

3270 for RJE

*3270 Interactive Terminal Support integrated
with BARR/RJE Communications Software*

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About the Cover

A distant sandbar glistens on the horizon of the Dry Tortugas, Fort Jefferson National Monument. The Dry Tortugas are a group of low coral islands west of the Florida Keys. In 1513, Ponce De Leon reached the Dry Tortugas, naming them for the many turtles in nearby waters. Scientists find unusual bird and marine life in this area of 67,400 acres. The Tortugas became a federal bird reserve in 1908.

January 1995

RJE+3270 software combines the RJE features of BARR/RJE software and the 3270 features of BARR/3270 software into a single program. To install and operate your RJE+3270 package, you need two manuals that are designed to be used together: the *3270 for RJE* manual (this manual) and the *BARR/RJE* manual.

The *3270 for RJE* manual describes how to install and use the 3270 features of RJE+3270 software. It also explains the fundamentals of 3270 communications. The *BARR/RJE* manual describes the RJE file transfer features of the RJE+3270 software. It also explains the fundamentals of remote communications between the PC workstation and the mainframe computer.

While it is not necessary to fully understand the principles of remote communications to use RJE+3270, it is helpful to have some basic background information. This manual presents 3270 communications concepts in a brief, simplified form. For a more comprehensive look at these 3270 topics, refer to the publications listed in the *References* section.

Whether you have technical or non-technical experience, the purpose of RJE+3270 is to help you communicate both RJE and 3270 data quickly and easily. Concise installation and operation instructions in the *3270 for RJE* and *BARR/RJE* manuals guide you every step of the way.

Package Contents

Your RJE+3270 package includes one software program, two user manuals, and several supplemental publications. The product also may include optional hardware, if purchased. This section lists the entire package contents for RJE+3270, including items from the package contents of the *BARR/RJE* manual. Items that differ from the BARR/RJE package contents are marked with an asterisk.

*RJE+3270 Software

The RJE+3270 software disk includes the RJE+3270 program file and reference files.

Barr Adapter or Hardware Key

For SDLC, X.25, or Coax host connections, a Barr communications adapter is included.

For a Token Ring host connection or a TCP/IP link to a 6200 network gateway, a Hardware Key is included. The Hardware Key (formerly called the Token Ring Key) is a small device that plugs into a PC parallel port. The key is used for software protection. If you also need to attach a printer to the port, a printer cable can be plugged into the other end of the key.

***3270 for RJE Manual**

The *3270 for RJE* manual provides instructions for installing the 3270 features of the RJE+3270 software and operating the 3270 terminal sessions and 3270 printer sessions.

BARR/RJE Manual

The *BARR/RJE* manual provides instructions for installing the host connection features and the RJE features of the RJE+3270 software. It also describes how to operate your RJE sessions.

Host Programmer's Guide

Give this publication to the host systems programmer. It contains a copy of Chapters 7 and 8 from the *BARR/RJE* manual. RJE+3270 requires that the host programmer enter certain parameters at the host computer. The *Host Programmer's Guide* will assist the host programmer with the host parameters required for RJE+3270, including the NCP Definition, VTAM Definition, and RJE LOGMODEs.

***Host Programmer's Guide to 3270 LOGMODEs**

Give this publication to the host systems programmer. This booklet contains a copy of Appendix D, which describes LOGMODE parameters for the 3270 sessions.

Systems Integration Notes

This document describes other software and hardware products you may want to use with RJE+3270. Product prices and vendor names, addresses, and phone numbers are included.

Barr Systems BBS User Guide

This document describes how to exchange files and messages on the BBS. You can use the Barr Systems Bulletin Board System (BBS) to request Technical Support or to obtain information about Barr products.

Other Manuals

If additional Barr software and/or hardware options were purchased for use with BARR/RJE, corresponding manuals will be included. Installation and operation of the hardware is described in the adapter manual.

Equipment Checklist

In addition to the items included with the RJE+3270 package, you need the equipment listed below. RJE+3270 requires the same equipment as BARR/RJE — the equipment requirements listed here are similar to the requirements listed in the *BARR/RJE* manual.

