Personal Communications
AS/400 and 3270 for Windows** 95
Version 4.1

IBM

Reference

SC31-8206-00

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AS/400 and 3270 for Windows** 95
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Reference

SC31-8206-00

Note

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

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This edition applies to Version 4.1 of Personal Communications and to all subsequent releases and modifications until otherwise indicated in new editions or technical newsletters. Make sure you are using the correct edition for the level of the product.

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About This Book

This book provides information for using IBM Personal Communications AS/400 for Windows** 95 (hereafter called PC400) and IBM Personal Communications AS/400 and 3270 for Windows 95. In this book, *Windows* refers to Windows 95. *PC/3270* refers to the 3270 portion of the combined package. Throughout this book, *workstation* refers to all supported personal computers. When only one model or architecture of the personal computer is referred to, only that type is specified.

Who Should Read This Book

This book is intended for 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.

Organization

This book has four parts divided into the following chapters:

Part 1: General Information

Chapter 1, Personal Communications Highlights, describes the functions of Personal Communications.

Chapter 2, Where to Find More Information, describes where to find more information.

Chapter 3, Problem Determination and Reporting, describes how to diagnose problems and how to report problems to IBM.

Chapter 4, Printing, describes how to set up printers.

Chapter 5, Transferring Files, describes how to transfer files between a host system and a workstation.

Chapter 6, SNA Node Operations, describes how to perform SNA node operations.

Chapter 7, Country Codes, Code Pages, and Character Sets, describes the country codes, code pages and character sets supported by Personal Communications.

Chapter 8, Keyboard Layouts, describes the keyboards supported by Personal Communications.

Chapter 9, Alerts, explains alerts generated by Personal Communications, along with the corresponding messages.

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Part 2: Personal Communications/3270

Chapter 10, Building a Printer Definition Table (PDT) for PC/3270, explains how to create and change the printer definition table (PDT) used for PC/3270.

Chapter 11, File Transfer Commands for PC/3270, explains file transfer for PC/3270.

Chapter 12, Considerations for the Use of PC/3270 Sessions, provides technical information, considerations, and restrictions for PC/3270.

Part 3: Personal Communications AS/400

Chapter 13, Building a Printer Definition Table (PDT) for PC400, explains how to create and change the printer definition table (PDT) used for PC400.

Chapter 14, Field Attribute Codes, describes field attribute codes.

Chapter 15, Data Transfer for PC400, explains file description files and data conversion for the PC400 data transfer facility.

Chapter 16, File Transfer for PC400, explains file transfer for PC400.

Chapter 17, Considerations for the Use of PC400 Sessions, provides technical information, considerations, and restrictions for PC400.

Part 4: Appendixes

Appendix A, Client/Server Concepts, provides some concepts for operating in a client/server environment.

Appendix B, Deleting Unnecessary Files, explains how to delete unnecessary Personal Communications files.

Appendix C, Modem Hints and Tips, describes how to set up and use modems with Personal Communications.

This book also contains a glossary and an index.

Highlighting Conventions

This book uses the following highlighting conventions:

UPPERCASE	Uppercase type indicates commands, program keywords, and default values. 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.

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. General Information

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Chapter 1. Personal Communications Highlights

Personal Communications is available in two packages:

Personal Communications AS/400 V4.1 for Windows 95, which provides 5250 emulation and connections to Application System/400 (AS/400) systems. This package is referred to as PC400.

Personal Communications AS/400 and 3270 V4.1 for Windows 95, which provides 5250 and 3270 emulation and connections to AS/400 and S/390 systems. The components of this combined package are referred to as PC400 and PC/3270.

The information in this book applies to both packages, except where indicated otherwise.

Personal Communications brings the power of personal networking to your workstation by exploiting the networking capabilities of Windows 95 (hereafter referred to as Windows) to provide a variety of connectivity options supporting local area network (LAN) and wide area network (WAN) environments. Whether you need host terminal emulation, client/server applications, or connectivity, Personal Communications offers a robust set of communications, networking, and administrative features.

Personal Communications is a full-function emulator package with an easy-to-use graphical interface, which includes many useful features such as file transfer and dynamic configuration, all in the Windows 95 environment. PC400 also provides support for data transfer.

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

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

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Personal Communications provides the following functions:

System/390 Connections

LAN	LAN via IEEE 802.2
	LAN via NetWare** for SAA (IPX/SPX)
	Telnet3270 (TN3270)
	3270 via AS/400 (passthru)
	APPC3270 via LAN
	Windows NT** client (using the FMI interface)
	Windows NT client (using the LUA interface)
	Windows NT client (using the APPC network interface)
	Dependent Logical Unit Requester (DLUR)
COAX	SNA Distributed Function Terminal
	Non-SNA Distributed Function Terminal
COM port	SNA-over-Async
	IBM Global Network
	Home3270
	Advantis (IIN)
	Dependent Logical Unit Requester (DLUR)
SDLC	Synchronous Data Link Control
	3270 via AS/400 (passthru)
	APPC3270 via SDLC
	Dependent Logical Unit Requester (DLUR)
5250	3270 via AS/400 (passthru twinax)

AS/400 Connections

LAN	LAN via IEEE 802.2
	Telnet5250 (TN5250)
	Windows NT client (using the APPC network interface)
SDLC	Synchronous Data Link Control (MPA)
5250	Twinaxial Data Link Control (APPC)
COM port	SNA-over-Async

Client/Server Connections

LAN	LAN via IEEE 802.2
	Telnet5250 (TN5250)
Twinaxial	Twinaxial Data Link Control (APPC)
COM port	SNA-over-Async
SDLC	Synchronous Data Link Control

Configuration of SNA Node (APPN) Sessions

- Emulator
- Client/server applications

SNA Node Operations

- Starting and stopping resources
- Deleting resources
- Displaying resource information
- Changing session limits
- Initiation of path switches

Log Viewer

Trace Capability

- 3270/5250 emulator data

- APPN and APPC API data
- Connectivity data, such as LAN or SDLC
- User services data, such as node initialization

APPC Applets

- Display SNA sense data (GETSENSE)
- Transfer files (AFTP and AFTPD)
- Check connection (APING)

Sample Programs

Installation and Configuration

- Partial installation option
- Program sharing on a network server
- Automatic detection of installed communication adapters
- Dynamic change of communication configurations
- Automatic Dial Facility (Async (IGN, IIN), SDLC, Home3270, SNA-A)

Migration

- Migration from Personal Communications for Windows V3.0 or later

Host Session Function

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

Host Graphics Support

- Built-in vector graphics support for GDDM and other graphics applications

File Transfer Function

- Easy operation through graphical user interface (GUI) windows
- Batch transfer of multiple files
- Concurrent file transfer through multiple sessions
- Background file transfer
- File transfer invocation by macro
- OfficeVision/MVS Import/Export functions

Edit (Cut and Paste) Function

You can use the clipboard to cut, copy, and paste a selected area. In addition, you can paste data in other applications, such as spreadsheet programs, that support the PasteLink function.

- Support of spreadsheet data format (Sylk, Biff3, Wk3 formats)
- Copy Append
- Paste Next
- Paste to Trim Rectangle
- Paste Stop at Protected Line

Graphical User Interface (GUI)

- Customizable 3D iconic tool bar
- 3D button hotspots
- Pop-up keypad
- Macro function, including record and play
- Keyboard-function setup and remapping
- Mouse-button-function setup and remapping
- Display setup (cursor type, graphics, sound, colors, for example)

- Automatic font size adjustment or fixed font size
- Window-appearance setup
- Menu-bar customization
- 3270 Light Pen emulation by using a mouse
- Online help

Print Function

- Printer session (for PC/3270: SCS, LU 3, or non-SNA)
- Graphics local print
- Printing with the Windows 95 printer drivers
- Print function by printer definition table (PDT)
- Multiple host-print functions in multiple sessions
- Print-job control by SNA bracket timeout
- PDF-to-PDT conversion tool
- PC400 print function by OS/400 Host Print Transform (HPT)
- PC400 printing supported by the AS/400 Advanced Print Support Utility
- ZipPrint

Programming Interfaces

- 16/32-bit Emulator High-Level Language Application Programming Interface (EHLLAPI)
- 16/32-bit Dynamic Data Exchange (DDE)
- Node Operations Facility (NOF)
- 32-bit Advanced Program-to-Program Communication (APPC)
- 16/32-bit Personal Communications API (PCSAPI)
- Common Programming Interface for Communications (CPI-C)
- 16/32-bit Server-Requester Programming Interface (SRPI)

PC400 Client Function

- Data transfer
- PC Organizer
- Text Assist
- Enhanced Programmable Terminal User Interface (ENPTUI)

Chapter 2. Where to Find More Information

This chapter discusses getting help when you are installing, configuring, or using Personal Communications.

Online Help

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

Use help to obtain the following information:

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

How to Use Online Help

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

You can use Personal Communications online help just as you use the online help for Windows 95.

Messages and Alerts

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

Page Fault Messages

If a message does appear in a pop-up window, you can paste its contents into the Windows 95 clipboard. To do this:

1. Click **Details** on the pop-up window.
2. Mark the text that you want to copy.
3. Click the marked text with the right mouse button and then click **Copy**.
4. Start an editor, such as Notepad, and click **Paste** from the Edit pull-down menu.
5. Save the file in case an IBM Service Representative needs this information to diagnose your problem.

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OIA Messages

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

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

All of the OIA indicators, reminders, and messages are described in the online help. To view this information:

1. Select **Index** from the Help pull-down menu.
2. Select **The operator information area messages**.

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

Alerts

Alerts may be generated which correspond to specific Personal Communications messages. See Chapter 9, “Alerts” on page 9-1 for more information.

Personal Communications Library

The Personal Communications library includes the following publications:

CD-ROM Guide to Installation, GC31-8078
Up and Running, SC31-8205
Reference, SC31-8206
Emulator Programming, SC31-8207
Client/Server Communications Programming, SC31-8208
System Management Programming, SC31-8199

These books are also available in BookManager format and are optionally installed.

Chapter 3. Problem Determination and Reporting

This chapter describes the information that will help you to solve a problem yourself, to recognize a problem accurately before reporting it to your system administrator, or to report a problem to IBM.

These are the processes that you should follow:

1. Problem determination (PD)
2. Problem-source identification (PSI)
3. Viewing message logs
4. Obtaining trace data
5. Problem reporting (PR)

Problem Determination (PD)

Problem determination (PD) is the first stage in solving your problem.

Symptoms

Recognize the differences between what you expect to see and what you do see.

Environment

Recognize the environment in which the problem occurs:

Personal Communications configuration

- Personal Communications version and CSD level
- The name of the workstation profile
- The name of the SNA Node configuration file

Workstation configuration

- The machine type and model, the system memory, the video adapter
- The communication adapter you are using
- Other adapters (especially communication adapters) installed
- The printer type and model
- Other devices installed, such as sound cards, modems, or fax machines

Software configuration

- Windows 95 version and level
- Communication device-driver version and level
- Other communication programs (such as Netware, Microsoft SNA Server, or Microsoft Data Link Control) that are running and using resources
- Printer driver version and level.

Host configuration

- The upstream host connection and configuration

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Problem Type

Categorize your problem into one of the following types:

1. **Installation Problem**. Note the error message and take the required action by consulting the online help.
2. **Configuration or Setup Problem**. If Personal Communications did not connect to the host (that is, if the host screen did not appear) verify that your hardware, software, and Personal Communications configurations are correctly set up for your host environment. To help you to isolate what is wrong, look up any OIA messages or error messages in the online help. You might also need to ask your system administrator to verify that your Personal Communications setup values are correctly configured for your host system.
3. **Operational Problem**. Although you were able to connect to the host, you might have difficulty in doing some operations or in using a certain Personal Communications function. Look up any OIA or error messages in the online help, and study *Up and Running* and this manual to see how the operation should be performed.

Problem Area

You also need to identify where the problem is:

1. Installation and configuration
2. Printer
3. API
4. Other Personal Communications functional area

Problem Re-Creation

As the final step of the problem determination process, try to re-create the problem; the problem-re-creation procedure and the probability of the recurrence of the problem are key factors in isolating it. If the problem is intermittent, any factor that you think is related to it becomes important information.

Problem-Source Identification (PSI)

The second stage is to try to identify the real cause of the problem; this depends largely on the problem area:

1. **Installation and Configuration**. Make sure that your workstation hardware and software are configured correctly. You might also need to contact your system administrator to verify that your Personal Communications setup values are correct for your host system.
2. **Printer**. Identify the operation you are having the problem with:

   Local print
   Host-directed print (LU 1)
   Host-directed print (LU 2)
   Host-directed print (LU 3)
   Host-directed print (non-SNA)

   Also identify which printer mode you are using:

   PDT mode: Personal Communications-proprietary printer-driver mode
   PD mode: Windows printer-driver mode

Then check that you have installed the correct printer driver and make sure that you have configured the driver appropriately. If you are using PDT mode, check the content of your PDF file, especially if you have customized it. Depending on the problem you are having, you might need to run a link-line trace.

3. **API**. The cause could be in an application that uses an API, or the problem could be in Personal Communications. Identify which of these is causing the problem. The API trace might also help you to identify the source of the problem.
4. **Other Personal Communications Functional Area**. Make sure that you can explain why you think that the source of the problem is in Personal Communications.

Viewing Personal Communications Logs

The Personal Communications log viewer utility enables you to view information contained in a Personal Communications log. You can use the viewer during problem determination to view the messages in the message log. The default name of the message log output file is *PCSMSG*; its file extension must be *.MLG*.

To view messages in a message log:

1. From the Administrative and PD Aids folder, click **Log Viewer**.
2. From the list of logged messages, double-click on a message number to display message help.

Obtaining Trace Data

The Personal Communications trace facility enables you to log trace information for certain Personal Communications functions. This information could be useful in identifying the source of problems by tracing:

3270/5250 emulator data
APPN and APPC API data
Connectivity data, such as LAN (LLC2) or SDLC
User services data, such as node initialization

Note

To obtain trace data on NT SNA Server attachments, use the PCSMON program. See the online help for more information.

To start a trace, perform the following steps:

1. From the Administrative and PD Aids folder, double-click **Trace Facility**. The trace status on the title bar displays the current state:

   Active Trace data is being collected by the trace facility.

   Inactive No trace data is being collected and the trace facility is not ready to collect data.

2. From the main dialog box, click **Set Up** to set up the desired trace system parameters.
3. Click **OK** to return to the main trace dialog box.

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

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

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

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

   The following table shows the available choices:

Function Name	Component Name	Trace Options
3270/5250 Emulator	Communication data	TCP/IP IPX/SPX IBM Global Network Home3270 SNA DFT Non-SNA DFT
	API	EHLLAPI DDE
	Event	Keystroke
APPN and APPC	NOF API MS CPI-C RUI CSV APPC CCE	**These options apply to all components:** Verb trace only Verb trace (up to 128 bytes of data) Verb trace (full data)
Connectivity	LAN (LLC2) SDLC TDLC	**These options apply to all components:** DLC interface Outbound data Inbound data
User Services	Node Initialization	API trace

5. Start tracing data by clicking **Start**, or apply changes to the trace options by clicking **Apply**.
6. Run the operation that you want to trace.
7. Optionally, stop the trace by clicking **Stop**.
8. Click **Format** to specify a formatted trace file name and to format the trace data. Click **OK**.
9. Save the trace data to your hard disk by clicking **Save**.
10. Click **Clear** to clear either the trace buffer or the disk file where you saved a trace.

Problem Reporting (PR)

If your problem still persists even at this stage, and if you think that the source is in Personal Communications, report the problem to IBM.

When you do this, you need to provide the information you obtained through the problem determination (PD) and problem-source identification (PSI) processes:

1. PD information includes:

   Symptoms
   Environment
   Type of problem
   Problem area
   Problem re-creatability and re-creation procedure

2. PSI information includes:

   OIA messages or error messages (if any)

   Key factors related to the problem

   Output from Trace facility

   Message log

   Data in the **PRIVATE** subdirectory, such as **.WS**, **.kmp**, and **.bch** files

   PDF file (for printer problems in PDT mode)

   Spool file (for printer problems)

What to Do If Pcs_srvr Fails

If your Personal Communications session fails to respond, Pcs_srvr may have failed. To restart Personal Communications, perform the following steps:

1. Press **Ctrl-Alt-Delete** to display the Close Program task list.
2. Select **Pcs-agnt**, then click on **End Task**.
3. Restart Personal Communications. If Personal Communications will not restart, shut down and restart your system.

Contacting IBM

This section lists a number of ways you can reach IBM for various reasons. Depending on the nature of your problem or concern, we will ask you to be prepared to provide us with some information to allow us to serve you better.

If you have a technical problem, please take the time to review and carry out the actions suggested here. Use your local support personnel before contacting IBM. Only persons with in-depth knowledge of the problem should contact IBM; therefore, support personnel should act as the interface with IBM.

If you determine that you need to contact IBM, the following section describes the services IBM provides.

Statement of Service

IBM provides defect support through Program Services. A defect-related problem means the program does not conform to specifications and could be either a code or documentation error.

For information on how you may access Program Services or other fee-based support services in the U.S.A., please contact the Project Office at 800-799-7765. Hours of operation are from 8:00 a.m. to 5:00 p.m. Eastern Time, Monday through Friday, except U.S. national holidays.

The terms and conditions for the technical support described in this guide are subject to change.

Reporting Defects

Customers can report code-related problems to IBM electronically, via fax, or through U.S. mail. IBM will respond in the same media as the customer inquiry. IBM will respond to customer inquiries within a maximum of 2 business days of electronic or facsimile receipt, and 7 days of mail receipt advising of the problem disposition.

If the problem reported is not known to be a code-related problem, the customer will be informed that IBM will continue to work on it for a fee if the customer does not have a support contract, or is beyond the “getting started” period. If the problem is determined to be caused by an error in IBM code, the fee will be waived.

Submitting Defects by Fax

To fax a potential defect to IBM:

1. Call 1-800-992-4777 to have a fax submission form sent to your fax machine. Follow the prompts to select the correct options. Fill out the form and fully describe your problem.
2. Fax the completed defect report to:

   8 -426-86 2

   Be sure to include your fax number for a response.

Submitting Defects by Mail

To mail a potential defect to IBM:

1. Fully describe your problem.
2. Mail the completed defect report to:

   IBM CORPORATION
   PERSONAL SYSTEMS SUPPORT FAMILY
   114 BURNET ROAD
   INTERNAL ZIP 29 1
   AUSTIN, TEXAS 78728

Be sure to include your return address for a response.

Submitting Defects Electronically

IBM will accept potential defect reports submitted using the Internet, TalkLink, or Compuserve. Included here for convenience are the steps to access electronic customer support:

TalkLink via IBMLink: The Personal Communications AS/400 and 3270 products are supported via the OS2BBS1 section of the IBMLink service.

1. Access the OS2BBS1 section via an IBMLink Main Menu.
2. Select **IBMSupt - IBM PS Defect Submission, CSD Order, & Info Library**.
3. Select **PROBrpt - Submit an ETR (Defect Submission)**.
4. Select **OTHERProb - PS Supportline - Other IBM Software Products Def. Menu**.
5. Select **J-p - PS Supportline - IBM software products J to P Menu**.
6. Then select the Personal Communications product in the displayed list (there are various versions and titles displayed, please choose the one that best describes your product)

A temporary reporting number will be displayed at the bottom of the screen. Record this number until a permanent Problem Management Record (PMR) number is assigned to your defect reported.

Also available in the U.S. is access to the PCOMM CFORUM on TalkLink. If you do not have access to TalkLink, call 1-800-547-1283 (U.S.A. only). TalkLink administration personnel will send you a registration package that lists the available features and the current subscription rates. You should receive the registration package approximately two weeks after calling. Return the necessary documents and TalkLink administration personnel will send you a welcome package that contains the software you need to access TalkLink.

The Internet: To submit a software defect report for a Personal Systems Support Family product, use an internet browser and go to URL:

http://ps.boulder.ibm.com/www/usa/ps/services

Please note that a customer number and a special personal identification number (PIN) are required to access this service. You can call 1-800-992-4777 to receive your customer number and PIN (tell the customer support representative that you need the customer number and PIN for reporting a defect via the Internet).

This will bring you to the IBM Personal Software Services page. Then choose **Electronic Services**. From the Electronic Services page, select **Other Electronic Services**. On that page, review the section **E-mail Services for Problem Defect Reporting**.

IBM Service Home Page

Using an internet browser, go to the following URL:

http://ps.software.ibm.com

Some service fixes and other miscellaneous product information files are located at the following FTP locations:

service.boulder.ibm.com/ps/products/pc3270
service.boulder.ibm.com/ps/products/pc400

service.boulder.ibm.com/ps/products/pctlkit
service.boulder.ibm.com/ps/products/nswin
service.boulder.ibm.com/ps/products/anynet

CompuServe: To report a suspected defect in a product in the Personal Systems Support Family via CompuServe:

1. From the CompuServe Main Menu, GO OS2SUPPORT.
2. In the Library called IBM Files (library 23), download the file PROBLM.TXT.
3. Fill in the appropriate sections of the form contained in PROBLM.TXT (some sections are specific to OS/2 and OS/2-related problems). Please complete the form as completely as possible for your specific operating environment.
4. Using CompuServe E-mail, send this completed form to the address: 76711,611

IBM will reply via CompuServe mail to each PROBLM.TXT defect report received. The reply will include a Problem Management Record (PMR) number. This number is used by IBM to track each unique problem reported by each customer. The IBM reply will also include any other information necessary for the situation.

Other Ways to Contact IBM

Information about Personal Communications is available from the following sources:

The PCOMM CFORUM

This forum is monitored by Personal Communications users and, when possible, by Personal Communications developers.

- In the U.S., access the PCOMM CFORUM on the OS2BBS bulletin board via TalkLink.

  If you do not have access to TalkLink/OS2BBS, call 1-800-547-1283 (U.S.A. only). TalkLink administration personnel will send you a registration package that lists the available features and the current subscription rates. You should receive the registration package approximately 2 weeks after calling. Return the necessary documents and TalkLink administration personnel will send you a welcome package that contains the software you need to access TalkLink/OS2BBS.

  IBMLink customers can register via SMARTLink's new TalkLink selection.

- In Canada, access the PCOMM CFORUM via IBMLink.
- In Australia, to access the PCOMM CFORUM:

  1. Type NEWMENU to access the pilot menus.
  2. Select **FORUMS**.

- In Europe, the Middle East, and Africa, use DIAL-IBM to access the PCOMM CFORUM via the CONFER application on OS2BBS.

  If you do not have access to OS2BBS, contact your country DIAL-IBM help desk.

Internet

IBM Personal Software Services has a home page on the Internet that has general product information as well as service information about APAR fixes.

Using an Internet browser such as IBM WebExplorer, go to the following URL: http://ps.software.ibm.com/www/usa/ps/services/

IBM Networking Software has a home page on the Internet that also has general product information and service information. Using an Internet browser such as IBM WebExplorer, go to the following URL: http://www.raleigh.ibm.com/

IBM Personal Communications Online Customer Support

Access this electronic bulletin board to view information APARs and to obtain APAR fixes. To request that an APAR fix be made available, either leave a message for SYSOP on the bulletin board or call 1-800-992-4777 (U.S.A. only).

To access the electronic bulletin board:

- Dial 919-543-8200 (country code: 001 from outside the U.S.A.).
- Use protocol N81.
- Follow the instructions. Entering your first name and last name registers you the first time you use the facility.

The IBM Software Solutions Center

From the U.S.A., call 800-992-4777. From Canada, call 800-465-2222. Outside call IBM International Information at 800-426-1774.

Problem Determination and Reporting

Chapter 4. Printing

You can use Personal Communications to print from display or printer sessions.

From display sessions, you can print all (**Print Screen**) or part (**Trim Print**) of the screen of your session window on a workstation printer. **Trim Print** is not available for PC400 sessions. For more information, refer to *Up and Running* or the online help.

From printer sessions, you can direct printing from an S/390 or AS/400 system to a workstation printer.

Configure a printer session to designate a workstation printer as a system printer that will use either a Windows printer driver or a printer definition table (PDT) provided with Personal Communications.

Use PDT files for Personal Communications to print files based on printer control information, such as control codes and the printer output format, defined in the PDT. You can customize PDTs to define your own controls, by editing the corresponding PDF and converting it to a PDT.

Use Windows printer drivers for Personal Communications to print files based on printer setup parameters, such as scaling, duplex options, and page orientation, that you define in **Printer Setup**.

From a PC/3270 session, you can also use the ZipPrint utility provided in the Emulator Utilities folder to print PROFS or OfficeVision (OV) notes, calendars, documents, CMS files, XEDIT workspaces, and host-session screens. See the online help for more information.

For considerations and restrictions on printing, refer to Chapter 12, “Considerations for the Use of PC/3270 Sessions” on page 12-1 and Chapter 17, “Considerations for the Use of PC400 Sessions” on page 17-1.

Setting Up the Printer

Following is a description of how to set up the printer that you want to use, with either a Windows printer driver or a PDT file.

For an explanation of how to customize a PDT, refer to Chapter 10, “Building a Printer Definition Table (PDT) for PC/3270” on page 10-1 or Chapter 13, “Building a Printer Definition Table (PDT) for PC400” on page 13-1.

Defining a Printer for a Session

To choose or change the printer to be used, follow these steps:

1. Click **File - Printer Setup** in the menu bar of the session window.

   The Printer Setup window lists the available printers.

2. Select the printer to be used from the list box.
3. Confirm that **Use PDT** is not selected.

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Using PDT Files

To use a PDT file:

1. Click **File - Printer Setup** from the menu bar of the session window.

   The Printer Setup window appears.

2. Click the printer to be used from the list box.
3. Click **Setup**; specify the paper size.
4. Click **OK**.
5. Click the **Use PDT** check box, then **Select PDT**.

   The Select PDT file window appears.

6. To use an existing PDT, select the PDT file to be used; then click **OK**.

   To use a PDF that you have modified, you must first convert it to a PDT. To do so:

   a. Click **Convert PDF**.

   b. Select the PDF file to be converted from the list, then click **Convert**.

      The window displays the result of the conversion. If there are any errors during the conversion, they are listed in the window.

   c. When you select **Save List**, the window list is saved in **.LST** file in the **PDFPDT** subdirectory.

      To close without saving the list, click **Close**.

      After the file is converted, control returns to the Select PDT file window and the converted PDT file appears in the list.

   d. Select the PDT file; then click **OK**.

7. Click **OK** in the Printer Setup window.

PDT Files

PDT files define the transfer of characters and control codes to a printer, and the printer output format. If a printer definition table (PDT) file is used, the Windows printer driver is not used; instead, Personal Communications generates print outputs based on printer control information defined in the PDT file.

The PDTs provided by Personal Communications and the corresponding printers are listed in the following table.

The following PDTs are supported for both 3270 and 5250 sessions:

File Name	Printer Name/Model
IBM3812.PDT	IBM 3812 Page Printer, Model 2
IBM3816.PDT	IBM 3816 Pageprinter II
IBM38521.PDT	IBM 3852 Color Printer
IBM38522.PDT	IBM 3852 Color Jetprinter, Model 2
IBM4 19.PDT	IBM 4 19 LaserPrinter
	IBM 4 19 LaserPrinter E
	IBM 4 29 Laser Printer
HPLJII.PDT	HP LaserJet II Series

HPLJII2.PDT[1]	
IBM4 72.PDT	IBM 4 72 ExecJet Printer
IBM42 1.PDT	IBM 42 1 Proprinter
	IBM 42 1 Proprinter II
	IBM 42 1 Proprinter III, Model 3
	IBM 238 Personal Printer Series 2
IBM42 2.PDT	IBM 42 2 Proprinter XL, Model 1
	IBM 42 2 Proprinter XL, Model 2
	IBM 42 2 Proprinter III XL, Model 2
	IBM 42 2 Proprinter III XL, Model 3
	IBM 4216 Personal Pageprinter
	IBM 2381 Personal Printer Series 2
IBM42 7.PDT	IBM 42 7 Proprinter X24
	IBM 42 7 Proprinter X24E
	IBM 239 Personal Printer Series 2
IBM42 8.PDT	IBM 42 8 Proprinter XL24
	IBM 42 8 Proprinter XL24E
	IBM 2391 Personal Printer Series 2
IBM5152.PDT	IBM 5152 Graphics Printer, Model 2
IBM5182.PDT	IBM 5182 Color Printer
IBM52 1.PDT	IBM 52 1 Quietwriter Printer, Model 1
	IBM 52 1 Quietwriter Printer, Model 2
IBM52 2.PDT	IBM 52 2 Quietwriter III
	IBM 52 4 Quietwriter Printer
PRN5216.PDT	IBM 5216 Wheelprinter
IBM5223.PDT	IBM 5223 Wheelprinter E
ACTLZR2.PDT	Epson Action Laser2 LQ25 mode
BJ3 .PDT	Canon BJ3 CAPSL mode
LBP4.PDT	Canon LBP4 ISO mode
LQ87 .PDT	Epson LQ87 /117

The following PDTs are supported for 3270 sessions only:

File Name	Printer Name/Model
PRN3812.PDT	IBM 3812 Pageprinter Model 2
	IBM 3816 Pageprinter II
PRN38521.PDT	IBM 3852 Color Printer
PRN38522.PDT	IBM 3852 Color Jetprinter, Model 2
PRN4 19.PDT	IBM 4 19 LaserPrinter
	IBM 4 19 LaserPrinter E
	IBM 4 29 Laser Printer
PRN4 72.PDT	IBM 4 72 ExecJet Printer
PRN42 2.PDT	IBM 42 1 Proprinter
	IBM 42 1 Proprinter II
	IBM 42 1 Proprinter III, Model 3
	IBM 42 2 Proprinter XL, Model 1
	IBM 42 2 Proprinter XL, Model 2
	IBM 42 2 Proprinter III XL, Model 2
	IBM 42 2 Proprinter III XL, Model 3
	IBM 42 7 Proprinter X24
	IBM 42 7 Proprinter X24E

[1] HPLJII2.PDT is identical to HPLJII.PDT, except that it does not contain FF in the END_JOB entry.

	IBM 42 8 Proprinter XL24
	IBM 42 8 Proprinter XL24E
	IBM 4216 Personal Pageprinter
	IBM 238 , 2381, 239 , 2391 printers
PRN5152.PDT	IBM 5152 Graphics Printer, Model 2
PRN5182.PDT	IBM 5182 Color Printer
PRN52 2.PDT	IBM 52 1 Quietwriter Printer, Model 1
	IBM 52 1 Quietwriter Printer, Model 2
	IBM 52 2 Quietwriter III
	IBM 52 4 Quietwriter Printer
PRN5216.PDT	IBM 5216 Wheelprinter
PRN5223.PDT	IBM 5223 Wheelprinter E

The following PDTs are provided for 5250 sessions only:

File Name	Printer Name/Model
CPQPM2 .PDT	Compaq PageMarq 15 HP Mode
	Compaq PageMarq 2 HP Mode
EAP225 .PDT	Epson AP225
EAP325 .PDT	Epson AP325
EAP55 .PDT	Epson AP5
	Epson AP55
EFX117 .PDT	Epson FX117
EFX5 .PDT	Epson DFX5
	Epson DFX8
EFX85 .PDT	Epson FX85
ELQ1 7 .PDT	Epson LQ57
	Epson LQ1 7
ELQ255 .PDT	Epson LQ255
ELQ51 .PDT	Epson LQ51
ELQ86 .PDT	Epson LQ86
ELX81 .PDT	Epson LX81
EPLPCL4.PDT	Epson EPL7 HP Mode
EPLPCL5.PDT	Epson EPL8 HP Mode
ESQ117 .PDT	Epson SQ117
HPDSKJT.PDT	HP DeskJet 5
HPDJ55 C.PDT	HP DeskJet 55 C
HPLJIII.PDT	HP LaserJet III
	HP LaserJet IIIP
	HP LaserJet IIISi
HPLJIIID.PDT	HP LaserJet IIID
	IBM 4 39 LaserPrinter HP Mode
HPLJ4.PDT	HP LaserJet 4
IBM4 7 .PDT	IBM 4 7 IJ
IBM4 7 E.PDT	IBM 4 7 IJ Epson Mode
IBM4212.PDT	IBM 4212 Proprinter 24P
IBM4226.PDT	IBM 4226-3 2 Printer
NEC63 .PDT	NEC P62 Pinwriter
	NEC P63 Pinwriter
PANLBP4.PDT	Panasonic KX-P441 HP Mode
	Panasonic KX-P442 HP Mode
	Panasonic KX-P445 i HP Mode
PANLBP5.PDT	Panasonic KX-P443 HP Mode
	Panasonic KX-P4451 HP Mode
PAN1123.PDT	Panasonic KX-P1123 Epson Mode

PAN1124.PDT	Panasonic KX-P1124 Epson Mode
	Panasonic KX-P1624 Epson Mode
PAN118 .PDT	Panasonic KX-P118 Epson Mode
	Panasonic KX-P118 i Epson Mode
	Panasonic KX-P1191 Epson Mode
PAN1695.PDT	Panasonic KX-P1695 Epson Mode
PAN2123.PDT	Panasonic KX-P2123 Epson Mode
PAN2124.PDT	Panasonic KX-P2124 Epson Mode
PAN218 .PDT	Panasonic KX-P218 Epson Mode
PAN2624.PDT	Panasonic KX-P1124i Epson Mode
	Panasonic KX-P1654 Epson Mode
	Panasonic KX-P2624 Epson Mode

If a PDT file does not exist for the printer being used, you can create your own. To do so, first create a printer definition file (PDF) and convert it into a PDT file, as described in “Using PDT Files” on page 4-2. PDF files are saved in the **PDFPDT** subdirectory under the directory in which Personal Communications has been installed.

PFT Migration

You can migrate a PC Support/400 Workstation Feature Printer Function Table (PFT) to a PDF for PC400. Refer to “PFT Migration Utility” on page 13-28 for more information.

Setting Printer Control Parameters

You can set Printer Control parameters, such as the maximum number of lines per page, the maximum number of columns, and fonts. These parameters are initially set to the defaults. Use this function to change specific control items.

Note: When a PDT file is used, this function cannot be used.

You can set the following parameters.

Table 4-1 (Page 1 of 2). Print Control Parameters (Text)

Parameter	Description
CPI	Specifies the number of characters to be printed per inch. If CPI was not set previously, a CPI value suitable for the font selected from the Font list box is assumed as the default.
LPI	Specifies the number of lines to be printed per inch. If LPI was not set previously, an LPI value suitable for the font selected from the Font list box is assumed as the default.
Maximum Number of Lines per Page	Specifies the maximum number of lines per page. A number 1–255 can be specified. The default is **66**.
Maximum Number of Characters per Line	Specifies the maximum number of characters per line. A number 1–255 can be specified. The default is **132**.

Table 4-1 (Page 2 of 2). Print Control Parameters (Text)

Parameter	Description
Font	Lists, in the list box, the fonts that can be used with the currently selected printer. The fonts in brackets [ ] are device fonts specific to the printer driver. The other fonts are graphics display interface (GDI) fonts printed in bit map formats.
Print Options	The options listed in the following table can be selected as print options. These options are not available for the printer session.

From either a PC/3270 or PC400 display session, you can set additional parameters by selecting the **Options** button, as follows:

Table 4-2 (Page 1 of 2). Print-Control Options

Option	Item to be set
Suppress null lines	Determines whether to delete lines containing only null or non print characters (null or non print field characters, and field attributes) or to print them as null lines. **Selected** Null lines are not printed. **Not selected** Null lines are printed. This option can be used when: The **Print Screen** command is used LU type 3 printing, or non-SNA printing is done The combination of bits 2 and 3 of the WCC is not 00.
Print nulls as spaces	Determines whether to print NULL control codes as null characters. **Selected** The codes are printed as null characters. **Not selected** The codes are not printed as null characters. This option can be used when: The **Print Screen** command is used LU type 1 or 3 printing, or non-SNA printing is done.

Table 4-2 (Page 2 of 2). Print-Control Options

Option	Item to be set
Suppress auto new line when:	**CR at maximum print position +1** Determines whether to perform automatic new line when CR is the maximum number of columns to be printed away from the first column. **Selected** Automatic new line is not done. The characters after the CR code are printed on the same line. **Not selected** Automatic new line is done. **NL at maximum print position +1** Determines whether to perform automatic new line/carriage return before new line/carriage return (NL) is done when NL is the maximum number of columns to be printed away from the first column. **Selected** Automatic new line/carriage return is not done. **Not selected** After automatic new line/carriage return is done, new line/carriage return is done again. This option can be used when LU type 3 printing or non-SNA printing is done and the combination of bits 2 and 3 of the WCC is 00. This option cannot be used in 5250 sessions.
Ignore FF when at first print position	Determines whether to ignore the FF code at the beginning of the buffer address. **Selected** The FF code is ignored and not executed. **Not selected** The FF code is executed. This option can be used when: The **Print Screen** command is used LU type 1, LU type 2, LU type 3, or non-SNA printing is done. This option cannot be used in 5250 sessions.
FF takes a print position if followed by data	Determines whether to print null characters if data follows the FF code. **Selected** FF is executed, and null characters are printed at the beginning of the next page. Therefore, the next data is printed in the second column of the line. **Not selected** The FF code is not executed. Therefore, the next data is printed at the beginning of the first line on the next page. This option can be used when: The **Print Screen** command is used Host initiated local copy and LU type 3 printing, or non-SNA printing is done. In both PDT and standard modes. This option cannot be used in 5250 sessions.

When you use a PC400 printer session, you can set additional parameters by clicking the **Options** button, as follows.

Table 4-3. Print Control (PC400 only)

Parameter	Description
Page Orientation	Allows you to change the default page orientation to specify how to print a document on the workstation printer. If the orientation is explicitly set by the AS/400 printer control code, the explicit orientation is used. The options are listed in the following table.

Table 4-4. Page Control (PC400 only)

Option	Item to be set
Drawer 1 orientation	The default page orientation for the paper from drawer 1. **Computer output reduction** The document is printed in landscape. The font, pitch, and margins are set to appropriate values to fit on a page. **Portrait** The document is printed in portrait. **Landscape** The document is printed in landscape.
Drawer 2 orientation	The default page orientation for the paper from drawer 2. **Computer output reduction** The document is printed in landscape. The font, pitch, and margins are set to appropriate values to fit on a page. **Portrait** The document is printed in portrait. **Landscape** The document is printed in landscape.
Automatic Page Orientation	Determines whether to calculate the page orientation when the page orientation is currently **Default**. **Selected** The page orientation is calculated as follows: 1. If the output exceeds the current page size, **Drawer 1 orientation** or **Drawer 2 orientation** is used. 2. If the output fits the current page size, the dimensions are compared. If the shorter dimension is specified as depth; then **Landscape** is used, otherwise **Portrait** is used. **Not selected** **Drawer 1 orientation** or **Drawer 2 orientation** option is used.

Table 4-5. Form Settings (PC400 only)

Parameter	Description
Form Settings	Specifies the form that should be selected when an application program specifies one of the following paper sources: Drawer-one form Drawer-two form Envelope-hopper form Before using this function, you must configure the paper trays and forms in the printer-driver setup.

Table 4-6. Print Control Parameters - Graphics (PC/3270 only)

Parameter	Description
Scaling	The screen image is printed with the resolution that is calculated as the actual screen resolution multiplied by the following parameters. **x1** Same resolution as screen **x2** Double the resolution in each dimension **x3** Triple the resolution in each dimension **x4** Four times the resolution in each dimension
Black-on-White	This option allows you to determine how the black pixels on the screen are printed. **Yes** Black pixels are printed as white pixels. Pixels other than black are printed as black pixels when you use a monochrome printer. When you use a color printer, they are printed in the same color as on the screen. **No** Black pixels are printed in black. Pixels other than black are printed as white pixels when you use a monochrome printer. When you use a color printer, they are printed in the same color as on the screen.

Setting Printer Control Items

To set or change control items:

1. Choose **File - Printer Control** from the menu bar of the session window.
2. Choose **Text** or **Graphics**.

   The Printer Control window appears.
3. Change the items to be set by referring to 4-1, 4-2, or 4-6.

   To switch from the current settings back to the defaults, select **Default**.
4. If PC400, the **Advanced** button is displayed at the bottom right of the window. Click **Advanced**; the Printer Control window appears.
5. Set each option by referring to 4-3 and 4-4.
6. When all the items have been set, click **OK**.

Printing to Disk

If you are using a PDT, you can save a host print-job or the contents of the session window (Print Screen) to a workstation file instead of printing it.

Two types of Print-to-Disk function are provided by Personal Communications:

Print-to-Disk Append:

Appends multiple host print jobs or print screen jobs to a single workstation file.

Print-to-Disk Separate:

Saves each host-print job or screen to a separate workstation file. You can specify the file name, but the extension is automatically assigned as a decimal number from 000 to 999. If you delete a file, its number will be re-used. When all 999 numbers have been used, subsequent print jobs are appended to file 999.

Notes:

1. Print-to-Disk is not available for the Print-Graphics function.
2. Print-to-Disk can be used only when you use a printer definition table (PDT) file.

To set up Print-to-Disk:

1. Click **File - Printer Setup** from the menu bar in the session window.

   The Printer Setup window lists the supported printers.
2. Select **Print to Disk** from the list box.
3. Click **Select PDT**.

   The Select PDT file window appears.
4. Select a PDT file from the list; then click **OK**.

   The Printer Setup window re-appears.
5. Click **Setup**.

   The Print to Disk window appears.
6. Specify a file name, drive, and path; then click **OK**.

   Note: If you specify the name of an existing file, subsequent print jobs are appended to the data in the original file.

Chapter 5. Transferring Files

Personal Communications File Transfer enables one or more files to be transferred between a host system and workstation at the same time. Transfer types and translation tables can be defined in advance.

PC400 File Transfer is quite different from Data Transfer, which is described in Chapter 15. The main differences are listed here:

Type of Transfer	Products required on an AS/400 system	Access Method	Sending and receiving unit	Type of connection to an AS/400 system
File Transfer	Personal Communications Tools (APVAFILE)	Transfer menu in the session window EHLLAPI application that invokes File Transfer DDE application that invokes File Transfer By playing a macro that invokes File Transfer By clicking the Send or Receive button on the tool bar	Entire file	Display session
Data Transfer	PC Support/400 V2R2 or V2R3 or OS/400 V3R1 or later[1]	Data Transfer icon or Transfer menu	Field, record, or file in a database	
Note 1: OS/400 provides the host transaction program for Data Transfer.				

Host Requirements

Before you can send or receive files, one of the following file transfer programs must be installed on the host system:

IBM 3270-PC File Transfer Program, 5665-311 (MVS/TSO)
IBM 3270-PC File Transfer Program, 5664-281 (VM/CMS)
IBM 3270-PC File Transfer Program, 5798-DQH (CICS/MVS)
Personal Communications Tools Program Package (APVAFILE)
- 1/4-inch tape 85G9969
- 1/2-inch tape 85G9973
- 8-mm tape 46H8353

You can perform the following file transfer functions:

Send files to the host system
Receive files from the host system
Use lists of files
Create templates to define file names and transfer types
Define transfer types
Set transfer options
Modify translation tables
Import or export files (PC/3270 CICS only)
Create interactive document profile (IDP) files (PC/3270 CICS only)

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Sending Files to the Host System

To send a file from your workstation to the host system:

1. Sign on to the host system.
2. Select **Transfer** from the menu bar of the session window. (You can also select the Send button on the tool bar.)
3. Select **Send File to Host**.

   The Send File to Host window appears.
4. Specify the name of the workstation file to be sent to the host system by selecting the name from the list box or entering the name in the **PC File** text box.
5. Enter the name under which the file will be stored on the host; then select the transfer type. If a template is provided for the file type you are transferring, the host file name and the transfer type appear automatically.

   Using List Files

   Select **Open List-File**; then select the list to be used for transfer. For the details of how to create list files, see page 5-3.

   Easy Mouse Operation

   Move the cursor to the name of the file to be transferred in the **PC File** list box. Double-click the left mouse button and the host file name and transfer type are automatically assigned by means of a template. Your workstation automatically starts transferring the selected file to the host system.
6. Click **Send**.

   The file is sent to the host system. The send status appears in the Send a File Status dialog box.

Receiving Files from the Host System

To transfer a file from the host system to your workstation:

1. Sign on to the host system.
2. Select **Transfer** from the session window menu bar. (You can also select the Receive button from the tool bar.)
3. Select **Receive File from Host**.

   The Receive File from Host dialog box appears.
4. Specify the name of the host file to be transferred. Enter the name in the **Host File** text box, or specify it as follows:

   Using the Paste button

   If you have copied one or more host file names to the clipboard, you can paste the names into the transfer list.

   Using the Load button

   If a Windows application program that uses dynamic data exchange (DDE) is designed to provide file lists to the workstation, the program can be used for loading a list.

5. Enter the name under which the file will be stored on the workstation, and select the transfer type.

   Using List Files

   Select **Open List-File**, and select the list to be used for transfer. (For an explanation of how to create list files, see page 5-3.)

   If a template is provided for the file type you are transferring, the workstation file name and the generated transfer type appear automatically.

6. Click **Receive**.

   The receive status appears in the **Receive a File Status** box.

Using List Files

If the same files are transmitted frequently, you can create a list of the files and save it.

A list file can be used for both Send and Receive. The default list file extension is .SRL.

Creating List Files

To create a list file:

1. Select **Transfer** from the menu bar of the session window or the tool bar.
2. Select **Send File to Host** or **Receive File from Host** .

   The corresponding dialog box appears.

3. Select a file to be transferred from the **Host File Name** or **PC File Name** list box by pointing to the name of a file to be selected. While holding down the Ctrl key, click the left mouse button.

   The filename, it's corresponding workstation or host filename (according to the available templates), and the transfer type appear in the lower part of the window.

4. After all desired files have been selected, click **Save List**.

   The Save File-Transfer List File As dialog box appears.

5. Enter a list name, and click **OK**.

Editing Lists

To edit the contents of a previously created list:

1. As explained above, display the Send File to Host or Receive File from Host dialog box.
2. Select **Open List-File**.

   The Open File-Transfer List File dialog box appears.

3. Select the name corresponding to the list file to be edited, then click **OK**.
4. The contents of the selected list appear in the Send File to Host or Receive File from Host dialog box.
5. Edit the contents of the list file.

Changing the contents of a list

Choose the file to be changed from the list, and overwrite the items to be changed in the text box.

Deleting a file from the list

Choose the file to be deleted, and click **Delete from List**.

Adding a file to the list

Double-click the file to be added from the list of host or workstation files.

6. Select **Save List**.

   The Save File-Transfer List File As dialog box appears.

7. Enter a name and then click **OK**.

Managing Templates

A *template* is a set of rules to be used by the workstation to automatically generate a workstation or host file name and transfer type when you specify a file to be sent or received.

You can have up to 32 templates. They are automatically numbered from 1 to 32.

When you specify a file to be transferred, the workstation scans the templates, starting from template 1. It uses the first matching template to generate a name for the transferred file and the transfer type.

To manage a template:

1. Select **Transfer** from the menu bar of the session window.
2. Select **Send File to Host** or **Receive File from Host**.

   The Send File to Host or Receive File from Host window appears.

3. Select **Template**.

   The Template dialog box appears. The contents of the dialog box depend on the connected host system.

Adding Templates

The list box for the Template dialog box lists the currently stored templates.

To add a template:

1. Select any template from the list box.

   The contents of the selected template appear under the list box.

2. Change the workstation or host file names or extensions by overwriting them; then select the transfer type. (For details of the transfer types, see “Defining Transfer Types” on page 5-5.)
3. Click **Add**.

   The dialog box for determining where in the list to display the new template appears.

4. Select a template number and specify whether to display the new template before or after the template that has that number. Click **OK**.

The new template is added to the list in the appropriate position.

Replacing and Deleting Templates

To change the contents of a currently stored template, or to delete a template:

1. Select the template to be changed or deleted.

   The contents of the selected template appear under the list box.

2. To change the contents, overwrite the appropriate part and then click **Replace**.

   To delete a template, click **Delete**.

   The selected template is changed or deleted, and the contents of the template list box are changed.

Testing Templates

To test the contents of an added or changed template:

1. Select the template to be tested from the list box.

   The number of the selected template appears in the Test Templates box in the lower part of the dialog box.

2. Select or enter data for the following items:

   Test mode Determine which mode is to be used for the test; the mode in which a file is transmitted from the workstation to the host system (send), or the mode in which a file is transmitted from the host system to the workstation (receive).

   Templates Determine which templates to test: only the template selected in step 1, or all registered templates.

   Source file Enter the name of the file to be used for the test.

3. Click **Test**.

   Target File indicates the name that has been generated by the template.

Note: Testing templates does not transfer files.

Defining Transfer Types

Transfer types define the option information used for controlling file transfer. Up to 16 transfer types can be defined for each host system. Text, binary, and append (excluding CICS) are the default.

To add or change transfer types:

1. Click **Transfer - Setup** from the menu bar of the session window.
2. Click **Define Transfer Types** from the submenu.

   The Transfer-Type Definition window appears. The items that appear depend on the selected host system.

3. Enter transfer-type names in the **Transfer-Type Names** text box, or select them from the list.
4. Select or enter the required items (see explanation below).

   To add a transfer type, click **Add**. To replace one, click **Replace**. To delete a transfer type, click **Delete**.

5. Click **OK**.

Explanation of Items to Be Defined

Choosing the **Transfer-Type Definition** command enables you to set the following items:

File Options

The file options that can be used depend on the type of the connected host system and the host code page selected when the session was configured. Table 5-1 lists the file options and the host systems and modes in which the options can be used.

File Option	Host System	Conversion Details
ASCII	VM/CMS MVS/TSO CICS	Converts 1-byte workstation codes to EBCDIC codes when a file is sent. Converts EBCDIC codes to 1-byte workstation codes when a file is received.
CRLF	VM/CMS MVS/TSO CICS	Converts codes as follows when a file is sent: Does not remove CRLF (X'0D0A') from the end of each line. The code is treated as a delimiter for each record. Removes EOF (X'1A') from the end of the file. Converts codes as follows when a file is received: Adds CRLF (X'0D0A') to the end of each line. Adds EOF (X'1A') to the end of the file. Removes EOF from the existing file, and appends EOF to the end of the added file when APPEND is specified.
APPEND	VM/CMS MVS/TSO	Appends the sent file to the existing host file. Appends the received file to the existing workstation file.

Table 5-1. Transfer File Options

Record Format

Valid only for VM/CMS and MVS/TSO when APPEND is not specified for file transmission. Any of the these can be selected:

Default value
Fixed (fixed length)
Variable (variable)
Undefined mode (for MVS/TSO only)

If the default value is selected, the record format is selected automatically by the host system.

Specifying **Variable** for VM file transfer enables host disk space to be used efficiently.

Logical Record Length (LRECL)

Valid only for VM/CMS and MVS/TSO when APPEND is not specified for file transmission.

Enter the **logical record length** to be used (host record byte count) in the **LRECL** text box. If **Variable** and **Undefined Mode** are specified as the record format, the logical record length is the maximum record length within a file. The maximum value is 32767.

The record length of a file sent from a workstation to the host system might exceed the logical record length specified here. If so, the host file transfer program divides the file by the logical record length.

To send a file containing long records to the host system, specify a sufficiently logical record length.

Because the record length of a workstation file exceeds the logical record length, a message does not appear normally if each record is divided. To display a message, add the following specification to the [Transfer] item of the workstation profile:

```
DisplayTruncateMessage = Y
```

TSO Allocation Parameter (MVS/TSO)

Valid only for MVS/TSO when **APPEND** is not specified for file transmission. The following items can be specified:

[Allocation Amounts]

Primary	Enter the number of tracks or cylinders allocated to this file transfer.
Secondary	If the primary allocation is not sufficient for the entire file transfer, enter additional storage capacity allocated to the file transfer.

[Allocation Units]

TRACKS	Specify this parameter to allocate a host file by track. Ask your system manager whether to use tracks or cylinders as the unit.
CYLINDERS	Specify this parameter to allocate a host file in units of cylinders.
AVBLOCK	Specify this parameter to allocate a host file in units of blocks.

[Block size]

This item is used only to create a new data set. Enter the block size of a new host data set, in bytes, in the text box. If this item is omitted, the workstation assumes the value that appears in the **Logical Record Length** box. The maximum value is 32767. If **AVBLOCK** is selected, the block size is the block size of the new data set.

Additional Options

The required host command options can be entered in the **Additional Options** text box.

Setting Miscellaneous Transfer Options

To set miscellaneous options:

1. Click **Transfer - Setup** from the menu bar of the session window.
2. Click **Miscellaneous Settings** from the submenu.
3. Change the required settings.

4. Click **OK**.

The following information can be defined for file transfer options:

File-Transfer Timeout

The time the workstation waits for a response from the host system can be entered (in seconds). If the host system does not respond, the transfer is canceled, and an error message appears. A number from 0 through 65535 can be specified. The default is 30 seconds. Specify an appropriate value such that the error message does not appear too early. If you specify 0, a timeout is not set.

If a packet or block size is relatively large for low-speed lines, such as SDLC or COM port or other lines, it is recommended that 150 seconds or greater be specified.

Clearing Sessions before Transfer (3270 Only)

You can specify whether a Clear command is sent to the host system before a file is transferred. Choose any of these option buttons:

Default value A Clear command is sent before a file is transferred (VM/CMS or CICS only).

Yes A Clear command is sent for MVS also.

No A Clear command is not sent for any host system.

File Transfer Packet Size (3270 Only)

The amount of memory (in bytes) used by the workstation for transmission and reception. If a large value is entered, a file is transferred more quickly, but the memory overhead is larger. The default value is 2500. The maximum value for TCP/IP is 8000.

Extension for List Files

You can change the default extension (.SRL) of file-transfer list files.

Status Window

You can choose the method of displaying the file-transfer-progress status. The default value is **Show in Session**.

Show in Session
When file transfer starts, the status dialog box appears. The name of the file being transferred and the transfer progress appear.

Show in icon When file transfer starts, the status icon appears on the screen. If the icon is restored, the status dialog box appears.

PC Code Page

When a file is transferred, EBCDIC codes are converted to 1-byte workstation codes, and vice versa. A default value is automatically selected from among 437, 813, 819, 850, 852, 855, 857, 860, 861, 863, 865, 866, 869, and 915. according to the host code page specified when the workstation is configured. For an explanation of how to select host code pages, see the online help for the Host Code Page.

Enhanced Protocol (IBM Global Network Connection Only)

This option enables faster file transfer in most cases. The packet size for Enhanced Protocol is fixed, so the File Transfer Packet Size setting is ignored.

Default Host Command

The host command to be called when file transfer starts can be entered. If nothing is entered in this text box, IND$FILE or its equivalent for other countries is used for 3270 sessions and APVAFILE is used for 5250 sessions.

Default Directory for File Transfer

You can specify the default directory that appears in the Send File to Host or Receive File From Host dialog box.

Setting the Translation Table

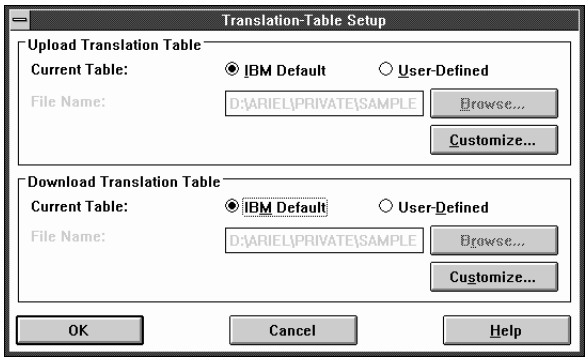
You can create or edit the translation table to be used for sending or receiving files.

Changing the Translation Table

To change the translation table:

1. Click **Transfer - Setup** from the menu bar of the session window.
2. Click **Translation Table** from the submenu.

   The Translation-Table Setup window appears.



3. The table currently being used (IBM default or the name of a user-defined table) is shown. Choose either **IBM Default** or **User-Defined**.
4. If you choose **User-Defined**, enter a translation-table name in the text box, or select a name by clicking **Browse**.
5. Click **OK**.

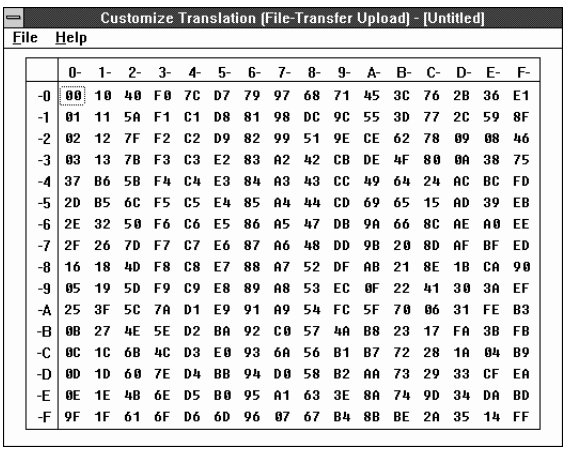
Customizing Translation Tables

You can create a user-specific translation table for transmission or reception, or you can edit an existing translation table.

To create or edit a translation table:

1. In the Translation-Table Setup dialog box, click **Customize** in the Upload or Download window.

   The Customize Translation window appears.



	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	00	10	40	F0	7C	D7	79	97	68	71	45	3C	76	2B	36	E1
-1	01	11	5A	F1	C1	D8	81	98	DC	9C	55	3D	77	2C	59	8F
-2	02	12	7F	F2	C2	D9	82	99	51	9E	CE	62	78	09	08	46
-3	03	13	7B	F3	C3	E2	83	A2	42	CB	DE	4F	80	0A	38	75
-4	37	B6	5B	F4	C4	E3	84	A3	43	CC	49	64	24	AC	BC	FD
-5	2D	B5	6C	F5	C5	E4	85	A4	44	CD	69	65	15	AD	39	EB
-6	2E	32	50	F6	C6	E5	86	A5	47	DB	9A	66	8C	AE	A0	EE
-7	2F	26	7D	F7	C7	E6	87	A6	48	DD	9B	20	8D	AF	BF	ED
-8	16	18	4D	F8	C8	E7	88	A7	52	DF	AB	21	8E	1B	CA	90
-9	05	19	5D	F9	C9	E8	89	A8	53	EC	0F	22	41	30	3A	EF
-A	25	3F	5C	7A	D1	E9	91	A9	54	FC	5F	70	06	31	FE	B3
-B	0B	27	4E	5E	D2	BA	92	C0	57	4A	B8	23	17	FA	3B	FB
-C	0C	1C	6B	4C	D3	E0	93	6A	56	B1	B7	72	28	1A	04	B9
-D	0D	1D	60	7E	D4	BB	94	D0	58	B2	AA	73	29	33	CF	EA
-E	0E	1E	4B	6E	D5	B0	95	A1	63	3E	8A	74	9D	34	DA	BD
-F	9F	1F	61	6F	D6	6D	96	07	67	B4	8B	BE	2A	35	14	FF

If you did not choose **IBM Default** or if you chose **New** from the File pull-down menu, the default values appear in the table.

Translation source codes
PC code-points when an upload translation table is edited. Host code-points when a download translation table is edited.

Translation target codes
Host code-points when an upload translation table is edited. PC code-points when a download translation table is edited.

2. Double-click the code to be changed in the table, and change the value in the entry field that subsequently appears.
3. Click **Save** or **Save As** from the File pull-down menu.
4. If asked, enter a name in the Save Translation File As window and click **OK**.
5. Click **Exit** from the File pull-down menu of the Customize Translation window.

Import/Export (3270 CICS Only)

Import/Export is an office system communication program and an application program executed under the IBM Customer Information Control System (CICS).

Clicking **Import/Export** loads a module into workstation memory. You can then start Import or Export from a menu on the host screen.

When you **Export** a document from the host, the workstation receives two files: one is the file itself, and the other is the interchange document profile (IDP) file, which contains document header information.

When you **Import** a file to a host system, it must be accompanied by an IDP file of the same name. If the necessary IDP file does not exist, you can create it as described on “Creating IDP Files” on page 5-11.

Transferring Files Using Import/Export

To transmit files using Import/Export:

1. Verify that the window of the host session is active and ready for file transfer.
2. Click **Transfer - Import/Export** from the menu bar of the session window.

   The minimized Import/Export Status dialog box appears.
3. Select **Import** or **Export** from the host application menu.
4. Specify the host and workstation file names of the file to be transferred. Run Import or Export.

   When Import or Export starts, the Import/Export Status dialog box is maximized.

   After the file is transferred, the dialog box is closed.

Creating IDP Files

To send a document to the host system using Import, you must have an IDP file that includes information on the document. If you have previously Exported the file, you should have an IDP. If not, or if you have deleted the IDP file, you must create an IDP file.

To create an IDP file:

1. Click **Transfer - Setup** from the menu bar of the session window.
2. Click **Create IDP File** from the submenu.
3. Enter the name for the IDP file to be created, or select it from the list.

   The IDP file has the same name as the file to be transferred, and the extension (.IDP).
4. Select **OK**.

Transferring Files

Chapter 6. SNA Node Operations

SNA Node Operations enable you to display information for certain Personal Communications resources, which can be useful when operating the SNA node. TCP/IP and IPX resources are not displayed or managed by this program. The following tasks are supported:

Starting and stopping resources
Deleting resources
Displaying resource information
Changing session limits
Initiating path switches

With 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.

You can display information or take action on resources if you start 3270 or 5250 sessions selecting the following connections:

System/390 Connections

LAN LAN via IEEE 802.2
3270 via AS/400 (passthru)
APPC3270 via LAN
COM port SNA-over-Async
Advantis (IIN)
SDLC Synchronous Data Link Control (MPA)
3270 via AS/400 (passthru)
APPC3270 via SDLC
5250 3270 via AS/400 (passthru twinax)

AS/400 Connections

LAN LAN via IEEE 802.2
SDLC Synchronous Data Link Control (MPA)
5250 Twinaxial Data Link Control (APPC)
COM port SNA-over-Async

SNA resources that can be displayed or managed include the following:

Connections
Link stations to the adjacent nodes

Connection Networks
Allow APPN nodes in a LAN to have direct links with each other without requiring logical link definitions at each node.

CPI-C Side Information
Associate a set of parameters with a specified symbolic destination name.

Data Link Control
How data is formatted for transmission on the physical connection.

Devices
Parts of the workstation hardware, such as adapters, that are used to transmit and receive data.

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DLUR PU
A dependent logical unit requester (DLUR) physical unit (PU) is a PU in an APPN end node that owns dependent LUs, but requests that a dependent LU server provide the SSCP services for those dependent LUs.

Focal Point
A system that provides centralized network management services.

Local LU 0 to 3
A local logical unit (LU) type 0, 1, 2, or 3 is a dependent LU on the workstation that provides services for 3270 terminal and printer emulation applications.

Local LU 6.2
A local logical unit (LU) type 6.2 is an independent or dependent LU that provides APPC services.

LU 6.2 Session
Transports data between two partner LU 6.2s. Conversations between transaction programs use LU 6.2 sessions.

Node
The control point that manages the node and its associated resources. The local node provides APPN services.

Mode
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 (COS) within the transport network.

Partner LU 6.2
A remote computer that communicates through an APPC session with local LU 6.2s.

RTP Connection
In high-performance routing (HPR), a rapid transport protocol (RTP) connection is the connection established between the endpoints of the route to transport session traffic.

Transaction Program
A transaction program (TP) is a program that processes transactions in an SNA network. There are two kinds of TPs: application transaction programs and service transaction programs.

Starting Node Operations

To start Node Operations, click on the **SNA Node Operations** icon in the Personal Communications folder.

Using the Menu Bar

From the menu bar, select one of the following:

Operations
To start or stop a SNA node.

To start a node, select the configuration file you want to use.

To change session limits (CNOS).

