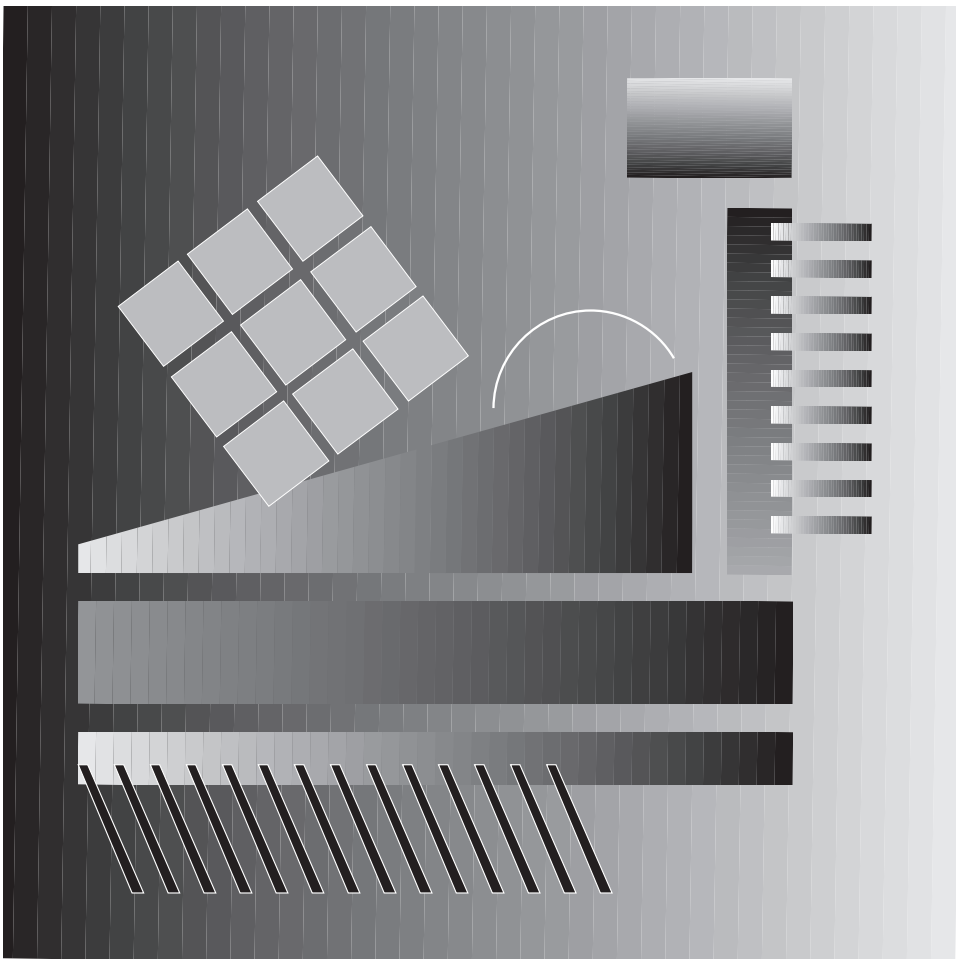
Point of Sale Subsystem

Installation, Keyboards, and Code Pages



created on July 23, 2001

GC30-3623-10

Point of Sale Subsystem

Installation, Keyboards, and Code Pages

created on July 23, 2001

GC30-3623-10

Note

Before using this information and the product it supports, be sure to read the general information under “Chapter 10. Notices” on page 10-1.

Eleventh Edition (September 2001)

This edition applies to Version 1.6 of the IBM Point of Sale Subsystem for OS/2, Version 2.0 of the IBM Point of Sale Subsystem for Windows, and to all subsequent releases and modifications until otherwise indicated in new editions. This publication is available on the Retail Store Solutions Electronic Solutions web site.

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Tables

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Preface

This manual provides information about using point-of-sale device drivers, and installing the Point of Sale Subsystem on OS/2 and Windows operating systems. It also provides reference information for the available keyboard layouts, scan code sets, character sets, and ASCII codes for Terminal Printers and Displays.

Who Should Read this Manual

This manual is intended for use by those people responsible for installing IBM point-of-sale hardware, and using either the IBM OS/2® operating system, or one of the Microsoft® Windows® operating systems. Depending on the operating system that is being used, this manual assumes that the reader is familiar with:

- For IBM Point of Sale Subsystem for OS/2:
  - Information Presentation Facility (IPF)
  - OS/2
  - Point of Sale environment
- For IBM Point of Sale Subsystem for Windows:
  - Microsoft Windows Help
  - Microsoft Windows
  - Point of Sale environment

How to Use this Manual

Use this manual in conjunction with the *IBM Point of Sale Subsystem: Programming Reference and User's Guide*.

This manual contains the following chapters:

- **Chapter 1. Using the Online User's Guide** explains how to use the online *Programming Reference and User's Guide*. See "Related Publications" on page x for information about how to obtain the latest softcopy version of this manual .
- **Chapter 2. Before You Begin** provides the information needed to start using the point-of-sale device drivers.
- **Chapter 3. Installing the IBM Point of Sale Subsystem for OS/2** explains how to install the point-of-sale device drivers on your OS/2 system.
- **Chapter 4. Installing the IBM Point of Sale Subsystem for Windows V1.4.3 and Earlier** explains how to install the point-of-sale device drivers on your Microsoft Windows 3.1x, Microsoft Windows 95, Microsoft Windows NT®, or the Microsoft Windows 98 operating system.
- **Chapter 5. Installing the IBM Point of Sale (POS) Suite** explains how to install the point-of-sale device drivers suite.
- **"Chapter 6. Installing the IBM Point of Sale Subsystem for Windows V2.3.0 and Later" on page 6-1** explains how to install the Point of Sale Subsystem for Windows V.2.3.0.
- **Chapter 8. Point of Sale Keyboard Layouts** contains the keyboard layouts and scan code sets for the keyboards that are supported by the IBM Point of Sale Subsystem.
- **Chapter 9. Character Sets for Terminal Printers and Displays** contains the character sets and the ASCII codes for characters.

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Related Publications

This section lists related publications. For information about ordering these publications, contact your IBM authorized dealer or marketing representative.

Minor technical updates might be made between major revisions of this manual. The latest softcopy version is available on the IBM Retail Store Solutions Web site:

1. Go to www.ibm.com/solutions/retail/store.
2. Click **Support**, then click **Publications**.

IBM Point of Sale Subsystem-Related Publications

IBM Point of Sale Subsystem Programming Reference and User's Guide, SC30-3560
IBM Point of Sale Subsystem Installation, Keyboards, and Code Pages, GC30-3623
FFST/2 Administration Guide, S96F-8593

IBM OS/2 Publications

OS/2 2.1 Documentation Only , S61G-0905
OS/2 Toolkit Technical Library , SB0F-1206
Object-Oriented Interface Design Common User Access Guideline, SC34-4399
Control Program Programming Reference, S10G-6263
Presentation Manager Programming Reference Volume 1, S10G-6264
Presentation Manager Programming Reference Volume 2, S10G-6265
Presentation Manager Driver Reference, S10G-6267
OS/2 WARP, V3 Technical Library, SB0F-8511

IBM C/C++ for OS/2 Library

IBM C/C++ Tools:: Programming Guide, S61G-1181
IBM C/C++ Tools:: Debugger Introduction , S61G-1184
IBM C/C++ Tools:: Execution Trace Analyzer Introduction, S61G-1398
IBM C/C++ Tools:: Browser Introduction , S61G-1397
IBM C/C++ Tools:: Class Libraries Reference Summary, S61G-1186
IBM C/C++ Tools:: C Library Reference, S61G-1183
IBM C/C++ Tools:: C Language Reference, S61G-1399
IBM C/C++ Tools:: C++ Language Reference, S61G-1185
IBM C/C++ Tools:: Standard Class Library Reference, S61G-1180
IBM C/C++ Tools:: User Interface Class Library Reference, S61G-1179
IBM C/C++ Tools:: Collection Class Library Reference, S61G-1178
IBM C/C++ Tools:: Reference Summary, S61G-1441

C-Related Publications

Portability Guide for IBM C, SC09-1405

IBM WorkFrame/2 Publications

IBM C++: WorkFrame/2: Introduction, S61G-1428

IBM VisualAge® Publications

IBM VisualAge C++ for OS/2, V3 Standard Manuals, S30H-1679
IBM VisualAge C++ for OS/2, V3 Extended Reference, S30H-1680
IBM VisualAge C++ for Windows V3.5 Standard Manuals, S33H-4981
IBM VisualAge C++ for Windows V3.5 Reference Manuals, S33H-4982

Related Non-IBM Publications

The ANSI Specifications for Magnetic-Stripe Encoding for Credit Cards, ANSI X4.16-1983
The ANSI Specifications for Credit Cards, ANSI X4.13
The Korean Industry Code for Information Exchange, KSC-5601
KANJI Code Table, N:GC18-2040-3

For publications relating to non-IBM software, contact the software vendor.

Store System Related Publications – Hardware

Scanners

IBM 1520 Hand-Held Scanner User's Guide, GA27-3685
IBM 4686 Retail Point of Sale Scanner: Physical Planning, Installation, and Operation Guide, SA27-3854
IBM 4686 Retail Point of Sale Scanner: Maintenance Manual, SY27-0319
IBM 4687 Point of Sale Scanner Model 1: Physical Planning, Installation, and Operation Guide, SA27-3855
IBM 4687 Point of Sale Scanner Model 1: Maintenance Manual, SY27-0317
IBM 4687 Point of Sale Scanner Model 2: Physical Planning Guide, SA27-3882
IBM 4687 Point of Sale Scanner Model 2: Operator's Guide, SA27-3884
IBM 4687 Point of Sale Scanner Model 2: Maintenance Manual, SY27-0324
IBM 4696 Point of Sale Scanner: Maintenance Manual, SY27-0333
IBM 4696 Point of Sale Scanner: Physical Planning, Installation, and Operation Guide, GA27-3965
IBM 4697 Point of Sale Scanner Model 001: Maintenance Manual, SY27-0338
IBM 4697 Point of Sale Scanner Model 001: Physical Planning, Installation, and Operation Guide, GA27-3990
IBM 4698 Point of Sale Scanner Scale Model 001 & 002: Physical Planning, Installation, and Operation Guide, GA27-4055
IBM 4698 Point of Sale Scanner Scale Model 001 & 002: Maintenance Manual, SY27-0344

Cabling

A Building Planning Guide for Communication Wiring, G320-8059
IBM Cabling System Planning and Installation Guide, GA27-3361
IBM Cabling System Catalog , G570-2040
Using the IBM Cabling System with Communication Products, GA27-3620

IBM 4610 SureMark Point of Sale Printer

IBM 4610 SureMark Point of Sale Printer: User's Guide, GA27-4151

IBM 4683/4684 Point of Sale Terminals

IBM 4683 Point of Sale Terminal: Installation Guide, SA27-3783
IBM 4684 Point of Sale Terminal: Installation Guide, SA27-3837
IBM 4684 Point of Sale Terminal: Introduction and Planning Guide, SA27-3835
IBM 4683/4684 Point of Sale Terminal: Operations Guide, SA27-3704
IBM 4680 Store System and IBM 4683/4684 Point of Sale Terminal: Problem Determination Guide, SY27-0330
IBM 4684 Point of Sale Terminal: Maintenance Summary Card, SX27-3885
IBM 4680 Store System: Terminal Test Procedures Reference Summary, GX27-3779
IBM 4683/4684 Point of Sale Terminal: Maintenance Manual, SY27-0295

IBM 4693/4694/4695 Point of Sale Terminals

IBM 4683/4684/4693/4694 Point of Sale Terminal: Parts Catalog, S131-0097
IBM 4693 Point of Sale Terminal: Setup Instructions
IBM 4693 Point of Sale Terminal: Quick Reference Card
IBM 4693 Point of Sale Terminal: Configuration and Operation Guide, SA27-3978
IBM 4693/4694/4695 Point of Sale Terminal: Maintenance and Test Summary, SX27-3919
IBM Store Systems: Technical Reference, SY27-0336
IBM 4693/4694/4695 Point of Sale Terminal: Hardware Service Manual, SY27-0337
IBM Store Systems: Hardware Service Manual for Point of Sale Terminal Input/Output Devices, SY27-0339
IBM 4694 Point of Sale Terminal: User's Guide, SA27-4005
IBM 4694 Point of Sale Terminal: Hardware Service Manual, SY27-0364
IBM 4695 Point of Sale Terminal: Installation and Operation Guide, GA27-4031
IBM 4695 Point of Sale Terminal: Hardware Service Manual, SY27-0361
IBM Store Systems: Installation and Operation Guide for Point of Sale Input/Output Devices, GA27-4028
IBM Store Systems: Point of Sale Terminals – Supplement for Installation, Operation, and Service, GA27-4035

IBM SurePOS Series Publications

IBM SurePOS 700 Series: Installation and Operation Guide, GA27-4235
IBM SurePOS 700 Series: Hardware Service Manual, GY27-0363
IBM SurePOS 700 Series: System Reference, SA27-4224
IBM SurePOS 700 Series Options and I/O Devices Service Guide SY27-0392

IBM 4820 SurePoint Solution

IBM 4820 SurePoint Solution: Installation and Service Guide, GY27-4231
IBM 4820 SurePoint Solution: System Reference, SA27-4249

IBM 7497 Point of Sale Attachment Adapter

Point of Sale Terminal Attachment Kit: Physical Planning, Installation, and Service Manual, GA27-4034

created on July 23, 2001

Summary of changes

June, 2001

This edition contains the following updates:

- Installation procedures
- Support for fiscal printers
- Code pages

February, 2001

This edition includes information about the PS/2 ANPOS keyboard with integrated mouse.

February, 2000

This edition includes information for the following topics:

- Support for Universal Serial Bus (USB) architecture and devices
- Support for the IBM 4610 SureMark Point of Sale Model TI5 printer
- Installation of the IBM POS Suite
- Support for installation with Microsoft Windows 2000

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Chapter 1. Using the Online User's Guide

The *IBM Point of Sale Subsystem: Programming Reference and User's Guide* is included in the program package. On OS/2® systems, you can view the online book using the OS/2 Information Presentation Facility (IPF); on Microsoft® Windows® operating systems, you can view the online book using Microsoft Windows Help; on Linux systems, you can view the book using Adobe Acrobat Reader.

Use this book in conjunction with the online *Programming Reference and User's Guide*. This book contains:

- Installation instructions
- Illustrations of the keyboards and code pages

All other information about using the IBM Point of Sale Subsystem is contained in the *IBM Point of Sale Subsystem:Programming Reference and User's Guide*.

The latest electronic version of this manual is viewable using Adobe Acrobat Reader Version 4.0, which is available on the IBM Retail Store Solutions Web site:

1. Go to www.ibm.com/solutions/retail/store.
2. Click **Support**, then click **Publications**

Viewing the Online User's Guide

To locate the online book, you must first install the IBM Point of Sale Subsystem. For installatin information, see:

- Chapter 3. Installing the IBM Point of Sale Subsystem for OS/2
- Chapter 4. Installing the IBM Point of Sale Subsystem for Windows V1.4.3 and Earlier
- Chapter 5. Installing the IBM Point of Sale (POS) Suite
- Chapter 6. Installing the IBM Point of Sale Subsystem for Windows V2.3.0 and Later
- Chapter 7. Installing the IBM Point of Sale Subsystem for Linux

After you have installed the IBM Point of Sale Subsystem, the method for viewing the online book depends on which version of the IBM Point of Sale Subsystem you are using. If you are using:

- IBM Point of Sale Subsystem for OS/2, see "Viewing the Online User's Guide on OS/2".
- IBM Point of Sale Subsystem for Windows, see "Viewing the Online User's Guide on Microsoft Windows" on page 1-2.
- IBM Point of Sale Subsystem for Linux, see "Viewing the Online User's Guide on Linux" on page 1-2.

Viewing the Online User's Guide on OS/2

To view the online book on OS/2, you can either:

- Open the IBM Point of Sale Subsystem/2 folder and then, click on the Online Help icon or,
- Open an OS/2 window and type `view aipuser` on the OS/2 command line in the subdirectory where the book files are located. If the installation program updated your CONFIG.SYS file, you can open the online book from any subdirectory.

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You can go directly to the application programming interfaces, the *PosIOCtl( )* requests, the error codes, and the event messages by typing `view aipuser` and the topic. For example, typing `view aipuser PosOpen` opens the chapter and section for the *PosOpen( )* subroutine call. This method is helpful for finding the meaning of error codes that are returned in the *errno* variable. For example, if *errno* contains 313 after your program has issued a POS_SYS_ACQUIRE_DEVICE *PosIOCtl( )* request, type `view aipuser 313` to find out the meaning of error code 313.

The online book includes a table of contents and an index. You can also locate topics by using the search facility of IPF. Select **Help** from the action bar to learn more about how to use IPF.

Viewing the Online User's Guide on Microsoft Windows

To view the online book on Microsoft Windows 3.1x, or Microsoft Windows NT 3.51:
1. Open the IBM Point of Sale Subsystem folder.
2. Double-click the icon that is titled "Programmers Reference and User's Guide".

To view the online book on Microsoft Windows 95, Microsoft Windows NT 4.0, or Microsoft Windows 98:
1. Select **Programs** from the Start menu.
2. Select **IBM Point of Sale Subsystem**
3. Select **Programmers Reference and User's Guide.**

The online book includes a table of contents and an index. You can also locate topics by using the search facility of Microsoft Windows Help. To learn more about how to use Microsoft Windows Help, select **Help** from the action bar of Microsoft Windows 3.1x and Microsoft Windows NT 3.51. Or you can select **Help** from the **Start** menu of Microsoft Windows 95, Microsoft Windows NT 4.0, and Microsoft Windows 98.

X Viewing the Online User's Guide on Linux

X The *IBM Point of Sale Subsystem: Programming Reference and User's Guide* is
X included with the IBM Point of Sale Subsystem for Linux is a PDF file. You will need
X Adobe Acrobat Reader to view it.

Chapter 2. Before You Begin

This chapter describes:

- IBM Point of Sale Subsystem package contents
- Hardware and software requirements
- Next steps

IBM Point of Sale Subsystem Package Contents

The IBM Point of Sale Subsystem product consists of:

- Application program interface (API) library
- C application programming interface
- C header files
- Device drivers
- Device handlers (programs and dynamic link libraries)
- Online documentation
- Sample programs
- Utility programs

The device drivers and device handlers are required on each point-of-sale terminal in order to access unique point-of-sale devices. The application program interface library and header files are required only on the machines that will be used to develop applications for the IBM Point of Sale Subsystem. The online documentation and sample programs are optional. Flash update files are also shipped as part of the IBM Point of Sale Subsystem.

System Requirements

This section describes the hardware, software, disk space, and memory that are required for the IBM Point of Sale Subsystem.

Hardware Environment

The IBM Point of Sale Subsystem supports the following hardware:

Point of Sale Terminals (for Windows and OS/2):

- 4674 Point of Sale Terminal Models (Japan only):

  OS/2 and Windows: 4674-001, 4674-010, 4674-011

  Windows only: 4674-DS1

- 4683 Point of Sale Terminal Models:

  OS/2 only: 4683-002, 4683-A02, 4683-421

- 4684 Point of Sale Terminal Models:

  OS/2 only: 4684-300

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- 4693 Point of Sale Terminal Models:

  OS/2 and Windows: 4693-321, 4693-331, 4693-3S1, 4693-3W1, 4693-421, 4693-431, 4693-4S1, 4693-541, 4693-551, 4693-5S1, 4693-741, 4693-7S1

- 4693 Point of Sale Terminal Models:

  OS/2 and Windows: 4693-202. 4693-212, 4693-2S2

- 4694 Point of Sale Terminal Models:

  OS/2 and Windows: 4694-001, 4694-004, 4694-024, 4694-041, 4694-044, 4694-S01, 4694-S04, 4694-S41, 4694-S44, 4694-104, 4694-SS4, 4694-114, 4694-124, 4694-144, 4694-1S4, 4694-154, 4694-205, 4694-206, 4694-207, 4694-244, 4694-245, 4694-254, 4694-2S4

  Windows only: 4694-206, 4694-207, 4694-246, 4694-247, 4694-2S6, 4694-2L6, 4694-307, 4694-347

  Pre-loaded Microsoft Windows NT Models:
  4694-LNT, 4694-SNT

- 4695 Point of Sale Integrated Touch Terminal Models:

  OS/2 and Windows: 4695-201, 4695-211, 4695-321, 4695-322, 4695-324, 4695-331, 4695-342, 4695-344, 4695-N43

- SurePOS 700 Series Models:

  Windows only: SureBase Model 001, SurePOS 730 Model 102, SurePOS 730 Model 142, SurePOS 750 Model 202, SurePOS 750 Model 20E, SurePOS 750 Model 242, SurePOS 750 Model 24E

Point of Sale Terminals (Linux):

- 4694 Point of Sale Terminal Models:

  4694-104, 4694-106, 4694-144, 4694-146

Point of Sale Adapter Cards (Windows and OS/2):

- 4695 Point of Sale Adapter (Feature Code 3941)
- 4695 Point of Sale Adapter/A (Feature Code 3941)
- 4695 Point of Sale Adapter II (Feature Code 3930)
- 7497 Point of Sale Attachment Adapter Model 001:
  ISA Bus Adapter (P/N 73G2529, Feature Code 3529)
  Micro Channel Adapter (P/N 83G0986, Feature Code 0986)

RS-485 Point of Sale Devices (Windows and OS/2):

- Cash Drawers:

  OS/2 and Windows:
  - Cash Drawer, No Till (Feature Code 3360)
  - Adjustable Till (Feature Code 1092)
  - Fixed Till (Feature Code 3879)
  - Cash Drawer, Removable Till (Feature Code 3361)
  - Flip-Top Cash Drawer (Feature Code 3362)
  - Cash Drawer I (P/N 6238669)
  - Cash Drawer IV (P/N 09F3519)
  - Cash Drawer V (Feature Code 3370)
  - Compact Cash Drawer with Vertical Till (Feature Code 3368)

X – Compact Cash Drawer with Horizontal Till (Feature Code 3378)

X • Displays:

X **OS/2 and Windows:**
X – Shopper Display (Feature Code 3339)
X – Operator Display (Feature Code 3340)
X – 40 Character Alphanumeric Display (Feature Code 3343)
X – 40 Character Vacuum Flourescent Display (Feature Code 3343)
X – Character/Graphics Display (Feature Code 3400)
X Japan - Tall (Feature Code 3402)
X Japan - Short (Feature Code 3403)
X Korean - Tall (Feature Code 3405)
X Korean - Short (Feature Code 3406)
X – 40-Character Vacuum Flourescent Display II (Feature Code 3501)
X – 40-Character Vacuum Flourescent Display II - Japan (Feature Code
X 3506)
X – Two-Sided Vacuum Flourescent Display II (Feature Code 3502)
X – Two-Sided Vacuum Flourescent Display II - Japan (Feature Code
X 3507)
X – 40-Character Liquid Crystal Display (Feature Code 3503)
X – 2x20 Character Vacuum Flourescent Display Customer Display
X (Feature Code 2826)

X • Keyboards:

X **OS/2 and Windows:**
X – 50-Key Modifiable Keyboard (Feature Code 3320)
X – 50-Key Modifiable Layout Keyboard/Operator Display (Feature Code
X 6300)
X – Alphanumeric Point of Sale Keyboard (Feature Code 3324)
X – Retail Point of Sale Keyboard with Card Reader:
X Brazil/Portuguese (Feature Code 3200)
X Danish (Feature Code 3211)
X Canada/Franch (Feature Code 3201)
X French (Feature Code 3203)
X German (Feature Code 3204)
X Italian (Feature Code 3205)
X Norwegian (Feature Code 3212)
X Spanish (Feature Code 3206)
X Swedish/Finnish (Feature Code 3213)
X UK English (Feature Code 3202)
X US English (Feature Code 3324)
X – Retail Point of Sale Keyboard (Feature Code 3315)
X – Retail Point of Sale Keyboard with Card Reader (Feature Code 3320)
X – Modifiable Layout Keyboard with Card Reader (Feature Code 3323)
X – 4820 SurePoint Solution 32-Key Keypad (Feature Code 5140)
X – PC Point of Sale Keyboard
X Japan (Feature Code 3207)
X Korea (Feature Code 3208)
X – Point of Sale Keyboard V
X Japan (Feature Code 3220)
X Korea (Feature Code 3221)
X – Point of Sale Keyboard VI - Korea (Feature Code 3209)
X – PLU Keyboard/Display III
X Japan (Feature Code 3230)
X Korea (Feature Code 3232)

X – Retail Point of Sale Keyboard with Card Reader and Display (Feature Code 6300)
X – 4685 Point of Sale Keyboard Model K01 (4685-K01)

X • Magnetic Stripe Readers:

X **OS/2 and Windows:**
X – One-Track Magnetic Stripe Reader - ISO Track 2 (Feature Code 4010)
X – Dual-Track Magnetic Stripe Reader - ISO Tracks 1 and 2 (Feature Code 4192)
X – Dual-Track Magnetic Stripe Reader - ISO Tracks 2 and 3 (Feature Code 4193)
X – Low-Profile Dual-Track Magnetic Stripe Reader - ISO Tracks 1 and 2 (Feature Code 6310)
X – Low-Profile Dual-Track Magnetic Stripe Reader - ISO Tracks 2 and 3 (Feature Code 6320)
X – Three-Track Magnetic Stripe Reader (Feature Code 2905)
X – Two-Sided Magnetic Stripe Reader (Feature Code 2906)
X – SurePoint Magnetic Stripe Reader (Feature Code 3951)
X – SurePoint JUCC Magnetic Stripe Reader (Feature Code 3953)

X **Windows only:**
X 4820 SurePoint Solution Magnetic Stripe Reader (Feature Code ????)

X

X • Non-volatile Random Access Memory:

X **OS/2 and Windows:**
X – 4693 Point of Sale Terminal Models (except Microsoft Windows 3.1):
X 4693-202, 4693-212, 4693-2S2
X – 4693 Point of Sale Terminal Models:
X 4693-321, 4693-331, 4693-3S1, 4693-3W1, 4693-421, 4693-431,
X 4693-4S1, 4693-541, 4693-551, 4693-5S1, 4693-741, 4693-7S1
X – 4694 Point of Sale Terminal Models:
X 4694-001, 4694-004, 4694-024, 4694-041, 4694-044, 4694-S01,
X 4694-S04, 4694-S41, 4694-S44, 4694-104, 4694-SS4, 4694-114,
X 4694-124, 4694-144, 4694-1S4, 4694-154, 4694-205, 4694-244,
X 4694-245, 4694-254, 4694-2S4
X – 4695 Point of Sale Integrated Touch Terminal Models:
X 4695-201, 4695-211, 4695-321, 4695-322, 4695-324, 4695-331,
X 4695-342, 4695-344, 4695-N43
X – Point of Sale Adapter Cards:
X 4695 Point of Sale Adapter (Feature Code 3941)
X 4695 Point of Sale Adapter/A (Feature Code 3941)
X 4695 Point of Sale Adapter II (Feature Code 3930)
X 7497 Point of Sale Attachment Adapter Model 001

X **Windows only:**
X 4694 Point of Sale Terminal Models:
X 4694-206, 4694-207, 4694-246, 4694-247, 4694-2S6, 4694-2L6,
X 4694-307, 4694-347, 4694-LNT, 4694-SNT

X • Printers:

X **OS/2 and Windows:**
X – Model 2 Printer (Feature Code 6400)
X – Model 3 Printer (Feature Code 4700)
X – Model 3F Fiscal Printer
X – IBM Model 3R Printer (Feature Code 4701)
X – IBM Model 4 Printer (Feature Code 4800)
X – IBM Model 4A Printer (Feature Code 4805)
X – IBM Model 4R Printer (Feature Code 4801)
X – 4610 SureMark Point of Sale Printer Models:
X 4610-TI1, 4610-TI2, 4610-TI3, 4610-TI4
X – 4689 Point of Sale Printer Models:
X 4689-001 Japan (Feature Code 4802)
X 4689-002 Korea (Feature Code 4803)
X 4689-301

X **Windows only:**
X – 4610 SureMark Point of Sale Printer Models:
X 4610-TI5, 4610-TF6, 4610-TF7, 4610-TM6, 4610-TM7, 4610-TN3,
X 4610-TN4
X – 4610 SureMark Point of Sale Fiscal Printers
X – 4689 Point of Sale Printer Models:
X 4689-3G1, 4689-3M1, 4689-TD5

X • Programmable Power:

X **OS/2 and Windows:** 4693-202, 4693-212, 4693-2S2

X **OS/2 only:**
X – 4683 Point of Sale Terminals:
X 4683-002, 4683-421, 4684-300 4693
X – Point of Sale Terminals:

4693-321, 4693-331, 4693-3S1,
4693-3W1, 4693-421, 4693-431,
4693-4S1, 4693-541, 4693-551, 4693-5S1,
4693-741, 4693-7S1

- Scales (except Microsoft Windows 3.1):

  OS/2 and Windows:
  - 4687 Point of Sale Scanner Model 002
  - 4696 Point of Sale Scanner Scale Model 001
  - 4698 Point of Sale Scanner Model 002

- Scanners:

  OS/2 and Windows:
  - Hand-Held Bar Code Reader Model 1 (Feature Code 4500)
  - Hand-Held Bar Code Reader Model 2 (Feature Code 4501)
  - IBM 1520 Hand-Held Scanner Model A02
  - 4685 Hand-Held Bar Code Reader Models:
    4685-001 (Feature Code 4502)
    4685-L01 (Handy Scanner III)
    4685-L0A
  - 4685 Point of Sale Scanner Model L0F
  - 4685 SurePOS Scanner Models:
    4685-S01, 4685-L0C, 4685-L0H, 4685-101
  - 4687 Point of Sale Scanner Models:
    4687-001, 4687-002
  - 4696 Point of Sale Scanner Scale Model 001
  - 4697 Point of Sale Scanner Model 001
  - 4698 Point of Sale Scanner Models:
    4698-001, 4698-002, 4698-201

  OS/2 only:
  4686 Point of Sale Scanner Models:
  4686-001, 4686-002, 4686-003, 4686-004

- Touch:

  OS/2 and Windows:
  - 4695 Point Of Sale Distributed Touch Terminal Models:
    4695-002, 4695-012, 4695-022, 4695-032, 4695-042
  - 4695 Point Of Sale Integrated Touch Terminal Models:
    4695-201, 4695-211, 4695-321, 4695-322, 4695-324, 4695-331,
    4695-342, 4695-344, 4695-N43
  - SurePoint Monochrome Touch Screen (Feature Code 3950)
  - SurePoint Color Touch Screen (Feature Code 3960)

  Windows only:
  4820 SurePoint Solution Color Touch Screen Models:
  4820-46T, 4820-46R

- Miscellandeous:

  OS/2 and Windows:
  Alarm (second cash drawer)
  Feature E Card Devices (RS-232)

RS-485 Point of Sale Devices (Linux):

- Cash Drawers:
  - Cash Drawer, No Till (Feature Code 3360)
    Adjustable Till (Feature Code 1092)
    Fixed Till (Feature Code 3879)
  - Cash Drawer, Removable Till (Feature Code 3361)
  - Flip-Top Cash Drawer (Feature Code 3362)

- Cash Drawer I (P/N 6238669)
- Cash Drawer IV (P/N 09F3519)
- Cash Drawer V (Feature Code 3370)
- Compact Cash Drawer with Vertical Till (Feature Code 3368)
- Compact Cash Drawer with Horizontal Till (Feature Code 3378)

• Displays:
- 40-Character Vacuum Flourescent Display II (Feature Code 3501)
- 40-Character Vacuum Flourescent Display II - Japan (Feature Code 3506)
- Two-Sided Vacuum Flourescent Display II (Feature Code 3502)
- Two-Sided Vacuum Flourescent Display II - Japan (Feature Code 3507)
- 40-Character Liquid Crystal Display (Feature Code 3503)

• Keyboards:
- Retail Point of Sale Keyboard with Card Reader

• Magnetic Stripe Readers:
- Three-Track Magnetic Stripe Reader (Feature Code 2905)

• Printers:
- Model 3F Fiscal Printer
- 4610 SureMark Point of Sale Printer Models:
  4610-TI1, 4610-TI2, 4610-TI3, 4610-TI4, 4610-TF6, 4610-TM6
- 4610 SureMark Point of Sale Fiscal Printers

• Scanners:
- Hand-Held Bar Code Reader Model 1 (Feature Code 4500)
- Hand-Held Bar Code Reader Model 2 (Feature Code 4501)
- IBM 1520 Hand-Held Scanner Model A02
- 4687 Point of Sale Scanner Models:
  4687-001, 4687-002
- 4696 Point of Sale Scanner Scale Model 001
- 4697 Point of Sale Scanner Model 001
- 4698 Point of Sale Scanner Models:
  4698-001, 4698-002, 4698-201

USB Point of Sale Devices (Windows 98 and Windows 2000 only):

• Cash Drawers:
- Full-size Cash Drawer (Fixed Till)
- Full-size Cash Drawer (Adjustable Till)
- Compact Cash Drawer (Vertical Till)
- Compact Cash Drawer (Horizontal Till)

• Displays:
- USB 40 Character Vacuum Flourescent Display
- USB Two-Sided Vacuum Flourescent Display
- USB 40 Character Liquid Crystal Display
- USB Character/Graphics Display

• Keyboards:
- USB 50-Key Keyboard
- USB 50-Key Keyboard with Magnetic Stripe Reader
- USB 50-Key Keyboard with Magnetic Stripe Reader and Liquid Crystal Display
- USB Alphanumeric Point of Sale Keyboard
- USB 133-Key Keyboard with Magnetic Stripe Reader
- USB 4820 SurePoint Solution 32-Key Keypad

• Magnetic Stripe Readers:
  USB 4820 SurePoint Solution Magnetic Stripe Reader

- Non-volatile Random Access Memory:
  4800 Point of Sale Terminal Models
- Printers:
  - USB 4610 SureMark Point of Sale Printer Models:
    4610-TI3, 4610-TI4, 4610-TI5, 4610-TM6, 4610-TM7
  - USB 4610 SureMark Point of Sale Fiscal Printers

Software Environment

The IBM Point of Sale Subsystem requires the following:

- OS/2 Version 2.1 or later
- Microsoft Windows Version 3.1 with Win32s Version 1.25A
- Microsoft Windows 95
- Microsoft Windows 98
- Microsoft Windows NT Version 3.51 or later
- Microsoft Windows 2000
- Red Hat Linux Version 7.1 (2.4 Kernel)

Depending on the operating system that you use, you will need the following to develop applications for the IBM Point of Sale Subsystem:

OS/2

IBM VisualAge C/C++ for OS/2
Borland C/C++ for OS/2

Windows

Microsoft Visual C++ Version 1.5 (16-bit applications)
Microsoft Visual C++ Version 2.0 or later (32-bit applications)
Borland C/C++ for Windows Version 4.5 or later
IBM VisualAge C/C++ for Windows Version 3.5 or later

Linux

GNU's Compiler Collection (GCC)

Software Environment

The IBM Point of Sale Subsystem requires the following:

- OS/2 Version 2.1 or later
- Microsoft Windows Version 3.1 with Win32s Version 1.25A
- Microsoft Windows 95
- Microsoft Windows 98
- Microsoft Windows NT Version 3.51 or later
- Microsoft Windows 2000
- Red Hat Linux Version 7.1 (2.4 Kernel)

Depending on the operating system that you use, you will need the following to develop applications for the IBM Point of Sale Subsystem:

OS/2

IBM VisualAge C/C++ for OS/2
Borland C/C++ for OS/2

Windows

Microsoft Visual C++ Version 1.5 (16-bit applications)
Microsoft Visual C++ Version 2.0 or later (32-bit applications)
Borland C/C++ for Windows Version 4.5 or later
IBM VisualAge C/C++ for Windows Version 3.5 or later

created on July 23, 2001

Linux

GNU's Compiler Collection (GCC)

Steps for Installation

You should proceed as follows:

1. Install the IBM Point of Sale Subsystem package. See one of the following for:
   - OS/2, see Chapter 3. Installing the IBM Point of Sale Subsystem for OS/2
   - Windows V1.4.3 and earlier, see Chapter 4. Installing the IBM Point of Sale Subsystem for Windows V1.4.3 and Earlier
   - 32–bit Windows (POSS for Windows, OPOS, and JavaPOS for Windows), see Chapter 5. Installing the IBM Point of Sale (POS) Suite
   - Windows V2.3.0 or later, see Chapter 6. Installing the IBM Point of Sale Subsystem for Windows V2.3.0 and Later
   - Linux, see Chapter 7. Installing the IBM Point of Sale Subsystem for Linux
2. Customize the IBM Point of Sale Subsystem for the point-of-sale applications that you are developing or running. See *"Customizing the IBM Point of Sale Subsystem"* in the *IBM Point of Sale Subsystem Programming Reference and User's Guide* for information.
3. Develop or run your point-of-sale application.

Chapter 3. Installing the IBM Point of Sale Subsystem for OS/2

This section guides you through the installation of the IBM Point of Sale Subsystem for OS/2. Online help is available throughout the program for each option, field, and push button. You can get help from the Help pull-down menu, or by making the field or push button active and pressing F1. Press F2 for general information about the window that is currently active.

The installation program creates the necessary subdirectories for you, creates a folder for the IBM Point of Sale Subsystem for OS/2 on the desktop, and optionally updates the following files or drivers:

- config.sys
- startup.cmd
- keyboard.dcp
- OS/2 keyboard device drivers

Local Area Network Installation

You can install the IBM Point of Sale Subsystem for OS/2 on a LAN to serve as a base for other installations, or to be shared by multiple users.