PC Requirements

The minimum requirements are a personal computer with:

- At least 640 kilobytes of memory
- Industry Standard Architecture (ISA), Extended ISA (EISA), or Micro Channel™ Architecture bus. (Barr hardware adapters are bus-dependent.)

Additional requirements vary depending on your application, the environment at your site, peak workloads, and other considerations. After evaluating your performance needs, you may discover that your site needs a 386/25-33 or 486 machine.

Contact Barr Systems Technical Support if you need a recommendation on which type of PC to use.

Memory Requirements

The PC running RJE+3270 needs to have at least 640 kilobytes of memory. *Extended* memory is supported by Barr products and can be used to enhance performance.

However, Barr products do *not* use the *expanded* memory feature of memory managers or expanded memory drivers.

Disk Space Requirements

RJE+3270 should be installed on your PC hard disk.

To achieve optimum performance when print spooling or performing other disk-intensive tasks, we suggest using a hard drive with fast access and fast transfer times. The size of hard drive needed depends on the storage needs at your site. When determining how much storage is needed, estimate that 2,000-5,000 bytes of storage are required per page of data or that it is possible to store 200-500 pages of data per megabyte of hard-drive capacity.

DOS Operating System

The PC and the host computer each have operating systems — programs that direct the flow of data and sort out details to free the user from complexity. The primary operating system for the PC, and the one that RJE+3270 requires, is DOS. RJE+3270 is compatible with DOS 3.0 or later versions.

LAN Adapter

When using a Token Ring 802.2 LLC host connection, these items are required:

- Local area network (LAN) adapter that transports 802.2 token ring frames. Refer to your LAN adapter manual to determine if your adapter meets this requirement.
- LAN Support program compatible with your adapter

LAN Support programs are supplied with some LAN adapters. If your adapter did not include a LAN Support program, you must purchase one from the LAN adapter vendor. Many 802.2-compatible adapters also are compatible with the IBM LAN Support program version 1.3 or later. Consult your adapter manual to determine which adapter driver to use.

LAN Support programs vary in their capabilities. For example, the IBM LAN Support program consists of the drivers **DXMA0MOD.SYS** and **DXMCOMOD.SYS**, which allow the adapter to be shared by the Barr software and other network applications. By contrast, the **TOKREUI.COM** driver supplied with the IBM 16/4 adapter allows the adapter to be used by only one application at a time. Similar programs are available from other vendors.

A LAN adapter also is required when connecting through BARR GATEWAY on the local area network. The LAN software interfaces Token Ring (802.2 LLC), NetBIOS, Novell IPX, and TCP/IP are supported for gateway connections.

Modem

For SDLC or X.25 host connections via a modem, a synchronous modem is required. You can use either an external modem or a Barr PC-SYNC internal synchronous modem.

For an asynchronous connection to BARR GATEWAY using the Barr ASYNC option, an asynchronous modem is required.

Other Equipment

Information about RJE equipment is given in Chapter 1 of the *BARR/RJE* manual. For information about other equipment you may want to use, refer to the *Systems Integration Notes* booklet included with the RJE+3270 package.

Using This Manual

This manual describes how to install 3270 program files, enter 3270 installation parameters, and operate 3270 sessions.

Refer to the *BARR/RJE* manual for steps that apply to both RJE and 3270 — or steps that apply only to RJE, including installing RJE software files, entering RJE installation parameters, and operating RJE sessions. In some instances, the same topic is discussed in both manuals, but the focus of the discussion is different: the *BARR/RJE* manual focuses on RJE and the *3270 for RJE* manual focuses on 3270.

Throughout this manual, text indicates when you need to refer to the *BARR/RJE* manual. Or, you can use the table below to help you determine whether to refer to the *BARR/RJE* manual or *3270 for RJE* manual for information about key topics.

