¢ SC040000	A LA020000	J LJ020000	€ SC200000	1 ND010000
-2	｢ JQ710000	オ JO010000	a LA010000	j LJ010000	イ JI000000	チ JT200000	ヘ JH400000	\ SM070000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	｣ JQ720000	ャ JY110000	b LB010000	k LK010000	ウ JU000000	ツ JT300000	ホ JH500000	t LT010000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	、 JQ730000	ユ JY310000	c LC010000	l LL010000	エ JE000000	テ JT400000	マ JM100000	u LU010000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	・ JQ740000	ヨ JY510000	d LD010000	m LM010000	オ JO000000	ト JT500000	ミ JM200000	v LV010000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ヲ JW500000	ッ JT310000	e LE010000	n LN010000	カ JK100000	ナ JN100000	ム JM300000	w LW010000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ア JA010000		f LF010000	o LO010000	キ JK200000	ニ JN200000	メ JM400000	x LX010000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	イ JI010000	― JX700000	g LG010000	p LP010000	ク JK300000	ヌ JN300000	モ JM500000	y LY010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ウ JU010000		h LH010000	` SD130000	ケ JK400000	ネ JN400000	ヤ JY100000	z LZ010000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	£ SC020000	! SP020000		: SP130000	コ JK500000	ノ JN500000	ユ JY300000	レ JR400000				
-B	. SP110000	¥ SC050000	, SP080000	# SM010000	q LQ010000	r LR010000	s LS010000	ロ JR500000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000	サ JS100000		ヨ JY500000	ワ JW100000				
-D	(SP060000	) SP070000	_ SP090000	' SP050000	シ JS200000	ハ JH100000	ラ JR100000	ン JN000000				
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ス JS300000	ヒ JH200000	リ JR200000	゛ JX710000				
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	セ JS400000	フ JH300000	ル JR300000	゜ JX720000				(EO)

Code Page 00290

Host Code Page 297-1/697-1 France

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	[SM060000	` SD130000	¢ SC040000	é LE110000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000	{ SM110000	/ SP120000	É LE120000	a LA010000	j LJ010000	¨ SD170000	# SM010000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	@ SM050000	} SM140000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	] SM080000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	µ SM170000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	° SM190000	§ SM240000	ù LU130000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	$ SC030000	, SP080000	£ SC020000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	à LA130000	ð LD630000	æ LA510000	Đ LD620000	⎯ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	̦ SD410000	Ý LY120000	~ SD190000	ò LO130000	¦ SM650000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00297

Host Code Page 420 Arabic Bilingual

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	– SP100000	AH450003	AS230000	AZ450000	AG310003	AK010003	SP140007	SP150007	× SA070000	0 ND100000
-1	(RSP) SP300000	AA310002	/ SP120000	AH470000	a LA010000	j LJ010000	÷ SA060000	AL010000	A LA020000	J LJ020000	(NSP) SP310000	1 ND010000
-2	AX100000	AW310000	AT020000	AH470003	b LB010000	k LK010000	s LS010000	AL220000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	AX100004		AT010000	AD010000	c LC010000	l LL010000	t LT010000	AL220003	C LC020000	L LL020000	T LT020000	3 ND030000
-4	— SM860000		AT010003	AD470000	d LD010000	m LM010000	u LU010000	AL320000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	SM870000	AY310000	AT470000	AR010000	e LE010000	n LN010000	v LV010000	AL320003	E LE020000	N LN020000	V LV020000	5 ND050000
-6	AX300000	AA010000	AT470003	AZ010000	f LF010000	o LO010000	w LW010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7	AA210000	AA010002	AG230000	AS010000	g LG010000	p LP010000	x LX010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8	AA210002	AB010000	AG230003	AS010003	h LH010000	q LQ010000	y LY010000	AL020000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	AA310000	AB010003	AH450000	SP080007	i LI010000	r LR010000	z LZ010000	AL020003	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¦ SM650000	: SP130000	AS230003	AC470000	AG310004	AL010003	(SHY) SP320000	AA020000	ND010001	
-B	. SP110000	$ SC030000	, SP080000	# SM010000	AS450000	AC470002	AF010000	AM010000	AH010003	AA020002	ND020001	ND060001
-C	< SA030000	* SM040007	⁕⁄ SM020007	@ SM050000	AS450003	AC470003	AF010003	AM010003		AY010000		ND070001
-D	(SP060000	) SP070000	_ SP090000	' SP050000	AD450000	AC470004	AQ010000	AN010000	AH010004	AY010002	ND030001	ND080001
-E	+ SA010000	; SP140000	> SA050000	= SA040000	AD450003	AG310000	AQ010003	AN010003		AY010003	ND040001	ND090001
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	AT450000	AG310002	AK010000	AH010000	AW010000	. ND100001	ND050001	(EO)

Code Page 00420

Host Code Page 424/941 Israel (Hebrew - Bulletin Code)

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000			° SM190000	μ SM170000	^ SD150000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	א HX330000	׳ HY010000	/ SP120000	ת HT010000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	ב HB010000	ך HK610000	ע HX350000		b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ג HG010000	כ HK010000	ף HP610000		c LC010000	l LL010000	t LT010000	● SM570000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ד HD010000	ל HL010000	פ HP010000	(RSP) SP300000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	ה HH010000	ם HM610000	ץ HS610000		e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ו HW010000	מ HM010000	צ HS450000		f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ז HZ010000	ן HN610000	ק HQ010000		g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ח HH450000	נ HN010000	ר HR010000	= SM100000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ט HT450000	ס HS010000	ש HS210000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¦ SM650000	: SP130000	« SP170000			[SM060000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	» SP180000			] SM080000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000				¯ SM150000				
-D	(SP060000	) SP070000	‾ SP090000	' SP050000		́ SD410000		¨ SD170000				
-E	+ SA010000	; SP140000	> SA050000	= SA040000				´ SD110000				
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000				(EO)

Code Page 00424

Host Code Page 500-1/697-1 International

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → / 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‾ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	¦ SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	– SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	‚ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00500

Host Code Page 803 Israel (Hebrew - Old Code)

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	א HX330000	- SP100000									0 ND100000
-1			/ SP120000		ב HB010000	ך HK610000			A LA020000	J LJ020000		1 ND010000
-2					ג HG010000	כ HK010000	ף HP610000		B LB020000	K LK020000	S LS020000	2 ND020000
-3					ד HD010000	ל HL010000	פ HP010000		C LC020000	L LL020000	T LT020000	3 ND030000
-4					ה HH010000	ם HM610000	ץ HS610000		D LD020000	M LM020000	U LU020000	4 ND040000
-5					ו HW010000	מ HM010000	צ HS450000		E LE020000	N LN020000	V LV020000	5 ND050000
-6					ז HZ010000	ן HN610000	ק HQ010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7					ח HH450000	נ HN010000	ר HR010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8					ט HT450000	ס HS010000	ש HS210000		H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9					י HY010000	ע HX350000	ת HT010000		I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	$ SC030000	! SP020000		: SP130000								
-B	. SP110000	לי SC150000	, SP080000	# SM010000								
-C	< SA030000	* SM040000	% SM020000	@ SM050000								
-D	(SP060000	) SP070000	_ SP090000	' SP050000								
-E	+ SA010000	; SP140000	> SA050000	= SA040000								
-F	| SM130000	¬ SM660000	? SP150000	" SP040000								(EO)