If you are installing the IBM Point of Sale Subsystem for OS/2 files on a LAN server, perform the following steps:

1. Insert the first IBM Point of Sale Subsystem for OS/2 diskette in drive A.
2. From an OS/2 window or full screen, change the current drive to the diskette drive where the diskette is located.
3. From the server machine, use **xcopy** to copy the IBM Point of Sale Subsystem for OS/2 diskettes to a target directory on the server. The command syntax is:

   `xcopy` *`current drive`*`:\*.*` *`target-directory`* `/S`

   The IBM Point of Sale Subsystem for OS/2 directory and file structure are copied to the server in the specified `target-directory`. The installation program is also copied to this directory.

To install the IBM Point of Sale Subsystem for OS/2 product on a client machine, follow the normal installation procedure beginning at step 2 of the following section, “Installation Procedure”.

Installation Procedure

Before installing the IBM Point of Sale Subsystem for OS/2, check to be sure that no IBM Point of Sale Subsystem for OS/2 applications are running on the target system. The IBM Point of Sale Subsystem for OS/2 files cannot be updated when they are in use.

1. Insert the IBM Point of Sale Subsystem for OS/2 diskette in drive A.
2. From an OS/2 window or full screen, change the current drive to the diskette drive where the diskette is located. If you are installing from a LAN, change to the `target-directory` on the server machine that you specified during step 3 of the Local Area Network Installation.
3. At the command prompt, type **install**, and then press **Enter**. If you have not disabled the logo display from the operating system, the IBM logo appears. Select the **OK** push button or press **Enter** to proceed.

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A dialog box appears with the installation options. The READ.ME file is displayed in the main installation window. Read this file for the latest information about the IBM Point of Sale Subsystem for OS/2 product.

4. Specify the drive and directory where you want to install the IBM Point of Sale Subsystem for OS/2, and whether you want the installation program to update your config.sys, startup.cmd, keyboard.dcp, or OS/2 keyboard device drivers. By default, the installation program installs the IBM Point of Sale Subsystem for OS/2 in the POS directory on your boot drive and does not update your config.sys, startup.cmd, keyboard.dcp, or OS/2 keyboard device drivers.
   - If you change the target directory to something other than POS, substitute your directory name wherever C:\POS appears in this document.
5. Select the options you want to install on your system.
   - If you are not using one of the alphanumeric point-of-sale keyboards attached to the system keyboard port, be sure that the point-of-sale keyboard option is not selected.
   - If you are not using one of the IBM 4695 or Sure Point touch screens, be sure that the touch-mouse option is not selected.
6. When you have selected your installation options, select the **OK** push button or press **Enter**. The program prompts you for the proper diskettes during the installation. A window shows you the status of the installation program, including files that are being installed and the percentage of the total bytes that have been installed.
7. When the installation is complete, a message box is displayed. Select the **OK** push button to return to the main installation window; then select **Close** from the system menu to end the installation program.
8. If you did not instruct the installation program to update the config.sys file, you must add the DLL subdirectory to your LIBPATH statement and the IBM Point of Sale Subsystem for OS/2 `DEVICE=` statements. For more information, see "Changes to Your Config.sys File".
   - If you are using one of the alphanumeric point-of-sale keyboards attached to the system keyboard port, and you did not instruct the installation program to update your startup.cmd, keyboard.dcp file, or OS/2 keyboard device drivers, see "Alphanumeric Point of Sale Keyboard Installation Considerations" on page 3-3 for the changes that you need to make.
   - If you are installing the IBM Point of Sale Subsystem for OS/2 on a point-of-sale terminal terminal with an IBM 7497 Point of Sale Attachment Adapter installed, see "IBM 7497 Point of Sale Attachment Adapter Installation Considerations" on page 3-4 for additional changes you need to make to the config.sys file.
9. Reboot your system.

Backup Files

Before it modifies your config.sys, startup.cmd, KBD01.SYS, KBD02.SYS, KBDBASE.SYS, keyboard.dcp, and VKBD.SYS files, the installation program creates a backup copy of each of these files with an extension of .BAK. If a file with this name and extension already exists, a dialog box appears. You can overwrite the existing backup file, or type a new file name. Then select the **OK** push button or press **Enter**. If you do not want to create a backup file, select the **Cancel** push button to close the dialog box and continue with the installation.

Changes to Your Config.sys File

The IBM Point of Sale Subsystem for OS/2 requires that some of the product subdirectories be added to certain configuration statements, and that two `DEVICE=`

statements be added to your config.sys file. If you did not instruct the installation program to update the config.sys file, you must make these changes to the following statements:

```
LIBPATH=%LIBPATH%;C:\POS\DLL;

DEVICE=C:\POS\BIN\AIPDCS.SYS

DEVICE=C:\POS\BIN\AIPNVRAM.SYS

DPATH=%DPATH%;C:\POS;C:\POS\HELP

SET PATH=%PATH%;C:\POS\BIN;
```

In the previous statements, %LIBPATH%, %DPATH%, and %PATH% are the contents of the LIBPATH, DPATH, and PATH statement before the installation program added the information specific to the IBM Point of Sale Subsystem for OS/2.

Four optional changes can be made to your config.sys file. If you instructed the installation program to update your config.sys file, the following changes were made:

```
SET INCLUDE=%INCLUDE%;C:\POS\INCLUDE\POS

SET LIB=%LIB%;C:\POS\LIB

SET HELP=%HELP%;C:\POS\HELP;

SET BOOKSHELF=%BOOKSHELF%;C:\POS\HELP;
```

In the previous statement, %INCLUDE%, %LIB%, %HELP%, and %BOOKSHELF% are the contents of the INCLUDE, LIB, HELP, and BOOKSHELF statements before the installation program added the information specific to the IBM Point of Sale Subsystem for OS/2.

Note: By default, the installation program does not update the config.sys file.

Alphanumeric Point of Sale Keyboard Installation Considerations

If you are using an alphanumeric point-of-sale keyboard attached to the system keyboard port, the section “Changes to Your startup.cmd File” describes the changes that must be made to your startup.cmd file, the section ““Replacing Keyboard Device-Driver Files” on page 3-4” describes the changes that must be made to the OS/2 keyboard device drivers, and the section “Updating the keyboard.dcp File” on page 3-4 describes the changes to your keyboard.dcp file that are required. If you did not instruct the installation program to update these files you must make these changes before you can use the alphanumeric point-of-sale keyboard.

Changes to Your startup.cmd File

The IBM Point of Sale Subsystem for OS/2 requires that the Alphanumeric Point of Sale (ANPOS) utility program be started when your system has an alphanumeric point-of-sale keyboard attached to the system keyboard port. If you instructed the installation program to update your startup.cmd file, the following statement was added to your startup.cmd file:

```
START "ANPOS Utility" /MIN C:\POS\BIN\AIPANPOS.EXE C:\POS\ANPOS.RES
```

Note: By default, the installation program does not update the startup.cmd file.

Replacing Keyboard Device-Driver Files

If you are using one of the alphanumeric point-of-sale keyboards attached to the system keyboard port in OS/2 Version 2.1, the KBD01.SYS or KBD02.SYS file in the C:\OS2 directory on the boot drive must be replaced with the copy provided by the IBM Point of Sale Subsystem for OS/2. The KBD01.SYS file is for ISA bus machines, and the KBD02.SYS file is for MCA bus machines. You will have only one of these files in your \OS2 directory.

If you are using one of the alphanumeric point-of-sale keyboards attached to the system keyboard port in OS/2 Warp Version 3.0, the KBDBASE.SYS file in the C:\OS2\BOOT directory on the boot drive must be replaced with the copy provided by the IBM Point of Sale Subsystem for OS/2. Your config.sys file must also be modified to remove the hardware-specific keyboard-driver line.

For example, the hardware-specific keyboard-driver line in your config.sys file could be as follows:

```
BASEDEV=IBMKBD.SYS
```

If you have installed OS/2 DOS support on your machine, it is required that the VKBD.SYS file in the C:\OS2\MDOS directory on the boot drive be replaced with the copy provided by the IBM Point of Sale Subsystem for OS/2.

If you did not instruct the installation process to replace the OS/2 keyboard device driver, you must copy the file from C:\POS\BIN directory. As a precaution, you should make a backup of KBD01.SYS, KBD02.SYS, KBDBASE.SYS or VKBD.SYS before replacing it with the one provided by IBM Point of Sale Subsystem for OS/2.

Note: By default, the installation program does not replace the KBD01.SYS, KBD02.SYS, KBDBASE.SYS, or VKBD.SYS file.

Updating the keyboard.dcp File

In order for OS/2 to recognize the POS specific keys, the keyboard.dcp file must be updated. The keyboard.dcp file cannot be a text file and cannot be manually modified. The program aipkbdcp.exe is provided in the C:\POS\BIN directory. Run this program from the C:\OS2 directory.

If you did not instruct the installation program to update the keyboard.dcp file, you must do so by running the aipkbdcp.exe program located in the C:\POS\BIN directory. As a precaution, you should make a backup of keyboard.dcp before running aipkbdcp.exe.

Note: By default, the installation program does not update the keyboard.dcp file.

IBM 7497 Point of Sale Attachment Adapter Installation Considerations

If you are installing the IBM Point of Sale Subsystem for OS/2 on an ISA bus machine with an IBM 7497 Point of Sale Attachment Adapter, changes must be made to your config.sys file so that the IBM Point of Sale Subsystem for OS/2 can recognize the IBM 7497 Point of Sale Attachment Adapter. The IBM Point of Sale Subsystem for OS/2 installation program will not make these changes.

Note: These changes to your config.sys file are not necessary if you are installing the IBM Point of Sale Subsystem for OS/2 on an MCA bus machine.

Changes to Your config.sys File

If you have an IBM 7497 Point of Sale Attachment Adapter installed in your ISA system, you must supply the adapter address, in hexadecimal, as a parameter to AIPDCS.SYS and AIPNVRAM.SYS in your config.sys file.

For example, if your adapter's address is 0x260, the following line would appear in your config.sys file:

```
DEVICE=C:\POS\BIN\AIPDCS.SYS 260

DEVICE=C:\POS\BIN\AIPNVRAM.SYS 260
```

Switches on the IBM 7497 Point of Sale Attachment Adapter (ISA Bus Adapter) control the adapter address. Refer to the *Point of Sale Terminal Attachment Kit: Physical Planning, Installation, and Service Manual* for information about setting up your adapter card.

Touch-Screen Mouse Installation Considerations

If you are installing Touch Screen Mouse Emulation support, you must make some changes to your startup.cmd and config.sys files. If you did not instruct the installation program to make the required changes to these files, you must make these changes.

The changes that you must make are described in the sections titled "Changes to Your startup.cmd File" and "Changes to Your config.sys File" .

Changes to Your startup.cmd File

If you did not instruct the installation program to update your startup.cmd file, add the following line:

```
START "Touch Mouse" /K /MIN C:\POS\BIN\AIPPOINT.EXE
```

The AIPPOINT.EXE program displays the results of key function calls as progress indicators. Mouse emulation is available after the program has successfully acquired the touch screen device. This typically takes approximately 45 seconds. A distinctive series of tones are sounded when the device has been successfully acquired.

Changes to Your config.sys File

If you did not instruct the installation program to update your config.sys file:

1. Add the following line:

   ```
   DEVICE=C:\POS\BIN\AIPPOINT.SYS
   ```

   immediately preceding the line that reads:

   ```
   DEVICE=C:\OS2\BOOT\MOUSE.SYS
   ```
2. Modify the MOUSE.SYS line to read:

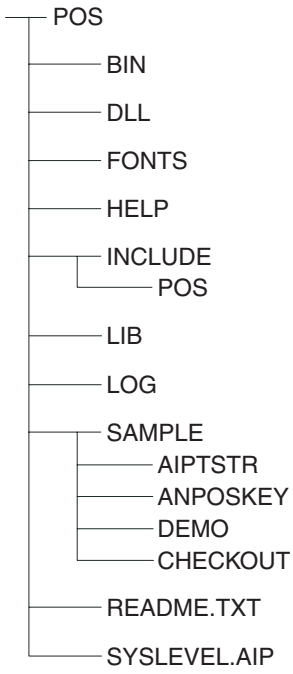
   ```
   DEVICE=C:\OS2\BOOT\MOUSE.SYS STYPE=AIPPOINT
   ```

The STYPE argument added to the MOUSE.SYS statement configures the touch screen as the secondary pointing device. This specification allows both a physical mouse device and the emulated mouse device to be used at the same time. To configure the touch screen as the primary pointing device (a physical mouse device is not installed), replace STYPE with TYPE.

IBM Point of Sale Subsystem for OS/2 Directory Structure

The POS subdirectory (or the target directory you specified) is created automatically by the installation program. It contains all the other IBM Point of Sale Subsystem for OS/2 subdirectories and files.

The IBM Point of Sale Subsystem for OS/2 directory structure is shown in the following illustration.



The subdirectories and their contents are:

BIN Executables and device drivers used by the IBM Point of Sale Subsystem for OS/2.

DLL Dynamic link library files used by the IBM Point of Sale Subsystem for OS/2.

FONTS
Font files used by the IBM Point of Sale Subsystem for OS/2.

HELP Help files, message files, and the online *IBM Point of Sale Subsystem: Programming Reference and User's Guide*

INCLUDE\POS
IBM Point of Sale Subsystem for OS/2 C language header files.

LIB IBM Point of Sale Subsystem for OS/2 library file.

LOG IBM Point of Sale Subsystem for OS/2 error log files.

SAMPLE
Several sample programs that you can install along with the rest of the product.

The sample programs are:

AIPTSTR
Calls the IBM Point of Sale Subsystem for OS/2 application

programming interface via prompted input. The results of the application programming interface calls are displayed on the screen. Also includes a sample resource file.

anposkey
Traces keys received from the ANPOS keyboard.

demo Illustrates the use of the IBM Point of Sale Subsystem for OS/2 application programming interface. It does this without prompting the user for parameters and only prompts for various actions (such as to sound a tone).

checkout
Shows how to program using the IBM Point of Sale Subsystem for OS/2 application programming interface.

Chapter 4. Installing the IBM Point of Sale Subsystem for Windows V1.4.3 and Earlier

This section guides you through the installation of the IBM Point of Sale Subsystem for Windows. Online help is available throughout the program for each option, field, and push button. You can get help from the Help pull-down menu, or by making the field or push button active and pressing **F1**. Press **F2** for general information about the currently active window.

The installation program creates the necessary subdirectories for you, creates a folder for the IBM Point of Sale Subsystem for Windows, and optionally updates your Microsoft Windows system files.

Local Area Network Installation

If you want to put the IBM Point of Sale Subsystem for Windows installation files on a LAN drive to serve as a base for other installations, perform the following steps:

1. Create a directory for the IBM Point of Sale Subsystem for Windows installation files on the server machine.
2. Copy the contents of each of the IBM Point of Sale Subsystem for Windows installation diskettes to the directory created above.

Note: If you have the self-extracting files for IBM Point of Sale Subsystem for Windows, you can extract the IBM Point of Sale Subsystem for Windows installation files directly to the LAN drive by copying the self-extracting files to the LAN drive and executing each one with no arguments.

To install the IBM Point of Sale Subsystem for Windows product on a client machine, follow the normal installation procedure for the particular version of the Microsoft Windows operating system that is running on the client machine.

Installation Procedure for Microsoft Windows 3.1

This section describes the procedure for installing the IBM Point of Sale Subsystem for Windows under the Microsoft Windows 3.1 operating system, including the procedure for installing Microsoft Win32s. This section also describes the Microsoft Windows 3.1 system file changes that are required by the IBM Point of Sale Subsystem for Windows.

Installing Microsoft Win32s

The IBM Point of Sale Subsystem for Windows requires Microsoft Win32s 1.25A or later to be installed on a Microsoft Windows 3.1 system. When you download the IBM Point of Sale Subsystem for Windows package from the IBM Retail Store Solutions Web site, be sure to also download the file, posswd4.exe, which contains Microsoft Win32s Version 1.25A. To get the latest version of Microsoft Win32s, go to Microsoft's Web site.

If you have previously installed a version of Microsoft Win32s that is at level 1.25A or later, then you do not need to reinstall it. Otherwise, you need to perform the following steps to install the Microsoft Win32s product. This procedure describes the installation of the Microsoft Win32s package from the IBM Retail Store Solutions Web site:

1. Insert the Microsoft Win32s diskette into drive A.

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2. Open a DOS window or a DOS full-screen session.
3. Create a temporary directory on a drive with at least 1.5 MB of free space and then change to this directory.

   For example:

   ```
   CD \

   MKDIR temporary-directory

   CD temporary-directory
   ```

4. At the DOS prompt, enter the following command: **A:\W32S125**. The Microsoft Win32s setup files that you use to install the Microsoft Win32s product are extracted to the current directory.
5. Close the DOS session by typing **Exit** at the DOS prompt.
6. Select **Run** from the File pull-down menu of the Microsoft Windows 3.1 Program Manager.
7. In the prompt box, type: **temporary-directory\SET**UP Then, press **Enter**. The Microsoft Win32s installation program is started.
8. Provide the appropriate responses to the Microsoft Win32s installation program to install it on your Microsoft Windows 3.1 operating system.
9. If the Microsoft Win32s installed successfully, you can now delete the temporary-directory created previously and all the files it contains.
10. Reboot your system.

Note: The Microsoft Win32s product requires the DOS share.exe program to be running before you can start any application written for the Microsoft Win32s product. The share.exe program starts automatically if you add the following line to your autoexec.bat file: **C:\DOS\SHARE.EXE**

Installing IBM Point of Sale Subsystem for Windows

To install the IBM Point of Sale Subsystem for Windows on a Microsoft Windows 3.1*x* system, perform the following steps:

1. If an older version of the IBM Point of Sale Subsystem for Windows is already installed on your system, uninstall the old version—see “Uninstalling IBM Point of Sale Subsystem for Windows” on page 4-19. If uninstall is not supported for the version of IBM Point of Sale Subsystem for Windows on your system, make sure that no IBM Point of Sale Subsystem for Windows applications are running on the target system. The IBM Point of Sale Subsystem for Windows files cannot be updated when they are in use.
2. If you are installing from diskette, insert the first IBM Point of Sale Subsystem for Windows diskette into drive A.
3. Select **Run** from the File pulldown menu of the Microsoft Windows 3.1 Program Manager. In the prompt box, type **A:\setup**

   Press **Enter** to start the IBM Point of Sale Subsystem for Windows installation.

   Note: If you are installing from a LAN drive, replace “A:” with the LAN drive letter and directory specification.
4. A Welcome dialog box is displayed. Select the **Next** push button or press **Enter** to continue with the installation.
5. The IBM Point of Sale Subsystem License Agreement is displayed. Select the **Yes** push button or press **Enter** to continue to the component selection dialog box.

Note: If Microsoft Win32s Version 1.25A or later is not already installed on the system, installation will not continue. See “Installing Microsoft Win32s” on page 4-1 for information about installing Microsoft Win32s.

6. Specify the IBM Point of Sale Subsystem for Windows components you want to install, and the drive and directory where you want to install them. Then, select the **Next** push button or press **Enter**.

   Notes:

   a. See “Alphanumeric Point of Sale Keyboard Installation Considerations” on page 4-5 if you are using an alphanumeric point-of-sale keyboard attached to the system keyboard port.

   b. By default, the installation program installs the IBM Point of Sale Subsystem for Windows in the POS directory on your boot drive. If you change the target directory to something other than POS, substitute your directory name wherever `C:\POS` appears in this document.

7. Specify whether you have a 7497 Point of Sale Attachment Adapter, and whether you want the installation program to update your system.ini, win.ini, and autoexec.bat files. Then select the **Next** push button or press **Enter**.

   Notes:

   a. See “IBM 7497 Point of Sale Attachment Adapter Installation Considerations” on page 4-5 for information about installing the IBM Point of Sale Subsystem for Windows on a point-of-sale terminal that has an IBM 7497 Point of Sale Attachment Adapter, installed.

   b. By default the IBM Point of Sale Subsystem for Windows updates your system.ini, win.ini and autoexec.bat files. The IBM Point of Sale Subsystem for Windows will not function without these updates. See “Microsoft Windows 3.1 System File Changes” on page 4-4 for a description of the changes IBM Point of Sale Subsystem for Windows requires in system.ini, win.ini, and autoexec.bat.

8. Before it modifies your system.ini, win.ini, or autoexec.bat files, the installation program creates a backup copy of each of these files with an extension of .BAK. You can overwrite the existing backup file, or type a new file name.

   If you do not want to create a backup file, erase the backup file names and select the **Next** push button or press **Enter** to continue with the installation.

   If you are installing from diskette, the program prompts you for the correct diskettes during the installation. A window shows you the status of the installation program, indicating the percentage of the total number of files that have been installed.

9. When the installation is complete, you are prompted to select one of the following restart options:
   - Yes, I want to restart Windows now.
   - Yes, I want to restart my computer now.
   - No, I will restart my computer later.

   Choose the desired restart option and select the **OK** push button to complete the installation. You should restart your computer if the installation program has modified system.ini, win.ini, or autoexec.bat.

For versions of the IBM Point of Sale Subsystem for Windows that support uninstall, a file called DeIsLx.isu (x is a positive integer) is created. This file is used by the uninstall program and is removed during the uninstall processing. Do not delete this file.

Microsoft Windows 3.1 System File Changes

This section describes the changes to the Microsoft Windows 3.1 system files that are required by the IBM Point of Sale Subsystem for Windows. If you did not instruct the installation program to update the system.ini, win.ini, and autoexec.bat files, you must make these changes.

Changes to Your System.ini File

The IBM Point of Sale Subsystem for Windows requires two `DEVICE=` statements to be added to your system.ini file. If you did not instruct the installation program to update the system.ini file, you must add the following lines in the [386Enh] section of your system.ini file:

```
DEVICE=C:\POS\BIN\AIPDCS.386

DEVICE=C:\POS\BIN\AIPNVRAM.386
```

Note: By default, the installation program updates your system.ini file, making these changes for you.

Changes to Your Win.ini File

The IBM Point of Sale Subsystem for Windows requires one `LOAD=` statement in the [windows] section of your win.ini file. This statement automatically loads the IBM Point of Sale Subsystem for Windows when the Microsoft Windows 3.1 operating system starts. If you did not instruct the installation program to update the win.ini file, you must add the following line in the [windows] section of your win.ini file:

```
LOAD=C:\POS\BIN\AIPCTRL.EXE
```

If a `LOAD=` line already exists, the IBM Point of Sale Subsystem for Windows installation program appends `C:\POS\BIN\AIPCTRL.EXE` to the existing `LOAD=` line.

Note: By default, the installation program updates your win.ini file, making this change for you.

Changes to Your Autoexe.bat File

The IBM Point of Sale Subsystem for Windows requires a change to the system path statement. If the installation program updated your autoexec.bat file, the following change was made:

```
path=%path%;C:\POS\BIN;C:\POS\DLL
```

In the previous statement, `%path%` is the contents of the path statement before the installation program added the information specific to the IBM Point of Sale Subsystem for Windows.

If you did not instruct the installation program to update your autoexec.bat file, then you must make this change.

Note: By default, the installation program updates the autoexec.bat file, making this change for you.

If you are installing IBM Point of Sale Subsystem for Windows on a system that will be used to develop point-of-sale applications and you have installed the IBM Point of Sale Subsystem for Windows C Library and Header files, make the following changes to your autoexec.bat file:

- Append the following to your `SET INCLUDE=` statement:

```
C:\POS\INCLUDE\POS
```

- Append the following to your SET LIB= statement in autoexec.bat:

```
C:\POS\LIB
```

Note: These changes are not made by the installation program.

Alphanumeric Point of Sale Keyboard Installation Considerations

If you are using an alphanumeric point-of-sale keyboard attached to the system keyboard port, you must select **Alphanumeric POS Keyboard** from the component selection menu. Some changes to your system.ini and win.ini files are required to support this keyboard. If you did not instruct the installation program to make the required changes to these files, you must make these changes yourself before you can use the alphanumeric point-of-sale keyboard.

The changes that you must make are described in the following sections.

Changes to Your System.ini File

The IBM Point of Sale Subsystem for Windows requires that an IBM Point of Sale Subsystem for Windows specific virtual keyboard device driver be loaded to replace the default virtual keyboard device driver. If the installation program updated your system.ini file, the following statement was added to the [386Enh] **section in your system.ini file:** KEYBOARD=C:\POS\BIN\AIPVKD.386

Note: By default, the installation program updates your system.ini file, making this change for you.

Changes to Your Win.ini File

The IBM Point of Sale Subsystem for Windows requires that the Alphanumeric Point of Sale (ANPOS) utility program be started when your system has an alphanumeric point-of-sale keyboard attached to the system keyboard port. If the installation program updated your win.ini file, the following statement was added to the [windows] section in your win.ini file:

```
RUN=C:\POS\BIN\AIPANPOS.EXE
```

Note: By default, the installation program updates your win.ini file, making this change for you.

IBM 7497 Point of Sale Attachment Adapter Installation Considerations

If you are installing the IBM Point of Sale Subsystem for Windows on an ISA bus machine with an IBM 7497 Point of Sale Attachment Adapter, the system.ini file must be updated to include the adapter address in order for the IBM Point of Sale Subsystem for Windows to recognize the adapter. The IBM Point of Sale Subsystem for Windows installation program will make these changes for you only if you select **7497 POS Adapter Installed** from the options menu, and you instruct the installation to update the system.ini file.

The necessary changes are described in the following section.

Note: These system.ini file changes are not necessary if you are installing the IBM Point of Sale Subsystem for Windows into an MCA bus machine.

Changes to Your System.ini File

You must update the Ioaddr statement in the [IbmPosSubSys] section of your system.ini file with the adapter address in hexadecimal in order for the IBM Point of Sale Subsystem for Windows to recognize the IBM 7497 Point of Sale Attachment Adapter.

For example, if your adapter's address is set to 0x260, the following would appear in your system.ini file:

```
[IbmPosSubSys]

ioaddr=260
```

If the [IbmPosSubSys] section does not exist in the system.ini file, you need to create it.

Switches on the IBM 7497 Point of Sale Attachment Adapter (ISA Bus Adapter) control the adapter address. Refer to the *Point of Sale Terminal Attachment Kit: Physical Planning, Installation, and Service Manual* for information about setting up your adapter card.

Installation Procedure for Microsoft Windows 95

This section describes the procedure for installing the IBM Point of Sale Subsystem for Windows under the Microsoft Windows 95 operating system. This section also describes the Microsoft Windows 95 system file changes that are required by IBM Point of Sale Subsystem for Windows.

Installing IBM Point of Sale Subsystem for Windows

To install the IBM Point of Sale Subsystem for Windows on a Microsoft Windows 95 system, perform the following steps:

1. If an older version of the IBM Point of Sale Subsystem for Windows is already installed on your system, uninstall the old version — see “Uninstalling IBM Point of Sale Subsystem for Windows” on page 4-19. If uninstall is not supported for the version of IBM Point of Sale Subsystem for Windows on your system, make sure that no IBM Point of Sale Subsystem for Windows applications are running on the target system. The IBM Point of Sale Subsystem for Windows files cannot be updated when they are in use.
2. If you are installing from diskette, insert the first IBM Point of Sale Subsystem for Windows diskette into drive A.
3. Select **Run** from the Start menu of Microsoft Windows 95. In the prompt box, type

   ```
   A:\SETUP
   ```

   Press **Enter** to start the IBM Point of Sale Subsystem for Windows installation.

   Note: If you are installing from a LAN drive, replace `A:` with the LAN drive letter and directory specification.
4. A Welcome dialog box is displayed. Select the **Next** push button or press **Enter** to continue the installation.
5. The IBM Point of Sale Subsystem License Agreement is displayed. Select the **Yes** push button or press **Enter** to continue to the component selection dialog box.
6. Specify the IBM Point of Sale Subsystem for Windows components you want to install and the drive and directory where you want them to be installed. Then, select the **Next** push button or press **Enter**.

   Notes:

   a. See “Alphanumeric Point of Sale Keyboard Installation Considerations” on page 4-9 if you are using an alphanumeric point-of-sale keyboard attached to the system keyboard port.

   b. By default, the installation program installs the IBM Point of Sale Subsystem for Windows in the POS directory on your boot drive. If you change the target directory to something other than POS, substitute your directory name wherever `C:\POS` appears in this document.
7. Specify whether you have a 7497 Point of Sale Attachment Adapter and whether you want the installation program to update your system.ini, win.ini and autoexec.bat files. Then select the **Next** push button or press **Enter**.

   Notes:

   a. See “IBM 7497 Point of Sale Attachment Adapter Installation Considerations” on page 4-9 for information about installing the IBM Point of Sale Subsystem for Windows on a system that has an IBM 7497 Point of Sale Attachment Adapter installed.

b. By default the IBM Point of Sale Subsystem for Windows updates your autoexec.bat file and, if necessary, your system.ini file. Your system will not function correctly without these updates. See "Microsoft Windows 95 System File Changes" for a description of the changes IBM Point of Sale Subsystem for Windows requires in autoexec.bat.

8. Before it modifies your system.ini or autoexec.bat files, the installation program creates a backup copy of each of these files with an extension of .BAK. You can overwrite the existing backup file, or type a new file name.
   - If you do not want to create a backup file, erase the backup file names and select the **Next** push button, or press **Enter** to continue with the installation.
   - If you are installing from diskette, the program prompts you for the correct diskettes during the installation. A window shows you the status of the installation program, indicating the percentage of the total number of files that have been installed.
9. When the installation is complete, you are prompted to select one of the following restart options:
   - Yes, I want to restart my computer now.
   - No, I will restart my computer later.

   Choose the desired restart option and select the **OK** push button to complete the installation. You should restart your computer if the installation program has modified system.ini or autoexec.bat.

For versions of the IBM Point of Sale Subsystem for Windows that support uninstall, a file called DeIsLx.isu (x is a positive integer) is created. This file is used by the uninstall program and is removed during the uninstall processing. Do not delete this file.

If you are using an alphanumeric Point of Sale Keyboard attached to the system keyboard port and you did not instruct the installation program to update your system.ini file, see "Alphanumeric Point of Sale Keyboard Installation Considerations" on page 4-9 for the changes that you need to make.

Microsoft Windows 95 System File Changes

This section describes the changes to the Microsoft Windows 95 system files that are required by the IBM Point of Sale Subsystem for Windows. If you did not instruct the installation program to update the autoexec.bat file, you must make these changes.

Changes to Your Autoexec.bat File

The IBM Point of Sale Subsystem for Windows requires a change to the system path statement. If the installation program updated your autoexec.bat file, the following change was made:

```
path=%path%;C:\POS\BIN;C:\POS\DLL
```

In the previous statement, `%path%` is the contents of the path statement before the installation program added the information specific to the IBM Point of Sale Subsystem for Windows.

Note: By default, the installation program updates the autoexec.bat file, making this change for you.

If you are installing IBM Point of Sale Subsystem for Windows on a system that will be used to develop point-of-sale applications and you have installed the IBM Point

of Sale Subsystem for Windows C Library and Header files, there are two additional changes to make to your autoexec.bat file:

- Append the following to your `SET INCLUDE=` statement:

```
C:\POS\INCLUDE\POS
```

- Append the following to your `SET LIB=` statement in autoexec.bat:

```
C:\POS\LIB
```

Note: These changes are not made by the installation program.

Microsoft Windows 95 System Changes

This section describes the modifications made by the IBM Point of Sale Subsystem for Windows installation program to your Microsoft Windows 95 system.

Microsoft Windows 95 Services

The IBM Point of Sale Subsystem for Windows installation adds the service, AIPSTART, to your Microsoft Windows 95 system. This service is started automatically when Microsoft Windows 95 starts, before any user logs into the system. This service is specified in the Microsoft Windows 95 registry under HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\RunServices.

Alphanumeric Point of Sale Keyboard Installation Considerations

If you are using an alphanumeric point-of-sale keyboard attached to the system keyboard port, you must select `Alphanumeric POS Keyboard` from the component selection menu. Some changes to your system.ini file are required to support this keyboard. If you did not instruct the installation program to make the required changes to these files, you must make these changes yourself before you can use the alphanumeric point-of-sale keyboard.

The changes that you must make are described below.

Changes to Your System.ini File

The IBM Point of Sale Subsystem for Windows requires that an IBM Point of Sale Subsystem for Windows specific virtual keyboard device driver be loaded to replace the default virtual keyboard device driver. If the installation program updated your system.ini file, the following statement was added to the [386Enh] section in your system.ini file:

```
KEYBOARD=C:\POS\BIN\AIPVKD.VXD
```

Note: By default, the installation program updates your system.ini file, making this change for you.

IBM 7497 Point of Sale Attachment Adapter Installation Considerations

If you are installing the IBM Point of Sale Subsystem for Windows on an ISA bus machine with an IBM 7497 Point of Sale Attachment Adapter, the Microsoft Windows 95 registry must be updated to include the adapter address in order for the IBM Point of Sale Subsystem for Windows to recognize the adapter. The IBM Point of Sale Subsystem for Windows installation program will make these changes for you only if you select **7497 POS Adapter Installed** from the options menu.

The necessary changes are described in the following section.

Note: Registry changes are not necessary if you are installing the IBM Point of Sale Subsystem for Windows on an MCA bus machine.

Changes to the Microsoft Windows 95 Registry

The Microsoft Windows 95 registry path that was set up during the installation of the IBM Point of Sale Subsystem for Windows is:

```
HKEY_LOCAL_MACHINE\SOFTWARE\IBM\IBM Point of Sale Subsystem
```

To update the Microsoft Windows 95 registry to include the adapter address, use the registry editor, Regedit, and perform the following steps:

1. Click **IBM Point of Sale Subsystem**
2. Click **Edit**
3. Select **New**.
4. Select **String value**
5. Type `Ioaddr` and press **Enter**
6. Click **Edit**
7. Select **Modify**
8. Type the adapter addresses as Value data
9. Click **Ok** or press **Enter**

   For example, if your adapter's address is set to 0x260, the following would be displayed at the top of the right-hand screen:

   ```
   Ioaddr:REG_SZ:260
   ```
10. Exit from the Regedit editor.

Switches on the IBM 7497 Point of Sale Attachment Adapter (ISA Bus Adapter) control the adapter address. Refer to the *Point of Sale Terminal Attachment Kit: Physical Planning, Installation, and Service Manual* for information about setting up your adapter.

Installation Procedure for Microsoft Windows 98

This section describes the procedure for installing the IBM Point of Sale Subsystem for Windows under the Microsoft Windows 98 operating system. This section also describes the Microsoft Windows 98 system file changes that are required by IBM Point of Sale Subsystem for Windows.

Installing IBM Point of Sale Subsystem for Windows

To install the IBM Point of Sale Subsystem for Windows on a Microsoft Windows 98 system, perform the following steps:

1. If an older version of the IBM Point of Sale Subsystem for Windows is already installed on your system, uninstall the old version; see “Uninstalling IBM Point of Sale Subsystem for Windows” on page 4-19. If uninstall is not supported for the version of IBM Point of Sale Subsystem for Windows on your system, make sure that no IBM Point of Sale Subsystem for Windows applications are running on the target system. The IBM Point of Sale Subsystem for Windows files cannot be updated when they are in use.
2. If you are installing from diskette, insert the first IBM Point of Sale Subsystem for Windows diskette into drive A.
3. Select **Run** from the Start menu of Microsoft Windows 98. In the prompt box, type **A:\setup**

   Press **Enter** to start the IBM Point of Sale Subsystem for Windows installation.

   Note: If you are installing from a LAN drive, replace **A:** with the LAN drive letter and directory specification.
4. A Welcome dialog box is displayed. Select the **Next** push button or press **Enter** to continue the installation.
5. The IBM Point of Sale Subsystem License Agreement is displayed. Select the **Yes** push button or press **Enter** to continue to the component-selection dialog box.
6. Specify the IBM Point of Sale Subsystem for Windows components you want to install, and the drive and directory where you want them to be installed. Then, select the **Next** push button or press **Enter**.

   Notes:

   a. See “Alphanumeric Point of Sale Keyboard Installation Considerations” on page 4-13 if you have an alphanumeric point-of-sale keyboard attached to the system keyboard port.

   b. By default, the installation program installs the IBM Point of Sale Subsystem for Windows in the POS directory on your boot drive. If you change the target directory to something other than POS, substitute your directory name wherever **C:\POS** appears in this document.
7. Specify whether you have a 7497 Point of Sale Attachment Adapter and whether you want the installation program to update your system.ini, win.ini and autoexec.bat files. Then select the **Next** push button or press **Enter**.

   Notes:

   a. See “IBM 7497 Point of Sale Attachment Adapter Installation Considerations” on page 4-14 for additional information about installing the IBM Point of Sale Subsystem for Windows on a system with an IBM 7497 Point of Sale Attachment Adapter installed.

   b. By default, the IBM Point of Sale Subsystem for Windows updates your autoexec.bat file and, if necessary, your system.ini file. Your system will not function correctly without these updates. See “Microsoft Windows 98 System

File Changes" for a description of the changes IBM Point of Sale Subsystem for Windows requires in autoexec.bat.

c. See "Alphanumeric Point of Sale Keyboard Installation Considerations" on page 4-13 if you have an alphanumeric point-of-sale keyboard attached to a USB port.

8. Before it modifies your system.ini or autoexec.bat files, the installation program creates a backup copy of each of these files with an extension of .bak. You can overwrite the existing backup file, or type a new file name.
   - If you do not want to create a backup file, erase the backup file names and select the **Next** push button, or press **Enter** to continue with the installation.
   - If you are installing from diskette, the program prompts you for the correct diskettes during the installation. A window shows you the status of the installation program, indicating the percentage of the total number of files that have been installed.
9. When the installation is complete, you are then prompted to select one of the following restart options:
   - Yes, I want to restart my computer now.
   - No, I will restart my computer later.

   Choose the desired restart option and select the **Finish** push button to complete the installation. You should restart your computer if the installation program has modified system.ini or autoexec.bat.