Table 0-1. 3270 Documentation Overview

Topic	3270 for RJE Manual	BARR/RJE Manual	Notes
Introduction	Chapter 1	Chapter 1	
Host Environment		Chapter 2	
Features	Chapter 2	Chapter 3	
Software Screen Conventions		Chapter 4	
Software Installation	Chapter 3	Chapter 5	
Installation Description	Section 3.4	Chapter 6	
3270 Description	Chapter 4		Refer to section 4.1 for screen size settings for 3270 sessions. Refer to <i>BARR/RJE</i> Chapter 12 for screen size settings for RJE sessions.
RJE Description		Chapter 7	
Logon Mode Table Entry (LOGMODEs)	Appendix D	Section 7.3	LOGMODEs for 3270 sessions are different than LOGMODEs for RJE sessions.
Communication Link, NCP Definition, Physical Unit Definition		Chapter 8	RJE+3270 host parameters are discussed for each type of Communication Link.
Devices and Printers		Chapter 9	Destination devices for your 3270 printer sessions are discussed in the <i>BARR/RJE</i> manual.
Assign Devices	Chapter 5	Chapter 11	

Topic	3270 for RJE Manual	BARR/RJE Manual	Notes
Tuning Data	Chapter 6	Chapter 19	ASCII and EBCDIC Translation tables for 3270 sessions are different from those for RJE sessions. Reader Control parameters apply only to BARR/RJE.
Communications Diagnostics	Chapter 7	Chapter 24	Bind data for 3270 sessions is different from bind data for RJE sessions. The NetView Response Time Monitor for 3270 sessions is documented in the <i>BARR/RJE</i> manual.
Software Startup		Chapter 21	
Operation	Chapters 8 - 9	Chapter 22	Includes file transfer instructions.
OIA Symbols and Session Information	Appendix A		
ASCII and EBCDIC Standards	Appendix B	Appendix B	ASCII and EBCDIC Translation tables for 3270 sessions are different from those for RJE sessions.

Organization

The order in which chapters are presented in this manual reflects the logical sequence of installation and operation of the 3270 components of the software. Each chapter is an independent unit that can be used for reference.

You need to be familiar only with the most basic features of data communications to operate 3270 sessions. Chapter 1 presents these basic 3270 communications concepts. Refer to the glossary at the back of the manual for a description of terms and acronyms that appear in the text.

3270 Overview

Following is an overview of the 3270 portion of RJE+3270 software. For an overview of BARR/RJE, refer to the *BARR/RJE* manual.

Emulation

The 3270 portion of RJE+3270 software allows your PC to emulate a 3174 Establishment Controller or a 3274 Cluster Controller with an attached DFT terminal. The software supports up to four 3270 sessions, and each session can emulate either a 3270 display terminal or a 3270 printer.

Data Link

RJE+3270 software supports the same data links that BARR/RJE supports. RJE+3270 is available in SDLC, X.25, Token Ring, Coax, and LAN Gateway versions. Which version you use depends on the data link provided by the host computer. The SDLC or X.25 versions are used when communication is through a modem or DSU/CSU. The Token Ring link is used when connecting via a Token Ring Network. The Coax version provides up to 20 logical units (LUs) with a direct connection to an IBM 3174 or 3274 communications controller. X.25, NetBIOS, Novell IPX, Token Ring, TCP/IP, or ADLC connections are used when connecting to the host computer through BARR GATEWAY.

Modems

Barr Systems offers the PC-SYNC modem series which integrate the Barr hardware and a modem on a single, full-slot adapter. For more information about modems, refer to section 1.3 of the *BARR/RJE* manual.

Applications

The 3270 features of RJE+3270 allow you to:

- Conduct interactive sessions with a host time-sharing system such as MVS/TSO, MVS/CICS, VM/CMS, and IMS.

- Send and receive files using IND\$FILE Transfer.
- Receive printouts at high speed on disks or printers.
- Use your existing EHLLAPI programs.

RJE+3270 is a step beyond traditional RJE and 3270 facilities. In one workstation, you have 3270 interactive terminal and printing capabilities, remote job entry capabilities, and the versatility of the PC environment with its word processing, data entry, and spreadsheet applications. The local area network (LAN) provides yet another dimension for sharing information among a community of users.