To apply a new configuration file, select the configuration file you want to use.

Launch

To launch to other Personal Communications programs, such as Log Viewer, Trace Facility, or SNA Node Configuration.

View

To modify the layout of your Personal Communications window (Tool bar or Status bar).

To select resource attributes, which allows you to customize the display of SNA resource attributes.

To view frequently used resources, such as:

Node
Connections
Local LU 0 to 3
Partner LUs
LU 6.2 sessions

Displaying a Resource

To display a resource, select a resource from the **Select SNA Resource** pull-down list.

Starting a Resource

To start a resource:

1. Select a resource from the **Select SNA Resource** pull-down list.
2. Select the first column of the item to display the pop-up.
3. Select **Start** to start the resource. A started (active) resource can be stopped, but not deleted.

If the resource to be started is a connection, an indicator in the form of a lightning bolt is displayed for the duration of the connection attempt.

Stopping a Resource

To stop a resource:

1. Select a resource from the **Select SNA Resource** pull-down list.
2. Select the first column of the item to display the pop-up.
3. Select **Stop** to suspend the resource. If a resource is stopped (inactive), it can be deleted or redefined.

Deleting a Resource

To delete a resource:

1. Select a resource from the **Select SNA Resource** pull-down list.
2. Select the first column of the item to display the pop-up.
3. Select **Delete** to delete the resource.

A resource to be redefined need not be deleted, but it should be stopped (inactive).

Changing a HPR Path Switch

To perform a high performance routing (HPR) path switch:

1. Select **RTP connections** from the Select SNA Resource pull-down list.
2. Select the first column of the item to display the pop-up.
3. Select **HPR path switch** to change the path for the data on this RTP connection.

Updating SNA Resources Dynamically

It is not necessary to delete an SNA resource before redefining it. A resource must be inactive, however, when you redefine it.

If a redefinition is rejected for a reason other than that the resource is active, a STATE_CHECK return code is returned, as well as a specific secondary return code as listed in the NOF specification. Most rejections are due to inconsistencies in the configuration, such as one of the following:

Attempting to define an LS with the adjacent CP name set to the local CP name.

Attempting to define two link stations on a non-switched port with the same destination address.

Such rejections occur regardless of whether you are defining a resource for the first time or redefining it.

Keep in mind the following when redefining resources:

You may not change the ls_role of a port that has link stations defined on it. The link stations must be deleted before the port role can be changed (because an LS may default to the port ls_role).

You may not change the type of a named DLC. The DLC definition must be deleted before the same name can be reused for a DLC of a different type.

Chapter 7. Country Codes, Code Pages, and Character Sets

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

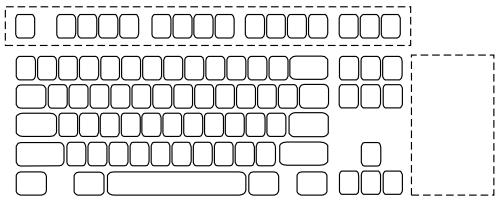
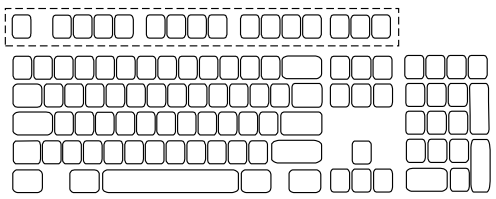
The **Country** option defaults to the current DOS country code. The countries are listed in “Country Codes” on page 7-2; the actual list available to you might be different.

The **PC code page** option defaults to the current active code page. The **Host code page** option defaults to the one for the keyboard country. The PC and Host code page options are listed in “Code Pages and Character Sets” on page 7-5.

For the **Keyboard type** option, the following choices are available:

Space Saving	Space Saving keyboard
MS Natural	MS** Natural keyboard
Enhanced	Enhanced keyboard

Table 7-1. Keyboard Type

Keyboard Type (Characteristics)	Figure
Space Saving (single row of function keys; no numeric keypad)	
Enhanced and MS Natural (single row of function keys; numeric keypad)	

Personal Communications matches the keyboard type that you are using by interrogating the BIOS of the workstation. If the keyboard type setting does not match what is actually used, the key mapping will be incorrect.

Note: If you are using one type of keyboard to configure an installation for use on systems with another type, select the keyboard type of the *target* system.

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Country Codes

The following table shows the country codes.

Table 7-2. Country Codes

Country	Country Code
Austria	043
Belgium	032
Bosnia / Herzegovina	387
Brazil	055
Bulgaria	035
Canada (French-speaking)	002
Croatia	384
Czech	042
Denmark	045
Finland	358
France	033
FYR Macedonia	389
Germany	049
Greece	030
Hungary	036
Iceland	354
Italy	039
Japan	081
Latin America	003
Netherlands	031
Norway	047
Poland	048
Portugal	351
Romania	040
Russia	007
Serbia / Montenegro	381
Slovakia	042
Slovenia	386
Spain	034
Sweden	046
Switzerland	041
Turkey	090
United Kingdom	044
U.S.	001

Keyboard Country ID and Shift Support

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

Table 7-3 (Page 1 of 2). Keyboard Country ID and Shift Support

Keyboard Country	Enhanced Keyboard ID	Enhanced Keyboard-Lock Mode
Austria	129	S
Belgium	120	S
Brazil	275	C
Canada (Bilingual)	058	C
Cyrillic		
Bulgaria	442	C
FYR Macedonia	449	C
Russia (441)	441	C
Russia (443)	443	C
Serbia / Montenegro	450	C
Denmark	159	C
Finland	153	C
France (120)	120	S
France (189)	189	S
Germany	129	S
Greece	319	C
Iceland	197	C
Italy (141)	141	C
Italy (142/293)	142	C
Japan	–	C
Latin America (Spanish)	171	C
Latin 2		
Bosnia / Herzegovina (Latin)	234	C
Croatia	234	C
Czech	243	C
Hungary	208	C
Poland	214	C
Romania (Moldavia)	446	C
Slovakia	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

Table 7-3 (Page 2 of 2). Keyboard Country ID and Shift Support

Keyboard Country	Enhanced Keyboard ID	Enhanced Keyboard-Lock Mode
U.S. (English)	101G	C

Note:

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

Code Pages and Character Sets

The following table shows the code pages and character sets.

Table 7-4. Code Pages and Character Sets

Country	Host CPGID[1]/GCSGID[2]	PC CPGID/GCSGID
Austria	273-1/697-1 or 500-1/697-1	437/919 or 850/980
Belgium	500-1/697-1	437/919 or 850/980
Brazil	037-1/697-1	437/919 or 850/980
Canada (French)	500-1/697-1	863/993 or 850/980
Cyrillic		
Bulgaria	1025/1150	855/985, 915, or 1251
FYR Macedonia	1025/1150	855/985, 915, or 1251
Serbia	1025/1150	855/985, 915, or 1251
Russia	1025/1150	866/966 or 1251
Denmark	277-1/697-1 or 500-1/697-1	865/996 or 850/980
Finland	278-1/697-1 or 500-1/697-1	437/919 or 850/980
France	297-1/697-1 or 500-1/697-1	437/919 or 850/980
Germany	273-1/697-1 or 500-1/697-1	437/919 or 850/980
Greece	875/925	869/998 or 813
Iceland	871-1/697-1	861/991 or 850/980
Italy	280-1/697-1 or 500-1/697-1	437/919 or 850/980
Latin America (Spanish)	284-1/697-1	437/919 or 850/980
Latin 2 (Multilingual)		
Bosnia / Herzegovina (Latin)	870/959	852/982, 912/959, or 1250
Croatia	870/959	852/982, 912/959, or 1250
Czech	870/959	852/982, 912/959, or 1250
Hungary	870/959	852/982, 912/959, or 1250
Poland	870/959	852/982, 912/959, or 1250
Romania (Moldavia)	870/959	852/982, 912/959, or 1250
Slovakia	870/959	852/982, 912/959, or 1250
Slovenia	870/959	852/982, 912/959, or 1250
Netherlands	037-1/697-1 or 500-1/697-1	437/919 or 850/980
Norway	277-1/697-1 or 500-1/697-1	865/995 or 850/980
Portugal	037-1/697-1 or 500-1/697-1	860/990 or 850/980
Spain	284-1/697-1 or 500-1/697-1	437/919 or 850/980
Sweden	278-1/697-1 or 500-1/697-1	437/919 or 850/980
Switzerland (French)	500-1/697-1	437/919 or 850/980
Switzerland (German)	500-1/697-1	437/919 or 850/980
Turkey	1026/1152	857/983
U.K.	285-1/697-1 or 500-1/697-1	437/919 or 850/980
U.S.	037-1/697-1 or 500-1/697-1	437/919 or 850/980

1 Code Page Global Identifier

2 Graphic Character Set Global Identifier

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.

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)	&	-	ø	Ø	°	µ	^	{	}	\	0
-1	(RSP)	é	/	É	a	j	~	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	¢	!	¦	:	«	ª	¡	[	¯ (SHY)	¹	²	³
-B	.	$	,	#	»	º	¿	]	ô	û	Ô	Û
-C	<	*	%	@	ð	æ	Ð	¯	ö	ü	Ö	Ü
-D	(	)	_	'	ý	¸	Ý	¨	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
-F	|	¬	?	"	±	¤	®	×	õ	ÿ	Õ	(EO)

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)	&	-	ø	Ø	°	µ	¢	ä	ü	Ö	0
-1	(RSP)	é	/	É	a	j	ß	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	{	ë	[	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	@	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	~	Ñ	`	i	r	z	¾	I	R	Z	9
-A	Ä	Ü	ö	:	«	ª	¡	¬	(SHY)	¹	²	³
-B	.	$	,	#	»	º	¿	|	ô	û	Ô	Û
-C	<	*	%	§	ð	æ	Ð	¯	¦	}	\	]
-D	(	)	_	'	ý	¸	Ý	¨	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
-F	!	^	?	"	±	¤	®	×	õ	ÿ	Õ	(EO)

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)	&	-	¦	@	°	µ	¢	æ	å	\	0
-1	(RSP)	é	/	É	a	j	ü	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	}	ï	$	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	#	¤	ø	:	«	ª	¡	¬	(SHY)	¹	²	³
-B	.	Å	,	Æ	»	º	¿	|	ô	û	Ô	Û
-C	<	*	%	Ø	ð	{	Ð	¯	ö	~	Ö	Ü
-D	(	)	_	'	ý	¸	Ý	¨	ò	ù	Ò	Ù
-E	+	;	>	=	þ	[	Þ	´	ó	ú	Ó	Ú
-F	!	^	?	"	±	]	®	×	õ	ÿ	Õ	(EO)

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)	&	-	ø	Ø	°	µ	¢	ä	å	É	0
-1	(RSP)	`	/	\	a	j	ü	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	{	ë	#	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	[	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	}	ï	$	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	é	i	r	z	¾	I	R	Z	9
-A	§	¤	ö	:	«	ª	¡	¬	(SHY)	¹	²	³
-B	.	Å	,	Ä	»	º	¿	|	ô	û	Ô	Û
-C	<	*	%	Ö	ð	æ	Ð	¯	¦	~	@	Ü
-D	(	)	_	'	ý	¸	Ý	¨	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
-F	!	^	?	"	±	]	®	×	õ	ÿ	Õ	(EO)

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)	&	-	ø	Ø	[	µ	¢	à	è	ç	0
-1	(RSP)	]	/	É	a	j	ì	#	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	{	}	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	@	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	\	~	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	ù	i	r	z	¾	I	R	Z	9
-A	°	é	ò	:	«	ª	¡	¬	¯ (SHY)	¹	²	³
-B	.	$	,	£	»	º	¿	|	ô	û	Ô	Û
-C	<	*	%	§	ð	æ	Ð	¯	ö	ü	Ö	Ü
-D	(	)	_	'	ý	¸	Ý	¨	¦	`	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
-F	!	^	?	"	±	¤	®	×	õ	ÿ	Õ	(EO)

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)	&	-	ø	Ø	°	µ	¢	{	}	\	0
-1	(RSP)	é	/	É	a	j	¨	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	¦	ß	#	`	i	r	z	¾	I	R	Z	9
-A	[	]	ñ	:	«	ª	¡	^	¯ (SHY)	¹	²	³
-B	.	$	,	Ñ	»	º	¿	!	ô	û	Ô	Û
-C	<	*	%	@	ð	æ	Ð	¯	ö	ü	Ö	Ü
-D	(	)	_	'	ý	¸	Ý	~	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
-F	|	¬	?	"	±	¤	®	×	õ	ÿ	Õ	(EO)

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)	&	-	ø	Ø	°	µ	¢	{	}	\	0
-1	(RSP)	é	/	É	a	j	¯	[	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	$	!	¦	:	«	ª	¡	^	¯ (SHY)	1	2	3
-B	.	£	,	#	»	º	¿	]	ô	û	Ô	Û
-C	<	*	%	@	ð	æ	Ð	~	ö	ü	Ö	Ü
-D	(	)	_	'	ý	¸	Ý	¨	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
-F	|	¬	?	"	±	¤	®	×	õ	ÿ	Õ	(EO)

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)	&	-	ø	Ø	[	`	¢	é	è	ç	0
-1	(RSP)	{	/	É	a	j	¨	#	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	@	}	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	]	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	\	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	µ	i	r	z	¾	I	R	Z	9
-A	°	§	ù	:	«	ª	¡	¬	¯ (SHY)	¹	²	³
-B	.	$	,	£	»	º	¿	|	ô	û	Ô	Û
-C	<	*	%	à	ð	æ	Ð	¯	ö	ü	Ö	Ü
-D	(	)	_	'	ý	¸	Ý	~	ò	¦	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
-F	!	^	?	"	±	¤	®	×	õ	ÿ	Õ	(EO)

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)	&	-	ø	Ø	°	µ	¢	{	}	\	0
-1	(RSP)	é	/	É	a	j	~	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	[	]	¦	:	«	ª	¡	¬	¯ (SHY)	1	2	3
-B	.	$	,	#	»	º	¿	|	ô	û	Ô	Û
-C	<	*	%	@	ð	æ	Ð	¯	ö	ü	Ö	Ü
-D	(	)	_	'	ý	¸	Ý	¨	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
-F	!	^	?	"	±	¤	®	×	õ	ÿ	Õ	(EO)

Host Code Page 870/959 Latin 2 - EBCDIC Multilingual

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

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP)	&	-	˅	˘	°	ą	·	{	}	\	0
-1	(RSP)	é	/	É	a	j	~	Ą	A	J	÷	1
-2	â	ę	Â	Ę	b	k	s	ż	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	Ţ	C	L	T	3
-4	ţ	ů	″	Ů	d	m	u	Ż	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ă	î	Ă	Î	f	o	w	ž	F	O	W	6
-7	č	Ĺ	Č	Ľ	g	p	x	ź	G	P	X	7
-8	ç	Í	Ç	Ĺ	h	q	y	Ž	H	Q	Y	8
-9	ć	ß	Ć	`	i	r	z	Ź	I	R	Z	9
-A	[	]	|	:	ś	ł	Ś	Ł	(SHY)	Ě	ď	Ď
-B	.	$	,	#	ň	ń	Ň	Ń	ô	ű	Ô	Ű
-C	<	*	%	@	đ	š	Đ	Š	ö	ü	Ö	Ü
-D	(	)	_	'	ý	¸	Ý	¨	ŕ	ť	Ŕ	Ť
-E	+	;	>	=	ř	˛	Ř	´	ó	ú	Ó	Ú
-F	!	^	?	"	ş	¤	Ş	×	ő	ě	Ő	(EO)

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)	&	-	ø	Ø	°	µ	¢	þ	æ	´	0
-1	(RSP)	é	/	É	a	j	ö	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	ð	i	r	z	¾	I	R	Z	9
-A	Þ	Æ	¦	:	«	ª	¡	¬	¯ (SHY)	¹	²	³
-B	.	$	,	#	»	º	¿	|	ô	û	Ô	Û
-C	<	*	%	Ð	`	{	@	¯	~	ü	^	Ü
-D	(	)	_	'	ý	¸	Ý	¨	ò	ù	Ò	Ù
-E	+	;	>	=	{	]	[	\	ó	ú	Ó	Ú
-F	!	Ö	?	"	±	¤	®	×	õ	ÿ	Õ	(EO)

Host Code Page 00875 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)	&	-	¨	΅	°	′	£	{	}	\	0
-1	Α	Κ	/	Ά	a	j	~	ά	A	J		1
-2	Β	Λ	Τ	Έ	b	k	s	έ	B	K	S	2
-3	Γ	Μ	Υ	Ή	c	l	t	ή	C	L	T	3
-4	Δ	Ν	Φ	(RSP)	d	m	u	ϊ	D	M	U	4
-5	Ε	Ξ	Χ	Ί	e	n	v	ί	E	N	V	5
-6	Ζ	Ο	Ψ	Ό	f	o	w	ό	F	O	W	6
-7	Η	Π	Ω	Ύ	g	p	x	ύ	G	P	X	7
-8	Θ	Ρ	Ϊ	Ώ	h	q	y	ϋ	H	Q	Y	8
-9	Ι	Σ	Ϋ	`	i	r	z	ώ	I	R	Z	9
-A	[	]	|	:	α	η	ν	ς	(SHY)	±	²	³
-B	.	$	,	#	β	θ	ξ	τ	ω	½	§	©
-C	<	*	%	@	γ	ι	ο	υ	ΐ			
-D	(	)	_	'	δ	κ	π	φ	ΰ	·		
-E	+	;	>	=	ε	λ	ρ	χ	‘	’	«	»
-F	!	^	?	"	ζ	μ	σ	ψ	—	¦	¬	(EO)

Host Code Page 1025/1150 Russian

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 may not display properly.

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP)	&	-		ц	й	я	ь	{	}	\	0
-1	(RSP)		/		a	j	~	ы	A	J	§	1
-2					b	k	s	з	B	K	S	2
-3			Ё		c	l	t	ш	C	L	T	3
-4	ё		Є	Ў	d	m	u	э	D	M	U	4
-5	є	ў			e	n	v	щ	E	N	V	5
-6				ю	f	o	w	ч	F	O	W	6
-7		Ъ	Ї	a	g	p	x	ъ	G	P	X	7
-8	ї	№		б	h	q	y	Ю	H	Q	Y	8
-9				`	i	r	z	А	I	R	Z	9
-A	[	]	|	:	д	к	р	Б	Х	Н	Т	З
-B	.	$	,	#	е	л	с	Ц	И	О	У	Ш
-C	<	*	%	@	ф	м	т	Д	Й	П	Ж	Э
-D	(	)	_	'	г	н	у	Е	К	Я	В	Щ
-E	+	;	>	=	х	о	ж	Ф	Л	Р	Ь	Ч
-F	!	^	?	"	и	п	в	Г	М	С	Ы	(FD)

Host Code Page 1025/1150 Cyrillic (Except Russian)

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 may not display properly.

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP)	&	-	Њ	ц	й	я	ь	{	}	\	0
-1	(RSP)	Љ	/	Ћ	a	j	~	ы	A	J	§	1
-2	ђ	њ	Ѓ	Ќ	b	k	s	з	B	K	S	2
-3	ѓ	ћ	Ё	(SHY)	c	l	t	ш	C	L	T	3
-4	ё	ќ	Є	Ў	d	m	u	э	D	M	U	4
-5	є	ў	S	Џ	e	n	v	щ	E	N	V	5
-6	s	џ	I	ю	f	o	w	ч	F	O	W	6
-7	i	Ъ	Ї	a	g	p	x	ъ	G	P	X	7
-8	ї	№	J	б	h	q	y	Ю	H	Q	Y	8
-9	j	Ђ	Љ	`	i	r	z	А	I	R	Z	9
-A	[	]	|	:	д	к	р	Б	Х	Н	Т	З
-B	.	$	,	#	е	л	с	Ц	И	О	У	Ш
-C	<	*	%	@	ф	м	т	Д	Й	П	Ж	Э
-D	(	)	_	'	г	н	у	Е	К	Я	В	Щ
-E	+	;	>	=	х	о	ж	Ф	Л	Р	Ь	Ч
-F	!	^	?	"	и	п	в	Г	М	С	Ы	(EO)

Host Code Page 1026/1 Latin 5 - Turkey

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

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP)	&	-	ø	Ø	°	µ	¢	ç	ğ	ü	0
-1	(RSP)	é	/	É	a	j	ö	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	{	ì	[	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	ı	i	r	z	¾	I	R	Z	9
-A	Ç	Ğ	ş	:	«	ª	¡	¬	(SHY)	¹	²	³
-B	.	İ	,	Ö	»	º	¿		ô	û	Ô	Û
-C	<	*	%	Ş	}	æ	]	¯	~	\	#	"
-D	(	)	_	'	`	¸	$	¨	ò	ù	Ò	Ù
-E	+	;	>	=	¦	Æ	@	´	ó	ú	Ó	Ú
-F	!	^	?	Ü	±	¤	®	×	õ	ÿ	Õ	(EO)

Chapter 8. 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. 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 95 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	Upper-Right Character All Templates
Denmark	AltGr	Ctrl
Finland	AltGr	Ctrl
Norway	AltGr	Ctrl
Sweden	AltGr	Ctrl
All others	AltGr	None

Alt and AltGr keys produce the same character on the Enhanced keyboard in DOS mode.

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Keyboard Layouts

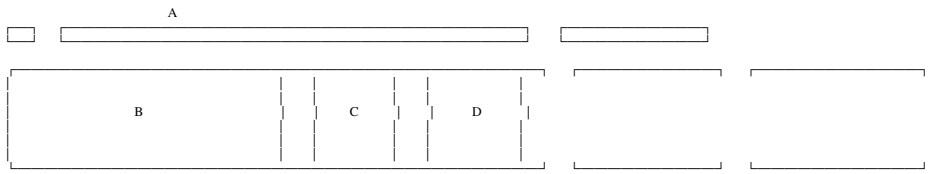
This section describes the keyboards supported by the host systems and Personal Communications. The function keys have the following shift statuses.

-Status-	
BASE	BASE : normal shift by depressing no shift key
SHIFT	SHIFT : Up Shift by depressing Up-Shift key
CTRL	CTRL : Control Shift by depressing Ctrl key
ALT	ALT : Alternate Shift by depressing Alt key
ALTGR	ALTGR : Shift by depressing Ctrl and Alt keys
CTRLSFT	CTRLSFT: Shift by depressing Ctrl and Up-Shift keys

Following are the abbreviation of the keys.

AltCur	Alternate Cursor
BackSp	Back Space
BgnOLn	Begin of Line
BotOPg	Bottom of Page
CarRtn	Carrier Return
ChgScrn	Change Screen
ChrAdv	Character Advance
CurBlink	Cursor Blink
CurSel	Cursor Select
DevCan	Device Cancel
DspTxC	Display TextCode
EndOLn	End of Line
ErEOF	Erase EOF
ErInp	Erase Input
Fld-	Field-
Fld+	Field+
FldColor	Field Color
FldExt	Field Exit
FldHigh	Field Highlight
FldMark	Field Mark
FldPS	PS Field Inherit
FldTrns	Transparency Field Inherit
FastDn	Fast Down
FastUp	Fast Up
HostPr	Host Print
JmpNext	Jump Next
MrkLeft	Mark Left
MrkUp	Mark Up
MrDown	Mark Down
MrRight	Mark Right
MvDown	Move Down
MvLeft	Move Left
MvRight	Move Right
MvUp	Move Up
NewLin	New Line
PSA	Programmed Symbol A
PSB	Programmed Symbol B
PSC	Programmed Symbol C
PSD	Programmed Symbol D
PSE	Programmed Symbol E
PSF	Programmed Symbol F
ReqBSp	Required Backspace
ReqTab	Required Tab
RolDwn	Roll Down
RolUp	Roll Up
Rst/Ctrl	Reset/Ctrl
RPause	Record/Play Pause
SysAttn	System Attention
SysReq	System Request
TabFld	Tab Field
TopOPg	Top of Page
TstReq	Test Request
TransOp	Transparency Opaque
Turq	Turquoise
UndScr	Underscore

Enhanced Keyboard, MS Natural Keyboard (3270 Only)



Segment A assignment:

11	112	113	114	115	116	117	118	119	12	121	122	123
SysAttn	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF1	PF11	PF12
SysReq	PF13	PF14	PF15	PF16	PF17	PF18	PF19	PF2	PF21	PF22	PF23	PF24
-----	-----	-----	-----	-----	Record	Play	RPause	-----	-----	-----	RTM	-----
-----	Doc	WdWrap	CfgFmt	-----	-----	-----	-----	APL	CurSel	CurBlink	AltCur	+Cr
-----	Doc	WdWrap	CfgFmt	-----	-----	-----	-----	APL	CurSel	CurBlink	AltCur	+Cr
-----	Red	Pink	Green	Yellow	Blue	Turq	White	FldColor	-----	-----	-----	-----

124	125	126
-----	-----	Clear
-----	-----	-----
-----	-----	Break
-----	-----	-----
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	1	11	12	13	14	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			

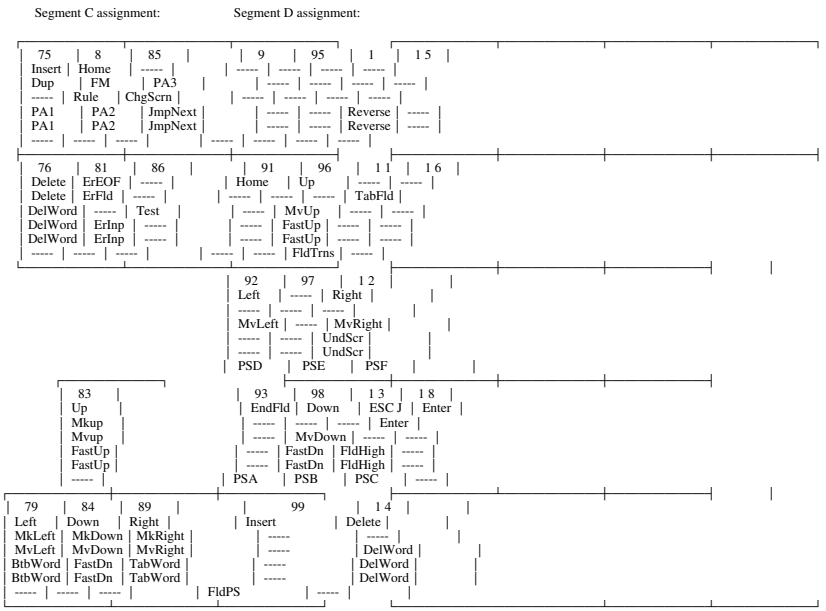
16	17	18	19	2	21	22	23	24	25	26	27	28	29
TabFld	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			

3	31	32	33	34	35	36	37	38	39	4	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine			
-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			

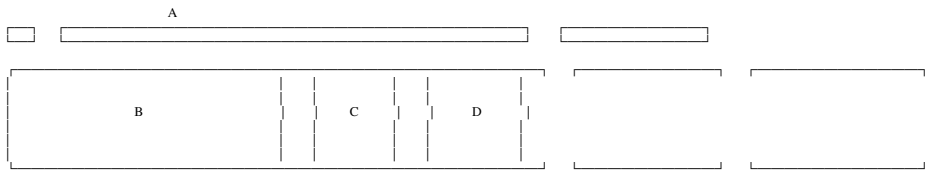
44	46	47	48	49	5	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		

58	6	61	62	64
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
-----	-----	-----	-----	-----
Quit	-----	-----	-----	-----
Quit	-----	-----	-----	-----
-----	-----	-----	-----	-----

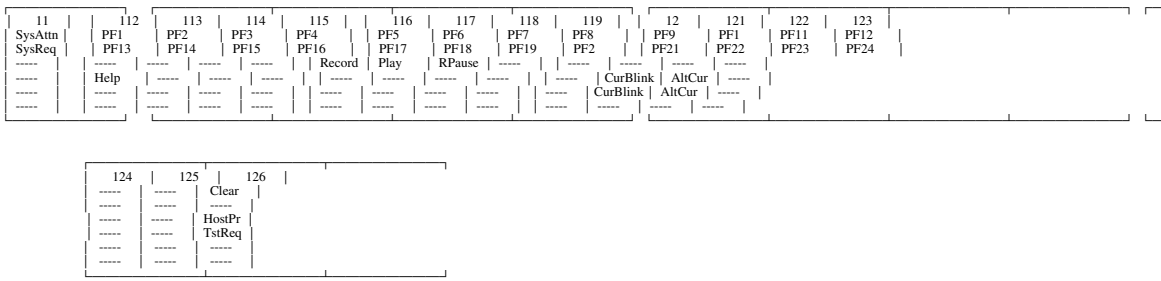
Keyboard Layouts



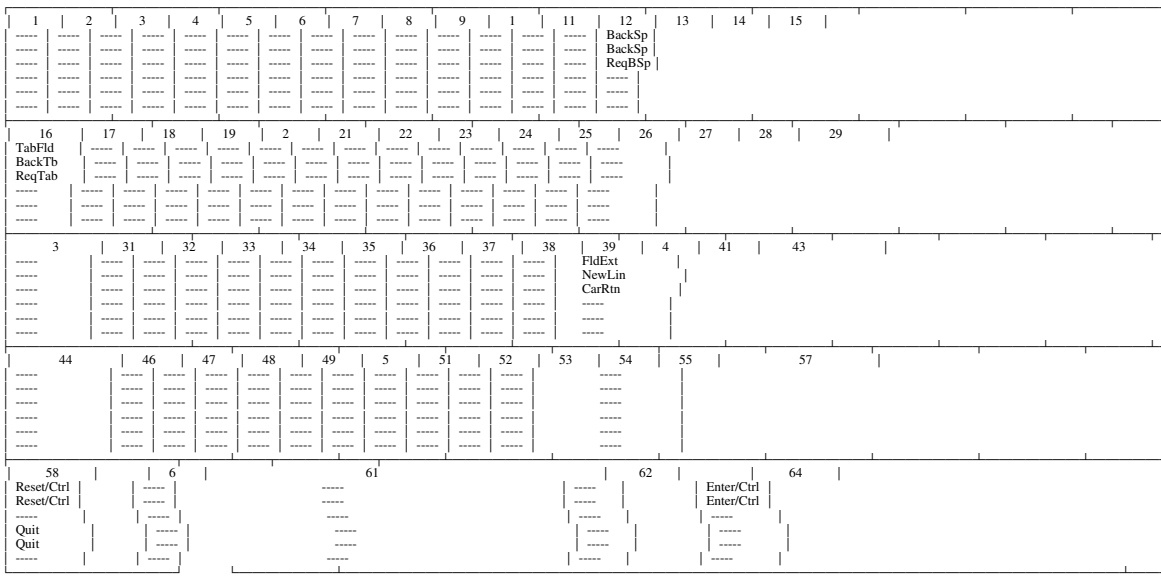
Enhanced Keyboard, MS Natural Keyboard (5250 Only)



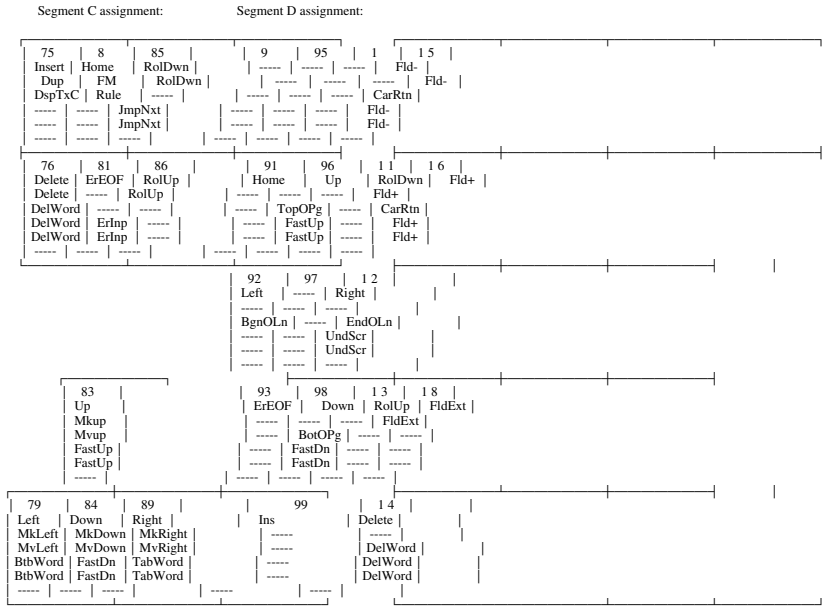
Segment A assignment:



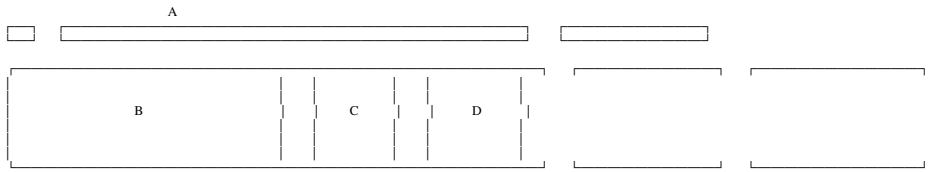
Segment B assignment:



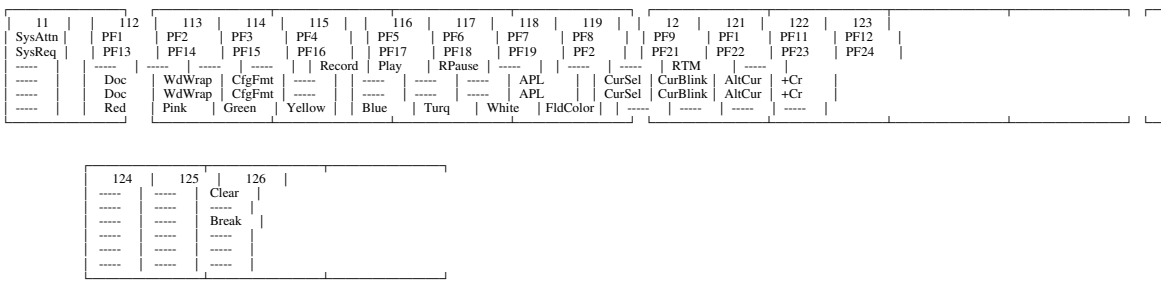
Keyboard Layouts



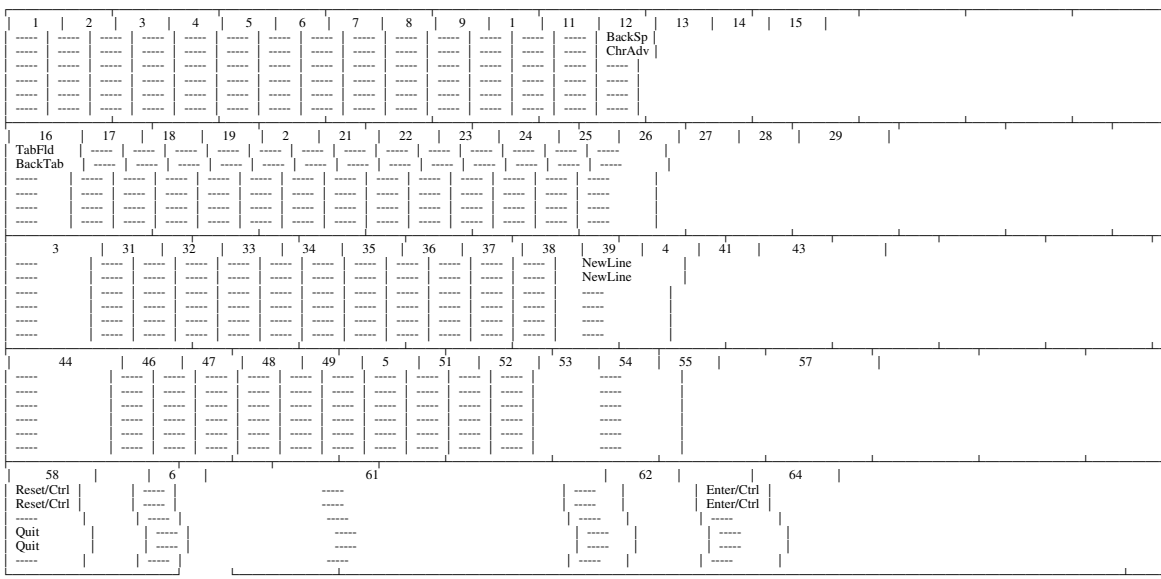
Enhanced Keyboard, MS Natural Keyboard (Combined 3270 and 5250)



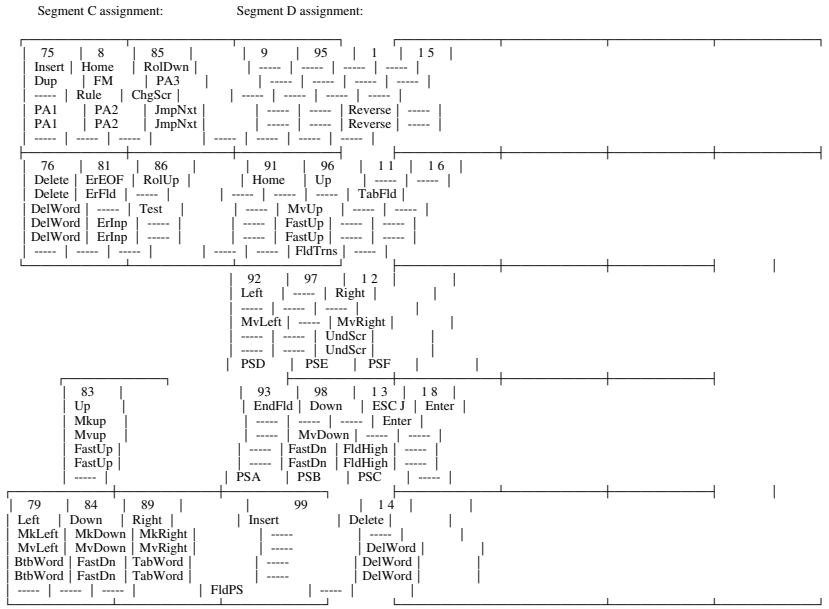
Segment A assignment:



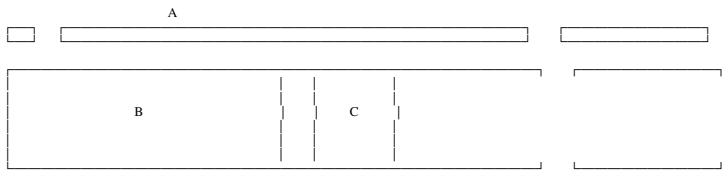
Segment B assignment:



Keyboard Layouts



Space-Saving Keyboard (3270 Only)



Segment A assignment:

11	112	113	114	115	116	117	118	119	12	121	122	123
SysAttn	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF1	PF11	PF12
SysReq	PF13	PF14	PF15	PF16	PF17	PF18	PF19	PF2	PF21	PF22	PF23	PF24
-----	-----	-----	-----	-----	Record	Play	RPause	-----	-----	-----	RTM	-----
-----	Doc	WdWrap	CfgFmt	-----	-----	-----	-----	APL	CurSel	CurBlink	AltCur	+Cr
-----	Doc	WdWrap	CfgFmt	-----	-----	-----	-----	APL	CurSel	CurBlink	AltCur	+Cr
-----	Red	Pink	Green	Yellow	Blue	Turq	White	FldColor	-----	-----	-----	-----

124	125	126
-----	-----	Clear
-----	-----	-----
-----	-----	Break
-----	-----	-----
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	1	11	12	13	14	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			

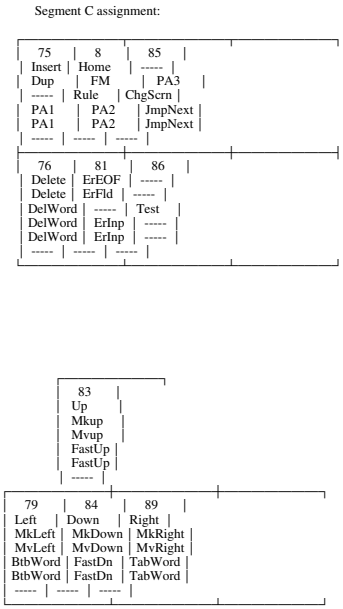
16	17	18	19	2	21	22	23	24	25	26	27	28	29
TabFld	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			

3	31	32	33	34	35	36	37	38	39	4	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine			
-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			

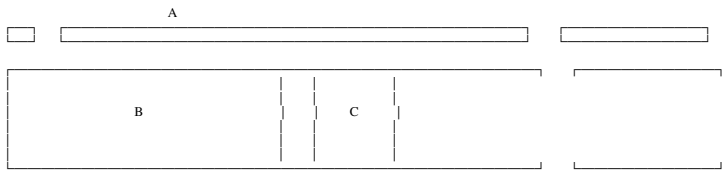
44	46	47	48	49	5	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		

58	6	61	62	64
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
-----	-----	-----	-----	-----
Quit	-----	-----	-----	-----
Quit	-----	-----	-----	-----
-----	-----	-----	-----	-----

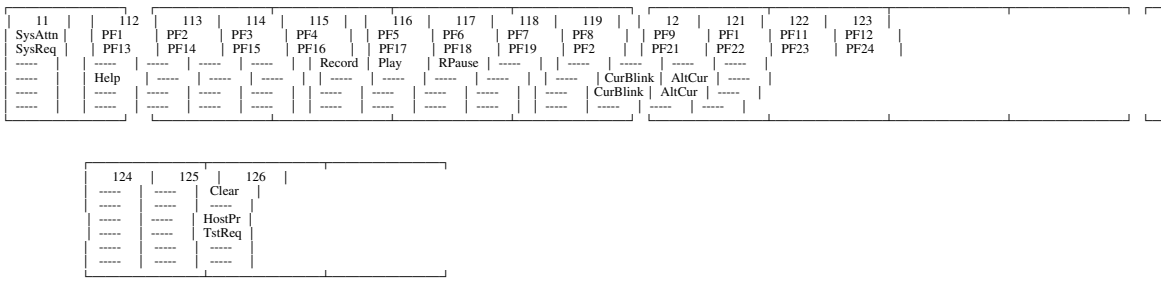
Keyboard Layouts



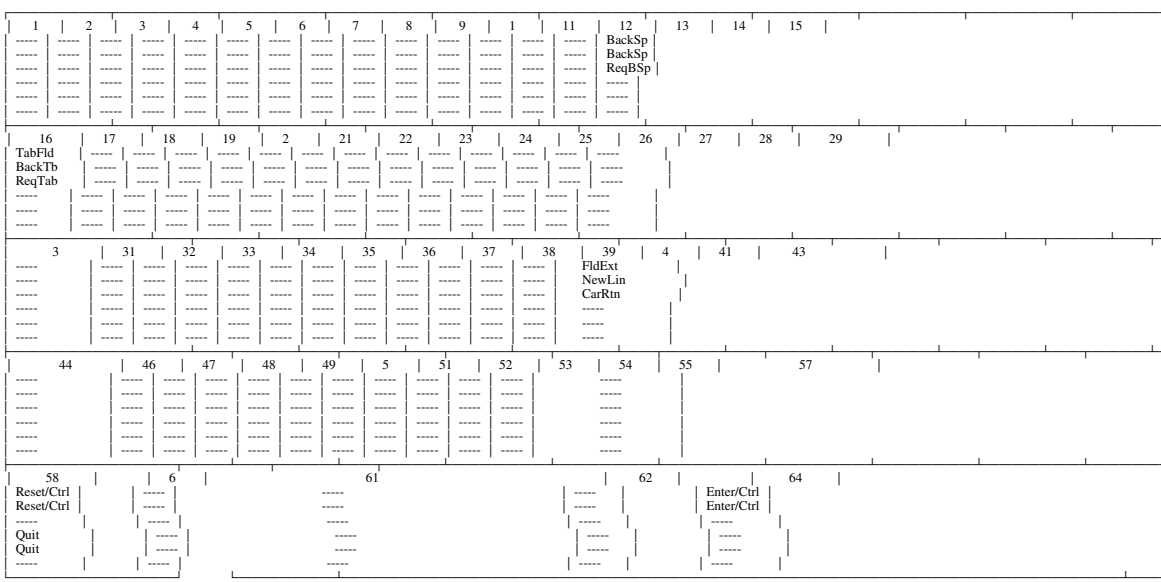
Space-Saving Keyboard (5250 Only)



Segment A assignment:

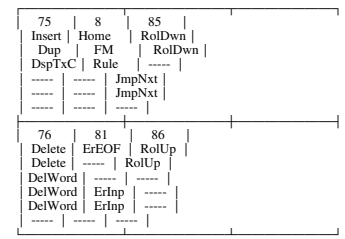


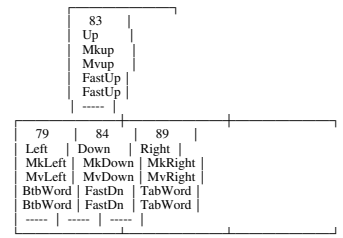
Segment B assignment:



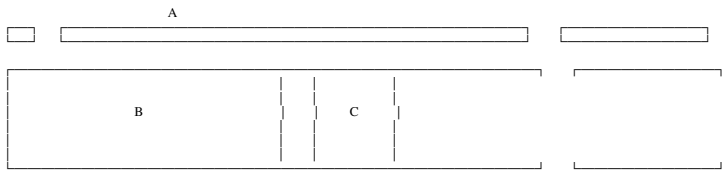
Keyboard Layouts

Segment C assignment:





Space-Saving Keyboard (Combined 3270 and 5250)



Segment A assignment:

11	112	113	114	115	116	117	118	119	12	121	122	123
SysAttn	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF1	PF11	PF12
SysReq	PF13	PF14	PF15	PF16	PF17	PF18	PF19	PF2	PF21	PF22	PF23	PF24
-----	-----	-----	-----	-----	Record	Play	RPause	-----	-----	-----	RTM	-----
-----	Doc	WdWrap	CfgFmt	-----	-----	-----	-----	APL	CurSel	CurBlink	AltCur	+Cr
-----	Doc	WdWrap	CfgFmt	-----	-----	-----	-----	APL	CurSel	CurBlink	AltCur	+Cr
-----	Red	Pink	Green	Yellow	Blue	Turq	White	FldColor	-----	-----	-----	-----

124	125	126
-----	-----	Clear
-----	-----	-----
-----	-----	Break
-----	-----	-----
-----	-----	-----
-----	-----	-----

Segment B assignment:

1	2	3	4	5	6	7	8	9	1	11	12	13	14	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	BackSp			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	ChrAdv			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			

16	17	18	19	2	21	22	23	24	25	26	27	28	29
TabFld	-----	-----	-----	-----	-----	-----	-----	-----	-----				
BackTab	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			

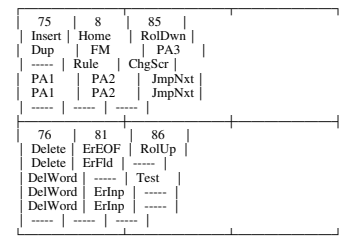
3	31	32	33	34	35	36	37	38	39	4	41	43
-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine			
-----	-----	-----	-----	-----	-----	-----	-----	-----	NewLine			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			

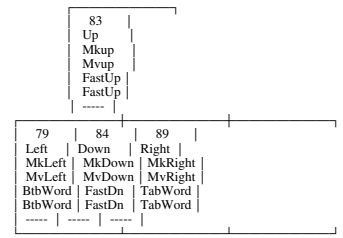
44	46	47	48	49	5	51	52	53	54	55	57
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		
-----	-----	-----	-----	-----	-----	-----	-----		-----		

58	6	61	62	64
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
Reset/Ctrl	-----	-----	-----	Enter/Ctrl
-----	-----	-----	-----	-----
Quit	-----	-----	-----	-----
Quit	-----	-----	-----	-----
-----	-----	-----	-----	-----

Keyboard Layouts

Segment C assignment:





APL Keyboard Layouts (3270 Only)

This section shows the APL keyboard layouts for each country. Only APL characters are shown in each shift position (up/down/ALT).

Language	Type	Figure on
Austrian/German	1	page 8-16
Belgian	2	page 8-16
Canadian-Bilingual	1	page 8-16
Denmark	1	page 8-16
Finnish/Swedish	1	page 8-16
French AZERTY	2	page 8-16
Italian	1	page 8-16
Japanese	4	page 8-17
Latin American Spanish	1	page 8-16
Norwegian	1	page 8-16
Portuguese	1	page 8-16
Spanish	1	page 8-16
Swiss-French	1	page 8-16
Swiss-German	1	page 8-16
U.K. English	1	page 8-16
U.S. English	3	page 8-17

Keyboard Layouts

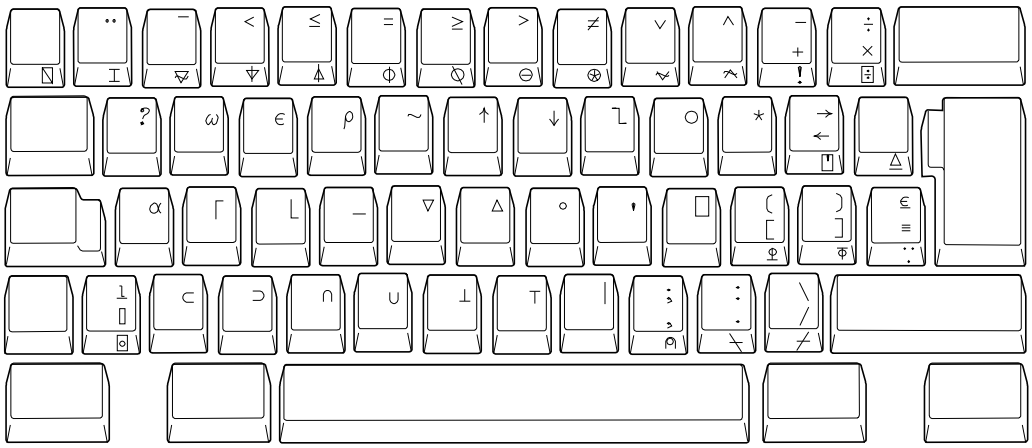


Figure 8-1. Type-1 APL Keyboard

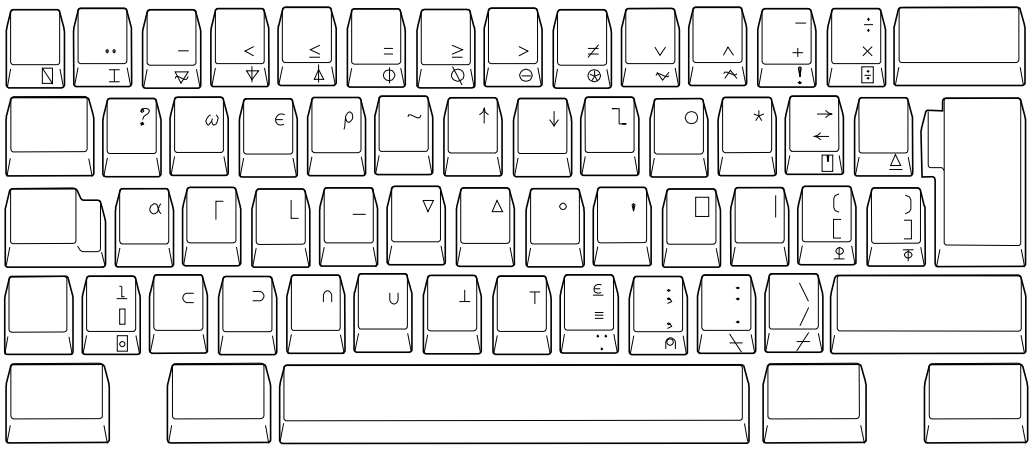


Figure 8-2. Type-2 APL Keyboard

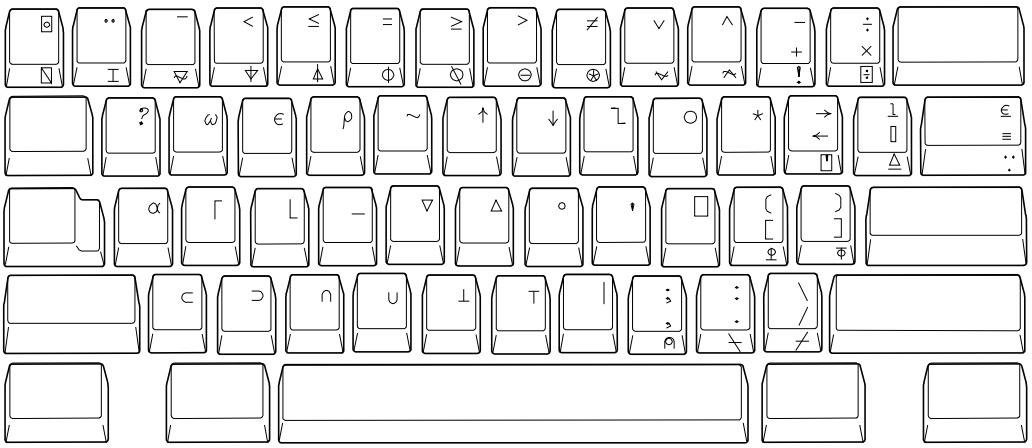


Figure 8-3. Type-3 APL Keyboard

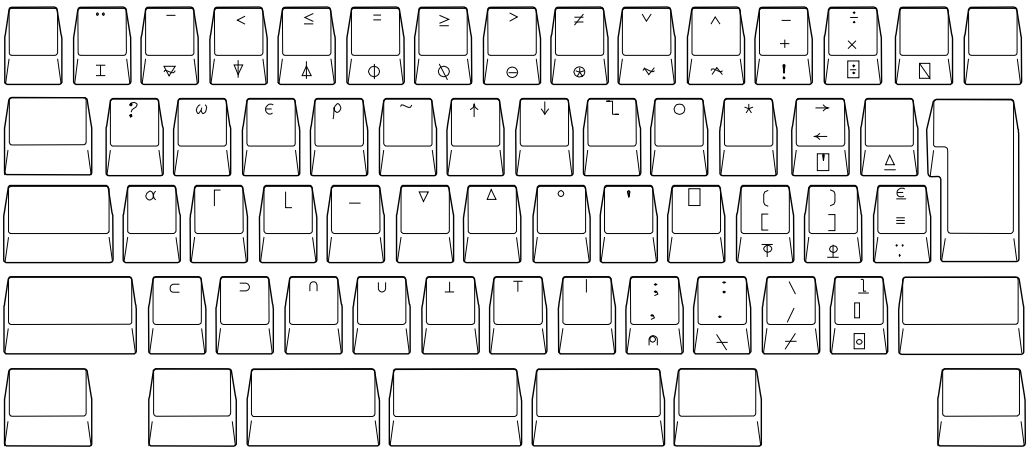


Figure 8-4. Type-4 APL Keyboard

Key Map for Home3270

This section shows the position of the following control codes:

NUL (×00)
ESC (×1B)
FS (×1C)
GS (×1D)
RS (×1E)
US (×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 8-5 through Figure 8-6.

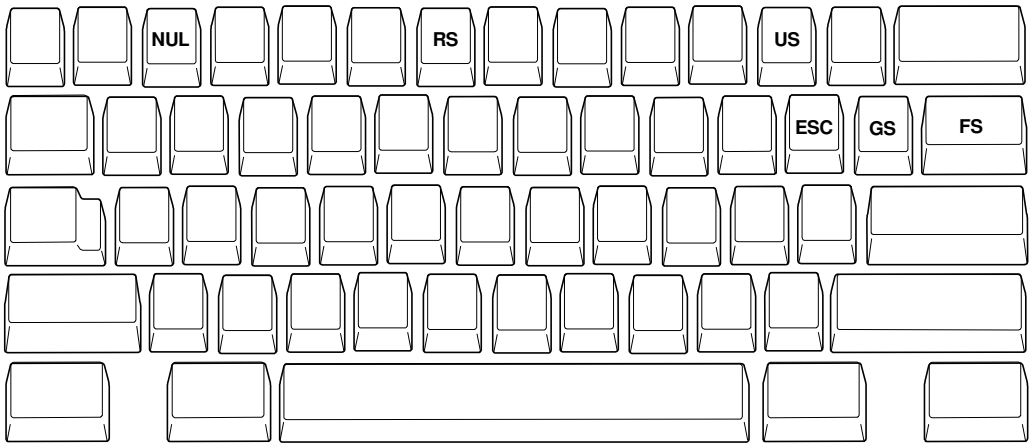


Figure 8-5. Common Control Code of Keyboard Core Segment for Non-Japanese Keyboard

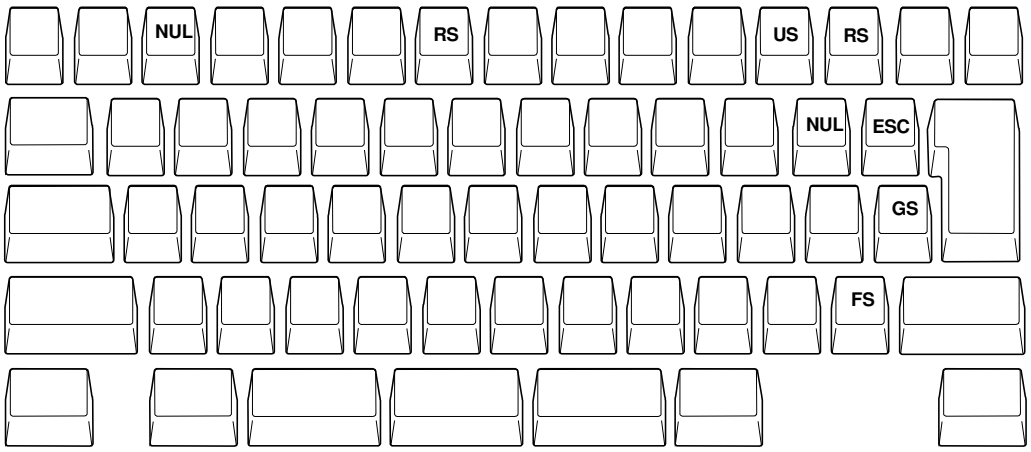


Figure 8-6. Common Control Code of Keyboard Core Segment for Japanese Keyboard

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 Alphabet
SOH (×01)	a
STX (×02)	b
ETX (×03)	c
EOT (×04)	d
ENQ (×05)	e
ACK (×06)	f
BEL (×07)	g
BS (×08)	h
HT (×09)	i
LF (×0A)	j
VT (×0B)	k
FF (×0C)	l
CR (×0D)	m
SO (×0E)	n
SI (×0F)	o
DLE (×10)	p
DC1(XON) (×11)	q
DC2 (×12)	r
DC3(XOF) (×13)	s
DC4 (×14)	t
NAK (×15)	u
SYN (×16)	v
ETB (×17)	w
CAN (×18)	x
EM (×19)	y
SUB (×1A)	z

Figure 8-7. Other Control Code Map of Key Segment B

Following is an example of control code mapping for the U.S. Enhanced Keyboard.

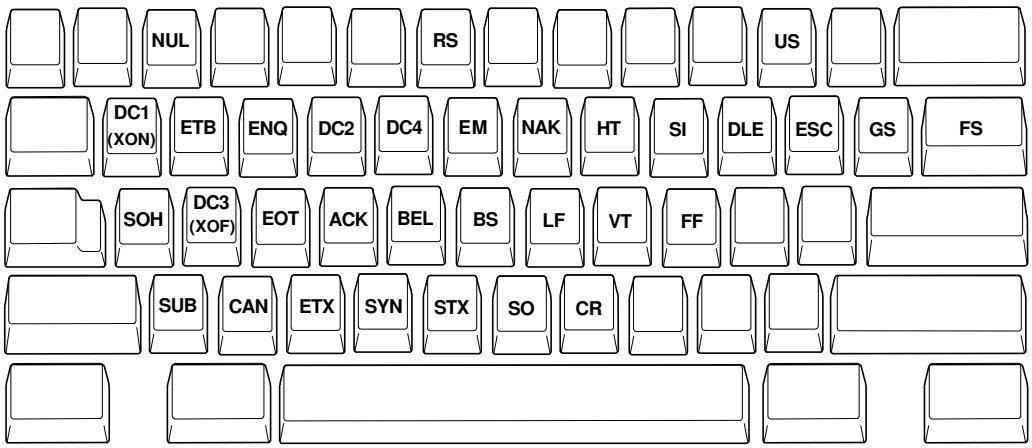


Figure 8-8. Control Code Map of Keyboard Core Segment for U.S. Enhanced Keyboard

Chapter 9. Alerts

Alerts are generated by components of Personal Communications and corresponding messages are logged.

Note that some alerts can be caused by different situations. Each situation may generate a different message. Other alerts are informational and do not generate specific messages in the log, although messages about problems relating to the situation that generated the alert may be logged.

Alert ID number	Messages logged
APPN Alerts	
x' 34A6F B'	PCS4 66E
	PCS4 68E
	PCS4 93E
x' DF28A14'	PCS4 65E
	PCS4 66E
	PCS4 68E
	PCS4 69E
	PCS4 7 E
x'17 F771 '	No specific message
x'21745F28'	No specific message
x'2313A399'	PCS4364A
	PCS4365A
	PCS4379A
x'32CDF4E2'	PCS4 73E
x'473 2521'	No specific message
x'6D27D125'	PCS4 66E
	PCS4 68E
x'7599A7D8'	No specific message
x'769 22F '	PCS45 4E
x'9DCD7CCA'	PCS4275E
	PCS428 E
	PCS4282E
	PCS4283A
	PCS4284E
	PCS43 4E
	PCS43 5E
	PCS431 A
	PCS4311E
	PCS4312E
x'9E452D9C'	PCS4593A
x'A89646AA'	PCS4275E
	PCS428 E
	PCS4282E
	PCS4283A
	PCS4284E
	PCS43 4E
	PCS43 5E
	PCS431 A
	PCS4311E
	PCS4312E
x'B558D31 '	PCS4324E

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	PCS4342E
	PCS4347E
x'C781E91E'	No specific message
x'EBAA3C4F'	PCS4593A
x'EBEE39 E'	PCS4 63E
	PCS4 64E
	PCS4 66E
	PCS4 67E
	PCS4 68E
	PCS4 71A
	PCS4 91E
	PCS4 92E
	PCS4 94E
	PCS4123E
	PCS4124E
	PCS4125E
x'F52A C 1'	PCS4 61E
	PCS4 62E
x'FE1C42EB'	No specific message

LLC2 SAP Alerts

x' 16E5F4E'	PCS1 66A
	PCS1 54A
x'3BA 3B6D'	PCS1 66A
	PCS1 5E
x'55BF3E1C'	PCS1 66A
	PCS1 54A
x'A676B23 '	PCS1 66A
	PCS1 5E
x'CAF3C58A'	PCS1 66A
	PCS1 54A
x'D2E24978'	PCS1 66A
	PCS1 5E
x'D615A61E'	PCS1 66A
	PCS1 54A
x'EB1D6ABB'	PCS1 66A
	PCS1 5E
x'EB61E14F'	PCS1 66A
	PCS1 5E

LLC2 Link Station Alerts

x'216D1 33'	PCS1 65A
	PCS1 3E
x'25AC D84'	PCS1 65A
	PCS1 4E
x'28EF2B5D'	PCS1 65A
	PCS1 1E
	PCS1 4E
	PCS1 6E
x'5B8F5BA7'	PCS1 65A
	PCS1 5 A
x'83D91642'	PCS1 65A
	PCS1 E
x'8718 BF5'	PCS1 65A
	PCS1 E
x'8A5B2D2C'	PCS1 65A
	PCS1 E

x'8E9A3 9B'	PCS1 65A
	PCS1 E
x'E65B B7F'	PCS1 65A

pDLC Alerts

Alert ID number	Messages logged	Alert type	Alert description
x' E499 26'	PCS86 7	1	33
x' F935B3E'	PCS86 3	1	33
x'21C346F '	PCS8619	1	33
x'25 25B47'	PCS862	1	33
x'28417D9E'	PCS8617	1	33
x'2C8 6 29'	PCS8618	1	33
x'4227687B'	PCS861	1	33
x'6C6E25 5'	PCS86 4	1	8
	PCS8612		
x'7EA9C871'	PCS86 8	1	33
x'8CEC6B74'	PCS86 9	1	33
x'AB218ADF'	PCS87	1	33
x'BB5C288E'	PCS86	1	33
x'C16E9922'	PCS8615	1	33
x'C5AF8495'	PCS8616	1	33
x'C8ECA24C'	PCS8613	1	33
x'CC2DBFFB'	PCS8614	1	33
x'D3F9C6D8'	PCS8611	1	33
x'EBB67B65'	PCS86 6	1	33

Alerts

Part 2. Personal Communications/3270

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Chapter 10. Building a Printer Definition Table (PDT) for PC/3270

If you are using a printer that is not directly supported by PC/3270, you can use the printer table compiler to build a printer definition table for use by PC/3270. The input to the printer table compiler is a text file that defines how characters and control codes are sent to the printer and how printer output is formatted. You can create this file by using a text editor that produces an ASCII file or by modifying one of the printer definition tables supplied with PC/3270. The printer definition files are files that have an extension of **.PDF**.