Code Page 00803

Host Code Page 833/1173 Hangeul

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	[SM060000	] SM080000		‾ SM150000	^ SD150000	{ SM110000	} SM140000	₩ SC140000	0 ND100000
-1			/ SP120000		a LA010000	j LJ010000	~ SD190000		A LA020000	J LJ020000		1 ND010000
-2	SP490000	ㄸ OD100000	ㅀ OL300000	ㅈ OJ000000	b LB010000	k LK010000	s LS010000	\ SM070000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ㄱ OG000000	ㄹ OL000000	ㅁ OM000000	ㅉ OJ100000	c LC010000	l LL010000	t LT010000		C LC020000	L LL020000	T LT020000	3 ND030000
-4	ㄲ OG100000	ㄽ OL200000	ㅂ OB000000	ㅊ OC200000	d LD010000	m LM010000	u LU010000		D LD020000	M LM020000	U LU020000	4 ND040000
-5	ㄳ OG200000	ㄾ OL400000	ㅃ OB100000	ㅋ OK000000	e LE010000	n LN010000	v LV010000		E LE020000	N LN020000	V LV020000	5 ND050000
-6	ㄴ ON000000	ㄿ OL100000	ㅄ OB200000	ㅌ OT000000	f LF010000	o LO010000	w LW010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7	ㄵ ON150000	ㅀ OL600000	ㅅ OS000000	ㅍ OP000000	g LG010000	p LP010000	x LX010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8	ㄶ ON100000	ㅀ OL700000	ㅆ OS100000	ㅎ OH000000	h LH010000	q LQ010000	y LY010000		H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ㄷ OD000000	ㄼ OL500000	ㅇ ON200000	` SD130000	i LI010000	r LR010000	z LZ010000		I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¦ SM650000	: SP130000	ㅏ OA000000	ㅕ OY400000	ㅛ OY500000	‐ OE300000				
-B	. SP110000	$ SC030000	, SP080000	# SM010000	ㅐ OA200000	ㅖ OY300000	ㅜ OU000000	ㅢ OE400000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ㅑ OY200000	ㅗ OO000000	ㅝ OU300000	ㅣ OI000000				
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ㅒ OY250000	ㅘ OO100000	ㅞ OU200000					
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ㅓ OE200000	ㅙ OO200000	ㅟ OU400000					
-F		SM130000	¬ SM660000	? SP150000	" SP040000	ㅔ OE000000	ㅚ OO300000	ㅠ OY600000					(EO)

Code Page 00833

Host Code Page 836/1174 Simplified Chinese

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000				~ SD190000	^ SD150000	{ SM110000	} SM140000	$ SC030000	0 ND100000
-1			/ SP120000		a LA010000	j LJ010000	¯ SM150000		A LA020000	J LJ020000		1 ND010000
-2					b LB010000	k LK010000	s LS010000	\ SM070000	B LB020000	K LK020000	S LS020000	2 ND020000
-3					c LC010000	l LL010000	t LT010000		C LC020000	L LL020000	T LT020000	3 ND030000
-4					d LD010000	m LM010000	u LU010000		D LD020000	M LM020000	U LU020000	4 ND040000
-5					e LE010000	n LN010000	v LV010000		E LE020000	N LN020000	V LV020000	5 ND050000
-6					f LF010000	o LO010000	w LW010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7					g LG010000	p LP010000	x LX010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8					h LH010000	q LQ010000	y LY010000		H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9				` SD130000	i LI010000	r LR010000	z LZ010000		I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	£ SC020000	! SP020000	¦ SM650000	: SP130000				[SM060000				
-B	· SP110000	¥ SC120000	, SP080000	# SM010000				] SM080000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000								
-D	(SP060000	) SP070000	‗ SP090000	' SP050000								
-E	+ SA010000	; SP140000	> SA050000	= SA040000								
-F	¦ SM130000	¬ SM660000	? SP150000	" SP040000								(EO)

Code Page 00836

Host Code Page 870/959 Latin 2 - EBCDIC Multilingual

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → / 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	– SP100000	ˇ SD210000	˘ SD230000	° SM190000	ą LA430000	˙ SD290000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	Ą LA440000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ę LE430000	Â LA160000	Ę LE440000	b LB010000	k LK010000	s LS010000	ż LZ290000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	Ţ LT420000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ţ LT410000	ů LU270000	″ SD250000	Ů LU280000	d LD010000	m LM010000	u LU010000	Ż LZ300000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ă LA230000	î LI150000	Ă LA240000	Î LI160000	f LF010000	o LO010000	w LW010000	ž LZ210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	č LC210000	ľ LL210000	Č LC220000	Ľ LL220000	g LG010000	p LP010000	x LX010000	ź LZ110000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ĺ LL110000	Ç LC420000	Ĺ LL120000	h LH010000	q LQ010000	y LY010000	Ž LZ220000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ć LC110000	ß LS610000	Ć LC120000	` SD130000	i LI010000	r LR010000	z LZ010000	Ź LZ120000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	ś LS110000	ł LL610000	Ś LS120000	Ł LL620000	(SHY) SP320000	Ě LE220000	ď LD210000	Ď LD220000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	ň LN210000	ń LN110000	Ň LN220000	Ń LN120000	ô LO150000	ű LU250000	Ô LO160000	Ű LU260000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	đ LD610000	š LS210000	Đ LD620000	Š LS220000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	˛ SD410000	Ý LY120000	¨ SD170000	ŕ LR110000	ť LT210000	Ŕ LR120000	Ť LT220000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ř LR210000	¸ SD430000	Ř LR220000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	ş LS410000	¤ SC010000	Ş LS420000	× SA070000	ő LO250000	ě LE210000	Ő LO260000	(EO)

Code Page 00870

Host Code Page 871-1/697-1 Iceland

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ / 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	þ LT630000	æ LA510000	′ SD110000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ö LO170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ð LD630000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Þ LT640000	Æ LA520000	¦ SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000		SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ð LD620000	` SD130000	} SM140000	@ SM050000	― SM150000	~ SD190000	ü LU170000	^ SD150000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	{ SM110000	] SM080000	[SM060000	\ SM070000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	Ö LO180000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00871

