

Personal Communications
Version 5.0 for Windows[®] 95, Windows 98,
Windows NT[®], and Windows 2000



Reference Volume II

Personal Communications
Version 5.0 for Windows[®] 95, Windows 98,
Windows NT[®], and Windows 2000



Reference Volume II

Note

Before using this information and the product it supports, read the information in "Appendix H. Notices" on page 253.

Second Edition (May 2000)

This edition applies to Version 5.0 of IBM Personal Communications and to all subsequent releases and modifications until otherwise indicated in new editions.

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Contents

Figures	vii
Tables	ix
About This Book.	xi
Who Should Read This Book.	xi
How to Use This Book.	xi
Highlighting Conventions.	xi
Command Syntax Symbols	xii

Part 1. Personal Communications/VT 1

Chapter 1. VT Emulation.	3
Introduction	3
Configuring a VT Session	3
Customizing the VT over Async Attachment.	3
Customizing the VT over Telnet Attachment.	3
Session Parameters	4
Optional Parameters.	5
Advanced ASCII Host	6
Link Parameters	7
Configuring Links for VT over Async	8
Configuring Links for VT over Telnet.	11
Using A VT Session	12
Compose Key	12
Transparent Mode	16
OIA Line Display Messages	17
Scrollable History Display	17
Chapter 2. ASCII Host File Transfer	19
Setting Preferences	19
Using XMODEM and YMODEM	19
Advanced Settings	20
Defining Transfer Types	20
File Transfer Templates	21
Working with Lists of Files	22
Receiving Files From an ASCII Host	23
Selecting a Workstation Directory	23
Selecting Files to Receive	23
Sending Files to an ASCII Host.	24
Selecting Files to Send.	24
Changing the Host File Name or the Transfer Type.	25
Saving a List of Files to Send	25
Sending a List of Files.	25

Part 2. Advanced Configuration, Management, and Operations 27

Chapter 3. Introduction.	29
Configuration Files	29
Initial Configuration Definitions	29
Configuration with Template and Update Files	29

Automatic Device Name Generation (5250 Only)	34
Substitution Characters	34
Client Naming Function	35
Device Name Collision Processing.	35
Support for Systems Policies.	36
Support for Management by Tivoli	36
Commands for Emulator Functions	36
Start a Personal Communications Session	36
Stop a Personal Communications Session	37
Query Personal Communications Sessions	37

Chapter 4. Using InstallShield Silent 39

Setting Up InstallShield Silent	39
Usage Examples	39
Usage Notes	40
Modifying the Samples	40
Debugging Silent Installation Problems	41
InstallShield Problems.	41
Common Problems.	42

Chapter 5. Remote Installation and Uninstallation of Personal Communications 43

General Information	43
Installation	43
Uninstallation	43
Preparing for Remote Silent Installation of Personal Communications	44
Remote Installation of Personal Communications Using Tivoli Courier	44
Remote Installation of Personal Communications Using SMS	45
Creating a New SMS Software Package	45
Creating an SMS Job	46
Remote Uninstallation of Personal Communications using SMS.	46
Modify the Personal Communications SMS software package	47
Create an SMS Job to Uninstall Personal Communications	47
Generic Remote Uninstallation Information for Personal Communications	48

Chapter 6. Tivoli Support 49

IBMPCOMM Plus Module for Personal Communications	49
Task Administration	50
Plus Module Administrative Tasks.	50
Personal Communications Administrative Tasks	51
Event Management.	53
Personal Communications Events	54
Event Rules	55
Event Adapter	56
Event Management Tasks.	58
Software Distribution	58

Distribute and Install Personal Communications	59
Distribute the SNA Node Configuration Files	59
Distribute the Emulator Configuration Files	59
Signature (Inventory) Information	60

Chapter 7. System Policy Support . . . 61

Configuration Policy	61
Communication Configuration	62
Menu Configuration	62
Multiple Session Configuration	63
Toolbar Configuration	63
Keyboard Configuration	64
Mouse Configuration	65
Execution Policy	65
Dynamic Menu Modification	66
Java Applet	66
Macro Play/Record	66
Session Execution	66
File Transfer	67
Send	67
Receive	67
Installation Policy	67

Chapter 8. Network Drives (Shared Folders) . . . 69

Client Installation Considerations	69
Accessibility	69
AS/400 Connection Configuration Utility	70
Performance Considerations	70
Disabling Network Drives (Shared Folders)	70

Chapter 9. Configuring and Using SSL Security for Personal Communications. 71

What is SSL?	71
Preparation for SSL Communication	71
Server and Related Client Configuration	71
Client Configuration	72
Establishing an SSL-Based Session	73
Secure Session Icon	74
Configuring Personal Communications for SSL Support	74
Host Definition	74
Automatic Host Location	75
Advanced Security Setup	75
Pop-up Messages	76
Changing the Password of a Client's Key Database	76
Using Certificate Wizard	77
Using Certificate Management	77
Configuring SSL for Connecting to a Server Using a Certificate from a Well-Known CA	77
Configuring SSL for Connecting to a Server Using a Certificate from an Unknown CA	78
Opening a Key Database and Adding a Root Certificate	78
Opening a Key Database and Adding a Personal Certificate	79
Obtaining a Personal ID Certificate from a Known Certificate Authority (CA)	81
Configuring SSL for Connecting to a Server Using a Self-signed Certificate	81

Using the Command Line Mode for Managing Certificates	81
Security References	84
Problem Determination	84

Part 3. National Language Support 87

Chapter 10. Multiple-Language Support 89

Overview	89
System Locale	89
Language Groups	89
Personal Communications User Interface Languages	90
Multiple Sessions	91
Other Considerations	91

Chapter 11. Country Codes, Code Pages, and Character Sets . . . 93

Keyboard Country ID and Shift Support	94
SBCS Code Pages and Character Sets	95
DBCS Code Pages and Character Sets	97
Host Code Page Tables	98
Host Code Page 037-1/697-1 Brazil, Canada, Netherlands, Portugal, U.S., and 037/1175	99
Traditional Chinese	99
Host Code Page 273-1/697-1 Austria, Germany	100
Host Code Page 275-1/697-1 Brazil	101
Host Code Page 277-1/697-1 Denmark, Norway	102
Host Code Page 278-1/697-1 Finland, Sweden	103
Host Code Page 280-1/697-1 Italy	104
Host Code Page 284-1/697-1 Latin America, Spain	105
Host Code Page 285-1/697-1 United Kingdom	106
Host Code Page 290 Japan (Katakana) Extended	107
Host Code Page 297-1/697-1 France	108
Host Code Page 420 Arabic Bilingual	109
Host Code Page 424/941 Israel (Hebrew - Bulletin Code)	110
Host Code Page 500-1/697-1 International	111
Host Code Page 803 Israel (Hebrew - Old Code)	112
Host Code Page 833/1173 Hangeul	113
Host Code Page 836/1174 Simplified Chinese	114
Host Code Page 870/959 Latin 2 - EBCDIC Multilingual	115
Host Code Page 871-1/697-1 Iceland	116
Host Code Page 875 Greece	117
Host Code Page 924-1/1353-1 International	118
Host Code Page 1025/1150 Cyrillic	119
Host Code Page 1026/1152 Latin 5 - Turkey	120
Host Code Page 1027/1172 Japan (Latin) Extended	121
Host Code Page 1047/103 Latin 1 (Open Systems)	122
Host Code Page 1112/1035 Latvia, Lithuania	123
Host Code Page 1122/1037 Estonia	124
Host Code Page 1123 Ukraine	125
Host Code Page 1130 Vietnam	126
Host Code Page 1132 Laos	127
Host Code Page 1140-1/695-1 Brazil, Canada, Netherlands, Portugal, U.S., and 1140/1175	128
Traditional Chinese	128

Host Code Page 1141-1/695-1 Austria, Germany	129
Host Code Page 1142-1/695-1 Denmark, Norway	130
Host Code Page 1143-1/695-1 Finland, Sweden	131
Host Code Page 1144-1/695-1 Italy	132
Host Code Page 1145-1/695-1 Latin America, Spain	133
Host Code Page 1146-1/695-1 United Kingdom	134
Host Code Page 1147-1/695-1 France	135
Host Code Page 1148-1/695-1 International	136
Host Code Page 1149-1/695-1 Iceland	137
Host Code Page 1153/1375 Latin 2 - EBCDIC Multilingual	138
Host Code Page 1154/1381 Cyrillic	139
Host Code Page 1155/1378 Latin 5 - Turkey	140
Host Code Page 1156/1393 Latvia, Lithuania	141
Host Code Page 1157/1391 Estonia	142
Host Code Page 1158/1388 Ukraine	143
Host Code Page 1160/1395 Thailand	144
Host Code Page 1164/1397 Vietnam	145
IBM Japanese Character Set (2-Byte Codes)	146
Character Types	146
Character Size	146
IBM Kanji Codes	146
IBM Traditional Chinese Character Set	147
IBM Simplified Chinese Character Set, GBK Code	148
IBM Hangeul Character Set	148
Thai Language Support	149

Chapter 12. Bidirectional Language Support (Arabic and Hebrew) 151

Considerations for Printing	151
Bidirectional Arabic Support	151
Limitations	151
Installation Tips	151
Bidirectional Keyboard Functions for 3270	152
Arabic Character Shape Selection Functions	154
Personal Communications AS/400	155
Operator Information Area Indicators	156
Bidirectional Hebrew Support	157
Hebrew and Bidirectional Functions	157
Bidirectional Key-Combinations Table for 3270	159
Operator Information Area (OIA) in Terminal Emulation Mode	159
Keyboard Layout	160
Configuration	160
Font	160
File Transfer With the 862 Code Page	161
Bidirectional Key-Combinations Table for 5250	161

Part 4. Appendixes 163

Appendix A. SNA Client/Server Concepts 165

Terminology	165
APPC Concepts	165
Introducing APPC and CPI-C	166
What Is a Transaction Program?	166

What Is the Difference between APPC and APPN?	167
Side Information Definitions	167
APPC Issues and Considerations	168
Improving Productivity Using APPC	168
Improving Productivity Using CPI-C	168
What Is a Logical Unit?	169
LU Types	169
Dependent and Independent LUs	169
What Is a Session?	169
What Is a Conversation?	170
A Conversation between Two TPs	171
Parallel Sessions between LUs	171
SNA Communications	171
SNA Node Operations	172

Appendix B. Introducing AnyNet SNA over TCP/IP 173

What Does AnyNet SNA over TCP/IP Do?	173
Running APPC or CPI-C Applications over a TCP/IP Network	173
Using AnyNet to Connect SNA Applications on Different Platforms	173
Chaining Gateways to Connect Multiple SNA and IP Networks	174
5250 Emulation over a TCP/IP Network	175
APPC3270 Emulation over a TCP/IP Network	175
3270 Emulation via DLUR over a TCP/IP Network	176
3270 Emulation over a TCP/IP Network via an SNA Gateway to a VTAM Host on an SNA Network	176
3270 Emulation over a TCP/IP Network via an SNA Gateway to a VTAM Host on an APPN Network	177
3270 Emulation via an SNA Gateway over a TCP/IP Network	177
How Does SNA over TCP/IP Work?	178
Mapping SNA Resources to IP Addresses	179
Defining Domain Names and IP Addresses	180
Defining Unique CP Names and Connection Network Names	181
Setting and Modifying the Routing Preference Protocol	182
Helpful Hints	183
Tuning	183
Dynamic IP Addresses	183

Appendix C. AnyNet Sockets over SNA 185

AnyNet Sockets over SNA Access Node	185
Socket Applications Communicating over an SNA Network	185
Connecting Sockets over SNA Access Nodes on Different Operating Systems	185
Connecting Remote TCP/IP Networks Using an SNA Backbone and Sockets over SNA Gateways	187
How Does Sockets over SNA Work?	187
Generating an LU 6.2 Call from a Socket Call	190

Mapping an IP Address to an SNA Network-Qualified Name	190
Application Program Support Provided by Sockets over SNA	191
Planning for Sockets over SNA	191
Routing and Mapping Overview	191
Internet Addressing	191
IP Routing Table	192
SNA Network ID Used by Sockets over SNA	192
How an IP Address Is Mapped to an LU Name	192
How Sockets over SNA Routes and Maps Data	193
Defining Sockets over SNA Modes	193
Changing the Idle-Timeout Interval	194

Appendix D. Keyboard Layouts. 195

Local Edit Keys.	195
Keyboard Layouts	196
Enhanced Keyboard, Microsoft Natural Keyboard (3270 Only)	200
Enhanced Keyboard, Microsoft Natural Keyboard (5250 Only)	202
Enhanced Keyboard, Microsoft Natural Keyboard (Combined 3270 and 5250)	204
Enhanced Keyboard, Microsoft Natural Keyboard (VT Keyboard Layout)	206
Enhanced Keyboard, Microsoft Natural Keyboard (VT Local Edit Mode Only)	208
Space-Saving Keyboard (3270 Only)	210
Space-Saving Keyboard (5250 Only)	212
Space-Saving Keyboard (Combined 3270 and 5250)	214
5576-001 (3270 Only)	216
5576-001 (5250 Only)	218
5576-001 (Combined 3270 and 5250)	220
5576-A01 (3270 Only)	222
5576-A01 Keyboard (5250 Only)	224
5576-A01 Keyboard (Combined 3270 and 5250)	226
5576-002/003 (3270 Only)	228
5576-002/003 Keyboard (5250 Only)	230
5576-002/003 Keyboard (Combined 3270 and 5250)	232
APL Keyboard Layouts (3270 Only)	233
Key Map for Home3270	235

Appendix E. Creating Additional Disk Space. 239

Important Notes	239
Emulator Utilities	239
Administration Tools	239
Other Tools	240
Link Utility	240
Information	240
Links	240

Appendix F. Hints and Tips 243

Usage Notes for Sessions in OLE Documents	243
Changing Fonts	243
Initial Selection of Font	243
WordPad	243
WordPro	243
Updating Linked Files	243
Inactivity Timeout for Communication Links	244
Considerations	244
Virtual Memory	244
Emulator Session Icons	244
Migrating from Windows 95 or Windows 98 to Windows NT or Windows 2000	245
Disabling CDRA Tables	245

Appendix G. ODBC Drivers and Database Access Utility 247

Overview of Open Database Connectivity (ODBC)	247
Components of ODBC	247
Database Access Utility	249
How to Access an ODBC Data Source	249
Database Size Limit	251
Further Information	251

Appendix H. Notices 253

Trademarks	255
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Appendix I. Glossary 257
297

Figures

1. A Session between Two LUs	170	16. Sockets Applications Communicating over an SNA Network	185
2. A Conversation between Two TPs.	171	17. Socket Applications on Multiple Operating Systems Communicating over an SNA Network	186
3. Parallel Sessions between LUs	171	18. Socket Applications Communicating through Multiple Sockets Gateways	187
4. Running APPC or CPI-C Applications over a TCP/IP Network	173	19. Structure of a Windows NT Node Running Sockets over SNA	188
5. Using AnyNet to Connect SNA Applications on Different Platforms	174	20. Structure of a Windows 95 Node Running Sockets over SNA	189
6. Chaining Multiple Gateways to Connect Multiple IP Networks.	175	21. Example of an IP Routing Panel	193
7. 5250 Emulation over a TCP/IP Network	175	22. Type-1 APL Keyboard.	234
8. APPC3270 Emulation over a TCP/IP Network	176	23. Type-2 APL Keyboard.	234
9. 3270 Emulation via DLUR over a TCP/IP Network	176	24. Type-3 APL Keyboard.	234
10. 3270 Emulation over a TCP/IP Network via an SNA Gateway to a VTAM Host on an SNA Network	177	25. Type-4 APL Keyboard.	235
11. 3270 Emulation over a TCP/IP Network via an SNA Gateway to a VTAM Host on an APPN Network.	177	26. Common Control Code of Keyboard Core Segment for Non-Japanese Keyboard.	235
12. 3270 Emulation via an SNA Gateway over a TCP/IP Network	178	27. Common Control Code of Keyboard Core Segment for Japanese Keyboard	236
13. Structure of SNA over TCP/IP for Personal Communications	179	28. Other Control Code Map of Key Segment B	237
14. Formats of the Domain Names That SNA over TCP/IP Builds	180	29. Control-Code Map of Keyboard Core Segment for U.S. Enhanced Keyboard	238
15. Defining a CP Name and a Connection Network Name	182	30. Example of a Language Statement	267
		31. Example of an NCP Definition Statement	268
		32. Example of a VTAM Definition Statement	268

Tables

1. Character Generation	13	9. The IBM Japanese Character Set and IBM Kanji Codes	146
2. Character Generation (Transparent Mode)	16	10. The IBM Japanese Character Set and IBM Kanji Codes (Extended for Unicode Subset)	147
3. Supported Keyboard Types	93	11. IBM Traditional Chinese Host Code	147
4. Keyboard Country ID and Shift Support	94	12. IBM Simplified Chinese Character Set, GBK Code	148
5. Code Pages and Character Sets	96	13. IBM Hangeul Host Code (833)	148
6. Japanese Code Pages and Character Sets (for 3270).	97	14. IBM Hangeul Host Code (1364)	149
7. Japanese Code Pages and Character Sets (for 5250).	97	15. IP Address Masks Supported by Sockets over SNA	192
8. Hangeul and Chinese Code Pages and Character Sets (for 3270 and 5250)	98		

About This Book

Beginning with version 4.3, the [®] Personal Communications for Windows[®] 95, Windows 98, Windows NT[®], and Windows 2000 Reference book was split into two volumes. These volumes provide information for using IBM[®] Personal Communications AS/400[®] for Windows 95, Windows 98, Windows NT, and Windows 2000 (hereafter called PC400) and IBM Personal Communications for Windows 95, Windows 98, Windows NT, and Windows 2000. In this book, *Windows* refers to Windows 95, Windows 98, Windows NT, and Windows 2000. *PC/3270* refers to the 3270 portion of the combined package. Throughout this book, *workstation* refers to all supported personal computers. When only one model or architecture of the personal computer is referred to, only that type is specified.

In this book, *Windows* refers to Windows 95, Windows 98, Windows NT, and Windows 2000. When information is specific to only Windows 95, Windows 98, Windows NT, or Windows 2000, this will be indicated in the text.

This volume (II) is the companion to Volume I of the Personal Communications Reference.

Who Should Read This Book

This book is intended for the person who installs and uses Personal Communications on a workstation.

How to Use This Book

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

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

Highlighting Conventions

This book uses the following highlighting conventions:

UPPERCASE

Uppercase type indicates commands and program keywords. You can enter these values in uppercase or lowercase.

Bold Bold type indicates the names of window controls, such as lists, check boxes, entry fields, menu choices, and push buttons.

Italics Italics indicate:

- Special emphasis in text or a reference citation.
- Variables that you supply a value for.
- Default values.

Example type

Example type indicates information that the user is instructed to type at a command prompt or in a window.

Command Syntax Symbols

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

- () Parentheses enclose operands that govern the action of certain command options.
- [] Brackets indicate an optional command argument. If you do not use the optional item, the program selects a default.
- ... Ellipsis after an argument indicates that you can repeat the preceding item any number of times.
- / For 3270, a slash must precede the Time Sharing Option Extensions (TSO/E) password. A slash must also precede parameters of DOS commands entered from the command line. For 5250, a slash must precede parameters of IBM DOS commands entered from the command line.
- \ A backslash is included as part of any directory name. An initial backslash indicates the first-level directory, and an additional backslash is inserted in the directory name to indicate another level.

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

Part 1. Personal Communications/VT

Chapter 1. VT Emulation

Introduction

For connection to ASCII hosts, Personal Communications provides the **VT Emulator** for VT340, VT100, and VT52 terminals. ASCII hosts commonly use these terminal control sequences as standards for session presentation, and many ASCII-host application programs assume a VT-compatible terminal. VT emulation allows your personal computer or workstation to operate as if it were a VT terminal. Software that is designed to operate a VT340, VT100, or VT52 terminal should work correctly with the Personal Communications VT emulator.

Although the keyboard layout on VT terminals is similar to that of the personal computer, there are some exceptions. The default mapping of keys for VT emulation appears in “Enhanced Keyboard, Microsoft Natural Keyboard (VT Keyboard Layout)” on page 206.

For file transfer to and from ASCII hosts, using the XMODEM and YMODEM protocols, see “Using XMODEM and YMODEM” on page 19.

VT connections to non-ASCII hosts, such as the IBM System/390® (S/390) are also possible if you have the appropriate communication devices.

Configuring a VT Session

Use the **Customize Communication - ASCII Host** panel to select values for the parameters that define your ASCII host session. There are two types of parameters: Session and Link.

Customizing the VT over Async Attachment

1. Select **Communication** from the WorkStation-window menu-bar.
2. Select **Configure...** from the Communication menu. The Customize Communication window appears.
3. Select **VT over Async** attachment.
4. Click the **Session Parameters** button.
The Session Parameters Host window appears.
5. Set the session parameters (see “Session Parameters” on page 4).
6. Click the **Link Parameters** button.
The VT Async Attachment window appears.
7. Set the Communication and Automatic-Dial Facility parameters, and click the **Advanced...** button to set advanced parameters.
8. Click the **OK** buttons until the Customize Communication window disappears. Customization is complete.

Customizing the VT over Telnet Attachment

1. Select **Communication** from the WorkStation-window menu bar.
2. Select **Configure...** from the Communication menu.
The Customize Communication window appears.
3. Select the the ASCII host and then select the **LAN** or **COM Port** interface .

VT Emulation

- The available attachments appear.
4. Select **VT over Telnet** attachment.
 5. Click the **Session Parameters** button.
The Session Parameters — ASCII Host window appears.
 6. Set the Session Parameters (see “Session Parameters”).
 7. Click the **Link Parameters** button.
The TelnetASCII window appears.
 8. Enter the host name or IP address.
 9. Optionally enter the port number, change the terminal ID, or select the **Auto-reconnect** checkbox.
 10. Click the **OK** buttons until the Customize Communication window disappears.
Customization is complete.

Session Parameters

These parameters correspond to setup choices on a VT340 terminal.

Online/Local

In the **Online** state, the emulator receives data from the host computer, and can send data to it. In the **Local** state, data you enter on the keyboard appears on the screen, but is not sent to the host; data from the host is held, and not presented on the screen until you change the state to **Online**.

Operating Mode

Select **Char** if the host does not echo the characters you type on your keyboard. The VT emulator displays them as it sends them to the host.

Select **Echo** if the host echos your keyboard characters for display. The VT emulator displays them only as they return from the host.

If you see doubled characters, you should select **Echo** instead of **Char**. *Echo* is the default.

Machine Mode

There are four machine modes. These are:

VT340 mode, with 7-bit controls

This is the default. This mode is recommended for most applications.

VT340 mode, with 8-bit controls

The emulator is set for an 8-bit environment with 8-bit controls.

VT100 mode

This mode is intended for situations requiring strict compatibility with the VT100 terminal. In general, the VT340 7-bit mode is appropriate for applications that expect a VT100.

VT52 mode

This mode is only for applications designed for the VT52 terminal.

Screen Size

You can choose the number of rows and columns that the session screen displays. The choices are

- Rows: 24, 36, 48, 72, and 144
- Columns: 80 and 132

The defaults are 24 rows and 80 columns.

Type of Host Code-Page

The choices are for the host code page are National, PC, and Multinational. Multinational which selects the 8-bit DEC Supplemental Graphic Character Set is the default. If you select National, then you must select a country from the Host Code Page pull-down list. The PC option selects the PC Code Page 437.

Host Code-Page

Select a National host code page. The choices are as follows:

- Belgian
- Canadian French
- Danish
- Finnish
- French
- German
- Italian
- Norwegian
- Spanish
- Swedish
- Swiss French
- Swiss German
- United Kingdom
- United States

Optional Parameters

These parameters correspond to setup choices on a VT340 terminal.

Reverse Screen Image

Check this box to reverse the foreground and background colors.

User Feature Lock

Check this box to lock the following functions so that the host cannot change them.

- Auto Repeat
- Keyboard Lock
- Reversed Screen Image
- Tab Stops

Auto Wrap

Check this box if you want the VT emulator to start a new line whenever the current row of characters reaches the end of line.

Auto-Answer Back Message

Check this box if you want the VT emulator to send a message automatically to the host, once a connection has been established.

Answer Back Message

VT Emulation

Enter the message, which is a maximum of 31 characters, to send to the host when communication is established.

Conceal

If you check this box, your answerback message is not displayed in the configuration window. After you conceal your message, the **Conceal** box has no effect, and the message remains concealed until it is changed.

User Defined Key Lock

Check this box to lock user-defined keys. For example, you can select **User Defined Key Lock** and define the values of the F6 to F20 keys. These keys are then locked with those values and cannot be redefined by the host.

Transparent Mode

Check this box to cause the VT emulator to display control characters rather than interpreting them.

VT ID The attributes of the selected model are sent to the host computer. Choose one of the following: **VT100 ID**, **VT101 ID**, **VT102 ID**, **VT220 ID**, **VT240 ID**, **VT320 ID**, or **VT340 ID**.

History Window Buffer Size

You can choose the size of the buffer used to store the history lines for the session; these lines can then be viewed in a scrollable window. The choices are 16KB, 32KB, 64KB, 128KB, and 512KB. The default is 64KB.

Advanced ASCII Host

The **Advanced** button takes you to the Advanced ASCII Host dialog. The Advanced Options dialog contains all of the configuration options needed for the Local editing feature of VT340 Emulation. These configuration options include the following:

Graphics Cursor

Determines whether or not the graphics input cursor is shown when in graphics mode.

Sixel Scrolling

When this option is selected a sixel graphics image scrolls to the next row when the last column is reached.

MacroGraph Reports

Controls the ability of the host to retrieve stored macro graph procedures. Possible values are *Enabled* or *Disabled*.

Edit Mode

Selects whether or not local editing is available and the current mode of operation. Possible values are *Unavailable*, *Interactive*, or *Edit*.

Erasure Mode

Determines which characters can be erased in edit mode. Possible values are *Unprotected* or *All*.

Edit Key

Determines how the VT340 emulation switches between *Interactive* and *Edit* mode. Possible values are *Immediate* or *Deferred*.

Transmit

Determines how the VT340 emulation sends a block of data to the host system in edit mode. Possible values are *Immediate* or *Deferred*.

Application Keys

Determines how the unshifted function keys F6 through F20 work in edit mode. Possible values are *Disabled*, *Immediate*, *Prefix*, or *Suffix*.

Guarded Area

Determines whether or not protected characters can be sent to the host system. Possible values are *All* or *Selected*.

Selected Area

Determines whether the VT340 emulation can send all characters or only selected characters to the host system. Possible values are *All* or *Selected*.

Multiple Area

Determines whether VT340 emulation can send all selected areas on the page, or only the area selected with the cursor. Possible values are *Multiple* or *Single*.

VT131 Transfer

When **Line Transmit Mode** is disabled, this feature selects an ANSI-style or VT131-style data transmission. The size of the block depends on **Transfer Termination Mode**. Possible values are *ANSI* or *VT131*.

EOL Characters

Allows you to select characters used to indicate the end of a line (EOL) in a data block. By default the VT340 emulation sends a carriage return (CR). Up to six hexadecimal characters can be specified.

EOB Characters

Allows you to select characters used to indicate the end of a data block (EOB). This feature has no default. Up to six hexadecimal characters can be specified.

Page Coupling

Determines whether or not to automatically display a new page when the cursor moves to a new page in page memory. Possible values are *Enabled* or *Disabled*.

Line Transmit Mode

Allows you to send characters one line at a time to the host system. Possible values are *Disabled* or *Enabled*.

Transfer Termination Mode

When Line Transmit Mode is disabled, this feature determines whether the VT340 emulation sends a partial page or the scrolling region. Possible values are *Enabled* or *Disabled*.

Space Compression Mode

Determines how the VT340 emulation sends unused character fields and spaces in a data block. Possible values are *Disabled* or *Enabled*.

Link Parameters

The **Configure Links** button take you to a panel for configuring the details of the connection to the ASCII host computer. The panel you see depends upon the attachment type that you chose for your ASCII host. There are two types:

- VT over Async
- VT over Telnet

Configuring Links for VT over Async

Introduction

The VT over Async attachment connects to an ASCII host through a protocol converter, using normal telephone lines or a direct connection.

For VT over Async attachment, you must define the following parameters.

Attachment Parameters

- Communication Port
- Line Speed in bps
- Data Bits
- Parity
- Stop Bits
- Advanced Configuration Parameters

Automatic Dial Facility Parameters

- Automatic-Dial
- Modem Name
- Primary/Backup Phone
- Title
- Configure Phone/Modem
-

Attachment Parameters

Communication Port

Select the number of the communications port through which your async connection will be established. The choices are COM1, COM2, COM3, and COM4. The default is COM1.

Line Speed (bps)

Line speed is the data transmission speed in bits per second.

If you have a 14,400 or 28,800 baud modem, its use of V.42bis compression technology allows you to take advantage of the highest speeds that your system supports. For a 14,400 baud modem, select a line speed of 57,600 or lower; for a 28,800 baud modem, select 115,200 or lower.

If you are not successful with these high speeds, you may need to select a lower line speed. For example, if your COM port does not have a FIFO buffer, you might need to select a lower speed. When a connection attempt fails or is not reliable at a higher speed, try a lower speed.

The default speed is 9600 bps.

The maximum usable speed depends on the capability of the processor or the communication port. If your connection fails, try a slow speed.

If you use the 8250 UART, your line speed should not be higher than 19,200 bps.

Data Bits

Select the number of bits that constitute a character, either 7 or 8. Your choice should match the value your ASCII host uses. The default is 8.

Parity

Parity is a method for detecting transmission errors. An extra bit is appended to some unit of data, usually a byte. That bit is set to 0 or 1, making the total number of 1 bits an even number (for “even” parity) or an odd number (for “odd” parity). The valid parity type is None, Odd, Even, Space, or Mark. “None” means that no parity bit is sent or expected. “Mark” and “Space” mean that the parity position is always set to 1 or 0, respectively, and that received parity is not checked.

Select the same parity used on your remote system.

The default is None.

Stop Bits

One or two stop bits signify the end of each asynchronously-transmitted character. Select the same value, 1 or 2, as used by your remote system. The number of stop bits in use may depend upon the line speed. The default is 1.

Advanced Configuration Parameters

The following advanced configuration parameters are available:

Flow Control

Select the method for controlling the flow of data between the emulator and the modem or the ASCII host. The choices are:

XON/XOFF

The software flow control method places the characters DC3 and DC1 into the data stream to stop and start the flow of data. This method, no longer common, allows the session user to pause incoming data for reading, by using the Control-S and Control-Q keys. DC3 is X'13', or XOFF; it is initially mapped to Control-S. DC1 is X'11', or XON; it is initially mapped to Control-Q. The keyboard positions are remappable.

Hardware

The hardware flow control method uses the electrical signals RTS (Request to Send) and CTS (Clear to Send). If your modem is using high-speed data compression, or if you are performing XMODEM or YMODEM file transfers, this method is mandatory.

Both This method uses both hardware and XON/XOFF flow control; it is the default.

None If you select **None** there is no flow control.

XOFF Point

For software flow control, the XOFF point is the level (in bytes) at which the XOFF signal is sent to the modem or ASCII host. The options (64, 256, 512, and 1024) specify the space remaining in the buffer. For example, if you select 64, the XOFF signal is sent when 64 bytes of space remain in the buffer.

Modem Signal Detection

Select the method that the VT emulator will use to determine whether data can be sent on the asynchronous line. The options are:

None The VT emulator will assume that the line is ready, ignoring CD, CTS and DSR.

VT Emulation

Ignore CD

The VT emulator will ignore Carrier Detect, which some modems artificially force high. Use this option if your host is connected through a null modem cable; most null modems do not support CD.

All The VT emulator will monitor CD, CTS (Clear to Send) and DSR (Data Set Ready).

Break Signal Length

The break signal is an intentional framing error on the asynchronous line, used as an attention signal to the host. Some hosts expect the break to be a particular length. The default value is 250 milliseconds. The other options are 500, 1000, and 2000 milliseconds. Select the value required by your host.

Additional Configuration Information

Automatic-Dial: Click **Yes** for Automatic-Dial; then use the **Configure Phone/Modem** if you need to provide more detailed information than is shown. Click **No** if you are using a leased-line connection; you will not use the Automatic-Dial Facility.

Modem Name: When running Windows 95, Windows 98, Windows NT, or Windows 2000, the modem information is handled through the operating system control panel modem applet. This drop-down list contains all the modems defined to Windows; select the one you wish to use.

Primary Phone: This entry is the primary phone number that should be dialed, in order to gain access to the network. It can include a delay for the dial tone and access codes for an outside line or for long-distance services.

Backup Phone: This entry specifies a backup phone number. If you specify a backup number, it is dialed automatically after an attempt to contact the gateway or host through the primary number fails. If you leave this option blank, backup dialing does not happen.

Title: This optional entry is text to describe the connection that you are configuring. The text will be displayed when the number is dialed, but it has no effect on the connection.

Configure Phone/Modem: When Personal Communications is running on Windows 95, Windows 98, Windows NT, or Windows 2000, phone and modem configuration is handled through the operating system's modem utility.

Clicking this button allows you to adjust the details of the modem configurations.

Automatic-Dial Facility: The automatic-dial facility establishes a connection to the host when you start a session.

To use the automatic-dial facility, you must store the dial information, telephone numbers, communication-line information and modem-control information in a file. For details, see the online help. The following functions are provided to enable you to create and change a dial-configuration file:

- Configure Phone/Modem
- Automatic-Dial Utility

Automatic-Dial Utility: The automatic-dial utility enables you to configure and use the automatic-dial function.

The automatic-dial utility window appears when **Show AutoDial Utility** in the Communication menu (on the session-window menu bar) is checked and the Automatic-Dial Facility starts.

Dial / Stop Dialing: This push-button either starts or stops dialing, depending on the current dialing status.

Dial: Push the **Dial** button to dial the specified telephone number and establish a connection.

Stop Dialing: Push the **Stop Dialing** button to stop the dial process immediately.

Hang up: Pushing this button sends the modem-hang-up string and disconnects your PC from the remote computer.

Manual Dial: **Manual Dial** enables you to use a nonpublic telephone line or operator assist to dial the number.

Auto-exit after connection: Choose **Auto-exit after connection** if you want the automatic-dial utility window to close after a connection is established. The window will otherwise remain open.

Modem-signal indicator: On Windows 95, Windows 98, Windows NT, and Windows 2000 systems, use the operating system's modem utility to monitor modem signals.

Configuring Links for VT over Telnet

The VT over Telnet attachment is an application that uses TCP/IP (Transmission Control Protocol/Internet Protocol) and that enables remote logon to an ASCII host. TCP/IP provides connectivity functions for both local area networks (LAN) and wide area networks (WAN) and includes the ability to route information between LANs and WANs. The major TCP/IP networks—the Internet—use a standardized addressing procedure to ensure that IP addresses are unique and that communication between enterprises is possible.

The VT over Telnet attachment for Personal Communications requires a TCP/IP stack that supports the Windows Sockets Version 1.1 interface. WSOCK32.DLL must be in the Windows system directory or the current path to provide the interface for the stack program and to support the Windows Sockets V1.1 interface.

For the VT over Telnet attachment, you must define the following attachment parameters.

- Host Name or IP Address (mandatory)
- Port Number (optional)
- Terminal ID (optional)
- Auto-reconnect (optional)

Attachment Parameters

Host Name or IP Address

Specify either the alphabetic name of the target host or its numeric IP address.

Host Name

VT Emulation

The name of the target host is a string—for example:
host.test.ibm.com

Host IP Address

The 32-bit Internet address of the target host is in dotted-decimal notation—for example: 0.0.0.0

Port Number

Specify the decimal number of the target host's Telnet port. The default, 23, is the standard Telnet port.

Terminal ID

The VT emulator and the Telnet server use the terminal ID for negotiating an appropriate connection. Ask your Telnet administrator for your host's correct terminal ID. When the "default" box is checked, the default values are selected from the Machine Mode, as shown in the following table:

Machine Mode	Default Terminal ID
VT340	DEC-VT220
VT100	DEC-VT100
VT52	DEC-VT52
ANSI	ansi

Auto-reconnect

If the session is disconnected from the host, and if this box is checked, you will be re-connected automatically.

The default is "not checked".

Using A VT Session

Your Personal Communications VT session works as if you were using a VT340, VT100, or VT52 terminal. For AS/400 or mainframe VT connections, the protocol converters have defined VT keyboard sequences, such as F1 or PA1.

The following tables are provided:

- Characters generated by VT Compose Key
- Characters displayed in transparent mode
- OIA line display messages

Refer to Appendix D. Keyboard Layouts for default mapping of the VT340 keyboard to the PC keyboard, as used by the Personal Communications VT emulator.

Compose Key

The VT emulator supports the VT340 compose key for generating special characters on the display. Before using the compose key, define a key combination that represents it.

Using the compose key involves three separate actions:

1. Press and release the compose key.
2. Press and release the first character. (See the table below.)

3. Press and release the second character.

The first and second characters may be typed in either order, except when the table specifies that they must be entered as shown,

The following table shows the appearance and name of each special character, the character pair that generates it, and an indication whether the order of entering the characters is significant.

Table 1. Character Generation

Generated Character		Compose Key, Plus This Pair		
Appearance	Description	First	Second	Order
Á	A acute	A	'	either
á	a acute	a	'	either
Â	A circumflex	A	^	either
â	a circumflex	a	^	either
À	A grave	A		either
à	a grave	a		either
Å	A ring	A	*	either
		A	°	either
å	a ring	a	*	either
		a	°	either
Ã	A tilde	A		either
ã	a tilde	a		either
Ä	A umlaut	A	"	either
ä	a umlaut	a	"	either
Æ	AE ligature	A	E	as shown
æ	ae ligature	a	e	as shown
'	apostrophe	'	space	either
@	at sign	a	a	either
		A	A	either
\	backslash	/	/	either
\	backslash	/	<	either
Ç	C cedilla	C	,	either
CallPath Client	c cedilla	c	,	either
¢	cent sign	c	/	either
		C	/	either
		c	|	either
		C	|	either
^	circumflex accent	^	space	either
}	close brace	)	-	either
]	close bracket	)	)	either
»	close French quote	>	>	either
@	commercial at	a	a	either
		A	A	either

VT Emulation

Table 1. Character Generation (continued)

Generated Character		Compose Key, Plus This Pair		
Appearance	Description	First	Second	Order
©	copyright mark	c	o	either
		C	O	either
		c	0	either
		C	0	either
°	degree sign	0	^	either
		°	space	either
		#	space	either
É	E acute	E	'	either
é	e acute	e	'	either
Ê	E circumflex	E	^	either
ê	e circumflex	e	^	either
È	E grave	E		either
è	e grave	e		either
Ë	E umlaut	E	"	either
ë	e umlaut	e	"	either
<u>a</u>	feminine ordinal indicator	a	_	either
		A	_	either
½	fraction one-half	1	2	as shown
¼	fraction one-quarter	1	4	as shown
ß	German ess-tset	s	s	either
μ	Greek mu	/	u	as shown
		/	U	as shown
»	guillemets, closing	>	>	either
«	guillemets, opening	<	<	either
Í	I acute	I	'	either
í	i acute	i	'	either
Î	I circumflex	I	^	either
î	i circumflex	i	^	either
Ì	I grave	I		either
ì	i grave	i		either
Ï	I umlaut	I	"	either
ï	i umlaut	i	"	either
¡	inverted exclamation	!	!	either
¿	inverted question mark	?	?	either
<u>o</u>	masculine ordinal indicator	o	_	either
		O	_	either
μ	micro sign	/	u	as shown
		/	U	as shown
·	middle dot	.	^	either

Table 1. Character Generation (continued)

Generated Character		Compose Key, Plus This Pair		
Appearance	Description	First	Second	Order
Ñ	N tilde	N		either
ñ	n tilde	n		either
#	number sign	+	+	either
Ó	O acute	O	'	either
ó	o acute	o	'	either
Ô	O circumflex	O	^	either
ô	o circumflex	o	^	either
Ò	O grave	O		either
ò	o grave	o		either
Ø	O slash	O	/	either
ø	o slash	o	/	either
Õ	O tilde	O		either
õ	o tilde	o		either
Ö	O umlaut	O	"	either
ö	o umlaut	o	"	either
Œ	OE ligature	O	E	as shown
œ	oe ligature	o	e	as shown
{	open brace	(	-	either
[	open bracket	(	(	either
«	open French quote	<	<	either
¶	paragraph sign	p	!	either
±	plus-or-minus sign	+	-	either
£	pound sterling sign	l	-	either
		L	-	either
		l	=	either
		L	=	either
"	quotation mark	"	space	either
§	section sign	s	o	either
		S	O	either
		s	!	either
		S	!	either
		s	0	either
		S	0	either
'	single quote	'	space	either
ß	ss German	s	s	either
¹	superscript 1	1	^	either
²	superscript 2	2	^	either
³	superscript 3	3	^	either
	tilde		space	either

VT Emulation

Table 1. Character Generation (continued)

Generated Character		Compose Key, Plus This Pair		
Appearance	Description	First	Second	Order
Ú	U acute	U	'	either
ú	u acute	u	'	either
Û	U circumflex	U	^	either
û	u circumflex	u	^	either
Û	U grave	U		either
ù	u grave	u		either
Ü	U umlaut	U	"	either
ü	u umlaut	u	"	either
|	vertical line	/	^	either
ÿ	Y umlaut	Y	"	either
ÿ	y umlaut	y	"	either
¥	yen sign	y	-	either
		Y	-	either
		y	=	either
		Y	=	either

Transparent Mode

The following table shows the symbol displayed for each character and control code when the VT emulator is in transparent mode. The characters at AA and BA are the feminine and masculine ordinals, respectively. The characters at 1E, 1F, 80, and 9E are underlined, although they may not appear underlined on the output.

Table 2. Character Generation (Transparent Mode)

	0x	1x	2x	3x	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	@	P		0	@	P		p		p	ÿ	°	À	Ð	à	ð
x1	<u>A</u>	<u>Q</u>	!	1	A	Q	a	q	<u>a</u>	<u>q</u>	ı	±	Á	Ñ	á	ñ
x2	<u>B</u>	<u>R</u>	"	2	B	R	b	r	<u>b</u>	<u>r</u>	¢	²	Â	Ò	â	ò
x3	<u>C</u>	<u>S</u>	#	3	C	S	c	s	<u>c</u>	<u>s</u>	£	³	Ã	Ó	ã	ó
x4	<u>D</u>	<u>T</u>	\$	4	D	T	d	t	<u>d</u>	<u>t</u>	¤	´	Ä	Ô	ä	ô
x5	<u>E</u>	<u>U</u>	%	5	E	U	e	u	<u>e</u>	<u>u</u>	¥	µ	Å	Õ	å	õ
x6	<u>F</u>	<u>V</u>	&	6	F	V	f	v	<u>f</u>	<u>v</u>	ı	¶	Æ	Ö	æ	ö
x7	<u>G</u>	<u>W</u>	'	7	G	W	g	w	<u>g</u>	<u>w</u>	§	·	Ç	×	CallPath Client	
x8	<u>H</u>	<u>X</u>	(	8	H	X	h	x	<u>h</u>	<u>x</u>	¨	˘	È	Ø	è	ø
x9	<u>I</u>	<u>Y</u>	)	9	I	Y	i	y	<u>i</u>	<u>y</u>	©	¹	É	Ù	é	ù
xA	<u>J</u>	<u>Z</u>	*	:	J	Z	j	z	<u>j</u>	<u>z</u>	<u>a</u>	<u>o</u>	Ê	Ú	ê	ú
xB	<u>K</u>	<u>L</u>	+	;	K	L	k	l	<u>k</u>	<u>l</u>	«	»	Ë	Û	ë	û
xC	<u>L</u>	<u>\</u>	,	<	L	\	l	|	<u>l</u>	<u>|</u>	¬	¼	Ï	Ü	ï	ü
xD	<u>M</u>	<u>]</u>	-	=	M	]	n	}	<u>m</u>	<u>}</u>	-	½	Í	Ý	í	ý
xE	<u>N</u>	<u>^</u>	.	>	N	^	m		<u>n</u>		®	¾	Î	Þ	î	þ

Table 2. Character Generation (Transparent Mode) (continued)

xF	Ö	=	/	?	Ö	_	n	Œ	o	œ	ˉ	ı	İ	ß	ï	ÿ
----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

OIA Line Display Messages

During VT emulation, messages unique to VT can appear in certain columns of the OIA line. These columns display only VT messages, and do not display any of the messages that would appear there in 3270 or 5250 mode. The following table shows the meaning of each VT-specific message. Columns that are not mentioned in the table show messages common to all Personal Communications modes.

Columns	Message	Meaning
1 through 7	VT340 7	Machine mode is VT340, seven-bit control.
	VT340 8	Machine mode is VT340, eight-bit control.
	VT100	Machine mode is VT100.
	VT52	Machine mode is VT52.
	VTANSI	Machine mode is VTANSI.
9 through 12	LOCK	Keyboard is locked.
30 through 39	OVERSTRIKE	New characters replace the character at the cursor position in Local Edit mode.
	INSERT	New characters move characters in page memory to the right in Local Edit mode.
61 through 64	HOLD	Screen is in hold mode.
66 through 69	EDIT	Local Edit mode is enabled.
71 through 72	Pn (n=1 through 6)	Current page number.

Scrollable History Display

Depending on the size of the history buffer set (see “Configuring a VT Session” on page 3) for your session, you can use the Windows scroll bar control to view history data from the current session.

Chapter 2. ASCII Host File Transfer

Setting Preferences

You can set up your Workstation to perform file transfers; some preferences need to be set first, as described in this section. Other facilities to simplify handling of transfers are also described.

Using XMODEM and YMODEM

Personal Communications allows you to transfer files to and from ASCII hosts that support the XMODEM and YMODEM protocols. In order to use XMODEM or YMODEM, you must have established a connection to an ASCII host.

For file transfer over asynchronous lines, you must select eight data bits and hardware flow control. See "Configuring Links for VT over Async" on page 8 for details.

Choosing a Protocol

You have four choices for protocols. The one you select will depend upon the protocols supported by your ASCII host and by your particular requirements. The following table shows the capabilities of the protocols:

	Downloading		Uploading	
	Single File	Multiple Files	Single File	Multiple Files
XMODEM	Yes	No	Yes	No
XMODEM1K	Yes	No	Yes	No
YMODEM	Yes	Yes	Yes	Yes
YMODEMG	Yes	Yes	Yes	Yes

XMODEM

The XMODEM protocol is a single-file half-duplex protocol that performs error checking. Data is transmitted in 128-byte packets. Error checking, either by CRC or by checksum, occurs automatically. The Personal Communications implementation of XMODEM first tries CRC. If the sender fails to acknowledge the first three requests for CRC, XMODEM shifts to the checksum mode.

XMODEM1K

The XMODEM protocol is the same as XMODEM, except that it always uses CRC and has a larger packet size of 1024 bytes. Because some hosts are not able to handle the 1024-byte packets, there is a need for both XMODEM and XMODEM1K.

YMODEM

The YMODEM protocol is similar to XMODEM, but it allows you to send multiple files in a single transfer. You may use a set of unique filenames, or you may specify groups of files.

YMODEMG

ASCII Host File Transfer

The YMODEMG protocol is the same as YMODEM, supporting multiple files, but it does not supply error checking. It assumes that the data always transfers correctly, and is only for use with error-correcting modems. For large amounts of data it can achieve much greater throughput than YMODEM because it does not wait for packet acknowledgment.

XMODEM and XMODEM1K

To use XMODEM, select **Preferences > Transfer** from the **Edit** menu in your Personal Communications session. The Transfer Preferences window appears. Select the **XMODEM** or **XMODEM1K** protocol, and optionally click on the tab for the selected modem protocol to define the **Transfer Type** or to change advanced settings.

When receiving a file, in the **Receive File from Host** dialog box, enter the file name in the **PC File** field or select a personal computer file name from the drop-down listbox. The transfer type is automatically generated according to the templates.

YMODEM and YMODEMG

To use YMODEM, select **Preferences > Transfer** from the **Edit** menu in your Personal Communications session. The Transfer Preferences window appears. Select the **YMODEM** or **YMODEMG** protocol, and optionally click on the tab for the selected modem protocol to define the **Transfer Type** or to change advanced settings.

When receiving a file, you cannot select the personal computer file name, but you can change the default transfer type, the drive, and the directory, if necessary.

Advanced Settings

There are four advanced setting entries on the **General** property page: **File-Transfer Timeout**, **Extension for List Files**, **Show Status Window** and **Default PC Directory**. They are described in *Personal Communications Reference, Volume I*.

Note: The default value for **File-Transfer Timeout** is 200 seconds, because of the time needed for retransmission of packets and waiting for NAKs.

Defining Transfer Types

Transfer types define the option information used for controlling file transfer. Up to 32 transfer types can be defined for each host system. The original default types are: **delete** (deletes a file on abort), **over** (overwrites existing files) and **none** (does not delete on abort, and does not overwrite).

To add or change transfer types:

1. Click **Preferences > Transfer** from the **Edit** menu.
2. Click the tab for the modem protocol you have selected. The items that appear depend on the selected host system.
3. Enter transfer-type names in the **Transfer-Type** text box, or select them from the drop-down list.
4. Select or enter the required items (see the explanation below).
To add or replace a transfer type, click **Save**. To delete a transfer type, click **Delete**.
5. Click **OK**.

Depending on the transfer type, set the following receive file options:

Delete File on Abort

With this option, if a file transfer is aborted then the incompletely received file is automatically deleted.

Overwrite Existing File

With this option, any existing file with the same name as the incoming file is overwritten.

If you do not select this option, then a new name is given to to the incoming file, according to the following scheme:

Existing file:	EXAMPLE.TXT
First contender becomes:	EXAMPLE.TX1
Second contender:	EXAMPLE.TX2
Tenth contender:	EXAMPLE.T10
Hundredth contender:	EXAMPLE.100
999th contender:	EXAMPLE.999

These options are independent of each other.

File Transfer Templates

For sending ASCII files, Personal Communications automatically generates Host file names and transfer types. For receiving ASCII files via XMODEM and XMODEM1K, Personal Communications generates a transfer type. In both situations, templates define the rules for file name and transfer type generation.

Defining Templates

The templates are common for all sessions and are used for both sending and receiving files. For ASCII host file transfer, you can define up to three templates for each protocol.

To display the templates panels, click the **Templates** button in the **Send File to Host** or **Receive File from Host** panel.

You can add, delete, or replace templates; you can also test templates to see how Personal Communications generates the target file name and transfer type.

When defining templates, you can use * (asterisk) for the global searching of file names; for example, *.EXE for all files that have a file name extension of EXE.

Automatic Generation of File Names

The templates are numbered from 1 to 32; when Personal Communications generates file names, the templates are searched, starting from 1, and the first template that matches is used.

Example of ASCII Protocol Template

The following example shows the use of templates for ASCII host file transfer. When sending files, Personal Communications automatically generates a host file name from a personal computer file name, and vice versa. It also generates a transfer type. When receiving files, Personal Communications automatically generates only transfer types, and only for the XMODEM and XMODEM1K protocols.

For more information about templates, refer to *Personal Communications Reference, Volume I*.

ASCII Host File Transfer

Here are the definitions of the three default templates. The template is selected from the available choices by matching the name of the file being transmitted or received against each template's file specifications.

Template Number	Wildcard specification for PC File	Wildcard specification for host File	Type
1	*.exe	*.*	delete
2	*.txt	*.*	over
3	*.*	*.*	none

Send Example: If you enter `program.exe`, Personal Communications selects template 1, and displays `program.exe delete` in the list box.

Receive Example: (XMODEM AND XMODEM1K only) If you enter `program.exe`, Personal Communications selects template 1, and displays `program.exe delete` in the list box.

Working with Lists of Files

For transferring a group of files it is convenient to use a list. A list makes it easier to transfer the same groups of files frequently, with a single command. Even if you are transferring a group of files only once, a list can help prevent errors. A list of files is itself a file.

You can transfer multiple files at once by using the send/receive list; it is accessible from the Send Files to Host or Receive Files from Host windows. For either window, the files selected are displayed in a **Transfer List**. This list can be saved, and later retrieved and modified. For instructions on selecting file, see "Receiving Files From an ASCII Host" on page 23 and "Sending Files to an ASCII Host" on page 24.

File Name Extension for List Files

By default, send/receive list files have a file name extension of `.SRL`. You can change this default on the property page with the **General** tab, by selecting **Preferences > Transfer** from the **Edit** menu.

Note: Personal Communications does not recognize a file as a send/receive list file unless its name has the specified extension.

Remove From List

By clicking the **Remove** button, you can delete the selected file from a send/receive list.

Open List File

If you click the **Open List** button, the Open File-Transfer List File dialog box appears, allowing you to manipulate the file names in the list.

Save List File

If you click the **Save** button, the Save File-Transfer List File As dialog-box appears and you can save the list of files.

Changing a List of Files

You can make changes to a list of files to be transferred:

Change the Personal Computer or Host File Name: When you select a file to send or receive, Personal Communications automatically generates a host or personal computer file name by using templates. To change the generated file name, just type over it.

Note: When receiving a file from an ASCII host, you specify the host file name on the host system.

For receiving files, you can select a personal computer file from the dialog obtained by clicking the **Browse** button.

Note: The browse function is not available when *receiving* files from an ASCII host; it is available when sending files, but only when using the YMODEM or YMODEMG protocols.

Delete File Names From List: To delete a file from the list, select it from the list and click the **Remove** button.

Add More File Names To List: To add more files to the list, select a file in the **PC File** list box with Ctrl + left mouse-button, or type a file name in the **PC File** entry field and press Enter.

Receiving Files From an ASCII Host

Receive File From Host allows you to receive files from a host system to your personal computer; with one command, you can receive a single file or several. If you often receive the same list of files, you can save the list of file names and receive all the files with one command.

For ASCII host file transfer, the host system must support one of two protocols, XMODEM or YMODEM.

Selecting a Workstation Directory

To receive files to a workstation directory, you can key in the directory information or click the **Browse** button to open the Browse dialog and select the directory; this can be done as part of setting preferences (setting the **Default PC Directory** field) or at the time of the file transfer.

Selecting Files to Receive

For ASCII host file transfer, select the file to receive on the host system.

Follow these steps to receive one or more files from an ASCII host:

1. For the COM port interface (VT over Async attachment only), set the **Flow Control** to **Hardware**. To display the window for setting flow control, follow these steps:
 - a. Select **Configure** from the **Communication** menu; or select **Programs > IBM Personal Communications > Start or Configure Session** from the Windows **Start** menu, then click the **Configure** button. The **Customize Communication** window appears.
 - b. Click the **Link Parameters** button. The **VT Async Attachment** window appears.
 - c. Click the **Advanced** button to display a second attachment window with the **Flow Control** field; select **Hardware**.

ASCII Host File Transfer

- d. Click **OK** in each window successively to return to your Personal Communications session window.
2. Prepare the host system. The exact method of preparation, including selection of file names, depends on the kind of host system to which you are connected. Contact your host-system administrator for details.

Note: The host system must support one of two protocols: XMODEM or YMODEM.

3. Select **Preferences > Transfer** from the **Edit** menu, to display the Transfer Preferences window. Select the type of protocol you want to use from the drop-down list box on the property page with the **General** tab.
4. In the **Default PC Directory** field, type the workstation directory where the file or files should be sent; or, click the **Browse** button to open a dialog and select the directory.
5. To change the transfer parameter defaults for the protocol you selected, click the tab to display the property page for the selected modem protocol.
6. When all preferences have been set, click **OK**.
7. Select **Receive File from Host** from the **Actions** menu. The **Receive File from Host** window appears.
8. For XMODEM and XMODEM1K, click the **Browse** button to open a dialog and select a personal computer file name or names, or enter the names in the **PC File** entry field. The transfer type is automatically generated and appears in the **Transfer Type** entry-field.
9. For YMODEM and YMODEMG, select the transfer type and click the **Browse** button to open a dialog and change the directory, if you desire.
10. Click the **Receive** button to display the **Receive Files Status** window and start the transfer.

Sending Files to an ASCII Host

Send file to host allows you to send files from your personal computer to the host system; with one command, you can send a single file or several files. If you often send the same list of files, you can save the list of file names, and subsequently send all the files with one command.

Note: This is only supported using the YMODEM and YMODEMG protocols.

Selecting Files to Send

There are several ways to do this:

Basic Methods

Type a file name in the **PC File** field and press **Tab**; a host file name and a transfer type are generated automatically according to the templates.

Select files from the dialog obtained by clicking the **Browse** button.

Select From a Send/Receive List

If you have saved a list of file names in a send/receive list, click the **Open List** button and select the list you want to use; the file names saved in the list appear.

Note: For ASCII host file transfer, you can use the send/receive list only with the YMODEM and YMODEMG protocols (not with XMODEM or XMODEM1K).

Advanced Method

The Browse window, obtained by clicking the **Browse** button, displays all the files in the current directory; you can display only certain types of files if you want to.

For example, if the directory has many files and you want to display only files that have the extension .DOC, you can type *.doc in the **PC File** field and click the **Browse** button; the resulting dialog shows only files that have the extension .DOC.

Changing the Host File Name or the Transfer Type

When you select a file to send, Personal Communications automatically generates a host file name and selects a transfer type from the default templates. You can change the file name by typing over the text in the **Host File** field; you can change the transfer type by selecting a different one from the **Transfer Type** drop-down list.

Saving a List of Files to Send

If you frequently send the same set of files, it is a good idea to save the names in a list, called a send/receive list.

Note: For ASCII host file transfer, you can use the send/receive list only with the YMODEM or YMODEMG protocols (not with XMODEM or XMODEM1K).

Sending a List of Files

Select the list, then click the **Send** button.

Part 2. Advanced Configuration, Management, and Operations

Chapter 3. Introduction

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

Configuration Files

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

- *Initial Configuration Definitions*
- *Configuration with Template and Update Files*

Initial Configuration Definitions

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

The first step is to create a configuration using SNA node configuration, Start or Configure Session, or an ASCII editor. For detailed information on configuring sessions refer to *Personal Communications Version 5.0 Quick Beginnings*.

Once the initial configurations file is created, rename the file to the appropriate reserved name. For SNA node configuration files (*.ACG), the file name is PCSINIT.AC\$. For workstation profiles (*.WS), the file name is PCSINIT.WS\$. For emulator configurations using SNA communication, both a PCSINIT.WS\$ and a PCSINIT.AC\$ file should be used.

After the files have been renamed, they can be distributed to client workstations. The files must be placed in the Personal Communications private subdirectory. The definitions in the files will be preloaded whenever a user creates a new configuration.

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

Configuration with Template and Update Files

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

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

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

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

When you create configurations using template and update files, the verification utility searches directories in the following order:

1. The local directory where the verification utility is being invoked
2. The Personal Communications private subdirectory

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

Key Fields

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

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

Adding Keywords to a Template File

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

```
MODE=(
  MODE_NAME=MYMODE
  COS_NAME=#INTER
  CRYPTOGRAPHY=NONE
  DEFAULT_RU_SIZE=1
  MAX_NEGOTIABLE_SESSION_LIMIT=128
  MAX_RU_SIZE_UPPER_BOUND=4096
  MIN_CONWINNERS_SOURCE=15
)
```

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

If the `MODE_NAME` parameter is omitted from the update file, an error will occur during the configuration verification because the `MODE_NAME` parameter cannot be uniquely identified. Not all parameters available for the `MODE` keyword are specified in the update file. The remaining parameters use the defaults as specified in the *Personal Communications Version 5.0 Configuration File Reference*. The resulting addition to the configuration will look like this:

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

Modifying a Keyword in a Template File

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

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

and the following keyword is specified in the update file:

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

the resulting configuration would have the following `MODE` keyword definition:

```
MODE=(
    MODE_NAME=#INTER
    AUTO_ACT=10
    COMPRESSION=PROHIBITED
    COS_NAME=#INTER
    CRYPTOGRAPHY=NONE
    DEFAULT_RU_SIZE=1
    MAX_NEGOTIABLE_SESSION_LIMIT=256
    MAX_RU_SIZE_UPPER_BOUND=4096
    MIN_CONWINNERS_SOURCE=128
    PLU_MODE_SESSION_LIMIT=256
    RECEIVE_PACING_WINDOW=20
)
```

Deleting a Keyword from a Template File

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

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

and the response file contains the following keyword:

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

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

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

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

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

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

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

```
MODE=(
  DELETE
)
```

Note



Not all keywords can be deleted; only those which are not listed as required can be deleted—refer to *IBM Personal Communications Version 5.0 Configuration File Reference* for details.

Applying Updates to Configuration Files

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

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

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

where:

config.acg

is the existing configuration file.

newconfig.chg

is the new configuration file.

Tip



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

Note



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

Automatic Device Name Generation (5250 Only)

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

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

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

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

Substitution Characters

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

Short Session ID

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

Example:

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

Session Type ID

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

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

Collision Avoidance ID

(value range: 1,2,3,...,9,A, B, C,...,Z) The Collision Avoidance ID (CAID) is used by the device name collision (DNC) function (see "Device Name Collision Processing" on page 35) to generate a new DEvICE NAME when the old name is rejected by the Telnet server as already being in use. The special character signifying this in the WID is the equals sign (=).

Example: If the Workstation ID is configured as %ABC=, the session type is Display, and the device name SABC1 is already in use on the

AS/400, then the first generated device name (SABC1) will be rejected by the server, but the second name (SABC2) will be accepted.

Client Naming Function

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

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

&COMPN

Windows COMPuter Name for the client

&USERN

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

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

Notes:

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

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

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

Device Name Collision Processing

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

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

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

Support for Systems Policies

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

See “Chapter 7. System Policy Support” on page 61 for further information.

Support for Management by Tivoli

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

See “Chapter 6. Tivoli Support” on page 49 for further information.