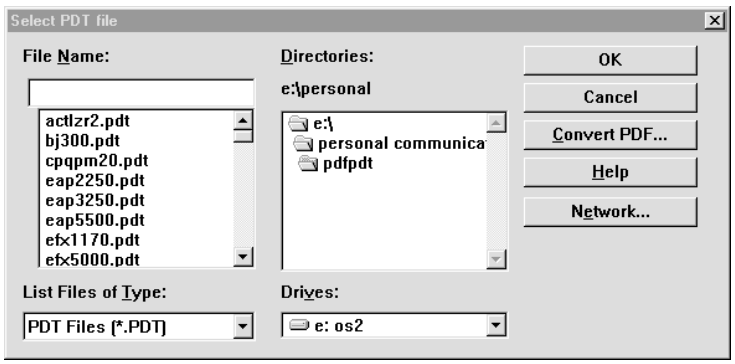
Customizing the Printer Definition Table

To use the PDT file:

1. Select **File** from the menu bar of the workstation window.
2. Select **Printer Setup** from the File menu.

   The Printer Setup dialog box appears.
3. Select the **Use PDT** check box and then **Select PDT**.

   The Select PDT File dialog box appears.



4. Select **Convert PDF**. Select the PDF file to be converted from the list in the Convert PDF to PDT dialog box; then select **Convert**. The PDF File Converter window appears. After the file has been converted, click on **Close**, then click on **Close** in the Convert PDF to PDT window.
5. Click **OK** in the Select PDT file window.
6. Click **OK** on the Printer Setup dialog box.

   After printer setup is complete, the Printer Setup dialog box is closed.

Printer Definition File Format

The printer definition file consists of a macro definitions section and a definitions section. In the *macro definitions section*, you can equate a sequence of hexadecimal numbers, decimal numbers, and ASCII characters with a name that is used in place of that sequence in the definitions section. In the *definitions section*, the left side of each statement contains the name of a character or control command.

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You enter a string of hexadecimal numbers, decimal numbers, ASCII characters, or previously defined macro names on the right side of each statement that defines the character or the command that is sent to the printer.

Different printer manuals define printer control strings in different ways. Some printer manuals describe control sequences as a string of hexadecimal numbers, while others use symbols such as esc J 1 K. The printer table compiler accepts either format and allows you to define macros for more readable files. The right side of each statement in the definitions section of the printer definition file can be any of these:

Single characters that are interpreted as their ASCII value
Two-digit numbers that are interpreted as hexadecimal values
Three-digit numbers that are interpreted as decimal values
Previously defined macros that are expanded by the printer table compiler.

If you leave the right side of a statement blank or if you delete it, the character or control code is interpreted as a null string. If a character or control code is defined more than once in the file, the last definition is used. If an error is detected in a statement, the printer table compiler ignores the statement and goes to the next statement.

After you have created your printer definition file, use the printer table compiler to compile it. The resulting file has the extension **.PDT**.

The symbols / indicate the beginning of a comment and the symbols / indicate the end of a comment. Comments can be entered anywhere in your printer definition table and are ignored by the printer table compiler.

A macro definition cannot contain another macro definition.

Printer Definition Tables

Standard printer definition table file names are of the form **IBM**nnnnn**.PDT**, and tables containing code page fonts are of the form **PRN**nnnnn**.PDT**, where nnnnn is a machine type.

See “PDT Files” on page 4-2 for a list of the PDT files provided by Personal Communications.

The PDT files contained in the Personal Communications installation diskette can be used as is. However, it might be advantageous to change the definitions of some fields. To do so, copy an existing PDF file, modify it, and then convert it to a new PDT file.

An example PDF file is shown below. Do not attempt to change the statements in a field for which modification is specifically prohibited. If a PDT file created according to a changed PDF file is used, the results of printing cannot be guaranteed.

Example Printer Definition File

The following example is an annotated version of a printer definition file for the IBM 4202 Proprinter. This is an example only; the actual file may differ.

IBM4202.PDF File Contents

```
/                                                  /
/                                                                                  /
/       PRINTER SESSION DEFINITION FILE FOR: Proprinter XL 42 2-1                  /
/                                                                                  /
/                                                  /
/                                                  /
/                                  Macro  Definitions                                  /
/ Define values here that will be used commonly throughout your          /
/ definitions.    Then use the left hand side of the equate as you          /
/ define your characters and control strings.    The printer compiler    /
/ will substitute the right hand side of the equate for each                /
/ occurrence of the left hand side throughout the file.                    /
/                                                                                  /
/ Macro names must be at least three characters long and may not          /
/ begin with a number.                                                              /
/                                                                                  /
/ Format                                                                           /
/ A Macro Name is associated with a value or string of values by the  /
/ EQU statement.    The right hand side of an EQU statement must be a    /
/ string of zero or more two digit hexadecimal numbers.    If a macro    /
/ definition is more than one line long, you may extend it to the        /
/ next line by ending the first line with a comma.    In this manner      /
/ you may define a macro which is many lines long by terminating each /
/ line except the last with a comma.    No macro names are allowed on    /
/ right hand side.                                                                  /
/                                                  /
BEGIN_MACROS
/ The following values are standard for most printers.    Check your      /
/ printer manual to verify that these are correct for your printer      /
NUL EQU                    / Nul character                        /
BEL EQU  7                 / Beeper                               /
BAK EQU  8                 / Back Space                           /
TAB EQU  9                 / Tab                                  /
LFF EQU  A                 / Line Feed                            /
VTB EQU  B                 / Vertical Tab                         /
FFF EQU  C                 / Form Feed                            /
CRR EQU  D                 / Carriage Return                      /
P 5 EQU 1B 57  1           / 5 Pitch-Characters/inch          /
                           / Same as Double Wide                  /
SEL EQU 11                 / Select Printer                       /
P1  EQU 12                 / 1  Pitch-Characters/inch         /
CDW EQU 1B 57              / Cancel Double Wide contin.    /
CDL EQU 14                 / Cancel Double Wide line          /
ESC EQU 1B                 / Escape                               /
CAN EQU 18                 / Cancel Data                          /
SPA EQU 2                  / Space                                /
P17 EQU 12  F              / 17.1 Pitch-Characters/inch    /
CS2 EQU 1B 36              / Select Character Set 2           /
CS1 EQU 1B 37              / Select Character Set 1           /
P12 EQU 1B 3A              / 12 Pitch-characters/inch         /
SVT EQU 1B 42              / Set Vertical Tabs                    /
SFL EQU 1B 43              / Set Form Length                      /
SHT EQU 1B 44              / Set Horizontal Tabs                  /
SDS EQU 1B 47              / Start Double Strike                  /
CDS EQU 1B 48              / Cancel Double Strike                 /
SSP EQU 1B 4E              / Set skip perforation                 /
CSP EQU 1B 4F              / Cancel skip perforation              /
CAT EQU 1B 52              / Cancel all tabs Clears VT            /
                           / and sets HT every 8 position /
CSS EQU 1B 54              / Cancel Subscript or Superscr /
SSO EQU 1B 53              / Set Superscript over                 /
SSU EQU 1B 53  1           / Set Subscript under                  /
SUL EQU 1B 2D  1           / Start Underline                      /
CUL EQU 1B 2D              / Cancel Underline                     /
LL6 EQU 1B 41  C 1B 32 / Set line length 6 lines/inch /
```

```
LL8 EQU 1B 41  9 1B 32 /  Set line length 8 lines/inch /
LL  EQU 1B 41  7 1B 32 /  Set line length 1  lines/inc /
                                  /  actually 7/72 inch                /
SDQ EQU 1B 49                 /  Select Draft Printing Quality                    /
SLQ EQU 1B 49  2              /  Select Letter Printing Quality                   /
END_MACROS
/                                 Session  Parameters                                  /
/  These parameters determine the way in which output will be                 /
/  formatted for your printer.                                                      /
/  Numeric Parameters                                                                /
/  These parameters should be defined with a two digit hex number          /
/  or a three digit decimal number.    The range of the number is zero     /
/  to 255 (decimal).                                                                /
MAXIMUM_PAGE_LENGTH= 66                    /  Printed lines per page           /
MAXIMUM_PRINT_POSITION=132                 /  Printed characters per line  /
INTERV_REQ_TIMER=  1
VERTICAL_PEL=216
PAGE_LENGTH_TYPE?=LINE                     /  SET_PAGE_LENGTH "value" is      /
LINE_SPACING_RATIO= 72
/  YES/NO Parameters                                                                /
/  These parameters should be defined with either "YES" or "NO" on the /
/  right hand side of the '='                                                       /
COMPRESS_LINE_SPACING?=NO                  /  Should blank or null lines     /
                                                  /  be printed?                    /
FORM_FEED_ANY_POSITION?=YES                /  Should the form feed be          /
                                                  /  valid in any position?          /
OVERRIDE_FORMATTED_PRINT?=YES              /  Should nulls be printed as     /
                                                  /  blanks?                        /
AUTO_NEWLINE_AT_MAX_POS?=NO
/                                 Control  Codes                                       /
/  These definitions tell the emulator what control strings to send to /
/  your printer to issue control commands.                                          /
/                                                                                    /
/  Format                                                                            /
/  The name of the control command should always be at the beginning     /
/  of a line followed by a '=' and then a definition string.                  /
/  A Definition String is any combination of macro names, hexadecimal  /
/  numbers, and characters separated by blanks.    A macro must have        /
/  previously defined in the macro definitions section above. A              /
/  hexadecimal number must be two digits ( ,..,F) long. and a                /
/  character must be preceded and followed by a blank.    If a                /
/  definition string will not fit on a line, it may be continued            /
/  as many lines as you wish by ending each line except the last with  /
/  a comma;    ','.      You made add any comments you wish to by including /
/  them between a slash     and a  slash where slash is the symbol /.      /

/  START_JOB is the control string which will be sent to your printer  /
/  at the beginning of each print job.                                          /
START_JOB=SEL CDW CDL CUL CDS CS2
/  END_JOB is the string which will be sent to your printer at the end /
/  of each print job.                                                              /
END_JOB=CAT CDW CDL CUL CDS FFF
BACKSPACE=BAK
BEL=BEL
CARRIAGE_RETURN=CRR
NEW_LINE=CRR LFF
LINE_FEED=LFF
FORM_FEED=FFF
HORIZONTAL_TAB=TAB
VERTICAL_TAB=VTB
START_SUBSCRIPT=SSU
END_SUBSCRIPT=CSS
START_SUPERSCRIPT=SSO
END_SUPERSCRIPT=CSS
DUP=
FIELD_MARK=;
/  The following commands specify control codes for which most PC          /
/  printers require command strings which contain a variable value        /
/  or values somewhere in the middle of the string.                          /
/  Place the word "value(s)" in the position of your definition            /
/  string where the Personal Communications 327  should fill in            /
/  the hexadecimal value(s) indicated.                                          /
```

```
/ For example, on the IBM Proprinter, the SET_HORIZONTAL_TABS          /
/ definition is:                                                       /
/ SET_HORIZONTAL_TABS=ESC D values NUL                                 /
SET_HORIZONTAL_TABS=SHT values NUL    / "values" are the tab stops     /
                                      / in column numbers              /
SET_VERTICAL_TABS=SVT values NUL      / "values" are the tab stops     /
                                      / in line numbers                /
SET_HORIZONTAL_MARGINS=
SET_PAGE_LENGTH=SFL value             / "value"=number of lines        /
SET_AUTO_PERFORATION_SKIP=SSP value
                                      / "value"=number of lines to     /
                                      / skip over the perforation      /
                                      / between pages.  Used to set    /
                                      / top and bottom margins.        /
SET_VARIABLE_LINE_DENSITY=ESC A value ESC 2
                                      / "value"=number of points.      /
                                      / A point is 1/72 of an inch.    /
SET_CHARACTER_SET=
/ SET_CHARACTER_SET=ESC I NULL  selects the normal font                 /
/ SET_CHARACTER_SET=ESC I  2    selects the NLQ (near letter quality)  /
/ SET_CHARACTER_SET=ESC I  4    selects the normal downloaded font     /
/ SET_CHARACTER_SET=ESC I  6    selects the NLQ downloaded font        /
/ SET_CHARACTER_SET=CS1         selects the Character set 1            /
/ SET_CHARACTER_SET=CS2         selects the Character set 2            /

/ These control codes set the printer lines per inch and characters    /
/ per inch to fixed amounts.                                           /
/ If your printer does not support setting the line density in points  /
/ then you can enter control strings for the following commands.       /
/ When Personal Communications 327 gets a command from the host to     /
/ set the lines per inch, it will round it to the closest line per     /
/ inch setting that you provide.  Note that if you provide a command   /
/ for the SET_VARIABLE_LINE_DENSITY command above that it will be      /
/ used and any control strings you provide for the set lines per inch  /
/ commands below will not be used.                                     /

SET_6_LINES_PER_INCH=LL6
SET_8_LINES_PER_INCH=LL8
SET_1 _LINES_PER_INCH=LL              / 7/72 inch or 9/96 inch         /
SET_1 _CHARACTERS_PER_INCH=P1
SET_12_CHARACTERS_PER_INCH=P12
SET_15_CHARACTERS_PER_INCH=           / The proprinter does not        /
                                      / support 15 pitch except in     /
                                      / graphs mode                    /
SET_17_CHARACTERS_PER_INCH=P17        / Condensed mode                 /
START_DOUBLE_WIDTH_CHARACTERS=P 5
END_DOUBLE_WIDTH_CHARACTERS=CDW

/ These control codes are used to select the source drawer number      /
/ when your printer has the dual drawer sheetfeed option.              /
SELECT_DRAWER1=
SELECT_DRAWER2=
SELECT_DRAWER3=
/ These control codes select the print mode (quality of print).        /
SELECT_DRAFT_QUALITY=SDQ
SELECT_LETTER_QUALITY=SLQ
SELECT_ENHANCED_QUALITY=
SELECT_SETUP_QUALITY=
/                        Color Specifications                          /
START_COLOR_BLUE=
END_COLOR_BLUE=
START_COLOR_GREEN=
END_COLOR_GREEN=
START_COLOR_CYAN=
END_COLOR_CYAN=
START_COLOR_RED=
END_COLOR_RED=
START_COLOR_MAGENTA=
END_COLOR_MAGENTA=
START_COLOR_YELLOW=
END_COLOR_YELLOW=
START_COLOR_BLACK=
```

```
END_COLOR_BLACK=
START_COLOR_WHITE=
END_COLOR_WHITE=

/                    Highlight  Specifications                    /
/ These definitions will determine how things which are sent by the    /
/ host to be displayed or printed as underlined, reverse video, or      /
/ blinking will be highlighted on your printer.                          /

START_HIGHLIGHT_INTENSE=SDS              / This is double strike          /
END_HIGHLIGHT_INTENSE=CDS
START_HIGHLIGHT_UNDERLINE=SUL
END_HIGHLIGHT_UNDERLINE=CUL
START_HIGHLIGHT_REVERSE_VIDEO=
END_HIGHLIGHT_REVERSE_VIDEO=
START_HIGHLIGHT_BLINK=
END_HIGHLIGHT_BLINK=

/                    Character  Definitions                    /
/ The remainder of the definitions are for printable characters.        /
/ See your users guide for the actual character referred to by each    /
/ character name.                                                        /
/ Format                                                                  /
/ The format of a character definition is the same as for a control    /
/ code.                                                                   /

SPACE=SPA
EXCLAMATION_POINT=21
QUOTATION_MARKS=22
NUMBER_SIGN=23
DOLLAR_SIGN=24
PERCENT_SIGN=25
AMPERSAND=26
APOSTROPHE=27
LEFT_PARENTHESIS=28
RIGHT_PARENTHESIS=29
ASTERISK=2A
PLUS_SIGN=2B
COMMA=2C
HYPHEN=2D
PERIOD=2E
SLASH=2F
ZERO=
ONE=1
TWO=2
THREE=3
FOUR=4
FIVE=5
SIX=6
SEVEN=7
EIGHT=8
NINE=9
COLON=3A
SEMICOLON=3B
LESS_THAN_SIGN=3C
EQUAL_SIGN=3D
GREATER_THAN_SIGN=3E
QUESTION_MARK=3F
AT_SIGN=4
A_CAPITAL=A
B_CAPITAL=B
C_CAPITAL=C
D_CAPITAL=D
E_CAPITAL=E
F_CAPITAL=F
G_CAPITAL=G
H_CAPITAL=H
I_CAPITAL=I
J_CAPITAL=J
K_CAPITAL=K
L_CAPITAL=L
M_CAPITAL=M
```

```
N_CAPITAL=N
O_CAPITAL=O
P_CAPITAL=P
Q_CAPITAL=Q
R_CAPITAL=R
S_CAPITAL=S
T_CAPITAL=T
U_CAPITAL=U
V_CAPITAL=V
W_CAPITAL=W
X_CAPITAL=X
Y_CAPITAL=Y
Z_CAPITAL=Z
LEFT_BRACKET=5B
BACKSLASH=5C
RIGHT_BRACKET=5D
CIRCUMFLEX_ACCENT=5E
UNDERLINE=5F
GRAVE_ACCENT=6
A_SMALL=a
B_SMALL=b
C_SMALL=c
D_SMALL=d
E_SMALL=e
F_SMALL=f
G_SMALL=g
H_SMALL=h
I_SMALL=i
J_SMALL=j
K_SMALL=k
L_SMALL=l
M_SMALL=m
N_SMALL=n
O_SMALL=o
P_SMALL=p
Q_SMALL=q
R_SMALL=r
S_SMALL=s
T_SMALL=t
U_SMALL=u
V_SMALL=v
W_SMALL=w
X_SMALL=x
Y_SMALL=y
Z_SMALL=z
LEFT_BRACE=7B
VERTICAL_BAR=B3
RIGHT_BRACE=7D
TILDE_ACCENT=7E
C_CEDILLA_CAPITAL=8
U_DIAERESIS_SMALL=81
E_ACUTE_SMALL=82
A_CIRCUMFLEX_SMALL=83
A_DIAERESIS_SMALL=84
A_GRAVE_SMALL=85
A_OVERCIRCLE_SMALL=ESC 4C  8     6 6A AA AA 6A 1E  2
C_CEDILLA_SMALL=87
E_CIRCUMFLEX_SMALL=88
E_DIAERESIS_SMALL=89
E_GRAVE_SMALL=8A
I_DIAERESIS_SMALL=8B
I_CIRCUMFLEX_SMALL=8C
I_GRAVE_SMALL=8D
A_DIAERESIS_CAPITAL=8E
A_OVERCIRCLE_CAPITAL=8F
E_ACUTE_CAPITAL=9
AE_DIPTHONG_SMALL=91
AE_DIPTHONG_CAPITAL=92
O_CIRCUMFLEX_SMALL=93
O_DIAERESIS_SMALL=94
O_GRAVE_SMALL=95
U_CIRCUMFLEX_SMALL=96
```

```
U_GRAVE_SMALL=97
Y_DIAERESIS_SMALL=98
O_DIAERESIS_CAPITAL=99
U_DIAERESIS_CAPITAL=9A
/                                                    /
/ The following character is printed by printing an o    (6F) then        /
/ backspacing(BAK) and over printing with a slash(2F).                    /
/                                                    /
O_SLASH_SMALL=6F BAK 2F
POUND_SIGN=9C
O_SLASH_CAPITAL=4F BAK 2F
/                                                    /
/ The following escape sequence defines the character in all points  /
/ addressable mode (APA).    The ESC 4C starts the APA mode.    The          /
/  8    is the count low and count high and defines eight bytes of     /
/ APA data. The    44 28 1  28 44       are the eight bytes of data. /
/ A bit set to 1 prints the dot and a bit set to   does not print.     /
/ The most significant bit prints as the top dot.    The least               /
/ significant bit prints as the bottom dot.    The first byte is            /
/ printed on the left following the last character.    The next byte     /
/ is printed to the right one dot column to the right of the last       /
/ byte etc..    Refer to the Proprinter Guide to Operations for             /
/ more information.                                                                  /
/                                                    /
MULTIPLY_SIGN=ESC 4C  8      44 28 1  28 44
A_ACUTE_SMALL=A
I_ACUTE_SMALL=A1
O_ACUTE_SMALL=ESC 4C  8     C 12 12 52 92 12  C
U_ACUTE_SMALL=A3
N_TILDE_SMALL=A4
N_TILDE_CAPITAL=A5
ORDINAL_INDICATOR_FEMININE=A6
ORDINAL_INDICATOR_MASCULINE=A7
QUESTION_MARK_INVERTED=A8
REGISTERED_TRADEMARK_SYMBOL=ESC 4C  9    7E 81 BD A9 B9 A5 81 7E
LOGICAL_NOT=AA
ONE_HALF=AB
ONE_QUARTER=AC
EXCLAMATION_POINT_INVERTED=AD
LEFT_ANGLE_QUOTES=AE
RIGHT_ANGLE_QUOTES=AF
A_ACUTE_CAPITAL=ESC 4C  8     6  C 54 A4 14  C  6
A_CIRCUMFLEX_CAPITAL=ESC 4C  8     6 4C 94 A4 94 4C  6
A_GRAVE_CAPITAL=ESC 4C  8     6  C 14 A4 54 4C  6
COPYRIGHT_SYMBOL=ESC 4C  9    7E 81 99 A5 A5 A5 81 7E
CENT_SIGN=9B
YEN_SIGN= 9D
A_TILDE_SMALL=ESC 4C  9     6 2A 2A CA AA 5E 42 8
A_TILDE_CAPITAL=ESC 4C  8     6 4C 94 A4 54 4C 86
INTERNATIONAL_CURRENCY_SYMBOL=ESC 4C  9    82 54 28 44 44 28 54 82
ETH_ICELANDIC_SMALL=EB
ETH_ICELANDIC_CAPITAL=ESC 4C  8    92 FE 92 92 44 7C 38
E_CIRCUMFLEX_CAPITAL=ESC 4C  8    3E 6A AA AA AA 62 22
E_DIAERESIS_CAPITAL=ESC 4C  8    3E AA AA 2A 2A A2 A2
E_GRAVE_CAPITAL=ESC 4C  8    3E 2A 2A AA 6A 22 22
I_DOTLESS_SMALL=ESC 4C  8          12 1E  2
I_ACUTE_CAPITAL=ESC 4C  8          52 9E 12
I_CIRCUMFLEX_CAPITAL=ESC 4C  8       4  92 9E 92 4
I_DIAERESIS_CAPITAL=ESC 4C  8       4  52 1E 52 4
VERTICAL_LINE_BROKEN=ESC 4C  8             77
I_GRAVE_CAPITAL=ESC 4C  8          12 9E 52
O_ACUTE_CAPITAL=ESC 4C  8     E 11 11 51 81 11  E
SHARP_S_SMALL=ESC 4C  8     2 3E 4  52 52 2A  4
O_CIRCUMFLEX_CAPITAL=ESC 4C  8    1C 22 62 A2 A2 62 1C
O_GRAVE_CAPITAL=ESC 4C  8    1C 22 22 A2 62 22 1C
O_TILDE_SMALL=ESC 4C  8     C 12 52 92 52 92 8C
O_TILDE_CAPITAL=ESC 4C  8    1C 22 62 A2 62 A2 9C
MICRO_SYMBOL=E6
THORN_ICELANDIC_SMALL=ESC 4C  8     2 FC    48 3  3
THORN_ICELANDIC_CAPITAL=ESC 4C  8    81 FF FF 42 24 3C 18
U_ACUTE_CAPITAL=ESC 4C  8    3C  2 42 82  2  2 3C
U_CIRCUMFLEX_CAPITAL=ESC 4C  8    3C  2 42 82 82 42 3C
```

```
U_GRAVE_CAPITAL=ESC 4C  8    3C  2  2 82 42  2 3C
Y_ACUTE_SMALL=ESC 4C  8    2  1  4A 84  8 1  2
Y_ACUTE_CAPITAL=ESC 4C  8    2  1  48 86  8 1  2
OVERLINE=ESC 4C  8    8  8  8  8  8  8  8
ACUTE_ACCENT=ESC 4C  8         4  8
SYLLABLE_HYPHEN=ESC 4C  8    1  1  1
PLUS_OR_MINUS_SIGN=F1
THREE_QUARTERS=ESC 4C  9    89 AA 74  8 16 2A 47 82
PARAGRAPH_SYMBOL=ESC 4C  8    6  F  FE      FE
SECTION_SYMBOL=ESC 4C  8    3  4B A9 A5 95 D2  C
DIVIDE_SIGN=F6
CEDILLA=ESC 4C  8            3  C  C
DEGREE_SYMBOL=F8
DIAERESIS=ESC 4C  8      8  8       8  8
MIDDLE_DOT_ACCENT=F9
ONE_SUPERSCRIPT=ESC 4C  8        48 F8  8
THREE_SUPERSCRIPT=ESC 4C  8        88 A8 A8 D8
TWO_SUPERSCRIPT=ESC 4C  8      48 98 A8 A8 48
REQUIRED_SPACE=FF
/                                                  /
/                    PC/327  Internal Data Area.                    /
/  Do not change these statement.                                  /
/                                                  /
TOP_MARGIN=
LEFT_MARGIN=
DYNAMIC_START_JOB=
DYNAMIC_END_JOB=
DYNAMIC_SET_PAGE_LENGTH=
PRINTER_ID=42  2
/                          End of Definition File                  /
```

Supplemental Explanation of PDF Statements

The PDF statements listed below have the following functions.

MAXIMUM_PAGE_LENGTH
Printed lines per page. If you change this value, you must change the value in the "SET_PAGE_LENGTH=SFL value" statement to be the same.

MAXIMUM_PRINT_POSITION
Printed characters per line.

COMPRESS_LINE_SPACING?
(For LU 3 only) Whether blank or null lines are to be printed if all characters on that line are nulls.

FORM_FEED_ANY_POSITION?
Whether a form feed is to be valid in any position. If NO, a form feed will be valid only in the following positions:

First print-position of the buffer
After a valid new line operation
First print-position of a line

OVERRIDE_FORMATTED_PRINT?
Whether nulls are to be printed as blanks.

INTERV_REQ_TIMER
This statement is ignored.

INTERV_TIMER_ON_PE_ONLY?
This statement is ignored.

RESELECT_TIME_EXCPT_5204
This statement is ignored.

ESC/P_LINE_FEED?
If YES, the line feed (LF) function is emulated when the line feed command is received. This is useful when you do not want a line feed accompanied by a carriage return (CR) on a printer using the ESC/P printer language. If NO, the value defined in the LINE_FEED statement is sent to the printer.

FFAnyPos? If YES, the form feed (FF) function is effective in any position (for LU 2, LU 3, and non-SNA sessions only).

IGNORE_FORM_FEED_AT_FIRST_POS?
If YES, the form feed (FF) function is ignored at the first position (for LU 2, LU 3, and non-SNA sessions) or at the beginning of the print job (for LU 1 sessions). Using this option eliminates extra blank pages at the beginning of each print job.

FORM_FEED_TAKES_POSITION?
If YES, the form feed (FF) function is effective if followed by data (LU 2, LU 3, and non-SNA sessions only).

SCS TAB Setting

A PC/3270 printer session LU type 1 can accept any number of tab positions, and the host printer session can send any number of tabs to the printer session. However, the workstation printer you are using might support fewer tab positions than the host application sets; for example, the IBM Proprinter supports 27 tab positions.

If the number of tab positions that the host application sets exceeds the maximum number of positions that the printer supports, your printed output will not look as you expect it to. You can avoid this situation by modifying the PDF file and reconfiguring PC/3270 as follows:

Modify the SET_HORIZONTAL_TABS statement as follows:

SET_HORIZONTAL_TABS=*number*

Save the file under a new name.

Convert the PDF file (with the procedure described on “Customizing the Printer Definition Table” on page 10-1).

Select a new PDT file created by the above step.

Printer Definition File Field Names and Symbols

The following table lists the symbols that are defined for printer definition files.

Table 10-1 (Page 1 of 4). Printer Symbol Definitions

Field Name	Symbol
SPACE	
EXCLAMATION_POINT	!
QUOTATION_MARKS	"
NUMBER_SIGN	#
DOLLAR_SIGN	$
PERCENT_SIGN	%
AMPERSAND	&
APOSTROPHE	'

Table 10-1 (Page 1 of 4). Printer Symbol Definitions

Field Name	Symbol
LEFT_PARENTHESIS	(
RIGHT_PARENTHESIS	)
ASTERISK	*
PLUS_SIGN	+
COMMA	,
HYPHEN	-
PERIOD	.
SLASH	/

Table 10-1 (Page 2 of 4). Printer Symbol Definitions

Field Name	Symbol
ZERO	0
ONE	1
TWO	2
THREE	3
FOUR	4
FIVE	5
SIX	6
SEVEN	7
EIGHT	8
NINE	9
COLON	:
SEMICOLON	;
LESS_THAN_SIGN	<
EQUAL_SIGN	=
GREATER_THAN_SIGN	>
QUESTION_MARK	?
AT_SIGN	@
A_CAPITAL	A
B_CAPITAL	B
C_CAPITAL	C
D_CAPITAL	D
E_CAPITAL	E
F_CAPITAL	F
G_CAPITAL	G
H_CAPITAL	H
I_CAPITAL	I
J_CAPITAL	J
K_CAPITAL	K
L_CAPITAL	L
M_CAPITAL	M
N_CAPITAL	N
O_CAPITAL	O
P_CAPITAL	P
Q_CAPITAL	Q
R_CAPITAL	R
S_CAPITAL	S
T_CAPITAL	T
U_CAPITAL	U
V_CAPITAL	V
W_CAPITAL	W
X_CAPITAL	X
Y_CAPITAL	Y
Z_CAPITAL	Z

Table 10-1 (Page 2 of 4). Printer Symbol Definitions

Field Name	Symbol
LEFT_BRACKET	[
BACKSLASH	\
RIGHT_BRACKET	]
CIRCUMFLEX_ACCENT	^
UNDERLINE	_
GRAVE_ACCENT	`
A_SMALL	a
B_SMALL	b
C_SMALL	c
D_SMALL	d
E_SMALL	e
F_SMALL	f
G_SMALL	g
H_SMALL	h
I_SMALL	i
J_SMALL	j
K_SMALL	k
L_SMALL	l
M_SMALL	m
N_SMALL	n
O_SMALL	o
P_SMALL	p
Q_SMALL	q
R_SMALL	r
S_SMALL	s
T_SMALL	t
U_SMALL	u
V_SMALL	v
W_SMALL	w
X_SMALL	x
Y_SMALL	y
Z_SMALL	z
LEFT_BRACE	{
VERTICAL_BAR	|
RIGHT_BRACE	}
TILDE_ACCENT	~
C_CEDILLA_CAPITAL	Ç
U_DIAERESIS_SMALL	ü
E_ACUTE_SMALL	é
A_CIRCUMFLEX_SMALL	â
A_DIAERESIS_SMALL	ä
A_GRAVE_SMALL	à
A_OVERCIRCLE_SMALL	å

Table 10-1 (Page 3 of 4). Printer Symbol Definitions

Field Name	Symbol
C_CEDILLA_SMALL	ç
E_CIRCUMFLEX_SMALL	ê
E_DIAERESIS_SMALL	ë
E_GRAVE_SMALL	è
I_DIAERESIS_SMALL	ï
I_CIRCUMFLEX_SMALL	î
I_GRAVE_SMALL	ì
A_DIAERESIS_CAPITAL	Ä
A_OVERCIRCLE_CAPITAL	Å
E_ACUTE_CAPITAL	É
AE_DIPTHONG_SMALL	æ
AE_DIPTHONG_CAPITAL	Æ
O_CIRCUMFLEX_SMALL	ô
O_DIAERESIS_SMALL	ö
O_GRAVE_SMALL	ò
U_CIRCUMFLEX_SMALL	û
U_GRAVE_SMALL	ù
Y_DIAERESIS_SMALL	ÿ
O_DIAERESIS_CAPITAL	Ö
U_DIAERESIS_CAPITAL	Ü
O_SLASH_SMALL	ø
POUND_SIGN	£
O_SLASH_CAPITAL	Ø
MULTIPLY_SIGN	×
A_ACUTE_SMALL	á
I_ACUTE_SMALL	í
O_ACUTE_SMALL	ó
U_ACUTE_SMALL	ú
N_TILDE_SMALL	ñ
N_TILDE_CAPITAL	Ñ
ORDINAL_INDICATOR_FEMININE	a
ORDINAL_INDICATOR_MASCULINE	o
QUESTION_MARK_INVERTED	¿
REGISTERED_TRADEMARK_SYMBOL	®
LOGICAL_NOT	¬
ONE_HALF	½
ONE_QUARTER	¼
EXCLAMATION_POINT_INVERTED	¡
LEFT_ANGLE_QUOTES	«
RIGHT_ANGLE_QUOTES	»
A_ACUTE_CAPITAL	Á
A_CIRCUMFLEX_CAPITAL	Â
A_GRAVE_CAPITAL	À

Table 10-1 (Page 3 of 4). Printer Symbol Definitions

Field Name	Symbol
COPYRIGHT_SYMBOL	©
CENT_SIGN	¢
YEN_SIGN	¥
A_TILDE_SMALL	ã
A_TILDE_CAPITAL	Ã
E_CIRCUMFLEX_CAPITAL	Ê
E_DIAERESIS_CAPITAL	Ë
I_ACUTE_CAPITAL	Í
I_CIRCUMFLEX_CAPITAL	Î
I_DIAERESIS_CAPITAL	Ï
VERTICAL_LINE_BROKEN	¦
I_GRAVE_CAPITAL	Ì
O_ACUTE_CAPITAL	Ó
O_CIRCUMFLEX_CAPITAL	Ô
O_GRAVE_CAPITAL	Ò
O_TILDE_SMALL	õ
O_TILDE_CAPITAL	Õ
MICRO_SYMBOL	µ
U_ACUTE_CAPITAL	Ú
U_CIRCUMFLEX_CAPITAL	Û
U_GRAVE_CAPITAL	Ù
ACUTE_ACCENT	´
SYLLABLE_HYPHEN	-
PLUS_OR_MINUS_SIGN	±
THREE_QUARTERS	¾
PARAGRAPH_SYMBOL	¶
SECTION_SYMBOL	§
DIVIDE_SIGN	÷
DEGREE_SYMBOL	°
ONE_SUPERSCRIPT	
THREE_SUPERSCRIPT	
TWO_SUPERSCRIPT	
REQUIRED_SPACE	
INTERNATIONAL_CURRENCY_SYMBOL	¤
ETH_ICELANDIC_SMALL	ð
ETH_ICELANDIC_CAPITAL	Ð
SHARP_S_SMALL	ß
THORN_ICELANDIC_SMALL	þ
THORN_ICELANDIC_CAPITAL	Þ
Y_ACUTE_SMALL	ý
Y_ACUTE_CAPITAL	Ý
OVERLINE	¯
CEDILLA	¸

Table 10-1 (Page 4 of 4). Printer Symbol Definitions

Field Name	Symbol
DIAERESIS	..
MIDDLE_DOT_ACCENT	.

Printer Color Mixing

Some printers, such as the IBM 5182, compose certain colors by mixing colors. Colors are mixed by printing the text in one color and then printing over the same text in another color on a second pass.

PC/3270 will compose a color if the color is not defined in the printer definition table of a color printer that is capable of mixing colors. Therefore, if you are using a printer that composes some colors by mixing two colors, leave the definition of the composed colors blank in the printer definition file. Only the composite colors defined in Table 10-2 are created by double-printing the primary colors.

Table 10-2. Color Mixes

Composite Color	Primary Colors
Red	yellow, magenta
Green	yellow, cyan
Blue	magenta, cyan

For example, to create red, you must define yellow and magenta. The primary colors must be defined in the printer definition table.

Printer Session Data Stream Support

There are two types of host-directed print data streams supported by PC/3270: the 3270 data stream and the SNA character string (SCS) data stream.

3270 Data Stream

The 3270 data stream is a buffer-oriented data stream. The print data is formatted as if it were going to be displayed on a screen. The host system sends commands to format the presentation space. These commands can change the presentation space in any location at any time. Once the host system completes formatting the presentation space, it issues a START PRINT command and the presentation space is printed as accurately as the printer hardware allows. The 3270 data stream can be sent to PC/3270 workstations over an SNA LU 3 session or a non-SNA DFT printer session.

Table 10-3 lists the commands that can be sent in the 3270 data stream.

Table 10-3. 3270 Data Stream Commands

Command	Meaning
W	Write
EW	Erase/Write
EWA	Erase/Write Alternate
RB	Read Buffer
RM	Read Modified
RMA	Read Modified All
EAU	Erase All Unprotected
WSF	Write Structured Field

The RB, RM, and RMA commands cannot be used with an SNA attachment.

Table 10-4 lists the orders that can be sent in the 3270 data stream.

Table 10-4. 3270 Data Stream Orders

Order	Meaning
SBA	Start Buffer Address
SSF	Start Field
IC	Insert Cursor
PT	Program Tab
RA	Repeat to Address
EUA	Erase Unprotected to Address
SFE	Start Field Extended
SA	Set Attribute
MF	Modify Field

The last three orders in this list manage the color, extended highlighting, and programmed symbols attributes for fields and individual characters. The programmed symbols attribute is not supported by PC/3270.

In addition to the commands and orders in the preceding list, there are special printer formatting control codes that can be included in the 3270 data stream.

Table 10-5 lists the control codes that can be sent in the 3270 data stream.

Table 10-5. 3270 Data Stream Control Codes

Code	Description
NL	New Line control code moves the print position to the left margin and down one line.
CR	Carriage Return control code moves the print position to the left margin.
EM	End of Message control code ends the print operation.
FF	Form Feed control code moves the print position to the left margin at the top of the next page.

Note: NL, CR, and EM are valid only if a line-length format specified by the WCC is not used. The FF code is valid in any buffer position.

PC/3270 printer support interprets each 3270 attribute and printer control code and translates them into a sequence of one or more workstation printer control codes. For more information about the 3270 data stream, refer to *IBM 3270 Information Display Data Stream Programmer's Reference*.

SCS Data Stream

The SCS data stream is a sequential data stream that is oriented toward line printers. The characters are translated according to the host system code page and printed according to the attributes and formatting specified by the control commands. The way in which SCS characters are printed depends only on the control codes that precede them. Therefore, it is not necessary to buffer the characters before they are printed. The SCS data stream flows across the SNA LU 1 session only.

The valid SCS control codes supported by PC/3270 are listed in Table 10-6.

Table 10-6 (Page 1 of 2). Supported SCS Control Codes

Code	Value	Command
NL	X'15'	New Line
LF	X'25'	Linefeed (Index)
CR	X'0D'	Carriage Return
FF	X'0C'	Form Feed
BS	X'16'	Backspace
BEL	X'2F'	Bell Function
IRS	X'1E'	Interchange-Record Separator
SA	X'28'	Set Attribute

Table 10-6 (Page 2 of 2). Supported SCS Control Codes

Code	Value	Command
TRN	X'35'	Transparent
NUL	X'00'	Null
HT	X'05'	Horizontal Tab
VT	X'0B'	Vertical Tab
SHF	X'2B C1'	Set Horizontal Format
SVF	X'2B C2'	Set Vertical Format
SLD	X'2BC 6'	Set Line Density
SPD	X'2BD2 xx29'	Set Print Density
VCS	X'04 xx'	Vertical Channel Select
ENP	X'14'	Enable Presentation
INP	X'24'	Inhibit Presentation
GE	X'08'	Graphic Escape
PPM	X'2BD2 xx48'	Page Presentation Media

Note: The ENP and INP commands are accepted, but are ignored, in an LU 1 session.

For more information about the SCS printer data stream, refer to *IBM Systems Network Architecture - Sessions Between Logical Units*.

Delimiting Print Jobs

Many print jobs can be sent over a single PC/3270 printer session. PC/3270 allows multiple sessions and applications to share a single workstation printer on a between-jobs basis. PC/3270 needs to know when each print job starts and ends so that printers can be shared properly and begin and end job strings can be sent at the appropriate times. The emulator recognizes a number of different methods of delimiting print jobs:

By Session PC/3270 printer support assumes, by default, that all print jobs are delimited by sessions. That is, in the absence of all other indicators, PC/3270 assumes that a print job begins when a printer session is started and ends when it is reset.

Time-Out Interval On non-SNA DFT sessions, print jobs can be delimited by a user-specified timeout interval. A print job on a non-SNA DFT printer session begins when the first host-outbound data for that job is received, and ends when no host-outbound data is received for a period of time exceeding the user-specified non-SNA DFT timeout interval. For PC/3270, this interval is specified during configuration.

By Brackets On an SNA session with an LU 1 or LU 3 host application, PC/3270 can use bracket indicators to delimit print jobs. The emulator opens the printer when it receives the begin bracket, then it processes and prints data. The emulator closes the printer after it receives an end bracket.

When the emulator receives another begin bracket, it again opens a printer and begins processing a print job.

Structured Fields The host can use structured fields to indicate to the device that a new file is beginning or that the current file is completed. PC/3270 delimits print jobs with Begin of File and End of File structured fields (SF) to perform host-directed printing. Structured fields are described in the next section.

Structured Fields

The host uses Begin of File and End of File structured fields to indicate to a device that a file is beginning or ending.

Begin/End of File Query Reply

The Begin/End of File query reply indicates that a device supports Begin of File and End of File to delineate print jobs. The PC/3270 sends a query reply, as shown in Table 10-7, to the host in response to a Read Partition General query.

Table 10-7. Begin/End of File Query Reply Format

Byte	Contents	Description
0–1	X'0005'	The length of this structure
2	X'81'	Query reply
3	QCODE X'9F'	Begin/End of File
4	FLAGS	Reserved; must be set to 0's

Begin/End of File Structured Fields

Begin/End of File structured fields are accepted on either LU 1 or LU 3 sessions. Table 10-8 shows the format of the Begin/End of File structured fields.

Table 10-8. Begin/End of File Structured Field Format

Byte	Bit	Contents	Description
0–1		X'0007'	The length of this structure
2–3		X'0F85'	Begin/End of File
4		PID	Partition ID
5		FLAG1	
	0–1	B'00'	Reserved
		B'01'	End of File is being sent
		B'10'	Begin of File is being sent
		B'11'	Reserved
	2–7		Reserved
6		FLAG2	Reserved; must be set to 0's.

This byte indicates whether Begin of File or End of File is being sent.

Processing Begin/End of File Structured Fields: When the Begin/End of File structured fields are used with brackets or non-SNA timeout intervals, the Begin/End of File SFs take precedence over the brackets or timeout intervals in determining when a print job begins or ends. Refer to the following examples:

Begin/End of File structured fields overriding brackets:

Begin Bracket, Begin of File Structured Field, ...Data...,
End Bracket

The device will wait indefinitely until the End of File structured fields is received before ending the print job.

Begin/End of File structured fields overriding non-SNA timeout intervals:

Begin of File structured fields, ...Data..., pause > timeout value

The device will wait indefinitely until the End of File structured fields is received before ending the print job.

Inconsistent use of Begin/End of File structured fields and brackets:

Begin Bracket, ...Data1...,
Begin of File Structured Fields,...Data2..,
End of File Structured Fields, ...Data3...,
End Bracket

When you use the Begin of File and End of File structured fields inconsistently with brackets, the results are unpredictable. In the preceding example, the device might process Data1, Data2, and Data3 as separate jobs or combine two or more of them into one file.

For predictable results, each data block must be enclosed by a Begin of File structured field and an End of File structured field. The following example shows three print jobs all delimited by Begin/End of File structured fields:

Begin Bracket, Begin of File Structured Field, ...Data1...,
End of File Structured Field,(job1)
Begin of File Structured Field, ...Data2..., End of File Structured Field, (job2)
Begin of File Structured Field, ...Data3..., End of File Structured Field,
End Bracket(job3)

PC/3270 always keeps track of brackets and timeout intervals. After the emulator receives a Begin of File structured field, it takes no action on Begin Brackets, End Brackets, or timeout until it receives an End of File structured field. Once a valid End of File SF is processed, the emulator defaults to delimiting jobs by brackets or timeout intervals until it receives the next Begin of File structured field.

Begin/End of File Structured Field Error Conditions: PC/3270 does not accept transmission of data belonging to two separate print jobs in the same chain. To be accepted by the emulator, Begin of File structured fields must be the first structured field of a chain and End of File structured fields must be the last structured field of a chain.

PC/3270 rejects transmission in the following instances:

The emulator receives an End of File structured field without first receiving a Begin of File structured field.

The emulator receives a second Begin of File structured field without receiving an intervening End of File structured field.

The emulator receives a Begin of File structured field that is not the first structured field following a **write structured field** command (LU 2, LU 3, and non-SNA sessions) or a Function Management Header 1 (LU 1 sessions).

The emulator receives an End of File structured field that is not the last structured field following a **write structured field** command (LU 2, LU 3, and non-SNA sessions) or a Function Management Header 1 (LU 1 sessions).

Processing SCS Data Streams: When processing an SCS data stream, PC/3270 treats Begin/End of File structured fields as follows:

A Begin of File structured field indicates that all SCS data in the same transmission until an End of File structured field is received is part of a new print job.

An End of File structured field indicates that any SCS data received in the same chain as the End of File structured field is the last data of the current print job.

Processing 3270 Data Streams: When processing a 3270 data stream, PC/3270 treats Begin/End of File structured fields as follows:

A Begin of File structured field indicates that the next presentation space print (initiated by a **write type** command with the start print bit turned on in the write control character) is the first in a print job.

An End of File structured field indicates that the last presentation space print was the last of the current print job. The emulator immediately sends a terminate string to the printer to close the printer session.

If PC/3270 receives a Begin of File structured field and an End of File structured field without at least one presentation space separating them, it ignores the structured fields.

Building PC/3270 PDTs

Chapter 11. File Transfer Commands for PC/3270

You can send data files to and receive them from IBM host systems that are running:

CICS/MVS	Customer Information Control System running under MVS
CICS/VSE	CICS running under Virtual Storage Extended
MVS/TSO	Multiple Virtual Storage/Time Sharing Option
OV/MVS	OfficeVision/MVS
VM/CMS	Virtual Machine/Conversational Monitor System

For more information on using these commands, select **Help** from the Personal Communications menu bar, then select **Commands** and **Transfer** in the pop-ups that follow.

File Transfer Methods

You can transfer files in the following ways with PC/3270:

By using the *Transfer* menu of the workstation window
By using the **SEND** and **RECEIVE** commands at the DOS command prompt
By using a DDE application that invokes file transfer
By using an EHLLAPI application that invokes file transfer
By using a macro that has send or receive commands as macro statements
By clicking on the Send or Recv icon on the tool bar

Requirements and Restrictions

Install the file transfer program, IND$FILE, at your host system. Ask your system administrator for additional file transfer procedures and precautions. An alternate host command name can be used by defining a DOS environment variable IND$FILE in **AUTOEXEC.BAT** or in a particular DOS box. For example:

```
SET IND$FILE = MYXFER
```

You should not use the following words as a VM file name or file type, as an MVS data set name, or as a CICS file name, because they are reserved for use as option commands.

ASCII, APPEND, TIME, CLEAR, NOCLEAR, SILENT, QUIET, PROGRESS, JISCII, SO, NOSO, BLANK, USER, CRLF, BINARY, NOCRLF

If you want to send to or receive from a subdirectory other than **Personal Communications**, you must specify the full path name.

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Sending and Receiving Files from the DOS Command Prompt

The workstation is the point of reference for the SEND and RECEIVE commands: You send from the workstation to the host and receive from the host to the workstation.

To send or receive a file:

1. Make sure you are logged on to your host.
2. Make sure the **Ready** message of the host system is displayed, except if you are transferring files through the command option of the ISPF application.

   Note: In the latter case, you must specify the NOCLEAR option for the file transfer command.

   If your screen is blank, make sure that no applications are running and that your host session is not in a *holding* state.

   Note: If you receive any messages from host application programs while you are transferring files, the transfer might not succeed. To prevent messages from interfering, enter the appropriate host command to set messages off temporarily. When file transfer is finished, set messages on again.
3. Switch to your DOS window session or DOS full-screen session.
4. If you use a hard disk, make sure the **SEND.EXE** and **RECEIVE.EXE** files are in your current directory or in your path. If you want to send to or receive from a subdirectory other than **Personal Communications**, you must specify the full path name.
5. Type the appropriate SEND or RECEIVE command at the DOS command prompt.

   Details on the SEND and RECEIVE commands and their options are explained in the following sections.

Using the VM/CMS SEND Command

Use the following information when sending a file to VM/CMS:

Figure 11-1 shows the command and information that you must provide. Enter it as shown (including parentheses). You can use either uppercase or lowercase letters.

Note: means to insert a space. There must ***not*** be a space between **h:** and **fn**.

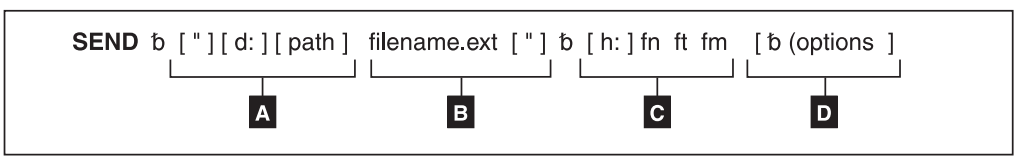

Figure 11-1. VM/CMS SEND Command Syntax

A The workstation drive and path of the file to send.

B The name of the workstation file to send.

C Host session specifications for the file to be sent to the host.

h: The short name of the session (which can be omitted if it is **a**)
fn File name
ft File type
fm File mode

D Optional changes made to the file during transfer. More than one option can be selected. Valid options are:

APPEND
ASCII
CLEAR
CRLF
LRECL n
NOCLEAR
PROGRESS
QUIET
RECFM x
TIME n

The parts of the VM/CMS SEND command are:

SEND The command.

d: The name of the diskette or hard disk drive on which the file is located.

path The path to the subdirectory that the file is in.

filename.ext The name of the file to be sent, including the extension.

h: The short name of the host session to which you want to send the file. The default is a:.

fn ft fm The name the file is to have on your VM/CMS disk. You must specify the file name (fn) and file type (ft). You can omit file mode (fm) if you want the file placed on your A-disk. You can create a new name or use a name that is already on your disk. If you use a new name, the file that you send is added to your disk. If you use the name of an existing file, the file that you send either replaces or is added to the old file. (Refer to the description of the APPEND option.)

(options
These options can be specified:

APPEND
Specifies that the file being sent is to be added to the end of an existing VM/CMS file. Omit this option if you want the file to replace an existing file. You cannot specify the LRECL n or RECFM x option if you use the APPEND option.

ASCII Specifies ASCII-to-EBCDIC character translation.

CLEAR
Clears the workstation window at the beginning of the file transfer. **CLEAR** is the default.

CRLF Specifies preserving of the carriage return and line feed codes. You need the ASCII and CRLF options for text or source files that you want to view or edit, such as SCRIPT files. You do not need them for binary files, such as programs.

LRECL n
: Specifies the file's record length. Include a record length only if you want the file to have a record length on your VM/CMS disk other than 80. Replace n with the record length you want. If you omit this option, the record length is set to 80 for fixed-length records or to a maximum of 80 for variable-length records.

NOCLEAR
: Suppresses the sending of a Clear command at the beginning of the file transfer.

PROGRESS
: Shows a message indicating that the file transfer is in progress or has ended. Such messages do not show the current transferred bytes.

QUIET Does not show any messages.

RECFM x
: Specifies the file record format. Use this parameter to specify variable-length or fixed-length records in the file. Replace x with V for variable or F for fixed. By default, the file has fixed-length records unless you specify the CRLF option; then the file has variable-length records unless you specify otherwise.

TIME n
: Specifies the length of time n, in units of 30 seconds, that the program waits for a response from the host before it sends an error message. Replace n with an integer value in the range from 0 through 2184. If you specify 0, timeout will not be set. The default is 1. To avoid a premature error message, specify an adequate value. In cases of large packet sizes, of large block sizes, or for slow communication lines (such as SDLC and COM port), *5* (150 seconds) is recommended. At least one blank space is required between TIME and n.

Examples

The following examples show the command syntax you can use to send files. The parameters of the SEND command can be combined into a single set of parentheses.

To send a workstation file from your default drive and add it as a new file on your VM/CMS A-disk:

SEND pc.txt a:cmsfile script a (ASCII CRLF LRECL 72 RECFM V

Note: If you use a command that exceeds one line, do not press Enter when you fill that line; continue typing your command.

This command sends a workstation file named **PC.TXT** from your default drive to your host in your host session named **a**. You do not need to specify the workstation drive if the file you are sending is on the current drive. The command creates a new file, named **CMSFILE SCRIPT**, on your A-disk. The records in the file can vary in length up to 72 characters.

To send a workstation file from your default drive to replace a file on your VM/CMS A-disk:

SEND pc.txt a:cmsfile script a (ASCII CRLF

This command sends a workstation file named **PC.TXT** from your default drive to your VM/CMS A-disk in your host session named **a**. You do not need to name the workstation drive if the file you are sending is on the default drive. The file replaces a **SCRIPT** file named **CMSFILE**. The new **CMSFILE** has the same record length and format as the old **CMSFILE**.

If you do not have a file called **CMSFILE SCRIPT** on your A-disk, **PC.TXT** is added to your A-disk as a new file called **CMSFILE SCRIPT**. The records in the file are 80 characters long and have fixed length.

To send a binary workstation file from a drive other than your default drive:

SEND a:pc.exe c:cmsfile exebin b (recfm v

This command sends a workstation file named **PC.EXE** from a diskette in drive A to your VM/CMS B-disk in your host session named **c**. It is a new file, or it replaces a file named **CMSFILE**.

When transferring a binary file, you must specify a variable record format (**recfm v**), otherwise, blank characters are added to the file.

To send a file from your hard disk and add it to the end of a file on your VM/CMS A-disk:

SEND c:pc.txt cmsfile script a (ASCII CRLF APPEND

This command sends a workstation file named **PC.TXT** from your hard disk to your host session. You do not need to name the host session if you are sending to the **a** session. The file is added to the end of a script file named **CMSFILE** on your VM/CMS A-disk.

To send a file from a subdirectory on your hard disk to your VM/CMS A-disk:

SEND c:\sd1\pc.txt cmsfile script a (ASCII CRLF

This command sends a file named **PC.TXT** from subdirectory **SD1** on your hard disk to your host session. It replaces a **SCRIPT** file named **CMSFILE** on your VM/CMS A-disk.

Using the VM/CMS RECEIVE Command

Use the following information when receiving a file from VM/CMS:

Figure 11-2 shows the command and information you must provide. Enter it as shown (including parentheses), except that you can use either uppercase or lowercase letters.

Note: means to insert a space. There must ***not*** be a space between **h:** and **fn**.

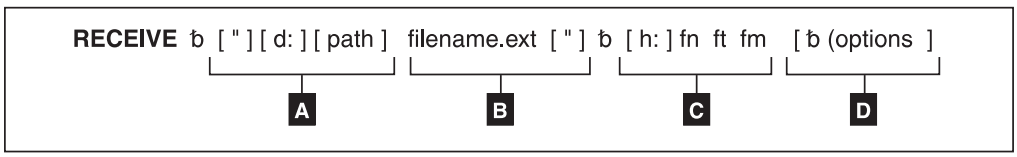

Figure 11-2. VM/CMS RECEIVE Command Syntax

A The workstation drive and path of the file to be received.

B The name of the workstation file to be received.

C Host session specifications for the file to be received from the host.

h: The short name of the session (which can be omitted if it is **a**)

fn File name
ft File type
fm File mode

D Optional changes made to the file during transfer. More than one option can be selected. Valid options are:

APPEND
ASCII
CLEAR
CRLF
NOCLEAR
PROGRESS
QUIET
TIME n

The parts of the VM/CMS RECEIVE command are:

RECEIVE The command.

d: The name of the diskette or hard disk drive on which the file is to be received.

path The path indicating the directory to which the file is to be stored.

filename.ext The name of the workstation file, including the extension. Use a new name or one that already exists. If you use a new name, the file that you receive is added to your diskette or hard disk. If you use the name of an existing file, the file that you receive either replaces or supplements the existing file. (Refer to the APPEND option.)

h: The short name of the host session from which you want to get the file. The default is a:.

fn ft fm The name of the file you want to receive from your VM/CMS disk. The file name fn is required.

(options
These options can be specified:

APPEND
Specifies that the file being received is to be added to the end of an existing file. Omit this part of the VM/CMS file that is received to replace an existing file.

ASCII Specifies EBCDIC-to-ASCII character translation.

CRLF Specifies the carriage return and line feed codes. You need ASCII and CRLF for text or source files that you want to view or edit, such as SCRIPT files. You do not need them for binary files, such as programs.

CLEAR
Clears the workstation window at the beginning of the file transfer.

NOCLEAR
Suppresses the sending of a Clear command at the beginning of the file transfer.

PROGRESS
: Shows a message indicating that the file transfer is in progress or has ended. Such messages do not show the current transferred bytes.

QUIET
: Does not show any messages.

TIME n
: Specifies the length of time, in units of 30 seconds, that the program waits for a response from the host before it sends an error message. The value n is an integer value in the range from 0 through 2184. If you specify 0, timeout is not set. The default is 1. To avoid a premature error message, specify an adequate value. In cases of large packet sizes, of large block sizes, or for slow communication lines (such as SDLC and COM port), *5* (150 seconds) is recommended. At least one blank space is required between TIME and *n*.

Examples

The following examples show the command syntax you can use to receive files from a VM/CMS host. The parameters of the RECEIVE command can be combined into a single set of parentheses.

To receive a file from your VM/CMS A-disk to your default drive for a workstation session:

RECEIVE pc.txt a:cmsfile script a (ASCII CRLF

This command sends a **SCRIPT** file **CMSFILE** from your VM/CMS A-disk in a host session named **A** to your workstation session. It adds the file to your default drive (diskette or hard disk) with the name **PC.TXT**.

To receive a file from your VM/CMS B-disk and replace a file on a drive other than your default:

RECEIVE a:pc.txt a:cmsfile script b (ASCII CRLF

This command sends a **SCRIPT** file named **CMSFILE SCRIPT** from your VM/CMS B-disk in a host session named **A** to a drive other than the default for your PC session. It replaces a file named **PC.TXT** on a diskette in drive A.

To receive a file from your VM/CMS A-disk and add it to the end of a file on your hard disk:

RECEIVE c:pc.txt a:cmsfile script a (ASCII CRLF APPEND

This command sends a **SCRIPT** file named **CMSFILE SCRIPT** from your VM/CMS A-disk in a host session named **A** to your workstation session. It adds the contents of **CMSFILE** to the end of a file named **PC.TXT** on your hard disk.

To receive a file from your VM/CMS A-disk and place it in a subdirectory on your default drive:

RECEIVE \sd1\pc.txt a:cmsfile script a (ASCII CRLF

This command sends a **SCRIPT** file named **CMSFILE SCRIPT** from your VM/CMS A-disk to your default drive. It creates or replaces a file named **PC.TXT** in a subdirectory named **SD1**.

Using the MVS/TSO SEND Command

Use the following information when entering the SEND command to the MVS/TSO host:

Figure 11-3 shows the command and information you must provide. Enter it as shown (including parentheses), except that you can use either uppercase or lowercase letters.

Note: ␣ means to insert a space. There must ***not*** be a space between **h:** and **data-set-name**.

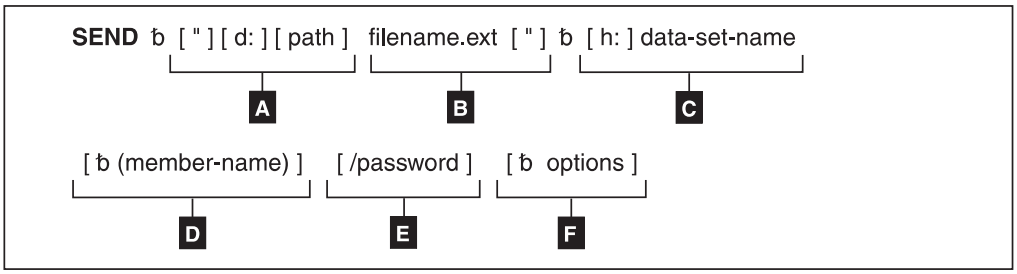

Figure 11-3. MVS/TSO SEND Command Syntax

A The workstation drive and path of the file to send.

B The name of the workstation file to send.

C The short name of the host session and the data set name of the file to send.

D The member name if the file is put in a partitioned data set.

E The password of the data set if it has one.

F Optional changes made to the file during transfer. More than one option can be specified. Valid options are:

APPEND
ASCII
BLKSIZE(n)
CLEAR
CRLF
LRECL(n)
NOCLEAR[1]
PROGRESS
QUIET
RECFM(x)
SPACE(n[,n1]) unit
TIME(n)

The parts of the MVS/TSO SEND command are:

SEND — The command.

d: — The name of the diskette or hard disk drive where the file is located.

[1] You must use the NOCLEAR option when you are transferring files while in ISPF command mode on the host.

path The path indicating the directory where the file is located.

filename.ext The name of the file to be sent. Include the extension if the file has one.

h: The name of the MVS/TSO host session to which you want to send the file. You can omit this name if you have only one host. If you have more than one host, this is the short name of the MVS/TSO host session. The default short name is **A**.

data-set-name The data set name that the file you send is to have on your MVS/TSO volume; this name is required. Enclose the data set name with the member name in single quotation marks if you are using a fully qualified data set name.

This option creates a new name or uses a data set name already on your TSO volume. If you use a new name, the file that you send is added to your MVS/TSO volume. If you use the name of an existing data set, the file you send either replaces or supplements the existing data set. Refer to the APPEND option.

(member-name) The member name if the file is to be put into a partitioned data set. If you use member-name, you cannot use LRECL(n), BLKSIZE(n), RECFM(x), and SPACE(n,[n1]) unit.

Note: If someone else is using the partitioned data set, you cannot send a file to your MVS/TSO host.

/password The password of the data set, if the data set has a password.

options

These options can be specified:

APPEND
Specifies that the file being sent is added to the end of an existing MVS/TSO data set. Omit this option if you want the file to replace an existing MVS/TSO data set. You cannot use LRECL(n), RECFM(x), SPACE(n[,n1]) unit, or BLKSIZE(n) options if you use the APPEND option.

ASCII Specifies ASCII-to-EBCDIC character translation.

BLKSIZE(n)
Specifies the size of the blocks of data in a new data set on your MVS/TSO volume. This part is optional. To set the block size for a new data set, replace n with the new size. If you omit this option, the block size is determined in the following manner:

If the record format is variable, the block size is 6233.