Host Code Page 875 Greece

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‒ SP100000	·· SD170000	·⁄ SD730000	º SM190000	′ SD110000	£ SC020000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	A GA020000	K GK020000	/ SP120000	΄Α GA120000	a LA010000	j LJ010000	~ SD190000	ά GA110000	A LA020000	J LJ020000		1 ND010000
-2	B GB020000	Λ GL020000	T GT020000	΄Ε GE120000	b LB010000	k LK010000	s LS010000	έ GE110000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	Γ GG020000	M GM020000	Y GU020000	΄Η GE720000	c LC010000	l LL010000	t LT010000	ή GE710000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	Δ GD020000	N GN020000	Φ GF020000	(RSP) SP300000	d LD010000	m LM010000	u LU010000	ï GI170000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	E GE020000	Ξ GX020000	X GH020000	΄Ι GI120000	e LE010000	n LN010000	v LV010000	ί GI110000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	Z GZ020000	O GO020000	Ψ GP620000	΄Ο GO120000	f LF010000	o LO010000	w LW010000	ό GO110000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	H GE320000	Π GP020000	Ω GO320000	΄Υ GU120000	g LG010000	p LP010000	x LX010000	ύ GU110000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	Θ GT620000	P GR020000	Ϊ GI180000	΄Ω GO720000	h LH010000	q LQ010000	y LY010000	ϋ GU170000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	I GI020000	Σ GS020000	Ϋ GU180000	` SD130000	i LI010000	r LR010000	z LZ010000	ώ GO710000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	α GA010000	η GE310000	ν GN010000	ς GS610000	(SHY) SP320000	± SA020000	² ND021000	³ ND031000
-B	· SP110000	$ SC030000	, SP080000	# SM010000	β GB010000	θ GT610000	ξ GX010000	τ GT010000	ω GO310000	½ NF010000	§ SM240000	© SM520000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	γ GG010000	ι GI010000	o GO010000	υ GU010000	ί GI730000			€ SC200000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	δ GD010000	κ GK010000	π GP010000	φ GF010000	ύ GU730000	· SD630000		
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ε GE010000	λ GL010000	ρ GR010000	χ GH010000	' SP190000	' SP200000	« SP170000	» SP180000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	ζ GZ010000	μ GM010000	σ GS010000	ψ GP610000	― SM120000	| SM650000	¬ SM660000	(EO)

Code Page 00875

Host Code Page 924-1/1353-1 International

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → / 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‾ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	Œ LO520000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	œ LO510000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	Ÿ LY180000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ý LY120000	! SP020000	Š LS220000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	‾(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	š LS210000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Đ LD640000	¯ SD310000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	ž LZ210000	[SM060000	] SM080000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	Ž LZ220000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F		SM130000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00924

Host Code Page 1025/1150 Cyrillic

The column indicates the first digit, and the row indicates the second digit. If this code page is not used with a Cyrillic host machine, certain characters might not display properly.

HEX DIGITS 1ST → / 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	Њ KN120000	ц KC010000	й KJ110000	Я KA150000	Ь KX110000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	Љ KL410000	/ SP120000	Ћ KC120000	a LA010000	j LJ010000	~ SD190000	Ы KY010000	A LA020000	J LJ020000	§ SM240000	1 ND010000
-2	ђ KD610000	њ KN110000	Ѓ KG120000	Ќ KK120000	b LB010000	k LK010000	s LS010000	З KZ010000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ѓ KG110000	ћ KC110000	Ё KE180000	(SHY) SP320000	c LC010000	l LL010000	t LT010000	ш KS210000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ё KE170000	ќ KK110000	Є KE160000	Ў KU240000	d LD010000	m LM010000	u LU010000	э KE130000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	є KE150000	ў KU230000	Ѕ KZ160000	Џ KG220000	e LE010000	n LN010000	v LV010000	щ KS150000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ѕ KZ150000	џ KG210000	I KI120000	ю KU150000	f LF010000	o LO010000	w LW010000	ч KC210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	і KI110000	Ъ KU220000	Ï KI180000	a KA010000	g LG010000	p LP010000	x LX010000	ъ KU210000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ї KI170000	№ SM000000	J KJ020000	б KB010000	h LH010000	q LQ010000	y LY010000	Ю KU160000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ј KJ010000	Ђ KD620000	Љ KL420000	` SD130000	i LI010000	r LR010000	z LZ010000	A KA020000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	д KD010000	к KK010000	р KR010000	Б KB020000	X KH020000	Н KN020000	Т KT020000	З KZ020000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	е KE010000	л KL010000	с KS010000	Ц KC020000	И KI020000	О KO020000	У KU020000	Ш KS220000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ф KF010000	м KM010000	т KT010000	Д KD020000	Й KJ120000	П KP020000	Ж KZ220000	Э KE140000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	г KG010000	н KN010000	у KU010000	Е KE020000	К KK020000	Я KA160000	В KV020000	Щ KS160000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	х KH010000	о KO010000	ж KZ210000	Ф KF020000	Л KL020000	Р KR020000	Ь KX120000	Ч KC220000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	и KI010000	п KP010000	в KV010000	Г KG020000	М KM020000	С KS020000	Ы KY020000	(EO)

Code Page 01025

Host Code Page 1026/1152 Latin 5 - Turkey

The column indicates the first digit, and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	– SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	ç LC410000	ğ LG230000	ü LU170000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ö LO170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	{ SM110000	ì LI130000	[SM060000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	1 LI610000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ç LC420000	Ğ LG240000	Ş LS410000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	İ LI300000	, SP080000	Ö LO180000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ş LS420000	} SM140000	æ LA510000	] SM080000	¯ SM150000	~ SD190000	\ SM070000	# SM010000	" SP040000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	` SD130000	´ SD410000	$ SC030000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	¦ SM650000	Æ LA520000	@ SM050000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	Ü LU180000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01026