Commands for Emulator Functions

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

PCOMSTRT

Start a Personal Communications session

PCOMSTOP

Stop a Personal Communications session

PCOMQRY

Query Personal Communications sessions

Start a Personal Communications Session

This command (PCOMSTRT) has the following parameters:

- /p** Name of workstation profile to start (required). The syntax is */p=workstation-profile*. The workstation profile can be specified as either the path (drive, directory, and file name) or just the file name, in which case the location of the workstation profile file is the Personal Communications private subdirectory.
- /s** Session letter of the session to start. The syntax is */s=session-letter*. This is optional. If omitted, the first available session letter is used.
- /w** Session window startup state. The syntax is */w={0|1|2|3}*.
 - 0** Hidden
 - 1** Normal (default)
 - 2** Minimized
 - 3** Maximized
- /q** Quiet mode. In quiet mode, PCOMSTRT does not write any messages to stdout.
- /nowait** Do not wait for session to start. The */nowait* option tells PCOMSTRT to complete execution without waiting until the emulator session is started. There is no */wait* option; the default is to wait until the session is started.
- /c** Convert output to Windows code page for output. The */c* option is

intended to be used when the Tivoli IBMPCOMM Plus module task invokes the PCOMSTRT program. It is not intended to be used when a user starts the program from an MS-DOS prompt.

/? Displays help information.

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

Stop a Personal Communications Session

This command (PCOMSTOP) has the following parameters:

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

/all Stops all sessions

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

/nowait

Do not wait for session to stop. The `/nowait` option tells PCOMSTOP to complete execution without waiting until the emulator session is stopped. There is no `/wait` option; the default is to wait until the session is stopped.

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

/? Displays help information.

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

Query Personal Communications Sessions

This command (PCOMQRY) has the following parameters:

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

/all Queries all sessions.

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

/nowait

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

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

/? Displays help information.

Chapter 4. Using InstallShield Silent

InstallShield Silent allows for the automated installation of software, also known as silent installation. With InstallShield Silent, you don't need to monitor the installation or provide input via dialog boxes. An InstallShield Silent installation runs unattended, without displaying any indication that it is running.

Setting Up InstallShield Silent

The file SETUP.EXE is the main program file for installing Personal Communications. It uses the following optional command line parameters, which must be preceded by a dash (-). When you use long path and file name expressions, enclose the expressions in double quotes.

Parameter

Description

-f1<path\ResponseFile>

Use this option to specify the alternate location and name of the response file (.ISS file). If you use this option when running InstallShield Silent, the response file is read from the directory or file specified by <path\ResponseFile>.

-f2<path\LogFile>

Use this option to specify the alternate location and name of the log file created by InstallShield Silent. By default, SETUP.LOG is created and stored in the same directory as SETUP.EXE. You must have write access to the location where SETUP.LOG will be created.

-noinst

Use this option to cause setup to prompt you for installation choices and then to terminate without performing an actual installation. If you use -noinst it must be the first parameter after setup. Normally you will use -noinst with -r.

Note: This option is provided by Personal Communications, not InstallShield. Do not try this option with other applications, unless it is explicitly supported.

-r Use this option to automatically record a silent installation response file (.ISS file) from an attended install. This is a record of the installation input and is stored, by default, in the windows directory.

-s Use this option to run a silent installation.

Usage Examples

The following examples illustrate possible uses of SETUP.EXE for silent installation:

setup -s

Launches InstallShield Silent and loads SETUP.ISS from the directory containing SETUP.EXE. The log file SETUP.LOG is created in the same directory.

setup -s -f1c:\mydir\mydir.iss

Launches InstallShield Silent and uses MYDIR.ISS (from the C:\MYDIR

InstallShield Silent

directory) as the response file. This example also creates the log file SETUP.LOG in the same directory as SETUP.EXE .

setup -s -f1c:\mydir\mydir.iss -f2c:\mydir\mydir.log

Launches InstallShield Silent, uses MYDIR.ISS from the C:\MYDIR directory, and generates the log file MYDIR.LOG in the C:\MYDIR directory.

setup -noinst -r

Records a response file without installing the product. The purpose is to generate a response file for subsequent installations without doing an actual installation on the current system. By default, the response file is named SETUP.ISS and is located in the Windows directory.

setup -noinst -r -f1c:\mydir\mydir.iss

Records a response file without installing the product and generates a response file MYDIR.ISS in the C:\MYDIR directory.

Usage Notes

1. The parameters f1 and f2 cannot be followed by a space.
2. When you run InstallShield Silent, a log file is created in the directory where SETUP.EXE is located. By default, the log file has the default name SETUP.LOG if the -f2 parameter is not provided along with -f1.
3. If you don't use the -f1 parameter when running InstallShield Silent, the response file SETUP.ISS is assumed to be in the same directory as SETUP.EXE. A log file is created in the same directory.
4. SETUP.EXE command line parameters are not case-sensitive.

Modifying the Samples

Personal Communications provides two sample response files for the PC400 product package and two for the combination PC400 and PC/3270 package. These files can be found on the Personal Communications CD-ROM in the **\Install\Admin\distrib** directory and have the following names:

setup.iss

Applies to the typical installation of Personal Communications

min5.iss

Applies to a minimal PC400 package without books and samples

min35.iss

Applies to a minimal installation of Personal Communications without books and samples

You can make minimal modifications to these files, namely to change the install directory and folder name. Following are the parameters that you can customize, along with their default values:

```
SzDir=c:\Program Files\Personal Communications  
SzResultFolder=IBM Personal Communications
```

If you wish to make extensive changes, you must create a response file using the **-r** record option detailed previously.

Usage Example

The following is an example using the response file located on the CD-ROM:

```
setup -s -f1e:\install\admin\distrib\setup.iss -f2c:\windows\setup.log
```

Debugging Silent Installation Problems

This section describes how to debug problems which occur when installing Personal Communications silently.

InstallShield Problems

If the silent install fails, check for the file SETUP.LOG in the directory from which you are installing the software (the directory where SETUP.EXE resides). If you used the -f2 parameter, look for your user-defined log file. The SETUP.LOG file contains a ResultCode indicating the reason why the silent installation did not succeed.

The SETUP.LOG file contains three sections. The first section, [InstallShield Silent], identifies the version of InstallShield Silent used in the silent installation. It also identifies the file as a log file.

The second section, [Application], identifies the installed application's name and version, and the company name.

The third section, [ResponseResult], contains the ResultCode indicating whether or not the silent installation succeeded. An integer value is assigned to the ResultCode keyname in the [ResponseResult] section. InstallShield places one of the following return values after the ResultCode keyname:

- 0 Success
- 1 General error
- 3 Required data not found in the SETUP.ISS file
- 4 Not enough memory available
- 5 File does not exist
- 6 Cannot write to the response file
- 7 Unable to write to log file
- 8 Invalid path to response file
- 9 Not a valid list type (string or number)
- 10 Data type is invalid
- 11 Unknown error during setup
- 12 Dialogs are out of order. (Since the dialog order depends on what products are installed on the workstation, a response file must be created for the specific circumstances expected to be found on the target workstation.)
- 51 Cannot create the specified folder
- 52 Cannot access the specified folder
- 53 Invalid option selected

The SETUP.LOG file for a successful silent installation is shown below.

```
[InstallShield Silent]
Version=v5.00.000
File=Log File
[Application]
Name=Personal Communications
```

InstallShield Silent

```
Version=Version 5.0  
Company=IBM  
Lang=0009  
[ResponseResult]  
ResultCode=0
```

Common Problems

Some of the problems you might encounter are:

- The SETUP.ISS file is not in the directory where the installation code resides, or is not in the directory specified by the -f1 parameter.
- You changed the name or location of the SETUP.ISS file and did not specify the new name or location when you issued the SETUP.EXE command to install the code.
- There is not enough space on specified target drive to install the code.
- You are installing/uninstalling Personal Communications and you are not logged on the target machine with Administrator authority.
- You attempted to uninstall the code immediately after installing it without restarting your workstation inbetween.
- The expected dialog order in the response file does not match the actual dialog order encountered on the target workstation during installation. Since the dialog order depends on what products are installed on the workstation, a response file must be created for the specific circumstances expected to be found on the target workstation.
- There is an error in the syntax of the SETUP.EXE command.

Chapter 5. Remote Installation and Uninstallation of Personal Communications

This chapter describes how to remotely install and uninstall Personal Communications using both the Tivoli Courier product and the the Microsoft Systems Management Server (SMS) product. This document also includes generic information which will allow you to use other software distribution products or to perform simple installs and uninstalls without having to use any software distribution product.

Note: Personal Communications can also be installed remotely using the IBMPCOMM Plus module in conjunction with the Tivoli desktop; see “Chapter 6. Tivoli Support” on page 49 for details.

General Information

Remote installation and uninstallation can be performed in a normal mode (attended) or silent mode (unattended). This chapter includes the following topics:

Preparing for Remote Silent Installation of Personal Communications

Remote Installation of Personal Communications Using Tivoli Courier

Remote Installation of Personal Communications Using SMS

Remote Uninstallation of Personal Communications using SMS

Generic Remote Uninstallation Information for Personal Communications

Debugging Silent Installation Problems

Refer to the *Personal Communications Quick Beginnings* manual for more detailed information on installing and uninstalling Personal Communications.

Installation

Before performing a silent installation of Personal Communications, follow the steps in “Preparing for Remote Silent Installation of Personal Communications” on page 44.

To install Personal Communications using Tivoli Courier, follow the steps in “Remote Installation of Personal Communications Using Tivoli Courier” on page 44.

To install Personal Communications using SMS, follow the steps in “Remote Installation of Personal Communications Using SMS” on page 45.

Uninstallation

To remove Personal Communications using SMS, perform the activities in “Remote Uninstallation of Personal Communications using SMS” on page 46.

Remote Install and Uninstall

To remove Personal Communications using another software distribution product, follow the steps in “Generic Remote Uninstallation Information for Personal Communications” on page 48 and then remove Personal Communications with the software distribution product.

To remove Personal Communications without using any software distribution product, follow the steps in Generic Remote Uninstallation Information for Personal Communications.

Preparing for Remote Silent Installation of Personal Communications

This section describes the preparation steps required to perform a silent installation of the Personal Communications product, regardless of the software distribution product or mechanism you will be using.

Personal Communications provides sample response files (which are English only) that you can use, or you can create your own. See “Chapter 4. Using InstallShield Silent” on page 39 for instructions on creating a response file. Make sure you select not to restart your computer when creating your own response file for use with SMS. SMS will not allow the machine to restart while it is running.

Remote Installation of Personal Communications Using Tivoli Courier

Personal Communications can be installed using Tivoli Courier, a Tivoli Software Distribution product. Tivoli requires that the installation software run in silent or unattended mode. In order to perform a silent installation, you will need a response file. Use the response files shipped with Personal Communications, or create your own.

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

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

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

where:

d1 is the CDROM drive letter

d2 is the local or shared network drive

2. Copy the sample pcomm.cdf file from the CDROM by typing the following command:

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

3. From the Tivoli Profile Manager, create a package by doing the following:
 - a. Create pcomm (the package for Personal Communications).
 - b. Import the pcomm.cdf file into the created Personal Communications package.
 - c. Go to the properties for the file package and update the following as necessary:
 - source host (the name of the Tivoli Administration Server)
 - source directory (d2:\pcomm from step 1)
 - d. From the **Edit** menu, select **Platform Specific Options**, then select either **Windows 95 Options** or **Windows NT Options** and update the following as necessary:

- destination directory (the location of Personal Communications install package on the target workstation which requires approximately 150MB of free disk space)
 - destination directory path
- e. Distribute the Personal Communications package file to the PC Managed nodes.
 - f. When the install process has completed successfully, you may want to remove the file package from target machines to free disk space.

Remote Installation of Personal Communications Using SMS

This section documents the steps required to remotely install Personal Communications using SMS. You must now create an SMS software package containing the Personal Communications installation software and then create an SMS Job to distribute and install the software package. Refer to the Microsoft Systems Management Server documentation for more detailed information on how to create a software package and a Job.

Creating a New SMS Software Package

1. From the Microsoft SMS Administrator application open the **Packages** folder and then create a **new** package.
2. In the SMS Package Properties dialog click the **import** button to create the software package by importing a Package Definition File (PDF).
3. A File Browser dialog appears. Select the drive where the IBM Personal Communications CDROM is located. Then select the **\Install\Admin\Distrib** directory that contains either the package definition file PCOMC.PDF for 3270 and 5250, or PCOMA.PDF for 5250 only. If you are performing a silent install, you can also find the sample SETUP.ISS in this directory.
4. Select the **PCOMC.PDF** or **PCOMA.PDF** file and click **OK**.
5. Click on the **Workstation** button.

In the Source Directory entry field specify the fully qualified pathname to the directory which contains the Personal Communications installation software.

If you are performing a silent install *and* you changed the name or location of the response file, then you need to change the command line syntax. To change the command line syntax, select the **Silent Installation** command and click on the **Properties** button. Append the following parameter to the end of the command in the **Command Line** entry field:

```
-f1d:\path\responsefile
```

Where

```
d:\path\responsefile
```

is the fully qualified path and filename of the response file. SMS requires using short path names.

The directory you indicate must contain all files required for an installation. These files are located on the Personal Communications CDROM in the **\install\pcomm** directory on the IBM Personal Communications installation media.

6. Click the **Close** button to close the Workstation Properties dialog.

Remote Install and Uninstall

If you specified a local path in the Source Directory entry field in step 4, you will get a pop-up dialog warning you that the local path you specified may not be accessible to SMS components running on another machine. Click **OK** to continue.

7. Click **OK** to close the Package Properties window.

If a pop-up dialog appears indicating that SMS will update the software package at all sites, click **OK** to continue.

The software package is now created and can be installed by creating an SMS Job.

Creating an SMS Job

You must now create an SMS Job to distribute and install the software package you created which contains the Personal Communications installation software. Refer to the Microsoft Systems Management Server documentation for detailed information on how to create a Job.

Note:

The user logged on the target machine must have Administrator authority in order to install the Personal Communications software.

When creating an SMS Job to distribute and install the software package, be sure to select the appropriate workstation command. The workstation commands are displayed on the Job Details dialog in the Run Phase section and appear in a drop down list box. Select the **Normal Installation** command if you are performing a normal (attended) installation. Select the **Silent Installation** command if you are performing a silent (unattended) installation.

Normal Installation

At the end of the normal installation, you will be asked whether or not you wish to restart the machine. Click **No**. SMS will not allow the machine to restart while it is running. After you click **No** and the dialog terminates, you must restart your machine manually in order for the changes to take effect and before you can bring up Personal Communications.

Installshield Problem

You may receive a pop-up dialog indicating ISSET_SE error at the end of the installation using SMS. This is a known Installshield program defect and does not affect the installation. If this occurs, click **OK** in the dialog to close it.

Remote Uninstallation of Personal Communications using SMS

This section describes the steps required to remotely uninstall *Personal Communications* using SMS. The UninstallShield program is used to uninstall Personal Communications.

The SMS package you created to install Personal Communications contains the software and files needed to perform the uninstall. If the package has been deleted, see Remote Installation of Personal Communications Using SMS and create the SMS software package. It is not necessary to create a response file to uninstall Personal Communications.

You must now modify the Personal Communications SMS software package and then create an SMS Job to uninstall Personal Communications. Refer to the

Microsoft Systems Management Server documentation for more detailed information on how to modify a software package and create a Job.

Modify the Personal Communications SMS software package

1. From the Microsoft SMS Administrator application open the **Packages** folder, select the **Personal Communications SMS** software package, and double-click to open it.
2. Click the **Workstations** button.
3. Select the uninstall command for the type of uninstall you will be performing.
If you will be performing a normal (attended) uninstall, select the **Normal Uninstall** workstation command on the Setup Package for Workstations dialog and click on the **Properties** button.
If you will be performing a silent (unattended) uninstall, select the **Silent Uninstall** workstation command on the Setup Package for Workstations dialog and then click on the **Properties** button.
4. Inspect and modify (if needed) the **command** in the Command Line edit field of the Command Line Properties dialog.
If you did not install Personal Communications on the target workstation in directory location **C:\PROGRA1\PERSON1** then you need to change the directory location in two places in the command. Be careful not to make any other changes to the command syntax.
5. Click **OK** to close the Command Line Properties dialog.
6. Click the **Close** button to close the Setup Package for Workstations dialog.
If you get a pop-up dialog warning you that the local path you specified may not be accessible to SMS components running on another machine, click **OK** to continue.
7. Click the **OK** button to close the Package Properties window.
If a pop-up dialog appears indicating that SMS will update the software package at all sites, click the **OK** button to continue.

The software package is updated and can be used to uninstall Personal Communications by creating an SMS Job.

Create an SMS Job to Uninstall Personal Communications

You must now create an SMS Job to uninstall Personal Communications. Refer to the Microsoft Systems Management Server documentation for detailed information on how to create a Job.

Note:

The user logged on the target machine must have Administrator authority in order to uninstall Personal Communications.

When creating an SMS Job to uninstall Personal Communications, be sure to select the appropriate workstation command, **Normal Uninstall** or **Silent Uninstall**, in the drop-down list box in the Run Phase section of the Job Details dialog.

You may receive a pop-up dialog with a title of ISSET_SE error at the end of the uninstall using SMS. This is a known Installshield program defect and does not affect the uninstall. If this occurs click the **OK** button in the dialog to close it.

Generic Remote Uninstallation Information for Personal Communications

This section describes generic information on how to perform a remote uninstall of Personal Communications for those users that do not have or wish to use Microsoft SMS. The UnInstallShield program is used to uninstall Personal Communications.

Remote uninstallation simply requires executing the Installshield program on the target workstation from the directory where Personal Communications was installed. With this information it should be easy to perform the uninstall procedure with any software distribution product.

Note: The user logged on the target machine must have Administrator authority in order to uninstall Personal Communications.

The syntax of the UnInstallshield program for uninstalling Personal Communications is:

```
PCSUNIST.EXE -S UNINST.EXE -a -fd2:\xxxxx\DeIsL1.isu
```

Where:

- -S indicates a silent (unattended) uninstall. If you do not wish to perform a silent (unattended) uninstall procedure, then remove this parameter.
- *d2* is the drive on the target workstation where you installed the Personal Communications software.
- *xxxxx* is the directory on the target workstation where you installed the Personal Communications software. If the directory name contains a space, enclose the -f parameter in double quotes.
- DEISL1.ISU is the InstallShield log file. In a few cases, its name may differ (for example, DEISL2.ISU). If the uninstall fails, check the registry key on the target machine and verify the *.ISU filename:

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall\IBM Personal Communications De-install Key.

Example:

The following command could be used to perform a silent uninstall procedure of Personal Communications from a target workstation when run on the target workstation:

```
PCSUNIST.EXE -S UNINST.EXE -a -f"C:\PROGRAM FILES\PERSONAL COMMUNICATIONS\DeIsL1.isu"
```

It is assumed here that the Personal Communications software was installed on the target workstation in the directory:

```
C:\PROGRAM FILES\PERSONAL COMMUNICATIONS
```

Chapter 6. Tivoli Support

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

IBMPCOMM Plus Module for Personal Communications

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

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

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

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

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

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

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

Note: The IBM PCOMMPlus module does not support nodes which have defined a different subdirectory than the \private subdirectory of the directory in which Personal Communications is installed; any configuration files to be accessed by the Tivoli console must be in the \privatesubdirectory. Notes are provided in the following sections, to indicate this restriction.

Task Administration

The IBMPCOMM Plus for Tivoli panel consists of icons representing various tasks, as described in the following sections.

This section describes the administrative tasks available for use on the Tivoli desktop. Tivoli tasks perform a specific function on one or more Personal Communications nodes. By default, the tasks use the nodes in the default subscription list, which is specified by the task

Subscriber_List_of_PCOMM_Nodes. When executing a task, you can select other subscribed Personal Communications nodes you want to execute the task on.

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

Plus Module Administrative Tasks

About_IBMPCOMMPlus

This function displays information about the IBMPCOMM Plus module installed on the TMR server, or other managed nodes.

Subscriber_List_of_PCOMM_Nodes

This is the administrator-defined list of Personal Communications nodes. Before any Personal Communications task can be used, you must subscribe the Personal Communications nodes you wish to manage with the IBMPCOMM Plus module. This is where the **Subscriber_List_of_PCOMM_Nodes** task is used; or you can use a different subscriber list, created using the **Create_Subscriber_List** task.

Create_Subscriber_List

This task allows you to build additional customized lists of Personal Communications nodes; for instance, you might set up different lists, based on geography, or types of user, or based on PCOMM installation options. For example, you can create one subscriber list for installing PCOMM with 5250 Emulation and Services only. Another for installing PCOMM with 3270 Emulation and Services plus IBM SNA Protocols. These are options you choose during the install process. Since the Personal Communications install task uses silent install via a response file, the response file must match exactly what is intended to be installed. For the two install choices above, two response files are needed. You can create these response files, and create corresponding subscriber lists, for installing Personal Communications. Since there are many install choices (and potentially many response files), the **Create_Subscriber_List** task is a way for you to coordinate all this.

Personal Communications Administrative Tasks

Issuing DOS Commands

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

Notes:

1. You should not issue the Personal Communications commands (CSSTART.EXE, CSSTOP.EXE, CSQUERY.EXE, CSDSPY.EXE, CSMODIFY.EXE, PCOMSTRT.EXE, PCOMSTOP.EXE, and PCOMQRY.EXE) manually with this task. These programs are intended for use by other administrative tasks of the IBMPCOMM Plus module. For example, the task **Start_SNA_Node** uses the CSSTART.EXE program. If any of these programs are specified for the **Issue_Command** task, the result can be unpredictable.
2. Be aware of the use of the PCOMM_ROOT environment variable in the DIR command; when Personal Communications is installed on a node, this environment variable is set as a system environment variable. The IBM PCOMMPlus tasks use this variable to identify where Personal Communications is installed on each node. For example, specifying `dir %PCOMM_Root%\private*.*` for the Issue_Command task will return a list of all files in the \private subdirectory of the directory in which Personal Communications is installed.

Launching Personal Communications Programs

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

Launch_Emulator

This can also be performed using the **Launch_Emulator** icon.

Note: The specified workstation profile (.WS) file must be in the \private subdirectory.

Launch_SNA_Node_Operations

This can also be performed using the **Launch_SNA_Node_Operations** icon.

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

Launch_Emulator: This icon is a short cut to Personal Communications Emulator on the TMR server; it executes the module PCSWS.EXE. This is not a remote operation, and is only available if Personal Communications is installed on the TMR server.

Launch_SNA_Node_Operations: This icon is a short cut to Personal Communications SNA node operations on the TMR server; it executes the module PCSNOPS.EXE. This is not a remote operation, and is only available if Personal Communications is installed on the TMR server.

Emulator Administration

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

- **List_Emulator_Configuration_Files**
- **Query_Emulator_Session_Status**
- **Start_Emulator_Session**
- **Stop_Emulator_Session**

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

Note: Only the config files in the \private subdirectory are listed.

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

Start_Emulator_Session: This task starts an emulator session. You are presented with a dialog box with which to specify the workstation profile, session letter, and session window for starting the session; you can select either a specific session letter or the first one available. The task invokes a batch file that calls PCOMSTRT.EXE and returns the resulting information to the Tivoli desktop.

Note: When only the file name is specified for the .WS file (and not the entire path), it must be in the \private subdirectory.

Stop_Emulator_Session: This task stops one or all emulator sessions; it presents a dialog box for you to specify the session letter for the session to stop. You can select either a specific session letter or all sessions. The task invokes a batch file that calls PCOMSTOP.EXE and returns the resulting information to the Tivoli desktop.

SNA Node Administration

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

- **List_SNA_Configuration_Files**
- **Start_SNA_Node**
- **Stop_SNA_Node**
- **Display_SNA_Node_Resource**
- **Modify_SNA_Node_Resource**
- **Query_SNA_Node_Status**

List_SNA_Configuration_Files: This task returns a list of the SNA node configuration files (.ACG) located in the Personal Communications private subdirectory.

Note: Only the config files in the \private subdirectory are listed.

Start_SNA_Node: This task starts an SNA node; the task presents a dialog box for you to optionally specify an SNA configuration file and an action to be performed. It uses the Personal Communications command-line program CSSTART.EXE on the

Personal Communications target nodes to start the specified SNA node configuration file, and displays the results on the Tivoli desktop.

Note: When only the file name is specified for the .ACG file (instead of the entire path), the file must be in the \private subdirectory.

The actions presented are as follows:

Start configuration

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

Set Start at boot time

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

Reset Start at boot time

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

Set default configuration

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

Stop_SNA_Node: This task stops the SNA node. It uses the Personal Communications command-line program CSSTOP.EXE on the Personal Communications target nodes to stop the SNA node, and displays the result.

Display_SNA_Node_Resource: This task displays attributes of an SNA resource; the task presents a dialog box for you to select the resource type, optionally specify the specific resource, and select the level of detail (the number of attributes) to be displayed. It uses the Personal Communications command-line program CSDSPY.EXE on the Personal Communications target nodes, and returns the requested information.

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

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

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

Query_SNA_Node_Status: This task queries the status of the SNA node. It uses the Personal Communications command-line program CSQUERY.EXE on the Personal Communications target nodes, and displays the result.

Event Management

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

Personal Communications Events

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

Events are formatted messages sent to an event server. The event server presents the events to the administrator at the event console. An event adapter formats the event messages in a form that the event server understands. See “Event Adapter” on page 56 for more information about formatting messages into events. The IBMPCOMM Plus module includes the following event classes:

IBMPCOMMBase class

parent for all PCOMM event classes

PCOMM_Unknown_Message class

for formatting unrecognized PCOMM events

PCOMM_Base class

parent class for formatting PCOMM events

PCOMM_Base_1 class

parent class for formatting PCOMM emulator events

PCOMM_Base_2 class

parent class for formatting PCOMM non-emulator events

PCOMM_Error class

parent for PCOMM error event classes

PCOMM_Attention class

parent for PCOMM attention event classes

PCOMM_Warning class

parent for PCOMM warning event classes

PCOMM_Information class

parent for PCOMM informational event classes

PCOMM_PCS_Error class

for formatting PCOMM non-emulator PCS error events

PCOMM_PCS_Attention class

for formatting PCOMM non-emulator PCS attention events

PCOMM_PCS_Information class

for formatting PCOMM non-emulator PCS informational events

PCOMM_ANY_Error class

for formatting PCOMM non-emulator ANY error events

PCOMM_ANY_Attention class

for formatting PCOMM non-emulator ANY attention events

PCOMM_ANY_Warning class

for formatting PCOMM non-emulator ANY warning events

PCOMM_ANY_Information class

for formatting PCOMM non-emulator ANY informational events

Notes:

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

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

2. The `_PCS_` and `_ANY_` notation distinguishes messages issued by Personal Communications with the form of `PCScccc` and `ANYcccc`, respectively.
3. Personal Communications records in the NT event log only error messages. So only the `*_Error` classes apply for formatting events, and thus only the error events get sent to the Tivoli event server.
4. All these classes are defined for the IBMPCOMM Plus module (in the `pcomm_plus.baroc` file). All classes are listed for your reference. You may refer to these class definitions in the `pcomm_plus.baroc` and `pcomm_plus.fmt` files when, for example, you want to add event filters to the NT event adapter configuration (`.conf`) file. More information on filtering Personal Communications events is given in “Event Adapter” on page 56.

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

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

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

At the Tivoli event console, these appear in the event attributes, as follows:

```
msg      Header message
msg_sub_1
          Subject message ID
msg_sub_2
          Probe information
msg_sub_3
          Text
```

Event Rules

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

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

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

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

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

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

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

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

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

Event Adapter

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

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

tecad_nt.baroc

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

tecad_nt.conf

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

tecad_nt.err

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

tecad_nt.fmt

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

Personal Communications also includes the following files:

pcomm_plus.fmt

for the Initialize_NT_Adapter task

pcomm_plus.baroc

for the Setup_Rule_Base task

pcomm_plus.rls

for the Setup_Rule_Base task

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

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

The association between the **Initiate_NT_Adapter** and **Setup_Rule_Base** tasks is as follows:

1. You must first run the **Initiate_NT_Adapter** task so that the target Windows NT or Windows 2000 nodes can send PCOMM events. This task must also be run after you make changes to the `.conf` file, such as adding or changing PCOMM filters. This task stops the NT adapter, combines the PCOMM event format definitions in `pcomm_plus.fmt` with the NT adapter definitions in `tecad_nt.fmt`, and restarts the NT adapter.
2. You must then run the **Setup_Rule_Base** task in order for the TEC server to process incoming PCOMM events. This task stops the event server, instantiates the PCOMM classes in `pcomm_plus.baroc` and the PCOMM rules in `pcomm_plus.rls` with the ones in the rule base the user specifies (or the default rule base), and restarts the event server.

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

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

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

```
Filter:Class=PCOMM_Emul_PCS_Error
```

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

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

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

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

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

Event Management Tasks

Setup_Rule_Base

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

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

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

This task presents a dialog to you; you can enter the rule base name and related information; refer to the help for details.

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

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

Refer to the help for further guidance.

Initialize_NT_Adapter

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

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

This task presents a dialog to you; you can click the **Continue** button, or the **Cancel** button. Click the **Help** button for further guidance.

Software Distribution

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

The IBMPCOMM Plus module includes tasks to create and distribute three file packages; they are used to:

- Distribute and Install Personal Communications
- Distribute the SNA Node Configuration Files
- Distribute the Emulator Configuration Files

Distribute and Install Personal Communications

This file package includes the Personal Communications install image and InstallShield response files. You must manually tailor the response files for installation. The **Create_File_Package_for_Install** task allows you to specify the location of the Personal Communications install image and the response file; it creates the file package (.fp) file. The install image location (path) may be on a Tivoli server or a managed node, or on a LAN server to which the target nodes have access. The response file must be located on the local managed node (the node on which the IBMPCOMM Plus module is running). If you desire, you can modify the response file (or create a new one) for a customized install. This would be useful, for instance, to install only a subset of the languages Personal Communications supports. The Personal Communications CD-ROM includes a sample customized-install response file that installs only one language. It also includes sample full-install and minimum-install response files for combination 3270/5250 and 5250-only. The **File_Package_for_Install** task is used to distribute the install-image files and invoke the InstallShield silent install.

Distribute the SNA Node Configuration Files

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

Note: The SNA node configuration files are written to the \private subdirectory.

Distribute the Emulator Configuration Files

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

Note: The emulator configuration files are written to the \private subdirectory.

Signature (Inventory) Information

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

The Tivoli inventory database includes a signature file for Personal Communications Versions 4.3 and higher. The signature file for Personal Communications Version 5.0 is named PCSINVTY.SYS. The information includes the file name, size, and related product name, version number, and, if applicable, CSD identification.

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

Chapter 7. System Policy Support

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

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

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

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

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

2. The administrator runs the policy editor, which reads one or more policy templates, and lists the available categories and policies. The administrator sets up the desired policies, and the policy editor uses registry functions to save the work to a policy (*.POL) file. The system policy editor is supplied with Microsoft NT Server; documentation about its use can be found at <http://www.microsoft.com>
3. After the user logs on (and user profiles are reconciled if they are enabled), the policy downloader determines where to find the file on the network, opens the policy file, and merges the appropriate computer, user, and user group policies into the local registry.

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

Within the IBM Personal Communications category are the following policies:

Configuration

Contains policy information related to configuration

Execution

Contains policy information related to execution

Installation

Contains policy information related to uninstallation

Configuration Policy

Within the configuration policy are the following parts:

Communication Configuration

Used for controlling the user's ability to change configuration information pertaining to communication. This includes both emulator configuration (the results of manipulating the **Communication > Configure** menu) and the SNA node configuration utility (PCSCFG.EXE).

Menu Configuration

Used for controlling the user's ability to read and change configuration information pertaining to the menu.

Multiple Session Configuration

Used for controlling the user's ability to read, execute, and change configuration information pertaining to multiple sessions—the multiple sessions utility (PCSBAT.EXE).

Toolbar Configuration

Used for controlling the user's ability to read and change configuration information pertaining to the toolbar.

Keyboard Configuration

Used for controlling the user's ability to read and change configuration information pertaining to the keyboard.

Mouse Configuration

Used for controlling the user's ability to read and change configuration information pertaining to the mouse.

Communication Configuration

Communication configuration is a part of type *DROPDOWNLIST*, containing the following:

- Read** The user may only read preconfigured communication information. However, this does not prevent the user from changing the communication configuration information by hand-editing the *.WS file and/or *.ACG file. This is the most restrictive level of control.
- Write** The user may read preconfigured communication information, and can make temporary and permanent changes to the communication configuration information. This is the least restrictive, and is equivalent to the level of control in which users operate without policy support.

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

Menu Configuration

Menu configuration is a part of type *DROPDOWNLIST*, containing the following:

No Access

The user has no access to menu configuration information, in that he can neither read preconfigured menu configuration information, nor change menu configuration information. This means that any menu configuration information contained in the .WS file (specifically, in the [Menu] stanza) or the PCSWIN.INI file (the results of manipulating the **View > Show > Menu** menu) is ignored, and the user cannot execute the menu bar customization utility (PCSMENU.EXE).

The difference between this item and the *Read* item (described below) is that this item ignores updates to the menu configuration information that the user may have made while hand-editing the .WS file or PCSWIN.INI file. This means that the user can only use the product default menu

configuration, and that the administrator cannot set up modified menu configurations to be used by users who have *No Access*. This is the most restrictive level of control.

- Read** The user may only read preconfigured menu information. This means that menu configuration information contained in the .WS file (specifically, in the [Menu] stanza) and the PCSWIN.INI file (the results of manipulating the **View > Show > Menu** menu) is *not* ignored, but the user cannot update the menu using the **View > Show > Menu** menu or the menu-bar customization utility (PCSMENU.EXE). The difference between this item and the *No Access* item is that this item does not prevent the user from updating the menu configuration information by hand-editing the .WS file or the PCSWIN.INI file. However, unlike the *No Access* item, this item allows an administrator to set up modified menu configurations to be used by users who have *Read* access. This is less restrictive than *No Access*.
- Write** The user may read preconfigured menu information, and can make permanent changes to the menu configuration information. This is the least restrictive item, and is equivalent to the level of control in which users operate without policy support.

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

Multiple Session Configuration

Multiple session configuration is a part of type *DROPDOWNLIST*, containing the following:

No Access

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

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

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

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

Toolbar Configuration

Toolbar configuration is a part of type *DROPDOWNLIST*, containing the following:

No Access

The user has no access to toolbar configuration information, in that he can neither read preconfigured toolbar configuration information, nor change (temporarily or permanently) toolbar configuration information. This means that any toolbar configuration information contained in the *.WS file

(specifically, in the [Toolbar] stanza) or the PCSWIN.INI file (the results of manipulating the **View > Show > Tool Bar** menu) is ignored. The difference between this item and the *Read* item (described later) is that this item ignores updates to the toolbar configuration information that the user may have made while hand-editing the .WS file or the PCSWIN.INI file. This means that the user can only use the product default toolbar configuration, and that the administrator cannot set up modified toolbar configurations to be used by users who have *No Access*. This is the most restrictive level of control.

- Read** The user may only read preconfigured toolbar information. This means that toolbar configuration information contained in the .WS file (specifically, in the [Toolbar] stanza) and the PCSWIN.INI file (the results of manipulating the **View > Show > Tool Bar** menu) is *not* ignored, but the user cannot change (temporarily or permanently) the toolbar configuration information. The difference between this item and the *No Access* item is that this item does not prevent the user from updating the toolbar configuration information by hand-editing the .WS file or the PCSWIN.INI file. However, unlike the *No Access* item, this item allows an administrator to set up modified toolbar configurations to be used by users who have *Read* access. This is less restrictive than *No Access*.
- Write** The user may read preconfigured toolbar information, and can make temporary or permanent changes to the toolbar configuration information. This is the least restrictive item, and is equivalent to the level of control in which users operate without policy support.

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

Keyboard Configuration

Keyboard configuration is a part of type *DROPDOWNLIST*, containing the following:

No Access

The user has no access to keyboard configuration information, in that he can neither read preconfigured keyboard configuration information, nor change (temporarily or permanently) keyboard configuration information. This means that any keyboard configuration information contained in the .WS file (specifically, in the [Keyboard] stanza) is ignored. The difference between this item and the *Read* item (described later) is that this item ignores updates to the keyboard configuration information that the user may have made while hand-editing the .WS file or the PCSWIN.INI file. This means that the user can only use the product default keyboard configuration, and that the administrator cannot set up modified keyboard configurations to be used by users who have *No Access*. This is the most restrictive level of control.

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

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

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

Mouse Configuration

Mouse configuration is a part of type *DROPDOWNLIST*, containing the following:

No Access

The user has no access to mouse configuration information, in that he can neither read preconfigured mouse configuration information, nor change (temporarily or permanently) mouse configuration information. This means that any mouse configuration information contained in the .WS file (specifically, in the [Mouse] stanza) is ignored. The difference between this item and the *Read* item (described later) is that this item ignores updates to the mouse configuration information that the user may have made while hand editing the .WS file or the PCSWIN.INI file. This means that the user can only use the product default mouse configuration, and that the administrator cannot set up modified mouse configurations to be used by users who have *No Access*. This is the most restrictive level of control.

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

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

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

Execution Policy

Within the execution policy are the following parts:

Dynamic Menu Modification

Used for controlling whether or not applications executed by the user are permitted to dynamically add themselves to the menu of an active session.

Java Applet

Used for controlling the user's ability to execute Java applets from the **Actions > Run Java Applet** menu.

Macro Play/Record

Used for controlling the user's ability to play and record macros.

Session Execution

Used for controlling the user's ability to start an emulator session.

File Transfer

Used for controlling the user's ability to receive files from or send files to the host system.

Dynamic Menu Modification

Dynamic menu modification is a part of type *CHECKBOX*, with the following states:

Checked

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

Unchecked

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

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

Java Applet

Java applet is a part of type *CHECKBOX*, with the following states:

Checked

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

Unchecked

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

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

Macro Play/Record

Macro play/record is a part of type *DROPDOWNLIST*, containing the following:

No Access

The user has no access to macros, in that he may neither play nor record macros. This is the most restrictive level of control.

Play The user may play macros.

Record

The user may play and record macros.

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

Session Execution

Session execution is a part of type *CHECKBOX*, with the following states:

Checked

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

Unchecked

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

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

File Transfer

Within the file transfer part are the following:

Send Used for controlling the user's ability to send files to the host system.

Receive

Used for controlling the user's ability to receive files from the host system.

Send

Send is of type *CHECKBOX*, with the following states:

Checked

The user may send files to the host system.

Unchecked

The user may not send files to the host system.

The default for send is *Checked*.

Receive

Receive is of type *CHECKBOX*, with the following states:

Checked

The user may receive files from the host system.

Unchecked

The user may not receive files from the host system.

The default for receive is *Checked*.

Installation Policy

Within the installation policy is the following part:

Uninstall

Used for controlling the user's ability to uninstall IBM Personal Communications.

The Uninstall part is a part of type *CHECKBOX*, with the following states:

Checked

The user may uninstall IBM Personal Communications.

Unchecked

The user may not uninstall IBM Personal Communications.

Chapter 8. Network Drives (Shared Folders)

The Network Drives function allows you to access a folder on the AS/400 system as a logical drive on your workstation

The AS/400 system uses a structure called a folder to store and organize documents, mail, and other related objects. Personal Communications lets you share these folders and store both AS/400 documents and your workstation files in them.

The Network Drives function lets you access a folder on the AS/400 system as if it were a drive on your workstation. For example, a folder on the AS/400 system could be assigned to drive E on your workstation; you could then access drive E in the same way as you access drive C on your hard drive.

You can use the Network Drives function to:

- Use AS/400 security to limit access to workstation files.
- Share data with multiple users at the same time.
- Back up workstation files to an AS/400 folder.
- Use workstation commands or AS/400 functions to work with workstation files.

Notes



Network drives requires AS/400 Version 2 Release 3 or higher.
This function is not available for Windows 2000.

Client Installation Considerations

If you choose to run Personal Communications from a server as a client, and you want to reconnect at logon to AS/400 Network Drives, map the Personal Communications server drive to a letter occurring earlier in the alphabet than the AS/400 drive. Failing to do this might result in a **.dll Load Failure** error.

When the computer reboots, drives are reconnected in alphabetic order. The client must reattach the Personal Communications server drive to access files needed to reattach the user's AS/400 Network Drives.

Accessibility

Network drives can be assigned and accessed in the following ways:

- **Command Line:** From the command line, use the following syntax.
`net use [drive letter]: [host name]`

Network Drives

- **Network Neighborhood:** From Network Neighborhood, assign the drive letter by locating the AS/400 server and mapping a logical network drive as you would any other drive. For a step-by-step procedure, refer to the *Quick Beginnings* guide.
- **Windows Explorer:** Access Network Neighborhood from Windows Explorer and follow the procedures for Network Neighborhood logical drive mapping.

AS/400 Connection Configuration Utility

The AS/400 Connection Configuration Utility is used to define connections to each AS/400 host that will use the network drives or the data transfer function. Refer to Personal Communications *Quick Beginnings* for details on how to use this utility.

Performance Considerations

To avoid problems and ensure optimal performance, change the Receive Window count to match the window size on the AS/400 (typically 2). This value is set with SNA Node Configuration on the Performance page for LAN devices.

Disabling Network Drives (Shared Folders)

To disable the Network Drives (Shared Folders) function, perform the following steps. Always save your registry prior to making any changes.

If you are using Windows NT, using REGEDIT, navigate to the section HKEY_LOCAL_MACHINE\. Then:

1. Remove the SYSTEM\CurrentControlSet\Services\pcssfnpn key from the registry.
2. Remove the string pcssfnpn from the value name **ProviderOrder** in SYSTEM\CurrentControlSet\Control\NetworkProvider\Order.
3. Remove the string pcssfrrx from the value name **Userinit** in SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon.
4. Press the **Startup** button, select the **Disable** radio button, and click **OK**.

If you are using Windows 95, using REGEDIT, navigate to the section HKEY_LOCAL_MACHINE\. Then:

1. Remove the SYSTEM\CurrentControlSet\Services\pcssfnp9 key from the registry.
2. Remove the string pcssfnp9 from the value name **ProviderOrder** in SYSTEM\CurrentControlSet\Control\NetworkProvider\Order.
3. Remove the string pcssfrrx from any value names in SOFTWARE\Microsoft\Windows\CurrentVersion\RunServices.
4. Press the **Startup** button, select the **Disable** radio button, and click **OK**.

Chapter 9. Configuring and Using SSL Security for Personal Communications

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

Personal Communications provides several ways to manage certificates:

- “Using Certificate Wizard” on page 77.
- “Using Certificate Management” on page 77.
- “Using the Command Line Mode for Managing Certificates” on page 81.

What is SSL?

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

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

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

Preparation for SSL Communication

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

Server and Related Client Configuration

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

- **Equip the server with an appropriate class X.509 certificate from a well-known Certificate Authority (CA).** The administrator will have created a public/private key pair, submitted a request to the CA for a certificate, and received and activated that server certificate. By definition a *well-known CA* is one whose root certificates are already stored in the Personal Communications PCommClientKeyDb.kdb database file—see “Configuring SSL for Connecting to a Server Using a Certificate from a Well-Known CA” on page 77 for a list of these.

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

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

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

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

Notes:

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

Client Configuration

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

- **PCommClientKeyDb.kdb** is a certificate management database that is automatically created in the Personal Communications private subdirectory when Personal Communications is installed. It is password protected. The default password is *pcomm* and is generated when PCommClientKeyDb.kdb is initially created by Personal Communications. To assure the continued integrity of PCommClientKeyDb.kdb, change the default password to a password or passphrase that is not easily guessed. See “Changing the Password of a Client’s Key Database” on page 76 for instructions on changing the password. As installed, this database contains a list of well known CAs and their root certificates that will be sufficient for the majority of SSL client users for server-side authentication. If the target server uses a certificate from one of those well-known CAs, the client user does not need to modify the PCommClientKeyDb.kdb other than to change the default password for server-side authentication. See the notes in “Server and Related Client Configuration” on page 71.
- **PCommClientKeyDb.sth** is a password stash file that is automatically created when Personal Communications is installed. The password or passphrase used to protect PCommClientKeyDb.kdb is encrypted and stored in this stash file for use by Personal Communications. Every time the password is changed on

PCommClientKeyDb.kdb, this stash file must be regenerated. Otherwise, the SSL-mode will not operate. See “Changing the Password of a Client’s Key Database” on page 76 for instructions on changing the password.

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

Note



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

- The **Enable Security** checkbox must be set in the telnet configuration of Personal Communications to operate in SSL mode. A client operating in SSL mode cannot establish a connection with a server that is operating in ordinary Telnet mode. Likewise, a client operating in ordinary Telnet mode cannot establish a connection with a server operating in SSL mode. See “Configuring Personal Communications for SSL Support” on page 74 for information on enabling security.
- Check the **Send Personal Certificate to Server if Requested** check-box on the **Advanced Security Setup** property page for client authentication. If this field not checked, only server-side authentication is performed. See “Opening a Key Database and Adding a Root Certificate” on page 78 for details.

Establishing an SSL-Based Session

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

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

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

Secure Session Icon

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

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

Configuring Personal Communications for SSL Support

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

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

Host Definition

Automatic Host Location

Advanced Security Setup

Host Definition

For the **Host Definition** property page:

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

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

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

The connection will start after a few moments.

Automatic Host Location

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

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

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

3. Fill in **Scope** and **LU or Pool Name** information, according to instructions from your network administrator.
4. For server authentication only, no additional setup is required. For client authentication, click on the tab for the **Advanced Security Setup** property page. Select the desired radio button for key database password option. Check the **Send Personal Certificate to Server if Requested** check-box and select the desired radio button to select or be prompted for the personal certificate. Click **OK**.
5. Fill out the remainder of the parameters in the standard way.
6. Click **OK**.
7. Click **OK**.

The connection will start after a few moments.

Note



The default TCP/IP parameter for packet multicast has changed for Windows 2000, to disable this function. To enable SLP support, the following **Value Name** needs to be defined or updated in the system registry:

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

Value Type
REG_DWORD-Boolean

Valid Range
Set the value to 0.

Advanced Security Setup

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

1. In the **Key Database Password** group box, you have option whether or not to use the key database password stash file. Check the **Use Password Stash (STH) File** radio button to use key database stash file and not to be prompted for the key database file password. This option can be used with or without Client Authentication function.
2. In the **Personal Client Certificate from Key database** group box, you determine when and how the client certificate will be chosen for sending to the server. If you want to enable client authentication and have the personal client certificate from the key database file sent to the server when requested, check

the **Send Personal Certificate to Server if Requested** check box. Click the **Send Personal Certificate Trusted by Server** radio button if one do not want to be prompted to select a Personal Client Certificate from Key Database file. Personal Communications will send the Personal Client Certificate trusted by Server.

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

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

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

The connection will start after a few moments.

Pop-up Messages

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

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

If you chose to be prompted for personal client certificate information (see “Advanced Security Setup” on page 75), the Select Client Personal Certificate Label Name screen is displayed at connection time, when the server requests the client personal certificate. The **Server Certificate Information** list-box displays the information about the certificate issued to the server, as well as the issuer. Information includes common name, organization, locality and e-mail. This is provided for information purpose only; none of the information can be selected. The **Server Trusted Root List** list-box displays the information about the trusted root supported by server. This is also provided for information purpose only; none of the information can be selected. Click the **Select Personal Certificate Label Name** drop-down list and select the personal certificate to be sent to the server for client authentication. Click **OK** after selection.

If you chose to be prompted once for the key database password (see “Advanced Security Setup” on page 75), the Enter Key Database Password screen is displayed at connection time, when the server requests the client personal certificate. Enter the key database password and click **OK**.

Changing the Password of a Client’s Key Database

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

Certificates can be managed using Certificate Wizard, Certificate Manager, or using the command line mode. For information on using the command line mode, see “Using the Command Line Mode for Managing Certificates” on page 81.

Using Certificate Wizard

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

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

Using Certificate Management

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

1. From the **Start > Programs > IBM Personal Communications > Utilities** menu, select **Certificate Management**.
2. From the **Key Database File** menu, select **Open**.
3. Select the PCommClientKeyDb.kdb file from the Personal Communications private subdirectory.
4. Click **Open**.
5. Type the current password for the file in the Password entry field.
6. From the **Key Database File** menu, select **Change Password**.
Follow the guidelines issued by your network manager for selecting a password or passphrase that is not easily guessed.
7. Type the new password in the New Password entry field.
8. Type the new password again in the Confirm New Password entry field.
9. To set a password expiration time, click **Set expiration time** and enter the number of days until expiration.
10. Click **Stash the password** to *stash* the password of the current database encrypted.

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

11. Click **OK**.

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

The procedures in this section explain how to configure security for connecting to a server using a certificate issued by a well-known CA. The following CA signed root certificates are already stored in the key database and marked as trusted certificates:

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

Following is a summary of the steps required:

1. Confirm that the server you want to connect to has a certificate from a well-known CA.
2. Configure Personal Communications for SSL support. See “Configuring Personal Communications for SSL Support” on page 74 for details.

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

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

Following is a summary of the steps required:

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

Opening a Key Database and Adding a Root Certificate

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

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

.DER Binary DER data

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

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

- Key database file: PCommClientKeyDb.kdb
- Password stash file: PCommClientKeyDb.sth
- These files are located in the Personal Communications private subdirectory.

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

Certificates can be managed using certificate wizard, certificate management, or command line mode. For information on using the command line mode, see “Using the Command Line Mode for Managing Certificates” on page 81.

Using Certificate Wizard

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

1. From the **Start > Programs > IBM Personal Communications > Utilities** menu, select **Certificate Wizard**.
2. Select one of the following radio buttons on the Welcome to the Certificate Wizard panel:
 - Import a certificate**
 - Create a self-signed certificate**
3. Click **Next** and proceed through the wizard following the instructions on each panel.

Using Certificate Management

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

1. From the **Start > Programs > IBM Personal Communications > Utilities** menu, select **Certificate Management**.
2. From the **Key Database File** menu, select **Open**.
3. Select the PCommClientKeyDb.kdb file.
4. Click **Open**.
5. Type the password in the **Password** entry field and click **OK**.
6. Select **Signer Certificates** from the drop-down listbox.
7. Click **Add** to receive the certificate.
The Add CA's Certificate from a File panel appears.
8. Select the format dictated by your server administrator from the **Data Type** listbox.
9. Type the full path to the root certificate file in the **Certificate file name** entry field.
10. Click **Browse**, open the certificate file, and click **OK**.
11. Enter a label for the certificate and click **OK**.
12. Click **View/Edit**.
13. Activate the **Set the certificate as a trusted root**, and click **OK**.

Opening a Key Database and Adding a Personal Certificate

When you get the personal certificate file from your server administrator or a CA, make sure that it is in one of the following formats:

- PKCS12 file
- CMS key database file
- Keyring file
- Base64-encoded ASCII data (armored 64 format)
- Binary DER data

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

Notes:

1. In many cases, instead of providing a personal certificate file, the server administrator may create the key database file and password stash file at the server. After adding the personal certificate, the server administrator can copy the files to each client. If this is done, it is important that the names and location match as follows:

Key database file

PCommClientKeyDb.kdb

Password Stash file PCommClientKeyDb.sth

These files are located in the Personal Communications private subdirectory.

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

Using Certificate Management

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

1. From the **Start > Programs > IBM Personal Communications > Utilities** menu, select **Certificate Management**.
2. From the **Key Database File** menu, select **Open**.
3. Select the PCommClientKeyDb.kdb file.
4. Click **Open**.
5. Type the password in the **Password** entry field and click **OK**.
6. Select **Personal Certificates** from the drop-down listbox.
7. Click **Import for KDB, DYR and P12 format files** to import the certificate.
The Import Key panel appears.
8. Select the format dictated by your server administrator from the **Key file Type** listbox.
9. Type the full path to the root certificate file in the **Certificate file name** entry field.
10. Click **Browse**, open the certificate file, and click **OK**.
11. Enter the **Key Label**, or accept the default, and click **OK**.
12. Click **Receive for ARM and DER format files**.
The Add CA's Certificate from a File panel appears.
13. Select the format dictated by your server administrator from the **Data Type** listbox.
14. Type the full path to the root certificate file in the **Certificate file name** entry field.
15. Click **Browse**, open the certificate file, and click **OK**.
16. Enter a label for the certificate and click **OK**.

Using Certificate Wizard

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

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

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

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

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

1. Open the VeriSign web page at <http://digitalid.verisign.com/> with a web browser.
2. Select **Personal IDs** from the page.
3. Follow the instructions on the next web page to install a **Digital ID** (either **full-service** or **trial**) in your web browser.

After the certificate has been installed in your browser, you must store it in the key database:

1. From the browser, export the certificate into a new key file.
2. Open the Personal Communications client key database file.
3. Click on **Export/Import** to import the certificate. The **Export/Import Key** dialog appears.
4. Click the **Key** button.

Note: The key file type must be PKCS12 file.

5. Enter the name of the file in the first field, the path to the file in the second field; click **OK**.
6. At the password prompt, enter your password and click **OK**.

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

Although using self-signed certificates is highly discouraged, a server administrator can use them while waiting on a purchased CA certificate. Once the CA certificate is available, the server and all clients should be reconfigured to switch from the self-signed certificate to the purchased one.

Following is a summary of the steps required:

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

The steps required by a client in this scenario are the same as those for the Unknown CA scenario. See “Opening a Key Database and Adding a Root Certificate” on page 78 for the steps involved.

Using the Command Line Mode for Managing Certificates

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

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

PCommClientKeyDb.kdb
The key database.

PCommClientKeyDb.sth

The stash file where the password is stashed.

Pcsgsk.pro

A sample profile.

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

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

The options have the following significance:

-h or -?

Displays the syntax shown above.

<filename>.pro

Based on the information specified in <filename>.pro, change the password of a key database, and/or add a certificate to the key database.

The <filename>.pro must be a fully qualified path, or the name of a file that exists in the Personal Communications private subdirectory. A default profile PCSGSK.PRO has been provided in the \private subdirectory.

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

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

The following shows the different ways to invoke the command line mode:

pcsgsk -?

Displays the syntax.

pcsgsk pcsgsk.pro

Changes the password of a key database as specified by parameters in the text file pcsgsk.pro which resides in the Personal Communications private subdirectory.

pcsgsk -e

Displays the possible error codes and the associated messages on the screen.

pcsgsk -g

Launches the Certificate Wizard.

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

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

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

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

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

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

```
Keyword=String
```


Valid keywords are:

KbdFile=

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

KbdFilePwd=

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

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

NewPwd= Multi-word password

The password is: *Multi-word password*.

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

NewPwd=

Used to specify the new password to be set.

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

NewPwd= Multi-word password

The password is: *Multi-word password*.

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

PwdSpaces=

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

NewPwd= Multi-word password

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

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

Warning

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

CertFile=

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

CertLabel=

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

3. Either operation; changing the password or adding a certificate; can be specified or both.
If the `NewPwd=` parameter is specified, the password will be changed to the new password.
If the `CertFile=` and the `CertLabel=` parameters are specified, the certificate will be added to the key database.
4. A line is treated as a comment if it is not the first line or last line and if it is not a keyword line.
5. To preserve the security of passwords, both the new password and the old password will be deleted from the profile during processing. This is true even if the attempted operation fails. For example, if the program cannot find the specified key database, and therefore cannot change the password, the old password and the new password *will* be deleted from the profile.
6. After processing, two lines will be added to the end of the profile, after the `-----END PROFILE-----` line, that specify the results of the attempted operation. These lines are as follows:

ResultPwd=nnnn

Specifies the status of the change-password operation.

ResultCert=nnnn

Specifies the status of the add-certificate operation.

The values possible for `nnnn` can be found by invoking `PCSGSK` with the `-e` option, as described above, which causes the possible error codes and the associated messages to be displayed on the screen.

Security References

Personal Communications supports server and client authentication. The following publications are available on the World Wide Web and provide more information:

- *SSL-Talk FAQ Version 1.0.3*

<http://www.consensus.com/security/ssl-talk-faq.html>

- *Introduction to SSL*

http://www.camb.opengroup.org/~fjh/Papers/cook/ssl_intro.html

- *SSL Version 3.0 Specification*

<http://home.netscape.com/eng/ssl3/index.html>

For an introduction to and a history of public key cryptography and privacy, refer to *Simson Garfinkel, PGP: Pretty Good Privacy, O'Reilly and Associates, 1995* ISBN: 1565920988.

Problem Determination

Here is some information to help you avoid problems that might be related to SSL configuration.

1. With server-side authentication, the common name in the sever's certificate is always compared to the name you type in the Host Name field on the client. These names must match exactly. You cannot:
 - Type the IP address in one place and the host name in the other.
 - Type `wrt05306` in one place and `WTR5306` in the other.
 - Type `wtr05036` in one place and `wtr05036.raleigh.ibm.com` in the other.

Note: This information is only available from the target server administrator.

2. Make sure that SSL is enabled in both the Personal Communications client and the SSL server.
3. Makes sure that the port number in the Advanced configuration panel on the client matches the port number defined in the server.
4. For each different server using a self-signed certificate, you must add a copy of each of the server certificates to your keyring.
5. Be sure there is a root certificate of the proper class to correspond with the class and issuer of the certificate on the server.

Note: Notify your server administrator of any problems prior to contacting IBM Service.

Part 3. National Language Support

Chapter 10. Multiple-Language Support

Personal Communications Version 5.0 multiple-language support provides the capability to allow users to interact with more than a single language on their workstations. Prior versions allowed for different languages to be displayed in emulator sessions; now, the Windows graphical user interface elements of the Personal Communications user interface can be tailored to the languages of users, allowing more flexibility in configuring and using Personal Communications.

This chapter provides some basic description of these facilities. Refer to *IBM Personal Communications Quick Beginnings* for a description of the procedures for changing your configured user interface language. The particulars of installing the support are described in the *Personal Communications CD-ROM Guide to Installation*.

Overview

There are two system-related factors which govern the usage of multiple languages by Personal Communications users:

System Locale

This is set in the Windows Regional Settings (Regional Options for Windows 2000) control panel applet; it determines what system user interface languages can be viewed.

Language Groups

Each system locale is associated with a language group; some groups have only one language; others support several, allowing for simultaneous viewing of applications in more than one language.

System Locale

When you choose a language on the Regional Settings (or Options) screen, a system locale is established as the basis for interacting with the system; Windows interactions of certain application (such as Personal Communications) are governed by this setting.

Notes:

1. Windows common dialogs, such as file open and print, may not change to match the system locale; they will be displayed in the language chosen when Windows was installed.
2. The actions needed to switch system locales depend on the languages installed and the version of Windows. Refer to your Windows documentation for details.

Language Groups

The system locale set when Windows is started determines which Windows/ANSI code page is used by applications; in turn, this code page determines which language group an application can use. The language groups and languages supported for Personal Communications user interface are:

Cyrillic

Russian

Japanese

Japanese

Latin 1

- Brazilian-Portuguese
- Danish
- Dutch
- English
- Finnish
- French
- German
- Italian
- Norwegian
- Portuguese
- Spanish
- Swedish

Latin 2

- Czech
- Hungarian
- Polish
- Slovenian

Turkish

Turkish

Notes:

1. English text can be displayed for any system locale without significant corruption. Therefore, English is an implicit member of each language group.
2. There are additional languages supported for host emulation sessions; these groups only concern user interface language.

Personal Communications User Interface Languages

It is important to understand how Personal Communications uses the capability for supporting multiple languages. Like other applications, Personal Communications can use any language within the language group for which the current system locale is set. You as a user have the ability to change that locale, using the Windows Regional Settings control panel applet.

There are several considerations to keep in mind:

- There is a default Personal Communications user interface language; this is set at installation, and applies to every user of the Windows system.

Note: This default is set to match the Windows user default locale.

- The Personal Communications user interface language is a preference that is stored per user; thus, a shared workstation can support users of different languages.
- If a user does not have a user interface language preference defined, Personal Communications uses the Personal Communications default language for that machine.
- If the user's language preference cannot be displayed (because of a language group mismatch) the user interface is in the Personal Communications default language; a warning is displayed.

- If the Personal Communications default language is incompatible with the system language, English is used as the default.
- Each user in a client/server or Windows Terminal Server (WTS) environments can have his own Personal Communications user interface language.

Multiple Sessions

It is possible to open multiple Personal Communications emulation sessions simultaneously; in previous versions of Personal Communications these sessions could interact with hosts of different languages.

With Version 5.0 it is also possible to have simultaneous sessions with different user interface languages; this is only possible for languages within a language group. In order to do this, you start a session in one language, then change the Personal Communications configuration to another language; when you then start a new session, it will use the newly selected language.

Other Considerations

To prevent the generation of log files in several languages the Personal Communications log file is recorded in the default Personal Communications user interface language.

Some of the Personal Communications components (such as LLC2 drivers) do not require multiple-language support; they only use the default Personal Communications language.

Some Personal Communications components (the keyboard customizer, keypad, play/record, copy/paste and macro components, for example) record, store and insert language sensitive text into Personal Communications sessions. It should be noted that text created in one language group may be corrupted and meaningless when inserted in a session running under another language group. For instance, keyboard customizer text created on a Japanese Personal Communications configuration will not be readable on a French configuration.

Chapter 11. Country Codes, Code Pages, and Character Sets

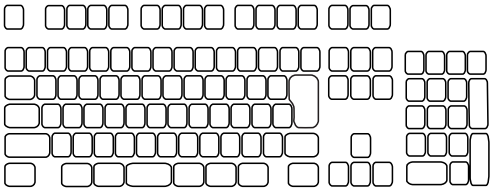
This chapter contains information useful in providing national language support for a network station or a gateway.

Table 3. Supported Keyboard Types

Keyboard Type (Characteristics)	Figure
Space Saving (single row of function keys; no numeric keypad)	
Enhanced and Microsoft Natural (single row of function keys; numeric keyboard)	
5576-001 (Japanese keyboard with double row of function keys; numeric keypad)	
5576-002 (Japanese keyboard with single row of function keys; numeric keypad)	
5576-003 (Japanese keyboard with single row of function keys; no numeric keypad)	

Code Pages and Character Sets

Table 3. Supported Keyboard Types (continued)

Keyboard Type (Characteristics)	Figure
5576-A01 (Japanese keyboard with single row of function keys; numeric keypad)	

Keyboard Country ID and Shift Support

The following table shows the keyboard country ID and shift support for each country.

