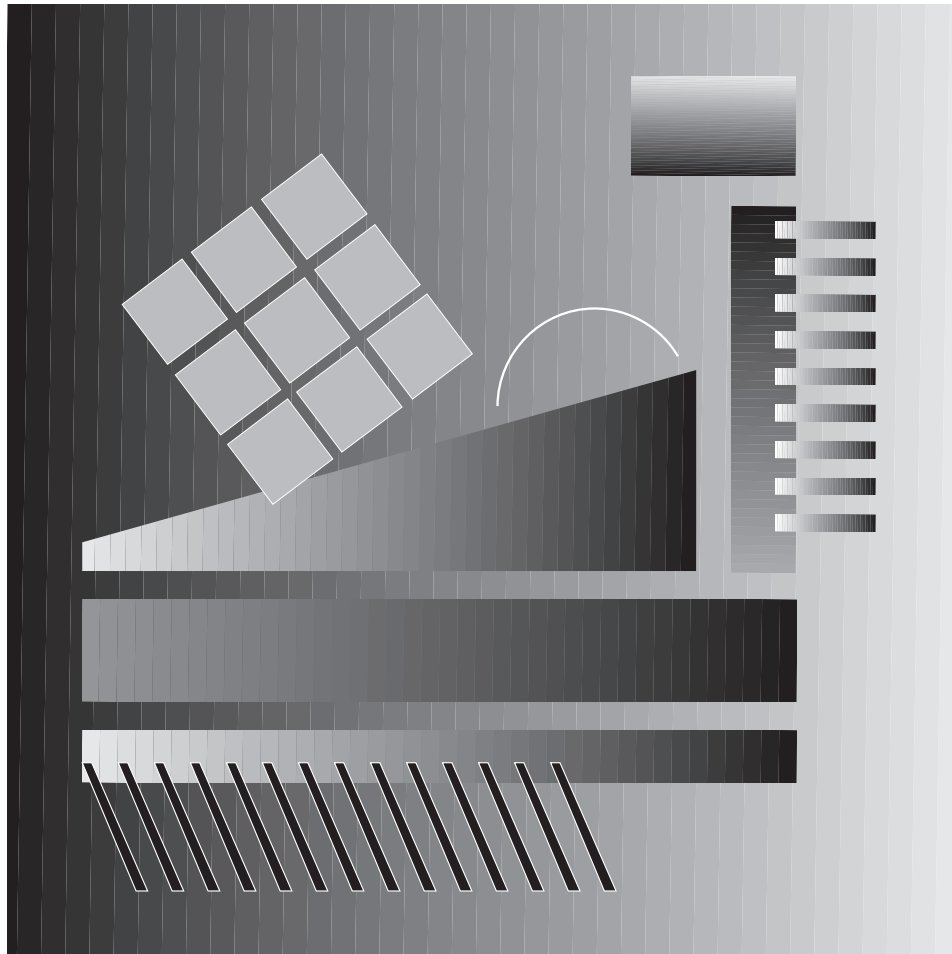


Installation, Keyboards, and Code Pages



Point of Sale Subsystem



Installation, Keyboards, and Code Pages

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.

1. Go to www.ibm.com/solutions/retail/store.
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Contents

	Tables	vii
	Preface	ix
	Who Should Read this Manual	ix
	How to Use this Manual	ix
	Related Publications	x
	Related Non-IBM Publications	xi
	Store System Related Publications – Hardware	xi
	Scanners	xi
	Cabling	xi
	IBM 4610 SureMark Point of Sale Printer	xi
	IBM 4683/4684 Point of Sale Terminals	xi
	IBM 4693/4694/4695 Point of Sale Terminals	xii
	IBM SurePOS Series Publications	xii
	IBM 4820 SurePoint Solution	xii
	IBM 7497 Point of Sale Attachment Adapter	xii
	Summary of changes	xiii
	June, 2001	xiii
	February, 2001	xiii
	February, 2000	xiii
	Chapter 1. Using the Online User's Guide	1-1
	Viewing the Online User's Guide	1-1
	Viewing the Online User's Guide on OS/2	1-1
	Viewing the Online User's Guide on Microsoft Windows	1-2
X	Viewing the Online User's Guide on Linux	1-2
	Chapter 2. Before You Begin	2-1
	IBM Point of Sale Subsystem Package Contents	2-1
X	System Requirements	2-1
X	Hardware Environment	2-1
X	Software Environment	2-8
	Software Environment	2-8
	Steps for Installation	2-9
	Chapter 3. Installing the IBM Point of Sale Subsystem for OS/2	3-1
	Local Area Network Installation	3-1
	Installation Procedure	3-1
	Backup Files	3-2
	Alphanumeric Point of Sale Keyboard Installation Considerations	3-3
	Changes to Your startup.cmd File	3-3
	Replacing Keyboard Device-Driver Files	3-4
	Updating the keyboard.dcp File	3-4
	IBM 7497 Point of Sale Attachment Adapter Installation Considerations	3-4
	Changes to Your config.sys File	3-5
	Touch-Screen Mouse Installation Considerations	3-5
	Changes to Your startup.cmd File	3-5
	Changes to Your config.sys File	3-5
	IBM Point of Sale Subsystem for OS/2 Directory Structure	3-6
	Chapter 4. Installing the IBM Point of Sale Subsystem for Windows V1.4.3 and Earlier	4-1

Local Area Network Installation.	4-1
Installation Procedure for Microsoft Windows 3.1	4-1
Installing Microsoft Win32s	4-1
Installing IBM Point of Sale Subsystem for Windows	4-2
Microsoft Windows 3.1 System File Changes	4-4
Alphanumeric Point of Sale Keyboard Installation Considerations	4-5
IBM 7497 Point of Sale Attachment Adapter Installation Considerations	4-5
Installation Procedure for Microsoft Windows 95	4-7
Installing IBM Point of Sale Subsystem for Windows	4-7
Microsoft Windows 95 System File Changes.	4-8
Microsoft Windows 95 System Changes	4-9
Alphanumeric Point of Sale Keyboard Installation Considerations	4-9
IBM 7497 Point of Sale Attachment Adapter Installation Considerations	4-9
Installation Procedure for Microsoft Windows 98	4-11
Installing IBM Point of Sale Subsystem for Windows	4-11
Microsoft Windows 98 System File Changes	4-12
Microsoft Windows 98 System Changes	4-13
Alphanumeric Point of Sale Keyboard Installation Considerations.	4-13
IBM 7497 Point of Sale Attachment Adapter Installation Considerations	4-14
Installation Procedure for Microsoft Windows NT.	4-15
Installing IBM Point of Sale Subsystem for Windows	4-15
Microsoft Windows NT System Changes.	4-16
Alphanumeric Point of Sale Keyboard Installation Considerations.	4-17
IBM 7497 Point of Sale Attachment Adapter Installation Considerations	4-17
Installation on Preloaded Systems	4-18
Installing From the System Drive	4-18
Creating Installation Diskettes.	4-18
Silent Installation	4-18
Installing IBM Point of Sale Subsystem for Windows in Silent Mode.	4-18
Uninstalling IBM Point of Sale Subsystem for Windows	4-19
Steps to Uninstall	4-19
IBM Point of Sale Subsystem for Windows Directory Structure	4-19
Chapter 5. Installing the IBM Point of Sale (POS) Suite	5-1
IBM POS Suite Package	5-1
POS Suite Files	5-2
Installation Restrictions and Requirements	5-2
Installing the IBM POS Suite for Microsoft Windows 98.	5-3
Installing the IBM POS Suite for Windows 98	5-3
Microsoft Windows 98 System File Changes.	5-4
Microsoft Windows 98 System Changes	5-5
Alphanumeric Point of Sale Keyboard Installation Considerations	5-5
IBM 7497 Point of Sale Attachment Adapter Installation Considerations	5-5
Installation Procedure for Microsoft Windows NT and Microsoft Windows 2000	5-7
Installing the IBM POS Suite on Microsoft Windows NT and Microsoft Windows 2000	5-7
Microsoft Windows NT and Microsoft Windows 2000 System Changes	5-8
Alphanumeric Point of Sale Keyboard Installation Considerations	5-9
IBM 7497 Point of Sale Attachment Adapter Installation Considerations	5-9
Uninstalling the IBM POS Suite	5-11
Chapter 6. Installing the IBM Point of Sale Subsystem for Windows V2.3.0 and Later	6-1
POS Subsystem Package	6-1
Installation Restrictions and Requirements	6-2
Installing the POS Subsystem for Microsoft Windows 98	6-2

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|
|
|
|

I	Installing the POS Subsystem for Windows 98	6-2
I	Microsoft Windows 98 System File Changes.	6-3
I	Microsoft Windows 98 System Changes	6-4
I	Alphanumeric Point of Sale Keyboard Installation Considerations	6-4
I	IBM 7497 Point of Sale Attachment Adapter Installation Considerations	6-4
I	Installation Procedure for Microsoft Windows NT and Microsoft Windows 2000	6-6
I	Installing the POS Subsystem on Microsoft Windows NT and Microsoft Windows 2000	6-6
I	Microsoft Windows NT and Microsoft Windows 2000 System Changes	6-7
I	Alphanumeric Point of Sale Keyboard Installation Considerations	6-8
I	IBM 7497 Point of Sale Attachment Adapter Installation Considerations	6-8
I	Uninstalling the POS Subsystem	6-9
X	Chapter 7. Installing the IBM Point of Sale Subsystem for Linux	7-1
X	IBM Point of Sale Subsystem for Linux.	7-1
X	RPM Installation	7-1
X	Tar File Installation	7-1
X	Alphanumeric Point of Sale Keyboard Installation	7-2
X	Applying the Keyboard Patch	7-2
X	Removing the Keyboard Patch.	7-2
X	IBM Point of Sale Subsystem for Linux Directory Structure	7-2
	Chapter 8. Point of Sale Keyboard Layouts	8-1
	Checkout Keyboards Layouts (50-key)	8-2
	50-Key Modifiable Layout Keyboard	8-2
	50-Key Modifiable Layout Keyboard and Operator Display.	8-2
	Retail Point of Sale Keyboard	8-2
	Retail Point of Sale Keyboard with Card Reader and Display.	8-3
	Point of Sale Keyboard VI	8-3
	Checkout Keyboards SIO/USB Scan- Code Set	8-3
	Modifiable Layout Keyboard with Card Reader Layout (133-Key)	8-6
	Modifiable Layout Keyboard with Card Reader SIO Scan-Code Set	8-7
	ANPOS Keyboard Layout	8-12
	PS/2 ANPOS Keyboard with Integrated Mouse	8-12
	ANPOS Keyboard SIO Scan-Code Set	8-12
	ANPOS Keyboard PS/2 Scan Codes	8-17
	Retail Alphanumeric Point of Sale Keyboard and PC Point of Sale Keyboard Layouts	8-21
	Retail Alphanumeric Point of Sale Keyboard with Card Reader Layout	8-21
	PC Point of Sale Keyboard (ANKPOS) Layout	8-22
	SIO Scan-Code Set for the Retail Alphanumeric Point of Sale Keyboard and the PC Point of Sale Keyboard (ANKPOS)	8-23
	PS/2 Scan-Code Set for the Retail Alphanumeric Point of Sale Keyboard and the PC Point of Sale Keyboard.	8-27
	Point of Sale Keyboard V Layout	8-32
	Keyboard-V Scan-Code Set	8-33
	PLU Keyboard and Display-III Layout	8-33
	4685 Point of Sale Keyboard Model K01 Layout	8-34
	4685 Keyboard Model K01 Scan-Code Set.	8-34
	4820 IBM SurePoint Solution Keypad Layout	8-35
	ANPOS Country Dependent Keyboards	8-37
	Canadian French Keyboard Layout.	8-37
	French Keyboard Layout	8-37
	German Keyboard Layout	8-38
	Italian Keyboard Layout	8-38
	Spanish Keyboard Layout	8-38

U.K. English Keyboard Layout	8-39
U.S. English Keyboard Layout	8-39
Retail Alphanumeric Point of Sale Country Dependent Keyboards	8-39
Brazil-Portuguese Keyboard Layout	8-40
Canadian French Keyboard Layout	8-40
Danish Keyboard Layout	8-41
French Keyboard Layout	8-41
German Keyboard Layout	8-42
Italian Keyboard Layout	8-42
Norwegian Keyboard Layout	8-43
Spanish Keyboard Layout	8-43
Swedish and Finnish Keyboard Layout	8-44
U.K. English Keyboard Layout	8-44
U.S. English Keyboard Layout	8-45

Chapter 9. Character Sets for Terminal Printers and Displays 9-1

Code Page 301	9-3
Code Page 437	9-7
Code Page 850	9-8
Code Page 852	9-9
Code Page 855	9-10
Code Page 857	9-11
Code Page 858	9-12
Code Page 860	9-13
Code Page 861	9-14
Code Page 862	9-15
Code Page 863	9-16
Code Page 864	9-17
Code Page 865	9-18
Code Page 866	9-19
Code Page 869	9-20
Code Page 897	9-21
Code Page 951	9-22
Code Page 1088	9-35

Chapter 10. Notices 10-1

Special Notice	10-1
Trademarks	10-2
Tell Us What You Think	10-3

Glossary A-1

Index X-1

Tables

5-1.	IBM POS Suite Files	5-2
8-1.	SIO/USB Scan Codes for All Checkout Keyboards	8-4
8-2.	SIO/USB Scan Codes for the Retail Point of Sale Keyboards	8-6
8-3.	SIO Scan Codes – Modifiable Layout Keyboard with Card Reader	8-7
8-4.	SIO Scan Codes – Modifiable Layout Keyboard with Card Reader.	8-11
8-5.	ANPOS SIO Scan Codes.	8-13
8-6.	ANPOS SIO Scan Codes.	8-17
8-7.	ANPOS Keyboard Scan-Code Set 1	8-17
8-8.	ANPOS Keyboard Scan-Code Set 1	8-20
8-9.	ANPOS Keyboard Scan-Code Set 1	8-21
8-10.	ANPOS Keyboard Scan-Code Set 1	8-21
8-11.	ANPOS Keyboard Scan-Code Set 1	8-21
8-12.	Scan Codes for the Retail Alphanumeric Point of Sale Keyboard with Card Reader and PC Point of Sale Keyboard	8-23
8-13.	Point of Sale Scan Codes – Retail Alphanumeric Point of Sale Keyboard with Card Reader	8-27
8-14.	Serial I/O Scan Codes– PC Point of Sale Keyboard (ANKPOS) Keyboard	8-27
8-15.	PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and PC Point of Sale Keyboard	8-27
8-16.	Key Switch 107	8-31
8-17.	PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and PC Point of Sale Keyboard	8-31
8-18.	PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and the PC Point of Sale Keyboard.	8-31
8-19.	PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and the PC Point of Sale Keyboard.	8-32
8-20.	PS/2 Scan-Code Set 1 – Retail Alphanumeric Point of Sale Keyboard with Card Reader and the PC Point of Sales Keyboard	8-32
8-21.	4820 IBM SurePoint Solution Keypad Scan Codes	8-35
8-22.	4820 Keyboard Scan Codes for Function Keys	8-36

created on July 23, 2001

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.

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

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

created on July 23, 2001

Chapter 1. Using the Online User's Guide

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

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

- X 1. Go to www.ibm.com/solutions/retail/store.
X 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 installation 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
- X • Chapter 5. Installing the IBM Point of Sale (POS) Suite
- X • Chapter 6. Installing the IBM Point of Sale Subsystem for Windows V2.3.0 and Later
- X • Chapter 7. Installing the IBM Point of Sale Subsystem for Linux

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

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

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 included with the IBM Point of Sale Subsystem for Linux is a PDF file. You will need
- X Adobe Acrobat Reader to view it.
- X

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.

X System Requirements

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

X Hardware Environment

- X The IBM Point of Sale Subsystem supports the following hardware:

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

- X • 4674 Point of Sale Terminal Models (Japan only):
 - X **OS/2 and Windows:** 4674-001, 4674-010, 4674-011
 - X **Windows only:** 4674-DS1
- X • 4683 Point of Sale Terminal Models:
 - X **OS/2 only:** 4683-002, 4683-A02, 4683-421
- X • 4684 Point of Sale Terminal Models:
 - X **OS/2 only:** 4684-300

X

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

X • Scales (except Microsoft Windows 3.1):

X **OS/2 and Windows:**

- X – 4687 Point of Sale Scanner Model 002
- X – 4696 Point of Sale Scanner Scale Model 001
- X – 4698 Point of Sale Scanner Model 002

X • Scanners:

X **OS/2 and Windows:**

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

X **OS/2 only:**

- X 4686 Point of Sale Scanner Models:
 - X 4686-001, 4686-002, 4686-003, 4686-004

X • Touch:

X **OS/2 and Windows:**

- X – 4695 Point Of Sale Distributed Touch Terminal Models:
 - X 4695-002, 4695-012, 4695-022, 4695-032, 4695-042
- 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 – SurePoint Monochrome Touch Screen (Feature Code 3950)
- X – SurePoint Color Touch Screen (Feature Code 3960)

X **Windows only:**

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

X • Miscellaneous:

X **OS/2 and Windows:**

- X Alarm (second cash drawer)
- X Feature E Card Devices (RS-232)

X **RS-485 Point of Sale Devices (Linux):**

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

created on July 23, 2001

- X – Cash Drawer I (P/N 6238669)
- X – Cash Drawer IV (P/N 09F3519)
- X – Cash Drawer V (Feature Code 3370)
- X – Compact Cash Drawer with Vertical Till (Feature Code 3368)
- X – Compact Cash Drawer with Horizontal Till (Feature Code 3378)
- X • Displays:
 - X – 40-Character Vacuum Fluorescent Display II (Feature Code 3501)
 - X – 40-Character Vacuum Fluorescent Display II - Japan (Feature Code 3506)
 - X – Two-Sided Vacuum Fluorescent Display II (Feature Code 3502)
 - X – Two-Sided Vacuum Fluorescent Display II - Japan (Feature Code 3507)
 - X – 40-Character Liquid Crystal Display (Feature Code 3503)
- X • Keyboards:
 - X – Retail Point of Sale Keyboard with Card Reader
- X • Magnetic Stripe Readers:
 - X – Three-Track Magnetic Stripe Reader (Feature Code 2905)
- X • Printers:
 - X – Model 3F Fiscal Printer
 - X – 4610 SureMark Point of Sale Printer Models:
 - X 4610-TI1, 4610-TI2, 4610-TI3, 4610-TI4, 4610-TF6, 4610-TM6
 - X – 4610 SureMark Point of Sale Fiscal Printers
- X • Scanners:
 - X – Hand-Held Bar Code Reader Model 1 (Feature Code 4500)
 - X – Hand-Held Bar Code Reader Model 2 (Feature Code 4501)
 - X – IBM 1520 Hand-Held Scanner Model A02
 - X – 4687 Point of Sale Scanner Models:
 - X 4687-001, 4687-002
 - X – 4696 Point of Sale Scanner Scale Model 001
 - X – 4697 Point of Sale Scanner Model 001
 - X – 4698 Point of Sale Scanner Models:
 - X 4698-001, 4698-002, 4698-201

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

- X • Cash Drawers:
 - X – Full-size Cash Drawer (Fixed Till)
 - X – Full-size Cash Drawer (Adjustable Till)
 - X – Compact Cash Drawer (Vertical Till)
 - X – Compact Cash Drawer (Horizontal Till)
- X • Displays:
 - X – USB 40 Character Vacuum Fluorescent Display
 - X – USB Two-Sided Vacuum Fluorescent Display
 - X – USB 40 Character Liquid Crystal Display
 - X – USB Character/Graphics Display
- X • Keyboards:
 - X – USB 50-Key Keyboard
 - X – USB 50-Key Keyboard with Magnetic Stripe Reader
 - X – USB 50-Key Keyboard with Magnetic Stripe Reader and Liquid Crystal Display
 - X – USB Alphanumeric Point of Sale Keyboard
 - X – USB 133-Key Keyboard with Magnetic Stripe Reader
 - X – USB 4820 SurePoint Solution 32-Key Keypad
- X • Magnetic Stripe Readers:
 - X – USB 4820 SurePoint Solution Magnetic Stripe Reader

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

X **Software Environment**

- X The IBM Point of Sale Subsystem requires the following:
- X • OS/2 Version 2.1 or later
- X • Microsoft Windows Version 3.1 with Win32s Version 1.25A
- X • Microsoft Windows 95
- X • Microsoft Windows 98
- X • Microsoft Windows NT Version 3.51 or later
- X • Microsoft Windows 2000
- X • Red Hat Linux Version 7.1 (2.4 Kernel)

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

X **OS/2**

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

X **Windows**

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

X **Linux**

- X 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

Steps for Installation

- X You should proceed as follows:
- X 1. Install the IBM Point of Sale Subsystem package. See one of the following for:
- X • OS/2, see Chapter 3. Installing the IBM Point of Sale Subsystem for OS/2
- X • Windows V1.4.3 and earlier, see Chapter 4. Installing the IBM Point of Sale
- X Subsystem for Windows V1.4.3 and Earlier
- X • 32-bit Windows (POSS for Windows, OPOS, and JavaPOS for Windows),
- X see Chapter 5. Installing the IBM Point of Sale (POS) Suite
- X • Windows V2.3.0 or later, see Chapter 6. Installing the IBM Point of Sale
- X Subsystem for Windows V2.3.0 and Later
- X • Linux, see Chapter 7. Installing the IBM Point of Sale Subsystem for Linux
- X 2. Customize the IBM Point of Sale Subsystem for the point-of-sale applications
- X that you are developing or running. See *“Customizing the IBM Point of Sale*
- X *Subsystem”* in the *IBM Point of Sale Subsystem Programming Reference and*
- X *User’s Guide* for information.
- X 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.