For versions of the IBM Point of Sale Subsystem for Windows that support uninstall, a file called DeIsLx.isu (x is a positive integer) is created. This file is used by the uninstall program and is removed during the uninstall processing. Do not delete this file.

If you are using one of the alphanumeric point-of-sale keyboards attached to the system keyboard port and you did not instruct the installation program to update your system.ini file, see "Alphanumeric Point of Sale Keyboard Installation Considerations" on page 4-9 for the changes that you need to make.

Microsoft Windows 98 System File Changes

This section describes the changes to the Microsoft Windows 98 system files that are required by the IBM Point of Sale Subsystem for Windows. If you did not instruct the installation program to update the autoexec.bat file, you must make these changes.

Changes to Your Autoexec.bat File

If you install the IBM Point of Sale Subsystem for Windows, there is one optional change that can be made to your autoexec.bat file. If the installation program updated your autoexec.bat file, the following change was made:

```
path=%path%;C:\POS\BIN;C:\POS\DLL
```

In the previous statement, `%path%` is the contents of the path statement before the installation program added the information specific to the IBM Point of Sale Subsystem for Windows.

Note: By default, the installation program updates the autoexec.bat file, making this change for you.

If you are installing IBM Point of Sale Subsystem for Windows on a system that will be used to develop point-of-sale applications and you have installed the IBM Point

of Sale Subsystem for Windows C Library and Header files, there are two additional changes to make to your autoexec.bat file:

- Append the following to your `SET INCLUDE=` statement:

```
C:\POS\INCLUDE\POS
```

- Append the following to your `SET LIB=` statement in autoexec.bat:

```
C:\POS\LIB
```

Note: These changes are not made by the installation program.

Microsoft Windows 98 System Changes

This section describes the modifications made by the IBM Point of Sale Subsystem for Windows installation program to your Microsoft Windows 98 system.

Microsoft Windows 98 Services

The IBM Point of Sale Subsystem for Windows installation adds the service, AIPSTART, to your Microsoft Windows 98 system. This service is started automatically when Microsoft Windows 98 starts, before any user logs into the system. This service is specified in the Microsoft Windows 98 registry under HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\RunServices.

Alphanumeric Point of Sale Keyboard Installation Considerations

The alphanumeric point-of-sale keyboard can be attached to the system keyboard port, to an RS-485 port, or to a USB port for use with the Microsoft Windows 98 operating system.

RS-485-Attached Alphanumeric Point of Sale Keyboard

If your alphanumeric point-of-sale keyboard is attached to an RS-485 port, do not select either `Alphanumeric POS Keyboard` from the component selection menu or `USB Alphanumeric POS Keyboard as a System Keyboard` from the options selection screen during installation. There are no system file changes required for this keyboard.

Note: The installation program asks you to verify that you do not want to use any point-of-sale keyboard as the system keyboard.

System Port-Attached Alphanumeric Point of Sale Keyboard

If your alphanumeric point-of-sale keyboard is attached to the system keyboard port, the IBM Point of Sale Subsystem for Windows requires that an IBM Point of Sale Subsystem for Windows-specific virtual keyboard device driver be loaded to replace the default virtual keyboard device driver. You should select `Alphanumeric POS Keyboard` from the component selection menu during installation. The installation program asks you to verify that you do have an alphanumeric point-of-sale keyboard attached to the system keyboard port.

By default, the installation program updates your system.ini file. The following statement is added to the [386Enh] section in your system.ini file:

```
KEYBOARD=C:\POS\BIN\AIPVKD.VXD
```

Note: You can instruct the installation program not to update this file. In that case, you must make these changes before you can use the point-of-sale-unique keys on the alphanumeric point-of-sale keyboard.

USB-Attached Alphanumeric Point of Sale Keyboard

If your alphanumeric point-of-sale keyboard is attached to a USB port, it can function as the system keyboard in Microsoft Windows 98. If you would like your USB alphanumeric point-of-sale keyboard to function as the system keyboard, do not select `Alphanumeric POS Keyboard` on the component selection menu during installation. Instead, select `USB Alphanumeric POS Keyboard as a System Keyboard` from the options selection screen.

Note: If you fail to select either **Alphanumeric POS Keyboard** or **USB Alphanumeric POS Keyboard as a System Keyboard,** the installation program asks you to verify that you do not want to use any point-of-sale keyboard as the system keyboard.

IBM 7497 Point of Sale Attachment Adapter Installation Considerations

If you are installing the IBM Point of Sale Subsystem for Windows on an ISA bus machine with an IBM 7497 Point of Sale Attachment Adapter, the Microsoft Windows 98 registry must be updated to include the adapter address in order for the IBM Point of Sale Subsystem for Windows to recognize the adapter. The IBM Point of Sale Subsystem for Windows installation program will make these changes for you only if you select `7497 POS Adapter Installed` from the options menu.

The necessary changes are described in the following section.

Note: Registry changes are not necessary if you are installing the IBM Point of Sale Subsystem for Windows on an MCA bus machine.

Changes to the Microsoft Windows 98 Registry

The Microsoft Windows 98 registry path that was set up during the installation of the IBM Point of Sale Subsystem for Windows is:

```
HKEY_LOCAL_MACHINE\SOFTWARE\IBM\IBM Point of Sale Subsystem
```

To update the Microsoft Windows 98 registry to include the adapter address, use the registry editor, Regedit, and perform the following steps:

1. Click **`IBM Point of Sale Subsystem`**.
2. Click **Edit**.
3. Select **New**.
4. Select **String value**.
5. Type `Ioaddr` and press **Enter**
6. Click **Edit**.
7. Select **Modify**.
8. Type the adapter addresses as Value data.
9. Click **OK** or press **Enter**.

   For example, if your adapter's address is set to 0x260, the following would be displayed at the top of the right-hand screen: **Ioaddr:REG_SZ:260**
10. Exit from the Regedit editor.

Switches on the IBM 7497 Point of Sale Attachment Adapter (ISA Bus Adapter) control the adapter address. Refer to the *Point of Sale Terminal Attachment Kit: Physical Planning, Installation, and Service Manual* for information about setting up your adapter.

Installation Procedure for Microsoft Windows NT

This section describes the procedure for installing the IBM Point of Sale Subsystem for Windows under the Microsoft Windows NT operating system. This section also describes the modifications made by the IBM Point of Sale Subsystem for Windows installation program to your Microsoft Windows NT system.

Installing IBM Point of Sale Subsystem for Windows

To install the IBM Point of Sale Subsystem for Windows on a Microsoft Windows NT system, perform the following steps:

1. If an older version of the IBM Point of Sale Subsystem for Windows is already installed on your system, uninstall the old version — see “Uninstalling IBM Point of Sale Subsystem for Windows” on page 4-19. If uninstall is not supported for the version of IBM Point of Sale Subsystem for Windows on your system, make sure that no IBM Point of Sale Subsystem for Windows applications are running on the target system. The IBM Point of Sale Subsystem for Windows files cannot be updated when they are in use.
2. If you are installing from diskette, insert the first IBM Point of Sale Subsystem for Windows diskette into drive A.
3. Select **Run** from the File. pulldown menu of Microsoft Windows NT 3.51 or from the Start menu of Microsoft Windows NT 4.0. In the prompt box, type

   ```
   A:\SETUP
   ```

   Press **Enter** to start the IBM Point of Sale Subsystem for Windows installation.

   Note: If you are installing from a LAN drive, replace `A:` with the LAN drive letter and directory specification.
4. A Welcome dialog box is displayed. Select the **Next** push button or press **Enter** to continue the installation.
5. The IBM Point of Sale Subsystem License Agreement is displayed. Select the **Yes** push button or press **Enter** to continue to the component selection dialog box.
6. Specify the IBM Point of Sale Subsystem for Windows components you want to install and the drive and directory where you want them installed. Then select the **Next** push button or press **Enter**.

   Notes:

   a. See “Alphanumeric Point of Sale Keyboard Installation Considerations” on page 4-17 if you have an alphanumeric point-of-sale keyboard attached to the system keyboard port.

   b. By default, the installation program installs the IBM Point of Sale Subsystem for Windows in the POS directory on your boot drive. If you change the target directory to something other than POS, substitute your directory name wherever `C:\POS` appears in this document.
7. Choose the options you want to install, then select the **Next** push button or press **Enter**.

   Note: See “IBM 7497 Point of Sale Attachment Adapter Installation Considerations” on page 4-17 for additional information about installing the IBM Point of Sale Subsystem for Windows on a point-of-sale terminal with an IBM 7497 Point of Sale Attachment Adapter installed.

If you are installing from diskette, the program prompts you for the correct diskettes during the installation. A window shows you the status of the installation program, indicating the percentage of the total number of files that have been installed.

8. When the installation is complete, you are then prompted to select one of the following restart options:
   - Yes, I want to restart my computer now.
   - No, I will restart my computer later.

   Choose the desired restart option and select the **OK** push button to complete the installation.

For versions of the IBM Point of Sale Subsystem for Windows that support uninstall, a file called DelsLx.isu (x is a positive integer) is created. This file is used by the uninstall program and will be removed during the uninstall processing. Do not delete this file.

Microsoft Windows NT System Changes

This section describes the modifications made by the IBM Point of Sale Subsystem for Windows installation program to your Microsoft Windows NT system.

Microsoft Windows NT Devices

The IBM Point of Sale Subsystem for Windows installation adds two new devices to Microsoft Windows NT, AIPDCS and AIPNVRAM. These devices are started automatically when Microsoft Windows NT starts. Devices are accessible by selecting **Devices** from the Microsoft Windows NT Control Panel.

Microsoft Windows NT Services

The IBM Point of Sale Subsystem for Windows installation adds a new service to Microsoft Windows NT called AIPSTART. This service is started automatically when Microsoft Windows NT starts. Services are accessed by selecting Services from the Microsoft Windows NT Control Panel.

Microsoft Windows NT System Environment Variables

When you install the IBM Point of Sale Subsystem for Windows, the following change is made to the Microsoft Windows NT system environment variables:

```
Path=%Path%;C:\POS\BIN;C:\POS\DLL
```

In the previous statement, `%Path%` is the contents of the Path statement before the installation program added the information specific to the IBM Point of Sale Subsystem for Windows.

Notes:

1. By default, the installation program updates the Path system environment variable.
2. Environment variables are accessible by selecting **System** from the Microsoft Windows NT Control Panel.

If you are installing IBM Point of Sale Subsystem for Windows on a system that will be used to develop point-of-sale applications and you have installed the IBM Point of Sale Subsystem for Windows C Library and Header files, there are two additional changes to make to your autoexec.bat file:

- Append the following to your `INCLUDE=` statement:

```
C:\POS\INCLUDE\POS
```

- Append the following to your LIB= statement in the Microsoft Windows NT system environment variables:

  ```
  C:\POS\LIB
  ```

Note: These autoexec.bat changes are not made by the installation program.

Alphanumeric Point of Sale Keyboard Installation Considerations

If you are using an point-of-sale keyboard attached to the system keyboard port, you must select `Alphanumeric POS Keyboard` from the component selection menu. The IBM Point of Sale Subsystem for Windows installation replaces your Microsoft Windows NT keyboard driver, I8042PRT.SYS. If this is the first time IBM Point of Sale Subsystem for Windows has been installed, the original keyboard driver is saved in I8042PRT.BAK.

IBM 7497 Point of Sale Attachment Adapter Installation Considerations

If you are installing the IBM Point of Sale Subsystem for Windows on an ISA bus machine with an IBM 7497 Point of Sale Attachment Adapter, the Microsoft Windows NT registry must be updated to include the adapter address in order for the IBM Point of Sale Subsystem for Windows to recognize the adapter. The IBM Point of Sale Subsystem for Windows installation program will make these changes for you only if you select `7497 POS Adapter Installed` from the options menu.

The necessary changes are described in the following section.

Note: Registry changes are not necessary if you are installing the IBM Point of Sale Subsystem for Windows on an MCA bus machine.

Changes to the Microsoft Windows NT Registry

The Microsoft Windows NT registry path that was set up during the installation of the IBM Point of Sale Subsystem for Windows is:

```
HKEY_LOCAL_MACHINE\SOFTWARE\IBM\IBM Point of Sale Subsystem
```

To modify the Microsoft Windows NT registry to specify the adapter address, use the registry editor, Regedt32, and perform the following steps:

1. Click **`IBM Point of Sale Subsystem`**
2. Click `Ioaddr` at the top on the right-hand screen
3. Click **Edit**
4. Select **String**
5. Type the adapter address as the String
6. Click **Ok** or press **Enter**

   For example, if your adapter's address is set to 0x260, the following information would be displayed at the top of the right-hand screen:

   ```
   Ioaddr:REG_SZ:260
   ```
7. Exit from the Regedt32 editor

Switches on the IBM 7497 Point of Sale Attachment Adapter (ISA Bus Adapter) control the adapter address. Refer to the *Point of Sale Terminal Attachment Kit: Physical Planning, Installation, and Service Manual* for information about setting up your adapter card.

Installation on Preloaded Systems

This section describes the procedure for installing the IBM Point of Sale Subsystem for Windows on systems that have been preloaded with a Microsoft Windows operating system and the IBM Point of Sale Subsystem for Windows installation files.

Installing From the System Drive

The **POSSW***xxx* directory on the system drive contains the installation files for the *x.x.x* release of IBM Point of Sale Subsystem for Windows. To install IBM Point of Sale Subsystem for Windows, perform the following steps:

1. Select the **Run** box from the Start menu or open an MS-DOS window to get access to a command line.
2. In the **Run** box or on the MS-DOS command line, type the following path: **C:\POSSW***xxx*\setup

Creating Installation Diskettes

The `DSK` subdirectory in the `POSSWxxx` contains the self-extracting files for the `x.x.x` release of IBM Point of Sale Subsystem for Windows. To create IBM Point of Sale Subsystem for Windows installation diskettes that can be used to install IBM Point of Sale Subsystem for Windows, follow the instructions in the `README.1ST` file located in the `DSK` subdirectory.

Silent Installation

This section describes the procedure for a silent installation of the IBM Point of Sale Subsystem for Windows. Silent installation is performed the same way for all supported Microsoft Windows operating systems. Before attempting a silent install, it is recommended that you read the previous install sections.

Installing IBM Point of Sale Subsystem for Windows in Silent Mode

To install IBM Point of Sale Subsystem for Windows in silent mode, perform the following steps:

1. If an older version of the IBM Point of Sale Subsystem for Windows is already installed on your system, uninstall the old version—see “Uninstalling IBM Point of Sale Subsystem for Windows” on page 4-19. If uninstall is not supported for the version of IBM Point of Sale Subsystem for Windows on your system, make sure that no IBM Point of Sale Subsystem for Windows applications are running on the target system. The IBM Point of Sale Subsystem for Windows files cannot be updated when they are in use.
2. If you are installing on Windows 3.1x, you ***must*** install Microsoft Win32s first. See “Installing Microsoft Win32s” on page 4-1.
3. Copy the contents of all IBM Point of Sale Subsystem for Windows diskettes into a directory on a drive accessible by the target system. In the following instructions, d:\silent refers to the directory into which the IBM Point of Sale Subsystem for Windows diskettes have been copied.
4. Modify the SETUP.ISS file in the d:\silent directory to customize the installation. The SETUP.ISS file contains instructions identifying where changes can be made.
5. Select **Run** from the File pulldown menu in Windows 3.1x or Windows NT 3.51; select **Run** from the Start menu in Microsoft Windows NT 4.0, Microsoft Windows 95 or Microsoft Windows 98; or open an MS-DOS Window to get access to a command line.

6. In either the Run box or on the MS-DOS command line, type the following path: **d:\silent\setup -s**

Uninstalling IBM Point of Sale Subsystem for Windows

This section describes the procedure for removing the IBM Point of Sale Subsystem for Windows from your system. Some earlier versions of IBM Point of Sale Subsystem for Windows do not support uninstall.

Steps to Uninstall

To uninstall IBM Point of Sale Subsystem for Windows under Microsoft Windows 3.1 or Microsoft Windows NT 3.51, perform the following steps:

1. Double-click the **IBM Point of Sale Subsystem for Windows** icon.
2. Double-click the **uninstall** icon. If no uninstall icon appears, the installed version IBM Point of Sale Subsystem for Windows does not support uninstall.
3. Reboot your system—some files cannot be removed until a reboot occurs.

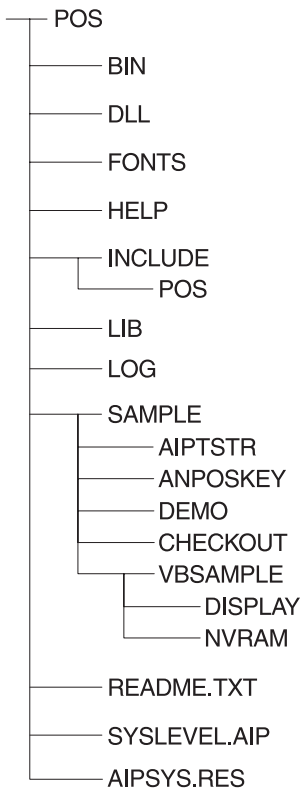
To uninstall IBM Point of Sale Subsystem for Windows under Microsoft Windows NT 4.0, Microsoft Windows 95 or Microsoft Windows 98:

1. Either double-click the **My Computer** icon on the desk top, then double-click the Control Panel icon, or select Settings from the Start menu and then select Control Panel.
2. Double-click the **Add/Remove Programs** icon.
3. Find and highlight **IBM Point of Sale Subsystem** in the list of installed programs. If IBM Point of Sale Subsystem is not in the list, the installed version does not support uninstall.
4. Select the **Add/Remove** push button or press **Enter**.
5. Reboot your system. Some files cannot be removed until a reboot occurs.

IBM Point of Sale Subsystem for Windows Directory Structure

The POS subdirectory (or the target directory you specified) is created automatically by the installation program. It contains all the other IBM Point of Sale Subsystem for Windows subdirectories and files.

The IBM Point of Sale Subsystem for Windows directory structure is shown in the following illustration.



The subdirectories and their contents are:

bin Executables and device drivers used by the IBM Point of Sale Subsystem for Windows.

dll Dynamic Link Library files used by the IBM Point of Sale Subsystem for Windows.

fonts Font files used by the IBM Point of Sale Subsystem for Windows.

help The online *IBM Point of Sale Subsystem: Programming Reference and User's Guide*

include\pos
IBM Point of Sale Subsystem for Windows C language header files.

lib IBM Point of Sale Subsystem for Windows library file.

log IBM Point of Sale Subsystem for Windows error log files.

sample
Several sample programs can be optionally installed along with the rest of the product.

The sample programs are:

aiptstr
Calls the IBM Point of Sale Subsystem for Windows application programming interface via prompted input. The results of the application programming interface calls are displayed on the screen. Also includes a sample resource file.

anposkey
Traces keys received from the ANPOS keyboard.

demo Illustrates the use of the IBM Point of Sale Subsystem for Windows

application programming interface. It does this without prompting the user for parameters, and only prompts for various actions (such as to sound a tone).

checkout
Shows how to program using the IBM Point of Sale Subsystem for Windows application programming interface.

vbsample
Illustrates the use of the IBM Point of Sale Subsystem for Windows application programming interface from Visual Basic™. Sample code is included for customer display and NVRAM devices. These sample programs are only installed if Visual Basic support is installed.

Other files installed in the POS subdirectory are:

readme.txt
Text file that documents the latest changes to IBM Point of Sale Subsystem for Windows.

syslevel.aip
File containing information about the installed version of IBM Point of Sale Subsystem for Windows. Use the IBM Point of Sale Subsystem for Windows program, AIPLEVEL, to view this information.

AIPSYS.RES
IBM Point of Sale Subsystem for Windows resource file. This resource file is always used for system-attached ANPOS keyboards, but can also be used by other IBM Point of Sale Subsystem for Windows applications.

Chapter 5. Installing the IBM Point of Sale (POS) Suite

The IBM POS Suite is a software package that allows you to use point-of-sale devices in a 32-bit Windows-based operating environment.

This section guides you through the installation of the IBM POS Suite for Windows. This application creates the necessary subdirectories, creates a folder for the IBM POS Suite, and updates your Microsoft Windows system files.

IBM POS Suite Package

The package file is very large; therefore, a compressed version and split-compressed version of the suite is available. If you do not have a high-speed internet connection, consider downloading the split-compressed version.

1. Download the package from the Web site: www.ibm.com/solutions/retail/store.
   a. **Compressed Version:**

      Download the setup.exe file to a temporary directory on your local hard disk.

   b. **Split-Compressed Version:**

      Download the following self-extracting files to a temporary directory on your local hard disk.
      - possuite1.exe
      - possuite2.exe
      - possuite3.exe

      Run possuite1.exe, possuite2.exe, and then possuite3.exe to extract all of the required installation files.

   Windows NT 4.0 and Windows 2000

   After downloading the package, you may need to logoff your machine and then log in under the Username and Password of the Administrator to run the setup.exe file.

2. Run the setup.exe file by proceeding to the section applicable to the operating system on your machine:

   Note: Every installation attempting to use the Microsoft Windows Installer begins by checking whether the Windows Installer Service is present on your computer.

   - On Windows 98 operating system, see “Installing the IBM POS Suite for Microsoft Windows 98” on page 5-3.
   - On a Windows NT (version 4.0 or later) or Windows 2000, see “Installation Procedure for Microsoft Windows NT and Microsoft Windows 2000” on page 5-7.
3. After installation, restart your system to enable the configuration changes.

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POS Suite Files

Table 5-1 lists the IBM POS Suite files that are downloaded onto your local hard disk:

Table 5-1. IBM POS Suite Files

File Name	File Description
IBM POS Suite.Msi	Windows Installer Database File
IBM POS Suite.PDF	File used for deploying install package via SMS
setup.exe	File for calling install initialization routine
setup.ini	Initialization file for the setup.exe
data.cab	Cabinet file containing the compressed installable files
data1.cab	Cabinet file containing the compressed installable files
data2.cab	Cabinet file containing the compressed installable files
instmia.exe	Microsoft redistributable of the Windows installer Service for Windows 95 and Windows 98
instmsiw.exe	Microsoft redistributable of the Windows installer Service for Windows NT

Installation Restrictions and Requirements

- Diskette distribution is not supported.
- See the ″Microsoft Windows Installer″ on the Web if you want to use the silent installation procedures (using `setup.exe /s`) or to pass options to the Microsoft Windows Installer (using `setup.exe /v`).
- Installation of the suite on a remote network drive is not supported.
- For Windows NT and for Windows 2000, you must have administrator privileges to install or remove the software.
- A Java Development Kit (JDK) or Java Runtime Environment (JRE) is required to install the POS Suite with USB support. Obtain the latest IBM Java JDK from: www.ibm.com/java/jdk/download.

Installing the IBM POS Suite for Microsoft Windows 98

This section describes the procedure for installing the IBM POS Suite under the Microsoft Windows 98 operating system. This section also describes the Microsoft Windows 98 system file changes that are required by IBM POS Suite.

Installing the IBM POS Suite for Windows 98

Before installing the IBM POS Suite on your system, verify the following prerequisites:

- Java is installed on your system.
- If an older version of the IBM POS Suite, POSSWin, OPOS, JavaPos, or POSSDD is already installed on your system, uninstall the old version —see "Uninstalling the IBM POS Suite" on page 5-11. Make sure that no IBM POS Suite applications are running on the target system. The IBM POS Suite files cannot be updated when they are in use.

To install the IBM POS Suite on a Microsoft Windows 98 system, perform the following steps:

1. Run setup.exe to start the installation process.
2. A Welcome dialog box is displayed. Select the **Next** push button or press **Enter** to continue the installation.
3. The IBM Point of Sale Subsystem License Agreement is displayed. Select the **I accept the terms of the license agreement** push button and select the **Next** push button to continue to the Customer Information dialog box.
4. Enter your **Name** and **Organization** and select the **Next** push button.
5. Specify the IBM POS Suite features you want to install and the drive and directory where you want them to be installed. Then, select the **Next** push button to continue.

   Notes:

   a. See "Alphanumeric Point of Sale Keyboard Installation Considerations" on page 5-5 if you have an IBM Alphanumeric Point of Sale Keyboard attached to the system keyboard port.

   b. By default, the installation program installs the IBM POS Suite in the POS directory on your boot drive. If you change the target directory to something other than POS, substitute your directory name wherever `C:\POS` appears in this document.
6. Specify whether or not you are using an IBM Alphanumeric Point of Sale Keyboard.
7. Specify whether an IBM Alphanumeric Point of Sale Keyboard will be attached to the Universal Serial Bus (USB) or the System Keyboard Port. Then select the **Next** push button.
8. Specify whether a 7497 POS Adapter Card is installed.

   Enter the address of the 7497 POS Adapter Card. Then select the **Next** push button.

   Notes:

   a. See "IBM 7497 Point of Sale Attachment Adapter Installation Considerations" on page 5-5 for additional information about installing the IBM POS Suite on a system with an IBM 7497 Point of Sale Attachment Adapter installed.

   b. By default, the IBM POS Suite updates your autoexec.bat file and, if necessary, your system.ini file. Your system will not function correctly

without these updates. See “Changes to Your Windows 98 AUTOEXEC.BAT File” for a description of the changes IBM POS Suite requires in autoexec.bat.

c. See “Alphanumeric Point of Sale Keyboard Installation Considerations” on page 5-5 if you have an alphanumeric Point of Sale Keyboard attached to a USB port.

9. Click **Install** to begin the installation process.
10. When the installation is complete, you are then prompted to select one of the following restart options:
    - Yes, I want to restart my computer now.
    - No, I will restart my computer later.
11. Close all programs and restart your computer.

Microsoft Windows 98 System File Changes

This section describes the changes to the Microsoft Windows 98 system files that are required by the IBM POS Suite. These changes are made automatically by the installation program.

Changes to Your Windows 98 AUTOEXEC.BAT File

If you install the IBM POS Suite, there is one optional change you can make to your autoexec.bat file. If the installation program updated your autoexec.bat file, the following changes were made:

For POSSWin and OPOS:

```
SET PATH=C:\POS\BIN; C:\POS\DLL;%PATH%


SET POSAPPLRESDIR = C:\POS
```

For JavaPOS:

```
SET CLASSPATH = C:\POS\IBMJPOS\Lib\JPOS14.JAR\IBMJPOS.JAR
```

In the previous statement, `%PATH%` is the contents of the path statement before the installation program added the information specific to the IBM POS Suite.

Note: By default, the installation program updates the autoexec.bat file, making this change for you.

If you are installing the IBM POS Suite on a system that will be used to develop point-of-sale applications and you have installed the IBM POS Suite C Library and Header files, make the following additional changes to your autoexec.bat file:

- Append the following to your `SET INCLUDE=` statement:

  ```
  C:\POS\INCLUDE\POS
  ```
- Append the following to your `SET LIB=` statement in autoexec.bat:

  ```
  C:\POS\LIB
  ```

Note: These changes are not made by the installation program.

Microsoft Windows 98 System Changes

This section describes the modifications made by the IBM POS Suite installation program to your Microsoft Windows 98 system.

Microsoft Windows 98 Services

The IBM POS Suite installation adds the service, aipstart, to your Microsoft Windows 98 system. This service is started automatically when Microsoft Windows 98 starts, before any user logs into the system. This service is specified in the Microsoft Windows 98 registry under `HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\RunServices .`

Alphanumeric Point of Sale Keyboard Installation Considerations

The alphanumeric point-of-sale keyboard can be attached to the system keyboard port, to an RS-485 port, or to a USB port for use with the Microsoft Windows 98 operating system.

RS-485-Attached Alphanumeric Point of Sale Keyboard

If your alphanumeric point-of-sale keyboard is attached to an RS-485 port, do not select either IBM **Alphanumeric POS Keyboard** from the feature selection menu or **USB Alphanumeric POS Keyboard as a System Keyboard** from the options selection screen during installation. There are no system file changes required for this keyboard.

Note: The installation program asks you to verify that you do not want to use any point-of-sale keyboard as the system keyboard.

System Port-Attached Alphanumeric Point of Sale Keyboard

If your alphanumeric point-of-sale keyboard is attached to the system keyboard port, the IBM Point of Sale Subsystem for Windows requires that an IBM Point of Sale Subsystem for Windows-specific virtual keyboard device driver be loaded to replace the default virtual keyboard device driver. You should select **Alphanumeric POS Keyboard** from the feature selection menu during installation. The installation program asks you to verify that you do have an alphanumeric point-of-sale keyboard attached to the system keyboard port.

By default, the installation program updates your system.ini file. The following statement is added to the [386Enh] section in your system.ini file:
KEYBOARD=C:\POS\BIN\AIPVKD.VXD

USB-Attached Alphanumeric Point of Sale Keyboard

If your alphanumeric point-of-sale keyboard is attached to a USB port, it can function as the system keyboard in Microsoft Windows 98. If you would like your USB alphanumeric point-of-sale keyboard to function as the system keyboard, select **USB Alphanumeric POS Keyboard as a System Keyboard** from the options selection screen.

IBM 7497 Point of Sale Attachment Adapter Installation Considerations

If you are installing the IBM POS Suite on an ISA bus machine with an IBM 7497 Point of Sale Attachment Adapter, the Microsoft Windows 98 registry must be updated to include the adapter address to allow the IBM Point of Sale Subsystem for Windows to recognize the adapter. The IBM Point of Sale Subsystem for Windows installation program will make these changes for you only if you select **7497 POS Adapter Card** from the options menu.

The necessary changes are described in the following section.

Note: Registry changes are not necessary if you are installing the IBM Point of Sale Subsystem for Windows on an MCA bus machine.

Changes to the Microsoft Windows 98 Registry

The Microsoft Windows 98 registry path that was set up during the installation of the IBM Point of Sale Subsystem for Windows is:

```
HKEY_LOCAL_MACHINE\SOFTWARE\IBM\Point of Sale Subsystem
```

To update the Microsoft Windows 98 registry to include the adapter address, use the registry editor, *Regedit*, and perform the following steps:

1. Click `HKEY_LOCAL_MACHINE\SOFTWARE\IBM\ Point of Sale Subsystem`
2. Click **Edit**
3. Select **New**
4. Select **String value**
5. Select **Ioaddr**
6. Click **Edit**
7. Select **Modify**
8. Type the adapter addresses as Value data.

   For example, if your adapter's address is set to 0x260, the following would be displayed at the top of the right-hand screen:

   ```
   Ioaddr     REG_SZ   260
   ```
9. Click **Ok** or press **Enter**
10. Exit from the Regedit editor

Switches on the IBM 7497 Point of Sale Attachment Adapter (ISA Bus Adapter) control the adapter address. Refer to the *Point of Sale Terminal Attachment Kit: Physical Planning, Installation, and Service Manual* for information about setting up your adapter.

Installation Procedure for Microsoft Windows NT and Microsoft Windows 2000

This section describes the following for Microsoft Windows NT (version 4.0 or later) and Microsoft Windows 2000 operating system:

- How to install the IBM POS Suite
- The modifications that the IBM POS Suite installation program makes to the system.

Installing the IBM POS Suite on Microsoft Windows NT and Microsoft Windows 2000

Before installing the IBM POS Suite on your system, verify the following **Prerequisites:**

- Java is installed on your system. For USB support, Java JDK or JRE must be installed.
- If an older version of the IBM Point of Sale Subsystem for Windows is already installed on your system, uninstall the old version - see “Uninstalling the IBM POS Suite” on page 5-11. If uninstall is not supported for the version of IBM Point of Sale Subsystem for Windows on your system, make sure that no IBM Point of Sale Subsystem for Windows applications are running on the target system. The IBM Point of Sale Subsystem for Windows files cannot be updated when they are in use.
- For Microsoft Windows 2000, disable the digital signature check as follows:
  1. Open the Control Panel
  2. Open the System icon
  3. Select the Hardware profiles tab
  4. Select Driver Signing
  5. Deselect digital signature

To install the IBM POS Suite on your system:

1. Run setup.exe to start the installation process. You may be directed to restart your system.
2. When the ″Welcome dialog box″ is displayed, select the **Next** push button or press **Enter** to continue the installation.
3. When the ″IBM Point of Sale Subsystem License Agreement″ is displayed, select the **I accept the terms of the license agreement** and select the **Next** push button to continue to the ″Customer Information dialog box″.
4. On the next dialog box, specify your **Name** and **Organization** and select the **Next** push button.
5. On the next dialog box, ″IBM POS Suite″ is already selected. Specify the features that you do not want to install. Items that will not be installed are labeled with a red **X**.

   Specify the drive/subdirectory where you want them to be installed. Then, select the **Next** push button to continue.

   Notes:

   a. See “Alphanumeric Point of Sale Keyboard Installation Considerations” on page 5-9 if you have an IBM Alphanumeric Point of Sale Keyboard attached to the system.

b. By default, the installation program installs the IBM POS Suite in the POS directory on your boot drive. If you change the target directory to something other than POS, substitute your directory name wherever `C:\POS` appears in this document.

6. Specify whether or not you are using an IBM Alphanumeric Point of Sale Keyboard.
7. Specify whether an IBM Alphanumeric Point of Sale Keyboard will be attached to the Universal Serial Bus (USB) or the System Keyboard Port. Then select the **Next** push button.
8. Specify whether a 7497 POS Adapter Card is installed.

   Enter the address of the 7497 POS Adapter Card. Then select the **Next** push button.

   Notes:

   a. See "IBM 7497 Point of Sale Attachment Adapter Installation Considerations" on page 5-9 for additional information about installing the IBM POS Suite on a system with an IBM 7497 Point of Sale Attachment Adapter installed.

   b. See "Alphanumeric Point of Sale Keyboard Installation Considerations" on page 5-9 if you have an alphanumeric Point of Sale Keyboard attached to a USB port.
9. Click **Install** to begin the installation process.
10. When the installation is complete, you are then prompted to select one of the following restart options:
    - Yes, I want to restart my computer now.
    - No, I will restart my computer later.
11. Close all programs and restart your computer.

Microsoft Windows NT and Microsoft Windows 2000 System Changes

This section describes the modifications made by the IBM POS Suite installation program to your system.

Microsoft Windows NT and Microsoft Windows 2000 Devices

The IBM POS Suite installation adds two new devices to these operating system files: aipdcs and aipnvram. These devices are started automatically when the operating system starts. Devices are accessible by selecting **Devices** from the Microsoft Windows NT or Microsoft Windows 2000 Control Panel.

Microsoft Windows NT and Microsoft Windows 2000 Services

The IBM POS Suite installation adds a new service to the operating system called AIPSTART. This service is started automatically when operating system starts. Services are accessed by selecting Services from the Microsoft Windows NTor Microsoft Windows 2000 Control Panel.

Microsoft Windows NT and Microsoft Windows 2000 System Environment Variables

When you install the IBM POS Suite, the following change is made to the Microsoft Windows NT or Microsoft Windows 2000 system environment variables:

For POSSWin and OPOS:

```
PATH=C:\POS\BIN;C:\POS\DLL

POSAPPLRESDIR = C:\POS
```

For JavaPOS:

```
SET CLASSPATH = C:\POS\IBMJPOS\LIB\JPOS14.JAR\IBMJPOS.JAR
```

Notes:

1. By default, the installation program updates the Path system environment variable.
2. Environment variables are accessible by selecting **System** from the Microsoft Windows NT or Microsoft Windows 2000 Control Panel.

If you are installing IBM POS Suite on a system that will be used to develop point-of-sale applications and you have installed the IBM POS Suite C Library and Header files, there are two additional changes to make to your system environment variables:

- Append the following to your `INCLUDE=` statement:

  ```
  C:\POS\INCLUDE\POS
  ```
- Append the following to your `LIB=` statement in the Microsoft Windows NT or the Microsoft Windows 2000 system environment variables: **C:\POS\LIB**

Alphanumeric Point of Sale Keyboard Installation Considerations

- For **Microsoft Windows NT**:

  If you are using a point-of-sale keyboard that is attached to the system keyboard port, select **Alphanumeric POS Keyboard** from the feature selection menu. The IBM POS Suite installation replaces your Microsoft Windows NT keyboard driver, I8042PRT.SYS. If this is the first time IBM POS Suite has been installed, the original keyboard driver is saved in I8042PRT.POS.
- For **Microsoft Windows 2000**:

  If you are using a point-of-sale keyboard attached to a USB port, select **USB Alphanumeric POS Keyboard** from the options selection screen..

IBM 7497 Point of Sale Attachment Adapter Installation Considerations

If you are installing the IBM POS Suite on an ISA bus machine with an IBM 7497 Point of Sale Attachment Adapter, the Microsoft Windows NT or Microsoft Windows 2000 registry must be updated to include the adapter address in order for the IBM POS Suite to recognize the adapter. The IBM POS Suite installation program will make these changes for you only if you select `7497 POS Adapter` from the options menu.

The necessary changes are described in the following section.

Note: Registry changes are not necessary if you are installing the IBM POS Suite on an MCA bus machine.

Changes to the Microsoft Windows NT or Microsoft Windows 2000 Registry

The registry path that was set up during the installation of the IBM POS Suite is:
`HKLM\Software\IBM\`**`Point of Sale Subsystem`**

To modify this registry to specify the adapter address, use the registry editor, *Regedit*, and perform the following steps:

1. Click **HKEY_LOCAL_MACHINE\SOFTWARE\IBM\Point of Sale Subsystem**
2. Click **Edit**
3. Select **New**
4. Select **String value**

5. Select **Ioaddr**
6. Click **Edit**
7. Select **Modify**
8. Type the adapter addresses as Value data.

   For example, if your adapter's address is set to 0x260, the following would be displayed at the top of the right-hand screen:

   ```
   Ioaddr     REG_SZ   260
   ```
9. Click **Ok** or press **Enter**
10. Exit from the Regedit editor

Switches on the IBM 7497 Point of Sale Attachment Adapter (ISA Bus Adapter) control the adapter address. Refer to the *Point of Sale Terminal Attachment Kit: Physical Planning, Installation, and Service Manual* for information about setting up your adapter.