Technical Support

This section also appears in the *BARR/RJE* manual. It is repeated here for your convenience.

Sources for Support

If you have any communications problems, contact:

- your PC user service consultant,
- your host communications consultant, or
- Barr Systems Technical Support.

Barr Phone Numbers

Toll-free technical support is available for Barr software and hardware products. Call Barr Systems, Inc. at 800-BARR-SYS or 904-371-3050 from 9 a.m. to 8 p.m. Eastern time.

Support Requests

Here are some things you can do to help the Technical Support staff serve you as quickly and effectively as possible:

- **Serial number.** Please be sure to have the serial number of your Barr adapter on hand when you call and include the serial number on any faxes or correspondence. The serial number appears in three places: on the front of the adapter box, on a sticker on the adapter edge that is visible from the rear of the PC, and on a handwritten label on the back of the adapter.

- **Problem number.** If you are calling about a previously reported problem, tell the Support Analyst your assigned problem number. If you are calling about a new problem, be sure to note the problem number for future reference.
- **Version number.** Determine the version number (e.g. 94A1) of the Barr software and provide it to the Support Analyst. The version number displays in three places: on the second screen of the Installation Description, on the console portion of the Operation screen at software startup, and on the Quit menu during software operation.
- **Problem description.** Be prepared to supply details about your problem. The Support Analysts also may ask you to supply information about your PC, printers, or host computer.
- **Diagnostics.** When asked to provide a line trace, memory dump, or other diagnostic information, please respond as quickly as possible. Your quick response helps Technical Support solve the problem in a timely manner and underscores your level of concern.
- **Schedule for return calls.** If you are frequently away from the phone, please advise our staff of the best possible time we can reach you.

Bulletin Board Access

An electronic Bulletin Board System (BBS) provides you with easy access to product information and the ability to send us messages. The Barr BBS is equipped with modems capable of speeds from 1200 to 14,400 bps. To dial in, you need an asynchronous modem and asynchronous communications software. Set your software for 8 data bits, no parity, and 1 stop bit. The Barr BBS can be reached 24 hours a day at 904 - 491-3148. For more information about the Barr BBS, refer to the *Barr Systems BBS User Guide* booklet.

CompuServe Access

Files and messages can be sent to Barr Systems via CompuServe. When calling from overseas, this method is less expensive than using the BBS. Access to CompuServe requires a CompuServe account, an asynchronous modem, and asynchronous communications software. The CompuServe Information Manager (CIM) program available from CompuServe is the easiest software tool to use when contacting CompuServe.

When logging on directly to CompuServe, the mail address for Barr Systems is **>MHS:Mail@BarrSys**. If you have an MHS mail system that interfaces with CompuServe's MHS hub, the mail address is **Mail@BarrSys**. For more information about obtaining a CompuServe account, contact Barr Systems.

Internet Access

Messages can be sent to Barr Systems through the Internet. You must have access to an Internet network mail system to use this method. File attachments cannot be sent to Barr Systems via this connection. When calling from overseas, this method is less expensive than using the BBS. The Internet address for Barr Systems is **Mail@BarrSys.Com**.

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Others

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Research Triangle Park, NC
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3270 References

These publications are listed to guide you in choosing appropriate 3270 documentation. Refer to the publications that apply to the data communications equipment you are using.

The publication number listed for the manuals relates to the version number of mainframe software. The number for your publication may be different, depending on the version of the software at your host.

Reference publications for RJE are listed in the *BARR/RJE* manual.

IBM 3270 Information Display System: 3274 Control Unit Description and Programmer's Guide (GA23-0061-2)

IBM 3270 Information Display System: Data Stream Programmer's Reference (GA23-0059-3)

IBM 3270 Information Display System: 3276 Control Unit Display Station Description and Programmer's Guide (GA18-2081-1)

IBM 3270 Workstation Program Version 1.10: Programming Guide (SO1F-0217-00)

IBM 3287 Printer Models 1C and 2C: Component Description (GA27-3229-2)

IBM OS/2 Extended Edition Communications Manager Version 1.1 Cookbook Volume 1 (GG24-3359)

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An introduction to the concepts of 3270 communications and the components of the remote 3270 terminal.