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 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\AIPOINT.EXE
```

The AIPOINT.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\AIPOINT.SYS
```

immediately preceding the line that reads:

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

2. Modify the MOUSE.SYS line to read:

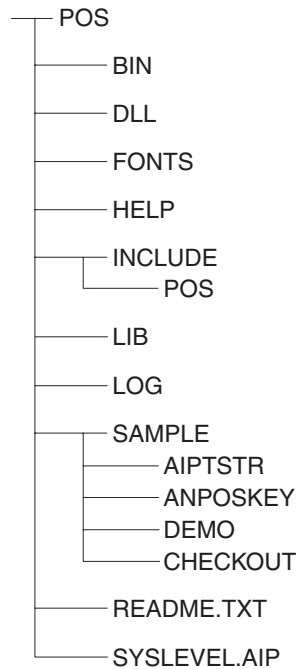
```
DEVICE=C:\OS2\BOOT\MOUSE.SYS STYPE=AIPPOINT
```

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

Installing the IBM Point of Sale Subsystem for OS/2

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.

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\SETUP** 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 3.1x 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.

Installing the IBM Point of Sale Subsystem for Windows

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 DelsLx.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 DelsLx.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 DelsLx.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 a 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 **POSSWxxx** 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:\POSSWxxx\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 of IBM Point of Sale Subsystem for Windows does not support uninstall.
3. Reboot your system—some files cannot be removed until a reboot occurs.

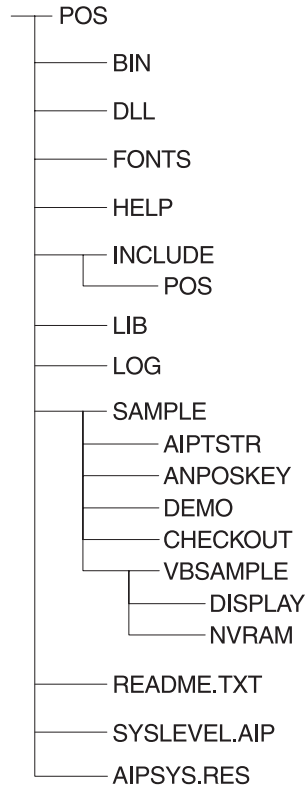
To uninstall IBM Point of Sale Subsystem for Windows under Microsoft Windows NT 4.0, Microsoft Windows 95 or Microsoft Windows 98:

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

Installing 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.

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 NT or 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.

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 **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/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" 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.

|

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

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

X

X IBM Point of Sale Subsystem for Linux

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

X **ibmposs-linux-X.X.X-X.i386.rpm**

X Red Hat Package Management (RPM) file

X **ibmposs-linux-X.X.X-X.i386.tgz**

X gzip'd tar file

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

X

X RPM Installation

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

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

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

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

X `rpm -e ibmposs-linux`

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

X

X Tar File Installation

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

X 1. Unpack the tar file using the command:

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

X 2. Run the install script:

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

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

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

X `install-ibmposs.sh uninstall`

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

X Alphanumeric Point of Sale Keyboard Installation

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

X Applying the Keyboard Patch

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

X For example, `cd /usr/src/linux`

X 2. Apply the patch using the patch utility.

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

X **Notes:**

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

X b. The patch utility modifies your kernel source. If you would like to save the
 X original source file(s), there are options for the patch utility such as **-b** that
 X will make backup copies of the original source for you. Type **man patch** or
 X **info patch** for additional information on using the patch utility.

X 3. Configure the kernel using **make config** or **make xconfig** (GUI). You should
 X enable (set to 'y'):

```
X     "Character Devices" ->
X         "Keyboards" ->
X             "PS/2 Keyboard Filter Support"
```

X 4. Save your configuration and rebuild the kernel.

X Removing the Keyboard Patch

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

X For example, `cd /usr/src/linux`

X • Apply the patch using the patch utility.

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

X **Notes:**

X 1. /usr/share/pos is the default location for the patch file. The path will be
 X different if you installed IBM Point of Sale Subsystem for Linux somewhere
 X other than the default location.

X 2. If you kept backup copies of the original kernel source, you can switch back
 X to your original source file(s) rather than using the **-R** option of the **patch**
 X command.

X • Configure the kernel using **make config** or **make xconfig** (GUI).

X • Save your configuration and rebuild the kernel.

X IBM Point of Sale Subsystem for Linux Directory Structure

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

created on July 23, 2001

X	/etc	Configuration files used with the IBM Point of Sale Subsystem for Linux.
X		
X	/etc/rc.d/init.d	aiptest - , the start-up shell script for the IBM Point of Sale Subsystem for Linux.
X		
X	/usr/bin **	Executable files used with the IBM Point of Sale Subsystem for Linux.
X		
X	usr/include/pos **	IBM Point of Sale Subsystem for Linux header files.
X		
X	//usr/lib **	Shared libraries used by the IBM Point of Sale Subsystem for Linux.
X		
X	/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.
X		
X	/usr/share/pos/fonts **	Font files used by the IBM Point of Sale Subsystem for Linux.
X		
X	/usr/doc/pos **	Documentation and README files for the IBM Point of Sale Subsystem for Linux.
X		
X	/usr/doc/pos/sample/checkout **	Sample source code for the IBM Point of Sale Subsystem for Linux.
X		
X	/var/log	Log files created by the IBM Point of Sale Subsystem for Linux.
X		
X	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.
X		

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.

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.

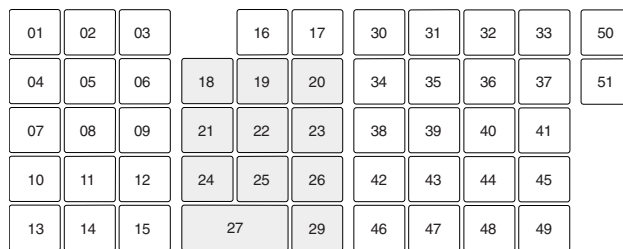


Figure 8-1. 50-Key Modifiable Layout Keyboard

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.

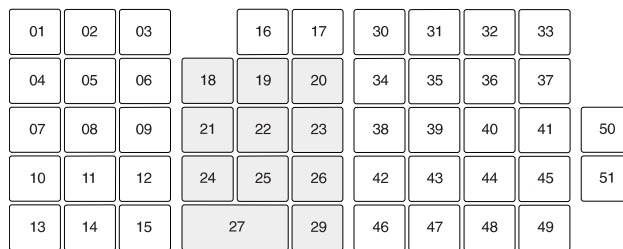


Figure 8-2. 50-Key Modifiable Layout Keyboard and Operator Display

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.

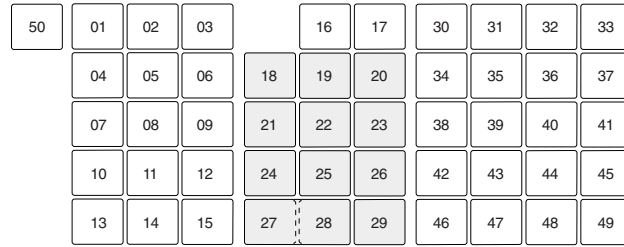


Figure 8-3. Retail Point of Sale Keyboard

Retail Point of Sale Keyboard with Card Reader and Display

Figure 8-4 The 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.

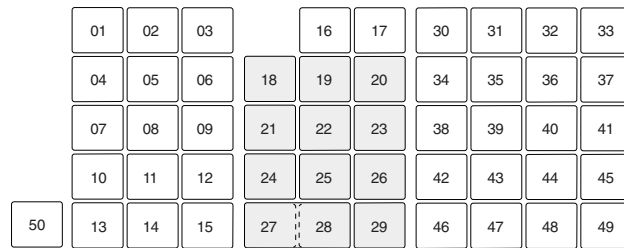


Figure 8-4. Retail Point of Sale Keyboard

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.

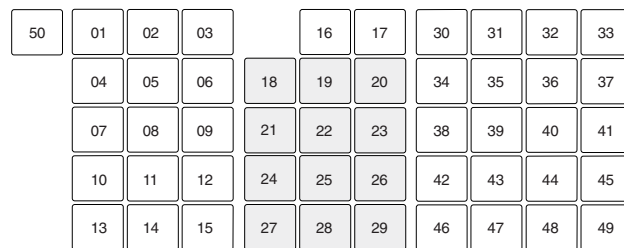


Figure 8-5. Point of Sale Keyboard VI

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.

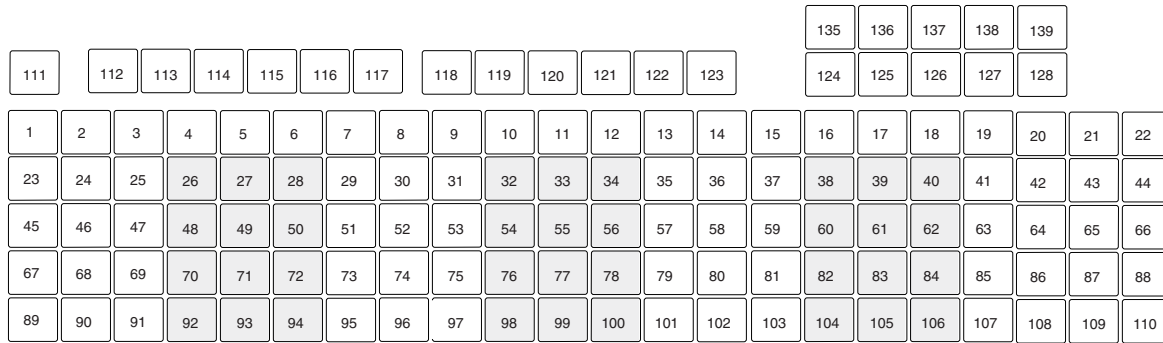


Figure 8-6. Modifiable Layout Keyboard with Card Reader

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 Type¹	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

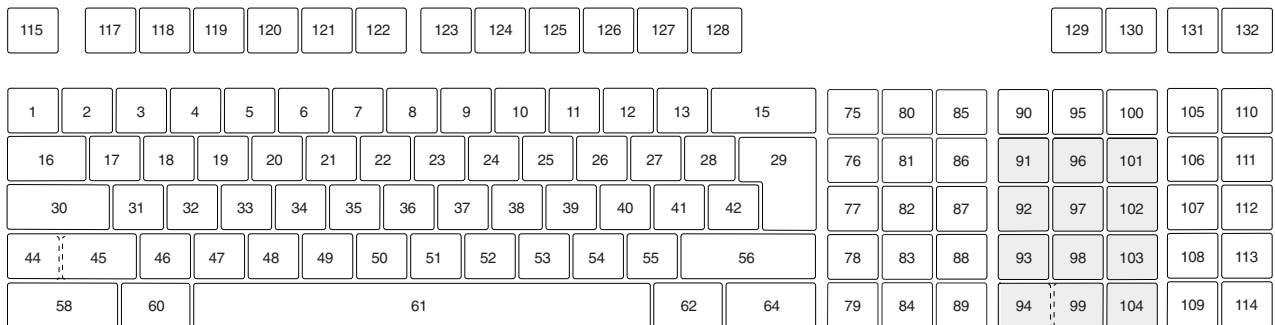
KeySwitch Number	Key Type	Ctrl + Scan Code (Hex)
124	S2	01
135	S1	00

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.

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 `0x85` for key switch 127 and scan code `0x86` for key switch 128.

³ Key switch 100 returns make scan code `0x65` and break scan code `0xE5` 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 `0x66` and break scan code `0xE6` 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.

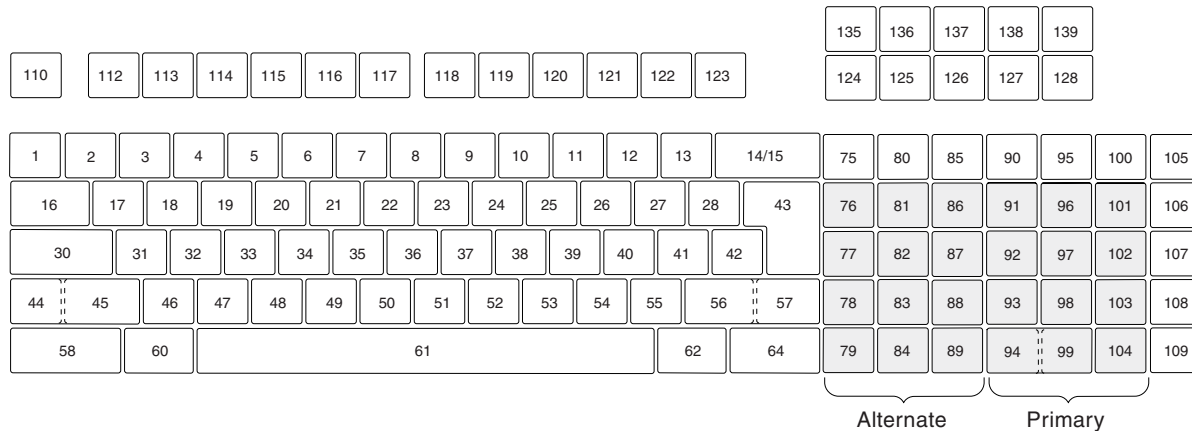


Figure 8-7. Layout and Assigned Switch Numbers

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.

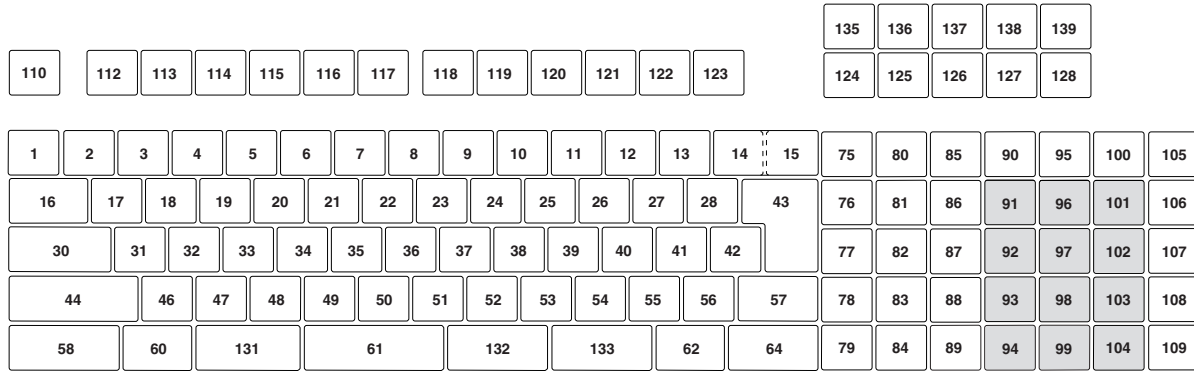


Figure 8-8. PC Point of Sale Keyboard Layout

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 Type¹	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

Point of Sale Keyboard and PC Point of Sale Keyboard Layouts*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 Type¹	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.

Point of Sale Keyboard and PC Point of Sale Keyboard Layouts

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

Point of Sale Keyboard and PC Point of Sale Keyboard Layouts*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 0x85 for key switch 122 and scan code 0x86 for key switch 123.

X ³ Key switch 100 returns make scan code 0x65 and break scan code 0xE5 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 ⁵On Microsoft Windows NT, Microsoft Windows 98 SE, and Microsoft Windows 2000, only WM_KEYDOWN will be sent.

⁶See Table 8-16 on page 8-31.

Point of Sale Keyboard and PC Point of Sale Keyboard Layouts

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.

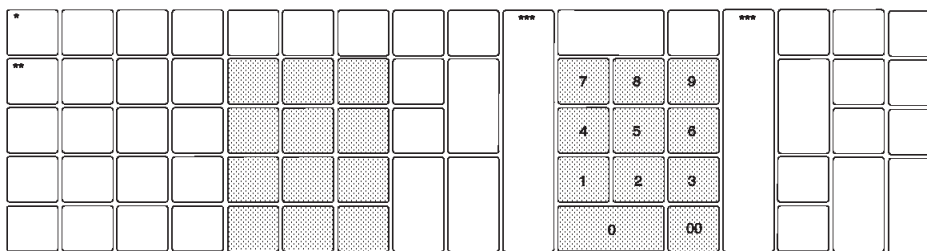


Figure 8-9. Point of Sale Keyboard V Layout

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 1x5 dummy cap covers those key switches.

- 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:

- ' () ' indicates that these scan codes can be generated when the layout is changed.
- ' { } ' indicates these scan codes will be generated only when the key lock is in the "system" position.
- 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:

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

- 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.

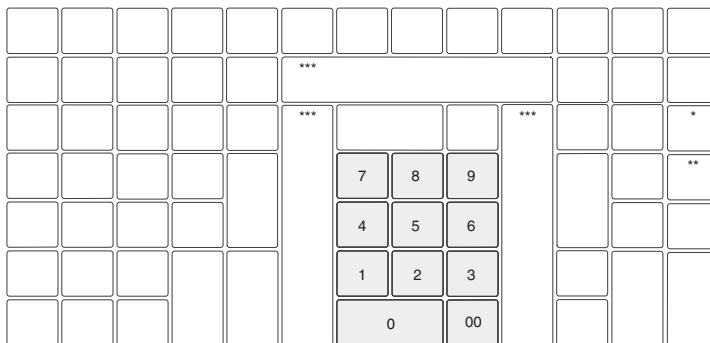


Figure 8-12. 4685 Point of Sale Keyboard Model K01 Layout

Notes:

- The single asterisk (*) in the middle right-hand portion of the keyboard indicates the S1 key.
- The double asterisk (**) in the middle right-hand portion of the keyboard indicates the S2 key.
- The triple asterisk (***) indicates that a 1x5 dummy cap covers those key switches.
- 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.

6B	6A	69	68	67	66	65	64	63	62	6F	6E	6D
5B	5A	59	58	57	*** 56	55	54	53	52	5F	5E	5D
4B	4A	49	48	47	*** 46	45	44	43	*** 42	4F	4E	* 4D (00)
3B	3A	39	38	37	36	35	34	33	32	3F	3E	** 3D (01)
2B	2A	29	28	27	26	25	24	23	22	2F	2E	2D
1B	1A	19	18	17	16	15	14	13	12	1F	1E	1D
0B	0A	09	08	07	06	05	04	03	02	0F	0E	0D

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

Notes:

- “()” indicates these scan codes will be generated only when the key lock is in the “system” position.
- 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.

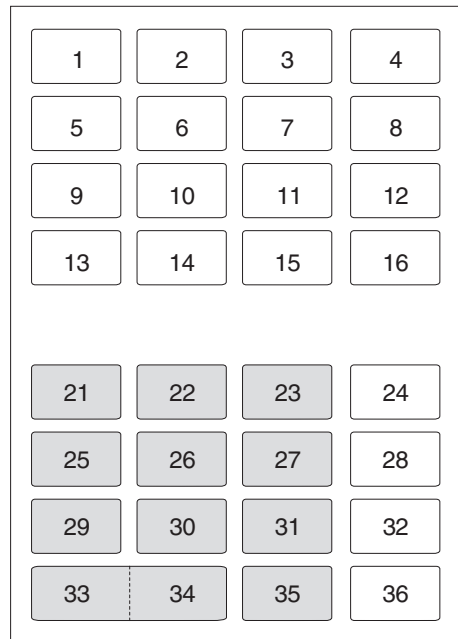


Figure 8-14. 4820 Keypad Key-Switch Layout

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

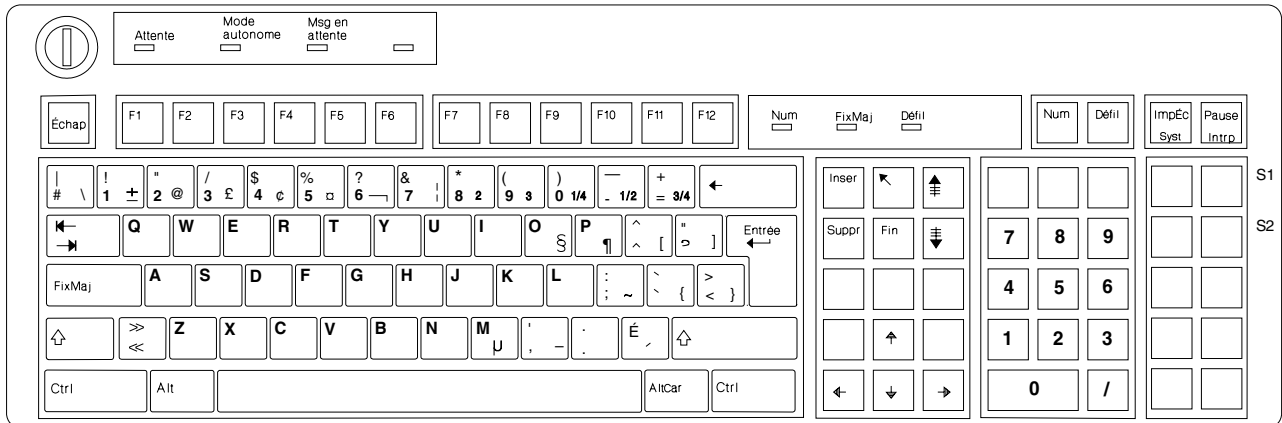
sent. The mnemonics S1 and S2 are on the keyboard cover above the two keys. The primary functions of these two keys are re-legendable.

- T Typematic keys (when typematic mode is selected via the CONFIGURE command). All keys default to non-typematic at power-up.