Uninstalling the IBM POS Suite

This section describes the procedure for removing the IBM POS Suite from your system.

To uninstall IBM POS Suite under Microsoft Windows 98, Microsoft Windows NT 4.0, or Microsoft Windows 2000, perform the following steps:

1. Click on the **Start** menu.
2. Select **Settings** from the Start menu and then select **Control Panel**.
3. Double-click the **Add/Remove Programs** icon.
4. Find and highlight IBM POS Suite in the list of installed programs.
5. Select the **Remove** push button.
6. If indicated, reboot your system. Some files cannot be removed until a reboot occurs.

Chapter 6. Installing the IBM Point of Sale Subsystem for Windows V2.3.0 and Later

The IBM POS Subsystem is a software package that when installed, allows you to use point-of-sale devices in a Windows-based operating environment.

This section guides you through the installation for Windows.

The installation program creates the necessary subdirectories for you, creates a folder for the POS Subsystem, and updates your Microsoft Windows system files.

POS Subsystem Package

Two versions of the package are available. On high-speed Internet connections, obtain the compressed version. For slower connections, obtain the split-compressed version.

1. Download one of the following versions of the package from the web site `www.ibm.com/solutions/retail/store` :
   a. **Compressed Version:**

      Download the `Setup.exe` file to a temporary directory on your local hard disk. Run the Setup file and follow the directions on each panel.

   b. **Split-Compressed Version:**

      Download the following self-extracting files to a temporary directory on your local hard disk:

      - `PosWin1.exe`
      - `PosWin2.exe`

      Run `PosWin1.exe`, and `PosWin2.exe`, respectively, to extract all of the required installation files.

   Window NT 4.0 and Windows 2000
   After the download is complete, you may need to logoff your machine and then log back in under the Username and Password of the Administrator to run the setup.exe file.

2. Run setup.exe file by proceeding to the section applicable to the operating system on your machine:
   - On Windows 98 operating system, see “Installing the POS Subsystem for Microsoft Windows 98” on page 6-2.
   - On a Windows NT (version 4.0 or later) or a Windows 2000 operating system, see “Installation Procedure for Microsoft Windows NT and Microsoft Windows 2000” on page 6-6.
3. To enable the configuration changes after the installation is complete, restart your system.

Note: The POS Subsystem for Window requires the Microsoft Windows Installer. Every installation begins by checking whether the installed engine is present on the user’s computer. If it is not installed, the setup installs the Windows installer engine.

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Installation Restrictions and Requirements

- Diskette distribution is not supported.
- The silent installation is not supported.
- Installation from and to a remote network drive is not supported.
- For Windows NT and for Windows 2000, you must have administrator privileges to install or remove the software.

Installing the POS Subsystem for Microsoft Windows 98

This section describes the procedures for installing with the Microsoft Windows 98 operating system. This section also describes the Microsoft Windows 98 system file changes that are required by the POS Subsystem.

Installing the POS Subsystem for Windows 98

Before installing the POS Subsystem on your system, verify the following **Prerequisites:**

- Make sure that no IBM POS applications are running on the target system.
- If an older version of the IBM POS Suite, POSSWin, OPOS, JavaPos, or POSSDD is already installed on your system, uninstall the old version. Refer to your documentation pertaining to the version.

To install the POS Subsystem on a Microsoft Windows 98 system, perform the following steps:

1. Run setup.exe to start the installation process.
2. A Welcome dialog box is displayed. Select the **Next** push button or press **Enter** to continue the installation.
3. The IBM Point of Sale Subsystem License Agreement is displayed. Select the **I accept the terms of the license agreement** push button and select the **Next** push button to continue to the Customer Information dialog box.
4. Enter your **Name** and **Organization** and select the **Next** push button.
5. On the next dialog box, *IBM POS* is already selected. Specify the features that you do not want to install. Items that will not be installed are labeled with a red **X**.

   Specify the drive/subdirectory where you want them to be installed. Then, select the **Next** push button to continue.

   Notes:

   a. See **Alphanumeric Point of Sale Keyboard Installation Considerations** if you have an IBM Alphanumeric Point of Sale Keyboard attached to the system.

   b. By default, the installation program installs the program in the POS directory on your boot drive. If you change the target directory to something other than POS, substitute your directory name wherever `C:\POS` appears in this document.
6. Specify whether or not you are using an IBM Alphanumeric Point of Sale Keyboard.
7. Specify whether an IBM Alphanumeric Point of Sale Keyboard will be attached to the Universal Serial Bus (USB) or the System Keyboard Port. Then select the **Next** push button.
8. Specify whether a 7497 POS Adapter Card is installed.

Enter the address of the 7497 POS Adapter Card. Then select the **Next** push button.

Notes:

a. See **IBM 7497 Point of Sale Attachment Adapter Installation Considerations** for additional information about installing the POS Subsystem on a system with an IBM 7497 Point of Sale Attachment Adapter installed.

b. By default the POS Subsystem updates your autoexec.bat file and, if necessary, your system.ini file. Your system will not function correctly without these updates. See **"Microsoft Windows 98 System File Changes"** for a description of the changes POS Subsystem requires in autoexec.bat.

c. See **Alphanumeric Point of Sale Keyboard Installation Considerations** if you have an alphanumeric Point of Sale Keyboard attached to a USB port.

9. Click **Install** to begin the installation process.
10. When the installation is complete, you are then prompted to select one of the following restart options:
    - Yes, I want to restart my computer now.
    - No, I will restart my computer later.
11. Close all programs and restart your computer.

Microsoft Windows 98 System File Changes

This section describes the changes to the Microsoft Windows 98 system files that are required by the POS Subsystem. These changes are made automatically by the installation program.

Changes to the Windows 98 autoexec.bat File

If you install the POS Subsystem, there is one optional change that can be made to your autoexec.bat file. If the installation program updated your autoexec.bat file, the following changes were made:

```
SET PATH=C:\POS\BIN; C:\POS\DLL;%PATH%



SET POSAPPLRESDIR = C:\POS
```

In the previous statement, `%PATH%` is the contents of the PATH statement before the installation program added the information specific to the POS Subsystem.

Note: By default, the installation program updates the autoexec.bat file, making this change for you.

If you are installing the POS Subsystem on a system that will be used to develop point-of-sale applications and you have installed the POS Subsystem C Library and Header files, there are two additional changes to make to your autoexec.bat file:

- Append the following to your Set include= statement: `C:\POS\INCLUDE\POS`
- Append the following to your `SET LIB=` statement in autoexec.bat: `C:\POS\LIB`

Note: These changes are not made by the installation program.

Microsoft Windows 98 System Changes

This section describes the modifications made by the POS Subsystem installation program to your Microsoft Windows 98 system.

Microsoft Windows 98 Services

The POS Subsystem installation adds the service, AIPSTART, to your Microsoft Windows 98 system. This service is started automatically when Microsoft Windows 98 starts, before any user logs into the system. This service is specified in the Microsoft Windows 98 registry under `HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\RunServices .`

Alphanumeric Point of Sale Keyboard Installation Considerations

The alphanumeric point-of-sale keyboard can be attached to the system keyboard port, to an RS-485 port, or to a USB port for use with the Microsoft Windows 98 operating system.

RS-485-Attached Alphanumeric Point of Sale Keyboard

If your alphanumeric point-of-sale keyboard is attached to an RS-485 port, do not select either IBM `Alphanumeric POS Keyboard` from the feature selection menu or `USB Alphanumeric POS Keyboard as a System Keyboard` from the options selection screen during installation. There are no system file changes required for this keyboard.

Note: The installation program asks you to verify that you do not want to use any point-of-sale keyboard as the system keyboard.

System Port-Attached Alphanumeric Point of Sale Keyboard

If your alphanumeric point-of-sale keyboard is attached to the system keyboard port, the IBM Point of Sale Subsystem for Windows requires that an IBM Point of Sale Subsystem for Windows-specific virtual keyboard device driver be loaded to replace the default virtual keyboard device driver. You should select `Alphanumeric POS Keyboard` from the feature selection menu during installation. The installation program asks you to verify that you do have an alphanumeric point-of-sale keyboard attached to the system keyboard port.

By default, the installation program updates your SYSTEM.INI file. The following statement is added to the “[386Enh]” section in your SYSTEM.INI file: `KEYBOARD=C:\POS\BIN\AIPVKD.VXD`

USB-Attached Alphanumeric Point of Sale Keyboard

If your alphanumeric point-of-sale keyboard is attached to a USB port, it can function as the system keyboard in Microsoft Windows 98. If you would like your USB alphanumeric point-of-sale keyboard to function as the system keyboard, select `USB Alphanumeric POS Keyboard as a System Keyboard` from the options selection screen.

IBM 7497 Point of Sale Attachment Adapter Installation Considerations

If you are installing the IBM POS Suite on an ISA bus machine with an IBM 7497 Point of Sale Attachment Adapter, the Microsoft Windows 98 registry must be updated to include the adapter address to allow the IBM Point of Sale Subsystem for Windows to recognize the adapter. The IBM Point of Sale Subsystem for Windows installation program will make these changes for you only if you select `7497 POS Adapter Card` from the options menu.

The necessary changes are described in the following section.

Note: Registry changes are not necessary if you are installing the IBM Point of Sale Subsystem for Windows on an MCA bus machine.

Changes to the Microsoft Windows 98 Registry

The Microsoft Windows 98 registry path that was set up during the installation of the IBM Point of Sale Subsystem for Windows is:
`HKEY_LOCAL_MACHINE\SOFTWARE\IBM\Point of Sale Subsystem`

To update the Microsoft Windows 98 registry to include the adapter address, use the registry editor, *Regedit*, and perform the following steps:

1. Click `HKEY_LOCAL_MACHINE\SOFTWARE\IBM\ Point of Sale Subsystem`
2. Click **Edit**
3. Select **New**
4. Select **String value**
5. Select **Ioaddr**
6. Click **Edit**
7. Select **Modify**
8. Type the adapter addresses as Value data.

   For example, if your adapter's address is set to 0x260, the following would be displayed at the top of the right-hand screen: `Ioaddr  REG_SZ  260`
9. Click **Ok** or press **Enter**
10. Exit from the Regedit editor

Switches on the IBM 7497 Point of Sale Attachment Adapter (ISA Bus Adapter) control the adapter address. Refer to the *Point of Sale Terminal Attachment Kit: Physical Planning, Installation, and Service Manual* for information about setting up your adapter.

Installation Procedure for Microsoft Windows NT and Microsoft Windows 2000

This section describes the following for Microsoft Windows NT (version 4.0 or later) and Microsoft Windows 2000 operating system:

- How to install the POS Subsystem
- The modifications that the installation program makes to the system.

Installing the POS Subsystem on Microsoft Windows NT and Microsoft Windows 2000

Before installing the POS Subsystem on your system, verify the following **Prerequisites:**

- Make sure that no IBM POS applications are running on the target system.
- If an older version of the IBM Point of Sale Subsystem for Windows is already installed on your system, uninstall the old version. Refer to the documentation for your version.
- For Microsoft Windows 2000, disable the digital signature check as follows:
  1. Open the Control Panel
  2. Open the System icon
  3. Select the Hardware profiles tab
  4. Select Driver Signing
  5. Deselect digital signature

To install the POS Subsystem on your system:

1. Run **Setup.exe** to start the installation process. You may be directed to restart your system.
2. When the ″Welcome dialog box″ is displayed, select the **Next** push button or press **Enter** to continue the installation.
3. When the ″IBM Point of Sale Subsystem License Agreement″ is displayed, select the **I accept the terms of the license agreement** and select the **Next** push button to continue to the ″Customer Information dialog box″.
4. On the next dialog box, specify your **Name** and **Organization** and select the **Next** push button.
5. On the next dialog box, *IBM POS* is already selected. Specify the features that you do not want to install. Items that will not be installed are labeled with a red **X**.

   Specify the drive/subdirctory where you want them to be installed. Then, select the **Next** push button to continue.

   Notes:

   a. See Alphanumeric Point of Sale Keyboard Installation Considerations if you have an IBM Alphanumeric Point of Sale Keyboard attached to the system.

   b. By default, the installation program installs the program in the POS directory on your boot drive. If you change the target directory to something other than POS, substitute your directory name wherever `C:\POS` appears in this document.
6. Specify whether or not you are using an IBM Alphanumeric Point of Sale Keyboard.

7. Specify whether an IBM Alphanumeric Point of Sale Keyboard will be attached to the Universal Serial Bus (USB) or the System Keyboard Port. Then select the **Next** push button.
8. Specify whether a 7497 POS Adapter Card is installed.

   Enter the address of the 7497 POS Adapter Card. Then select the **Next** push button.

   Notes:

   a. See "IBM 7497 Point of Sale Attachment Adapter Installation Considerations" on page 6-8 for additional information about installing the POS Subsystem on a system with an IBM 7497 Point of Sale Attachment Adapter installed.

   b. See Alphanumeric Point of Sale Keyboard Installation Considerations if you have an alphanumeric Point of Sale Keyboard attached to a USB port.
9. Click **Install** to begin the installation process.
10. When the installation is complete, you are then prompted to select one of the following restart options:
    - Yes, I want to restart my computer now.
    - No, I will restart my computer later.
11. Close all programs and restart your computer.

Microsoft Windows NT and Microsoft Windows 2000 System Changes

This section describes the modifications made by the POS Subsystem installation program to your system.

Microsoft Windows NT and Microsoft Windows 2000 Devices

The POS Subsystem installation adds two new devices to these operating system files: AIPDCS and AIPNVRAM. These devices are started automatically when the operating system starts. Devices are accessible by selecting **Devices** from the Microsoft Windows NT or Microsoft Windows 2000 Control Panel.

Microsoft Windows NT and Microsoft Windows 2000 Services

The POS installation adds a new service to the operating system called AIPSTART. This service is started automatically when operating system starts. Services are accessed by selecting Services from the Microsoft Windows NT or Microsoft Windows 2000 Control Panel.

Microsoft Windows NT and Microsoft Windows 2000 System Environment Variables

When you install the POS Subsystem, the following change is made to the Microsoft Windows NT or Microsoft Windows 2000 system environment variables:

```
PATH=C:\POS\BIN;C:\POS\DLL

POSAPPLRESDIR = C:\POS
```

Notes:

1. By default, the installation program updates the Path system environment variable.
2. Environment variables are accessible by selecting **System** from the Microsoft Windows NT or Microsoft Windows 2000 Control Panel.

If you are installing POS Subsystem on a system that will be used to develop point-of-sale applications and you have installed the POS Subsystem C Library and Header files, there are two additional changes to make to your system environment variables:

- Append the following to your `INCLUDE=` statement: `C:\POS\INCLUDE\POS`
- Append the following to your `LIB=` statement in the Microsoft Windows NT or the Microsoft Windows 2000 system environment variables: `C:\POS\LIB`

Alphanumeric Point of Sale Keyboard Installation Considerations

- For **Microsoft Windows NT**:

  If you are using a point-of-sale keyboard that is attached to the system keyboard port, select `Alphanumeric POS Keyboard` from the feature selection menu. The POS Subsystem installation replaces your Microsoft Windows NT keyboard driver, i8042prt.sys. If this is the first time POS Subsystem has been installed, the original keyboard driver is saved in i8042prt.pos.

- For **Microsoft Windows 2000**:

  If you are using a point-of-sale keyboard attached to a USB port, select `USB Alphanumeric POS Keyboard`.

IBM 7497 Point of Sale Attachment Adapter Installation Considerations

If you are installing the POS Subsystem on an ISA bus machine with an IBM 7497 Point of Sale Attachment Adapter, the Microsoft Windows NT or Microsoft Windows 2000 registry must be updated to include the adapter address in order for the POS Subsystem to recognize the adapter. The POS Subsystem installation program will make these changes for you only if you select `7497 POS Adapter` from the options menu.

The necessary changes are described in the following section.

Note: Registry changes are not necessary if you are installing the POS Subsystem on an MCA bus machine.

Changes to the Microsoft Windows NT or Microsoft Windows 2000 Registry

The registry path that was set up during the installation of the POS Subsystem is:
`HKLM\Software\IBM\ Point of Sale Subsystem`

To modify this registry to specify the adapter address, use the registry editor, **Regedit**, and perform the following steps:

1. Click `HKEY_LOCAL_MACHINE\SOFTWARE\IBM\ Point of Sale Subsystem`
2. Click **Edit**
3. Select **New**
4. Select **String value**
5. Select **Ioaddr**
6. Click **Edit**
7. Select **Modify**
8. Type the adapter addresses as Value data.

   For example, if your adapter's address is set to 0x260, the following would be displayed at the top of the right-hand screen: `Ioaddr  REG_SZ  260`
9. Click **Ok** or press **Enter**
10. Exit from the Regedit editor

Switches on the IBM 7497 Point of Sale Attachment Adapter (ISA Bus Adapter) control the adapter address. Refer to the *Point of Sale Terminal Attachment Kit: Physical Planning, Installation, and Service Manual* for information about setting up your adapter.

Uninstalling the POS Subsystem

This section describes the procedure for removing the POS Subsystem from your system.

To uninstall POS Subsystem under Microsoft Windows 98, Microsoft Windows NT 4.0, or Microsoft Windows 2000, perform the following steps:

1. Click on the **Start** menu.
2. Select **Settings** from the Start menu and then select **Control Panel**.
3. Double-click the **Add/Remove Programs** icon.
4. Find and highlight POS Subsystem in the list of installed programs.
5. Select the **Remove** push button.
6. If indicated, reboot your system. Some files cannot be removed until a reboot occurs.

Chapter 7. Installing the IBM Point of Sale Subsystem for Linux

The IBM Point of Sale Subsystem is a software package that, when installed, allows you to use IBM point-of-sale devices in a Linux-based environment. This section guides you through the installation of the package.

IBM Point of Sale Subsystem for Linux

Before installing the IBM Point of Sale Subsystem for Linux, remove or uninstall any previous version of the package from your system. Download the latest package from the IBM Retail Store Solutions web site www.ibm.com/solutions/retail/store. There are two versions of the package:

ibmposs-linux-*X.X.X-X*.i386.rpm
: Red Hat Package Management (RPM) file

ibmposs-linux-*X.X.X-X*.i386.tgz
: gzip'd tar file

where *X.X.X-X* indicates the version of the package.

RPM Installation

To install the package from the RPM file, type the following:

```
rpm -i ibmposs-linux-X.X.X-X.i386.rpm --prefix path
```

where *path* indicates an alternate dirctory to install the various package files. By default, the package installs in the `/usr` directory. Specify *path* to install somewhere other than `/usr`.

To uninstall the package from the RPM file, type the following:

```
rpm -e ibmposs-linux
```

If you would like to use an Alphanumeric Point of Sale Keyboard as your system keyboard (attached via the PS/2 port), please see "Alphanumeric Point of Sale Keyboard Installation" on page 7-2.

Tar File Installation

To install the package from the gzip'd tar file:

1. Unpack the tar file using the command:

   ```
   tar -zxvf ibmposs-linux-X.X.X-X.i386.tgz
   ```

2. Run the install script:

   ```
   install-ibmposs.sh install --prefix path
   ```

   where *path* indicates an alternate directory to install the various package files. By default, the package installs in the `/usr` directory. Specify *path* to install somewhere other than `/usr` dirctory.

To uninstall the package from the gzip'd tar file, use the command:

```
install-ibmposs.sh uninstall
```

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If you would like to use an Alphanumeric Point of Sale Keyboard as your system keyboard (attached via the PS/2 port), please see “Alphanumeric Point of Sale Keyboard Installation”.

Alphanumeric Point of Sale Keyboard Installation

Included in the IBM Point of Sale Subsystem for Linux package, there is a Linux keyboard driver patch that you will need if you plan to use the Alphanumeric Point of Sale Keyboard as your system keyboard. The patch file is copied to your system but is not applied.

Applying the Keyboard Patch

1. Change directory into the top-level directory of your kernel source tree.

   For example, **cd /usr/src/linux**
2. Apply the patch using the patch utility.

   For example. **patch -p1 < /usr/share/pos/patch-ps2filter_redhat**

   Notes:

   a. `/usr/share/pos` is the default location for the patch file. The path will be different if you installed IBM Point of Sale Subsystem for Linux somewhere other than the default location.

   b. The patch utility modifies your kernel source. If you would like to save the original source file(s), there are options for the patch utility such as**-b** that will make backup copies of the original source for you. Type **man patch** or **info patch** for additional information on using the patch utility.
3. Configure the kernel using **make config** or **make xconfig** (GUI). You should enable (set to ’y’):

   ```
   "Character Devices" ->
         "Keyboards" ->
               "PS/2 Keyboard Filter Support"
   ```
4. Save your configuration and rebuild the kernel.

Removing the Keyboard Patch

- Change the directory into the top-level directory of your kernel source tree.

  For example, **cd /usr/src/linux**
- Apply the patch using the patch utility.

  For example. **patch -p1 -R < /usr/share/pos/patch-ps2filter_redhat**

  Notes:

  1. `/usr/share/pos` is the default location for the patch file. The path will be different if you installed IBM Point of Sale Subsystem for Linux somewhere other than the default location.
  2. If you kept backup copies of the original kernel source, you can switch back to your original source file(s) rather than using the **-R** option of the **patch** command.
- Configure the kernel using **make config** or **make xconfig** (GUI).
- Save your configuration and rebuild the kernel.

IBM Point of Sale Subsystem for Linux Directory Structure

Installing the IBM Point of Sale Subsystem for Linux places or creates files in the following directories on your system:

/etc	Configuration files used with the IBM Point of Sale Subsystem for Linux.
/etc/rc.d/init.d	`aipstart` - , the start-up shell script for the IBM Point of Sale Subsystem for Linux.
/usr/bin **	Executable files used with the IBM Point of Sale Subsystem for Linux.
usr/include/pos **	IBM Point of Sale Subsystem for Linux header files.
//usr/lib **	Shared libraries used by the IBM Point of Sale Subsystem for Linux.
/usr/share/pos **	Code/microcode update files used by the IBM Point of Sale Subsystem for Linux; the Linux keyboard patch file is also located here.
/usr/share/pos/fonts **	Font files used by the IBM Point of Sale Subsystem for Linux.
/usr/doc/pos **	Documentation and README files for the IBM Point of Sale Subsystem for Linux.
/usr/doc/pos/sample/checkout **	Sample source code for the IBM Point of Sale Subsystem for Linux.
/var/log	Log files created by the IBM Point of Sale Subsystem for Linux.

Note: The directories indicated with ****** can be relocated. The locations listed here are the default locations for these files. During Installation, you may have chosen a location other than `/usr...` Replace `/usr` with the path you specified during installation to locate these files on your system.

Chapter 8. Point of Sale Keyboard Layouts

This chapter contains the keyboard layouts and scan-code sets for the following keyboards:

- 50-Key Modifiable Layout Keyboard
- 50-Key Modifiable Layout Keyboard and Operator Display
- Alphanumeric Point of Sale (ANPOS) Keyboard
- PS/2 ANPOS keyboard with integrated mouse
- Point of Sale Keyboard V
- Point of Sale Keyboard VI
- Modifiable Layout Keyboard with Card Reader (133-key)
- PC Point of Sale Keyboard
- PLU Keyboard and Display-III
- Retail Alphanumeric Point of Sale Keyboard with Card Reader
- Retail Point of Sale Keyboard (50-key)
- Retail Point of Sale Keyboard with Card Reader (50-key)
- Retail Point of Sale Keyboard with Card Reader and Display (50-key)
- IBM 4685 Point of Sale Keyboard Model K01 (4685-K01)

The following keyboards are referred to in this manual as the *checkout keyboards*:

- 50-Key Modifiable Layout Keyboard
- 50-Key Modifiable Layout Keyboard and Operator Display
- Retail Point of Sale Keyboard (50-key)
- Retail Point of Sale Keyboard with Card Reader (50-key)
- Retail Point of Sale Keyboard with Card Reader and Display (50-key)
- Point of Sale Keyboard VI
- IBM 4820 SurePoint Solution Keypad

The following keyboards are referred to in this manual as *USB keyboards*

- Modifiable Layout Keyboard with Card Reader
- Retail Alphanumeric Point of Sale Keyboard with Card Reader
- Retail Point of Sale Keyboard
- Retail Point of Sale Keyboard with Card Reader
- Retail Point of Sale Keyboard with Card Reader and Display

When there is a significant difference, the last four keyboards in the above list are referred to in this book as the *retail point-of-sale keyboards* .

The following keyboards are referred to in this manual as the *alphanumeric point-of-sale keyboards*:

- Alphanumeric Point of Sale (ANPOS) Keyboard
- PS/2 ANPOS keyboard with integrated mouse
- Retail Alphanumeric Point of Sale Keyboard with Card Reader
- PC Point of Sale Keyboard

Scan Codes: When a key is pressed on any keyboard, the keyboard device driver receives a code that is called a *make scan code*. There are different codes for each key. When a key is released on some keyboards, the keyboard device driver receives a code that is called a *break scan code*. These codes are translated into ASCII character codes using the code page the application is using.

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Checkout Keyboards Layouts (50-key)

This section contains illustrations of the layouts for the following keyboards:

- 50-Key Modifiable Layout Keyboard
- 50-Key Modifiable Layout Keyboard Operator Display
- Retail Point of Sale Keyboard (50-key)
- Retail Point of Sale Keyboard with Card Reader (50-key)
- Retail Point of Sale Keyboard with Card Reader and Display (50-key)
- Point of Sale Keyboard VI

50-Key Modifiable Layout Keyboard

Figure 8-1 shows the key-switch numbers for the 50-Key Modifiable Layout Keyboard. The numeric keypad (key switches 18 to 29) is shown in the shaded area of the illustration.

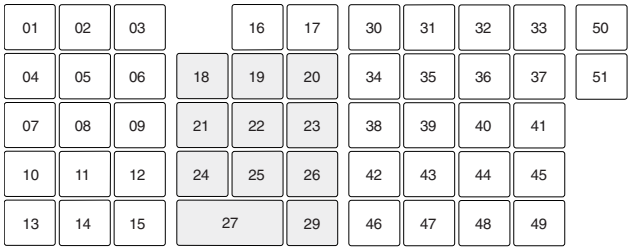


Figure 8-1. 50-Key Modifiable Layout Keyboard

50-Key Modifiable Layout Keyboard and Operator Display

Figure 8-2 shows the key-switch numbers for the 50-Key Modifiable Layout Keyboard and Operator Display. The numeric keypad (key switches 18 to 29) is shown in the shaded area of the illustration.

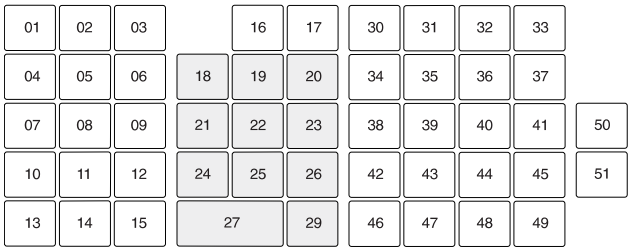


Figure 8-2. 50-Key Modifiable Layout Keyboard and Operator Display

Retail Point of Sale Keyboard

Figure 8-3 on page 8-3 shows the key-switch numbers for the Retail Point of Sale Keyboard, both with and without the Card Reader. The numeric keypad (key switches 18 to 29) is shown in the shaded area of the illustration.

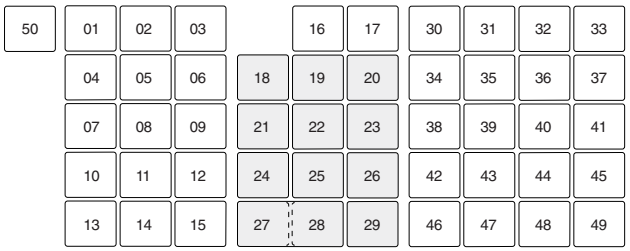


Figure 8-3. Retail Point of Sale Keyboard

Retail Point of Sale Keyboard with Card Reader and Display

Figure 8-4The following figure shows the key-switch numbers for the Retail Point of Sale Keyboard with Card Reader and Display. The numeric keypad (key switches 18 to 29) is shown in the shaded area of the illustration.

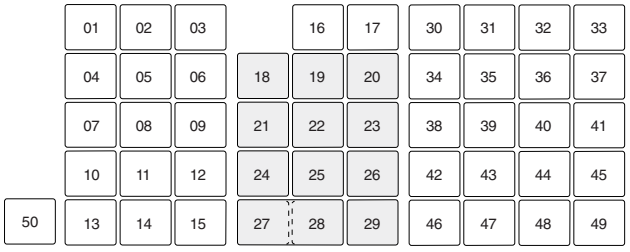


Figure 8-4. Retail Point of Sale Keyboard

Point of Sale Keyboard VI

Figure 8-5 shows the key-switch numbers for the Point of Sale Keyboard VI. The numeric keypad (key switches 18 to 29) is shown in the shaded area of the illustration.

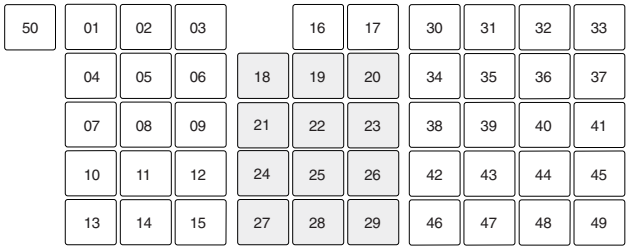


Figure 8-5. Point of Sale Keyboard VI

Checkout Keyboards SIO/USB Scan- Code Set

Table 8-1 on page 8-4 shows the key scan codes for the following keyboards:

- 50-Key Modifiable Layout Keyboard
- 50-Key Modifiable Layout Keyboard and Operator Display
- Retail Point of Sale Keyboard (50-key)
- Retail Point of Sale Keyboard with Card Reader (50-key)
- Retail Point of Sale Keyboard with Card Reader and Display (50-key)
- Point of Sale Keyboard VI

The hardware scan-code set for the 50-Key Modifiable Layout Keyboard, and the 50-Key Modifiable Layout Keyboard and Operator Display is different from the hardware scan-code set for the retail point-of-sale keyboards.

In order to allow the application to work with either keyboard more easily, the hardware scan-code set for the 50-Key Modifiable Layout Keyboard and the 50-Key Modifiable Layout Keyboard and Operator Display is translated to the scan- code set for the retail point-of-sale keyboards.

Note: The 50-Key Modifiable Layout Keyboard and 50-Key Modifiable Layout Keyboard and Operator Display only generate make scan codes when a key is pressed. In order for your application to work with either the old or the new keyboards, it must use the make scan codes from the checkout style keyboards and discard any break scan codes it receives. This can be done by checking the PosKC_KEYUP bit on the POSM_KBD_WM_CHAR event message.

Table 8-1. SIO/USB Scan Codes for All Checkout Keyboards

Key-Switch Number	Key Type[1]	Scan Code (Hex)	50-Key Modifiable Keyboard Scan Code[2]
1	RL	4B	12
2	RL	3B	13
3	RL	6B	14
4	RL	4C	22
5	RL	3C	15
6	RL	6C	16
7	RL	4F	23
8	RL	3F	24
9	RL	6F	37
10	RL	4E	25
11	RL	3E	26
12	RL	6E	28
13	RL	4D	34
14	RL	3D	35
15	RL	6D	36
16	RL	7B	02
17	RL	1B	03
18	NUM	7C	05
19	NUM	0C	06
20	NUM	1C	07
21	NUM	7F	08
22	NUM	0F	09
23	NUM	1F	0A
24	NUM	7E	0B
25	NUM	0E	0C
26	NUM	1E	0D

Table 8-1. SIO/USB Scan Codes for All Checkout Keyboards (continued)

Key-Switch Number	Key Type[1]	Scan Code (Hex)	50-Key Modifiable Keyboard Scan Code[2]
27	NUM	7D	0E
28	NUM	0D	not applicable[3]
29	NUM	1D	0F
30	RL	8B	10
31	RL,S1	AF	11
32	RL,S2	BF	20
33	RL	BB	21
34	RL	8C	17
35	RL	9C	18
36	RL	AC	2E
37	RL	BC	2F
38	RL	8F	29
39	RL	9F	1A
40	RL	9B	2C
41	RL	AB	2D
42	RL	8E	1B
43	RL	9E	3D
44	RL	AE	3E
45	RL	BE	3F
46	RL	8D	39
47	RL	9D	3A
48	RL	AD	3B
49	RL	BD	3C
50	CTRL	50	not applicable[3]
50	S1	00	00
51	S2	01	01

Table 8-1. SIO/USB Scan Codes for All Checkout Keyboards (continued)

Key-Switch Number	Key Type[1]	Scan Code (Hex)	50-Key Modifiable Keyboard Scan Code[2]

Notes:

[1] The key types are defined as follows:

- **CTRL** Ctrl shift key. This key is used to access a second level of function keys. This key did not exist on the 50-Key Modifiable Layout Keyboard or the 50-Key Modifiable Layout Keyboard and Operator Display. This key is not allowed to be part of a double key.
- **RL** Re-legendable key. The user can label (define) primary and secondary functions of these keys.
- **NUM** Numeric keypad location.
- **S1, S2** Point of Sale S1 and S2 function keys. Keys 50 and 51 provide the S1 and S2 functions on the 50-Key Modifiable Layout Keyboard, and the 50-Key Modifiable Layout Keyboard and Operator Display. These keys are not allowed to be part of a double key.

[2] This column lists the hardware scan code for the 50-Key Modifiable Layout Keyboard, and the 50-Key Modifiable Layout Keyboard and Operator Display. This column is provided for you if you need to port existing code. The IBM Point of Sale Subsystem only produces the codes listed in the third column.

[3] This key does not exist on the 50-Key Modifiable Layout Keyboard, or the 50-Key Modifiable Layout Keyboard and Operator Display.

Table 8-2 explains the scan codes received for the S1 and S2 function keys on the retail point-of-sale keyboards.

The S1 and S2 function keys send a series of scan codes on the retail point-of-sale keyboards. These function keys generate a break scan code for the Ctrl key (scan code of 0x50 with PosKC_KEYUP flag set), a make scan code for the S1 or S2 key and then a make scan code for the Ctrl key (scan code of 0x50 with PosKC_KEYUP flag reset). The S1 and S2 function keys can only be accessed by pressing the Ctrl key. With the Ctrl key pressed, key 31 represents the S1 function and key 32 represents the S2 function.

No break scan codes are sent for the 0x00 or 0x01 scan codes.

Table 8-2. SIO/USB Scan Codes for the Retail Point of Sale Keyboards

Key-Switch Number	Key Type	Ctrl + Scan Code (Hex)
31	S1	00
32	S2	01

Modifiable Layout Keyboard with Card Reader Layout (133-Key)

Figure 8-6 on page 8-7 shows the key-switch numbers for the Modifiable Layout Keyboard with Card Reader.

The three possible locations for the numeric keypad are shown in the shaded area of the illustration. The default location for the numeric keypad is the right-most shaded area.

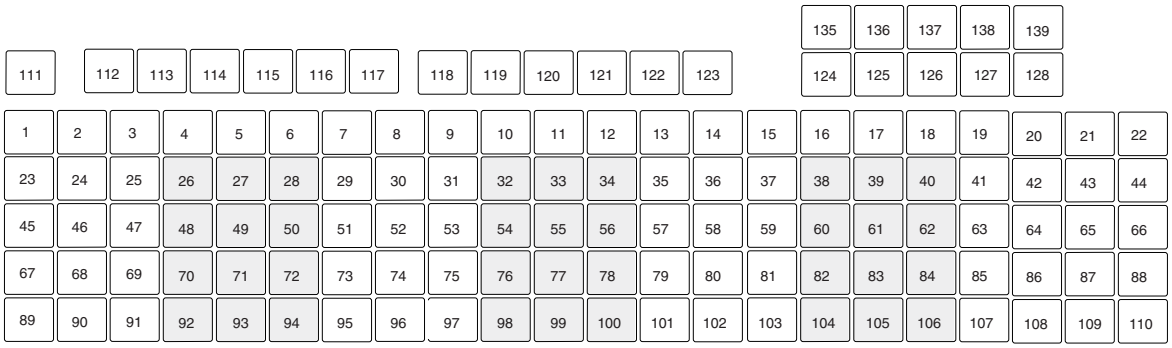


Figure 8-6. Modifiable Layout Keyboard with Card Reader

Modifiable Layout Keyboard with Card Reader SIO Scan-Code Set

Table 8-3 shows the key scan codes for the Modifiable Layout Keyboard with Card Reader.