Table 4. Keyboard Country ID and Shift Support

Keyboard Country	Enhanced Keyboard ID	Enhanced Keyboard-Lock Mode
Arabic-speaking	238,239,240,253,254	C
Austria	129	S
Baltic		
Estonia	442	C
Latvia	463	C
Lithuania	449	C
Belgium	120	S
Brazil	275	C
Canada (Bilingual)	058	C
Canada (445)	445	C
Cyrillic		
Bulgaria	442	C
Belarus	463	C
FYR Macedonia	449	C
Russia (441)	441	C
Russia (443)	443	C
Serbia / Montenegro	450	C
Ukraine	465	C
Denmark	159	C
Finland	153	C
France (120)	120	C
France (189)	189	S
Germany	129	S
Greece	319	C
Iceland	197	C
Israel	115	C

Table 4. Keyboard Country ID and Shift Support (continued)

Keyboard Country	Enhanced Keyboard ID	Enhanced Keyboard-Lock Mode
Italy (141)	141	C
Italy (142/293)	142	C
Japan	–	C
Laos	466	C
Latin America (Spanish)	171	C
Latin 1 (Open Systems)	1047	697
Latin 2		
Bosnia / Herzegovina (Latin)	234	C
Croatia	234	C
Czech Republic	243	C
Hungary	208	C
Poland	457	C
Romania (Moldavia)	214	C
Slovakia	446	C
Slovenia	245	C
Slovenia	234	C
Netherlands	143	C
Norway	155	C
Portugal	163	C
Spain	173	C
Sweden	153	C
Switzerland (French)	150F	C
Switzerland (German)	150G	C
Turkey (179/402)	179	C
Turkey (440)	440	C
U.K. (166)	166	C
U.K. (168)	168	C
U.S. (English)	101G	C
Vietnam	461	C

Note:

- Not selectable
- S Shift lock on key 30
- C Caps lock on key 30

SBCS Code Pages and Character Sets

The following table shows SBCS code pages and character sets.

-
1. Code Page Global Identifier
 2. Graphic Character Set Global Identifier
 3. If you require character set 1250 support, you must manually copy the PCS1250.FON file from the CD-ROM to the Personal Communications directory.

Code Pages and Character Sets

Table 5. Code Pages and Character Sets

Country	Host CPGID ¹ GCSGID ²
Arabic-speaking	235/240
Austria	273-1/697-1 or 500-1/697-1 1141-1/695-1, 1148-1/924-1
Baltic	
Estonia	1122/1307 or 1157/1391
Latvia	1112/1305 or 1156/1393
Lithuania	1112/1305 or 1156/1393
Belgium	500-1/697-1, 1148-1/924-1
Brazil	037-1/697-1 275-1/697-1 1140-1/695-1
Canada (French)	500-1/697-1 1148-1/924-1
Cyrillic	
Bulgaria	1025/1150 or 1154/1381
Belarus	1025/1150 or 1154/1381
FYR Macedonia	1025/1150 or 1154/1381
Serbia	1025/1150 or 1154/1381
Russia	1025/1150 or 1154/1381
Ukraine	1123 or 1158/1388
Denmark	277-1/697-1 or 500-1/697-1 1142-1/695-1, 1148-1/924-1
Finland	278-1/697-1 or 500-1/697-1 1143-1/695-1, 1148-1/924-1
France	297-1/697-1 or 500-1/697-1 1147-1/695-1, 1148-1/924-1
Germany	273-1/697-1 or 500-1/697-1, 1141-1/695-1, 1148-1/924-1
Greece	875/925
Iceland	871-1/697-1 1149-1/695-1
Israel	424/941
Italy	280-1/697-1 or 500-1/697-1 1144-1/695-1, 1148-1/924-1
Laos	1132
Latin America (Spanish)	284-1/697-1 1145-1/695-1
Latin 2 (Multilingual) ³	
Bosnia / Herzegovina (Latin)	870/959 or 1153/1375
Croatia	870/959 or 1153/1375
Czech Republic	870/959 or 1153/1375
Hungary	870/959 or 1153/1375
Poland	870/959 or 1153/1375
Romania (Moldavia)	870/959 or 1153/1375
Slovakia	870/959 or 1153/1375
Slovenia	870/959 or 1153/1375

Table 5. Code Pages and Character Sets (continued)

Country	Host CPGID ¹ GCSGID ²
Netherlands	037-1/697-1 or 500-1/697-1 1140-1/695-1 1148-1/924-1
Norway	277-1/697-1 or 500-1/697-1, 1142-1/695-1, 1148-1/924-1
Portugal	037-1/697-1 or 500-1/697-1 1140-1/695-1 1148-1/924-1
Spain	284-1/697-1 or 500-1/697-1 1145-1/695-1 1148-1/924-1
Sweden	278-1/697-1 or 500-1/697-1 1143-1/695-1 1148-1/924-1
Switzerland (French)	500-1/697-1, 1148-1/924-1
Switzerland (German)	500-1/697-1, 1148-1/924-1
Thailand	1160/1395
Turkey	1026/1152 or 1155/1378
U.K.	285-1/697-1 or 500-1/697-1 1146-1/695-1, 1148-1/924-1
U.S.	037-1/697-1 or 500-1/697-1, 1140-1/695-1 1148-1/924-1
Vietnam	1130 or 1164/1397

DBCS Code Pages and Character Sets

The following tables show the host code pages for DBCS sessions.

Table 6. Japanese Code Pages and Character Sets (for 3270)

Language	Host CPGID ⁴ GCSGID ⁵ (1-byte code)	Host CPGID/GCSGID (2-byte code)	Host CCSID ⁶
Japanese Katakana	290/332	300/370	00930
Japanese Latin Extended	1027/1172	300/370	00939
Japanese Katakana Extended	290/1172	300/370	00930
New Japanese Katakana Extended	290/65535	300/65535	01390
New Japanese Latin Extended	1027/65535	300/65535	01399

Table 7. Japanese Code Pages and Character Sets (for 5250)

Language	Host CPGID/GCSGID (1-byte code)	Host CPGID/GCSGID (2-byte code)	Host CCSID
Japanese Katakana	290/332	300/370	00930
Japanese Katakana Extended	290/1172	300/370	00930
Japanese English	037/101	300/370	00931

4. Code Page Global Identifier

5. Graphic Character Set Global Identifier

6. Coded Character Set Identifier

7. Requires OS/400 V3R1 or higher

Code Pages and Character Sets

Table 7. Japanese Code Pages and Character Sets (for 5250) (continued)

Language	Host CPGID/GCSGID (1-byte code)	Host CPGID/GCSGID (2-byte code)	Host CCSID
Japanese Latin Extended	1027/1172	300/370	00939 ⁷
New Japanese Katakana Extended	290/65535	300/65535	01390
New Japanese Latin Extended	1027/65535	300/65535	01399

Table 8. Hangeul and Chinese Code Pages and Character Sets (for 3270 and 5250)

Language	Host CPGID/GCSGID (1-byte code)	Host CPGID/GCSGID (2-byte code)	Host CCSID
Hangeul	833/933	834/934	05029
Hangeul 1364	833/65535	834/65535	01364
Hangeul Extended	833/1173	834/934	00933
Simplified Chinese	836/936	837/937	05031
Simplified Chinese Extended	836/1174	837/937	00935
Taiwan 1372	1159/65535	835/65535	01371
Traditional Chinese	037/101	835/935	05033
Traditional Chinese Extended	037/1175	835/935	00937

Host Code Page Tables

The following tables show the host code page for each country.

Host Code Page 037-1/697-1 Brazil, Canada, Netherlands, Portugal, U.S., and 037/1175 Traditional Chinese

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¡ SM650000	: SP130000	« SP170000	ª SM210000	ï SP030000	[SM060000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	] SM080000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	☒ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00037

Austria, Germany

Host Code Page 273-1/697-1 Austria, Germany

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ä LA170000	ü LU170000	Ö LO180000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ß LS610000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	[SM060000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	~ SD190000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ä LA180000	Ü LU180000	ö LO170000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(šŸ) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	¡ SM650000	}	\	\] SM080000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	, SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	☒ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00273

Host Code Page 275-1/697-1 Brazil

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	õ LO190000	é LE110000	\ SM070000	0 ND100000
-1	(RSP) SP300000	} SM140000	/ SP120000	[SM060000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	` SD130000	î LI150000	@ SM050000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ı SM650000	ì LI130000	ı SM080000	İ LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ã LA190000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	É LE120000	\$ SC030000	ç LC410000	: SP130000	« SP170000	ª SM210000	ı SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	Ç LC420000	, SP080000	Õ LO200000	» SP180000	º SM200000	ı SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ã LA200000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	ϝ SC010000	® SM530000	× SA070000	{ SM110000	ÿ LY170000	# SM010000	(EO)

Code Page 00275

Denmark, Norway

Host Code Page 277-1/697-1 Denmark, Norway

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ı SM650000	@ SM050000	° SM190000	μ SM170000	¢ SC040000	æ LA510000	å LA270000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	§ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	# SM010000	☒ SC010000	ø LO610000	: SP130000	« SP170000	ª SM210000	ı SP030000	¬ SM660000	(šŸ) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	Å LA280000	, SP080000	Æ LA520000	» SP180000	º SM200000	ı SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ø LO620000	ð LD630000	{ SM110000	Ð LD620000	- SM150000	ö LO170000	~ SD190000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	, SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	[SM060000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00277

Host Code Page 278-1/697-1 Finland, Sweden

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ä LA170000	å LA270000	É LE120000	0 ND100000
-1	(RSP) SP300000	` SD130000	/ SP120000	\ SM070000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	# SM010000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	[SM060000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	}	ï LI170000	\$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	é LE110000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	§ SM240000	☒ SC010000	ö LO170000	:	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(šŸ) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	Å LA280000	,	Ä LA180000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ö LO180000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	¡ SM650000	~ SD190000	@ SM050000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00278

Italy

Host Code Page 280-1/697-1 Italy

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	[SM060000	μ SM170000	¢ SC040000	à LA130000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000	] SM080000	/ SP120000	É LE120000	a LA010000	j LJ010000	ì LI130000	# SM010000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	{ SM110000	} SM140000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	~ SD190000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ù LU130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	° SM190000	é LE110000	ò LO130000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(šŸ) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	£ SC020000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	¡ SM650000	` SD130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	☒ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00280

Host Code Page 284-1/697-1 Latin America, Spain

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	á LA010000	¡ LJ010000	¨ SD170000	£ SC020000	À LA020000	Ê LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ı SM650000	ß LS610000	# SM010000	` SD130000	ı LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	ñ LN190000	: SP130000	« SP170000	ª SM210000	ı SP030000	^ SD150000	(SİY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	\$ SC030000	, SP080000	Ñ LN200000	» SP180000	º SM200000	¿ SP160000	! SP020000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	, SD410000	Ý LY120000	~ SD190000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	☒ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00284

United Kingdom

Host Code Page 285-1/697-1 United Kingdom

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	- SM150000	[SM060000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Ï LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	\$ SC030000	! SP020000	¡ SM650000	: SP130000	« SP170000	ª SM210000	ï SP030000	^ SD150000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	£ SC020000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	] SM080000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	~ SD190000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	, SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	☒ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00285

Host Code Page 290 Japan (Katakana) Extended

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	[SM060000	] SM080000	ソ JS500000	~ SD190000	^ SD150000	{ SM110000	}	\$ SC030000	0 ND100000
-1	。 JQ700000	エ JE010000	/ SP120000	i LI010000	ア JA000000	タ JT100000	- SM150000	¢ SC040000	A LA020000	J LJ020000	€ SC200000	1 ND010000
-2	「 JQ710000	オ JO010000	a LA010000	j LJ010000	イ JI000000	チ JT200000	へ JH400000	\ SM070000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	」 JQ720000	ヤ JY110000	b LB010000	k LK010000	ウ JU000000	ツ JT300000	ホ JH500000	t LT010000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	、 JQ730000	ユ JY310000	c LC010000	l LL010000	エ JE000000	テ JT400000	マ JM100000	u LU010000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	・ JQ740000	ヨ JY510000	d LD010000	m LM010000	オ JO000000	ト JT500000	ミ JM200000	v LV010000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ヲ JW500000	ツ JT310000	e LE010000	n LN010000	カ JK100000	ナ JN100000	ム JM300000	w LW010000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ア JA010000		f LF010000	o LO010000	キ JK200000	ニ JN200000	メ JM400000	x LX010000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	イ JI010000	ー JX700000	g LG010000	p LP010000	ク JK300000	ヌ JN300000	モ JM500000	y LY010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ウ JU010000		h LH010000	` SD130000	ケ JK400000	ネ JN400000	ヤ JY100000	z LZ010000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	£ SC020000	! SP020000		: SP130000	コ JK500000	ノ JN500000	ユ JY300000	レ JR400000				
-B	・ SP110000	¥ SC050000	, SP080000	# SM010000	q LQ010000	r LR010000	s LS010000	ロ JR500000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000	サ JS100000		ヨ JY500000	ワ JW100000				
-D	(SP060000	) SP070000	_ SP090000	´ SP050000	シ JS200000	ハ JH100000	ラ JR100000	ン JN000000				
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ス JS300000	ヒ JH200000	リ JR200000	´ JX710000				
-F	| SM130000	フ SM660000	? SP150000	" SP040000	セ JS400000	フ JH300000	ル JR300000	° JX720000				(EO)

Code Page 00290

France

Host Code Page 297-1/697-1 France

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	[SM060000	` SD130000	¢ SC040000	é LE110000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000	{ SM110000	/ SP120000	É LE120000	a LA010000	j LJ010000	¨ SD170000	# SM010000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	@ SM050000	}	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	] SM080000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	μ SM170000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	° SM190000	§ SM240000	ù LU130000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(S̄HY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	£ SC020000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	à LA130000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	´ SP050000	ý LY110000	¸ SD410000	Ý LY120000	~ SD190000	ò LO130000	¡ SM650000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	☒ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00297

Host Code Page 420 Arabic Bilingual

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ح AH450003	ش AS230000	ظ AZ450000	غ AG310003	ك AK010003	؛ SP140007	؟ SP150007	× SA070000	0 ND100000
-1	(RSP) SP300000	أ AA310002	/ SP120000	خ AH470000	a LA010000	j LJ010000	÷ SA060000	ل AL010000	A LA020000	J LJ020000	(NSP) SP310000	1 ND010000
-2	و AX100000	ؤ AW310000	ة AT020000	ذ AH470003	b LB010000	k LK010000	s LS010000	ي AL220000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ؤ AX100004		ت AT010000	د AD010000	c LC010000	l LL010000	t LT010000	ي AL220003	C LC020000	L LL020000	T LT020000	3 ND030000
-4	- SM860000		ت AT010003	ذ AD470000	d LD010000	m LM010000	u LU010000	ي AL320000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	ع SM870000	ع AY310000	ث AT470000	ر AR010000	e LE010000	n LN010000	v LV010000	ي AL320003	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ء AX300000	ا AA010000	ث AT470003	ز AZ010000	f LF010000	o LO010000	w LW010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7	آ AA210000	ا AA010002	ج AG230000	س AS010000	g LG010000	p LP010000	x LX010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8	آ AA210002	ب AB010000	ح AG230003	س AS010003	h LH010000	q LQ010000	y LY010000	ي AL020000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	أ AA310000	ب AB010003	ح AH450000	، SP080007	i LI010000	r LR010000	z LZ010000	ي AL020003	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	ع SC040000	!	!	:	ش AS230003	ع AC470000	غ AG310004	ل AL010003	(SHY) SP320000	ي AA020000	ا ND010001	
-B	.	\$	,	#	ص AS450000	ع AC470002	ف AF010000	م AM010000	ه AH010003	ي AA020002	٢ ND020001	٦ ND060001
-C	<	*	%	@	ص AS450003	ع AC470003	ف AF010003	م AM010003		ي AY010000		٧ ND070001
-D	(	)	_	'	ض AD450000	ع AC470004	ق AQ010000	ن AN010000	ه AH010004	ي AY010002	٣ ND030001	٨ ND080001
-E	+	;	>	=	ض AD450003	غ AG310000	ق AQ010003	ن AN010003		ي AY010003	٤ ND040001	٩ ND090001
-F	|	٧	?	"	ط AT450000	غ AG310002	ك AK010000	ه AH010000	و AW010000	.	٥ ND050001	(EO)

Code Page 00420

Israel (Hebrew)

Host Code Page 424/941 Israel (Hebrew - Bulletin Code)

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP120000			° SM190000	μ SM170000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1	א HX330000	י HY010000	/ SP120000	ת HT010000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	ב HB010000	ך HK610000	ע HX350000		b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ג HG010000	כ HK010000	ך HP610000		c LC010000	l LL010000	t LT010000	• SM570000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ד HD010000	ל HL010000	פ HP010000	(RSP) SP300000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	ה HH010000	מ HM610000	ץ HS610000		e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ו HW010000	מ HM010000	צ HS450000		f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ז HZ010000	ן HN610000	ק HQ010000		g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ח HH450000	נ HN010000	ך HR010000	= SM100000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ט HT450000	ס HS010000	ש HS210000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	! SM650000	: SP130000	« SP170000			[SM060000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000			] SM080000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000				- SM150000				
-D	(SP060000	) SP070000	_ SP090000	' SP050000		ˆ SD410000		ˆ SD170000				
-E	+ SA010000	; SP140000	> SA050000	= SA040000				' SD110000				
-F	| SM130000	∟ SM660000	? SP150000	" SP040000	± SA020000	⊗ SC010000	® SM530000	× SA070000				(EO)

Code Page 00424

Host Code Page 500-1/697-1 International

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Ï LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	! SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(S̄HY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	, SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	☒ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00500

Israel (Hebrew)

Host Code Page 803 Israel (Hebrew - Old Code)

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	א HX330000	- SP100000									0 ND100000
-1			/ SP120000		ב HB010000	ג HK610000			A LA020000	J LJ020000		1 ND010000
-2					ד HG010000	ה HK010000	ו HP610000		B LB020000	K LK020000	S LS020000	2 ND020000
-3					ז HD010000	ח HL010000	ט HP010000		C LC020000	L LL020000	T LT020000	3 ND030000
-4					י HH010000	יא HM610000	יב HS610000		D LD020000	M LM020000	U LU020000	4 ND040000
-5					יג HW010000	יד HM010000	יז HS450000		E LE020000	N LN020000	V LV020000	5 ND050000
-6					יח HZ010000	יט HN610000	כ HQ010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7					כא HH450000	כב HN010000	כד HR010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8					כה HT450000	כז HS010000	כח HS210000		H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9					כט HY010000	ל HX350000	מ HT010000		I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	\$ SC030000	! SP020000	:	SP130000								
-B	. SP110000	א SC150000	,	SP080000	# SM010000							
-C	< SA030000	* SM040000	% SM020000	@ SM050000								
-D	(SP060000	) SP070000	_ SP090000	' SP050000								
-E	+ SA010000	; SP140000	> SA050000	= SA040000								
-F	| SM130000	א SM660000	? SP150000	" SP040000								(EO)

Code Page 00803

Host Code Page 833/1173 Hangeul

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	[SM060000	] SM080000		- SM150000	^ SD150000	{ SM110000	}	₩ SC140000	0 ND100000
-1			/ SP120000		a LA010000	j LJ010000	~ SD190000		A LA020000	J LJ020000		1 ND010000
-2	SP490000	ㄸ OD100000	ㄹ OL300000	ㅀ OJ000000	b LB010000	k LK010000	s LS010000	\ SM070000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ㄱ OG000000	ㄴ OL000000	ㄷ OM000000	ㄸ OJ100000	c LC010000	l LL010000	t LT010000		C LC020000	L LL020000	T LT020000	3 ND030000
-4	ㄷ OG100000	ㄹ OL200000	ㅁ OB000000	ㅂ OC200000	d LD010000	m LM010000	u LU010000		D LD020000	M LM020000	U LU020000	4 ND040000
-5	ㅅ OG200000	ㅇ OL400000	ㅈ OB100000	ㅊ OK000000	e LE010000	n LN010000	v LV010000		E LE020000	N LN020000	V LV020000	5 ND050000
-6	ㄴ ON000000	ㄷ OL100000	ㅈ OB200000	ㅊ OK000000	f LF010000	o LO010000	w LW010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7	ㅅ ON150000	ㅇ OL600000	ㅈ OS000000	ㅊ OP000000	g LG010000	p LP010000	x LX010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8	ㅇ ON100000	ㅈ OL700000	ㅊ OS100000	ㅋ OH000000	h LH010000	q LQ010000	y LY010000		H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ㄷ OD000000	ㄹ OL500000	ㅁ ON200000	ㅂ SD130000	i LI010000	r LR010000	z LZ010000		I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	₩ SC040000	!	! | SM650000	:	ㅏ OA000000	ㅑ OY400000	ㅓ OY500000	ㅕ OE300000				
-B	. SP110000	\$ SC030000	,	# SM010000	ㅏ OA200000	ㅑ OY300000	ㅓ OU000000	ㅕ OE400000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ㅏ OY200000	ㅑ OO000000	ㅓ OU300000	ㅕ OI000000				
-D	(SP060000	) SP070000	_	' SP050000	ㅏ OY250000	ㅑ OO100000	ㅓ OU200000					
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ㅏ OE200000	ㅑ OO200000	ㅓ OU400000					
-F	| SM130000	ㅏ SM660000	? SP150000	" SP040000	ㅏ OE000000	ㅑ OO300000	ㅓ OY600000					(EO)

Code Page 00833

Simplified Chinese

Host Code Page 836/1174 Simplified Chinese

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000				~ SD190000	^ SD150000	{ SM110000	}	\$ SC030000	0 ND100000
-1			/ SP120000		a LA010000	j LJ010000	- SM150000		A LA020000	J LJ020000		1 ND010000
-2					b LB010000	k LK010000	s LS010000	\ SM070000	B LB020000	K LK020000	S LS020000	2 ND020000
-3					c LC010000	l LL010000	t LT010000		C LC020000	L LL020000	T LT020000	3 ND030000
-4					d LD010000	m LM010000	u LU010000		D LD020000	M LM020000	U LU020000	4 ND040000
-5					e LE010000	n LN010000	v LV010000		E LE020000	N LN020000	V LV020000	5 ND050000
-6					f LF010000	o LO010000	w LW010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7					g LG010000	p LP010000	x LX010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8					h LH010000	q LQ010000	y LY010000		H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9				` SD130000	i LI010000	r LR010000	z LZ010000		I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	£ SC020000	! SP020000	¡ SM650000	:				[SM060000				
-B	· SP110000	¥ SC120000	, SP080000	# SM010000				] SM080000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000								
-D	(SP060000	) SP070000	_ SP090000	' SP050000								
-E	+ SA010000	; SP140000	> SA050000	= SA040000								
-F	| SM130000	∟ SM660000	? SP150000	" SP040000								(EO)

Code Page 00836

Host Code Page 870/959 Latin 2 - EBCDIC Multilingual

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	∨ SD210000	˘ SD230000	◦ SM190000	ą LA430000	· SD290000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	Ą LA440000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ę LE430000	Â LA160000	Ę LE440000	b LB010000	k LK010000	s LS010000	ż LZ290000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	Ť LT420000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ţ LT410000	û LU270000	" SD250000	Ů LU280000	d LD010000	m LM010000	u LU010000	Ž LZ300000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	ş SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA230000	î LI150000	Ă LA240000	Î LI160000	f LF010000	o LO010000	w LW010000	ž LZ210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	č LC210000	ř LL210000	Č LC220000	Ř LL220000	g LG010000	p LP010000	x LX010000	ź LZ110000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	í LL110000	Ç LC420000	Ĺ LL120000	h LH010000	q LQ010000	y LY010000	Ž LZ220000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	é LC110000	ß LS610000	Ć LC120000	` SD130000	i LI010000	r LR010000	z LZ010000	Ż LZ120000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	ś LS110000	ł LL610000	Ś LS120000	Ł LL620000	(šřŷ) SP320000	Ě LE220000	ď LD210000	Ď LD220000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	ň LN210000	ń LN110000	Ň LN220000	Ŋ LN120000	ô LO150000	ů LU250000	Ô LO160000	Ů LU260000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ď LD610000	š LS210000	Ď LD620000	Š LS220000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	í LR110000	ř LT210000	Ř LR120000	Ť LT220000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ř LR210000	¸ SD430000	Ř LR220000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	ş LS410000	Ŧ SC010000	Ş LS420000	× SA070000	ő LO250000	ě LE210000	Ő LO260000	(EO)

Code Page 00870

Iceland

Host Code Page 871-1/697-1 Iceland

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	þ LT630000	æ LA510000	' SD110000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ö LO170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Ï LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ð LD630000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	þ LT640000	Æ LA520000	! SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ð LD620000	` SD130000	} SM140000	@ SM050000	- SM150000	~ SD190000	ü LU170000	^ SD150000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	, SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	{ SM110000	] SM080000	[SM060000	\ SM070000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	Ö LO180000	? SP150000	" SP040000	± SA020000	☒ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00871

Host Code Page 875 Greece

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	.. SD170000	.' SD730000	o SM190000	' SD110000	£ SC020000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	A GA020000	K GK020000	/ SP120000	À GA120000	a LA010000	j LJ010000	~ SD190000	ά GA110000	A LA020000	J LJ020000		1 ND010000
-2	B GB020000	Λ GL020000	T GT020000	Έ GE120000	b LB010000	k LK010000	s LS010000	έ GE110000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	Γ GG020000	M GM020000	Υ GU020000	Ή GE720000	c LC010000	l LL010000	t LT010000	ή GE710000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	Δ GD020000	N GN020000	Φ GF020000	(RSP) SP300000	d LD010000	m LM010000	u LU010000	ï GI170000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	E GE020000	Ξ GX020000	X GH020000	Ί GI120000	e LE010000	n LN010000	v LV010000	ί GI110000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	Z GZ020000	O GO020000	Ψ GP020000	Ό GO120000	f LF010000	o LO010000	w LW010000	ó GO110000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	H GE320000	Π GP020000	Ω GO320000	Υ GU120000	g LG010000	p LP010000	x LX010000	ύ GU110000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	Θ GT620000	P GR020000	Ϊ GI180000	Ό GO720000	h LH010000	q LQ010000	y LY010000	ÿ GU170000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	I GI020000	Σ GS020000	ÿ GU180000	` SD130000	i LI010000	r LR010000	z LZ010000	ώ GO710000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	α GA010000	η GE310000	ν GN010000	ς GS610000	(σ̄ιγ) SP320000	± SA020000	² ND021000	³ ND031000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	β GB010000	θ GT610000	ξ GX010000	τ GT010000	ω GO310000	½ NF010000	§ SM240000	© SM520000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	γ GG010000	ι GI010000	ο GO010000	υ GU010000	ί GI730000			€ SC200000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	δ GD010000	κ GK010000	π GP010000	φ GF010000	ύ GU730000	· SD630000		
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ε GE010000	λ GL010000	ρ GR010000	χ GH010000	‘ SP190000	’ SP200000	« SP170000	» SP180000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	ζ GZ010000	μ GM010000	σ GS010000	ψ GP610000	— SM120000	| SM650000	⌋ SM660000	(EO)

Code Page 00875

International

Host Code Page 924-1/1353-1 International

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	á LA010000	ĵ LJ010000	~ SD190000	£ SC020000	À LA020000	Ĵ LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	Œ LO520000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	œ LO510000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	ÿ LY180000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ý LY120000	! SP020000	Š LS220000	: SP130000	« SP170000	ª SM210000	ı SP030000	¬ SM660000	(šŷ) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	ı SP160000	š LS210000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD640000	- SD310000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	ž LZ210000	[SM060000	] SM080000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	Ž LZ220000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00924

Host Code Page 1025/1150 Cyrillic

The column indicates the first digit, and the row indicates the second digit. If this code page is not used with a Cyrillic host machine, certain characters might not display properly.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	Ъ KN120000	Ц KC010000	Й KJ110000	Я KA150000	Ь KX110000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	ЛЪ KL410000	/ SP120000	Ѡ KC120000	а LA010000	ј LJ010000	~ SD190000	Ы KY010000	А LA020000	Ј LJ020000	§ SM240000	1 ND010000
-2	ђ KD610000	Њ KN110000	ѓ KG120000	ќ KK120000	б LB010000	к LK010000	ѕ LS010000	з KZ010000	В LB020000	К LK020000	Ѕ LS020000	2 ND020000
-3	ѓ KG110000	ћ KC110000	Ё KE180000	(SHY) SP320000	с LC010000	l LL010000	t LT010000	ш KS210000	С LC020000	Л LL020000	Т LT020000	3 ND030000
-4	ё KE170000	ќ KK110000	Є KE160000	Ў KU240000	d LD010000	m LM010000	u LU010000	э KE130000	Д LD020000	М LM020000	У LU020000	4 ND040000
-5	є KE150000	ђ KU230000	Ѕ KZ160000	Ц KG220000	e LE010000	n LN010000	v LV010000	ш KS150000	Е LE020000	Н LN020000	В LV020000	5 ND050000
-6	s KZ150000	ц KG210000	І KI120000	ю KU150000	f LF010000	o LO010000	w LW010000	ч KC210000	Ф LF020000	О LO020000	W LW020000	6 ND060000
-7	i KI110000	Ђ KU220000	Ї KI180000	а KA010000	g LG010000	p LP010000	x LX010000	ь KU210000	Г LG020000	Р LP020000	Х LX020000	7 ND070000
-8	ï KI170000	№ SM000000	Ј KJ020000	б KB010000	h LH010000	q LQ010000	y LY010000	Ю KU160000	Н LH020000	Q LQ020000	У LY020000	8 ND080000
-9	j KJ010000	Ђ KD620000	Љ KL420000	` SD130000	i LI010000	r LR010000	z LZ010000	А KA020000	І LI020000	Р LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	д KD010000	к KK010000	р KR010000	Б KB020000	Х KH020000	Н KN020000	Т KT020000	З KZ020000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	e KE010000	л KL010000	с KS010000	Ц KC020000	И KI020000	О KO020000	У KU020000	Ш KS220000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ф KF010000	м KM010000	т KT010000	Д KD020000	Й KJ120000	П KP020000	Ж KZ220000	Э KE140000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	г KG010000	н KN010000	у KU010000	Е KE020000	К KK020000	Я KA160000	В KV020000	Щ KS160000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	х KH010000	о KO010000	ж KZ210000	Ф KF020000	Л KL020000	Р KR020000	Ь KX120000	Ч KC220000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	и KI010000	п KP010000	в KV010000	Г KG020000	М KM020000	С KS020000	Ы KY020000	(EO)

Code Page 01025

Latin 5, Turkey

Host Code Page 1026/1152 Latin 5 - Turkey

The column indicates the first digit, and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ç LC410000	ğ LG230000	ü LU170000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ö LO170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Ï LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	{ SM110000	ì LI130000	[SM060000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ı LI610000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ç LC420000	Ğ LG240000	Ş LS410000	:	«	ª	ı	¬	(SHY) SP320000	1	2	3
-B	· SP110000	İ LI300000	,	Ö LO180000	»	º	¿	|	ô	û	Ô	Û
-C	< SA030000	* SM040000	% SM020000	Ş LS420000	}	æ]	-	~	\	#	"
-D	(SP060000	) SP070000	_	´	`	´	\$	¨	ò	ù	Ò	Ù
-E	+ SA010000	; SP140000	>	=	ı	Æ	@	'	ó	ú	Ó	Ú
-F	! SP020000	^ SD150000	? SP150000	Ü LU180000	±	☒	®	×	õ	ÿ	Õ	(EO)

Code Page 01026

Host Code Page 1027/1172 Japan (Latin) Extended

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	コ JK500000			- SM150000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1		ウ JU010000	/ SP120000	サ JS100000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	€ SC200000	1 ND010000
-2	。 JQ700000	エ JE010000	イ JI000000	シ JS200000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	「 JQ710000	オ JO010000	ウ JU000000	ス JS300000	c LC010000	l LL010000	t LT010000	ヤ JY100000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	」 JQ720000	ヤ JY110000	エ JE000000	セ JS400000	d LD010000	m LM010000	u LU010000	ユ JY300000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	、 JQ730000	ユ JY310000	オ JO000000	ソ JS500000	e LE010000	n LN010000	v LV010000	ヨ JY500000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	・ JQ740000	ヨ JY510000	カ JK100000	タ JT100000	f LF010000	o LO010000	w LW010000	ラ JR100000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ヲ JW500000	ツ JT310000	キ JK200000	チ JT200000	g LG010000	p LP010000	x LX010000	リ JR200000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ア JA010000	ー JX700000	ク JK300000	ツ JT300000	h LH010000	q LQ010000	y LY010000	ル JR300000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	イ JI010000	ア JA000000	ケ JK400000	` SD130000	i LI010000	r LR010000	z LZ010000	レ JR400000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000		:	テ JT400000	ノ JN500000	マ JM100000	ロ JR500000				
-B	・ SP110000	\$ SC030000	,	# SM010000	ト JT500000	ハ JH100000	ミ JM200000	ワ JW100000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ナ JN100000	ヒ JH200000	ム JM300000	ン JN000000				
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ニ JN200000	フ JH300000	[SM060000	] SM080000				
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ヌ JN300000	へ JH400000	メ JM400000	ゝ JX710000				
-F	| SM130000	フ SM660000	? SP150000	" SP040000	ネ JN400000	ホ JH500000	モ JM500000	。 JX720000				(EO)

Code Page 01027

Latin 1

Host Code Page 1047/103 Latin 1 (Open Systems)

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	∟ SM660000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	á LA010000	â LJ010000	~ SD190000	£ SC020000	À LA020000	Ê LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	´ SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¡ SM650000	: SP130000	« SP170000	ª SM210000	ï SP030000	Ý LY120000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	¨ SD170000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	ˉ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	[SM060000	] SM080000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	^ SD150000	? SP150000	" SP040000	± SA020000	ϝ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01047

Host Code Page 1112/1035 Latvia, Lithuania

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	š LS210000	ę LE430000	Š LS220000	Ę LE440000	b LB010000	k LK010000	s LS010000	ī LI310000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	è LE290000	Ä LA180000	È LE300000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ą LA430000	č LC210000	Ą LA440000	Č LC220000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	ì LI430000	ų LU430000	Į LI440000	Ų LU440000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ū LU310000	„ SP230000	Ū LU320000	Į LI320000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ą LA270000	“ SP210000	Ą LA280000	Ł LL420000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ē LE310000	ġ LG410000	Ē LE320000	Ģ LG420000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ž LZ210000	ß LS610000	Ž LZ220000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¡ SM650000	: SP130000	« SP170000	Ŕ LR420000	” SP220000	[SM060000	(šīy) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	ŗ LR410000	ż LZ110000	] SM080000	ō LO310000	ć LC110000	ō LO320000	Ć LC120000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ā LA310000	æ LA510000	Ā LA320000	Ž LZ120000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ż LZ290000	ķ LK410000	Ž LZ300000	Ḳ LK420000	ņ LN410000	ł LL610000	Ń LN420000	Ł LL620000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ń LN110000	Æ LA520000	Ń LN120000	↓ LL410000	ó LO110000	ś LS110000	Ó LO120000	Ś LS120000
-F	| SM130000	⌋ SM660000	? SP150000	" SP040000	± SA020000	⊘ SC010000	® SM530000	× SA070000	õ LO190000	’ SP200000	Õ LO200000	(EO)

Code Page 01112

Estonia

Host Code Page 1122/1037 Estonia

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ä LA170000	å LA270000	É LE120000	0 ND100000
-1	(RSP) SP300000	` SD130000	/ SP120000	\ SM070000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	# SM010000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	[SM060000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	\$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	é LE110000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	§ SM240000	☒ SC010000	ö LO170000	:	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(šŸ) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	Å LA280000	,	Ä LA180000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ö LO180000	š LS210000	æ LA510000	Š LS220000	- SM150000	¡ SM650000	~ SD190000	@ SM050000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ž LZ210000	Æ LA520000	Ž LZ220000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01122

Host Code Page 1123 Ukraine

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP120000	Ї KN120000	Ц KC010000	Й KJ110000	Я KA150000	Ь KX110000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	Љ KL410000	/ SP120000	Ѡ KC120000	а LA010000	ј LJ010000	~ SD190000	Ы KY010000	А LA020000	Ј LJ020000	§ SM240000	1 ND010000
-2	ђ KD610000	њ KN110000	Г KG300000	Ќ KK120000	б LB010000	к LK010000	ѕ LS010000	з KZ010000	В LB020000	К LK020000	Ѕ LS020000	2 ND020000
-3	г KG290000	ћ KC110000	Ё KE180000	ѡ ^(SHY) SP320000	с LC010000	l LL010000	t LT010000	ш KS210000	С LC020000	Л LL020000	Т LT020000	3 ND030000
-4	ё KE170000	ќ KK110000	Є KE160000	Ў KU240000	d LD010000	m LM010000	u LU010000	э KE130000	Д LD020000	М LM020000	У LU020000	4 ND040000
-5	є KE150000	ђ KU230000	Ѕ KZ160000	Ц KG220000	e LE010000	n LN010000	v LV010000	ш KS150000	Е LE020000	Н LN020000	В LV020000	5 ND050000
-6	s KZ150000	ц KG210000	І KI120000	ю KU150000	f LF010000	o LO010000	w LW010000	ч KC210000	Ф LF020000	О LO020000	W LW020000	6 ND060000
-7	i KI110000	Ђ KU220000	Ї KI180000	а KA010000	g LG010000	p LP010000	x LX010000	ь KU210000	Г LG020000	Р LP020000	Х LX020000	7 ND070000
-8	ï KI170000	№ ² SM000000	Ј KJ020000	б KB010000	h LH010000	q LQ010000	y LY010000	Ю KU160000	Н LH020000	Q LQ020000	У LY020000	8 ND080000
-9	j KJ010000	Ђ KD620000	Љ KL420000	` SD130000	i LI010000	r LR010000	z LZ010000	А KA020000	І LI020000	Р LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	д KD010000	к KK010000	р KR010000	Б KB020000	Х KH020000	Н KN020000	Т KT020000	З KZ020000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	e KE010000	л KL010000	с KS010000	Ц KC020000	И KI020000	О KO020000	У KU020000	Ш KS220000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ф KF010000	м KM010000	т KT010000	Д KD020000	Й KJ120000	П KP020000	Ж KZ220000	Э KE140000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	г KG010000	н KN010000	у KU010000	Е KE020000	К KK020000	Я KA160000	В KV020000	Щ KS160000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	х KH010000	о KO010000	ж KZ210000	Ф KF020000	Л KL020000	Р KR020000	Ь KX120000	Ч KC220000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	и KI010000	п KP010000	в KV010000	Г KG020000	М KM020000	С KS020000	Ы KY020000	(EO)

Code Page 01123

Vietnam

Host Code Page 1130 Vietnam

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA230000	î LI150000	Ã LA240000	Ï LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ñ SD198000	Ç LC420000	Đ SC180000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	]	¡ SM650000	:	« SP170000	ª SM210000	ı SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	,	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	đ LD610000	æ LA510000	Ð LD600000	- SD310000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	¿ SD918000	Œ LO520000	◌ SD458000	œ LO510000	ƒ LU910000	ù LU130000	Ɔ LU920000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	◌ SD138000	Æ LA520000	◌ SD118000	ÿ LY180000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	◌ SC010000	® SM530000	× SA070000	σ LO910000	ÿ LY170000	Œ LO920000	(EO)

Code Page 01130

Host Code Page 1132 Laos

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	₭ SC190000				○ U0000ED0	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000		/ SP120000		a LA010000	j LJ010000	~ SD190000	◌ U0000ED1	A LA020000	J LJ020000		1 ND010000
-2	ກ U0000E81	ຢ U0000E8D	ປ U0000E9B	ສ U0000EA3	b LB010000	k LK010000	s LS010000	໒ U0000ED2	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ຂ U0000E82	ດ U0000E84	ຜ U0000E9C	ລ U0000EA5	c LC010000	l LL010000	t LT010000	໓ U0000ED3	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ຄ U0000E84	ຕ U0000E85	ຝ U0000E9D	ວ U0000EA7	d LD010000	m LM010000	u LU010000	໔ U0000ED4	D LD020000	M LM020000	U LU020000	4 ND040000
-5	ງ U0000E87	ຖ U0000E86	ພ U0000E9E	ຫ U0000EAB	e LE010000	n LN010000	v LV010000	໕ U0000ED5	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ຈ U0000E88	ທ U0000E87	ູ U0000E9F	ອ U0000EAD	f LF010000	o LO010000	w LW010000	໖ U0000ED6	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ສ U0000EAA	ນ U0000E89	ມ U0000EA1	ຮ U0000EAE	g LG010000	p LP010000	x LX010000	໗ U0000ED7	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ຮ U0000E8A	ປ U0000E8A	ຢ U0000EA2		h LH010000	q LQ010000	y LY010000	໘ U0000ED8	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	[SM060000	] SM080000	^ SD150000	` SD130000	i LI010000	r LR010000	z LZ010000	໙ U0000ED9	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	! SM650000	: SP130000		ິ U0000EB4	ື U0000EBC			ໍ U0000ECD		
-B	. SP110000	\$ SC030000	, SP080000	# SM010000		ີ U0000EB5	ື U0000EB1	໒ U0000EC0	ໍ U0000EC8	ຸ U0000EC6		
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ູ U0000EAF	ື U0000EB6	ື U0000EBB	໔ U0000EC1	ໍ U0000EC9			
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ູ U0000EB0	ື U0000EB7	ື U0000EBD	໒ U0000EC2	ື U0000ECA	໙ U0000EDC		
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ງ U0000EB2	ື U0000EB8		ື U0000EC3	ໍ U0000ECB	໙ U0000EDD		
-F	| SM130000	┘ SM660000	? SP150000	" SP040000	ູ U0000EB3	ື U0000EB9		໒ U0000EC4	ໍ U0000ECC			(EO)

Code Page 01132

Brazil, Canada, Netherlands, Portugal, U.S., Trad. Chinese

Host Code Page 1140-1/695-1 Brazil, Canada, Netherlands, Portugal, U.S., and 1140/1175 Traditional Chinese

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¡ SM650000	: SP130000	« SP170000	ª SM210000	ï SP030000	[SM060000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	] SM080000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	đ LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	⌋ SM660000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01140

Host Code Page 1141-1/695-1 Austria, Germany

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ä LA170000	ü LU170000	Ö LO180000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ß LS610000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	[SM060000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	~ SD190000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ä LA180000	Ü LU180000	ö LO170000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(šŸ) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	¡ SM650000	}	\	\] SM080000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	, SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01141

Denmark, Norway

Host Code Page 1142-1/695-1 Denmark, Norway

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	| SM650000	@ SM050000	° SM190000	μ SM170000	¢ SC040000	æ LA510000	å LA270000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	§ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	# SM010000	€ SC200000	ø LO610000	:	« SP170000	ª SM210000	ı SP030000	¬ SM660000	(SİY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	Å LA280000	,	Æ LA520000	» SP180000	º SM200000	ı SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ø LO620000	ð LD630000	{ SM110000	Ð LD620000	- SM150000	ö LO170000	~ SD190000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	[SM060000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01142

Host Code Page 1143-1/695-1 Finland, Sweden

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ä LA170000	å LA270000	É LE120000	0 ND100000
-1	(RSP) SP300000	` SD130000	/ SP120000	\ SM070000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	# SM010000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	[SM060000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	\$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	é LE110000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	§ SM240000	€ SC200000	ö LO170000	:	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(šŸ) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	Å LA280000	,	Ä LA180000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ö LO180000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	¡ SM650000	~ SD190000	@ SM050000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	´ SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01143

Italy

Host Code Page 1144-1/695-1 Italy

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	[SM060000	μ SM170000	¢ SC040000	à LA130000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000	] SM080000	/ SP120000	É LE120000	a LA010000	j LJ010000	ì LI130000	# SM010000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	{ SM110000	} SM140000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	~ SD190000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ù LU130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	° SM190000	é LE110000	ò LO130000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SİY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	£ SC020000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	´ SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	¡ SM650000	¸ SD130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01144

Host Code Page 1145-1/695-1 Latin America, Spain

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	á LA010000	¡ LJ010000	¨ SD170000	£ SC020000	À LA020000	Ê LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ı SM650000	ß LS610000	# SM010000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	ñ LN190000	: SP130000	« SP170000	ª SM210000	ı SP030000	^ SD150000	(SİY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	Ñ LN200000	» SP180000	º SM200000	¿ SP160000	! SP020000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	~ SD190000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01145

United Kingdom

Host Code Page 1146-1/695-1 United Kingdom

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	– SM150000	[SM060000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Ï LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	\$ SC030000	! SP020000	¡ SM650000	: SP130000	« SP170000	ª SM210000	ï SP030000	^ SD150000	(S̄Y) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	£ SC020000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	] SM080000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	~ SD190000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01146

Host Code Page 1147-1/695-1 France

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	[SM060000	` SD130000	¢ SC040000	é LE110000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000	{ SM110000	/ SP120000	É LE120000	a LA010000	j LJ010000	¨ SD170000	# SM010000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	@ SM050000	}	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	] SM080000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	μ SM170000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	° SM190000	§ SM240000	ù LU130000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(šŸ) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	£ SC020000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	à LA130000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	´ SP050000	ý LY110000	¸ SD410000	Ý LY120000	~ SD190000	ò LO130000	¡ SM650000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01147

International

Host Code Page 1148-1/695-1 International

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	á LA010000	ĵ LJ010000	~ SD190000	£ SC020000	À LA020000	Ĵ LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	! SM650000	: SP130000	« SP170000	ª SM210000	ı SP030000	¬ SM660000	(SİY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01148

Host Code Page 1149-1/695-1 Iceland

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	þ LT630000	æ LA510000	' SD110000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ö LO170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Ï LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ð LD630000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	þ LT640000	Æ LA520000	! SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(šŸ) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ð LD620000	` SD130000	} SM140000	@ SM050000	- SM150000	~ SD190000	ü LU170000	^ SD150000	Û LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	, SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	{ SM110000	] SM080000	[SM060000	\ SM070000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	Ö LO180000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01149

Latin 2

Host Code Page 1153/1375 Latin 2 - EBCDIC Multilingual

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	∨ SD210000	˘ SD230000	◦ SM190000	ą LA430000	· SD290000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	Ą LA440000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ę LE430000	Â LA160000	Ę LE440000	b LB010000	k LK010000	s LS010000	ż LZ290000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	Ť LT420000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ț LT410000	û LU270000	" SD250000	Û LU280000	d LD010000	m LM010000	u LU010000	Ź LZ300000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA230000	î LI150000	Ă LA240000	Î LI160000	f LF010000	o LO010000	w LW010000	ž LZ210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	č LC210000	ĭ LL210000	Č LC220000	Ľ LL220000	g LG010000	p LP010000	x LX010000	ź LZ110000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	í LL110000	Ç LC420000	Ĺ LL120000	h LH010000	q LQ010000	y LY010000	Ž LZ220000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ć LC110000	ß LS610000	Ć LC120000	` SD130000	i LI010000	r LR010000	z LZ010000	Ż LZ120000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	ś LS110000	ł LL610000	Ś LS120000	Ł LL620000	(SİY) SP320000	Ě LE220000	ď LD210000	Ď LD220000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	ñ LN210000	ń LN110000	Ń LN220000	Ň LN120000	ô LO150000	ů LU250000	Ô LO160000	Ů LU260000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ď LD610000	š LS210000	Ď LD600000	Š LS220000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	í LR110000	ĭ LT210000	Ř LR120000	Ť LT220000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ř LR210000	¸ SD430000	Ř LR220000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	ş LS410000	€ SC200000	Ş LS420000	× SA070000	ő LO250000	ě LE210000	Ő LO260000	(EO)

Code Page 01153

Host Code Page 1154/1381 Cyrillic

The column indicates the first digit, and the row indicates the second digit. If this code page is not used with a Cyrillic host machine, certain characters might not display properly.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP120000	Ъ KN120000	Ц KC010000	Й KJ110000	Я KA150000	Ь KX110000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	Љ KL410000	/ SP120000	Ѡ KC120000	а LA010000	ј LJ010000	~ SD190000	Ы KY010000	А LA020000	Ј LJ020000	€ SC200000	1 ND010000
-2	ђ KD610000	њ KN110000	ѓ KG120000	ќ KK120000	б LB010000	к LK010000	ѕ LS010000	з KZ010000	В LB020000	К LK020000	Ѕ LS020000	2 ND020000
-3	ѓ KG110000	ћ KC110000	Ё KE180000	ѡ ^(SHY) SP320000	с LC010000	l LL010000	t LT010000	ш KS210000	С LC020000	Л LL020000	Т LT020000	3 ND030000
-4	ё KE170000	ќ KK110000	Є KE160000	Ў KU240000	d LD010000	m LM010000	u LU010000	э KE130000	Д LD020000	М LM020000	U LU020000	4 ND040000
-5	є KE150000	ђ KU230000	Ѕ KZ160000	Ц KG220000	e LE010000	n LN010000	v LV010000	ш KS150000	Е LE020000	Н LN020000	V LV020000	5 ND050000
-6	s KZ150000	ц KG210000	І KI120000	ю KU150000	f LF010000	o LO010000	w LW010000	ч KC210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	i KI110000	Ѣ KU220000	Ї KI180000	а KA010000	g LG010000	p LP010000	x LX010000	ь KU210000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ï KI170000	N ^e SM000000	J KJ020000	б KB010000	h LH010000	q LQ010000	y LY010000	Ю KU160000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	j KJ010000	Ѥ KD620000	Љ KL420000	` SD130000	i LI010000	r LR010000	z LZ010000	А KA020000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	д KD010000	к KK010000	р KR010000	Б KB020000	X KH020000	Н KN020000	Т KT020000	З KZ020000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	е KE010000	л KL010000	с KS010000	Ц KC020000	И KI020000	О KO020000	У KU020000	Ш KS220000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ф KF010000	м KM010000	т KT010000	Д KD020000	Й KJ120000	П KP020000	Ж KZ220000	Э KE140000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	г KG010000	н KN010000	у KU010000	Е KE020000	К KK020000	Я KA160000	В KV020000	Щ KS160000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	х KH010000	о KO010000	ж KZ210000	Ф KF020000	Л KL020000	Р KR020000	Ь KX120000	Ч KC220000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	и KI010000	п KP010000	в KV010000	Г KG020000	М KM020000	С KS020000	Ы KY020000	(EO)

Code Page 01154

Latin 5, Turkey

Host Code Page 1155/1378 Latin 5 - Turkey

The column indicates the first digit, and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ç LC410000	ğ LG230000	ü LU170000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ö LO170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	{ SM110000	ì LI130000	[SM060000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ı LI610000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ç LC420000	Ğ LG240000	Ş LS410000	:	«	ª	ı	¬	(SİY) SP320000	1	2	3
-B	· SP110000	İ LI300000	,	Ö LO180000	»	º	ı	|	ô	û	Ô	Û
-C	< SA030000	* SM040000	% SM020000	Ş LS420000	}	æ]	-	~	\	#	"
-D	(SP060000	) SP070000	_	´	`	´	\$	¨	ò	ù	Ò	Ù
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ı	Æ	@	'	ó	ú	Ó	Ú
-F	! SP020000	^ SD150000	? SP150000	Ü LU180000	± SA020000	€ SC200000	® SM530000	×	õ	ÿ	Õ	(EO)

Code Page 01155

Host Code Page 1156/1393 Latvia, Lithuania

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	š LS210000	ę LE430000	Š LS220000	Ę LE440000	b LB010000	k LK010000	s LS010000	ī LI310000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	è LE290000	Ä LA180000	È LE300000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ą LA430000	č LC210000	Ą LA440000	Č LC220000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	ì LI430000	ų LU430000	Į LI440000	Ų LU440000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ū LU310000	„ SP230000	Ū LU320000	Į LI320000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ą LA270000	“ SP210000	Ą LA280000	Ł LL420000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ē LE310000	ġ LG410000	Ē LE320000	Ģ LG420000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ž LZ210000	ß LS610000	Ž LZ220000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¡ SM650000	: SP130000	« SP170000	Ŕ LR420000	” SP220000	[SM060000	(šīy) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	ŗ LR410000	ż LZ110000	] SM080000	ō LO310000	ć LC110000	Ō LO320000	Ć LC120000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ā LA310000	æ LA510000	Ā LA320000	Ž LZ120000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ż LZ290000	ķ LK410000	Ž LZ300000	Ķ LK420000	ņ LN410000	ł LL610000	Ń LN420000	Ł LL620000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ń LN110000	Æ LA520000	Ń LN120000	↓ LL410000	ó LO110000	ś LS110000	Ó LO120000	Ś LS120000
-F	| SM130000	⌋ SM660000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	’ SP200000	Õ LO200000	(EO)

Code Page 01156

Estonia

Host Code Page 1157/1391 Estonia

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ä LA170000	å LA270000	É LE120000	0 ND100000
-1	(RSP) SP300000	` SD130000	/ SP120000	\ SM070000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	# SM010000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	[SM060000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	\$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ï LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	é LE110000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	§ SM240000	€ SC200000	ö LO170000	:	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SİY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	Å LA280000	,	Ä LA180000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ö LO180000	š LS210000	æ LA510000	Š LS220000	- SD310000	¡ SM650000	~ SD190000	@ SM050000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ž LZ210000	Æ LA520000	Ž LZ220000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01157

Host Code Page 1158/1388 Ukraine

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP120000	Ъ KN120000	ц KC010000	й KJ110000	я KA150000	ь KX110000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	Љ KL410000	/ SP120000	Ѡ KC120000	а LA010000	ј LJ010000	~ SD190000	ы KY010000	А LA020000	Ј LJ020000	€ SC200000	1 ND010000
-2	ђ KD610000	њ KN110000	Г KG300000	Ќ KK120000	б LB010000	к LK010000	ѕ LS010000	з KZ010000	В LB020000	К LK020000	Ѕ LS020000	2 ND020000
-3	г KG290000	ћ KC110000	Ё KE180000	Ѓ ^(SHY) SP320000	с LC010000	l LL010000	t LT010000	ш KS210000	С LC020000	Л LL020000	Т LT020000	3 ND030000
-4	ё KE170000	ќ KK110000	Є KE160000	Ў KU240000	d LD010000	m LM010000	u LU010000	э KE130000	Д LD020000	М LM020000	U LU020000	4 ND040000
-5	є KE150000	ђ KU230000	Ѕ KZ160000	Ц KG220000	e LE010000	n LN010000	v LV010000	ш KS150000	Е LE020000	Н LN020000	В LV020000	5 ND050000
-6	s KZ150000	ц KG210000	І KI120000	ю KU150000	f LF010000	o LO010000	w LW010000	ч KC210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	i KI110000	Ђ KU220000	Ї KI180000	а KA010000	g LG010000	p LP010000	x LX010000	ь KU210000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ï KI170000	№ ² SM000000	J KJ020000	б KB010000	h LH010000	q LQ010000	y LY010000	Ю KU160000	Н LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	j KJ010000	Ђ KD620000	Љ KL420000	` SD130000	i LI010000	r LR010000	z LZ010000	А KA020000	І LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	д KD010000	к KK010000	р KR010000	Б KB020000	Х KH020000	Н KN020000	Т KT020000	З KZ020000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	e KE010000	л KL010000	с KS010000	Ц KC020000	И KI020000	О KO020000	У KU020000	Ш KS220000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ф KF010000	м KM010000	т KT010000	Д KD020000	Й KJ120000	П KP020000	Ж KZ220000	Э KE140000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	г KG010000	н KN010000	у KU010000	Е KE020000	К KK020000	Я KA160000	В KV020000	Щ KS160000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	х KH010000	о KO010000	ж KZ210000	Ф KF020000	Л KL020000	Р KR020000	Ь KX120000	Ч KC220000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	и KI010000	п KP010000	в KV010000	Г KG020000	М KM020000	С KS020000	Ы KY020000	(EO)

Code Page 01158

Host Code Page 1160/1395 Thailand

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	฿ SC130000	◎ BQ400000	๗ BQ500000	☯ BQ600000	○ ND100002	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	' BZ100300	/ SP120000	ˆ BE400000	a LA010000	j LJ010000	~ SD190000	๑ ND010002	A LA020000	J LJ020000	๗ BZ300300	1 ND010000
-2	ก BK100000	จ BC100000	ฉ BT100000	ช BT600000	b LB010000	k LK010000	s LS010000	๒ ND020002	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ข BK200000	ฉ BX100000	ฐ BT200000	ฑ BT700000	c LC010000	l LL010000	t LT010000	๓ ND030002	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ช BK300000	ซ BS100000	ฑ BT300000	ฒ BT800000	d LD010000	m LM010000	u LU010000	๔ ND040002	D LD020000	M LM020000	U LU020000	4 ND040000
-5	ค BK400000	ซ BX200000	ฒ BT400000	น BN300000	e LE010000	n LN010000	v LV010000	๕ ND050002	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ค BK500000	ณ BX300000	ณ BN200000	บ BB100000	f LF010000	o LO010000	w LW010000	๖ ND060002	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ฃ BK600000	ญ BY100000	ด BD200000	ป BP100000	g LG010000	p LP010000	x LX010000	๗ ND070002	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ง BN100000	ฉ BD100000	ด BT500000	ฝ BP200000	h LH010000	q LQ010000	y LY010000	๘ ND080002	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	[SM060000	]	^ SD150000	` SD130000	i LI010000	r LR010000	z LZ010000	๙ ND090002	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	๕ SC040000	! SP020000	! SM650000	: SP130000	ฝ BF100000	ร BR100000	๒ BS300000	๗ BQ200000	๘ BZ200300	• BQ300000	๗ BA700000	+ BZ400000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	พ BP300000	ถ BR200000	ส BS400000	๘ BA200000	๘ BI200000	๒ BE200000	๗ BQ100000	๕ BZ500000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	พ BF200000	ล BL100000	ห BH100000	๘ BA100000	๘ BU100000	๒ BE300000	๘ BE100000	๐ BN400000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ภ BP400000	ภ BL200000	ฬ BL300000	๗ BA300000	๘ BU200000	๒ BO200000	' BZ100000	+ BZ400300
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ม BM100000	ว BW100000	อ BO100000	๗ BA400000	๗ BU300000	๒ BA500000	๘ BZ200000	€ SC200000
-F	| SM130000	๗ SM660000	? SP150000	" SP040000	ย BY200000	ศ BS200000	๘ BH200000	๘ B1100000	๗ BU400000	๒ BA600000	๘ BZ300000	(EO)

Host Code Page 1164/1397 Vietnam

The column indicates the first digit and the row indicates the second digit.

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA230000	î LI150000	Ã LA240000	Ï LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ñ SD198000	Ç LC420000	Đ SC180000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	]	¡ SM650000	:	« SP170000	ª SM210000	ı SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	,	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	đ LD610000	æ LA510000	Ð LD600000	- SD310000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	¿ SD918000	Œ LO520000	◊ SD458000	œ LO510000	ƒ LU910000	ù LU130000	Ɔ LU920000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	◊ SD138000	Æ LA520000	◊ SD118000	ÿ LY180000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	σ LO910000	ÿ LY170000	Œ LO920000	(EO)

Code Page 01164

IBM Japanese Character Set (2-Byte Codes)

The IBM Japanese character set defines characters that consist of 2-byte codes.

Character Types

The following characters are included in this character set:

- Basic kanji set
- Basic non-kanji set: alphabet, numerals, Katakana, Hiragana, symbols, and space
- Extended kanji set
- New extended kanji set
- New extended non-kanji set
- Extended non-kanji set: Roman numerals, Greek alphabet, and Russian alphabet

In addition to these characters, you can define up to 1880 (6205 for extended Unicode subset) user-defined characters.

Character Size

A kanji character is displayed on the screen using the area of two SBCS characters; it is usually enclosed with the shift characters hex 0E and hex 0F. Similarly, when a kanji character is printed, it uses the area of two SBCS printed characters. This size is equivalent to double the area used by alphabetic, numeric, and Katakana characters when they are displayed or printed.

IBM Kanji Codes

The following tables show the relationship between kanji and IBM kanji codes.

Table 9. The IBM Japanese Character Set and IBM Kanji Codes

1st byte (hex)	2nd byte (hex)	
40	41...	...FE
40	space	Reserved area
41		Extended non-kanji set 134 characters
42		Basic kanji set (includes space) 416 characters
43		
44		
45		Basic kanji set 3226 characters
46		
47		
55		
56		Extended kanji set 3487 characters
57		
58		
68		
69		User-defined characters 1880 characters
70		
71		
7F		
80		Reserved area
81		
82		
FE		

IBM Japanese Character Set

Table 10. The IBM Japanese Character Set and IBM Kanji Codes (Extended for Unicode Subset)

1st byte (hex)	2nd byte (hex)	
40	41...	...FE
40	space	Reserved area
41		Extended non-kanji set 134 characters
42		Basic kanji set (includes space) 416 characters
43		
44		
45		Basic kanji set 3226 characters
46		
47		
55		
56		Extended kanji set 3478 characters
57		
58		
68		
69		User-defined characters 6205 characters
70		
71		
B7		
B8		New extended kanji set 5522 characters
B9		
C0		
A5		
A6		New extended non-kanji set 2035 characters
A7		
A8		
E9		
EA		Reserved area
EB		
EC		
FE		

Note: These tables do not show that all characters have a kanji code assigned. Each kanji character has a kanji number in addition to the IBM kanji code. A kanji number is a decimal number up to five digits in length, which is used for entering a kanji-like symbol from keyboards that do not have “YOMI”.

Following is the relationship between IBM kanji codes and kanji numbers:

kanji number = converted value of ((IBM kanji code) - x'4000')

All kanji characters can be entered using kanji numbers.