If the record format is fixed, the block size is the largest multiple of the record length that is less than 6233:

BLKSIZE = LRECL (6233/LRECL)

If you use the (member-name) or APPEND option, do not use this option.

CLEAR
Clears the workstation window at the beginning of the file transfer.

CRLF Specifies the global use of carriage return and line feed codes. You need to specify ASCII and CRLF options for sending text or source files that you want to view or edit, such as SCRIPT files. You do not need them for binary files.

LRECL(n)
Specifies the record length for a new data set on your MVS/TSO volume, where n is a whole number from 1 through 32760 representing the number of characters per record. If you want to set the record length for a new data set, replace n with the new length. If you omit this option, the record length is set to 80 for fixed-length records and to 255 for variable-length records. If you use the (member-name) or APPEND options, do not use this option.

NOCLEAR
Suppresses the sending of a Clear command at the beginning of the file transfer. This option is required for ISPF command mode.

PROGRESS
Shows a message indicating that the file transfer is in progress or has ended. Such messages do not show the current transferred bytes.

QUIET Does not show any messages.

RECFM(x)
Specifies the record format for a new data set on your MVS/TSO volume, where x = V, F, or U. For variable-, fixed- or undefined-length records in the data set, replace the x with V, F, or U, respectively.

If you omit this option, the record format of the host data set is determined by the setting of the CRLF parameter: if you specify CRLF, the data set has variable-length records; if you do not specify CRLF, it has fixed-length records. If you use the (member-name) or APPEND options, do not use this option.

SPACE(n[,n1]) unit
Specifies an amount of space to be set aside for a new data set on your MVS/TSO volume. To set aside a certain number of blocks, tracks, or cylinders for the new data set:

Provide unit as the type of space you want (AVBLOCK, TRACKS, or CYLINDERS).

Give n as the amount of space that you want the data set to occupy (in the unit of measure you select).

If the data set needs more space than you ask for with n, give n,n1 where n1 is the size of additional space to be used only when necessary.

These values are similar to the values on the ALLOCATE command of MVS/TSO.

If you omit this option, you get space for one block. The length of the block is set by the BLKSIZE(n) or LRECL(n) options. If you use the (member-name) or APPEND options, do not use this option.

TIME (n)
Specifies the length of time, in seconds, the program waits for a response from the host before it sends an error message. Replace n with an integer value in the range from 0 through 2184. If you specify 0, timeout is not set. The default is 1. To avoid a premature error message, specify an adequate value. In cases of large packet sizes, of large block sizes, or for slow communication lines (such as SDLC or COM port), *5* (150 seconds) is recommended.

Examples

The following examples show the command syntax you can use to send files from your workstation to an MVS/TSO host:

To send a file from your default drive to replace a file on the MVS/TSO host:

SEND pc.txt g:ds.script ASCII CRLF

This command sends a workstation file named **PC.TXT** from your default drive to your MVS/TSO host in a host session named **G**. It creates or replaces a data set named **DS.SCRIPT** on your MVS/TSO volume.

To send a file from a drive other than the default to your MVS/TSO host:

SEND a:pc.txt g:ds.script ASCII CRLF

This command sends a workstation file named **PC.TXT** from a diskette in drive A to your MVS/TSO host in a host session named **G**. It replaces a data set named **DS.SCRIPT** on your MVS/TSO volume.

To send a file from your default drive to your MVS/TSO host and add it to the end of an MVS/TSO data set:

SEND a:pc.txt g:ds.script ASCII CRLF APPEND

This command sends a workstation file named **PC.TXT** from a diskette in drive A to your MVS/TSO host in a host session named **G**. It adds the file to the end of a data set named **DS.SCRIPT** on your MVS/TSO volume.

To send a file to your MVS/TSO host and add it to the end of a data set that has a password:

SEND a:pc.txt g:ds.script/odyssey8 ASCII CRLF APPEND

This command sends a workstation file named **PC.TXT** from a diskette in drive A to your MVS/TSO host in a host session named **G**. It adds the file to the end of a data set named **DS.SCRIPT** on your MVS/TSO volume. This data set has a password of odyssey8.

To send a file from a subdirectory on your hard disk to a partitioned data set on your MVS/TSO host:

SEND c:\sd1\pc.txt g:ds.script (m1) ASCII CRLF

This command sends a workstation file named **PC.TXT** from a subdirectory named **SD1** on your hard disk to your MVS/TSO host in a host session named **G**. It creates or replaces a member named **M1** in a partitioned data set named **DS.SCRIPT** on your MVS/TSO volume.

To send a file to a partitioned data set that has a password:

SEND a:pc.txt g:ds.script (m2)/ili11 ASCII CRLF APPEND

This command sends a workstation file named **PC.TXT** from a diskette in drive A to your MVS/TSO host in a host session named **G**. It adds the file as a member named **M2** to a partitioned data set named **DS.SCRIPT** on your MVS/TSO volume. In this example, the data set has a password of ili11.

To send a file from your default drive and add it as a new data set on your MVS/TSO volume:

```
SEND pc.txt g:ds.script/aeneid2 ASCII CRLF LRECL(132)
     BLKSIZE(132) RECFM(V) SPACE(2 ,1 ) TRACKS
```

This command sends a workstation file named **PC.TXT** from your default drive to your MVS/TSO host. It adds the file as a new data set named **DS.SCRIPT** on your MVS/TSO volume. A password of aeneid2 is assigned. The records in the data set can vary in length up to 132 characters. Data blocks are the same length as the records. Twenty tracks are set aside for this data set. If more tracks are needed, they are added in groups of 10.

Using the MVS/TSO RECEIVE Command

Use the following information when receiving a file from MVS/TSO:

Figure 11-4 shows the command and information you must provide. Enter it as shown (including parentheses), except that you can use either uppercase or lowercase letters.

Note: means to insert a space. There must ***not*** be a space between **h:** and **data-set-name**.

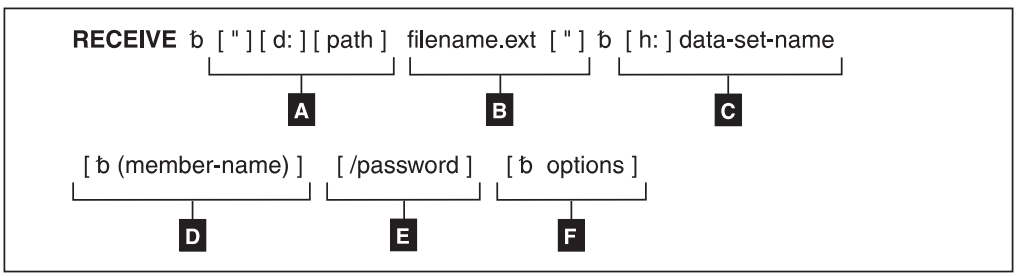

Figure 11-4. MVS/TSO RECEIVE Command Syntax

A The workstation drive and path to the directory where the file is to be stored.

B The name of the workstation file to receive.

C The short name of the host session, and the data set name of the file you are receiving.

D The member name if the file is put in a partitioned data set.

E The password of the data set, if any.

F Optional changes made to the file during transfer. More than one option can be specified. Valid options are:

APPEND
ASCII
CRLF
PROGRESS
QUIET
TIME(n)

The parts of the MVS/TSO RECEIVE commands are:

RECEIVE The command.

d: The name of the diskette or hard disk drive where the file is to be located. Use **A:**, **B:**, **C:**, **D:** through **Z:**. This part is optional if the file is received on the current drive.

path The subdirectory where you want the data set located. This part is optional.

filename.ext The name the file is to have on your diskette or hard disk. Creates a new name or uses a name that is already on your diskette or hard disk.

If you use a new name, the data set that you receive is added to your diskette or hard disk. If you use the name of an existing file, the data set that you receive either replaces or supplements the existing file. (Refer to the APPEND option on page 11-13.)

h: The short name of the MVS/TSO session where the data set is located. If you have only one host, this part is optional. Use this option if you have more than one host. The default short name is **A**.

data-set-name The name of the data set or the partitioned data set that contains the member you want to send to your workstation session. You must use the qualified name. Enclose the data set name with the member name in single quotation marks if you are using a fully qualified data set name.

(member-name) The member name of a partitioned data set to send to your workstation session. This part is optional. Use it only if the data set is a member of a partitioned data set.

/password The password of the data set. Use it only if the data set has a password.

options

These options can be specified:

APPEND
Adds the data set to the end of an existing file. Omit this part if you want the MVS/TSO data set to replace an existing workstation file.

ASCII Specifies EBCDIC-to-ASCII character translation.

CRLF Specifies the use of carriage return and line feed codes. You need ASCII and CRLF for text or source files that you want to view or edit, such as SCRIPT files. You do not need them for binary files.

PROGRESS
Shows a message indicating that the file transfer is in progress or has ended. Such messages do not show the current transferred bytes.

QUIET Does not show any messages.

TIME(n)
Specifies the length of time, in units of 30 seconds, the program waits for a response from the host before it sends an error

message. Replace n with an integer value in the range from 0 through 2184. If you specify 0, timeout is not set. The default is 1. To avoid a premature error message, specify an adequate value. In cases of large packet sizes, of large block sizes, or for slow communication lines (such as SDLC and COM port), *5* (150 seconds) is recommended.

Examples

The following examples show the command syntax you can use to receive files from your MVS/TSO host to your workstation:

To receive a data set from an MVS/TSO host to the default drive for your workstation session:

RECEIVE pc.txt g:ds.script ASCII CRLF

This command sends a data set named **DS.SCRIPT** from your MVS/TSO volume in a host session named **G** to your OS/2 session. It creates or replaces the file on the default drive with the name **PC.TXT**.

To receive a data set from an MVS/TSO host to a drive other than your default drive:

RECEIVE A:pc.txt g:ds.script ASCII CRLF

This command sends a data set named **DS.SCRIPT** from your MVS/TSO volume in a host session named **G**. It replaces a file named **PC.TXT** on a diskette in drive A.

To receive a data set from an MVS/TSO host and add it to a workstation file:

RECEIVE a:pc.txt g:ds.script ASCII CRLF APPEND

This command sends a data set named **DS.SCRIPT** from your MVS/TSO volume in a host session named **G**. It adds the data set to the end of a file named **PC.TXT** on the diskette in drive A.

To receive a data set from an MVS/TSO host and place it in a subdirectory on your hard disk:

RECEIVE c:\sd1\pc.txt ds.script ASCII CRLF

This command sends a data set named **DS.SCRIPT** from your MVS/TSO volume in a host session named **G**. It creates or replaces a file named **PC.TXT** in a subdirectory named **\SD1** on your hard disk.

To receive a data set that has a password from an MVS/TSO host to your default drive:

RECEIVE A:pc.txt g:ds.script/odyssey8 ASCII CRLF APPEND

This command sends a data set named **DS.SCRIPT** from your MVS/TSO volume in a host session named **G**. The data set has the password odyssey8. The data set is added to the end of a file named **PC.TXT** on the diskette in drive A.

To receive a member of a partitioned data set from an MVS/TSO host to your DOS session:

RECEIVE c:\sd1\pc.txt g:ds.script (m1) ASCII CRLF

This command sends a member named **M1** from a partitioned data set named **DS.SCRIPT** in a host session named **G**. The member is placed on your hard

disk in a subdirectory named **SD1**. It replaces or creates a file named **PC.TXT**.

To receive a member of a partitioned data set that has a password to your Windows session:

RECEIVE a:pc.txt g:ds.script (m2)/ili1 ASCII CRLF APPEND

This command sends a member named **M2** from a partitioned data set named **DS.SCRIPT** in a host session named **G**. The data set has a password of ili1. The member is added to a file named **PC.TXT** on the diskette in drive A.

Using the CICS SEND Command

Use the following information when sending a file to CICS:

Figure 11-5 shows the command and information you must provide. Enter it as shown (including parentheses), except that you can use either uppercase or lowercase letters.

Note: ␣ means to insert a space. There must ***not*** be a space between **h:** and **fn**.

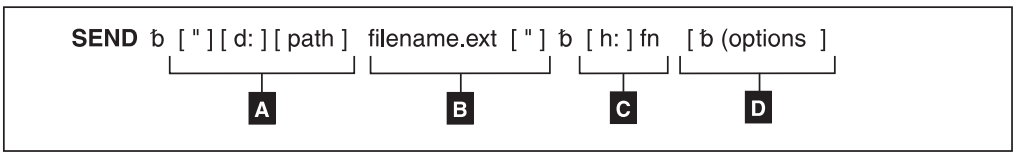

Figure 11-5. CICS SEND Command Syntax

A The workstation drive and path of the file to send.

B The name of the workstation file to send.

C The short name of the host session, and the host file name of the file to send.

D Optional changes made to the file during transfer. More than one option can be specified. Valid options are:

ASCII
BINARY
CLEAR
CRLF
NOCLEAR
NOCRLF
PROGRESS
QUIET
TIME n

The parts of the CICS SEND command are:

SEND — The command.

d: — The name of the diskette or hard disk drive where the file is located.

path — The path to the subdirectory that the file is in.

filename.ext — The name of the file to be sent, including the extension.

h: — The short name of the host session where you want to send the file. If you have only one host, this part is optional. The default is session **A**.

fn The name the file is to have on your CICS disk. You must specify the file name. You can create a new name or use a name that is already on the disk.

(options

These options can be specified:

ASCII Specifies ASCII-to-EBCDIC character translation. The default is ASCII CRLF. You need these control terms for text or source files that you want to view or edit, such as SCRIPT files. You do not need them for binary files.

Notes:

1. CRLF and NOCRLF are mutually exclusive options.
2. BINARY and ASCII are mutually exclusive options.
3. The assumed defaults, if the optional parameters are omitted, are CRLF ASCII.

BINARY

Specifies that the data in the file is binary data. The data can be encrypted, compiled programs, or other data. It is not translated by the host file transfer program but copied unaltered into a temporary storage queue.

CLEAR

Clears the workstation window at the beginning of the file transfer.

CRLF Specifies carriage return and line feed codes in the text file.

NOCLEAR

Suppresses the sending of a Clear command at the beginning of file transfer. This option is required for ISPF command mode.

NOCRLF

Specifies that the PC file does not consist of logical records delimited by carriage return and line feed characters. No concatenation or splitting of records is performed by the CICS file transfer program.

The file is written into a temporary storage using one item on the queue to represent each inbound data buffer. The items on the CICS temporary storage queue can be of different lengths, but none can be more than 32767 characters.

PROGRESS

Shows a message indicating that the file transfer is in progress or has ended. Such messages do not show the current transferred bytes.

QUIET Does not show any messages.

TIME n

Specifies the length of time, in units of 30 seconds, the program waits for a response from the host before it sends an error message. Replace n with an integer value in the range from 0 through 2184. If you specify 0, timeout is not set. The default is 1. To avoid a premature error message, specify an adequate value. In cases of large packet sizes, large block sizes, or for slow communication lines (such as SDLC and COM port), *5* (150

seconds) is recommended. A blank space is required between TIME and n.

Examples

The following examples show the command syntax you can use to send files from your workstation to your CICS host:

To send a workstation file from your default drive and add it as a new file on your CICS host:

SEND pc.txt a:cicsfile (ASCII CRLF)

Note: Enter the complete CICS SEND command on one line.

This command sends a workstation file named **PC.TXT** from your default drive on your workstation to your host session **A**. You do not need to provide the workstation drive name if the file you are sending is on the current drive. The command creates a new file named **CICSFILE**.

To send a basic workstation file from a drive other than your default to replace a file on your CICS host:

SEND a:myprog.exe a:basprog

This command sends a workstation file named **MYPROG.EXE** from a diskette in drive A to your CICS host in your host session named **A**. It is written to a file named **BASPROG**, replacing any existing file by that name in host session **A**.

Using the CICS RECEIVE Command

Use the following information when receiving files from CICS:

Figure 11-6 shows the command and information you must provide. Enter it as shown (including parentheses), except that you can use either uppercase or lowercase.

Note: means to insert a space. There must ***not*** be a space between **h:** and **fn**.

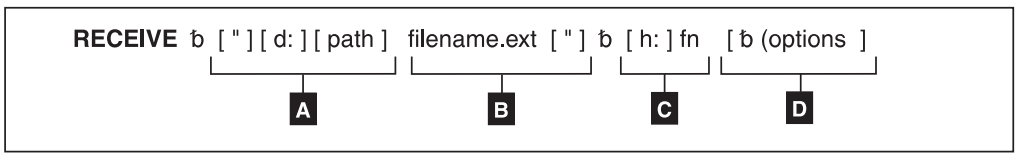

Figure 11-6. CICS RECEIVE Command Syntax

A The workstation drive and path where the file is to be received.

B The name of the workstation file.

C The short name of the host session (h:) from which you are receiving the file, and the host file name (fn).

D Optional changes made to the file during transfer. More than one option can be specified. Valid options are:

ASCII
BINARY
CLEAR
CRLF
NOCLEAR

NOCRLF
PROGRESS
QUIET
TIME n

The parts of the CICS RECEIVE command are:

RECEIVE The command.

d: The name of the diskette or hard disk drive where the file is to be received.

path The path to the subdirectory where the file is to be located.

filename.ext The name of the workstation file, including the extension. You can create a new name or use a name that is already on your workstation diskette or hard disk. If you use a new name, the file that you receive is added to your diskette or hard disk. If you use the name of an existing file, the file that you receive either replaces or supplements the existing file. Refer to the APPEND option.

h: The short name of the CICS session where the data set is located. If you have only one host, this part is optional. The default session is **A**.

fn The name of the file you want to receive from your CICS host.

(options

These options can be specified:

ASCII Specifies EBCDIC-to-ASCII character translation. The default is ASCII CRLF. You need ASCII and CRLF control terms for text or source files that you want to view or edit, such as SCRIPT files. You do not need them for binary files.

Notes:

1. CRLF and NOCRLF are mutually exclusive options.
2. BINARY and ASCII are mutually exclusive options.
3. The assumed defaults, if the optional parameters are omitted, are CRLF ASCII.

BINARY
The data in the file is binary data. The data can be encrypted data, compiled programs, or other data. It is not translated by the host file transfer program but is copied without changes into the workstation file.

CLEAR
Clears the workstation window at the beginning of the file transfer.

CRLF Specifies the use of the carriage return and line feed codes.

NOCLEAR
Suppresses the sending of a Clear command at the beginning of file transfer. This option is required for ISPF command mode.

NOCRLF
Specifies that the host computer file does not consist of logical records. The items in the temporary storage queue are sent in

order and concatenated in your workstation into a single string of data.

PROGRESS
Shows a message indicating that the file transfer is in progress or has ended. Such messages do not show the current transferred bytes.

QUIET Does not show any messages.

TIME n
Specifies the length of time, in units of 30 seconds, the program waits for a response from the host before it sends an error message. Replace n with an integer value in the range from 0 through 2184. If you specify 0, timeout is not set. The default is 1. To avoid a premature error message, specify an adequate value. In cases of large packet sizes, of large block sizes, or for slow communication lines (such as SDLC and COM port), *5* (150 seconds) is recommended. A blank space is required between TIME and n.

Examples

The following examples show the command syntax you can use to receive files from your CICS host to your workstation:

To receive a file from your CICS host to your default drive for a workstation session:

RECEIVE pc.txt A:cicsfile (ASCII CRLF)

This command sends a file named **CICSFILE** from your CICS host in session **A** to your workstation session. It adds the file to your default drive (diskette or hard disk) with the name **PC.TXT**.

To receive a basic file from your CICS host and replace a file on a drive other than your default:

RECEIVE a:myprog.exe a:myprog

This command sends a file named **MYPROG** from your CICS host in session **A** to a drive other than the default for your workstation session. It replaces a file named **MYPROG.EXE** on a diskette in drive A.

Configuring File-Transfer Code Translation

When you transfer a file between the host and the workstation using the ASCII option, the host-system file-transfer program performs translation from EBCDIC to ASCII or vice versa, according to the host and PC code pages specified during PC/3270 configuration. However, you might want to use different translation from that supplied by IBM. For the details, refer to Chapter 5, “Transferring Files” on page 5-1.

File Transfer Commands for PC/3270

Chapter 12. Considerations for the Use of PC/3270 Sessions

Additional information on Personal Communications is available in the README found on diskette 1 or by clicking the **Readme - Please** icon to view the **README** file after installation.

The information in the README file supplements and supersedes information found in the publications.

Host-Session Window Operations

Cursor Color

PC/3270 assigns white to the cursor color as the product default, and mixes the background color (if it exists) with an exclusively-ORed operation. If you want to change this default cursor color assignment, you need to modify the PCSWIN.INI file and insert the following line into the [Session] section:

```
[Session]
 CursorColor=<red-value> <green-value> <blue-value>
```

Where <red-value>, <green-value>, and <blue-value> are integers from 0 to 255 that specify the color intensity for each color primitive respectively; 0 0 0 for black, and 255 255 255 for white.

Releasing Insert Mode with Attention Keys

As on a non-programmable terminal, you can release insert mode when you press an Attention key. If you want this to happen, add this parameter to the [Keyboard] section of the workstation profile (.WS):

```
[Keyboard]
ResetInsertByAttn=Y                <- Added.
```

Scroll Bar

If you choose **Font** from the Appearance menu in the host session window and choose **Fixed Size** from the Select Display Font dialog box, the entire operator information area might not appear on the screen. If you specify **With Scroll Bar**, the OIA will not scroll. The session window size is restricted to be smaller than the screen size.

Scroll-Lock Key

When the Scroll Lock keyboard indicator is turned on, the cursor movement keys and the Page Up and Page Down keys are used to scroll windows only when you specify **With Scroll-Bar** in the Window Setup dialog box. If you specify **Without Scroll-Bar**, you cannot use the Scroll Lock key, because the entire screen is displayed. For example, cursor-movement keys in Scroll Lock mode do nothing.

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3270-Session Screen-Size Control

Although you can specify the screen size of the 3270 session in the PC/3270 configuration, the final screen size is determined by the host according to the SNA BIND negotiation.

Sometimes, you might want to use a particular screen size when it is difficult to have the host VTAM table changed. The following method will satisfy your requirement; however, because it violates SNA rules, some applications that refer to the VTAM table only might not work.

Modify your workstation profile (.WS) to insert the following line into the [LU] section:

```
[LU]
InfScreenSize=Y
```

Personal Communications processes byte 24 of the host BIND image correctly and according to the SNA architecture. Byte 24 is the last 2 bytes of

PSERVIC=X' 28 3 ' (3 in this case)

in the log mode.

If byte 24 is X'03', the default screen size is 24 x 80 and the alternate is what you configured with PC/3270.

If byte 24 is X'00' or X'02', the default and alternate screen sizes are 24 x 80.

If byte 24 is X'7E' or X'7F', bytes 20–23 in the BIND control the default and alternate screen sizes.

If you have X'03' in the BIND image, you can customize whatever screen size you want. The host will query Personal Communications and use the alternate screen size.

The following table shows the details of the BIND image processing:

	Byte in BIND by Host ==>					Result (Screen size)	
	24	2	21	22	23	Default	Alternate
	==	==	==	==	==	=======	=========
a)	--	--	--	--	==>	24 x 8	24 x 8
b)	2	--	--	--	==>	24 x 8	24 x 8
c)	3	--	--	--	==>	24 x 8	R x C
d)	7E	Rd	Cd	--	==>	Rd x Cd	Rd x Cd
e)	7F	Rd	Cd	Ra	Ca ==>	Rd x Cd	Ra x Ca

Legend: RxC: Screen Size defined by PC/327 configuration
(R,C) = (24,8) , (32,8) , (43,8) or (27,132)

Rd: Rows in the default screen size mode
Cd: Columns in the default screen size mode
(Rd,Cd) = (24,8) , (32,8) , (43,8) or (27,132)
Rd Cd <= R C

Ra: Rows in the alternate screen size mode
Ca: Columns in the alternate screen size mode
(Ra,Ca) = (24,8) , (32,8) , (43,8) or (27,132)
Ra Ca <= R C

PC/3270 supports Query Replies. Make sure that the Query Reply of Implicit Partition returns the final screen size upon receipt of the BIND command.

Customizing a Display Translation Table

PC/3270 displays the host EBCDIC character using the workstation (ANSI) graphic symbol so that the character defined by the S/390 EBCDIC host code page is displayed correctly using the same graphic symbol defined by ANSI. However, you might need your original translation, because your host or workstation application is not designed to use the standard translation.

You can use your original translation table if you refer to the following procedure as an example. Note that the data integrity caused by the user-defined table is your responsibility.

The following procedure is an example of how to remap left and right brackets.

1. Terminate all running 3270 sessions
2. Modify the PC/3270 workstation profile (.WS).

   ```
   [Translation]
   IBMDefaultView=N
   DefaultView=C:\PCOMWIN\PRIVATE\BRACKET.XLT
   ```

3. Create the display translation table file (**.XLT**). In this example, the following **C:\PCOMWIN\PRIVATE\BRACKET.XLT** file is created.

```
[Profile]
id=XLT
Description=User-defined Display Translation Table

[Option]
Replace=Y

[SB Xlate]
; EBCDIC=ANSI
; The next line displays EBCDIC X'AD' as
; an ANSI X'5B' (left bracket)
AD=5B
; The next line displays EBCDIC X'BD' as
; an ANSI X'5D' (right bracket)
BD=5D
```

4. Create your own keyboard layout (.KMP) if you need to enter your new left and right brackets graphic symbols:

   ```
   [KEYBOARD]
   KEY27=ansi dd
   KEY28=ansi a8
   ```

   The information on the right should be lowercase characters. PC/3270 translates ANSI X'dd' into EBCDIC X'ad'. It is displayed as [by the table created in step 3.

5. Click on the PC/3270 icon corresponding to the modified workstation profile.

Support for Long File Names

Like Windows 95, Personal Communications supports long file names. You can give any name (up to 255 characters) to a file; you are not limited to eight characters with a three-character extension. You can use spaces in the file name, but not the symbols /, \, :, *, ?, “, <, >, or |. In addition, the tilde (˜) character should not be used in CMS or MVS host file names.

Edit Function

Edit-Function Restrictions with Home3270 Attachment

When you use the Home3270 attachment, the following edit functions are restricted:

Undo function

You cannot execute the Undo function after using the Cut, Paste, PasteNext, or Clear functions because these functions modify display areas in the protocol converter.

Cut and Clear functions

When an area to be cut or cleared contains a field attribute character or protected field, or each line in that area ends at the end of an unprotected field, the following things might happen:

Characters in an unprotected field outside the area to be cut or cleared might also be cleared.

An alarm might sound.

The cursor might not appear at the initial position.

When you execute the Cut or Clear function, specify only the minimum area required (for example, some words or one field in one line), then confirm that the frame exists in an unprotected field.

Paste and PasteNext functions

When the area to be pasted contains a field attribute character or protected field, or the end of the paste area on each line is at the end of an unprotected field, the following things might occur:

The character to be pasted might not be written to the expected position.

An alarm might sound.

The cursor might not appear at the initial position.

When you use the paste function, paste the shortest character string possible (for example, a character string, but excluding CR/LF). Confirm that the area to be pasted is in an unprotected field.

File Transfer Function

Host File Name and Reserved Words

You should not use the following words as a VM file name or file type, as a MVS data set name, or as a CICS file name, because they are reserved for use as option commands:

ASCII
APPEND
TIME
CLEAR
NOCLEAR
SILENT
QUIET
PROGRESS
JISCII
SO
NOSO
BLANK
USER

However, if it is essential for you to use them for files, you must add a backslash, as a separate word, immediately after the file name and so on, even if you do not specify any options. For example:

```
SEND c:\MYFILE a:APPEND \ QUIET \ H
```

Changing the Packet Size When Import/Export Is Idle

When import/export is idle, select **Setup** from the Transfer pull-down menu. When you change the packet size on the Miscellaneous Settings window, end import/export, and then rerun it.

WAIT Option for Multiple File Transfer

If multiple file transfers do not succeed, insert the following statement into the [Transfer] section of your .WS file:

```
[Transfer]
WAIT=1
```

This parameter causes a 1000 msec (1 sec) delay between file transfers. If this does not help, you might need to increase the value again.

NOTRUNC and BLANK Options

If you want to add trailing blanks (spaces) to fill the logical record length for each record when downloading a text file, use the following options in the **Additional Options** edit field of the Transfer-Type Definition window.

NOTRUNC : for VM/CMS (PTF# UR35492)
NOTRUNC : for MVS/TSO (PTF# UR34797)
BLANK : for CICS

Setting the VTAM PSERVIC Statement

File transfer problems can occur if extended attribute support has not been set on in the VTAM PSERVIC statement. For extended attribute support, set on the high order bit in PSERVIC byte1 (zero byte origin) as follows: x'xx80xxxxxx...'.

Graphic Functions

Graphic Protocol

PC/3270 allows you to use host-graphics applications such as GDDM and others. Two protocols are supported: ***advanced*** and ***native***.

Advanced Protocol

Choose the advanced protocol when you have GDDM Version 2 Release 3 or higher and are using any of the following operating system:

MVS
VSE
VM/SP
VM/XA SP

Note that the advanced protocol is not supported by the CICS pseudo-conversational mode with versions of GDDM earlier than Version 3. It is not supported by IMS/VS. It is supported by the CICS pseudo-conversational mode with GDDM Version 3 Release 1 or later.

The advanced protocol is equivalent to that used by OS/2 Link and by PC/3270 Version 4.0, so it supports the same subsystems. No download of code from the host system is required for PC/3270, because all the function is integrated into the program.

Native Protocol

Choose the native protocol when you intend to use earlier GDDM versions or non-GDDM host graphics applications, such as those originally intended to use 3270 nonprogrammable terminals such as the 3179G, 3192G, or 3472G.

The native protocol also allows IMS/VS users to display GDDM graphics.

Note: A 3174 controller requires a terminal to respond within a certain period; if it does not, Machine Check 207 message appears. If you are using a coaxial-cable attachment for graphics in Native mode, this might happen for various reasons such as the complexity of the graphics drawing orders or the speed of your workstation. In this case, change to advanced mode.

Drawing-Buffer Size

The drawing-buffer size varies depending on the contents set for Redraw of a graphic function.

To set **Redraw**, click **Display Setup** in the Appearance pull-down menu in the session window. Select **Graphics** from **Category**.

Selecting **Host** from the optional items of **Redraw** requires no buffer.

If you select **Retained**, the graphic execution module stores all redrawing data into a buffer. Such a buffer is called a *retained buffer*. The buffer size varies depending on the complexity of the graphic data from an application program.

Example:

Simple table ... 10KB to 20KB
Complicated graphic image... 200KB to 300KB

When you select **Bitmap** to set **Redraw**, the buffer size will be the same as the sum of the retained buffer size and compatible bit map size. For example:

(Height) x (Width) x (Number of planes) x (Bits/Pixel) / 8 bytes

Example:
When you select a 7x12 font for a VGA 16-Color Display Model 2 (24x80), the bitmap size is:
Bitmap size = (7x80) x (12x24) x 1 x 4 / 8 = 80 KB

When you select a 12x20 font for an IBM PS/55 High-Resolution 256-Color Display Model 2, the bitmap size is as follows:
Bitmap size = (12x80) x (20x24) x 1 x 8 / 8 = 460 KB

Using Bitmaps for Drawing

The graphic execution module uses a bit map compatible with the display unit to draw an area instruction in overpaint mode. An image instruction requires one plane bit map.

(Buffer for area) = (Area width) x (Area height) x (Number of planes) x (Bits/Pixel) / 8

(Image buffer) = (Image width) x (Image height) / 8

Print Buffer Size

The retained buffer must be used for printing. The retained buffer is the same size as that used for redrawing. This is also applied when you specified **Bit Map** for **Redraw** on the Display Setup window.

If graphic printing is called in Bitmap mode, the graphic printing module generates a bitmap compatible with the connected printer, draws an image on the bitmap, and transfers the bit image to the printer.

This operation is generally performed quickly. When memory is frequently swapped, the process slows down in proportion to the number of swap operations. If a large bit map is not allocated, the graphic printing module prints a graphic image normally using only the retained buffer.

Example: Proprinter (240x144 DPI) character size:
Bitmap size = (240x8) x (144x11) x 1 x 1 / 8 = 380 KB

Example: EPSON (ESC/P) (360x180 DPI color) character size:
Bitmap size = (360x8.5) x (180x11) x 3 x 1 / 8 = 2.3 MB

Note: With some printers, different printing results might be obtained in bitmap mode and non-bitmap mode. If the desired results are not obtained, change the current bitmap mode. For example, specify non-bitmap mode to print in bitmap mode.

Edit-Copy Buffer

An editing operation causes the graphic execution module to copy a bit map and DIBitmap to the clipboard. The bit map is compatible with the display; DIBitmap is a 4-bit/pixel bit map.

Printer Fonts

The printer driver can handle two font sets, the device font and GDI font. The device font is a hardware font built into the printer. The GDI fonts are System (without brackets) or other software fonts for Windows.

When you select a font set for graphic printing from the Printer Control window, use the GDI fonts for the following reasons:

In bitmap mode, a GDI font can be used for printing. However, the device font cannot be used, because an image cannot be drawn on a memory bit map when using the device font.

In bitmap mode, the device font cannot be used for printing when OR and exclusive OR attributes are mixed.

Plotter

Because a plotter does not support a raster, the following restrictions are imposed on drawing. Use a plotter for figures and tables that have mainly lines.

No shading is supported.

Some shading patterns cannot be distinguished.

Image order drawing requires much time, and the final printout is of poor quality.

The OR and exclusive OR are not correctly reflected.

Hole in Screen Caused by Clearing a Graphic Character

When a character overlaps a graphic image, the graphic image is cleared at the position where the character is to be displayed. When you enter a null character or space having the transparent attribute at the position where a graphic image is displayed, the graphic image in that character cell is not cleared.

If you select **Host** or **Retained** to set **Redraw** on the Display Setup window, when characters in a graphic image are cleared, a hole appears in the graphic area. This is because these two modes do not have a bitmap image, and partial redrawing cannot be performed on the screen.

If you select **Bitmap** mode as **Redraw Graphics**, you can find no hole on the graphic region by the application that overrides any alphanumeric characters (as well as NULL and SPACE) on the graphic image.

To restore the screen, perform either of the following actions:

Press the PA3 key to have the application program redraw the screen.

Minimize and restore the graphic image retained in Retained mode, then redraw it or select Bitmap mode.

Note: When you change the setting of **Redraw** in the Display Setup window, the set contents are valid from the next drawing.

Miscellaneous Restrictions for Graphic Functions

If advanced protocol is selected, graphic functions cannot be used in the IMS/VS and CICS pseudo-conversational mode with versions of GDDM earlier than Version 3.

Print Processing

Using a Printer With the Non-SNA DFT Attachment

For the non-SNA DFT attachment, PC/3270 regards any print job within 30 seconds after the previous one as a continuous job with the previous one. It determines the job end artificially by a timeout value.

You can change the standard timeout value by modifying the [CNDFT] section of the workstation profile (.WS):

[CNDFT]
PrtTimeOut=nn

Note: The variable nn is the decimal value of the timeout in seconds.

Print Job Control Using SNA Timeout

PC/3270 treats the data packet, which begins with an SNA Begin Bracket (BB) and ends with an SNA End Bracket (EB), as one job, and spools it to the Windows print manager. However, some applications might not use SNA BB and EB appropriately, and an unexpected page eject can occur. This section describes two timeout controls that you can customize.

Concatenation of Multiple Print Jobs

When a new print job comes from the host before the timer specified by the workstation profile expires, the job is concatenated to the previous one, and they are regarded as one job. You can change the timer value by specifying the following parameter in the [printers] section of the workstation profile (.WS):

[printers]
ConcatenateTime=nn

Note: The variable nn is as follows; its unit is one second:

0	No concatenation of print jobs
1 – 32767:	Concatenation of print jobs by this timeout value

When a non-SNA attachment is used, the timer should not be specified in the workstation profile.

Termination of a Print Job: If an end of a print job (SNA End of Bracket) does not come from the host before the timer specified by the workstation profile has expired, the job is automatically terminated. You can change the timer value by specifying the following parameter in the [printers] section of the workstation profile (.WS):

[printers]
TerminateTime=nn

Note: The variable nn is as follows; its unit is one second:

0	No automatic termination of a print job
1 – 32767	Automatic termination of a print job by this timeout value

When a non-SNA attachment is used, the timer should not be specified in the workstation profile.

SCS TRN Command (LU 1)

You can change the operation of the SCS TRN command by adding a parameter to the [printers] section of the workstation profile (.WS):

ATRN=Y Transfers data that is controlled by the SCS TRN command to the printer driver without conversion. In the cases below, however, this parameter is assumed to be ATRN=N.

The printer driver does not support PASSTHRU.

The printer driver supports the BANDING function.

BANDING=Y is specified in the [printers] section of the workstation profile (.WS).

When you use a printer driver for which the PASSTHRU function is incomplete, sense code X'1003' is returned to the host system for the SCS TRN command.

ATRN=N Converts data that is controlled by SCS TRN command and transfers the result to the printer driver. You can then specify the following parameters in the [printers] section of the workstation profile (.WS).

3270TRN=Y Converts host codes 40H to FFH to ASCII codes.

3270TRH=N Does not convert host codes 40H to FFH.

When either ATRN=Y or ATRN=N is specified, host codes 00H – 3FH are converted to hyphens or to characters specified with the SCS SGEA command.

The default values are:

ATRN=Y
327 TRN=N

Note: The SCS TRN command (LU 1) is available in PDT mode only.

SCS SPD/SLD Command (LU 1)

If the selected font cannot be used with the values specified for CPI or LPI, this command temporarily switches it to a valid font.

Note: The SCS SPD/SLD command (LU 1) is available in PDT mode only.

Ignoring Blank Pages

If you cannot print a blank page correctly, check for the following things:

Some printers ignore a blank page if so specified with the **Printer Setup** option (or setting the printer's DIP switches). Check whether the printer is set to enable this option.

Some printer drivers ignore a blank page if so set with the **Printer Driver Setup** option. Check whether this option is supported by the printer driver.

Printing with GDI Fonts

Some printer drivers do not support fixed-pitch GDI fonts.

Printing Reverse-Display Characters with GDI Fonts

Some printer drivers that do not support reverse-display character printing print reverse-display characters as spaces. To avoid this, add the **REVERSE=N** line to the [printers] section of the workstation profile (.WS).

CPI/LPI of Device Fonts

If the printer driver cannot use the device font for the specified CPI or LPI, data can be printed with other CPI or LPI values.

Printing Reverse-Display Characters with Device Fonts

Most printer drivers do not support reverse-display-character printing with device fonts.

PCSERR999 Error Messages

Message PCSERR999 - Personal Communications internal error: module-name - xxx might appear when there is insufficient memory. Because the print job remains in the print manager, you should delete it.

Printable Area

Characters might not be printed over a large enough area, depending on the printer driver used. When using a printer driver that allows you to set the margins, specify the minimum margins to maximize the printable area.

SVF Control Code

If the maximum print line (MPL) is less than the paper size in the SVF control code, a page feed is performed when the printing position reaches MPL.

Note: The SVF control code is available in PDT mode only.

PDT Mode

Printing in PDT mode is restricted as follows:

A graphic image is printed through the Windows printer driver specified in "Printer Setup", even if the printer is set up for PDT mode.

APL characters cannot be printed.

Postscript printers are not supported.

SDDLU Considerations

PC/3270 supports the self-defining dependent logical units (SDDLU) function of ACF/VTAM Version 3 Release 4.1 (MVS) or Version 3 Release 4 (VM). SDDLU provides the ability to dynamically create dependent LUs on predefined PUs and to reconfigure dependent LUs without interruption to any other user on the network and without intervention by system programming or operations staff.

PC/3270 SDDLU is supported for all connections except DFT (coaxial connection).

PC/3270 network stations support SDDLU by:

Accepting a format-1 Activate PU (ACTPU), which signals that VTAM requires a Network Management Vector Transport (NMVT) containing the Product Set ID (PSID) and LOCADDR of the LU.

A PC/3270 network station will use LOCADDRs 02, 03, 04, and so on, in that sequence, by default. However, if you specify the LU addresses explicitly, it will use the addresses that you specify.

Sending an unsolicited NMVT to VTAM when an LU switches on.

PSID Definitions

PC/3270 defines the default PSID for each LU type. Generally, the PSID contains such things as the machine type and the model number. The following table describes the machine type and model number definitions for each LU type supported by PC/3270.

Machine Type	Model Number	LU Type	Screen/Buffer Size
3270	002	Display Model 2 screen	24 rows by 80 columns
3270	003	Display Model 3 screen	32 rows by 80 columns
3270	004	Display Model 4 screen	43 rows by 80 columns
3270	005	Display Model 5 screen	27 rows by 132 columns
3270	DS2*	Printer 3270 data stream	24 rows by 80 columns
3270	DS3*	Printer 3270 data stream	32 rows by 80 columns
3270	DS4*	Printer 3270 data stream	43 rows by 80 columns
3270	DS5*	Printer 3270 data stream	27 rows by 132 columns
3270	00A	Display	48 rows by 80 columns
3270	00B	Display	62 rows by 160 columns
3270	00C	Display	24 rows by 132 columns

* PC/3270 assumes that 3270 data stream is the default printer-session type. If you use the SNA Character String (SCS) data stream, you must use a different designation for the PSID, such as 3270SCS. You must define this yourself, as shown in the next example.

Assigning User-Defined PSIDs

You can replace the default PSID values with your own definitions or define new PSIDs, by preparing a PSID definition file or by changing the Windows workstation profile. The PSIDs you use must be defined to VTAM.

Add a statement such as the following one to the [LU] definition in the workstation profile. This example supersedes the default PSID with LUA0001. PSID = LUA 1

Considerations and restrictions on the use of PC/3270 and supplementary information other than the items described in this chapter may be included in README.TXT in the PC/3270 directory. Double-click the **Readme - Please!** icon to open this file.

Considerations for PC/3270 Sessions

Part 3. Personal Communications AS/400

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Chapter 13. Building a Printer Definition Table (PDT) for PC400

This chapter explains how to create and change the printer definition table (PDT file) used for PC400. The PDT file is created by converting the printer definition file (PDF file). The file defines how characters and control codes are sent to the printer and how printer output is formatted. You can create this file by using a text editor that produces an ASCII file or by modifying one of the printer definition tables provided by PC400.

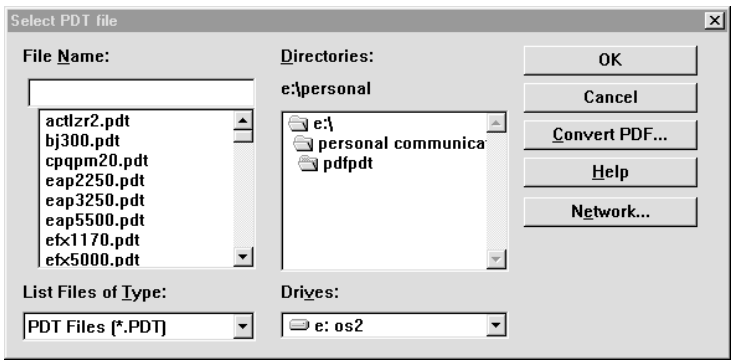
Creating and Changing the Printer Definition Table (PDT File)

To use the PDT file:

1. Select **File** from the menu bar of the workstation window.
2. Select **Printer Setup** from the File pull-down menu.

   The Printer Setup dialog box appears.
3. Select the **Use PDT file** check box and **Select PDT**.

   The Select PDT file dialog box appears.



4. Select **Convert PDF**. Select the PDF file to be converted from the list in the Convert PDF to PDT dialog box; then select **Convert**. The PDF File Converter window appears. After the file has been converted, click on **Close**, then click on **Close** in the Convert PDF to PDT window.
5. Click on **OK** in the Select PDT file window.
6. Select **OK** on the Printer Setup dialog box.

   After printer setup is complete, the Printer Setup dialog box is closed.

Printer Definition File (PDF File) Format

A printer definition file consists of a macro definitions section and a definitions section. In the macro definitions section, you can equate a sequence of hexadecimal and decimal numbers and ASCII characters with the name used in place of the sequence in the definitions sections. In the definitions section, the left side of each statement contains the name of a character or control command. You enter a string of hexadecimal or decimal numbers, ASCII characters, or predefined macro names on the right side of each statement, which defines the character or the command sent to a printer.

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Different printer manuals define printer control strings in different ways. Some printer manuals describe control sequences in hexadecimal, while others use symbols such as esc J1 K. You can use either format and define macros to make the file more readable. In the definitions section of a printer definition file, the following items can be specified to the right of each statement:

A single character is treated as an ASCII value.
Two digits are treated as a hexadecimal number.
Three or more digits are treated as a decimal number.
A predefined macro is expanded by the printer table compiler.

If you leave the right side of a statement blank or if you delete it, the character or the control code is interpreted as a null string. If a character or a control code is defined more than once in a file, the last definition is used. If an error is detected in a statement, the printer table compiler ignores the statement and proceeds to the next statement.

After a printer definition file has been created, convert it to a PDT file using the printer table compiler. A file having the **.PDT** extension can be created.

The / symbol indicates the beginning of a comment. The / symbol indicates the end of a comment. A comment can be placed anywhere within a printer definition file. It is ignored by the printer table compiler.

A macro definition cannot contain another macro definition.

Printer Definition Tables

Standard printer definition table file names are of the form **IBM**nnnnn**.PDT**, and tables containing code page fonts are of the form **PRN**nnnnn**.PDT**, where nnnnn is a machine type.

See “PDT Files” on page 4-2 for a list of the PDT files provided by Personal Communications.

The PDT files contained in the PC400 installation diskette can be used as is. However, it might be advantageous to change the definitions of some fields. To do so, copy an existing PDF file, modify it, and then convert it to a new PDT file.

An example PDF file is shown below. Do not attempt to change the statements in a field for which modification is specifically prohibited. If a PDT file created according to a changed PDF file is used, the results of printing cannot be guaranteed.

Example Printer Definition File

The following example is an annotated version of a printer definition file for the IBM LaserPrinter 4019. This is an example only; the actual file may differ.

IBM4019.PDF File Contents

```
/                                                  /
/                                                                  /
/      PRINTER SESSION DEFINITION FILE FOR: LaserPrinter 4 19/4 19-E      /
/                                                                  /
/                                                  /
/                                                  /
/                                Macro  Definitions                          /
/ Define values here that will be used commonly throughout your          /
```

```
/ definitions.  Then use the left hand side of the equate as you        /
/ define your characters and control strings.  The printer compiler     /
/ will substitute the right hand side of the equate for each            /
/ occurrence of the left hand side throughout the file.                 /
/                                                                                 /
/ Macro names must be at least three characters long and may not        /
/ begin with a number.                                                  /
/                                                                                 /
/ Format                                                                          /
/ A Macro Name is associated with a value or string of values by the    /
/ EQU statement.  The right hand side of an EQU statement must be a     /
/ string of zero or more two digit hexadecimal numbers.  If a macro     /
/ definition is more than one line long, you may extend it to the       /
/ next line by ending the first line with a comma.  In this manner      /
/ you may define a macro which is many lines long by terminating each   /
/ line except the last with a comma.  No macro names are allowed on     /
/ right hand side.                                                      /
/                                                 /
BEGIN_MACROS
/ The following values are standard for most printers.  Check your      /
/ printer manual to verify that these are correct for your printer      /
NUL EQU                 / Nul character                 /
BEL EQU  7              / Beeper                        /
BAK EQU  8              / Back Space                    /
TAB EQU  9              / Tab                           /
LFF EQU  A              / Line Feed                     /
VTB EQU  B              / Vertical Tab                  /
FFF EQU  C              / Form Feed                     /
CRR EQU  D              / Carriage Return               /
P 5 EQU 1B 57  1        / 5 Pitch-Characters/inch       /
                        / Same as Double Wide           /
SEL EQU 11              / Select Printer                /
P1  EQU 12              / 1  Pitch-Characters/inch      /
CDW EQU 1B 57           / Cancel Double Wide contin.    /
CDL EQU 14              / Cancel Double Wide line       /
ESC EQU 1B              / Escape                        /
CAN EQU 18              / Cancel Data                   /
SPA EQU 2               / Space                         /
P17 EQU 12  F           / 17.1 Pitch-Characters/inch    /
CS2 EQU 1B 36           / Select Character Set 2        /
CS1 EQU 1B 37           / Select Character Set 1        /
P12 EQU 1B 3A           / 12 Pitch-characters/inch      /
SVT EQU 1B 42           / Set Vertical Tabs             /
SFL EQU 1B 43           / Set Form Length               /
SHT EQU 1B 44           / Set Horizontal Tabs           /
SDS EQU 1B 47           / Start Double Strike           /
CDS EQU 1B 48           / Cancel Double Strike          /
SSP EQU 1B 4E           / Set skip perforation          /
CSP EQU 1B 4F           / Cancel skip perforation       /
CAT EQU 1B 52           / Cancel all tabs Clears VT     /
                        / and sets HT every 8 position  /
CSS EQU 1B 54           / Cancel Subscript or Superscr  /
SSO EQU 1B 53           / Set Superscript over          /
SSU EQU 1B 53  1        / Set Subscript under           /
SUL EQU 1B 2D  1        / Start Underline               /
CUL EQU 1B 2D           / Cancel Underline              /
SCP EQU 1B 5B 54  4     / ESC   T : select code page                    /
CP8 EQU 1B 5B 54  4       3 52      / select code page 85               /
CP4 EQU 1B 5B 54  4       1 B5      / select code page 437              /
LL2 EQU 1B 41 24 1B 32 /  Setline length 2 lines/inch /
LL3 EQU 1B 41 18 1B 32 /  Setline length 3 lines/inch /
LL4 EQU 1B 41 12 1B 32 /  Setline length 4 lines/inch /
LL6 EQU 1B 41  C 1B 32 /  Set line length 6 lines/inch /
LL8 EQU 1B 41  9 1B 32 /  Set line length 8 lines/inch /
LL  EQU 1B 41  7 1B 32 /  Set line length 1  lines/inc /
                        / actually 7/72 inch            /
SD1 EQU 1B 5B 46  5     1  1      / Select Drawer 1  /
SD2 EQU 1B 5B 46  5     1  2      / Select Drawer 2  /
ENV EQU 1B 5B 46  5     2         / Select Envelope  /
FRM EQU 1B 64           / Forward Relative Movement     /
VLF EQU 1B 4A           / Vertical Line Feed 1/216 inch units           /
SPO EQU 1B 6B           / Set Portrait Orientation      /
```

```
SLO EQU 1B 6C                  /  Set Landscape Orientation          /
SFG EQU 1B 5B 49  8    /  Set Font Global                          /
END_MACROS
/                              Session  Parameters                                  /
/  These parameters determine the way in which output will be                /
/  formatted for your printer.                                                  /
/  Numeric Parameters                                                           /
/  These parameters should be defined with a two digit hex number          /
/  or a three digit decimal number.    The range of the number is zero     /
/  to 255 (decimal).                                                            /
MAXIMUM_PAGE_LENGTH= 66                        /  Printed lines per page          /
MAXIMUM_PRINT_POSITION= 8                    /  Printed characters per line  /
INTERV_REQ_TIMER=  1
RESELECT_TIME_EXCPT_52 4=  1
INTERV_TIMER_ON_PE_ONLY?=NO
HORIZONTAL_PEL=12
VERTICAL_PEL=216
LINE_SPACING_RATIO= 72
PAGE_LENGTH_TYPE?=INCH                         /  SET_PAGE_LENGTH "value" is     /
                                                /   values                          /
/  YES/NO Parameters                                                            /
/  These parameters should be defined with either "YES" or "NO" on the /
/  right hand side of the '='                                                   /
COMPRESS_LINE_SPACING?=NO                      /  Should blank or null lines     /
                                                /  be printed?                     /
FORM_FEED_ANY_POSITION?=YES                    /  Should the form feed be          /
                                                /  valid in any position?           /
OVERRIDE_FORMATTED_PRINT?=YES                  /  Should nulls be printed as     /
                                                /   blanks?                        /
AUTO_NEWLINE_AT_MAX_POS?=NO
/                                  Control  Codes                                   /
/  These definitions tell the emulator what control strings to send to /
/  your printer to issue control commands.                                      /
/                                                                               /
/  Format                                                                       /
/  The name of the control command should always be at the beginning     /
/  of a line followed by a '=' and then a definition string.                 /
/  A Definition String is any combination of macro names, hexadecimal  /
/  numbers, and characters separated by blanks.    A macro must have        /
/  previously defined in the macro definitions section above. A              /
/  hexadecimal number must be two digits ( ,..,F) long. and a                /
/  character must be preceded and followed by a blank.    If a                /
/  definition string will not fit on a line, it may be continued            /
/  as many lines as you wish by ending each line except the last with  /
/  a comma;    ','.      You made add any comments you wish to by including /
/  them between a slash     and a  slash where slash is the symbol /.      /

/  START_JOB is the control string which will be sent to your printer  /
/  at the beginning of each print job.                                          /
START_JOB=SEL CDW CDL CUL CDS CP8 CS2
/  END_JOB is the string which will be sent to your printer at the end /
/  of each print job.                                                           /
END_JOB=CAT CDW CDL CUL CDS CP4 FFF
BACKSPACE=BAK
BEL=BEL
CARRIAGE_RETURN=CRR
NEW_LINE=CRR LFF
LINE_FEED=LFF
FORM_FEED=FFF
HORIZONTAL_TAB=TAB
VERTICAL_TAB=VTB
START_SUBSCRIPT=SSU
END_SUBSCRIPT=CSS
START_SUPERSCRIPT=SSO
END_SUPERSCRIPT=CSS
DUP=
FIELD_MARK=;
/  The following commands specify control codes for which most PC          /
/  printers require command strings which contain a variable value        /
/  or values somewhere in the middle of the string.                          /
/  Place the word "value(s)" in the position of your definition            /
/  string where the Personal Communications 525  should fill in            /
```

```
/ the hexadecimal value(s) indicated.                                    /
/ For example, on the IBM Proprinter, the SET_HORIZONTAL_TABS            /
/ definition is:                                                         /
/ SET_HORIZONTAL_TABS=ESC D values NUL                                   /
SET_HORIZONTAL_TABS=SHT values NUL     / "values" are the tab stops     /
                                       / in column numbers              /
SET_VERTICAL_TABS=SVT values NUL       / "values" are the tab stops     /
                                       / in line numbers                /
SET_HORIZONTAL_MARGINS=
SET_PAGE_LENGTH=SFL value              / "value"=inch of the page       /
SET_AUTO_PERFORATION_SKIP=SSP value
                                       / "value"=number of lines to     /
                                       / skip over the perforation      /
                                       / between pages.  Used to set    /
                                       / top and bottom margins.        /
SET_VARIABLE_LINE_DENSITY=ESC A value ESC 2
                                       / "value"=number of points.      /
                                       / A point is                     /
                                       / 1/(LINE_SPACING_RATIO) inch.   /
SET_CHARACTER_SET=
/ SET_CHARACTER_SET=ESC I NULL   selects the normal font                 /
/ SET_CHARACTER_SET=ESC I  2    selects the NLQ (near letter quality)    /
/ SET_CHARACTER_SET=ESC I  4    selects the normal downloaded font       /
/ SET_CHARACTER_SET=ESC I  6    selects the NLQ downloaded font          /
/ SET_CHARACTER_SET=CS1          selects the Character set 1             /
/ SET_CHARACTER_SET=CS2          selects the Character set 2             /

/ These control codes set the printer lines per inch and characters      /
/ per inch to fixed amounts.                                             /
/ If your printer does not support setting the line density in points    /
/ then you can enter control strings for the following commands.         /
/ When Personal Communications 525 gets a command from the host to       /
/ set the lines per inch, it will round it to the closest line per       /
/ inch setting that you provide.  Note that if you provide a command     /
/ for the SET_VARIABLE_LINE_DENSITY command above that it will be        /
/ used and any control strings you provide for the set lines per inch    /
/ commands below will not be used.                                       /

SET_2_LINES_PER_INCH=LL2
SET_3_LINES_PER_INCH=LL3
SET_4_LINES_PER_INCH=LL4
SET_6_LINES_PER_INCH=LL6
SET_8_LINES_PER_INCH=LL8
SET_1 _LINES_PER_INCH=LL               / 7/72 inch or 9/96 inch         /
SET_1 _CHARACTERS_PER_INCH=P1
SET_12_CHARACTERS_PER_INCH=P12
SET_13_CHARACTERS_PER_INCH=            /                                /
SET_15_CHARACTERS_PER_INCH=            / The proprinter does not        /
                                       / support 15 pitch except in     /
                                       / graphs mode                    /
SET_17_CHARACTERS_PER_INCH=P17         / Condensed mode                 /
SET_2 _CHARACTERS_PER_INCH=
START_DOUBLE_WIDTH_CHARACTERS=P 5
END_DOUBLE_WIDTH_CHARACTERS=CDW

/ These control codes are used to select the source drawer number        /
/ when your printer has the dual drawer sheetfeed option.                /
SELECT_DRAWER1=SD1
SELECT_DRAWER2=SD2
SELECT_DRAWER3=
SELECT_ENVELOPE=ENV                    / Envelop                        /

/ These control codes select the print mode (quality of print).          /
SELECT_DRAFT_QUALITY=
SELECT_LETTER_QUALITY=
SELECT_ENHANCED_QUALITY=
SELECT_SETUP_QUALITY=

/ These control codes                                                    /
SET_DUPLEX=
SET_DUPLEX_TUMBLE=
RESET_DUPLEX=
```

```
/ These control codes set page orientation                                    /
SET_PORTRAIT_ORIENT=SPO
SET_LANDSCAPELEFT_ORIENT=SLO
SET_PORTRAITUPDWN_ORIENT=SPO
SET_LANDSCAPERGHT_ORIENT=SLO

/ These control codes move the print position (Horizontal/Vertical)    /
FORWARD_HORIZONTAL_SKIP=FRM word-value(LH)
FORWARD_VERTICAL_STEP_FEED=VLF byte-value

/ These control codes select the printer font via global font ID        /
SET_FONT_GLOBAL=
SET_GFID_  3=SFG    3   9  1  1  3 52 CDW     / OCR-B.1                  /
SET_GFID_  5=SFG    5   9  1  1  3 52 CDW     / Orator.1                /
SET_GFID_ 11=SFG    B   9  1  1  3 52 CDW     / Courier.1                /
SET_GFID_ 12=SFG    C   9  1  1  3 52 CDW     / Prestige.1               /
SET_GFID_ 13=SFG    B   9  1  1  3 52 CDW     / Artisan.1                /
SET_GFID_ 18=SFG   12   9  1  1  3 52 CDW     / Courier.Italic.1     /
SET_GFID_ 19=SFG   13   9  1  1  3 52 CDW     / OCR-A.1                  /
SET_GFID_ 2 =SFG   14   9  1  1  3 52 CDW     / Pica.1                   /
SET_GFID_ 3 =SFG   1E   9  1  1  3 52 CDW     / Math-Symbol.1          /
SET_GFID_ 38=SFG   26   9  1  1  3 52 CDW     / Orator.Bold.1          /
SET_GFID_ 39=SFG   27   9  1  1  3 52 CDW     / Gothic.Bold.1          /
SET_GFID_ 4 =SFG   28   9  1  1  3 52 CDW     / Gothic-Text.1          /
SET_GFID_ 41=SFG   29   9  1  1  3 52 CDW     / Roman-text.1            /
SET_GFID_ 42=SFG   2A   9  1  1  3 52 CDW     / Serif-text.1           /
SET_GFID_ 43=SFG   2B   9  1  1  3 52 CDW     / Serif-text.Italic.1  /
SET_GFID_ 44=SFG   2C   9  1  1  3 52 CDW     / Katakana-gothic.1   /
SET_GFID_ 45=SFG   2D   9  1  1  3 52 CDW     / APL.1                    /
SET_GFID_ 46=SFG   2E   9  1  1  3 52 CDW     / Courier.Bold.1         /
SET_GFID_ 5 =SFG   32   9  1  1  3 52 CDW     / Shalom.1                 /
SET_GFID_ 66=SFG   42   78  1  1  3 52 CDW     / Gothic-text.12         /
SET_GFID_ 68=SFG   44   78  1  1  3 52 CDW     / Gothic-text.Italic.12 /
SET_GFID_ 69=SFG   45   78  1  1  3 52 CDW     / Gothic.Bold.12         /
SET_GFID_ 7 =SFG   46   78  1  1  3 52 CDW     / Serif-text.12          /
SET_GFID_ 71=SFG   47   78  1  1  3 52 CDW     / Serif-text.Italic.12 /
SET_GFID_ 72=SFG   48   78  1  1  3 52 CDW     / Serif.Bold.12          /
SET_GFID_ 8 =SFG   73   78  1  1  3 52 CDW     / Math-Symbol.12         /
SET_GFID_ 84=SFG   54   78  1  1  3 52 CDW     / Script.12               /
SET_GFID_ 85=SFG   55   78  1  1  3 52 CDW     / Courier.12              /
SET_GFID_ 86=SFG   56   78  1  1  3 52 CDW     / Prestige.12             /
SET_GFID_ 87=SFG   57   78  1  1  3 52 CDW     / Letter-gothic.12      /
SET_GFID_ 91=SFG   7    78  1  1  3 52 CDW     / Light.Italic.12       /
SET_GFID_ 1 7=SFG   55   78  1  1  3 52 CDW     / Courier.12              /
SET_GFID_ 11 =SFG   6E   78  1  1  3 52 CDW     / Letter-Gothic.Bold.12 /
SET_GFID_ 111=SFG   6F   78  1  1  3 52 CDW     / Prestige-Elite.Bold.12 /
SET_GFID_ 112=SFG   7    78  1  1  3 52 CDW     / Prestige.Italic.12  /
SET_GFID_ 115=SFG   73   78  1  1  3 52 CDW     / Math-Symbol.12         /
SET_GFID_ 155=SFG   9B   78  2  1  3 52 CDW     / Boldface.Italic.PSM /
SET_GFID_ 158=SFG   9E   78  2  1  3 52 CDW     / Modern.PSM               /
SET_GFID_ 159=SFG   9F   78  2  1  3 52 CDW     / Document.PSM            /
SET_GFID_ 16 =SFG   A    78  2  1  3 52 CDW     / Essay.PSM                /
SET_GFID_ 162=SFG   A2   78  2  1  3 52 CDW     / Essay.Italic.PSM      /
SET_GFID_ 163=SFG   A3   78  2  1  3 52 CDW     / Essay.Bold.PSM         /
SET_GFID_ 168=SFG   A8   78  2  1  3 52 CDW     / Barak.PSM               /
SET_GFID_ 173=SFG   AD   78  2  1  3 52 CDW     / Essay.Light.PSM        /
SET_GFID_ 175=SFG   AF   78  2  1  3 52 CDW     / Document.PSM           /
SET_GFID_ 176=SFG   B    78  2  1  3 52 CDW     / Boldface.PSM            /
SET_GFID_ 177=SFG   9B   78  2  1  3 52 CDW     / Boldface.Italic.PSM /
SET_GFID_ 193=SFG   73   78  1  1  3 52 CDW     / Math-Symbol.12         /
SET_GFID_ 198=SFG   1E   9  1  1  3 52 CDW     / Math-Symbol.1          /
SET_GFID_ 2 4=SFG   CC   6C  1  1  3 52 CDW     / Gothic-text.13         /
SET_GFID_ 221=SFG   DD   6  1  1  3 52 CDW     / Prestige.15             /
SET_GFID_ 222=SFG   E6   6  1  1  3 52 CDW     / Gothic-text.15         /
SET_GFID_ 223=SFG   DF   6  1  1  3 52 CDW     / Courier.15              /
SET_GFID_ 225=SFG   E1   6  1  1  3 52 CDW     / Math-symbol.15         /
SET_GFID_ 229=SFG   E5   6  1  1  3 52 CDW     / Serif-text.15          /
SET_GFID_ 23 =SFG   E6   6  1  1  3 52 CDW     / Gothic-text.15         /
SET_GFID_ 245=SFG   2E   9  1  1  3 52 P 5     / Courier.Bold.5        /
SET_GFID_ 252=SFG   FC   54  1  1  3 52 CDW     / Courier.15              /
SET_GFID_ 253=SFG   FD   54  1  1  3 52 CDW     / Courier.Bold.17       /
```

```
SET_GFID_ 254=SFG   FE   55  1  1  3 52 CDW     / Courier.17               /
SET_GFID_ 28 =SFG  1 18   48  1  1  3 52 CDW     / APL.2                    /
SET_GFID_ 281=SFG  1 19   48  1  1  3 52 CDW     / Gothic-text.2            /
SET_GFID_ 29 =SFG  1 22   36  1  1  3 52 CDW     / Gothic-text.27           /
SET_GFID_ 751=SFG 11 37    A  1  3  3 52 CDW     / Sonoran-serif.8pt    /
SET_GFID_1 51=SFG 11 37   C8  1  3  3 52 CDW     / Sonoran-serif.1 pt  /
SET_GFID_1 53=SFG 11 4B   C8  1  3  3 52 CDW     / Sonoran-serif.bold.1 pt /
SET_GFID_1 56=SFG 11 B7   C8  1  3  3 52 CDW     / Sonoran-serif.italic.1 pt /
SET_GFID_1351=SFG 11 37    F  1  3  3 52 CDW     / Sonoran-serif.12pt    /
SET_GFID_1653=SFG 11 4B  1 4   1  3  3 52 CDW     / Sonoran-serif.Bold.16pt /
SET_GFID_21 3=SFG 11 4B  1 E   1  3  3 52 CDW     / Sonoran-serif.Bold.24pt /

/                              Color  Specifications                          /
START_COLOR_BLUE=
END_COLOR_BLUE=
START_COLOR_GREEN=
END_COLOR_GREEN=
START_COLOR_CYAN=
END_COLOR_CYAN=
START_COLOR_RED=
END_COLOR_RED=
START_COLOR_MAGENTA=
END_COLOR_MAGENTA=
START_COLOR_YELLOW=
END_COLOR_YELLOW=
START_COLOR_BLACK=
END_COLOR_BLACK=
START_COLOR_WHITE=
END_COLOR_WHITE=

/                              Highlight  Specifications                       /
/ These definitions will determine how things which are sent by the    /
/ host to be displayed or printed as underlined, reverse video, or     /
/ blinking will be highlighted on your printer.                        /

START_HIGHLIGHT_INTENSE=SDS              / This is double strike          /
END_HIGHLIGHT_INTENSE=CDS
START_HIGHLIGHT_UNDERLINE=SUL
END_HIGHLIGHT_UNDERLINE=CUL
START_HIGHLIGHT_REVERSE_VIDEO=
END_HIGHLIGHT_REVERSE_VIDEO=
START_HIGHLIGHT_BLINK=
END_HIGHLIGHT_BLINK=

/                              Character  Definitions                         /
SPACE=SPA
EXCLAMATION_POINT=21
QUOTATION_MARKS=22
NUMBER_SIGN=23
DOLLAR_SIGN=24
PERCENT_SIGN=25
AMPERSAND=26
APOSTROPHE=27
LEFT_PARENTHESIS=28
RIGHT_PARENTHESIS=29
ASTERISK=2A
PLUS_SIGN=2B
COMMA=2C
HYPHEN=2D
PERIOD=2E
SLASH=2F
ZERO=
ONE=1
TWO=2
THREE=3
FOUR=4
FIVE=5
SIX=6
SEVEN=7
EIGHT=8
NINE=9
COLON=3A
```