Table 8-3. SIO Scan Codes – Modifiable Layout Keyboard with Card Reader

Key-Switch Number	Key Type[1]	Scan Code (Hex)
1	RL	B4
2	RL	A4
3	RL	34
4	RL	44
5	RL	94
6	RL	84
7	RL	14
8	RL	04
9	RL	74
10	RL	64
11	RL	54
12	RL	5B
13	RL	6B
14	RL	7B
15	RL	0B
16	RL	1B
17	RL	8B
18	RL	9B
19	RL	3B
20	RL	4B
21	RL	AB
22	RL	BB
23	RL	B5
24	RL	A5
25	RL	35

Table 8-3. SIO Scan Codes – Modifiable Layout Keyboard with Card Reader (continued)

Key-Switch Number	Key Type[1]	Scan Code (Hex)
26	RL/NUM3	45
27	RL/NUM3	95
28	RL/NUM3	85
29	RL	15
30	RL	05
31	RL	75
32	RL/NUM2	65
33	RL/NUM2	55
34	RL/NUM2	5A
35	RL	6A
36	RL	7A
37	RL	0A
38	RL/NUM1	1A
39	RL/NUM1	8A
40	RL/NUM1	9A
41	RL	3A
42	RL	4A
43	RL	AA
44	RL	BA
45	RL	B6
46	RL	A6
47	RL	36
48	RL/NUM3	46
49	RL/NUM3	96
50	RL/NUM3	86
51	RL	16
52	RL	06
53	RL	76
54	RL/NUM2	66
55	RL/NUM2	56
56	RL/NUM2	59
57	RL	69
58	RL	79
59	RL	09
60	RL/NUM1	19
61	RL/NUM1	89
62	RL/NUM1	99
63	RL	39
64	RL	49
65	RL	A9

Table 8-3. SIO Scan Codes – Modifiable Layout Keyboard with Card Reader (continued)

Key-Switch Number	Key Type[1]	Scan Code (Hex)
66	RL	B9
67	RL	B3
68	RL	A3
69	RL	33
70	RL/NUM3	43
71	RL/NUM3	93
72	RL/NUM3	83
73	RL	13
74	RL	03
75	RL	73
76	RL/NUM2	63
77	RL/NUM2	53
78	RL/NUM2	5C
79	RL	6C
80	RL	7C
81	RL	0C
82	RL/NUM1	1C
83	RL/NUM1	8C
84	RL/NUM1	9C
85	RL	3C
86	RL	4C
87	RL	AC
88	RL	BC
89	RL	B2
90	RL	A2
91	RL	32
92	RL/NUM3	42
93	RL/NUM3	92
94	RL/NUM3	82
95	RL	12
96	RL	02
97	RL	72
98	RL/NUM2	62
99	RL/NUM2	52
100	RL/NUM2	5D
101	RL	6D
102	RL	7D
103	RL	0D
104	RL/NUM1	1D
105	RL/NUM1	8D

Table 8-3. SIO Scan Codes – Modifiable Layout Keyboard with Card Reader (continued)

Key-Switch Number	Key Type[1]	Scan Code (Hex)
106	RL/NUM1	9D
107	RL	3D
108	RL	4D
109	RL	AD
110	RL	BD
111	CTRL	20
112	RL	B1
113	RL	A1
114	RL	31
115	RL	41
116	RL	91
117	RL	81
118	RL	88
119	RL	18
120	RL	58
121	RL	68
122	RL	78
123	RL	08
124	RL,S2	1E
125	RL	8E
126	RL	9E
127	RL	AE
128	RL	BE
135	RL,S1	1F
136	RL	8F
137	RL	9F
138	RL	AF
139	RL	BF

Table 8-3. SIO Scan Codes – Modifiable Layout Keyboard with Card Reader (continued)

Key-Switch Number	Key Type[1]	Scan Code (Hex)

Note:

[1] The key types are defined as follows:

CTRL Ctrl shift key. This key is used to access a second level of function keys. This key is not allowed to be part of a double key.

RL Re-legendable key. You can define primary and secondary functions of these keys.

NUM1 Primary numeric keypad location. This is the default numeric keypad location.

NUM2 Secondary numeric keypad location. This is an alternate numeric keypad location.

NUM3 Secondary numeric keypad location. This is an alternate numeric keypad location.

S1, S2 Point of Sale S1 and S2 function keys. These keys provide the S1 or S2 functions as secondary functions on the Modifiable Layout Keyboard with Card Reader. These keys cannot be part of a double key.

Table 8-4 explains the scan codes received for the S1 and S2 function keys on the Modifiable Layout Keyboard with Card Reader.

The S1 and S2 function keys send a series of scan codes on the Modifiable Layout Keyboard with Card Reader. These function keys generate a break scan code for the Ctrl key (scan code of 0x20 with PosKC_KEYUP flag set), a make scan code for the S1 or S2 key, and then a make scan code for the Ctrl key (scan code of 0x20 with the PosKC_KEYUP flag reset). The S1 and S2 function keys can only be accessed by pressing the **Ctrl** key. With the **Ctrl** key pressed, key 135 represents the S1 function, and key 124 represents the S2 function.

No break scan codes are sent for the 0x00 or 0x01 scan codes.

Table 8-4. SIO Scan Codes – Modifiable Layout Keyboard with Card Reader

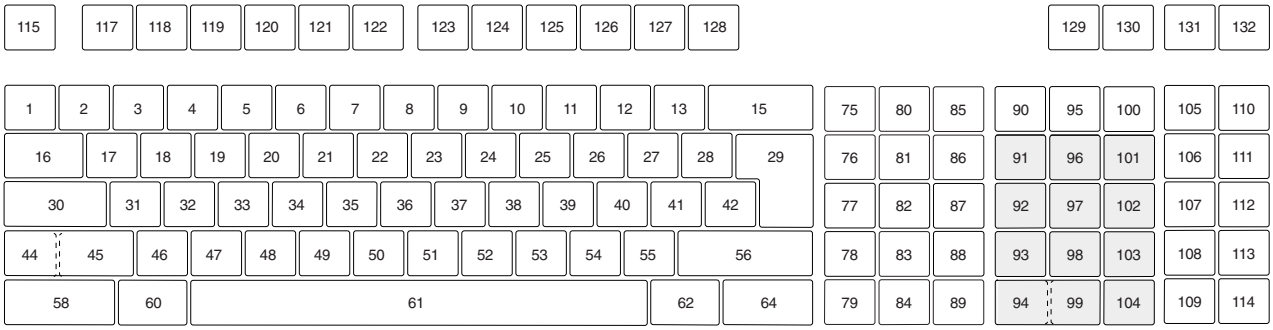
KeySwitch Number	Key Type	Ctrl + Scan Code (Hex)
124	S2	01
135	S1	00

ANPOS Keyboard Layout

This section describes the layout and assigned key-switch numbers for the ANPOS keyboards

PS/2 ANPOS Keyboard with Integrated Mouse

Note: Information about the ANPOS keyboard layout applies to the PS/2 ANPOS keyboard with integrated mouse.



Notes:

1. The numeric keypad is shown in the shaded area of the illustration.
2. Key 45 appears as a single key only on non-U.S. keyboards. On U.S. keyboards, key 44 also covers key 45 (key 44, 45 is a double key).
3. Keys 94 and 99 can have a single, horizontal double-wide key covering both keys, or they can be split into two individual keys.
4. This keyboard is similar to the 101-enhanced keyboard and the 102-enhanced keyboard. The following keys, which are on the ANPOS keyboard but not on the 101-enhanced keyboard or the 102-enhanced keyboard, are referred to as the *point-of-sale-unique keys*.

   77 105
   78 106
   82 107
   87 108
   88 110
   90 111
   94 112
   95 113
   100 114

   See Table 8-7 on page 8-17 for the scan codes associated with these keys.
5. Due to a limitation of the OS/2 Presentation Manager, it is not recommended that you use the point-of-sale-unique keys as the Presentation Manager accelerator keys.

ANPOS Keyboard SIO Scan-Code Set

Table 8-5 on page 8-13 relates the keyboard key-switch number to the key type (typematic, make, only, make or break) and the scan codes received by the SIO ANPOS device handler. The ASCII characters assigned to the scan codes depend on the active code page, country, and sub-country at the time the SIO-attached ANPOS keyboard is opened. The IBM Point of Sale Subsystem calls the operating system to perform translation of scan code to ASCII.

ANPOS Keyboard Layout

The hardware scan-code set for the ANPOS keyboard is different from the hardware scan-code set for the Retail Alphanumeric Point of Sale Keyboard with Card Reader. In order to allow the application to work more easily with either keyboard, the hardware scan-code set of the ANPOS keyboard is translated to the scan code set for the Retail Alphanumeric Point of Sale Keyboard with Card Reader.

Note: Some keys on the original ANPOS keyboard only generate make scan codes when a key is pressed. For your application to work with either of the alphanumeric point-of-sale keyboards, it must only use the make scan codes from these keys on the alphanumeric point-of-sale keyboards. This can be done by checking the PosKC_KEYUP bit on the POSM_KBD_WM_CHAR event message.

Table 8-5. ANPOS SIO Scan Codes

Key-Switch Number	Key Type[1]	Scan Code (Hex)	Original ANPOS Scan Code (Hex)[2]
1	FF, TY, MO	51	52
2	FF, TY, MO	11	32
3	FF, TY, MO	12	33
4	FF, TY, MO	13	34
5	FF, TY, MO	14	35
6	FF, TY, MO	54	55
7	FF, TY, MO	55	56
8	FF, TY, MO	15	36
9	FF, TY, MO	18	37
10	FF, TY, MO	16	39
11	FF, TY, MO	17	38
12	FF, TY, MO	57	58
13	FF, TY, MO	58	57
15	FF, TY, MO	7A	74
16	FF, TY, MO	71	72
17	FF, TY, MO	61	42
18	FF, TY, MO	62	43
19	FF, TY, MO	63	44
20	FF, TY, MO	64	45
21	FF, TY, MO	74	75
22	FF, TY, MO	75	76
23	FF, TY, MO	65	46
24	FF, TY, MO	68	47
25	FF, TY, MO	66	49
26	FF, TY, MO	67	48
27	FF, TY, MO	77	78
28	FF, TY, MO	78	77
29	FF, TY, MO	4A	63
30	FF, MO	72	73

Table 8-5. ANPOS SIO Scan Codes (continued)

Key-Switch Number	Key Type[1]	Scan Code (Hex)	Original ANPOS Scan Code (Hex)[2]
31	FF, TY, MO	81	22
32	FF, TY, MO	82	23
33	FF, TY, MO	83	24
34	FF, TY, MO	84	25
35	FF, TY, MO	24	05
36	FF, TY, MO	25	06
37	FF, TY, MO	85	26
38	FF, TY, MO	88	27
39	FF, TY, MO	86	29
40	FF, TY, MO	87	28
41	FF, TY, MO	27	08
42	FF, TY, MO	47	07
44	FF, TY, M/B	79	71
45	FF, TY, M/B, WT	22	03
46	FF, TY, MO	41	12
47	FF, TY, MO	42	13
48	FF, TY, MO	43	14
49	FF, TY, MO	44	15
50	FF, TY, MO	34	85
51	FF, TY, MO	35	86
52	FF, TY, MO	45	16
53	FF, TY, MO	48	17
54	FF, TY, MO	46	19
55	FF, TY, MO	37	18
56	FF, TY, M/B	49	87
58	FF, TY, M/B	50	50
60	FF, TY, M/B	2D	0F
61	FF, TY, MO	3A	83
62	FF, TY, M/B	3D	8F
64	FF, TY, M/B	40	10
75	RL, TY, MO	5C	3C
76	RL, TY, MO	5B	5D
77	RL, TY, MO	5A	5A
78	RL, TY, MO	2B	5C
79	RL, TY, MO	3E	3A
80	RL, TY, MO	4B	5E
81	RL, TY, MO	1E	3F
82	RL, TY, MO	7B	5B
83	RL, TY, MO	2E	3E

Table 8-5. ANPOS SIO Scan Codes (continued)

Key-Switch Number	Key Type[1]	Scan Code (Hex)	Original ANPOS Scan Code (Hex)[2]
84	RL, TY, MO	3B	3B
85	RL, TY, MO	8F	1C
86	RL, TY, MO	1F	4D
87	RL, TY, MO	7E	4A
88	RL, TY, MO	7F	4C
89	RL, TY, MO	3C	1A
90	RL, TY, MO	9B	4E
91	N, TY, MO	6B	59
92	N, TY, MO	0B	4B
93	N, TY, MO	8B	1E
94	N, TY, MO	BB	1B
95	RL, TY, MO	9C	2C
96	N, TY, MO	6C	7D
97	N, TY, MO	0C	7A
98	N, TY, MO	8C	7C
99	N, TY, MO	BC	2A
100	RL, TY, MO	AE	7E
101	N, TY, MO	6F	2F
102	N, TY, MO	0F	7B
103	N, TY, MO	5F	2E
104	N, TY, MO	4F	2B
105	RL, TY, MO	3F	8C
106	RL, TY, MO	6E	0D
107	RL, TY, MO	0E	0A
108	RL, TY, MO	8E	0C
109	RL, TY, MO	BE	8A
110	RL, TY, MO	8D	0E
111	RL, TY, MO	1D	6F
112	RL, TY, MO	6D	0B
113	RL, TY, MO	4E	8E
114	RL, TY, MO	4C	8B
115	RL, TY, M/B	21	02
117	RL, TY, MO	52	53
118	RL, TY, MO	53	54
119	RL, TY, MO	32	64
120	RL, TY, MO	23	84
121	RL, TY, MO	2A	66
122	RL, TY, MO	28	62
123	RL, TY, MO	08	69

Table 8-5. ANPOS SIO Scan Codes (continued)

Key-Switch Number	Key Type[1]	Scan Code (Hex)	Original ANPOS Scan Code (Hex)[2]
124	RL, TY, MO	56	68
125	RL, TY, MO	07	6C
126	RL, TY, MO	1A	3D
127	RL, TY, MO	1B	6D
128	RL, TY, MO	1C	6A
129	RL, MO	BF	2D
130	RL, MO	AB	6E
131	RL, MO	AC	8D
132	RL, MO	AF	6B

Notes:

[1] The key types are defined as follows:

- **FF** Fixed function. These keys have meanings specific to the operating system, and cannot be redefined.
- **RL** Re-legendable key. You can define the primary and secondary functions of these keys.
- **TY** Typematic key on the keyboard.
- **MO** Make only key. A make scan code is sent only when the key is pressed. There is no indication that the key is released.
- **M/B** Make/break key. A make scan code is sent when the key is pressed, and the break scan code is sent when the key is released. A break scan code is detected by checking the PosKC_KEYUP bit on the POSM_KBD_WM_CHAR event message.
- **S1, S2** S1 and S2 keys. These functions are secondary functions of these keys when pressed in combination with the **Ctrl** key. These keys cannot be part of a double key.
- **N** Numeric keypad keys. You can swap the 1, 2, and 3 key tops with the 7, 8, and 9 key tops to change the numeric keypad from the default telephone-type pad to a calculator-type pad. Also, legend label inserts are available to add secondary functions to the numerals and the period key (.). These functions are cursor and page movement, home, end, insert, and delete (similar to the PS/2 numeric keypad layout), and are accessed by using the Num Lock key (Num Lock off). These inserts are available for either a telephone-type or calculator-type numeric keypad layout.

  The numeric keys also perform secondary functions when pressed in combination with the Alt key. The Alt key used in combination with numeric keypad keys produces a scan code equivalent to the decimal number typed while the Alt key is pressed. For example: Alt plus **65** produces a scan code of 65 decimal or an ASCII “A”.
- **WT** World Trade key. This key is present on all non-U.S. versions of this keyboard.

[2] This column lists the hardware scan codes for the ANPOS Keyboard. This column is provided for you if you need to port existing code. The IBM Point of Sale Subsystem only produces the scan codes listed in the third column.

Table 8-6 on page 8-17 explains the scan codes received for the S1 and S2 function keys on the SIO ANPOS keyboard.

The S1 and S2 function keys send a series of scan codes on the ANPOS Keyboard. When these function keys are pressed, a break scan code is generated for the Ctrl key pressed (scan code 0x50 or 0x40 with PosKC_KEYUP flag set), a make scan code for the S1 or S2 key, and then a make scan code for the Ctrl key pressed (scan code of 0x50 or 0x40 with PosKC_KEYUP flag reset). The S1 and S2 function keys can only be accessed by pressing the Ctrl key. When the Ctrl key is pressed, key 110 represents the S1 function, and key 111 represents the S2 function.

No break scan codes are sent for the 0x00 or 0x01 scan codes.

Table 8-6. ANPOS SIO Scan Codes

Key-Switch Number	Key Type	Ctrl + Scan Code (Hex)
110	S2	01
111	S1	00

ANPOS Keyboard PS/2 Scan Codes

Table 8-7 relate the keyboard key-switch number to the scan code received when the ANPOS keyboard is attached to the system keyboard port.

If you are writing a Presentation Manager program, the WM_CHAR message that is received for a break scan code uses the KC_KEYUP flag to indicate a break scan code instead of setting the X'80' bit on in the scan code field.

Table 8-7. ANPOS Keyboard Scan-Code Set 1

Key-Switch Number	Make Scan-Code (Hex)	Break Scan-Code (Hex)
1	29	A9
2	02	82
3	03	83
4	04	84
5	05	85
6	06	86
7	07	87
8	08	88
9	09	89
10	0A	8A
11	0B	8B
12	0C	8C
13	0D	8D
15	0E	8E
16	0F	8F
17	10	90
18	11	91
19	12	92
20	13	93
21	14	94
22	15	95

Table 8-7. ANPOS Keyboard Scan-Code Set 1 (continued)

Key-Switch Number	Make Scan-Code (Hex)	Break Scan-Code (Hex)
23	16	96
24	17	97
25	18	98
26	19	99
27	1A	9A
28	1B	9B
29	1C	9C
30	3A	BA
31	1E	9E
32	1F	9F
33	20	A0
34	21	A1
35	22	A2
36	23	A3
37	24	A4
38	25	A5
39	26	A6
40	27	A7
41	28	A8
42	2B	AB
44	2A	AA
45	56	D6
46	2C	AC
47	2D	AD
48	2E	AE
49	2F	AF
50	30	B0
51	31	B1
52	32	B2
53	33	B3
54	34	B4
55	35	B5
56	36	B6
58	1D	9D
60	38	B8
61	39	B9
62	E0 38	E0 B8
64	E0 1D	E0 9D
77[1]	6A	EA
78[1]	6B	EB

Table 8-7. ANPOS Keyboard Scan-Code Set 1 (continued)

Key-Switch Number	Make Scan-Code (Hex)	Break Scan-Code (Hex)
82[1]	6C	EC
87[1]	6D	ED
88[1]	6E	EE
90[1]	6F	EF
91	47	C7
92	4B	CB
93	4F	CF
94[1,5]	77	F7
95[1,5]	78	F8
96	48	C8
97	4C	CC
98	50	D0
99	52	D2
100[1,3,5]	7C	FC
101	49	C9
102	4D	CD
103	51	D1
104	53	D3
105[1,5]	7A	FA
106[1,5]	7E	FE
107[1,6]	5F	DF
108[1,5]	71	F1
109[4]	E0 1C	E0 9C
112[1,5]	74	F4
113[1,5]	75	F5
114[1,5]	76	F6
115	01	81
117	3B	BB
118	3C	BC
119	3D	BD
120	3E	BE
121	3F	BF
122	40	C0
123	41	C1
124	42	C2
125	43	C3
126	44	C4
127 [2]	57	D7
128 [2]	58	D8
129	45	C5

Table 8-7. ANPOS Keyboard Scan-Code Set 1 (continued)

Key-Switch Number	Make Scan-Code (Hex)	Break Scan-Code (Hex)
130	46	C6

Notes:

[1] Key-switch number marked with [1] indicate the keys for the ANPOS keyboard that are unique to point-of-sale.

[2] The category 4 function 74H *DosDevIOCtl()* returns scan code 0×85 for key switch 127 and scan code 0×86 for key switch 128.

[3] Key switch 100 returns make scan code 0×65 and break scan code 0×E5 when running under Microsoft Windows NT or Microsoft Windows 98 SE.

[4] Only 1C is sent rather than E0 1C as specified in the table.

[5] Under Microsoft Windows 95 and Microsoft Windows 98 SE, the make scan code is sent.

[6] Key switch 107 returns make scan code 0×66 and break scan code 0×E6 when running under Microsoft Windows 98 SE or Microsoft Windows NT.

Table 8-8. ANPOS Keyboard Scan-Code Set 1

Key-Switch Number	Base Case or Shift plus Num Lock on Make / Break (Hex)	Shift Case Make / Break (Hex)*	Num Lock on Make / Break (Hex)
75	E0 52 / E0 D2	E0 AA E0 52 / E0 D2 E0 2A	E0 2A E0 52 / E0 D2 E0 AA
76	E0 53 / E0 D3	E0 AA E0 53 / E0 D3 E0 2A	E0 2A E0 53 / E0 D3 E0 AA
79	E0 4B / E0 CB	E0 AA E0 4B / E0 CB E0 2A	E0 2A E0 4B / E0 CB E0 AA
80	E0 47 / E0 C7	E0 AA E0 47 / E0 C7 E0 2A	E0 2A E0 47 / E0 C7 E0 AA
81	E0 4F / E0 CF	E0 AA E0 4F / E0 CF E0 2A	E0 2A E0 4F / E0 CF E0 AA
83	E0 48 / E0 C8	E0 AA E0 48 / E0 C8 E0 2A	E0 2A E0 48 / E0 C8 E0 AA
84	E0 50 / E0 D0	E0 AA E0 50 / E0 D0 E0 2A	E0 2A E0 50 / E0 D0 E0 AA
85	E0 49 / E0 C9	E0 AA E0 49 / E0 C9 E0 2A	E0 2A E0 49 / E0 C9 E0 AA
86	E0 51 / E0 D1	E0 AA E0 51 / E0 D1 E0 2A	E0 2A E0 51 / E0 D1 E0 AA
89	E0 4D / E0 CD	E0 AA E0 4D / E0 CD E0 2A	E0 2A E0 4D / E0 CD E0 AA

* If the left **Shift** key is held down, the X'AA'/X'2A' make and break key codes are sent with the other scan codes. If the right **Shift** key is held down, X'B6'/X'36' is sent. If both **Shift** keys are held down, both sets of codes are sent with the other scan code.

Table 8-9. ANPOS Keyboard Scan-Code Set 1

Key-Switch Number	Scan Code Make / Break (Hex)	Ctrl Case, Shift Case Make / Break (Hex)	Alt Case Make / Break (Hex)
131	E0 2A E0 37 / E0 B7 E0 AA	E0 37 / E0 B7	54 / D4

Table 8-10. ANPOS Keyboard Scan-Code Set 1

Key-Switch Number	Make Code (Hex)	Ctrl Key Pressed (Hex)
132	E1 1D 45 E1 9D C5	E0 46 E0 C6

Note: This key is not typematic. All associated scan codes occur on the make of the key (when the key is pressed down).

Table 8-11. ANPOS Keyboard Scan-Code Set 1

Key-Switch Number	Base Case Make / Break Code (Hex)	Ctrl + Make / Break Code (Hex)
110	72 / F2	9D 01 1D / 81
111	63 / D3	9D 1C 1D / 9C

Notes:

- If the left Ctrl key is held down, the X'9D'/X'1D' scan codes are sent with the other scan codes. If the right Ctrl key is held down, the X'E0 9D'/X'E0 1D' scan codes are sent. If both Ctrl keys are held down, both sets of codes are sent with the other scan codes.
- When these keys are pressed in combination with the Ctrl key, they represent the S1 function key (key number 110) and the S2 function key (key number 111). When Ctrl is pressed in combination with key number 110, a string of bytes representing the Ctrl break scan code, the Esc make scan code, and the Ctrl make scan code are sent. When Ctrl is pressed in combination with key number 111, a string of bytes representing the Ctrl break scan code, the Enter make scan code, and the Ctrl make scan code are sent.

Retail Alphanumeric Point of Sale Keyboard and PC Point of Sale Keyboard Layouts

This section contains illustrations of the layouts for the following keyboards:

- Retail Alphanumeric Point of Sale Keyboard with Card Reader
- PC Point of Sale Keyboard

Retail Alphanumeric Point of Sale Keyboard with Card Reader Layout

Figure 8-7 on page 8-22 shows the layout and assigned key-switch numbers for the Retail Alphanumeric Point of Sale Keyboard with Card Reader.

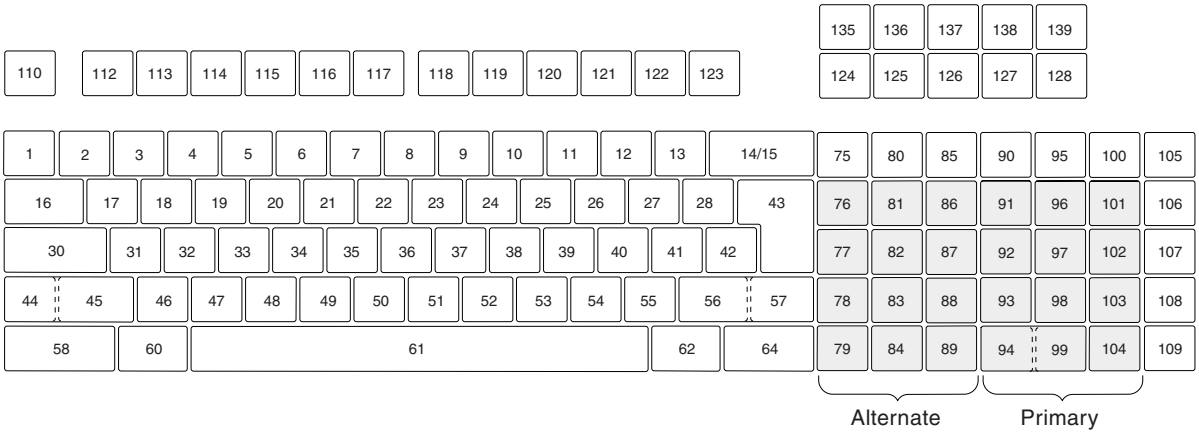


Figure 8-7. Layout and Assigned Switch Numbers

Notes:

1. The two possible locations for the numeric keypad are shown in the shaded area of the illustration. The default location for the numeric keypad is the right-most shaded area.
2. Key 45 appears as a single key only on non-U.S. keyboards. On U.S. keyboards, key 44 also covers key 45 (key 44, 45 is a double key).
3. Keys 94 and 99 can have a single, horizontal double-wide key covering both keys, or they can be split into two individual keys.
4. This keyboard is similar to the 101-enhanced keyboard and the 102-enhanced keyboard. The following keys are on the Retail Alphanumeric Point of Sale Keyboard with Card Reader, but not on the 101-enhanced keyboard or the 102-enhanced keyboard. These keys are referred to as the *point-of-sale-unique keys*.

77	106
78	107
82	108
87	124
88	125
90	126
95	127
99	128
100	135
105	

   See Table 8-15 on page 8-27 for the scan codes associated with these keys.
5. Due to a limitation of OS/2 Presentation Manager, it is not recommended that you use the point-of-sale-unique keys as the Presentation Manager accelerator keys.

PC Point of Sale Keyboard (ANKPOS) Layout

Figure 8-8 on page 8-23 shows the layout and assigned key-switch numbers for the PC Point of Sale Keyboard. The numeric keypad location is shown in the shaded area of the illustration.

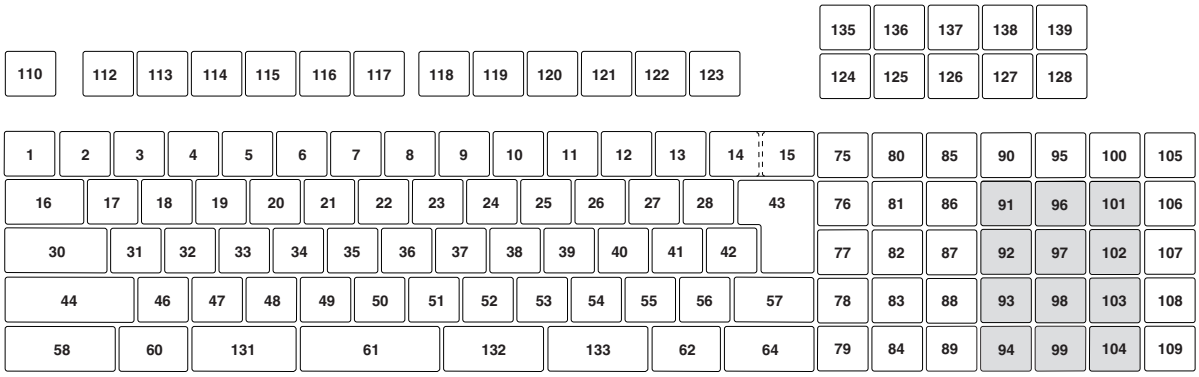


Figure 8-8. PC Point of Sale Keyboard Layout

SIO Scan-Code Set for the Retail Alphanumeric Point of Sale Keyboard and the PC Point of Sale Keyboard (ANKPOS)

Table 8-12 shows the key scan codes for the Retail Alphanumeric Point of Sale Keyboard with Card Reader and the PC Point of Sale Keyboard.

Table 8-12. Scan Codes for the Retail Alphanumeric Point of Sale Keyboard with Card Reader and PC Point of Sale Keyboard

Key-Switch Number	Key Type[1]	Scan Code (Hex)
1	FF	51
2	FF	11
3	FF	12
4	FF	13
5	FF	14
6	FF	54
7	FF	55
8	FF	15
9	FF	18
10	FF	16
11	FF	17
12	FF	57
13	FF	58
14	FF, ANK	6A
15	FF	7A
16	FF	71
17	FF	61
18	FF	62
19	FF	63
20	FF	64
21	FF	74
22	FF	75
23	FF	65
24	FF	68

Table 8-12. Scan Codes for the Retail Alphanumeric Point of Sale Keyboard with Card Reader and PC Point of Sale Keyboard (continued)

Key-Switch Number	Key Type[1]	Scan Code (Hex)
25	FF	66
26	FF	67
27	FF	77
28	FF	78
30	FF	72
31	FF	81
32	FF	82
33	FF	83
34	FF	84
35	FF	24
36	FF	25
37	FF	85
38	FF	88
39	FF	86
40	FF	87
41	FF	27
42	FF	47
43	FF	4A
44	FF	79
45	FF, WT	22
46	FF	41
47	FF	42
48	FF	43
49	FF	44
50	FF	34
51	FF	35
52	FF	45
53	FF	48
54	FF	46
55	FF	37
56	FF, ANK	38
57	FF	49
58	FF	50
60	FF	2D
61	FF	3A
62	FF	3D
64	FF	40
75	RL	5C
76	RL/NUM2	5B

Table 8-12. Scan Codes for the Retail Alphanumeric Point of Sale Keyboard with Card Reader and PC Point of Sale Keyboard (continued)

Key-Switch Number	Key Type[1]	Scan Code (Hex)
77	RL/NUM2	5A
78	RL/NUM2	2B
79	RL/NUM2	3E
80	RL	4B
81	RL/NUM2	1E
82	RL/NUM2	7B
83	RL/NUM2	2E
84	RL/NUM2	3B
85	RL	8F
86	RL/NUM2	1F
87	RL/NUM2	7E
88	RL/NUM2	7F
89	RL/NUM2	3C
90	RL	9B
91	RL/NUM1	6B
92	RL/NUM1	0B
93	RL/NUM1	8B
94	RL/NUM1	BB
95	RL	9C
96	RL/NUM1	6C
97	RL/NUM1	0C
98	RL/NUM1	8C
99	RL/NUM1	BC
100	RL	AE
101	RL/NUM1	6F
102	RL/NUM1	0F
103	RL/NUM1	5F
104	RL/NUM1	4F
105	RL	3F
106	RL	6E
107	RL	0E
108	RL	8E
109	RL	BE
110	RL	21
112	RL	52
113	RL	53
114	RL	32
115	RL	23
116	RL	2A

Table 8-12. Scan Codes for the Retail Alphanumeric Point of Sale Keyboard with Card Reader and PC Point of Sale Keyboard (continued)

Key-Switch Number	Key Type[1]	Scan Code (Hex)
117	RL	28
118	RL	08
119	RL	56
120	RL	07
121	RL	1A
122	RL	1B
123	RL	1C
124 [3]	RL,S2	1D[2]
125	RL	6D
126	RL	4E
127	RL	4C
128	RL	9E
131	FF, ANK	31
132	FF, ANK	26
133	FF, ANK	36
135[3]	RL,S1	8D[2]
136	RL	AC
137	RL	AB
138	RL	AF
139	RL	BF

Note:

[1] The key types are defined as follows:

- **FF** Fixed function. These keys have meanings specific to the operating system, and cannot be redefined.
- **RL** Re-legendable key. You can define primary and secondary functions of these keys.
- **NUM1** Primary numeric keypad location. This is the default numeric keypad location.
- **NUM2** Secondary numeric keypad location. This is an alternate numeric keypad location.
- **S1, S2** Point of Sale S1 and S2 function keys. These keys provide the S1 or S2 functions as secondary functions on these keyboards. These keys cannot be part of a double key.
- **WT** World Trade key. This key is present on all non-U.S. versions of the ANPOS keyboard, but is not present on the ANKPOS keyboard.
- **ANK** PC Point of Sale Keyboard unique keys. These keys are present only on the PC Point of Sale Keyboard (ANKPOS keyboard).

[2] The expected scancode when the key lock is not in the system position.

[3] When the keylock is in the System position, the Scan Code for Key 124 is 01 and Key 135 is 00, respectively.

The following table explains the scan codes received for the S1 and S2 function keys on the Retail Alphanumeric Point of Sale Keyboard with Card Reader.

The S1 and S2 function keys send a series of scan codes on the Retail Alphanumeric Point of Sale Keyboard with Card Reader. These function keys generate a break scan code for the Ctrl key pressed (scan code 0x50 or 0x40 with PosKC_KEYUP flag set), a make scan code for the S1 or S2 key and then a make scan code for the Ctrl key pressed (scan code of 0x50 or 0x40 with PosKC_KEYUP flag reset). The S1 and S2 function keys can only be accessed by pressing the Ctrl key. With the Ctrl key pressed, key 135 represents the S1 function, and key 124 represents the S2 function.

No break scan codes are sent for the 0x00 or 0x01 scan codes.

Table 8-13. Point of Sale Scan Codes – Retail Alphanumeric Point of Sale Keyboard with Card Reader

Key-Switch Number	Key Type	Ctrl + Scan Code (Hex)
124	S2	01
135	S1	00

For the PC Point of Sale Keyboard, Table 8-14 shows the scan codes sent by the S1 and S2 function keys, depending upon the Keylock Positions.

Table 8-14. Serial I/O Scan Codes– PC Point of Sale Keyboard (ANKPOS) Keyboard

Key-Switch Number	Key Type	Ctrl + Scan Code (Key lock in System Position) (Hex)	Ctrl + Scan Code (Key lock in Operator/Manager position) (Hex)
124	S2	01	1D
135	S1	00	8D

PS/2 Scan-Code Set for the Retail Alphanumeric Point of Sale Keyboard and the PC Point of Sale Keyboard

Table 8-15, Table 8-17 on page 8-31, and Table 8-18 on page 8-31 relate the keyboard key-switch number to the scan codes received when the keyboard is attached to the system keyboard port.

If you are writing a Presentation Manager program, the WM_CHAR message that is received for a break scan code uses the KC_KEYUP flag to indicate a break scan code instead of setting the X'80' bit on in the scan code field.

Table 8-15. PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and PC Point of Sale Keyboard

Key-Switch Number	Make Scan Code (Hex)	Break Scan Code (Hex)
1	29	A9
2	02	82
3	03	83
4	04	84
5	05	85
6	06	86

Table 8-15. PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and PC Point of Sale Keyboard (continued)

Key-Switch Number	Make Scan Code (Hex)	Break Scan Code (Hex)
7	07	87
8	08	88
9	09	89
10	0A	8A
11	0B	8B
12	0C	8C
13	0D	8D
14	7D, ANK	FD
15	0E	8E
16	0F	8F
17	10	90
18	11	91
19	12	92
20	13	93
21	14	94
22	15	95
23	16	96
24	17	97
25	18	98
26	19	99
27	1A	9A
28	1B	9B
30	3A	BA
31	1E	9E
32	1F	9F
33	20	A0
34	21	A1
35	22	A2
36	23	A3
37	24	A4
38	25	A5
39	26	A6
40	27	A7
41	28	A8
42	2B	AB
43	1C	9C
44	2A	AA
45	56, WT	D6
46	2C	AC

Table 8-15. PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and PC Point of Sale Keyboard (continued)

Key-Switch Number	Make Scan Code (Hex)	Break Scan Code (Hex)
47	2D	AD
48	2E	AE
49	2F	AF
50	30	B0
51	31	B1
52	32	B2
53	33	B3
54	34	B4
55	35	B5
56	73, ANK	F3
57	36	B6
58	1D	9D
60	38	B8
61	39	B9
62	E0 38	E0 B8
64	E0 1D	E0 9D
77[1]	6A	EA
78[1]	6B	EB
82[1]	6C	EC
87[1]	6D	ED
88[1]	6E	EE
90[1]	6F	EF
91	47	C7
92	4B	CB
93	4F	CF
94	52	D2
95[1,5]	78	F8
96	48	C8
97	4C	CC
98	50	D0
99[1,5]	77	F7
100[1, 3,5]	7C	FC
101	49	C9
102	4D	CD
103	51	D1
104	53	D3
105[1, 5]	7A	FA
106[1, 5]	7E	FE
107[1, 6]	5F	DF

Table 8-15. PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and PC Point of Sale Keyboard (continued)

Key-Switch Number	Make Scan Code (Hex)	Break Scan Code (Hex)
108[1], [5]	71	F1
109[4]	E0 1C	E0 9C
110	01	81
112	3B	BB
113	3C	BC
114	3D	BD
115	3E	BE
116	3F	BF
117	40	C0
118	41	C1
119	42	C2
120	43	C3
121	44	C4
122[2]	57	D7
123[2]	58	D8
125[1],[5]	74	F4
126[1], [5]	75	F5
127[1], [5]	76	F6
128[1]	59	D9
131	7B, ANK	FB
132	79, ANK	F9
133	70, ANK	F0
137	46	C6
139	45	C5

ANK PC Point of Sale Keyboard unique keys. These keys are present only on the PC Point of Sale (ANKPOS) keyboard.

WT World Trade key. This key is present on all non-U.S. versions of the ANPOS keyboard, but is not present on the ANKPOS keyboard.

Notes:

[1] Point-of-sale-unique keys for the Retail Alphanumeric Point of Sale Keyboard with Card Reader, and the PC Point of Sale Keyboard.

[2] The category 4 function 74H *DosDevIOCtl()* returns scan code 0×85 for key switch 122 and scan code 0×86 for key switch 123.

X [3] Key switch 100 returns make scan code 0×65 and break scan code 0×E5 on Microsoft Windows NT, Microsoft Windows 98, Windows 2000, and Linux.