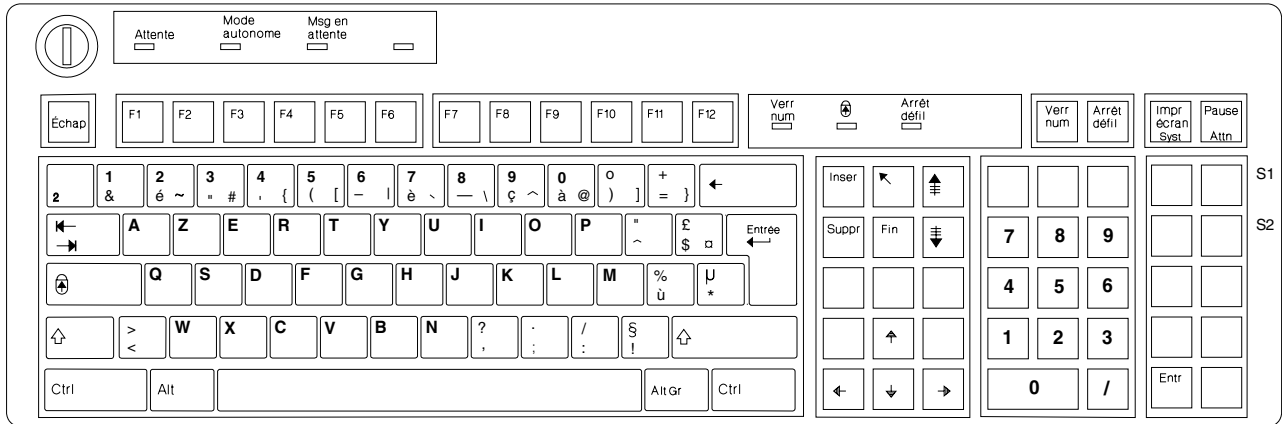
ANPOS Country Dependent Keyboards

The following pages illustrate the keyboards for all the supported ANPOS keyboards.

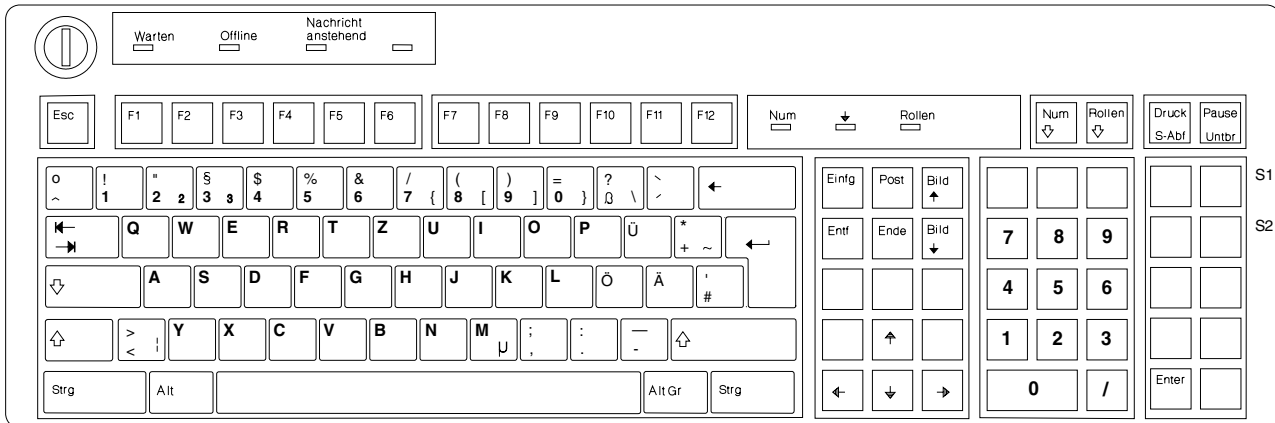
Canadian French Keyboard Layout



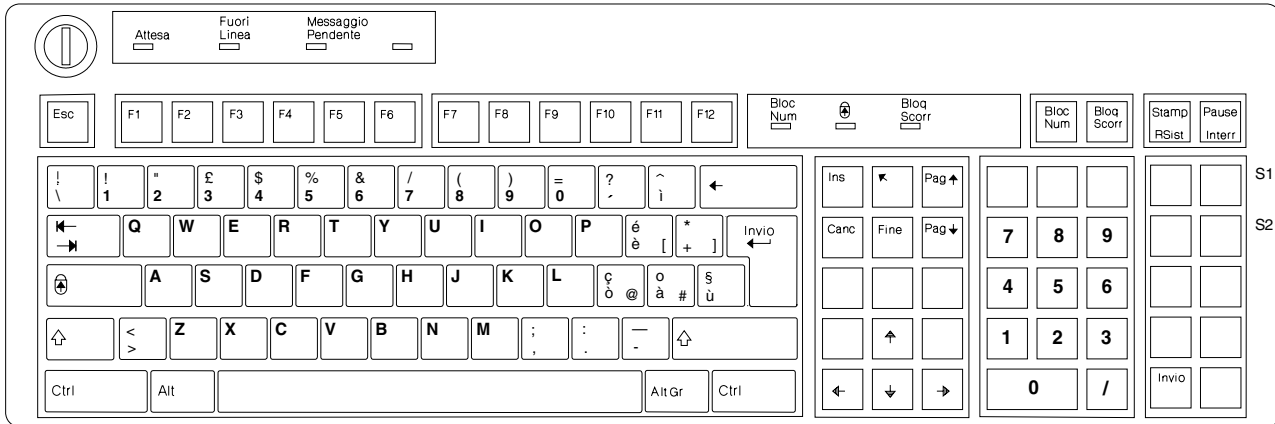
French Keyboard Layout



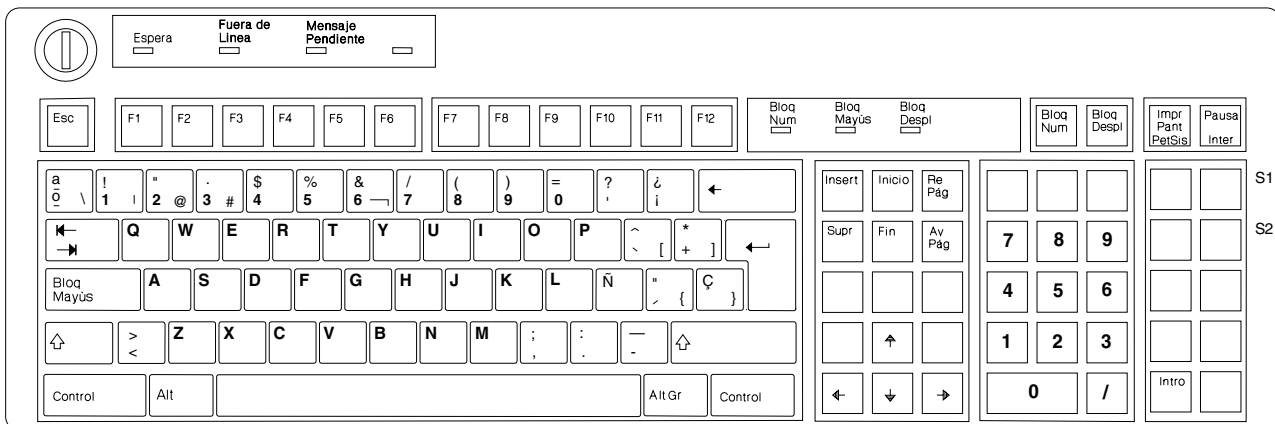
German Keyboard Layout



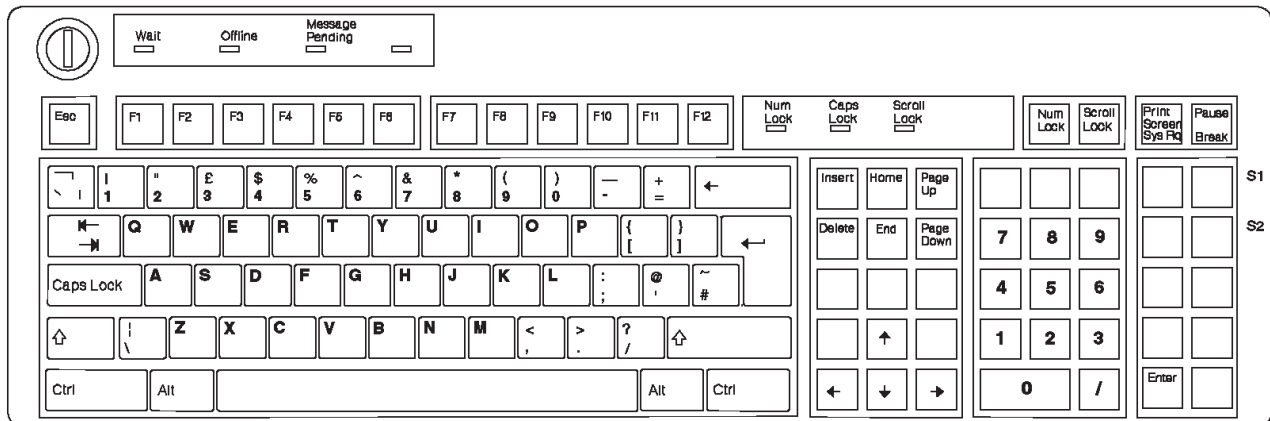
Italian Keyboard Layout



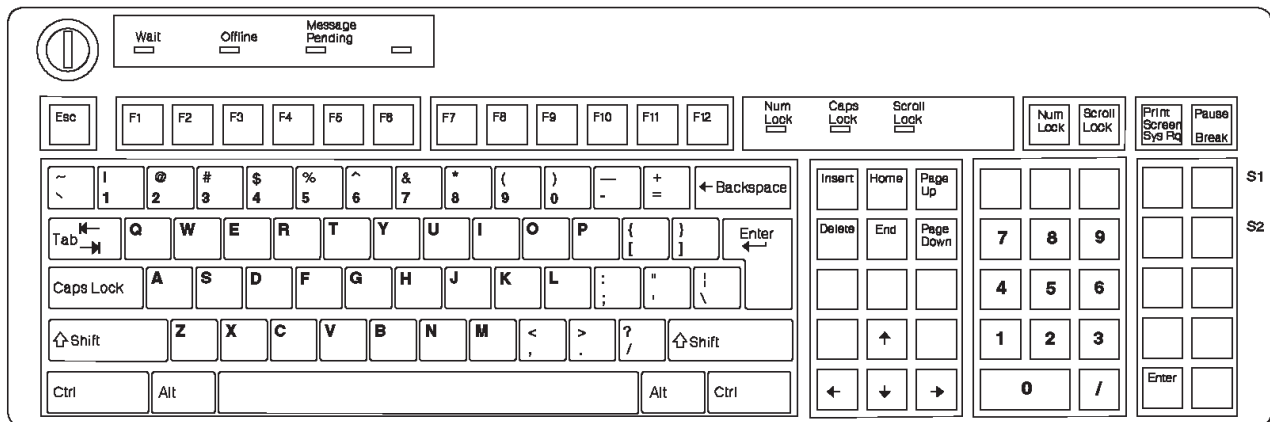
Spanish Keyboard Layout



U.K. English Keyboard Layout



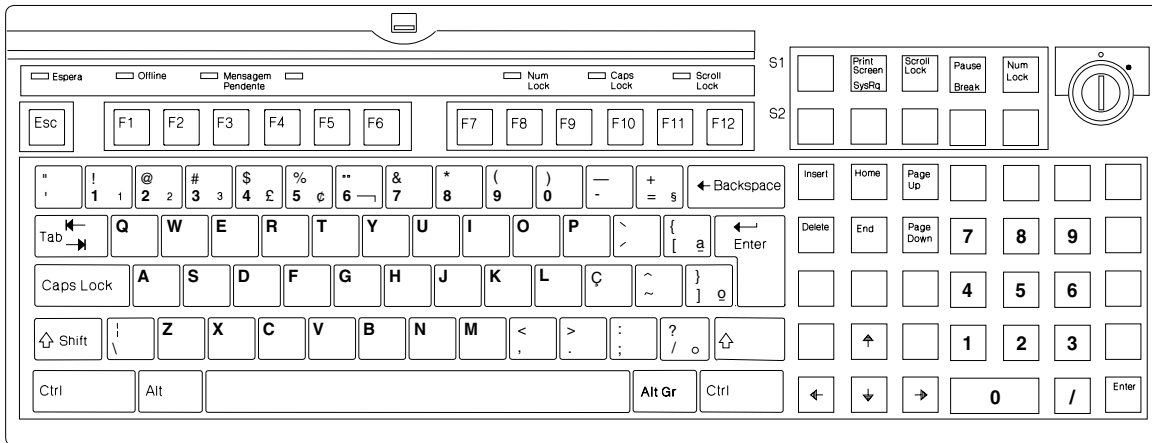
U.S. English Keyboard Layout



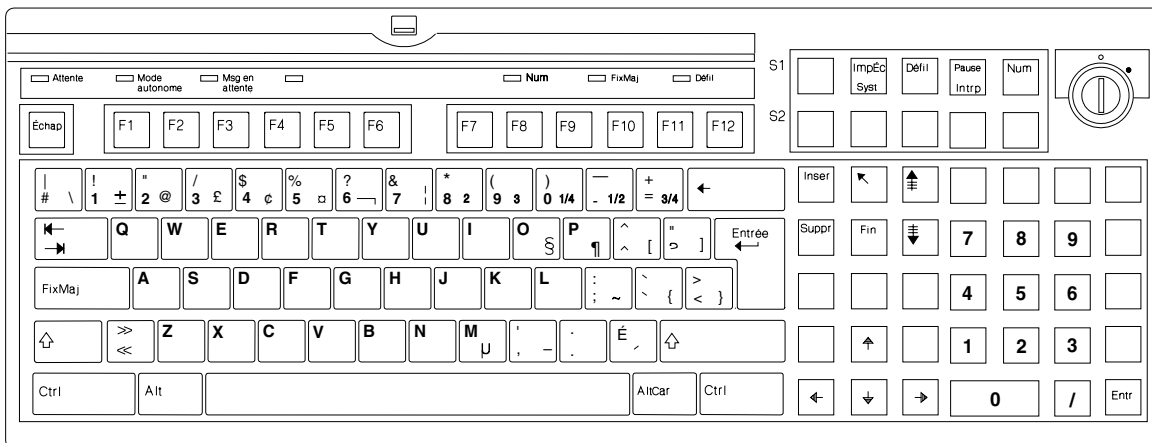
Retail Alphanumeric Point of Sale Country Dependent Keyboards

The following pages illustrate the keyboards for all the supported Retail Alphanumeric Point of Sale Keyboards.