SEMICOLON=3B
LESS_THAN_SIGN=3C
EQUAL_SIGN=3D
GREATER_THAN_SIGN=3E
QUESTION_MARK=3F
AT_SIGN=4
A_CAPITAL=A
B_CAPITAL=B
C_CAPITAL=C
D_CAPITAL=D
E_CAPITAL=E
F_CAPITAL=F
G_CAPITAL=G
H_CAPITAL=H
I_CAPITAL=I
J_CAPITAL=J
K_CAPITAL=K
L_CAPITAL=L
M_CAPITAL=M
N_CAPITAL=N
O_CAPITAL=O
P_CAPITAL=P
Q_CAPITAL=Q
R_CAPITAL=R
S_CAPITAL=S
T_CAPITAL=T
U_CAPITAL=U
V_CAPITAL=V
W_CAPITAL=W
X_CAPITAL=X
Y_CAPITAL=Y
Z_CAPITAL=Z
LEFT_BRACKET=5B
BACKSLASH=5C
RIGHT_BRACKET=5D
CIRCUMFLEX_ACCENT=5E
UNDERLINE=5F
GRAVE_ACCENT=6
A_SMALL=a
B_SMALL=b
C_SMALL=c
D_SMALL=d
E_SMALL=e
F_SMALL=f
G_SMALL=g
H_SMALL=h
I_SMALL=i
J_SMALL=j
K_SMALL=k
L_SMALL=l
M_SMALL=m
N_SMALL=n
O_SMALL=o
P_SMALL=p
Q_SMALL=q
R_SMALL=r
S_SMALL=s
T_SMALL=t
U_SMALL=u
V_SMALL=v
W_SMALL=w
X_SMALL=x
Y_SMALL=y
Z_SMALL=z
LEFT_BRACE=7B
VERTICAL_BAR=7C
RIGHT_BRACE=7D
TILDE_ACCENT=7E
C_CEDILLA_CAPITAL=8
U_DIAERESIS_SMALL=81
E_ACUTE_SMALL=82
A_CIRCUMFLEX_SMALL=83

A_DIAERESIS_SMALL=84
A_GRAVE_SMALL=85
A_OVERCIRCLE_SMALL=86
C_CEDILLA_SMALL=87
E_CIRCUMFLEX_SMALL=88
E_DIAERESIS_SMALL=89
E_GRAVE_SMALL=8A
I_DIAERESIS_SMALL=8B
I_CIRCUMFLEX_SMALL=8C
I_GRAVE_SMALL=8D
A_DIAERESIS_CAPITAL=8E
A_OVERCIRCLE_CAPITAL=8F
E_ACUTE_CAPITAL=9
AE_DIPTHONG_SMALL=91
AE_DIPTHONG_CAPITAL=92
O_CIRCUMFLEX_SMALL=93
O_DIAERESIS_SMALL=94
O_GRAVE_SMALL=95
U_CIRCUMFLEX_SMALL=96
U_GRAVE_SMALL=97
Y_DIAERESIS_SMALL=98
O_DIAERESIS_CAPITAL=99
U_DIAERESIS_CAPITAL=9A
O_SLASH_SMALL=9B
POUND_SIGN=9C
O_SLASH_CAPITAL=9D
MULTIPLY_SIGN=9E
A_ACUTE_SMALL=A
I_ACUTE_SMALL=A1
O_ACUTE_SMALL=A2
U_ACUTE_SMALL=A3
N_TILDE_SMALL=A4
N_TILDE_CAPITAL=A5
ORDINAL_INDICATOR_FEMININE=A6
ORDINAL_INDICATOR_MASCULINE=A7
QUESTION_MARK_INVERTED=A8
REGISTERED_TRADEMARK_SYMBOL=A9
LOGICAL_NOT=AA
ONE_HALF=AB
ONE_QUARTER=AC
EXCLAMATION_POINT_INVERTED=AD
LEFT_ANGLE_QUOTES=AE
RIGHT_ANGLE_QUOTES=AF
A_ACUTE_CAPITAL=B5
A_CIRCUMFLEX_CAPITAL=B6
A_GRAVE_CAPITAL=B7
COPYRIGHT_SYMBOL=B8
CENT_SIGN=BD
YEN_SIGN=BE
A_TILDE_SMALL=C6
A_TILDE_CAPITAL=C7
INTERNATIONAL_CURRENCY_SYMBOL=CF
ETH_ICELANDIC_SMALL=D
ETH_ICELANDIC_CAPITAL=D1
E_CIRCUMFLEX_CAPITAL=D2
E_DIAERESIS_CAPITAL=D3
E_GRAVE_CAPITAL=D4
I_DOTLESS_SMALL=D5
I_ACUTE_CAPITAL=D6
I_CIRCUMFLEX_CAPITAL=D7
I_DIAERESIS_CAPITAL=D8
VERTICAL_LINE_BROKEN=DD
I_GRAVE_CAPITAL=DE
O_ACUTE_CAPITAL=E
SHARP_S_SMALL=E1
O_CIRCUMFLEX_CAPITAL=E2
O_GRAVE_CAPITAL=E3
O_TILDE_SMALL=E4
O_TILDE_CAPITAL=E5
MICRO_SYMBOL=E6
THORN_ICELANDIC_SMALL=E7
THORN_ICELANDIC_CAPITAL=E8

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U_ACUTE_CAPITAL=E9
U_CIRCUMFLEX_CAPITAL=EA
U_GRAVE_CAPITAL=EB
Y_ACUTE_SMALL=EC
Y_ACUTE_CAPITAL=ED
OVERLINE=EE
ACUTE_ACCENT=EF
SYLLABLE_HYPHEN=F
PLUS_OR_MINUS_SIGN=F1
THREE_QUARTERS=F3
PARAGRAPH_SYMBOL=F4
SECTION_SYMBOL=F5
DIVIDE_SIGN=F6
CEDILLA=F7
DEGREE_SYMBOL=F8
DIAERESIS=F9
MIDDLE_DOT_ACCENT=FA
ONE_SUPERSCRIPT=FB
THREE_SUPERSCRIPT=FC
TWO_SUPERSCRIPT=FD
REQUIRED_SPACE=SPA
/                                                  /
/                    PC525  Internal Data Area.                    /
/  Do not change these statement.                                  /
/                                                  /
TOP_MARGIN=
LEFT_MARGIN=
DYNAMIC_START_JOB=
DYNAMIC_END_JOB=
DYNAMIC_SET_PAGE_LENGTH=
PRINTER_ID=4  19
/                          End of Definition File                  /
```

Field Names of Printer Definition Files

The following table lists the field names of the printer definition files (PDF files) and their meanings:

Table 13-1 (Page 1 of 5). Field Names of PDF Files

Field Name	Meaning	Remarks
MAXIMUM_PAGE_LENGTH	Default MPL	
MAXIMUM_PRINT_POSITION	Default MPP	
DEFAULT_CPI?	Default CPI	
DEFAULT_LPI?	Default LPI	
COMPRESS_LINE_SPACING?	Specifies whether to print a line containing only space characters or nonprint characters.	
FORM_FEED_ANY_POSITION?	Specifies whether to validate the FF control code on the first line.	Do not change this field.
OVERRIDE_FORMATTED_PRINT?	Specifies whether to print NULL characters as blanks.	Do not change this field.
HORIZONTAL_PEL	FORWARD_HORIZONTAL_SKIP length unit	
VERTICAL_PEL	FORWARD_VERTICAL_SKIP length unit	
IMAGE_HORIZONTAL_PEL	IMAGE_TRANSMISSION horizontal length unit	
IMAGE_VERTICAL_PEL	IMAGE_TRANSMISSION vertical length unit	
LINE_SPACING_RATIO	SET_VARIABLE_LINE_DENSITY length unit	
PAGE_LENGTH_TYPE?	SET_PAGE _LENGTH page length parameter type	
FIRST_LEFT_POSITION	Distance from left paper edge	
FIRST_TOP_POSITION	Distance from top paper edge	
DRAWER1_ORIENTATION	Default page orientation for drawer 1	
DRAWER2_ORIENTATION	Default page orientation for drawer 2	
AUTOMATIC_ORIENTATION	Specifies whether to calculate the page orientation.	
START_JOB	Printer control code sent to a printer to start printing	If the control code specifying LPI/CPI is defined, also change DEFAULT_CPI, DEFAULT_LPI.
END_JOB	Printer control code sent to a printer when printing ends	
BACKSPACE	Backspace control code	
BEL	Bell control code	
CARRIAGE_RETURN	Carriage return control code	
NEW_LINE	New line (CR/LF) control code	
LINE_FEED	New line control code	
FORM_FEED	Form feed (FF) control code	
HORIZONTAL_TAB	Horizontal tab control code	
VERTICAL_TAB	Vertical tab control code	
DESELECT	Device control 3 control code	
START_SUBSCRIPT	Subscript character specification	
END_SUBSCRIPT	Subscript character specification release	
START_SUPERSCRIPT	Superscript character specification	
END_SUPERSCRIPT	Superscript character specification release	

Table 13-1 (Page 2 of 5). Field Names of PDF Files

Field Name	Meaning	Remarks
DUP	Character used for printing DUP codes	
FIELD_MARK	Character used for printing FIELD MARK characters	
SET_HORIZONTAL_TABS	Horizontal tab setup	Do not change this field.
SET_VERTICAL_TABS	Vertical tab setup	Do not change this field.
SET_HORIZONTAL_MARGINS	Right and left margin setup	Do not change this field.
SET_PAGE_LENGTH	Page length setup	Assign the unit used for the defined control code page length to the PAGE_LENGTH_TYPE field. When single sheets are to be used, delete this field.
SET_VARIABLE_LINE_DENSITY	Line density setup	Assign the unit used for the control code length defined to LINE_SPACING_RATIO field.
SET_2_LINES_PER_INCH	New line pitch (2LPI) setup	
SET_3_LINES_PER_INCH	New line pitch (3LPI) setup	
SET_4_LINES_PER_INCH	New line pitch (4LPI) setup	
SET_6_LINES_PER_INCH	New line pitch (6LPI) setup	
SET_8_LINES_PER_INCH	New line pitch (8LPI) setup	
SET_10_LINES_PER_INCH	New line pitch (10LPI) setup	
SET_10_CHARACTERS_PER_INCH	Character pitch (10CPI) setup	
SET_12_CHARACTERS_PER_INCH	Character pitch (12CPI) setup	
SET_13_CHARACTERS_PER_INCH	Character pitch (13CPI) setup	
SET_15_CHARACTERS_PER_INCH	Character pitch (15CPI) setup	
SET_17_CHARACTERS_PER_INCH	Character pitch (17CPI) setup	
SET_20_CHARACTERS_PER_INCH	Character pitch (20CPI) setup	
IMAGE_TRANSMISSION	Image data setup (vertical 24-dot image)	
SELECT_DRAWER1	Page tray (Primary) setup	
SELECT_DRAWER2	Page tray (Alternate) setup	
SELECT_ENVELOPE	Envelope tray setup	
SELECT_DRAFT_QUALITY	Draft print quality setup	
SELECT_LETTER_QUALITY	Letter print quality setup	
SELECT_ENHANCED_QUALITY	Enhanced print quality setup	
SET_DUPLEX	Duplex printing setup	
SET_DUPLEX_TUMBLE	Duplex (tumble) printing setup	
RESET_DUPLEX	Duplex printing release	
SET_PORTRAIT_ORIENT	Page orientation (Normal portrait (upright)) setup	
SET_LANDSCAPELEFT_ORIENT	Page orientation (Landscape left (270 degree clockwise rotation of text)) setup	
SET_PORTRAITUPDWN_ORIENT	Page orientation (Portrait upside down (180 degree clockwise rotation of text)) setup	
SET_LANDSCAPERGHT_ORIENT	Page orientation (Landscape right (90 degree clockwise rotation of text)) setup	

Table 13-1 (Page 3 of 5). Field Names of PDF Files

Field Name	Meaning	Remarks
FORWARD_HORIZONTAL_SKIP	Variable skip (relative position/dot unit)	Assign the unit of the defined control code length to the HORIZONTAL_PEL field.
FORWARD_VERTICAL_STEP_FEED	Variable line feed (relative position/dot unit)	Assign the unit of the defined control code length to the VERTICAL_PEL field.
SET_FONT_GLOBAL	Global font ID setup	Do not change this field.
SET_GFID_0003	GFID 3 (OCR-B) setup	
SET_GFID_0005	GFID 5 (Orator) setup	
SET_GFID_0011	GFID 11 (Courier 10) setup	
SET_GFID_0012	GFID 12 (Prestige Pica) setup	
SET_GFID_0013	GFID 13 (Artisan 10) setup	
SET_GFID_0018	GFID 18 (Courier Italic 10) setup	
SET_GFID_0019	GFID 19 (OCR-A) setup	
SET_GFID_0020	GFID 20 (Pica) setup	
SET_GFID_0030	GFID 30 (Math Symbol 10) setup	
SET_GFID_0038	GFID 38 (Orator Bold) setup	
SET_GFID_0039	GFID 39 (Gothic Bold 10) setup	
SET_GFID_0040	GFID 40 (Gothic Text 10) setup	
SET_GFID_0041	GFID 41 (Roman Text 10) setup	
SET_GFID_0042	GFID 42 (Serif Text 10) setup	
SET_GFID_0043	GFID 43 (Serif Italic 10) setup	
SET_GFID_0044	GFID 44 (Katakana 10) setup	
SET_GFID_0045	GFID 45 (APL 10) setup	
SET_GFID_0046	GFID 46 (Courier Bold 10) setup	
SET_GFID_0050	GFID 50 (Shalom 10) setup	
SET_GFID_0066	GFID 66 (Gothic Text 12) setup	
SET_GFID_0068	GFID 68 (Gothic Italic 12) setup	
SET_GFID_0069	GFID 69 (Gothic Bold 12) setup	
SET_GFID_0070	GFID 70 (Serif Text 12) setup	
SET_GFID_0071	GFID 71 (Serif Italic 12) setup	
SET_GFID_0072	GFID 72 (Serif Bold 12) setup	
SET_GFID_0080	GFID 80 (Math Symbol 12) setup	
SET_GFID_0084	GFID 84 (Script 12) setup	
SET_GFID_0085	GFID 85 (Courier 12) setup	
SET_GFID_0086	GFID 86 (Prestige Elite) setup	
SET_GFID_0087	GFID 87 (Letter Gothic 12) setup	
SET_GFID_0091	GFID 91 (Light Italic 12) setup	
SET_GFID_0110	GFID 110 (Letter Gothic Bold 12) setup	
SET_GFID_0111	GFID 111 (Prestige Elite Bold) setup	
SET_GFID_0112	GFID 112 (Prestige Elite Italic) setup	
SET_GFID_0115	GFID 115 (Math Symbol 12) setup	
SET_GFID_0155	GFID 155 (Boldface Italic) setup	
SET_GFID_0158	GFID 158 (Modern) setup	

Table 13-1 (Page 4 of 5). Field Names of PDF Files

Field Name	Meaning	Remarks
SET_GFID_0159	GFID 159 (Boldface) setup	
SET_GFID_0160	GFID 160 (Essay) setup	
SET_GFID_0162	GFID 162 (Essay Italic) setup	
SET_GFID_0163	GFID 163 (Essay Bold) setup	
SET_GFID_0168	GFID 168 (Barak PSM) setup	
SET_GFID_0173	GFID 173 (Essay Light) setup	
SET_GFID_0175	GFID 175 (Document) setup	
SET_GFID_0176	GFID 176 (Boldface) setup	
SET_GFID_0177	GFID 177 (Boldface Italic) setup	
SET_GFID_0193	GFID 193 (Math Symbol 12) setup	
SET_GFID_0198	GFID 198 (Math Symbol 10) setup	
SET_GFID_0204	GFID 204 (Gothic Text 13) setup	
SET_GFID_0221	GFID 221 (Prestige 15) setup	
SET_GFID_0222	GFID 222 (Gothic Text 15) setup	
SET_GFID_0223	GFID 223 (Courier 15) setup	
SET_GFID_0225	GFID 225 (Math Symbol 15) setup	
SET_GFID_0229	GFID 229 (Serif Text 15) setup	
SET_GFID_0230	GFID 230 (Gothic Text 15) setup	
SET_GFID_0245	GFID 245 (Courier Bold 5) setup	
SET_GFID_0252	GFID 252 (Courier 17) setup	
SET_GFID_0253	GFID 253 (Courier Bold 17) setup	
SET_GFID_0254	GFID 254 (Courier 17 (sub/super)) setup	
SET_GFID_0280	GFID 280 (APL 20) setup	
SET_GFID_0281	GFID 281 (Gothic Text 20) setup	
SET_GFID_0290	GFID 290 (Gothic Text 27) setup	
SET_GFID_0751	GFID 751 (Sonoran-Serif 8-pt Roman Medium) setup	
SET_GFID_1051	GFID 1051 (Sonoran-Serif 10-pt Roman Medium) setup	
SET_GFID_1053	GFID 1053 (Sonoran-Serif 10-pt Roman Bold) setup	
SET_GFID_1056	GFID 1056 (Sonoran-Serif 10-pt Italic Medium) setup	
SET_GFID_1351	GFID 1351 (Sonoran-Serif 12-pt Roman Medium) setup	
SET_GFID_1653	GFID 1653 (Sonoran-Serif 16-pt Roman Bold) setup	
SET_GFID_2103	GFID 2103 (Sonoran-Serif 24-pt Roman Bold) setup	
START_HIGHLIGHT_INTENSE	Highlight printing setup	
END_HIGHLIGHT_INTENSE	Highlight printing release	
START_HIGHLIGHT_UNDERLINE	Underline setup	
END_HIGHLIGHT_UNDERLINE	Underline release	
TOP_MARGIN	Default top margin	Do not change this field.
LEFT_MARGIN	Default left margin	Do not change this field.

Table 13-1 (Page 5 of 5). Field Names of PDF Files

Field Name	Meaning	Remarks
DYNAMIC_START_JOB	Printer control code sent to a printer to start printing (internal use)	Do not change this field.
DYNAMIC_END_JOB	Printer control code sent to a printer to stop printing (internal use)	Do not change this field.
DYNAMIC_SET_PAGE_LENGTH	Page length setup control code sent to a printer at the start of printing (internal use)	Do not change this field.
PRINTER_ID	Printer ID	Do not change this field.

The following table lists the session parameter field names and their effective values:

Table 13-2. Effective Values for PDF File Field Names

Field Name	Effective Value
MAXIMUM_PAGE_LENGTH	001 to 255
MAXIMUM_PRINT_POSITION	001 to 255
DEFAULT_CPI?	010/012/015
DEFAULT_LPI?	004/006/008
COMPRESS_LINE_SPACING?	YES/NO
FORM_FEED_ANY_POSITION?	YES/NO
OVERRIDE_FORMATTED_PRINT?	YES/NO
HORIZONTAL_PEL	FORWARD_HORIZONTAL_SKIP length unit
VERTICAL_PEL	FORWARD_VERTICAL_ STEP_FEED length unit
IMAGE_HORIZONTAL_PEL	IMAGE_TRANSMISSION horizontal unit
IMAGE_VERTICAL_PEL	IMAGE_TRANSMISSION vertical unit
LINE_SPACING_RATIO	SET_VARIABLE_LINE_DENSITY length unit
PAGE_LENGTH_TYPE?	LINE/INCH/6INCH*
FIRST_LEFT_POSITION	000 to 1440 in units of 1/1440 inch
FIRST_TOP_POSITION	000 to 1440 in units of 1/1440 inch
DRAWER1_ORIENTATION	LANDSCAPE/PORTRAIT/COR
DRAWER2_ORIENTATION	LANDSCAPE/PORTRAIT/COR
AUTOMATIC_ORIENTATION	YES/NO

* 6INCH indicates that page length should be specified in units of 1/6 inch.

Notes:

1. If one of the desired CPI/LPI settings is not exactly supported by the printer, set the nearest value. The results of printing might not be as desired.
2. If the units used to specify the control code length defined in FORWARD_HORIZONTAL _SKIP and FORWARD_VERTICAL _STEP_FEED are not the same as the units used to specify the HORIZONTAL_PEL and VERTICAL_PEL, the desired output will not be obtained.
3. If the units used to specify the control code length defined in SET_VARIABLE_LINE_DENSITY are not the same as the units used to specify the LINE_SPACING_RATIO, the desired output will not be obtained.
4. When FIRST_LEFT_POSITION and FIRST_TOP_POSITION are specified, their values are regarded as specifying the unprintable area in the page of the

printer. These values are included in the top margin and the left margin specified by the AS/400 printer control code.

Parameter Definition of Printer Control Codes

This section explains how to define the parameters, if any, of the printer control codes. Some printer control codes require that parameters be specified. Pay particular attention when defining a parameter because how this is done depends on the parameter type. If the definition method for another type is used, the desired output will not be obtained.

The following table lists printer control code parameters and their meanings:

Table 13-3. Printer Control Code Parameters

Parameter Type	Meaning
byte-value	One-byte parameter.
byte-values	Multibyte parameter. Used if operands are fixed.
word-value(HL)	One-word parameter (higher and lower bytes).
word-value(LH)	One-word parameter (lower and higher bytes).
length(HL)-values	Multibyte parameter requiring operands. An operand consists of a higher and lower byte. Used if operands are variable.
length(LH)-values	Multibyte parameter requiring operands. An operand consists of a lower and higher byte. Used if operands are variable.
length(HL)-images	Image data requiring operands. An operand consists of a higher and lower byte.
length(LH)-images	Image data requiring operands. An operand consists of a lower and higher byte.
decimal-characters	Decimal characters parameter.

Symbols of Printer Definition Files

The following table lists the symbols that are defined for printer definition files.

Table 13-4 (Page 1 of 3). Printer Symbol Definitions

Field Name	Symbol
SPACE	
EXCLAMATION_POINT	!
QUOTATION_MARKS	"
NUMBER_SIGN	#
DOLLAR_SIGN	$
PERCENT_SIGN	%
AMPERSAND	&
APOSTROPHE	'
LEFT_PARENTHESIS	(
RIGHT_PARENTHESIS	)
ASTERISK	*
PLUS_SIGN	+
COMMA	,

Table 13-4 (Page 1 of 3). Printer Symbol Definitions

Field Name	Symbol
HYPHEN	-
PERIOD	.
SLASH	/
ZERO	0
ONE	1
TWO	2
THREE	3
FOUR	4
FIVE	5
SIX	6
SEVEN	7
EIGHT	8
NINE	9

Table 13-4 (Page 2 of 3). Printer Symbol Definitions

Field Name	Symbol
COLON	:
SEMICOLON	;
LESS_THAN_SIGN	<
EQUAL_SIGN	=
GREATER_THAN_SIGN	>
QUESTION_MARK	?
AT_SIGN	@
A_CAPITAL	A
B_CAPITAL	B
C_CAPITAL	C
D_CAPITAL	D
E_CAPITAL	E
F_CAPITAL	F
G_CAPITAL	G
H_CAPITAL	H
I_CAPITAL	I
J_CAPITAL	J
K_CAPITAL	K
L_CAPITAL	L
M_CAPITAL	M
N_CAPITAL	N
O_CAPITAL	O
P_CAPITAL	P
Q_CAPITAL	Q
R_CAPITAL	R
S_CAPITAL	S
T_CAPITAL	T
U_CAPITAL	U
V_CAPITAL	V
W_CAPITAL	W
X_CAPITAL	X
Y_CAPITAL	Y
Z_CAPITAL	Z
LEFT_BRACKET	[
BACKSLASH	\
RIGHT_BRACKET	]
CIRCUMFLEX_ACCENT	^
UNDERLINE	_
GRAVE_ACCENT	`
A_SMALL	a
B_SMALL	b
C_SMALL	c
D_SMALL	d

Table 13-4 (Page 2 of 3). Printer Symbol Definitions

Field Name	Symbol
E_SMALL	e
F_SMALL	f
G_SMALL	g
H_SMALL	h
I_SMALL	i
J_SMALL	j
K_SMALL	k
L_SMALL	l
M_SMALL	m
N_SMALL	n
O_SMALL	o
P_SMALL	p
Q_SMALL	q
R_SMALL	r
S_SMALL	s
T_SMALL	t
U_SMALL	u
V_SMALL	v
W_SMALL	w
X_SMALL	x
Y_SMALL	y
Z_SMALL	z
LEFT_BRACE	{
VERTICAL_BAR	|
RIGHT_BRACE	}
TILDE_ACCENT	~
C_CEDILLA_CAPITAL	Ç
U_DIAERESIS_SMALL	ü
E_ACUTE_SMALL	é
A_CIRCUMFLEX_SMALL	â
A_DIAERESIS_SMALL	ä
A_GRAVE_SMALL	à
A_OVERCIRCLE_SMALL	å
C_CEDILLA_SMALL	ç
E_CIRCUMFLEX_SMALL	ê
E_DIAERESIS_SMALL	ë
E_GRAVE_SMALL	è
I_DIAERESIS_SMALL	ï
I_CIRCUMFLEX_SMALL	î
I_GRAVE_SMALL	ì
A_DIAERESIS_CAPITAL	Ä
A_OVERCIRCLE_CAPITAL	Å
E_ACUTE_CAPITAL	É

Table 13-4 (Page 3 of 3). Printer Symbol Definitions

Field Name	Symbol
AE_DIPTHONG_SMALL	æ
AE_DIPTHONG_CAPITAL	Æ
O_CIRCUMFLEX_SMALL	ô
O_DIAERESIS_SMALL	ö
O_GRAVE_SMALL	ò
U_CIRCUMFLEX_SMALL	û
U_GRAVE_SMALL	ù
Y_DIAERESIS_SMALL	ÿ
O_DIAERESIS_CAPITAL	Ö
U_DIAERESIS_CAPITAL	Ü
O_SLASH_SMALL	ø
POUND_SIGN	£
O_SLASH_CAPITAL	Ø
MULTIPLY_SIGN	×
A_ACUTE_SMALL	á
I_ACUTE_SMALL	í
O_ACUTE_SMALL	ó
U_ACUTE_SMALL	ú
N_TILDE_SMALL	ñ
N_TILDE_CAPITAL	Ñ
ORDINAL_INDICATOR_FEMININE	a
ORDINAL_INDICATOR_MASCULINE	o
QUESTION_MARK_INVERTED	¿
REGISTERED_TRADEMARK_SYMBOL	®
LOGICAL_NOT	¬
ONE_HALF	½
ONE_QUARTER	¼
EXCLAMATION_POINT_INVERTED	¡
LEFT_ANGLE_QUOTES	«
RIGHT_ANGLE_QUOTES	»
A_ACUTE_CAPITAL	Á
A_CIRCUMFLEX_CAPITAL	Â
A_GRAVE_CAPITAL	À
COPYRIGHT_SYMBOL	©
CENT_SIGN	¢
YEN_SIGN	¥
A_TILDE_SMALL	ã
A_TILDE_CAPITAL	Ã
E_CIRCUMFLEX_CAPITAL	Ê
E_DIAERESIS_CAPITAL	Ë
I_ACUTE_CAPITAL	Í
I_CIRCUMFLEX_CAPITAL	Î
I_DIAERESIS_CAPITAL	Ï

Table 13-4 (Page 3 of 3). Printer Symbol Definitions

Field Name	Symbol
VERTICAL_LINE_BROKEN	¦
I_GRAVE_CAPITAL	Ì
O_ACUTE_CAPITAL	Ó
O_CIRCUMFLEX_CAPITAL	Ô
O_GRAVE_CAPITAL	Ò
O_TILDE_SMALL	õ
O_TILDE_CAPITAL	Õ
MICRO_SYMBOL	µ
U_ACUTE_CAPITAL	Ú
U_CIRCUMFLEX_CAPITAL	Û
U_GRAVE_CAPITAL	Ù
ACUTE_ACCENT	´
SYLLABLE_HYPHEN	-
PLUS_OR_MINUS_SIGN	±
THREE_QUARTERS	¾
PARAGRAPH_SYMBOL	¶
SECTION_SYMBOL	§
DIVIDE_SIGN	÷
DEGREE_SYMBOL	°
ONE_SUPERSCRIPT	
THREE_SUPERSCRIPT	
TWO_SUPERSCRIPT	
REQUIRED_SPACE	
INTERNATIONAL_CURRENCY_SYMBOL	¤
ETH_ICELANDIC_SMALL	ð
ETH_ICELANDIC_CAPITAL	Ð
SHARP_S_SMALL	ß
THORN_ICELANDIC_SMALL	þ
THORN_ICELANDIC_CAPITAL	Þ
Y_ACUTE_SMALL	ý
Y_ACUTE_CAPITAL	Ý
OVERLINE	¯
CEDILLA	¸
DIAERESIS	..
MIDDLE_DOT_ACCENT	.

Using Printer Control Codes

This section explains the SNA Character String (SCS) control codes, or Final Form Text: Document Content Architecture (FFT DCA).

For details of AS/400 printer control codes, see *AS/400 Guide to Programming for Printing*, SC41-8194.

Printer Control Code Format

Some printer control codes perform single, specific functions by themselves, while others perform multiple functions according to the parameters specified after the control code.

A printer control code with parameters has the following format:

Control Code	Count	Parameter 1	Parameter 2...
1 or 2 bytes	1 byte	1 or 2 bytes	1 or 2 bytes

Normally, a control code with parameters consists of 2 bytes. (Usually, a control code without parameters, that is, functioning as a unit, has only 1 byte.)

A count consists of 1 byte, and indicates the length of the parameters (including the count) after the control code, in bytes. For example, a count and two 1-byte parameters is shown as X'03', because the count itself is included. Some control codes, such as the Printing Position (PP) control code, do not have counts.

A parameter can be 1 or 2 bytes in length. The number of bytes depends on the control codes.

Note: In this manual, counts and parameters that are actually processed in binary are all expressed in hexadecimal (0–F) to improve readability.

Supported Control Codes

Control Code	3812	5219	5224	5256
Set CGCS Through Local ID (SCGL)	Yes	Yes	Yes	No
Set Character Distance (SCD)	Yes	Yes	Yes	No
Set FID Through GCID (SFG)	Yes	Yes	Yes	No
Set GCGID Through GCID (SCG)	Yes	Yes	Yes	No
Bell (BEL)	Yes	Yes	Yes	Yes
Null (NUL)	Yes	Yes	Yes	Yes
Repeat (RPT)	Yes	Yes	No	No
Set Error Action (SEA)	Yes	Yes	Yes	No
Set Initial Condition (SIC)	Yes	No	No	No
Set Print Setup (SPSU)	Yes	Yes	Yes	No
Switch (SW)	Yes	Yes	No	No

Control Code	3812	5219	5224	5256
Begin Emphasis (BES)	Yes	No	No	No
Begin Overstrike (BOS)	Yes	No	No	No
Begin Underscore (BUS)	Yes	Yes	No	No
Enable Presentation (ENP)	Yes	No	No	No
End Emphasis (EES)	Yes	No	No	No
End Overstrike (EOS)	Yes	No	No	No
End Underscore (EUS)	Yes	Yes	No	No
Inhibit Presentation (INP)	Yes	No	No	No
Set Graphic Error Action (SGEA)	Yes	Yes	Yes	Yes
Justify Text Field (JTF)	Yes	Yes	No	No
Set Justify Mode (SJM)	Yes	Yes	No	No
Subscript (SBS)	Yes	Yes	No	No
Substitute (SUB)	Yes	No	No	No
Superscript (SPS)	Yes	Yes	No	No
Word Underscore (WUS)	Yes	Yes	No	No
Form Feed (FF)	Yes	Yes	Yes	Yes
Page Presentation Media (PPM)	Yes	Yes	Yes	No
Required Form Feed (RFF)	Yes	Yes	No	No
Set Horizontal Format (SHF)	Yes	Yes	Yes	Yes
Set Horizontal Margins (SHM)	Yes	Yes	Yes	No
Set Presentation Page Size (SPPS)	Yes	Yes	Yes	No
Set Text Orientation (STO)	Yes	No	No	No
Set Vertical Format (SVF)	Yes	Yes	Yes	Yes
Set Vertical Margins (SVM)	Yes	Yes	Yes	No
Backspace (BS)	Yes	Yes	No	No
Carriage Return (CR)	Yes	Yes	Yes	Yes
Horizontal Tab (HT)	Yes	Yes	No	No
Indent Tab (IT)	Yes	Yes	No	No
Index Return (IRT)	Yes	Yes	No	No
Interchange Record Separator (IRS)	Yes	Yes	Yes	Yes
Line Feed (LF)	Yes	Yes	Yes	Yes
New Line (NL)	Yes	Yes	Yes	Yes
Numeric Backspace (NBS)	Yes	Yes	No	No

Control Code	3812	5219	5224	5256
Presentation Position (PP)	Yes	Yes	Yes	Yes
Release Left Margin (RLM)	Yes	Yes	Yes	No
Required New Line (RNL)	Yes	Yes	No	No
Set Horizontal Tab Stops (STAB)	Yes	Yes	Yes	No
Set Indent Level (SIL)	Yes	Yes	Yes	No
Set Line Density (SLD)	Yes	Yes	Yes	No
Set Line Spacing (SLS)	Yes	Yes	Yes	No
Set Single Line Distance (SSLD)	Yes	Yes	Yes	No
Unit Backspace (UBS)	Yes	Yes	No	No
Vertical Tab (VT)	Yes	No	No	No
ASCII Transparent (ATRN)	Yes	Yes	Yes	Yes

Table 13-5. Supported Control Codes

Printer Control Codes

Table 13-6 (Page 1 of 4). Printer Control Codes

Control Code	Abbreviation	Hexadecimal Code	Function
		Character Set Control	
Set CGCS[1] Through Local ID	SCGL	2BD1nn81xx	Specifies the code page through a local ID.
Set Character Distance	SCD	2BD2nn29xxxx	Selects the pitch and font.
Set Font ID Through GFID[2]	SFG	2BD1nn05xxxxyyyyzz	Selects the font.
Set GCSGID[3] Through GCID[4]	SCG	2BD1nn01xxxxyyyy	Specifies the code page.
		Device Control	
Bell	BEL	2F	Ignored.
Null	NUL	00	Ignored.
Repeat	RPT	0A	Ignored.
Set Exception Action	SEA	2BD2nn85p1–pn	Specifies the explicit action.
Set Initial Conditions	SIC	2BD2nn45xx	Sets the environment of the EBCDIC transform.
Set Print Setup	SPSU	2BD2nn4Cp1–pn	Ignored.
Switch	SW	2A	Ignored.

Legend:
nn: Count
fp: Function parameter
ee, gg, hh, il–ix, mm, nn, p1–pn, ss, t1–tn, uu, vv, ww, xx, yy, zz: Numeric parameter

Table 13-6 (Page 2 of 4). Printer Control Codes

Control Code	Abbreviation	Hexadecimal Code	Function
		Generation Control	
Begin Emphasis	BES	2BD1nn8Axx	Begins emphasis.
Begin Overstrike	BOS	2BD4nn72wwxxyyyyzzzz	Begins overstriking.
Begin Underscore	BUS	2BD4nn0Axxyy	Begins underscoring.
Enable Presentation	ENP	14	Ignored.
End Emphasis	EES	2BD1nn8Exx	Ends emphasis.
End Overstrike	EOS	2BD4nn76	Ends overstriking.
End Underscore	EUS	2BD4nn0E	Ends underscoring.
Inhibit Presentation	INP	24	Ignored.
Justify Text Field	JTF	2BD2nn03xxxxyy	Justifies the following text.
Set Graphic Error Action	SGEA	2BC8nnxxyy	Specifies how to process a received unprintable character font.
Set Justify Mode	SJM	2BD2nn0Dxxyy	Justifies each line of text between the left and right margins.
Subscript	SBS	38	Subscript.
Substitute	SUB	3F	Synonym for the graphic exception character.
Superscript	SPS	09	Superscript.
Word Underscore	WUS	23	Underscore the entire word immediately preceding the control.
		Print Format Control	
Form Feed	FF	0C	Moves the printing position to the next page.
Page Presentation Media	PPM	2BD2nn48ssssuuvv wwxxyyzz	Specifies the forms setting, the source drawer, the quality, and the duplex function.
Required Form Feed	RFF	3A	Moves the printing position to the next page and restores the indent level to the left margin.
Set Horizontal Format	SHF	2BC1nnxxyyzzt1–tn	Specifies the maximum print position, the left and right margins, and the horizontal tab stops in units of 1 character.
Set Horizontal Margins	SHM	2BD2nn11xxxxyyyy	Sets the left and right margins in units of 1/1440 inch.
Set Presentation Page Size	SPPS	2BD2nn40xxxxyyyy	Specifies the presentation surface width and depth.
Set Text Orientation	STO	2BD3nnF6xxxxyyyy	Specifies the page rotation.

Legend:
nn: Count
fp: Function parameter
ee, gg, hh, il–ix, mm, nn, p1–pn, ss, t1–tn, uu, vv, ww, xx, yy, zz: Numeric parameter

Table 13-6 (Page 3 of 4). Printer Control Codes

Control Code	Abbreviation	Hexadecimal Code	Function
Set Vertical Format	SVF	2BC2nnxxyyzzt1–tn	Specifies the maximum print line, the top and bottom margins, and the vertical tab stops in units of 1 character.
Set Vertical Margins	SVM	2BD2nn49xxxxyyyy	Sets the top and bottom margins in units of 1/1440 inch.
Printing Position Control			
Backspace	BS	16	Moves the printing position to the left one font width.
Carriage Return	CR	0D	Moves the printing position to the left margin.
Horizontal Tab	HT	05	Moves the printing position right to the next tab stop.
Indent Tab	IT	39	Moves the printing position right to the next tab stops and sets the indent level one tab stop further to the right.
Index Return	IRT	33	Synonym for “Required New Line.”
Interchange Record Separator	IRS	1E	Synonym for “New Line.”
Line Feed	LF	25	Moves the printing position one line vertically.
New Line	NL	15	Moves the printing position to the left margin of the next line.
Numeric Backspace	NBS	36	Synonym for “Backspace.”
Presentation Position	PP	34fpxx	Moves the printing position.
Release Left Margin	RLM	2BD2nn0B	Ignored.
Required New Line	RNL	06	Moves the printing position to the left margin of the next line and resets any pending indent level.
Set Horizontal Tab Stops	STAB	2BD2nn01xxt1–tn	Specifies the tab stops.
Set Indent Level	SIL	2BD2nn07xx	Sets the indent level to the specific tab stop.
Set Line Density	SLD	2BC6nnxx	Specifies the line pitch in units of 1/72 inch.
Set Line Spacing	SLS	2BD2nn09xx	Specifies the number of lines spaced by a new line control.
Set Single Line Distance	SSLD	2BD2nn15xxxx	Specifies the line pitch in units of 1/1440 inch.
Unit Backspace	UBS	1A	Move the printing position 1/60 inch to the left.

Legend:
nn: Count
fp: Function parameter
ee, gg, hh, il–ix, mm, nn, p1–pn, ss, t1–tn, uu, vv, ww, xx, yy, zz: Numeric parameter

Table 13-6 (Page 4 of 4). Printer Control Codes

Control Code	Abbreviation	Hexadecimal Code	Function
Vertical Tab	VT	0B	Moves the printing position down to the next tab stop.
		Transparent Control	
ASCII Transparent	ATRN	03	Enables the printing of an ASCII data stream.

Note:

1 Coded Graphic Character Set
2 Global Font ID
3 Graphic Character Set Global Identifier
4 Graphic Character set ID

Legend:
nn: Count
fp: Function parameter
ee, gg, hh, il–ix, mm, nn, p1–pn, ss, t1–tn, uu, vv, ww, xx, yy, zz: Numeric parameter

Programming Notes

This section briefly explains how a printer reacts if a partial control code is received, or if an incomplete control code is sent.

If the transmission of a control code is interrupted, the printer waits for the remaining part of the code. If the data stream (the series of data units and control codes) sent after the interruption is consistent with the data stream sent before the interruption, (that is, if one complete printer control code is restored by chaining), the control code is processed as is.

If the two parts of the data stream are inconsistent, an error occurs. A negative response to an "Invalid Printer Parameter" is sent to the host system, or treated as a no-op (no operation: ignored because of a meaningless code).
The main point to note here is that detailed information is not sent to the host system if an error occurs in a control code. After programming, the data stream must be checked thoroughly by repeating the printing test.

Restrictions and Notes for AS/400 Printer Commands and Printer Setup

This section provides supplementary notes and explains restrictions for printing.

Printer Control Codes

<table>
<tr><th>Printer Control Code</th><th>If Use PDT file is Selected:</th><th>If a Windows Printer Driver is Used:</th></tr>
<tr><td>Set the Character Density (SCD)</td><td colspan="2">The GFID is selected for the valid character distance (CD) parameter as follows:

CD Parameter — Character Pitch (Normal) — GFID Value (COR)
000A — 10 CPI — 13 CPI 13
000B — Proportional — 13 CPI 175
000C — 12 CPI — 15 CPI 86
000F — 15 CPI — 20 CPI 230
00FF — 10 CPI — 13 CPI 12</td></tr>
<tr><td></td><td>If the specified font is not supported, a substitution is provided. For example, when 15 CPI font is specified but the font is not supported, the supported 17 CPI font is substituted.</td><td>See "How to Determine Font" on page 13-26.</td></tr>
</table>

<table>
<tr><th>Printer Control Code</th><th>If Use PDT file is Selected:</th><th>If a Windows Printer Driver is Used:</th></tr>
<tr><td>Set Font ID through GFID (SFG)</td><td colspan="2">Recognizable GFIDs are restricted. (See “Field Names of Printer Definition Files” on page 13-11.)
If the specified GFID is not supported and it is out of the range from 154 through 200, the closest font width of the following fonts is substituted:

Font Name — GFID value
Courier Bold 5 — 245
Courier 10 — 11
Prestige Elite 12 — 86
Gothic-text 13 — 204
Gothic-text 15 — 230
Courier 17 — 252
Gothic-text 20 — 281
Gothic-text 27 — 290

If the specified GFID is not supported and it is between 154 and 200, the following font is substituted:

Font Name — GFID value
Document — 175</td></tr>
<tr><td></td><td></td><td>See “How to Determine Font” on page 13-26.</td></tr>
<tr><td>Begin Underscore (BUS)</td><td></td><td>The selected font might not support the underscore.</td></tr>
<tr><td>Begin Emphasis (BES)</td><td></td><td>The selected font might not support the emphasis.</td></tr>
<tr><td>Set Text Orientation (STO)</td><td></td><td>The page orientation can be changed to portrait or landscape. The direction, which is up, down, left, or right on the paper, depends on the Microsoft Windows** printer driver. If the page orientation is changed, the current paper is ejected.</td></tr>
<tr><td>Page Presentation Media (PPM)</td><td colspan="2">The following parameters are supported.

Forms Control (FC)
Source Drawer (SD)
Duplex (DX)

Other parameters are ignored.</td></tr>
</table>

When you use the Windows printer driver, the spooler must be on.

How to Determine Font

This section explains how PC400 determines a font when the Microsoft Windows printer driver is used.

If the specified font is available on your printer, it is selected. However, if it is not available, PC400 selects a font out of the available ones on your printer by checking the font attributes in the following order.

1. Typeface name
2. Character set
3. Fixed pitch font
4. Character width. If the specified font is a scalable one, the character width is not checked. If no available font has the same character width as the specified one, PC400 selects the font with the closest width.
5. Font family
6. Italic font
7. Bold font

PFT Migration Utility

The PFT migration utility converts the printer function table (PFT) for the PC Support/400 workstation feature to a printer definition file (PDF) for PC400.

This section describes the operator interface of the PFT migration utility.

For details of PFT, see *AS/400 PC Support: DOS and OS/2 Technical Reference*, SC21-8091.

How to Use the PFT Migration Utility

The file name of the PFT Migration Utility program is **PCSPFC.EXE**. It is a Windows 95 application, and you can execute it by:

Double-clicking the program name using the Windows 95 Explorer utility.

Specifying the program name (and parameters) in the Windows 95 Run utility as follows:

```
PCSPFC [ [drive:] [path] PFT-file-name[.extension] ]
```

If no parameter is specified, PCSPFC.EXE displays the Convert PFT to PDF dialog box.

If you omit a drive name and a directory name, PCSPFC.EXE uses the current drive and the current directory. If you omit an extension, PCSPFC.EXE adds ".PFT" to the PFT file name.

When you execute the PFT Migration Utility, the Convert PFT to PDF dialog box appears.

On the Convert PFT to PDF dialog box, select a PFT file from the list box or type a specific PFT file name, and select **OK**. The PFT Migration Utility starts the conversion and displays the PFT File Converter dialog box to show the conversion status.

After the conversion, if you select **Save List** on the PFT File Converter dialog box, conversion messages in the dialog box are saved into a list file. The list file is created in the same directory and with the same name as the PFT file, except the extension. The extension of the list file is ".LS2".

If the conversion was completed successfully, you can select **Convert PDF to PDT** from the PFT File Converter dialog box to convert the PDF file to a PDT file. You can also create a PDT file by selecting **Printer Setup** from the File pull-down menu as explained in "Creating and Changing the Printer Definition Table (PDT File)" on page 13-1.

Considerations

When the base PDF file already exists, the converted PDF fields are appended to the end of the base PDF file. The name of the base PDF file is decided as follows:

Table 13-7. PDF File Name	
PFT File Name	**Base PDF File Name**
xxxxxxxx**.PFT**	xxxxxxxx**.PDF**
IBMxxxxx**.MNL**	**MNL**xxxxx**.PDF**
zzzxxxxx**.MNL***	zzzxxxxx**.PDF***
* “zzz” is not “IBM”.	

Even if the same fields are already defined in the PDF file, the appended fields are effective because the last definition is always effective in a PDF file.

If the base PDF file does not exist in the directory, the PFT Migration Utility creates a new PDF file that has only the converted fields from the PFT file.
In this case, you should append this file to an appropriate base file manually, because the fields converted from the PFT file do not cover all of the necessary PDF fields.

Therefore, it is recommended that you prepare both the PFT file and its base PDF file in the same directory before the conversion.

Details of Migration

This section describes how the PFT Migration Utility migrates the printer function table (PFT) to the printer definition file (PDF).

Migration from the Printer Function Table

The following table shows the target fields of the PDF for the data in the PFT.

Table 13-8 (Page 1 of 23). Migration from the Printer Function Table to the Printer Definition File	
PFT Field Name	**PDF Field Name** **Description**
INITIALIZATION AND RESET	
Initialization	
Initialization	START_JOB= When the data is defined in the Initialization field of PFT, the data is appended to the string START_JOB=.
Filename	
Filename	None This field is ignored.
Reset	
Reset	END_JOB= When the data is defined in the Reset field of PFT, the data is appended to the string END_JOB=.
VERTICAL LINE SPACING	
6 lines per inch	

Table 13-8 (Page 2 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
6 lines per inch	SET_6_LINES_PER_INCH=
	When the data is defined in the 6 lines per inch field of PFT, the data is appended to the string SET_6_LINES_PER_INCH=.
8 lines per inch	
8 lines per inch	SET_8_LINES_PER_INCH=
	When the data is defined in the 8 lines per inch field of PFT, the data is appended to the string SET_8_LINES_PER_INCH=.
Variable line spacing	
Control Sequence	SET_VARIABLE_DENSITY=
	When the data is defined in the control sequence field of the PFT for the variable line spacing, the data is appended to the string SET_VARIABLE_DENSITY=. The parameter n in the control sequence is replaced with the PDF parameter type.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	LINE_SPACING_RATIO=
	When the data is defined in the X/Y field of the PFT for the variable line spacing, the value Y/X is appended to the string LINE_SPACING_RATIO= as three-digit or four-digit numbers to indicate the decimal number. For example, when Y/X is 72, the **72** is appended to the string LINE_SPACING_RATIO= and **LINE_SPACING_RATIO= 72** is written to the output file. When the value is greater than 255, the four-digit number is migrated. When the value is less than 255, the three-digit number is migrated.
Indexing Functions	
Begin Superscript	START_SUPERSCRIPT=
	When the data is defined in the Begin Superscript field and End Superscript field of the PFT for the indexing functions, the data is appended to the string START_SUPERSCRIPT=. If the data for the End Superscript is not defined, the data for the Begin Superscript is ignored.
End Superscript	END_SUPERSCRIPT=
	When the data is defined in the End Superscript field and Begin Superscript field of the PFT for the indexing functions, the data is appended to the string END_SUPERSCRIPT=. If the data for the Begin Superscript is not defined, the data for the End Superscript is ignored.

Table 13-8 (Page 3 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
Begin Subscript	START_SUBSCRIPT=
	When the data is defined in the Begin Subscript field and End Subscript field of the PFT for the indexing functions, the data is appended to the string START_SUBSCRIPT=. If the data for the End Subscript is not defined, the data for the Begin Subscript is ignored.
End Subscript	END_SUBSCRIPT=
	When the data is defined in the End Subscript field and Begin Subscript field of the PFT for the indexing functions, the data is appended to the string END_SUBSCRIPT=. If the data for the Begin Subscript is not defined, the data for the End Subscript is ignored.
Reverse 1/2 Index	START_SUPERSCRIPT= END_SUBSCRIPT=
	The data is appended to the START_SUPERSCRIPT= for all of the following conditions: When the data is not defined in the Begin Superscript field in the PFT or when the data is not defined in the End Superscript field in the PFT. When the data is defined in the Reverse 1/2 index and Forward 1/2 index field in the PFT. The data is appended to END_SUBSCRIPT= for all of the following conditions: When the data is not defined in the Begin Subscript field in the PFT or when the data is not defined in the End Subscript field in the PFT. When the data is defined in the Reverse 1/2 index and Forward 1/2 index field in the PFT.
Forward 1/2 Index	END_SUPERSCRIPT= START_SUBSCRIPT=
	The data is appended to END_SUPERSCRIPT= for all of the following conditions: When the data is not defined in Begin Superscript field in the PFT or when the data is not defined in End Superscript field in the PFT. When the data is defined in the Reverse 1/2 index and Forward 1/2 index field in the PFT. The data is appended to START_SUBSCRIPT= for all of the following conditions: When the data is not defined in the Begin Subscript field in the PFT or when the data is not defined in the End Subscript field in the PFT. When the data is defined in the Reverse 1/2 index and Forward 1/2 index field in the PFT.
Reverse Index	None
	This field is ignored.

Table 13-8 (Page 4 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name Description
HORIZONTAL LINE SPACING	
5 pitch	
5 pitch	None
	This field is ignored.
8.55 pitch	
8.55 pitch	None
	This field is ignored.
10 pitch	
10 pitch	SET_10_CHARACTERS_PER_INCH=
	When the data is defined in the 10 pitch field of the PFT for the horizontal character spacing, the data is appended to the string SET_10_CHARACTERS_PER_INCH=.
12 pitch	
12 pitch	SET_12_CHARACTERS_PER_INCH=
	When the data is defined in the 12 pitch field of the PFT for the horizontal character spacing, the data is appended to the string SET_12_CHARACTERS_PER_INCH=.
15 pitch	
15 pitch	SET_15_CHARACTERS_PER_INCH=
	When the data is defined in the 15 pitch field of the PFT for the horizontal character spacing, the data is appended to the string SET_15_CHARACTERS_PER_INCH=.
17.1 pitch	
17.1 pitch	SET_17_CHARACTERS_PER_INCH=
	When the data is defined in the 17.1 pitch field of the PFT for the horizontal character spacing, the data is appended to the string SET_17_CHARACTERS_PER_INCH=.
Horizontal Motion Index	
Control Sequence	Ignored
	This field is ignored.
Maximum	Ignored
	This field is ignored.
Offset	Ignored
	This field is ignored.
X/Y	Ignored
	This field is ignored.

Table 13-8 (Page 5 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name Description
HORIZONTAL RELATIVE MOVEMENT	
Forward Relative Movement	
Control Sequence	FORWARD_HORIZONTAL_SKIP=
	When the data is defined in the Forward Relative Movement field of PFT, the data is appended to the string FORWARD_HORIZONTAL_SKIP=. The parameter n in the control sequence is replaced with the PDF parameter type.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	HORIZONTAL_PEL=
	When the data is defined in the X/Y field of the PFT for the forward relative movement, the value Y/X is appended to the string HORIZONTAL_PEL= as three-digit or four-digit number to indicate the decimal number. For example, when Y/X is 120, **12** is appended to the string HORIZONTAL_PEL= and **HORIZONTAL_PEL=12** is written to the output file. When the value is greater than 255, the four-digit number is migrated. When the value is less than 255, the three-digit number is migrated.
Backward Relative Movement	
Control Sequence	None
	This field is ignored.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	None
	This field is ignored.
HIGHLIGHTING	
Begin Emphasis	
Begin Emphasis	START_HIGHLIGHT_INTENSE=
	When the data is defined in the Begin Emphasis of PFT, the data is appended to the string START_HIGHLIGHT_INTENSE=.
End Emphasis	
End Emphasis	END_HIGHLIGHT_INTENSE=
	When the data is defined in the End Emphasis of PFT, the data is appended to the string END_HIGHLIGHT_INTENSE=.
Begin Underline	

Table 13-8 (Page 6 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
Begin Underline	START_HIGHLIGHT_UNDERLINE=
	When the data is defined in the Begin Underline of PFT, the data is appended to the string START_HIGHLIGHT_UNDERLINE=.
End Underline	
End Underline	END_HIGHLIGHT_UNDERLINE=
	When the data is defined in the End Underline of PFT, the data is appended to the string END_HIGHLIGHT_UNDERLINE=.
Begin Quality Print	
Begin Quality Print	None
	This field is ignored.
End Quality Print	
End Quality Print	None
	This field is ignored.
PAPER HANDLING	
Bottom Tray Feed	
Bottom Tray Feed	SELECT_DRAWER2=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control of the portrait orientation. For this, the PFT Migration Utility divides this control sequence into two parts and migrates the control sequence for the drawer select and paper feed. The control sequence of the portrait orientation is migrated to SET_PORTRAIT_ORIENT=. If no data is defined in any fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility migrates this control sequence to the SELECT_DRAWER2=. (See “Definition of PAPER HANDLING Migration” on page 13-51.)
Top Tray Feed	
Top Tray Feed	SELECT_DRAWER1=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control of the portrait orientation. For this, the PFT Migration Utility divides this control sequence into two parts and migrates the control sequence for the drawer select and paper feed. The control sequence of the portrait orientation is migrated to SET_PORTRAIT_ORIENT=. If no data is defined in any fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility migrates this control sequence to SELECT_DRAWER1=. (See “Definition of PAPER HANDLING Migration” on page 13-51.)

Table 13-8 (Page 7 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name Description
Envelope Feed	
Envelope Feed	SELECT_ENVELOPE=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control of the portrait orientation. For this, the PFT Migration Utility divides this control sequence into two parts and migrates the control sequence for the drawer select and paper feed. The control sequence of the portrait orientation is migrated to SET_PORTRAIT_ORIENT=. If no data is defined in any fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility migrates this control sequence to SELECT_ENVELOPE=. (See "Definition of PAPER HANDLING Migration" on page 13-51.)
Manual Feed	
Manual Feed	SELECT_DRAWER3=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control of the portrait orientation. For this, the PFT Migration Utility divides this control sequence into two parts and migrates the control sequence for the drawer select and paper feed. The control sequence of the portrait orientation is migrated to SET_PORTRAIT_ORIENT=. If no data is defined in any fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility migrates this control sequence to SELECT_DRAWER3=. (See "Definition of PAPER HANDLING Migration" on page 13-51.)
Continuous Feed	
Continuous Feed	None
	This field is ignored.
Ignore Paper End Sensor	
Ignore Paper End Sensor	None
	This field is ignored.
Enable Paper End Sensor	
Enable Paper End Sensor	None
	This field is ignored.
Eject Automatic Cut Sheet	
Eject automatic Cut Sheet	None
	This field is ignored.
Eject Manual Cut Sheet	
Eject Manual Cut Sheet	None
	This field is ignored.
Collate	

Table 13-8 (Page 8 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
Collate	None
	This field is ignored.
PAPER POSITIONING	
Continuous Forms	
Dist. from Top Paper Edge	None
	This field is ignored.
Dist. from Left Paper Edge	None
	This field is ignored.
Location of First Print Column	None
	This field is ignored.
Manual Feed	
Dist. from Top Paper Edge	None
	This field is ignored.
Dist. from Left Paper Edge	None
	This field is ignored.
Location of First Print Column	None
	This field is ignored.
Automatic Feed	
Dist. from Top Paper Edge	None
	This field is ignored.
Dist. from Left Paper Edge	None
	This field is ignored.
Location of First Print Column	None
	This field is ignored.
SET PAGE LENGTH (INCHES)	
Control Sequence	PAGE_LENGTH_TYPE?=INCH SET_PAGE_LENGTH=
	When the data is defined in the control sequence for SET PAGE LENGTH (INCHES) and any data is not defined in the control sequence for SET PAGE LENGTH (LINES), this field is migrated.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	None
	This field is ignored.

Table 13-8 (Page 9 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
Top Margin Size	None
	This field is ignored.
Bottom Margin Size	None
	This field is ignored.
SET PAGE LENGTH (LINES)	
Control Sequence	PAGE_LENGTH_TYPE?=LINE SET_PAGE_LENGTH=
	When the data is defined in the control sequence for SET PAGE LENGTH (LINES), this field is migrated.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	None
	This field is ignored.
Top Margin Size	None
	This field is ignored.
Bottom Margin Size	None
	This field is ignored.
SET LEFT MARGIN (INCHES)	
Control Sequence	None
	This field is ignored.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	None
	This field is ignored.
SET LEFT MARGIN (COLUMNS)	
Control Sequence	SET_HORIZONTAL_MARGIN=
	When the data is defined in the control sequence field for SET LEFT MARGIN (COLUMNS), this field is migrated.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.

Table 13-8 (Page 10 of 23). Migration from the Printer Function Table to the Printer Definition File	
PFT Field Name	**PDF Field Name** **Description**
CARRIER RETURN/LINE FEED	
Continuous Forms	
Carrier Return (Continuous Forms)	CARRIAGE_RETURN= This field is migrated for the following cases: Case 1 – When the data is defined in the Carrier Return field for the Continuous Forms and – Any data is not defined in the Carrier Return field for the Manual Feed and Automatic Feed. Case 2 – When the data is defined in the Carrier Return field for the Continuous Forms and – The same data is defined in the Carrier Return field for the Manual Feed and – Any data is not defined in the Carrier Return field for the Automatic Feed. Case 3 – When the data is defined in the Carrier Return field for the Continuous Forms and – The same data is defined in the Carrier Return field for the Automatic Feed and – Any data is not defined in the Carrier Return field for the Manual Feed. Case 4 – When the data is defined in the Carrier Return field for the Continuous Forms and – The same data is defined in the Carrier Return field for the Automatic Feed and Manual Feed.

Table 13-8 (Page 11 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name Description
Line Feed (Continuous Forms)	LINE_FEED= This field is migrated for the following cases: Case 1 – When the data is defined in the Line Feed field for the Continuous Forms and – Any data is not defined in the Line Feed Line field for the Manual Feed and Automatic Feed. Case 2 – When the data is defined in the Line Feed field for the Continuous Forms and – The same data is defined in the Line Feed field for the Manual Feed and – Any data is not defined in the Line Feed field for the Automatic Feed. Case 3 – When the data is defined in the Line Feed field for the Continuous Forms and – The same data is defined in the Line Feed field for the Automatic Feed and – Any data is not defined in the Line Feed field for the Manual Feed. Case 4 – When the data is defined in the Line Feed field for the Continuous Forms and – The same data is defined in the Line Feed field for the Automatic Feed and Manual Feed.

Table 13-8 (Page 12 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name Description
Manual Feed	
Carrier Return (Manual Feed)	CARRIAGE_RETURN= This field is migrated for the following cases: Case 1 – When the data is defined in the Carrier Return field for the Manual Feed and – Any data is not defined in the Carrier Return field for the Continuous Feed and Automatic Feed. Case 2 – When the data is defined in the Carrier Return field for the Manual Feed and – The same data is defined in the Carrier Return field for the Continuous Forms and – Any data is not defined in the Carrier Return field for the Automatic Feed. Case 3 – When the data is defined in the Carrier Return field for the Manual Feed and – The same data is defined in the Carrier Return field for the Automatic Feed and – Any data is not defined in the Carrier Return field for the Continuous Forms. Case 4 – When the data is defined in the Carrier Return field for the Manual Feed and – The same data is defined in the Carrier Return field for the Automatic Feed and Continuous Forms.

Table 13-8 (Page 13 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
Line Feed (Manual Feed)	LINE_FEED=
	This field is migrated for the following cases: Case 1 – When the data is defined in the Line Feed field for the Manual Feed and – Any data is not defined in the Line Feed Line field for the Continuous Forms and Automatic Feed. Case 2 – When the data is defined in the Line Feed field for the Manual Feed and – The same data is defined in the Line Feed field for the Continuous Forms and – Any data is not defined in the Line Feed field for the Automatic Feed. Case 3 – When the data is defined in the Line Feed field for the Manual Feed and – The same data is defined in the Line Feed field for the Automatic Feed and – Any data is not defined in the Line Feed field for the Continuous Forms. Case 4 – When the data is defined in the Line Feed field for the Manual Feed and – The same data is defined in the Line Feed field for the Automatic Feed and Continuous Forms.

Table 13-8 (Page 14 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name Description
Automatic Feed	
Carrier Return (Automatic Feed)	CARRIAGE_RETURN= This field is migrated for the following cases: Case 1 – When the data is defined in the Carrier Return field for the Automatic Feed and – Any data is not defined in the Carrier Return field for the Continuous Feed and Manual Feed. Case 2 – When the data is defined in the Carrier Return field for the Automatic Feed and – The same data is defined in the Carrier Return field for the Continuous Forms and – Any data is not defined in the Carrier Return field for the Manual Feed. Case 3 – When the data is defined in the Carrier Return field for the Automatic Feed and – The same data is defined in the Carrier Return field for the Manual Feed and – Any data is not defined in the Carrier Return field for the Continuous Forms. Case 4 – When the data is defined in the Carrier Return field for the Automatic Feed and – The same data is defined in the Carrier Return field for the Manual Feed and Continuous Forms.

Table 13-8 (Page 15 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
Line Feed (Automatic Feed)	LINE_FEED=
	This field is migrated for the following cases: Case 1 – When the data is defined in the Line Feed field for the Automatic Feed and – Any data is not defined in the Line Feed Line field for the Continuous Forms and Manual Feed. Case 2 – When the data is defined in the Line Feed field for the Automatic Feed and – The same data is defined in the Line Feed field for the Continuous Forms and – Any data is not defined in the Line Feed field for the Manual Feed. Case 3 – When the data is defined in the Line Feed field for the Automatic Feed and – The same data is defined in the Line Feed field for the Manual Feed and – Any data is not defined in the Line Feed field for the Continuous Forms. Case 4 – When the data is defined in the Line Feed field for the Automatic Feed and – The same data is defined in the Line Feed field for the Manual Feed and Continuous Forms.
MULTIPLE COPIES	
Print without Clearing Page from	
Top Tray	None
	This field is ignored.
Bottom Tray	None
	This field is ignored.
Envelope Tray	None
	This field is ignored.
Manual Tray	None
	This field is ignored.
Clear Page Buffer	None
	This field is ignored.
Multiple Copies Variable Control	
Control Sequence	None
	This field is ignored.

Table 13-8 (Page 16 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
LANDSCAPE PAPER HANDLING	
Bottom Tray Feed	
Bottom Tray Feed	SET_LANDSCAPELEFT_ORIENT=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control sequence for the landscape orientation. For this, the PFT Migration Utility divides the control sequence into two parts. The control sequence for the drawer select and paper feed is ignored because this control sequence is migrated when the data for PAPER HANDLING is processed. The control sequence for landscape orientation is migrated to SET_LANDSCAPE_ORIENT=. (See "Definition of PAPER HANDLING Migration" on page 13-51.)
Top Tray Feed	
Top Tray Feed	SET_LANDSCAPELEFT_ORIENT=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control sequence for the landscape orientation. For this, the PFT Migration Utility divides the control sequence into two parts. The control sequence for the drawer select and paper feed is ignored because this control sequence is migrated when the data for PAPER HANDLING is processed. The control sequence for landscape orientation is migrated to SET_LANDSCAPE_ORIENT=. (See "Definition of PAPER HANDLING Migration" on page 13-51.)
Envelope Feed	
Envelope Feed	SET_LANDSCAPELEFT_ORIENT=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control sequence for the landscape orientation. For this, the PFT Migration Utility divides the control sequence into two parts. The control sequence for the drawer select and paper feed is ignored because this control sequence is migrated when the data for PAPER HANDLING is processed. The control sequence for landscape orientation is migrated to SET_LANDSCAPE_ORIENT=. (See "Definition of PAPER HANDLING Migration" on page 13-51.)
Manual Feed	

Table 13-8 (Page 17 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name Description
Manual Feed	SET_LANDSCAPELEFT_ORIENT= If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control sequence for the landscape orientation. For this, the PFT Migration Utility divides the control sequence into two parts. The control sequence for the drawer select and paper feed is ignored because this control sequence is migrated when the data for PAPER HANDLING is processed. The control sequence for landscape orientation is migrated to SET_LANDSCAPE_ORIENT=. (See "Definition of PAPER HANDLING Migration" on page 13-51.)
TYPESTYLE DEFINITION	
Default TypeStyle Definition	
PC Character Set	None This field is ignored.
Initial Control Sequence	None This field is ignored.
Ending Control Sequence	None This field is ignored.
Individual Typestyle Definition	
Typestyle number	SET_GFID_ This number is appended as a four-digit number after the string SET_GFID_. For example, when the typestyle number **9** is defined, **9** is appended after the string SET_GFID_ and SET_GFID_0009= is migrated. And the numbers supported by PC400 are migrated. The numbers not supported by PC400 are ignored.
PC Character Set	None This field is ignored.
Initial Control Sequence	SET_GFID_xxxx= This control sequence is appended after the string SET_GFID_xxxx=, where xxxx is the four-digit number defined in the typestyle number field.
Ending Control Sequence	None This field is ignored.
Characters	None This field is ignored.
Initial Control Sequence	None This field is ignored.
Ending Control Sequence	None This field is ignored.

Table 13-8 (Page 18 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
Symbols	None
	This field is ignored.
Initial Control Sequence	None
	This field is ignored.
Ending Control Sequence	None
	This field is ignored.
Group Typestyle Definition	
Group Identifier	None
	This field is ignored.
Group Identifier Comment	None
	This field is ignored.
Typestyle number	SET_GFID_
	This number is appended as a four-digit number after the string SET_GFID_. For example, when the typestyle numbers 1, 2, 3, and 4 are defined, **1**, **2**, **3**, and **4** are appended after the string SET_GFID_ and SET_GFID_0001=, SET_GFID_0002=, SET_GFID_0003=, and SET_GFID_0004= are migrated because the PC400 does not have the group typestyle definition. The typestyle numbers that are not supported by the PC400 are not migrated.
PC Character Set	None
	This field is ignored.
Initial Control Sequence	SET_GFID_xxxx=
	This control sequence is appended after the string SET_GFID_xxxx=, where xxxx is the four-digit number defined in the typestyle number field.
Ending Control Sequence	None
	This field is ignored.
Characters	None
	This field is ignored.
Initial Control Sequence	None
	This field is ignored.
Ending Control Sequence	None
	This field is ignored.
Symbols	None
	This field is ignored.
Initial Control Sequence	None
	This field is ignored.

Table 13-8 (Page 19 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
Ending Control Sequence	None
	This field is ignored.
Character Set Number	
Character Set Number	None
	This field is ignored.
SLOT SELECTION	
Slot 1 Sequence	
Slot 1 Sequence	None
	This field is ignored.
Slot 2 Sequence	
Slot 2 Sequence	None
	This field is ignored.
Slot 3 Sequence	
Slot 3 Sequence	None
	This field is ignored.
Stop Sequence	
Stop Sequence	None
	This field is ignored.
USER DEFINED CONTROL	
Parameters of SET ENVELOP SIZE Command	
Control Number: 984	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
ESC Sequence of SET ENVELOP SIZE Command	
Control Number: 985	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
Parameters of SET PAGE SIZE Command	
Control Number: 986	None
	This field is ignored.

Table 13-8 (Page 20 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
ESC Sequence of SET PAGE SIZE Command	
Control Number: 987	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
Printer Data Stream	
Control Number: 988	None
	This field is ignored.
Control Sequence	SET_FONT_GLOBAL=1B 5B 49 word-value(LH) word-value(HL) word-value(HL) byte-value word-value(HL)
	When **4** is defined in this field, SET_FONT_GLOBAL=1B 5B 49 ... word-value(HL) is migrated. When the other value is defined, this field is ignored. **4** means IBM Personal Printer Data Stream Level 2 or higher. When the migration is done for PAPER HANDLING, use this information. (See "Definition of PAPER HANDLING Migration" on page 13-51.)
Control Sequence File Name	None
	This field is ignored.
Duplex long edge	
Control Number: 989	None
	This field is ignored.
Control Sequence	SET_DUPLEX=
	When the data is defined in the control sequence for the duplex long edge, the data is appended to the string SET_DUPLEX=.
Control Sequence File Name	None
	This field is ignored.
Duplex short edge	
Control Number: 990	None
	This field is ignored.
Control Sequence	SET_DUPLEX_TUMBLE=
	When the data is defined in the control sequence for the duplex short edge, the data is appended to the string SET_DUPLEX_TUMBLE=.

Table 13-8 (Page 21 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
Control Sequence File Name	None
	This field is ignored.
Simplex	
Control Number: 991	None
	This field is ignored.
Control Sequence	RESET_DUPLEX=
	When the data is defined in the control sequence for the simplex, the data is appended to the string RESET_DUPLEX=.
Control Sequence File Name	None
	This field is ignored.
Jog the output tray	
Control Number: 992	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
Normal portrait orientation	
Control Number: 993	None
	This field is ignored.
Control Sequence	SET_PORTRAIT_ORIENT=
	When the data is defined in the control field for the normal portrait orientation, the data is appended to the string SET_PORTRAIT_ORIENT=.
Control Sequence File Name	None
	This field is ignored.
Landscape left	
Control Number: 994	None
	This field is ignored.
Control Sequence	SET_LANDSCAPELEFT_ORIENT=
	When the data is defined in the control field for the landscape left, the data is appended to the string SET_LANDSCAPELEFT_ORIENT=.
Control Sequence File Name	None
	This field is ignored.
Portrait upside down orientation	
Control Number: 995	None
	This field is ignored.

Table 13-8 (Page 22 of 23). Migration from the Printer Function Table to the Printer Definition File

PFT Field Name	PDF Field Name
	Description
Control Sequence	SET_PORTRAITUPDWN_ORIENT=
	When the data is defined in the control field for the portrait upside down orientation, the data is appended to the string SET_PORTRAITUPDWN_ORIENT=.
Control Sequence File Name	None
	This field is ignored.
Landscape right	
Control Number: 996	None
	This field is ignored.
Control Sequence	SET_LANDSCAPERGHT_ORIENT=
	When the data is defined in the control field for the landscape right, the data is appended to the string SET_LANDSCAPERGHT_ORIENT=.
Control Sequence File Name	None
	This field is ignored.
COR in 10 pitch	
Control Number: 997	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
COR in 12 pitch	
Control Number: 998	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
COR in 15 pitch	
Control Number: 999	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
FUNCTION SELECTION TEST RESPONSES	

Table 13-8 (Page 23 of 23). Migration from the Printer Function Table to the Printer Definition File	
PFT Field Name	**PDF Field Name**
	Description
Superscript /Subscript	None
	This data is ignored.
Underline	None
	This data is ignored.
Emphasis (Bold)	None
	This data is ignored.
Form Feed	None
	This data is ignored.
Back Space	BACKSPACE=
	This field is migrated when you type YES or NO in response to the prompt during the Backspace Function Selection Test.
Mid-line pitch change	None
	This data is ignored.
Horizontal Character spacing	None
	This data is ignored.
First character position	None
	This data is ignored.
PSM	None
	This data is ignored.
Cursor Draw	None
	This data is ignored.

Note: When you migrate **IBM3812.PFT** and **IBM3812.MNL**, the following fields are added to **IBM3812.PDF**:

```
FORWARD_VERTICAL_STEP_FEED=1B 5B 43  3    E3 word-value(LH)
VERTICAL_PEL=24
```

Definition of PAPER HANDLING Migration

The PFT Migration Utility migrates the data for PAPER HANDLING and LANDSCAPE PAPER HANDLING as follows:

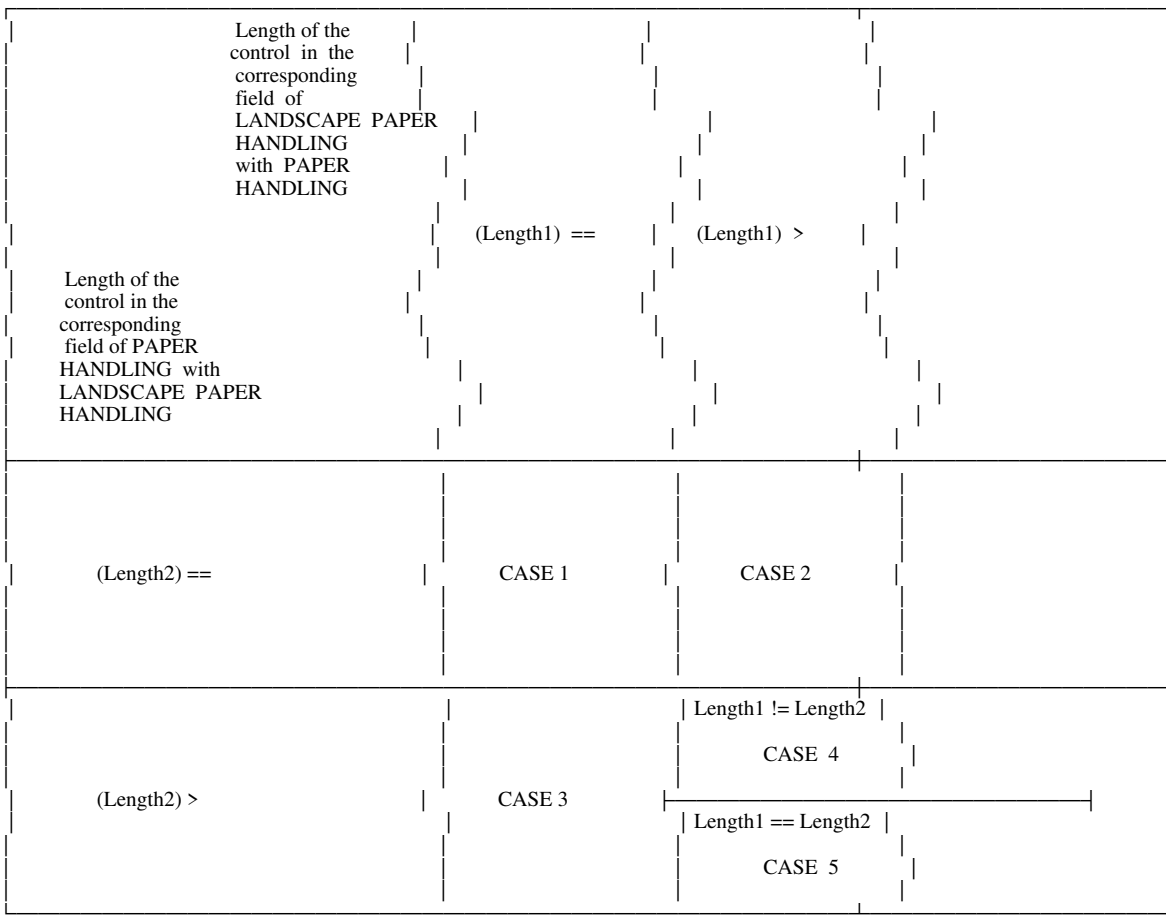
1. The PFT Migration Utility checks whether the LANDSCAPE PAPER HANDLING controls are defined.
2. If the LANDSCAPE PAPER HANDLING controls are defined, the PFT Migration Utility assumes that the PAPER HANDLING control sequences include controls to set the page orientation to portrait. Each LANDSCAPE PAPER HANDLING control sequence has the controls to set the page orientation to landscape in addition to the tray select and feed controls.
3. If the LANDSCAPE PAPER HANDLING controls are not defined, the PAPER HANDLING controls do not have the controls to set the page orientation to portrait. If a personal printer supports normal portrait, landscape left, portrait

upside down, and landscape right orientation, the page orientation controls are defined in the appropriate user-defined controls.

If the LANDSCAPE PAPER HANDLING controls are not defined: When the PAPER HANDLING controls are defined, the controls are migrated as follows:

PFT Fields		PDF Fields
Bottom Tray Select & Feed	——	SELECT_DRAWER2=
Top Tray Select & Feed	——	SELECT_DRAWER1=
Envelope Tray Select & Feed	——	SELECT_ENVELOPE=
Manual Select & Feed	——	SELECT_DRAWER3=

If the LANDSCAPE PAPER HANDLING controls are defined: When the PAPER HANDLING controls are defined, these controls have the controls to set the page orientation to portrait. The LANDSCAPE PAPER HANDLING controls have the controls to set the page orientation to landscape. The PFT Migration Utility migrates the controls as follows:



CASE 1

Since both of the fields are not defined, no data is migrated.

Example:
No data is migrated to SELECT_DRAWER2= under the following conditions. For this, SELECT_DRAWER2= is not written in the output file.

- No data is defined in the bottom tray select and feed for PAPER HANDLING.
- No data is defined in the bottom tray select and feed for LANDSCAPE PAPER HANDLING.

CASE 2

Since no data is defined in the field for PAPER HANDLING, the PFT Migration Utility cannot compare the data in the corresponding field with the data for LANDSCAPE PAPER HANDLING. The data for LANDSCAPE PAPER HANDLING is migrated to the drawer selection field of PDF regardless, including control of the landscape orientation.

Example:
The control of the top tray select and feed for LANDSCAPE PAPER HANDLING is migrated to SELECT_DRAWER1= under the following conditions.

- No data is defined in the top tray select and feed for PAPER HANDLING.
- The control is defined in the top tray select and feed for LANDSCAPE PAPER HANDLING.

CASE 3

Since no data is defined in the field for LANDSCAPE PAPER HANDLING, the PFT Migration Utility cannot compare the data in the corresponding field with the data for PAPER HANDLING. The data for PAPER HANDLING is migrated to the drawer selection field of PDF regardless, including the control of the portrait orientation.

Example:
The control of the manual select and feed for PAPER HANDLING is migrated to SELECT_DRAWER3= under the following conditions.

- The control is defined in the manual select and feed for PAPER HANDLING.
- No data is defined in the top tray select and feed for LANDSCAPE PAPER HANDLING.

CASE 4

Since the length is different, no data is migrated.

Example:
No data is migrated to SELECT_DRAWER2= under the following conditions. For this, SELECT_DRAWER2= is not written in the output file.

- The data is defined in the bottom tray select and feed for PAPER HANDLING and the length is 8.
- The data is defined in the bottom tray select and feed for LANDSCAPE PAPER HANDLING and the length is 10.

CASE 5

The PFT Migration Utility compares the data for PAPER HANDLING with the data for LANDSCAPE PAPER HANDLING as follows:

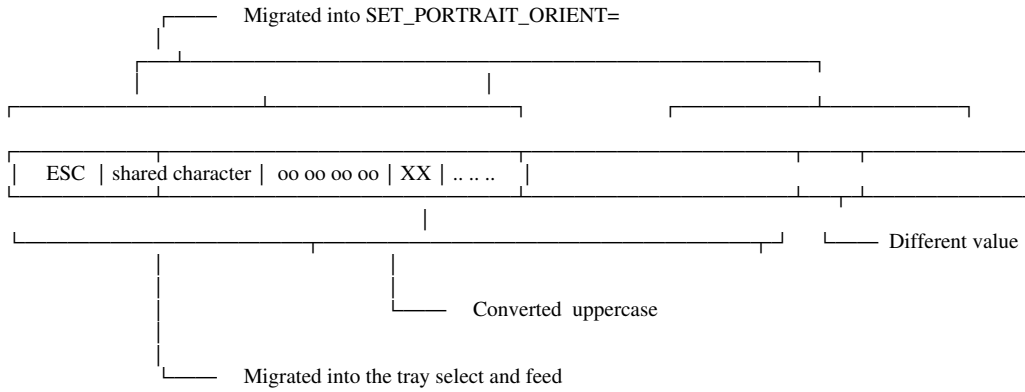
- If a different value is found in the data, search the control backward for the escape character X'1B'.
- If the escape character is found in the middle of the control, divide the control into two parts. The PFT Migration Utility assumes that the first part

is the control for the tray select and feed, and the second part is the control for the page orientation. The PFT Migration Utility migrates the first part of the PAPER HANDLING control into the tray select and feed, the second part of the PAPER HANDLING control into the SET_PORTRAIT_ORIENT=, and the second part of the LANDSCAPE PAPER HANDLING control into SET_LANDSCAPELEFT_ORIENT=.

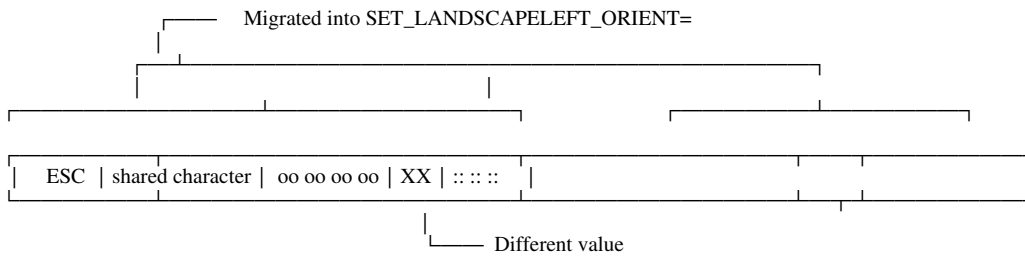
– If the escape character is found at the top of the control and 03 (= HP PCL) is defined in the user-defined control 988, the PFT Migration Utility assumes that the controls are combined. For this, the control begins with the escape character and the two shared characters. For this, the PFT Migration Utility assumes that the last character of the first part is a lowercase letter and converts it to an uppercase letter to indicate that it is a terminating character.

  The PFT Migration Utility divides the controls into the two parts as follows:

  < Control for the PAPER HANDLING >



  < Control for LANDSCAPE PAPER HANDLING >



– If the escape character is found, but the data stream is not HP PCL, the PFT Migration Utility displays the error message to indicate that the PFT Migration Utility cannot migrate the data.

– If the escape character is not found, the PFT Migration Utility displays the error message to indicate that the PFT Migration Utility cannot migrate the data.

– If a different value is not found, the same control is defined for PAPER HANDLING and LANDSCAPE PAPER HANDLING.

The PFT Migration Utility migrates the data in the following order:

1. Top Tray Select and Feed
2. Bottom Tray Select and Feed

3. Manual Select and Feed
4. Envelope Tray Select and Feed

The migration stops for the page orientation, SET_PORTRAIT_ORIENT= and SET_LANDSCAPELEFT_ORIENT=, when the controls for the page orientation are found. For example, the controls for the page orientation are found when the data is migrated for the Bottom Tray Select and Feed. The PFT Migration Utility does not care about the page orientation when migrating the data Manual Select and Feed, and Envelop Tray Select and Feed.

Building PC400 PDTs

Chapter 14. Field Attribute Codes

The following table explains the field attribute codes used in PC400.

Table 14-1. Meanings of Field Attribute Codes

Hex Code	Meaning
20	Green
21	Green, reversed image
22	White
23	White, reversed image
24	Green, underlined
25	Green, underlined, reversed image
26	White, underlined
27	Nondisplay
28	Red
29	Red, reversed image
2A	Red
2B	Red, reversed image
2C	Red, underlined
2D	Red, underlined, reversed image
2E	Red, underlined
2F	Nondisplay
30	Sky blue with column delimiter
31	Sky blue, column delimiter, reversed image
32	Yellow with column delimiter
33	Yellow, column delimiter, reversed image
34	Sky blue, underlined, with column delimiter
35	Sky blue, underlined, reversed image, with column delimiter
36	Yellow, underlined, with column delimiter
37	Nondisplay with column delimiter
38	Purple
39	Purple, reversed image
3A	Blue
3B	Blue, reversed image
3C	Purple, underlined
3D	Purple, underlined, reversed image
3E	Blue, underlined
3F	Nondisplay with column delimiter

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Chapter 15. Data Transfer for PC400

This chapter explains file-description files and data conversions for the data transfer function. References in this chapter to *router sessions* mean an SNA connection to an AS/400 system (with or without a display session).

Data Transfer Function Overview

The PC400 data transfer function transfers data to or from the AS/400 system and a workstation.

PC400 can transfer data between the host and workstation. The data transfer function can be used by selecting the **Data Transfer** icon.

Transferring data, described in this chapter, is quite different from transferring files, which is described in Chapter 16. The main differences are listed below:

Type of Transfer	Products required on an AS/400 system	Access Method	Sending and receiving unit	Type of connection to an AS/400 system
File Transfer	Personal Communications Tools (APVAFILE)	Transfer menu in the session window EHLLAPI application that invokes File Transfer DDE application that invokes File Transfer By playing a macro that invokes File Transfer By clicking the Send or Receive button on the tool bar	Entire file	Display session
Data Transfer	PC Support/400 V2R2 or V2R3 or OS/400 V3R1 or later[1]	Data Transfer icon or Transfer menu	Field, record, or file in a database	
Note 1: OS/400 provides the host transaction program for Data Transfer.				

Transferring Files from an AS/400 System to a Workstation

When using a workstation, you can retrieve and use data from the following file types on an AS/400 system:

Physical database
Logical database
Distributed data management (DDM)

When retrieving files, you can:

Control which records (and which fields within a record) are retrieved.
Control the ordering of records and the ordering of fields within the record.
Select a subset of the records.
Group records into summary records.
Join two or more files.

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Specify formats and separators of date and time fields.
Specify the decimal separator character.

The following output destinations can be specified:

Display
Disk
Printer

Transferring Files from a Workstation to an AS/400 System

The PC-to-AS/400 transfer function enables the transfer of data from a workstation to an AS/400 physical file. Data can be transferred to any of the following destinations:

Existing members in an existing AS/400 physical file
New members in an existing AS/400 physical file
New members in a new AS/400 physical file

Note: Data cannot be transferred from a workstation file to an AS/400 logical file.

Note the following considerations when transferring data.

Transferring Data to Existing Members in an Existing File

Note the following considerations when transferring data from a workstation to an existing AS/400 member.

When data is transferred to an existing member, data in that member is replaced with that transferred from a workstation.

When AS/400 members already contain data, a message appears, indicating that the data in the existing members will be replaced with the data that is about to be transferred.

Consider the effect of returning data that was previously transferred from the AS/400 system (such as when an AS/400 master file is updated on a workstation).

For example, you can transfer only the field subset of an AS/400 file by issuing a transfer request from the AS/400 system to a workstation. In this case, when returning data from the workstation to the AS/400 system, only the subset included in that AS/400 file can be transferred. Other fields that had been defined in the AS/400 file but not transferred are filled with blanks if they are character fields or, if they are numeric fields, with zeros or the values specified at file creation.

Therefore, the data must be transferred to another AS/400 file and the transferred data must be embedded in the AS/400 file by running the AS/400 application program. Follow this procedure to control the update processing for an AS/400 master file.

To prevent users from transferring data to a certain AS/400 file, check that the authority level for that file is defined correctly.

Transferring Data to New Members in an Existing File

You can transfer the data in a workstation file to new members in an existing AS/400 file. The transfer function automatically creates these members in the specified file in the specified library. New members are created according to the file description in the existing file.

Be particularly careful when only the field subset of the AS/400 file can be transferred from the AS/400 system to a workstation by the previous transfer request. When data is returned to the AS/400 system, new members can receive only the subset defined in that AS/400 file. Other character fields that are defined, but not transferred are filled with blanks. Numeric fields are filled with zeros or the valued specified at file creation. The date, time, and time-stamp fields use AS/400 default values.

Transferring Data to New Members in a New File

By using a transfer request from a workstation to the AS/400 system, you can transfer data to new members in a new AS/400 file. This is one of the safest transfer methods, because data already stored in the AS/400 file is not replaced with that transferred from the workstation.

There are two ways of transferring data to new members in a new AS/400 file. The method used depends on the data to be transferred.

For data that is broken up into fields, correct conversion is achieved by transferring it in units of fields. Specify use of the workstation file-description file at file transfer. In addition, specify data as the type of the AS/400 file.

When an AS/400 file and its members are created, the transfer function must access the description of the format of each field to be transferred in the AS/400 file. You can get this description, called a field-reference file, from the AS/400 file. To create an AS/400 file and its members, specify the name of this AS/400 field reference file, as well as the parameters for the other files and members. Note that only the fields to be transferred are defined in a new file.

For data consisting only of text or source statement records, it is not necessary to break up the records into fields. In addition, the workstation file-description file is not required to transfer data. In other words, an AS/400 physical source file is created.

Transferring Data to an AS/400 Data File and Source File

You can transfer data to the following two types of AS/400 physical files.

Physical data file The members of a physical data file can contain numeric and character data of any AS/400 data type. To transfer data to a physical data file, use the workstation file-description file to define how data is stored in a workstation data file. Besides this definition, the file description of the AS/400 file is required to ensure correct conversion of the data.

When data is transferred to an existing AS/400 file, the file description becomes part of the AS/400 file. When data is transferred to a new AS/400 file, the file description is included in the AS/400 field-reference file.

Physical source file Normally, a physical source file stores no data. It contains only text or source statements, as follows:

- The first part (field) of a source file always contains numbers indicating the order.

- The second part (field) of a source file always contains the date on which the file was created.
- The third part (field) of a source file contains the text of the file. This part can contain data fields of character type or zoned type only. Physical source files provide the optimum means of transferring text or source statements with a workstation.

Note the following considerations when transferring data to and from an AS/400 physical source file:

- To transfer text from the AS/400 system to a workstation, specify the name of the source file and members in **FROM**. Specify an asterisk (*) in **SELECT**. This informs the AS/400 system that only text is transferred from the source file, with the order number and date fields excluded.
- The AS/400 text must be stored in the workstation code text file. Normally, a workstation text editing program can be used to manipulate this workstation code text file.
- Specify that the file-description file is not to be stored for that workstation file. Because text is assumed to be a record consisting only of character data, it is not necessary to define fields.
- To return text from a workstation file to an AS/400 file, specify the type of the workstation file containing the text. This is almost always workstation code text. Specification of the file-description file is not required.
- To create a new AS/400 file and its members, specify a valid record length. This record length must be equal to the maximum record length of the workstation file, plus 12 bytes. This is because the transfer function automatically creates the order number and date fields when the file is transferred to the AS/400 members. The order number and date fields together occupy 12 bytes.

Preparing for Data Transfer

The following topics describe the software products required to transfer data and the points you must understand before transferring data with PC400.

Required Software Products

To use Data Transfer, IBM PC Support/400 (5738-PC1) must be installed on the AS/400 system. IBM PC Support/400 is not required with OS/400 Version 3 or later.

Before using the data transfer function, run the router of PC400 or PC Support/400.

Transfer Function

You can transfer only source programs, records, and the following information:

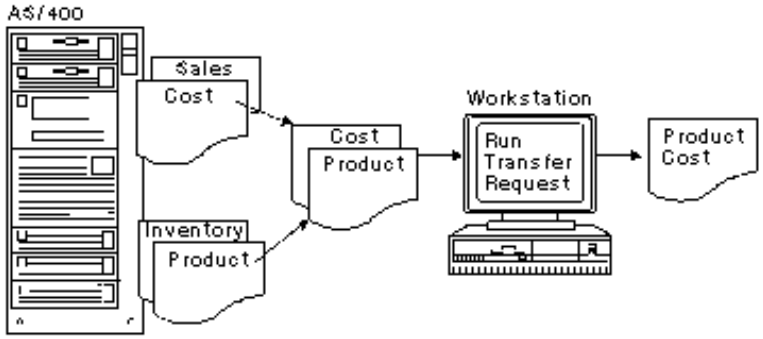
Information organized for analysis
Information used for decision making
Information suited for computer processing

When using a spreadsheet, for example, you might want to use inventory data to create a cost analysis report. If there is no way to copy the data into the workstation, you must print the data from the AS/400 system and manually type it

into a workstation file. With the transfer function, however, you can access the inventory database directly, select only the data needed for the report, process the data as required, then complete the report using that data.

Data can also be sent from the workstation to the host system for processing by AS/400 application. When a remote user is authorized to access the AS/400 system directly, he or she can access the created cost analysis report to compare with their results.

The following example outlines the joining of two files, transferring the information to the workstation, and creating a report.



To transfer data by using PC400, you must create a transfer request. A transfer request provides the necessary information about the data you want to transfer.

Before creating a transfer request, you must have the answers to the following questions:

Where is the data located?
How much of the data do you want to transfer?
How should the data be sorted?
Where do you want data to be transferred?

When transferring data from the AS/400 system to a workstation, PC400 allows you to specify which data is to be transferred and whether the data is to be displayed or written to a workstation file.

In addition, a transfer request can be saved to a workstation file, allowing you to easily perform the same transfer at a later date. After a transfer request is saved, you can call the request to make changes or to run it again.

Data Transfer Program

PC400 data transfer is classified into two types, depending on the direction of the transfer:

Transferring data from the workstation to the AS/400 system is called data sending.

Transferring data from the AS/400 system to the workstation is called data receiving.

Data transfer can also be classified according to how the program is started, as follows:

Data is transferred by interactively entering information such as *what data is transferred from which file to which file* on the screen. In this case, the interactive screen for sending is called the PC→AS/400 Transfer window, and that for receiving is called the AS/400→PC Transfer window.

Data is transferred according to the information that has already been registered. The interactive screen is not necessary. This is called the *automatic transfer* of data.

In both cases, data transfer is performed by **PCSFT5.EXE** on the workstation and by the *PC Support/400* transfer program on the AS/400 system.

The **Data Transfer** icon is registered in the PC400 folder by installing PC400. Double-clicking on this icon displays the AS/400→PC Transfer window (for receiving). This icon includes:

\Personal Communications\PCSFT5.EXE

The PC→AS/400 Transfer window (for sending) appears when the registered contents are changed as follows:

\Personal Communications\PCSFT5.EXE

The AS/400→PC Transfer and PC→AS/400 Transfer windows have a **Switch to SEND** button and **Switch to RECEIVE** button, respectively. By clicking either of these buttons, the window for sending can be switched to the window for receiving, and vice versa.

To perform *automatic transfer*, transfer information must be created, using the interactive screen window, and then saved. Data transfer can then be performed automatically by specifying the file name in which the data was saved.

For example, if transfer information is saved to file **TENSOU.TTO**, contained in directory **C:\Personal Communications\PRIVATE**, run *automatic transfer* as follows:

"C:\Personal Communications\PCSFT5.EXE" "C:\Personal Communications\PRIVATE\TENSOU.TTO"

When you save the transfer information, register it as an icon in the PC400 folder. You can then transfer data automatically simply by double-clicking on this icon.

Data Concepts of the AS/400 System and Your Workstation

The basic components of data management are files, records, and fields. A *file* is an aggregate of records, referenced by a single name. Each record in a file contains one or more items of correlated information. Each item of information is called a *field*.

The AS/400 system and your workstation use different functions to store and group data, and to set the format.

Workstation Files

To transfer data from a workstation to the AS/400 system, the transfer function uses a special-format workstation file, called a *file-description file*. Using this file, data is stored in a valid format and converted into a valid type.

A file-description file identifies the format of a workstation data file and contains a description of the fields in the data file. The file-description file also contains a name list of all the fields in the data file. This list reflects the order, as well as the names, in which each field appears within the data file. In addition, this list includes a description of the data type, length, and decimal position of each field. Using this information, the transfer function can recognize not only how data has been modified but also where a certain field exists in a file record.

When data is transferred from the AS/400 system to a workstation, you can use the transfer function to automatically create the file-description file. In this case, the information in the file-description file depends on the file description in the AS/400 file.

You must create a file-description file with the same name as the workstation data file to transfer a workstation data file to the AS/400 system.

Distributed Data Management (DDM) Files

Distributed data management (DDM) is one of the functions supported by the AS/400 system. This function is used to access database files that are stored on remote AS/400 systems. To use the transfer function to access these database files, specify a DDM file name as the name of the AS/400 file to be transferred. Refer to the *DDM Guide* for details of how to use DDM files.

AS/400 Files

The following list provides a simple explanation of the requirements for transferring data between the AS/400 system and a workstation.

Library The AS/400 library contains related objects that are used to generate significant groups. For example, the objects might be all the programs and files related to credit sales management. Using the library, you can group objects and find a desired file by name. The transfer function uses the library to locate an AS/400 file.

File AS/400 files that you can manipulate consist of a file description and data stored in the file. PC400 processes an AS/400 file, called a database file. The database file can be either a physical file or a logical file.

A *physical file* is a database file that contains data stored in records. It includes a description of the record format in addition to the data itself.

A *logical file* is a database file, which you can use to access data stored in one or more physical files. Logical files, like physical files, contain a file description. However, logical files do not contain any actual data. Instead, you can access fields in one or more physical files by using the record format included in the logical file description. When a logical file is transferred from the AS/400 system to a workstation, data is obtained from one or more physical files. You need only specify a logical file as the file to be transferred. The AS/400 system recognizes which physical file contains the actual data to be transferred.

Note: Data cannot be transferred from a workstation to logical files.

Member Data records in a database file are grouped into several members. At least one member must be included in one file.

When data is transferred to and from the AS/400 system, actual data transfer is done between file members. For example, a certain workstation file can be transferred to the AS/400 system. In this case, the file members become new members of a new or existing AS/400 file, or substitute for existing members in an existing AS/400 file.

Record format
A record format describes the fields contained in a file record and the order in which these fields appear in the record. Record formats are stored in the file description. Both physical and logical database files can have one or more record formats.

Creating a Workstation-to-AS/400 Transfer Request

To create a request for data transfer from a workstation to the AS/400 system, do as follows.

1. Using the router session, establish attachment to the AS/400 system to which data is to be transferred.
2. Select the **Data Transfer** icon.
3. When the AS/400→PC Transfer window has been displayed, select **Switch to SEND**. The display is switched to the PC→AS/400 Transfer window.

   To choose additional settings, select **Advanced**.
4. Specify each item. Refer to “Items to Be Specified” for details.

Items to Be Specified

The following section explains the items specified in the PC→AS/400 Transfer window. Those items that are specified by selecting **Advanced**, are indicated by the addition of “(Advanced)” at the end of the corresponding item name.

FROM

PC file name

This item is always required. It specifies the name of the workstation file containing the data to be transferred to the AS/400 system. Specify this item using the following format. (Items inside brackets [ ] can be omitted.)

[*d*:][*path-name*]*file-name*[.*ext*]

A list of workstation files can be displayed by selecting **Browse**. You can limit the number of names listed. To limit the listing, specify a combination consisting of part of a file name and a global file name character (* or ?) in the input area of the workstation file list. For example:

When you select **OK** with /**A:** specified, the displayed listing contains the names of all files in the current directory of the diskette inserted into drive A.

When you select **OK** with **A:\SUPPLY** specified, the displayed listing contains the names of all files under the **SUPPLY** path of the diskette inserted into drive A.

When you select **OK** after specifying **B:*.XLS**, the displayed listing contains the names of all files having extension **XLS** in the current directory of the diskette inserted into drive B.

TO

System name

This item is always required. When the router program is active, this item specifies the default system name.

Library/File (Member)

This item is always required. It specifies the name of the AS/400 physical file that will receive the data to be transferred from the workstation. Either an existing file name or new file name can be specified.

Specify this item using the following format. (Items inside brackets [ ] can be omitted.)

[*library-name/*]*file-name*[(*member-name*[,*record-format-name*])]

library-name

This is the name of the AS/400 library containing the AS/400 file to which data is to be transferred. If no library is specified, ***LIBL** is used. To create a new file to receive transferred data, specify the library name.

When the input field is null and **Browse** is selected, the AS/400 system displays a list of all libraries defined in ***USRLIBL** of the AS/400 job library list. This list can be modified by changing the job description. Run a change job description (**CHGJOBD**) command on the AS/400 system.

file-name

This is the name of an AS/400 physical database file. When data is transferred to an existing file, the data in that file is replaced with the transferred data. To create a new file to receive transferred data, specify a new file name of 1 to 10 characters.

To list the available files, do one of the following things:

To list all files within all libraries defined in ***USRLIBL** of the AS/400 job library list, specify ***USRLIBL** followed by a slash (/), then select **Browse**. If a slash (/) is not specified after the library name, the AS/400 system displays a list of library names rather than the file names.

To list the names of the files in a certain library, specify the library name followed by a slash (/), then select **Browse**. You can also specify a part of a file name followed by an asterisk (*), then select **Browse**. The AS/400 system lists all the files whose names begin with the specified character string.

member-name

This is the name of a member in the specified AS/400 file to which data is to be transferred. If this member name is not specified, data is transferred to the first member, ***FIRST**, in the AS/400 file. When the specified member already exists, the data in that member is replaced with the transferred data.

To transfer data to an existing file, specify the member name. The data within that file member is replaced with the transferred data.

To create a new member in an existing file or in a new file, specify a new member name of 1 to 10 characters.

By selecting **Browse** with a file name specified, the names of the members in that file are listed. When a left parenthesis, part of a member name, an asterisk (*), and a right parenthesis are specified, in this order, and then **Browse** is selected, the AS/400 system can list all member names beginning with the specified character string.

record-format-name

This is the name of the record format in the specified AS/400 file. The record format name need not be specified except when a physical file contains more than one record format. Most physical files have only one record format. Before specifying a record format name, a member name or ***FIRST** must be specified as the member name.

When you transfer data to an existing file without specifying a record format name, it is assumed that the file has only one record format (***ONLY**). Therefore, that record format is used.

When a new file is created with no record format name, **QDFTFMT** is used as the record format name.

Note: A library name, file name, member name, and record format name can be specified using up to 10 characters each. Each name must begin with one of characters A to Z, ¥, #, and @. For characters subsequent to the first, 0 to 9, underscores, and periods can also be used.

Use of File Description File (Advanced)

This item is always required. It specifies whether a file-description file is used to transfer data to the AS/400 system. The file-description file is required to transfer a workstation file, containing the data to be transferred (and converted), in fields. Such a workstation file can have either several fields or numeric data fields. To transfer a workstation file containing text (character data) only, the file-description file is not required. For details on creating a file-description file, see "File-Description Files" on page 15-44.

Follow either of the two procedures below.

Do not specify this item in the following case: a workstation file having only one field (for example, PC code character) is specified in **FROM**, while the AS/400 file is a physical source file having the following record format.

Field	Type	Length	" " Decimal Places
Order number	Zoned	6	2
Date	Zoned	6	
Data	Character or Open	1 to 4 96	

Note: When fields contain character data or zoned data only, the data portion can be broken down into several fields. The destination AS/400 file contains the fields for order number and date. The workstation file, however, does not. This method is recommended when transferring text only between the AS/400 system and the workstation.

Specify this item in all cases other than that described above. Two examples are:

– Data is transferred from a workstation file having more than one field.

– The AS/400 file that receives the data is other than a physical source file having the record format described above.

File Description File Name (Advanced)

This item appears only when item **Use of File Description File** is specified.

This item is always required. It specifies the name of the workstation file-description file that describes the data to be transferred.

Upon transferring data from the AS/400 system to a workstation, a file-description file might have been created.

A file-description file must be created when the data has not yet been transferred from the AS/400 system to a workstation or when no file-description file exists.

PC File Type (Advanced)

This item appears only when **Use of File Description File** is not specified.

This item is always required. You must specify the type of the workstation file specified in the **FROM** field. The values provided by the AS/400 system are recognized as workstation code text. If the file type of a data file is not converted, the file can include nothing other than data that does not require conversion.

AS/400 Object (Advanced)

This item is always required. It specifies whether the AS/400 member to which data is transferred is a new member or an existing member. When data is transferred to a new member, this item also specifies whether the file to contain the new member is an existing file.

Create New Member

This item specifies that a new member, to which data is transferred, is created in an existing AS/400 file.

Notes:

1. To create a new member, you must have the following authorities:

   ***OBJOPR**, ***OBJMGT**, and ***ADD** for the file that will include the new member

   ***READ** and ***ADD** for a library that will contain the file

   See *Security Descriptions* (SC41-8083) for details of object authorities.

2. To create a member to add to a file, the transfer function uses the AS/400 default value for the add physical file member (**ADDPFM**) command.

When you specify this item, the following item must also be specified:

Member Text

This item is optional. It is used to add an explanation of a new AS/400 member. This explanation helps remind you of the contents of the member. This explanation appears, for example, when a list of all members in a file is requested (**Browse** is selected). If this item is left blank, no explanation is added to the new AS/400 member.

To specify an apostrophe (') in the explanation, enter two apostrophes (' ').

Create New Member in New File

This item specifies that a new member, to which data is to be transferred, is created in a new AS/400 file.

Notes:

1. To create a new member in a new file, ***READ** and ***ADD** authorities are required for the library that will contain that file. Authority to use the create physical file (**CRTPF**) command of the AS/400 system is also required.
2. To create a new member in a new file, the transfer function uses the default value for the create physical file (**CRTPF**) command of the AS/400 system. It does not, however, use the following values:

   (**MAXMBRS**[***NOMAX**]). This indicates that the file can contain up to 32,767 members.

   (**SIZE**[***NOMAX**]). This indicates that each member of the file can contain an unlimited number of records.

When this item is specified, also specify the following item:

Member Text

This item is optional. It is used to add an explanation of a new AS/400 member. This explanation helps remind you of the contents of the member. This explanation appears, for example, when a list of all the members in a file is requested (**Browse** is selected). If this item is left blank, no explanation is added to the new AS/400 member.

To specify an apostrophe (') in the explanation, enter two apostrophes (' ').

AS/400 File Type

This item is always required. It specifies the type of an AS/400 file and the members to be created (same type for both).

Specify one of the following things:

To create an AS/400 physical source file and its members, specify **Source**. These members are created with two fields (order number and date) added to the beginning of the data transferred from the workstation file. A new AS/400 source file and its members have the following record format:

Field	Type	Length	Decimal Places
Order number	Zoned	6	2
Date	Zoned	6	
Data	Character or Open	1 to 32755	

Note that in an AS/400 physical source file, each record can be up to 32,755 bytes in length. But, the maximum size of a source file created using the workstation-to-AS/400 transfer function is 4,107 bytes. Also, this file must include the order and date fields. Therefore, the maximum amount of data that can be transferred is 4,096 bytes per record.

The data portions of members inherit the workstation file characteristics. In other words, when a workstation file is a workstation code text file consisting of many records containing text, the created data fields will be the same.

To create an AS/400 physical data file and its members, specify **Data**. The file and members will contain only the data fields described in the file-description file.

The value of the **AS/400 File Type** is assumed to be **Data** when a file-description file is used to transfer data. If a file-description file is not used for data transfer, the value of this item is assumed to be **Source**.

Field Reference File Name

This item appears only when **Use of File Description File** is specified for the creation of a new file.

When **Use of File Description File** is not specified, an AS/400 physical source file is created. **AS/400 File Type** and **Field Reference File Name** are not displayed. Instead, **Record Length** appears.

This item is always required. A new AS/400 file is created using the field name in a file-description file and the field definitions in an AS/400 field-reference file.

The format of a field-reference file name is as follows. (Items inside brackets [ ] can be omitted.)

[*library-name/*]*file-name*

library-name: This is the name of an AS/400 library containing a field-reference file. If this library name is not specified, ***LIBL** is assumed. If you cannot find the desired library, selecting **Browse** displays a list of all libraries in ***USRLIBL** of the AS/400 job library list. ***USRLIBL** of the library list can be changed by modifying the job description by executing a **CHGJOBD** command on the AS/400 processor.

file-name: This is the name of the AS/400 physical database file containing the field definitions. Always specify this file name. When a library name is specified concurrently, use a slash (/) to delimit the library name and file name. If the desired file cannot be found, enter the library name and a slash, then select **Browse**. The system displays a list of files in that library. To list all the files in the libraries defined in ***USRLIBL** of the AS/400 job library list, enter ***USRLIBL**/ then select **Browse**.

If you enter part of a file name followed by an asterisk (*) and then select **Browse**, the system displays a list of available file names, each beginning with the specified part of the name.

For example, enter **ARLIB**/**AR*** in the **Field Reference File Name** item, then select **Browse**. The system displays a list of all physical file names beginning with AR in library ARLIB.

Note: You must have ***OBJOPR** authority for the field-reference file to be specified. To list certain files, you must also have ***OBJOPR** authority for those files.

Record Length

This item is always required. It specifies the record length of an AS/400 physical source file. When the data receiver is an AS/400 physical source file, the specified value must include the length of the order number and date fields that are added to a workstation file at transfer (the total length of these two fields is 12 bytes).

Authority

This item is always required. It specifies the authority level of a new AS/400 file.

Specify one of the following things:

Read/Write. This enables other users to read from and write to the AS/400 file and allows the file name to be displayed in lists. However, users cannot delete the file (***OBJOPR**, ***READ**, ***ADD**, ***OBJMGT**, ***UPD**, and ***DLT** authorities). If other users might be transferring data from a workstation file to the AS/400 file, specify **Read/Write** or **All**.

Read. This enables other users to read from the AS/400 file, and allows the file name to be displayed in lists. However, other users can neither write to the file nor delete it (***USE** authority).

All. This enables other users to read from and write to the AS/400 file as well as delete it. The file name is displayed in lists (***ALL** authority).

None. This prevents other users (except for the system administrator) from writing to or deleting the AS/400 file. The file name does not appear in lists (***EXCLUDE** authority).

File Text

This item is optional. It is used to add an explanation of a new AS/400 file. This explanation helps remind the user of the contents of the file. This explanation appears, for example, when a list of all files in a library is requested (**Browse** is selected). If this item is left blank, no explanation is added to the new AS/400 file.

To specify an apostrophe (') in the explanation, enter two apostrophes (' ').

Replace Existing Member

This item transfers data to an existing AS/400 member, specified in the **Library/File (Member)** item. The existing data in that AS/400 member is replaced with the transferred data.

Saving, Opening, Changing, and Executing a Transfer Request

The following section explains how to save, open, change, and execute, as a file, information (transfer request) on data to be transferred.

Saving a Transfer Request

Save a transfer request when the request is likely to be executed repeatedly. This eliminates the need to create a transfer request every time data is to be transferred. To save a transfer request, do as follows:

1. Specify the information needed for transfer, using the PC→AS/400 Transfer window.
2. After specifying the necessary information, select **Save** or **Save As** from the File pull-down menu of the menu bar.

   The Save Transfer Request File as window appears.
3. Specify each item, referring to the following explanation, then select **OK**.

   File Name Disk to which data is to be saved. Specify a file name or diskette file name. The default extension is **TFR**. Extension **TFR** identifies a file as a transfer request file.

   Description This item can be used to add an additional explanation of a transfer request, as required. The explanation can be up to 40 characters in length. This explanation is saved with the transfer request, and displayed in the list of transfer request names. It is, therefore, useful for identifying a transfer request.
4. The system asks whether the saved transfer request is to be registered in the PC400 folder.

   When **OK** is selected, the transfer request is registered as an icon. Subsequently selecting this icon transfers data according to the contents of the registered data transfer request.

Opening and Changing a Saved Transfer Request

To open and change a saved transfer request, do as follows:

1. Display the PC→AS/400 Transfer window.
2. Select **Open** from the File pull-down menu of the menu bar.
3. Specify the name of the file to be opened using the Open Transfer Request File window, then select **OK**.

   The PC→AS/400 Transfer window reappears, and the transfer request information, saved to the specified file, appears for each item. This opens the saved transfer request.
4. Change the contents of the transfer request as necessary.
5. To save the changed contents, follow the procedure explained in “Saving a Transfer Request.”

Performing a Transfer Request

A transfer request can be performed in any of the following ways:

By selecting the icon with which the transfer request has been registered
By using the PC→AS/400 Transfer window of the Data Transfer icon

Selecting the Icon with Which the Transfer Request Has Been Registered:

This method can be used only when a transfer request has been saved as an icon by using the PC→AS/400 Transfer window.

Selecting the corresponding icon starts data transfer.

Using the PC→AS/400 Transfer Window:

1. Before executing a transfer request, operations such as creating, opening, and changing a transfer request must be completed.

   Note: When data is transferred from a workstation to an existing member in an AS/400 file, the transferred data replaces the existing data in that member.

2. Select **Send** from the PC→AS/400 Transfer window.

   Data transfer starts.

3. After the transfer has been completed, select the **Cancel** push button or **Exit** from the menu bar File pull-down menu.

Conversion Errors That Can Occur during Transfer

Upon executing a transfer request, a file-description file (when specified) is read from the disk or diskette to be processed. The AS/400 system and workstation exchange information, if the data is transferable.

The workstation transfers records, one at a time, from the file specified in **FROM**. Transferred records are converted and stored in the AS/400 member specified in **TO**.

During this conversion process, conversion errors might occur. For example, the values in a workstation file might have to be rounded to fit the AS/400 fields. Another example is the case where the record length of a workstation file differs from that expected by the AS/400 system.

If such an error occurs, an error message is issued with the number of the workstation file record for which the error occurred and, sometimes, information about certain fields in that record.

If a severe error occurs, data transfer might stop. In such a case, stop the transfer request, correct the error, then rerun the transfer request.

When the error is not so severe, you can request that the system continue transferring data. By doing so, even if the same error occurs in another record, an error message does not appear and the transfer function automatically continues executing the transfer request.

Creating an AS/400-to-Workstation Transfer Request

To create a transfer request to receive data from the host, do as follows:

1. Select the **Data Transfer** icon.
2. When the PC→AS/400 Transfer window is displayed, select **Switch to RECEIVE** to switch the display to the AS/400→PC Transfer window.

   For the additional settings, select the **Advanced** button.

3. Which items are to be specified by the user vary with the data type, as follows:

   Entire AS/400 file
   Part of an AS/400 file
   Data combined from several AS/400 files

Summary of record groups

Before specifying each item, while referring to “Items to Be Specified” on page 15-18, note the following points regarding the data to be received.

Receiving an Entire AS/400 File

This is the simplest way of transferring data from the AS/400 system to a workstation. All records in a file and all the data in each record are transferred.

The **FROM** items that must be specified as follows:

System name:
This item specifies the name of the system.

Library/File (Member):
This item specifies the name of the AS/400 file.

SELECT: Specifying an asterisk (*) for this item indicates that all fields are to be transferred, or lists all the fields in the AS/400 file.

ORDER BY:
This item is optional. It specifies how records will be grouped. When this item is left blank, records are not grouped (data is transferred in the same order it appears in the AS/400 file).

Receiving Part of an AS/400 File

Only part of an AS/400 file is transferred to the workstation.

The **FROM** items that must be specified as follows:

System name:
This item specifies the name of the system.

Library/File (Member):
This item specifies the name of the AS/400 file.

SELECT: This item specifies a field to be transferred.

WHERE: This item specifies the requirements that must be satisfied before records can be selected for transfer.

ORDER BY:
This item is optional. It specifies how records will be grouped. When this item is left blank, records are not grouped (data is transferred in the same order it appears in the AS/400 file).

Receiving Data Combined from Several AS/400 Files

The data to be transferred can be stored in two or more AS/400 files. These files are assumed to be related. Based on this relationship, they can be linked or *joined*, as if all the data existed in a single file. The files can be transferred to the workstation after they have been joined. By using the AS/400-to-PC transfer function, this “join and transfer” function can be performed in a single step.

The **FROM** items that must be specified as follows:

System name:
This item specifies the name of the system.

Library/File (Member):
This item specifies the names of all AS/400 files from which data is to be transferred.

JOIN BY: This item specifies how to join or combine the data in each file.

SELECT: This item specifies a field to be transferred.

WHERE: This item specifies the requirements that must be satisfied before records can be selected for transfer.

ORDER BY:
This item is optional. It specifies how records will be grouped. When this item is left blank, records are not grouped (data is transferred in the same order as it appears in the AS/400 file).

Receiving a Summary of Record Groups

A summary record is a single record that includes information on each set of records grouped from one or more AS/400 files.

The **FROM** items that must be specified as follows:

System name:
This item specifies the name of the system.

Library/File (Member):
This item specifies the names of all files from which data is to be transferred.

JOIN BY: This item is optional. It specifies the join conditions that must be satisfied before records can be joined.

GROUP BY:
This item is optional. It must be specified only when the records of AS/400 files are classified into several groups. To group all records into a single group, this item need not be specified.

SELECT: Specifying this item causes a summary record to be created. The field names specified in **GROUP BY** can be specified.

WHERE: This item is optional. It specifies the requirements that each record to be grouped must satisfy. To group all records, this item need not be specified.

HAVING: This item is optional. It specifies the summary record to be transferred. To transfer all summary records, this item need not be specified.

ORDER BY:
This item is optional. It specifies how summary records will be grouped. When this item is left blank, records are not grouped (data is transferred in the same order as it appears in the AS/400 file).

Items to Be Specified

The following section explains the items to be specified using the AS/400→PC Transfer window. Those items that can be specified by selecting **Advanced**, are identified by adding “(Advanced)” to the end of those item names.

FROM

System name

This item specifies the name of the host system that contains the data to be received. When the router program is active, this item specifies the default system name.

Library/File (Member)

This item is always required. It specifies the name or names of one or more files used to store data to be transferred. Up to 32 file names can be specified. To specify several files, delimit them with commas and use **JOIN BY**, displayed after all **FROM** items have been specified. Only the file name must be specified. Do not specify a comma as a part of a file name. When the other optional items are not specified, they are assumed automatically. For example, the library name, member name, and format name can be assumed to be ***LIBL**, ***FIRST**, and ***ONLY**, respectively. When the cursor is on the input field of **FROM**, selecting **Browse** lists libraries, files, members, and formats.

Note: To transfer data from an AS/400 physical file, you must have ***USE** authority for that file. To transfer data from an AS/400 logical file, you must have ***OBJOPR** authority for that file and ***READ** authority for each subordinate file.

Specify file names as follows. (Items inside brackets [ ]can be omitted.) To specify several file names, delimit the names with commas.

[*library-name*/]*file-name*[(*member-name*[,*record-format-name*])],
[*library-name*/]*file-name*[(*member-name*[,*record-format-name*])],...

library-name

This is the name of the AS/400 library that contains the AS/400 file to be transferred. This AS/400 file contains the data to be transferred from the AS/400 system to a workstation. If this library name is not specified, ***LIBL** is assumed. If you cannot find the desired library, selecting **Browse** displays a list of all libraries defined in ***USRLIBL** of the AS/400 job library list. ***USRLIBL** of the library list can be changed by modifying the job description by executing the **CHGJOBD** command on the AS/400 system.

file-name

This is the name of the AS/400 physical file, logical file, or DDM file from which data is transferred. This file name must always be specified. To specify a file name and library name concurrently, delimit them with a slash (/). If you cannot find the desired file name, enter the library name followed by a slash, then select **Browse**. The system then displays a list of files contained in that library. To display a list of all the files in the libraries defined in ***USRLIBL** of the AS/400 job library list, enter ***USRLIBL**/, then select **Browse**.

member-name

This is the name of the AS/400 member containing the data to be transferred, or ***FIRST**. If this member is not specified, the system assumes ***FIRST**, and the first member of that file is used.

record-format-name

This is the name of the record format contained in the specified AS/400 file, or ***ONLY**. Before specifying the record format name, specify the member name or ***FIRST**. If the record format name is not specified, the system

assumes ***ONLY**, and the only record format for that file is used. To specify a record format name, delimit the record format name and member name with a comma.

When the specified AS/400 file has several record formats, a record format name must be specified. If the file member name is not specified, a record format name cannot be specified.

Notes:

1. A library name, file name, file member name, and record format name can be specified using up to 10 characters for each. Each name must begin with A to Z, ¥, #, or @. For characters subsequent to the first, 0 to 9, underscores, and periods can also be used.
2. When the **FROM** field remains blank or a comma is entered to specify the next file name, selecting **Browse** displays a list of libraries defined in ***USRLIBL** of the AS/400 job library list.
3. Enter part of the file name, member name, or record format name, followed by an asterisk (*), then select **Browse**. The system displays a list of names beginning with the specified characters.

Example: You might want to transfer data from file member **ITEMMBR1** (first member) of file **ITEMMAST** in library **ITEMLIB**. **ITEMFMT** is the only record format of this file. The specification will be as follows:

ITEMLIB/ITEMMAST(ITEMMBR1,ITEMFMT)

Alternatively, specify:

ITEMLIB/ITEMMAST

JOIN BY (Advanced)

When several files have been specified in **FROM**, specify **JOIN BY**. When only one file has been specified in **FROM**, **JOIN BY** does not appear.

JOIN BY specifies how to link or join the records of the files specified in **FROM**. Each file specified in **FROM** must be joined with at least one other file that has been specified in **FROM**.

Use **JOIN BY** to specify one or more join conditions. The join conditions indicate the similarity of two files. Therefore, they indicate which records of one file are joined with those of another.

The join conditions are as follows:

field-name = field-name

Field name is the name of the field defined in the record format specified in **FROM**. The join conditions require two field names, one for each file to be joined.

Field names must be delimited by one these:

=	Equal
<> or ><	Not equal
>	Greater than

>=	Greater than or equal to
<	Less than
<=	Less than or equal to

When specifying fields in **JOIN BY**, observe the following rules.

Join a numeric field to another numeric field. The field lengths and types do not have to be identical.

Join a character field to another character field. The lengths do not have to be identical.

The field name to be specified might have been defined in the files specified in **FROM**. When such a field name is used in the following items, prefix the field name with the file qualifier:

JOIN BY
GROUP BY
SELECT
WHERE
HAVING
ORDER BY

The file qualifier is the character T (uppercase or lowercase) followed by a one- or two-digit number. Use T1 for fields defined with the first record format, T2 for fields defined with the second record format, and so on. Delimit the file qualifier and field name with a period (.). See “Receiving Records Using File Qualifiers” on page 15-38 for details of the file qualifiers.

If the field name of the file specified in **FROM** cannot be found, select **Browse** when the cursor is on the **JOIN BY** input area. Then, a list of file qualifiers and field names of the files appears.

To join three or more files, or to join two files based on two or more common fields, two or more link conditions must be used. To specify several join conditions, join the conditions with AND. For example:

T1.EMPNO = T2.EMPNO AND T2.EMPNO = T3.EMPNO

In this case, records having the same value as **EMPNO** are joined between the first and second files specified in **FROM**. Then, such records are joined between the second and third files specified in **FROM**.

Up to 32 join conditions can be specified.

After **JOIN BY** is specified, each of **SELECT**, **WHERE**, and **ORDER BY** can be completed, by following the procedure described earlier in this chapter. To browse a field name that has been defined in several files, prefix the field name with a file qualifier.

GROUP BY (Advanced)

This item is required only to classify AS/400 file records into several groups. When no value is specified in **GROUP BY**, all the records are treated as a single group.

If **GROUP BY** is not displayed, select **Group functions** at the bottom right of the screen. Then, **GROUP BY** appears. **GROUP BY** and **HAVING** are displayed concurrently. You can specify either, both, or neither.

When **GROUP BY** and **HAVING** are displayed but you do not want to specify either, select **Remove Group functions**. The two items disappear.

To classify several records into groups, specify one or more fields to act as the base for grouping. Records are grouped according to the field specified first, then by the field specified second, and so on. For example, suppose that the following groupings are specified:

SHIFT, DEPTNO

In this example, the records are first grouped by **SHIFT**. Records belonging to a single group will subsequently have the same value as **SHIFT**. Then, the records in each group are grouped by **DEPTNO**. When there is only one record having a certain **SHIFT** value, the group has only one record.

Delimit field names with commas. Blanks can be specified to improve readability. Up to 50 field names can be specified. These fields must have been defined in the record format defined in **FROM**.

If a field cannot be found, selecting **Browse** displays a list of all the fields contained in the record.

With **GROUP BY** specified, specify **SELECT** to transfer the summary record of each group.

SELECT (Advanced)

This item is always required. It specifies the field to be transferred or the function that indicates the type of summary information to be transferred.

The field to be specified must have been defined in the record format specified in **FROM**.

To transfer all the fields in the specified record, specify an asterisk (*) in this input field. (Specifying an asterisk causes all fields in the record to be transferred.)

Note: Up to 256 fields can be transferred. When more than 256 fields have been defined in a file, an asterisk cannot be used. In this case, specify the names by selecting the fields to be transferred.

To transfer fields by selecting from a record, enter the field names in the order in which the fields are arranged. One or more blanks can be placed between the field names to improve readability. However, the names must be delimited by commas, as follows:

ITEMNO, QONHAND, PRIC

You can also specify:

ITEMNO,QONHAND,PRICE

When records are transferred from an AS/400 source file, specifying an asterisk (*) causes all fields in the file to be transferred, with the exception of the order number field and date field. (To transfer all the fields, including the order number field and date field, specify all the field names, including each data field name.)

A field can be specified repeatedly as required. However, bear in mind that no more than 256 fields can be selected. A list of field names can be displayed by selecting **Browse**.

Receiving a Summary of Record Groups:

The following information is necessary to receive summary records.

To transfer a summary record, do not leave this input area blank or specify an asterisk (*) (except when all the fields of the file specified at the prompt are specified in **GROUP BY**). The field names specified in **SELECT** (except for those specified in functions) must also have been specified in **GROUP BY**.

The functions and fields specified in **SELECT** return actual summary information for each group. Enter the field names and functions in **SELECT** in the order in which they are to be displayed.

Note: Null values are not included in the functions. When an entire value is null, the function output is set to null, except for **COUNT**. The **COUNT** output is 0.

The function format is as follows.

function (field-name)

This has the following meaning:

function:
This is one of the following functions:

- **AVG** Transfers the average value of the specified fields for each record group. This function can be used only for numeric fields.
- **MIN** Transfers the minimum or lowest value of the specified fields for each record group.
- **MAX** Transfers the maximum or highest value of the specified fields for each record group.
- **SUM** Transfers the total value of the specified fields for each record group. This function can be used only for numeric fields.
- **COUNT** Transfers the total number of records that satisfy the **WHERE** condition for each record group. Specify **COUNT(*)**.

field-name:
This is the field name defined with the record format specified in **FORM**.

Each function returns one value for each record group. In **SELECT**, several functions can be specified. To do so, delimit the functions by commas, as follows:

SUPPNO, AVG(PRICE), MIN(PRICE), MAX(PRICE)

This indicates that the average, minimum, and maximum values for **PRICE** are calculated for each supplier after **SUPPNO** has been selected. A summary record

is transferred according to the function selection. Specify **SUPPNO** in **GROUP BY**, because **SUPPNO** has not been used for the functions.

WHERE (Advanced)

This item is optional. It specifies one or more conditions that records to be transferred must satisfy.

To transfer summary records, use this item to specify which records are to be grouped, then group the records. Using this item, you can specify one or more conditions that the record must satisfy to belong to a certain group. When **WHERE** is not specified, all records are grouped.

As the *conditions*, specify the test to be applied to the records in the specified file member. All the records in the specified file member are tested for the conditions specified here. Only those records that pass this test are transferred.

When **WHERE** is not specified, all records in the specified file member are transferred.

The condition format is as follows:

field-name test value

field-name:

This must be a field substring or field name defined in the record format.

Fields or constants can be manipulated by specifying a supported function, with the results being used for comparison. The supported functions and usage are as follows:

SUBSTR Returns the specified part of a character string. This function contains three parameters: the field name, starting position, and length of the returned substring. The following example returns the 20 characters starting from the 10th character of the **FULLNAME** field.

SUBSTR(FULLNAME 10 20)

VALUE Returns the first non-null value in the parameter list. (If all parameters are null, null is returned.)

VALUE(DEPOSIT WITHDRAW BALANCE)

CURRENT Returns **DATE**, **TIME**, **TIMEZONE**, or **TIMESTAMP** for the current system.

CURRENT(TIMEZONE)

DIGITS Returns a character string representation of a numeric field.

DIGITS(EMPLOYEE#)

CHAR Returns a character string representation of the date field, time field, or time-stamp field. The second parameter is used to specify the format of the Systems Application Architecture (SAA) of the string to be returned (supported values are **USA**, **EUR**, **ISO**, or **JIS**).

CHAR(DATEHIRE USA)

DATE Returns the date of the time-stamp field.

DATE(TIMECRTD)

TIME Returns the time of the time-stamp field.

TIME(TIMECRTD)

TIMESTAMP Returns the time-stamp, combining the date field and time field.

TIMESTAMP(DATESEND TIMESEND)

YEAR Returns the year of the date field or time-stamp field.

YEAR(DATEHIRE)

MONTH Returns the month of the date field or time-stamp field.

MONTH(DATEHIRE)

DAY Returns the date of the date field or time-stamp field.

DAY(DATEHIRE)

DAYS Returns the day of the year, counted from January 1, of the date field or time-stamp field.

DAYS(DATEHIRE)

HOUR Returns the time of the time field or time-stamp field.

HOUR(TIMESEND)

MINUTE Returns the minute of the time field or time-stamp field.

MINUTE(TIMESEND)

SECOND Returns the second of the time field or time-stamp field.

SECOND(TIMESEND)

MICROSECOND Returns the microsecond of the time field or time-stamp field.

MICROSECOND(TIMECRTD)

test: This is the comparison type to be applied to fields or functions.

The following tests can be used. One or more blanks can be placed before and after these tests.

= Equal

<> or >< Not equal (See the note.)

> Greater than

>= Greater than or equal to

< Less than

<= Less than or equal to

LIKE The field is similar to the specified value.

BETWEEN The field is equal to one of two constants, or to a value between them.

IN The field is the same as one of the values in the constant list.

IS The field contains null values.

ISNOT The field contains no null values.

Using the **LIKE** Test

The **LIKE** test checks the field specified with the field name for a character pattern specified as a value. The field to be specified must be a character field.

The values to be tested must be character-string constants. This string can contain any characters. A percent (%) character (both SBCS% and DBCS%) indicates a character string consisting of zero or more characters. A 1-byte underscore (_) character indicates any single 1-byte character. A 2-byte underscore (_) character indicates any single 2-byte character.

The following example explains how to use the **LIKE** test:

```
NAME LIKE '%ANNE%'
```

The previous example searches for names containing character string **ANNE**, such as **ANNE**, **ANNETTE**, and **SUZANNE**.

The following example searches for names beginning with character string **ANNE**, such as **ANNE** and **ANNETTE**.