Host Code Page 1027/1172 Japan (Latin) Extended

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	コ JK500000			‾ SM150000	^ SD150000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1		ウ JU010000	/ SP120000	サ JS100000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	€ SC200000	1 ND010000
-2	° JQ700000	エ JE010000	イ JI000000	シ JS200000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	「 JQ710000	オ JO010000	ウ JU000000	ス JS300000	c LC010000	l LL010000	t LT010000	ヤ JY100000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	」 JQ720000	ヤ JY110000	エ JE000000	セ JS400000	d LD010000	m LM010000	u LU010000	ユ JY300000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	、 JQ730000	ユ JY310000	オ JO000000	ソ JS500000	e LE010000	n LN010000	v LV010000	ヨ JY500000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	・ JQ740000	ヨ JY510000	カ JK100000	タ JT100000	f LF010000	o LO010000	w LW010000	ラ JR100000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ヲ JW500000	ッ JT310000	キ JK200000	チ JT200000	g LG010000	p LP010000	x LX010000	リ JR200000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ア JA010000	ー JX700000	ク JK300000	ツ JT300000	h LH010000	q LQ010000	y LY010000	ル JR300000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	イ JI010000	ア JA000000	ケ JK400000	｀ SD130000	i LI010000	r LR010000	z LZ010000	レ JR400000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000		: SP130000	テ JT400000	ノ JN500000	マ JM100000	ロ JR500000				
-B	· SP110000	$ SC030000	, SP080000	# SM010000	ト JT500000	ハ JH100000	ミ JM200000	ワ JW100000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ナ JN100000	ヒ JH200000	ム JM300000	ン JN000000				
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ニ JN200000	フ JH300000	[SM060000	] SM080000				
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ヌ JN300000	ヘ JH400000	メ JM400000	゛ JX710000				
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	ネ JN400000	ホ JH500000	モ JM500000	゜ JX720000				(EO)

Code Page 01027

Host Code Page 1047/103 Latin 1 (Open Systems)

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¬ SM660000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¦ SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	Ý LY120000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	¨ SD170000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	¯ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	[SM060000	] SM080000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	^ SD150000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01047

Host Code Page 1112/1035 Latvia, Lithuania

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	^ SD150000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	š LS210000	ę LE430000	Š LS220000	Ę LE440000	b LB010000	k LK010000	s LS010000	ī LI310000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ė LE290000	Ä LA180000	Ė LE300000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ą LA430000	č LC210000	Ą LA440000	Č LC220000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	į LI430000	ų LU430000	Į LI440000	Ų LU440000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ū LU310000	„ SP230000	Ū LU320000	Ī LI320000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	" SP210000	Å LA280000	Ļ LL420000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ē LE310000	ġ LG410000	Ē LE320000	Ģ LG420000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ž LZ210000	ß LS610000	Ž LZ220000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¦ SM650000	: SP130000	« SP170000	Ŗ LR420000	" SP220000	[SM060000	⁻ (SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	ŗ LR410000	ź LZ110000	] SM080000	ō LO310000	ć LC110000	Ō LO320000	Ć LC120000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ā LA310000	æ LA510000	Ā LA320000	Ź LZ120000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ż LZ290000	ķ LK410000	Ż LZ300000	Ķ LK420000	ņ LN410000	ł LL610000	Ņ LN420000	Ł LL620000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ń LN110000	Æ LA520000	Ń LN120000	ļ LL410000	ó LO110000	ś LS110000	Ó LO120000	Ś LS120000
-F		SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	' SP200000	Õ LO200000	(EO)

Code Page 01112

Host Code Page 1122/1037 Estonia

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‑ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	ä LA170000	å LA270000	É LE120000	0 ND100000
-1	(RSP) SP300000	` SD130000	/ SP120000	\ SM070000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	# SM010000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	[SM060000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	é LE110000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	§ SM240000	¤ SC010000	ö LO170000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	‾ (SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	Å LA280000	, SP080000	Ä LA180000	» SP180000	º SM200000	¿ SP160000		SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ö LO180000	š LS210000	æ LA510000	Š LS220000	‒ SM150000	¦ SM650000	~ SD190000	@ SM050000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	‚ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ž LZ210000	Æ LA520000	Ž LZ220000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01122

Host Code Page 1123 Ukraine

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	– SP100000	Њ KN120000	ц KC010000	й KJ110000	Я KA150000	Ь KX110000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	Љ KL410000	/ SP120000	Ћ KC120000	a LA010000	j LJ010000	~ SD190000	Ы KY010000	A LA020000	J LJ020000	§ SM240000	1 ND010000
-2	ђ KD610000	њ KN110000	Г KG300000	Ќ KK120000	b LB010000	k LK010000	s LS010000	З KZ010000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	г KG290000	ћ KC110000	Ё KE180000	(SHY) SP320000	c LC010000	l LL010000	t LT010000	Ш KS210000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ё KE170000	ќ KK110000	Є KE160000	Ӳ KU240000	d LD010000	m LM010000	u LU010000	Э KE130000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	є KE150000	ў KU230000	Ѕ KZ160000	Ц KG220000	e LE010000	n LN010000	v LV010000	Щ KS150000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ѕ KZ150000	џ KG210000	I KI120000	Ю KU150000	f LF010000	o LO010000	w LW010000	Ч KC210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	i KI110000	Ъ KU220000	Ї KI180000	a KA010000	g LG010000	p LP010000	x LX010000	Ъ KU210000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ї KI170000	№ SM000000	J KJ020000	б KB010000	h LH010000	q LQ010000	y LY010000	Ю KU160000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	j KJ010000	Ђ KD620000	Љ KL420000	` SD130000	i LI010000	r LR010000	z LZ010000	A KA020000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	д KD010000	к KK010000	р KR010000	Б KB020000	X KH020000	H KN020000	T KT020000	З KZ020000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	е KE010000	л KL010000	с KS010000	Ц KC020000	И KI020000	О KO020000	У KU020000	Ш KS220000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ф KF010000	м KM010000	т KT010000	Д KD020000	Й KJ120000	П KP020000	Ж KZ220000	Э KE140000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	г KG010000	н KN010000	у KU010000	Е KE020000	К KK020000	Я KA160000	В KV020000	Щ KS160000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	х KH010000	о KO010000	ж KZ210000	Ф KF020000	Л KL020000	Р KR020000	Ь KX120000	Ч KC220000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	и KI010000	п KP010000	в KV010000	Г KG020000	М KM020000	С KS020000	Ы KY020000	(EO)

Code Page 01123

Host Code Page 1130 Vietnam

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ă LA230000	î LI150000	Ă LA240000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	˜ SD198000	Ç LC420000	đ SC180000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	¦ SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	đ LD610000	æ LA510000	Đ LD600000	¯ SD310000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	̉ SD918000	Œ LO520000	̣ SD458000	œ LO510000	ư LU910000	ù LU130000	Ư LU920000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	̀ SD138000	Æ LA520000	́ SD118000	Ÿ LY180000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	ơ LO910000	ÿ LY170000	Ơ LO920000	(EO)