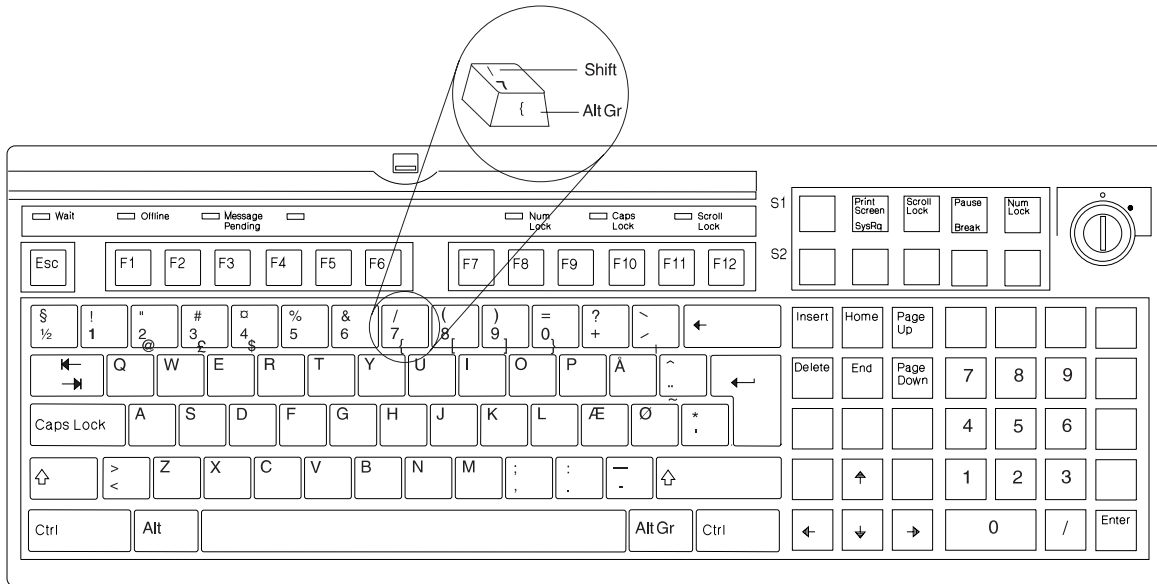
Brazil-Portuguese Keyboard Layout



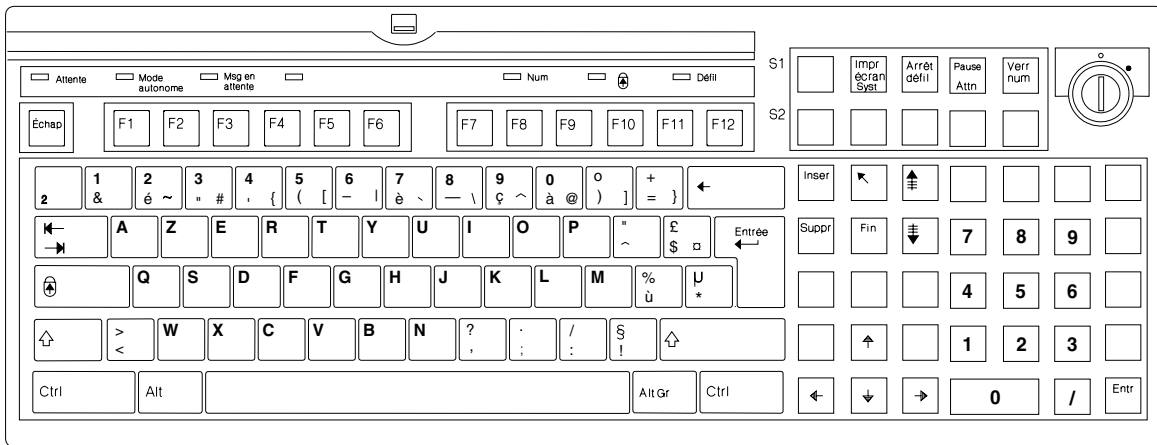
Canadian French Keyboard Layout



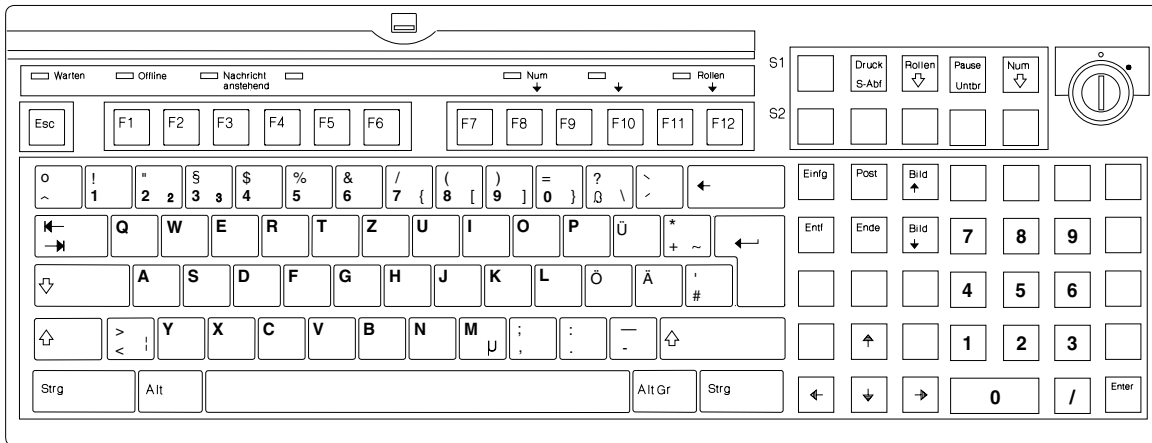
Danish Keyboard Layout



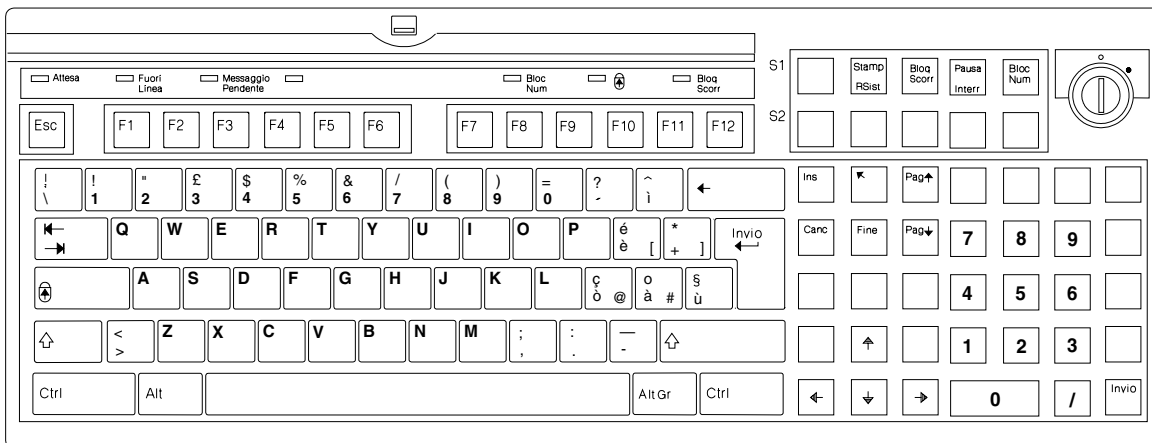
French Keyboard Layout



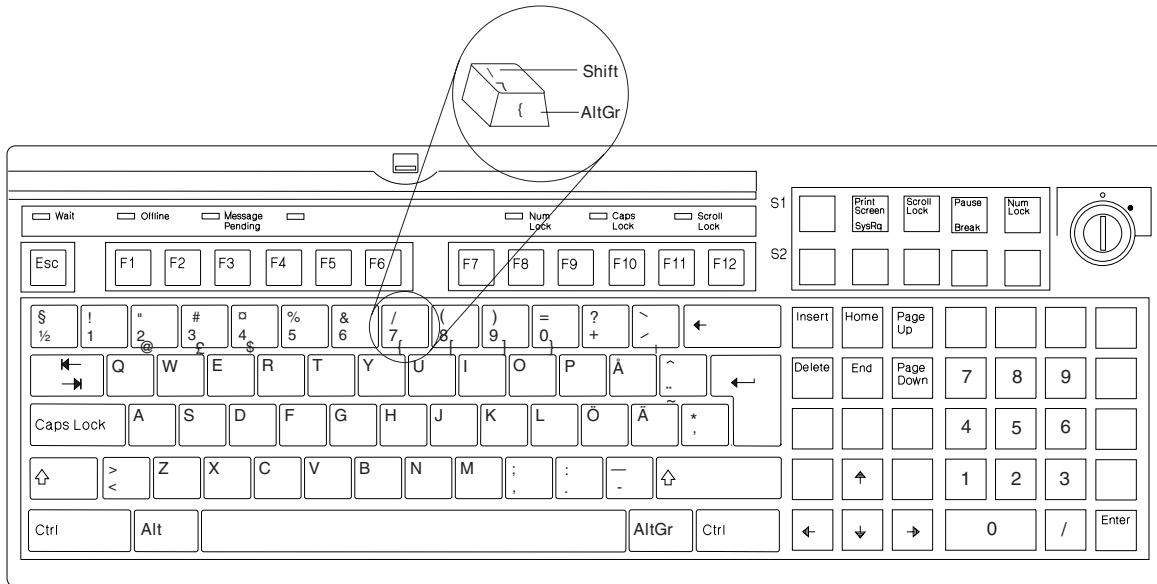
German Keyboard Layout



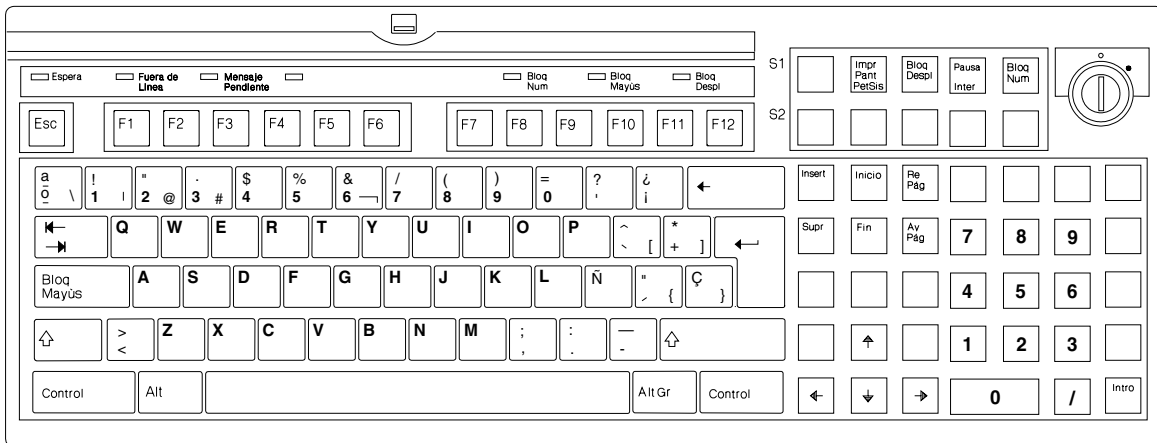
Italian Keyboard Layout



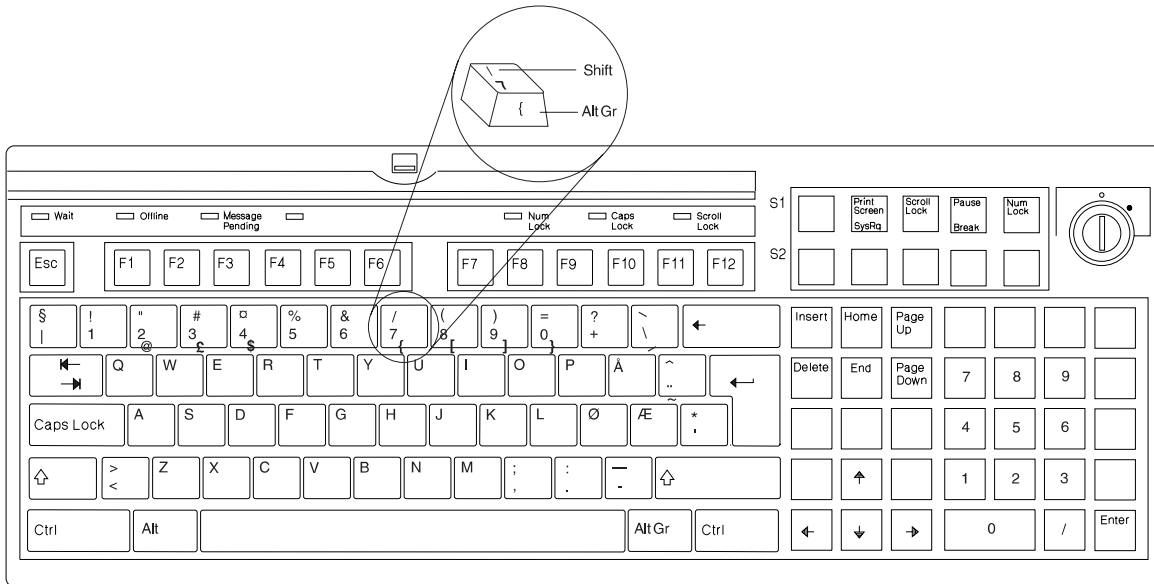
Norwegian Keyboard Layout



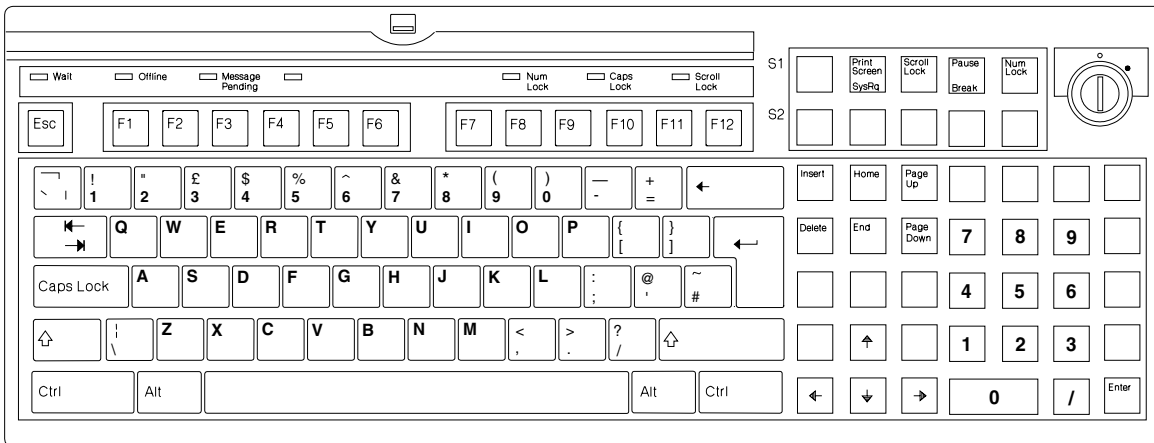
Spanish Keyboard Layout



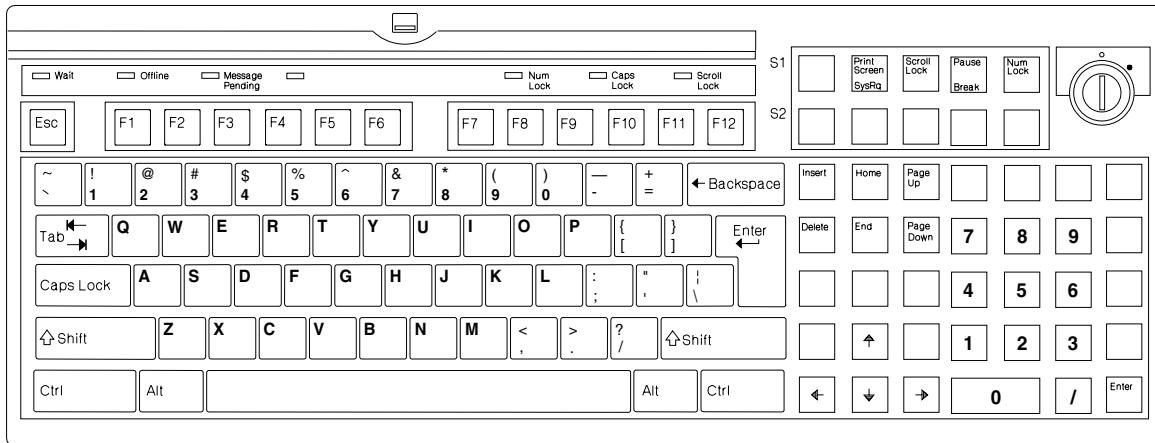
Swedish and Finnish Keyboard Layout



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

- 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

8140	8141	8142	8143	8144	8145	8146	8147	8148	8149	814A	814B	814D	814F	8150	8151
	、	。	，	。	・	：	：	？	！	”	°	˘	^	—	—
815B	815E	8162	8169	816A	816D	816E	816F	8170	8175	8176	817B	817C	8181	8183	8184
—	/		()	[]	()	「	」	+	-	=	<	>
818C	818D	818F	8190	8193	8194	8195	8196	8197	824F	8250	8251	8252	8253	8254	8255
'	"	¥	\$	%	#	&	*	@	0	1	2	3	4	5	6
8256	8257	8258	8260	8261	8262	8263	8264	8265	8266	8267	8268	8269	826A	826B	826C
7	8	9	A	B	C	D	E	F	G	H	I	J	K	L	M
826D	826E	826F	8270	8271	8272	8273	8274	8275	8276	8277	8278	8279	8281	8282	8283
N	O	P	Q	R	S	T	U	V	W	X	Y	Z	a	b	c
8284	8285	8286	8287	8288	8289	828A	828B	828C	828D	828E	828F	8290	8291	8292	8293
d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s
8294	8295	8296	8297	8298	8299	829A	8340	8341	8342	8343	8344	8345	8346	8347	8348
t	u	v	w	x	y	z	ア	アイ	イ	ウ	ウ	イ	イ	オ	
8349	834A	834B	834C	834D	834E	834F	8350	8351	8352	8353	8354	8355	8356	8357	8358
オ	カ	ガ	キ	キ	ク	ク	ケ	ケ	コ	コ	サ	サ	シ	シ	ス
8359	835A	835B	835C	835D	835E	835F	8360	8361	8362	8363	8364	8365	8366	8367	8368
ズ	セ	ゼ	ソ	ソ	タ	タ	チ	チ	ツ	ツ	ツ	テ	テ	ト	ド
8369	836A	836B	836C	836D	836E	836F	8370	8371	8372	8373	8374	8375	8376	8377	8378
ナ	ニ	ヌ	ネ	ノ	ハ	ハ	パ	ピ	ピ	フ	フ	テ	テ	ヘ	ベ
8379	837A	837B	837C	837D	837E	8380	8381	8382	8383	8384	8385	8386	8387	8388	8389
ヤ	ホ	ホ	ホ	マ	ミ	ム	メ	モ	ヤ	ヤ	ユ	ユ	ヨ	ヨ	ラ
838A	838B	838C	838D	838F	8392	8393									
リ	ル	レ	ロ	ワ	ヲ	ン									

Figure 9-1. Alphanumeric Katakana

829F	82A0	82A1	82A2	82A3	82A4	82A5	82A6	82A7	82A8	82A9	82AA	82AB	82AC	82AD	82AE
あ	あい	いう	え	お	か	が	き	ぎ	く	ぐ					
82AF	82B0	82B1	82B2	82B3	82B4	82B5	82B6	82B7	82B8	82B9	82BA	82BB	82BC	82BD	82BE
け	げ	こ	ご	さ	ざ	し	じ	す	ず	せ	ぜ	そ	ぞ	た	だ
82BF	82C0	82C1	82C2	82C3	82C4	82C5	82C6	82C7	82C8	82C9	82CA	82CB	82CC	82CD	82CE
ち	ぢ	っ	つ	づ	て	で	と	ど	な	に	ぬ	ね	の	は	ば
82CF	82D0	82D1	82D2	82D3	82D4	82D5	82D6	82D7	82D8	82D9	82DA	82DB	82DC	82DD	82DE
ぱ	ひ	び	び	ふ	ぶ	ぷ	へ	べ	ぺ	ほ	ぼ	ぼ	ま	み	む
82DF	82E0	82E1	82E2	82E3	82E4	82E5	82E6	82E7	82E8	82E9	82EA	82EB	82EC	82ED	82EE
め	も	ゃ	や	ゅ	ゆ	よ	よ	ら	り	る	れ	ろ	わ	わ	ぬ
82EF	82F0	82F1	88B3	88B5	88B6	88C0	88C3	88C4	88C8	88CB	88CD	88D5	88D9	88DA	88DF
を	を	ん	圧	扱	宛	安	暗	案	以	依	囲	易	異	移	衣
88E1	88E3	88EA	88EB	88F3	88F5	88F6	88F8	88F9	8945	894A	895E	895F	8963	8966	8968
達	医	一	杏	印	負	因	引	飲	右	雨	運	雲	營	映	榮
8969	8974	8976	897A	897E	899B	899D	899E	899F	89A1	89A4	89B3	89B5	89B9	89BA	89BB
永	液	益	越	円	央	往	応	押	横	王	乙	卸	音	下	化
89BC	89BD	89BF	89C1	89C2	89C4	89C6	89C8	89CA	89CD	89CE	89D4	89D7	89D9	89DB	89DF
仮	何	価	加	可	夏	家	科	果	河	火	花	荷	蕪	課	過
89E6	89EE	89EF	89F0	89F1	89F4	89FC	8A43	8A45	8A4A	8A4B	8A4F	8A51	8A65	8A67	8A69
画	介	会	解	回	廻	改	海	界	開	階	外	害	各	括	格
8A6D	8A70	8A72	8A76	8A7A	8A7C	8A84	8A87	8A94	8AA3	8AAE	8AB7	8ABF	8AC7	8AC8	8AD4
確	角	較	革	額	掛	割	括	株	乾	完	換	漢	管	簡	間
8AD6	8ADF	8AE9	8AED	8AEE	8AFA	8AFC	8B40	8B41	8B43	8B47	8B4C	8B4D	8B5A	8B71	8B78
関	玩	企	器	基	期	棄	機	帰	気	季	記	貴	技	客	休
8B81	8B8B	8B8C	8B8D	8B8E	8B8F	8B90	8B96	8B9B	8B9E	8B9F	8BA4	8BA6	8BAD	8BC6	8BC7
求	給	旧	牛	去	居	巨	許	魚	京	供	共	協	強	業	局
8BCE	8BCF	8BD6	8BD8	8BE0	8BE2	8BE3	8BE6	8BEF	8BF3	8C4A	8C50	8C51	8C53	8C57	8C58
勤	均	禁	筋	金	銀	九	区	具	空	繰	訓	群	郡	係	傾
8C5F	8C60	8C67	8C69	8C6F	8C70	8C76	8C79	8C85	8C87	8C88	8C8B	8C8E	8C8F	8C93	8C94
契	形	携	景	經	繼	計	輕	桁	欠	決	結	月	件	兼	券
8C9F	8CA0	8CA2	8CA3	8CA7	8CAF	8CB3	8CB4	8CB8	8CBB	8CBE	8CC0	8CC2	8CC3	8CC4	8CC5
横	推	犬	献	具	険	元	原	減	現	言	限	個	古	呼	固

Figure 9-2. Kanji (1 of 3)

8CC9	8CDA	8CDC	8CDF	8CE0	8CE3	8CE4	8CEB	8CF0	8CF5	8CF6	8CF8	8CFA	8CFB	8CFC	8D46
庫	顧	五	午	吳	後	御	誤	交	光	公	幼	厚	口	向	考
8D48	8D4C	8D54	8D58	8D62	8D72	8D73	8D76	8D80	8D82	8D86	8D87	8D8F	8D90	8D95	8D9E
工	広	控	更	甲	荒	行	頁	項	高	号	合	刻	告	黒	込
8DA1	8DB6	8DB7	8DB8	8DC0	8DC2	8DC3	8DC4	8DC5	8DCB	8DCC	8DCE	8DCF	8DD5	8DD7	8DD8
今	左	差	査	座	債	催	再	最	才	探	歳	濟	祭	細	菜
8DDC	8DDD	8DDE	8DE3	8DEC	8DED	8DF0	8E44	8E47	8E4F	8E51	8E52	8E59	8E5A	8E63	8E64
荆	在	材	阪	作	削	昨	札	雜	三	孝	山	産	算	殘	仕
8E67	8E6C	8E6D	8E6E	8E71	8E73	8E75	8E76	8E77	8E78	8E7D	8E7E	8E80	8E81	8E84	8E85
使	四	士	始	子	市	志	思	指	支	枝	止	死	氏	私	糸
8E86	8E8E	8E8F	8E91	8E96	8E97	8E9A	8E9D	8E9E	8E9F	8EA1	8EA6	8EA8	8EA9	8EAE	8EB5
糺	試	誌	資	事	似	字	持	時	次	治	示	耳	自	式	七
8EB8	8EBA	8EBF	8EC0	8ECA	8ECC	8ED0	8ED2	8ED4	8ED8	8EE6	8EE8	8EED	8EF0	8EF1	8EF3
失	室	質	実	写	捨	社	者	車	借	取	手	種	酒	首	受
8EFB	8EFC	8F48	8F49	8F4B	8F54	8F57	8F5A	8F5B	8F5C	8F5D	8F63	8F64	8F68	8F6A	8F6F
収	周	秋	終	習	週	集	住	充	十	從	織	重	宿	祝	出
8F74	8F7B	8F80	8F83	8F87	8F88	8F89	8F8A	8F91	8F94	8F97	8F9C	8FA4	8FAC	8FAD	8FB3
春	旬	準	純	順	処	初	所	書	諸	女	除	商	小	少	承
8FB5	8FBA	8FC1	8FC6	8FCC	8FCF	8FD8	8FE1	8FE3	8FEA	8FED	8FEE	8FFC	9046	9048	904D
招	昭	消	照	称	粧	証	障	上	場	常	情	飾	色	食	信
9051	9055	9056	9058	905B	905C	905E	905F	9060	9061	9065	9066	9069	906A	906C	907D
寝	振	新	森	深	申	真	神	奈	紳	親	診	進	針	人	凶
9085	9094	90A7	90AC	90AE	90B0	90B3	90B4	90B6	90B7	90B8	90BB	90BF	90C2	90C5	90CD
水	数	制	成	整	晴	正	清	生	盛	精	製	請	青	税	析
90CE	90CF	90D0	90D1	90D3	90D4	90D8	90DD	90DF	90E0	90E1	90E6	90E7	90E8	90E9	90EA
石	積	籍	績	賣	赤	切	設	節	説	雪	先	千	占	宣	専
90EC	90F4	9149	914B	914E	914F	9153	9162	9165	916E	9177	917D	9180	918A	918D	9195
川	洗	選	錢	鮮	前	全	礎	粗	創	層	挿	操	相	繰	装
9196	9197	919D	91A1	91A3	91A6	91AB	91AE	91B1	91B9	91BA	91BC	91BD	91BE	91C5	91CC
走	送	増	贈	促	即	足	属	統	損	村	他	多	太	打	体
91CE	91D6	91DD	91DE	91E3	91E4	91E5	91EE	91F0	9242	9249	9250	9253	926A	926B	926C
对	替	貸	退	代	台	大	宅	扱	達	捌	単	担	男	談	値

Figure 9-3. Kanji (2 of 3)

926D	926E	9285	9286	928D	929A	92A0	92A3	92AC	92B2	92BC	92C0	92C2	92C7	92CA	92DE
知	地	着	中	注	丁	帳	張	町	調	直	賃	陳	追	通	釣
92E1	92E2	92E8	92F1	92F9	9350	9358	935D	935F	9360	9363	9364	936E	936F	9373	9378
低	停	定	提	訂	撤	店	転	点	伝	田	電	渡	登	都	度
9379	937E	9380	9387	938C	9394	9396	9399	939A	939E	93A2	93AA	93AE	93AF	93B9	93BA
土	忽	凍	島	東	灯	当	等	答	到	討	頭	勤	同	道	銅
93BE	93C1	93C2	93C6	93C7	93CD	93DC	93E0	93EC	93F1	93F3	93F7	93FA	93FB	93FC	9443
得	特	督	独	読	届	疊	内	南	二	式	肉	日	乳	入	在
9446	944E	945B	945C	9467	946E	9470	947A	947B	9483	9484	9491	9492	94A0	94AA	94AD
認	年	納	能	波	馬	鹿	配	倍	買	売	泊	白	箱	入	発
94BB	94BC	94BD	94CA	94CC	94D4	94E4	94EF	94F1	94F5	9553	9557	9558	9559	955B	955C
判	半	反	般	販	番	比	費	非	備	百	標	氷	漂	票	表
9562	9569	9572	9573	9574	9576	9577	957B	9583	958A	9594	959E	95A5	95A8	95AA	95B6
秒	品	瓶	不	付	夫	婦	府	父	賦	部	服	払	物	分	文
95B8	95B9	95BD	95C2	95C4	95CA	95CF	95D0	95D4	95D6	95D9	95DB	95DC	95E2	95E5	95E9
丙	併	平	閉	米	別	変	片	返	便	弁	保	舗	補	蒸	蒸
95EA	95EF	95F1	95F2	95FB	9640	966B	967B	9687	9688	9694	9696	969C	96A1	96A2	96B3
母	包	報	率	方	法	北	本	枚	毎	又	末	万	味	未	無
96BC	96BD	96BE	96C6	96CA	96CD	96D1	96D8	96DA	96DF	96E2	96E5	96EC	96EE	96F1	96F2
名	命	明	免	面	模	毛	木	目	戻	問	門	野	矢	約	葉
96F3	96FB	9746	974C	9752	9758	975B	975C	975D	975E	9761	9765	976A	976C	976D	9770
訳	油	友	有	由	郵	夕	予	余	与	預	容	曜	様	洋	用
9776	9782	978A	978E	9790	9797	9798	979D	97A0	97A6	97A7	97AA	97B9	97BC	97BF	97CA
要	翌	頼	落	乱	覧	利	理	裏	率	立	略	了	両	料	量
97CC	97CD	97DD	97DE	97E1	97E2	97F1	97FB	9841	985A	985E	9861	9862			
領	力	累	類	例	冷	列	練	連	六	録	和	話			