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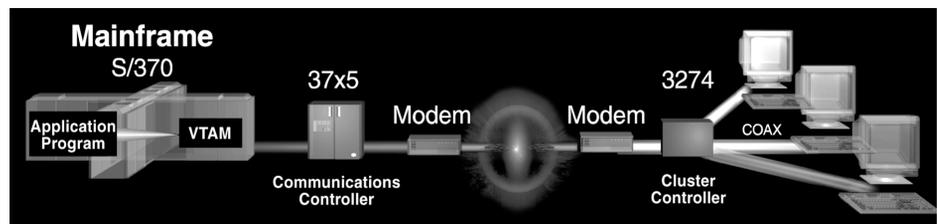
IBM's 3270 technology allows a user to communicate interactively with a mainframe computer, often called the host. Previously, communication was achieved using an expensive 3270 controller to which several display terminals were attached. The 3270 portion of RJE+3270 software provides a low-cost alternative. The software emulates a 3270 controller with an attached terminal and supports up to four 3270 sessions on a single PC. This chapter presents information about 3270 technology.

1.1 What is 3270?

The 3270 Information Display System is IBM's solution for interactive communication with a mainframe. 3270 architecture specifies a set of rules for communication between a mainframe and a 3270 controller. Users interact with display terminals, printers, plotters, and other devices attached to the controller.

This section discusses the function of each component in a standard 3270 configuration. For additional information about the host environment, refer to Chapter 2 of the *BARR/RJE* manual.

Standard 3270 Configuration



In this configuration, 3270 terminals and a 3274 controller communicate with an IBM host, over an SDLC link.

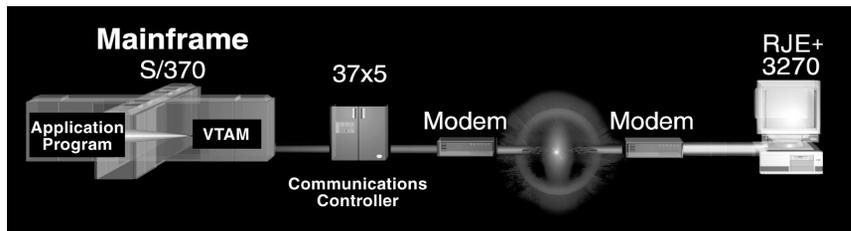
The 3274 controller is remote from the host.

The mainframe and the 3270 controller communicate via a 3270 data stream, which contains data, commands, and display orders for formatting data-entry screens. The data flow between the mainframe, 3270 controller, and a 3270 terminal follows this sequence:

- The mainframe sends the 3270 controller a data stream that will display an data-entry screen on a specific terminal.
- The 3270 controller processes the data stream and paints the screen on the specified display terminal.
- The user at the display terminal enters data in the input fields. Then he presses an attention identifier (AID) key to send the completed data-entry screen to the 3270 controller.
- The 3270 controller reads the screen, creates a 3270 data stream, and sends the data stream to the mainframe for processing.

Barr 3270 Configuration

A PC with Barr 3270 software performs the functionality of the 3270 controller and a 3270 terminal, as shown in the diagram below.



A PC running Barr 3270 software replaces a cluster controller and attached 3270 terminals.

3270 Communications Components

3270 Host

The mainframe computer, or *host*, runs the 3270 application and provides storage for the related 3270 data. Typically, the 3270 application runs in a time-sharing environment where several users can be connected to the same application.

The host communicates with a 3270 controller by establishing a session between itself and the controller. This session serves as the communications channel. The host end of the communications channel is called the Primary Logical Unit (PLU), while the controller end is referred to as the Secondary Logical Unit (SLU). The host program that establishes and manages this channel is the System Services Control Point (SSCP), or Systems Operator. The Virtual Telecommunications Access Method (VTAM) operating system program is the most widely used SSCP.