```
NAME LIKE 'ANNE%'
```

The following example searches for names ending with character string **ANNE**, such as **ANNE** and **SUZANNE**.

```
NAME LIKE '%ANNE'
```

The following example searches for all names whose second character is A.

```
NAME LIKE '_A%'
```

The following example searches for all last names beginning with character J.

```
LSTNAM LIKE 'J%'
```

This has the same effect as the following example:

```
SUBSTR (LSTNAM,1,1) = 'J'
```

When the pattern does not include a percent character (%), the length of the character string must be identical to that of the field.

Note: Values are searched according to the exact characters specified by the user. In other words, when the user's specification consists only of uppercase characters, only uppercase character strings are returned. Similarly, when the specification consists only lowercase characters, only lowercase character strings are returned.

Using the **BETWEEN** Test

The **BETWEEN** test checks the fields specified in the field name for character strings or numeric values that are equal to or between the specified constants. The values to be tested must be two character-string constants or two numeric constants. The types of these constants must be identical to that of the field name specified by the user. Delimit the two constants with **AND**.

The following example searches for those records for which the price is between 50.35 and 75.3, inclusive:

```
PRICE BETWEEN 5 .35 AND 75.3
```

The following example searches for those records for which the name begins with C:

```
NAME BETWEEN 'C' AND 'CZZZZZZZZZ'
```

The following example searches for those records for which the balance is between 0 and 5 000.

```
BALDUE BETWEEN  AND 5
```

This has the same meaning as the following expression.

```
BALDUE >=  AND BALDUE <= 5
```

Note: Specify the values to be tested in the form of **BETWEEN** (minimum) **AND** (maximum). For instance, **BETWEEN 1 AND 1** is a valid specification. However, **BETWEEN 1 AND 1** returns no records.

Using the **IN** Test

The **IN** test checks the fields specified in the field name for the character strings or numeric values in the list specified as the value. The value to be tested must be a list of character-string constants or numeric constants. In addition, the types of these constants must be identical to that of the specified field. Delimit the constants with blanks and enclose them in parentheses. Up to 100 constants can be specified. The following example shows how to use the **IN** test:

```
NAME IN ('SMITH' 'JONES' 'ANDERSON')
```

This example searches for those records for which the name is **SMITH**, **JONES**, or **ANDERSON**.

The following example searches for the values in the **STATE** field for which the value is other than **NY**, **MN**, or **TX**:

```
NOT STATE IN ('NY' 'MN' 'TX')
```

Note: Values are searched according to the exact characters specified by the user. In other words, when the user's specification consists of only uppercase characters, only uppercase character strings are returned. Similarly, when the specification consists of only lowercase characters, only lowercase character strings are returned.

Using the **IS** Test

The **IS** test checks the fields specified in the field name for null values.

The following example searches for those records for which the commission field contains null values:

```
COMMISSIONS IS NULL
```

Using the **ISNOT** Test

The **ISNOT** test checks the fields specified in the field name for non-null values.

The following example searches for those records for which the commission field does not contain null values:

```
COMMISSIONS ISNOT NULL
```

In the test, logical **AND** and logical **OR** can be combined. When both **AND** and **OR** are specified, **AND** comparison is performed first. Up to 50 conditions can be specified. For example:

```
MONTH=2 AND LOC='MIAMI' OR LOC='CHICAGO'
```

In this example, each record to be selected must satisfy the following condition:

```
MONTH=2 AND LOC='MIAMI'
```

or must satisfy the following condition:

```
LOC='CHICAGO'
```

This command can be modified by using parentheses. For example:

```
MONTH=2 AND (LOC='MIAMI' OR LOC='CHICAGO')
```

In this example, each record to be selected must satisfy the following condition:

```
MONTH=2
```

and it must satisfy the following condition:

```
LOC='MIAMI' OR LOC='CHICAGO'
```

NOT can also be used. The following example selects items where data is transferred not only from those records in which the **DEPT** field is not equal to 470, but also from those records for which the **DEPT** field is equal to 470 and, additionally, **STATE** is equal to **NY**.

```
NOT (DEPT = 47 ) OR (DEPT = 47  AND
  STATE = 'NY')
```

Comparison can start from a certain line and end at the next line. However, a field name cannot start from a certain line and end at the next line. Field names must not exceed one line.

When a value to be tested is a character string enclosed in quotation marks, the value can start from a certain line and continue to the next line.

value Field names or constants can be specified as values. To use constants, enclose number or character strings in single quotation marks.

Note: Do not specify commas between numbers, because the system recognizes these as decimal points.

When a character field or substring is specified in the field name, the character field name or character-string constant must be specified as the *value*. If the field length differs from the value length, the shorter field is extended to the value length by adding blanks on the right.

When a numeric field is specified as the field name, a numeric field name, numeric constant, or expression must be specified as the *value*. The transfer function performs decimal alignment for numeric fields prior to comparison. Zeros are added wherever numeric values are missing.

When a date field is specified in the field name, the name of a date field, character field (when the **CHAR** function is used for date field conversion), or character-string constant must be specified as the *value*. To use a character-string constant, use a value in a form other than SAA (**USA**, **EUR**, **ISO**, or **JIS**).

Using Constants

A character string, numeric value, or keyword **NULL** can be specified as a constant.

Note: **NULL** can be used only when operators **IS** or **ISNOT** are used.

Using Character Strings

A character string must be enclosed in apostrophes, as follows:

'JOHN'

Use two apostrophes to represent one apostrophe in a character string, as follows:

'JOHN''S'

Note: The transfer function supports only right apostrophes (').

When a character string is shorter than the specified field, the string is extended to the value length by adding blanks on the right. When a character string is longer than the specified field, the string is truncated.

Values are searched according to the exact characters you specified. In other words, when your specification consists only of uppercase characters, only uppercase character strings are returned. Similarly, when the specification consists only lowercase characters, only lowercase character strings are returned.

A character string can also be specified in hexadecimal format. In this case, enter X. Then, enter the character string, enclosed in apostrophes, using EBCDIC hexadecimal representation. For example:

X'D1D6C8D5'

If the character string contains any characters that cannot be represented, hexadecimal representation can be used. A character string can also be specified using DBCS representation, enclosed in apostrophes (DBCS mixed, DBCS exclusive, or DBCS alternative). In this case, first enter G. Then, enter the DBCS string, enclosed in apostrophes. For example:

G' D B C S'

A character string can also be specified using DBCS graphic representation. In this case, first enter N. Then, enter the DBCS string, enclosed in apostrophes. An example is given below.

N' D B C S'

Using Numeric Values

A numeric value can contain an optional sign (+ or –) and optional decimal point. Either a period (.) or comma (,) can be used to represent a decimal point. For example:

.5
-. 5
1 .
+5.

Decimal alignment is performed prior to numeric field comparison. Zeros are added where numeric values are missing.

Using Expressions

An expression can contain numeric field names, numeric constants, parentheses, and the following arithmetic operators:

+ Plus sign (addition)

– Minus sign (subtraction)

***** Multiplication

/ Division

For instance, the following expression searches for those records for which the number of products in stock (**ONHAND**) is at least 500 greater than the number of ordered products (**ONORDER**).

```
ONHAND > ONORDER + 5
```

The following expression searches for those records for which the price is 1 000.

```
PRICE = (1 .    1  )
```

HAVING (Advanced)

This item is optional. It specifies which summary record is transferred.

Pay particular attention to the difference between **HAVING** and **WHERE**. **WHERE** operates on each record within a certain group. **HAVING**, on the other hand, operates only on summary records (records that contain summary information for each group).

With this item, you can specify one or more conditions that a summary record must satisfy prior to being transferred.

As the conditions, specify the tests that should be applied to the summary records. The specified test conditions are applied to all summary records, only those summary records that pass the tests are transferred. To transfer all summary records, leave the **HAVING** item blank.

The format of the conditions is as follows:

```
function  (field-name)  test  value
```

This indicates:

function
This is a function supported for **SELECT**. See the description of **SELECT** in this section for details of these functions.

field-name
This is the field defined by the record format specified in **FROM**. A field name is acceptable even when it has not been specified in **SELECT**.

Test
This is the comparison type for functions. The types are listed below.

=	Equal to
<> or ><	Not equal
>	Greater than
>=	Greater than or equal to
<	Less than
<=	Less than or equal to

value

This is a function operating on certain fields or a constant. See "WHERE (Advanced)" on page 15-24 for details of constants, expressions, and tests.

Note: A comma is treated as a decimal point. Therefore, do not separate numbers with commas.

Test conditions can be combined by using logical **AND** or logical **OR**. When both **AND** and **OR** are specified, **AND** comparison is performed first. Up to 50 tests can be specified. By using parentheses, the operation order can be modified, or a description can be added to an operation. For example, you can specify:

```
COUNT( ) >=2 AND MAX(PRICE) > 1
```

In this case, the following conditions are applied concurrently: groups to be transferred must contain more than one record, and the summary records in such groups are transferred only when the maximum price is greater than 100.

If the desired field cannot be found, selecting **Browse** displays a list of the names of all fields in the record.

The type, length, digit, and number of decimal places of the value returned for each function are:

	Type	Length	Digit	Decimal Places
SUM	Packed	16	31	(Same as tested field)
AVG	Packed	16	31	31 (Total of the digit and decimal places of the field)
COUNT	Binary	4	1	
MAX	(Same as tested field)			
MIN	(Same as tested field)			

ORDER BY (Advanced)

This item is optional. It specifies the order in which the requested records are grouped. When **ORDER BY** is not specified, record transfer is not done according to a certain order.

Records are grouped according to the field specified first. Those records having the same value in each field specified first are grouped by the field specified second, and so on. Records containing null values are grouped after all records without null values have been grouped.

For example, you can specify:

```
DEPT,NAME,PHONE
```

In this case, records are first grouped according to **DEPT**. Then, the records having the same value for **DEPT** are grouped by **NAME**. The records with the same **DEPT** and **NAME** values are finally grouped by **PHONE**.

When a field name is specified in **ORDER BY**, it must also have been specified in **SELECT**, or **SELECT*** must have been specified.

Fields can be grouped in ascending or descending order. To do this, specify one blank after a field name then enter **ASC** or **DESC**. The default value is **ASC**. For example, specify:

DEPT DESC, NAME ASC

This indicates that the **DEPT** fields are to be grouped in descending order, after which the **NAME** fields are to be grouped in ascending (alphabetic) order.

Absolute values (**ABS**) can be specified for numeric fields. To do this, add a blank after a field name then enter **ABS**. For those fields having negative values, the negative signs are ignored and the absolute values are used.

The total length of the fields to be specified must not exceed 120 digits.

Return Record at Missing Field Value (Advanced)

When joining records from several files, joining might fail because a record is missing. This item specifies whether records with missing fields are transferred.

When you specify that records with missing fields are to be transferred, the alternative values for the missing fields are transferred. These values are normally blanks for character fields and zeros for numeric fields.

When you do not specify transfer of records with missing fields, those records are not transferred.

Specify this item to transfer data records that have alternative values for missing fields.

Do not specify this item if data records that have alternative values for missing fields are not to be specified. In this case, only those data records created from those records that exist in all files specified in **FROM** are transferred.

TO

Output device

This item specifies where received data is to be sent.

Display The received data is displayed on the screen.

Disk The received data is written to a workstation diskette or hard disk file.

Printer The received data is printed on the printer.

When **Disk** is selected as the output device, also specify the following items.

PC file

This item specifies the name of the workstation disk file or diskette file to which the data is to be written.

Replace old file

This item is always required. It specifies whether the records in the file specified by **PC File** are to be replaced with the transferred records.

The default value is **Replace old file**.

Workstation file type

This item is always required. It specifies the type of the workstation disk file or diskette file to which the transferred records are written.

The system default is PC code test.

Save transfer description

This item is always required. It specifies whether the workstation file description is written to a workstation file. This file description describes the transferred data and it is required to subsequently return data to the AS/400 system.

The system default is **Save**.

Description file name

This item is always required. It appears only when **Save Transfer Description** is selected. The **File Description File Name** specifies the name of the workstation disk file or diskette file to which the file description is written.

This item automatically sets the desired file name. This file name is the same as that specified by the user for **TO**, but to which extension **.FDF** has been added. Extension **.FDF** indicates that this file is a file-description file.

The use of extension **.FDF** is recommended when using a unique file name. To specify a file name in this item, use the same format as that in **TO**. (Items inside brackets [ ] can be omitted.)

[*d*:][*path-name*]*file-name*[.*ext*]

After **Save File Description File** is specified or a name is specified for **File Description File Name**, the AS/400→PC Transfer Request window reappears after the **Return** key is pressed. Using this screen, a transfer request can be changed, saved, or executed.

Saving, Opening, Changing, and Executing a Transfer Request

The following section explains how to save, open, change, and execute, as a file, the information (transfer request) on the data to be transferred.

Saving a Transfer Request

You should save a transfer request, especially when the request will be executed repeatedly. This eliminates the need to create a transfer request every time a request is executed. To save a transfer request, do as follows:

1. Specify the information needed for transfer, using the AS/400→PC Transfer window. See “Creating an AS/400-to-Workstation Transfer Request” on page 15-16 for an explanation of how to specify the required data.
2. After specifying the necessary data, select **Save** or **Save As** from the File pull-down menu of the menu bar.

   The Save Transfer Request File As window appears.
3. Specify each item, referring to the following explanation, then select **OK**.

   File Name Disk to which data is to be saved. Specify a file name or diskette file name. The default extension is TTO. Extension TTO identifies a file as a transfer request file.

   Description This item can be used to add a short explanation of a transfer request, as required. The explanation can be up to 40 characters in length. This explanation is saved with the transfer request, and displayed in the list of transfer request names. It is useful, therefore, for identifying a transfer request.

4. The system asks whether the saved transfer request is to be registered in the PC400 folder.

   When **OK** is selected, the transfer request is registered as an icon. Subsequently selecting this icon transfers data according to the registered data transfer request.

Opening and Changing a Saved Transfer Request

To open and change a saved transfer request:

1. Display the AS/400→PC Transfer window.
2. Select **Open** from the File pull-down menu of the menu bar.

   The Open Transfer Request File window appears.
3. Specify the name of the file to be opened using the Open Transfer Request File window. Then select **OK**.

   The AS/400→PC Transfer window reappears, with the information specified for each item for the transfer request displayed. This completes opening of the saved transfer request.
4. Change the contents, as necessary.
5. To save the changed contents, follow the procedure given in “Saving a Transfer Request” on page 15-33.

Executing a Transfer Request

A transfer request can be executed in one of the following three ways:

By selecting the icon with which the transfer request has been registered
By using the AS/400→PC Transfer window of the Data Transfer icon

Selecting the Icon with Which the Transfer Request Has Been Registered:

This method can be used only when a transfer request has been saved as an icon by using the AS/400→PC Transfer window.

Data transfer starts as soon as you select the icon with which a transfer request has been registered.

Using the AS/400→PC Transfer Window:

1. Before attempting to execute a transfer request, all operations such as creating, opening, and changing a transfer request must have been completed.

   Note: When data is transferred from a workstation to an existing member in an AS/400 file, the transferred data replaces the existing data in the member.
2. Select **Receive** from the AS/400→PC Transfer window.

   Data transfer starts.
3. After the transfer has been completed, select the **Cancel** push button, or select **Exit** from the menu bar File pull-down menu.

Status during Transfer

Display can be specified as the **output device**, when the current transfer request is created or changed. This sends the transferred record to the screen. On the screen, each record is displayed on one line.

Each field in a transferred record is converted from the AS/400 data type to workstation code.

Note: The workstation receives the AS/400 records in order and then writes them to a temporary file of the default directory in the default drive (usually, the directory in which PC400 is installed). The maximum number of records that can be transferred is 4096 records, limited by the amount of records that can be stored in free space of the default drive.

When **Disk** is selected as the **output device**, the following actions are performed:

1. The workstation file description is written to a workstation disk file or diskette file according to the **Save File Description File** specification. (If **Save File Description File** has not been specified, this procedure is not performed.)
2. The transferred records are written to a workstation disk file or diskette file.

Limited Usage of File Names and Field Names

For a transfer request from a workstation to the AS/400 system, none of the following reserved words can be specified as a file name or field name:

CRTFILE	MBRTEXT
CRTMBR	PUBAUT
FILETEXT	RCDLEN
FILETYPE	REFFILE
INTO	

For a transfer request from the AS/400 system to a workstation, none of the following reserved words can be used as a file name or field name:

ABS	IS
AND	ISNOT
ASC	LIKE
AVG	MAX
BETWEEN	MIN
BY	NOT
COLUMNS	OPTIONS
COUNT	OR
DESC	ORDER
EXTRACT	PARTOUT
FROM	REPLACE
GROUP	SELECT
HAVING	SUBSTR
IN	SUM
INNER	TABLES
	WHERE

To use one of these reserved words as a file name or field name, use the reserved word in uppercase, enclosed in quotation marks. Here is an example:

```
TO MYLIB/"INTO"
```

Examples of Transfer Requests for Receiving

This section provides examples of transfer requests for receiving. The contents of this section provide supplementary information to help you better understand transfer requests for receiving.

This section describes how to transfer data from the AS/400 system, based on the inventory control file **INVENTORY** and supplier file **SUPPLIERS**.

The **INVENTORY** file contains information about the various parts in stock. Each part has a three-digit identification number, **PARTNUM**. The **INVENTORY** file contains the names of parts (**DESCRIPTION**) and the quantity on hand (**QONHAND**) for each part.

File: INVENTORY

Field name:	PARTNUM	DESCRIPTION	QONHAND
Record 1:	2 9	CAM	5
2:	221	BOLT	65
3:	222	BOLT	125
4:	231	NUT	7
5:	232	NUT	11
6:	2 7	GEAR	75
7:	241	WASHER	6
8:	285	WHEEL	35
9:	295	BELT	85

The **SUPPLIERS** file contains information about the suppliers of each part. Each supplier is identified by a two-digit number, **SUPPNO**. The **SUPPLIERS** file contains the number of parts delivered (**PARTNO**), their prices (**PRICE**), times of delivery (**DELIVTIME**), and ordered quantities (**QONORDER**). The parts listed in the **SUPPLIERS** file are the same as those listed in the **INVENTORY** file.

File: SUPPLIERS

Field name:	SUPPNO	PARTNO	PRICE	DELIVTIME	QONORDER
Record 1:	51	221	.3	1	5
2:	51	231	.1	1	
3:	53	222	.25	15	
4:	53	232	.1	15	2
5:	53	241	. 8	15	
6:	54	2 9	18.	21	
7:	54	221	.1	3	15
8:	54	231	. 4	3	2
9:	54	241	. 2	3	2
1 :	57	285	21.	14	
11:	57	295	8.5	21	24
12:	61	221	.2	21	
13:	61	222	.2	21	2
14:	61	241	. 5	21	
15:	64	2 7	29.	14	2
16:	64	2 9	19.5	7	7

Receiving Part of an AS/400 File

Specify the following items:

Library/File (Member)	**INVENTORY**
SELECT	**PARTNUM, QONHAND**
WHERE	**QONHAND < 100**
ORDER BY	**PARTNUM**

In this case, only part of the **INVENTORY** file is to be transferred. Specifically, only the part number (**PARTNUM**) and quantity on hand (**QONHAND**) fields of the records for which the number of parts in stock is less than 100 (**QONHAND** < 100) are transferred. Records are transferred in ascending order of parts numbers (**PARTNUM**).

The following data is transferred:

Field:	PARTNUM	QONHAND
Record 1:	2 7	75
2:	2 9	5
3:	295	85

Receiving Records Joined from Several AS/400 Files

Two AS/400 files, **INVENTORY** and **SUPPLIERS**, are assumed. Note that both files contain records including part number fields. The **INVENTORY** file contains inventory information about individual parts. The **SUPPLIERS** file contains information about purchasing and ordering.

The user might want to transfer information on part numbers, part names, and the prices of the parts to be ordered from supplier 51. The desired fields are **PARTNO** (**SUPPLIERS** file), **DESCRIPTION** (**INVENTORY** file), and **PRICE** (**SUPPLIERS** file).

By comparing the data in the **INVENTORY** file and the **SUPPLIERS** file, the user can determine that supplier 51 provides part numbers 221 and 231, called **BOLT** and **NUT**, respectively, and that their prices are 30 cents and 10 cents, respectively. The following table summarizes this information:

Field:	PARTNO	DESCRIPTION	PRICE
Record 1:	221	BOLT	.3
2:	231	NUT	.1

The same results are available by joining the data in these two files by using the AS/400-to-PC transfer function. To do this, specify both files (**INVENTORY** and **SUPPLIERS**) in the **FROM** item. For **SELECT**, specify which fields are to be transferred (**PARTNO**, **DESCRIPTION**, and **PRICE**). For **WHERE**, specify which records are to be transferred (records for which **SUPPNO** = 51).

Respecify the relationship between the two files in **JOIN BY**. From these results, the user can determine, by checking the **SUPPLIERS** file, that part number 221 is delivered from supplier 51 at a cost of 30 cents. In addition, to determine the part name, the user must check the **INVENTORY** file for part number 221 and its product name. In other words, the user observes that data is joined from the records in both the **SUPPLIERS** file and the **INVENTORY** file and that those

records have the same part number. Therefore, to link the two records in these files, the records must have the same part number.

In short, to obtain this information, specify:

Library/File (Member)	**SUPPLIERS, INVENTORY**
JOIN BY	**PARTNO = PARTNUM**
SELECT	**PARTNO, DESCRIPTION, PRICE**
WHERE	**SUPPNO = 51**
ORDER BY	**PARTNO**

Receiving Records Using File Qualifiers

To join records from several AS/400 files, fields of the same type must be joined.

For example, the part number fields in the **INVENTORY** and **SUPPLIERS** files can have the same name **PARTNO**. To specify the desired **PARTNO** fields, the user must specify which file contains those fields. To do so, file qualifiers are used.

A file qualifier is the character **T** (uppercase or lowercase) followed by a one- or two-digit number. A comma is used to delimit the file qualifier and field name. In the previous example, prefix **T1.** and **T2.** to the **PARTNO** field names. **T1.** indicates the first file of **FROM**, while **T2.** indicates the second.

To obtain the same information as in the previous example, specify:

Library/File (Member)	**SUPPLIERS, INVENTORY**
JOIN BY	**T1.PARTNO = T2.PARTNO**
SELECT	**T1.PARTNO, DESCRIPTION, PRICE**
WHERE	**SUPPNO = 51**
ORDER BY	**T1.PARTNO**

T1.PARTNO indicates the **PARTNO** fields in the **SUPPLIERS** file, while **T2.PARTNO** indicates the **PARTNO** fields in the **INVENTORY** file.

Qualifiers are not needed for the names of the **DESCRIPTION**, **PRICE**, and **SUPPNO** fields, because they exist in one file only. However, the user can specify the following qualifiers for clarity:

T2.DESCRIPTION, T1.PRICE, T1.SUPPNO

The following examples of joining several AS/400 files describe more sophisticated techniques. You should now be familiar with the basics of how to join two files. For a more detailed explanation, refer to the following sections.

Receiving with Field Missing Records Joined

The joining of records from several files could fail because one or more records is missing. For example, the record containing part number 221 might not be found in the **INVENTORY** file. This means that the records that can be joined to the 1st, 7th, and 12th records in the **SUPPLIERS** file do not exist in the **INVENTORY** file. In this case, the **PARTNO** field and **PRICE** field for part number 221 can be determined, but the **DESCRIPTION** field cannot be determined. So, the **DESCRIPTION** field is missing.

To transfer field missing records, use **Return Record at Missing Field Value**.

When **Return Record at Missing Field Value** has been specified, the default AS/400 values are transferred instead of the missing field values. The default values for character fields are blanks, while those for numeric fields are zeros. For example, if the **INVENTORY** file does not contain the part number 221 record, the result of the previous example will be as follows:

```
        Field: PARTNO    DESCRIPTION    PRICE
               ------    -----------    -----
Record  1:      221                      .3
        2:      231     NUT              .1
```

If **Return Record at Missing Field Value** has not been specified, the field missing records are not transferred. For example, if the **INVENTORY** file does not contain the part number 221 record, the result of the previous example will be as follows:

```
        Field: PARTNO    DESCRIPTION    PRICE
               ------    -----------    -----
Record  1:      231     NUT              .1
```

Receiving with Records in a Same File Joined

Records in the same file can be joined. In other words, a file can be repeatedly specified in **FROM**. For instance, data in certain records can be compared using this function.

For example, the **SUPPLIERS** file shows that several suppliers provide the same part. The user might want to know which supplier sets a price that is double, or greater than double, that of another. To transfer the necessary information to a workstation, specify:

Library/File (Member)	**SUPPLIERS, SUPPLIERS**
JOIN BY	**T1.PARTNO = T2.PARTNO**
SELECT	**T1.PARTNO, T1.SUPPNO**, **T1.PRICE**, **T2.SUPPNO**, **T2.PRICE**
WHERE	**T1.PRICE > 2 * T2.PRICE**
ORDER BY	**T1.PARTNO**

The same file has been specified in **FROM** twice. **JOIN BY** specifies that records having the same part number are joined. This creates a joined record containing information about two suppliers of a single part. The user can spot those records for which the price is double, or greater than double, that of another supplier.

Records in the **SUPPLIERS** file are compared, one by one, with all the records (including itself) in the **SUPPLIERS** file. When the same part number is found, the two corresponding records are linked. This processing is performed for each record in the **SUPPLIERS** file.

For each record, the first supplier's price is compared with the second supplier's price. When the first supplier's price is double, or greater than double, that of the second, only the record containing the first supplier price is kept.

The final result is as follows:

Field:	T1.PARTNO	T1.SUPPNO	T1.PRICE	T2.SUPPNO	T2.PRICE
Record 1:	221	51	.3	54	.1
2:	231	51	.1	54	. 4
3:	241	53	. 8	54	. 2
4:	241	61	. 5	54	. 2

Specifying Records to Be Included in a Group

You might want to limit which records will be included in a group. To do so, use **WHERE**. For example, the following example transfers the average and lowest prices of each part for those records for which the delivery time (**DELIVTIME**) is less than 30 days.

Library/File (Member)	**SUPPLIERS**
GROUP BY	**PARTNO**
SELECT	**PARTNO, AVG(PRICE), MIN(PRICE)**
WHERE	**DELIVTIME < 30**

The result is as follows:

Field:	PARTNO	AVG(PRICE)	MIN(PRICE)
Record 1:	221	.25	.2
2:	231	.1	.1
3:	222	.23	.2
4:	232	.1	.1
5:	241	. 7	. 5
6:	2 9	18.75	18.
7:	285	21.	21.
8:	295	8.5	8.5
9:	2 7	29.	29.

Note that the conditions specified in **WHERE** are checked first, then the records that satisfy those conditions are included in the group.

Specifying Summary Records to Be Transferred

In some cases, you might want to transfer only summary records that satisfy certain conditions. The use of **HAVING** enables the selection of which summary records are to be transferred. **WHERE** is applied to certain records in a group, while **HAVING** is applied only to summary records.

The following example transfers the highest and lowest prices for each part. However, the summary records to be transferred are only those for which the highest price exceeds 10.00.

Library/File (Member)	**SUPPLIERS**
GROUP BY	**PARTNO**
SELECT	**PARTNO, MAX(PRICE), MIN(PRICE)**
HAVING	**MAX(PRICE) > 10.00**

The following table shows the result of removing unnecessary summary records by using **HAVING**.

Field:	PARTNO	MAX(PRICE)	MIN(PRICE)
	------	----------	----------
Record 1:	2 9	19.5	18.
2:	285	21.	21.
3:	2 7	29.	29.

One summary record for an entire file can be transferred. To do this, specify only the summary function in **SELECT** and nothing in **GROUP BY**. As a result, an entire file can be recognized as one group, while one summary record can be transferred for the group.

You can concurrently use the concept of summarizing groups and that of joining records from several files. To obtain the desired results, do as follows:

1. Specify a file in **FROM**, and specify the join conditions to join the records in **JOIN BY**.
2. Specify the conditions in **WHERE** to remove unnecessary records.
3. Specify the fields used for grouping the remaining records in **GROUP BY**.
4. Specify the function in **SELECT**, then create summary records.
5. Specify the conditions in **HAVING** to remove unnecessary records.
6. Specify the items for grouping the final summary records in **ORDER BY**.

Functions Available from Pull-Down Menu

The following section provides a simple explanation of the menu bar of the AS/400→PC Transfer window and PC→AS/400 Transfer window.

File

Transfer request files can be processed.

Create
This item creates a transfer request file.

Open
This item displays the contents of an existing transfer request file.

Save, Save As
These items save the current settings to the transfer request file being used or to a new transfer request file, respectively.

Exit
This item terminates the operation started by selecting the **Data Transfer** icon.

Setup (Only for AS/400→PC Transfer)

User options

Time, date, and numeric value format for receiving can be specified. The following paragraphs describe each item.

Ignore Decimal Data Error
This item specifies whether decimal data errors found in packed or zoned decimal fields upon executing requests are to be ignored. Selecting **Yes** to ignore decimal data errors and using existing indices can considerably reduce the time needed to execute a request. If this item is not specified,

the transfer request creates indices again and modifies any detected decimal data errors. This requires extra processing time.

Time Format

This item specifies a desired time format for fields of AS/400 field type having a selected time. If no time format is specified, the default value in the workstation's national information file is assumed when the transfer request starts, and that in an existing transfer request is assumed when the request is called again.

Supported time formats are as follows:

HMS Hours, minutes, seconds (hh:mm:ss)
ISO International Standard Organization (hh.mm.ss)
USA USA Standard (hh:mm AM or PM)
EUR IBM European Standard (hh.mm.ss)
JIS Japanese Industrial Standard (hh:mm:ss)
DDS AS/400 DDS (Format given by AS/400 file attribute)
DFT AS/400 default format (Host job default is used)

Time separator

This item specifies enabled delimiters when fields of the AS/400 field type for the selected time are of the format type for which delimiters can be specified.

When no delimiters are specified, the default value in the workstation's national information file is assumed when the transfer request starts, and that in an existing transfer request is assumed when the request is called again.

Supported time delimiters are as follows:

Colon (:)
Period (.)
Comma (,)
Blank ( )
Null (NULL) No Separator
Default value
(DFT) AS/400 Default Separator

Date Format

Specifies the date format for fields of AS/400 field type for the selected date.

If this date format is not specified, the default value in the workstation's national information file is assumed.

Supported values are as follows:

MDY Month, day, year (mm/dd/yy)

DMY Day, month ,year (dd/mm/yy)

YMD Year, month, day (yy/mm/dd)

JUL Julian (yy/ddd)

ISO International Standard Organization (yyyy-mm-dd)

USA USA Standards (mm/dd/yyyy)

EUR IBM European Standard (dd.mm.yyyy)

JIS Japanese Industrial Standard (yyyy-mm-dd)

DDS AS/400 DDS (Format given by AS/400 file attribute)

DFT AS/400 default format (Host job default is used)

Date separator

This item specifies delimiters when fields of the AS/400 field type for the selected date are of the format type for which delimiters can be specified.

When no date delimiters are specified, the default value in the workstation's national information file is assumed when the transfer request starts, and that in an existing transfer request is assumed when the request is called again.

Supported date delimiters are as follows:

Slash (/)
Dash (-)
Period (.)
Comma (,)
Blank ( )
Null (Null) Delimiters are not used.
DFT (DFT) AS/400 default separator

Decimal separator

This item specifies the decimal point character in an AS/400 field whose type is packed decimal or zoned decimal.

When decimal points are not specified, the default value in the workstation's national information file is assumed when the transfer request starts, and that in an existing transfer request is assumed when the request is called again.

Supported decimal point delimiters are as follows:

Period (.)
Comma (,)
DFT (DFT) - Default decimal separator

Sort Sequence

Specify which sort sequence should be used for this transfer request.

AS/400 job default
Sort by the table identified on the AS/400 system as the job sort table.

Hexadecimal
Sort by the internal hexadecimal representation.

User specified table
Sort by the table identified by the user in a subsequent prompt.

Shared Weight Table
Sort by the shared weight table associated with the language named in a subsequent prompt.

Unique Weight Table
Sort by the shared unique table associated with the language named in a subsequent prompt.

Changing the sort sequence affects the order in which records appear ***only*** if the **ORDER BY** clause is being used. The sort sequence affects all character comparisons that depend on the order of the alphabet. Such comparisons can occur in the **WHERE** clause, the **GROUP BY** clause, the

HAVING clause, the **JOIN BY** clause, the **IN** predicate, the **LIKE** predicate, the **BETWEEN** predicate, the **MAX** function, and the **MIN** function. Comparison operations are =, <>, >, >=, and >=.

Sort Sequence Table Name
Type the name of the sort sequence table that you want to use for this transfer request. The format of the table name should be *library/table*. ***LIBL** and ***CURLIB** are allowed for the library name.

Language
AS/400 standard tables provide many languages. Select the user-specified languages to enter the desired language ID. Language IDs shipped with AS/400 are found in the *AS/400 NLS Guide*.

Language ID
Enter the language ID for the desired language.

AS/400 standard tables provide many languages. Language IDs shipped with AS/400 are found in the *AS/400 NLS Guide*.

Translation Table

Translation tables for ASCII-to-EBCDIC translation or for EBCDIC-to-ASCII translation can be specified, created, and customized. The following paragraphs describe each item.

Current Table
This item specifies whether the IBM default translation or the user-defined translation table is to be used.

Host Code Page
This item specifies the host code page to be used for translation.

Workstation Code Page
This item specifies the workstation code page to be used for translation.

File Name
This item specifies the file name of the user-defined table to be used for translation.

To list all files in your workstation, select **Browse**.
To customize the translation table, select **Customize**.

File-Description Files

A file-description file is a workstation file that contains all field descriptions of the data in the corresponding workstation data file. Each field descriptor contains the field name, data type, and field length. There is one field descriptor for each field in the workstation file.

A file-description file defines:

File type of the workstation file to be transferred. For an explanation of each file type, see “File-Description Files.”

Field names and order of these fields in each data record.

Data type of each field in the workstation file.

Size and number of decimal places of each field.

The workstation files require field definitions when the files are transferred. The field definitions describe the file as it exists on the workstation. These definitions contain data that is similar to the field definitions (DDS) required by AS/400 system files. The data must be defined for both the AS/400 system and the workstation files, because the field names from each file are needed to send the data to the AS/400 system and the data in each file might be in different formats.

A file-description file is created on request during the transfer process of data from an AS/400 file to a workstation file. Therefore, you usually do not need to worry about the contents or the format of the file-description file. However, if you transfer data that has not been previously transferred to the system, you must create a file-description file.

Creating a File-Description File

You can create a file-description file using a workstation text editor. The file-description file must be an ASCII text file. Therefore, each record must end with a carriage return (CR) character (hex 0D) followed by a line feed (LF) character (hex 0A). All tab characters (hex 09) are treated as ASCII spaces. The last byte of the file must contain an end-of-file (EOF) character (hex 1A). Workstation editors that create ASCII text files usually use these special character designators, so normally you do not need to be concerned about them.

File-Description File Format

The format of the file-description file is as follows:

```
PCFDF [comment]
PCFT file-type-indicator [comment]
PCFO time-format,time-separator, date-format, date-separator, decimal-separator [comment]
PCFL field-name-1 data-type-1 length-1[/decimal-position-1][comment]
    .
    .
    .
PCFL field-name-n data-type-n length-n[/decimal-position-n][comment]
[ comment]
```

Items within brackets are optional. Use either uppercase or lowercase characters anywhere in the file.

PCFDF Entries: PCFDF is a keyword that identifies this file as a workstation file-description file. It must appear in the first line of the file, starting in column 1. A comment is the only other entry allowed on the first line. If you type a comment, it must be separated from the PCFDF keyword by a space.

PCFT Entries: PCFT is a keyword that identifies this record as containing the file type indicator. It is followed by an indicator identifying the type of file in which the data is stored. It must appear only once, and must start in column 1, after the PCFDF record and before any PCFL records. An optional comment can follow this file-type indicator if separated from the indicator by at least one space.

Following is an example of a PCFT entry:

```
PCFT 4 BASIC RANDOM FILE
```

Table 15-1 on page 15-46 shows the valid file-type indicators.

Table 15-1. File-Type Indicators

Indicator	File Type
1	ASCII text
2	DOS random
3	BASIC sequential
4	BASIC random
5	Data interchange format (DIF**)
6	No-conversion file
7	Reserved
8	DOS random type 2
9	BIFF format

PCFO Entry: The PCFO entry is optional. PCFO is a keyword that identifies this record as containing information about the date and time formats, time stamp, and separator characters for applicable formats. It must appear only once and must start in column 1, after the PCFT record and before any PCFL records. If there is no PCFO entry, the information or characters assigned as defaults for the host system are used.

Table 15-2 shows the valid time formats.

Table 15-2. Time Formats

Indicator	Format Name	Time Format
1	HMS	hh:mm:ss
2	ISO - International Standards Organization	hh.mm.ss
3	USA - USA standard	hh:mm AM or PM
4	EUR - European	hh.mm.ss
5	JIS - Japanese Industrial Standard Christian Era	hh:mm:ss
6	DDS	Format given by AS/400 file attribute
7	DFT	Host job default is used
*	Unspecified	Host job default is used

Table 15-3 on page 15-47 shows the valid time separators.

Table 15-3. Time Separators

Indicator	Separator
1	Colon (:)
2	Period (.)
3	Comma (,)
4	Blank ( )
5	Null (N)
6	Default (D) (host job default)
*	Unspecified (host job default)

Table 15-4 shows the valid date formats.

Table 15-4. Date Formats

Indicator	Format Name	Date Format
1	MDY	mm/dd/yy
2	DMY	dd/mm/yy
3	YMD	yy/mm/dd
4	Julian	yy/ddd
5	ISO	yyyy-mm-dd
6	USA	mm/dd/yyyy
7	EUR	dd.mm.yyyy
8	JIS	yyyy-mm-dd
9	DDS	Format given by AS/400 file attribute
10	DFT	Host job default is used
*	Unspecified	Host job default is used

Table 15-5 shows the valid date separators.

Table 15-5 (Page 1 of 2). Date Separators

Indicator	Separator
1	Slash (/)
2	Dash (–)
3	Period (.)
4	Comma (,)
5	Blank ( )
6	Null (N)

Table 15-5 (Page 2 of 2). Date Separators

Indicator	Separator
7	Default (D) (host job default)
*	Unspecified (host job default used)

Table 15-6 shows the valid decimal separators.

Table 15-6. Decimal Separators

Indicator	Separator
1	Period (.)
2	Comma (,)
*	Unspecified (workstation default used)

Following is an example of a PCFO entry:

```
PCFO 1,1,1,1,1 OPTIONS SETTINGS
```

PCFL Entries: PCFL identifies a definition for a field. Enter a PCFL entry in the file-description file for each field in the data file. The PCFL records must be in the same order as the fields they define in the data file.

Define as many as 256 PCFL records in the file-description file and start PCFL records in column 1. If you enter more than 256 PCFL records, you receive an error message. You cannot continue a record on one line, and only the first 80 characters of a record are used.

Following is an example of a PCFL entry:

```
PCFL CUSTNAME 1 2     CUSTOMER NAME
```

Each PCFL entry contains the following things:

- The keyword, PCFL, starting in column 1 and followed by a space. This identifies the record as a field description.
- The field name, followed by a space. This must match the name that exists in the field definitions on the AS/400 system and can be from 1 to 10 characters.
- The indicator for the data type. Table 15-7 on page 15-49 shows the indicators that represent the data type of the data in the field. Follow the specified indicator with a space.
- The size of the field (in bytes) as it is stored in the workstation file. The length specification can be from 1 to 4 characters.

Table 15-7. Data Type Indicators

Indicator	Data Type
1	ASCII[1]
2	ASCII numeric
3	Hexadecimal
4	Binary
5	Zoned
6	Packed
7	BASIC integer
8	BASIC single-precision floating point
9	BASIC double-precision floating point
10	EBCDIC
11	EBCDIC zoned
12	EBCDIC packed

Note:

1 Includes date, time, and time stamp except for files that are not converted.

The data type indicator you enter must be valid for the file type entered earlier. Any other data types are not valid and are diagnosed as errors during a data transfer to the AS/400 system.

Table 15-8 shows the valid single-byte character set (SBCS) data types for each file.

Table 15-8 (Page 1 of 2). Valid SBCS Data Types for File Types

File Type	Valid Data Type
ASCII text	ASCII ASCII numeric
DOS random	ASCII Binary Hexadecimal Packed Zoned
BASIC sequential	ASCII ASCII numeric

Table 15-8 (Page 2 of 2). Valid SBCS Data Types for File Types

File Type	Valid Data Type
BASIC random	ASCII BASIC double-precision floating point BASIC integer BASIC single-precision floating point Hexadecimal
DIF	ASCII ASCII numeric
No-conversion	Binary EBCDIC EBCDIC packed EBCDIC zoned Hexadecimal
DOS random type 2	ASCII Binary Hexadecimal Packed Zoned
BIFF format	ASCII ASCII numeric

Note: ASCII (SBCS) includes date, time, and time stamp types if converted. EBCDIC includes date, time, and time stamp if not converted.

For numeric fields in BASIC sequential and DIF files, a size specification must be present. However, because the data in these fields is of variable length, the data transfer function assumes a maximum length of 65 characters. This length more than covers the largest possible exponential ASCII numeric value. The size specifications for character fields must be the maximum size of any data item in that field.

Table 15-9 shows the allowed data length limits for each workstation data type. These are the maximum lengths you can specify for size in the PCFL entry.

Table 15-9 (Page 1 of 2). Allowable Data Length Limits for Personal Computer SBCS Data Types

Personal Computer Data Type	Data Length Limit (in Bytes)
ASCII	4093
ASCII numeric	33 (65 for DIF and BASIC sequential)
BASIC double-precision	8 (only allowed length)
BASIC integer	2 (only allowed length)
BASIC single-precision	4 (only allowed length)

Table 15-9 (Page 2 of 2). Allowable Data Length Limits for Personal Computer SBCS Data Types

Personal Computer Data Type	Data Length Limit (in Bytes)
Binary	4
EBCDIC	4093
Hexadecimal	2048
Packed decimal (ASCII and EBCDIC)	16
Zoned decimal (ASCII and EBCDIC)	31
Time	
HMS (see note 1)	8
USA	8
ISO, EUR, and JIS (see note 1)	8
DDS, DFT	8 or 10 (see note 2)
Date	
MDY, DMY, YMD	8
Julian	6 (only allowed length)
ISO, EUR, JIS, USA (see note 1)	10
DDS, DFT	6, 8, or 10 (see note 2)
Time stamp	26

Notes:

1 These abbreviations appear in the time and date parameter sections.

Abbreviation	Description
HMS	Hours Minutes Seconds
EUR	IBM European Standard
JIS	Japanese Industrial Standard Christian Era
ISO	International Standards Organization

2 The length is determined by the format defined in the host file for DDS, or from the AS/400 job default (DFT keyword).

Table 15-10 shows the allowed data length limits for each AS/400 data type.

Table 15-10 (Page 1 of 2). Allowable Data Length Limits for AS/400 Data Types

AS/400 Data Type	Data Length Limit in Bytes (see note 1)
Binary	2 or 4 (only allowed lengths)
EBCDIC	4096

Table 15-10 (Page 2 of 2). Allowable Data Length Limits for AS/400 Data Types

AS/400 Data Type	Data Length Limit in Bytes (see note 1)
Hexadecimal	2048
Packed decimal (EBCDIC)	16
Zoned decimal (EBCDIC)	31
Time	
HMS	8
USA	8
ISO, EUR, and JIS	8
DDS, DFT	8 or 10 (see note 2)
Date	
MDY, DMY, YMD	8
Julian	6 (only allowed length)
ISO, EUR, JIS, USA	10
DDS, DFT	6, 8, or 10 (see note 2)
Time stamp	26

Notes:

1 The data length limits for the workstation and the system data fields are different in some cases. For these cases, the transfer function attempts to fit the workstation data into the system field. If the data does not fit into the field, a message is displayed. Refer to "Data Conversions" on page 15-53 for more details.

2 The length is determined by the format defined in the host file for DDS, or from the AS/400 job default (DFT keyword).

If there is a decimal position associated with the data in that field, place a forward slash (/) and then the number of decimal positions after the length specification. There are no spaces between the length, slash, and decimal position specifications.

The decimal position specification refers to the number of positions from the right-hand byte of the resulting decimal number. Do not specify a decimal position for floating-point numbers unless the data type is one of the following types:

ASCII numeric
Binary
Packed
Zoned

Note: The number of decimal positions in a field ranges from 0 to 9 or the maximum number of decimal digits in this number, whichever is smaller. The data transfer function might round the number to fit it into the field. Refer to "Data Conversions" on page 15-53 for more details.

Comment Entries: Enter comment lines anywhere in the file-description file, observing the following restrictions:

The last element of the field-descriptor entry specification is a comment. This is an optional entry for your information only, and must be separated from the size entry by a space. PCFL entries created by the data transfer function (RTOPC) do not contain a comment field.

Precede the comment with an asterisk (*) as the first nonspace character in the line.

Do not exceed 80 characters in length.

Do not make the comment the first record in the file-description file.

Following is an example of a comment:

```
This is a comment
```

Example

Following is an example of a file-description file for an inventory file:

```
PCFDF
PCFT 3 BASIC SEQUENTIAL FILE
 ITEM INVENTORY FILE
PCFO 1,1,1,2,1 OPTIONS SETTINGS
PCFL ITEMNO 2 8    ITEM NUMBER
PCFL ITEMDESC 1 2     DESCRIPTION OF ITEM
PCFL COLOR 1 8    COLOR
PCFL WEIGHT 2 7/2    ITEM WEIGHT
PCFL PRICE 2 7/2    PRICE PER ITEM
PCFL INSTOCK 2 6    ITEMS IN STOCK
```

Data Conversions

The data transfer function needs data conversions for transferring data from the system to the workstation, and vice versa. For both types of transfers, the necessary conversion depends on the record size, the type of data being transferred, the type of workstation file being used, the system data type, and, in some cases, the data length.

Record Size

Each transferred record contains data indicating whether each field contains a null value. There is a restriction on the maximum data record that can be sent or received from the AS/400 system because of this data.

The following formula determines the maximum record length that can be transferred:

```
4 96 – (number of fields in the record + 2) = (maximum record length)
```

Data Types

The data transfer function supports the following system data types:

Binary data
Character data
Date
Hexadecimal data
Packed decimal data
Time
Time stamp
Zoned decimal data

The data transfer function supports the following workstation data types:

ASCII numeric data
BASIC numeric data, including:
- Double-precision data
- Integer data
- Single-precision data

Binary data
Character data, including:
- ASCII
- EBCDIC

Hexadecimal data
Packed decimal data
Zoned decimal data

ASCII Numeric Data

The data transfer function defines ASCII numeric data to represent any numeric value stored in ASCII format. This is not a valid AS/400 system data type. The number −123.45 in ASCII format is:

2D 31 32 33 2E 34 35

The decimal point and sign are stored explicitly for ASCII numeric data. The character on the left displays the sign (space or plus (+) for positive, minus (−) for negative). Leading zeros to the left of the decimal point change to spaces. The decimal point, if any, is added in the correct position.

BASIC sequential and DIF file types also support another form of ASCII numeric data called exponential numbers.

An exponential number is a decimal number followed by the letter E or D and a signed integer of two or three digits. E represents a single-precision number and D represents a double-precision number. The exponent portion (E or D and the integer) represents “times 10 to the power of the integer specified.”

For example, the number −1.0E+03 (representing -1.0×10^{3} in ASCII numeric format) is:

2D 31 2E 30 45 2B 30 33

For example, the number 9.5D−15 (representing 9.5×10^{-15} in ASCII numeric format) is:

39 2E 35 44 2D 31 35

Binary Data

This data represents signed or unsigned numbers in twos complement form. Binary numbers of 1, 2, 3, or 4 bytes in length are allowed on the workstation, but the AS/400 system allows only numbers 2 or 4 bytes in length. The bit on the left side of the high-order bit determines the sign of the number (0 for positive, 1 for negative). The system stores the data with the high-order byte on the left side of the field, whereas the workstation stores the data with the high-order byte in the right-hand position of the field.

The decimal position, if specified by the file description, represents the number of decimal digits to the right of the decimal point. The file description specifies the presence of a decimal position.

For example, the binary number 3BF5 is equivalent to the decimal number 15349, and the binary number FFB4 is equivalent to the decimal number –76.

Character Data for SBCS

You can think of this data as a string of bits that represents particular characters and symbols.

The tables used to translate characters from ASCII to EBCDIC and from EBCDIC to ASCII contain the following kinds of values:

Values where the workstation ASCII characters and AS/400 EBCDIC characters match exactly

Values where a substitute character is chosen for a character that cannot be translated

The data transfer function uses tables to translate data from ASCII to EBCDIC and EBCDIC to ASCII. You can change these default tables using the translation table utility (TRTABLE).

Note: ASCII (SBCS) data includes date, time, and time stamp types if converted. EBCDIC data includes date, time, and time stamp if not converted.

Double-Precision Data

Double-precision data is defined only for the workstation. The AS/400 system does not support this data type. BASIC applications use double-precision data. This data type is a positive or negative number from $2.938735877055719 \times 10^{-39}$ to $1.701411834604692 \times 10^{38}$. Double-precision numbers are stored in 8 bytes, with 7 bytes representing the mantissa and 1 byte representing the exponent.

Date, Time, and Time-Stamp Data Types

Date, time, and time-stamp values can be used in certain arithmetic and character operations and are compatible with certain character constants, but they are neither characters nor numbers.

A date is a three-part value (year, month, and day) designating a point in time on the calendar. The range of the year is 0001 to 9999. The range of the year for a non-SAA format is 1940 to 9999. The range of the month is 1 to 12. The range of the day is 1 to *x*, where *x* depends on the month.

A time is a three-part value (hour, minute, and second) designating a time of day under a 24-hour clock. The range of the hour is 0 to 24 and the range of the other values is 0 to 59.

A time stamp is a seven-part value (year, month, day, hour, minute, second, and microsecond) that designates a date and time including the specified microseconds. The maximum length of the time stamp is a character string of 26.

Dates, times, and time stamps can be assigned to result fields. A valid character-string representation of a date can be compared with a date field, or a valid character-string representation of a time can be compared with a time field.

Hexadecimal Data

You can think of this data as a string of bits representing base 16 numbers. For example, you can represent hex 3D with the following string of bits:

0011 1101

Integer Data

Integer data is defined only for the workstation. BASIC applications use integer data. Integer data is stored in 2 bytes and represents a whole number from –32768 to 32767.

Packed Decimal Data

For both the AS/400 system and the workstation, each half-byte represents a value from 0 through 9. The hexadecimal value in the half-byte on the right side of the right-hand byte specifies the sign.

For the AS/400 system, a value of hex B or hex D in this half-byte represents a negative number.

For DOS random files, only the last half-byte (the half-byte that contains the sign) is changed. For the sign half-byte, the workstation uses hex 3 to indicate a positive number or hex B to indicate a negative number.

For example, X'0865431F' appears as X'08654313'.

For DOS random type-2 files, the last half-byte (the half-byte that contains the sign) is not changed. The sign convention used on the workstation and on the host system is the same.

For example, X'0865431C' appears as X'0865431C'.

The decimal position, if specified, represents the number of decimal digits to the right of the decimal point. The presence of a decimal position is specified in the file description.

Single-Precision Data

Single-precision data is defined only for the workstation. The AS/400 system does not support this data type. BASIC applications use single-precision data. This data type is a positive or negative number from 2.938736×10^{-39} to 1.701412×10^{38}. Single-precision numbers are stored in 4 bytes, with 3 bytes representing the mantissa and 1 byte representing the exponent and sign.

Zoned Decimal Data

This data is represented in a form in which each byte corresponds to one decimal digit. Each of these bytes is stored in character form. For example, the digit 7 is stored on the AS/400 system as F7, which is the EBCDIC representation, and is stored on the workstation as 37, which is the ASCII representation.

The size of each digit is determined by its half-byte on the right side. Valid values for the half-bytes are decimal 0 through 9.

The sign in both the AS/400 system and workstation zoned decimal fields is specified by the hexadecimal value in the left half-byte of the right byte of the field. For the AS/400 system, a hex B or hex D in this half-byte represents a negative number (for example, X'F6D2' represents –62).

For DOS random files, zoned decimal fields from the system change from EBCDIC to ASCII, as do character fields, except that the sign half-byte in the workstation field is changed to a hex 3 to indicate a positive number or a hex B to indicate a negative number.

For DOS random type-2 files, zoned decimal fields from the system change from EBCDIC to ASCII, as do character fields, except that the sign half-byte in the workstation field is changed to a hex 3 to indicate a positive number or a hex 7 to indicate a negative number.

The decimal position, if specified, represents the number of decimal digits to the right of the decimal point and is specified by the file description.

Personal Computer File Types

The following workstation file types are supported:

ASCII text files
BASIC random files
BASIC sequential files
DIF files
BIFF files
DOS random files
DOS random type-2 files
No-conversion files

ASCII Text Files

ASCII text files are normally used with programs that work with text (such as editors and print routines). The characteristics of an ASCII text file are as follows:

Records consist of ASCII characters.

A carriage return character (hex 0D) and a line feed character (hex 0A) delimit each record from the next. The character for end-of-file is hex 1A.

Workstation records in an ASCII file can be variable in length due to truncation of trailing blanks at the end of an AS/400 record.

Transferring Data to ASCII Text Files: When you create an ASCII text file, the data coming from the AS/400 system changes as follows:

Hexadecimal fields change to equivalent ASCII characters for each half-byte.

For example, X'D3' expands to ASCII 4433 and is written to the file. When displayed by an editor or printed, the string appears as D3.

EBCDIC character fields change byte by byte and are mapped into ASCII characters as defined by the translation tables.

Date, time, and time-stamp data is mapped into ASCII characters as defined by the translation tables.

Variable-length and null fields are converted to fixed lengths, and trailing blanks (for character, hexadecimal, date, time, and time-stamp data) or zeros (for binary, zoned, and packed,) are added to the maximum length of the field.

Note: Some nondisplayable EBCDIC characters are translated into ASCII control characters on the workstation. If EBCDIC character fields contain nondisplayable data, you might get unexpected results and your ASCII text file might appear to be corrupted.

For example, X'05' in an EBCDIC field is translated to an ASCII X'09', which is an ASCII control character for horizontal tab. Most workstation text editors process this tab character so that the data in your workstation text file appears to be shifted to the right when viewed. If one of the EBCDIC characters is X'3F', it translates into an ASCII X'1A', which is interpreted as end-of-file by the workstation text editor. You might not be able to view any of the remaining records that were transferred to your ASCII text file.

One possible solution to this problem is to define these fields on the host system as hexadecimal fields instead of character fields.

Binary fields change to ASCII numeric. For example, X'FFD3' with no decimal position expands to ASCII 20202020202020202D3435. When displayed by an editor or printed, the string appears as –45.

Note: The length of the ASCII field depends on the length of the binary field.

A binary field on the AS/400 system is either 2 or 4 bytes long. The resulting ASCII field length is from 6 to 11 bytes, including the sign. Another byte is added for a decimal point.

Table 15-11 shows the mapping between binary field lengths and their ASCII lengths.

Table 15-11. Binary-to-ASCII Field Length Mapping

Binary Length	ASCII Length	Value Range
2	6	–32768 to 32767
4	11	–2147483648 to 2147483647

Zoned decimal fields are changed to ASCII numeric. For example, EBCDIC F0F0F9F5F2D6 with a field length that indicates two digits to the right of the decimal point expands to ASCII 20202D39352E3236. When displayed by an editor or printed, the string appears as –95.26. The resulting workstation field length is equal to the length of the system field plus 1 for the sign and 1 for the decimal point, if specified.

Packed decimal fields change to ASCII numeric. For example, X'871D' (no decimal point) changes to ASCII 2D383731. When displayed by an editor or printed, the string appears as –871.

Since two decimal digits are packed into 1 byte, the length of the resulting workstation field is equal to two times the length of the AS/400 field, plus 1 for the decimal point (if specified). This length always includes the sign. A minus sign (–) indicates negative, and a space indicates positive.

Transferring Data from ASCII Text Files: When you transfer data from ASCII text files to system files, the data changes as follows:

ASCII character data changes to EBCDIC character, date, time, or time-stamp data (based on the AS/400 field type) on a byte-to-byte basis, or to hexadecimal data by changing 2 ASCII bytes into 1 hexadecimal byte.

ASCII numeric data changes to AS/400 binary, zoned decimal, or packed decimal data, depending on the specified data type.

The field lengths on the AS/400 system and the workstation are different because of the explicit way minus signs and decimal points are stored in ASCII numeric fields. Each field changes individually, to ensure that the resulting field length matches the specifications for that field. The data transfer function tries to fit the workstation data into the system field.

For null-capable AS/400 fields, null values (except date, time, and time stamp) cannot be reliably detected and are not uploaded. For variable-length AS/400 fields, trailing blanks are removed and the field is converted to the variable-length format.

Errors When Transferring Data from ASCII Text Files: When you transfer data from a workstation ASCII text file to an AS/400 file, the following errors can occur:

A data field in the ASCII text file is too long for a field in the AS/400-defined file. In this case, the data is truncated. This occurs when the description file defines the character data as longer than the field length specified for the system file.

If the data transfers to an EBCDIC field, this error occurs only if the extra bytes are not spaces.

If the data transfers to a hexadecimal field, this error occurs only if the extra bytes are not zeros. These extra bytes are truncated so the data fits into the specified field.

The value of numeric data is too large for the system field. The maximum value is used. This error occurs when:

- Numeric data in the field does not fit into the specified number of bytes for the field.
- The decimal value of a numeric field contains more digits than were specified for the field.

The value of the field is set to the maximum value possible for the number of bytes and digits specified by the AS/400 system.

Data in this field has too many decimal positions. The number is rounded. This error occurs when the number of decimal positions in the field is greater than the number of decimal positions specified on the AS/400 system. These

extra bytes are significant because the data rounds up if the first extraneous digit is 5 or greater, and rounds down if it is less than 5.

Data in this field is incorrect or does not match the data type. This error occurs when:

- Nonnumeric data is found in a field that the file descriptions defined as numeric. The transfer request ends to prevent transferring incorrect data to the file.
- ASCII numeric data is found that does not match the format the file description specified. An incorrectly positioned decimal point within the field could cause this error.
- A value other than X'30' through X'39', minus, plus, or decimal point is found. A duplicated decimal point or minus is found. The transfer request ends to prevent transferring incorrect data to the file.

Data for this field is missing. The default values are used. This error occurs when a data field is defined, but the data is not in the file. This means that the end of the record is reached before all of the defined data is found.

The field or fields for which data has been defined but not found then fill with default values and transfer to the file. The default values are EBCDIC spaces for character fields, or zeros for numeric and hexadecimal fields.

To supply your own default values, use the default (DFT) keyword in the data description specifications (DDS) for the file.

Extra data is found at the end of this record. The extra data is not transferred. Data found at the end of this record and not defined by the system data definitions or workstation file-description file is not transferred to the system file, because no definitions exist to define the data and how it should change.

When you transfer data from an ASCII text file to an AS/400 file without using a file-description file, any extra data found past the record length specified for the file is not transferred.

BASIC Random Files

BASIC random files are the most general-purpose BASIC file type. They contain fixed-length records with:

No delimiters between fields or records
No end-of-file marks

Transferring Data to BASIC Random Files: When you create a BASIC random file, system data changes as follows:

Hexadecimal fields do not change.

Change from a system binary field depends on the field length:

- Fields of 2 bytes, with no decimal positions to the right of the decimal point, change to 2-byte BASIC integer values. The only change is that the order of the bytes reverses.
- Fields of 2 bytes, with decimal positions to the right of the decimal point, change to BASIC single-precision numbers.
- Fields of 4 bytes change to BASIC double-precision numbers.

EBCDIC character, date, time, and time-stamp fields change byte by byte and are mapped into ASCII characters as defined by the translation tables.

Variable-length and null fields are converted to fixed lengths, and trailing blanks (for character, hexadecimal, date, time, and time-stamp data) or zeros (for binary, zoned, and packed data) are added to the maximum length of the field.

Zoned decimal fields change into one of the following BASIC variables depending on the field length and the number of decimal positions:

- Zoned decimal fields of 4 bytes or less with no positions to the right of the decimal point change to a BASIC integer of an equivalent value.

  A zoned decimal field of 4 bytes or less, but with a decimal point, falls into the following category.

- Zoned decimal fields up to 7 bytes (including those that did not fall into the previous category) change to a BASIC single-precision number of an equivalent value.

- Zoned decimal fields greater than 7 bytes change to a BASIC double-precision number of an equivalent value.

Packed decimal fields change into one of the following BASIC variables depending on the length of the field:

- Packed decimal fields of 2 bytes or less with no positions to the right of the decimal point change to a BASIC integer of an equivalent value.

  A packed decimal field of 2 bytes or less, but with a decimal point, falls into the following category (up to 4 bytes).

- Packed decimal fields of up to 4 bytes (including those that did not fall into the previous category) change to a BASIC single-precision number of an equivalent value.

- Packed decimal fields greater than 4 bytes change to a BASIC double-precision number of an equivalent value.

Note: Changes between binary, packed decimal, and zoned decimal numbers with decimal points are not equivalent to their BASIC number counterparts, because BASIC uses a binary number format that does not always change into exact decimal fractions.

Transferring Data from BASIC Random Files: When you transfer data from BASIC random files to system files, the data changes as follows:

Hexadecimal fields transfer to the system file as unchanged hexadecimal data. The field lengths as stored on the workstation should be the same as the field lengths as stored on the system.

ASCII character, date, time, and time-stamp data changes to EBCDIC character data byte by byte.

For null-capable AS/400 fields, null values (except date, time, and time stamp) cannot be reliably detected and are not uploaded. For variable-length AS/400 fields, trailing blanks are removed and the field is converted to the variable-length format.

Numeric fields from BASIC random files (BASIC integers, single-precision floating-point numbers, and double-precision floating-point numbers) change to system binary data, zoned decimal data in EBCDIC format, or packed decimal data in EBCDIC format.

Note: Because the change of floating-point numbers into decimal fractions is not always exact, each number automatically changes into the most precise number possible with respect to the system field length. If you want more precision, specify a larger system field size.

Errors When Transferring Data from BASIC Random Files: When you transfer data from a workstation BASIC random file to a system file, the following errors can occur:

Data in this field is too short for the system field. The data is padded. This error occurs when the file contains character or hexadecimal data shorter than the field length specified on the system. This error can occur if the workstation field is defined as shorter than the system, or if the data in the last record of the file is too short. Character fields are padded on the right with EBCDIC spaces, and hexadecimal fields are padded with zeros.

Data in this field is too long for the system field. The data is truncated. This error occurs when the workstation file-description file defines character or hexadecimal data as longer than the field length specified on the system.

For character data, this error occurs only if the extra bytes are not spaces. For hexadecimal data, this error occurs only if the extra bytes are not zeros. These extra bytes are then truncated so that the data fits into the specified AS/400 field.

The value of numeric data is too large for the system field. The maximum number is used. This error occurs when:

- Numeric data in the workstation field does not fit into the specified number of bytes for the system field.
- The decimal value of a numeric field contains more digits than are specified for the system field.

Data in this field has too many decimal positions. The number is rounded down to zero. In BASIC random processing, this error occurs if the value of the number is too small to fit into the specified field.

For example, the number 0.00001 does not fit into a system zoned field specified as being 2 bytes in length and 2 decimal positions to the right of the decimal point. In this example, the resulting value is zero.

Data for this field is missing. The default values are used. This error occurs when a data field is defined, but the data is not in the file. This means that the end of the file is reached before all of the defined data is found. For BASIC random files, this error occurs only on the last record in the file, since there are no explicit record delimiters.

When this error occurs, the field or fields for which data is defined, but not found, are filled with default values and are transferred to the AS/400 file. These default values are EBCDIC spaces for character fields and zeros for numeric fields.

To supply your own default values, use the Default (DFT) keyword in the DDS for the file.

When you transfer data from a BASIC random file to an AS/400 file, any data shorter than the record length defined for the system file is padded with EBCDIC spaces.

Because there are no record delimiters in BASIC random files, this error can occur only on the last record of the file. This probably indicates that the record length of the system file does not match the record length of the workstation file.

BASIC Sequential Files

BASIC uses BASIC sequential files for sequential processing (for example, INPUT and WRITE statements). The fields written are considered either character or numeric. Characteristics of BASIC sequential files are as follows:

Both numeric and character fields are written as displayable characters. However, character strings are distinguished from numeric strings by the ASCII double quotation marks (X'22') that surround them.

Therefore, character data in BASIC sequential files cannot contain ASCII double quotation marks, because they are interpreted as the end of the character string.

Fields are delimited by ASCII commas (X'2C'). Therefore, commas are not allowed as date, time, or decimal separators.

Each record is delimited from the next by a carriage return character (X'0D') and a line feed character (X'0A'). The end-of-file character is X'1A'.

Records and fields are variable in length.

Transferring Data to BASIC Sequential Files: The following list describes how AS/400 data created by a BASIC-sequential-file-defined data definition changes:

Hexadecimal fields change to equivalent ASCII characters for each half-byte. Double quotation marks surround them.

For example, X'F3' expands to ASCII 22443322 and is written to the file.

EBCDIC character, date, time, and time-stamp fields change byte by byte and are mapped into ASCII characters as defined by the translation tables. ASCII double quotation marks are added before and after the character string.

Null fields are represented by the absence of the field (comma comma, or by a single comma if the null field is the last field of the record).

For null fields, successive commas in the file will result in a null value being sent to the AS/400 system if the field is null-capable.

In variable-length fields, if the AS/400 field is variable length, the field is converted to the AS/400 variable-length format.

Binary fields change to ASCII numeric. Leading zeros to the left of the decimal point and trailing zeros to the right of the decimal point are removed.

For example, X'FFD3' appears as ASCII 2D3435. When displayed on an ASCII device, the string appears as –45.

Zoned decimal fields change to ASCII numeric. Leading zeros to the left of the decimal point and trailing zeros to the right of the decimal point are removed.

For example, EBCDIC F0F0F9F5F2D6 with a field length that indicates two digits to the right of the decimal point expands to ASCII 2D39352E3236. The string appears as –95.26 when an editor displays it or it prints.

Packed decimal fields change to ASCII numeric. Leading zeros to the left of the decimal point and trailing zeros to the right of the decimal point are removed.

For example, X'871F' (no decimal point) changes to ASCII 383731. The string appears as 871 when an editor displays it or it prints.

Transferring Data from BASIC Sequential Files: When you transfer data from BASIC sequential files to AS/400 files, the data changes as follows:

ASCII character, date, time, and time-stamp data changes to EBCDIC character data on a byte by byte basis and to hexadecimal by changing 2 ASCII bytes into 1 hexadecimal byte.

ASCII numeric data translates to system binary, zoned decimal, or packed decimal data, depending on the specified data type. The lengths of the system data and the workstation data might be different because the minus signs and decimal points are stored in ASCII numeric fields, and leading and trailing spaces are stripped away.

BASIC might create exponential numbers in these files. The data transfer function also changes these numbers.

Each translated field is individually verified to ensure that the resulting field length matches the specifications for that field. The data transfer function tries to fit the workstation data into the system field.

Errors When Transferring Data from BASIC Sequential Files: When you transfer data from a BASIC sequential file to a AS/400-defined file, the following errors can occur:

Data in this field is too long for the AS/400 field. The data is truncated. The file-description file defines character data as longer than the field length specified for the file.

If the data transfers to an EBCDIC field, this error occurs only if the extra bytes are not spaces. If the data transfers to a hexadecimal field, this error occurs only if the extra bytes are not zeros. These extra bytes are truncated so that the data fits into the specified AS/400 field.

The value of numeric data is too large for the system field. The maximum value is used. This error occurs when:

- Numeric data in the workstation field does not fit into the specified number of bytes for the system field.
- The decimal value of a numeric field contains more digits than were specified for the system field.

The value of the field is set to the maximum value possible for the number of bytes and digits specified by the AS/400 system.

Data in this field has too many decimal positions. The number is rounded. This error occurs when the number of decimal positions in the workstation field is greater than the number of decimal positions specified on the system. The extra bytes are significant, because the data is rounded up if the first extraneous digit is 5 or greater, and is rounded down if it is less than 5.

Data in this field is incorrect or does not match the workstation data type. This error occurs when a field defined as numeric by the file description contains nonnumeric data. This could also result if a character or hexadecimal field contains a numeric field, or if a numeric (zoned, packed, or binary) field contains a character field.

When this error occurs, the transfer request ends to prevent transferring incorrect data to the system file.

Data for this field is missing. The default values are used. This error occurs when a data field is defined, but the data is not in the file. This means that the end of the record is reached before all of the defined data is found.

When this error occurs, the field or fields for which data has been defined, but not found, are filled with default values and transferred to the AS/400 file. These default values are EBCDIC spaces for character fields, or zeros for numeric fields.

To supply your own default values, use the default (DFT) keyword in the DDS for the file.

Data in this field exceeds the workstation field size. The data is lost. This error occurs when extra data, not defined by the file-description file, is found at the end of a character field. The extra bytes are truncated and are not transferred to the system file.

Extra data found at the end of the record. The extra data is not transferred. This error occurs when extra data is found at the end of the record, and has not been defined by the system data definitions or workstation file-description file. This extra data is not transferred to the system, because no definitions exist to define the data and describe how it should change.

Data Interchange Format Files

Data Interchange Format (DIF) files represent data in rows and columns. DIF files contain character and numeric data (positive and negative decimal numbers).

DIF is used for data interchange between spreadsheet programs and other application programs.

The data transfer function supports only the following two data types within DIF files:

Character data: The data in a character cell (think of a *cell* as one field in one record) must be enclosed in double quotation marks if there is an embedded space in the string. However, if the string begins with a quotation mark, it must also end with a quotation mark.

Numeric data: The numeric data supported by the data transfer function consists of a decimal number that can contain a minus sign or a decimal point or both. The data transfer function also supports exponential numeric data.

Transferring Data to DIF Files: When creating a DIF file, system data changes as follows:

Hexadecimal fields change to equivalent ASCII characters for each half-byte. Double quotation marks surround them.

EBCDIC character, date, time, and time-stamp data changes byte by byte and is mapped into ASCII characters as defined by the translation tables. ASCII double quotation marks are added before and after the character string.

Binary fields change to ASCII numeric. Leading zeros to the left of the decimal point, and trailing zeros to the right of the decimal point, are removed.

Zoned decimal fields change to ASCII numeric. Leading zeros to the left of the decimal point, and trailing zeros to the right of the decimal point, are removed.

For example, EBCDIC F0F0F9F5F2D6 with a field length that indicates two digits to the right of the decimal point expands to ASCII 2D39352E3236. When displayed or printed, the string appears as –95.26.

Packed decimal fields change to ASCII numeric. Leading zeros to the left of the decimal point, and trailing zeros to the right of the decimal point, are removed.

For example, X'871D' (no decimal point) changes to ASCII 2D383731. When displayed or printed, the string appears as –871.

If untranslatable data is found, the entire field becomes an error cell. An **error cell** results when untranslatable data is found when a DIF file is created or when a not valid calculation is done using the DIF file with a spreadsheet program.

Transferring Data from DIF Files: If an error cell is found when data is transferred from a DIF file to the AS/400 system, one of the following things can occur, depending on the type of data in the file:

If the system field is a character (EBCDIC) field, it is filled with untranslatable characters (hexadecimal zeros) and is transferred to the system. A message appears, telling you how many bytes of untranslatable data have transferred.

If the system field is a hexadecimal, zoned, packed, or binary field, you receive an error message telling you that the data in this cell is incorrect, and that the data was not transferred to the system.

When you transfer data from a system file to a DIF file, the field names are placed in the first record and you can consider them column headings. When you transfer DIF files back to the system, the first row must either be these field names (exactly as they are defined on the system) or data. If the first row does not consist of field names, the file is processed as if it contains only data.

No DIF header information is used when sending the file to the AS/400 system. To correctly transfer a DIF file to the system, ensure that the file is in the correct format (row and column). It is essential that the field names, if present, make up the first row of data. The subsequent records make up the remaining rows of data. Therefore, when you transfer the data to the AS/400 system, the file must be saved in the same format as originally created by the data transfer function.

When you transfer data from DIF files to AS/400 files, the data changes as follows:

ASCII character, date, time, and time-stamp data is changed to EBCDIC character data or to hexadecimal data. ASCII-to-EBCDIC conversion is done byte by byte. ASCII-to-hexadecimal conversion is done by changing 2 ASCII bytes to 1 hexadecimal byte.

ASCII numeric data changes to system binary, zoned decimal, or packed decimal data, depending on the data type the system specifies.

The lengths of the fields on the system and the workstation can be different, because of the explicit way minus signs and decimal points are stored in ASCII numeric fields. This means that each field changes individually, to ensure that the resulting field length matches the system specifications for that field. The data transfer function tries to fit the workstation data into the system field.

In null fields, a NULL DIF character field results in a null value being sent to the AS/400 field if the field is null-capable.

If the AS/400 field is variable-length, the field is converted to the AS/400 variable-length format.

Errors When Transferring Data from DIF Files: When you transfer data from a workstation DIF file to a system file with data definitions, the following errors can occur:

Data in this workstation file is not valid, or the version of this workstation file is not supported. The DIF file does not follow the standard DIF format. Processing ends, and no more records are transferred.

Data in this field is too long for the AS/400 field. The data is truncated. The workstation file-description file defines character or numeric data as longer than the field length specified for the system file.

For character data, this error occurs only if the extra bytes are not spaces. For hexadecimal data, this error occurs only if the extra bytes are not zeros. The extra bytes are truncated so that the data fits into the specified AS/400 field.

The value of numeric data is too large for the system field. The maximum value is used. This error occurs when:

- Numeric data in the workstation field does not fit into the specified number of bytes for the AS/400 field.
- The decimal value of a numeric field contains more digits than are specified for the system field.

The value of the field is set to the maximum value possible for the number of bytes and digits the system specifies.

Data in this field has too many decimal positions. The number is rounded. The number of decimal positions in the workstation field is greater than the number of decimal positions specified on the system. The data is rounded up if the first extraneous digit is 5 or greater, and is rounded down if it is less than 5.

Data in this field is incorrect or does not match the workstation data type. One of the following things has occurred:

- A numeric field contains nonnumeric data.
- A character or hexadecimal field contains a numeric field or a numeric (zoned, packed, or binary) field contains a character field.
- An AS/400 hexadecimal or numeric (zoned, packed, or binary) field contains a DIF error cell.

When this error occurs, the transfer request ends to prevent the transfer of incorrect data to the system file.

Data for this field is missing. This occurs when a data field is defined, but the data is not in the file. This means that the end of the record is reached before all of the defined data is found. If the host field is null-capable then a null is inserted; otherwise, the default values are used.

When this error occurs, the field or fields for which data is defined, but not found, are filled with default values and are transferred to the system file. These default values are EBCDIC spaces for character fields, or zeros for numeric fields.

To supply your own default values, use the Default (DFT) keyword in the DDS for the file.

Data in this field exceeds the field size. The data is lost. This error occurs when extra data, not defined by the file-description file, is found at the end of a character field. The extra bytes are truncated and are not transferred to the system file.

Extra data is found at the end of this record. The extra data is not transferred. This error occurs when there is extra data at the end of the record, and the AS/400 data definitions or file-description file have not defined it. This extra data is not transferred to the system, because no definitions exist to define the data and how it should change.

BIFF Files

In a BIFF file, data is expressed in lines and columns. A BIFF file contains character and numeric data (positive and negative decimal values).

The BIFF file format is used in EXCEL. The supported BIFF version is 4 (EXCEL 4.0).

The transfer facility supports only the following two data types for a BIFF file:

Character data
Numeric data

Transferring Data to BIFF Files: When a BIFF file is created, the system data is converted to equivalent EXCEL cell data.

If untranslatable data is found, the entire field is treated as an error cell.

Transferring Data from BIFF Files: If an error cell is found during data transfer from a BIFF file to the AS/400 system, either of the following things can occur depending on the data type of the file:

If the system field is a character (EBCDIC) field, the error cell containing untranslatable characters (hexadecimal zeros) is transferred to the system. A message indicating how many bytes of untranslatable data were transferred is displayed.

If the system field is a hexadecimal, zoned decimal, packed decimal, or binary field, an error message indicating that the data in this cell is not valid and thus has not been transferred to the system is displayed.

When data is transferred from a system file to a BIFF file, the first record contains field names, which can be treated as column headers.

To return a BIFF file to the system, the first line must contain these field names (as defined in the system) or data. If the first line does not contain field names, the file is regarded as containing data only.

When a file is sent to the AS/400 system, cell information (such as the character size and font information) is ignored. This means that cell information is lost, even if the contents of a BIFF file that have been sent to the AS/400 system are retransmitted to a workstation.

When data is transferred from a BIFF file to an AS/400 file, the data is converted as follows:

ASCII character cell data is converted to EBCDIC character data or hexadecimal data; 1-byte ASCII data is converted to 1-byte EBCDIC data.

ASCII numeric cell data is converted to a binary number, or a zoned or packed decimal number, depending on the data type specified in the system.

When data is transferred from a BIFF file to the AS/400 system, the following specific processing is performed:

When data is transferred to a BIFF file, the first record contains the names of the fields to be transferred, which can be treated as column headers. To return a BIFF file to the AS/400 system, the first line must contain the same field names (as defined in the AS/400 system) or data. If the first line or the first set does not contain a character field that exactly matches the AS/400 field, the file is treated as being a file with no column headers, and only data is processed.

When a BIFF file is transferred to the AS/400 system, header information is not used.

To ensure correct transfer of a BIFF file to the AS/400 system, the file format must be valid (lines and columns). Data for each set or line must correspond to one record in the AS/400 file.

Errors When Transferring Data from BIFF Files: When data is transferred from a BIFF file on a workstation to the system file with the data definition, the following errors can occur:

Data in this workstation file is not valid, or the version of this workstation file is not supported. The BIFF file does not conform to the standard BIFF format. Processing terminates, and no more records are transferred.

Data in this field is too long for the corresponding AS/400 field. The data is truncated. A file-description file defines character or numeric data that is longer than the field specified in the system file.

- For conversion from ASCII to EBCDIC, this error occurs if a file-description file defines ASCII data that is longer than the field specified in AS/400 system.

  During conversion from ASCII to hexadecimal, this error will occur if a file-description file defines ASCII data that is twice as long as the field specified in AS/400 system. This is because 2-byte ASCII data is converted to one hexadecimal character.

- A truncation error only occurs if excess bytes are other than blanks (X'20') during conversion from ASCII to EBCDIC, or other than zeros (X'30') during conversion from ASCII to hexadecimal. Truncating these excess bytes enables data to fit into the specified AS/400 fields.

Numeric data is too long to fit into the corresponding AS/400 field. The maximum value is assumed. This error occurs under either of the following conditions:

- Numeric data in a workstation field is too long to fit into the number of bytes specified for the AS/400 field.
- The number of decimal digits in a numeric field exceeds the number of digits specified for the AS/400 field.

The field value is set to the maximum value that can be specified for the number of bytes, and that for the number of digits, specified for the AS/400 system.

Data in this field contains too many decimal places. The data is rounded off. The number of decimal places in a workstation field is greater than the number of decimal places specified for the system. If the first excess digit is 5 or more, the data is rounded up. Otherwise, it is rounded down.

Data in this field is not correct, or its type does not match the type of workstation data. One of the following things has occurred:

- A numeric field contains other than numeric data.
- A character field or a hexadecimal field contains a number, or a numeric (zoned or packed decimal, or binary) field contains characters.
- A hexadecimal field or a numeric (zoned or packed decimal, or binary) field for the AS/400 contains a BIFF error cell.

If this error occurs, the transfer request terminates to avoid transferring incorrect data to the system file.

Data for this field is missing. This error occurs if the data field is defined, but the file does not contain any data. This means that the end of the record is reached before all defined data has been found.

If this error occurs (that is, if data is defined for one or more fields, but it is not found there) the fields containing the default value are transferred to the system file. The default value is EBCDIC spaces for a character field and zeros for a numeric field.

To specify a user-specific default value, use the default value (DFT) keyword in DDS for the file.

Data in this field exceeds the size of a workstation field. Data is lost. This error occurs if excess data, not defined in the workstation file-description file, is found at the end of the field. For character data, excess bytes are truncated, and not transferred to the system file. For numeric data, the entire field is converted to zeros and transferred to the system file.

Excess data is found at the end of this record. The excess data is not transferred. This error occurs if such excess data is not defined in the AS/400 data definition or in the workstation file-description file. This excess data is not transferred to the system, because the data and the conversion method are not defined.

DOS Random Files

DOS random files are fixed-length files used by the DOS random read and write routines. The characteristics of DOS random files are as follows:

There are no end-of-record or end-of-file markers.

Records are delimited by their constant length, relative positions in the file, and the total length of the file.

Note: DOS random and DOS random type-2 files are identical, except for the way in which the signs are represented for packed decimal and zoned decimal numbers.

Transferring Data to DOS Random Files: When creating DOS random file data definitions, system data changes as follows:

Binary fields on the AS/400 system and the workstation are represented as two-complement numbers, so it is unnecessary to change individual bytes. The workstation uses the convention of storing numeric values with the least significant byte in the left-hand byte position. The data transfer function then reverses the order of the bytes in the binary fields.

For example, X'CEF3', coming from the system as a 2-byte binary number (representing the value –12557), appears as X'F3CE'.

EBCDIC character, date, time, and time-stamp data changes byte by byte and is mapped into ASCII characters as defined by the translation tables.

Variable-length and null fields are converted to fixed length, and trailing blanks (for character, hex, date, time, and time stamp) or zeros (for binary, zoned, and packed) are added to the maximum length of the field.

Hexadecimal fields do not change.

Packed decimal fields do not change except for the last half-byte, which contains the sign. The workstation uses X'3' to indicate a positive number and X'B' to indicate a negative number in the sign half-byte.

For example, X'0865431F' appears as X'08654313'.

Zoned decimal fields from the system change from EBCDIC to ASCII, as do character fields, except that the sign half-byte in the workstation changed field is X'3' to indicate a positive number and X'B' to indicate a negative number.

For example, EBCDIC X'F0F1F2F5F2D6' appears as ASCII X'3031323532B6'.

Transferring Data from DOS Random Files: When you transfer data from DOS random files to AS/400 files, the data changes as follows:

ASCII character, date, time, and time-stamp data changes to EBCDIC character data on a byte by byte basis.

Binary fields in the workstation file are stored in an order reversed from what the system file expects. These bytes reverse and transfer to the system file.

Hexadecimal fields do not change. The field length on the system should be the same as the field length on the workstation.

For packed decimal fields, only the last half-byte (the byte that contains the sign) is changed. The host system uses X'F' to indicate a positive number and X'D' to indicate a negative number for the sign half-byte.

For example, X'08654313' appears as X'0865431F'.

Zoned decimal fields on the workstation change from ASCII to EBCDIC (ASCII to EBCDIC for DBCS), as do character fields. The last half-byte (the half-byte that contains the sign) in the workstation field is changed to X'F' to indicate a positive number and X'D' to indicate a negative number.

For example, ASCII X'3031323532B6' appears as EBCDIC X'F0F1F2F5F2D6'.

For null-capable AS/400 fields, null values (except date, time, and time stamp) cannot be reliably detected and are not uploaded. For variable-length AS/400

fields, trailing blanks are removed, and the field is converted to the variable-length format.

Errors When Transferring Data from DOS Random Files: When you transfer data from a DOS random file to an AS/400 file, the following errors can occur:

Data in this field is too short for the system field. The data is padded. This error occurs when the workstation file contains character or hexadecimal data shorter than the specified field length. It also occurs if the length of the workstation field is defined as less than the system field, or if the data in the last record of the file is too short. Character fields are padded on the right with EBCDIC spaces. Hexadecimal fields are padded on the right with zeros.

Data in this field is too long for the system field. The data is truncated. This error occurs when the workstation file-description file defines character or hexadecimal data as longer than the field length specified for the system file.

For character data, this error occurs only if the extra bytes are not spaces. For hexadecimal data, this error occurs only if the extra bytes are not zeros. These extra bytes are truncated so that the data fits into the specified field.

The value of numeric data is too large for the system field. The maximum value is used. This error occurs when:

- Numeric data in the workstation field does not fit into the specified number of bytes for the AS/400 field.
- The decimal value of a numeric field contains more digits than were specified for the AS/400 field.

The value of the field is set to the maximum value possible for the number of bytes and digits specified by the system.

Data in this field has too many decimal positions. The number is rounded. This occurs when the number of decimal positions in the workstation field is greater than the number of decimal positions specified on the system. The extra bytes are significant, because the data rounds up if the first extraneous digit is 5 or greater, and rounds down if it is less than 5.

Data in this field is incorrect or does not match the workstation data type. This error occurs when nonnumeric data appears in a field defined as numeric by the file descriptions. When this occurs, the transfer request ends to prevent transferring incorrect data to the system file.

Data for this field is missing. The default values are used. This error occurs when a data field is defined, but the data is not in the file. This means that the end of the file is reached before all the defined data is found.

When this error occurs, the field or fields for which data has been defined, but not found, fill with default values and transfer to the system file. Default values are EBCDIC spaces for character fields, or zeros for numeric fields.

To supply your own default values, use the default (DFT) keyword in the DDS for the file.

When you transfer data from a DOS random file to a system file without data definitions, any data shorter than the record length defined for the system file is padded with EBCDIC spaces.

Because DOS random files have no record delimiters, this error occurs only on the last record and probably indicates that the record length of the system file does not match that of the workstation file.

DOS Random Type-2 Files

DOS random type-2 files are fixed-length files used by the DOS random read and write routines. The characteristics of DOS random type-2 files are as follows:

There are no end-of-record or end-of-file markers.

Records are delimited by their constant length, relative positions in the file, and the total length of the file.

Note: This workstation file type is identical to the DOS random file type, except that the internal sign representation for packed decimal and zoned decimal data types follow Systems Application Architecture (SAA) standards. Some workstation applications, such as applications written in IBM COBOL/2 programming language, need to have the signs for packed decimal and zoned decimal data types represented this way. Use the DOS random type-2 file type for those workstation applications.

Transferring Data to DOS Random Type-2 Files: When you create DOS random type-2 file data definitions, system data changes as follows:

Binary fields on the AS/400 system and the workstation are represented as twos complement numbers, so it is unnecessary to change individual bytes. The workstation uses the convention of storing numeric values with the least significant byte in the left-hand byte position. The data transfer function then reverses the order of the bytes in binary fields.

For example, X'CEF3', coming from the system as a 2-byte binary number (representing the value –12557), appears as X'F3CE'.

EBCDIC character, date, time, and time-stamp fields change byte by byte and are mapped into ASCII characters as defined by the translation tables.

Variable-length and null fields are converted to fixed length, and trailing blanks (for character, hex, date, time, and time stamp) or zeros (for binary, zoned, and packed) are added to the maximum length of the field.

Hexadecimal fields do not change.

Packed decimal fields do not change. The sign convention used on the workstation and on the host system is the same.

For example, X'0865431C' appears as X'0865431C'.

Zoned decimal fields from the system change from EBCDIC to ASCII, as do character fields. However, the sign half-byte is changed to a 3 to indicate a positive number or a 7 to indicate a negative number when the data is sent to the workstation.

For example, EBCDIC X'F0F1F2F5F2D6' appears as ASCII X'303132353276'.

Transferring Data from DOS Random Type-2 Files: When you transfer data from DOS random type-2 files to AS/400 files, the data changes as follows:

ASCII character data, date, time, and time stamp data change to EBCDIC character data on a byte by byte basis.

Binary fields in the workstation file are stored in an order reversed from what the system file expects. These bytes reverse and transfer to the system file.

Hexadecimal fields do not change. The field length on the system should be the same as the field length on the workstation.

For packed decimal fields, the last half-byte (the half-byte that contains the sign) is not changed unless the sign half-byte is less than X'A' (represented by values 0 through 9). If the sign half-byte is less than X'A', it is changed to X'F' on the host system.

For example, X'865431D' appears as X'0865431D', but X'08654318' appears as X'0865431F'.

Zoned decimal fields on the workstation change from ASCII to EBCDIC, as do character fields. However, the sign half-byte is changed to an F to indicate a positive number or a D to indicate a negative number when the data is sent to the host system.

For example, ASCII X'303132353276' appears as EBCDIC X'F0F1F2F5F2D6'.

For null-capable AS/400 fields, null values (except date, time, and time stamp) cannot be reliably detected and are not uploaded. For variable-length AS/400 fields, trailing blanks are removed and the field is converted to the variable-length format.

Errors When Transferring Data from DOS Random Type-2 Files: When you transfer data from a DOS random type-2 file to an AS/400 file, the following errors can occur:

Data in this field is too short for the system field. The data is padded. This error occurs when the workstation file contains character or hexadecimal data shorter than the specified field length. It also occurs if the length of the workstation field is defined as less than the system field, or if the data in the last record of the file is too short. Character fields are padded on the right with EBCDIC spaces. Hexadecimal fields are padded on the right with zeros.

Data in this field is too long for the system field. The data is truncated. This error occurs when the workstation file-description file defines character or hexadecimal data as longer than the field length specified for the system file.

For character data, this error occurs only if the extra bytes are not spaces. For hexadecimal data, this error occurs only if the extra bytes are not zeros. These extra bytes are truncated so that the data fits into the specified field.

The value of numeric data is too large for the system field. The maximum value is used. This error occurs when:

- Numeric data in the workstation field does not fit into the specified number of bytes for the AS/400 field.
- The decimal value of a numeric field contains more digits than were specified for the AS/400 field.

The value of the field is set to the maximum value possible for the number of bytes and digits specified by the system.

Data in this field has too many decimal positions. The number is rounded. This occurs when the number of decimal positions in the workstation field is greater than the number of decimal positions specified on the system. The

extra bytes are significant, since the data rounds up if the first extraneous digit is 5 or greater, and rounds down if it is less than 5.

Data in this field is incorrect or does not match the workstation data type. This error occurs when nonnumeric data appears in a field defined as numeric by the file descriptions. When this occurs, the transfer request ends to prevent transferring incorrect data to the system file.

Data for this field is missing. The default values are used. This error occurs when a data field is defined, but the data is not in the file. This means that the end of the file is reached before all the defined data is found.

When this error occurs, the field or fields for which data has been defined, but not found, fill with default values and transfer to the system file. Default values are EBCDIC spaces for character fields, or zeros for numeric fields.

To supply your own default values, use the default (DFT) keyword in the DDS for the file.

When you transfer data from a DOS random type-2 file to a system file without data definitions, any data shorter than the record length defined for the system file is padded with EBCDIC spaces.

Because DOS random type-2 files have no record delimiters, this error occurs only on the last record and probably indicates that the record length of the system file does not match that of the workstation file.

No-Conversion Files

No-conversion files, defined by the data transfer function, consist of data that has not changed. For example, when data transfers from the system to a workstation no-conversion file, the data transfers exactly as it is stored on the AS/400 system. Date, time, and time-stamp data transfers to EBCDIC character data on the workstation.

Transferring Data to No-Conversion Files: When you transfer data from the AS/400 system to a no-conversion file, the data transfers exactly as it is stored on the system.

Variable-length AS/400 fields are converted to fixed-length fields, and trailing EBCDIC blanks are added to the maximum length of the field.

Date, time, and time-stamp data is converted to EBCDIC character data.

Variable-length and null fields are converted to fixed length, and trailing EBCDIC blanks (for character, hex, date, time, and time stamp) or EBCDIC zeros (for binary, zoned, and packed) are added to the maximum length of the field.

Transferring Data from No-Conversion Files: The data types that exist in a no-conversion file are EBCDIC system data types only. When a no-conversion file transfers to the system, the data transfer function performs no data change or translation. Date, time, and time-stamp data transfers to EBCDIC character data on the workstation.

However, the data transfer function verifies that all numeric data is in the correct EBCDIC format. If any numeric data is found that is not in the correct EBCDIC format, that data and any remaining data does not transfer.

Errors When Transferring Data from No-Conversion Files: When you transfer data from a workstation no-conversion file to a system file, the following errors can occur:

Data sizes are not equal. When you transfer no-conversion files, the length and decimal position specifications for the system and the workstation must match exactly. If not, no records transfer.

Data in this field is too short for system field. The data is padded. This error occurs when the workstation file contains character or hexadecimal data shorter than the field length specified for the system file. This could occur if the data in the last record of the file is too short. Character fields are padded on the right with EBCDIC spaces. Hexadecimal fields are padded with zeros.

Data in this field is incorrect or does not match the workstation data type. The transfer request ends to prevent transferring incorrect data to the system file. This error occurs when a field defined by the file descriptions as numeric contains nonnumeric data.

Note: The data is verified assuming that the data is in EBCDIC format. If you want to transfer data in another format, do not use data definitions or file descriptions, and specify the record lengths defined on the system and the workstation in the same way.

Data for this field is missing. The default values are used. This error occurs when a data field has been defined, but the data is not in the file. This error can occur only in the last record of the file, since no-conversion files have no explicit record delimiters.

When this error occurs, the field or fields for which data has been defined but not found fill with default values and transfer to the system file. These default values are EBCDIC spaces for character fields, or zeros for numeric fields.

To supply your own default values, use the default (DFT) keyword in the DDS for the file.

AS/400 System-to-Personal Computer Performance Considerations

Transferring data from the AS/400 system to the workstation depends on the following performance considerations:

The system workload.

How many records have to be looked at to complete the transfer.

If more than two files are joined. You need extra AS/400 resources to join records from more than one file.

If GROUP BY fields are specified.

If complicated WHERE or HAVING comparisons are specified.

These factors and others influence the time needed to determine which data should be transferred. For example, the time needed to receive the first record of a transfer in which all the records are chosen is less than the time needed to start transferring a smaller group of records based on complicated WHERE or HAVING values. However, transferring all the records in a large file is sometimes impractical or unnecessary.

The AS/400-to-workstation data transfer function uses many functions within the AS/400 system to determine the fastest method of selectively retrieving records. When it selects a smaller group of records to transfer, the AS/400-to-workstation data transfer function uses the existing access paths whenever possible to improve performance.

For the AS/400-to-workstation data transfer function to consider using an existing access path (logical file), the access path must meet the following conditions:

It must be defined to the data that transfers.
It must have either *DELAY or *IMMED maintenance.

When you meet these conditions, you must then match the transfer request to the access path. The following considerations might be helpful when you define your transfer request:

The time it takes to select records based on WHERE clause values is less when the following things are true of the WHERE field:

- It is compared with a constant.
- It is the first key field in an existing access path defined to the data to be transferred.

A transfer request containing a GROUP BY or ORDER BY clause or both can work better if the key fields in the access path are in the same order as specified on the GROUP BY or ORDER BY clauses.

A transfer request containing a JOIN BY clause can work better when:

- An access path exists over the file that you are joining to.
- The field you are joining to is a primary key field in the access path.
- You are not returning records with missing fields.

PC400 Data Transfer

Chapter 16. File Transfer for PC400

File transfer is designed so that you can use it in the following cases:

To store a workstation file on the AS/400 system for a backup

To edit a source file of an AS/400 program with a workstation editor, and send the file edited on the workstation to the AS/400 system.

To distribute workstation documents and programs to the AS/400 users

You can easily transfer a file if you know the library name and file name.

File transfer is not suitable for complicated processing, such as the processing of an AS/400 database on a workstation and then returning the results to the AS/400. In that case, use the Data Transfer Function.

Before attempting to use file transfer, review this chapter.

Note: You need to have a program that supports the **APVAFILE** command installed on the host, such as Personal Communications Tools/400, If you do not, install one or ask IBM or your dealer how to obtain one.

PC File Transfer with the CRLF Option

If the CRLF option is specified, the transfer program checks for new-line characters. If the record length is reached before a new-line character is found, the record is divided at this point; one sentence of a workstation file will become two or more records. Particularly, specify a sufficiently long record length when retransmitting a workstation file containing 2-byte characters.

By default, the message records segmented. is not displayed. To display the message:

Look for the profile for the session you will use. Normally, this will be in the **\Personal Communications\Private** directory under the name *filename***.WS** (*filename* is a user-specified file name).

Use an editor to insert the following sentence into the [Transfer] section. If there is no [Transfer] section, first enter [Transfer]. Be careful to enter it correctly.

```
DisplayTruncateMessage=Y

or

[Transfer]
DisplayTruncateMessage=Y
```

The next time the session is started, this specification becomes active.

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Transfer to a Physical Source File

An AS/400 physical source file contains 12 bytes of information for each record as internal information: 6 bytes are for a record number, the other 6 bytes are for a date. When you transfer a file from a workstation using file transfer, the date field contains 000000. If the APPEND option is not specified, the record number is incremented by 1, up to a maximum of 9999. Otherwise, it is incremented from the nearest integer, greater than the number of the last record in the original file (for example, 24 for 23.1). If the number of records exceeds 9999, the next and all subsequent record numbers are 9999.

Use the source specifications input utility (SIU) to renumber records when saving the file after editing.

Transfer to a Physical File

A file, such as a PC program, that does not require the processing of the contents of an AS/400 file or the reading of data, should be transferred to a physical file with the BINARY transfer type. Because data is not converted, if the data is subsequently retransmitted from the AS/400 system to a workstation, the original workstation file can be re-created exactly. If the data is converted, however, data might not be restored to its original form, depending on the contents of the conversion table.

For the maximum number of members (MAXMBRS), a physical file attribute, the default value is 1. When a physical file is created during file transfer, MAXMBRS is 1.

When a file is transferred from a workstation to a physical file, the default file name **xxxBIN** is assumed (**xxx** is a workstation file extension.) If you transfer more than one file, an error occurs when the second and subsequent files are transferred: The TRANS58 file or member cannot be created. File transfer terminates. A file should be created with the expected file attribute before it is transferred from a workstation to the AS/400 system.

Use of the DSPMBRLST Command

For file transfer from the AS/400 system to a workstation, the Paste function can be used. If the name of the Library/File(Member) to be transferred is copied with the Copy function of the Edit menu, it can be displayed as the host file candidate to be transferred on the transfer request screen by clicking **Paste**. This is particularly convenient when transferring more than one file at a time.

Use the DSPMBRLST command to list AS/400 files or members. The command format is as follows:

DSPMBRLST LIB(lib-name) FILE(file-name)

LIB parameter

The LIB parameter contains the target library name. The default value is ***USRLIBL**. Extensive specification, such as ***ALL**, * for generic name, is possible, but is time consuming. AS/400 files or members are listed more efficiently if a specific name is specified.

FILE parameter

The FILE parameter contains the target file name. There is no default value. The parameter must be specified. ***ALL** and * for generic name can be specified.

Executing this command lists Library/File(Member) on the screen. If they cannot be listed on one screen, **MORE...** is displayed in the lower right corner of the screen. Use the next page or the preceding page key to scroll the screen. Create a list for Paste with the Copy or the CopyAppend function of the Edit menu, as required.

Restrictions for Transferred File Size

A file that is more than 1,040,000 bytes cannot be transferred correctly.

PC400 File Transfer

Chapter 17. Considerations for the Use of PC400 Sessions

This chapter describes considerations and restrictions for PC400 functions. First-time users of PC400 or users who want only to perform simple operations using the PC400-supplied default values need not read this chapter.

Refer to this chapter:

If a problem occurs during operation

When you want to obtain more detailed information about the system

When you want to know the restrictions imposed on the system's use

General Workstation Window Operations

Scroll Bar

When you select **Font** from the Appearance menu in the host session window and select **Fixed Size** from the Select Display Font window, the entire operator information area might not appear on the screen; the session-window size is restricted to be smaller than the screen size. If you specify **With Scroll Bar**, the OIA will not scroll.

Print Processing

Printing GDI Fonts

Some printer drivers do not support fixed-pitch GDI fonts.

CPI/LPI of Device Fonts

If the printer driver cannot print with device fonts associated with the user-specified CPI/LPI, the print output can be generated with incorrect CPI/LPI values.

PCSERR999 Error Messages

Message PCSERR999 - Personal Communications internal error:module-name - xxxx might appear if there is insufficient memory. If any print jobs are queued in the print manager, delete those print jobs.

Printable Area

Depending on the printer driver used, it might not be possible to use the entire surface of the paper for printing.

If the printing position is beyond the printable area, the page is automatically changed. When using a printer driver that allows you to set the margins, specify the minimum margins, thus maximizing the printable area.

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PDT Mode

Printing using a PDT file is restricted as follows:

Only the fonts specific to the printer being used are supported.

Graphics are printed via the Windows printer driver selected in **Printer Setting**, regardless of the PDT mode.

Postscript printers are not supported. There are no PDF files for Postscript printers.

Setting the Code Page

The host code page, which is set in the Configuration panel, is used as the default. The Set Initial Condition (SIC) command is used to set the host code page.

You can change the code page by using Set GCGID Through GCID (SCG) command or Set CGCS Through Local ID (SCGL) command. The same code pages for the display session are available.

For considerations and restrictions on the use of PC400, information supplementary to the items described in this chapter is stored, as a file, on the installation diskette. To access this information, click on the **README** icon in the PC400 folder.

Part 4. Appendixes

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Appendix A. Client/Server Concepts

Terminology

Advanced Program-to-Program Communications (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 IBM's 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.

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APPC Concepts

Personal Communications for Windows 95 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 for Windows 95 provides advanced program-to-program communications (APPC) to support communications between distributed processing programs, called *transaction programs* (TPs). APPN extends this capability to a networking environment. The TPs can be located at any node in the network that provides APPC.

Introducing APPC and CPI-C

Advanced Program-to-Program Communication (APPC), also known as LU 6.2, is software that enables high-speed communications between programs on different computers, from portables and workstations to midrange and host computers. APPC software is available for many different IBM and non-IBM operating systems, either as part of the operating system or as a separate software package.

APPC serves as an interface between application programs and the network. When the communications application on your workstation passes information to the APPC software, APPC takes the information and sends it on to a network interface, such as a token-ring adapter card. The information travels across the network to another computer, where the APPC software receives the information from the network interface. APPC puts the information back into its original format and passes it to the corresponding communications application.

APPC provides a consistent set of functions for program-to-program communications across different platforms. But, the architecture did not specify a common application programming interface (API) for implementing these functions. As a result, each operating system that supports APPC developed its own API, a set of verbs that closely resemble the operating system itself. These differences do not pose a problem if you are writing programs for two computers that use the same operating system. Most client/server applications run on different types of computers, however, to take advantage of the strengths of each computer. So, if you are designing programs for different operating systems, you must learn how to use two or more different sets of verbs.

The Common Programming Interface for Communications (CPI-C) eliminates this problem. CPI-C provides one standard set of verbs, known as CPI-C calls, for all systems that support CPI-C. As a result, you learn only one set of calls to write client/server applications for different systems.

What Is a Transaction Program?

The part of the communications application that initiates or responds to APPC communications is called a transaction program. A transaction program is not an entire, stand-alone program. Instead, it is the part of the program that handles transactions (exchanges of data) with another program.

When people talk with each other, we say that they are having a conversation. Likewise, the communication between two transaction programs is called a conversation.

A conversation between two programs is similar to a conversation between two people. When you have a conversation with another person, you follow unwritten rules that govern how you begin and end the conversation, take turns speaking, and exchange information. Similarly, APPC is called a protocol because it provides the rules that govern how conversations between transaction programs start and stop, which program “speaks” first, and how data is exchanged. Computers need complete and rigid rules for conversations between programs. For that reason, APPC consists of a set of well-defined and thorough rules to cover all possible communications situations.

An APPC program may have several conversations active at one time, with the same transaction program or with different transaction programs.

Every transaction program needs a partner to communicate with. Thus, transaction programs are developed in pairs called partner transaction programs.

People use different parts of speech to communicate with each other. Transaction programs are more limited in their communications; they use only verbs to communicate with each other. The verbs are the programming language you use to start, stop, and control conversations.

A transaction program consists of APPC and CPI-C verbs such as:

ALLOCATE (CMALLC in CPI-C)
: Starts a conversation with another transaction program

SEND_DATA (CMSEND in CPI-C)
: Sends data to the partner transaction program

RECEIVE (CMRCV in CPI-C)
: Receives data from the partner transaction program

DEALLOCATE (CMDEAL in CPI-C)
: Ends a conversation with another transaction program.

The APPC verbs make up the application programming interface (API) for APPC and CPI-C. In other words, these verbs represent the interface between the transaction program and the APPC software.

What Is the Difference between APPC and APPN?

APPC is a communications protocol that enables programs on different computers to “talk to” each other. APPC provides the interface between the programs and the networking hardware and software and defines the rules that programs use to exchange information.

Advanced Peer-to-Peer Networking (APPN) is the underlying networking protocol that routes APPC traffic through intermediate nodes in the network. For instance, when Program A uses APPC to talk to Program B, APPN finds the node where Program B is located and directs the APPC traffic through the network.

APPN includes several features that help reduce the amount of configuration required to set up and maintain a network. These features automate many tasks that are time-consuming, complicated, and error-prone. For example, if you're installing a new workstation that uses APPN, you don't have to set up configuration information for every workstation you want to communicate with. You simply provide the name of the computer and the address of the intermediate node that

handles your traffic. APPN takes care of the rest of the information needed to route APPC traffic to and from your workstation.

If you connect to an APPN network, you simplify your own configuration and make it easier for other computers in the network to find you.

Side Information Definitions

Before starting a conversation with a partner program, a CPI-C program requires the following information:

The name of the partner program
The name of the LU on the remote computer
The type of session used by the program
Security information

If the CPI-C partner program uses a blank symbolic destination name, a side information definition is not necessary.

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 for Windows 95 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 for Windows 95 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 95 workstations. A Personal Communications for Windows 95 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 A-1 on page A-7 illustrates this communication relationship. Multiple, concurrent sessions between the same two LUs are called *parallel* LU-LU sessions.

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.

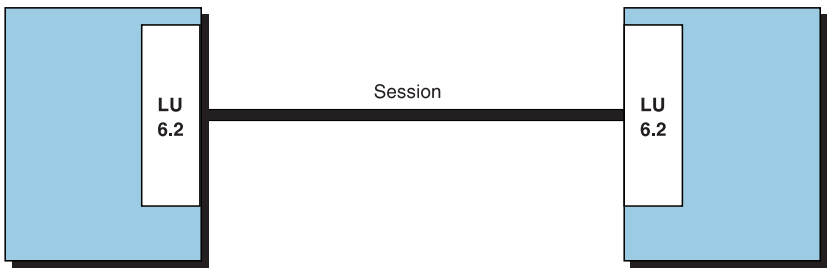

Figure A-1. A Session between Two LUs

Conversations can exchange control information and data. The TP should select the conversation style best suited for its application. The *APPC Application Programming Guide and Reference* explains how to choose a conversation style for your application.

A Conversation between Two TPs

Figure A-2 on page A-8 shows a conversation between two TPs as it occurs over a session.

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 A-3 on page A-9 shows three parallel sessions between two LUs; each session carries a conversation.

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 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.

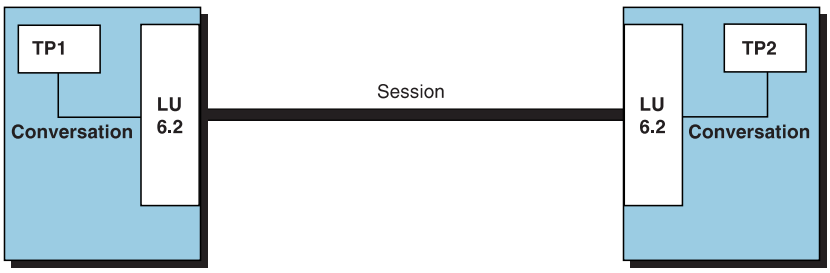

Figure A-2. A Conversation between Two TPs

When Personal Communications for Windows 95 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 Chapter 6, “SNA Node Operations” on page 6-1 or the online help for information on using SNA Node Operations.

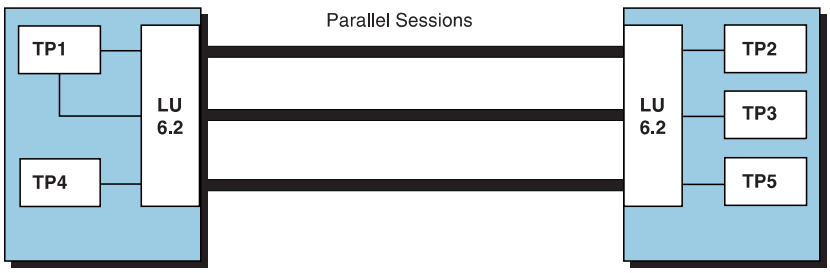

Figure A-3. Parallel Sessions between LUs

Appendix B. Deleting Unnecessary Files

If you do not have enough disk space and you want to allocate minimum disk space for Personal Communications, you can delete unneeded 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.

Attention

Do not delete any Personal Communications files other than the ones listed below. Otherwise, you will have unpredictable results.

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	4
	PCSMON.DLL	22
	TRCGUI.EXE	185
	TRCGUI.HLP	57
	TRCGUI.CNT	4
	TRCMSG.DLL	18
	NSTRC.CFG	1
	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

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	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
	NOPSMSG.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	PCSHELP.HLP	654
	PCSHELP.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	9
	PCSTN52.DLL	6
- AEA	PCSAEA.DLL	53
- SPX/IPX	PCSNWCS.DLL	66
	PCSNWSAA.DLL	26

	PCSNW16.DLL	21
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Deleting Unnecessary Files

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.

Appendix C. Modem Hints and Tips

Note

Use the modem definitions provided by Windows 95. If you have problems, refer to this chapter for specific Personal Communications definitions.

This chapter contains information about modems that the Auto-Dial Utility supports.

Asynchronous Modem Information

Modems must have certain characteristics to work properly with asynchronous communications. You can change the characteristics of most modems by switch settings, commands from the workstation, or both:

The modem must break the connection to the remote system (“hang up”) and return to its initial state when the ‘data terminal ready (DTR)’ line is turned off and then turned back on.

The modem must turn off the ‘carrier detect (CD)’ line when it loses the connection to the remote system.

An autodial modem must send result codes to the workstation.

US Robotics Sportster 14.4 External Modem

When specifying the line speed in the link parameters of Personal Communications, use a speed other than 14,400 bps, due to a hardware limitation. The suggested setting is 19,200 bps.

IBM ASYNC/SDLC V.32 Modem/A Modem

If you connect to AS/400 via SNA-over-Async when using this modem, the connection might fail. If this happens, save the Personal Communications default configuration command for this modem to the modem's profile-0.

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Synchronous Modem Information

To use the Automatic Dial Facility with SDLC attachment, you need a synchronous modem that is based on ITU-T recommendation V.25 bis and has the Automatic Dial Facility.

Command and Indication

For V.25 bis, *command* means the data that is transferred from data terminal equipment, or terminal (DTE) to data circuit-terminating equipment, or modem (DCE), and *indication* means the data transferred from a modem to a terminal.

3270 and 5250 sessions support the following commands and indications:

Command

CRN Automatic transmission by specifying a telephone number.

Format: **CRN**xxx...xxx
(xxx...xxx is a telephone number.)

CRS Automatic transmission by specifying a shortened dial number.

Format: **CRS**xxx...xxx
(xxx...xxx is a shortened dial number.)

CRI Automatic transmission by specifying a telephone number and an ID number.

Format: **CRI**xxx...xxx
(xxx...xxx is a telephone number and an ID number.)

Indication

INV Shows that the modem received a command that is not valid.

VAL Shows that the modem sent a valid command.

CFI Shows that the automatic transmission failed.

CNX Shows that the connection is successful.

Dial Character

A character used for dialing is called the *dial character*. The following characters can be used as the dial character:

Any number from 0 to 9
; / * # : = < > – ( )
space
F, N, V

Note: You can use the dial characters only when they are supported by the modems you use.

NEC ITM2400mkII Modem

The memory switch settings for the NEC** ITM2400mkII modems are:

AUTODIAL On
HDLC

The modem dial command designed for the NEC ITM2400mkII modem is:

CRN/tn

where /**tn** is the value you entered for the **Telephone number** option. For example, if you enter **123456** for the telephone number, the command designed is **CRN123456**.

You need not specify dial answering. The Automatic Dial Facility identifies the modem signal and then confirms the connection.

Hitachi High-Speed Hybrid Telephone

The settings for the Hitachi** high-speed hybrid telephone modems are:

AA mode
V.25 bis synchronous HDLC

The setting for synchronous data format of the automatic send/receive procedure should be same as that for data bit and parity of the Automatic Dial Facility.

The modem dial command designed for the Hitachi high-speed hybrid telephone modem is:

CRN/tn

where /**tn** is the value you entered for the **Telephone number** option. For example, if you enter **123456** for the telephone number, the command designed is **CRN123456**.

You need not specify the dial answering indication. The Automatic Dial Facility identifies the modem signal and then confirms the connection.

IBM7855-10 Modem

The setting for the IBM7855-10 modems is:

Synchronous

The modem dial command designed for the IBM7855-10 modem is:

CRN/tn

where /**tn** is the value you entered for the **Telephone number** option. For example, if you enter **123456** for the telephone number, the command designed is **CRN123456**.

You need not specify the dial answering. The Automatic Dial Facility identifies the modem signal and then confirms the connection.

Note: When the 1988 indicator is selected for the V.25 bis extended function, **CNX** (which indicates that the connection is established) is returned. Specify **CNX** as the dial answering indication.

Modems

The maximum line speed supported by the IBM 7855 modem is 38.4 Kbps. To change the line speed, change the SNA configuration file for this attachment as follows:

1. Click **Configure Link** in the Customize Communication window.
2. Type the required information or select values for the session parameters and then click **Next** to continue.
   Click **Help** to display parameter details.
3. Click **Advanced...** on the Configure COM / MPA connection window.
4. Change **Line speed** to 38400 or less and then click **OK**.
5. Save your configuration file and return to your session window.

Glossary

A

adapter. A hardware component that must be installed in the PC to connect to the SDLC, LAN, asynchronous, DFT, or other communications attachment (possibly connecting through a modem).

American National Standard Code for Information Interchange (ASCII). The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), 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. See also *Extended Binary-Coded Decimal Interchange Code*.

attachment. A communications link used by Personal Communications to connect a PC to a host system, consisting of an adapter and controlling software.

B

backup diskette. A diskette that contains information copied from a Personal Communications diskette.

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.

C

Caps Lock. The PC 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.

character set. A finite group of characters defined for a keyboard or output device.

configuration. (1) The arrangement of a computer system or network as defined by the nature, number and chief characteristics of its functional units.
(2) In Personal Communications, the arrangement of PCs connected to one or more host systems by one or more attachment types.

continuous carrier. A characteristic of the modem used in an SDLC type of attachment; frequency capable of being modulated or impressed with a second (informative carrier) signal.

customization. The process of configuring one or more PCs connected to a host system by the SDLC, LAN, ASYNCH, TDLC or other attachment. Customization precedes Personal Communications installation and includes the definition of the sessions to be carried out by Personal Communications.

D

default. A value, attribute, or option that is assumed when no differing selection is made.

dial-up line. See *switched line*.

directory. A named hierarchical grouping of files in a file system.

downloading. The transfer of a file from a host system to a PC.

E

EBCDIC. See *extended binary-coded decimal interchange code*.

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 PCs and a host system. See also *American National Standard Code for Information Interchange*.

F

field. (1) An area in a record or panel used to contain data.
(2) In the IBM 3270 or 5250 data stream, a group of consecutive positions on a presentation space having similar characteristics, which are defined by a field attribute byte at the beginning of the field.

H

hard disk. A rigid-magnetic disk such as the internal disks used in the system units of PCs and in external hard disk drives (also known as a fixed disk).

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I

International Telecommunication Union - Telecommunication Standardization Sector. A telephonic media communications standards committee.

interrupt level. A number assigned to an interrupt to indicate priority. The interrupt with the lowest number has the highest priority.

ITU-T. See *International Telecommunication Union - Telecommunication Standardization Sector*.

L

LAN. See *local area network*.

leased line. Synonym for *nonswitched line*.

line speed. The speed at which data is transferred over an analog (telephone) line. Line speeds depend on the quality of the line.

local area network (LAN). A data network in which communications are limited to a moderate-sized geographic area such as a single office building, warehouse, or campus, and which do not generally extend across public rights-of-way.

logical unit (LU). A port that provides user access to the host and to the SNA network in order to communicate with another user.

logon. The process of accessing a domain and assuming a user ID.

LU. See *logical unit*.

LU 6.2. 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.

N

network. A configuration of terminals connected to a host system for information interchange.

nonswitched line. (1) A connection between systems or devices that does not have to be made by dialing. Contrast with *switched line*. (2) A telecommunication line on which connections do not have to be established by dialing. Synonymous with *leased line*.

Num Lock. The keyboard mode entered after the Num Lock key is pressed. This mode is indicated by NUM in the operator information area (OIA). When the Shift key is pressed while in this mode, Num Lock is temporarily discontinued and the OIA indication changes. Pressing the Shift key again returns to Num Lock mode.

O

OIA. See *operator information area*.

OIA indicator. Characters or symbol in the operator information area providing information about network, workstation, gateway, or interface status. See also *operator information area*.

operator information area (OIA). In Personal Communications, the bottom line of a PC screen, which shows information on status and Personal Communications connections.

P

PC Network. A local area network providing peer-to-peer communication among IBM personal computers, allowing them to share resources. It utilizes carrier sense multiple access/collision detect (CSMA/CD) protocol and supports a data transmission rate of 2 million bits per second. Broadband and baseband versions are available.

permanent virtual circuit (PVC). In X.25 and frame-relay communications, a virtual circuit that has a logical channel permanently assigned to it at each data terminal (DTE). Call-establishment protocols are not required. Contrast with *switched virtual circuit (SVC)*.

personal computer. A microcomputer primarily intended for stand-alone use by an individual, but may be connected to mainframes or networks.

presentation space. The entire window of data, which can exceed the boundaries of a display screen's viewing area.

public application. An application shared among users on a network.

S

SAP. See *service access point*.

SDLC. See *Synchronous Data Link Control*.

service access point (SAP). The gateway address of the controller. This provides a point to link the controller to the host system.

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*.

Shift Lock. The PC 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.

short name. 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*.

SNA. See *Systems Network Architecture*.

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 end users and provides protocols for controlling the resources of various network configurations. The SNA network consists of network addressable units (NAUs), boundary-function components, and the path control network.

source diskette. In a diskette copying procedure, the diskette from which information is read.

SVC. See *switched virtual circuit*.

switched line. A telephonic communication line on which connections are established by dialing. See also *switched virtual circuit*. Contrast with *nonswitched line*.

switched virtual circuit (SVC). (1) An X.25 circuit that is dynamically established when needed. The X.25 equivalent of a switched line. (2) A virtual circuit that is requested by a virtual call. It is released when the virtual circuit is cleared. Contrast with *permanent virtual circuit (PVC)*.

Synchronous Data Link Control (SDLC). A discipline for managing synchronous, code-transparent, serial-by-bit information transfer over a line connection. Transmission exchanges may be duplex (in both directions at the same time) or half-duplex (in either direction, one direction at a time) over switched lines or direct lines.

Systems Network Architecture (SNA). A set of rules for controlling the transfer of information in a layered protocol structure communications network. The logical structure, formats, protocols, and operating sequences for transmitting data and controlling network configuration and operation are defined.

T

token-ring network. (1) A ring network that allows unidirectional data transmission between data stations, by a token passing procedure, such that the transmitted data return to the transmitting station. (2) A network that uses a ring topology, in which tokens are passed in a circuit from node to node. A node that is ready to send can capture the token and insert data fir transmission.

transferring files. Sending files from a PC to a host system or vice versa. See *downloading* and *uploading*.

U

uploading. The transfer of a file from a PC to a host system.

V

video graphics adapter (VGA). A computer adapter that provides high-resolution graphics and a total of 256 colors. See *enhanced graphics adapter (EGA)*.

W

WAN. See *wide area network*.

wide area network (WAN). A network that provides data communication capability in geographic areas larger than those serviced by local networks.

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