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	▶ SM630000	(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	β 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	ƒ 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	J 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	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	⌋ SM660000	☐ SF240000	☐ SF400000	☐ SF010000	Ω GO320000	• SD630000
-B	♂ SM280000	← SM300000	+ SA010000	;	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	Pts SC060000	« SP170000	☐ SF280000	☐ SF440000	☐ SF590000	ε GE010000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	◊ SM790000	Å LA280000	f SC070000	» SP180000	☐ SF030000	☐ SF450000	☐ SF600000	∩ SA380000	(RSP) SP300000

Code Page 00437

Code Page 850

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	Ç	É	á	☐	☐	ø	Ó	(SHY)
-1	☺	◀	!	1	A	Q	a	q	ü	æ	í	☐	☐	Ð	ß	±
-2	☹	↕	"	2	B	R	b	r	é	Æ	ó	☐	☐	Ê	Ô	=
-3	♥	!!	#	3	C	S	c	s	â	ô	ú	☐	☐	Ë	Ò	¾
-4	♦	¶	\$	4	D	T	d	t	ä	ö	ñ	☐	☐	È	õ	¶
-5	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á	☐	ı	Õ	§
-6	♠	▬	&	6	F	V	f	v	å	û	ª	Â	ã	Í	μ	÷
-7	•	↕	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	¾
-8	☐	↑	(8	H	X	h	x	ê	ÿ	¿	©	☐	Ï	ƒ	°
-9	○	↓)	9	I	Y	i	y	ë	Ö	®	☐	☐	Ú	ˆ	ˆ
-A	●	→	*	:	J	Z	j	z	è	Ü	⌋	☐	☐	Û	˙	˙
-B	♂	←	+	;	K	[k	{	ï	ø	½	☐	☐	Ü	¹	¹
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Code Page 00850

Code Page 852

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓																
-0		(SP)	0	@	P	`	p	Ç	É	á			đ	Ó	(SHY)	
-1			!	1	A	Q	a	q	ü	Ł	í			Đ	ß	"
-2		↑	"	2	B	R	b	r	é	Í	ó			Ď	Ô	˘
-3		!!	#	3	C	S	c	s	â	ô	ú			Ě	Ń	˘
-4		¶	\$	4	D	T	d	t	ä	ö	Ą			ď	ń	˘
-5		§	%	5	E	U	e	u	ű	Ľ	ą	Á		Ň	ň	§
-6		■	&	6	F	V	f	v	é	ĭ	ž	Â	Ă	Í	Š	÷
-7	•	↑	'	7	G	W	g	w	ç	Ś	ž	Ě	ă	Î	š	˘
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-9	○	↓)	9	I	Y	i	y	ë	Ö	ę				Ú	˘
-A		→	*	:	J	Z	j	z	ő	ü					í	˘
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-C	♀	↳	,	<	L	\	l		î	ř	č				ý	ř
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-F		▼	/	?	O	_	o	◊	Ć	č	»				'	(RSP)

Code Page 00852

Code Page 855

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	ё	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	с	ђ	е	И	▒	п	У	Э
-9	○	↓)	9	I	Y	i	y	Ѕ	Ў	Е	▒	▒	▒	ж	ш
-A	●	→	*	:	J	Z	j	z	і	ц	ф	▒	▒	▒	Ж	Щ
-B	♂	←	+	;	K	[k	{	І	Џ	Ф	▒	▒	■	в	ч
-C	♀	└	,	<	L	\	l		ї	ю	г	▒	▒	■	В	Ч
-D	♪	↔	-	=	M]	m	}	İ	Ю	Г	й	▒	П	ь	§
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Code Page 00855

Code Page 857

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓																
-0		▶	(SP)	0	@	P	`	p	Ç	É	á			º	Ó	(SHY)
	SM590000	SP010000	ND100000	SM050000	LP020000	SD130000	LP010000	LC420000	LE120000	LA110000	SF140000	SF020000	SM200000	LO120000	SP320000	
-1	☺	◀	!	1	A	Q	a	q	ü	æ	í			ª	ß	±
	SS000000	SM630000	SP020000	ND010000	LA020000	LQ020000	LA010000	LQ010000	LU170000	LA510000	LI110000	SF150000	SF070000	SM210000	LS610000	SA020000
-2	☹	↕	"	2	B	R	b	r	é	Æ	ó			Ê	Ô	
	SS010000	SM760000	SP040000	ND020000	LB020000	LR020000	LB010000	LR010000	LE110000	LA520000	LO110000	SF160000	SF060000	LE160000	LO160000	
-3	♥	!!	#	3	C	S	c	s	â	ô	ú			Ë	Ò	¾
	SS020000	SP330000	SM010000	ND030000	LC020000	LS020000	LC010000	LS010000	LA150000	LO150000	LU110000	SF110000	SF080000	LE180000	LO140000	NF050000
-4	♦	¶	\$	4	D	T	d	t	ä	ö	ñ			È	õ	¶
	SS030000	SM250000	SC030000	ND040000	LD020000	LT020000	LD010000	LT010000	LA170000	LO170000	LN190000	SF090000	SF100000	LE140000	LO190000	SM240000
-5	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á			Õ	§
	SS040000	SM240000	SM020000	ND050000	LE020000	LU020000	LE010000	LU010000	LA130000	LO130000	LN200000	LA120000	SF050000		LO200000	SM240000
-6	♠	—	&	6	F	V	f	v	å	û	Ǧ	Â	ã	Í	µ	÷
	SS050000	SM700000	SM030000	ND060000	LF020000	LV020000	LF010000	LV010000	LA270000	LU150000	LG240000	LA160000	LA190000	LI120000	SM170000	SA060000
-7	•	↕	'	7	G	W	g	w	ç	ù	ğ	À	Ã	Î		¼
	SM570000	SM770000	SP050000	ND070000	LG020000	LW020000	LG010000	LW010000	LC410000	LU130000	LG230000	LA140000	LA200000	LI160000		SD410000
-8	◼	↑	(	8	H	X	h	x	ê	ï	¿	©		Ï	×	°
	SM570001	SM320000	SP060000	ND080000	LH020000	LX020000	LH010000	LX010000	LE150000	LI300000	SP160000	SM520000	SF380000	LI180000	SA070000	SM190000
-9	○	↓	)	9	I	Y	i	y	ë	Ö	®			Ú	¨	
	SM750000	SM330000	SP070000	ND090000	LI020000	LY020000	LI010000	LY010000	LE170000	LO180000	SM530000	SF230000	SF390000	SF040000	LU120000	SD170000
-A	◐	→	*	:	J	Z	j	z	è	Ü	¬			Û	·	
	SM750002	SM310000	SM040000	SP130000	LJ020000	LZ020000	LJ010000	LZ010000	LE130000	LU180000	SM660000	SF240000	SF400000	SF010000	LU160000	SD630000
-B	♂	←	+	;	K	[	k	{	ï	ø	½			Ü	¹	
	SM280000	SM300000	SA010000	SP140000	LK020000	SM060000	LK010000	SM110000	LI170000	LO610000	NF010000	SF250000	SF410000	SF610000	LU140000	ND011000
-C	♀	↳	,	<	L	\	l	|	î	£	¼			Û	³	
	SM290000	SA420000	SP080000	SA030000	LL020000	SM070000	LL010000	SM130000	LI150000	SC020000	NF040000	SF260000	SF420000	SF570000	LI130000	ND031000
-D	♪	↔	-	=	M	]	m	}	ı	Ø	ı	€		ı	ÿ	²
	SM930000	SM780000	SP100000	SA040000	LM020000	SM080000	LM010000	SM140000	LI610000	LO620000	SP030000	SC040000	SF430000	SM650000	LY170000	ND021000
-E	♫	▲	.	>	N	^	n	~	Ä	Ş	«	¥		İ	-	■
	SM910000	SM600000	SP110000	SA050000	LN020000	SD150000	LN010000	SD190000	LA180000	LS420000	SP170000	SC050000	SF440000	LI140000	SM150000	SM470000
-F	☀	▼	/	?	O	_	o	◊	Å	ş	»			'	(RSP)	
	SM690000	SV040000	SP120000	SP150000	LO020000	SP090000	LO010000	SM790000	LA280000	LS410000	SP180000	SF030000	SC010000	SF600000	SD110000	SP300000

Code Page 00857

Code Page 858

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			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			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			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			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			È LE140000	õ LO190000	¶ SM240000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	Á LA120000		€ LE1610000	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		Ï LI180000	Þ LT640000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	® SM530000			Ú LU120000	“ SD170000	”
-A	● SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	¬ SM660000			Û LU160000	• SD630000	
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	ø LO610000	½ NF010000			Ü LU140000	¹ ND011000	
-C	♀ SM290000	└ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000			Ý LY110000	³ ND031000	
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	Ø LO620000	¡ SP030000	¢ SC040000		ı SM650000	Ý LY120000	² ND021000
-E	♪ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	× SA070000	« SP170000	¥ SC050000		ì LI140000	– SM150000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	<u> </u> SP090000	o LO010000	◊ SM790000	Å LA280000	f SC070000	» SP180000			' SF600000	(RSP) SD110000	SP300000

Code Page 00858

Code Page 860

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	☐ SM590000	▶ SM630000	(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	β 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	ƒ 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	J 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	Ï LI140000	¿ SP160000	☐ SF220000	☐ SF380000	☐ SF540000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	Ê LE160000	Ï LO200000	Ò LO140000	☐ SF230000	☐ SF390000	☐ SF040000	Θ GT620000	• SA790000
-A	☐ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	⌋ SM660000	☐ SF240000	☐ SF400000	☐ SF010000	Ω GO320000	• SD630000
-B	♂ SM280000	← SM300000	+ SA010000	;	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	Û LU140000	ï SP030000	☐ SF270000	☐ SF430000	☐ SF580000	φ GF010001	² ND021000
-E	♪ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ã LA200000	Pts 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

Code Page 00860

Code Page 861

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	☐	☐	☐	α GA010000	≡ SA480000
-1	☺ SS000000	◀ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	☐	☐	☐	β LS610000	± SA020000
-2	☺ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	☐	☐	☐	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	☐	☐	☐	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	Á LA120000	☐	☐	☐	Σ GS020000	ƒ SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	þ LT630000	Í LI120000	☐	☐	☐	σ GS010000	J SS270000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	Ó LO120000	☐	☐	☐	μ GM010000	÷ SA060000
-7	• SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	Ý LY120000	Ú LU120000	☐	☐	☐	τ GT010000	≈ SA700000
-8	◼ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ý LY110000	¿ SP160000	☐	☐	☐	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	⌋ SM680000	☐	☐	☐	Θ GT620000	• SA790000
-A	◐ SM750002	→ SM310000	* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	⌋ SM660000	☐	☐	☐	Ω GO320000	• SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	Ð LD620000	ø LO610000	½ NF010000	☐	☐	☐	δ GD010000	√ SA800000
-C	♀ SM290000	⌋ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	ð LD630000	£ SC020000	¼ NF040000	☐	☐	☐	∞ SA450000	ⁿ LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	Þ LT640000	Ø LO620000	ı SP030000	☐	☐	☐	ϕ GF010001	² ND021000
-E	♪ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	Pts SC060000	« SP170000	☐	☐	☐	ε GE010000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	⏏ SM790000	Å LA280000	f SC070000	» SP180000	☐	☐	☐	∩ SA380000	(RSP) SP300000

Code Page 00861

Code Page 862

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	☐	▶	(SP)	0	@	P	`	p	⌘	Ⓜ	á	☐	☐	☐	α	≡
-1	☺	◀	!	1	A	Q	a	q	כ	ס	í	☐	☐	☐	β	±
-2	☹	↕	"	2	B	R	b	r	ג	ע	ó	☐	☐	☐	Γ	≥
-3	♥	!!	#	3	C	S	c	s	ד	ה	ú	☐	☐	☐	π	≤
-4	♦	¶	\$	4	D	T	d	t	ה	פ	ñ	☐	☐	☐	Σ	ƒ
-5	♣	§	%	5	E	U	e	u	ו	ז	Ñ	☐	☐	☐	σ	J
-6	♠	▬	&	6	F	V	f	v	ז	צ	ä	☐	☐	☐	μ	÷
-7	•	↕	'	7	G	W	g	w	ח	ק	ø	☐	☐	☐	τ	≈
-8	☐	↑	(	8	H	X	h	x	ט	ר	ı	☐	☐	☐	Φ	°
-9	○	↓	)	9	I	Y	i	y	ש	ת	◌	☐	☐	☐	Θ	•
-A	◐	→	*	:	J	Z	j	z	ך	ת	◌	☐	☐	☐	Ω	·
-B	♂	←	+	;	K	[	k	{	כ	ץ	½	☐	☐	☐	δ	√
-C	♀	⌞	,	<	L	\	l	|	ל	£	¼	☐	☐	☐	∞	ⁿ
-D	♪	↔	-	=	M	]	m	}	ם	¥	ı	☐	☐	☐	φ	²
-E	♫	▲	.	>	N	^	n	~	נ	Pts	«	☐	☐	☐	ε	■
-F	☀	▼	/	?	O	_	o	⏏	ן	f	»	☐	☐	☐	∩	(RSP)

Code Page 00862

Code Page 863

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	ı 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	β 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	ƒ 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	Ƶ 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	œ 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	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	⌋ SM660000	☐ SF240000	☐ SF400000	☐ SF010000	Ω GO320000	• SD630000
-B	♂ SM280000	← SM300000	+ SA010000	;	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	Û 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

Code Page 00863

Code Page 864

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	°	β	(RSP)	•	ϕ	ذ	ـ	س
-1	☺	◀	!	1	A	Q	a	q	•	∞	(SHY)	ا	ء	ر	ف	س
-2	♪	↕	"	2	B	R	b	r	•	ϕ	آ	٢	آ	ز	ق	ن
-3	🎵	!!	#	3	C	S	c	s	✓	±	£	٣	أ	س	ك	ه
-4	☀	☿	\$	4	D	T	d	t	☐	½	☒	٤	ؤ	ش	ل	ف
-5	☐	§	%	5	E	U	e	u	☐	¼	أ	٥	ع	ص	م	ي
-6	☐	■	&	6	F	V	f	v	☐	≈		٦	ث	ض	ن	ي
-7	☐	↕	'	7	G	W	g	w	☐	«		٧	ا	ط	ه	غ
-8	☐	↑	(	8	H	X	h	x	☐	»	ا	٨	ب	ظ	و	ق
-9	☐	↓	)	9	I	Y	i	y	☐	لأ	ب	٩	ة	ع	ي	لأ
-A	☐	→	*	:	J	Z	j	z	☐	لأ	ت	ف	ت	غ	ي	لأ
-B	☐	←	+	;	K	[	k	{	☐		ث	؛	ث	ا	ض	ل
-C	☐	⌞	,	<	L	\	l	|	☐		،	س	ج	ع	ك	ك
-D	☐	↔	-	=	M	]	m	}	☐	لا	ج	ش	ح	÷	غ	ي
-E	☐	▲	.	>	N	^	n	~	☐	لا	ح	ص	خ	×	غ	■

Code Page 865

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	☐	☐	☐	α GA010000	≡ SA480000
-1	☺ SS000000	◀ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	☐	☐	☐	β LS610000	± SA020000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	☐	☐	☐	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	☐	☐	☐	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	ñ LN190000	☐	☐	☐	Σ GS020000	ƒ SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	☐	☐	☐	σ GS010000	J SS270000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	ª SM210000	☐	☐	☐	μ GM010000	÷ SA060000
-7	• SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	º SM200000	☐	☐	☐	τ GT010000	≈ SA700000
-8	◼ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ÿ LY170000	¿ SP160000	☐	☐	☐	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	⌋ SM680000	☐	☐	☐	Θ GT620000	• SA790000
-A	◐ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	⌋ SM660000	☐	☐	☐	Ω GO320000	• SD630000
-B	♂ SM280000	← SM300000	+ SA010000	;	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	ø LO610000	½ NF010000	☐	☐	☐	δ GD010000	√ SA800000
-C	♀ SM290000	⌋ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000	☐	☐	☐	∞ SA450000	ⁿ LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	Ø LO620000	¡ SP030000	☐	☐	☐	φ GF010001	² ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	Pts SC060000	« SP170000	☐	☐	☐	ε GE010000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	◊ SM790000	Å LA280000	f SC070000	☐ SC010000	☐	☐	☐	∩ SA380000	(RSP) SP300000

Code Page 00865

Code Page 866

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	€
-3	♥	!!	#	3	C	S	c	s	Г	У	г	▒	▒	▒	у	€
-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)

Code Page 00866

Code Page 869

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		ı	ï	■	☐	T	ζ	(SHY)	
-1	☺	◀	!	1	A	Q	a	q		ÿ	ı̇	■	☐	Y	η	±	
-2	☺	↕	"	2	B	R	b	r		Œ	ó	■	☐	Φ	θ	υ	
-3	♥	!!	#	3	C	S	c	s			ú	☐	☐	X	ι	φ	
-4	♦	¶	\$	4	D	T	d	t			À	☐	☐	Ψ	κ	χ	
-5	♣	§	%	5	E	U	e	u		Ÿ	B	K	☐	Ω	λ	§	
-6	♠	—	&	6	F	V	f	v	À	ÿ	Γ	Λ	Π	α	μ	ψ	
-7	•	↕	'	7	G	W	g	w	€	©	Δ	M	P	β	ν	’	
-8	■	↑	(	8	H	X	h	x	•	Ω	E	N	☐	γ	ξ	°
-9	○	↓	)	9	I	Y	i	y	¬	²	Z	☐	☐	☐	ο	¨
-A	●	→	*	:	J	Z	j	z	ı	³	H	☐	☐	☐	π	ω	
-B	♂	←	+	;	K	[	k	{	‘	á	½	☐	☐	■	ρ	ü
-C	♀	└	,	<	L	\	l	|	’	£	Θ	☐	☐	■	σ	ů	
-D	♪	↔	-	=	M]	m	}	’E	é	I	☐	☐	☐	δ	ς	ώ
-E	♪	▲	.	>	N	^	n	~	—	ή	«	O	☐	ε	τ	■	
-F	☀	▼	/	?	O	_	o	⌣	’H	í	»	☐	Σ	■	’	(RSP)	

Code Page 00869

Code Page 897

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		(SP)	0	@	P	`	p					ー	タ	ミ		
-1			!	1	A	Q	a	q			。	ア	チ	ム		
-2			"	2	B	R	b	r			「	イ	ツ	メ		
-3			#	3	C	S	c	s			」	ウ	テ	モ		
-4			\$	4	D	T	d	t			、	エ	ト	ヤ		
-5			%	5	E	U	e	u			・	オ	ナ	ユ		
-6			&	6	F	V	f	v			ヲ	カ	ニ	ヨ		
-7			'	7	G	W	g	w			ア	キ	ヌ	ラ		
-8			(	8	H	X	h	x			イ	ク	ネ	リ		
-9			)	9	I	Y	i	y			ウ	ケ	ノ	ル		
-A			*	:	J	Z	j	z			エ	コ	ハ	レ		
-B			+	;	K	[	k	{			オ	サ	ヒ	ロ		
-C			,	<	L	¥	l	|			ヤ	シ	フ	ワ		
-D			-	=	M	]	m	}			ユ	ス	ヘ	ン		
-E			→	.	>	N	^	n			ヨ	セ	ホ	。		
-F			←	/	?	O	—	o			ッ	ソ	マ	。		