IBM Traditional Chinese Character Set

Table 11. IBM Traditional Chinese Host Code

	Number of Characters	Code Range	Low-Byte Range
DBCS Space	1	X'4040'	
DBCS Symbols	1003	X'4141' - X'4959'	X'41' - X'FD', skipping X'7F'
Primary Chinese	5402	X'4C41' - X'68CB'	X'41' - X'FD', skipping X'7F'

IBM Japanese Character Set

Table 11. IBM Traditional Chinese Host Code (continued)

	Number of Characters	Code Range	Low-Byte Range
Secondary Chinese	7654	X'6941' - X'91C7'	X'41' - X'FD', skipping X'7F'
User-Defined Area	6204	X'C241' - X'E2FD'	X'41' - X'FD', skipping X'7F'

IBM Simplified Chinese Character Set, GBK Code

Table 12. IBM Simplified Chinese Character Set, GBK Code

	Number of Characters	Host Code Range	PC Code Range
DBCS Space	1	X'4040'	X'A1A1'
GB 2312-80 Non-Chinese Character Set (GBK/1)		X'4141'-X'47FE' (737)	X'A1A1'-X'A9FE' (846)
GB 2312-80 Chinese Character Set (GBK/2)		X'4841'-X'6CFE' (6763)	X'B0A1'-X'F7FE' (6768)
ISO 10646-1 CJK unified ideographs (GBK/3)	6080	X'8141'-X'A0FE', X'A141'-X'A181'	X'8140'-X'A0FE' (Note 1)
ISO 10646-1 CJK unified ideographs ISO 10646-1 CJK compatibility (GBK/4)	8160	X'A182'-X'A1FE', X'A241'-X'CCFE', X'CE41'-X'CEFE'	X'AA40'-X'FEA0' (Note 1)
Big-5 Symbol Compatibility Ideographic Structure Symbols (GBK/5)		X'CD41'-X'CDFE' (148)	X'A840'-X'A9A0' (192) (Note 1)
User Definable Charcters Area (UDC 1 to 3)	1894	X'7641'-X'80FE'	X'AAA1'-X'AFFE', X'F8A1'-X'FEFE', X'A140'-X'A7A0' (Note 1)
Note 1: X'7F' of second byte is excluded.			

IBM Hangeul Character Set

Table 13. IBM Hangeul Host Code (833)

	Number of Characters	Code Range	Low-Byte Range
DBCS Space	1	X'4040'	
DBCS Symbols	939	X'4141' - X'4BFD'	X'41' - X'FD', skipping X'7F'
Hanja Set	5265	X'5041' - X'6C45'	X'41' - X'FD', skipping X'7F'

Table 13. IBM Hangeul Host Code (833) (continued)

	Number of Characters	Code Range	Low-Byte Range
Hangeul and Jamo Set	2672	X'8441' - X'D3B7'	X'41' - X'FD', skipping X'7F'
User-Defined Area	1880	X'D441' - X'DDFD'	X'41' - X'FD', skipping X'7F'

Table 14. IBM Hangeul Host Code (1364)

	Number of Characters	Code Range	Low-Byte Range
DBCS Space	1	X'4040'	
Non-Hangeul/Hanja Set	1181	X'4141' - X'4E92'	X'41' - X'FE'
Hanja Set	5265	X'5041' - X'6C45'	X'41' - X'FE'
Hangeul and Jamo Set	11224	X'8441' - X'D3BD'	X'41' - X'FE'
User-Defined Area	1880	X'D441' - X'DDFD'	X'41' - X'FE'

Thai Language Support

Thai Display Mode Selection

Select menu **Appearance** on emulator session, and then select **Thai Compose Mode...**

Switching Keyboard Between Thai and Latin

Press either **Alt+left shift** or **Alt+right shift** to toggle the keyboard between Thai and Latin.

Language Shift Status

The status line of each emulator session shows a language shift indicator. If keyboard is in Thai language shift, an indicator **TH** will appear in the status line.

Thai Display Composed Mode

Mode 1 - Non-compose mode

No character composition occurs in this mode. .

Mode 2 - Composed mode

Thai characters are auto-composed in this mode. No column realignment is performed.

Mode 3 - Composed with space alignment

In this mode of composing, three consecutive spaces cause column realignment. The realignment occurs whenever composing routine finds three consecutive spaces. Thus if all fields have at least three trailing spaces, then all fields of all records will be properly aligned.

Mode 4 - Composed with EOF alignment

In this mode of composing, the EOF character (Hexadecimal 'EA') also causes column realignment. Whenever the composing routine finds a single EOF, it deletes the EOF and performs column realignment. If two consecutive EOFs are found, no realignment occurs, one EOF is deleted, and one EOF is treated as data.

IBM Japanese Character Set

Mode 5 - Composed with space and EOF alignment

This mode of composing performs the column realignment function of both mode 3 and mode 4.

Printer Space Adjustment

If your printer needs space adjustment for Thai printing, please add the following statement to PCSWIN.INI, which resides in the Personal Communications private subdirectory

```
[Thai]  
PrintAdjust=x
```

The value of x can be:

- 0 no adjustment (same as no PrintAdjust statement)
- 1 Perform adjustment when found three consecutive spaces
- 2 Perform adjustment when found EOF character
- 3 Perform adjustment when found three consecutive spaces or EOF character (combine 1 and 2)

Thai Scalable (Truetype) Font support on Printers

IBM Personal Communications 4.3 provides a Thai Truetype font, ThaiPhuket. To print Thai characters, you can install a Thai scalable (Truetype) font as follows:

1. Open the **Control Panel** Folder.
 - Click **Start** on the task bar.
 - Move pointer to **Settings** and click **Control Panel**.
2. Open the **Fonts** Folder (Double-click the Fonts icon).
3. On the file menu, select **Install New Font**.
4. Click the drive and folder where Personal Communications is installed.
5. Double-click on **ThaiPhuket**

Chapter 12. Bidirectional Language Support (Arabic and Hebrew)

Considerations for Printing

PDT printing mode requires the IBM Arabic 864 code page font to be installed, and the IBM Hewbrew 862 code page font for Hebrew printing.

Bidirectional Arabic Support

Limitations

The Bidirectional Text Assist Function is not supported in the Personal Communications AS/400 component. As a result, the user cannot run Bidirectional OfficeVision[®]/400.

Installation Tips

For non-Arabic Windows systems, select **Custom Installations** for Personal Communications installation. Then select **Arabic** as your language to install the Arabic font files.

For Arabic Windows systems, select **Full Installation**. Arabic font files will automatically be included.

To set up an Arabic workstation, do the following:

1. Select **Configure** from the Communication pull-down menu; then select **Configure** again to display the Customize Communication panel.
2. Select **420 Arabic Speaking**.
3. Select **Keyboard Setup** from the Assist pull-down menu. Select **Arabic Speaking** as the Keyboard layout.
4. Select **Font Size** from the Appearance pull-down menu. Choose **ARB3270** at the Automatic Sizing list box or at the Fixed size font selection. This ensures that the active font for display is the Arabic font.
5. Select **API Setting** from the Files pull-down menu and then select **864** as the DDE/EHLLAPI PC Code-Page.
6. Select **Page Setup** from the File pull-down menu. Choose **Typing Arabic** as the font in order to be able to print Arabic files.

Note: For Personal Communications for Windows 95 you can also select **ARB3270** for printers with drivers that allow bitmap fonts. For example, printing via **PDT**, requires the IBM Arabic 864 font to be available on the printer.

To set up for Numeric Swapping or Symmetric Swapping:

1. Select **Display Setup** from the Appearance pull-down.
2. Select **Swapping** from the list box at the left, where the settings for numerics and symmetric characters is displayed. Changes are immediately reflected on the active session.

Bidirectional Arabic Support

Note: Numeric Swapping is a 3270-only feature. This function will not be selectable if the session is an AS/400 session.

The supported Arabic fonts are:

1. ARB3270, which is found in the PCSANSIA.FON, or MFIANSIA.FON. To use the MFIANSIA.FON:
 - Rename the file PCSANSIA.FON to PCSANSIA.ORG.
 - Copy MFIANSIA.FON to PCSANSIA.FON.
2. Typing Arabic, which is found in the file TYPEARB.TTF.

The Arabic font files are located on the product CD-ROM in the FONT subdirectory.

When transferring files between the workstation and the host, you can select one of two workstation codepages:

864 IBM PC Arabic Codepage

1256 Microsoft Arabic Windows Codepage

- For right-to-left host file orientation, mark the HostFileOrientation box.
- For left-to-right host file orientation, unmark the HostFileOrientation box.

For data transfer, when transferring SQL data between the workstation and the AS/400 system, you can select one of two workstation codepages.

864 IBM Arabic Codepage

1256 Arabic Windows Codepage

For codepage 1256, you must set the orientation of the HOST file. The HOST file can be set to left-to-right or right-to-left.

Bidirectional Keyboard Functions for 3270

This section describes the keys and functions that are unique to Bidirectional 3270. Those key combinations are identical to previous versions of 3270.

The keys unique to Bidirectional 3270 are:

- **Language selection:** This function is activated by the key combination Alt+Shift and allows you to change the language layer. If the language layer is Latin, pressing the **Alt+RightShift** key combination changes the language layer to Arabic. If the language layer is Arabic, pressing the **Alt+LeftShift** key combination changes the language layer to Latin.
- **Screen Reverse:** This function is activated by the key combination **Alt+NewLine** and reverses the screen image. If the screen orientation is left-to-right, pressing this key combination reverses the screen image right-to-left. If the screen orientation is right-to-left, pressing this key combination reverses the screen image to left-to-right.

Note that the operator information area is not reversed by this operation.

When the screen orientation is changed, the language layer is changed to the default language of the new screen orientation. If the screen is reversed to right-to-left, then the language is changed to Arabic. If the screen is reversed to left-to-right, then the language is changed to Latin.

If the swapping of symmetric characters is enabled, the inversion of the screen causes directional characters to be replaced by their counterparts.

If the swapping of numeric characters is enabled, the inversion of the screen causes Hindi numerals to be replaced by their Arabic counterparts and the Arabic numerals to be replaced by their Hindi counterparts.

- **Field Reverse:** This function is activated by the key combination **Alt+NumLock** and toggles the field orientation to either opposite to or the same as the screen orientation. The text in the field is not inverted. The cursor orientation is set equal to the new field orientation and the language layer is selected accordingly. If the cursor is in the first logical position of a field or line, when you select the field reverse function, the cursor skips to the other side of that field or line, which becomes the first logical position. If the cursor was not in the first position of the field or line, when selecting the field reverse function, the cursor remains in its position and allows natural and correct editing of existing text.
- **Auto Field Reverse:** This function is activated by the key combination **Alt+NumPad5**, which toggles the auto field reverse mode for the current screen orientation.

Auto field reverse affects the automatic selection of the field orientation of unprotected fields:

- When auto field reverse is disabled, upon initial entry to a field (whether numeric or alphanumeric), the field orientation is always set equal to the screen orientation.
- When auto field reverse is enabled, upon initial entry to an alphanumeric field, the field orientation will be set to right-to-left (for both left-to-right and right-to-left screen orientations).
- When auto field reverse is enabled, upon initial entry to a numeric field, the field orientation will be set to left-to-right (for both left-to-right and right-to-left screen orientations).
- **Push/End Push:** This function is activated by the key combination **Shift+NumLock** and allows the entering and editing of text whose direction is opposite from the field direction. When this function is activated, the cursor orientation is reversed, the language layer is changed accordingly, and a push segment is created.

The PUSH function has two secondary modes:

- Boundary mode: This mode is activated upon entering push mode. In this mode, the cursor remains in its position, and the typing of additional characters pushes the text in the direction opposite from the field direction. To indicate this boundary mode, the cursor has a block shape.
- Edit mode: This mode is activated when the cursor is moved from its boundary position into the PUSH SEGMENT area. In this mode, you can edit the text within the PUSH segment, while typing in the field's natural direction.

END PUSH, activated by the **Shift+NumLock** key sequence, terminates the push mode.

Note: In Windows mode, END PUSH is activated by the **Shift+Numpad/** key sequence.

The cursor jumps to the end of the PUSH segment, and its direction changes to the original direction. You can also perform END PUSH by pressing any field exit keys (for example, Cursor Up or Cursor Down) or an AID key (for example, Enter)

- **AutoPush:** This function is activated by the key combination **Alt+NumPad/** and assists the terminal operator in typing mixed left-to-right and right-to-left text.

Bidirectional Arabic Support

When enabled, reversed segments are automatically initiated and terminated, according to the entered character or the selected language layer. This mode relieves the operator from manually pressing Push, as it is automatically invoked.

- In right-to-left fields, typing a digit or a Latin letter causes the automatic initiation of Push, without language change. Further Latin letters or digits will continue the push mode; any other character automatically terminates push mode. This feature allows you to type Arabic text with imbedded numbers or Latin words without using Push/End Push.
- In left-to-right fields, typing an Arabic character or special character causes the automatic initiation of Push, without language change. Typing any digit or Latin character causes the automatic termination of the mode. This allows the user to type Latin text with imbedded Arabic words using language layer selection rather than Push/End Push.

Arabic Character Shape Selection Functions

There are five shape selection keys: one for Contextual Shape Determination (CSD), and 4 for Specific Shaping modes (Base/Isolated, Initial, Middle, Final). The default Shaping Mode is CSD.

The keys unique to Bidirectional 3270 are:

- **Contextual Shape Determination (CSD) key:** Pressing this key sets the shaping mode to Contextual Shape Determination (CSD), which is the default. Note that contextual shape determination is performed only for right-to-left text entered or modified by the operator. This key toggles between CSD and Base mode.

Pressing any of the Specific shape selection keys disables CSD.

The character “Alef-Madda”

ā

in the operator information area indicates that CSD is selected.

This function is initiated by the key combination **Alt+NumPad4**.

- **Specific Shape Selection keys:**
 - Base/Isolated: initiated by the key combination **Alt+NumPad2**
 - Initial: initiated by the key combination **Alt+NumPad1**
 - Final: initiated by the key combination **Alt+NumPad7**
 - Middle: initiated by the key combination **Alt+NumPad8**

Pressing one of the above keys disables CSD, and sets shaping mode to the selected value. Arabic letters typed from then on will have the selected shape.

Note: Some Arabic characters do not have middle, initial, or final shapes. In this case, if the user enters one of those characters where the requested shape does not exist, then the closest shape is selected according to the following rules:

- Instead of initial, isolated is selected.
- Instead of final, isolated is selected.
- Instead of middle, final (if it exists) or isolated is selected.

The selected Shaping Mode is shown in the operator information area:

- Isolated “GHEIN”

ع

indicates Base/Isolated Shaping Mode

- Initial “GHEIN”

ع

indicates Initial Shaping Mode

- Middle “GHEIN”

ع

indicates Middle Shaping Mode

- Final “GHEIN”

ع

indicates Final Shaping Mode

- **Field Shape key:** Pressing the key combination **Alt+NumPad+** causes the shaping of the Arabic data present in the current field or line. The cursor position remains unchanged.
- **Field De-Shape key:** The key combination **Alt+NumPad Enter** de-shapes the Arabic data present in the current field or line. All Arabic letters are converted to their Base/Isolated shapes.

Personal Communications AS/400

This section describes the keys and functions that are unique to Bidirectional Personal Communications AS/400.

The keys unique to Bidirectional PC400 are:

- **Language selection:** This function is activated by the key combination **Alt+Shift** and allows the changing of the language layer. If the language layer is Latin, by pressing the **Alt+RightShift** key combination, the language layer will change to Arabic. If the language layer is Arabic, by pressing the **Alt+LeftShift** key combination, the language layer will change to Latin.
- **Screen Reverse:** This function is activated by the key combination **Alt+NewLine** and reverses the screen image. If the screen orientation is left-to-right, by pressing this key combination the screen image will be reversed to right-to-left. If the screen orientation right-to-left, pressing this key combination reverses the screen image to left-to-right.

Note that the operator information area is not reversed by this operation.

When the screen orientation is changed, the language layer is changed to the default language of the new screen orientation. If the screen is reversed to right-to-left, the language is changed to Arabic. If the screen is reversed to left-to-right, the language is changed to Latin.

The inversion of the screen causes directional characters to be replaced by their counterparts.

- **Field Reverse:** This function is activated by the key **NumLock** and toggles the field orientation to either left-to-right or right-to-left. The text in the field is not inverted. The cursor orientation is set equal to the new field orientation and the language layer is selected accordingly.

Bidirectional Arabic Support

If the cursor is in the first logical position of a field or line, when selecting field reverse function, the cursor skips to the other side of that field or line, which now becomes the first logical position. If the cursor was not in the first position of the field or line, when selecting field reverse function, the cursor remains in its position and allows natural and correct editing of existing text.

- **Close:** This function is activated by the key **NumPad/** and is provided so that the data entered in one keying direction can be concatenated with the data that was previously entered in the opposite direction. It operates as follows:
 - All embedded nulls are removed from the current line.
 - Concatenated text is moved to the right boundary of the field (if the field direction is right-to-left) or to the left boundary (if the field direction is left-to-right).
 - The cursor direction is set to the field direction.
 - The language layer is set to the default for the field direction.
 - If the screen orientation is now left-to-right, the cursor is positioned at the first null to the right of the concatenated text.
 - If the screen orientation is now right-to-left, the cursor is positioned at the first null to the left of the concatenated text.
- **BASE:** This function is activated by the key combination **Ctrl+Home**; it is a toggle key that activates or deactivates the Automatic Shape determination function for Arabic RTL text. It is valid only when processing RTL Arabic text. If it is pressed in a LTR field, an operator error 0027 results.

Operator Information Area Indicators

In the host session, the bottom line of the screen is called the Operator Information Area (OIA). This line is always displayed from left-to-right. In the Arabic environment, the following symbols have been added:

- Language Indicator:
 - Isolated “EIN”

ع

Current language, Arabic
 - E : Current language, English
- Screen Direction:
 - S> : Left-to-right screen direction
 - <S : Right-to-left screen direction
- Typing Direction:
 - => : Left-to-right direction
 - <= : Right-to-left direction
 - ■>
: Left-to-right Push direction (3270 Only)
 - <■
: Right-to-Left Push direction (3270 Only)
- Auto Field Reverse function active (3270 Only):
 - <->

- Auto Field Reverse for numbers (3270 Only):
 - N
- Auto Push active indicator (3270 Only):
 - P
- Arabic Character Shape Mode:
 - The character “Alef-Madda”

Ī

indicates CSD mode

- Isolated “GHEIN”

Ĝ

indicates Base/Isolated Shaping Mode

- Initial “GHEIN”

Ĥ

indicates Initial Shaping Mode (3270 Only)

- Middle “GHEIN”

Ħ

indicates Middle Shaping Mode (3270 Only)

- Final “GHEIN”

Ħ

indicates Final Shaping Mode (3270 Only)

Bidirectional Hebrew Support

The Bidirectional Hebrew support in 3270 enables the program to emulate an English/Hebrew 3270 display terminal. Special Language and Bidirectional functions are added to the list of standard functions supported by the emulation program.

Hebrew and Bidirectional Functions

3270 can run as a native Windows application. The layout and user-interface functions in the Windows-based product conform to the IBM user-interface standard (SAA/CUA); they are similar to the layout and functions implemented in other IBM products (for example, OS/2).

- **Language Selection:** The key combination Alt+Shift allows you to change the language layer. If the language layer is Latin, pressing **Alt+RightShift** changes the language layer to Hebrew. If the language layer is Hebrew, pressing **Alt+LeftShift** changes the language layer to Latin.
- **Screen Reverse:** This function, activated by the Alt+Enter key sequence, reverses the screen image. If the screen direction is left-to-right, the screen image is inverted and displayed from right-to-left. Pressing this hot-key again returns the screen to its original direction, left-to-right. When the screen orientation is changed, the language layer is changed to the default language of the new

Bidirectional Hebrew Support

screen orientation. If the screen is changed to right-to-left, the language changes to Hebrew. If the screen is changed to left-to-right, the language changes to Latin.

Note that the status line (see “Operator Information Area (OIA) in Terminal Emulation Mode” on page 159) never reverses. It always displays from left to right.

- **Field Reverse:** In most cases, the field direction is the same as the general screen direction. However, sometimes it is necessary to have a field whose direction is the opposite of the screen direction. The Field Reverse function, activated by the **Alt+NumLock** key sequence, allows such transitions. When this function is activated, the typing direction is reversed, but the existing text in the field and the screen image do not change. This function creates a temporary change which stays in effect as long as the cursor remains within the field, or until Field Reverse is activated again.

If the function is activated while the cursor is at the beginning of a line or field, the cursor jumps to the end of the line or field, so that the reversed field begins logically from that position. Otherwise, the cursor remains in its position and allows natural and correct editing of existing texts whose direction is the opposite of the screen direction.

- **Auto Field Reverse:** This function sets the field orientation for you, when you are entering data for mixed applications (Hebrew and English). This is done by automatically activating the Field Reverse function. The Auto Field Reverse mode is activated by the **Alt+NumPad5** key sequence, and can be applied independently for each screen orientation, left-to-right or right-to-left.
 - If the Auto Field Reverse option is activated on a right-to-left screen, the Field Reverse function is automatically activated every time the cursor moves to a numeric field. The cursor then jumps to the leftmost position of the numeric field, to allow left-to-right typing of numbers.
 - If the Auto Field Reverse option is activated on a left-to-right screen, the Field Reverse function is automatically activated only when the cursor moves to an alphanumeric field. The cursor then jumps to the rightmost position of the field, to allow right-to-left typing of Hebrew.

Initially, the Auto Field Reverse option is enabled when the screen direction is right-to-left, and is not enabled when the screen direction is left-to-right. To terminate the Auto Field Reverse mode, press **Alt+NumPad5** again.

- **Push and End Push:** These functions allow you to type or edit text whose direction is the opposite of the field direction. When this function is activated the cursor orientation is reversed, the language layer is changed accordingly, and a “push segment” is created.

The Push function is activated by the **Shift+NumLock** key sequence. The Push function has two secondary modes:

- **Boundary Mode:** This mode is activated upon entering the Push mode. In this mode, the cursor remains in its position, and the typing of additional characters “pushes” the text in the direction opposite to the field direction. To indicate this boundary mode, the cursor shape is changed.
- **Edit Mode:** This mode is activated when the cursor is moved from its boundary position into the Push Segment area. In this mode, you can change the text within the Push segment, while typing in the text’s natural direction.

End Push, activated by the **Shift+NumPad/** key sequence, terminates the temporary mode. The cursor jumps to the end of the Push segment, and its direction reverts to that of the field.

- **Autopush:** The Autopush mode makes work easier and more efficient when typing mixed text - Hebrew and English. When this mode is enabled, reverse segments initiate and terminate automatically, according to the entered character or the selected language layer. It relieves the operator from manually selecting Push and End Push. Autopush is especially useful for typing digits in Hebrew fields (right-to-left fields). The Autopush mode is activated by the **Alt+NumPad/** key sequence; it can be applied independently to fields whose direction is left-to-right or right-to-left. In this mode, the Push and End Push functions are automatically activated according to the language of the text being typed. There is no need to worry about activating and terminating the Push mode manually.
 - In right-to-left fields, typing a digit or a Latin letter causes the automatic initiation of Push, without language change. Further Latin letters or digits will continue the push mode; any other character automatically terminates push mode. This feature allows you to type Hebrew text with imbedded numbers or Latin words without using Push/End Push.
 - In left-to-right fields, typing a Hebrew character causes the automatic initiation of Push. Typing any digit or Latin character causes the automatic termination of the mode. This allows the user to type Latin text with imbedded Hebrew words by using language layer selection rather than Push/End Push.

Bidirectional Key-Combinations Table for 3270

Function	Combination
Hebrew Language	Alt+RightShift
English Language	Alt+LeftShift
Screen Reverse	Alt+Enter
Field Reverse	Alt+NumLock
Auto Field Reverse	Alt+NumPad5
Push	Shift+NumLock
End Push	Shift+NumPad/
Autopush	Alt+NumPad/

Operator Information Area (OIA) in Terminal Emulation Mode

When you are working in host mode, the bottom line of the screen becomes an Operator Information Area (OIA). This line is always displayed from left to right. For work in the Hebrew environment, the following symbols have been added:

- Language Indicator:
 - H : Current language is Hebrew
 - E : Current language is English
- Screen Direction:
 - S> : Left-to-right screen direction
 - <S : Right-to-left screen direction
- Typing Direction:
 - => : Left-to-right direction
 - <= : Right-to-left direction
 - #>: Left-to-right Push direction (3270 Only)
 - <#: Right-to-Left Push direction (3270 Only)

Bidirectional Hebrew Support

- Auto Field Reverse function active - bidirectional arrow:
 - <-->
- Auto Field Reverse for numbers:
 - N
- Autopush active indicator:
 - P

Keyboard Layout

Two Hebrew keyboard templates (Bulletin and Old Code) are supplied with the product. The Old-Code template is similar to the Bulletin template, with the following exceptions:

- Shift of "6" (s-6) produces the Greek Delta symbol (ASCII 235, hex EB), representing the old Israeli Lira, instead of the regular Cent symbol.
- Shift of "7" (s-7) does not produce anything (the Ampersand symbol is not available in Old Code).
- In English language mode, unshifted English letters produce uppercase letters (A-Z), rather than lower case letters (a-z), whether Caps Lock is ON or OFF.

Configuration

To configure a Hebrew workstation, select the Hebrew definitions in the following panels:

- Make sure that **Host Code-Page** is either **424 Hebrew (Bulletin Code)** or **803 Hebrew (Old Code)**. To verify it, select **Configure** from the Communication pull-down menu and then **Configure** once again to display the Customize Communication - 3270 Host panel.
- Make sure that the Hebrew **Keyboard Layout** is active. To verify it, select **Keyboard Setup** from the Assist pull-down menu.
- Make sure that the Hebrew File Transfer translation tables are active. To verify it, select **Setup** from the Transfer pull-down menu and then **Miscellaneous Settings** to present the Miscellaneous Settings panel, and then select **862** or **916** as the PC Code-Page.
- Make sure that the Hebrew DDE/EHLLAPI translation tables are active. To verify it, select **API Settings** from the Files pull-down menu and then select **862** or **916** as the **DDE/EHLLAPI PC Code-Page**.
- Make sure that the Hebrew Display Font (HEB3270) is active. To verify it, select **Font** from the Appearance pull-down menu. Choose **HEB3270** at the **Automatic Sizing** list box or at the **Fixed size** font selection.
- Make sure that the Hebrew Printer font (Courier Heb) is active. To verify it, select **Printer Control** from the File pull-down menu, and then select **Text**.

Font

If you are accustomed to a traditional Display Station such as IBM InfoWindow 3472, you may not prefer the Personal Communications font. You can try an alternative font by changing the font files as follows:

1. Rename PCSANSIH.FON file to BASANSIH.FON
2. Copy ALTANSIH.FON to PCSANSIH.FON

In order to use the ALTANSIH.FON file, you must order the needed diskette separately.

File Transfer With the 862 Code Page

PC codepage 862 is the IBM number for the Hebrew codepage. Microsoft Windows (Hebrew) uses a codepage based on (but not identical to) the ISO codepage, and quite different from codepage 862.

Apart from the differences in code points, Microsoft Windows for Hebrew works with “logical text”. This means that Windows applications are expected to store text in logical order (that is, the same order as typed but not as displayed). Accordingly, the text that is displayed on the screen is different from the text that is processed by the application.

Therefore, when transferring files with translation to and from codepage 862, there may be unexpected results (such as a different order of Hebrew text), in some cases. To overcome such problems, it is recommended after conversion of EBCDIC text to codepage 862 to consider using the CONVERT program, provided as part of Microsoft Windows, which is capable of converting between “logical text” and “visual text”.

Bidirectional Key-Combinations Table for 5250

Function	Combination
Hebrew Language	Alt+RightShift
English Language	Alt+LeftShift
Reverse	NumLock
Close	NumPad/
Screen Reverse	Alt+Enter

- Hebrew Language: same meaning as in 3270
- English Language: same meaning as in 3270
- Reverse: Pressing this key allows the operator to reverse the current cursor direction. It functions as follows:
 - The cursor is repositioned according to the current cursor direction. When right-to-left, the cursor is placed at the current left boundary location. When left-to-right, the cursor is placed at the current right boundary location.
 - The cursor direction is then reversed; the Keyboard Layer you get depends on the new cursor direction.
 - Insert mode is reset.
- Close: By pressing this key, data entered in one key direction is joined with data that was previously entered in the opposite direction:
 - All embedded null characters are removed from the current line (or field, if the field is contained on one line).
 - Joined text is moved to the right boundary of the field if the field direction is right-to-left, or to the left boundary if the field direction is left-to-right.
 - The remainder of the line (or the field, if contained on one line) is padded with null characters.
 - The cursor direction is set to the field direction.
 - If the cursor direction is now left-to-right, the cursor is positioned at the first null character to the right of the joined text. If the cursor direction is now right-to-left, the cursor is positioned at the first null character to the left of the joined text.
 - Insert mode is reset.
- Screen Reverse: same meaning as in 3270

Bidirectional Hebrew Support

Part 4. Appendixes

Appendix A. SNA Client/Server Concepts

Terminology

Advanced Program-to-Program Communication (APPC)

An implementation of the SNA LU 6.2 protocol that allows interconnected systems to communicate and share the processing of programs.

Advanced Peer-to-Peer Networking (APPN)

An enhancement for Systems Network Architecture (SNA) networks featuring:

- Dynamic exchange of network topology information that simplifies connections, route selection, network definition, and reconfiguration
- Automated resource registration and directory lookup
- Greater distributed network control that helps to isolate the effects of single points of failure

Common Programming Interface for Communications (CPI-C)

Personal Communications provides support for the Common Programming Interface for Communications (CPI-C) 2.0 industry-standard interface from X/Open. The CPI-C interface enables greater application portability across different platforms. By using CPI-C 2.0, APPC programming is simplified, resulting in reduced cycle time, and enhanced client-server computing capability. This support provides the capability for distributed parts of an application to "converse" with one another. The implementation is consistent with the Conversational function described in the IBM Open Blueprint.

Logical Unit Address (LUA)

System software and interfaces that supply input/output (I/O) service routines to support communications that use LU types 0, 1, 2, and 3 SNA protocols. These protocols support user-defined data streams, SNA character streams, and SNA 3270 data streams. LUA services include only those services that support data communications. LUA does not supply any device emulation facilities.

Node An endpoint of a link, or a junction, common to two or more links in a network. Nodes can be linked to host processors, communication controllers, cluster controllers, terminals, or workstations.

End Node

Provides directory and routing services for a workstation on an APPN network.

If the workstation will not be connecting from an end node to a network node server, you need to define an SNA connection.

APPC Concepts

Personal Communications provides Advanced Peer-to-Peer Networking[®] (APPN[®]) end-node support for workstations, allowing them to communicate more flexibly with other systems in the network.

Personal Communications provides advanced program-to-program communications (APPC) to support communications between distributed

SNA Client/Server Concepts

processing programs, called *transaction programs* (TPs). APPN extends this capability to a networking environment. The TPs can be located at any node in the network that provides APPC.

Introducing APPC and CPI-C

Advanced Program-to-Program Communication (APPC), also known as LU 6.2, is software that enables high-speed communications between programs on different computers, from portables and workstations to midrange and host computers. APPC software is available for many different IBM and non-IBM operating systems, either as part of the operating system or as a separate software package.

APPC serves as an interface between application programs and the network. When the communications application on your workstation passes information to the APPC software, APPC takes the information and sends it on to a network interface, such as a token-ring adapter card. The information travels across the network to another computer, where the APPC software receives the information from the network interface. APPC puts the information back into its original format and passes it to the corresponding communications application.

APPC provides a consistent set of functions for program-to-program communications across different platforms. But, the architecture did not specify a common application programming interface (API) for implementing these functions. As a result, each operating system that supports APPC developed its own API, a set of verbs that closely resemble the operating system itself. These differences do not pose a problem if you are writing programs for two computers that use the same operating system. Most client/server applications run on different types of computers, however, to take advantage of the strengths of each computer. So, if you are designing programs for different operating systems, you must learn how to use two or more different sets of verbs.

The Common Programming Interface for Communications (CPI-C) eliminates this problem. CPI-C provides one standard set of verbs, known as CPI-C calls, for all systems that support CPI-C. As a result, you learn only one set of calls to write client/server applications for different systems.

What Is a Transaction Program?

The part of the communications application that initiates or responds to APPC communications is called a transaction program. A transaction program is not an entire, stand-alone program. Instead, it is the part of the program that handles transactions (exchanges of data) with another program.

When people talk with each other, we say that they are having a conversation. Likewise, the communication between two transaction programs is called a conversation.

A conversation between two programs is similar to a conversation between two people. When you have a conversation with another person, you follow unwritten rules that govern how you begin and end the conversation, take turns speaking, and exchange information. Similarly, APPC is called a protocol because it provides the rules that govern how conversations between transaction programs start and stop, which program “speaks” first, and how data is exchanged. Computers need complete and rigid rules for conversations between programs. For that reason, APPC consists of a set of well-defined and thorough rules to cover all possible communications situations.

An APPC program may have several conversations active at one time, with the same transaction program or with different transaction programs.

Every transaction program needs a partner to communicate with. Thus, transaction programs are developed in pairs called partner transaction programs.

People use different parts of speech to communicate with each other. Transaction programs are more limited in their communications; they use only verbs to communicate with each other. The verbs are the programming language you use to start, stop, and control conversations.

A transaction program consists of APPC and CPI-C verbs such as:

ALLOCATE (CMALLC in CPI-C)

Starts a conversation with another transaction program

SEND_DATA (CMSEND in CPI-C)

Sends data to the partner transaction program

RECEIVE (CMRCV in CPI-C)

Receives data from the partner transaction program

DEALLOCATE (CMDEAL in CPI-C)

Ends a conversation with another transaction program.

The APPC verbs make up the application programming interface (API) for APPC and CPI-C. In other words, these verbs represent the interface between the transaction program and the APPC software.

What Is the Difference between APPC and APPN?

APPC is a communications protocol that enables programs on different computers to “talk to” each other. APPC provides the interface between the programs and the networking hardware and software and defines the rules that programs use to exchange information.

Advanced Peer-to-Peer Networking (APPN) is the underlying networking protocol that routes APPC traffic through intermediate nodes in the network. For instance, when Program A uses APPC to talk to Program B, APPN finds the node where Program B is located and directs the APPC traffic through the network.

APPN includes several features that help reduce the amount of configuration required to set up and maintain a network. These features automate many tasks that are time-consuming, complicated, and error-prone. For example, if you’re installing a new workstation that uses APPN, you don’t have to set up configuration information for every workstation you want to communicate with. You simply provide the name of the computer and the address of the intermediate node that handles your traffic. APPN takes care of the rest of the information needed to route APPC traffic to and from your workstation.

If you connect to an APPN network, you simplify your own configuration and make it easier for other computers in the network to find you.

Side Information Definitions

Before starting a conversation with a partner program, a CPI-C program requires the following information:

- The name of the partner program
- The name of the LU on the remote computer

SNA Client/Server Concepts

- The type of session used by the program
- Security information

If the CPI-C partner program uses a blank symbolic destination name, a side information definition is not necessary.

APPC Issues and Considerations

Why is APPC the protocol of choice for many client/server applications? Many users cite its openness, its advanced features, its common programming interface, and its exceptional performance. IBM and other vendors are constantly improving both the architecture and the products to ensure greater usability and performance in your network.

Improving Productivity Using APPC

The advanced features of APPC help speed the development of robust client/server applications and keep development costs low.

Client/server applications often prove to be especially challenging to the programmer. It's not enough to understand the details about the computer and operating system that your application uses. If you're designing client/server applications, you have to deal with computers used by both sides of the application, as well as the intervening network. For instance, implementing effective security measures is more important and more complicated, since you must ensure security throughout the network. In addition, synchronization and error reporting are often problematic in a distributed environment, because both sides of the application must coordinate their work.

One reason that APPC has become so widely used in client/server applications is that it furnishes a complete set of useful functions like security, synchronization, and error reporting. If you use other protocols, you must build these functions in every application you write. For example, if you use NetBIOS, you must design and implement a strategy for security for each application. Not only does this approach require additional work, it may result in a number of incompatible security systems in your network. By contrast, APPC includes a common set of security services that are consistent across all APPC platforms.

Similarly, most protocols do not include synchronization functions. Synchronization is required by any program that cannot continue processing data until the data sent to the partner program has been received and processed. Rather than writing your own synchronization routine, APPC provides a Confirm call that you can use to handle synchronization between two programs.

Improving Productivity Using CPI-C

Because many client/server applications are distributed between mainframe systems and workstations, host programmers and workstation programmers must work together to develop partner applications. CPI-C bridges the gap between these programmers by providing a common "language" for designing the communications part of the applications. CPI-C also enables you to write the communications portion of an application without knowing the details of the operating system. After you write a CPI-C application, you can easily move the programs from one operating system to another with few changes. So, by using the CPI-C interface, you can port both your applications and your programming skills from one system to another, quickly and cost-effectively.

What Is a Logical Unit?

Every TP gains access to an SNA network through a *logical unit* (LU). An LU is SNA software that accepts verbs from your programs and acts on those verbs. A TP issues APPC verbs to its LU. These verbs cause commands and data to flow across the network to a partner LU. An LU also acts as an intermediary between the TPs and the network to manage the exchange of data between TPs. A single LU can provide services for multiple TPs. Multiple LUs can be active in the node simultaneously.

LU Types

Personal Communications supports LU types 0, 1, 2, 3, and 6.2. LU types 0, 1, 2, and 3 support communication between host application programs and different kinds of devices, such as terminals and printers.

LU 6.2 supports communications between two programs located at type 5 subarea nodes, type 2.1 peripheral nodes, or both, and between programs and devices. APPC is an implementation of the LU 6.2 architecture.

Communication occurs only between LUs of the same LU type. For example, an LU 2 communicates with another LU 2; it does not communicate with an LU 3.

When Personal Communications is configured, your local and partner LUs are defined once for each machine. When you design programs, you must understand the capabilities supported by the LU in the particular machines you plan to use.

Dependent and Independent LUs

A *dependent LU* depends on a system services control point (SSCP) to activate a session. A dependent LU needs an active SSCP-LU session, which the dependent LU uses to start an LU-LU session with an LU in a subarea node. A dependent LU can have only one session at a time with the subarea LU. For communications with a TP at a subarea node, each dependent LU can have only one conversation at a time, and each dependent LU can support communications for only one TP at a time.

An *independent LU* does not depend on an SSCP to activate a session. An independent LU supports multiple concurrent sessions with other LUs in a subarea node, so you can have multiple conversations and support multiple TPs for communications with subarea TPs. LUs between peripheral nodes also use this support.

The distinction between a dependent LU and an independent LU is meaningful only when discussing a session between an LU in a peripheral node and an LU in a subarea node. Otherwise, dependent and independent LUs both support multiple concurrent sessions and conversations when communicating between type 2.1 peripheral nodes, for example, between two Windows NT workstations. A Personal Communications LU can support a single session with a dependent LU or multiple sessions with an independent LU.

What Is a Session?

Before TPs can communicate with each other their LUs must be connected in a mutual relationship called a *session*. A session connects two LUs, so it is called an *LU-LU* session. Figure 1 on page 170 illustrates this communication relationship.

SNA Client/Server Concepts

Multiple, concurrent sessions between the same two LUs are called *parallel* LU-LU sessions.

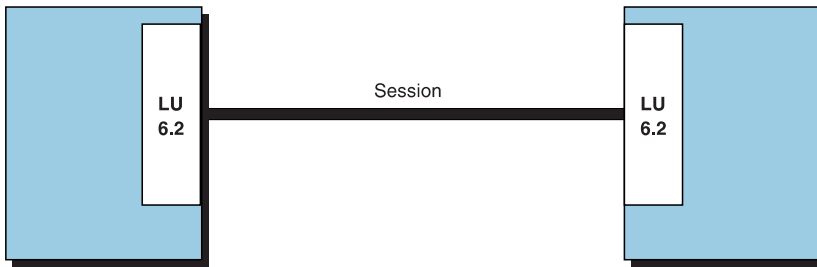


Figure 1. A Session between Two LUs

Sessions act as conduits that manage the movement of data between a pair of LUs in an SNA network. Specifically, sessions deal with things such as the quantity of data transmitted, data security, network routing, and traffic congestion.

Sessions are maintained by their LUs. Normally, your TPs do not deal with session characteristics. You define session characteristics when you:

- Configure your system
- Use the Session Services function in the Subsystem Management windows
- Use the management verbs

What Is a Conversation?

The communication between TPs is called a *conversation*. Conversations occur across LU-LU sessions. A conversation starts when a TP issues an APPC verb or CPI-C call that allocates a conversation. The conversation style associated with the conversation indicates the style of data transfer to be used, two-way alternate or two-way simultaneous. A conversation that specifies a two-way alternate style of data transfer is also known as a *half-duplex* conversation. A conversation that specifies a two-way simultaneous style of data transfer is referred to as a *full-duplex* conversation.

When a half-duplex conversation is allocated to a session, a send-receive relationship is established between the TPs connected to the conversation, and a two-way alternate data transfer occurs where information is transferred in both directions, one direction at a time. Like a telephone conversation, one TP calls the other, and they "converse", one TP talking at a time, until a TP ends the conversation. One TP issues verbs to send data, and the other TP issues verbs to receive data. When it finishes sending data, the sending TP can transfer send control of the conversation to the receiving TP. One TP decides when to end the conversation and informs the other when it has ended.

When a full-duplex conversation is allocated to a session, both TPs connected to the conversation are started in send-and-receive state, and a two-way simultaneous data transfer occurs where information is transferred in both directions at the same time. Both TPs may issue verbs to send and receive data simultaneously with no transfer of send control required. The conversation ends when both TPs indicate they are ready to stop sending data, and each TP has received the data sent by the partner. If an error condition occurs, one TP may decide to end both sides of the conversation abruptly.

Conversations can exchange control information and data. The TP should select the conversation style best suited for its application.

A Conversation between Two TPs

Figure 2 shows a conversation between two TPs as it occurs over a session.

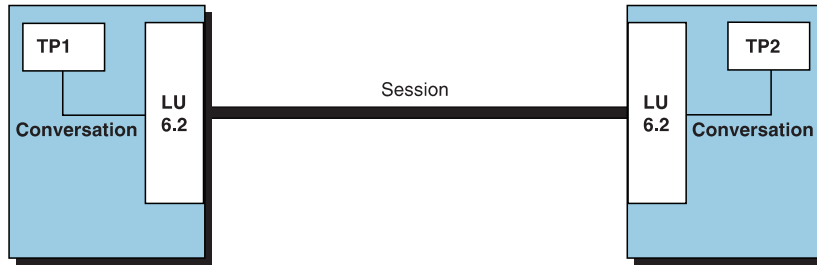


Figure 2. A Conversation between Two TPs

A session can support only one conversation at a time, but one session can support many conversations in sequence. Because multiple conversations can reuse sessions, a session is a long-lived connection compared to a conversation. When a program allocates a conversation and all applicable sessions are in use, the LU puts the incoming Attach (allocation request) on a queue. It completes the allocation when a session becomes available.

Two LUs can also establish parallel sessions with each other to support multiple concurrent conversations. A parallel session occurs when either TP allocates a conversation, and a session exists but is being used by a conversation. The LU can request a new session to satisfy the allocation.

Parallel Sessions between LUs

Figure 3 shows three parallel sessions between two LUs; each session carries a conversation.

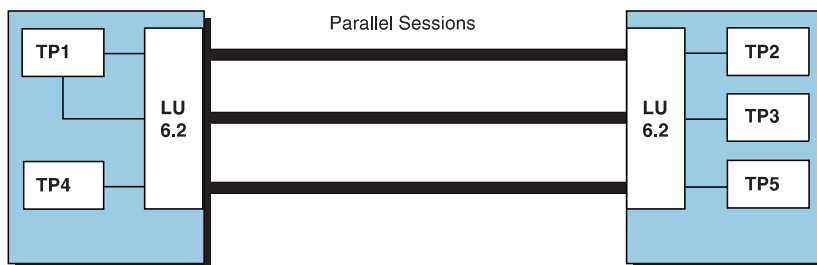


Figure 3. Parallel Sessions between LUs

SNA Communications

Personal Communications supports Systems Network Architecture (SNA) type 2.1 nodes (including SNA type 2.0 and SNA type 2.1 support for logical units “LUs” other than SNA LU 6.2). This support lets you write programs to communicate with many other IBM SNA products.

You can write programs without knowing the details of the underlying network. All you need to know is the name of the partner LU; you do not need to know its location. SNA determines the partner LU location and the best path for routing data. A change to the underlying network, such as a physical address change, the

SNA Client/Server Concepts

addition of a new adapter, or the relocation of a machine, does not affect APPC programs. A program might, however, need to establish link connections over switched SDLC connections.

When Personal Communications starts, it establishes local LU and logical link definitions, which are stored in a configuration file. The system management application programming interface (API) provides functions that control configuration definition and adapter and link activation.

SNA Node Operations

With SNA Node Operations, either an end-user or system administrator can display information or take action on node resources that are known to the active node.

The following tasks are supported:

- Starting and stopping resources
- Deleting resources
- Displaying resource information
- Changing session limits
- Initiating path switches

See "*SNA Node Operations*" in *Personal Communications Reference, Volume I* or the online help for information on using SNA Node Operations.

Appendix B. Introducing AnyNet SNA over TCP/IP

This chapter introduces the AnyNet[®] SNA over TCP/IP function of Personal Communications.

What Does AnyNet SNA over TCP/IP Do?

SNA over TCP/IP is one of the IBM AnyNet software offerings. AnyNet software enables application programs to communicate over different transport networks and across interconnected networks. Using AnyNet, you can reduce the number of transport networks and therefore reduce operational complexity. These benefits are gained without modification to your existing application programs or hardware.

The AnyNet function in Personal Communications enables SNA applications to communicate over an IP network. This includes the Personal Communications emulators, both 3270 and 5250, as well as APPC and CPI-C applications.

The following network configurations illustrate how SNA over TCP/IP access nodes and gateways can be used.

Running APPC or CPI-C Applications over a TCP/IP Network

Figure 4 illustrates how you can use the AnyNet SNA over TCP/IP function of Personal Communications to enable communication between SNA applications over an IP network. Configuration information for a similar configuration is provided in *Quick Beginnings*.

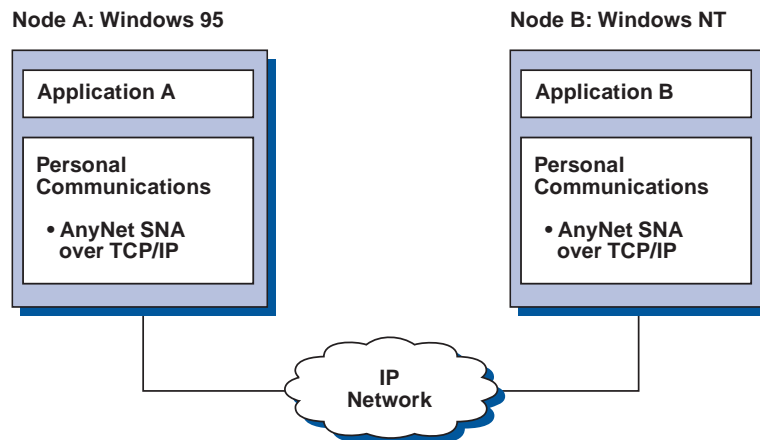


Figure 4. Running APPC or CPI-C Applications over a TCP/IP Network

Using AnyNet to Connect SNA Applications on Different Platforms

Figure 5 on page 174 illustrates some of the many products with AnyNet SNA over TCP/IP function. AnyNet gateways (Node F) allow SNA applications to communicate across a combination of TCP/IP and SNA networks.

AnyNet SNA over TCP/IP

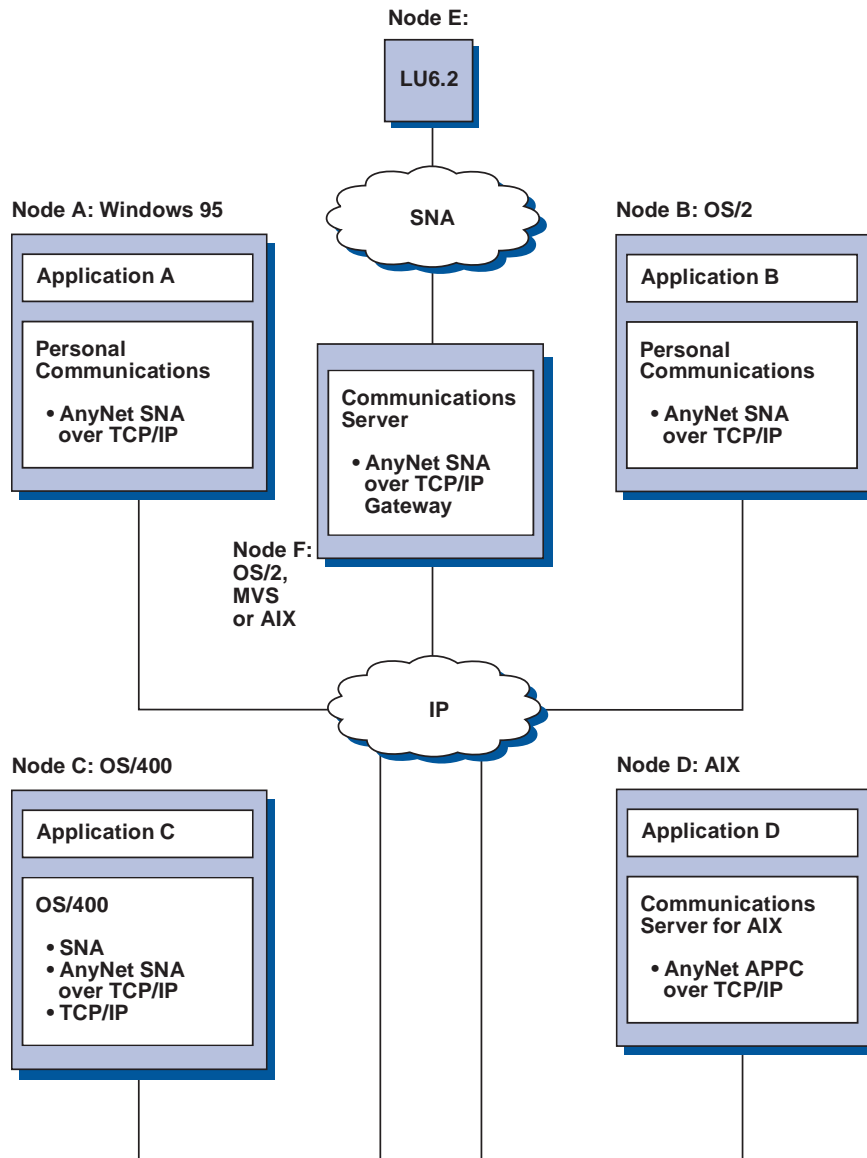


Figure 5. Using AnyNet to Connect SNA Applications on Different Platforms

Chaining Gateways to Connect Multiple SNA and IP Networks

Chained gateways enable the SNA network to connect multiple IP networks.

Note: While Figure 6 on page 175 shows three networks connected, the number of networks that can be concatenated is unlimited.

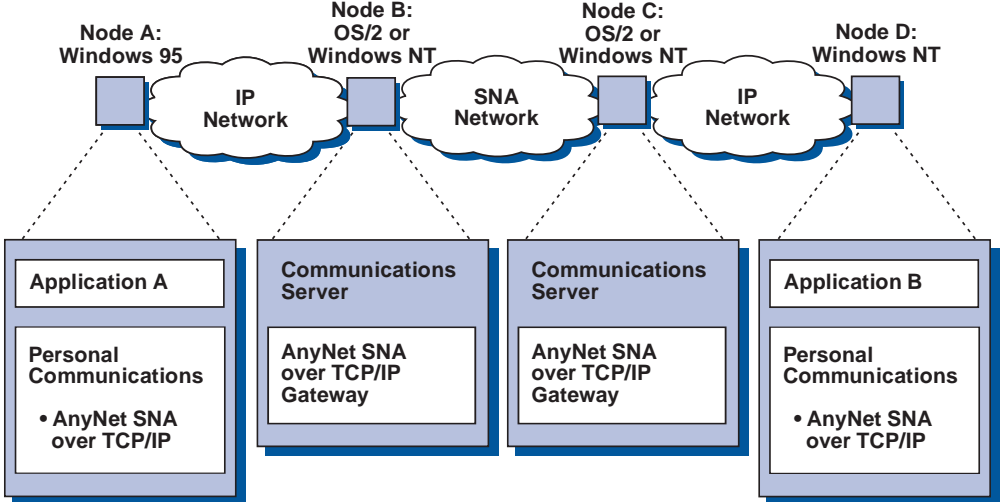


Figure 6. Chaining Multiple Gateways to Connect Multiple IP Networks

5250 Emulation over a TCP/IP Network

Figure 7 illustrates how AnyNet enables 5250 emulation over a TCP/IP network. Configuration instructions for this example are provided in *Quick Beginnings*.

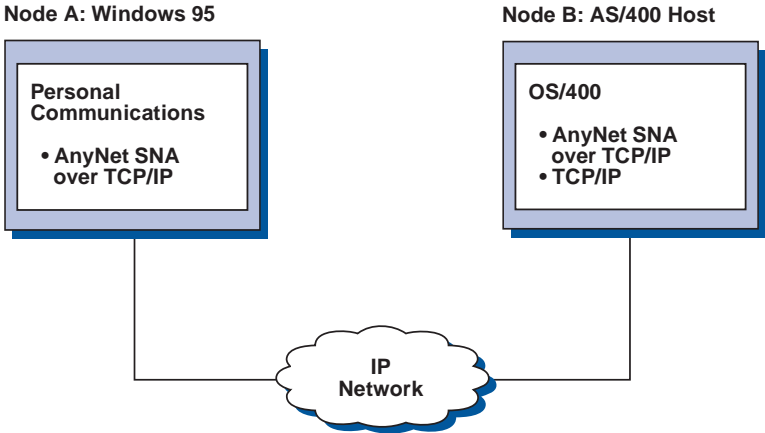


Figure 7. 5250 Emulation over a TCP/IP Network

APPC3270 Emulation over a TCP/IP Network

AnyNet also enables APPC3270 emulation over a TCP/IP network. See Figure 8 on page 176. Configuration instructions for this example are given in *Quick Beginnings*.

AnyNet SNA over TCP/IP

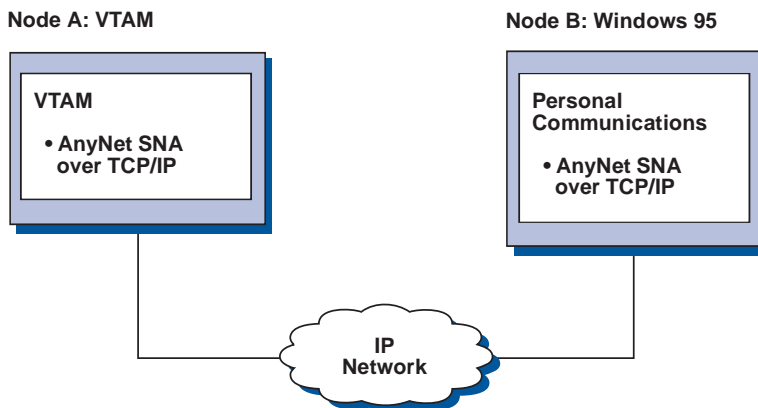


Figure 8. APPC3270 Emulation over a TCP/IP Network

3270 Emulation via DLUR over a TCP/IP Network

Figure 9 illustrates how you can use the AnyNet SNA over TCP/IP function of Personal Communications to enable 3270 emulation over a TCP/IP network. Node B, an access node, is defined as a dependent LU requester (DLUR). Configuration instructions for this example are provided in *Quick Beginnings*.

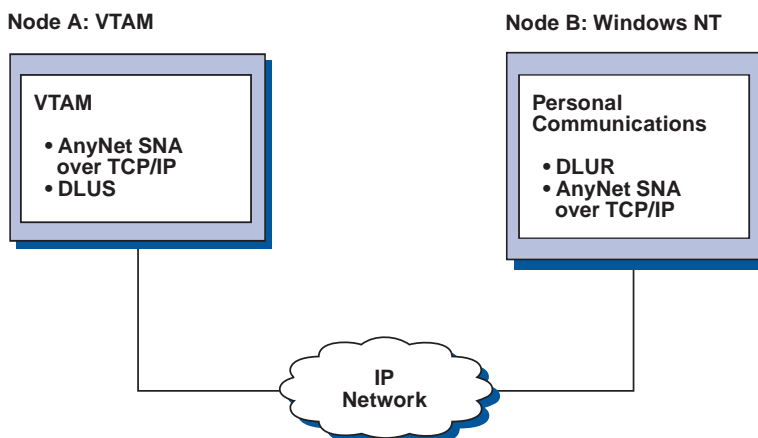


Figure 9. 3270 Emulation via DLUR over a TCP/IP Network

3270 Emulation over a TCP/IP Network via an SNA Gateway to a VTAM Host on an SNA Network

Figure 10 on page 177 illustrates a configuration that supports dependent LU communications for downstream workstations to a subarea host. In this example, Node B is configured for dependent LU communication over AnyNet to an S/390 host. Configuration instructions for this example are provided in *Quick Beginnings*.

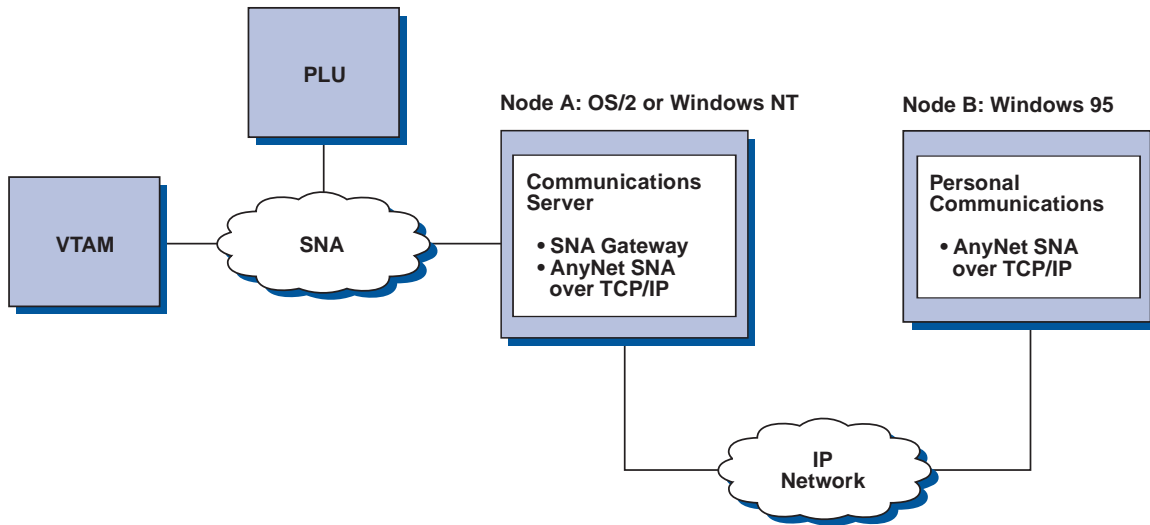


Figure 10. 3270 Emulation over a TCP/IP Network via an SNA Gateway to a VTAM Host on an SNA Network

3270 Emulation over a TCP/IP Network via an SNA Gateway to a VTAM Host on an APPN Network

Figure 11 illustrates a configuration that supports dependent LU communication for downstream workstations to an APPN host. The configuration of Node C is the same as that of Node B in the previous example, but the VTAM® host and the OS/2 gateway are connected to an APPN network.

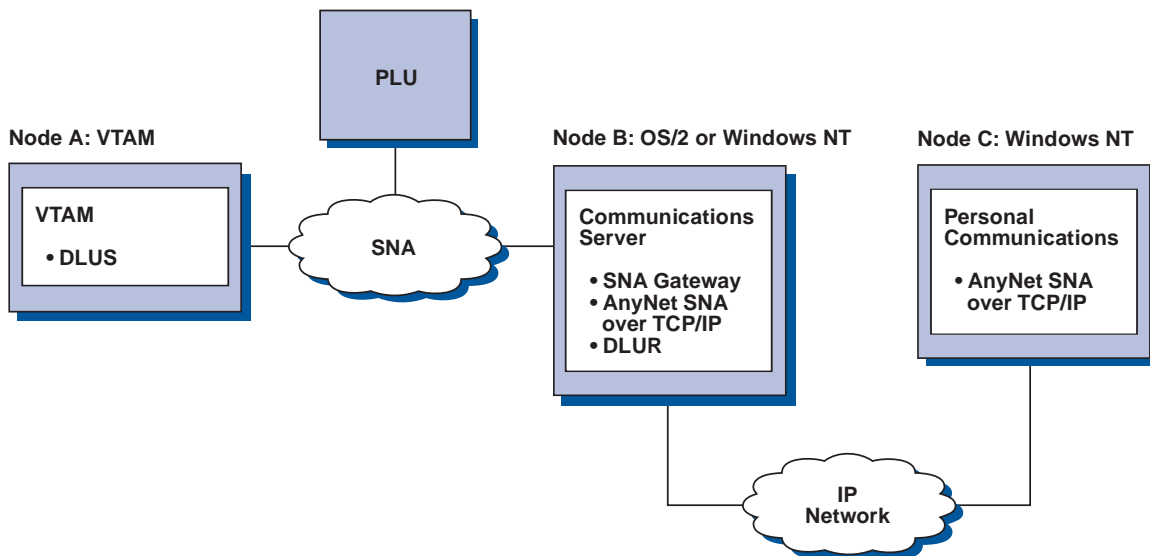


Figure 11. 3270 Emulation over a TCP/IP Network via an SNA Gateway to a VTAM Host on an APPN Network

3270 Emulation via an SNA Gateway over a TCP/IP Network

Figure 12 on page 178 illustrates a configuration that supports dependent LU communication for downstream workstations over a single IP network. All three machines are running AnyNet SNA over TCP/IP. As in the previous example, Node A is a dependent LU server (DLUS), and Node B is a dependent LU

AnyNet SNA over TCP/IP

requester (DLUR). Configuration instructions for this example are given in *Quick Beginnings*.

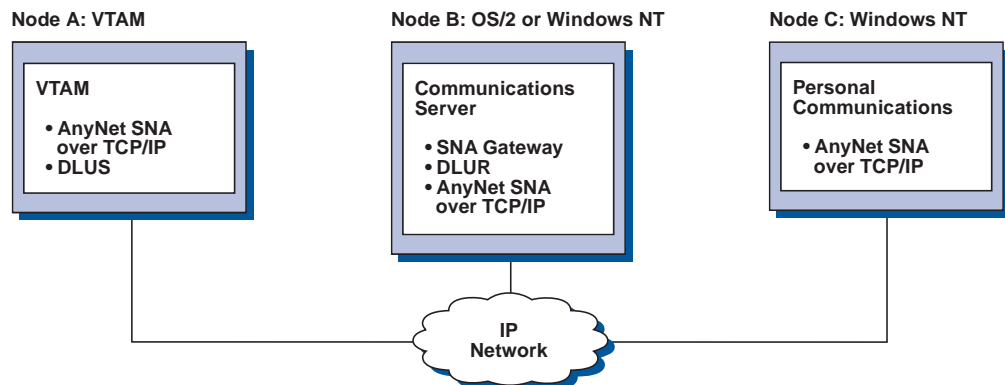


Figure 12. 3270 Emulation via an SNA Gateway over a TCP/IP Network

How Does SNA over TCP/IP Work?