Code Page 01130

Host Code Page 1132 Laos

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ / 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	¬ SP100000	Ƙ SC190000				໐ U0000ED0	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000		/ SP120000		a LA010000	j LJ010000	~ SD190000	໑ U0000ED1	A LA020000	J LJ020000		1 ND010000
-2	ກ U0000E81	ຍ U0000E8D	ບ U0000E9B	ຣ U0000EA3	b LB010000	k LK010000	s LS010000	໒ U0000ED2	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ຂ U0000E82	ດ U0000E94	ປ U0000E9C	ລ U0000EA5	c LC010000	l LL010000	t LT010000	໓ U0000ED3	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ຄ U0000E84	ຕ U0000E95	ຝ U0000E9D	ວ U0000EA7	d LD010000	m LM010000	u LU010000	໔ U0000ED4	D LD020000	M LM020000	U LU020000	4 ND040000
-5	ງ U0000E87	ຖ U0000E96	ພ U0000E9E	ຫ U0000EAB	e LE010000	n LN010000	v LV010000	໕ U0000ED5	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ຈ U0000E88	ທ U0000E97	ຟ U0000E9F	ຍ U0000EAD	f LF010000	o LO010000	w LW010000	໖ U0000ED6	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ສ U0000EAA	ນ U0000E99	ມ U0000EA1	ຮ U0000EAE	g LG010000	p LP010000	x LX010000	໗ U0000ED7	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ຊ U0000E8A	ບ U0000E9A	ຢ U0000EA2		h LH010000	q LQ010000	y LY010000	໘ U0000ED8	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	[SM060000	] SM080000	^ SD150000	` SD130000	i LI010000	r LR010000	z LZ010000	໙ U0000ED9	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¦ SM650000	: SP130000		ຊ U0000EB4	ຼ U0000EBC			ໍ U0000ECD		
-B	. SP110000	$ SC030000	, SP080000	# SM010000		ຕ U0000EB5	ຫ U0000EB1	ເ U0000EC0	່ U0000EC8	ໆ U0000EC6		
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ຯ U0000EAF	ຖ U0000EB6	ຫ U0000EBB	ແ U0000EC1	້ U0000EC9			
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ະ U0000EB0	ທ U0000EB7	ຽ U0000EBD	ໂ U0000EC2	໊ U0000ECA	ໝ U0000EDC		
-E	+ SA010000	; SP140000	> SA050000	= SA040000	າ U0000EB2	ຘ U0000EB8		ໃ U0000EC3	໋ U0000ECB	ໝ U0000EDD		
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	ຳ U0000EB3	ຩ U0000EB9		ໄ U0000EC4	໌ U0000ECC			(EO)

Code Page 01132

Host Code Page 1137 India

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ / 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	– SP100000	ज्ञ U000091D	द U0000926	म U000092E	(ZW)(N-J) SP5300Z0	◌ैT U000093E	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	ऋ U000090B	/ SP120000	अ U000091E	a LA010000	j LJ010000	~ SD190000	◌ी U000093F	A LA020000	J LJ020000	(ZW)(Join) SP5400Z0	1 ND010000
-2	◌ँ U0000901	ॡ U000090C	औ U0000914	ट U000091F	b LB010000	k LK010000	s LS010000	◌ो U0000940	B LB020000	K LK020000	S LS020000	2 ND020000
-3	◌ं U0000902	ऍ U000090D	क U0000915	ठ U0000920	c LC010000	l LL010000	t LT010000	◌ौ U0000941	C LC020000	L LL020000	T LT020000	3 ND030000
-4	◌ः U0000903	ऎ U000090E	ख U0000916	ड U0000921	d LD010000	m LM010000	u LU010000	◌् U0000942	D LD020000	M LM020000	U LU020000	4 ND040000
-5	अ U0000905	ए U000090F	ग U0000917	ढ U0000922	e LE010000	n LN010000	v LV010000	◌ U0000943	E LE020000	N LN020000	V LV020000	5 ND050000
-6	आ U0000906	ऐ U0000910	घ U0000918	ण U0000923	f LF010000	o LO010000	w LW010000	◌ U0000944	F LF020000	O LO020000	W LW020000	6 ND060000
-7	इ U0000907	आँ U0000911	ङ U0000919	त U0000924	g LG010000	p LP010000	x LX010000	◌ U0000945	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ई U0000908	ऒ U0000912	च U000091A	थ U0000925	h LH010000	q LQ010000	y LY010000	◌ U0000946	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	उ U0000909	ओ U0000913	छ U000091B	` SD130000	i LI010000	r LR010000	z LZ010000	◌ U0000947	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	ऊ U000090A	! SP020000	ज U000091C	: SP130000	ध U0000927	य U000092F	ष U0000937	◌ U0000948	◌ U000094D	ॠ U0000960	० U0000966	६ U000096C
-B	◌ SP110000	$ SC030000	, SP080000	# SM010000	न U0000928	र U0000930	स U0000938	◌ाँ U0000949	ॐ U0000950	ॡ U0000961	१ U0000967	७ U000096D
-C	< SA030000	* SM040000	% SM020000	@ SM050000	प U000092A	ल U0000932	ह U0000939	◌ो U000094A	◌ U0000951	◌ U0000962	२ U0000968	८ U000096E
-D	(SP060000	) SP070000	‾ SP090000	' SP050000	फ U000092B	ळ U0000933	[SM060000	] SM080000	◌ U0000952	◌ U0000963	३ U0000969	९ U000096F
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ब U000092C	व U0000935	◌ U000093C	◌ौ U000094B		॰ U0000964	४ U000096A	० U0000970
-F		SM130000	^ SD150000	? SP150000	" SP040000	भ U000092D	श U0000936	ऽ U000093D	◌ U000094C		॥ U0000965	५ U000096B	(EO)

Code Page 01137

Host Code Page 1140-1/695-1 Brazil, Canada, Netherlands, Portugal, U.S., and 1140/1175 Traditional Chinese

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‾ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	^ SD150000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¦ SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	[SM060000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	] SM080000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Đ LD620000	¬ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01140

Host Code Page 1141-1/695-1 Austria, Germany

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ / 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	ä LA170000	ü LU170000	Ö LO180000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ß LS610000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	[SM060000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	~ SD190000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ä LA180000	Ü LU180000	ö LO170000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000		SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Đ LD620000	¯ SM150000	¦ SM650000	} SM140000	\ SM070000	] SM080000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	‚ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01141

Host Code Page 1142-1/695-1 Denmark, Norway

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → / 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	¦ SM650000	@ SM050000	° SM190000	µ SM170000	¢ SC040000	æ LA510000	å LA270000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	# SM010000	€ SC200000	ø LO610000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	Å LA280000	, SP080000	Æ LA520000	» SP180000	º SM200000	¿ SP160000	¦ SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ø LO620000	ð LD630000	{ SM110000	Đ LD620000	‒ SM150000	ö LO170000	~ SD190000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	ؚ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	[SM060000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01142

Host Code Page 1143-1/695-1 Finland, Sweden

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	– SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	ä LA170000	å LA270000	É LE120000	0 ND100000
-1	(RSP) SP300000	` SD130000	/ SP120000	\ SM070000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	# SM010000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	[SM060000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	é LE110000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	§ SM240000	€ SC200000	ö LO170000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	Å LA280000	, SP080000	Ä LA180000	» SP180000	º SM200000	¿ SP160000	¦ SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ö LO180000	ð LD630000	æ LA510000	Đ LD620000	– SM150000	¦ SM650000	~ SD190000	@ SM050000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	‚ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01143