Code Page 00897

Code Page 951

A1A1	A1A2	A1A3	A1A4	A1A5	A1A6	A1A7	A1A8	A1A9	A1AA	A1AB	A1AC	A1AD	A1AE	A1AF	A1B0
A1B1	A1B2	A1B3	A1B4	A1B5	A1B6	A1B7	A1B8	A1B9	A1BA	A1BB	A1BC	A1BD	A1BE	A1BF	A1C0
A1C1	A1C2	A1C3	A1C4	A1C5	A1C6	A1C7	A1C8	A1C9	A1CA	A1CB	A1CC	A1CD	A1D7	A1D8	A1D9
A1DA	A1DB	A1DC	A1DD	A1DE	A1DF	A1E0	A1E1	A1E2	A1E3	A1E4	A1E5	A1E6	A1E7	A1E8	A1E9
A1EA	A1EB	A3A1	A3A2	A3A3	A3A4	A3A5	A3A6	A3A7	A3A8	A3A9	A3AA	A3AB	A3AC	A3AD	A3AE
A3AF	A3B0	A3B1	A3B2	A3B3	A3B4	A3B5	A3B6	A3B7	A3B8	A3B9	A3BA	A3BB	A3BC	A3BD	A3BE
A3BF	A3C0	A3C1	A3C2	A3C3	A3C4	A3C5	A3C6	A3C7	A3C8	A3C9	A3CA	A3CB	A3CC	A3CD	A3CE
A3CF	A3D0	A3D1	A3D2	A3D3	A3D4	A3D5	A3D6	A3D7	A3D8	A3D9	A3DA	A3DB	A3DC	A3DD	A3DE
A3DF	A3E0	A3E1	A3E2	A3E3	A3E4	A3E5	A3E6	A3E7	A3E8	A3E9	A3EA	A3EB	A3EC	A3ED	A3EE
A3EF	A3F0	A3F1	A3F2	A3F3	A3F4	A3F5	A3F6	A3F7	A3F8	A3F9	A3FA	A3FB	A3FC	A3FD	A3FE
A4A1	A4A2	A4A3	A4A4	A4A5	A4A6	A4A7	A4A8	A4A9	A4AA	A4AB	A4AC	A4AD	A4AE	A4AF	A4B0
A4B1	A4B2	A4B3	A4B4	A4B5	A4B6	A4B7	A4B8	A4B9	A4BA	A4BB	A4BC	A4BD	A4BE	A4BF	A4C0
A4C1	A4C2	A4C3	A4C4	A4C5	A4C6	A4C7	A4C8	A4C9	A4CA	A4CB	A4CC	A4CD	A4CE	A4CF	A4D0
A4D1	A4D2	A4D3	AAA1	AAA2	AAA3	AAA4	AAA5	AAA6	AAA7	AAA8	AAA9	AAAA	AAAB	AAAC	AAAD
AAAE	AAAF	AAB0	AAB1	AAB2	AAB3	AAB4	AAB5	AAB6	AAB7	AAB8	AAB9	AABA	AABB	AABC	AABD
AABE	AABF	AAC0	AAC1	AAC2	AAC3	AAC4	AAC5	AAC6	AAC7	AAC8	AAC9	AACA	AACB	AACC	AACD

Figure 9-5. Special Symbols/Alphanumeric/Numerics/Jamo/Hiragana/Hanja (1 of 3)

AACE	AACF	AAD0	AAD1	AAD2	AAD3	AAD4	AAD5	AAD6	AAD7	AAD8	AAD9	AADA	AADB	AADC	AADD
のは	ば	ひ	び	び	ふ	ぶ	ぶ	へ	べ	べ	ほ	ぼ	ぼ		
AADE	AADF	AAE0	AAE1	AAE2	AAE3	AAE4	AAE5	AAE6	AAE7	AAE8	AAE9	AAEA	AAEB	AAEC	AAED
ま	み	む	め	も	ゃ	や	ゅ	ゆ	よ	よ	ら	り	る	れ	ろ
AAEE	AAEF	AAF0	AAF1	AAF2	AAF3	ABA1	ABA2	ABA3	ABA4	ABA5	ABA6	ABA7	ABA8	ABA9	ABAA
わ	わ	ぬ	を	ん	ア	ア	イ	イ	ウ	ウ	エ	エ	オ	オ	
ABAB	ABAC	ABAD	ABAE	ABAF	ABBO	ABB1	ABB2	ABB3	ABB4	ABB5	ABB6	ABB7	ABB8	ABB9	ABBA
カ	ガ	キ	ギ	ク	グ	ケ	ゲ	コ	ゴ	サ	ザ	シ	ジ	ス	ズ
ABBB	ABBC	ABBD	ABBE	ABBF	ABCO	ABC1	ABC2	ABC3	ABC4	ABC5	ABC6	ABC7	ABC8	ABC9	ABCA
セ	ゼ	ソ	ゾ	タ	ダ	チ	ヂ	ツ	ヅ	テ	デ	ト	ド	ナ	
ABCB	ABCC	ABCD	ABCE	ABCF	ABD0	ABD1	ABD2	ABD3	ABD4	ABD5	ABD6	ABD7	ABD8	ABD9	ABDA
ニ	ヌ	ネ	ノ	ハ	バ	パ	ヒ	ビ	ピ	フ	ブ	プ	ヘ	ベ	ペ
ABDB	ABDC	ABDD	ABDE	ABDF	ABE0	ABE1	ABE2	ABE3	ABE4	ABE5	ABE6	ABE7	ABE8	ABE9	ABEA
ホ	ボ	ポ	マ	ミ	ム	メ	モ	ャ	ヤ	ュ	ユ	ョ	ヨ	ラ	リ
ABEB	ABEC	ABED	ABEE	ABEF	ABF0	ABF1	ABF2	ABF3	ABF4	ABF5	ABF6	A5B0	A5B1	A5B2	A5B3
ル	レ	ロ	ワ	ワ	キ	エ	フ	ヴ	カ	ケ	I	II	III	IV	
A5B4	A5B5	A5B6	A5B7	A5B8	A5B9	A5C1	A5C2	A5C3	A5C4	A5C5	A5C6	A5C7	A5C8	A5C9	A5CA
V	VI	VII	VIII	IX	X	A	B	Γ	Δ	E	Z	H	Θ	I	K
A5CB	A5CC	A5CD	A5CE	A5CF	A5D0	A5D1	A5D2	A5D3	A5D4	A5D5	A5D6	A5D7	A5D8	A5E1	A5E2
Λ	M	N	Ξ	Ο	Π	P	Σ	T	Υ	Φ	Χ	Ψ	Ω	α	β
A5E3	A5E4	A5E5	A5E6	A5E7	A5E8	A5E9	A5EA	A5EB	A5EC	A5ED	A5EE	A5EF	A5F0	A5F1	A5F2
γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ	ο	π	ρ	σ
A5F3	A5F4	A5F5	A5F6	A5F7	A5F8	C3A3	CAA4	CAAB	CAE0	CBC1	CBC7	CBD2	CBD4	CBDB	CBEC
τ	υ	φ	χ	ψ	ω	仮	価	家	間	個	改	開	客	去	件
CBFE	CCAB	CCBD	CCBF	CCDA	CCF8	CCF9	CDA	CDD3	CDD4	CDEA	CDEB	CDEC	CDFD	CEA1	CEDF
検	格	決	結	更	契	季	計	願	高	供	公	共	果	科	交
CEFA	CEFD	CFA1	CFD1	CFD8	CFDB	CFE7	DOB3	DOC3	DODD	DOEA	DOEC	DOF1	D1A2	D1C0	D1F5
九	具	区	局	群	郡	券	均	勤	金	企	其	基	期	記	南
D2A1	D2AE	D2B4	D3A4	D3B9	D3BD	D3DB	D3DE	D3E8	D3F8	D4CF	D4D4	D4F4	D4F5	D5D1	D5D7
納	内	年	単	達	担	代	大	貸	度	冬	東	登	等	來	両
D5E1	D5F4	D6E2	D6F5	D6F9	D7BE	D7BF	D7D7	D8B2	D7C7	D8DD	D8E2	D8E3	D8FC	D9A3	D9CA
量	力	録	了	料	類	六	利	万	末	枚	買	売	面	名	木

Figure 9-6. Special Symbols/Alphanumeric/Numerics/Jamo/Hiragana/Hanja (2 of 3)

D9CD	D9ED	D9FE	DAA6	D9FD	DAAA	DAB1	DAE2	DAE3	DAF5	DAF7	DBA1	DBB0	DBC3	DBD5	DBDD
目	無	文	門	問	物	未	半	反	般	返	発	方	倍	配	百
DBE3	DBF6	DCA8	DCAC	DCC3	DCD7	DDBB	DDC2	DDD5	DDD7	DDE1	DEA8	DEAA	DEBC	DECO	DEC5
番	法	変	別	報	服	部	分	不	払	備	費	非	氷	事	使
DECC	DEDB	DEE4	DEE7	DFA7	DFA9	DFB2	DFBE	DFC2	DFE6	E0B4	E0BB	E0E2	E0F7	E1AA	E1B3
四	査	社	私	産	算	三	上	商	生	石	先	設	成	税	小
E1B4	E1B6	E1BC	E1EA	E1F4	E2A2	E2A5	E2A6	E2A9	E2ED	E2F7	E3A7	E3AF	E3B7	E3BC	E3C1
少	所	消	送	受	手	収	数	水	純	順	習	承	始	市	時
E3CB	E3D2	E3E1	E3E6	E3E9	E3F7	E4A8	E4CC	E4D0	E4E7	E4FE	E5B3	E5D5	E5EB	E5F6	E6B6
試	式	信	新	申	失	十	安	案	央	額	約	陽	言	業	易
E7BD	E7E8	E7E9	E7ED	E8A6	E8C7	E8D9	E8DD	E8E2	E9C4	E9D3	EAAA	EAAB	EAAC	EAC5	EAF3
営	預	五	午	誤	完	往	王	外	用	右	元	原	員	月	有
EBBF	EBDE	EBFD	ECA3	ECA4	ECCC	ECD1	ECDA	ECE3	ECE9	ECED	ECFD	ECAD	EDAE	EDBA	EDCO
肉	銀	衣	二	以	益	人	引	認	一	日	入	子	字	者	資
EDC2	EDD1	EDDE	EDE5	EEA2	EEA4	EEA7	EEDD	EEEF	EEF1	EFB1	EFB7	EFC1	EFC3	EFD2	EFE1
作	残	場	張	再	在	材	積	全	前	銭	切	店	点	定	正
EFF1	EFF4	FOA4	FOFA	FOFB	F1A7	F1AC	F1BB	F1CE	F1DE	F1E9	F2A4	F2A5	F2A8	F2AD	F3AC
精	訂	制	種	終	左	住	株	廻	準	中	志	持	支	止	差
F4A1	F4B6	F4F0	F4F8	F5C5	F5D5	F5E6	F5F0	F5F3	F6A2	F6B7	F6D2	F6E2	F7CF	F7D7	F7E5
責	干	替	初	繰	秋	祝	春	出	取	値	七	他	土	通	特
F7FC	F8A1	F8A2	F8C1	F8CD	F8F6	F8F9	F8FA	F9A1	F9BB	F9BE	F9C3	F9D3	F9DC	F9EA	FABC
販	販	入	平	閑	標	票	表	品	下	夏	荷	漢	割	合	行
FADE	FAF0	FBA1	FBBC	FBDC	FBFD	FCB5	FCC0	FCDE	FCE5	FDAD	FDBA	FDCC			
現	協	形	呼	号	火	換	活	回	会	後	訓	休			

Figure 9-7. Special Symbols/Alphanumeric/Numerics/Jamo/Hiragana/Hanja (3 of 3)

BOA1	BOA2	BOA3	BOA4	BOA5	BOA6	BOA7	BOA8	BOA9	BOAA	BOAB	BOAC	BOAD	BOAE	BOAF	BOB0
가	각	간	갈	갈	갈	갈	갈	갈	가	가	가	가	가	가	가
BOB1	BOB2	BOB3	BOB4	BOB5	BOB6	BOB7	BOB8	BOB9	BOBA	BOBB	BOBC	BOBD	BOBE	BOBF	BOC0
강	강	개	개	개	개	개	개	개	개	개	개	개	개	개	개
BOC1	BOC2	BOC3	BOC4	BOC5	BOC6	BOC7	BOC8	BOC9	BOCA	BOCB	BOCC	BOCD	BOCE	BOCF	BOD0
강	개	개	개	개	개	개	개	개	개	개	개	개	개	개	개
BOD1	BOD2	BOD3	BOD4	BOD5	BOD6	BOD7	BOD8	BOD9	BODA	BODB	BODC	BODD	BODE	BODF	BOE0
걸	걸	걸	계	계	계	계	계	계	계	계	계	계	계	계	계
BOE1	BOE2	BOE3	BOE4	BOE5	BOE6	BOE7	BOE8	BOE9	BOEA	BOEB	BOEC	BOED	BOEE	BOEF	BOF0
결	결	결	결	결	결	결	결	결	결	결	결	결	결	결	결
BOF1	BOF2	BOF3	BOF4	BOF5	BOF6	BOF7	BOF8	BOF9	BOFA	BOFB	BOFC	BOFD	BOFE	B1A1	B1A2
굴	굴	굴	굴	굴	굴	굴	굴	굴	굴	굴	굴	굴	굴	굴	굴
B1A3	B1A4	B1A5	B1A6	B1A7	B1A8	B1A9	B1AA	B1AB	B1AC	B1AD	B1AE	B1AF	B1B0	B1B1	B1B2
관	관	관	관	관	관	관	관	관	관	관	관	관	관	관	관
B1B3	B1B4	B1B5	B1B6	B1B7	B1B8	B1B9	B1BA	B1BB	B1BC	B1BD	B1BE	B1BF	B1C0	B1C1	B1C2
교	교	교	교	교	교	교	교	교	교	교	교	교	교	교	교
B1C3	B1C4	B1C5	B1C6	B1C7	B1C8	B1C9	B1CA	B1CB	B1CC	B1CD	B1CE	B1CF	B1D0	B1D1	B1D2
공	공	공	공	공	공	공	공	공	공	공	공	공	공	공	공
B1D3	B1D4	B1D5	B1D6	B1D7	B1D8	B1D9	B1DA	B1DB	B1DC	B1DD	B1DE	B1DF	B1E0	B1E1	B1E2
귀	귀	귀	귀	귀	귀	귀	귀	귀	귀	귀	귀	귀	귀	귀	귀
B1E3	B1E4	B1E5	B1E6	B1E7	B1E8	B1E9	B1EA	B1EB	B1EC	B1ED	B1EE	B1EF	B1F0	B1F1	B1F2
기	기	기	기	기	기	기	기	기	기	기	기	기	기	기	기
B1F3	B1F4	B1F5	B1F6	B1F7	B1F8	B1F9	B1FA	B1FB	B1FC	B1FD	B1FE	B2A1	B2A2	B2A3	B2A4
파	파	파	파	파	파	파	파	파	파	파	파	파	파	파	파
B2A5	B2A6	B2A7	B2A8	B2A9	B2AA	B2AB	B2AC	B2AD	B2AE	B2AF	B2B0	B2B1	B2B2	B2B3	B2B4
까	까	까	까	까	까	까	까	까	까	까	까	까	까	까	까
B2B5	B2B6	B2B7	B2B8	B2B9	B2BA	B2BB	B2BC	B2BD	B2BE	B2BF	B2C0	B2C1	B2C2	B2C3	B2C4
패	패	패	패	패	패	패	패	패	패	패	패	패	패	패	패
B2C5	B2C6	B2C7	B2C8	B2C9	B2CA	B2CB	B2CC	B2CD	B2CE	B2CF	B2D0	B2D1	B2D2	B2D3	B2D4
폼	폼	폼	폼	폼	폼	폼	폼	폼	폼	폼	폼	폼	폼	폼	폼
B2D5	B2D6	B2D7	B2D8	B2D9	B2DA	B2DB	B2DC	B2DD	B2DE	B2DF	B2E0	B2E1	B2E2	B2E3	B2E4
퓌	퓌	퓌	퓌	퓌	퓌	퓌	퓌	퓌	퓌	퓌	퓌	퓌	퓌	퓌	퓌

Figure 9-8. Hangeul (1 of 10)

B2E5	B2E6	B2E7	B2E8	B2E9	B2EA	B2EB	B2EC	B2ED	B2EE	B2EF	B2F0	B2F1	B2F2	B2F3	B2F4
꺄	꺅	꺆	꺇	꺈	꺉	꺊	꺋	꺌	꺍	꺎	꺏	꺑	꺒	꺓	꺔
B2F5	B2F6	B2F7	B2F8	B2F9	B2FA	B2FB	B2FC	B2FD	B2FE	B3A1	B3A2	B3A3	B3A4	B3A5	B3A6
꺕	꺖	꺗	꺘	꺙	꺚	꺛	꺜	꺝	꺞	꺟	꺠	꺡	꺢	꺣	꺤
B3A7	B3A8	B3A9	B3AA	B3AB	B3AC	B3AD	B3AE	B3AF	B3B0	B3B1	B3B2	B3B3	B3B4	B3B5	B3B6
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴
B3B7	B3B8	B3B9	B3BA	B3BB	B3BC	B3BD	B3BE	B3BF	B3C0	B3C1	B3C2	B3C3	B3C4	B3C5	B3C6
꺵	꺶	꺷	꺸	꺹	꺺	꺻	꺼	꺽	꺾	꺿	꺠	꺡	꺢	꺣	꺤
B3C7	B3C8	B3C9	B3CA	B3CB	B3CC	B3CD	B3CE	B3CF	B3D0	B3D1	B3D2	B3D3	B3D4	B3D5	B3D6
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴
B3D7	B3D8	B3D9	B3DA	B3DB	B3DC	B3DD	B3DE	B3DF	B3E0	B3E1	B3E2	B3E3	B3E4	B3E5	B3E6
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴
B3E7	B3E8	B3E9	B3EA	B3EB	B3EC	B3ED	B3EE	B3EF	B3F0	B3F1	B3F2	B3F3	B3F4	B3F5	B3F6
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴
B3F7	B3F8	B3F9	B3FA	B3FB	B3FC	B3FD	B3FE	B4A1	B4A2	B4A3	B4A4	B4A5	B4A6	B4A7	B4A8
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴
B4A9	B4AA	B4AB	B4AC	B4AD	B4AE	B4AF	B4B0	B4B1	B4B2	B4B3	B4B4	B4B5	B4B6	B4B7	B4B8
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴
B4B9	B4BA	B4BB	B4BC	B4BD	B4BE	B4BF	B4C0	B4C1	B4C2	B4C3	B4C4	B4C5	B4C6	B4C7	B4C8
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴
B4C9	B4CA	B4CB	B4CC	B4CD	B4CE	B4CF	B4D0	B4D1	B4D2	B4D3	B4D4	B4D5	B4D6	B4D7	B4D8
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴
B4D9	B4DA	B4DB	B4DC	B4DD	B4DE	B4DF	B4E0	B4E1	B4E2	B4E3	B4E4	B4E5	B4E6	B4E7	B4E8
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴
B4E9	B4EA	B4EB	B4EC	B4ED	B4EE	B4EF	B4F0	B4F1	B4F2	B4F3	B4F4	B4F5	B4F6	B4F7	B4F8
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴
B4F9	B4FA	B4FB	B4FC	B4FD	B4FE	B5A1	B5A2	B5A3	B5A4	B5A5	B5A6	B5A7	B5A8	B5A9	B5AA
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴
B5AB	B5AC	B5AD	B5AE	B5AF	B5B0	B5B1	B5B2	B5B3	B5B4	B5B5	B5B6	B5B7	B5B8	B5B9	B5BA
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴
B5BB	B5BC	B5BD	B5BE	B5BF	B5C0	B5C1	B5C2	B5C3	B5C4	B5C5	B5C6	B5C7	B5C8	B5C9	B5CA
꺥	꺦	꺧	꺨	꺩	꺪	꺫	꺬	꺭	꺮	꺯	꺰	꺱	꺲	꺳	꺴

Figure 9-9. Hangeul (2 of 10)

B5CB	B5CC	B5CD	B5CE	B5CF	B5D0	B5D1	B5D2	B5D3	B5D4	B5D5	B5D6	B5D7	B5D8	B5D9	B5DA
B5DB	B5DC	B5DD	B5DE	B5DF	B5E0	B5E1	B5E2	B5E3	B5E4	B5E5	B5E6	B5E7	B5E8	B5E9	B5EA
B5EB	B5EC	B5ED	B5EE	B5EF	B5F0	B5F1	B5F2	B5F3	B5F4	B5F5	B5F6	B5F7	B5F8	B5F9	B5FA
B5FB	B5FC	B5FD	B5FE	B6A1	B6A2	B6A3	B6A4	B6A5	B6A6	B6A7	B6A8	B6A9	B6AA	B6AB	B6AC
B6AD	B6AE	B6AF	B6B0	B6B1	B6B2	B6B3	B6B4	B6B5	B6B6	B6B7	B6B8	B6B9	B6BA	B6BB	B6BC
B6BD	B6BE	B6BF	B6C0	B6C1	B6C2	B6C3	B6C4	B6C5	B6C6	B6C7	B6C8	B6C9	B6CA	B6CB	B6CC
B6CD	B6CE	B6CF	B6D0	B6D1	B6D2	B6D3	B6D4	B6D5	B6D6	B6D7	B6D8	B6D9	B6DA	B6DB	B6DC
B6DD	B6DE	B6DF	B6E0	B6E1	B6E2	B6E3	B6E4	B6E5	B6E6	B6E7	B6E8	B6E9	B6EA	B6EB	B6EC
B6ED	B6EE	B6EF	B6F0	B6F1	B6F2	B6F3	B6F4	B6F5	B6F6	B6F7	B6F8	B6F9	B6FA	B6FB	B6FC
B6FD	B6FE	B7A1	B7A2	B7A3	B7A4	B7A5	B7A6	B7A7	B7A8	B7A9	B7AA	B7AB	B7AC	B7AD	B7AE
B7AF	B7B0	B7B1	B7B2	B7B3	B7B4	B7B5	B7B6	B7B7	B7B8	B7B9	B7BA	B7BB	B7BC	B7BD	B7BE
B7BF	B7C0	B7C1	B7C2	B7C3	B7C4	B7C5	B7C6	B7C7	B7C8	B7C9	B7CA	B7CB	B7CC	B7CD	B7CE
B7CF	B7D0	B7D1	B7D2	B7D3	B7D4	B7D5	B7D6	B7D7	B7D8	B7D9	B7DA	B7DB	B7DC	B7DD	B7DE
B7DF	B7E0	B7E1	B7E2	B7E3	B7E4	B7E5	B7E6	B7E7	B7E8	B7E9	B7EA	B7EB	B7EC	B7ED	B7EE
B7EF	B7F0	B7F1	B7F2	B7F3	B7F4	B7F5	B7F6	B7F7	B7F8	B7F9	B7FA	B7FB	B7FC	B7FD	B7FE
B8A1	B8A2	B8A3	B8A4	B8A5	B8A6	B8A7	B8A8	B8A9	B8AA	B8AB	B8AC	B8AD	B8AE	B8AF	B8B0