SNA over TCP/IP uses protocols that bypass the lower transport layers of the SNA architecture. This process is transparent to the SNA application program. Using a supported API, an application program passes data to the presentation services of Personal Communications. This data, in turn, is passed through the SNA architectural layers and presented to SNA over TCP/IP at the data link control level. When Personal Communications initiates a session for an application program, SNA over TCP/IP translates the SNA routing information (network-qualified name) into IP routing information (IP address) and uses the IP address to create a TCP connection to the appropriate system.

Figure 13 on page 179 illustrates how an SNA over TCP/IP access node enables SNA application programs to communicate over IP networks.

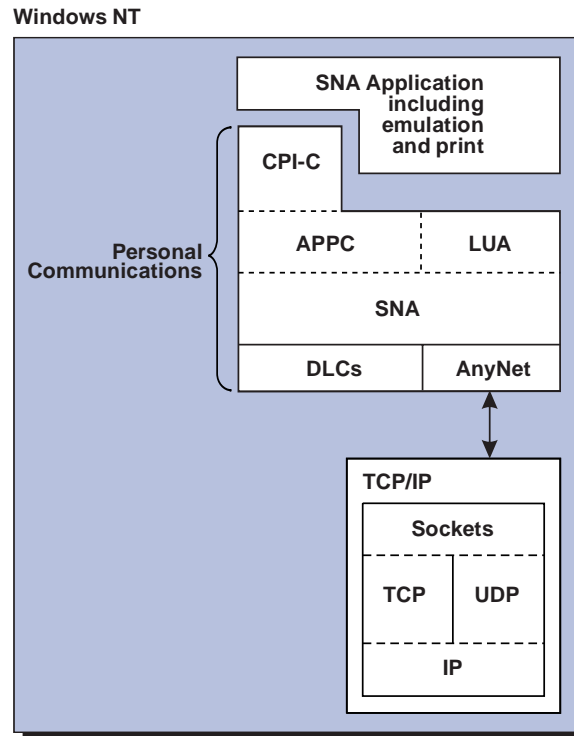


Figure 13. Structure of SNA over TCP/IP for Personal Communications

The configuration information you define enables SNA over TCP/IP to determine:

- Whether to route the data using SNA or to route the data using IP
- The IP address associated with the network-qualified LU name

SNA over TCP/IP uses both stream (TCP) and datagram (UDP) sockets that are bound to the well-known port (397). Any information received over this port is routed to AnyNet.

Mapping SNA Resources to IP Addresses

SNA over TCP/IP access nodes must determine the IP address of the partner before an SNA session can be established. The SNA identifier of the partner is mapped to an IP address using the following steps:

1. SNA over TCP/IP receives the SNA identifier from Personal Communications in one of the following formats:
 - For LU names, `netid.luname`
 - For CP names, `netid.cpname`
2. SNA over TCP/IP takes the identifier and generates a domain name:
 - For LU names, `luname.netid.snasuffix`
 - For CP names, `cpname.netid.snasuffix`

Note: The default value for `snasuffix` is `SNA.IBM.COM`. For additional information on the SNA domain name suffix, refer to the on-line help.

Figure 14 on page 180 shows examples of domain names generated by SNA over TCP/IP.

AnyNet SNA over TCP/IP

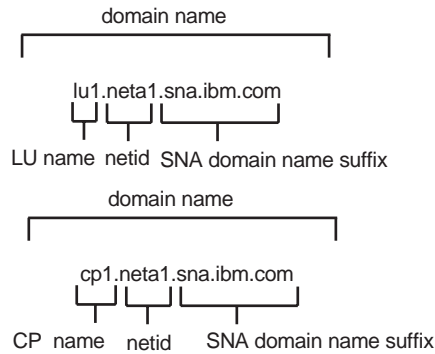


Figure 14. Formats of the Domain Names That SNA over TCP/IP Builds

3. SNA over TCP/IP requests that the domain name be translated into an IP address.
4. TCP/IP uses the HOSTS file or domain name server to translate the domain name into an IP address (for example, 9.67.192.28).

When the IP network includes SNA over TCP/IP gateways, consider the following additional address mapping issue:

If the partner LU can be reached through a gateway, the domain name of the partner must be mapped to the IP address of the gateway. If there are parallel gateways, the domain name should be mapped to each gateway IP address.

Defining Domain Names and IP Addresses

This section describes the TCP/IP name resolution function, used by AnyNet to map SNA resources to IP addresses. This function queries both the local HOSTS file and any domain name servers to convert a domain name (for example, lu1.neta1.sna.ibm.com) into an IP address (for example, 10.1.1.1).

HOSTS File

You can use TCP/IP HOSTS files to define domain names and IP addresses for your network. However, as your network becomes larger and maintaining the HOSTS file on each end-user workstation becomes too time-consuming, it is recommended that you use a domain name server.

The HOSTS file lists:

- IP address
- Domain name
- Other aliases for the domain name

Note: For Windows/NT this resides in the drivers\etc subdirectory of your NT system. For Windows 95 and Windows 98, this is in your Windows system directory.

For example, if your IP address is 10.1.1.1, network ID is NETA1, SNA resource name is LUA1, and SNA domain name suffix is the default (sna.ibm.com), enter the following in your HOSTS file:

```
10.1.1.1    lua1.neta1.sna.ibm.com
```

Domain Name Server

Domain names and IP addresses can also be defined in the domain name server database.

Each SNA identifier is mapped to a corresponding IP address by a domain name server. The location of these servers is configured in the Network section of the Control Panel.

For more information on HOSTS files and domain name servers, refer to your TCP/IP documentation. If your workstation is using the TCP/IP support in Windows 95, Windows 98, Windows NT, or Windows 2000, refer to the on-line TCP/IP documentation that is included with the Windows 95, Windows 98, Windows NT, or Windows 2000 product.

Defining Unique CP Names and Connection Network Names

For configurations that have two or more SNA over TCP/IP gateways connecting an SNA network with two or more IP networks, you must define a unique SNA control point (CP) name and a unique SNA connection network name for each IP network.

All LUs that reside on access nodes in the IP network appear to reside on a node with this CP name.

Use the reverse data file of the domain name server or the HOSTS file to define the CP name and the connection network name for a given IP network. Map the IP address 127.0.0.3 to the CP name and map the IP address 127.0.0.4 to the connection network name.

The following example shows entries in the reverse data file. For an IP network with SNA network ID NETA, CP name MYCPNAME, and connection network name MYCNET, you would define the following entries:

```
127.0.0.3      NETA.MYCPNAME.  
127.0.0.4      NETA.MYCNET.
```

Notes:

1. A period is required at the end of the name only if the definition is in the DNS reverse data file. No period is used in HOSTS file definitions.
2. Do not include the SNA domain name suffix.

The AnyNet SNA over TCP/IP function of Personal Communications provides a default CP name (\$ANYNET.\$GWCP) and a default connection network name (\$ANYNET.\$GWCNET). In configurations with one IP network, you can use the default by not defining a CP name or a connection network name. In configurations with multiple gateways connecting multiple IP networks, one IP network can use the default. You must, however, define a unique CP name and connection network name for all other IP networks.

Figure 15 on page 182 shows how to define the CP name and the connection network name for a configuration with two IP networks. An example is provided in *Quick Beginnings*.

AnyNet SNA over TCP/IP

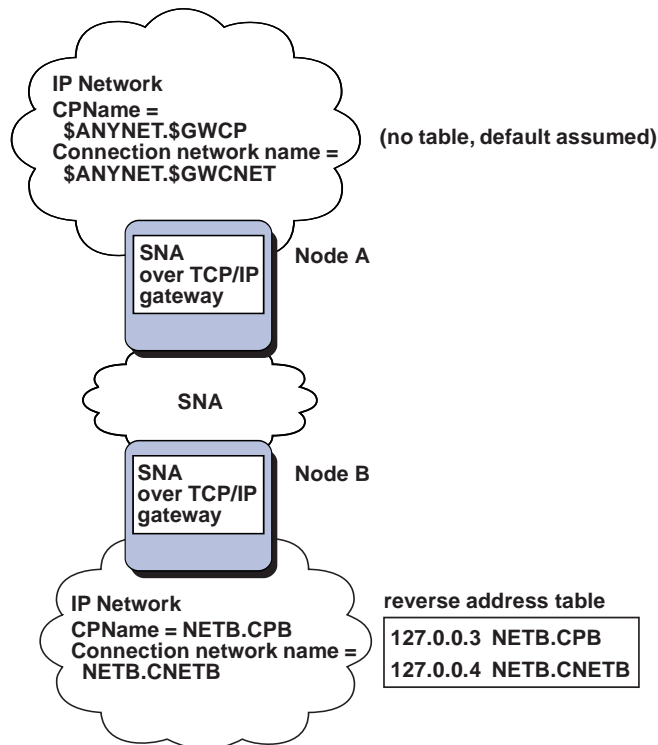


Figure 15. Defining a CP Name and a Connection Network Name

Setting and Modifying the Routing Preference Protocol

When an SNA application initiates a session, Personal Communications must first determine which transport to use, either SNA, IP, or a combination of the two.

Personal Communications uses the default routing preference for the session unless there is a specific routing preference set for the partner LU. Personal Communications then sets up a session for the partner LU using the preferred transport.

If the partner is not available through the preferred transport, Personal Communications can reroute the session request over the other available transport, depending on the setting in the routing preference table. For example, if the setting in the routing preference table for the destination LU is non-native first, Personal Communications will attempt to set up the session over TCP/IP. If the partner is not available through TCP/IP, Personal Communications will route the session over SNA. However, if the setting in the routing preference table for the destination LU is non-native only, Personal Communications will attempt to set up the session over TCP/IP. If TCP/IP is not available, Personal Communications will not route the session over SNA, because the setting allows only Personal Communications to use non-native transport.

The routing preference table is used only for new sessions. Previously existing sessions use the same transport; they are not brought down and rerouted if the routing preference table is changed.

You can set or modify the default routing preference to one of the following:

Native first

Requests are routed over SNA. If no SNA route is available, requests are routed over TCP/IP.

Non-native first

Requests are routed over TCP/IP. If no TCP/IP route is available, requests are routed over SNA.

Native only

Requests are routed only over SNA. If no SNA route is available, the connection will fail.

Non-native only

Requests are routed only over TCP/IP. If no TCP/IP route is available, the connection will fail.

Helpful Hints

This section contains helpful hints on tuning, TCP/IP connectivity via SLIP or PPP, and dynamic IP addresses.

Tuning

If you can access an LU through multiple SNA over TCP/IP gateways, and you have mapped that LU name to multiple IP addresses, increase the Connection retry duration and Connection wait time limit when configuring the AnyNet base parameters. This ensures that TCP attempts to connect to all possible adapters and gateways. It can take as long as 90 seconds for a TCP connection to fail to an inactive IP address.

Dynamic IP Addresses

Generally, AnyNet SNA over TCP/IP depends on SNA resources (for example, LU names, CP names or idblk/num) being statically mapped to IP addresses. However, depending on your configuration and how your connections are initiated, you might be able to use AnyNet SNA over TCP/IP in environments where IP addresses are dynamically assigned (for example, DHCP).

APPC or CPI-C Applications

An SNA over TCP/IP access node with a dynamically assigned IP address may always initiate sessions to another SNA over TCP/IP access node or gateway with a static IP address.

The only way an SNA over TCP/IP access node or gateway with a static IP address (node A) can initiate a session to a partner with a dynamic IP address (node B) is:

- Node B initiated a session to or through node A first.
- The session initiated in Step 1 is still active.

Dependent LU Applications

Note: The information in this section applies to LU 0, 1, 2, 3, or dependent 6.2 applications.

SNA over TCP/IP access nodes with dynamically assigned IP addresses can support dependent LU communications if the following criteria are met.

- Dependent LU communication is occurring through an SNA gateway either through:

AnyNet SNA over TCP/IP

- Communications Server/2 V5 or later
- Communications Server for Windows NT 5.0 or later
- The SNA over TCP/IP access node with a dynamically assigned IP address initiates connections to an SNA gateway with a static IP address.

Dependent LU communication through DLUS/DLUR over AnyNet SNA over TCP/IP is not supported if the DLUR node has a dynamically assigned IP address.

Appendix C. AnyNet Sockets over SNA

This chapter contains information about how to configure Sockets over SNA. The Sockets over SNA access node function of Personal Communications enables WinSock compliant applications to communicate over SNA networks. .

AnyNet Sockets over SNA Access Node

The Sockets over SNA access node function enables TCP/IP application programs using either the WinSock 1.1 or WinSock 2.0 socket interface to communicate over an SNA network.

Socket Applications Communicating over an SNA Network

Figure 16 illustrates a network where Sockets over SNA is configured on each node, but no Sockets gateway function is needed. Socket applications A and B can exchange information as long as they are connected through an SNA network. The SNA transport can take full advantage of APPN and HPR for enhanced reliability and performance.

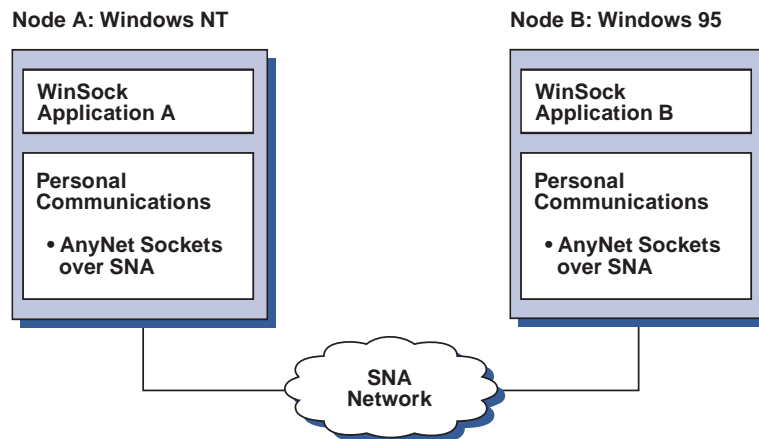


Figure 16. Sockets Applications Communicating over an SNA Network

Connecting Sockets over SNA Access Nodes on Different Operating Systems

Figure 17 on page 186 illustrates an SNA network in which socket applications on multiple operating systems are communicating over an SNA network. In this example:

- Node A is configured with Sockets over SNA which is provided as part of Personal Communications for either Windows 95 or Windows NT.
- Node B is configured with Sockets over SNA for OS/2 which is also provided with Communications Server for OS/2.
- Node C is configured with Sockets over SNA for MVS which is provided with the VTAM Multiprotocol Transport Feature (MPTF) or the VTAM AnyNet feature.
- Node D is configured with Sockets over SNA for AIX which is provided as part of the Communications Server for AIX.

AnyNet Sockets over SNA

- Node E is configured with OS/400, which includes the Sockets over SNA function.
- Node F is configured with Windows NT and Sockets over SNA, which is provided with Communications Server for Windows NT.

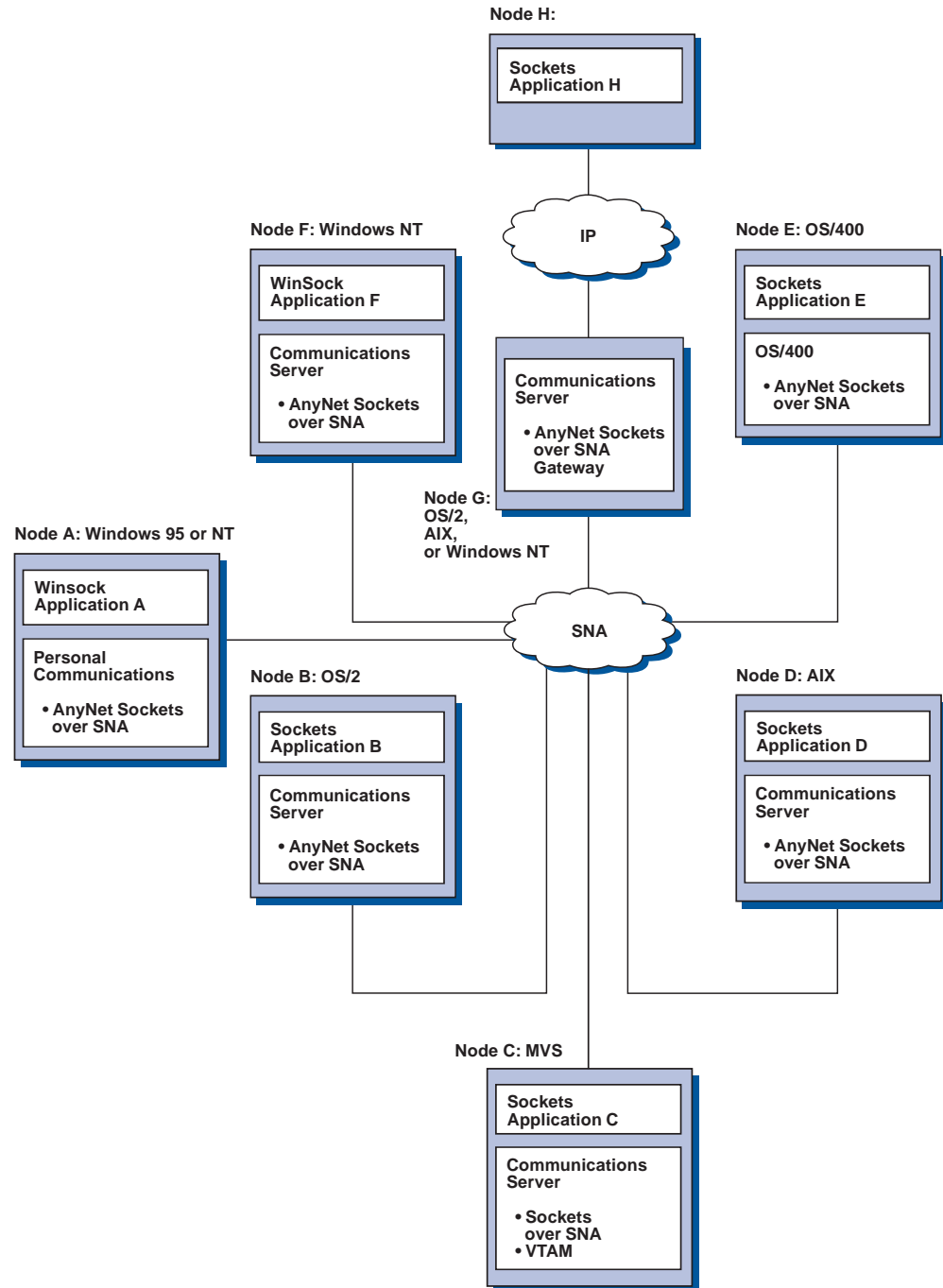


Figure 17. Socket Applications on Multiple Operating Systems Communicating over an SNA Network

Connecting Remote TCP/IP Networks Using an SNA Backbone and Sockets over SNA Gateways

Sockets over SNA access nodes can communicate with a native TCP/IP network through a Sockets over SNA gateway (as provided by IBM Communications Server products).

In Figure 18, Node A is configured with TCP/IP and runs on a remote, native TCP/IP network. Node C is configured as a Sockets over SNA Gateway. Node B is an access node configured with Sockets over SNA and runs on an SNA network.

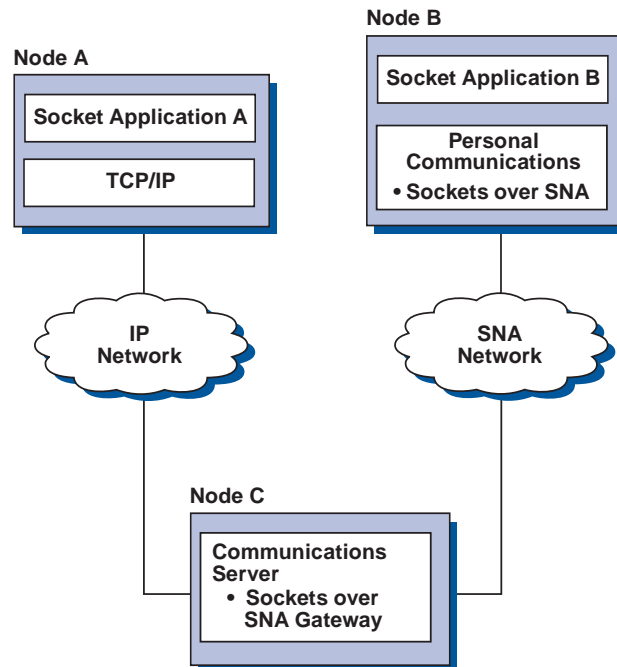


Figure 18. Socket Applications Communicating through Multiple Sockets Gateways

How Does Sockets over SNA Work?

Figure 19 on page 188 shows the structure of a Windows NT node that is running Sockets over SNA and illustrates how socket application programs and Sockets over SNA operate on a Windows NT node. Similarly, Figure 20 on page 189 shows the structure of a Windows 95 node that is running Sockets over SNA.

AnyNet Sockets over SNA

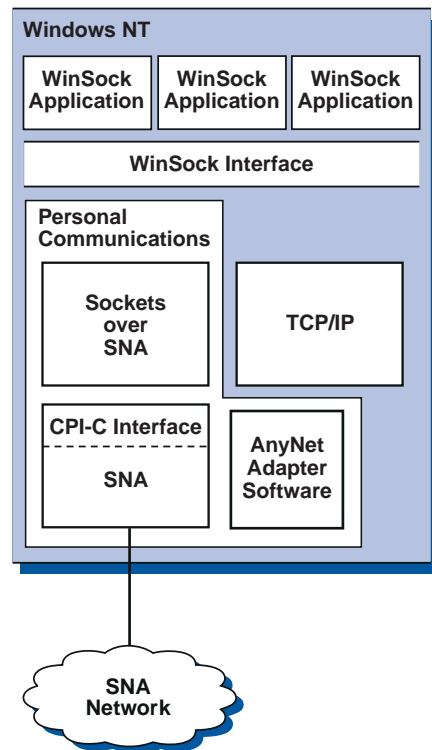


Figure 19. Structure of a Windows NT Node Running Sockets over SNA

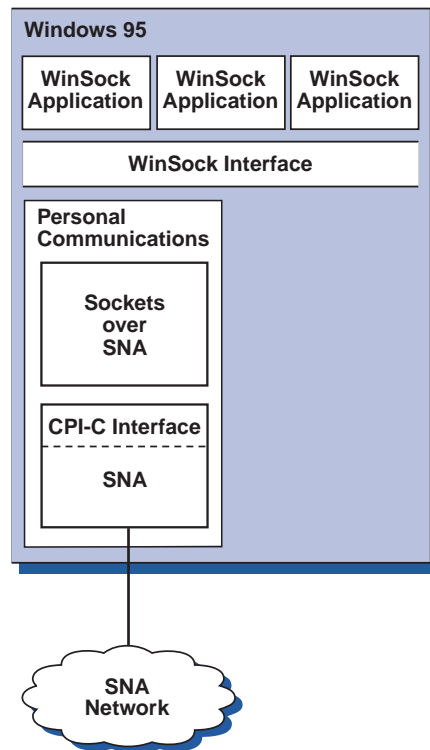


Figure 20. Structure of a Windows 95 Node Running Sockets over SNA

WinSock is an API that allows socket applications to run in a Windows environment. Microsoft ships the WinSock API with each operating systems. Newer versions of Winsock are also available from the Microsoft Web site.

Sockets over SNA does not provide a WinSock interface and does not process socket calls. Instead, WinSock applications use the WinSock interface. The Sockets over SNA code then allows these applications to communicate across the SNA network.

Note: As a part of the installation of the AnyNet[®] Sockets over SNA component, AnyNet Sockets over SNA will install its own layered service provider (LSP). The AnyNet LSP will form a new service provider protocol chain which will exclude all other currently installed LSPs. This means applications using an existing LSP may no longer work.

Likewise, if another service provider is installed after installation of AnyNet Sockets over SNA, it is possible that the AnyNet Sockets over SNA LSP will be left out of the new protocol chain. It is also possible for a new service provider to insert its LSP into the protocol chain in such a manner as to cause the AnyNet Sockets over SNA code to fail.

This is a known problem with the current WinSock 2 Specification. At this time there is still no architected solution to the problem of managing the ordering of multiple service providers in protocol chains. Until such a solution is made available for the WinSock 2 Specification, there will be continued problems with multiple service providers.

AnyNet Sockets over SNA

Personal Communications users who are experiencing this problem should try the following workarounds:

If you do not need to run the AnyNet Sockets over SNA function:

- At installation time use the **Custom Install** option and uncheck the **AnyNet Sockets over SNA** box.
- If install has already been performed, using **Full Install** or **Custom Install** with AnyNet Sockets over SNA:
 1. Go to a DOS command prompt and switch to the directory where Personal Communications is installed.
 2. Issue the command **ANYWS2 -h**.
 3. Follow the help information to uninstall the AnyNet LSP.
 4. If you later need to use AnyNet Sockets over SNA, issue the **ANYWS2 -h** command and follow the directions to install and reorder the AnyNet LSP.

If you need to run with the AnyNet Sockets over SNA function and another service provider:

- In some cases, it will be possible to run with both service providers.
 1. Ensure that AnyNet Sockets over SNA is installed first.
 2. Install the new service provider.

If the new service provider is of the correct type *and* creates a new protocol chain correctly, both AnyNet Sockets over SNA and the new service provider will work

- In most cases this will not work, and you will have to determine which service provider you want to work with for a given work scenario; to accomplish this:
 1. Go to a DOS command prompt and switch to the directory where PCOMM is installed.
 2. Issue the command **ANYWS2 -h**.
 3. Follow the help information to uninstall or install and reorder the AnyNet LSP.

Generating an LU 6.2 Call from a Socket Call

To enable TCP/IP-formatted information to route over SNA, Sockets over SNA maps IP addresses to SNA network-qualified LU names. When an application program invokes Sockets over SNA to establish a stream connection with another application program, Sockets over SNA establishes two half-duplex LU 6.2 conversations for the stream connection.

Sockets over SNA establishes one LU 6.2 conversation for all datagrams sent to a single destination. Conversations dedicated to datagram traffic are deallocated if they are unused for some specified period of time.

Mapping an IP Address to an SNA Network-Qualified Name

When an application program invokes Sockets over SNA to communicate with another application program, it supplies the IP address of the destination node. Sockets over SNA must map the IP address to an SNA address to issue an appropriate LU 6.2 call. For every IP address that identifies a node, there will be a corresponding SNA network-qualified name.

“Routing and Mapping Overview” explains how address mapping works and provides guidelines and requirements for setting up IP-LU address mapping.

Application Program Support Provided by Sockets over SNA

Sockets over SNA supports WinSock 1.1 and WinSock 2.0 applications that use AF_INET sockets. Sockets over SNA does not support applications that use broadcasting.

Planning for Sockets over SNA

This section describes what the network planner should consider before configuring a network with Sockets over SNA.

Routing and Mapping Overview

This section explains basic concepts of Internet addressing and how those concepts relate to routing and mapping. It includes the following information:

- “Internet Addressing”
- “IP Routing Table” on page 192
- “SNA Network ID Used by Sockets over SNA” on page 192
- “How an IP Address Is Mapped to an LU Name” on page 192
- “How Sockets over SNA Routes and Maps Data” on page 193

Internet Addressing

Every host is assigned at least one unique Internet Protocol (IP) address, which is used to route data through the network.

Note: In the IP suite of protocols, *host* refers to an end system and can be any workstation; it does not have to be a mainframe.

The IP address assigned to the host does not define a host on the network; it defines a network interface on that host to a network. For example, the address of the SNA network interface identifies a node’s connection to the SNA network. You must configure a unique IP address for the SNA interface.

The following section describes the IP address format, address classes, and network masks. For more detailed information, see your TCP/IP documentation.

IP Address Format and Classes

An IP address consists of a 2-part, 32-bit address field:

- The first part of the address field contains the network address; the second part contains the host address.
- The number of bits used for the network and host portions of an IP address are variable, depending on the address class of the IP address.
- A network mask enables you to use part of the host portion of the IP address as a subnetwork address.

AnyNet Sockets over SNA

Default network masks are shown in Table 15.

Table 15. IP Address Masks Supported by Sockets over SNA

For a dotted decimal IP address in the form <i>a.b.c.d</i> , the range of values for <i>a</i> is:	Default Network Mask
1–127	255.0.0.0
128–191	255.255.0.0
192–223	255.255.255.0

Masks Used by Sockets over SNA

Sockets over SNA uses two types of masks:

- **Subnet mask**

The subnet mask is used in routing and is specified during the configuration of the local node and routes. You can accept the default subnet mask or specify a value other than the default to define subnetwork addresses.

- **Address mask**

The address mask is used for generated IP-LU address mapping and is specified during configuration.

IP Routing Table

Each host has an IP routing table that stores information about possible destinations and how to reach them. Route entries are added when:

- The local IP address is defined. For more information, see the online help.
- Routes are defined from the SNA Node Configuration window. Click **Configure AnyNet Sockets over SNA** and then click **Routes**. For more information, see the online help.
- A route with fewer hops is found. This occurs when Sockets over SNA receives an ICMP redirect message.

For a routing table example, see Figure 21 on page 193.

SNA Network ID Used by Sockets over SNA

For each route you define through the SNA interface (sna0), there must be a corresponding SNA network ID to which the destination IP network address is mapped. The number of SNA network IDs you define depends on how you want to map the IP network to the SNA network.

For example, if the socket applications using SNA are configured to use IP subnetworks 9.67.0.0 and 9.77.0.0, you can define an SNA network ID that corresponds to each IP subnetwork, or you can define one SNA network ID that corresponds to both subnetworks. Sockets over SNA does not require a unique one-to-one mapping between an IP network address and an SNA network ID.

How an IP Address Is Mapped to an LU Name

You can use either explicit or generated mapping to map IP addresses to SNA LU names:

- In explicit mapping, all LU names are defined, and you assign each IP host address to a specific SNA LU name during configuration.
- In generated mapping, LU names are automatically generated for you. During configuration, you specify a network IP address, address mask, network ID, and LU template value.

Sockets over SNA uses the address mask to map the network portion of the IP address to the SNA network ID and the host portion to the SNA LU name. The LU template value is used to determine the characters and the positions of characters used in the LU name.

You can display the generated LU name for a given IP address using the `sxmap` command line utility. The syntax for this utility is:

```
sxmap convert <IP address> <address mask> <LU template>
```

How Sockets over SNA Routes and Maps Data

The following steps briefly describe how Sockets over SNA determines whether to route data over SNA or TCP/IP, and how address mapping is handled:

1. Sockets over SNA searches its own routing table to find a route that enables data to reach the destination IP address. If Sockets over SNA does not find any matching routes, and if the node is configured for native access, the connection request is forwarded to the native TCP/IP stack.
2. If Sockets over SNA finds a matching route, the route entry indicates how the destination can be reached:
 - a. If the router address is the address of a local network interface, such as `sna0`, the destination network, subnetwork, or host address can be reached directly.
 - b. If the router address is the address of a gateway or router, the destination can only be reached through that intermediate gateway or router.

Figure 21 shows an example of an IP routing table.

Destination IP Address	Destination Mask	Gateway IP Address	Use Count
1.2.3.4	255.255.255.255	199.245.253.1	10
10.0.0.0	255.0.0.0	199.245.253.2	0
10.11.0.0	255.255.0.0	199.245.253.113	37
127.0.0.1	255.255.255.255	127.0.0.1	8
128.1.0.0	255.255.0.0	199.245.253.3	0
199.245.253.0	255.255.255.0	199.245.253.113	368

Figure 21. Example of an IP Routing Panel

3. If no route is found in the Sockets over SNA routing table, and native TCP/IP access is also configured, then Sockets over SNA assumes that the TCP/IP destination can be reached through a native IP network. Refer to your TCP/IP documentation for more information on how TCP/IP routes data.
4. If the chosen route indicates that data should go over the SNA interface (`sna0`), Sockets over SNA looks up the next-hop address in the IP-LU mapping table:
 - a. If Sockets over SNA finds a matching entry, an LU 6.2 connection is established.
 - b. If Sockets over SNA does not find a matching entry, the connection attempt fails and Sockets over SNA returns completion error code `WSAEHOSTUNREACH`.
 - c. Sockets over SNA passes the destination SNA address and data to Personal Communications.

Defining Sockets over SNA Modes

Sockets over SNA uses LU 6.2 conversations to enable communication between socket application programs. When an LU 6.2 conversation is established, Sockets

AnyNet Sockets over SNA

over SNA defines the mode and associated session characteristics of the connection. Personal Communications uses the mode name to identify characteristics of the connection between the two Sockets over SNA nodes.

The default Sockets over SNA mode is BLANK. You can use the default mode for Sockets over SNA or define your own. To change the default Sockets over SNA mode, from the SNA Node Configuration window, click **Configure AnyNet Sockets Over SNA** and then click **Modes**. You can define another default mode for all TCP/IP traffic and assign a specific mode to a specific TCP/IP port.

If you specify an alternative mode that is not defined by Personal Communications, you must define the session characteristics associated with that mode to Personal Communications.

Changing the Idle-Timeout Interval

The Idle Timeout start option allows you to adjust the number of idle seconds before Sockets over SNA deallocates a datagram conversation. This interval enables you to balance between using system resources to maintain an existing datagram conversation and taking longer to reestablish a new datagram conversation. For example, if you set this value low, unused datagram conversations end faster, but it takes longer to send the next datagram. The default idle-timeout interval is 90 seconds.

To modify the start option, from the SNA Node Configuration window, click **Configure AnyNet Sockets over SNA**, then click **View/Change/Add**, click **Advanced** and select a new value for this option.

Appendix D. Keyboard Layouts

This chapter describes keyboard layouts supported by the host system. The keyboards are selected during installation or customization procedures. You can use keyboard layouts to locate character positions on the keyboard.

Different characters can appear in different key positions, depending on the country language selected. This chapter shows only U.S. keyboards. The function keys located across the top of the keyboard are not shown. Shaded areas show keys that are not available on some U.S. keyboards. Refer to your Windows documentation for more information about the country and code page options. Ask your system administrator for information about host code pages.

For keys with three or four characters shown, use the key combinations in the following table to produce the desired upper-right and lower-right characters. Lower-left characters require no additional keys. Use the shift key for upper-left characters.

Country	Lower-Right Character Enhanced Template ¹	Upper-Right Character All Templates
Denmark	AltGr	Ctrl
Finland	AltGr	Ctrl
Norway	AltGr	Ctrl
Sweden	AltGr	Ctrl
All others	AltGr	None

Note:

¹ Alt and AltGr keys produce the same character on the Enhanced keyboard in DOS mode.

Local Edit Keys

The following table shows the keys used by local editing. These keys behave differently between the local editing mode and the interactive editing (ECHO) mode.

VT Key Mnemonics	Local Edit Function	Action in Local Edit Mode
VT Find	Home Cursor	Moves the cursor to the top left position on a page in memory.
VT Insert	Insert/Override	Selects whether new characters typed displace existing characters to the right, or replace existing characters.
VT Remove	Clear	Clears an unprotected field of all characters. Press in conjunction with the SHIFT key to clear all unprotected fields in the scrolling region.
VT Select	Edit	Press in conjunction with the SHIFT key to enter or exit local edit mode. The status line shows the current state.

Keyboard Layouts

VT Prev	PrevPage	Moves the cursor to the beginning of the previous page.
VT Next	NextPage	Moves the cursor to the beginning of the next page.
VT PF1	Tab	Advances the cursor to the first occurrence of: <ul style="list-style-type: none"> • a tab stop at the beginning of an unprotected field • an unprotected field • the end of the scrolling region Pressing SHIFT with this key moves the cursor back to the first occurrence of: <ul style="list-style-type: none"> • the previous tab stop • the beginning of the current unprotected field • the beginning of the previous unprotected field • the beginning of the scrolling region
VT PF2	Insert Line	Adds a blank line on the screen and moves the following lines down. This key cannot be selected on a line containing a protected field.
VT PF3	DeleteLine	Deletes a line from the screen and moves the following lines up. This key cannot be selected on a line containing a protected field.
VT PF4	DeleteChar	Deletes an unprotected character at the cursor.
VT Numpad Enter Newline	Transmit	Sends a block of edited text to the host. Works like the Transmit key, if you select Line Transmit.

Keyboard Layouts

This section describes the keyboards supported by the host systems and Personal Communications. See the online helps for more information on keyboards. The function keys have the following shift statuses.

-Status-	
BASE	: Normal shift
SHIFT	: Up shift by pressing Shift
CTRL	: Control shift by pressing Ctrl
ALT	: Alternate shift by pressing Alt
ALTGR	: Shift by pressing Ctrl+Alt
CTRLSFT	: Shift by pressing Ctrl+Shift

Following are some abbreviations for the keys.

AltCur	Alternate Cursor
AltView	Alternate View
BackSp	Back Space
BackTb	Backtab
BgnOLn	Begin of Line
BotOPg	Bottom of Page

BtbWord	Backtab Word
CarRtn	Carrier Return
ChgFmt	Change Format
ChgScrn	Change Screen
ChrAdv	Character Advance
Ctrl	Control
CurBlink	Cursor Blink
CurSel	Cursor Select
DelWord	Delete Word
DevCan	Device Cancel
DspTxC	Display TextCode
Dup	Duplicate
EditCop	Edit Copy
EditPst	Edit Paste
EditUnd	Edit Undo
EndFld	End of Field
EndOLn	End of Line
ErEOF	Erase EOF
ErFld	Erase Field
ErInp	Erase Input
Fld-	Field-
Fld+	Field+
FldColor	Field Color
FldExt	Field Exit
FldHigh	Field Highlight
FldMark	Field Mark
FldTrns	Transparency Field Inherit
FastDn	Fast Down
FastDow	Fast Down
FastUp	Fast Up
FieldCol	Field Color
GrpCsr	Graphic Cursor

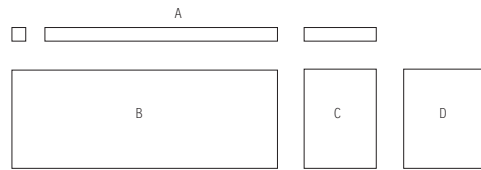
Keyboard Layouts

HostPr	Host Print
JmpNext	Jump Next
JumpNxt	Jump Next
MarkLef	Mark Left
MkDown	Mark Down
MkLeft	Mark Left
MkRight	Mark Right
MrkUp	Mark Up
MarkDow	Mark Down
MarkRig	Mark Right
MoveDow	Move Down
MoveLef	Move Left
MoveRig	Move Right
MvDown	Move Down
MvLeft	Move Left
MvRight	Move Right
MvUp	Move Up
NewLin	New Line
ReqBSp	Required Backspace
ReqTab	Required Tab
RolDwn	Roll Down
RollDow	Roll Down
RolUp	Roll Up
Rst/Ctrl	Reset/Ctrl
RPause	Record/Play Pause
SOSI	SOSI Display
SOSI/G	SOSI Generate
SysAttn	System Attention
SysReq	System Request

TabFld Tab Field
TopOPg Top of Page
TransOp Transparency Opaque
TrnfdI Transparency Field Inherit
TrnOp Transparency Opaque
TstReq Test Request
Turquois Turquoise
UnderSc Underscore
UndScr Underscore
WdWrap Word Wrap

Keyboard Layouts

Enhanced Keyboard, Microsoft Natural Keyboard (3270 Only)



Segment A assignment:

110 SysAttn SysReq	112 PF1 PF13 SDSI Doc Doc Red	113 PF2 PF14 WdWrap WdWrap Pink	114 PF3 PF15 CfGfmt CfGfmt Green	115 PF4 PF16 Yellow	116 PF5 PF17 Record Blue	117 PF6 PF18 Play Turq	118 PF7 PF19 RPause White	119 PF8 PF20 FidColor	120 PF9 PF21 CurSel1 CurSel1	121 PF10 PF22 CurBlink CurBlink	122 PF11 PF23 AltCur AltCur	123 PF12 PF24 +Cr +Cr
---	---	--	---	---------------------------------------	--------------------------------------	------------------------------------	---------------------------------------	---	--	---	---	---

124	125	126 Clear Break
--------------------------------	--------------------------------	---

Segment B assignment:

1	2	3 NUL	4	5	6	7 RS	8	9	10	11	12 US	13 RS	14	15 BackSp BackSp EditUnd
16 TabFld BackTab	17 DC1	18 ETB	19 ENQ	20 DC2	21 DC4	22 EM	23 NAK	24 HT	25 SI	26 DLE	27 NUL	28 ESC	29	
30	31 SOH	32 DC3	33 EOT	34 ACK	35 BEL	36 BS	37 LF	38 VT	39 FF	40	41	43 NewLine NewLine		
44	46 SUB	47 CAN	48 ETX	49 SYN	50 STX	51 SO	52 CR	53	54	55	57			
58 Reset/Ctrl Reset/Ctrl Quit Quit	60	61						62	64 Enter/Ctrl Enter/Ctrl					

Keyboard Layouts

Segment C assignment:

75	80	85
Insert	Home	-----
Dup	FM	PA3
EditCop	Rule	ChgScrn
PA1	PA2	JumpNext
PA1	PA2	JumpNext
EditPst	-----	-----
76	81	86
Delete	ErEOF	-----
EditCut	ErFld	EditPst
DelWord	-----	Test
DelWord	ErInp	-----
DelWord	ErInp	-----
-----	-----	-----

Segment D assignment:

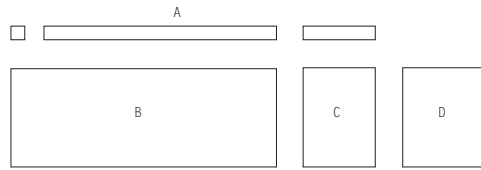
90	95	100	105
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	Reverse	-----
-----	-----	Reverse	-----
-----	TrnOp	-----	-----
-----	-----	-----	-----
91	96	101	106
Home	Up	-----	-----
-----	-----	-----	TabFld
-----	MvUp	-----	-----
-----	FastUp	-----	-----
-----	FastUp	-----	-----
-----	TrnFld	FldTrns	-----
-----	-----	-----	-----
92	97	102	
Left	-----	Right	
-----	-----	-----	
MyLeft	-----	MyRight	
-----	-----	UndScr	
-----	-----	UndScr	
-----	-----	-----	
93	98	103	108
EndFld	Down	Esc J	Enter
-----	-----	-----	Enter
-----	MvDown	-----	-----
-----	FastDn	FldHigh	-----
-----	FastDn	FldHigh	-----
-----	-----	-----	-----
99	104		
Insert	Delete		
-----	-----		
-----	DelWord		
-----	DelWord		
-----	DelWord		
-----	-----		

	83	
	Up	
	Mkup	
	Mvup	
	FastUp	
	FastUp	

79	84	89
Left	Down	Right
MkLeft	MkDown	MkRight
MvLeft	MvDown	MvRight
BtbWord	FastDn	TabWord
BtbWord	FastDn	TabWord
-----	-----	-----

Keyboard Layouts

Enhanced Keyboard, Microsoft Natural Keyboard (5250 Only)



Segment A assignment:

110 SysAttn SysReq	112 PF1 PF13 SOS1 Help	113 PF2 PF14	114 PF3 PF15	115 PF4 PF16	116 PF5 PF17 Record	117 PF6 PF18 Play	118 PF7 PF19 RPause	119 PF8 PF20 SOS1/G FieldCol	120 PF9 PF21	121 PF10 PF22	122 PF11 PF23 AltCur AltCur	123 PF12 PF24 TestReq TestReq
124	125	126 Clear HostPr TstReq										

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 BackSp BackSp ReqBSp
16 TabFld BackTb ReqTab	17	18	19	20	21	22	23	24	25	26	27	28	29	
30	31	32	33	34	35	36	37	38	39	40	41	43 FldExt NewLin CarRtn		
44	46	47	48	49	50	51	52	53	54	55	57			
58 Reset/Ctrl Reset/Ctrl Quit Quit	60	61						62	64 Enter/Ctrl Enter/Ctrl					

Keyboard Layouts

Segment C assignment:

75 Insert Dup EditCop ----- EditPst	80 Home FM Rule ----- -----	85 Ro1Dwn Ro1Dwn ----- JmpNxt ----- -----
76 Delete EditCut DelWord DelWord DelWord -----	81 ErEOF ----- ----- ErInp ----- -----	86 Ro1Up EditPst ----- ----- ----- -----

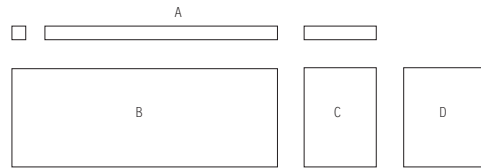
	83 Up Mkup Mvup FastUp FastUp -----	
79 Left MkLeft MvLeft BtbWord BtbWord -----	84 Down MkDown MvDown FastDn FastDn -----	89 Right MkRight MvRight TabWord TabWord -----

Segment D assignment:

90 ----- ----- ----- ----- -----	95 ----- ----- ----- ----- -----	100 ----- ----- ----- ----- -----	105 Fld- Fld- CarRtn Fld- Fld- -----
91 Home ----- ----- TopPg ----- FastUp ----- FastUp -----	96 Up ----- ----- ----- ----- ----- -----	101 Ro1Dwn ----- ----- ----- ----- ----- -----	106 Fld+ Fld+ CarRtn Fld+ Fld+ -----
92 Left ----- ----- BgnDln ----- -----	97 ----- ----- ----- ----- -----	102 Right ----- ----- EndDln UndScr UndScr -----	
93 ErEOF ----- ----- ----- BotPg ----- FastDn ----- FastDn -----	98 Down ----- ----- ----- ----- ----- -----	103 Ro1Up ----- ----- ----- ----- ----- -----	108 FldExt FldExt ----- ----- ----- -----
	99 Ins ----- ----- ----- ----- -----	104 Delete ----- ----- DelWord DelWord DelWord -----	

Keyboard Layouts

Enhanced Keyboard, Microsoft Natural Keyboard (Combined 3270 and 5250)



Segment A assignment:

110 SysAttn SysReq	112 PF1 PF13 SOSI Doc Doc Red	113 PF2 PF14 WdWrap WdWrap Pink	114 PF3 PF15 CfFmt CfFmt Green	115 PF4 PF16 Yellow	116 PF5 PF17 Record Blue	117 PF6 PF18 Play Turq	118 PF7 PF19 RPause White	119 PF8 PF20 APL APL FldColor	120 PF9 PF21 CurSel1 CurSel1	121 PF10 PF22 CurBlink CurBlink	122 PF11 PF23 RTM AltCur AltCur	123 PF12 PF24 +Cr +Cr
124	125	126 Clear Break										

Segment B assignment:

1	2	3 NUL	4	5	6	7	8	9	10	11	12 US	13 RS	14	15 BackSp ChrAdv
16 TabFld BackTab	17 DC1	18 ETB	19 ENQ	20 DC2	21 DC4	22 EM	23 NAK	24 HT	25 SI	26 DLE	27 NUL	28 ESC	29	
30	31 SOH	32 DC3	33 EOT	34 ACK	35 BEL	36 BS	37 LF	38 VT	39 FF	40	41	43 NewLine NewLine		
44	46 SUB	47 CAN	48 ETX	49 SYN	50 STX	51 SO	52 CR	53	54	55	57			
58 Reset/Ctrl Reset/Ctrl Quit Quit	60	61	62	64 Enter/Ctrl Enter/Ctrl										

Keyboard Layouts

Segment C assignment:

75	80	85
Insert	Home	Ro1Dwn
Dup	FM	PA3
EditCop	Rule	ChgScr
PA1	PA2	JmpNxt
PA1	PA2	JmpNxt
EditPst	-----	-----
76	81	86
Delete	ErEOF	Ro1Up
EditCut	ErFlid	EditPst
DelWord	-----	Test
DelWord	ErInp	-----
DelWord	ErInp	-----
-----	-----	-----

79	84	89
Left	Down	Right
MkLeft	MkDown	MkRight
MvLeft	MvDown	MvRight
BtbWord	FastDn	TabWord
BtbWord	FastDn	TabWord
-----	-----	-----

83
Up
Mkup
Mvup
FastUp
FastUp

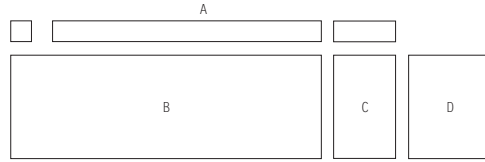
Segment D assignment:

90	95	100	105
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	Reverse	-----
-----	-----	Reverse	-----
-----	TrnOp	-----	-----
91	96	101	106
Home	Up	-----	Field+
-----	-----	-----	TabFlid
-----	MvUp	-----	-----
-----	FastUp	-----	-----
-----	FastUp	-----	-----
-----	TrnFlid	Flidtrns	-----
92	97	102	
Left	-----	Right	
-----	-----	-----	
MvLeft	-----	MvRight	
-----	-----	UndScr	
-----	-----	UndScr	
-----	-----	-----	
93	98	103	108
EndFlid	Down	ESC J	Enter
-----	-----	-----	Enter
-----	MvDown	-----	-----
-----	FastDn	-----	-----
-----	FastDn	-----	-----
-----	FastDn	-----	-----
-----	-----	-----	-----
99	104		
Insert	Delete		
-----	-----		
-----	-----		
-----	DelWord		
-----	DelWord		
-----	DelWord		
-----	-----		

Keyboard Layouts

Enhanced Keyboard, Microsoft Natural Keyboard (VT Keyboard Layout)

Note: This keyboard layout does not include Personal Communications local function (for example, edit copy, edit paste, etc.).



Segment A assignment:

110 ESC ESC ----- ----- -----	112 HidScrn F13 ----- ----- ----- UsrF13	113 Compose F14 ----- ----- ----- UsrF14	114 Help F15 ----- ----- ----- UsrF15	115 Do F16 ----- ----- ----- UsrF16	116 Break F17 ----- ----- ----- UsrF17	117 F6 F18 UsrF6 ----- ----- ----- UsrF18	118 F7 F19 UsrF7 ----- ----- ----- UsrF19	119 F8 F20 UsrF8 ----- ----- ----- UsrF20	120 F9 ----- ----- ----- UsrF9	121 F10 ----- ----- ----- UsrF10	122 F11 ----- ----- ----- UsrF11	123 F12 ----- ----- ----- UsrF12
124 ----- ----- ----- ----- -----	125 ----- ----- ----- ----- -----	126 ----- ----- ----- ----- -----										

Segment B assignment:

1 . ans17e ----- ----- -----	2 1 ----- ----- -----	3 2 @ NULL ----- ----- -----	4 3 # ----- ----- -----	5 4 \$ ----- ----- -----	6 5 % ----- ----- -----	7 6 ^ RS ----- ----- -----	8 7 & ----- ----- -----	9 8 * ----- ----- -----	10 9 (----- ----- -----	11 0) ----- ----- -----	12 - US ----- ----- -----	13 = + ----- ----- -----	15 Backspace Backspace ----- ----- -----
16 Tab Field Backtab ----- ----- -----	17 q Q DC1 ----- ----- -----	18 w W ETB ----- ----- -----	19 e E ENQ ----- ----- -----	20 r R DC2 ----- ----- -----	21 t T DC4 ----- ----- -----	22 y Y EM ----- ----- -----	23 u U NAK ----- ----- -----	24 i I HT ----- ----- -----	25 o O SI ----- ----- -----	26 p P DLE ----- ----- -----	27 [{ ESC ----- ----- -----	28] } GS ----- ----- -----	29 ans15c | FS ----- ----- -----
30 ----- ----- -----	31 a A SOH ----- ----- -----	32 s S DC3 ----- ----- -----	33 d D EOT ----- ----- -----	34 f F ACK ----- ----- -----	35 g G BEL ----- ----- -----	36 h H BS ----- ----- -----	37 j J LF ----- ----- -----	38 k K VT ----- ----- -----	39 l L FF ----- ----- -----	40 : : ----- ----- -----	41 " " ----- ----- -----	43 Newline Newline ----- ----- -----	
44 ----- ----- -----	46 z Z SUB ----- ----- -----	47 x X CAN ----- ----- -----	48 c C ETX ----- ----- -----	49 v V SYN ----- ----- -----	50 b B STX ----- ----- -----	51 n N SO ----- ----- -----	52 m M CR ----- ----- -----	53 , , ----- ----- -----	54 > > ----- ----- -----	55 / / ----- ----- -----	57 ----- ----- -----		
58 ----- ----- -----	60 ----- ----- -----	61 Space Space ----- ----- -----						62 ----- ----- -----	64 ----- ----- -----				

Keyboard Layouts

Segment C assignment:

75 InsertHere ----- ----- ----- ----- -----	80 Select ----- ----- ----- ----- -----	85 PrevScn ----- ----- ----- ----- -----
76 Remove ----- ----- ----- ----- -----	81 Find ----- ----- ----- ----- -----	86 NextScn ----- ----- ----- ----- -----

	83 Up ----- ----- ----- ----- -----	
79 Left ----- ----- ----- ----- -----	84 Down ----- ----- ----- ----- -----	89 Right ----- ----- ----- ----- -----

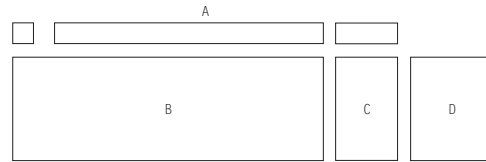
Segment D assignment:

90 ----- PF1 ----- ----- ----- -----	95 ----- PF2 ----- ----- ----- -----	100 ----- PF3 ----- ----- ----- -----	105 ----- PF4 ----- ----- ----- -----
91 Select numpd 7 ----- ----- ----- -----	96 Up numpd 8 ----- ----- ----- -----	101 PrvScn numpd 9 ----- ----- ----- -----	106 numpd - numpd , ----- ----- ----- -----
92 Left numpd 4 ----- ----- ----- -----	97 ----- numpd 5 ----- ----- ----- -----	102 Right numpd 6 ----- ----- ----- -----	
93 Find numpd 1 ----- ----- ----- -----	98 Down numpd 2 ----- ----- ----- -----	103 NxPg numpd 3 ----- ----- ----- -----	108 ----- numpd Newln ----- ----- ----- -----
99 InsertHere numpd 0 ----- ----- ----- -----		104 Remove numpd . ----- ----- ----- -----	

Keyboard Layouts

Enhanced Keyboard, Microsoft Natural Keyboard (VT Local Edit Mode Only)

Note: This keyboard layout does not include Personal Communications local function (for example, edit copy, edit paste, etc.).