[4] Only 1C is sent rather than E0 1C as specified in the table.

X [5]On Microsoft Windows NT, Microsoft Windows 98 SE, and Microsoft Windows 2000, only WM_KEYDOWN will be sent.

[6]See Table 8-16 on page 8-31.

[6] Key switch 107 returns the following:

Table 8-16. Key Switch 107

X

	Windows 98SE	Windows 2000	Windows NT	Linux
USB	66	66		
PS/2	66	5F	5F	5F

Table 8-17. PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and PC Point of Sale Keyboard

Key- Switch Number	Base Case or Shift plus Num Lock on Make / Break (Hex)	Shift Case Make / Break (Hex)*	Num Lock on Make / Break (Hex)
75	E0 52 / E0 D2	E0 AA E0 52 / E0 D2 E0 2A	E0 2A E0 52 / E0 D2 E0 AA
76	E0 53 / E0 D3	E0 AA E0 53 / E0 D3 E0 2A	E0 2A E0 53 / E0 D3 E0 AA
79	E0 4B / E0 CB	E0 AA E0 4B / E0 CB E0 2A	E0 2A E0 4B / E0 CB E0 AA
80	E0 47 / E0 C7	E0 AA E0 47 / E0 C7 E0 2A	E0 2A E0 47 / E0 C7 E0 AA
81	E0 4F / E0 CF	E0 AA E0 4F / E0 CF E0 2A	E0 2A E0 4F / E0 CF E0 AA
83	E0 48 / E0 C8	E0 AA E0 48 / E0 C8 E0 2A	E0 2A E0 48 / E0 C8 E0 AA
84	E0 50 / E0 D0	E0 AA E0 50 / E0 D0 E0 2A	E0 2A E0 50 / E0 D0 E0 AA
85	E0 49 / E0 C9	E0 AA E0 49 / E0 C9 E0 2A	E0 2A E0 49 / E0 C9 E0 AA
86	E0 51 / E0 D1	E0 AA E0 51 / E0 D1 E0 2A	E0 2A E0 51 / E0 D1 E0 AA
89	E0 4D / E0 CD	E0 AA E0 4D / E0 CD E0 2A	E0 2A E0 4D / E0 CD E0 AA

* If the left **Shift** key is held down, the X'AA'/X'2A' make and break key codes are sent with the other scan codes. If the right **Shift** key is held down, X'B6'/X'36' is sent. If both **Shift** keys are held down, both sets of codes are sent with the other scan code.

Table 8-18. PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and the PC Point of Sale Keyboard

Key- Switch Number	Scan Code Make / Break (Hex)	Ctrl Case, Shift Case Make / Break (Hex)	Alt Case Make / Break (Hex)
136	E0 2A E0 37 / E0 B7 E0 AA	E0 37 / E0 B7	54 / D4

Table 8-19. PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and the PC Point of Sale Keyboard

Key- Switch Number	Make Code (Hex)	Ctrl Key Pressed (Hex)
138	E1 1D 45 E1 9D C5	E0 46 E0 C6

Note: This key is not typematic. All associated scan codes occur on the make of the key (when the key is pressed down).

Table 8-20. PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and the PC Point of Sales Keyboard

Key- Switch Number	Base Case Make / Break Code (Hex)	Ctrl + Make / Break Code (Hex)
124	63 / E3	9D 1C 1D / 9C
135	72 / F2	9D 01 1D / 81

Notes:

1. If the left **Ctrl** key is held down, the X'9D'/X'1D' scan codes are sent with the other scan codes. If the right **Ctrl** key is held down, the X'E0 9D'/X'E0 1D' scan codes are sent. If both Ctrl keys are held down, both sets of codes are sent with the other scan codes.
2. Keys 124 and 135 are point-of-sale-unique keys.

   When these keys are pressed in combination with the Ctrl key, they represent the S1 function key (key number 135) and the function key S2 (key number 124).

   When Ctrl is pressed in combination with key number 124, a string of bytes representing the Ctrl break scan code, the Esc make scan code, and the Ctrl make scan code are sent. When Ctrl is pressed in combination with key number 135, a string of bytes representing the Ctrl break code, the Enter make scan code, and the Ctrl make scan code are sent.

Point of Sale Keyboard V Layout

Figure 8-9 shows the Keyboard V layout.

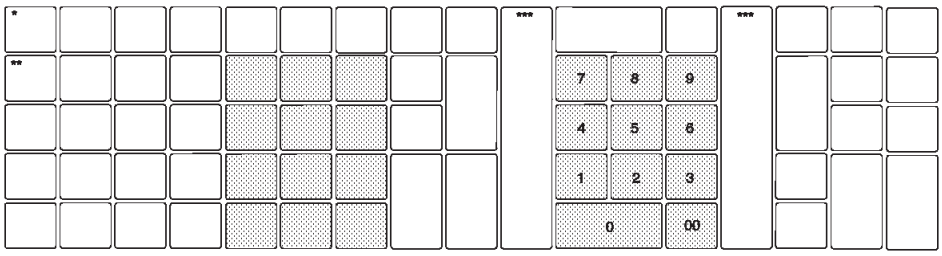


Figure 8-9. Point of Sale Keyboard V Layout

Notes:

1. The single asterisk (*) in the top-left-hand portion of the keyboard indicates the S1 key.
2. The double asterisk (**) in the top-left-hand portion of the keyboard indicates the S2 key.
3. The triple asterisk (***) indicates that a 1×5 dummy cap covers those key switches.

4. The two possible locations for the numeric keypad are shown in the shaded area of the illustration. The default location for the numeric keypad is the right-most shaded area.

Keyboard-V Scan-Code Set

Figure 8-10 shows the key scan codes for the Keyboard-V.

4C {00}	4F	4E	4D	49	48	47	4B	4A	(46)	45	(44)	43	(42)	41	40	50
3C {01}	3F	3E	3D	39	38	37	3B	(3A)	(36)	35	34	33	(32)	(31)	30	51
2C	2F	2E	2D	29	28	27	2B	2A	(26)	25	24	23	(22)	21	20	52
1C	1F	1E	1D	19	18	17	(1B)	(1A)	(16)	15	14	13	(12)	11	(10)	(53)
0C	0F	0E	0D	09	08	07	0B	0A	(06)	05	(04)	03	(02)	81	80	54

Figure 8-10. Keyboard-V Scan Code Set

Notes:

1. '( )' indicates that these scan codes can be generated when the layout is changed.
2. '{ }' indicates these scan codes will be generated only when the key lock is in the "system" position.
3. Each double key produces only one scan code (the key scan code without parentheses in the illustration), unlike the single-byte character set (SBCS) keyboards.

PLU Keyboard and Display-III Layout

Figure 8-11 shows the PLU Keyboard and Display-III layout and scan codes.

The two possible locations for the numeric keypad are shaded in Figure 8-11. The default location for the numeric keypad is the right-most shaded area.

7F	7E	7D	79	78	77	7C	7B	7A	76	75	74	73	72	71	70
6F	6E	6D	69	68	67	6C	6B	6A	66	65	64	63	62	61	60
5F	5E	5D	59	58	57	5C	5B	5A	56	55	54	53	52	51	50
4F	4E	4D	49	48	47	4C	4B	4A	46	45	(44)	43	42	41	40
3F	3E	3D	39	38	37	3C	3B	3A	(36)	35	34	33	(32)	31	30
2F	2E	2D	29	28	27	2C	2B	2A	26	25	24	23	22	21	20
1F	1E	1D	19	18	17	1C	1B	(1A)	(16)	15	14	13	12	(11)	(10)
0F	0E	0D	09	08	07	0C	0B	0A	06	05	(04)	03	02	01	00

Figure 8-11. PLU Keyboard and Display-III Layout

Notes:

1. "( )" indicates that these scan codes can be generated when the layout is changed.

2. Each double key produces only one scan code(the key scan code without parentheses in the illustration), unlike the single-byte character set keyboards.

Note: Only double keys are shown in the figure.

4685 Point of Sale Keyboard Model K01 Layout

Figure 8-12 shows the layout of the 4685 Keyboard Model K01.

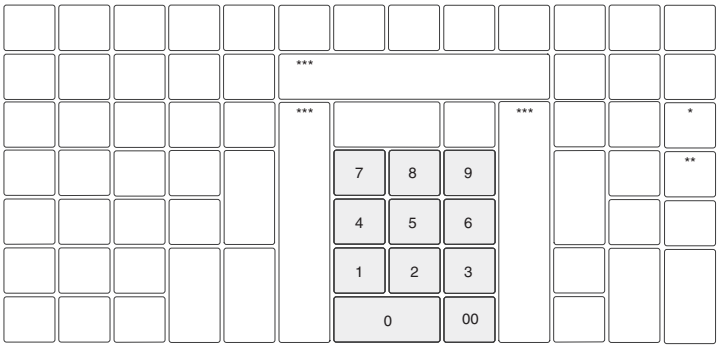


Figure 8-12. 4685 Point of Sale Keyboard Model K01 Layout

Notes:

1. The single asterisk (*) in the middle right-hand portion of the keyboard indicates the S1 key.
2. The double asterisk (**) in the middle right-hand portion of the keyboard indicates the S2 key.
3. The triple asterisk (***) indicates that a 1×5 dummy cap covers those key switches.
4. The numeric keypad location is shaded in the illustration.

4685 Keyboard Model K01 Scan-Code Set

Figure 8-13 shows the key scan codes for the 4685 Keyboard Model K01.

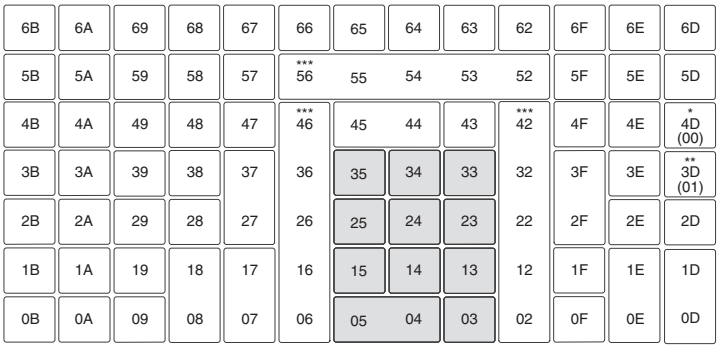


Figure 8-13. 4685 Keyboard Model K01 Scan-Code Set

Notes:

1. "( )" indicates these scan codes will be generated only when the key lock is in the "system" position.
2. Each double key produces only one scan code (the key scan code without parentheses in the illustration), unlike the single-byte character set keyboards.

3. The single asterisk (*) in the middle right-hand portion of the keyboard indicates the S1 key.
4. The double asterisk (**) in the middle right-hand portion of the keyboard indicates the S2 key.
5. The triple asterisk (***) indicates that a 1×5 dummy cap covers those key switches.
6. The numeric keypad location is shaded in the illustration.

4820 IBM SurePoint Solution Keypad Layout

Figure 8-14 shows the layout of the key-switch numbers for the 4820 Keypad.

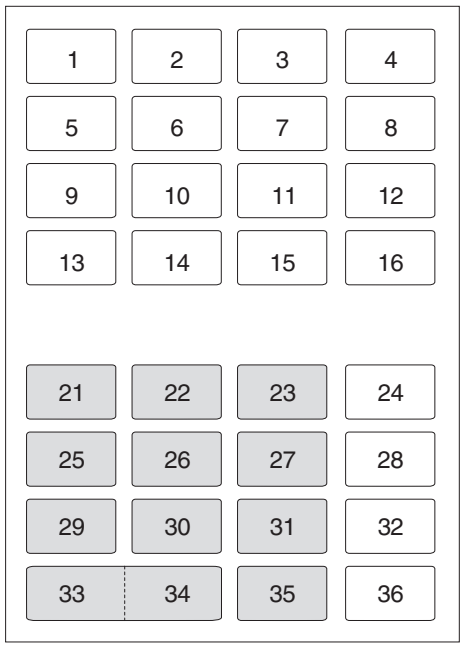


Figure 8-14. 4820 Keypad Key-Switch Layout

Table 8-21. 4820 IBM SurePoint Solution Keypad Scan Codes

Key-Switch Number	Key Type	Make/Break Scan Code (Hex.)
1	RL,T	4B/F0 4B
2	RL,T	3B/F0 3B
3	RL,T	6B/F0 6B
4	S1	8B/F0 8B
5	RL,T	4C/F0 4C
6	RL,T	3C/F0 3C
7	RL,T	6C/F0 6C
8	S2	8C/F0 8C
9	RL,T	4F/F0 4F
10	RL,T	3F/F0 3F
11	RL,T	6F/F0 6F

Table 8-21. 4820 IBM SurePoint Solution Keypad Scan Codes (continued)

Key-Switch Number	Key Type	Make/Break Scan Code (Hex.)
12	RL,T	8F/F0 8F
13	RL,T	4E/F0 4E
14	RL,T	3E/F0 3E
15	RL,T	6E/F0 6E
16	RL,T	8E/F0 8E
21	NUM,T	7C/F0 7C
22	NUM,T	0C/F0 0C
23	NUM,T	1C/F0 1C
24	CTRL,T	50/F0 50
25	NUM,T	7F/F0 7F
26	NUM,T	0F/F0 0F
27	NUM,T	1F/F0 1F
28	RL,T	9F/F0 9F
29	NUM,T	7E/F0 7E
30	NUM,T	0E/F0 0E
31	NUM,T	1E/F0 1E
32	RL,T	9E/F0 9E
33	NUM,T	7D/F0 7D
34	NUM,T	0D/F0 0D
35	NUM,T	1D/F0 1D
36	RL,T	9D/F0 9D

Note: The S1 and S2 keys are typematic make/break in the base case, and are non-typematic make-only when the Ctrl key is pressed.

Table 8-22. 4820 Keyboard Scan Codes for Function Keys

Key-Switch Number	Key Type	Ctrl + Make Code (Hex.)
4	S1	F0 50 00 50
8	S2	F0 50 01 50

The key types are defined as follows:

RL Re-legendable key. You can define the primary and secondary functions of these keys. They may also be doubled where physically possible.

NUM Numeric pad location

CTRL Ctrl key, which is a shift-type key that allows the rest of the key to have a secondary function (via driver code), and to achieve the “S1” and “S2” functions.

S1, S2

Point of Sale S1 and S2 function keys. These functions are secondary function keys. When Ctrl + S1 (or S2) is pressed, a string of bytes representing a CTRL break code, X‘00’ (or X‘01’), and CTRL make code are

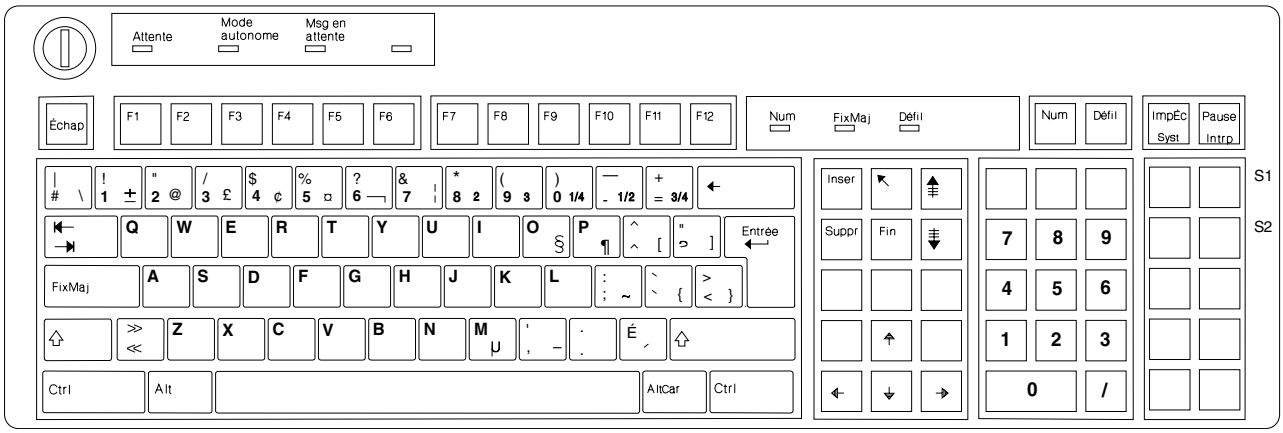
sent. The mnemonics S1 and S2 are on the keyboard cover above the two keys. The primary functions of these two keys are re-legendable.

T Typematic keys (when typematic mode is selected via the CONFIGURE command). All keys default to non-typmatic at power-up.

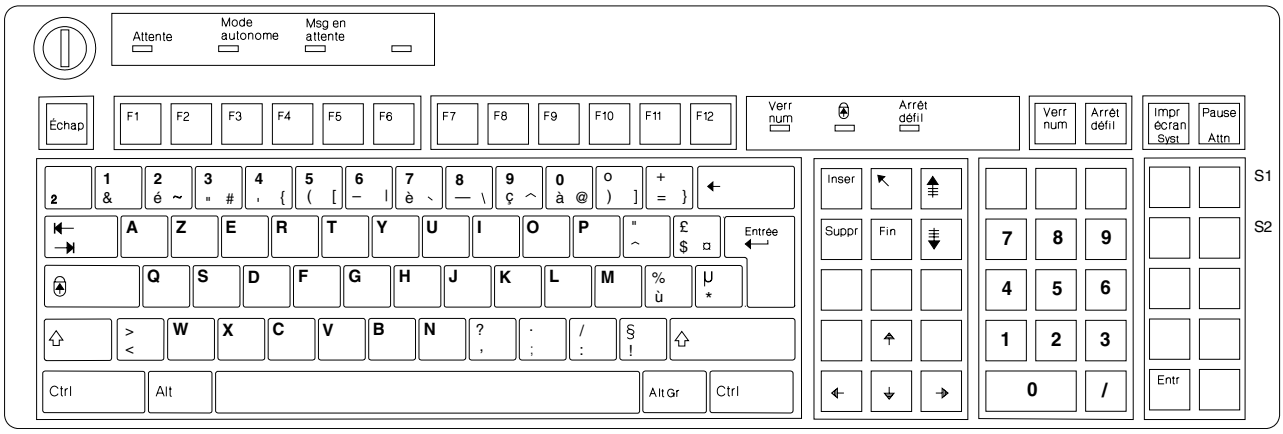
ANPOS Country Dependent Keyboards

The following pages illustrate the keyboards for all the supported ANPOS keyboards.

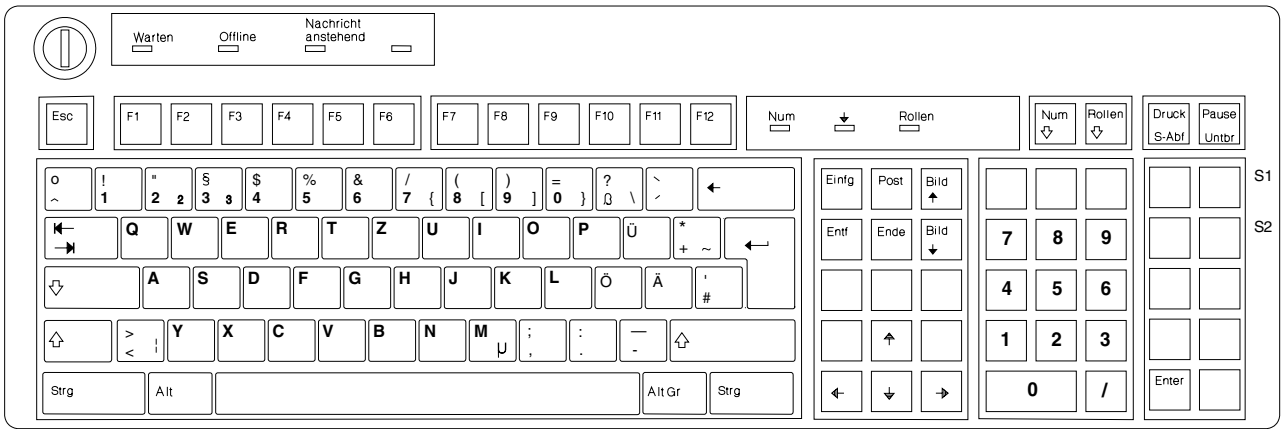
Canadian French Keyboard Layout



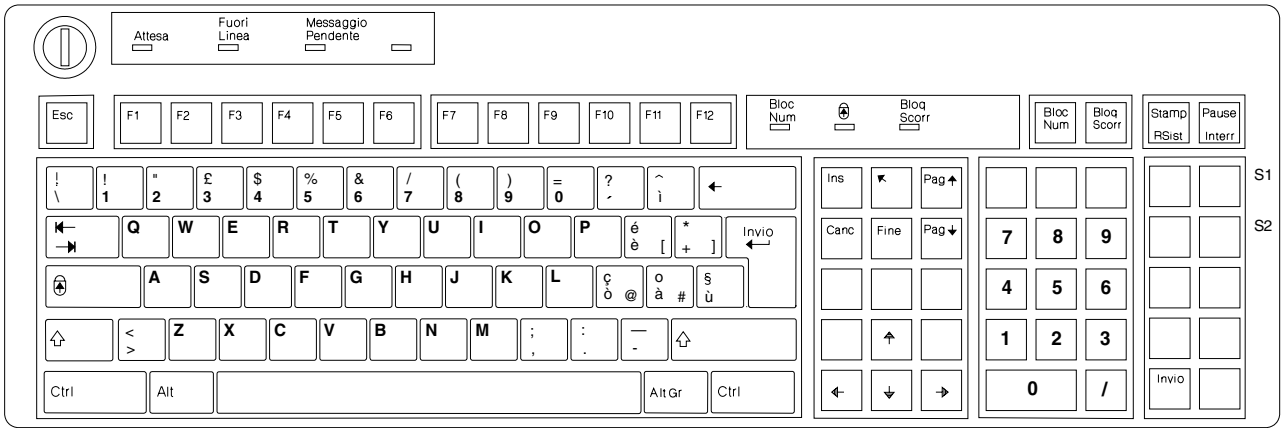
French Keyboard Layout



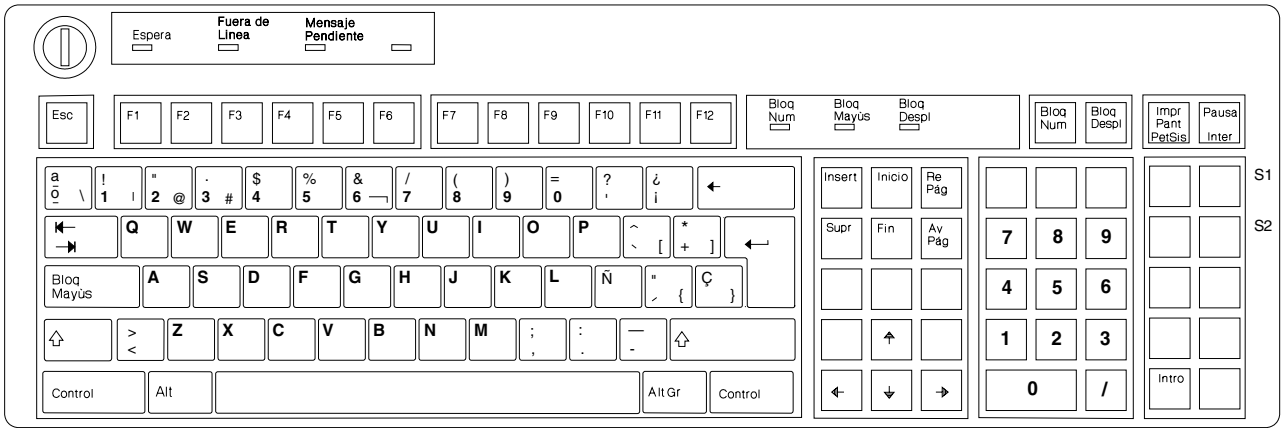
German Keyboard Layout



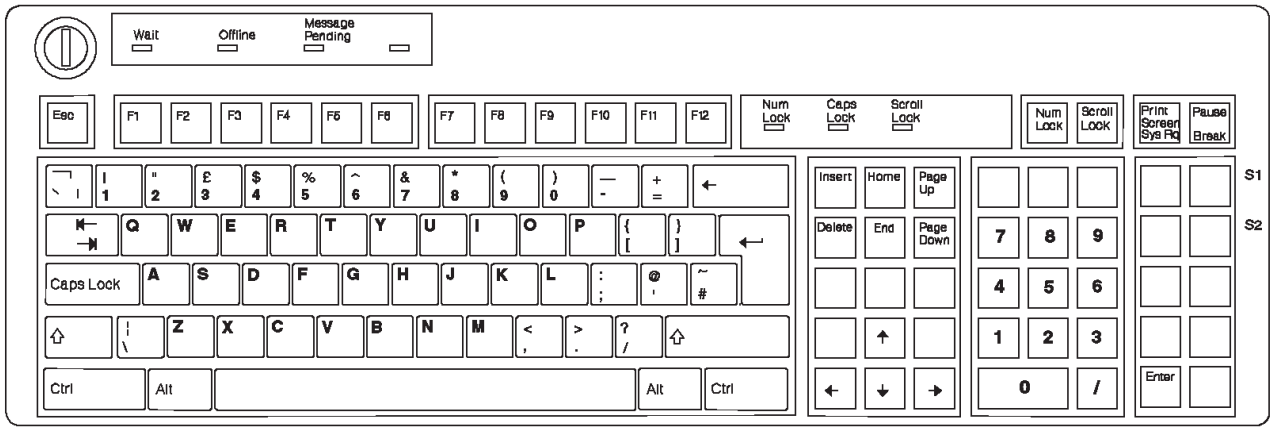
Italian Keyboard Layout



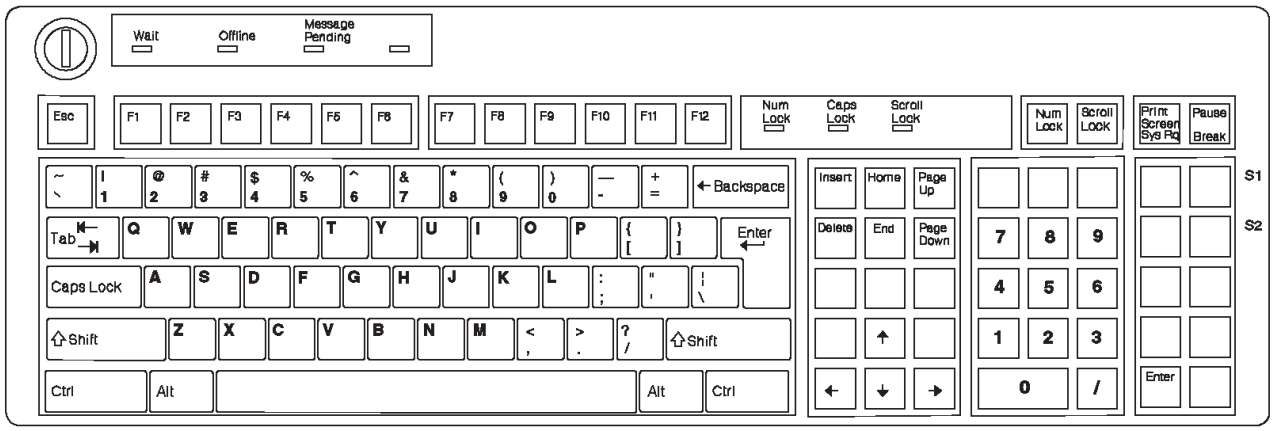
Spanish Keyboard Layout



U.K. English Keyboard Layout



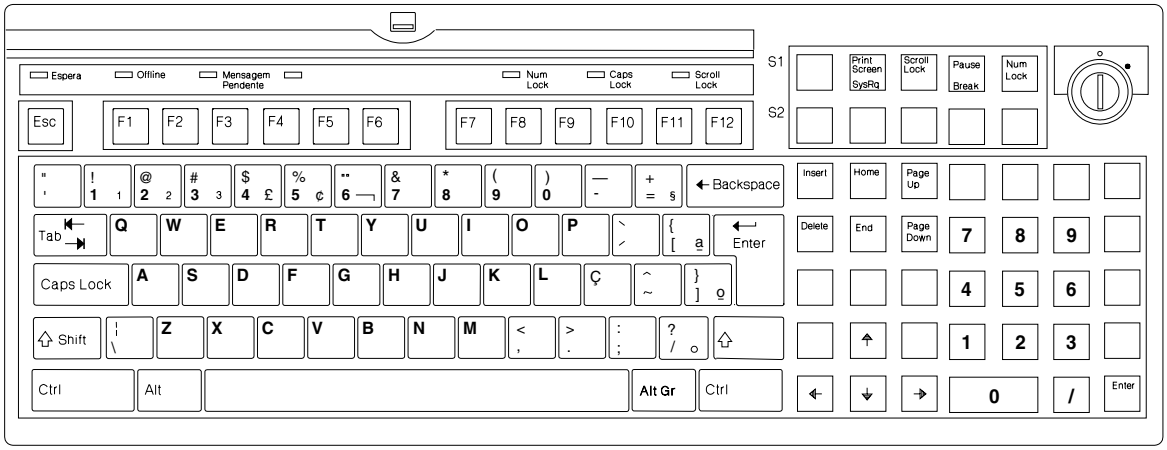
U.S. English Keyboard Layout



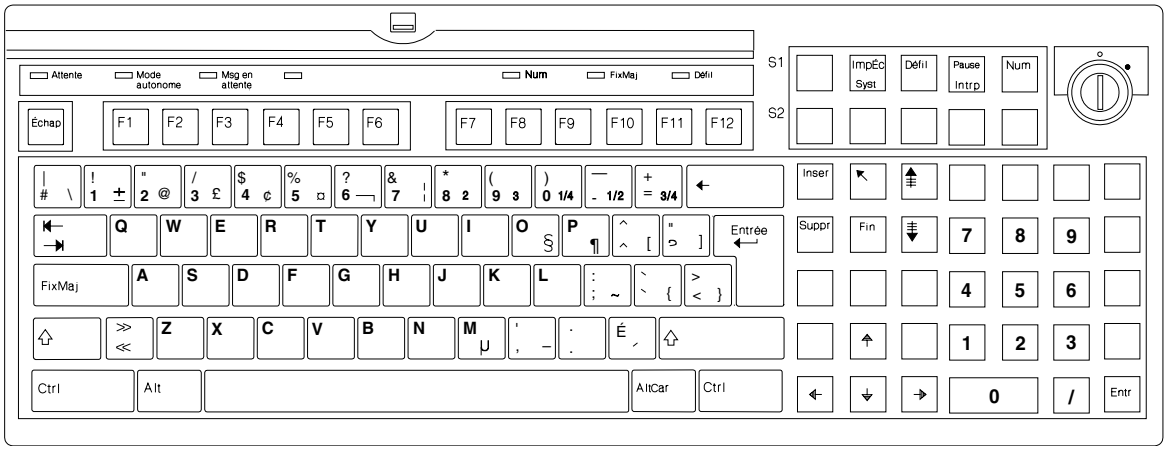
Retail Alphanumeric Point of Sale Country Dependent Keyboards

The following pages illustrate the keyboards for all the supported Retail Alphanumeric Point of Sale Keyboards.