Communication Links

A *communication link* is a mechanism for transferring information between two points. Examples of communication links include SDLC, X.25, Token Ring, Coax, and LAN Gateway connections. Some links, such as SDLC and X.25, require modems to transfer data over telephone lines to remote locations. Others, such as Token Ring and LAN Gateway, communicate over Local Area Networks (LANs).

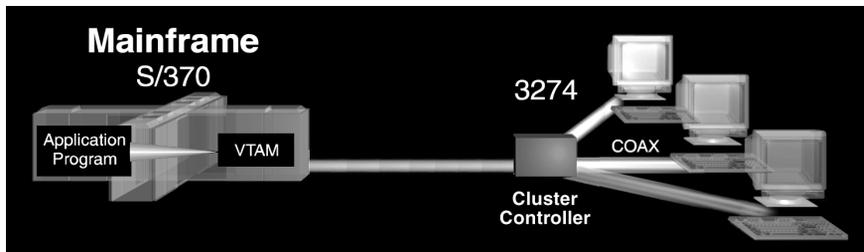
Communications Controllers

The host computer uses *communications controllers* to talk to remote terminals over communication links. Examples of communications controllers include the 3745, 3725, and 3720. Management of the communications and the flow of information across the communication link is performed by the Network Control Program (NCP) that resides in the communications controller.

Cluster Controllers

A *cluster controller*, such as the 3274 or 3174, connects several display terminals and printers to the host. This type of controller manages the flow of data between each terminal and the host. At one end, the cluster controller is either locally attached to the host or remotely attached via a communication link. At the other end, the cluster controller is attached to display terminals or printers by coax cables (the type of cable used by cable TV) or a Token Ring network (supported by the IBM 3174 Establishment Controller).

The standard 3270 configuration diagram presented earlier in this section shows a remotely attached controller. The diagram below shows a locally attached controller.



In this configuration, a controller is locally attached to the host.

CUT and DFT Protocols

Two protocols are used for connecting display terminals and printers to the cluster controller: the Control Unit Terminal (CUT) protocol and the Distributed Function Terminal (DFT) protocol. If the CUT protocol is implemented, the controller processes an incoming 3270 data stream and also provides storage for the 3270 buffer. The display terminal acts as a dumb terminal and can have only one logical session. The original 3270 terminals operated in CUT mode.

The DFT protocol offers more functionality. The DFT display terminal processes the 3270 data stream and provides buffer storage. For this reason, the DFT terminal is called a *smart* terminal. In addition, the DFT terminal can maintain several (usually four) logical sessions. Barr 3270 software operates like a DFT terminal.

3270 Display Terminals

The 3270 display terminal enables a user to communicate interactively with the host. Two common terminal types are the 3278 and 3279, and each of these is available in several models. The screen size, color display, and highlighting features for these terminals vary. For example, the 3278 terminals have a monochrome display, while the 3279 terminals display color and support extended attributes.

Following is a list of the model types and their corresponding supported screen sizes:

- Model 2: 24 x 80 (24 lines by 80 columns)
- Model 3: 32 x 80 (32 lines by 80 columns)
- Model 4: 43 x 80 (43 lines by 80 columns)
- Model 5: 27 x 132 (27 lines by 132 columns)

The RJE+3270 software supports all of these models. However, which model is used for a session depends on the host application. The visual presentation of the model type depends on the PC video adapter.

3270 Printers

The 3287 and 3289 printers are common 3270 printer models. 3270 printers vary in the type of print functions, fonts, margin controls, and other features supported. Two different data streams, or LU types, are supported:

- LU Type 1 printer which supports SNA Character Set (SCS): This printer supports more advanced printer functions and formatting commands than the LU Type 3.
- LU Type 3, data-stream compatible (DSC) printer: This original 3270 printer supports basic print control functions, and it processes the 3270 data stream commands and orders in the same manner that a display terminal processes data.