Segment A assignment:

110 ESC ESC ----- ----- -----	112 HidScrn F13 ----- ----- ----- UsrF13	113 Compose F14 ----- ----- ----- UsrF14	114 Help F15 ----- ----- ----- UsrF15	115 Do F16 ----- ----- ----- UsrF16	116 Break F17 ----- ----- ----- UsrF17	117 F6 F18 UsrF6 ----- ----- ----- UsrF18	118 F7 F19 UsrF7 ----- ----- ----- UsrF19	119 F8 F20 UsrF8 ----- ----- ----- UsrF20	120 F9 ----- ----- ----- UsrF9	121 F10 ----- ----- ----- UsrF10	122 F11 ----- ----- ----- UsrF11	123 F12 ----- ----- ----- UsrF12
124 ----- ----- ----- ----- -----	125 ----- ----- ----- ----- -----	126 ----- ----- ----- ----- -----										

Segment B assignment:

1 . ans17e ----- ----- -----	2 1 ----- ----- -----	3 2 @ NULL ----- ----- -----	4 3 # ----- ----- -----	5 4 \$ ----- ----- -----	6 5 % ----- ----- -----	7 6 ^ RS ----- ----- -----	8 7 & ----- ----- -----	9 8 * ----- ----- -----	10 9 (----- ----- -----	11 0) ----- ----- -----	12 - US ----- ----- -----	13 = + ----- ----- -----	15 Backspace Backspace ----- ----- -----
16 Tab Field Backtab ----- ----- -----	17 q Q DC1 ----- ----- -----	18 w W ETB ----- ----- -----	19 e E ENQ ----- ----- -----	20 r R DC2 ----- ----- -----	21 t T DC4 ----- ----- -----	22 y Y EM ----- ----- -----	23 u U NAK ----- ----- -----	24 i I HT ----- ----- -----	25 o O SI ----- ----- -----	26 p P DLE ----- ----- -----	27 [{ ESC ----- ----- -----	28 ] | } | GS ----- ----- -----	29 ans15c | FS ----- ----- -----
30 ----- ----- -----	31 a A SOH ----- ----- -----	32 s S DC3 ----- ----- -----	33 d D EOT ----- ----- -----	34 f F ACK ----- ----- -----	35 g G BEL ----- ----- -----	36 h H BS ----- ----- -----	37 j J LF ----- ----- -----	38 k K VT ----- ----- -----	39 l L FF ----- ----- -----	40 : : ----- ----- -----	41 ' " ----- ----- -----	43 Newline/Transmit Newline/Transmit ----- ----- -----	
44 ----- ----- -----	46 z Z SUB ----- ----- -----	47 x X CAN ----- ----- -----	48 c C ETX ----- ----- -----	49 v V SYN ----- ----- -----	50 b B STX ----- ----- -----	51 n N SO ----- ----- -----	52 m M CR ----- ----- -----	53 , < ----- ----- -----	54 > > ----- ----- -----	55 / /? ----- ----- -----	57 ----- ----- -----		
58 ----- ----- -----	60 ----- ----- -----	61 Space Space ----- ----- -----						62 ----- ----- -----	64 ----- ----- -----				

Keyboard Layouts

Segment C assignment:

75 Insrt/Ovstrk ----- ----- ----- ----- -----	80 Select EDIT ----- ----- ----- ----- -----	85 PrevPg ----- ----- ----- ----- -----
76 ClrFld ClrPg ----- ----- ----- ----- -----	81 HomeCur ----- ----- ----- ----- -----	86 NextPg ----- ----- ----- ----- -----

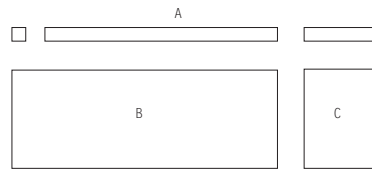
	83 Up ----- ----- ----- ----- -----	
79 Left ----- ----- ----- ----- -----	84 Down ----- ----- ----- ----- -----	89 Right ----- ----- ----- ----- -----

Segment D assignment:

90 BkTab TabFld ----- ----- ----- ----- -----	95 ----- InsrtLn ----- ----- ----- ----- -----	100 ----- DelLn ----- ----- ----- ----- -----	105 ----- DelChar ----- ----- ----- ----- -----
91 Select numpd 7 ----- ----- ----- ----- -----	96 Up numpd 8 ----- ----- ----- ----- -----	101 PrvPg numpd 9 ----- ----- ----- ----- -----	106 numpd - numpd , ----- ----- ----- ----- -----
92 Left numpd 4 ----- ----- ----- ----- -----	97 ----- numpd 5 ----- ----- ----- ----- -----	102 Right numpd 6 ----- ----- ----- ----- -----	
93 HmeCur numpd 1 ----- ----- ----- ----- -----	98 Down numpd 2 ----- ----- ----- ----- -----	103 NxpPg numpd 3 ----- ----- ----- ----- -----	108 ----- Transmit ----- ----- ----- ----- -----
99 Insert/Overstrike numpd 0 ----- ----- ----- ----- -----		104 ClrFld numpd . ----- ----- ----- ----- -----	

Keyboard Layouts

Space-Saving Keyboard (3270 Only)



Segment A assignment:

110 SysAttn SysReq ----- ----- -----	112 PF1 PF13 ----- ----- -----	113 PF2 PF14 ----- ----- -----	114 PF3 PF15 ----- ----- -----	115 PF4 PF16 ----- ----- -----	116 PF5 PF17 Record ----- ----- -----	117 PF6 PF18 Play ----- ----- -----	118 PF7 PF19 RPause ----- ----- -----	119 PF8 PF20 ----- ----- -----	120 PF9 PF21 ----- ----- -----	121 PF10 PF22 ----- ----- -----	122 PF11 PF23 RTM ----- ----- -----	123 PF12 PF24 ----- ----- -----
---	---	---	---	---	---	---	---	---	---	--	---	--

124 ----- ----- ----- ----- -----	125 ----- ----- ----- ----- -----	126 Clear ----- Break ----- ----- -----
--	--	---

Segment B assignment:

1 ----- ----- ----- ----- -----	2 ----- ----- ----- ----- -----	3 ----- ----- ----- ----- -----	4 ----- ----- ----- ----- -----	5 ----- ----- ----- ----- -----	6 ----- ----- ----- ----- -----	7 ----- ----- ----- ----- -----	8 ----- ----- ----- ----- -----	9 ----- ----- ----- ----- -----	10 ----- ----- ----- ----- -----	11 ----- ----- ----- ----- -----	12 ----- ----- ----- ----- -----	13 ----- ----- ----- ----- -----	14 ----- ----- ----- ----- -----	15 BackSp BackSp ----- ----- -----
16 TabFld BackTab ----- ----- -----	17 ----- ----- ----- ----- -----	18 ----- ----- ----- ----- -----	19 ----- ----- ----- ----- -----	20 ----- ----- ----- ----- -----	21 ----- ----- ----- ----- -----	22 ----- ----- ----- ----- -----	23 ----- ----- ----- ----- -----	24 ----- ----- ----- ----- -----	25 ----- ----- ----- ----- -----	26 ----- ----- ----- ----- -----	27 ----- ----- ----- ----- -----	28 ----- ----- ----- ----- -----	29 ----- ----- ----- ----- -----	
30 ----- ----- ----- ----- -----	31 ----- ----- ----- ----- -----	32 ----- ----- ----- ----- -----	33 ----- ----- ----- ----- -----	34 ----- ----- ----- ----- -----	35 ----- ----- ----- ----- -----	36 ----- ----- ----- ----- -----	37 ----- ----- ----- ----- -----	38 ----- ----- ----- ----- -----	39 ----- ----- ----- ----- -----	40 ----- ----- ----- ----- -----	41 ----- ----- ----- ----- -----	43 NewLine NewLine ----- ----- -----		
44 ----- ----- ----- ----- -----	46 ----- ----- ----- ----- -----	47 ----- ----- ----- ----- -----	48 ----- ----- ----- ----- -----	49 ----- ----- ----- ----- -----	50 ----- ----- ----- ----- -----	51 ----- ----- ----- ----- -----	52 ----- ----- ----- ----- -----	53 ----- ----- ----- ----- -----	54 ----- ----- ----- ----- -----	55 ----- ----- ----- ----- -----	57 ----- ----- ----- ----- -----			
58 Reset/Ctrl Reset/Ctrl ----- Quit Quit -----	60 ----- ----- ----- ----- -----	61 ----- ----- ----- ----- -----						62 ----- ----- ----- ----- -----	64 Enter/Ctrl Enter/Ctrl ----- ----- -----					

Keyboard Layouts

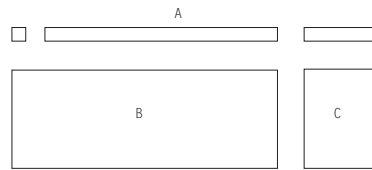
Segment C assignment:

75 Insert Dup ----- PA1 PA1 -----	80 Home FM Rule PA2 PA2 -----	85 ----- PAS ChgScrn JmpNext JmpNext -----
76 Delete Delete DelWord DelWord DelWord -----	81 ErEOF ErFld ----- ErInp ErInp -----	86 ----- ----- Test ----- ----- ----- -----

	83 Up Mkup Mvup FastUp FastUp -----	
79 Left MkLeft MvLeft BtbWord BtbWord -----	84 Down MkDown MvDown FastDn FastDn -----	89 Right MkRight MvRight TabWord TabWord -----

Keyboard Layouts

Space-Saving Keyboard (5250 Only)



Segment A assignment:

110 SysAttn SysReq	112 PF1 PF13 Help	113 PF2 PF14	114 PF3 PF15	115 PF4 PF16	116 PF5 PF17 Record	117 PF6 PF18 Play	118 PF7 PF19 RPause	119 PF8 PF20	120 PF9 PF21	121 PF10 PF22 CurBlink CurBlink	122 PF11 PF23 AltCur AltCur	123 PF12 PF24
124			125		126 Clear HostPr TstReq							

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 BackSp BackSp ReqBSp
16 TabFld BackTb ReqTab	17	18	19	20	21	22	23	24	25	26	27	28	29	
30	31	32	33	34	35	36	37	38	39	40	41	43 FldExt NewLin CarRtn		
44	46	47	48	49	50	51	52	53	54	55	57			
58 Reset/Ctrl Reset/Ctrl Quit Quit	60	61						62	64 Enter/Ctrl Enter/Ctrl					

Keyboard Layouts

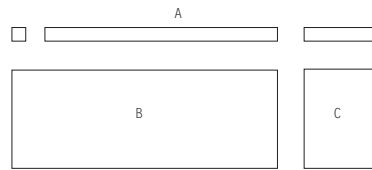
Segment C assignment:

75 Insert Dup DspTxC ----- ----- -----	80 Home FM Ru1e ----- ----- -----	85 Ro1Dwn Ro1Dwn ----- ----- ----- -----
76 Delete Delete DelWord DelWord DelWord -----	81 ErEOF ----- ----- ----- ----- -----	86 Ro1Up Ro1Up ----- ----- ----- -----

	83 Up Mkup Mvup FastUp FastUp -----	
79 Left MkLeft MvLeft BtbWord BtbWord -----	84 Down MkDown MvDown FastDn FastDn -----	89 Right MkRight MvRight TabWord TabWord -----

Keyboard Layouts

Space-Saving Keyboard (Combined 3270 and 5250)



Segment A assignment:

110 SysAttn SysReq ----- ----- -----	112 PF1 PF13 ----- ----- -----	113 PF2 PF14 ----- ----- -----	114 PF3 PF15 ----- ----- -----	115 PF4 PF16 ----- ----- -----	116 PF5 PF17 Record ----- ----- -----	117 PF6 PF18 Play ----- ----- -----	118 PF7 PF19 RPause ----- ----- -----	119 PF8 PF20 ----- ----- -----	120 PF9 PF21 ----- ----- -----	121 PF10 PF22 ----- ----- -----	122 PF11 PF23 RTM ----- ----- -----	123 PF12 PF24 ----- ----- -----
---	---	---	---	---	---	---	---	---	---	--	---	--

124 ----- ----- ----- ----- -----	125 ----- ----- ----- ----- -----	126 Clear ----- Break ----- ----- -----
--	--	---

Segment B assignment:

1 ----- ----- ----- ----- -----	2 ----- ----- ----- ----- -----	3 ----- ----- ----- ----- -----	4 ----- ----- ----- ----- -----	5 ----- ----- ----- ----- -----	6 ----- ----- ----- ----- -----	7 ----- ----- ----- ----- -----	8 ----- ----- ----- ----- -----	9 ----- ----- ----- ----- -----	10 ----- ----- ----- ----- -----	11 ----- ----- ----- ----- -----	12 ----- ----- ----- ----- -----	13 ----- ----- ----- ----- -----	14 ----- ----- ----- ----- -----	15 BackSp ChrAdv ----- ----- -----
16 TabFld BackTab ----- ----- -----	17 ----- ----- ----- ----- -----	18 ----- ----- ----- ----- -----	19 ----- ----- ----- ----- -----	20 ----- ----- ----- ----- -----	21 ----- ----- ----- ----- -----	22 ----- ----- ----- ----- -----	23 ----- ----- ----- ----- -----	24 ----- ----- ----- ----- -----	25 ----- ----- ----- ----- -----	26 ----- ----- ----- ----- -----	27 ----- ----- ----- ----- -----	28 ----- ----- ----- ----- -----	29 ----- ----- ----- ----- -----	
30 ----- ----- ----- ----- -----	31 ----- ----- ----- ----- -----	32 ----- ----- ----- ----- -----	33 ----- ----- ----- ----- -----	34 ----- ----- ----- ----- -----	35 ----- ----- ----- ----- -----	36 ----- ----- ----- ----- -----	37 ----- ----- ----- ----- -----	38 ----- ----- ----- ----- -----	39 ----- ----- ----- ----- -----	40 ----- ----- ----- ----- -----	41 ----- ----- ----- ----- -----	43 NewLine NewLine ----- ----- -----		
44 ----- ----- ----- ----- -----	46 ----- ----- ----- ----- -----	47 ----- ----- ----- ----- -----	48 ----- ----- ----- ----- -----	49 ----- ----- ----- ----- -----	50 ----- ----- ----- ----- -----	51 ----- ----- ----- ----- -----	52 ----- ----- ----- ----- -----	53 ----- ----- ----- ----- -----	54 ----- ----- ----- ----- -----	55 ----- ----- ----- ----- -----	57 ----- ----- ----- ----- -----			
58 Reset/Ctrl Reset/Ctrl ----- Quit Quit -----	60 ----- ----- ----- ----- -----	61 ----- ----- ----- ----- -----						62 ----- ----- ----- ----- -----	64 Enter/Ctrl Enter/Ctrl ----- ----- -----					

Keyboard Layouts

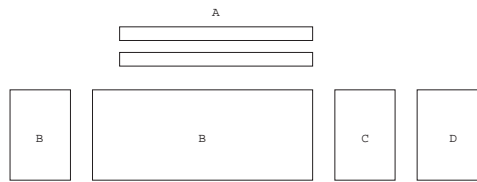
Segment C assignment:

75 Insert Dup ----- PA1 PA1 -----	80 Home FM Rule PA2 PA2 -----	85 Ro1Dwn PA3 ChoScrnn JmpNxt JmpNxt -----
76 Delete Delete DelWord DelWord DelWord -----	81 ErEOF ErFlid ----- ErInp ErInp -----	86 Ro1Up ----- Test ----- ----- -----

	83 Up Mkup Mvup FastUp FastUp -----	
79 Left MkLeft MvLeft BtbWord BtbWord -----	84 Down MkDown MvDown FastDn FastDn -----	89 Right MkRight MvRight TabWord TabWord -----

Keyboard Layouts

5576-001 (3270 Only)



Segment A assignment:

-----	-----	CrBrk	-----	-----	-----	-----	-----	ErEOF	SysAttn	PA1	PA2
-----	-----	AltCr	-----	-----	-----	-----	-----	ErInp	CrSel	DevCom	PA3
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

112	113	114	115	116	117	118	119	120	121	122	123
PF1	PF14	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12
PF13	PF15	PF15	PF16	PF17	PF18	PF19	PF20	PF21	PF22	PF23	PF24
SQSI	AltView	AltView	-----	-----	-----	-----	APL	-----	-----	-----	GrpCsr
Doc	WordWrap	CfgRut	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Segment B assignment:

Clear	-----	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Clear	-----	SysAttn	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
SysReq	-----	SysReq	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	EditUnd
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Play	-----	16	17	18	19	20	21	22	23	24	25	26	27	28	29	-----
-----	-----	Tab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
RPause	-----	-----	DCI	ETB	ENQ	DC2	DC4	EM	NAK	HT	SI	DLE	NUL	ESC	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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Reset	-----	58	-----	60	-----	61	-----	62	-----	-----	-----	-----	-----	-----	64	-----
Reset	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Entr/Ctl	-----
Record	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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Keyboard Layouts

Segment C assignment:

75	80	85
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76	81	86
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-----	-----	-----
-----	-----	-----

79	84	89
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83

Segment D assignment:

90	95	100	105
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----
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-----	-----	-----	-----
-----	-----	-----	-----
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91	96	101	106
-----	-----	-----	-----
-----	-----	-----	-----
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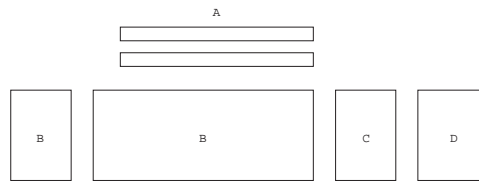
92	97	102
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-----	-----	-----

93	98	103	108
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99	104
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Keyboard Layouts

5576-001 (5250 Only)



Segment A assignment:

-----	-----	CrBrk	-----	-----	-----	SOSI	-----	ErEOF	SysAttn	-----	-----
-----	-----	AltCr	-----	-----	-----	-----	-----	ErInp	TestReq	Quit	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	TestReq	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

112	113	114	115	116	117	118	119	120	121	122	123
PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12
PF13	PF14	PF15	PF16	PF17	PF18	PF19	PF20	PF21	PF22	PF23	PF24
SOSI	-----	AltView	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Segment B assignment:

Clear	-----	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Clear	-----	Newlin	-----	-----	-----	-----	-----	-----	-----	-----	-----	Ansi 7E	-----	-----	-----	CharAdv
SysReq	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Ansi A3	-----	Ansi AC	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Play	-----	16	17	18	19	20	21	22	23	24	25	26	27	28	29	-----
-----	-----	Tab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
RPause	-----	BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Ansi A2	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Reset	-----	44	46	47	48	49	50	51	52	53	54	55	57	-----	-----	-----
Reset	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Ansi 5C	-----	-----	-----
Record	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Reset	-----	58	60	61								62	64			
Reset	-----	-----	-----	-----								-----	Entr/Ctl			
Record	-----	-----	-----	-----								-----	Entr/Ctl			
-----	-----	-----	-----	-----								-----	-----			
-----	-----	-----	-----	-----								-----	-----			
-----	-----	-----	-----	-----								-----	-----			

Keyboard Layouts

Segment C assignment:

75	80	85
RollDwn	Home	RollUp
RollDwn	FldMk	RollUp
-----	Rule	-----
-----	-----	-----
-----	-----	-----

76	81	86
Insert	DelChar	-----
EditPaste	-----	-----
EditCopy	-----	-----
-----	-----	-----
-----	-----	-----

79	84	89
Left	Home	Right
MarkLef	Home	MarkRig
MoveLef	Rule	MoveRig
FastLef	-----	FastRig
-----	-----	-----
-----	-----	-----

83
Up
MarkUp
MoveUp
FastUp

Down
MarkDow
MoveDow
FastDow

Segment D assignment:

90	95	100	105
Dup	FldMark	-----	Field-
Dup	FldMark	-----	Field-
Dup	FldMark	-----	Field-
Dup	FldMark	-----	Field-
Dup	FldMark	-----	Field-

91	96	101	106
-----	-----	-----	Field+
-----	-----	-----	Field+
-----	-----	-----	Field+
-----	-----	-----	Field+
-----	-----	-----	Field+

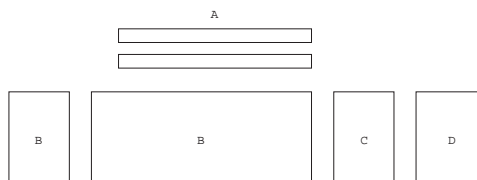
92	97	102	
-----	-----	-----	
-----	-----	-----	
-----	-----	-----	
-----	-----	-----	

93	98	103	108
-----	-----	-----	FldExt
-----	-----	-----	FldExt
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----

99	104		
-----	-----		
-----	-----		
-----	-----		
-----	-----		

Keyboard Layouts

5576-001 (Combined 3270 and 5250)



Segment A assignment:

----	----	CrBnk	----	Help	----	SOSI	HostPrt	ErEOF	SysAttn	PA1	PA2
----	----	AltCur	----	Help	----	SOSI	----	ErInp	CrSel	DevCom	PA3
----	----	----	----	----	----	----	----	----	----	----	----

112	113	114	115	116	117	118	119	120	121	122	123
PF1	PF14	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12
SOSI	WordTrap	AltView	PF16	PF17	PF18	PF19	PF20	PF21	PF22	PF23	PF24
Doc	----	CfgRpt	----	----	----	----	APL	----	----	----	+Cr
----	----	----	----	----	----	----	----	----	----	----	----

Segment B assignment:

Clear	----	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Clear	----	SysAttn	----	----	----	----	----	----	----	----	----	Ansi 7E	US	RS	Ansi A3	BackSp
SysReq	----	----	----	----	----	----	----	----	----	----	----	----	Ansi A3	----	----	CharAdv
SysReq	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Play	----	16	17	18	19	20	21	22	23	24	25	26	27	28	29	----
----	----	Tab	DCI	ETB	ENQ	DC2	DC4	EM	NAK	HT	SI	DLE	NUL	ESC	----	----
RPause	----	BackTab	----	----	----	----	----	----	----	----	----	----	Ansi A2	----	----	----
----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
----	----	30	31	32	33	34	35	36	37	38	39	40	41	42	43	----
----	----	----	SOH	DC3	EOT	ACK	BEL	BS	LF	VT	FF	----	----	GS	NewLine	NewLine
----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
----	----	44	46	47	48	49	50	51	52	53	54	55	Ansi 5C	57	----	----
----	----	----	SUB	CAN	ETX	SYN	STX	SO	CR	----	----	----	FS	----	----	----
----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Reset	----	58	60	61								62	64		----	
Reset	----	----	----	Entr/Ctl								----	Entr/Ctl		----	
Record	----	----	----	----								----	----		----	
----	----	----	----	----								----	----		----	

Keyboard Layouts

Segment C assignment:

75	80	85
RollDwn	-----	RollDwn
-----	-----	JmpNext
-----	-----	-----
-----	ChgScr	-----
-----	ChgScr	-----
-----	-----	-----

76	81	86
Insert	DelChar	-----
EditPaste	EditCut	-----
EditCopy	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----

79	84	89
Left	Home	Right
MarkLef	Home	MarkRig
MoveLef	Rule	MoveRig
FastLef	-----	FastRig
-----	-----	-----
-----	-----	-----

83
Up
MarkUp
MoveUp
FastUp
FastUp

Down
MarkDow
MoveDow

Segment D assignment:

90	95	100	105
Dup	FlgMark	-----	Field-
Dup	FlgMark	-----	Field-
-----	-----	-----	Break
Reverse	Red	Pink	-----
-----	TrnOp	-----	-----
-----	-----	-----	-----

91	96	101	106
-----	-----	-----	Field+
-----	-----	-----	Field+
-----	Green	Yellow	-----
-----	-----	-----	-----
-----	FlgTrna	-----	-----

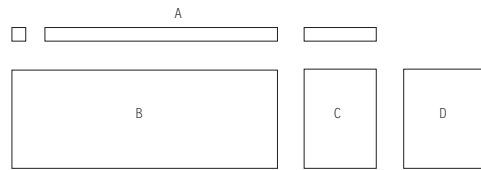
92	97	102
-----	-----	-----
-----	-----	-----
-----	UnderSc	Blue
-----	-----	Turquoi
-----	-----	-----

93	98	103	108
-----	-----	ESC_J	Enter
-----	-----	-----	Enter
-----	-----	-----	-----
FieldHi	White	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----

99	104
-----	-----
-----	-----
-----	-----
-----	FlgCol
-----	-----
-----	-----

Keyboard Layouts

5576-A01 (3270 Only)



Segment A assignment:

110 SysAttn SysReq ----- ----- -----	112 PF1 PF13 SDSI Doc ----- Red	113 PF2 PF14 WordWrap Pink -----	114 PF3 PF15 AltView CfgFmt Green -----	115 PF4 PF16 Yellow -----	116 PF5 PF17 Record Blue -----	117 PF6 PF18 Play Turq -----	118 PF7 PF19 RPause White -----	119 PF8 PF20 APL FidColor -----	120 PF9 PF21 CrSel -----	121 PF10 PF22 CrBnk -----	122 PF11 PF23 RTM AltCr -----	123 PF12 PF24 ----- GrpCsr GrpCsr -----
---	---	---	---	---------------------------------------	---	---	--	--	--------------------------------------	---------------------------------------	--	---

124 ----- ----- -----	125 ----- ----- -----	126 Clear Break ----- -----
--------------------------------	--------------------------------	---

Segment B assignment:

1 ----- ----- -----	2 ----- ----- -----	3 ----- ----- NUL -----	4 ----- ----- ----- -----	5 ----- ----- ----- -----	6 ----- ----- ----- -----	7 ----- ----- RS -----	8 ----- ----- ----- -----	9 ----- ----- ----- -----	10 ----- ----- ----- -----	11 ----- ----- ----- -----	12 ----- ----- US -----	13 ----- ----- RS -----	14 ----- ----- ----- -----	15 BackSp BackSp EditUnd -----
16 Tab BackTab -----	17 ----- DC1 -----	18 ----- ETB -----	19 ----- ENQ -----	20 ----- DC2 -----	21 ----- DC4 -----	22 ----- EM -----	23 ----- NAK -----	24 ----- HT -----	25 ----- SI -----	26 ----- DLE -----	27 ----- NUL -----	28 ----- ESC -----	29 ----- ----- -----	
30 ----- ----- -----	31 ----- SOH -----	32 ----- DC3 -----	33 ----- EOT -----	34 ----- ACK -----	35 ----- BEL -----	36 ----- BS -----	37 ----- LF -----	38 ----- VT -----	39 ----- FF -----	40 ----- ----- -----	41 ----- ----- -----	43 NewLine NewLine -----		
44 ----- ----- -----	46 ----- SUB -----	47 ----- CAN -----	48 ----- ETX -----	49 ----- SYN -----	50 ----- STX -----	51 ----- SO -----	52 ----- CR -----	53 ----- ----- -----	54 ----- ----- -----	55 ----- ----- -----	57 ----- ----- -----			
58 Reset/Ctrl Reset/Ctrl Quit Quit -----	60 ----- ----- -----	61 ----- ----- ----- ----- -----						62 ----- ----- -----	64 Enter/Ctl Enter/Ctl ----- -----					

Keyboard Layouts

Segment C assignment:

75	80	85
Insert	Home	-----
Dup	FldMk	PA3
EditCp	Rule	ChgSen
PA1	PA2	JmpNext
PA1	PA2	JmpNext
EditPst	-----	-----

76	81	86
Delete	ErEOF	-----
EditCut	ErFld	EditPst
DelWd	-----	Test
DelWd	ErInp	-----
-----	ErInp	-----
-----	-----	-----

83
Up
MarkUp
MoveUp
FastUp
FastUp

79	84	89
Left	Down	Right
MarkLef	MarkDow	MarkRig
MoveLef	MoveDow	MoveRig
BackWd	FastDow	FwdWd
BackWd	FastDow	FwdWd
-----	-----	-----

Segment D assignment:

90	95	100	105
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	Reverse	-----
-----	-----	Reverse	-----
-----	TrnOp	-----	-----

91	96	101	106
Home	Up	-----	-----
-----	-----	-----	-----
-----	MoveUp	-----	-----
-----	FastUp	-----	-----
-----	FastUp	-----	-----
-----	TrnFldI	-----	-----

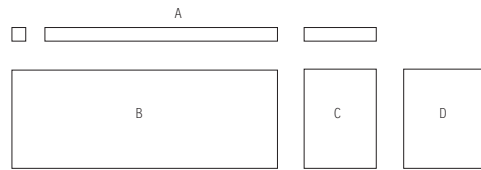
92	97	102
Left	-----	Right
-----	-----	-----
MoveLeft	-----	MoveRig
-----	-----	UnderSc
-----	-----	UnderSc
-----	-----	-----

93	98	103	108
EndFld	Down	ESC J	Enter
-----	-----	-----	Enter
-----	MoveDow	-----	-----
-----	FastDow	FieldH	-----
-----	FastDow	FieldH	-----
-----	-----	-----	-----

99	104
Insert	Delete
-----	-----
-----	DelWd
-----	DelWd
-----	-----
-----	-----

Keyboard Layouts

5576-A01 Keyboard (5250 Only)



Segment A assignment:

110 SysAttn SysReq	112 PF1 PF13 SOSI Help	113 PF2 PF14	114 PF3 PF15 AltView	115 PF4 PF16	116 PF5 PF17 Record	117 PF6 PF18 Play	118 PF7 PF19 RPause	119 PF8 PF20 SOSI/G SOSI/G FieldCol	120 PF9 PF21	121 PF10 PF22	122 PF11 PF23 AltCur AltCur	123 PF12 PF24 TestReq TestReq
---	---	--	--	---	---	---	---	---	---	--	---	--

124	125	126 Clear HostPr
---	---	---

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11 Ansi 7E	12 Ansi A3	13	14 Ansi AC	15 CharBsp CharAdv EditUnd
16 Tab BackTab	17	18	19	20	21	22	23	24	25	26	27 Ansi A2	28	29	
30	31	32	33	34	35	36	37	38	39	40	41	43 FieldExt FieldExt		
44	46	47	48	49	50	51	52	53	54	55	57			
58 Reset/Ctrl Reset/Ctrl Quit	60	61						62	64 Enter/Ctrl Enter/Ctrl					

Keyboard Layouts

Segment C assignment:

75 Insert Dup EditCop ----- ----- EditPst	80 Home FldMk Rule ----- ----- -----	85 Ro11Dwn Ro11Dwn ----- JumpNxt JumpNxt -----
76 Delete EditCut DelWd DelWd ----- -----	81 ErEOF ----- ----- ErInp ErInp ----- -----	86 Ro11Up EditPst ----- ----- ----- -----

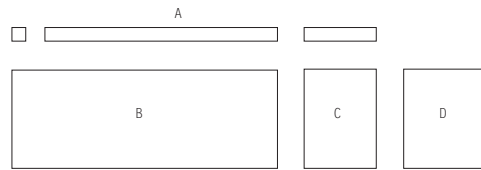
79 Left MarkLef MoveLef BackWd BackWd ----- -----	83 Up MarkUp MoveUp FastUp FastUp ----- -----	84 Down MarkDow MoveDow FastDow FastDow ----- -----	89 Right MarkRig MoveRig TabWord TabWord ----- -----
--	--	--	---

Segment D assignment:

90 ----- ----- ----- ----- ----- -----	95 FldMk FldMk FldMk FldMk ----- -----	100 Dup Dup ----- ----- ----- -----	105 Ansi 2D Ansi 2D ----- Field- Field- Field- -----
91 Home ----- ----- ----- ----- -----	96 Up ----- MoveUp FastUp FastUp ----- -----	101 Ro11Dwn ----- ----- ----- ----- -----	106 Field+ Field+ Field+ Field+ Field+ ----- -----
92 Left ----- ----- MoveLft ----- ----- -----	97 ----- ----- ----- ----- ----- -----	102 Right ----- ----- MoveRig ----- ----- -----	
93 ErEOF ----- ----- ----- ----- -----	98 Down ----- MoveDow FastDow FastDow ----- -----	103 Ro11Up ----- ----- ----- ----- -----	108 FldExt FldExt ----- ----- ----- -----
99 Insert ----- ----- ----- ----- -----	104 Delete ----- ----- DelWord DelWord ----- -----		

Keyboard Layouts

5576-A01 Keyboard (Combined 3270 and 5250)



Segment A assignment:

110 Attn SysReq ----- ----- -----	112 PF1 PF13 SDSI Doc Doc Red	113 PF2 PF14 WordWrap WordWrap Pink	114 PF3 PF15 AltView CfgFmt Green	115 PF4 PF16 ----- ----- Yellow	116 PF5 PF17 Record Blue	117 PF6 PF18 Play Turquoise	118 PF7 PF19 RPause White	119 PF8 PF20 APL -----	120 PF9 PF21 ----- CrSel -----	121 PF10 PF22 CrBnk ----- CrBnk -----	122 PF11 PF23 AltCur ----- AltCur -----	123 PF12 PF24 ----- ----- +Cr +Cr -----
--	---	--	--	--	--------------------------------------	---	---------------------------------------	------------------------------------	---	---	---	--

124 ----- ----- -----	125 ----- ----- -----	126 Clear Break ----- -----
--------------------------------	--------------------------------	---

Segment B assignment:

1 ----- ----- -----	2 ----- ----- -----	3 ----- ----- NUL ----- -----	4 ----- ----- ----- ----- -----	5 ----- ----- ----- ----- -----	6 ----- ----- ----- ----- -----	7 ----- ----- ----- ----- -----	8 ----- ----- ----- ----- -----	9 ----- ----- ----- ----- -----	10 ----- ----- ----- ----- -----	11 ----- ----- ANSI 7E ----- -----	12 ----- ----- US ANSI A3 ----- -----	13 ----- ----- RS ----- -----	14 ----- ----- ANSI AC ----- -----	15 BackSp CharAdv ----- ----- -----
16 Tab BackTab ----- -----	17 ----- ----- DC1 ----- -----	18 ----- ----- ETB ----- -----	19 ----- ----- ENQ ----- -----	20 ----- ----- DC2 ----- -----	21 ----- ----- DC4 ----- -----	22 ----- ----- EM ----- -----	23 ----- ----- NAK ----- -----	24 ----- ----- HT ----- -----	25 ----- ----- SI ----- -----	26 ----- ----- DLE ----- -----	27 ----- ----- NUL ANSI A2 ----- -----	28 ----- ----- ESC ----- -----	29 ----- ----- ----- ----- -----	
30 ----- ----- ----- ----- -----	31 ----- ----- SOH ----- -----	32 ----- ----- DC3 ----- -----	33 ----- ----- EOT ----- -----	34 ----- ----- ACK ----- -----	35 ----- ----- BEL ----- -----	36 ----- ----- BS ----- -----	37 ----- ----- LF ----- -----	38 ----- ----- VT ----- -----	39 ----- ----- FF ----- -----	40 ----- ----- ----- ----- -----	41 ----- ----- ----- ----- -----	43 NewLine NewLine ----- ----- -----		
44 ----- ----- ----- ----- -----	46 ----- ----- SUB ----- -----	47 ----- ----- CAN ----- -----	48 ----- ----- ETX ----- -----	49 ----- ----- SYN ----- -----	50 ----- ----- STX ----- -----	51 ----- ----- SO ----- -----	52 ----- ----- CR ----- -----	53 ----- ----- ----- ----- -----	54 ----- ----- ----- ----- -----	55 ----- ----- ----- ----- -----	57 ----- ----- ----- ----- -----			
58 Reset/Ctrl Reset/Ctrl ----- Quit Quit -----	60 ----- ----- ----- ----- -----	61 ----- ----- ----- ----- -----	62 ----- ----- ----- ----- -----	64 Enter/Ctl Enter/Ctl ----- ----- -----										

Keyboard Layouts

Segment C assignment:

75 Insert Dup EditCop PA1 PA1 EditPst	80 Home FieldMk Rule PA2 PA2	85 Ro11Dwn PA3 CngScn JumpNxt JumpNxt
76 Delete EditCut DelWord	81 ErEDF ErFlId ErInp	86 Ro11Up EditPst Test

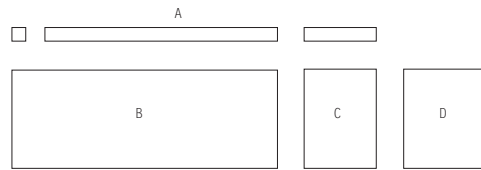
79 Left MarkLef MoveLef BackWd BackWd	83 Up MarkUp MoveUp FastUp FastUp	84 Down MarkDow MoveDow FastDow FastDow	89 Right MarkRig MoveRig FwdWd FwdWd
---	---	---	--

Segment D assignment:

90	95	100 Reverse Reverse TrnOp	105 ANSI ZD ANSI ZD
91 Home MoveUp FastUp FastUp TrnFlId	96 Up MoveUp FastUp FastUp TrnFlId	101	106 Field
92 Left MoveLet	97	102 Right MoveRig UnderSc UnderSc..........	..............................
93 EndFlId FastDow FastDow FastDow	98 Down MoveDow FastDow FastDow FastDow	103 ESC J FieldH FieldH FieldH	108 Enter Enter
.....	99 Insert	104 Delete DelWord DelWord..........	..............................

Keyboard Layouts

5576-002/003 (3270 Only)



Segment A assignment:

110 Sysattn SysRq ----- ----- -----	112 PF1 PF13 SDSI Doc Doc Red	113 PF2 PF14 WordWrap WordWrap Pink	114 PF3 PF15 AltView CfgFmt Green	115 PF4 PF16 ----- ----- Yellow	116 PF5 PF17 Record Blue	117 PF6 PF18 Play Turquoise	118 PF7 PF19 RPause White	119 PF8 PF20 APL FieldCol	120 PF9 PF21 CrSel -----	121 PF10 PF22 CrBnk -----	122 PF11 PF23 RTM AltCr -----	123 PF12 PF24 ----- GrpCsr GrpCsr -----
--	---	--	--	--	--------------------------------------	---	---------------------------------------	---------------------------------------	--------------------------------------	---------------------------------------	--	---

124 ----- ----- -----	125 ----- ----- -----	126 Clear Break ----- -----
--------------------------------	--------------------------------	---

Segment B assignment:

1 ----- ----- -----	2 ----- ----- -----	3 ----- ----- NUL ----- -----	4 ----- ----- ----- ----- -----	5 ----- ----- ----- ----- -----	6 ----- ----- ----- ----- -----	7 ----- ----- RS ----- -----	8 ----- ----- ----- ----- -----	9 ----- ----- ----- ----- -----	10 ----- ----- ----- ----- -----	11 ----- ----- ----- ----- -----	12 ----- ----- US ----- -----	13 ----- ----- RS ----- -----	14 ----- ----- ----- ----- -----	15 BackSp BackSp ----- EditUnd -----
16 Tab BackTab ----- -----	17 ----- DC1 ----- -----	18 ----- ETB ----- -----	19 ----- ENQ ----- -----	20 ----- DC2 ----- -----	21 ----- DC4 ----- -----	22 ----- EM ----- -----	23 ----- NAK ----- -----	24 ----- HT ----- -----	25 ----- SI ----- -----	26 ----- DLE ----- -----	27 ----- NUL ----- -----	28 ----- ESC ----- -----	29 ----- ----- ----- ----- -----	
30 ----- ----- ----- -----	31 ----- SOH ----- -----	32 ----- DC3 ----- -----	33 ----- EOT ----- -----	34 ----- ACK ----- -----	35 ----- BEL ----- -----	36 ----- BS ----- -----	37 ----- LF ----- -----	38 ----- VT ----- -----	39 ----- FF ----- -----	40 ----- ----- ----- -----	41 ----- ----- ----- -----	43 NewLine NewLine ----- -----		
44 ----- ----- ----- -----	46 ----- SUB ----- -----	47 ----- CAN ----- -----	48 ----- ETX ----- -----	49 ----- SYN ----- -----	50 ----- STX ----- -----	51 ----- SO ----- -----	52 ----- CR ----- -----	53 ----- ----- ----- -----	54 ----- ----- ----- -----	55 ----- ----- ----- -----	57 ----- ----- ----- -----			
58 Reset/Ctrl Reset/Ctrl ----- Quit Quit -----	60 ----- ----- ----- -----	61 ----- ----- ----- -----	62 ----- ----- ----- -----	64 Entr/Ctl Entr/Ctl ----- -----										

Keyboard Layouts

Segment C assignment:

75	80	85
Insert	Home	-----
Dup	FldMk	PA3
EditCp	Rule	ChgSen
PA1	PA2	JmpNext
PA1	PA2	JmpNext
EditPst	-----	-----

76	81	86
Delete	ErEOF	-----
EditCut	ErFld	EditPst
DelWd	-----	Test
DelWd	ErInp	-----
-----	ErInp	-----
-----	-----	-----

83
Up
MarkUp
MoveUp
FastUp
FastUp

79	84	89
Left	Down	Right
MarkLef	MarkDow	MarkRig
MoveLef	MoveDow	MoveRig
BackWd	FastDow	FwdWd
BackWd	FastDow	FwdWd
-----	-----	-----

Segment D assignment:

90	95	100	105
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	Reverse	-----
-----	-----	Reverse	-----
-----	TrnOp	-----	-----

91	96	101	106
Home	Up	-----	-----
-----	-----	-----	-----
-----	MoveUp	-----	-----
-----	FastUp	-----	-----
-----	FastUp	-----	-----
-----	TrnFldl	-----	-----

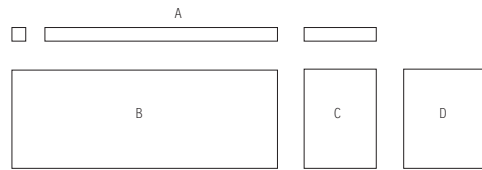
92	97	102
Left	-----	Right
-----	-----	-----
MoveLeft	-----	MoveRig
-----	-----	UnderSc
-----	-----	UnderSc
-----	-----	-----

93	98	103	108
EndFld	Down	ESC J	Enter
-----	-----	-----	Enter
-----	MoveDow	-----	-----
-----	FastDow	FieldH	-----
-----	FastDow	FieldH	-----
-----	-----	-----	-----

99	104
Insert	Delete
-----	-----
-----	DelWd
-----	DelWd
-----	-----
-----	-----

Keyboard Layouts

5576-002/003 Keyboard (5250 Only)



Segment A assignment:

110 SysAttn SysReq	112 PF1 PF13 SOSI Help	113 PF2 PF14	114 PF3 PF15 AltView	115 PF4 PF16	116 PF5 PF17 Record	117 PF6 PF18 Play	118 PF7 PF19 Pause	119 PF8 PF20 SOSI/G SOSI/G FieldCol	120 PF9 PF21	121 PF10 PF22	122 PF11 PF23 AltCur AltCur	123 PF12 PF24 TestReq TestReq
---	--	---	---	---	--	--	---	--	---	--	---	--

124	125	126 Clear HostPr
---	---	---

Segment B assignment:

1	2	3	4	5	6	7	8	9	10	11 Ansi 7E	12 Ansi A3	13 RS	14 ANSI AC	15 CharBsp CharAdv EditUnd
16 Tab BackTab	17	18	19	20	21	22	23	24	25	26	27 Ansi A2	28	29	
30	31	32	33	34	35	36	37	38	39	40	41	43 FieldExt FieldExt		
44	46	47	48	49	50	51	52	53	54	55	57			
58 Reset/Ctl Reset/Ctl Quit	60	61						62	64 Entr/Ctl Entr/Ctl					

Keyboard Layouts

Segment C assignment:

75	80	85
Insert	Home	Ro11Dwn
Dup	F1dMk	Ro11Dwn
EditCop	Rule	-----
-----	-----	JumpNxt
-----	-----	JumpNxt
EditPst	-----	-----

76	81	86
Delete	ErEOF	Ro11Up
EditCut	-----	EditPst
DelWd	-----	-----
DelWd	ErInp	-----
-----	ErInp	-----
-----	-----	-----

83
Up
MarkUp
MoveUp
FastUp
FastUp

79	84	89
Left	Down	Right
MarkLef	MarkDow	MarkRig
MoveLef	MoveDow	MoveRig
BackWd	FastDow	TabWord
BackWd	FastDow	TabWord
-----	-----	-----

Segment D assignment:

90	95	100	105
Dup	F1dMk	-----	ANSI ZD
Dup	F1dMk	-----	ANSI ZD
Dup	F1dMk	-----	-----
Dup	F1dMk	-----	-----
Dup	F1dMk	-----	-----
-----	-----	-----	-----

91	96	101	106
Home	Up	Ro11Dwn	Field+
-----	-----	-----	Field+
-----	MoveUp	-----	Field+
-----	FastUp	-----	Field+
-----	FastUp	-----	Field+
-----	-----	-----	-----

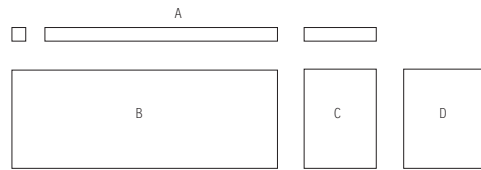
92	97	102
Left	-----	Right
-----	-----	-----
MoveLft	-----	MoveRig
-----	-----	-----
-----	-----	-----
-----	-----	-----

93	98	103	108
ErEOF	Down	Ro11Up	F1dExt
-----	-----	-----	F1dExt
-----	MoveDow	-----	-----
-----	FastDow	-----	-----
-----	FastDow	-----	-----
-----	-----	-----	-----

99	104
Insert	Delete
-----	-----
-----	DelWord
-----	DelWord
-----	-----
-----	-----

Keyboard Layouts

5576-002/003 Keyboard (Combined 3270 and 5250)



Segment A assignment:

110 Attn SysReq ----- ----- -----	112 PF1 PF13 SDSI Doc Doc Red	113 PF2 PF14 WordWrap WordWrap Pink	114 PF3 PF15 AltView CfgFmt Green	115 PF4 PF16 ----- ----- Yellow	116 PF5 PF17 Record Blue	117 PF6 PF18 Play Turquoise	118 PF7 PF19 Pause White	119 PF8 PF20 APL ----- APL	120 PF9 PF21 ----- CrSel -----	121 PF10 PF22 CrBnk ----- CrBnk	122 PF11 PF23 AltCur ----- AltCur	123 PF12 PF24 ----- ----- +Cr -----
--	---	--	--	--	--------------------------------------	---	--------------------------------------	---	---	--	--	---

124 ----- ----- -----	125 ----- ----- -----	126 Clear Break ----- -----
--------------------------------	--------------------------------	---

Segment B assignment:

1 ----- ----- -----	2 ----- ----- -----	3 ----- ----- NUL ----- -----	4 ----- ----- ----- ----- -----	5 ----- ----- ----- ----- -----	6 ----- ----- ----- ----- -----	7 ----- ----- ----- ----- -----	8 ----- ----- ----- ----- -----	9 ----- ----- ----- ----- -----	10 ----- ----- ----- ----- -----	11 ----- ----- ANSI 7E ----- -----	12 ----- ----- US ANSI A3 ----- -----	13 ----- ----- RS ----- -----	14 ----- ----- ANSI AC ----- -----	15 BackSp CharAdv ----- -----
16 Tab BackTab ----- -----	17 ----- ----- DC1 ----- -----	18 ----- ----- ETB ----- -----	19 ----- ----- ENQ ----- -----	20 ----- ----- DC2 ----- -----	21 ----- ----- DC4 ----- -----	22 ----- ----- EM ----- -----	23 ----- ----- NAK ----- -----	24 ----- ----- HT ----- -----	25 ----- ----- SI ----- -----	26 ----- ----- DLE ----- -----	27 ----- ----- NUL ANSI A2 ----- -----	28 ----- ----- ESC ----- -----	29 ----- ----- ----- ----- -----	
30 ----- ----- ----- ----- -----	31 ----- ----- SOH ----- -----	32 ----- ----- DC3 ----- -----	33 ----- ----- EOT ----- -----	34 ----- ----- ACK ----- -----	35 ----- ----- BEL ----- -----	36 ----- ----- BS ----- -----	37 ----- ----- LF ----- -----	38 ----- ----- VT ----- -----	39 ----- ----- FF ----- -----	40 ----- ----- ----- ----- -----	41 ----- ----- ----- ----- -----	43 NewLine NewLine ----- ----- -----		
44 ----- ----- ----- ----- -----	46 ----- ----- SUB ----- -----	47 ----- ----- CAN ----- -----	48 ----- ----- ETX ----- -----	49 ----- ----- SYN ----- -----	50 ----- ----- STX ----- -----	51 ----- ----- SO ----- -----	52 ----- ----- CR ----- -----	53 ----- ----- ----- ----- -----	54 ----- ----- ----- ----- -----	55 ----- ----- ----- ----- -----	57 ----- ----- ----- ----- -----			
58 Reset/Ctl Reset/Ctl ----- Quit Quit -----	60 ----- ----- ----- ----- -----	61 ----- ----- ----- ----- -----	62 ----- ----- ----- ----- -----	64 Entr/Ctl Entr/Ctl ----- ----- -----										

Segment C assignment:

75	80	85
Insert	Home	Ro11Dwn
Dup	FieldMk	PA3
EditCop	Rule	ChgScn
PA1	PA2	JumpNxt
PA1	PA2	JumpNxt
EditPst	.....	.....

Segment D assignment:

90	95	100	105
.....	.....	.....	ANSI 2D
.....	.....	.....	ANSI 2D
.....	.....	Reverse	.....
.....	.....	Reverse	.....
.....	TrnOp	.....	.....

76	81	86
Delete	ErEOF	Ro11Up
EditCut	ErFld	EditPst
DelWord	.....	Test
.....	ErInp	.....
.....	ErInp	.....
.....

91	96	101	106
Home	Up	.....	Field+
.....
.....	MoveUp	.....	.....
.....	FastUp	.....	.....
.....	FastUp	.....	.....
.....	TrnFldI	.....	.....

92	97	102
Left	.....	Right
.....
MoveLef	.....	MoveRig
.....	.....	UnderSc
.....	.....	UnderSc
.....

93	98	103	108
EndFld	Down	Esc J	Enter
.....	.....	.....	Enter
.....	MoveDow	.....	.....
.....	FastDow	FieldH	.....
.....	FastDow	FieldH	.....
.....

79	84	89
Left	Down	Right
MarkLef	MarkDow	MarkRig
MoveLef	MoveDow	MoveRig
BackWd	FastDow	FwdWd
BackWd	FastDow	FwdWd
.....

83
Up
MarkUp
MoveUp
FastUp
FastUp
.....

99	104
Insert	Delete
.....
.....	DelWord
.....	DelWord
.....

APL Keyboard Layouts (3270 Only)

This section shows the APL keyboard layouts for each country. Only APL characters are shown in each shift position (up/down/ALT).

Language	Type	Figure on
Austrian/German	1	page234
Belgian	2	page234
Canadian-Bilingual	1	page234
Denmark	1	page234
Finnish/Swedish	1	page234
French AZERTY	2	page234
Hangeul	4	page235
Italian	1	page234
Japanese	4	page235
Latin American Spanish	1	page234
Norwegian	1	page234
Portuguese	1	page234
Simplified Chinese	4	page235
Spanish	1	page234
Swiss-French	1	page234
Swiss-German	1	page234
Traditional Chinese	4	page235
U.K. English	1	page234
U.S. English	3	page234

Keyboard Layouts

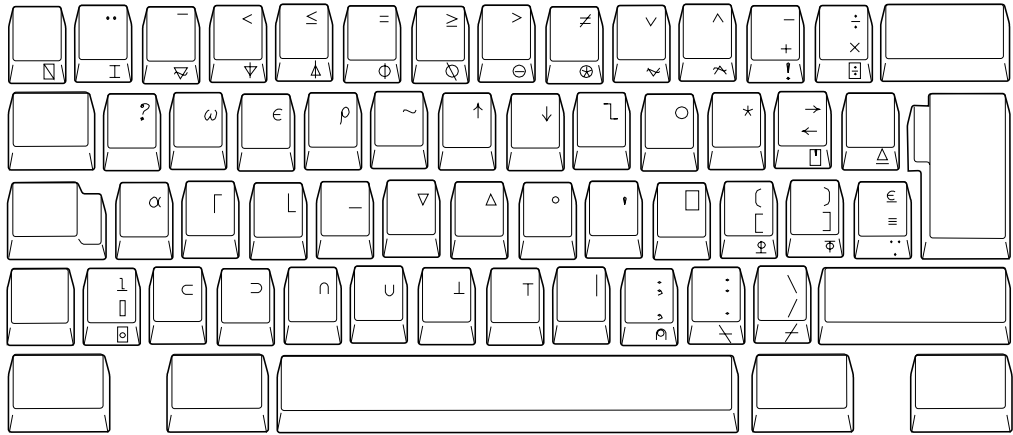


Figure 22. Type-1 APL Keyboard

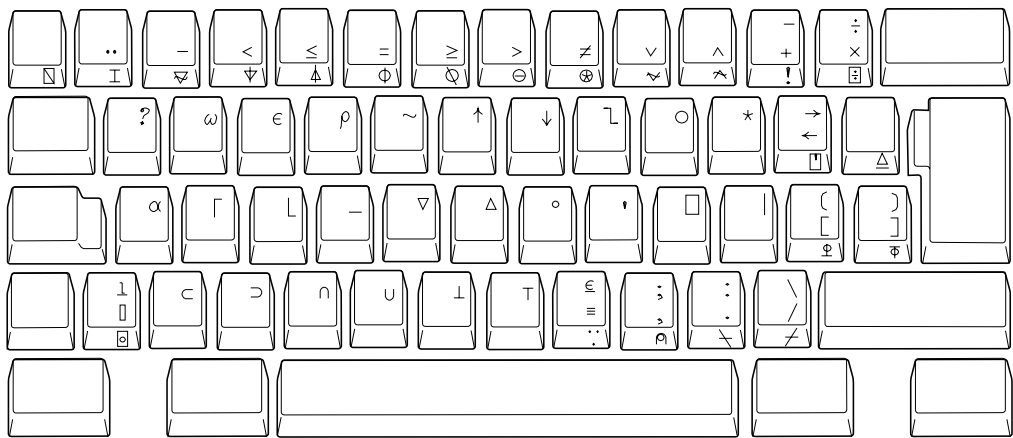


Figure 23. Type-2 APL Keyboard

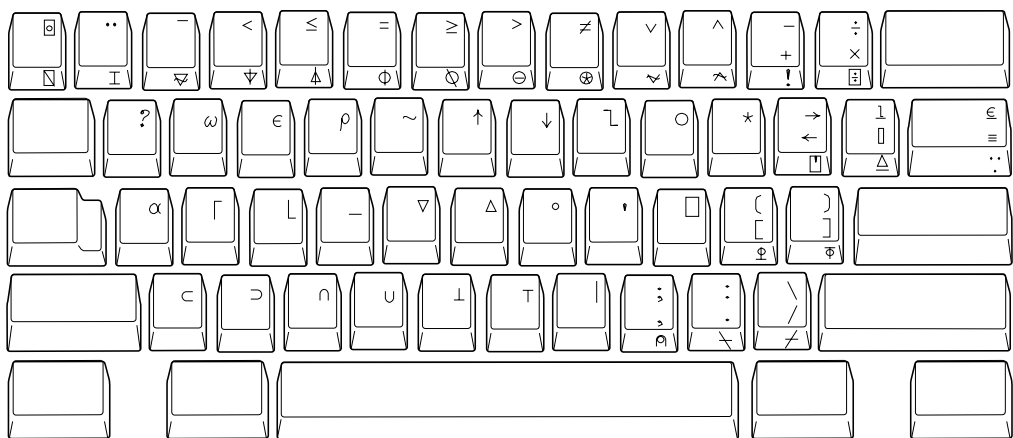


Figure 24. Type-3 APL Keyboard

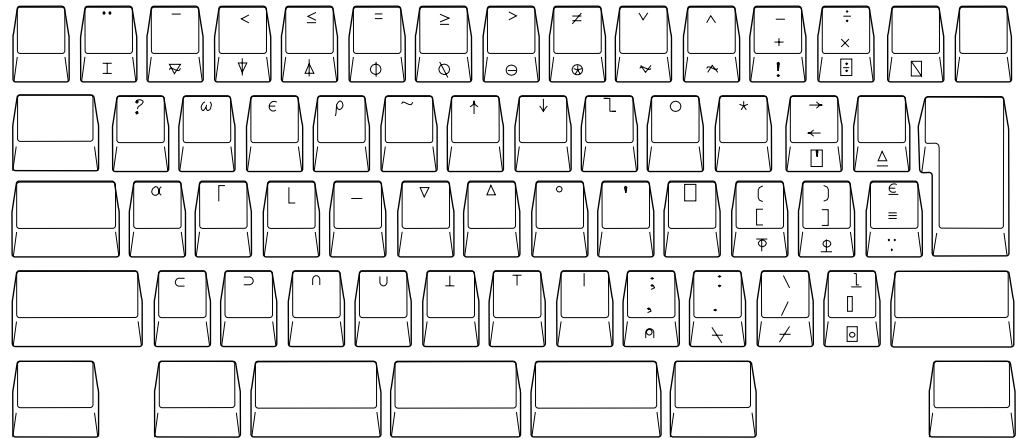


Figure 25. Type-4 APL Keyboard

Key Map for Home3270

This section shows the position of the following control codes:

- NUL (X'00')
- ESC (X'1B')
- FS (X'1C')
- GS (X'1D')
- RS (X'1E')
- US (X'1F')

The positions of these control codes are fixed and common for all languages (including U.S. English), regardless of the characters assigned to BASE and UP SHIFT positions of the keys. These control codes are positioned to the CONTROL positions of the keys shown in Figure 26 through Figure 27 on page 236.

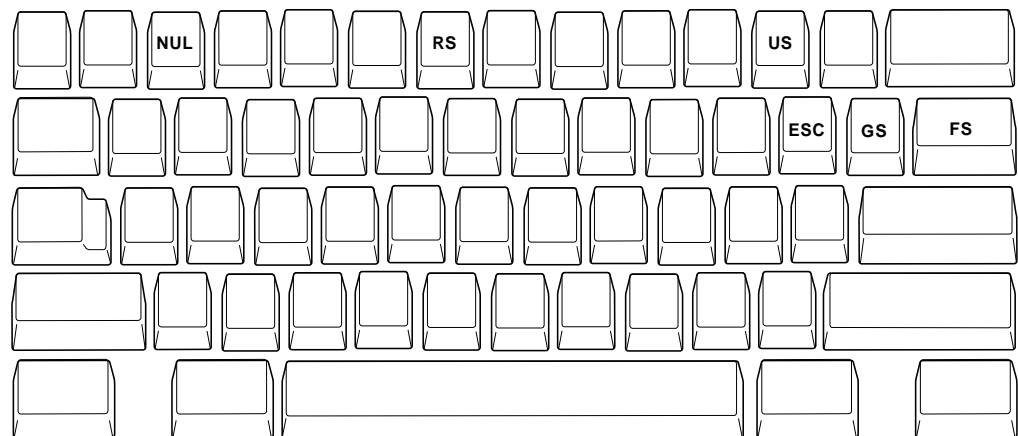


Figure 26. Common Control Code of Keyboard Core Segment for Non-Japanese Keyboard

Keyboard Layouts

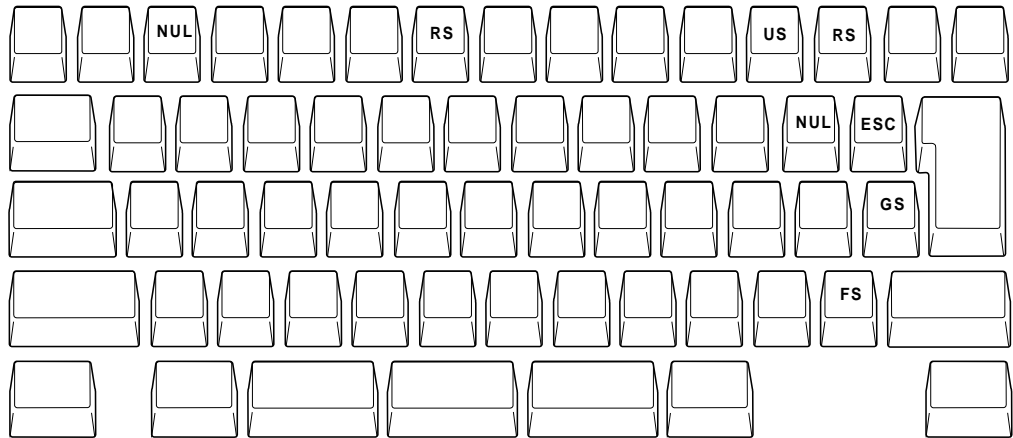


Figure 27. Common Control Code of Keyboard Core Segment for Japanese Keyboard

The positions of other control codes vary for each language. These control codes are positioned to the CONTROL position of the associated alphabetic key. Those control codes and the associated alphabetic characters are as follows.

Control Code	Associated Letter
SOH (X'01')	a
STX (X'02')	b
ETX (X'03')	c
EOT (X'04')	d
ENQ (X'05')	e
ACK (X'06')	f
BEL (X'07')	g
BS (X'08')	h
HT (X'09')	i
LF (X'0A')	j
VT (X'0B')	k
FF (X'0C')	l
CR (X'0D')	m
SO (X'0E')	n
SI (X'0F')	o
DLE (X'10')	p
DC1(XON) (X'11')	q
DC2 (X'12')	r
DC3(XOF) (X'13')	s
DC4 (X'14')	t
NAK (X'15')	u
SYN (X'16')	v
ETB (X'17')	w
CAN (X'18')	x
EM (X'19')	y
SUB (X'1A')	z

Figure 28. Other Control Code Map of Key Segment B

Following is an example of control-code mapping for the U.S. Enhanced Keyboard.

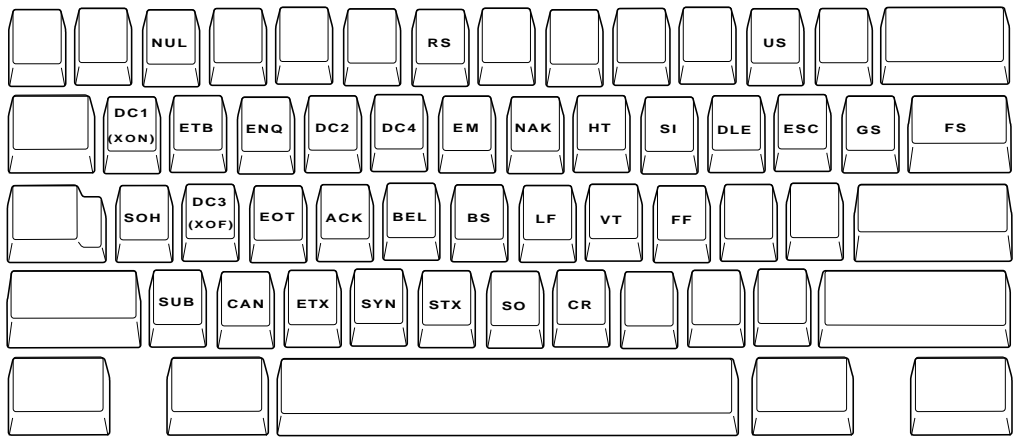


Figure 29. Control-Code Map of Keyboard Core Segment for U.S. Enhanced Keyboard

Appendix E. Creating Additional Disk Space

If you do not have enough disk space and you want to allocate minimum disk space for Personal Communications, you can delete extraneous Personal Communications files from the directory where you installed them. Before deleting any of the listed files, make sure that you don't intend to use that particular Personal Communications function.

Important Notes

Attention

Do not delete any Personal Communications files other than the ones listed below. Otherwise, you will have unpredictable results and may have to reinstall Personal Communications.

Emulator Utilities

		KB
		--
- Profs/Xedit/CMS print utility	ZIPPRINT.EXE	87
- Multiple Sessions	PCSBAT.EXE	37
	PCSBAT.CNT	1
- Data Transfer	PCSFT5.EXE	279
- Menu-Bar Customizing Utility	PCSCMENU.EXE	33

Administration Tools

- Trace	PCSMON.EXE	40
	PCSMON.DLL	22
	TRCGUI.EXE	185
	TRCGUI.HLP	57
	TRCGUI.CNT	4
	TRCMSG.DLL	18
	NSTRC.CFG	10
	FMT_UTIL.DLL	37
	FMTENG.DLL	38
	FMTMSG.DLL	23
	FMTNODE.DLL	49
	FMTNOPS.DLL	14
	PCSFMTPI.DLL	24
- Display SNA Sense Data	GETSENSE.EXE	15
	GETSENSE.HLP	9
	SENSDATA.DAT	137
- Check Connection (APING)	WINAPING.EXE	44
- Transfer File (AFTP)	AFTP.EXE	187
	AFTP.HLP	14
	AFTP.INI	6
	AFTPAPI.DLL	138
	AFTPD.EXE	12

Creating Additional Disk Space

	AFTPSERV.DLL	132
	ANAMEAPI.DLL	85
	APP.DLL	288
- Log Viewer	MSGBRWSR.EXE	69
	MSGBRWSR.HLP	12
	MSGBRWSR.CNT	1
- SNA Node Operations	PCSNOPS.EXE	415
	PCSNOPS.HLP	23
	PCSNOPS.CNT	2
	NOPSMG.DLL	17

Other Tools

- SEND/RECEIVE	SEND.EXE	11
	RECEIVE.EXE	11
- PC Organizer	PCSPCO.DLL	17
	PCSPCOC.EXE	5
- Printer Function Table Migration Aid	PCSPFC.EXE	41

Link Utility

- Auto Dial	PCSDIAL.DLL	66
	PCSMODEM.DAT	24
	PCSDIA.DLL	41

Information

- Help	PCSHHELP.HLP	654
	PCSHHELP.CNT	2
- ReadMe	README.TXT	11

Links

- COAX	PCSCSDFT.DLL	37
	PCSCOAX.VXD	13
	PCSCNDFT.DLL	42
	PCSCOAX.DLL	24
	PCSVPD.DLL	24
- TCP/IP	PCSTLNET.DLL	90
	PCSTN52.DLL	6
- AEA	PCSAEA.DLL	53
- SPX/IPX	PCSNWCS.DLL	66
	PCSNWSAA.DLL	26
- HPO	PCSHPO.DLL	68
- 802.2	NBAMLLC2.CNT	3
	NBAMLLC2.HLP	30
	NBAMLLC2.DLL	31
	SNAPLLC2.DLL	58
	VLLC2D.VXD	13
- PDLC ¹	PDLWEMSG.DLL	4

Creating Additional Disk Space

	PDLWEBAS.DLL	8
	PDLWERAP.DLL	63
	PDLWEBTF.DLL	10
	PDLWECFG.DLL	34
	PDLWEFMT.DLL	10
	PDLWEMAP.DLL	52
- Connection Management Framework ²	PDLWCFGF.DLL	9
	PDLWCBAS.DLL	6
	PDLWCFWK.DLL	185
	PDLWCFMT.DLL	28
- DLC Common ³	PDLWDINT.DLL	9
	PDLWDFMT.DLL	10
- SDLC ⁴	PDLWSDL.DLL	70
- Twinaxial DLC ⁵	PDLNDTDL.SYS	58
- Signalling Protocols		
- Leased ⁶	PDLWSLEA.DLL	32
	PDLWSLEF.DLL	9
- Hayes AT ⁷	PDLWSHAY.DLL	77
	PDLWSHAF.DLL	9
- V.25 bis ⁸	PDLWSV25.DLL	71
	PDLWSV2F.DLL	9
- Twinaxial Adapter ⁹	PDLNATDL.SYS	23
	PDLNATCM.SYS	23
	PDLNATSN.SYS	23
	PDLNATNM.SYS	23
- MPA and COM Adapter Common ¹⁰	PDLWAFAC.DLL	48
	PDLWAFMT.VXD	7
- MPA ¹¹	PDLWAMPA.VXD	27
- COM ¹²	PDLWACOM.VXD	29

Configuration Notes:

1. LAN only: groups 1 through 12 can be deleted.
2. COM-port switched: groups 5, 6, 8, 9, and 11 can be deleted.
3. COM-port leased: groups 5, 7, 8, 9, and 11 can be deleted.
4. MPA switched: groups 5, 6, 7, 9, and 12 can be deleted.
5. MPA leased: groups 5, 7, 8, 9, and 12 can be deleted.
6. Twinaxial: groups 4, 7, 8, 10, 11, and 12 can be deleted.

Creating Additional Disk Space

Appendix F. Hints and Tips

This chapter is intended to help you avoid problems that were discovered in the course of using Personal Communications in combination with products from other vendors. Some of the problems mentioned here may already have been corrected, either by IBM or by other vendors. See the README files for the latest information.

Usage Notes for Sessions in OLE Documents

Changing Fonts

If you are using an In-Place embedded session, then changing the font face name, switching between automatic sizing and fixed size, or changing the size for a fixed size font can result in an incorrect display on the screen. To correct the display, adjust the size of the session object window slightly.

Initial Selection of Font

The initial font selection for a embedded or linked session is determined by its Session ID (a letter "A" through "Z") just like a regular session. Therefore, the initial font may change if other sessions are already active. Further, to prevent In-Place embedded sessions from having adverse effects on subsequent sessions, font changes made during use of In-Place embedded sessions are not saved.

WordPad

Personal Communications session objects created in Microsoft WordPad documents by the drag-and-drop method cannot be used after the document has been saved and closed. This limitation may be fixed by some future version of WordPad. For the present, you should only create Personal Communications objects in WordPad by using the Insert-Object menu item.

Some versions of Microsoft Word and Microsoft WordPad incorrectly save the state of embedded objects that are displayed as icons. If you open a document that contains a Personal Communications session object that was created to display as an icon, and the object is activated, then it may activate In-Place instead of as a separate window. This problem may be fixed in future versions of these containers.