Host Code Page 1144-1/695-1 Italy

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → / 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	[SM060000	µ SM170000	¢ SC040000	à LA130000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000	] SM080000	/ SP120000	É LE120000	a LA010000	j LJ010000	ì LI130000	# SM010000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	{ SM110000	} SM140000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	~ SD190000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ù LU130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	º SM190000	é LE110000	ò LO130000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	$ SC030000	, SP080000	£ SC020000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Đ LD620000	SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	؛ SD410000	Ý LY120000	¨ SD170000	¦ SM650000	` SD130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01144

Host Code Page 1145-1/695-1 Latin America, Spain

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	¨ SD170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	¦ SM650000	ß LS610000	# SM010000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	ñ LN190000	: SP130000	« SP170000	ª SM210000	¡ SP030000	^ SD150000	¯ (SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	Ñ LN200000	» SP180000	º SM200000	¿ SP160000	! SP020000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Đ LD620000	¬ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	‚ SD410000	Ý LY120000	~ SD190000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01145

Host Code Page 1146-1/695-1 United Kingdom

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	– SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	‾ SM150000	[SM060000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	$ SC030000	! SP020000	¦ SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	^ SD150000	‾ (SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	£ SC020000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	] SM080000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Đ LD620000	~ SD190000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01146

Host Code Page 1147-1/695-1 France

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‑ SP100000	ø LO610000	Ø LO620000	[SM060000	` SD130000	¢ SC040000	é LE110000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000	{ SM110000	/ SP120000	É LE120000	a LA010000	j LJ010000	¨ SD170000	# SM010000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	@ SM050000	} SM140000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	] SM080000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	µ SM170000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	º SM190000	§ SM240000	ù LU130000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	‾ (SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	$ SC030000	, SP080000	£ SC020000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	à LA130000	ð LD630000	æ LA510000	Ð LD620000	‒ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	‚ SD410000	Ý LY120000	~ SD190000	ò LO130000	¦ SM650000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01147

Host Code Page 1148-1/695-1 International

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → / 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‑ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	¦ SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	‾ (SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	¦ SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	‑ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01148

Host Code Page 1149-1/695-1 Iceland

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → / 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‑ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	þ LT630000	æ LA510000	´ SD110000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ö LO170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ð LD630000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Þ LT640000	Æ LA520000	¦ SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	‾(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	¦ SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ð LD620000	` SD130000	} SM140000	@ SM050000	¯ SM150000	~ SD190000	ü LU170000	^ SD150000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	{ SM110000	] SM080000	[SM060000	\ SM070000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	Ö LO180000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01149

Host Code Page 1153/1375 Latin 2 - EBCDIC Multilingual

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	– SP100000	ˇ SD210000	˘ SD230000	° SM190000	ą LA430000	˙ SD290000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	Ą LA440000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ę LE430000	Â LA160000	Ę LE440000	b LB010000	k LK010000	s LS010000	ż LZ290000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	Ţ LT420000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ţ LT410000	ů LU270000	″ SD250000	Ů LU280000	d LD010000	m LM010000	u LU010000	Ż LZ300000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ă LA230000	î LI150000	Ă LA240000	Î LI160000	f LF010000	o LO010000	w LW010000	ž LZ210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	č LC210000	ľ LL210000	Č LC220000	Ľ LL220000	g LG010000	p LP010000	x LX010000	ź LZ110000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ĺ LL110000	Ç LC420000	Ĺ LL120000	h LH010000	q LQ010000	y LY010000	Ž LZ220000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ć LC110000	ß LS610000	Ć LC120000	` SD130000	i LI010000	r LR010000	z LZ010000	Ź LZ120000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	ś LS110000	ł LL610000	Ś LS120000	Ł LL620000	(SHY) SP320000	Ě LE220000	ď LD210000	Ď LD220000
-B	· SP110000	$ SC030000	, SP080000	# SM010000	ň LN210000	ń LN110000	Ň LN220000	Ń LN120000	ô LO150000	ű LU250000	Ô LO160000	Ű LU260000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	đ LD610000	š LS210000	Đ LD600000	Š LS220000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	˛ SD410000	Ý LY120000	¨ SD170000	ŕ LR110000	ť LT210000	Ŕ LR120000	Ť LT220000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ř LR210000	˛ SD430000	Ř LR220000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	ş LS410000	€ SC200000	Ş LS420000	× SA070000	ő LO250000	ě LE210000	Ő LO260000	(EO)

Code Page 01153

Host Code Page 1154/1381 Cyrillic

The column indicates the first digit, and the row indicates the second digit. If this code page is not used with a Cyrillic host machine, certain characters might not display properly.

HEX DIGITS 1ST→ / 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	– SP100000	Њ KN120000	ц KC010000	й KJ110000	Я KA150000	Ь KX110000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	Љ KL410000	/ SP120000	Ћ KC120000	a LA010000	j LJ010000	~ SD190000	Ы KY010000	A LA020000	J LJ020000	€ SC200000	1 ND010000
-2	ђ KD610000	Њ KN110000	Ѓ KG120000	Ќ KK120000	b LB010000	k LK010000	s LS010000	з KZ010000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ѓ KG110000	ħ KC110000	Ё KE180000	(SHY) SP320000	c LC010000	l LL010000	t LT010000	ш KS210000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ё KE170000	ќ KK110000	Є KE160000	Ў KU240000	d LD010000	m LM010000	u LU010000	э KE130000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	є KE150000	ў KU230000	Ѕ KZ160000	Џ KG220000	e LE010000	n LN010000	v LV010000	щ KS150000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ѕ KZ150000	џ KG210000	I KI120000	ю KU150000	f LF010000	o LO010000	w LW010000	ч KC210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	і KI110000	Ъ KU220000	Ї KI180000	a KA010000	g LG010000	p LP010000	x LX010000	ъ KU210000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ї KI170000	№ SM000000	J KJ020000	б KB010000	h LH010000	q LQ010000	y LY010000	Ю KU160000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ј KJ010000	Ђ KD620000	Љ KL420000	` SD130000	i LI010000	r LR010000	z LZ010000	A KA020000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	д KD010000	к KK010000	р KR010000	Б KB020000	X KH020000	Н KN020000	Т KT020000	З KZ020000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	е KE010000	л KL010000	с KS010000	Ц KC020000	И KI020000	О KO020000	У KU020000	Ш KS220000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ф KF010000	м KM010000	т KT010000	Д KD020000	Й KJ120000	П KP020000	Ж KZ220000	Э KE140000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	г KG010000	н KN010000	у KU010000	Е KE020000	К KK020000	Я KA160000	В KV020000	Щ KS160000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	х KH010000	о KO010000	ж KZ210000	Ф KF020000	Л KL020000	Р KR020000	Ь KX120000	Ч KC220000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	и KI010000	п KP010000	в KV010000	Г KG020000	М KM020000	С KS020000	Ы KY020000	(EO)