Figure 9-10. Hangeul (3 of 10)

B8B1	B8B2	B8B3	B8B4	B8B5	B8B6	B8B7	B8B8	B8B9	B8BA	B8BB	B8BC	B8BD	B8BE	B8BF	B8C0
림	림	림	리	링	마	막	만	망	말	말	말	말	맘	맘	맛
B8C1	B8C2	B8C3	B8C4	B8C5	B8C6	B8C7	B8C8	B8C9	B8CA	B8CB	B8CC	B8CD	B8CE	B8CF	B8D0
망	망	망	망	매	매	매	매	매	매	매	매	매	매	매	막
B8D1	B8D2	B8D3	B8D4	B8D5	B8D6	B8D7	B8D8	B8D9	B8DA	B8DB	B8DC	B8DD	B8DE	B8DF	B8E0
말	말	머	머	머	머	머	머	머	머	머	머	머	머	머	머
B8E1	B8E2	B8E3	B8E4	B8E5	B8E6	B8E7	B8E8	B8E9	B8EA	B8EB	B8EC	B8ED	B8EE	B8EF	B8F0
머	머	머	머	머	머	머	머	머	머	머	머	머	머	머	머
B8F1	B8F2	B8F3	B8F4	B8F5	B8F6	B8F7	B8F8	B8F9	B8FA	B8FB	B8FC	B8FD	B8FE	B9A1	B9A2
목	목	목	목	목	목	목	목	목	목	목	목	목	목	목	목
B9A3	B9A4	B9A5	B9A6	B9A7	B9A8	B9A9	B9AA	B9AB	B9AC	B9AD	B9AE	B9AF	B9B0	B9B1	B9B2
목	목	목	목	목	목	목	목	목	목	목	목	목	목	목	목
B9B3	B9B4	B9B5	B9B6	B9B7	B9B8	B9B9	B9BA	B9BB	B9BC	B9BD	B9BE	B9BF	B9C0	B9C1	B9C2
목	목	목	목	목	목	목	목	목	목	목	목	목	목	목	목
B9C3	B9C4	B9C5	B9C6	B9C7	B9C8	B9C9	B9CA	B9CB	B9CC	B9CD	B9CE	B9CF	B9D0	B9D1	B9D2
목	목	목	목	목	목	목	목	목	목	목	목	목	목	목	목
B9D3	B9D4	B9D5	B9D6	B9D7	B9D8	B9D9	B9DA	B9DB	B9DC	B9DD	B9DE	B9DF	B9E0	B9E1	B9E2
목	목	목	목	목	목	목	목	목	목	목	목	목	목	목	목
B9E3	B9E4	B9E5	B9E6	B9E7	B9E8	B9E9	B9EA	B9EB	B9EC	B9ED	B9EE	B9EF	B9F0	B9F1	B9F2
목	목	목	목	목	목	목	목	목	목	목	목	목	목	목	목
B9F3	B9F4	B9F5	B9F6	B9F7	B9F8	B9F9	B9FA	B9FB	B9FC	B9FD	B9FE	BAA1	BAA2	BAA3	BAA4
목	목	목	목	목	목	목	목	목	목	목	목	목	목	목	목
BAA5	BAA6	BAA7	BAA8	BAA9	BAAA	BAAB	BAAC	BAAD	BAAE	BAAF	BAB0	BAB1	BAB2	BAB3	BAB4
목	목	목	목	목	목	목	목	목	목	목	목	목	목	목	목
BAB5	BAB6	BAB7	BAB8	BAB9	BABA	BABB	BABC	BABD	BABE	BABF	BAC0	BAC1	BAC2	BAC3	BAC4
목	목	목	목	목	목	목	목	목	목	목	목	목	목	목	목
BAC5	BAC6	BAC7	BAC8	BAC9	BACA	BACB	BACC	BACD	BACE	BACF	BAD0	BAD1	BAD2	BAD3	BAD4
목	목	목	목	목	목	목	목	목	목	목	목	목	목	목	목
BAD5	BAD6	BAD7	BAD8	BAD9	BADA	BADB	BADC	BADD	BADE	BADF	BAE0	BAE1	BAE2	BAE3	BAE4
목	목	목	목	목	목	목	목	목	목	목	목	목	목	목	목
BAE5	BAE6	BAE7	BAE8	BAE9	BAEA	BAEB	BAEC	BAED	BAEE	BAEF	BAF0	BAF1	BAF2	BAF3	BAF4
목	목	목	목	목	목	목	목	목	목	목	목	목	목	목	목

Figure 9-11. Hangeul (4 of 10)

BAF5	BAF6	BAF7	BAF8	BAF9	BAFA	BAFB	BAFC	BAFD	BAFE	BBA1	BBA2	BBA3	BBA4	BBA5	BBA6
비	미	빔	비	비	비	비	빠	빠	빠	빠	빠	빠	빠	빠	빠
비	미	빔	비	비	비	비	빠	빠	빠	빠	빠	빠	빠	빠	빠
BBA7	BBA8	BBA9	BBAA	BBAB	BBAC	BBAD	BBAE	BBAF	BBB0	BBB1	BBB2	BBB3	BBB4	BBB5	BBB6
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BBB7	BBB8	BBB9	BBBA	BBBB	BBBC	BBBD	BBBE	BBBF	BBC0	BBC1	BBC2	BBC3	BBC4	BBC5	BBC6
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BBC7	BBC8	BBC9	BBCA	BBCB	BBCC	BBCD	BBCE	BBCF	BBD0	BBD1	BBD2	BBD3	BBD4	BBD5	BBD6
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BBD7	BBD8	BBD9	BBDA	BBDB	BBDC	BBDD	BBDE	BBDF	BBE0	BBE1	BBE2	BBE3	BBE4	BBE5	BBE6
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BBE7	BBE8	BBE9	BBEA	BBEB	BBEC	BBED	BBEE	BBEF	BBF0	BBF1	BBF2	BBF3	BBF4	BBF5	BBF6
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BBF7	BBF8	BBF9	BBFA	BBFB	BBFC	BBFD	BBFE	BCA1	BCA2	BCA3	BCA4	BCA5	BCA6	BCA7	BCA8
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BCA9	BCAA	BCAB	BCAC	BCAD	BCAE	BCAF	BCB0	BCB1	BCB2	BCB3	BCB4	BCB5	BCB6	BCB7	BCB8
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BCB9	BCBA	BCBB	BCBC	BCBD	BCBE	BCBF	BCC0	BCC1	BCC2	BCC3	BCC4	BCC5	BCC6	BCC7	BCC8
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BCC9	BCCA	BCCB	BCCC	BCCD	BCCE	BCCF	BCD0	BCD1	BCD2	BCD3	BCD4	BCD5	BCD6	BCD7	BCD8
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BCD9	BCDA	BCDB	BCDC	BCDD	BCDE	BCDF	BCE0	BCE1	BCE2	BCE3	BCE4	BCE5	BCE6	BCE7	BCE8
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BCE9	BCEA	BCEB	BCEC	BCED	BCEE	BCEF	BCF0	BCF1	BCF2	BCF3	BCF4	BCF5	BCF6	BCF7	BCF8
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BCF9	BCFA	BCFB	BCFC	BCFD	BCFE	BDA1	BDA2	BDA3	BDA4	BDA5	BDA6	BDA7	BDA8	BDA9	BDA0
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BDAB	BDAC	BDAD	BDAE	BDAF	BDB0	BDB1	BDB2	BDB3	BDB4	BDB5	BDB6	BDB7	BDB8	BDB9	BDBA
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BDBB	BDBC	BDBD	BDBE	BDBF	BDC0	BDC1	BDC2	BDC3	BDC4	BDC5	BDC6	BDC7	BDC8	BDC9	BDCA
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
BDCB	BDCC	BDCD	BDCE	BDCF	BDD0	BDD1	BDD2	BDD3	BDD4	BDD5	BDD6	BDD7	BDD8	BDD9	BDDA
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠
빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠	빠

Figure 9-12. Hangeul (5 of 10)

BDDB	BDDC	BDDD	BDDE	BDDF	BDE0	BDE1	BDE2	BDE3	BDE4	BDE5	BDE6	BDE7	BDE8	BDE9	BDEA	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BDEB	BDEC	BDED	BDEE	BDEF	BDF0	BDF1	BDF2	BDF3	BDF4	BDF5	BDF6	BDF7	BDF8	BDF9	BDFA	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BDFB	BDFC	BDFD	BDFE	BEA1	BEA2	BEA3	BEA4	BEA5	BEA6	BEA7	BEA8	BEA9	BEAA	BEAB	BEAC	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BEAD	BEAE	BEAF	BEB0	BEB1	BEB2	BEB3	BEB4	BEB5	BEB6	BEB7	BEB8	BEB9	BEBA	BEBB	BEBC	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BEBD	BEBE	BEBF	BEC0	BEC1	BEC2	BEC3	BEC4	BEC5	BEC6	BEC7	BEC8	BEC9	BECA	BECB	BECC	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BECD	BECE	BECF	BED0	BED1	BED2	BED3	BED4	BED5	BED6	BED7	BED8	BED9	BEDA	BEDB	BEDC	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BEDD	BEDE	BEDF	BEE0	BEE1	BEE2	BEE3	BEE4	BEE5	BEE6	BEE7	BEE8	BEE9	BEEA	BEEB	BEEC	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BEED	BEEE	BEEF	BEF0	BEF1	BEF2	BEF3	BEF4	BEF5	BEF6	BEF7	BEF8	BEF9	BEFA	BEFB	BEFC	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BEFD	BEFE	BFA1	BFA2	BFA3	BFA4	BFA5	BFA6	BFA7	BFA8	BFA9	BFAA	BFAB	BFAC	BFAD	BFAE	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BFAF	BFBO	BFB1	BFB2	BFB3	BFB4	BFB5	BFB6	BFB7	BFB8	BFB9	BFBA	BFBB	BFBC	BFBD	BFBE	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BFBF	BFC0	BFC1	BFC2	BFC3	BFC4	BFC5	BFC6	BFC7	BFC8	BFC9	BFCA	BFCB	BFCC	BFCD	BFCE	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BFCF	BFD0	BFD1	BFD2	BFD3	BFD4	BFD5	BFD6	BFD7	BFD8	BFD9	BFDA	BFDB	BFDC	BFDD	BFDE	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BFDf	BFE0	BFE1	BFE2	BFE3	BFE4	BFE5	BFE6	BFE7	BFE8	BFE9	BFEA	BFEB	BFEC	BFED	BFEF	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
BFEF	BFF0	BFF1	BFF2	BFF3	BFF4	BFF5	BFF6	BFF7	BFF8	BFF9	BFFA	BFFB	BFFC	BFFD	BFFE	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
COA1	COA2	COA3	COA4	COA5	COA6	COA7	COA8	COA9	COAA	COAB	COAC	COAD	COAE	COAF	COB0	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클
COB1	COB2	COB3	COB4	COB5	COB6	COB7	COB8	COB9	COBA	COBB	COBC	COBD	COBE	COBF	COC0	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클	썩 클

Figure 9-13. Hangeul (6 of 10)

C0C1	C0C2	C0C3	C0C4	C0C5	C0C6	C0C7	C0C8	C0C9	C0CA	C0CB	C0CC	C0CD	C0CE	C0CF	C0D0
으	우	우	우	우	우	이	인	일	임	잇	이	익	인	일	익
C0D1	C0D2	C0D3	C0D4	C0D5	C0D6	C0D7	C0D8	C0D9	C0DA	C0DB	C0DC	C0DD	C0DE	C0DF	C0E0
이	이	이	이	이	이	이	이	이	자	작	잔	잔	잔	잔	잔
C0E1	C0E2	C0E3	C0E4	C0E5	C0E6	C0E7	C0E8	C0E9	C0EA	C0EB	C0EC	C0ED	C0EE	C0EF	C0F0
잠	잠	자	자	자	자	재	재	재	재	재	재	재	재	재	재
C0F1	C0F2	C0F3	C0F4	C0F5	C0F6	C0F7	C0F8	C0F9	C0FA	C0FB	C0FC	C0FD	C0FE	C1A1	C1A2
작	작	작	작	작	작	재	재	재	저	적	전	적	적	적	적
C1A3	C1A4	C1A5	C1A6	C1A7	C1A8	C1A9	C1AA	C1AB	C1AC	C1AD	C1AE	C1AF	C1B0	C1B1	C1B2
저	저	저	제	제	제	제	제	제	제	제	저	저	저	저	저
C1B3	C1B4	C1B5	C1B6	C1B7	C1B8	C1B9	C1BA	C1BB	C1BC	C1BD	C1BE	C1BF	C1C0	C1C1	C1C2
저	저	제	저	저	저	저	저	저	저	저	저	저	저	저	저
C1C3	C1C4	C1C5	C1C6	C1C7	C1C8	C1C9	C1CA	C1CB	C1CC	C1CD	C1CE	C1CF	C1D0	C1D1	C1D2
작	작	작	작	작	작	작	작	작	작	작	작	작	작	작	작
C1D3	C1D4	C1D5	C1D6	C1D7	C1D8	C1D9	C1DA	C1DB	C1DC	C1DD	C1DE	C1DF	C1E0	C1E1	C1E2
작	작	작	작	작	작	작	작	작	작	작	작	작	작	작	작
C1E3	C1E4	C1E5	C1E6	C1E7	C1E8	C1E9	C1EA	C1EB	C1EC	C1ED	C1EE	C1EF	C1F0	C1F1	C1F2
작	작	작	작	작	작	작	작	작	작	작	작	작	작	작	작
C1F3	C1F4	C1F5	C1F6	C1F7	C1F8	C1F9	C1FA	C1FB	C1FC	C1FD	C1FE	C2A1	C2A2	C2A3	C2A4
작	작	작	작	작	작	작	작	작	작	작	작	작	작	작	작
C2A5	C2A6	C2A7	C2A8	C2A9	C2AA	C2AB	C2AC	C2AD	C2AE	C2AF	C2B0	C2B1	C2B2	C2B3	C2B4
작	작	작	작	작	작	작	작	작	작	작	작	작	작	작	작
C2B5	C2B6	C2B7	C2B8	C2B9	C2BA	C2BB	C2BC	C2BD	C2BE	C2BF	C2C0	C2C1	C2C2	C2C3	C2C4
작	작	작	작	작	작	작	작	작	작	작	작	작	작	작	작
C2C5	C2C6	C2C7	C2C8	C2C9	C2CA	C2CB	C2CC	C2CD	C2CE	C2CF	C2D0	C2D1	C2D2	C2D3	C2D4
작	작	작	작	작	작	작	작	작	작	작	작	작	작	작	작
C2D5	C2D6	C2D7	C2D8	C2D9	C2DA	C2DB	C2DC	C2DD	C2DE	C2DF	C2E0	C2E1	C2E2	C2E3	C2E4
작	작	작	작	작	작	작	작	작	작	작	작	작	작	작	작
C2E5	C2E6	C2E7	C2E8	C2E9	C2EA	C2EB	C2EC	C2ED	C2EE	C2EF	C2F0	C2F1	C2F2	C2F3	C2F4
작	작	작	작	작	작	작	작	작	작	작	작	작	작	작	작
C2F5	C2F6	C2F7	C2F8	C2F9	C2FA	C2FB	C2FC	C2FD	C2FE	C3A1	C3A2	C3A3	C3A4	C3A5	C3A6
작	작	작	작	작	작	작	작	작	작	작	작	작	작	작	작

Figure 9-14. Hangeul (7 of 10)

C3A7	C3A8	C3A9	C3AA	C3AB	C3AC	C3AD	C3AE	C3AF	C3B0	C3B1	C3B2	C3B3	C3B4	C3B5	C3B6
첼	챔	챔	채	채	채	차	차	차	찰	참	창	처	척	천	첼
C3B7	C3B8	C3B9	C3BA	C3BB	C3BC	C3BD	C3BE	C3BF	C3C0	C3C1	C3C2	C3C3	C3C4	C3C5	C3C6
침	침	천	천	천	체	체	체	첼	첼	첼	첼	첼	첼	천	천
C3C7	C3C8	C3C9	C3CA	C3CB	C3CC	C3CD	C3CE	C3CF	C3D0	C3D1	C3D2	C3D3	C3D4	C3D5	C3D6
체	첼	첼	초	속	온	출	음	음	웃	옹	화	환	활	황	치
C3D7	C3D8	C3D9	C3DA	C3DB	C3DC	C3DD	C3DE	C3DF	C3E0	C3E1	C3E2	C3E3	C3E4	C3E5	C3E6
흰	힐	힘	힉	희	힝	초	흠	추	후	훈	훈	훈	훈	훈	훈
C3E7	C3E8	C3E9	C3EA	C3EB	C3EC	C3ED	C3EE	C3EF	C3F0	C3F1	C3F2	C3F3	C3F4	C3F5	C3F6
취	혔	첼	헨	취	흰	힐	힘	힉	히	힝	츄	훈	훈	흠	흠
C3F7	C3F8	C3F9	C3FA	C3FB	C3FC	C3FD	C3FE	C4A1	C4A2	C4A3	C4A4	C4A5	C4A6	C4A7	C4A8
츠	츄	츄	츄	츄	츄	츄	츄	치	치	친	칠	칠	칠	침	침
C4A9	C4AA	C4AB	C4AC	C4AD	C4AE	C4AF	C4B0	C4B1	C4B2	C4B3	C4B4	C4B5	C4B6	C4B7	C4B8
치	칭	카	카	칸	칼	캠	캠	카	강	개	캐	캐	캐	캠	캠
C4B9	C4BA	C4BB	C4BC	C4BD	C4BE	C4BF	C4C0	C4C1	C4C2	C4C3	C4C4	C4C5	C4C6	C4C7	C4C8
캐	캐	캠	카	카	강	커	컹	컨	컨	컬	컴	컴	컹	컹	컹
C4C9	C4CA	C4CB	C4CC	C4CD	C4CE	C4CF	C4D0	C4D1	C4D2	C4D3	C4D4	C4D5	C4D6	C4D7	C4D8
케	케	켄	켄	켄	켄	켄	켄	켜	켄	컬	컴	컴	컹	컹	컹
C4D9	C4DA	C4DB	C4DC	C4DD	C4DE	C4DF	C4E0	C4E1	C4E2	C4E3	C4E4	C4E5	C4E6	C4E7	C4E8
케	크	목	콘	콜	콤	콧	콩	카	각	관	갈	감	광	캐	캐
C4E9	C4EA	C4EB	C4EC	C4ED	C4EE	C4EF	C4F0	C4F1	C4F2	C4F3	C4F4	C4F5	C4F6	C4F7	C4F8
랭	키	킬	크	쿠	쿠	쿨	콤	콧	콩	콩	콩	콩	콩	콩	콩
C4F9	C4FA	C4FB	C4FC	C4FD	C4FE	C5A1	C5A2	C5A3	C5A4	C5A5	C5A6	C5A7	C5A8	C5A9	C5AA
켄	켄	키	킉	퀸	퀸	퀸	퀸	퀸	퀸	퀸	퀸	퀸	퀸	퀸	퀸
C5AB	C5AC	C5AD	C5AE	C5AF	C5B0	C5B1	C5B2	C5B3	C5B4	C5B5	C5B6	C5B7	C5B8	C5B9	C5BA
큰	쿨	콤	콤	콩	키	킉	킨	킬	킴	킴	키	킹	타	탁	탄
C5BB	C5BC	C5BD	C5BE	C5BF	C5C0	C5C1	C5C2	C5C3	C5C4	C5C5	C5C6	C5C7	C5C8	C5C9	C5CA
탈	탈	탐	탐	타	타	탕	태	택	텐	탈	탐	탐	태	태	탱
C5CB	C5CC	C5CD	C5CE	C5CF	C5D0	C5D1	C5D2	C5D3	C5D4	C5D5	C5D6	C5D7	C5D8	C5D9	C5DA
타	탕	터	터	턴	털	털	털	털	털	털	털	털	털	털	털
C5DB	C5DC	C5DD	C5DE	C5DF	C5E0	C5E1	C5E2	C5E3	C5E4	C5E5	C5E6	C5E7	C5E8	C5E9	C5EA
템	템	텨	텨	턴	텨	텨	텨	텨	텨	텨	텨	텨	텨	텨	텨

Figure 9-15. Hangeul (8 of 10)