WordPro

If you attempt to open a link to a Personal Communications session in a Lotus WordPro document, current versions WordPro are likely to trap. This limitation may be fixed by some future version of WordPro. For the present, you should only use embedded Personal Communications objects in WordPro documents. You may use the "Display as Icon" option if a separate window is desired.

Updating Linked Files

Files that are linked into Word 97 or Excel 97 do not update automatically. You must manually save the linked file before your edits are reflected in the container window.

Inactivity Timeout for Communication Links

The Inactivity Timeout automatically disconnects a link after it has been idle for a specified length of time. Its purpose is to avoid excessive charges on dial-up links, such as switched-line connections with SNA/A, Asynchronous IIN, Hayes AutoSync, or SDLC. Inactivity Timeout is not recommended for other types of connections.

To enable Inactivity Timeout, add the following statement to the PU section of your workstation profile (.WS file):

```
[PU]
  InactiveTimeout=xx
```

The value xx, ranging from 1 to 999, is the number of minutes a link remains connected when there is no activity over it. The default value, InactiveTimeout=0 disables Inactivity Timeout.

Note: The Inactivity Timeout function monitors only attention keys (that is, the Enter, Clear, and PFX keys). We recommend that you set a comparably longer value for xx if, for example, you expect to key in large amounts of data on the screen before pressing the Enter key.

Considerations

The following are environmental considerations for Personal Communications.

Virtual Memory

If you receive a message stating that the system is low on virtual memory, increase the virtual memory paging file. If you get this message as you are trying to open new host sessions or starting some Personal Communications function such as File transfer, it is apparent that virtual memory settings should be increased. You can increase the size of the virtual memory paging file on Windows NT as follows:

For Windows NT and Windows 2000

1. Select **Start > Settings > Control Panel**.
2. On the Control Panel double click on the **Systemicon**.
3. Select the Performance tab on the System Properties panel and then press the **Change** button.
4. Select the appropriate drive and increase the maximum size value.
5. Press the **Set** button to establish the new size.
6. Press the **OK** button on the Virtual Memory panel.
7. Press the **Close** button on the System Properties panel.
8. You will be prompted to restart your computer. You should close any open applications and restart your computer.

Emulator Session Icons

Emulator session icons will not function correctly after installing a new version of Personal Communications to a different directory if the session icons were created in a folder other than the Personal Communications folder. For example, if Personal Communications was installed in C:\Personal Communications and if you had created session icons on the desktop, then after you install a newer version of

Personal Communications to a different directory (for example, C:\pcomm), the session icons on the desktop will not function correctly.

The icons can be made to work by simply changing the Target and Start In fields on the Properties sheet for each of the icons. (In the example above, all references to C:\Personal Communications would be changed to C:\pcomm.)

Migrating from Windows 95 or Windows 98 to Windows NT or Windows 2000

On Windows NT or Windows 2000, Personal Communications installs itself as an entry in the Common area of the Start/Programs menu (that is, below the split line on the Programs menu). Personal Communications for Windows 95 or Windows 98 places itself in the Private area of the Programs menu—above the split line on the Programs menu. When you install Personal Communications on a machine where Personal Communications Version 4.1 for Windows 95 or Windows 98 was previously installed, the Personal Communications for Windows 95 or Windows 98 icons will not automatically be removed from the Private area of the Programs menu. You can manually remove these icons by clicking the **Taskbar** with the right mouse button and clicking **Properties/Start Menu Programs/Remove**.

Disabling CDRA Tables

This release uses the standard IBM CDRA translation tables when converting between ASCII and EBCDIC. From some code page pairs, the standard tables differ from those that Personal Communications has used in the past. For code pages that were supported in prior releases, you can configure Personal Communications to use the old tables. A switch is available in PCSWIN.INI to disable the use of CDRA tables. This switch is located in the Translate section and is named UseOnlyPCOMM. This switch takes a binary value and is defaulted to *FALSE* (except for Japan, Korea, Taiwan, and PRC where it defaults to *True*). For the code pages that are new to Version 5.0, you must use the standard tables. Setting the switch will apply to all sessions, as well as data transfer and command line file transfer.

Appendix G. ODBC Drivers and Database Access Utility

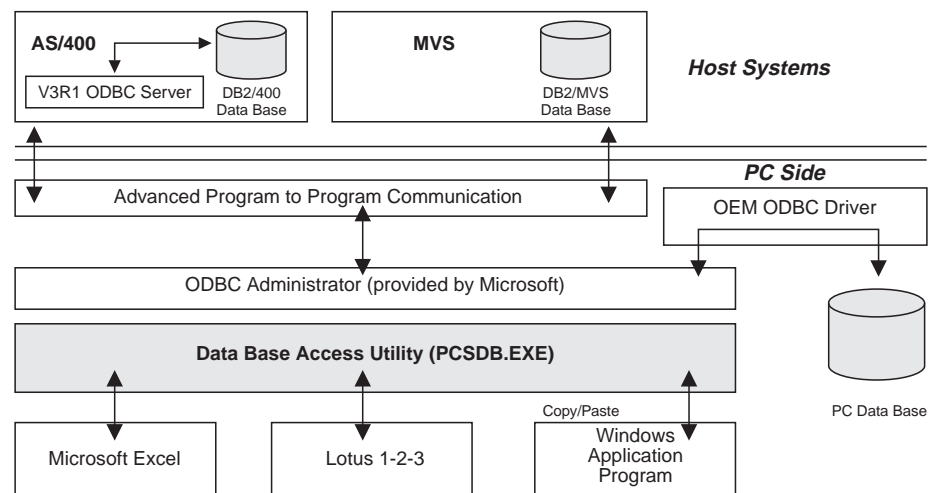
Overview of Open Database Connectivity (ODBC)

ODBC is an industry-standard application program interface (API) that provides a solution to a common problem—how to write programs that access a Database Management System (DBMS) without making them dependent on specific DBMS designs. ODBC provides API access to SQL-accessible databases, allowing application programs to use SQL to access data from many kinds of sources. The independence of the access method from the original design of the database means that developers can design and produce a single version of an application that can work with, for example, DB2, Oracle, or Sybase data, without requiring a separate version for each DBMS. Users simply add database drivers to link the application to their choice of DBMS.

ODBC is a component of the Windows Open Services Architecture (WOSA). Personal Communications Version 5.0 supports ODBC 2.0, for development of 32-bit applications for Windows 95, Windows 98, Windows NT, and Windows 2000. (Personal Communications Version 4.3 supports Windows 3.x.)

An ODBC driver provides an application program with standard and uniform SQL access to a DBMS database. An ODBC driver allows the designers and users of the application program to ignore the SQL differences between various DBMS systems.

The figure below shows an overview of the Personal Communications Database Access utility and the ODBC DB2 drivers.



Components of ODBC

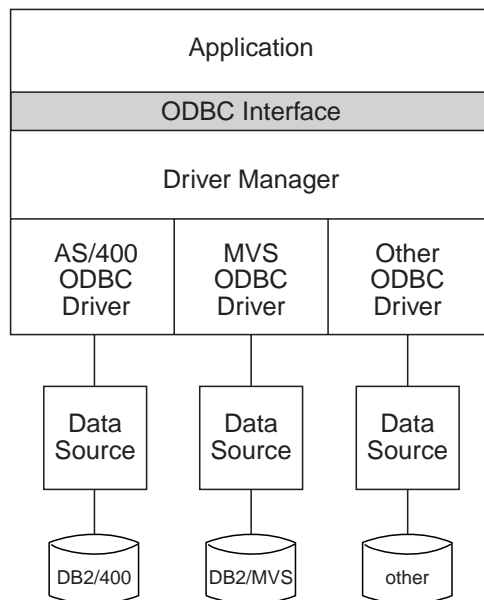
There are four components in the ODBC architecture:

- The **application** component defines and performs the work to be accomplished. It calls the ODBC API functions that submit SQL statements and retrieve results.
- The **driver manager** component loads drivers on behalf of an application.

Open Database Connectivity

- The **driver** component processes ODBC function calls, submits SQL requests to a specific data source, and passes results to the application. The driver transforms the application's SQL syntax into the syntax expected by the driver's associated DBMS.
- The **data source** component is the data to be accessed and the means for doing so, including the associated operating system, DBMS and network platform.

From the application program's perspective, the driver manager and the driver appear to be a single unit for processing ODBC function calls. The following diagram shows the relationship between the four components:



Following are descriptions of the components:

Application Component

An application using ODBC performs the following tasks:

- Requests a session (connection) with a data source
- Sends SQL requests to the data source
- Defines storage areas and data formats for the results of the SQL requests
- Requests the results of the defined query
- Processes errors
- Requests commit or rollback operations for transaction control
- Terminates the session with the data source

Any program that accesses a DBMS, such as a spreadsheet, a mail server, or a report generator, can be designed to use ODBC.

Driver Manager

The driver manager is a dynamic-link library (DLL), the purpose of which is to load drivers. It also performs the following functions:

- Maps a data source name to a specific driver DLL.
- Processes ODBC initialization calls.
- Provides the entry points to the ODBC functions for each driver.
- Provides parameter and sequence validation for ODBC calls.

Driver

A driver is a DLL that implements ODBC function calls and interacts with a data source.

The driver manager loads a driver when the application calls the **SQLBrowseConnect**, **SQLConnect**, or **SQLDriverConnect** function.

A driver performs the following tasks in response to ODBC function calls from an application:

- Establishes a connection to a data source.
- Submits requests to the data source.
- Translates data to or from other formats, if requested by the application.
- Returns results to the application.
- Formats errors into standard error codes and returns them to the application.
- Declares and manipulates cursors if necessary. This operation is invisible to the application unless there is a request for access to a cursor name.
- Initiates transactions of the data source. This operation is invisible to the application.

Data Source

A data source is an instance of a DBMS product and any remote operating system and the protocol required to access it.

Database Access Utility

Database Access lets you access host or PC databases and retrieve data, using ODBC drivers. If you specify the conditions for accessing data in each window, the desired query can be created automatically. Please see the online help for extensive information on using the Database Access utility with the Personal Communications ODBC drivers.

From Database Access, you can perform any of the following actions:

- You can see and modify the SQL statements that are created automatically.
- You can see available database-table lists.
- You can copy spreadsheet data to the clipboard
- You can show data in the grid in the main window spreadsheet, send data to other applications (for example Lotus[®] 1-2-3 or Microsoft Excel), or send data to a printer.
- If you want to know the meaning of items in the windows, you can see an explanation when you click on the item and then click help.

How to Access an ODBC Data Source

To access an ODBC data source, do one of the following:

- Click on the **Data Source** button



on the toolbar.

- Select **Data Source** from the query pull-down menu.

The SQL Data Source window appears.

Open Database Connectivity

Select the data source you want to access; then click OK.

Note: before using Database Access, you must install the 32-bit ODBC administrator and set up the ODBC data source you wish to use.

Selecting Database Tables

To select database tables, do one of the following:

- Click on the **Tables** button



on the toolbar

- Select **Tables** from the Query pull-down.

The Tables window appears.

Joining Conditions for Multiple Tables

To join conditions for multiple tables, do one of the following:

- Click on the **Join Conditions** button



on the toolbar.

- Select **Join** from the Query pull-down menu.

The Join By window appears.

Selecting Database Columns

To select database columns, do one of the following:

- Click on the **Columns** button



on the toolbar.

- Select **Columns** from the Query pull-down menu.

The Columns window appears.

Selecting Query Conditions

To select query conditions for the data, do one of the following:

- Click on the **Query Conditions** button



on the toolbar

- Select **Query Conditions** from the Query pull-down menu.

The Query Conditions window appears.

Selecting Sort Conditions

To select sort conditions for each column, do one of the following:

- Click on the **Order** button



on the toolbar.

- Select **Order** from the Query pull-down menu.

The Order By window appears.

Viewing the Current SQL Statement

To view the current SQL statement, do one of the following:

- Click on the **SQL Statement** button



on the toolbar.

- Select **SQL Statement** from the Query pull-down menu.
- Click the SQL button in any window selected from the Query pull-down menu.

The SQL Statement window appears.

Database Size Limit

When you use Database Access, the maximum number of each value that can be displayed in the spreadsheet is as follows:

Number of columns	400
Number of rows	16350
Column length	2048 bytes
Row length	2048 bytes
SQL statement's length	32766 bytes

Note: The values shown are standard, but your PC's available resources (such as memory) can result in other limits.

When you use another application (for example Lotus 1-2-3), refer to the manual for that application because the limit might be different.

Further Information

For further information, please refer to the following guides:

- IBM DB2 Connect Personal Edition Quick Beginnings — S10J-8162-00
- IBMDB2 Connect User's Guide — S10J-8163-00

Note:

You can find additional information in the on-line help.

Open Database Connectivity

Appendix H. Notices

This information was developed for products and services offered in the U.S.A. IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

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Appendix I. Glossary

This glossary includes terms and definitions from:

- The *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036. Definitions are identified by the symbol (A) after the definition.
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- The *Information Technology Vocabulary* developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1). Definitions of published parts of this vocabulary are identified by the symbol (I) after the definition; definitions taken from draft international standards, committee drafts, and working papers being developed by ISO/IEC JTC1/SC1 are identified by the symbol (T) after the definition, indicating that final agreement has not yet been reached among the participating National Bodies of SC1.
- The *IBM Dictionary of Computing*, New York: McGraw-Hill, 1994.
- Internet Request for Comments: 1208, *Glossary of Networking Terms*
- Internet Request for Comments: 1392, *Internet Users' Glossary*
- The *Object-Oriented Interface Design: IBM Common User Access Guidelines*, Carmel, Indiana: Que, 1992.

The following cross-references are used in this glossary:

Contrast with:

This refers to a term that has an opposed or substantively different meaning.

Synonym for:

This indicates that the term has the same meaning as a preferred term, which is defined in its proper place in the glossary.

Synonymous with:

This is a backward reference from a defined term to all other terms that have the same meaning.

See: This refers the reader to multiple-word terms that have the same last word.

See also:

This refers the reader to terms that have a related, but not synonymous, meaning.

Deprecated term for:

This indicates that the term should not be used. It refers to a preferred term, which is defined in its proper place in the glossary.

The complete *IBM Dictionary of Computing* is available on the World Wide Web at www.networking.ibm.com/nsg/nsgmain.htm.

A

accept. (1) In a VTAM application program, to establish a session with a logical unit (LU) in response to a CINIT request from a system services control point (SSCP). The session-initiation request may begin when a terminal user logs on, a VTAM application program issues a macroinstruction, or a VTAM operator issues a command. See also *acquire*. (2) An SMP process that moves distributed code and MVS-type programs to the distribution libraries.

ACCESS. In the Simple Network Management Protocol (SNMP), the clause in a Management Information Base (MIB) module that defines the minimum level of support that a managed node provides for an object.

access method. (1) A technique, implemented in software, that controls the flow of information through a network. (2) A technique for moving data between main storage and input/output devices.

ACDI port. In Communications Manager/2, a serial port (such as COM1, COM2, or COM3) that can be programmed for asynchronous communications through the Asynchronous Communications Device Interface (ACDI).

ACF. Advanced Communications Function.

ACF/VTAM. Advanced Communications Function for the Virtual Telecommunications Access Method. Synonym for *VTAM*.

acquire. (1) In VTAM, to take over resources that were formerly controlled by an access method in another domain or to resume control of resources that were controlled by that domain but released. Contrast with *release*. See also *resource takeover*. (2) In a VTAM application program, to initiate and establish a session with another logical unit (LU). The acquire process begins when the application program issues a macroinstruction. See also *accept*.

action. (1) An operation on a managed object, the semantics of which are defined as part of the managed object class definition. (2) In the AIX operating system, a defined task that an application performs. An action modifies the properties of an object or manipulates the object in some way.

activate. To make a resource ready to perform its function. Contrast with *deactivate*.

active. (1) Operational. (2) Pertaining to a node or device that is connected or is available for connection to another node or device. (3) The state of a resource when it has been activated and is operational.

ACTPU. Activate physical unit. In SNA, a command used to start a session on a physical unit.

adapter. (1) A hardware component that must be installed in the personal computer to connect to the SDLC, LAN, asynchronous, DFT, or other communication attachment (possibly connecting through a modem). (2) A part that electrically or physically connects a device to a computer or to another device.

adaptive pacing. Synonym for *adaptive session-level pacing*.

adaptive session-level pacing. A form of session-level pacing in which session components exchange pacing windows that may vary in size during the course of a session. This allows transmission within a network to adapt dynamically to variations in availability and demand of buffers on a session-by-session basis. Session-level pacing occurs within independent stages along the session path according to local congestion at the intermediate and endpoint nodes. Synonymous with *adaptive pacing* and *adaptive session pacing*. Contrast with *fixed session-level pacing*.

adaptive session pacing. Synonym for *adaptive session-level pacing*.

address. In data communication, the unique code assigned to each device, workstation, or user connected to a network.

adjacent link station (ALS). (1) In SNA, a link station directly connected to a given node by a link connection over which network traffic can be carried.

Note: Several secondary link stations that share a link connection do not exchange data with each other and therefore are not adjacent to each other.

(2) With respect to a specific node, a link station partner in an adjacent node.

adjacent nodes. Two nodes connected together by at least one path that connects no other node. (T)

Advanced Communications Function (ACF). A group of IBM licensed programs, principally VTAM, TCAM, NCP, and SSP, that use the concepts of Systems Network Architecture (SNA), including distribution of function and resource sharing.

Advanced Peer-to-Peer Networking (APPN). An extension to SNA featuring (a) greater distributed network control that avoids critical hierarchical dependencies, thereby isolating the effects of single points of failure; (b) dynamic exchange of network topology information to foster ease of connection, reconfiguration, and adaptive route selection;

(c) dynamic definition of network resources; and (d) automated resource registration and directory lookup. APPN extends the LU 6.2 peer orientation for end-user services to network control and supports multiple LU types, including LU 2, LU 3, and LU 6.2.

Advanced Peer-to-Peer Networking (APPN) end node. A node that provides a broad range of end-user services and supports sessions between its local control point (CP) and the CP in an adjacent network node. It uses these sessions to dynamically register its resources with the adjacent CP (its network node server), to send and receive directory search requests, and to obtain management services. An APPN end node can also attach to other end nodes.

Advanced Peer-to-Peer Networking (APPN) network. A collection of interconnected network nodes and their client end nodes.

Advanced Peer-to-Peer Networking (APPN) network node. A node that offers a broad range of end-user services and that can provide the following:

- Distributed directory services, including registration of its domain resources to a central directory server
- Topology database exchanges with other APPN network nodes, enabling network nodes throughout the network to select optimal routes for LU-LU sessions based on requested classes of service
- Session services for its local LUs and client end nodes
- Intermediate routing services within an APPN network

Advanced Peer-to-Peer Networking (APPN) node. An APPN network node or an APPN end node.

advanced program-to-program communication (APPC). (1) (2) An LU 6.2 logical unit protocol implementation of SNA that lets interconnected systems share programming tasks. The general facility characterizing the LU 6.2 architecture and its various implementations in products. (3) Sometimes used to refer to the LU 6.2 architecture and its product implementations as a whole, or to an LU 6.2 product feature in particular, such as an APPC application programming interface.

AID. Attention identifier.

alert. (1) A message sent to a management services focal point in a network to identify a problem or an impending problem. (2) In SNA management services (SNA/MS), a high priority event that warrants immediate attention.

allocate. (1) An LU 6.2 application programming interface (API) verb used to assign a session to a conversation for the conversation's use. (2) Contrast with *deallocate*.

all points addressable (APA). In computer graphics, pertaining to the ability to address and display or not display each picture element (pel) on a display surface.

ALS. Adjacent link station.

American National Standards Institute (ANSI). An organization consisting of producers, consumers, and general interest groups, that establishes the procedures by which accredited organizations create and maintain voluntary industry standards in the United States. (A)

AND operation. Synonym for *conjunction*.

ANR. Automatic network routing.

ANSI. American National Standards Institute.

APA. All points addressable.

APAR. Authorized program analysis report.

API. Application programming interface.

APL. A programming language requiring the use of a special keyboard to represent various operator symbols.

APPC. Advanced program-to-program communication.

application. A collection of software components used to perform specific types of user-oriented work on a computer.

application program. (1) A program written for or by a user that applies to the user's work, such as a program that does inventory control or payroll. (2) A program used to connect and communicate with stations in a network, enabling users to perform application-oriented activities.

application programming interface (API). (1) (2) A defined programming language interface between an IBM system control program or an IBM-licensed program and the program user. The set of programming language constructs or statements that can be coded in an application program to obtain the specific functions and services provided by an underlying operating system or service program. (3) In VTAM, the language structure used in control blocks so that application programs can reference them and be identified to VTAM.

Apply. A push button that carries out the selected choices in a window without closing the window.

APPN. Advanced Peer-to-Peer Networking.

APPN end node. See *Advanced Peer-to-Peer Networking (APPN) end node*.

APPN network. See *Advanced Peer-to-Peer Networking (APPN) network*.

argument. A parameter passed between a calling program and a called program.

ASCII (American National Standard Code for Information Interchange). The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), that is used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphic characters. (A)

ASYNC. Asynchronous.

asynchronous (ASYNC). (1) Pertaining to two or more processes that do not depend upon the occurrence of specific events such as common timing signals. (T) (2) Without regular time relationship; unexpected or unpredictable with respect to the execution of program instructions.

attach. (1) In programming, to create a task that can be executed asynchronously with the execution of the mainline code. (2) To connect a device logically to a ring network.

attachment. A communication link used by Personal Communications to connect a personal computer to a host system, consisting of an adapter and controlling software.

attention identifier (AID). A character in a data stream indicating that the user has pressed a key, such as the Enter key, that requests an action by the system.

attribute. Variable data that is logically a part of an object and that represents a property of the object. For example, a serial number is an attribute of an equipment object.

authorized program analysis report (APAR). A report of a problem caused by a suspected defect in a current unaltered release of a program.

automatic network routing (ANR). In High-Performance Routing (HPR), a highly efficient routing protocol that minimizes cycles and storage requirements for routing network layer packets through intermediate nodes on the route.

autotask. (1) An unattended NetView operator station task that does not require a terminal or a logged-on user. Autotasks can run independently of VTAM and are typically used for automated console operations. (2) Contrast with *logged-on operator*.

available. In VTAM, pertaining to a logical unit that is active, connected, enabled, and not at its session limit.

B

Basic Input/Output System (BIOS). Code that controls basic hardware operations, such as interactions with diskette drives, hard disk drives, and the keyboard.

batch. (1) An accumulation of data to be processed. (2) A group of records or data processing jobs brought together for processing or transmission. (3) Pertaining to activity involving little or no user action. Contrast with *interactive*.

begin bracket. In SNA, the value (binary 1) of the begin-bracket indicator in the request header (RH) of the first request in the first chain of a bracket; the value denotes the start of a bracket. Contrast with *end bracket*. See also *bracket*.

binary. Pertaining to the base two system of numbers. The binary digits are 0 and 1. Executable files are generally in binary format rather than the character string format that text files are composed of.

BIND. In SNA, a request to activate a session between two logical units (LUs). See also *session activation request*. Contrast with *UNBIND*.

BIOS. (1) Basic Input/Output System. (2) See also *NetBIOS*.

bis. A suffix used to designate the second version of a standard, as in ITU-T Recommendation V.25 bis.

bit. Either of the digits 0 or 1 when used in the binary numeration system. (T)

bitmap. A representation of an image by an array of bits.

BIU segment. In SNA, the portion of a basic information unit (BIU) that is contained within a path information unit (PIU). It consists of either (a) a request/response header (RH) followed by all or a part of a request/response unit (RU) or (b) a part of an RU. Synonymous with *segment*.

block. A string of data elements recorded or transmitted as a unit. The elements may be characters, words, or physical records. (T)

bps. Bits per second.

bracket. In SNA, one or more chains of request units and their responses that are exchanged between two session partners and that represent a transaction between them. A bracket must be completed before another bracket can be started. Examples of brackets are database inquiries/replies, update transactions, and remote job entry output sequences to workstations.

bracket protocol. In SNA, a data flow control protocol in which exchanges between two session partners are achieved through the use of brackets, with one partner designated at session activation as the first speaker and the other as the bidder. The bracket protocol involves bracket initiation and termination rules.

bridge. (1) A functional unit that interconnects two local area networks that use the same logical link control protocol but may use different medium access control protocols. (T) (2) A functional unit that interconnects multiple LANs (locally or remotely) that use the same logical link control protocol but that can use different medium access control protocols. A bridge forwards a frame to another bridge based on the medium access control (MAC) address. (3) In the connection of local loops, channels, or rings, the equipment and techniques used to match circuits and to facilitate accurate data transmission. (4) Contrast with *gateway* and *router*.

browse. (1) To look at records in a file. (2) In the NetView Graphic Monitor Facility, to open a view that cannot receive status changes from the NetView program. Contrast with *monitor*.

buffer. (1) A routine or storage used to compensate for a difference in rate of flow of data, or time of occurrence of events, when transferring data from one device to another. (A) (2) A portion of storage used to hold input or output data temporarily.

bus. (1) A facility for transferring data between several devices located between two end points, only one device being able to transmit at a given moment. (T) (2) A computer configuration in which processors are interconnected in series.

button. See *mouse button*, *push button*, *radio button*, and *spin button*.

byte. (1) A string that consists of a number of bits, treated as a unit, and representing a character. (T) (2) A binary character operated upon as a unit and usually shorter than a computer word. (A) (3) A group of 8 adjacent binary digits that represent one EBCDIC character.

C

call. (1) The action of bringing a computer program, a routine, or a subroutine into effect, usually by specifying the entry conditions and jumping to an entry point. (I) (A) (2) In data communication, the actions necessary to make

a connection between two stations on a switched line. (3) In communications, a conversation between two users. (4) To transfer control to a procedure, program, routine, or subroutine. (5) To attempt to contact a user, regardless of whether the attempt is successful.

calling. (1) The process of transmitting selection signals in order to establish a connection between data stations. (1) (A) (2) In X.25 communications, pertaining to the location or user that makes a call.

Cancel. A push button that removes a window without applying any changes made in that window.

Caps Lock. The personal computer keyboard mode entered after the Caps Lock key is pressed. This mode is indicated by a capital A in the operator information area (OIA). When the Shift key is pressed while in this mode, Caps Lock is temporarily discontinued and the OIA indicator changes. Pressing the Shift key again returns the Caps Lock mode.

card. (1) An electronic circuit board that is plugged into a slot in a system unit. (2) A plug-in circuit assembly. (3) See also *adapter*. (4) In NetView for AIX, see *event card*.

carrier. (1) An electric or electromagnetic wave or pulse train that may be varied by a signal bearing information to be transmitted over a communication system. (T) (2) In data communication, a continuous frequency that can be modulated or impressed with an information carrying signal.

carrier detect. Synonym for *received line signal detector (RLSD)*.

CD. Compact disc.

CD-ROM. High-capacity read-only memory in the form of an optically read compact disc.

CDS. (1) Control data set. (2) Configuration data set. (3) Central directory server.

central directory server (CDS). A network node that provides a repository for information on network resource locations; it also reduces the number of network searches by providing a focal point for queries and broadcast searches and by caching the results of network searches to avoid later broadcasts for the same information.

chain. (1) A group of logically linked user data records processed by LU 6.2. (2) A group of request units delimited by begin-chain and end-chain. Responses are always single-unit chains. See *RU chain*.

channel. (1) A path along which signals can be sent, for example, data channel, output channel. (A) (2) In data communication, a means of one-way transmission. (3) A functional unit, controlled by the processor, that handles the transfer of data between processor storage and local peripheral equipment.

channel-attached. (1) Pertaining to the attachment of devices directly by input/output channels to a host processor. (2) Pertaining to devices attached to a controlling unit by cables, rather than by telecommunication lines. (3) Contrast with *link-attached*. (4) Synonymous with *local*.

character cell. The maximum physical boundary of a character on a display screen.

character set. A finite group of characters defined for a keyboard or output device.

check box. A square box with associated text that represents a choice. When a user selects the choice, the check box is filled to indicate that the choice is selected. The user can clear the check box by selecting the choice again, thereby deselecting the choice.

CICS. Customer Information Control System.

CICS/VS. Customer Information Control System for Virtual Storage.

circuit. (1) One or more conductors through which an electric current can flow. See *physical circuit* and *virtual circuit*. (2) A logic device.

class. (1) In object-oriented design or programming, a group of objects that share a common definition and that therefore share common properties, operations, and behavior. Members of the group are called instances of the class. (2) In the AIX operating system, pertaining to the I/O characteristics of a device. System devices are classified as block or character devices.

class of service (COS). A set of characteristics (such as route security, transmission priority, and bandwidth) used to construct a route between session partners. The class of service is derived from a mode name specified by the initiator of a session.

CLI. Command line interface.

click. To press and release a button on a pointing device without moving the pointer off of the object or choice.

client. (1) A functional unit that receives shared services from a server. (T) (2) A user. (3) In an AIX distributed file system environment, a system that is dependent on a server to provide it with programs or access to programs. (4) Synonymous with *requester*.

client/server. In communications, the model of interaction in distributed data processing in which a program at one site sends a request to a program at another site and awaits a response. The requesting program is called a client; the answering program is called a server.

clipboard. An area of storage provided by the system to hold data temporarily.

Close. A choice that removes a window and all of the windows associated with it from the workplace. For example, if a user is performing a task in a window and a message appears, or the user asks for help, both the message and the help windows disappear when the user closes the original window.

cluster. A station that consists of a control unit (a cluster controller) and the terminals attached to it.

CMS. Conversational monitor system.

CNOS. Change number of sessions.

coaxial cable. A cable consisting of one conductor, usually a small copper tube or wire, within and insulated from another conductor of larger diameter, usually copper tubing or copper braid.

code page. (1) A table that defines a coded character set by assignment of a character meaning to each code point in the table for a language or a country. (2) A mapping between characters and their internal binary representation. (3) An assignment of graphic characters and control function meanings to all code points; for example, assignment of characters and meanings to 256 code points for an 8-bit code, assignment of characters and meanings to 128 code points for a 7-bit code. (4) In the Print Management Facility, a font library member that associates code points and character identifiers. A code page also identifies invalid code points. (5) A particular assignment of hexadecimal identifiers to graphic characters. (6) In AFP support, a font file that associates code points and graphic character identifiers.

COM. See *ACDI port*.

command. (1) A request from a terminal for the performance of an operation or the execution of a particular program. (2) In SNA, any field set in the transmission header (TH), request header (RH), and sometimes portions of a request unit (RU), that initiates an action or that begins a protocol; for example: (a) Bind Session (session-control request unit), a command that activates an LU-LU session, (b) the change-direction indicator in the RH of the last RU of a chain, (c) the virtual route reset window indicator in an FID4 transmission header.

command area. In Basic CUA architecture, the area on a panel that contains the command entry field.

command line. (1) On a display screen, a display line usually at the bottom of the screen, in which only commands can be entered. (2) In CUA architecture, deprecated term for *command area*.

command line interface (CLI). A type of computer interface in which the input command is a string of text. Contrast with *graphical user interface (GUI)*.

command name. The first term in a command, usually followed by operands.

command prompt. A displayed character or string of characters that indicates that a user may enter a command to be processed.

common operations services (COS). The portion of SNA management services that pertains to the major vectors for limited remote operations control.

Common Programming Interface for Communications (CPI-C). An evolving application programming interface (API), embracing functions to meet the growing demands from different application environments and to achieve openness as an industry standard for communications programming. CPI-C provides access to interprogram services such as (a) sending and receiving data, (b) synchronizing processing between programs, and (c) notifying a partner of errors in the communication.

communication adapter. (1) A circuit card with associated software that enables a processor, controller, or other device to be connected to a network. (2) A mechanism that enables communication facilities to be attached to host processors..

compact disc (CD). (1) A disc, usually 4.75 inches in diameter, from which data is read optically by means of a laser. (2) A disc with information stored in the form of pits along a spiral track. The information is decoded by a compact-disc player and interpreted as digital audio data, which most computers can process.

compile. (1) 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. (T) (2) 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. (A) (3) To translate a source program into an executable program (an object program). (4) To translate a program written in a high-level programming language into a machine language program.

compiler. (1) A program that translates a source program into an executable program (an object program). (2) A program that decodes instructions written as pseudo codes and produces a machine language program to be executed at a later time.

component. Hardware or software that is part of a functional unit.

computer. A functional unit that can perform substantial computations, including numerous arithmetic operations and logic operations without human intervention during a run. In information processing, the term computer usually describes a digital computer. A computer may consist of a stand-alone unit or may consist of several interconnected units. (T)

configuration. (1) The manner in which the hardware and software of an information processing system are organized and interconnected. (T) (2) The devices and programs that make up a system, subsystem, or network. (3) In Personal Communications, the arrangement of personal computers connected to one or more host systems by one or more attachment types. Examples are: SDLC, LAN, ASYNCH, X.25, or DFT.

configuration file. A file that specifies the characteristics of a system device or network.

configuration services. One of the types of network services in a control point (SSCP, NNCP, or ENCP). Configuration services activates, deactivates, and records the status of physical units, links, and link stations.

configure. To describe to a system the devices, optional features, and programs installed on the system.

congestion. See *network congestion*.

conjunction. The Boolean operation whose result has the Boolean value 1 if and only if each operand has the Boolean value 1. (I) (A) Synonymous with *AND operation*.

connected. In VTAM, the state of a physical unit (PU) or a logical unit (LU) that has an active physical path to the host processor containing the system services control point (SSCP) that controls the respective PU or LU.

connection. (1) In data communication, an association established between functional units for conveying information. (I) (A) (2) In SNA, the network path that links together two logical units (LUs) in different nodes to enable them to establish communications. (3) In TCP/IP, the path between two protocol applications that provides reliable data stream delivery service. In the Internet, a connection extends from a TCP application on one system to a TCP application on another system.

connectivity. (1) The capability of a system or device to be attached to other systems or devices without modification. (T) (2) The capability to attach a variety of functional units without modifying them.

control character. A character whose occurrence in a particular context specifies a control function. (T)

control data set (CDS). In NPM, an SMP data set used in the NPM installation process.

controller. A device that coordinates and controls the operation of one or more input/output devices, such as workstations, and synchronizes the operation of such devices with the operation of the system as a whole.

control point (CP). (1) A component of an APPN or LEN node that manages the resources of that node. In an APPN node, the CP is capable of engaging in CP-CP sessions with other APPN nodes. In an APPN network node, the CP also provides services to adjacent end nodes in the APPN network. (2) A component of a node that manages resources of that node and optionally provides services to other nodes in the network. Examples are a system services control point (SSCP) in a type 5 subarea node, a network node control point (NNCP) in an APPN network node, and an end node control point (ENCP) in an APPN or LEN end node. An SSCP and an NNCP can provide services to other nodes.

Control Program (CP). In VM/ESA, a component that manages the resources of a single computer so multiple computing systems appear to exist. Each of these apparent systems, or virtual machines, is the functional equivalent of an IBM System/370, 370-XA, or ESA computer.

control unit terminal (CUT) mode. (1) An IBM protocol used for communications with an IBM 3174 or 3274 Control Unit or other appropriate interface unit. In this protocol, a program in the workstation emulates a 3278 or 3879 terminal for a user at a virtual terminal, and the interface unit is responsible for enforcing the protocol. (2) Contrast with *distributed function terminal (DFT)*.

conversation. A logical connection between two transaction programs using an LU 6.2 session. Conversations are delimited by brackets to gain exclusive use of a session.

conversational monitor system (CMS). A virtual machine operating system that provides general interactive time sharing, problem solving, and program development capabilities, and operates only under control of the VM control program.

coordinated universal time (UTC). The time scale, based on the *Système International (SI)* second, as defined and recommended by the *Comité Consultatif International de la Radio (CCIR)* and maintained (using an atomic clock) by the *Bureau International des Poids et Mesures (BIPM)*.

Note: The *Système International* is based on three fundamental units of measure—the meter, the kilogram, and the second—and is sometimes called the “MKS system” because of these units.

For most practical purposes, coordinated universal time (UTC) is equivalent to the mean solar time at the prime meridian (0 degrees longitude) of Greenwich, England, known as *Greenwich mean time (GMT)*. Synonymous with *Z time* and *Zulu time*.

Copy. A choice that places a copy of a selected object onto the clipboard.

COS. Class of service.

country code. In X.25 communications, the 3-digit number that precedes the national terminal number in the network user address for public networks.

CP. (1) Control point. (2) In VM, Control Program.

CPI-C. Common Programming Interface for Communications.

CP name. A network-qualified name of a control point (CP), consisting of a network ID qualifier identifying the network (or name space) to which the CP’s node belongs, and a unique name within the scope of that network ID identifying the CP. Each APPN or LEN node has one CP name, assigned to it at system-definition time.

CSD. Corrective service diskette.

cursor. (1) A movable, visible mark used to indicate a position of interest on a display surface. (A) (2) A visible indication of the position where user interaction with the keyboard will appear. The keyboard cursors are the selection cursor and the text cursor.

Customer Information Control System (CICS). An IBM licensed program that enables transactions entered at remote terminals to be processed concurrently by user-written application programs. It includes facilities for building, using, and maintaining databases.

Customer Information Control System for Virtual Storage (CICS/VS). (1) An IBM licensed program that can be used in a communications network. (2) A general-purpose licensed program that controls online communication between terminal users and a database.

customization. The process of configuring one or more personal computers connected to a host system by the SDLC, LAN, ASYNCH, X.25, DFT, or other attachment. Customization precedes Personal Communications installation and includes the definition of the sessions to be carried out by Personal Communications.

Cut. A choice that moves a selected object and places it onto the clipboard. The space it occupied is usually filled by the remaining object or objects in the window.

D

data. (1) A re-interpretable representation of information in a formalized manner suitable for communication, interpretation, or processing. Operations can be performed upon data by humans or by automatic means. (T) (2) Any representations such as characters or analog quantities to which meaning is or might be assigned. (A) (3) A representation of facts or instructions in a form suitable for communication, interpretation, or processing by human or automatic means. Data include constants, variables, arrays, and character strings.

Note: Programmers make a distinction between instructions and the data they operate on; however, in the usual sense of the word, data includes programs and program instructions.

database. (1) A collection of data with a given structure for accepting, storing, and providing, on demand, data for multiple users. (T) (2) A collection of interrelated data organized according to a database schema to serve one or more applications. (T) (3) A collection of data fundamental to a system. (A) (4) A collection of data fundamental to an enterprise. (A)

data carrier detect (DCD). Synonym for *received line signal detector (RLSD)*.

data circuit. (1) A pair of associated transmit and receive channels that provide a means of two-way data communication. (I) (2) In SNA, synonym for *link connection*. (3) See also *physical circuit* and *virtual circuit*.

Notes:

1. Between data switching exchanges, the data circuit may include data circuit-terminating equipment (DCE), depending on the type of interface used at the data switching exchange.
2. Between a data station and a data switching exchange or data concentrator, the data circuit includes the data circuit-terminating equipment at the data station end, and may include equipment similar to a DCE at the data switching exchange or data concentrator location.

data circuit-terminating equipment (DCE). In a data station, the equipment that provides the signal conversion and coding between the data terminal equipment (DTE) and the line. (I)

Notes:

1. The DCE may be separate equipment or an integral part of the DTE or of the intermediate equipment.
2. A DCE may perform other functions that are usually performed at the network end of the line.

data flow control (DFC). In SNA, a request/response unit (RU) category used for requests and responses exchanged between the data flow control layer in one half-session and the data flow control layer in the session partner.

data link. In SNA, synonym for *link*.

data link control (DLC). A set of rules used by nodes on a data link (such as an SDLC link or a token ring) to accomplish an orderly exchange of information.

data link control (DLC) layer. In SNA, the layer that consists of the link stations that schedule data transfer over a link between two nodes and perform error control for the link. Examples of data link control are SDLC for serial-by-bit link connection and data link control for the System/370 channel.

Note: The DLC layer is usually independent of the physical transport mechanism and ensures the integrity of data that reaches the higher layers.

data packet. In X.25 communications, a packet used for the transmission of user data on a virtual circuit at the DTE/DCE interface.

data set. (1) Synonym for *file*. (2) Deprecated term for *modem*.

data stream. (1) All information (data and control commands) sent over a data link usually in a single read or write operation. (2) A continuous stream of data elements being transmitted, or intended for transmission, in character or binary-digit form, using a defined format.

data terminal equipment (DTE). That part of a data station that serves as a data source, data sink, or both. (I) (A)

data terminal ready (DTR). A signal to the modem used with the EIA 232 protocol.

data types. In the NetView program, a description of the organization of panels. Data types are alerts, events, and statistics. Data types are combined with resource types and display types to describe the NetView program's display organization. See also *display types* and *resource types*.

DBCS. Double-byte character set.

DCD. Data carrier detect.

DCE. (1) Data circuit-terminating equipment. (2) Distributed Computing Environment.

deactivate. To take a resource of a node out of service, rendering it inoperable, or to place it in a state in which it cannot perform the functions for which it was designed. Contrast with *activate*.

deallocate. An LU 6.2 application programming interface (API) verb that terminates a conversation, thereby freeing the session for a future conversation. Contrast with *allocate*.

default. Pertaining to an attribute, condition, value, or option that is assumed when none is explicitly specified. (I)

definite response (DR). In SNA, a protocol requested in the form-of-response-requested field of the request header that directs the receiver of the request to return a response unconditionally, whether positive or negative, to that request chain. Contrast with *exception response* and *no response*.

definition file. A file loaded by default that contains keyboard and screen color characteristics that can be adapted for a particular session. The lines of a definition file must be coded according to a strict layout.

definition statement. (1) In VTAM, the statement that describes an element of the network. (2) In NCP, a type of instruction that defines a resource to the NCP. (3) See also *macroinstruction*. (4) See Figure 30, Figure 31 on page 268, and Figure 32 on page 268.

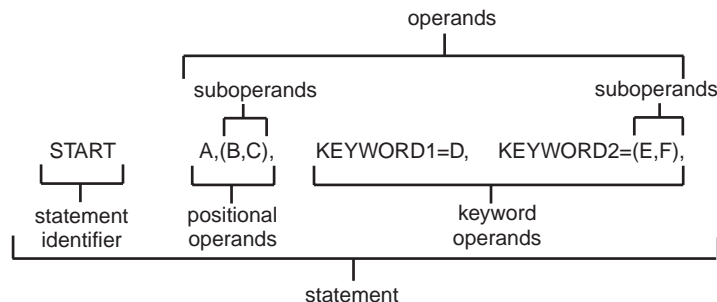


Figure 30. Example of a Language Statement

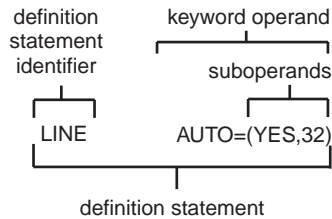


Figure 31. Example of an NCP Definition Statement

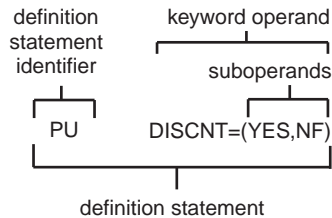


Figure 32. Example of a VTAM Definition Statement

Delete. A choice that removes a selected object. The space it occupied is usually filled by the remaining object or objects in the window.

delimiter. (1) A character used to indicate the beginning and end of a character string. (T) (2) A flag that separates and organizes items of data. (A) (3) A character that groups or separates words or values in a line of input. (4) In the IBM Token-Ring Network, a bit pattern that defines the limits of a frame or token.

dependent LU. See *SSCP-dependent LU*.

dependent LU requester (DLUR). An APPN end node or an APPN network node that owns dependent LUs, but requests that a dependent LU server provide the SSCP services for those dependent LUs..

dependent LU server (DLUS). An APPN network node that provides SSCP services for a dependent LU in its own or another APPN network. Contrast with *dependent LU requester*..

destination. (1) Any point or location, such as a node, station, or a particular terminal, to which information is to be sent. (2) An external logical unit (LU) or application program to which messages or other data are directed.

destination address. A code that identifies the location to which information is to be sent.

device. A mechanical, electrical, or electronic contrivance with a specific purpose.

device driver. (1) A file that contains the code needed to use an attached device. (2) A program that enables a computer to communicate with a specific peripheral device; for example, a printer, a videodisc player, or a CD drive. (3) A collection of subroutines that control the interface between I/O device adapters and the processor.

DFT. Distributed function terminal.

dialog. (1) The interaction between a user and a computer. (2) In an interactive system, a series of related inquiries and responses similar to a conversation between two people. (3) In the AIXwindows Toolkit, a two-way text interface between an application and its user. The interface takes the form of a collection of widgets and gadgets, including a DialogShell widget, a BulletinBoard widget (or a subclass of a BulletinBoard widget or some other container widget), plus various children, including Label, PushButton, and Text widgets.

directory. (1) A table of identifiers and references to the corresponding items of data. (I) (A) (2) A named hierarchical grouping of files in a file system. (3) A database in an APPN node that lists names of resources (in particular, logical units) and records the CP name of the node where each resource is located. See *distributed directory database* and *local directory database*.

directory services (DS). A control point component of an APPN node that maintains knowledge of the location of network resources.

diskette. (1) A small magnetic disk enclosed in a jacket. (T) (2) A thin, flexible magnetic disk and a semi-rigid protective jacket, in which the disk is permanently enclosed.

display. A visual presentation of data. (I) (A)

display levels. Synonym for *display types*.

display types. In the NetView program, a concept to describe the organization of panels. Display types are defined as total, most recent, user action, and detail. Display types are combined with resource types and data types to describe NetView's panel organization. See also *data types* and *resource types*. Synonymous with *display levels*.

Distributed Computing Environment (DCE). The Open Software Foundation (OSF) specification (or a product derived from this specification) that assists in networking. DCE provides such functions as authentication, directory service (DS), and remote procedure call (RPC).

distributed directory database. The complete listing of all the resources in the network as maintained in the individual directories scattered throughout an APPN network. Each node has a piece of the complete directory, but it is not necessary for any one node to have the entire list. Entries are created, modified, and deleted through system definition, operator action, automatic registration, and ongoing network search procedures. Synonymous with *distributed network directory* and *network directory database*.

distributed function terminal (DFT). (1) A protocol used for communication between a terminal and an IBM 3274 or IBM 3174 control unit that allows multiple concurrent logical terminal sessions. (2) A mode of operation that uses this protocol. (3) A terminal that supports multiple concurrent logical terminal sessions. (4) Contrast with *control unit terminal (CUT) mode*.

distributed network directory. Synonym for *distributed directory database*.

distributed processing. Processing that takes place across two or more linked systems.

DLC. Data link control.

DLL. Dynamic link library.

DLUR. Dependent LU requester.

domain operator. In a multiple-domain network, the person or program that controls operation of resources controlled by one system services control point (SSCP). See also *network operator*.

DOS. Disk Operating System. See *IBM Disk Operating System*.

DOS session. A session in which a personal computer operates as a stand-alone computer, running under Disk Operating System (DOS). See *host session*.

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 (SBCS)*.

double-click. To press and release a button on a pointing device twice while a pointer is within the limits that the user has specified for the operating environment.

download. (1) To transfer programs or data from a computer to a connected device, typically a personal computer. (T) (2) To transfer data from a computer to a connected device, such as a workstation or microcomputer. Contrast with *upload*.

downstream. In the direction of data flow from the host to the user. Contrast with *upstream*.

drive. A peripheral device, especially one that has addressed storage media.

DS. Directory services.

DTE. Data terminal equipment. (A)

DTR. Data terminal ready.

duplex. Pertaining to communication in which data can be sent and received at the same time. Synonymous with *full-duplex*. Contrast with *half-duplex*.

dynamic. (1) In programming languages, pertaining to properties that can only be established during the execution of a program; for example, the length of a variable-length data object is dynamic. (I) (2) Pertaining to an operation that occurs at the time it is needed rather than at a predetermined or fixed time. (3) Contrast with *static*.

dynamic data exchange (DDE). A protocol that allows applications to exchange data.

dynamic link library (DLL). A file containing executable code and data bound to a program at load time or run time, rather than during linking. The code and data in a dynamic link library can be shared by several applications simultaneously.

E

EBCDIC. Extended binary-coded decimal interchange code. A coded character set of 256 8-bit characters.

EC. Engineering change.

Edit. A choice on a menu bar that provides access to other choices that enable a user to modify data.

EGA. Enhanced graphics adapter.

EHLAPI. Emulator High-Level Language Application Programming Interface.

element. (1) A field in the network address. (2) In SNA, the particular resource within a subarea that is identified by an element address. See also *subarea*.

emulator. A program that allows a device to operate as if it were a different type of device. Personal Communications, for example, allows supported personal computers and printers to operate as if they were 3270-series workstations.

Emulator High-Level Language Application Programming Interface (EHLAPI). In Communications Manager/2, an application programming interface that provides programming access to the area in computer memory that corresponds to the user's screen image (this area in memory is known as the "presentation space").

enabled. (1) Pertaining to a state of the processing unit that allows the occurrence of certain types of interruptions. (2) Pertaining to the state in which a transmission control unit or an audio response unit can accept incoming calls on a line.

end bracket. In SNA, the value (binary 1) of the end bracket indicator in the request header (RH) of the first request of the last chain of a bracket; the value denotes the end of the bracket. Contrast with *begin bracket*. See also *bracket*.

end node (EN). (1) See *Advanced Peer-to-Peer Networking (APPN) end node* and *low-entry networking (LEN) end node*. (2) In communications, a node that is frequently attached to a single data link and cannot perform intermediate routing functions.

enhanced graphics adapter (EGA). An adapter, such as the IBM Enhanced Graphics Adapter, that provides high-resolution graphics, allowing the use of a color display for text processing as well as graphics applications.

entry field. An area into which a user types or places text. Its boundaries are usually indicated.

environment variable. A variable that specifies (a) how an operating system or another program will run or (b) the devices that the operating system will recognize.

EOF. End of Field

EOT. End of Text

ER. Explicit route.

error. A discrepancy between a computed, observed, or measured value or condition and the true, specified, or theoretically correct value or condition. (I) (A)

Ethernet. A 10-Mbps baseband local area network that allows multiple stations to access the transmission medium at will without prior coordination, avoids contention by using carrier sense and deference, and resolves contention by using collision detection and delayed retransmission. Ethernet uses carrier sense multiple access with collision detection (CSMA/CD).

event. An occurrence of significance to a task; for example, an SNMP trap, the opening of a window or a submap, or the completion of an asynchronous operation.

event card. In NetView for AIX, a graphical representation, resembling a card, of the information contained in an event sent by an agent to a manager reflecting a change in the status of one of the agent's managed nodes.

exception. An abnormal condition such as an I/O error encountered in processing a data set or a file.

exception response (ER). In SNA, a protocol requested in the form-of-response-requested field of a request header that directs the receiver to return a response only if the request is unacceptable as received or cannot be processed; that is, a negative response, but not a positive response, can be returned. Contrast with *definite response* and *no response*.

execute. To perform the actions specified by a program or a portion of a program. (T)

exit. To execute an instruction within a portion of a computer program in order to terminate the execution of that portion. Such portions of computer programs include loops, subroutines, modules, and so on. (T)

explicit route (ER). In SNA, a series of one or more transmission groups that connect two subarea nodes. An explicit route is identified by an origin subarea address, a destination subarea address, an explicit route number, and a reverse explicit route number. Contrast with *virtual route (VR)*.

EXT. External trace file.

extended binary-coded decimal interchange code (EBCDIC). The standard code, using a character set consisting of 8-bit coded characters, used by Personal Communications for information interchange between personal computers and a host system. See also *American National Standard Code for Information Interchange*.

E1. See *T1*.

F

fault. An accidental condition that causes a functional unit to fail to perform its required function. (I) (A)

feature. A part of an IBM product that may be ordered separately by the customer.

FID. Format identification.

field. (1) An area in a record or panel used to contain data. (2) In the IBM 3270 data stream, a group of consecutive positions on a presentation space having similar characteristics that are defined by a field attribute byte at the beginning of the field. (3) An identifiable area in a window. Examples of fields are: an entry field, into which a user can type or place text, and a field of radio button choices, from which a user can select one choice.

file. A named set of records stored or processed as a unit. (T) Synonymous with *data set*.

file mode. In VM/CMS, the third field of the file identifier, which indicates the assigned virtual disk wherein the file resides.

file specification. In Communications Manager/2, the full identifier for a file, which includes its drive, path, file name, and file extension. The format is dependent on the storage medium of a file; for example, C:\PATH\FILENAME.EXT.

file transfer. The transfer of one or more files from one system to another over a data link.

File Transfer Protocol (FTP). In the Internet suite of protocols, an application layer protocol that uses TCP and Telnet services to transfer bulk-data files between machines or hosts.

file type. In VM/CMS, the second field of the file identifier. The file type can be arbitrary, or of significance to the system (for example, SCRIPT, LIST3270, and NOTEBOOK file types).

fixed pacing. Synonym for *fixed session-level pacing*.

fixed session-level pacing. A form of session-level pacing in which the data transfer rate is controlled using fixed pacing-window sizes, which are initialized at session-activation time. Synonymous with *fixed pacing*. Contrast with *adaptive session-level pacing*.

flow. In NetDA/2, the amount of traffic that can pass through a node, connection, or route in both directions during a given period of time.

flow control. (1) In SNA, the process of managing the rate at which data traffic passes between components of the network. The purpose of flow control is to optimize the rate of flow of message units with minimum congestion in the network; that is, to neither overflow the buffers at the receiver or at intermediate routing nodes, nor leave the receiver waiting for more message units. (2) See also *pacing*.

focal point (FP). See *management services focal point (MSFP)*.

folder. A container used to organize objects.

format identification (FID) field. In SNA, a field in each transmission header (TH) that indicates the format of the TH; that is, the presence or absence of certain fields. TH formats differ in accordance with the types of nodes between which they pass. Following are the six FID types:

- FID0, used for traffic involving non-SNA devices between adjacent subarea nodes when either or both nodes do not support explicit route and virtual route protocols
- FID1, used for traffic involving SNA devices between adjacent subarea nodes when either or both nodes do not support explicit route and virtual route protocols
- FID2, used for traffic between a subarea node and an adjacent type 2 peripheral node
- FID3, used for traffic between a subarea node and an adjacent type 1 peripheral node
- FID4, used for traffic between adjacent subarea nodes when both nodes support explicit route and virtual route protocols
- FIDE, used for certain commands (for example, for transmission group control) sent between adjacent subarea nodes when both nodes support explicit route and virtual route protocols.

FP. Focal point.

frame. (1) In Open Systems Interconnection architecture, a data structure pertaining to a particular area of knowledge and consisting of slots that can accept the values of specific attributes and from which inferences can be drawn by appropriate procedural attachments. (T) (2) The unit of transmission in some local area networks, including the IBM Token-Ring Network. It includes delimiters, control characters, information, and checking characters. (3) In SDLC, the vehicle for every command, every response, and all information that is transmitted using SDLC procedures. (4) A data structure (data frame) composed of fields meeting the field specifications of a type of communication protocol. Frames are used to control data transfer across a data link. (5) In SDLC, a sequence of bits delimited by an opening and closing flag. In X.25 packet switching data networks, frames are composed of 8-bit byte sequences delimited by beginning and ending flags; the frames in X.25 control various functions, data transfer, and transmission checking.

FTP. File Transfer Protocol.

full-duplex (FDX). Synonym for *duplex*.

function management data (FMD). An RU category used for end-user data exchanged between logical units (LUs) and for requests and responses exchanged between network services components of LUs, PUs, and control points.

function management header (FMH). One or more headers, optionally present in the leading request units (RUs) of an RU chain, that allow one LU to (a) select a transaction program or device at the session partner and control the

way in which the end-user data it sends is handled at the destination, (b) change the destination or the characteristics of the data during the session, and (c) transmit between session partners status or user information about the destination (for example, a program or device). Function management headers can be used with LU type 1, 4, and 6.2 protocols.

G

gateway. (1) A functional unit that interconnects two computer networks with different network architectures. A gateway connects networks or systems of different architectures. A bridge interconnects networks or systems with the same or similar architectures. (T) (2) The combination of machines and programs that provide address translation, name translation, and system services control point (SSCP) rerouting between independent SNA networks to allow those networks to communicate. A gateway consists of one gateway NCP and at least one gateway VTAM. (3) In the IBM Token-Ring Network, a device and its associated software that connect a local area network to another local area network or a host that uses different logical link protocols. (4) In the AIX operating system, an entity that operates above the link layer and translates, when required, the interface and protocol used by one network into those used by another distinct network. (5) In TCP/IP, synonym for *router*. (6) A station in a local area network through which a connection to a host system or a separate network is established.

GDDM. Graphical Data Display Manager.

generation. The process of assembling and link editing definition statements so that resources can be identified to all the necessary programs in a network.

generic unbind. Synonym for *session deactivation request*.

GMT. Greenwich mean time.

Graphical Data Display Manager (GDDM). (1) An IBM host function that processes text and graphics for output to a display, printer, or graphic output device. (2) In the NetView Performance Monitor (NPM), an IBM licensed program used in conjunction with the Presentation Graphics Feature (PGF) to generate online graphs in the NPM Graphic Subsystem.

graphical user interface (GUI). (1) A type of computer interface consisting of a visual metaphor of a real-world scene, often of a desktop. Within that scene are icons, representing actual objects, that the user can access and manipulate with a pointing device. (2) Contrast with *command line interface (CLI)*.

Greenwich mean time (GMT). The mean solar time at the prime meridian (0 degrees longitude) of Greenwich, England. Greenwich mean time is sometimes called *Z time* or *Zulu time*.

Note: Although *Greenwich mean time (GMT)* and *coordinated universal time (UTC)* are sometimes used interchangeably, they are not synonyms. Greenwich mean time is an approximate time. Because the second is no longer defined in terms of astronomical phenomena, the preferred name for this time scale is *coordinated universal time (UTC)*.

H

half-duplex (HD, HDX). In data communication, pertaining to transmission in only one direction at a time. Contrast with *duplex*.

handle. In the Advanced DOS and OS/2 operating systems, a binary value created by the system that identifies a drive, directory, and file so that the file can be found and opened.

hard disk. A rigid-magnetic disk such as the internal disks used in the system units of personal computers and in external hard disk drives (also known as fixed disks).

HD. Half-duplex.

HDLC. High-level data link control.

header. (1) System-defined control information that precedes user data. (2) The portion of a message that contains control information for the message such as one or more destination fields, name of the originating station, input sequence number, character string indicating the type of message, and priority level for the message.

Help. A choice that gives a user access to helpful information about objects, choices, tasks, and products. A Help choice can appear on a menu bar or as a push button.

hexadecimal. (1) Pertaining to a selection, choice, or condition that has 16 possible different values or states. (I) (2) Pertaining to a fixed-radix numeration system, with radix of 16. (I) (3) Pertaining to a system of numbers to the base 16; hexadecimal digits range from 0 through 9 and A through F, where A represents 10 and F represents 15.

high-level data link control (HDLC). In data communication, the use of a specified series of bits to control data links in accordance with the International Standards for HDLC: ISO 3309 Frame Structure and ISO 4335 Elements of Procedures.

high-level language (HLL). A programming language that does not reflect the structure of any particular computer or operating system.

high-level language application programming interface (HLLAPI). (1) A software product that supports interaction between a host program and an application program running on a personal computer in terminal emulation (usually 3270 terminal emulation). (2) A programming interface that usually operates in conjunction with an emulator, such as 3270 emulation, and allows interaction using 3270 data stream between a host and a remote application program.

highlighting. Emphasizing a display element or segment by modifying its visual attributes. (I) (A)

High-Performance Routing (HPR). An addition to APPN that enhances data-routing performance and session reliability..

High-Performance Routing (HPR) node. An APPN end node or network node that includes High-Performance Routing support.

hiragana. One of the two common Japanese phonetic alphabets (the other is katakana). In hiragana, each character is represented by 1 byte. See also *kanji*..

host. (1) In the Internet suite of protocols, an end system. The end system can be any workstation; it does not have to be a mainframe. (2) See *host processor*.

host code page. The character code page used by the host system to which a gateway connects.

host ID. In the Internet suite of protocols, that part of the IP address that defines the host system on the network. The length of the host ID depends on the type of network or network class (A, B, or C).

host print. A printer session on a local personal computer directed by the host system.

host processor. (1) A processor that controls all or part of a user application network. (T) (2) In a network, the processing unit in which the data communication access method resides.

host session. A logical connection that enables a personal computer to communicate with a host system. A session can be identified by LU address, LT number, or session ID. See *DOS session*. See also *logical terminal*.

host system. In Personal Communications, the computer linked to one or more personal computers by the SDLC, LAN, ASYNCH, X.25, or DFT attachment.

HPR. High-Performance Routing..

I

IBM Disk Operating System (DOS). A disk operating system based on MS-DOS that operates with all IBM personal computers.

IBM OS/2 Presentation Manager. The front-end data manager and user interface for the IBM OS/2 operating system; an example of a graphical user interface.

icon. A graphical representation of an object, consisting of an image, image background, and a label.

ICP. Internet Control Protocol.

ID. (1) Identifier. (2) Identification.

IEEE. Institute of Electrical and Electronics Engineers.

IEEE 802.2. An IEEE standard describing how data is formatted into frames for LAN transmission. See also *Type 1 frame* and *Type 2 frame*.

inactive. (1) Not operational. (2) Pertaining to a node or device not connected or not available for connection to another node or device. (3) Contrast with *active*.

inbound. In communications, data that is received from the network.

information (I) format. A format used for information transfer.

information (I) frame. A frame in I format used for numbered information transfer.

input field. (1) In computer graphics, an unprotected field on a display surface in which data can be entered, modified, or erased. (2) A field in a display file into which a user can key in data. An input field is passed from the device to the program when the program reads the record containing that field.

input/output (I/O). (1) Pertaining to input, output, or both. (A) (2) Pertaining to a device, process, or channel involved in data input, data output, or both.

installation. (1) In Personal Communications, the process of loading microcode from the Personal Communications diskettes. (2) In system development, preparing and placing a functional unit in position for use. (T) (3) A particular computing system, including the work it does and the people who manage it, operate it, apply it to problems, service it, and use the results it produces.

instance. In the AIX operating system, a concrete realization of an abstract object class. An instance of a widget or a gadget is a specific data structure that contains detailed appearance and behavioral information that is used to generate a specific graphical object on-screen at run time.