Code Page 01154

Host Code Page 1155/1378 Latin 5 - Turkey

The column indicates the first digit, and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	ç LC410000	ğ LG230000	ü LU170000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ö LO170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	{ SM110000	ì LI130000	[SM060000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	¹ LI610000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ç LC420000	Ğ LG240000	Ş LS410000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	İ LI300000	, SP080000	Ö LO180000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ş LS420000	} SM140000	æ LA510000	] SM080000	¯ SD310000	~ SD190000	\ SM070000	# SM010000	" SP040000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	` SD130000	¸ SD410000	$ SC030000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	¦ SM650000	Æ LA520000	@ SM050000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	Ü LU180000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01155

Host Code Page 1156/1393 Latvia, Lithuania

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	^ SD150000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	š LS210000	ę LE430000	Š LS220000	Ę LE440000	b LB010000	k LK010000	s LS010000	ī LI310000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ė LE290000	Ä LA180000	Ė LE300000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ą LA430000	č LC210000	Ą LA440000	Č LC220000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	į LI430000	ų LU430000	Į LI440000	Ų LU440000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ū LU310000	„ SP230000	Ū LU320000	Ī LI320000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	" SP210000	Å LA280000	Ł LL420000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ē LE310000	ġ LG410000	Ē LE320000	Ģ LG420000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ž LZ210000	ß LS610000	Ž LZ220000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¦ SM650000	: SP130000	« SP170000	Ŗ LR420000	" SP220000	[SM060000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	ŗ LR410000	ź LZ110000	] SM080000	ō LO310000	ć LC110000	Ō LO320000	Ć LC120000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ā LA310000	æ LA510000	Ā LA320000	Ź LZ120000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ż LZ290000	ķ LK410000	Ż LZ300000	Ķ LK420000	ņ LN410000	ł LL610000	Ņ LN420000	Ł LL620000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ń LN110000	Æ LA520000	Ń LN120000	ļ LL410000	ó LO110000	ś LS110000	Ó LO120000	Ś LS120000
-F	¦ SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	' SP200000	Õ LO200000	(EO)

Code Page 01156

Host Code Page 1157/1391 Estonia

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	ä LA170000	å LA270000	É LE120000	0 ND100000
-1	(RSP) SP300000	` SD130000	/ SP120000	\ SM070000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	# SM010000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	[SM060000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	é LE110000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	§ SM240000	€ SC200000	ö LO170000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	Å LA280000	, SP080000	Ä LA180000	» SP180000	º SM200000	¿ SP160000	¦ SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ö LO180000	š LS210000	æ LA510000	Š LS220000	SD310000	¦ SM650000	~ SD190000	@ SM050000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ž LZ210000	Æ LA520000	Ž LZ220000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01157

Host Code Page 1158/1388 Ukraine

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST→ 2ND↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	– SP100000	Њ KN120000	ц KC010000	й KJ110000	Я KA150000	Ь KX110000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	Љ KL410000	/ SP120000	Ћ KC120000	a LA010000	j LJ010000	~ SD190000	Ы KY010000	A LA020000	J LJ020000	€ SC200000	1 ND010000
-2	đ KD610000	Њ KN110000	Г KG300000	Ќ KK120000	b LB010000	k LK010000	s LS010000	з KZ010000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	г KG290000	ђ KC110000	Ё KE180000	(SHY) SP320000	c LC010000	l LL010000	t LT010000	ш KS210000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ё KE170000	ќ KK110000	Є KE160000	Ў KU240000	d LD010000	m LM010000	u LU010000	э KE130000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	є KE150000	ў KU230000	S KZ160000	Џ KG220000	e LE010000	n LN010000	v LV010000	щ KS150000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	s KZ150000	џ KG210000	I KI120000	ю KU150000	f LF010000	o LO010000	w LW010000	ч KC210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	i KI110000	Ъ KU220000	Ï KI180000	a KA010000	g LG010000	p LP010000	x LX010000	ъ KU210000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ï KI170000	№ SM000000	J KJ020000	б KB010000	h LH010000	q LQ010000	y LY010000	Ю KU160000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	j KJ010000	Ђ KD620000	Љ KL420000	` SD130000	i LI010000	r LR010000	z LZ010000	A KA020000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	д KD010000	к KK010000	р KR010000	Б KB020000	Х KH020000	Н KN020000	Т KT020000	З KZ020000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	е KE010000	л KL010000	с KS010000	Ц KC020000	И KI020000	О KO020000	У KU020000	Ш KS220000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ф KF010000	м KM010000	т KT010000	Д KD020000	Й KJ120000	П KP020000	Ж KZ220000	Э KE140000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	г KG010000	н KN010000	у KU010000	Е KE020000	К KK020000	Я KA160000	В KV020000	Щ KS160000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	х KH010000	о KO010000	ж KZ210000	Ф KF020000	Л KL020000	Р KR020000	Ь KX120000	Ч KC220000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	и KI010000	п KP010000	в KV010000	Г KG020000	М KM020000	С KS020000	Ы KY020000	(EO)

Code Page 01158

Host Code Page 1160/1395 Thailand

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	– SP100000	฿ SC130000	◎ BQ400000	BQ500000	BQ600000	○ ND100002	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	BZ100300	/ SP120000	BE400000	a LA010000	j LJ010000	~ SD190000	ND010002	A LA020000	J LJ020000	BZ300300	1 ND010000
-2	BK100000	BC100000	BT100000	BT600000	b LB010000	k LK010000	s LS010000	ND020002	B LB020000	K LK020000	S LS020000	2 ND020000
-3	BK200000	BX100000	BT200000	BT700000	c LC010000	l LL010000	t LT010000	ND030002	C LC020000	L LL020000	T LT020000	3 ND030000
-4	BK300000	BS100000	BT300000	BT800000	d LD010000	m LM010000	u LU010000	ND040002	D LD020000	M LM020000	U LU020000	4 ND040000
-5	BK400000	BX200000	BT400000	BN300000	e LE010000	n LN010000	v LV010000	ND050002	E LE020000	N LN020000	V LV020000	5 ND050000
-6	BK500000	BX300000	BN200000	BB100000	f LF010000	o LO010000	w LW010000	ND060002	F LF020000	O LO020000	W LW020000	6 ND060000
-7	BK600000	BY100000	BD200000	BP100000	g LG010000	p LP010000	x LX010000	ND070002	G LG020000	P LP020000	X LX020000	7 ND070000
-8	BN100000	BD100000	BT500000	BP200000	h LH010000	q LQ010000	y LY010000	ND080002	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	[SM060000	] SM080000	^ SD150000	` SD130000	i LI010000	r LR010000	z LZ010000	ND090002	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¦ SM650000	: SP130000	BF100000	BR100000	BS300000	BQ200000	BZ200300	• BQ300000	BA700000	+ BZ400000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	BP300000	BR200000	BS400000	BA200000	BI200000	BE200000	BQ100000	BZ500000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	BF200000	BL100000	BH100000	BA100000	BU100000	BE300000	BE100000	BN400000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	BP400000	BL200000	BL300000	BA300000	BU200000	BO200000	BZ100000	+ BZ400300
-E	+ SA010000	; SP140000	> SA050000	= SA040000	BM100000	BW100000	BO100000	BA400000	BU300000	BA500000	BZ200000	€ SC200000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	BY200000	BS200000	BH200000	BI100000	BU400000	BA600000	BZ300000	(EO)