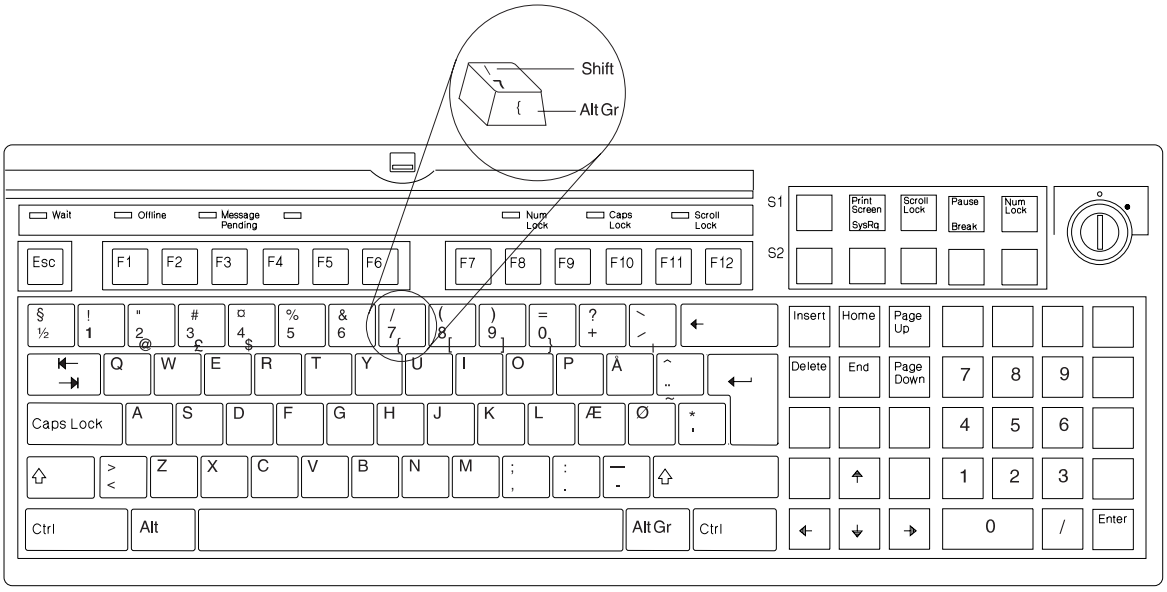
Brazil-Portuguese Keyboard Layout



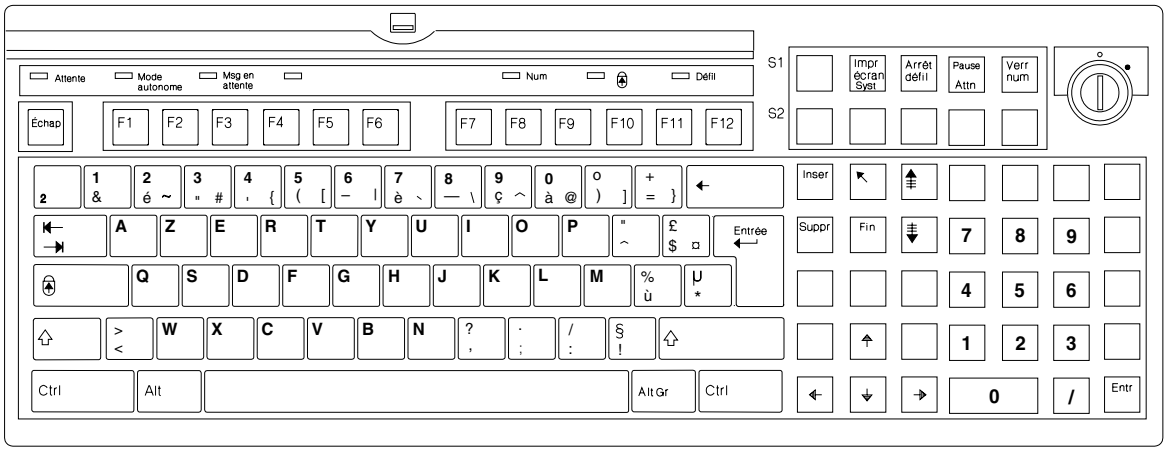
Canadian French Keyboard Layout



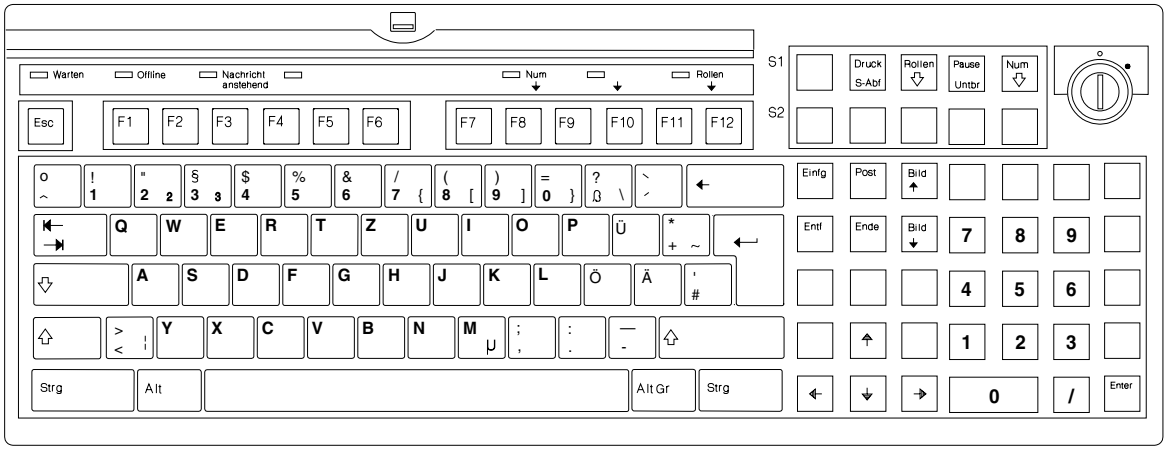
Danish Keyboard Layout



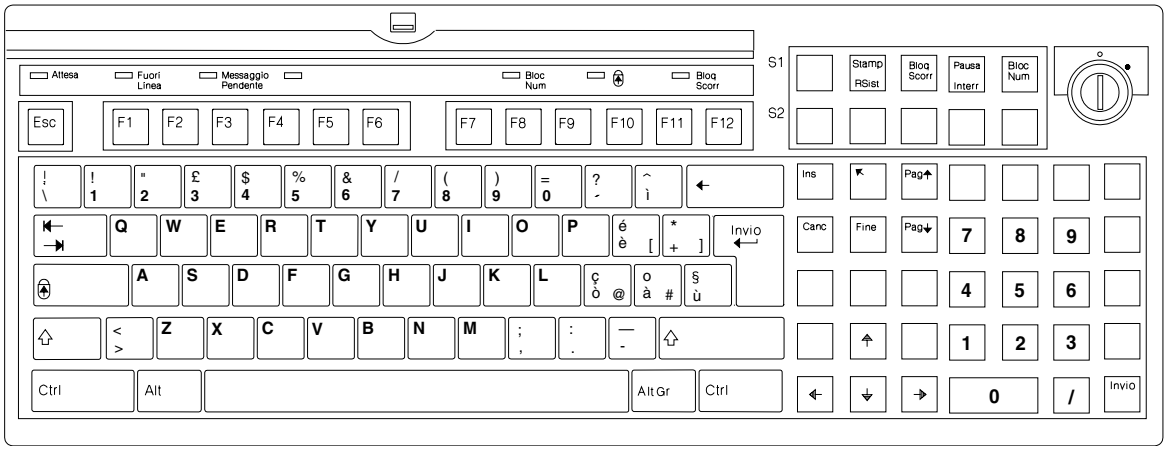
French Keyboard Layout



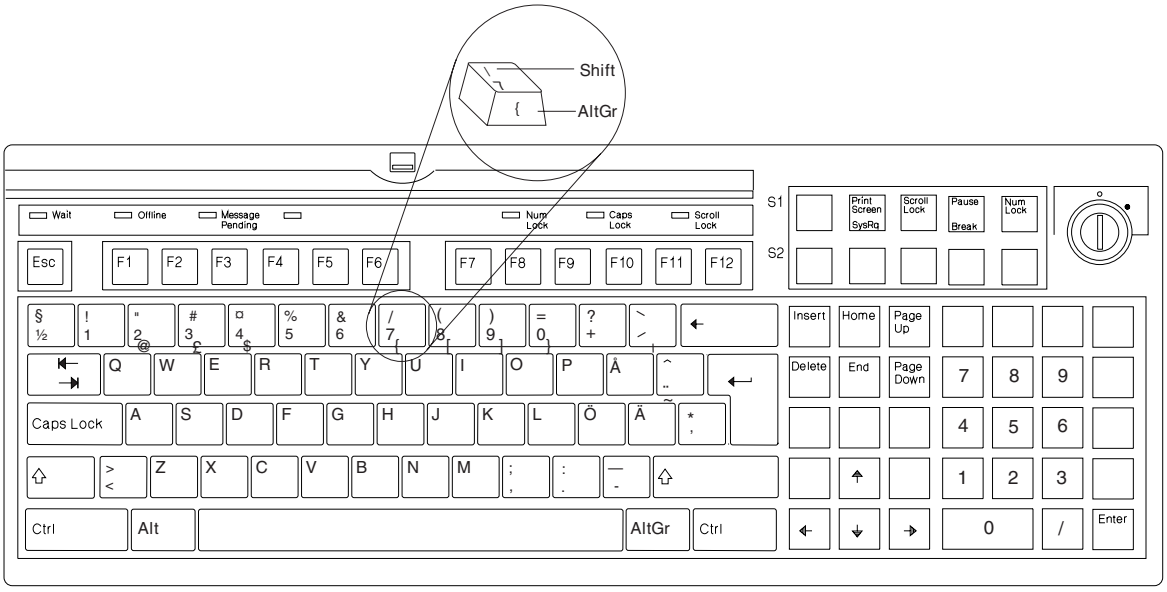
German Keyboard Layout



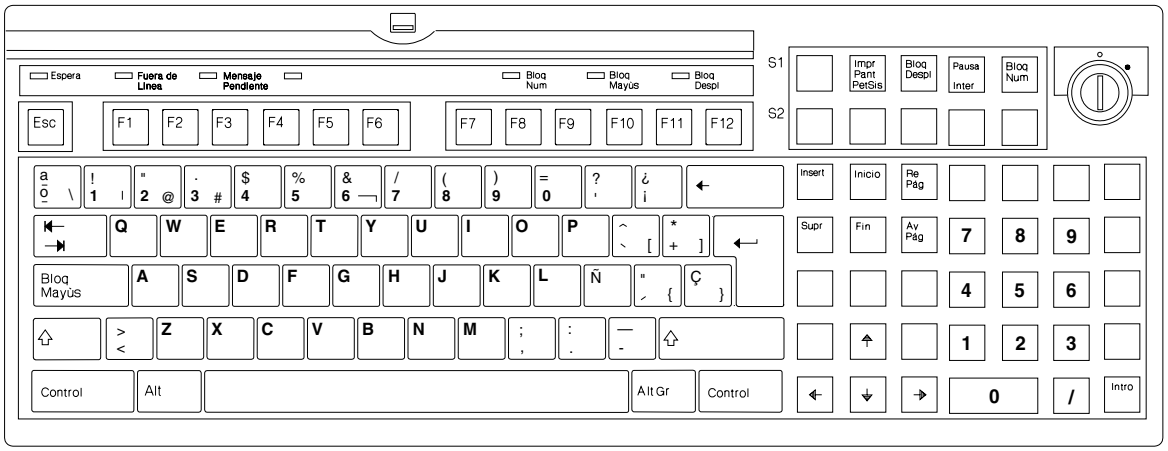
Italian Keyboard Layout



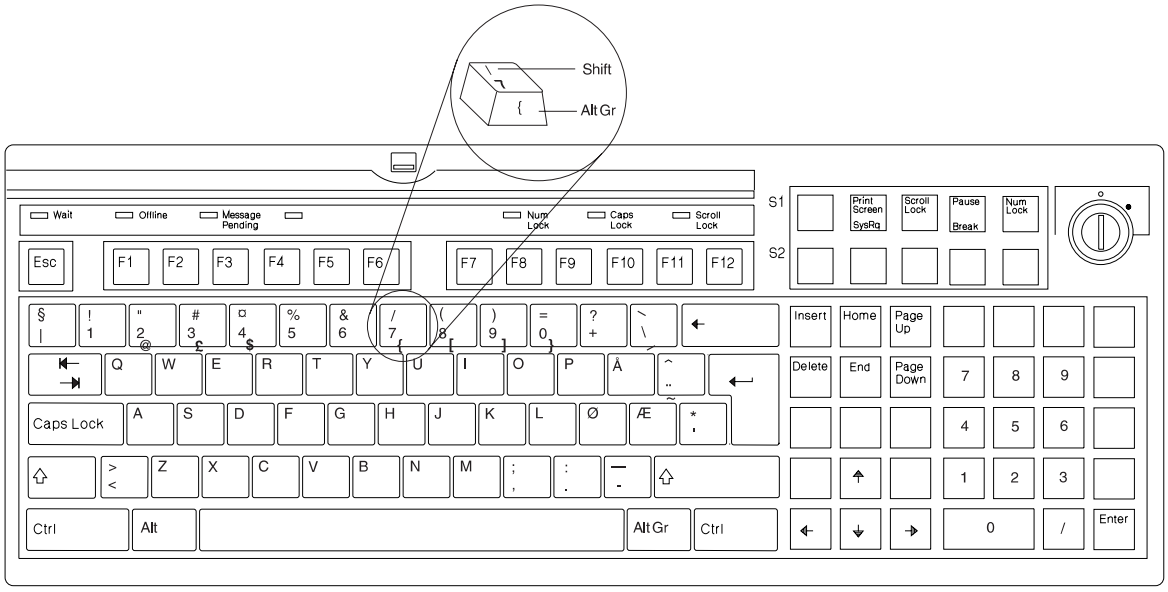
Norwegian Keyboard Layout



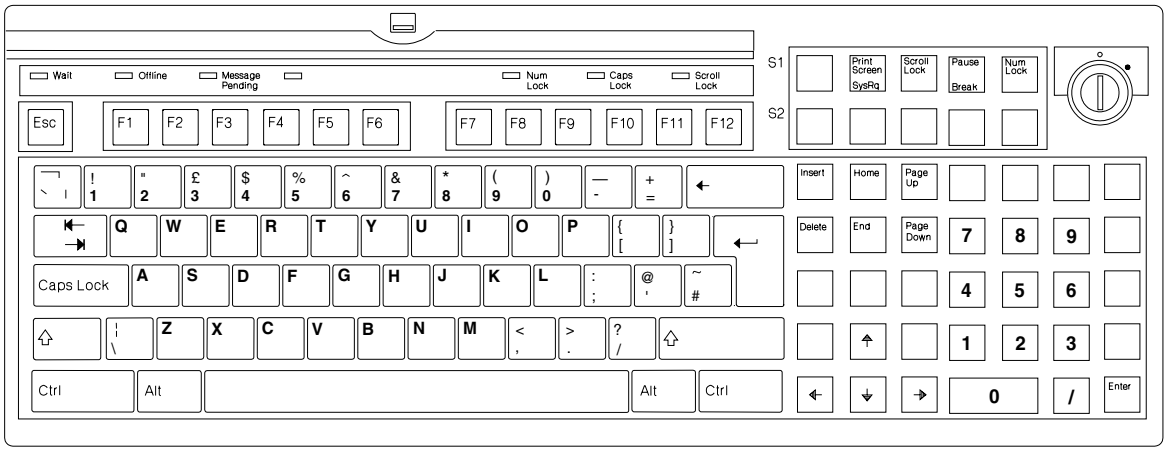
Spanish Keyboard Layout



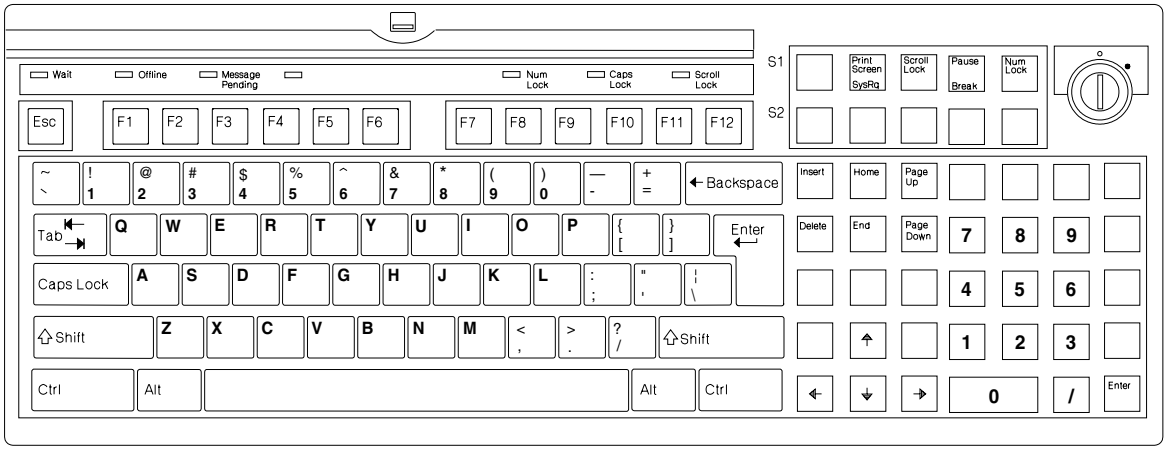
Swedish and Finnish Keyboard Layout



U.K. English Keyboard Layout



U.S. English Keyboard Layout



Chapter 9. Character Sets for Terminal Printers and Displays

This chapter contains the character sets and the ASCII codes for each character for the following devices:

- Alphanumeric Display
- Operator Display
- Shopper Display
- Character/Graphics Display
- PLU Keyboard/Display-III
- 40-Character Vacuum Fluorescent Display II
- Two-Sided Vacuum Fluorescent Display II
- 40-Character Liquid Crystal Display
- 2x20 Character VFD Customer Display
- IBM Model 2 Printer
- IBM Model 3 Printer
- IBM Model 3F Fiscal Printer
- IBM Model 3R Printer
- IBM Model 4 Printer
- IBM Model 4A Printer
- IBM Model 4R Printer
- IBM 4610 SureMark Point of Sale Printer Model TI1
- IBM 4610 SureMark Point of Sale Printer Model TI2
- IBM 4610 SureMark Point of Sale Printer Model TI3
- IBM 4610 SureMark Point of Sale Printer Model TI4
- IBM 4610 SureMark Point of Sale Printer Model TI5
- IBM 4610 SureMark Point of Sale Printer Model SST/TF6
- IBM 4610 SureMark Point of Sale Printer Model SST/TF7
- IBM 4610 SureMark Point of Sale Printer Model SST/TM6
- IBM 4610 SureMark Point of Sale Printer Model SST/TM7
- IBM 4689 Point of Sale Printer Model 001
- IBM 4689 Point of Sale Printer Model 002
- IBM 4689 Point of Sale Printer Model 301

The following code pages are supported:

- 301
- 437
- 819
- 850
- 852
- 855
- 857
- 858
- 860
- 861
- 862
- 863
- 864
- 865
- 866
- 869
- 897
- 932 (see note below)
- 949 (see note below)
- 950 (see note below)
- 951

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- 1088
- 1116
- 1117
- 1118
- 1119
- 1250
- 1251
- 1252
- 1253
- 1254
- 1257
- 1381 (see note below)

Note: Code pages are referred to in this chapter only by their last 3 or 4 digits. Code pages 932 and 949 are mixed, single-byte/double-byte code pages.

- Code page 932 contains the following:
  - Single-byte characters - code page 897
  - Double-byte characters - code page 301
- Code page 949 contains the following:
  - Single-byte characters - code page 1088
  - Double-byte characters - code page 951
- Code page 950 and code page 1381 are supported; however, these pages are too large to document in this book.

The characters that are supported by the devices are listed later in this chapter.

Code Page 301

Figure 9-1. Alphanumeric Katakana

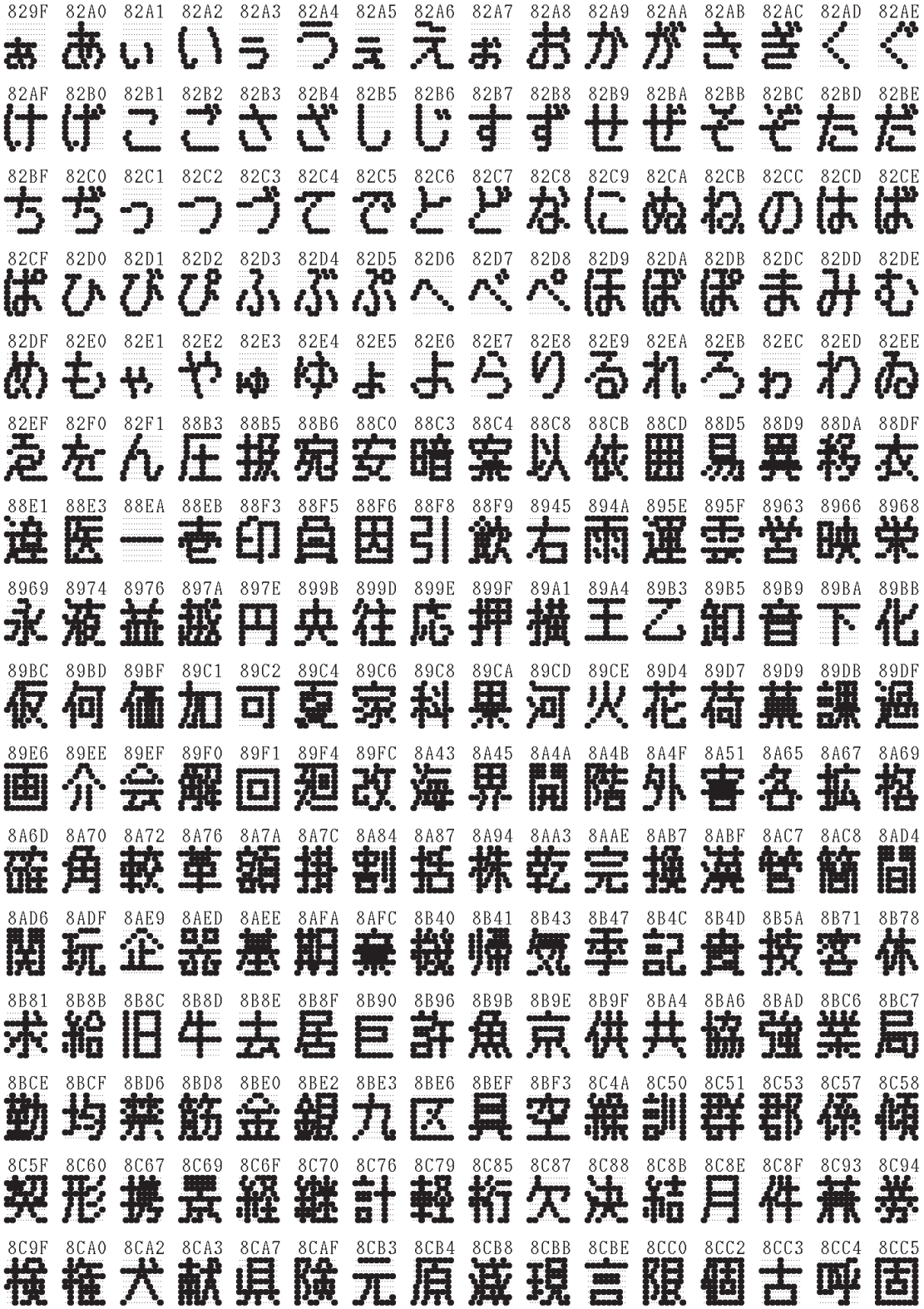

Figure 9-2. Kanji (1 of 3)

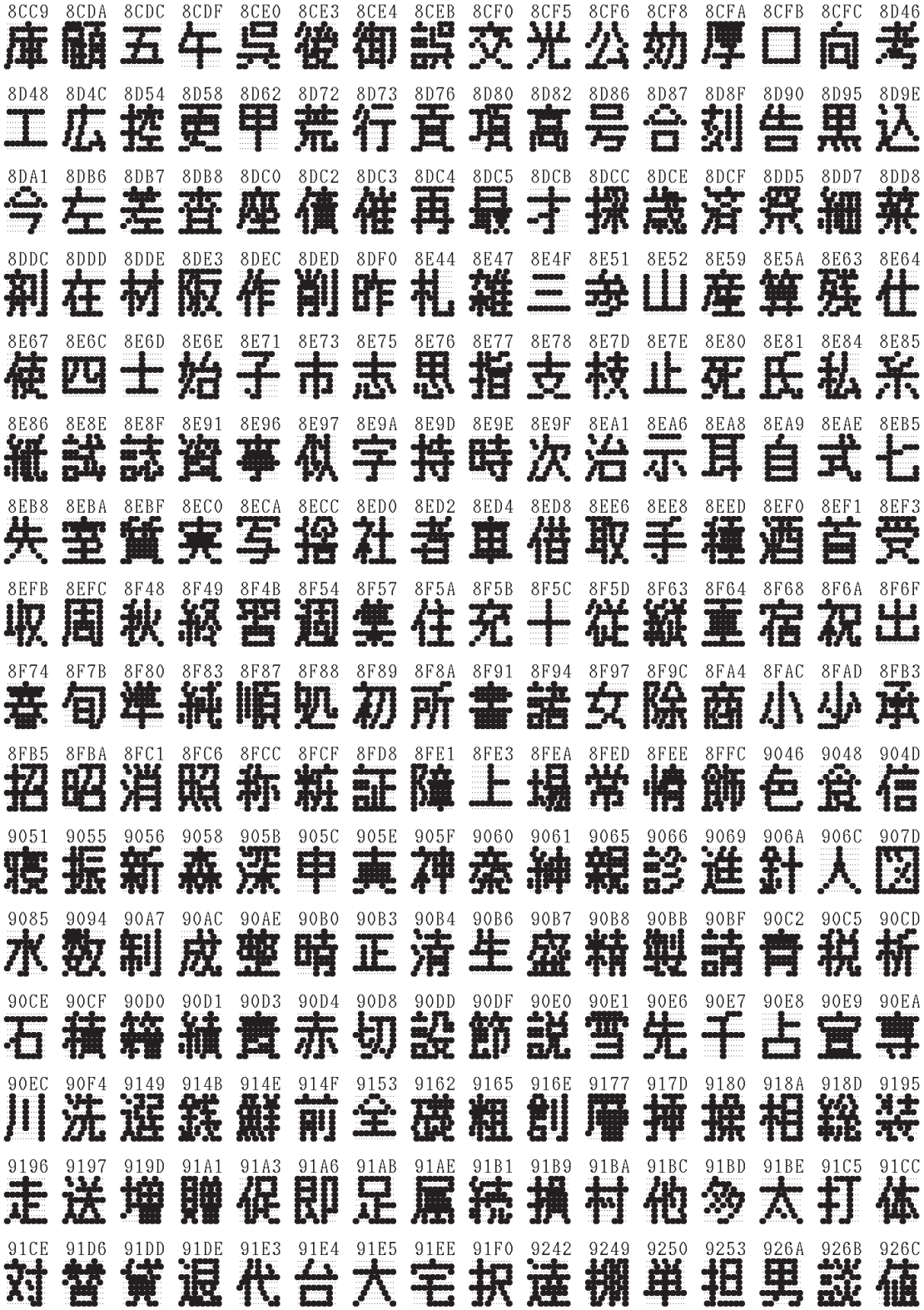

Figure 9-3. Kanji (2 of 3)

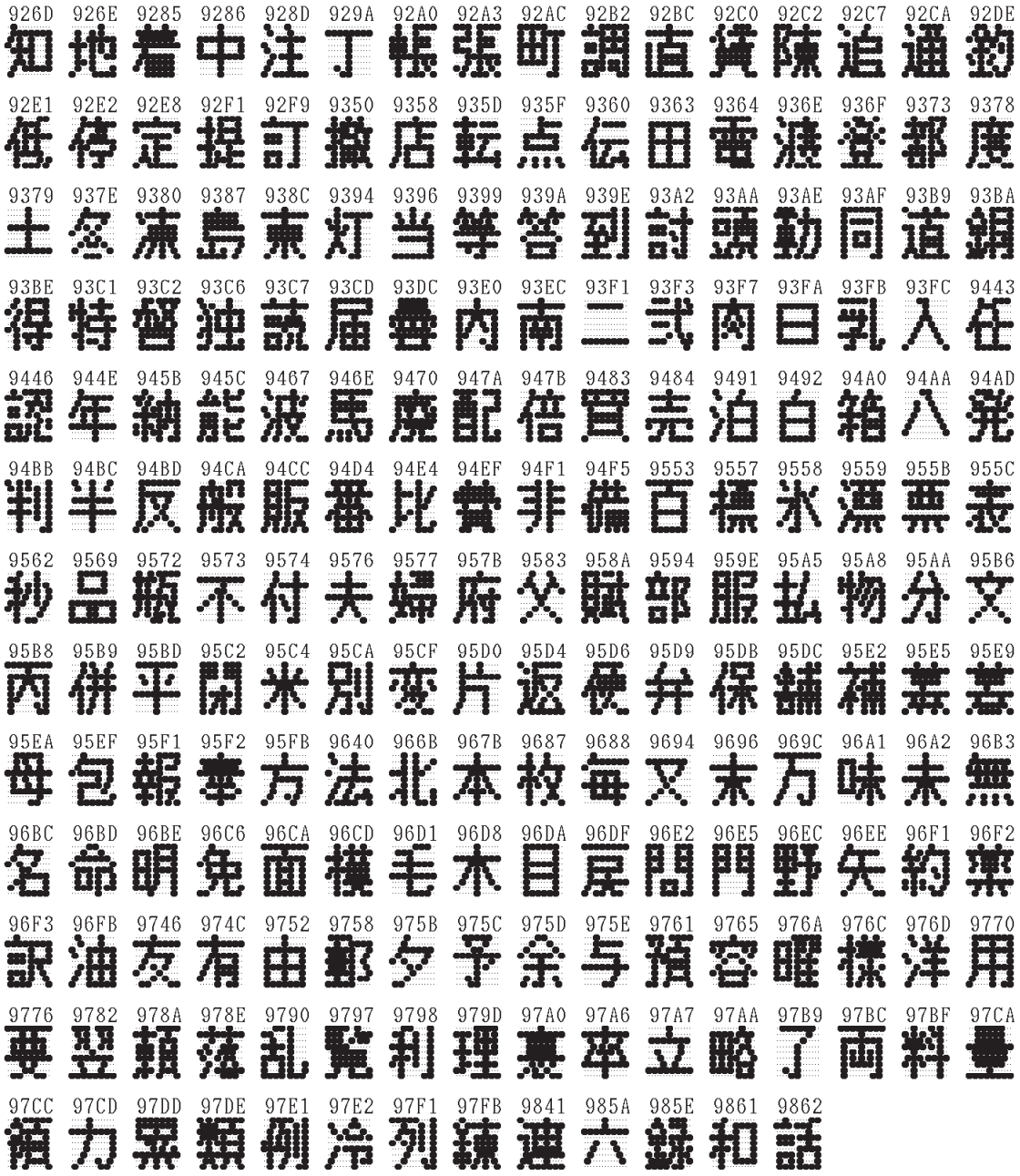

Figure 9-4. Kanji (3 of 3)

Code Page 437

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	░ SF140000	└ SF020000	╙ SF460000	α GA010000	≡ SA480000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	▒ SF150000	┴ SF070000	╨ SF470000	ß LS610000	± SA020000
-2	☻ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	▓ SF160000	┬ SF060000	╥ SF480000	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	│ SF110000	├ SF080000	╙ SF490000	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	ñ LN190000	┤ SF090000	─ SF100000	╘ SF500000	Σ GS020000	⌠ SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	╡ SF190000	┼ SF050000	╒ SF510000	σ GS010000	⌡ SS270000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	ª SM210000	╢ SF200000	╞ SF360000	╓ SF520000	µ GM010000	÷ SA060000
-7	• SM570000	↨ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	º SM200000	╖ SF210000	╟ SF370000	╫ SF530000	τ GT010000	≈ SA700000
-8	◘ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ÿ LY170000	¿ SP160000	╕ SF220000	╚ SF380000	╪ SF540000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	⌐ SM680000	╣ SF230000	╔ SF390000	┘ SF040000	Θ GT620000	• SA790000
-A	◙ SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	¬ SM660000	║ SF240000	╩ SF400000	┌ SF010000	Ω GO320000	· SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	¢ SC040000	½ NF010000	╗ SF250000	╦ SF410000	■ SF610000	δ GD010000	√ SA800000
-C	♀ SM290000	∟ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000	╝ SF260000	╠ SF420000	▬ SF570000	∞ SA450000	n LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	¥ SC050000	¡ SP030000	╜ SF270000	═ SF430000	▌ SF580000	ϕ GF010001	² ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	₧ SC060000	« SP170000	╛ SF280000	╬ SF440000	▐ SF590000	ε GE010000	■ SM470000
-F	☼ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	⌂ SM790000	Å LA280000	ƒ SC070000	» SP180000	┐ SF030000	╧ SF450000	▀ SF600000	∩ SA380000	(RSP) SP300000

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	▒ SF140000	└ SF020000	ð LD630000	Ó LO120000	(SHY) SP320000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	▓ SF150000	┴ SF070000	Ð LD620000	ß LS610000	± SA020000
-2	☻ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	▓ SF160000	┬ SF060000	Ê LE160000	Ô LO160000	‗ SM100000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	┤ SF110000	├ SF080000	Ë LE180000	Ò LO140000	¾ NF050000
-4	♦ SS030000	¶ SM250000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	ñ LN190000	┼ SF090000	─ SF100000	È LE140000	õ LO190000	¶ SM250000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	Á LA120000	┼ SF050000	ı LI610000	Õ LO200000	§ SM240000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	ª SM210000	Â LA160000	ã LA190000	Í LI120000	µ SM170000	÷ SA060000
-7	• SM570000	↨ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	º SM200000	À LA140000	Ã LA200000	Î LI160000	þ LT630000	¸ SD410000
-8	◘ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ÿ LY170000	¿ SP160000	© SM520000	╣ SF380000	Ï LI180000	Þ LT640000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	® SM530000	╠ SF230000	╦ SF390000	┘ SF040000	Ú LU120000	¨ SD170000
-A	◙ SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	¬ SM660000	╩ SF240000	╩ SF400000	┌ SF010000	Û LU160000	· SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	ø LO610000	½ NF010000	╗ SF250000	╦ SF410000	▀ SF610000	Ù LU140000	1 ND011000
-C	♀ SM290000	∟ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000	╝ SF260000	╠ SF420000	▬ SF570000	ý LY110000	3 ND031000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	Ø LO620000	¡ SP030000	¢ SC040000	═ SF430000	¦ SM650000	Ý LY120000	2 ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	× SA070000	« SP170000	¥ SC050000	╬ SF440000	Ì LI140000	¯ SM150000	■ SM470000
-F	☼ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	⌂ SM790000	Å LA280000	ƒ SC070000	» SP180000	┐ SF030000	¤ SC010000	▬ SF600000	´ SD110000	(RSP) SP300000

Code Page 00850

Code Page 852

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	▒ SF140000	└ SF020000	đ LD610000	Ó LO120000	(SHY) SP320000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	Ĺ LL120000	í LI110000	▓ SF150000	┴ SF070000	Đ LD620000	ß LS610000	″ SD250000
-2	☻ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Í LL110000	ó LO110000	▓ SF160000	┬ SF060000	Ď LD220000	Ô LO160000	˛ SD430000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	▏ SF110000	├ SF080000	Ë LE180000	Ń LN120000	ˇ SD210000
-4	♦ SS030000	¶ SM250000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	Ą LA440000	┤ SF090000	─ SF100000	ď LD210000	ń LN110000	˘ SD230000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	ů LU270000	Ľ LL220000	ą LA430000	Á LA120000	┼ SF050000	Ň LN220000	ň LN210000	§ SM240000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	ć LC110000	ĺ LL210000	Ž LZ220000	Â LA160000	Ă LA240000	Í LI120000	Š LS220000	÷ SA060000
-7	• SM570000	↨ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	Ś LS120000	ž LZ210000	Ě LE220000	ă LA230000	Î LI160000	š LS210000	¸ SD410000
-8	◘ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ł LL610000	ś LS110000	Ę LE440000	Ş LS420000	╚ SF380000	ě LE210000	Ŕ LR120000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	ę LE430000	╣ SF230000	╔ SF390000	┘ SF040000	Ú LU120000	¨ SD170000
-A	◙ SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	Ő LO260000	Ü LU180000		╗ SF240000	╩ SF400000	┌ SF010000	ŕ LR110000	• SD290000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	ő LO250000	Ť LT220000	ź LZ110000	╝ SF250000	╦ SF410000	■ SF610000	Ű LU260000	ű LU250000
-C	♀ SM290000	∟ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	ť LT210000	Č LC220000	╚ SF260000	╠ SF420000	▬ SF570000	ý LY110000	Ř LR220000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	Ź LZ120000	Ł LL620000	ş LS410000	Ż LZ300000	═ SF430000	Ţ LT420000	Ý LY120000	ř LR210000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	× SA070000	« SP170000	ż LZ290000	╬ SF440000	Ů LU280000	ţ LT410000	■ SM470000
-F	☼ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	⌂ SM790000	Ć LC120000	č LC210000	» SP180000	┐ SF030000	¤ SC010000	▬ SF600000	´ SD110000	(RSP) SP300000

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		►	(SP)	0	@	P	`	p	ђ	љ	а	▒	└	л	Я	(SHY)
-1	☺	◄	!	1	A	Q	a	q	Ђ	Љ	А	▓	┴	Л	р	ы
-2	☻	↕	"	2	B	R	b	r	ѓ	њ	б	│	┬	м	Р	Ы
-3	♥	!!	#	3	C	S	c	s	Ѓ	Њ	Б	┤	├	М	с	з
-4	♦	¶	$	4	D	T	d	t	ё	ћ	ц	┐	─	н	С	З
-5	♣	§	%	5	E	U	e	u	Ё	Ћ	Ц	х	┼	Н	т	ш
-6	♠	▬	&	6	F	V	f	v	є	ќ	д	Х	к	о	Т	Ш
-7	•	↨	'	7	G	W	g	w	Є	Ќ	Д	и	К	О	у	э
-8	◘	↑	(	8	H	X	h	x	s	ў	е	И	╚	п	У	Э
-9	○	↓	)	9	I	Y	i	y	S	Ў	Е	╣	╔	┘	ж	щ
-A	◙	→	*	:	J	Z	j	z	i	ц	ф	║	╩	┌	Ж	Щ
-B	♂	←	+	;	K	[	k	{	I	Ц	Ф	╗	╦	■	в	ч
-C	♀	∟	,	<	L	\	l	|	ї	ю	г	╝	╠	▄	В	Ч
-D	♪	↔	-	=	M	]	m	}	Ї	Ю	Г	й	═	П	ь	§
-E	♫	▲	.	>	N	^	n	~	j	ъ	«	Й	╬	я	Ь	■
-F	☼	▼	/	?	O	_	o	⌂	J	Ъ	»	┘	€	▀	№	(RSP)

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	▒ SF140000	└ SF020000	º SM200000	Ó LO120000	(SHY) SP320000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	▓ SF150000	┴ SF070000	ª SM210000	ß LS610000	± SA020000
-2	☻ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	▓ SF160000	┬ SF060000	Ê LE160000	Ô LO160000	
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	┤ SF110000	├ SF080000	Ë LE180000	Ò LO140000	¾ NF050000
-4	♦ SS030000	¶ SM250000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	ñ LN190000	╡ SF090000	─ SF100000	È LE140000	õ LO190000	¶ SM250000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	Á LA120000	┼ SF050000		Õ LO200000	§ SM240000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	Ğ LG240000	Â LA160000	ã LA190000	Í LI120000	µ SM170000	÷ SA060000
-7	• SM570000	↨ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	ğ LG230000	À LA140000	Ã LA200000	Î LI160000		¸ SD410000
-8	◘ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	İ LI300000	¿ SP160000	© SM520000	╚ SF380000	Ï LI180000	× SA070000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	® SM530000	╣ SF230000	╗ SF390000	┘ SF040000	Ú LU120000	¨ SD170000
-A	◙ SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	¬ SM660000	╝ SF240000	╩ SF400000	┌ SF010000	Û LU160000	· SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	ø LO610000	½ NF010000	╖ SF250000	╦ SF410000	SF610000	Ù LU140000	¹ ND011000
-C	♀ SM290000	∟ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000	╕ SF260000	╠ SF420000	SF570000	ì LI130000	³ ND031000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ı LI610000	Ø LO620000	¡ SP030000	¢ SC040000	═ SF430000	¦ SM650000	ÿ LY170000	² ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	Ş LS420000	« SP170000	¥ SC050000	╬ SF440000	Ì LI140000	¯ SM150000	■ SM470000
-F	☼ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	⌂ SM790000	Å LA280000	ş LS410000	» SP180000	╓ SF030000	¤ SC010000	▬ SF600000	´ SD110000	(RSP) SP300000

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	▒ SF140000	└ SF020000	ð LD630000	Ó LO120000	(SHY) SP320000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	▓ SF150000	┴ SF070000	Ð LD620000	ß LS610000	± SA020000
-2	☻ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	▓ SF160000	┬ SF060000	Ê LE160000	Ô LO160000	‗ SM100000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	┤ SF110000	├ SF080000	Ë LE180000	Ò LO140000	¾ NF050000
-4	♦ SS030000	¶ SM250000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	ñ LN190000	┼ SF090000	─ SF100000	È LE140000	õ LO190000	¶ SM250000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	Á LA120000	┼ SF050000	€ LI610000	Õ LO200000	§ SM240000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	ª SM210000	Â LA160000	ã LA190000	Í LI120000	µ SM170000	÷ SA060000
-7	• SM570000	↨ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	º SM200000	À LA140000	Ã LA200000	Î LI160000	þ LT630000	¸ SD410000
-8	◘ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ÿ LY170000	¿ SP160000	© SM520000	╚ SF380000	Ï LI180000	Þ LT640000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	® SM530000	╣ SF230000	╔ SF390000	┘ SF040000	Ú LU120000	¨ SD170000
-A	◙ SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	¬ SM660000	╩ SF240000	╦ SF400000	┌ SF010000	Û LU160000	· SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	ø LO610000	½ NF010000	╗ SF250000	╠ SF410000	▀ SF610000	Ù LU140000	1 ND011000
-C	♀ SM290000	∟ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000	╝ SF260000	╬ SF420000	▄ SF570000	ý LY110000	3 ND031000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	Ø LO620000	¡ SP030000	¢ SC040000	═ SF430000	¦ SM650000	Ý LY120000	2 ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	× SA070000	« SP170000	¥ SC050000	╬ SF440000	Ì LI140000	¯ SM150000	■ SM470000
-F	☼ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	⌂ SM790000	Å LA280000	ƒ SC070000	» SP180000	╓ SF030000	¤ SC010000	▬ SF600000	´ SD110000	(RSP) SP300000

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	░ SF140000	└ SF020000	╙ SF460000	α GA010000	≡ SA480000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	À LA140000	í LI110000	▒ SF150000	┴ SF070000	╫ SF470000	ß LS610000	± SA020000
-2	☻ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	È LE140000	ó LO110000	▓ SF160000	┬ SF060000	╪ SF480000	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	│ SF110000	├ SF080000	╘ SF490000	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ã LA190000	õ LO190000	ñ LN190000	┤ SF090000	─ SF100000	╒ SF500000	Σ GS020000	⌠ SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	╡ SF190000	┼ SF050000	╞ SF510000	σ GS010000	⌡ SS270000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	Á LA120000	Ú LU120000	ª SM210000	╢ SF200000	╟ SF360000	╓ SF520000	μ GM010000	÷ SA060000
-7	• SM570000	↨ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	º SM200000	╖ SF210000	╫ SF370000	╪ SF530000	τ GT010000	≈ SA700000
-8	◘ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	Ì LI140000	¿ SP160000	╕ SF220000	╙ SF380000	╧ SF540000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	Ê LE160000	Õ LO200000	Ò LO140000	╣ SF230000	╔ SF390000	┘ SF040000	Θ GT620000	• SA790000
-A	◙ SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	¬ SM660000	║ SF240000	╩ SF400000	┌ SF010000	Ω GO320000	· SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	Í LI120000	¢ SC040000	½ NF010000	╗ SF250000	╦ SF410000	■ SF610000	δ GD010000	√ SA800000
-C	♀ SM290000	∟ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	Ô LO160000	£ SC020000	¼ NF040000	╝ SF260000	╠ SF420000	▬ SF570000	∞ SA450000	n LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	Ù LU140000	¡ SP030000	╜ SF270000	═ SF430000	▌ SF580000	φ GF010001	2 ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ã LA200000	₧ SC060000	« SP170000	╛ SF280000	╬ SF440000	▐ SF590000	ε GE010000	■ SM470000
-F	☼ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	⌂ SM790000	Â LA160000	Ó LO120000	» SP180000	┐ SF030000	╧ SF450000	▬ SF600000	∩ SA380000	(RSP) SP300000