Institute of Electrical and Electronics Engineers (IEEE). An organization that establishes and promotes standards in related industries.

interactive. Pertaining to the exchange of information between a user and a computer.

interface. (1) A shared boundary between two functional units, defined by functional characteristics, signal characteristics, or other characteristics, as appropriate. The concept includes the specification of the connection of two devices having different functions. (T) (2) Hardware, software, or both, that links systems, programs, or devices.

intermediate node. A node that is at the end of more than one branch. (T)

International Organization for Standardization (ISO). An organization of national standards bodies from various countries established to promote development of standards to facilitate international exchange of goods and services, and develop cooperation in intellectual, scientific, technological, and economic activity.

International Telecommunication Union (ITU). The specialized telecommunication agency of the United Nations, established to provide standardized communication procedures and practices, including frequency allocation and radio regulations worldwide.

International Telecommunication Union - Telecommunication Standardization Sector (ITU-TS). The part of the International Telecommunication Union (ITU) that is responsible for developing recommendations for telecommunications.

internet. A collection of networks interconnected by a set of routers that allow them to function as a single, large network. See also *Internet*.

Internet. The internet administered by the Internet Architecture Board (IAB), consisting of large national backbone networks and many regional and campus networks all over the world. The Internet uses the Internet suite of protocols.

Internet Control Protocol (ICP). The Virtual Networking System (VINES) protocol that provides exception notifications, metric notifications, and PING support. See also *RouTing update Protocol (RTP)*.

Internet Protocol (IP). A connectionless protocol that routes data through a network or interconnected networks. IP acts as an intermediary between the higher protocol layers and the physical network. However, this protocol does not provide error recovery and flow control and does not guarantee the reliability of the physical network.

Internetwork Packet Exchange (IPX). The network protocol used to connect Novell's servers, or any workstation or router that implements IPX, with other workstations. Although similar to the Internet Protocol (IP), IPX uses different packet formats and terminology.

I/O. Input/output.

IP. Internet Protocol..

IPX. Internetwork Packet Exchange.

ISO. International Organization for Standardization.

ITU. International Telecommunication Union.

ITU-T. See *ITU-TS*.

ITU-TS. International Telecommunication Union - Telecommunication Standardization Sector.

J

JISCII. Japanese Industry Standard Code for Information Interchange. A code used by IBM Personal Computers in Japan. It contains Japanese Industry Standard (JIS) C 6226 "Kanji code for exchanging information" (JIS Kanji set) and user unique characters.

jump. To switch to the logical terminal session specified.

K

kanji. A Japanese ideographic alphabet. In kanji, each character is represented by 2 bytes. See also *hiragana* and *katakana*..

katakana. One of the two common Japanese phonetic alphabets (the other is hiragana). In katakana, each character is represented by 1 byte. Katakana is primarily used to write foreign words phonetically. See also *kanji*..

kbps. Kilobits per second.

kernel. The part of an operating system that performs basic functions such as allocating hardware resources.

keyboard template. An overlay placed on a keyboard to explain the function of each key.

keylock. In Communications Manager/2, a function that controls access to configuration data and some advanced functions. See also *lock*, *master key*, and *service key*.

keyword. (1) In programming languages, a lexical unit that, in certain contexts, characterizes some language construct; for example, in some contexts, IF characterizes an if-statement. A keyword normally has the form of an identifier. (I) (2) One of the predefined words of an artificial language. (A) (3) A significant and informative word in a title or document that describes the content of that document.

L

LAN. Local area network.

line. (1) The portion of a data circuit external to data circuit-terminating equipment (DCE), that connects the DCE to a data switching exchange (DSE), that connects a DCE to one or more other DCEs, or that connects a DSE to another DSE. (I) (2) Synonymous with *channel* and *circuit*.

line control discipline. Synonym for *link protocol* and *protocol*.

line discipline. Synonym for *link protocol* and *protocol*.

line speed. The number of binary digits that can be sent over a telecommunication line in one second, expressed in bits per second (bps).

link. (1) The combination of the link connection (the transmission medium) and two link stations, one at each end of the link connection. A link connection can be shared among multiple links in a multipoint or token-ring configuration. (2) To interconnect items of data or portions of one or more computer programs: for example, the linking of object programs by a linkage editor, linking of data items by pointers. (T) (3) In SNA, synonymous with *data link*.

link-attached. (1) Pertaining to devices that are connected to a controlling unit by a data link. (2) Contrast with *channel-attached*. (3) Synonymous with *remote*.

link connection. (1) The physical equipment providing two-way communication between one link station and one or more other link stations; for example, a telecommunication line and data circuit-terminating equipment (DCE). (2) In SNA, synonymous with *data circuit*.

link connection segment. A portion of the configuration that is located between two resources listed consecutively in the service point command service (SPCS) query link configuration request list.

link protocol. (1) The rules for sending and receiving data at the link level. (2) Synonymous with *line control discipline* and *line discipline*.

link station. (1) The hardware and software components within a node representing a connection to an adjacent node over a specific link. For example, if node A is the primary end of a multipoint line that connects to three adjacent nodes, node A will have three link stations representing the connections to the adjacent nodes. (2) In VTAM, a named resource within an APPN or a subarea node that represents the connection to another APPN or subarea node that is attached by an APPN or a subarea link. In the resource hierarchy in a subarea network, the link station is subordinate to the subarea link. (3) See also *adjacent link station (ALS)*.

link status (LS). Information maintained by local and remote modems.

load. (1) To bring all or part of a computer program into memory from auxiliary storage so that the computer can run the program. (2) To place a diskette into a diskette drive.

local. (1) Pertaining to a device accessed directly without use of a telecommunication line. (2) Contrast with *remote*. (3) Synonym for *channel-attached*.

local area network (LAN). (1) A computer network located on a user's premises within a limited geographical area. Communication within a local area network is not subject to external regulations; however, communication across the LAN boundary may be subject to some form of regulation. (T) (2) A network in which a set of devices are connected to one another for communication and that can be connected to a larger network. (3) See also *Ethernet* and *token ring*. (4) Contrast with *metropolitan area network (MAN)* and *wide area network (WAN)*.

local copy. A printer session initiated by a personal computer user or host that reproduces a presentation space with all supported graphics.

local directory database. That set of resources (LUs) in the network known at a particular node. The resources included are all those in the node's domain as well as any cache entries.

local LU. A logical unit not distributed over the LAN, but controlled by a gateway personal computer. This is normally a physical device such as a workstation, printer, or terminal.

Locate. Synonym for *Locate/CD-Initiate*.

Locate/CD-Initiate. (1) An abbreviated term for a message exchanged between APPN nodes that contains one of the following sets of general data stream (GDS) variables:

- A Locate, a Find Resource, and a Cross-Domain Initiate GDS variable used for a network search request
- A Locate, a Found Resource, and a Cross-Domain Initiate GDS variable used for a search reply when a network resource has been located

These message structures correspond to the CP components that perform the search of the distributed network directory and establish the session. The Locate GDS variable contains information used to control the delivery of the search messages in the network. The Find and Found GDS variables contain information used in the directories: origin cache data (control point information) and search arguments (destination LU name), and located resource

information, respectively. The Cross-Domain Initiate GDS variable contains endpoint TG vector information to be used in selecting the route for the session. The length of the Locate/CD-Initiate message is limited to 1024 bytes. (2) Synonymous with *Locate* and *Locate search message*.

Locate search message. Synonym for *Locate/CD-Initiate*.

lock. (1) The means by which integrity of data is ensured by preventing more than one user from accessing or changing the same data or object at the same time. (2) In Communications Manager/2, a password-protection system that can be used to prevent access to some advanced functions. See also *keylock*.

logged-on operator. (1) A NetView operator station task that requires a terminal and a logged-on user. (2) Contrast with *autotask*.

logical link. (1) A pair of link stations, one in each of two adjacent nodes, and their underlying link connection, providing a single link-layer connection between the two nodes. Multiple logical links can be distinguished while they share the use of the same physical media connecting two nodes. Examples are 802.2 logical links used on local area network (LAN) facilities and LAP E logical links on the same point-to-point physical link between two nodes. The term logical link also includes the multiple X.25 logical channels that share the use of the access link from a DTE to an X.25 network. (2) In APPNTAM, the unidirectional representation in a node of a link..

logical record. A set of related data or words considered to be a record from a logical viewpoint. (T)

logical terminal. (1) A destination with a name that is related to one or more physical terminals. (2) The definition of a specific 3270 or 5250 emulation session.

logical unit (LU). A type of network accessible unit that enables users to gain access to network resources and communicate with each other.

logon mode. In VTAM, a subset of session parameters specified in a logon mode table for communication with a logical unit. See also *session parameters*.

low-entry networking (LEN) end node. A LEN node receiving network services from an adjacent APPN network node.

LS. Link status.

LU. Logical unit.

LU-LU session. A logical connection between two logical units (LUs) in an SNA network that typically provides communication between two users.

LUS. Logical unit services.

LU type. The classification of an LU in terms of the specific subset of SNA protocols and options it supports for a given session, namely:

- The mandatory and optional values allowed in the session activation request
- The usage of data stream controls, function management headers (FMHs), request unit parameters, and sense data values
- Presentation services protocols such as those associated with FMH usage

LU types 0, 1, 2, 3, 4, 6.1, 6.2, and 7 are defined.

LU 2. A type of LU for an application program that communicates with a single display workstation in an interactive environment, using the SNA 3270 data stream.

LU 3. A type of LU for an application program that communicates with a single printer, using the SNA 3270 data stream.

LU 6.2. (1) A type of logical unit that supports general communication between programs in a distributed processing environment. LU 6.2 is characterized by (a) a peer relationship between session partners, (b) efficient utilization of a session for multiple transactions, (c) comprehensive end-to-end error processing, and (d) a generic application programming interface (API) consisting of structured verbs that are mapped into a product implementation. (2) A type of LU that supports sessions between two applications in a distributed data processing environment using the SNA general data stream, which is a structured-field data stream, or a user-defined data stream.

LU 6.2 verb. A syntactical unit in the LU 6.2 application programming interface representing an operation.

M

macroinstruction. (1) An instruction in a source language that is to be replaced by a defined sequence of instructions in the same source language and that may also specify values for parameters in the replaced instructions. (T) (2) In assembler programming, an assembler language statement that causes the assembler to process a predefined set of statements called a macro definition. The statements normally produced from the macro definition replace the macroinstruction in the program. (3) See also *definition statement*.

maintenance analysis procedure (MAP). A maintenance document that gives an IBM service representative a step-by-step procedure for tracing a symptom to the cause of a failure.

maintenance services. In SNA, one of the types of network services in system services control points (SSCPs) and physical units (PUs). Maintenance services provide facilities for testing links and nodes and for collecting and recording error information.

MAN. Metropolitan area network.

management services (MS). (1) One of the types of network services in control points (CPs) and physical units (PUs). Management services are the services provided to assist in the management of SNA networks, such as problem management, performance and accounting management, configuration management, and change management. (2) Services that assist in the management of systems and networks in areas such as problem management, performance management, business management, operations management, configuration management, and change management.

management services focal point (MSFP). For any given management services discipline (for example, problem determination or response time monitoring), the control point that is responsible for that type of network management data for a sphere of control. This responsibility may include collecting, storing, or displaying the data, or all of these. (For example, a problem determination focal point is a control point that collects, and that may store or display, problem determination data.)

manager. (1) In systems management, a user that, for a particular interaction, has assumed a manager role. (2) An entity that monitors or controls one or more managed objects by (a) receiving notifications regarding the objects and (b) requesting management operations to modify or query the objects. (3) A system that assumes a manager role.

mantissa. The decimal part of a common logarithm.

map. In NetView for AIX, a database represented by a set of related submaps that provide a graphical and hierarchical presentation of a network and its systems.

MAP. Maintenance analysis procedure.

mapping. The process of converting data that is transmitted in one format by the sender into the data format that can be accepted by the receiver.

master key. In Communications Manager/2, the access password used to unlock the keylock for Communications Manager/2. A user who has access to the master key can also change the service key.

matching. In MPTN architecture, pertaining to the relationship between peer transport users or peer transport providers that use the same user protocols or the same transport protocols.

Maximize. A choice that enlarges a window to its largest possible size.

MB. Megabyte.

medium. (1) A physical carrier of electrical energy. (2) A physical material in or on which data may be represented.

megabyte (MB). (1) For processor storage, real and virtual storage, and channel volume, 220 or 1 048 576 bytes. (2) For disk storage capacity and communications volume, 1 000 000 bytes.

memory. All of the addressable storage space in a processing unit and other internal storages that is used to execute instructions. (T)

menu. (1) A list of options displayed to the user by a data processing system, from which the user can select an action to be initiated. (T) (2) In text processing, a list of choices displayed to the user by a text processor from which the user can select an action to be initiated. (T) (3) A list of choices that can be applied to an object. A menu can contain choices that are not available for selection in certain contexts. Those choices are indicated by reduced contrast.

menu bar. The area near the top of a window, below the title bar and above the rest of the window, that contains choices that provide access to other menus.

message. (1) An assembly of characters and sometimes control codes that is transferred as an entity from an originator to one or more recipients. A message consists of two parts: envelope and content. (T) (2) A communication sent from a person or program to another person or program.

metropolitan area network (MAN). A network formed by the interconnection of two or more networks which may operate at higher speed than those networks, may cross administrative boundaries, and may use multiple access methods. (T) Contrast with *local area network (LAN)* and *wide area network (WAN)*.

MID. Machine identifier.

migration. The installation of a new version or release of a program to replace an earlier version or release.

mode. See *mode name*.

modem (modulator/demodulator). (1) A functional unit that modulates and demodulates signals. One of the functions of a modem is to enable digital data to be transmitted over analog transmission facilities. (T) (A) (2) A device that converts digital data from a computer to an analog signal that can be transmitted on a telecommunication line, and converts the analog signal received to data for the computer.

mode name. The name used by the initiator of a session to designate the characteristics desired for the session, such as traffic pacing values, message-length limits, sync point and cryptography options, and the class of service within the transport network.

module. A program unit that is discrete and identifiable with respect to compiling, combining with other units, and loading; for example, the input to or output from an assembler, compiler, linkage editor, or executive routine. (A)

monitor. (1) A device that observes and records selected activities within a data processing system for analysis. Possible uses are to indicate significant departure from the norm, or to determine levels of utilization of particular functional units. (T) (2) Software or hardware that observes, supervises, controls, or verifies operations of a system. (A) (3) The function required to initiate the transmission of a token on the ring and to provide soft-error recovery in case of lost tokens, circulating frames, or other difficulties. The capability is present in all ring stations. (4) In the NetView Graphic Monitor Facility, to open a view that can receive status changes from the NetView program. Problem determination and correction can be performed directly from the view. Contrast with *browse*.

mouse. A commonly used pointing device, containing one or more buttons, with which a user can interact with a product or the operating environment.

mouse button. A mechanism on a mouse pointing device used to select objects or choices, initiate actions, or directly manipulate objects; a user presses a mouse button to interact with a computer system. The button makes a "clicking" sound when pressed and released.

MS. Management services.

MSFP. Management services focal point.

Multiple Virtual Storage (MVS). See *MVS*.

MVS. Multiple Virtual Storage. Implies *MVS/390*, *MVS/XA*, and *MVS/ESA*.

N

national language support (NLS). The modification or conversion of a United States English product to conform to the requirements of another language or country. This can include the enabling or retrofitting of a product and the translation of nomenclature, machine-readable information (MRI), or documentation of a product. NLS is also known as “internationalization.”

native. In MPTN architecture, pertaining to the relationship between a transport user and a transport provider that are both based on the same transport protocol.

NC. Network control.

negative response (NR). In SNA, a response indicating that a request did not arrive successfully or was not processed successfully by the receiver. Contrast with *positive response*.

negotiation. The process of deciding what packet size to transmit between a network and a 3710 Network Controller.

NetBIOS. (1) Network Basic Input/Output System. A standard interface to networks, IBM personal computers (PCs), and compatible PCs, that is used on LANs to provide message, print-server, and file-server functions. Application programs that use NetBIOS do not need to handle the details of LAN data link control (DLC) protocols. (2) See also *BIOS*.

NetView-NetView task (NNT). The task under which a cross-domain NetView operator session runs. See *operator station task*.

network. (1) An arrangement of nodes and connecting branches. (T) (2) A configuration of data processing devices and software connected for information interchange. (3) A group of nodes and the links interconnecting them.

network architecture. The logical structure and operating principles of a computer network. (T)

Note: The operating principles of a network include those of services, functions, and protocols.

network congestion. An undesirable overload condition caused by traffic in excess of what a network can handle.

network control (NC). In SNA, a request/response unit (RU) category used for requests and responses exchanged between physical units (PUs) for such purposes as activating and deactivating explicit and virtual routes and sending load modules to adjust peripheral nodes. See also *data flow control*, *function management data*, and *session control*.

network directory database. Synonym for *distributed directory database*.

network management. The process of planning, organizing, and controlling a communication-oriented data processing or information system.

network management vector transport (NMVT). A management services request/response unit (RU) that flows over an active session between physical unit management services and control point management services (SSCP-PU session).

network node (NN). See *Advanced Peer-to-Peer Networking (APPN) network node*.

network node server. An APPN network node that provides network services for its local LUs and client end nodes.

network operator. (1) A person who controls the operation of all or part of a network. (2) In a multiple-domain network, a person or program responsible for controlling all domains. (3) See also *domain operator*.

NLS. National language support.

NMVT. Network management vector transport.

NN. Network node.

node. (1) In a network, a point at which one or more functional units connect channels or data circuits. (I) (2) Any device, attached to a network, that transmits and receives data. (3) An endpoint of a link or a junction common

to two or more links in a network. Nodes can be processors, communication controllers, cluster controllers, or terminals. Nodes can vary in routing and other functional capabilities.

no response. In SNA, a protocol requested in the form-of-response-requested field of the request header that directs the receiver of the request not to return any response, regardless of whether or not the request is received and processed successfully. Contrast with *definite response* and *exception response*.

NUL. A transmission control character used as a filler or for sequence control in network communication.

O

object. (1) In object-oriented design or programming, an abstraction consisting of data and the operations associated with that data. See also *class*. (2) An item that a user can manipulate as a single unit to perform a task. An object can appear as text, an icon, or both.

Off. A choice that appears in the cascaded menu from the Refresh choice. It sets the refresh function to off.

offline. (1) Pertaining to the operation of a functional unit that takes place either independently of, or in parallel with, the main operation of a computer. (T) (2) Neither controlled by, nor communicating with, a computer. Contrast with *online*.

offset. The number of measuring units from an arbitrary starting point in a record, area, or control block, to some other point.

OIA. Operator information area.

OK. A push button that accepts the information in a window and closes it. If the window contains changed information, those changes are applied before the window is closed.

On. A choice that appears in a cascaded menu from the Refresh choice. It immediately refreshes the view in a window.

online. (1) Pertaining to the operation of a functional unit when under the direct control of the computer. (T) (2) Pertaining to a user's ability to interact with a computer. (A) (3) Pertaining to a user's access to a computer via a terminal. (A) (4) Controlled by, or communicating with, a computer. (5) Contrast with *offline*.

open. (1) A break in an electrical circuit. (2) To make an adapter ready for use.

Open. A choice that leads to a window in which users can select the object they want to open.

operand. (1) An entity on which an operation is performed. (I) (2) That which is operated upon. An operand is usually identified by an address part of an instruction. (A) (3) Information entered with a command name to define the data on which a command processor operates and to control the execution of the command processor.

operating system (OS). Software that controls the execution of programs and that may provide services such as resource allocation, scheduling, input/output control, and data management. Although operating systems are predominantly software, partial hardware implementations are possible. (T)

operation. In object-oriented design or programming, a service that can be requested at the boundary of an object. Operations include modifying an object or disclosing information about an object.

operator. (1) In a language statement, the lexical entity that indicates the action to be performed on operands. See also *definition statement*. (2) A person or program responsible for managing activities controlled by a given piece of software such as MVS, the NetView program, or IMS. (3) A person who operates a device. (4) A person who keeps a system running. (5) See also *autotask*, *logged-on operator*, *network operator*, and *operator station task*.

operator information area (OIA). The area near the bottom of the display area where terminal or system status information is displayed.

operator station task (OST). The NetView task that establishes and maintains the online session with the network operator. There is one operator station task for each network operator who logs on to the NetView program. See *NetView-NetView task*.

origin. An external logical unit (LU) or application program from which a message or other data originates. See also *destination*.

OS. Operating system.

outbound. In communications, data that is transmitted to the network.

output. Pertaining to a device, process, or channel involved in an output process, or to the associated data or states. The word “output” may be used in place of “output data,” “output signal”, “output process”, when such a usage is clear in a given context. (T)

P

pacing. (1) A technique by which a receiving component controls the rate of transmission of a sending component to prevent overrun or congestion. (2) See *receive pacing*, *send pacing*, *session-level pacing*, and *virtual route (VR) pacing*. (3) See also *flow control*.

pacing group. Synonym for *pacing window*.

pacing window. (1) The path information units (PIUs) that can be transmitted on a virtual route before a virtual-route pacing response is received, indicating that the virtual route receiver is ready to receive more PIUs on the route. (2) The requests that can be transmitted on the normal flow in one direction on a session before a session-level pacing response is received, indicating that the receiver is ready to accept the next group of requests. (3) Synonymous with *pacing group*.

packet. (1) In data communication, a sequence of binary digits, including data and control signals, that is transmitted and switched as a composite whole. The data, control signals, and, possibly, error control information are arranged in a specific format. (I) (2) A discrete unit of information including addressing and sequence information that can be sent interleaved with other packets of the same and other transmission sequences. Packets sent over X.25 virtual circuits always arrive in the order they were sent.

page. (1) In a virtual storage system, a fixed-length block that has a virtual address and is transferred as a unit between real storage and auxiliary storage. (I) (A) (2) The information displayed at the same time on the screen of a display device. (3) To replace the information displayed on the screen with prior or subsequent information from the same file.

panel. See *window*.

parallel. (1) Pertaining to a process in which all events occur within the same interval of time, each handled by a separate but similar functional unit; for example, the parallel transmission of the bits of a computer word along the lines of an internal bus. (T) (2) Pertaining to concurrent or simultaneous operation of two or more devices or to concurrent performance of two or more activities in a single device. (A) (3) Pertaining to concurrent or simultaneous occurrence of two or more related activities in multiple devices or channels. (A) (4) Pertaining to the simultaneity of two or more processes. (A) (5) Pertaining to the simultaneous processing of the individual parts of a whole, such as the bits of a character and the characters of a word, using separate facilities for the various parts. (A) (6) Contrast with *serial*.

parallel sessions. Two or more concurrently active sessions between the same two network accessible units (NAUs) using different pairs of network addresses or local-form session identifiers. Each session can have independent session parameters.

parameter. (1) A variable that is given a constant value for a specified application and that may denote the application. (I) (A) (2) In Basic CUA architecture, a variable used in conjunction with a command to affect its result. (3) An item in a menu for which the user specifies a value or for which the system provides a value when the menu is interpreted. (4) Data passed to a program or procedure by a user or another program, namely as an operand in a language statement, as an item in a menu, or as a shared data structure.

password. (1) A value used in authentication or a value used to establish membership in a set of people having specific privileges. (2) A unique string of characters known to a computer system and to a user, who must specify the character string to gain access to a system and to the information stored within it. (3) In computer security, a string of characters known to the computer system and a user, who must specify it to gain full or limited access to a system and to the data stored within it.

path. (1) In a network, any route between any two nodes. A path may include more than one branch. (T) (2) The series of transport network components (path control and data link control) that are traversed by the information exchanged between two network accessible units. See also *explicit route (ER)*, *route extension (REX)*, and *virtual route (VR)*.

path control (PC). The function that routes message units between network accessible units in the network and provides the paths between them. It converts the basic information units (BIUs) from transmission control (possibly segmenting them) into path information units (PIUs) and exchanges basic transmission units containing one or more PIUs with data link control. Path control differs by node type: some nodes (APPN nodes, for example) use locally generated session identifiers for routing, and others (subarea nodes) use network addresses for routing.

path control network. Synonym for *transport network*.

PC. (1) Personal computer. (2) Path control. (3) Personal Communications.

PCSDIAL. A program that automatically dials a host number, permitting a fast connection.

PDF. (1) Printer Definition File — A file determining the transfer of characters and control codes to a printer, as well as the output format. (2) Package Definition File — A text file that contains predefined property settings for a package. (3) Portable Document Format — Adobe's © proprietary document format.

peer. In network architecture, any functional unit that is in the same layer as another entity. (T)

peripheral LU. In SNA, a logical unit in a peripheral node. Contrast with *subarea LU*.

peripheral node. A node that uses local addresses for routing and therefore is not affected by changes in network addresses. A peripheral node requires boundary-function assistance from an adjacent subarea node. A peripheral node can be a type 1, 2.0, or 2.1 node connected to a subarea boundary node.

peripheral PU. In SNA, a physical unit in a peripheral node. Contrast with *subarea PU*.

personal computer (PC). (1) A microcomputer primarily intended for stand-alone use by an individual. (T) (2) A desktop, floor-standing, or portable microcomputer that usually consists of a system unit, a display monitor, a keyboard, one or more diskette drives, internal fixed-disk storage, and an optional printer. PCs are designed primarily for stand-alone operation but may be connected to mainframes or networks.

physical circuit. A circuit established without multiplexing. See also *data circuit*. Contrast with *virtual circuit*.

physical connection. (1) A connection that establishes an electrical circuit. (2) A point-to-point or multipoint connection. (3) Synonymous with *connection*.

physical unit (PU). (1) The component that manages and monitors the resources (such as attached links and adjacent link stations) associated with a node, as requested by an SSCP via an SSCP-PU session. An SSCP activates a session with the physical unit in order to indirectly manage, through the PU, resources of the node such as attached links. This term applies to type 2.0, type 4, and type 5 nodes only. (2) See also *peripheral PU* and *subarea PU*.

physical unit (PU) services. In SNA, the components within a physical unit (PU) that provide configuration services and maintenance services for SSCP-PU sessions.

PM. Presentation Manager.

pop. To remove an item from the top of a pushdown list. Contrast with *push*.

POP. Post Office Protocol.

port. (1) An access point for data entry or exit. (2) A connector on a device to which cables for other devices such as display stations and printers are attached. (3) The representation of a physical connection to the link hardware. A port is sometimes referred to as an adapter; however, there can be more than one port on an adapter. There may be one or more ports controlled by a single DLC process. (4) In the Internet suite of protocols, a 16-bit number used to communicate between TCP or the User Datagram Protocol (UDP) and a higher-level protocol or application. Some protocols, such as File Transfer Protocol (FTP) and Simple Mail Transfer Protocol (SMTP), use the same well-known port number in all TCP/IP implementations. (5) An abstraction used by transport protocols to distinguish among multiple destinations within a host machine. (6) Synonymous with *socket*.

positive response. In SNA, a response indicating that a request was received and processed. Contrast with *negative response*.

Post Office Protocol (POP). A protocol used for exchanging network mail and accessing mailboxes.

Prepare. A presentation services header that flows as part of commit processing, indicating the partner has begun the first phase of the two-phase commit process.

Presentation Manager (PM). See *IBM OS/2 Presentation Manager*.

presentation space. (1) A conceptual two-dimensional surface in storage on which data for a portion of the display surface is represented. (2) The space that contains the device-independent definition of a picture. (3) In the context of the Emulator High-Level Language Application Programming Interface (EHLLAPI), the area in computer memory that corresponds to the user's screen image. (4) The host display space for the window. It is the entire window of data, which can exceed the boundaries of a display screen's viewing area.

presentation space ID (PSID). In *Communications Manager/2*, synonym for *short name*.

primitive. Synonym for *service primitive*. (T)

problem determination. The process of determining the source of a problem; for example, a program component, machine failure, telecommunication facilities, user or contractor-installed programs or equipment, environmental failure such as a power loss, or user error.

procedure. (1) In a programming language, a block, with or without formal parameters, whose execution is invoked by means of a procedure call. (I) (2) The description of the course of action taken for the solution of a problem. (A)

process. (1) To perform operations on data in a process. (I) (A) (2) In data processing, the course of events that occurs during the execution of all or part of a program. (T) (3) A course of the events defined by its purpose or by its effect, achieved under given conditions. (4) Any operation or combination of operations on data. (5) A function being performed or waiting to be performed.

processor. In a computer, a functional unit that interprets and executes instructions. A processor consists of at least an instruction control unit and an arithmetic and logic unit. (T)

product-set identification (PSID). (1) In SNA, a technique for identifying the hardware and software products that implement a network component. (2) A management services common subvector that transports the information described in definition (1).

profile. Data that describes the significant characteristics of a user, a group of users, or one or more computer resources.

program. (1) A sequence of instructions suitable for processing by a computer. Processing may include the use of an assembler, a compiler, an interpreter, or a translator to prepare the program for execution, as well as to execute it. (I) (2) In programming languages, a logical assembly of one or more interrelated modules. (I) (3) To design, write, and test computer programs. (I) (A)

program temporary fix (PTF). A temporary solution or bypass of a problem diagnosed by IBM in a current unaltered release of the program.

protocol. (1) A set of semantic and syntactic rules that determine the behavior of functional units in achieving communication. (I) (2) In Open Systems Interconnection architecture, a set of semantic and syntactic rules that determine the behavior of entities in the same layer in performing communication functions. (T) (3) In SNA, the meanings of, and the sequencing rules for, requests and responses used for managing the network, transferring data, and synchronizing the states of network components. Synonymous with *line control discipline* and *line discipline*. See *bracket protocol* and *link protocol*.

PSID. Presentation space ID.

PTF. Program temporary fix.

PU. Physical unit.

push. To add an item to the top of a pushdown list. Contrast with *pop*.

push button. A button, labeled with text, graphics, or both, that represents an action that will be initiated when a user selects it.

PUT. Program update tape.

Q

queue. (1) A list constructed and maintained so that the next data element to be retrieved is the one stored first. (T) (2) A line or list of items waiting to be processed; for example, work to be performed or messages to be displayed. (3) To arrange in or form a queue.

R

radio button. A circle with text beside it. Radio buttons are combined to show a user a fixed set of choices from which the user can select one. The circle becomes partially filled when a choice is selected.

Rapid Transport Protocol (RTP). A connection-oriented, full-duplex transport protocol for carrying session traffic over High-Performance Routing (HPR) routes. See also *automatic network routing (ANR)* and *Rapid Transport Protocol (RTP) connection*.

Rapid Transport Protocol (RTP) connection. A connection between two High-Performance Routing (HPR) nodes that may traverse one or more intermediate HPR nodes and links. The connection endpoints provide error recovery and adaptive rate-based flow control for the connection traffic, and nondisruptive switching of the underlying physical path in the case of route outage. The intermediate HPR nodes minimize their routing overhead using automatic network routing (ANR) protocols, which rely on header information to permit efficient source routing and prioritized transmission along the RTP connection.

read-only memory (ROM). Memory in which stored data cannot be modified by the user except under special conditions.

received line signal detector (RLSD). In the EIA 232 standard, a signal that indicates to the data terminal equipment (DTE) that it is receiving a signal from the remote data circuit-terminating equipment (DCE). Synonymous with *carrier detect* and *data carrier detect (DCD)*.

receive pacing. In SNA, the pacing of message units that a component is receiving. Contrast with *send pacing*.

record. A set of data treated as a unit. (T)

release. (1) A distribution of a new product or new function and APAR fixes for an existing product. Normally, programming support for the prior release is discontinued after some specified period of time following availability of a new release. The first version of a product is announced as Release 1, Modification Level 0. (2) In VTAM, to relinquish control of resources (communication controllers or physical units). See also *resource takeover*. Contrast with *acquire*.

remote. (1) Pertaining to a system, program, or device that is accessed through a telecommunication line. (2) Synonym for *link-attached*. (3) Contrast with *local*.

request. A message unit that signals initiation of a particular action or protocol. For example, Initiate-Self is a request for activation of an LU-LU session.

requester. A computer that accesses shared network resources through a server. Synonym for *client*.

reset. On a virtual circuit, reinitialization of data flow control. At reset, all data in transit are eliminated.

resource. Any facility of a computing system or operating system required by a job or task, and including main storage, input/output devices, the processing unit, data sets, and control or processing programs.

resource registration. The process of identifying names of resources, such as LUs, to a network node server or a central directory server.

resource takeover. In VTAM, an action initiated by a network operator to transfer control of resources from one domain to another without breaking the connections or disrupting existing LU-LU sessions on the connection. See also *acquire* and *release*.

resource types. In the NetView program, a concept to describe the organization of panels. Resource types are defined as central processing unit, channel, control unit, and I/O device for one category; and communication controller, adapter, link, cluster controller, and terminal for another category. Resource types are combined with data types and display types to describe display organization. See also *data types* and *display types*.

response. (1) In data communication, a reply represented in the control field of a response frame. It advises the primary or combined station of the action taken by the secondary or other combined station to one or more commands. (2) See also *command*.

return code. (1) A code used to influence the execution of succeeding instructions. (A) (2) A value returned to a program to indicate the results of an operation requested by that program.

REX. Route extension.

ring. See *ring network*.

ring network. A network configuration in which devices are connected by unidirectional transmission links to form a closed path.

RLSD. Received line signal detector.

ROM. Read-only memory. (A)

route. (1) An ordered sequence of nodes and transmission groups (TGs) that represent a path from an origin node to a destination node traversed by the traffic exchanged between them. (2) The path that network traffic uses to get from source to destination.

route extension (REX). In SNA, the path control network components, including a peripheral link, that make up the portion of a path between a subarea node and a network addressable unit (NAU) in an adjacent peripheral node. See also *explicit route (ER)*, *path*, and *virtual route (VR)*.

router. (1) A computer that determines the path of network traffic flow. The path selection is made from several paths based on information obtained from specific protocols, algorithms that attempt to identify the shortest or best path, and other criteria such as metrics or protocol-specific destination addresses. (2) An attaching device that connects two LAN segments, which use similar or different architectures, at the reference model network layer. (3) In OSI terminology, a function that determines a path by which an entity can be reached. (4) In TCP/IP, synonymous with *gateway*.. (5) Contrast with *bridge*.

routine. A program, or part of a program, that may have some general or frequent use. (T)

routing. (1) The process of determining the path to be used for transmission of a message over a network. (T) (2) The assignment of the path by which a message is to reach its destination. (3) In SNA, the forwarding of a message unit along a particular path through a network, as determined by parameters carried in the message unit, such as the destination network address in a transmission header.

RouTing update Protocol (RTP). The Virtual NETworking System (VINES) protocol that maintains the routing database and allows the exchange of routing information between VINES nodes. See also *Internet Control Protocol (ICP)*.

RTP. Rapid Transport Protocol..

RTP connection. See *Rapid Transport Protocol (RTP) connection*..

RU chain. In SNA, a set of related request/response units (RUs) that are consecutively transmitted on a particular normal or expedited data flow. The request RU chain is the unit of recovery: if one of the RUs in the chain cannot be processed, the entire chain is discarded. Each RU belongs to only one chain, which has a beginning and an end indicated by means of control bits in request/response headers within the RU chain. Each RU can be designated as first-in-chain (FIC), last-in-chain (LIC), middle-in-chain (MIC), or only-in-chain (OIC). Response units and expedited-flow request units are always sent as only-in-chain.

S

SAP. (1) Service access point. (2) Service Advertising Protocol.

SBCS. Single-byte character set.

scroll. To move a display image vertically or horizontally to view data that otherwise cannot be observed within the boundaries of the display screen.

scroll bar. A window component that shows a user that more information is available in a particular direction and can be scrolled into view. Scroll bars can be either horizontal or vertical.

SCS. SNA character string.

SDLC. Synchronous Data Link Control.

segment. (1) A section of cable between components or devices. A segment may consist of a single patch cable, several patch cables that are connected, or a combination of building cable and patch cables that are connected. (2) In Internet communications, the unit of transfer between TCP functions in different machines. Each segment contains control and data fields; the current byte-stream position and actual data bytes are identified along with a checksum to validate received data. (3) Synonym for *BIU segment*. (4) See also *link connection segment*.

select. To explicitly identify one or more objects to which a subsequent choice will apply.

selection. The process of explicitly identifying one or more objects to which a subsequent choice will apply.

send pacing. In SNA, the pacing of message units that a component is sending. Contrast with *receive pacing*.

serial. (1) Pertaining to a process in which all events occur one after the other; for example, serial transmission of the bits of a character according to V24 CCITT protocol. (T) (2) Pertaining to the sequential or consecutive occurrence of two or more related activities in a single device or channel. (A) (3) Pertaining to the sequential processing of the individual parts of a whole, such as the bits of a character or the characters of a word, using the same facilities for successive parts. (A) (4) Contrast with *parallel*.

server. (1) A functional unit that provides shared services to workstations over a network; for example, a file server, a print server, a mail server. (T) (2) In a network, a data station that provides facilities to other stations; for example, a file server, a print server, a mail server. (A) (3) In the AIX operating system, an application program that usually runs in the background and is controlled by the system program controller. (4) In the Enhanced X-Windows Toolkit, a program that provides the basic windowing mechanism. It handles interprocess communication (IPC) connections from clients, demultiplexes graphics requests onto screens, and multiplexes input back to clients.

Server-Requester Programming Interface (SRPI). An IBM application programming interface (API) used by requester and server programs to communicate with the personal computer or host routers.

service access point (SAP). (1) In Open Systems Interconnection (OSI) architecture, the point at which the services of a layer are provided by an entity of that layer to an entity of the next higher layer. (T) (2) A logical point made available by an adapter where information can be received and transmitted. A single service access point can have many links terminating in it. (3) The gateway address of the controller. A SAP provides a point to link the controller to the host system.

Service Advertising Protocol (SAP). In Internetwork Packet Exchange (IPX), a protocol that provides the following:

- A mechanism that allows IPX servers on an internet to advertise their services by name and type. Servers using this protocol have their name, service type, and IP address recorded in all file servers running NetWare.
- A mechanism that allows a workstation to broadcast a query to discover the identities of all servers of all types, all servers of a specific type, or the nearest server of a specific type.
- A mechanism that allows a workstation to query any file server running NetWare to discover the names and addresses of all servers of a specific type.

service key. In Communications Manager/2, one of two access passwords (the other is the master key) used to unlock the keylock for Communications Manager/2.

service point (SP). An entry point that supports applications that provide network management for resources not under the direct control of itself as an entry point. Each resource is either under the direct control of another entry

point or not under the direct control of any entry point. A service point accessing these resources is not required to use SNA sessions (unlike a focal point). A service point is needed when entry point support is not yet available for some network management function.

Service Point Application (SPA) Router. In Communications Manager/2, a program that receives commands issued from the NetView program and sends the commands to an application program to be processed on an OS/2 workstation.

service primitive. (1) In Open Systems Interconnection architecture, an abstract description of an interaction between a service user and a service provider.

Note: A service user is usually an entity. A service provider, in a given layer, usually comprises entities of that layer and a lower layer service (except at the Physical Layer). Therefore, a service primitive is also an abstract description of an interaction between two adjacent entities. (T)

(2) Synonymous with *primitive*.

session. (1) In network architecture, for the purpose of data communication between functional units, all the activities which take place during the establishment, maintenance, and release of the connection. (T) (2) A logical connection between two network accessible units (NAUs) that can be activated, tailored to provide various protocols, and deactivated, as requested. Each session is uniquely identified in a transmission header (TH) accompanying any transmissions exchanged during the session. (3) A logical connection between a server and a requester that was initiated by a successful request for a shared resource. See also *host session* and *DOS session*.

session activation request. In SNA, a request that activates a session between two network accessible units (NAUs) and specifies session parameters that control various protocols during session activity; for example, BIND and ACTPU. Contrast with *session deactivation request*.

session control (SC). In SNA, either of the following:

- One of the components of transmission control. Session control is used to purge data flowing in a session after an unrecoverable error occurs, to resynchronize the data flow after such an error, and to perform cryptographic verification.
- A request unit (RU) category used for requests and responses exchanged between the session control components of a session and for session activation and deactivation requests and responses.

session data. Data about a session, collected by the NetView program, that consists of session awareness data, session trace data, and session response time data.

session deactivation request. In SNA, a request that deactivates a session between two network accessible units (NAUs); for example, UNBIND and DACTPU. Synonymous with *generic unbind*. Contrast with *session activation request*.

session ID. An alphabetic ID (*a* through *h*) assigned by Personal Communications to each session or screen. This applies to all types of host sessions and is used in file transfers. See also *short name*.

session-level pacing. (1) A flow control technique that permits a receiving half-session or session connector to control the data transfer rate (the rate at which it receives request units) on the normal flow. It is used to prevent overloading a receiver with unprocessed requests when the sender can generate requests faster than the receiver can process them. (2) See also *adaptive session-level pacing*, *fixed session-level pacing*, and *virtual route (VR) pacing*.

session parameters. In SNA, the parameters that specify or constrain the protocols (such as bracket protocol and pacing) for a session between two network accessible units. See also *logon mode*.

session services (SS). One of the types of network services in the control point (CP) and in the logical unit (LU). These services provide facilities for an LU or a network operator to request that a control point (an ENCP, NNCP, or SSCP) assist with initiating or terminating sessions between logical units. Assistance with session termination is needed only by SSCP-dependent LUs. See *configuration services*, *maintenance services*, and *management services*.

shared. Pertaining to the availability of a resource for more than one use at the same time.

shift-in character (SI). A code extension character used to terminate a sequence that has been introduced by the shift-out character to make effective the graphic characters of the standard character set. (I) (A)

Shift Lock. The personal computer keyboard mode entered after the Shift Lock key is pressed. In this mode, the keyboard performs the function printed on the upper half of the keytop. Press the Shift key to cancel the Shift Lock mode.

shift-out character (SO). A code extension character that substitutes for the graphic characters of the standard character set an alternative set of graphic characters upon which an agreement has been arrived at or that has been designated using code extension procedures. (I) (A)

short name. (1) In Personal Communications, a character displayed in column 7 of the operator information area that shows the session ID. See also *session ID* and *operator information area*. (2) In Communications Manager/2, the one-letter name (A through Z) of the presentation space or emulation session. Synonymous with *presentation space ID (PSID)* and *short-session ID*.

short-session ID. In Communications Manager/2, synonym for *short name*.

SI. The shift-in character. (I) (A)

simplex. Pertaining to printing on only one side of a sheet of paper. Contrast with *duplex* and *tumble*.

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 (DBCS)*.

SNA. Systems Network Architecture.

SNA character string (SCS). In SNA, a character string composed of EBCDIC controls, optionally intermixed with end-user data, that is carried within a request/response unit.

SNA network. The part of a user-application network that conforms to the formats and protocols of Systems Network Architecture. It enables reliable transfer of data among users and provides protocols for controlling the resources of various network configurations. The SNA network consists of network accessible units (NAUs), boundary function, gateway function, and intermediate session routing function components; and the transport network.

SO. The shift-out character. (I) (A)

socket. An endpoint for communication between processes or application programs.

SP. Service point.

spin button. A component used to display, in sequence, a ring of related but mutually exclusive choices. A user can accept the value displayed in the entry field or can type a valid choice into the entry field.

SRPI. Server-Requester Programming Interface.

SS. Session services.

SSCP. System services control point.

SSCP-dependent LU. An LU that requires assistance from a system services control point (SSCP) in order to initiate an LU-LU session. It requires an SSCP-LU session.

SSCP-LU session. In SNA, a session between a system services control point (SSCP) and a logical unit (LU). The session enables the LU to request the SSCP to help initiate LU-LU sessions.

stage. A program that processes messages in a NetView pipeline. Stages send messages to each other serially.

statement. A language syntactic unit consisting of an operator, or other statement identifier, followed by one or more operands. See *definition statement*.

static. (1) In programming languages, pertaining to properties that can be established before execution of a program; for example, the length of a fixed length variable is static. (I) (2) Pertaining to an operation that occurs at a predetermined or fixed time. (3) Contrast with *dynamic*.

station. An input or output point of a system that uses telecommunication facilities; for example, one or more systems, computers, terminals, devices, and associated programs at a particular location that can send or receive data over a telecommunication line.

status. The condition or state of hardware or software, usually represented by a status code.

storage. (1) A functional unit into which data can be placed, in which they can be retained and from which they can be retrieved. (T) (2) The action of placing data into a storage device. (I) (A) (3) A storage device. (A)

stream. (1) To send data from one device to another. (2) See *data stream*.

subarea. A portion of the SNA network consisting of a subarea node, attached peripheral nodes, and associated resources. Within a subarea node, all network accessible units (NAUs), links, and adjacent link stations (in attached peripheral or subarea nodes) that are addressable within the subarea share a common subarea address and have distinct element addresses.

subarea LU. In SNA, a logical unit in a subarea node. Contrast with *peripheral LU*.

subarea node (SN). A node that uses network addresses for routing and maintains routing tables that reflect the configuration of the network. Subarea nodes can provide gateway function to connect multiple subarea networks, intermediate routing function, and boundary function support for peripheral nodes. Type 4 and type 5 nodes can be subarea nodes.

subarea PU. In SNA, a physical unit in a subarea node. Contrast with *peripheral PU*.

subdirectory. A directory contained within another directory in a file system hierarchy.

subsystem. A secondary or subordinate system, usually capable of operating independently of, or asynchronously with, a controlling system. (T)

subsystem management. In Communications Manager/2, a group of advanced functions for diagnosis and problem resolution. These functions are typically used by system administrators and application programmers.

synchronization point. Synonym for *sync point*.

synchronous. (1) Pertaining to two or more processes that depend upon the occurrence of specific events such as common timing signals. (T) (2) Occurring with a regular or predictable time relationship.

Synchronous Data Link Control (SDLC). A discipline conforming to subsets of the Advanced Data Communication Control Procedures (ADCCP) of the American National Standards Institute (ANSI) and High-level Data Link Control (HDLC) of the International Organization for Standardization, for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection. Transmission exchanges may be duplex or half-duplex over switched or nonswitched links. The configuration of the link connection may be point-to-point, multipoint, or loop. (I)

sync point. An intermediate or end point during processing of a transaction at which an update or modification to one or more of the transaction's protected resources is logically complete and error free. Synonymous with *synchronization point*.

system. In data processing, a collection of people, machines, and methods organized to accomplish a set of specific functions. (I) (A)

system services control point (SSCP). A component within a subarea network for managing the configuration, coordinating network operator and problem determination requests, and providing directory services and other session services for users of the network. Multiple SSCPs, cooperating as peers with one another, can divide the network into domains of control, with each SSCP having a hierarchical control relationship to the physical units and logical units within its own domain.

system services control point (SSCP) domain. The system services control point, the physical units (PUs), the logical units (LUs), the links, the link stations, and all the resources that the SSCP has the ability to control by means of activation and deactivation requests.

Systems Network Architecture (SNA). The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through, and controlling the configuration and operation of, networks.

The layered structure of SNA allows the ultimate origins and destinations of information, that is, the users, to be independent of and unaffected by the specific SNA network services and facilities used for information exchange.

T

table. A repository for data that NetDA/2 uses to design a network. Each table contains information related to the network.

task. In a multiprogramming or multiprocessing environment, one or more sequences of instructions treated by a control program as an element of work to be accomplished by a computer. (I) (A)

Task-Related User Exit (TRUE). A CICS module used for invoking resource managers that are outside of CICS. A TRUE is one of the components of CICS sockets.

TCP. Transmission Control Protocol..

TCP/IP. Transmission Control Protocol/Internet Protocol.

template. See *keyboard template*.

TERMINATE. In SNA, a request unit that is sent by a logical unit (LU) to its system services control point (SSCP) to cause the SSCP to start a procedure to end one or more designated LU-LU sessions.

timeout. (1) An event that occurs at the end of a predetermined period of time that began at the occurrence of another specified event. (I) (2) A time interval allotted for certain operations to occur; for example, response to polling or addressing before system operation is interrupted and must be restarted.

Time Sharing Option (TSO). An option of the MVS operating system that provides interactive time sharing from remote terminals.

time stamp. (1) To apply the current system time. (2) The value on an object that is an indication of the system time at some critical point in the history of the object. (3) In query, the identification of the day and time when a query report was created that query automatically provides on each report.

token. (1) In a local area network, the symbol of authority passed successively from one data station to another to indicate the station temporarily in control of the transmission medium. Each data station has an opportunity to acquire and use the token to control the medium. A token is a particular message or bit pattern that signifies permission to transmit. (T) (2) In LANs, a sequence of bits passed from one device to another along the transmission medium. When the token has data appended to it, it becomes a frame.

token ring. (1) According to IEEE 802.5, network technology that controls media access by passing a token (special packet or frame) between media-attached stations. (2) A FDDI or IEEE 802.5 network with a ring topology that passes tokens from one attaching ring station (node) to another. (3) See also *local area network (LAN)*.

topology. In communications, the physical or logical arrangement of nodes in a network, especially the relationships among nodes and the links between them.

TP. Transaction program.

trace. (1) A record of the execution of a computer program. It exhibits the sequences in which the instructions were executed. (A) (2) For data links, a record of the frames and bytes transmitted or received.

transaction program (TP). A program that processes transactions in an SNA network. There are two kinds of transaction programs: application transaction programs and service transaction programs. See also *conversation*.

translation table. A table used to replace one or more characters with alternative characters; for example, to translate characters representing a virtual address to those representing a real address, characters representing an event to those representing a procedure call, characters of a national character set to those of another national language, or characters representing a relocated address to those representing an absolute address.

Transmission Control Protocol (TCP). A communications protocol used in the Internet and in any network that follows the U.S. Department of Defense standards for internetwork protocol. TCP provides a reliable host-to-host protocol between hosts in packet-switched communications networks and in interconnected systems of such networks. It uses the Internet Protocol (IP) as the underlying protocol..

Transmission Control Protocol/Internet Protocol (TCP/IP). A set of communications protocols that support peer-to-peer connectivity functions for both local and wide area networks.

transport network. (1) The part of the SNA network that includes the data link control and path control layers. Synonymous with *path control network*. (2) An implementation of transport networking. Examples are parts of SNA, TCP/IP, OSI, IPX, NetBIOS, DECnet, and Appletalk.

transport protocol. A specification of the rules governing the exchange of information between components of a transport network.

TRUE. Task-Related User Exit.

TSO. Time Sharing Option.

tumble. Pertaining to printing on both sides of a sheet of paper such that the bottom of the printed image on one side of the paper is juxtaposed against the *top* of the printed image on the other side of the paper. Contrast with *duplex* and *simplex*.

Type 1 frame. In the IEEE 802.2 LAN standard, a frame sent without the establishment of a link-level connection. It is used for IP and IPX traffic as well as NetBIOS datagrams. Contrast with *Type 2 frame*.

Type 2 frame. In the IEEE 802.2 LAN standard, a frame sent over an established link-level connection. It is used for NetBIOS and SNA links. Contrast with *Type 1 frame*.

T1. In the United States, a 1.544-Mbps public access line. It is available in twenty-four 64-kbps channels. The European version (E1) transmits 2.048 Mbps. The Japanese version (J1) transmits 1.544 Mbps.

U

UNBIND. In SNA, a request to deactivate a session between two logical units (LUs). See also *session deactivation request*. Contrast with *BIND*.

upload. (1) To transfer programs or data from a connected device, typically a personal computer, to a computer with greater resources. (T) (2) To transfer data from a device, such as a workstation or a microcomputer, to a computer. Contrast with *download*.

upstream. In the direction of data flow from the user to the host. Contrast with *downstream*.

user. (1) Any person or any thing that may issue or receive commands and messages to or from the information processing system. (T) (2) Anyone who requires the services of a computing system.

UTC. Coordinated universal time.

V

value. (1) A specific occurrence of an attribute; for example, "blue" for the attribute "color." (T) (2) A quantity assigned to a constant, a variable, a parameter, or a symbol.

variable. (1) In programming languages, a language object that may take different values, one at a time. The values of a variable are usually restricted to a certain data type. (I) (2) A quantity that can assume any of a given set of values. (A) (3) A name used to represent a data item whose value can be changed while the program is running.

vector. The MAC frame information field.

verb. See *LU 6.2 verb*.

version. A separately licensed program that usually has significant new code or new functions.

VGA. Video graphics adapter.

video graphics adapter (VGA). A computer adapter that provides high-resolution graphics and a total of 256 colors. See also *enhanced graphics adapter (EGA)*.

virtual circuit. (1) In packet switching, the facilities provided by a network that give the appearance to the user of an actual connection. (T) See also *data circuit*. Contrast with *physical circuit*. (2) A logical connection established between two DTEs.

virtual machine (VM). (1) A virtual data processing system that appears to be at the exclusive disposal of a particular user, but whose functions are accomplished by sharing the resources of a real data processing system. (T) (2) In VM/ESA, the virtual processors, virtual storage, virtual devices, and virtual channel subsystem allocated to a single user. A virtual machine also includes any expanded storage dedicated to it.

Virtual Machine/Conversational Monitoring System (VM/CMS). A time sharing system control program that manages the resources of an IBM System/370 or System/390 such that multiple remote terminal users have a functioning simulation of a computing system at their disposal. The Conversational Monitoring System provides general time sharing, development, and problem-solving facilities.

Virtual Machine/Enterprise Systems Architecture (VM/ESA). An IBM licensed program that manages the resources of a single computer so that multiple computing systems appear to exist. Each virtual machine is the functional equivalent of a real machine.

virtual route (VR). (1) In SNA, either (a) a logical connection between two subarea nodes that is physically realized as a particular explicit route or (b) a logical connection that is contained wholly within a subarea node for intranode sessions. A virtual route between distinct subarea nodes imposes a transmission priority on the underlying explicit route, provides flow control through virtual route pacing, and provides data integrity through sequence numbering of path information units (PIUs). (2) Contrast with *explicit route (ER)*. See also *path* and *route extension (REX)*.

virtual route (VR) pacing. In SNA, a flow control technique used by the virtual route control component of path control at each end of a virtual route to control the rate at which path information units (PIUs) flow over the virtual route. VR pacing can be adjusted according to traffic congestion in any of the nodes along the route. See also *session-level pacing*.

virtual storage. The storage space that may be regarded as addressable main storage by the user of a computer system in which virtual addresses are mapped into real addresses. The size of virtual storage is limited by the addressing scheme of the computer system and by the amount of auxiliary storage available, not by the actual number of main storage locations. (I) (A)

Virtual Telecommunications Access Method (VTAM). An IBM licensed program that controls communication and the flow of data in an SNA network. It provides single-domain, multiple-domain, and interconnected network capability.

VM. Virtual machine.

VM/CMS. Virtual Machine/Conversational Monitoring System.

VM/ESA. Virtual Machine/Enterprise Systems Architecture.

VR. Virtual route.

VS. Virtual storage.

VTAM. (1) Virtual Telecommunications Access Method. (2) Synonymous with *ACF/VTAM*.

V.25. In data communication, a specification of the CCITT that defines the automatic answering equipment and parallel automatic calling equipment on the General Switched Telephone Network, including procedures for disabling of echo controlled devices for both manually and automatically established calls.

V.25 bis. A procedure defined by the CCITT that allows call establishment and data transfer to take place over the same link. The support eliminates the need for two physical lines or ports when automatic calling units (ACUs) are employed in a switched connection.

W

WAN. Wide area network.

weight. For route selection purposes, the degree to which resources (such as nodes and transmission groups) meet the criteria specified by a particular class of service. In APPN route selection, routes of minimum weight are chosen..

wide area network (WAN). (1) A network that provides communication services to a geographic area larger than that served by a local area network or a metropolitan area network, and that may use or provide public communication facilities. (T) (2) A data communication network designed to serve an area of hundreds or thousands of miles; for example, public and private packet-switching networks, and national telephone networks. (3) Contrast with *local area network (LAN)* and *metropolitan area network (MAN)*.

window. (1) A portion of a display surface in which display images pertaining to a particular application can be presented. Different applications can be displayed simultaneously in different windows. (A) (2) An area with visible boundaries that presents a view of an object or with which a user conducts a dialog with a computer system. (3) In data communication, the number of data packets a data terminal equipment (DTE) or data circuit-terminating equipment (DCE) can send across a logical channel before waiting for authorization to send another data packet. The window is the main mechanism of pacing, or flow control, of packets. (4) See *pacing window*.

window size. The specified number of frames of information that can be sent before receiving an acknowledgment response.

WinSock application programming interface (API). A socket-style transport interface developed for the Windows family of operating systems.

workstation. (1) A functional unit at which a user works. A workstation often has some processing capability. (T) (2) One or more programmable or nonprogrammable devices that allow a user to do work. (3) A terminal or microcomputer, usually one that is connected to a mainframe or to a network, at which a user can perform applications.

Z

Z time. Abbreviation for *Zulu time*. Synonym for *coordinated universal time (UTC)*.

Zulu time (Z). Synonym for *coordinated universal time (UTC)*.

Special Characters

(Arabic and Hebrew), Bidirectional Language Support 151

A

AnyNet SNA over TCP/IP,
Introducing 173
AnyNet SNA over TCP/IP
overview 173
Defining Unique CP Names and
Connection Network Names 181
Helpful Hints 183
How SNA over TCP/IP Works 178
Mapping SNA Resources to IP
Addresses 179
Setting and Modifying the Routing
Preference Protocol 182
AnyNet Sockets over SNA 185
AnyNet Sockets over SNA Access
Node 185
Application Program Support
Provided by Sockets over SNA 191
How Sockets over SNA Works 187
Planning for Sockets over SNA 191
Routing and Mapping Overview 191
Arabic support 151
ASCII Host File Transfer 19
Advanced Settings 20
Changing a List of Files 22
Add More File Names to List 23
Change the personal computer or
Host File Name 23
Delete File Names From List 23
Defining Transfer Types 20
Explanation of Items to Be
Defined 20
Example of ASCII Protocol
Template 21
Templates Defined 21
File Transfer Templates 21
Automatic Generation of
File-Names 21
Defining Templates 21
Receiving Files From an ASCII
Host 23
Receiving Files to a Workstation
Directory 23
Saving the List of Files
File-Name Extension for List
Files 22
Open List File 22
Remove From List 22
Save List File 22
Selecting Files to Receive 23
Selecting Files to Send 24
Advanced Method 25
Basic Methods 24
Select From a Send/Receive
List 24

ASCII Host File Transfer 19 (*continued*)
Send File to Host 24
Changing the Host-File Name or
the Transfer-Type 25
Saving a List of Files to Send 25
Sending a List of Files 25
Using XMODEM and YMODEM 19
Choosing a Protocol 19
XMODEM and XMODEM1K 20
YMODEM and YMODEMG 20

B

Bidirectional Language Support (Arabic
and Hebrew) 151
Bidirectional Arabic Support 151
Bidirectional Hebrew Support 157
Considerations for Printing 151
birectional language support
Arabic 151
Hebrew 157

C

character sets 93, 95, 97
Character Sets, Country Codes, Code
Pages, and 93
code pages 93, 95, 97
Code Pages, and Character Sets, Country
Codes, 93
configuring, SSL support 74
Configuring SSL
using self-signed certificate 81
using unknown CA 78
using well-known CA 77
connecting remote TCP/IP
networks 187
country codes 93
Country Codes, Code Pages, and
Character Sets 93
DBCS Code Pages and Character
Sets 97
Host Code Page Tables 98
IBM Japanese Character Set (2-Byte
Codes) 146
Keyboard Country ID and Shift
Support 94
SBCS Code Pages and Character
Sets 95
Creating Additional Disk Space 239
Administrative Tools 239
Emulator Utilities 239
Important Notes 239
Information 240
Link Utility 240
Links 240
Other Tools 240

D

Database Access 247
Disk Space, Creating Additional 239
Drives (Shared Folders), Network 69

H

Hebrew support 157
Hints and Tips 243
Considerations 244
Inactivity Timeout for
Communications Links 244
Usage Notes for Sessions in OLE
Documents 243
host code page 98
Host File Transfer, ASCII 19

I

Installation and Uninstallation of
Personal Communications, Remote 43
General Information 43
Generic Uninstallation 48
Preparing 44
Remote Installation using SMS 45
Remote Installation using Tivoli
Courier 44
Remote Uninstallation using SMS 46
InstallShield Silent, Using 39
Debugging Silent Installation
Problems 41
Setting Up InstallShield Silent 39
Introducing AnyNet SNA over
TCP/IP 173

K

keyboard 93
keyboard country ID 94
keyboard layouts 195
Keyboard Layouts 195
APL Keyboard Layouts 233
Diagrams of Keyboard Layouts 196
Key Map for Home3270 235
Local Edit Keys 195

L

Language Support (Arabic and Hebrew),
Bidirectional 151
Layouts, Keyboard 195

N

Network Drives (Shared Folders) 69
Accessibility 69
Client Installation Considerations 69

Network Drives (Shared Folders) 69
(*continued*)
 Disabling Network Drives (Shared
 Folders) 70
 Performance Considerations 70
node operations 172
Notices 253

O

ODBC driver 247
ODBC Drivers and Database Access
 Utility 247
 Database Access Utility 249
 Open Database Connectivity (ODBC)
 Overview 247

P

Personal Communications, Remote
 Installation and Uninstallation of 43

R

Remote Installation and Uninstallation of
 Personal Communications 43

S

security
 configuring SSL 71
 using SSL 71
shift support 94
SNA Client/Server Concepts 165
 APPC Concepts 165
 SNA Communications 171
 SNA Node Operations 172
 Terminology 165
SNA node operations 172
sockets over SNA
 communicating over an SNA
 network 185
SSL Security
 configuring 71
 limitations 84
 Password
 changing 76
 problem determination 84
 using 71
SSL support
 configuring 74

T

Tips, Hints and 243
Tivoli Support 49
trademarks 255
Trademarks 255

U

Uninstallation of Personal
 Communications, Remote Installation
 and 43

Using InstallShield Silent 39

V

VT Emulation 3
 Configuring 3
 Additional Configuration
 Information for VT over
 Async 10
 Advanced ASCII Host 6
 Configuring Links for VT over
 Async 8
 Configuring Links for VT over
 Telnet 11
 Link Parameters 7
 Optional Parameters 5
 Session Parameters 4
 Using a VT Session 12
 Compose Key 12
 OIA Line Display Messages 17
 Transparent Mode 16

W

WinSock 185, 189

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