Code Page 01160

Host Code Page 1164/1397 Vietnam

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	‐ SP100000	ø LO610000	Ø LO620000	° SM190000	µ SM170000	¢ SC040000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ă LA230000	î LI150000	Ă LA240000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	̃ SD198000	Ç LC420000	đ SC180000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	¦ SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	⌐ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	¦ SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	đ LD610000	æ LA510000	Đ LD600000	¯ SD310000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	̉ SD918000	Œ LO520000	̣ SD458000	œ LO510000	ư LU910000	ù LU130000	Ư LU920000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	̀ SD138000	Æ LA520000	́ SD118000	Ÿ LY180000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	ơ LO910000	ÿ LY170000	Ơ LO920000	(EO)

Code Page 01164

Vietnam

Appendix D. Alerts

Alerts are generated by components of Personal Communications; corresponding messages are logged in the message log and can be viewed with the Personal Communications log viewer utility. Refer to the information about log viewer functions in the User's Reference for the specific emulator type for more information.

Note that some alerts can be caused by different situations. Each situation may generate a different message. Other alerts are informational and do not generate specific messages in the log, although messages about problems relating to the situation that generated the alert may be logged.

```
   Alert ID number      Messages logged

APPN

   X'034A6F0B'          PCS4066E
                        PCS4068E
                        PCS4093E
   X'0DF28A14'          PCS4065E
                        PCS4066E
                        PCS4068E
                        PCS4069E
                        PCS4070E
   X'170F7710'          No specific message
   X'21745F28'          No specific message
   X'2313A399'          PCS4364A
                        PCS4365A
                        PCS4379A
   X'32CDF4E2'          PCS4073E
   X'47302521'          No specific message
   X'6D27D125'          PCS4066E
                        PCS4068E
   X'7599A7D8'          No specific message
   X'769022F0'          PCS4504E
   X'9DCD7CCA'          PCS4275E
                        PCS4280E
                        PCS4282E
                        PCS4283A
                        PCS4284E
                        PCS4304E
                        PCS4305E
                        PCS4310A
                        PCS4311E
                        PCS4312E
   X'9E452D9C'          PCS4593A
   X'A89646AA'          PCS4275E
                        PCS4280E
                        PCS4282E
                        PCS4283A
                        PCS4284E
                        PCS4304E
                        PCS4305E
                        PCS4310A
                        PCS4311E
                        PCS4312E
   X'B558D310'          PCS4324E
                        PCS4342E
                        PCS4347E
   X'C781E91E'          No specific message
```

```
            X'EBAA3C4F'        PCS4593A
            X'EBEE390E'        PCS4063E
                               PCS4064E
                               PCS4066E
                               PCS4067E
                               PCS4068E
                               PCS4071A
                               PCS4091E
                               PCS4092E
                               PCS4094E
                               PCS4123E
                               PCS4124E
                               PCS4125E
            X'F52A0C01'        PCS4061E
                               PCS4062E
            X'FE1C42EB'        No specific message
```

LLC2 SAP

```
            X'016E5F4E'        PCS1066A
                               PCS1054A
            X'3BA03B6D'        PCS1066A
                               PCS1005E
            X'55BF3E1C'        PCS1066A
                               PCS1054A
            X'A676B230'        PCS1066A
                               PCS1005E
            X'CAF3C58A'        PCS1066A
                               PCS1054A
            X'D2E24978'        PCS1066A
                               PCS1005E
            X'D615A61E'        PCS1066A
                               PCS1054A
            X'EB1D6ABB'        PCS1066A
                               PCS1005E
            X'EB61E14F'        PCS1066A
                               PCS1005E
```

LLC2 Link Station

```
            X'216D1033'        PCS1065A
                               PCS1003E
            X'25AC0D84'        PCS1065A
                               PCS1004E
            X'28EF2B5D'        PCS1065A
                               PCS1001E
                               PCS1004E
                               PCS1006E
            X'5B8F5BA7'        PCS1065A
                               PCS1050A
            X'83D91642'        PCS1065A
                               PCS1000E
            X'87180BF5'        PCS1065A
                               PCS1000E
            X'8A5B2D2C'        PCS1065A
                               PCS1000E
            X'8E9A309B'        PCS1065A
                               PCS1000E
            X'E65B0B7F'        PCS1065A
```

pDLC

Alert ID number	Messages logged	Alert type	Alert description
X'0E499026'	PCS8607	01	3300
X'0F935B3E'	PCS8603	01	3300
X'21C346F0'	PCS8619	01	3300
X'25025B47'	PCS8620	01	3300

```
X'28417D9E'          PCS8617              01            3300
X'2C806029'          PCS8618              01            3300
X'4227687B'          PCS8610              01            3300
X'6C6E2505'          PCS8604              01            8000
                     PCS8612
X'7EA9C871'          PCS8608              01            3300
X'8CEC6B74'          PCS8609              01            3300
X'AB218ADF'          PCS8700              01            3300
X'BB5C288E'          PCS8600              01            3300
X'C16E9922'          PCS8615              01            3300
X'C5AF8495'          PCS8616              01            3300
X'C8ECA24C'          PCS8613              01            3300
X'CC2DBFFB'          PCS8614              01            3300
X'D3F9C6D8'          PCS8611              01            3300
X'EBB67B65'          PCS8606              01            3300
```

Twinax DLC

```
Alert ID number    Messages logged    Alert type   Alert description

X'24077791'        PCS8700            01           3300
X'C91C002A'        PCS8107            01           3300
X'D7D5F953'        PCS8101            01           3300
```

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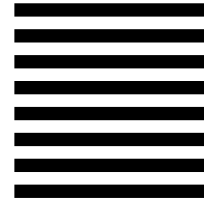Fold and Tape   **Please do not staple**   Fold and Tape

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