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	▒ SF140000	└ SF020000	╨ SF460000	α GA010000	≡ SA480000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	▓ SF150000	┴ SF070000	╤ SF470000	ß LS610000	± SA020000
-2	☻ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	▓ SF160000	┬ SF060000	╥ SF480000	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	│ SF110000	├ SF080000	╙ SF490000	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	Á LA120000	┤ SF090000	─ SF100000	╘ SF500000	Σ GS020000	⌠ SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	þ LT630000	Í LI120000	╡ SF190000	┼ SF050000	╒ SF510000	σ GS010000	⌡ SS270000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	Ó LO120000	╢ SF200000	╞ SF360000	╓ SF520000	μ GM010000	÷ SA060000
-7	• SM570000	↨ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	Ý LY120000	Ú LU120000	╖ SF210000	╟ SF370000	╫ SF530000	τ GT010000	≈ SA700000
-8	◘ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ý LY110000	¿ SP160000	╕ SF220000	╚ SF380000	╪ SF540000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	⌐ SM680000	╣ SF230000	╔ SF390000	┘ SF040000	Θ GT620000	• SA790000
-A	◙ SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	¬ SM660000	║ SF240000	╩ SF400000	┌ SF010000	Ω GO320000	· SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	Đ LD620000	ø LO610000	½ NF010000	╗ SF250000	╦ SF410000	■ SF610000	δ GD010000	√ SA800000
-C	♀ SM290000	∟ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	ð LD630000	£ SC020000	¼ NF040000	╝ SF260000	╠ SF420000	▬ SF570000	∞ SA450000	n LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	Þ LT640000	Ø LO620000	¡ SP030000	╜ SF270000	═ SF430000	▌ SF580000	φ GF010001	2 ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	Pts SC060000	« SP170000	╛ SF280000	╬ SF440000	▐ SF590000	ε GE010000	■ SM470000
-F	☼ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	⌂ SM790000	Å LA280000	ƒ SC070000	» SP180000	┐ SF030000	╧ SF450000	▀ SF600000	∩ SA380000	(RSP) SP300000

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	SM590000	SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	א HX330000	נ HN010000	á LA110000	SF140000	SF020000	SF460000	α GA010000	≡ SA480000
-1	☺ SS000000	SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ב HB010000	ס HS010000	í LI110000	SF150000	SF070000	SF470000	ß LS610000	± SA020000
-2	☻ SS010000	SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	ג HG010000	ע HX350000	ó LO110000	SF160000	SF060000	SF480000	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	ד HD010000	ף HP610000	ú LU110000	SF110000	SF080000	SF490000	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ה HH010000	פ HP010000	ñ LN190000	SF090000	SF100000	SF500000	Σ GS020000	⌠ SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	ו HW010000	ץ HS610000	Ñ LN200000	SF190000	SF050000	SF510000	σ GS010000	⌡ SS270000
-6	♠ SS050000	SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	ז HZ010000	צ HS450000	ª SM210000	SF200000	SF360000	SF520000	µ GM010000	÷ SA060000
-7	• SM570000	↨ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ח HH450000	ק HQ010000	º SM200000	SF210000	SF370000	SF530000	τ GT010000	≈ SA700000
-8	◘ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ט HT450000	ר HR010000	¿ SP160000	SF220000	SF380000	SF540000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	י HY010000	ש HS210000	⌐ SM680000	SF230000	SF390000	SF040000	Θ GT620000	• SA790000
-A	◙ SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	ך HK610000	ת HT010000	¬ SM660000	SF240000	SF400000	SF010000	Ω GO320000	· SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	כ HK010000	¢ SC040000	½ NF010000	SF250000	SF410000	SF610000	δ GD010000	√ SA800000
-C	♀ SM290000	∟ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	ל HL010000	£ SC020000	¼ NF040000	SF260000	SF420000	SF570000	∞ SA450000	n LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ם HM610000	¥ SC050000	¡ SP030000	SF270000	SF430000	SF580000	φ GF010001	2 ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	מ HM010000	₧ SC060000	« SP170000	SF280000	SF440000	SF590000	ε GE010000	■ SM470000
-F	☼ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	⌂ SM790000	ן HN610000	ƒ SC070000	» SP180000	SF030000	SF450000	SF600000	∩ SA380000	(RSP) SP300000

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	¦ SM650000	SF140000	SF020000	SF460000	α GA010000	≡ SA480000
-1	SS000000	SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	È LE140000	′ SD110000	SF150000	SF070000	SF470000	ß LS610000	± SA020000
-2	SS010000	SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Ê LE160000	ó LO110000	SF160000	SF060000	SF480000	Γ GG020000	≥ SA530000
-3	SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	SF110000	SF080000	SF490000	π GP010000	≤ SA520000
-4	SS030000	¶ SM250000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	Â LA160000	Ë LE180000	¨ SD170000	SF090000	SF100000	SF500000	Σ GS020000	⌠ SS260000
-5	SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	Ï LI180000	¸ SD410000	SF190000	SF050000	SF510000	σ GS010000	⌡ SS270000
-6	SS050000	SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	¶ SM250000	û LU150000	³ ND031000	SF200000	SF360000	SF520000	μ GM010000	÷ SA060000
-7	SM570000	↨ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	¯ SM150000	SF210000	SF370000	SF530000	τ GT010000	≈ SA700000
-8	SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	¤ SC010000	Î LI160000	SF220000	SF380000	SF540000	Φ GF020000	° SM190000
-9	SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ô LO160000	⌐ SM680000	SF230000	SF390000	SF040000	Θ GT620000	• SA790000
-A	SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	¬ SM660000	SF240000	SF400000	SF010000	Ω GO320000	· SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	¢ SC040000	½ NF010000	SF250000	SF410000	SF610000	δ GD010000	√ SA800000
-C	♀ SM290000	∟ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000	SF260000	SF420000	SF570000	∞ SA450000	n LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	‗ SM100000	Ù LU140000	¾ NF050000	SF270000	SF430000	SF580000	φ GF010001	2 ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	À LA140000	Û LU160000	« SP170000	SF280000	SF440000	SF590000	ε GE010000	■ SM470000
-F	☼ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	⌂ SM790000	§ SM240000	ƒ SC070000	» SP180000	SF030000	SF450000	SF600000	∩ SA380000	(RSP) SP300000

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	SM590000	SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	° SM190000	β GB010000	(RSP) SP300000	٠ ND100001	¢ SC040000	ذ AD470000	ـ SM860000	ّ AX100004
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	· SD630000	∞ SA450000	(SHY) SP320000	١ ND010001	ء AX300000	ر AR010000	ف AF010003	ً AX100000
-2	♪ SM930000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	• SA790000	ϕ GF010001	آ AA210002	٢ ND020001	آ AA210000	ز AZ010000	ق AQ010003	ن AN010000
-3	♫ SM910000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	√ SA800000	± SA020000	£ SC020000	٣ ND030001	أ AA310000	س AS010003	ك AK010003	ه AH010000
-4	☼ SM690000	¶ SM250000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	▒ SF150000	½ NF010000	¤ SC010000	٤ ND040001	ؤ AW310000	ش AS230003	ل AL010003	ة AH010004
-5	═ SF430000	§ SM240000	٪ SM020007	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	┤ SF100000	¼ NF040000	أ AA310002	٥ ND050001	ع AC470002	ص AS450003	م AM010003	ى AA020002
-6	╢ SF240000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	╡ SF110000	≈ SA700000		٦ ND060001	ئ AY310000	ض AD450003	ن AN010003	ي AY010002
-7	╬ SF440000	↨ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	┼ SF050000	« SP170000		٧ ND070001	ا AA010000	ط AT450000	ه AH010003	غ AG310004
-8	╣ SF230000	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	╪ SF090000	» SP180000	ا AA010002	٨ ND080001	ب AB010003	ظ AZ450000	و AW010000	ق AQ010000
-9	╗ SF410000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	┬ SF060000	لأ AL320000	ب AB010000	٩ ND090001	ة AT020000	ع AC470003	ى AA020000	لآ AL220000
-A	╝ SF420000	→ SM310000	* SM040007	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	╧ SF080000	لأ AL320003	ت AT010000	ف AF010000	ت AT010003	غ AG310003	ي AY010003	لآ AL220003
-B	╜ SF400000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	╨ SF070000		ث AT470000	؛ SP140007	ث AT470003	! SM650000	ض AD450000	ل AL010000
-C	╛ SF250000	∟ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	┐ SF030000		، SP080007	س AS010000	ج AG230003	¬ SM660000	ع AC470004	ك AK010000
-D	╒ SF390000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	╒ SF010000	لا AL020000	ج AG230000	ش AS230000	ح AH450003	÷ SA060000	غ AG310002	ي AY010000
-E	╘ SF380000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	╘ SF020000	لا AL020003	ح AH450000	ص AS450000	خ AH470003	× SA070000	غ AG310000	■ SM470000
	SF020000	AL020003	AH450000	AS450000	AH470003	SA070000	AG310000	SM470000	SF380000	SM600000	SP110000	SA050000	LN020000	SD150000	LN010000	SD190000

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	▒ SF140000	└ SF020000	╙ SF460000	α GA010000	≡ SA480000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	▓ SF150000	┴ SF070000	╨ SF470000	ß LS610000	± SA020000
-2	☻ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	▓ SF160000	┬ SF060000	╥ SF480000	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	▏ SF110000	├ SF080000	╙ SF490000	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	ñ LN190000	┤ SF090000	─ SF100000	╘ SF500000	Σ GS020000	⌠ SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	╡ SF190000	┼ SF050000	╒ SF510000	σ GS010000	⌡ SS270000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	ª SM210000	╢ SF200000	╞ SF360000	╓ SF520000	µ GM010000	÷ SA060000
-7	• SM570000	↨ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	º SM200000	╖ SF210000	╟ SF370000	╫ SF530000	τ GT010000	≈ SA700000
-8	◘ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ÿ LY170000	¿ SP160000	╕ SF220000	╚ SF380000	╪ SF540000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	⌐ SM680000	╣ SF230000	╔ SF390000	┘ SF040000	Θ GT620000	• SA790000
-A	◙ SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	¬ SM660000	║ SF240000	╩ SF400000	┌ SF010000	Ω GO320000	· SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	ø LO610000	½ NF010000	╗ SF250000	╦ SF410000	■ SF610000	δ GD010000	√ SA800000
-C	♀ SM290000	∟ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000	╝ SF260000	╠ SF420000	▬ SF570000	∞ SA450000	n LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	Ø LO620000	¡ SP030000	╜ SF270000	═ SF430000	▌ SF580000	φ GF010001	2 ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	Pts SC060000	« SP170000	╛ SF280000	╬ SF440000	▐ SF590000	ε GE010000	■ SM470000
-F	☼ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	⌂ SM790000	Å LA280000	ƒ SC070000	¤ SC010000	┐ SF030000	╧ SF450000	▀ SF600000	∩ SA380000	(RSP) SP300000

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		►	(SP)	0	@	P	`	p	А	Р	а	▒	└	╚	р	Ё
-1	☺	◄	!	1	A	Q	a	q	Б	С	б	▒	┴	═	с	ё
-2	☻	↕	"	2	B	R	b	r	В	Т	в	▓	├	╠	т	Є
-3	♥	!!	#	3	C	S	c	s	Г	У	г	│	─	╙	у	є
-4	♦	¶	$	4	D	T	d	t	Д	Ф	д	┤	┼	╘	ф	Ї
-5	♣	§	%	5	E	U	e	u	Е	Х	е	╡	╞	╒	х	ї
-6	♠	▬	&	6	F	V	f	v	Ж	Ц	ж	╢	╟	╓	ц	Ў
-7	•	↨	'	7	G	W	g	w	З	Ч	з	╖	╫	╪	ч	ў
-8	◘	↑	(	8	H	X	h	x	И	Ш	и	╕	╤	┘	ш	°
-9	○	↓	)	9	I	Y	i	y	Й	Щ	й	╣	╦	┌	щ	∙
-A	◙	→	*	:	J	Z	j	z	К	Ъ	к	║	╩	█	ъ	·
-B	♂	←	+	;	K	[	k	{	Л	Ы	л	╗	╦	▄	ы	√
-C	♀	∟	,	<	L	\	l	|	М	Ь	м	╝	╠	▬	ь	№
-D	♪	↔	-	=	M	]	m	}	Н	Э	н	╜	═	▌	э	€
-E	♫	▲	.	>	N	^	n	~	О	Ю	о	╛	╬	▐	ю	■
-F	☼	▼	/	?	O	_	o	⌂	П	Я	п	┐	╧	▀	я	(RSP)

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		►	(SP)	0	@	P	`	p		΄Ι	ϊ	░	┐	Τ	ζ	(SHY)
-1	☺	◄	!	1	A	Q	a	q		Ϊ	ΐ	▒	┴	Υ	η	±
-2	☻	↕	"	2	B	R	b	r		Ό	ό	▓	┬	Φ	θ	υ
-3	♥	!!	#	3	C	S	c	s			ύ	│	├	Χ	ι	φ
-4	♦	¶	$	4	D	T	d	t			Α	┤	─	Ψ	κ	χ
-5	♣	§	%	5	E	U	e	u		΄Υ	Β	Κ	┼	Ω	λ	§
-6	♠	▬	&	6	F	V	f	v	΄Α	Ϋ	Γ	Λ	Π	α	μ	ψ
-7	•	↨	'	7	G	W	g	w	€	©	Δ	Μ	Ρ	β	ν	΄
-8	◘	↑	(	8	H	X	h	x	·	Ώ	Ε	Ν	╚	γ	ξ	°
-9	○	↓	)	9	I	Y	i	y	¬	²	Ζ	╝	╔	┘	ο	¨
-A	◙	→	*	:	J	Z	j	z	¦	³	Η	╜	╩	┌	π	ω
-B	♂	←	+	;	K	[	k	{	‘	ά	½	╗	╦	■	ρ	ϋ
-C	♀	∟	,	<	L	\	l	|	’	£	Θ	╙	╠	▬	σ	ΰ
-D	♪	↔	-	=	M	]	m	}	΄Ε	έ	Ι	Ξ	═	δ	ς	ώ
-E	♫	▲	.	>	N	^	n	~	—	ή	«	Ο	╬	ε	τ	■
-F	☼	▼	/	?	O	_	o	⌂	΄Η	ί	»	┐	Σ	▬	΄	(RSP)

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		 SF440000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000				ー JX700000	タ JT100000	ミ JM200000		
-1	 SF390000		! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			。 JQ700000	ア JA000000	チ JT200000	ム JM300000		
-2	 SF250000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			「 JQ710000	イ JI000000	ツ JT300000	メ JM400000		
-3	 SF380000		# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			」 JQ720000	ウ JU000000	テ JT400000	モ JM500000		
-4	 SF260000	 SF160000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			、 JQ730000	エ JE000000	ト JT500000	ヤ JY100000		
-5	 SF240000	 SF400000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			・ JQ740000	オ JO000000	ナ JN100000	ユ JY300000		
-6	 SF430000	 SF410000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			ヲ JW500000	カ JK100000	ニ JN200000	ヨ JY500000		
-7	↓ SM330000	 SF230000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			ァ JA010000	キ JK200000	ヌ JN300000	ラ JR100000		
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			ィ JI010000	ク JK300000	ネ JN400000	リ JR200000		
-9	○ SM750000	SF420000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			ゥ JU010000	ケ JK400000	ノ JN500000	ル JR300000		
-A		 SF140000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			ェ JE010000	コ JK500000	ハ JH100000	レ JR400000		
-B	SP500000	↵ SM720000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			ォ JO010000	サ JS100000	ヒ JH200000	ロ JR500000		
-C		↑ SM320000	, SP080000	< SA030000	L LL020000	¥ SC050000	l LL010000	| SM130000			ャ JY110000	シ JS200000	フ JH300000	ワ JW100000		
-D		 SF110000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			ュ JY310000	ス JS300000	ヘ JH400000	ン JN000000		
-E	■ SM470000	→ SM310000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	¯ SM150000			ョ JY510000	セ JS400000	ホ JH500000	゛ JX710000		
-F	☼ SM690000	← SM300000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				ッ JT310000	ソ JS500000	マ JM100000	゜ JX720000		

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Figure 9-5. Special Symbols/Alphanumeric/Numerics/Jamo/Hiragana/Hanja (1 of 3)

Figure 9-6. Special Symbols/Alphanumeric/Numerics/Jamo/Hiragana/Hanja (2 of 3)

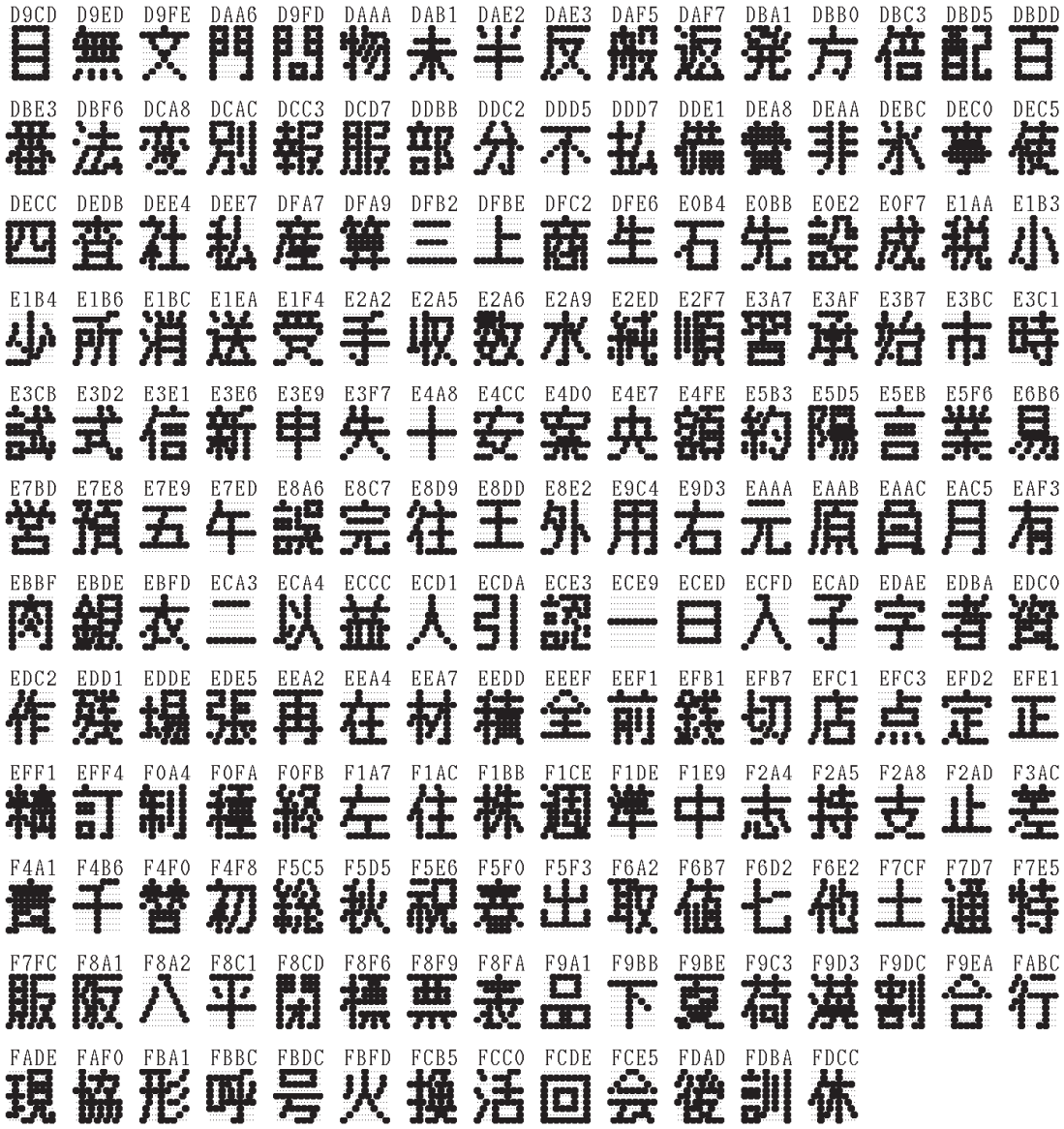

Figure 9-7. Special Symbols/Alphanumeric/Numerics/Jamo/Hiragana/Hanja (3 of 3)

Figure 9-8. Hangeul (1 of 10)

Figure 9-9. Hangeul (2 of 10)

Figure 9-10. Hangeul (3 of 10)

Figure 9-11. Hangeul (4 of 10)

Figure 9-12. Hangeul (5 of 10)

Figure 9-13. Hangeul (6 of 10)

Figure 9-14. Hangeul (7 of 10)

Figure 9-15. Hangeul (8 of 10)

Figure 9-16. Hangeul (9 of 10)

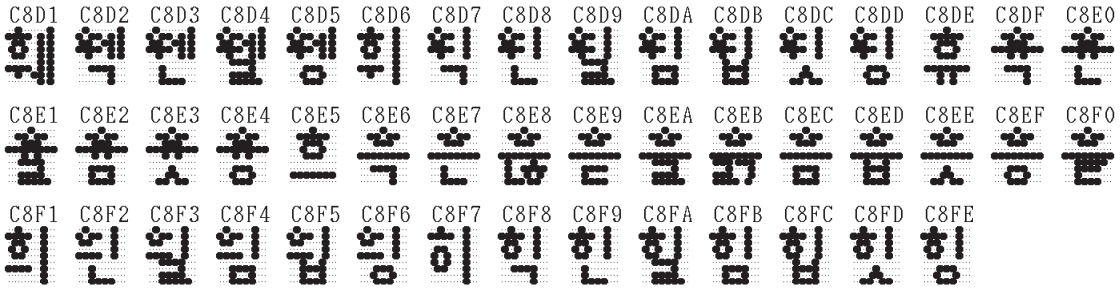

Figure 9-17. Hangeul (10 of 10)

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HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		SF050000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000								
-1	SF010000	SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000								
-2	SF030000	SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000								
-3	SF020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000								
-4	SF040000	¶ SM250000	$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000								
-5	SF110000	SF070000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000								
-6	SF100000	SF060000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000								
-7	SM570000	SF090000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000								
-8	SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000								
-9	SM750000	SF080000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000								
-A	SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000								
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000								
-C	♀ SM290000	∟ SA420000	, SP080000	< SA030000	L LL020000	₩ SC140000	l LL010000	| SM130000								
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000								
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000								
-F	☼ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	⌂ SM790000								

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Glossary

This glossary defines terms and abbreviations used in this book.

A

adapter. In the point-of-sale terminal, a circuit card that along with its associated software, enables the terminal to use a function or feature. In a LAN, within a communicating device, a circuit card that, with its associated software and microcode, enables the device to communicate over the network.

address. In data communication, the IEEE-assigned unique code or the unique locally administered code assigned to each device or workstation connected to a network. A character, group of characters, or a value that identifies a register, a particular part of storage, a data source, or a data link. The value is represented by one or more characters. To refer to a device or an item of data by its address. The location in the storage of a computer where data is stored.

alphanumeric. Pertaining to a character set containing letters, digits, and other characters such as punctuation marks.

Alphanumeric point-of-sale keyboard (ANPOS keyboard). This keyboard consists of a section of alphanumeric keys, a programmable set of point-of-sale keys, a numeric keypad, and system function keys.

American National Standard Code for Information Interchange (ASCII) . The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphics characters.

American National Standards Institute (ANSI). An organization for the purpose of establishing voluntary industry standards.

ANPOS keyboard. Alphanumeric point-of-sale keyboard.

ANSI. American National Standards Institute.

API. Application program interface.

application program. A program written for or by a user that applies to the user's own work. A program written for or by a user that applies to a particular application. A program used to connect and communicate with stations in a network, enabling users to perform application-oriented activities.

application program interface (API). The formally defined programming language interface between an IBM system control program or a licensed program and the user of the program.

ASCII. American National Standard Code for Information Interchange.

B

backup. Pertaining to a system, device, file, or facility that can be used in the event of a malfunction or the loss of data.

backup copy. A copy, usually of a program or of a library member, that is kept in case the original or the working copy is unintentionally altered or destroyed.

bit. Either of the binary digits: a 0 or 1.

bit map. A coded representation in which each bit or group of bits represents or corresponds to an item; for example, a configuration of bits in main storage in which each bit indicates whether a peripheral device or a storage block is available or in which each group of bits corresponds to one pixel of a display image.

break scan code. The hardware scan code that is received by the keyboard device driver when a key on the keyboard is physically released.

byte. A string that consists of a number of bits, treated as a unit, and representing a character. A binary character operated upon as a unit and usually shorter than a computer word. A string that consists of a particular number of bits, usually 8, that is treated as a unit, and that represents a character. A group of 8 adjacent binary digits that represent one extended binary-coded decimal interchange code (EBCDIC). See *n-bit byte*.

C

C. A high-level programming language designed to optimize run time, size, and efficiency.

card reader. See *magnetic stripe reader, (MSR).*

code page. A particular assignment of hexadecimal identifiers to graphic characters.

code point. A 1-byte code representing one of 256 potential characters.

command. A request for performance of an operation or execution of a program. A character string from a source external to a system that represents a request for system action.

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compile. To translate all or part of a program expressed in a high-level language into a computer program expressed in an intermediate language, an assembly language, or a machine language. To prepare a machine language program from a computer program written in another programming language by making use of the overall logic structure of the program, or generating more than one computer instruction for each symbolic statement, or both, as well as performing the function of an assembler. To translate a source program into an executable program (an object program). To translate a program written in a high-level programming language into a machine language program.

compiler. A program that decodes instructions written as pseudo codes and produces a machine language program to be executed at a later time. Contrast with *interpretive routine*.

configuration. The group of devices, options, and programs that make up a data processing system or network as defined by the nature, number, and chief characteristics of its functional units. More specifically, the term may refer to a hardware configuration or a software configuration. See also *system configuration*.

cursor. A movable point of light (or a short line) that indicates where the next character is to be entered on the display screen.

customize. To tailor a program or store system through option selection.

D

data. A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by human or automatic means. Any representations such as characters or analog quantities to which meaning is or might be assigned.

data file. A collection of related data records organized in a specific manner; for example, a payroll file (one record for each employee, showing such information as rate of pay and deductions) or an inventory file (one record for each inventory item, showing such information as cost, selling price, and number in stock.)

DBCS. See *Double-byte character set*.

default. Pertaining to an attribute, value, or option that is assumed when none is explicitly specified.

device. A mechanical, electrical, or electronic contrivance with a specific purpose. An input/output unit such as a terminal, display, or printer.

device connection. The connection between an application and a hardware device created by the IBM Point of Sale Subsystem when the application opens a device.

device descriptor. An identifier that represents a device to the IBM Point of Sale Subsystem application programming interface. This identifier is created by the IBM Point of Sale Subsystem when the application opens a device.

device driver. The code needed to attach and use a device on a computer or a network.

device handler. In the OS/2 operating system, the component of a device driver that communicates directly with the application.

directory. A table of identifiers and references that correspond to items of data. An index that a control program uses to locate one or more blocks of data that are stored in separate areas of a data set in direct access storage.

disabled. Pertaining to a state of a processing unit that prevents the occurrence of certain types of interruptions. Pertaining to the state in which a transmission control unit or audio response unit cannot accept incoming calls on a line.

disk. A round, flat plate coated with a magnetic substance on which computer data is stored.

diskette. A thin, flexible magnetic disk permanently enclosed in a protective jacket. A diskette is used to store information for processing.

diskette drive. The mechanism used to seek, read, and write data on diskettes.

Disk Operating System (DOS). An operating system for computer systems that use disks and diskettes for auxiliary storage of programs and data.

display. A visual presentation of data. A device that presents visual information to the point-of-sale terminal operator and to the customer, or to the display station operator.

DOS. See *Disk Operating System*.

double-byte character set (DBCS). A set of characters in which each character is represented by 2 bytes. Languages such as Japanese, Chinese, and Korean, which contain more symbols than can be represented by 256 code points, require double-byte character sets. Because each character requires 2 bytes, the typing, display, and printing of DBCS characters requires hardware and programs that support DBCS. Contrast with single-byte character set.

driver. Software component that controls a device.

DLL. See *dynamic link library*.

dynamic link library (DLL). In the OS/2 operating system, the delayed connection of a library to a routine until load time or run time.

E

error message. A message that is issued because an error has been detected.

event. Processing unit containing price changes and item file updates. All records in an event share common characteristics such as type of change and event due date. An occurrence of significance to a task; for example, the completion of an asynchronous operation, such as an I/O operation.

F

fat-finger. When two keys are pressed faster than the value specified using the PosNfatFingerTimeOut resource. This could occur under any of the following conditions: 1) Two keys on the keyboard were pressed at the same time. 2) The operator is keying faster than 25 keys per second. 3) A double key is not defined to the keyboard device handler.

field. On a data medium or a storage medium, a specified area used for a particular category of data; for example, a group of character positions used to enter or display wage rates on a panel.

file. A named set of records stored or processed as a unit. For example, an invoice may form a record and the complete set of such records may form a file. See also *data file* and *data set*.

file name. A name assigned or declared for a file. The name used by a program to identify a file.

fixed disk (drive). In a personal computer system unit, a disk storage device that reads and writes on rigid magnetic disks. It is faster and has a larger storage capacity than a diskette and is permanently installed.

flag. A character or indicator that signals the occurrence of some condition, such as the setting of a switch, or the end of a word.

function. A specific purpose of an entity, or its characteristic action. A subroutine that returns the value of a single variable. In data communications, a machine action such as a carriage return or line feed.

function key. A key on a terminal, such as an ENTER key, that causes the transmission of a signal not associated with a character that can be printed or displayed. Detection of the signal usually causes the system to perform some predefined action for the operator or determined by the application program.

H

hardware. Physical equipment as opposed to programs, procedures, rules, and associated documentation.

I

IBM Disk Operating System (DOS). A disk operating system based on MS-DOS**.

Industry Standard Architecture. ISA

input/output (I/O). Pertaining to a device whose parts can perform an input process and an output process at the same time. Pertaining to a functional unit or channel involved in an input process, output process, or both, concurrently or not, and to the data involved in such a process.

integrated. Arranged together as one unit.

interface. A shared boundary between two functional units, defined by functional characteristics, common physical interconnection characteristics, signal characteristics, and other characteristics as appropriate. A shared boundary. An interface may be a hardware component to link two devices or a portion of storage or registers accessed by two or more computer programs. Hardware, software, or both, that links systems, programs, or devices.

I/O. Input/output.

ISA. Industry Standard Architecture

K

K. When referring to storage capacity, a symbol that represents two to the tenth power, or 1024.

keyboard. A group of numeric keys, alphabetic keys, special character keys, or function keys used for entering information into the terminal and into the system.

kHz. Kilohertz. See also *hertz*.

kilohertz (kHz). A thousand hertz. See also *hertz*.

L

label. Constant, either numeric or literal, that references a statement or function.

LAN. Local area network.

line. On a terminal, one or more characters entered before a return to the first printing or display position.

local area network (LAN). A computer network located on a user's premises within a limited geographical area. **Note:** Communication within a LAN is not subject to external regulations; however, communication across the LAN boundary may be subject to some form of regulation.

lock. To disable a device, such as a scanner or Magnetic Strip Reader, so that it cannot receive input. See also *unlock*.

M

magnetic stripe. The magnetic material (similar to recording tape) on merchandise tickets, credit cards, and employee badges. Information is recorded on the stripe for later "reading" by the Magnetic Strip Reader (MSR) or magnetic wand reader attached to the point-of-sale terminal.

magnetic stripe reader. A device that reads precoded information from a magnetic stripe. The device can be hand-held or fixed.

make scan code. The hardware scan code received by the keyboard device driver when a key on the keyboard is physically pressed.

MB (megabyte). For processor storage and real and virtual memory, 2(20) or 1 048 576 bytes. For disk storage capacity and transmission rates, 1 000 000 bytes.

MCA. See *Micro Channel Architecture*.

megabyte (MB). For processor storage and real and virtual memory, 2(20) or 1 048 576 bytes. For disk storage capacity and transmission rates, 1 000 000 bytes.

megahertz (MHz). A unit of measure of frequency. 1 megahertz = 1,000,000 hertz.

memory. Program-addressable storage from which instructions and other data can be loaded directly into registers for subsequent execution or processing.

message. An arbitrary amount of information whose beginning and end are defined or implied. A group of characters and control bit sequences transferred as an entity. In telecommunication, a combination of characters and symbols transmitted from one point to another. A logical partition of the user device's data stream to and from the adapter. See also *error message, operator message*.

MHz (megahertz). A unit of measure of frequency. 1 megahertz = 1,000,000 hertz. **

Micro Channel Architecture. The architecture used by IBM Personal System/2 computers, Models 50 and above. This term is used to distinguish these computers from personal computers using a PC I/O channel, such as an IBM PC, XT, or an IBM Personal System/2 computer, Model 25 or 30.

migration. Installation of a new version of a release of a program to replace an earlier version or release.

N

name. An alphanumeric term that identifies a data set, statement, program, or cataloged procedure.

n-bit byte. A string that consists of n bits.

network. A configuration of data processing devices and software connected for information interchange. An arrangement of nodes and connecting branches. Connections are made between data stations.

O

online. Operation of a functional unit that is under the continual control of a computer or control unit. The term also describes a user's access to a computer using a terminal.

operating system. Software that controls the execution of programs. An operating system may provide services such as resource allocation, scheduling, input/output control, and data management. Examples are IBM DOS and IBM OS/2

Operating System/2 (OS/2). A set of programs that control the operation of high-speed large-memory IBM Personal Computers (such as the IBM Personal System/2 computer, Models 50 and above), providing multitasking and the ability to address up to 16 MB of memory. Contrast with *Disk Operating System (DOS)* .

option. A specification in a statement, a selection from a menu, or a setting of a switch, that may be used to influence the execution of a program. A hardware or software function that may be selected or enabled as part of a configuration process. A piece of hardware (such as a network adapter) that can be installed in a device to modify or enhance device function.

OS. See *Operating system*.

OS/2. See *Operating System/2*.

P

page. The portion of a panel that is shown on a display surface at one time. To move back and forth among the pages of a multiple-page panel. In a virtual storage system, a fixed-length block that has a virtual address and is transferred as a unit between main storage and auxiliary storage.

path. Reference that specifies the location of a particular file within the various directories and subdirectories of a hierarchical file system. In a network, any route between any two nodes. The route traversed by the information exchanged between two attaching devices in a network. A command in IBM DOS and IBM

OS/2 that specifies directories to be searched for commands or batch files that are not found by a search of the current directory.

personal computer (PC). A desk-top, free-standing, or portable microcomputer that usually consists of a system unit, a display, a keyboard, one or more diskette drives, internal fixed-disk storage, and an optional printer. PCs are designed primarily to give independent computing power to a single user and are inexpensively priced for purchase by individuals or small businesses. Examples include the various models of the IBM Personal Computers, and the IBM Personal System/2 computer.

presentation facility. The visual component of the operating system that presents, in windows, a graphical interface. In OS/2, the presentation facility is Presentation Manager. In AIX, it is Xwindows.

point-of-sale terminal. A unit that provides point-of-sale transaction, data collection, credit authorization, price look-up, and other inquiry and data entry functions.

problem determination. The process of determining the source of a problem as being a program component, a machine failure, a change in the environment, a common-carrier link, a user-supplied device, or a user error.

prompt. A character or word displayed by the operating system to indicate that it is ready to accept input.

R

resource. An element that affects the way devices behave.

resource set. The set of resources associated with a device.

S

SBCS. See *Single byte character set*.

scan. To pass an item over or through the scanner so that the encoded information is read. See also *wanding*.

scanner. A device that examines the bar code on merchandise tickets, credit cards, and employee badges and generates analog or digital signals corresponding to the bar code.

serial input/output (SIO). Pertaining to the sequential or consecutive occurrence of two or more input, output or both, activities in a single device or channel.

SIO. See *serial input/output*.

server. A device, program, or code module on a network dedicated to providing a specific service to a network. On a LAN, a data station that provides facilities to other data stations. Examples are a file server, print server, and mail server.

single-byte character set (SBCS). A character set in which each character is represented by a one-byte code. Contrast with *double-byte character set*.

subdirectory. Any level of file directory lower than the root directory within a hierarchical file system.

subroutine. Section of code that performs a specific task and is logically separate from the rest of the program.

subsystem. A secondary or subordinate system, or programming support, usually capable of operating independently of or asynchronously with a controlling system.

switch. On an adapter, a mechanism used to select a value for, enable, or disable a configurable option or feature.

system configuration. A process that specifies the devices and programs that form a particular data processing system.

T

terminal. In data communication, a device, usually equipped with a keyboard and a display, capable of sending and receiving information over a communication channel.

typematic. A keyboard button that will continue to enter characters or repeat its function as long as the button is held down.

U

universal serial bus (USB). A serial interface connection standard that provides telephony and multimedia connections to personal computers.

unlock. To enable a device, such as a scanner or MSR, so that it can read data. See also *lock*.

user. Category of identification defined for file access protection. A person using a program or system.

user interface. Hardware, software, or both that allows a user to interact with and perform operations on a system, program, or device.

V

version. A separate IBM-licensed program, based on an existing IBM-licensed program, that usually has significant new code or new function.

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