C5EB	C5EC	C5ED	C5EE	C5EF	C5F0	C5F1	C5F2	C5F3	C5F4	C5F5	C5F6	C5F7	C5F8	C5F9	C5FA
롱	롱	타	판	태	티	윈	윈	링	트	투	투	룬	룬	롱	롱
C5FB	C5FC	C5FD	C5FE	C6A1	C6A2	C6A3	C6A4	C6A5	C6A6	C6A7	C6A8	C6A9	C6AA	C6AB	C6AC
루	루	티	티	테	티	틱	윈	윈	윈	윈	윈	윈	룬	룬	롱
C6AD	C6AE	C6AF	C6B0	C6B1	C6B2	C6B3	C6B4	C6B5	C6B6	C6B7	C6B8	C6B9	C6BA	C6BB	C6BC
롱	트	투	룬	룬	룬	룬	룬	룬	룬	티	윈	윈	윈	윈	티
C6BD	C6BE	C6BF	C6C0	C6C1	C6C2	C6C3	C6C4	C6C5	C6C6	C6C7	C6C8	C6C9	C6CA	C6CB	C6CC
틱	틴	윈	윈	윈	윈	윈	파	파	파	파	팔	팔	팔	팔	파
C6CD	C6CE	C6CF	C6D0	C6D1	C6D2	C6D3	C6D4	C6D5	C6D6	C6D7	C6D8	C6D9	C6DA	C6DB	C6DC
파	파	팔	패	패	패	패	패	패	패	패	패	패	패	패	패
C6DD	C6DE	C6DF	C6E0	C6E1	C6E2	C6E3	C6E4	C6E5	C6E6	C6E7	C6E8	C6E9	C6EA	C6EB	C6EC
퍼	퍼	퍼	퍼	퍼	퍼	퍼	페	페	페	페	페	페	페	페	퍼
C6ED	C6EE	C6EF	C6F0	C6F1	C6F2	C6F3	C6F4	C6F5	C6F6	C6F7	C6F8	C6F9	C6FA	C6FB	C6FC
퍼	퍼	퍼	퍼	퍼	퍼	페	페	페	페	페	포	포	포	포	포
C6FD	C6FE	C7A1	C7A2	C7A3	C7A4	C7A5	C7A6	C7A7	C7A8	C7A9	C7AA	C7AB	C7AC	C7AD	C7AE
포	포	파	파	피	핀	표	포	포	포	포	포	포	포	포	포
C7AF	C7B0	C7B1	C7B2	C7B3	C7B4	C7B5	C7B6	C7B7	C7B8	C7B9	C7BA	C7BB	C7BC	C7BD	C7BE
포	포	포	포	포	피	핑	피	핀	핀	핀	핀	핀	핀	핀	포
C7BF	C7C0	C7C1	C7C2	C7C3	C7C4	C7C5	C7C6	C7C7	C7C8	C7C9	C7CA	C7CB	C7CC	C7CD	C7CE
푸	푸	프	프	프	프	프	프	피	피	피	피	피	피	피	핑
C7CF	C7D0	C7D1	C7D2	C7D3	C7D4	C7D5	C7D6	C7D7	C7D8	C7D9	C7DA	C7DB	C7DC	C7DD	C7DE
하	하	한	한	한	한	한	한	한	해	해	해	해	해	해	하
C7DF	C7E0	C7E1	C7E2	C7E3	C7E4	C7E5	C7E6	C7E7	C7E8	C7E9	C7EA	C7EB	C7EC	C7ED	C7EE
해	해	하	하	허	허	허	허	허	허	허	허	허	해	해	해
C7EF	C7F0	C7F1	C7F2	C7F3	C7F4	C7F5	C7F6	C7F7	C7F8	C7F9	C7FA	C7FB	C7FC	C7FD	C7FE
해	해	해	해	해	허	허	현	현	현	현	현	현	형	혜	현
C8A1	C8A2	C8A3	C8A4	C8A5	C8A6	C8A7	C8A8	C8A9	C8AA	C8AB	C8AC	C8AD	C8AE	C8AF	C8B0
현	현	호	호	호	호	호	호	호	호	호	호	화	화	완	완
C8B1	C8B2	C8B3	C8B4	C8B5	C8B6	C8B7	C8B8	C8B9	C8BA	C8BB	C8BC	C8BD	C8BE	C8BF	C8C0
완	완	해	왜	왜	왜	왜	희	희	희	힐	힐	희	희	호	호
C8C1	C8C2	C8C3	C8C4	C8C5	C8C6	C8C7	C8C8	C8C9	C8CA	C8CB	C8CC	C8CD	C8CE	C8CF	C8D0
힐	힐	호	후	후	후	후	후	후	후	후	히	힐	힐	힐	힐

Figure 9-16. Hangeul (9 of 10)

C8D1	C8D2	C8D3	C8D4	C8D5	C8D6	C8D7	C8D8	C8D9	C8DA	C8DB	C8DC	C8DD	C8DE	C8DF	C8E0
헤	헝	헨	헬	헝	히	히	히	힐	힘	힘	히	힝	ㅎ	후	후
C8E1	C8E2	C8E3	C8E4	C8E5	C8E6	C8E7	C8E8	C8E9	C8EA	C8EB	C8EC	C8ED	C8EE	C8EF	C8F0
후	후	후	후	후	후	후	후	후	후	후	후	후	후	후	후
C8F1	C8F2	C8F3	C8F4	C8F5	C8F6	C8F7	C8F8	C8F9	C8FA	C8FB	C8FC	C8FD	C8FE		
히	히	힐	힘	힘	힝	히	히	히	힐	힘	힘	히	힝		

Figure 9-17. Hangeul (10 of 10)

Code Page 1088

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓																
-0			(SP)	0	@	P	`	p								
	SF050000	SM630000	SP010000	ND100000	SM050000	LP020000	SD130000	LP010000								
-1			!	1	A	Q	a	q								
	SF010000	SM630000	SP020000	ND010000	LA020000	LQ020000	LA010000	LQ010000								
-2			"	2	B	R	b	r								
	SF030000	SM760000	SP040000	ND020000	LB020000	LR020000	LB010000	LR010000								
-3			#	3	C	S	c	s								
	SF020000	SP330000	SM010000	ND030000	LC020000	LS020000	LC010000	LS010000								
-4			\$	4	D	T	d	t								
	SF040000	SM250000	SC030000	ND040000	LD020000	LT020000	LD010000	LT010000								
-5			%	5	E	U	e	u								
	SF110000	SF070000	SM020000	ND050000	LE020000	LU020000	LE010000	LU010000								
-6			&	6	F	V	f	v								
	SF100000	SF060000	SM030000	ND060000	LF020000	LV020000	LF010000	LV010000								
-7			'	7	G	W	g	w								
	SM570000	SF090000	SP050000	ND070000	LG020000	LW020000	LG010000	LW010000								
-8			(	8	H	X	h	x								
	SM570001	SM320000	SP060000	ND080000	LH020000	LX020000	LH010000	LX010000								
-9			)	9	I	Y	i	y								
	SM750000	SF080000	SP070000	ND090000	LI020000	LY020000	LI010000	LY010000								
-A			*	:	J	Z	j	z								
	SM750002	SM310000	SM040000	SP130000	LJ020000	LZ020000	LJ010000	LZ010000								
-B			+	;	K	[	k	{								
	SM280000	SM300000	SA010000	SP140000	LK020000	SM060000	LK010000	SM110000								
-C			,	<	L	W	l	|								
	SM290000	SA420000	SP080000	SA030000	LL020000	SC140000	LL010000	SM130000								
-D			-	=	M	]	m	}								
	SM930000	SM780000	SP100000	SA040000	LM020000	SM080000	LM010000	SM140000								
-E			.	>	N	^	n	~								
	SM910000	SM600000	SP110000	SA050000	LN020000	SD150000	LN010000	SD190000								
-F			/	?	O	_	o	⏏								
	SM690000	SV040000	SP120000	SP150000	LO020000	SP090000	LO010000	SM790000								

Code Page 01088

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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.

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

created on July 23, 2001

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.

Index

Numerics

- 4685 Keyboard Model K01 Scan-Code set 8-34
- 4685 Point of Sale Keyboard Model K01 layout 8-34
- 4820 IBM SurePoint Solution Keypad 8-35
- 7497 Point of Sale Attachment Adapter 4-10, 4-14, 4-17, 5-6, 5-9, 6-5, 6-8
 - installation considerations, IBM OS/2 3-4
 - installation considerations, Microsoft Windows 3.1 4-5
 - installation considerations, Microsoft Windows 95 4-9
 - installation considerations, Microsoft Windows 98 4-14, 5-5, 6-4
 - installation considerations, Microsoft Windows NT 4-17, 5-9, 6-8

A

- adapter
 - IBM 7497 Point of Sale Attachment Adapter 3-4, 4-5, 4-9, 4-14, 4-17, 5-5, 5-9, 6-4, 6-8
- Alphanumeric Point of Sale (ANPOS) Keyboard
 - attached to system keyboard port, installation considerations 3-3, 4-5, 4-9, 4-13, 4-17, 5-5, 5-9, 6-4, 6-8
 - country dependent 8-37
 - layout 8-12
 - list of 8-1
 - PS/2 scan codes 8-17
 - SIO scan codes 8-12
 - USB attached 4-14, 5-5, 6-4
- Alphanumeric Point of Sale Keyboard Installation 7-2
- Applying the Keyboard Patch 7-2
- autoexec.bat file, changes to 4-4, 4-8, 4-12, 6-3
- AUTOEXEC.BAT file, changes to 5-4

B

- backup files, creating 4-3, 4-8, 4-12
- before you begin 2-1
- Brazil-Portuguese keyboard layout 8-40
- break scan code 8-1

C

- Canadian French keyboard layout
 - Alphanumeric Point of Sale, country dependent 8-37
 - Retail Alphanumeric Point of Sale, country dependent 8-40, 8-41
- changes to
 - autoexec.bat file 4-4, 4-8, 4-12, 6-3
 - AUTOEXEC.BAT file 5-4
 - config.sys file 3-2, 3-4
 - Microsoft Windows 95 registry 4-10
 - Microsoft Windows 98 registry 4-14, 5-6, 6-5
 - startup.cmd file 3-3

- changes to (*continued*)
 - system.ini file 4-4, 4-5, 4-9, 4-13
 - SYSTEM.INI file 5-5, 6-4
 - win.ini file 4-4, 4-5
 - Windows 2000 Devices 5-8, 6-7
 - Windows NT Devices 4-16, 5-8, 6-7
 - Windows NT registry 4-17, 5-9, 6-8
- character sets and code pages 9-1
- checkout keyboards
 - layouts 8-2
 - list of 8-1
- code pages
 - 1088 9-35
 - 301 9-3
 - 437 9-7
 - 850 9-8
 - 852 9-9
 - 855 9-10
 - 857 9-11
 - 858 9-12
 - 860 9-13
 - 861 9-14
 - 862 9-15
 - 863 9-16
 - 864 9-17
 - 865 9-18
 - 866 9-19
 - 869 9-20
 - 897 9-21
 - 932 9-3, 9-21
 - 949 9-22, 9-35
 - 951 9-22
- code pages and character sets 9-1
- compressed version download 5-1, 6-1
- config.sys file, changes to 3-2

D

- Danish keyboard layout 8-41
- device driver suite
 - package 5-1, 6-1
- directories
 - target, considerations 4-3, 4-8, 4-12, 4-16
- directory structure 3-6, 4-19
- Directory Structure, IBM Point of Sale Subsystem for Linux 7-2

E

- editors
 - Microsoft Windows 95 registry, regedit 4-10
 - Microsoft Windows 98 registry, regedit 4-14, 5-6, 6-5
 - Microsoft Windows NT registry, regedit 5-9, 6-8
 - Microsoft Windows NT registry, regedt32 4-17

F

- File Installation, Tar 7-1
- file structure 3-6, 4-19
- Finnish and Swedish keyboard layout 8-44
- French keyboard layout
 - Alphanumeric Point of Sale, country dependent 8-37
 - Retail Alphanumeric Point of Sale, country dependent 8-41

G

- German keyboard layout
 - Alphanumeric Point of Sale, country dependent 8-38
 - Retail Alphanumeric Point of Sale, country dependent 8-42
- getting started 2-1

I

- IBM Point of Sale Subsystem for Linux, Installing the 7-1
- IBM Point of Sale Subsystem for Linux Directory Structure 7-2
- Installation, Alphanumeric Point of Sale Keyboard 7-2
- Installation, RPM 7-1
- Installation, Tar File 7-1
- installing IBM Point of Sale Subsystem
 - IBM OS/2, from a LAN 3-1
 - IBM OS/2, procedure 3-1
 - Microsoft Windows 2000, procedure 5-7, 6-6
 - Microsoft Windows 3.1, procedure 4-2
 - Microsoft Windows 95, procedure 4-7
 - Microsoft Windows 98, procedure 4-11, 5-3, 6-2
 - Microsoft Windows NT, procedure 4-15, 5-7, 6-6 on preloaded systems 4-18
 - on system used to develop POSS applications, considerations 3-3, 4-4, 4-9, 4-13, 4-16, 5-4, 5-9, 6-3, 6-7
 - silent 4-18
 - target system considerations 3-1, 4-2, 4-7, 4-11, 4-15, 5-3, 5-7, 6-2, 6-6
- Installing the IBM Point of Sale Subsystem for Linux 7-1
- loadaddr, updating
 - Microsoft Windows 3.1 system.ini 4-5
 - Microsoft Windows 95 registry 4-10
 - Microsoft Windows 98 registry 4-14, 5-6, 6-5
 - Microsoft Windows NT registry 4-17
 - Microsoft Windows 2000 registry 5-9, 6-8
- ISA bus machine
 - IBM OS/2 considerations 3-4
 - Microsoft Windows 3.1 considerations 4-5
 - Microsoft Windows 95 considerations 4-9
 - Microsoft Windows 98 considerations 4-14, 5-6, 6-5
 - Microsoft Windows NT considerations 4-17, 5-9, 6-8
- Italian keyboard layout
 - Alphanumeric Point of Sale, country dependent 8-38

Italian keyboard layout (*continued*)

- Retail Alphanumeric Point of Sale, country dependent 8-42, 8-43

K

- KBD01.SYS file, replacing during installation 3-4
- KBD02.SYS file, replacing during installation 3-4
- KBDBASE.SYS file, replacing during installation 3-4
- keyboard.dcp file, replacing during installation 3-4
- Keyboard Installation, Alphanumeric Point of Sale 7-2
- Keyboard Patch, Applying the 7-2
- Keyboard Patch, Removing the 7-2
- keyboards
 - 4685 Point of Sale Keyboard Model K01, layout 8-34
 - 50-Key Modifiable Layout Keyboard, layout 8-2
 - 50-Key Modifiable Layout Keyboard and Operator Display, layout 8-2
 - Alphanumeric Point of Sale (ANPOS) Keyboard, layout 8-12
 - Alphanumeric Point of Sale Keyboard, system-attached 3-3, 4-5, 4-9, 4-13, 4-17, 5-5, 5-9, 6-4, 6-8
 - Modifiable Layout Keyboard with Card Reader, layout 8-6
 - PC Point of Sale Keyboard, layout 8-22
 - Retail Alphanumeric Point of Sale country dependent keyboards 8-39
 - Retail Alphanumeric Point of Sale Keyboard, layout 8-21
 - Retail Point of Sale Keyboard, layout 8-2
 - Retail Point of Sale Keyboard VI, layout 8-3
 - Retail Point of Sale Keyboard with Card Reader and Display, layout 8-3

L

- LAN, installing on IBM OS/2 from a 3-1
- LAN, installing on Microsoft Windows from a 4-1
- layouts, point-of-sale keyboards 8-1
- Linux, Installing the IBM Point of Sale Subsystem for 7-1
- Linux Directory Structure, IBM Point of Sale Subsystem for 7-2

M

- make scan code 8-1
- MCA bus machine, considerations
 - IBM OS/2 considerations 3-4
 - Microsoft Windows 2000 considerations 5-9, 6-8
 - Microsoft Windows 3.1 considerations 4-5
 - Microsoft Windows 95 considerations 4-9
 - Microsoft Windows 98 considerations 4-14, 5-6, 6-5
 - Microsoft Windows NT considerations 4-17, 5-9, 6-8
- Microsoft Win32s
 - Microsoft Windows 3.1, installing 4-1
- Microsoft Window 98
 - Alphanumeric Point of Sale Keyboard, considerations 4-13, 5-5, 6-4

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Microsoft Window 98 *(continued)*

- autoexec.bat file, changes to 4-12, 6-3
- AUTOEXEC.BAT file, changes to 5-4
- IBM 7497 Point of Sale Attachment Adapter, considerations 4-14, 5-5, 6-4
- installing IBM Point of Sale Subsystem 4-11, 5-3, 6-2
- Microsoft Windows 98 services 4-13
- registry, changes to 4-14, 5-6, 6-5
- system.ini file, changes to 4-13
- SYSTEM.INI file, changes to 5-5, 6-4

Microsoft Windows 3.1

- Alphanumeric Point of Sale Keyboard, considerations 4-5
- autoexec.bat file, changes to 4-4
- IBM 7497 Point of Sale Attachment Adapter, considerations 4-5
- installing IBM Point of Sale Subsystem 4-2
- Microsoft Win32s, installing 4-1
- system.ini file, changes to 4-4
- win.ini file, changes to 4-4

Microsoft Windows 95

- Alphanumeric Point of Sale Keyboard, considerations 4-9
- autoexec.bat file, changes to 4-8
- IBM 7497 Point of Sale Attachment Adapter, considerations 4-9
- installing IBM Point of Sale Subsystem 4-7
- Microsoft Windows 95 services 4-9
- registry, changes to 4-10
- system.ini file, changes to 4-9

Microsoft Windows NT

- Alphanumeric Point of Sale Keyboard, considerations 4-17, 5-9, 6-8
- environment variables, changes to 4-16, 5-8, 6-7
- IBM 7497 Point of Sale Attachment Adapter, considerations 4-17, 5-9, 6-8
- installing IBM Point of Sale Subsystem 4-15, 5-7, 6-6
- Microsoft Windows 2000 services 5-8, 6-7
- Microsoft Windows NT devices 4-16, 5-8, 6-7
- Microsoft Windows NT services 4-16, 5-8, 6-7
- registry, changes to 4-17, 5-9, 6-8

N

Norwegian keyboard layout 8-43

O

online User's Guide
reading 1-1, 1-2

P

package, point-of-sale device drivers 2-1
Patch, Applying the Keyboard 7-2
Patch, Removing the Keyboard 7-2
Point of Sale Keyboard Installation, Alphanumeric 7-2
point-of-sale keyboard layouts 8-1

Point of Sale Subsystem for Linux, Installing the IBM 7-1
Point of Sale Subsystem for Linux Directory Structure, IBM 7-2
preloaded systems, installation on 4-18
PS/2 ANPOS keyboard with integrated mouse
keyboard layout 8-12
PS/2 scan codes
Alphanumeric Point of Sale Keyboard 8-17
PC Point of Sale Keyboard 8-27
Retail Alphanumeric Point of Sale Keyboard 8-27

R

registry, updating
Microsoft Windows 95 4-9
Microsoft Windows 98 4-14, 5-6, 6-5
Microsoft Windows NT 4-17, 5-9, 6-8
registry editors, using
regedit 4-10, 4-14, 5-6, 5-9, 6-5, 6-8
regedt32 4-17
Removing the Keyboard Patch 7-2
replacing
I8042PRT.SYS file 4-17, 5-9, 6-8
KBD01.SYS file 3-4
KBD02.SYS file 3-4
KBDBASE.SYS file 3-4
keyboard.dcp file 3-4
VKBD.SYS file 3-4
RPM Installation 7-1

S

Sample Programs
aipstr 4-20
AIPSTR 3-6
anposkey 3-7, 4-20
checkout 3-7
CHECKOUT 4-21
demo 3-7, 4-20
vbsample 4-21
silent installation 4-18
SIO scan code sets
50-Key Modifiable Layout Keyboard 8-3
50-Key Modifiable Layout Keyboard and Operator Display 8-3
Alphanumeric Point of Sale Keyboard 8-12
Modifiable Layout Keyboard with Card Reader 8-7
Point of Sale Keyboard VI 8-3
Retail Alphanumeric Point of Sale Keyboard with Card Reader 8-23
Retail Point of Sale Keyboard 8-3
Retail Point of Sale Keyboard with Card Reader and Display 8-3
Spanish keyboard layout
Alphanumeric Point of Sale, country dependent 8-38
Retail Alphanumeric Point of Sale, country dependent 8-43, 8-44
split-compressed version download 5-1, 6-1
startup.cmd file, changes to 3-3

Structure, IBM Point of Sale Subsystem for Linux
Directory 7-2
subsystem, installing
 IBM OS/2, procedure 3-1
 Microsoft Windows, procedure 4-1
 Microsoft Windows 2000, procedure 5-7, 6-6
 Microsoft Windows 3.1, procedure 4-2
 Microsoft Windows 95, procedure 4-7
 Microsoft Windows 98, procedure 4-11, 5-3, 6-2
 Microsoft Windows NT, procedure 4-15, 5-7, 6-6
Subsystem for Linux, Installing the IBM Point of
Sale 7-1
Swedish and Finnish keyboard layout 8-44
system.ini file, changes to 4-4, 4-5, 4-9, 4-13
SYSTEM.INI file, changes to 5-5, 6-4

T

Tar File Installation 7-1
touch
 installation considerations 3-5

U

U.K. English keyboard layout
 Alphanumeric Point of Sale, country
 dependent 8-39
 Retail Alphanumeric Point of Sale, country
 dependent 8-44
U.S. English keyboard layout
 Alphanumeric Point of Sale, country
 dependent 8-39
 Retail Alphanumeric Point of Sale, country
 dependent 8-45
uninstall
 Microsoft Windows, procedure 4-19, 5-11, 6-9
USB
 attached point-of-sale keyboard 4-14, 5-5, 6-4
 checkout keyboard scan- code set 8-3
 IBM 7497 Point of Sale Attachment Adapter,
 considerations 4-14, 5-5, 6-4
 keyboard port attachment considerations 4-13, 5-5,
 6-4
 retail point-of-sale keyboard scan codes 8-6
 selecting system keyboard considerations 4-14
User's Guide, reading online 1-1, 1-2

V

VKBD.SYS file, replacing during installation 3-4

W

win.ini file, changes to 4-4, 4-5
Windows Installer 5-1, 6-1



created on July 23, 2001



Printed in the United States of America
on recycled paper containing 10%
recovered post-consumer fiber.

GC30-3623-10