Both printer types can be used with Barr 3270 software.

A 3270 printer is connected directly to the controller. By contrast, a PC with RJE+3270 software can print to a printer attached directly to the PC or attached to the LAN. Either the host or the terminal operator can initiate printing, depending on the application.

1.2 Barr 3270 Emulation

The 3270 portion of RJE+3270 software allows a PC to emulate:

- A 3274 controller with connected display terminals and printers.
- Display terminal models 2, 3, 4, and 5 with their respective screen sizes. Extended attributes for either monochrome or color display also are supported.
- 3287 printers in either the DSC or SCS modes. Print files can be directed to a printer attached to the PC or to a disk file. Host-initiated, local print functions are supported.
- IBM's EHLLAPI (Enhanced High Level Language Application Program Interface).
- IND\$FILE file transfer protocol between the PC and the host.

The Barr 3270 software also supports several different types of communication links. The software can communicate with the host either through a dial-up line, a dedicated line, or a LAN Gateway. When connected directly to the host, Barr 3270 software supports SDLC, X.25, Token Ring, and Coax communications protocols. When connected through the BARR GATEWAY, the X.25, NetBIOS, Novell IPX, Token Ring 802.2, TCP/IP, and Async communications protocols may be used.

1.3 3270 Workstation Hardware

A PC equipped with a Barr synchronous communications adapter — or an IBM Token Ring adapter — and Barr software replaces an expensive 3174 Establishment Controller. In fact, the PC's higher throughput and simpler user interface uniformly exceeds the older technology.

A 3270 workstation may consist of a PC, a PC adapter or hardware key, software, a modem, and printers.

The modems and printers used for RJE+3270 are same as ones used for BARR/RJE. Refer to section 1.3 of the *BARR/RJE* manual for a discussion of communication links and modems and to section 1.2 of the *BARR/RJE* manual for a discussion of printers.

Notes:

Barr 3270 software has a full range of features that enhance every area of operation.

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Barr 3270 software emulates a 3274 controller that is connected to a multiple-session DFT terminal. The software emulates various terminal models and printers, provides fast communication speeds, and is easy to use.

This chapter highlights the features of the 3270 portion of the RJE+3270 software. Refer to Chapter 3 of the *BARR/RJE* manual for a list of additional software features.

2.1 3270 Printer Features

LU Type 1 and LU Type 3 Printer Sessions

Barr 3270 software emulates both LU Type 1 (SCS) and LU Type 3 (DSC) printers. The software can direct print output to a printer, disk file, or screen from multiple 3270 and RJE printer sessions.

Print Speed

RJE+3270 can be used with a variety of printers. Print speeds on single and multiple printers range from 30 characters-per-second to beyond 40,000 lines-per-minute (lpm). Even the fastest laser printers are driven at maximum efficiency from a PC.

Form Header Processing

Barr software processes any Select Vertical Channel, Lines-per-Form, and Lines-per-Inch commands that occur in the 3270 printer data stream, then uses this information to format the data when it prints.

Data Transparency

For LU Type 1 (SCS) printer streams, the software allows you to maintain data transparency when translating from the EBCDIC format used by the host to the ASCII format used by the PC. This feature is useful when the data includes imbedded printer commands. Alternatively, you can choose to translate the imbedded codes.

2.2 3270 Display Terminal Features

The 3270 software supports many features of a 3270 terminal, plus some value-added features that terminals do not support.

Barr's 3270 display terminal support has a number of unique features useful to 3270 programmers and end-users, including true Model 3, 4, and 5 support with popular video adapters.

Terminal Models 2, 3, 4, and 5

The software emulates 3278 and 3279 terminals with different screen sizes (Models 2, 3, 4, 5). Screen size can vary from 24-43 lines and 80-132 columns.

Screen Sizes up to 44 x 80 and 28 x 132

Barr software supports the standard screen size of 25 lines by 80 characters that is available for Model 2 terminals. The software also allows you to use larger screen sizes with many video adapters. The supported adapters include:

- Everex/EV-659
- Genoa SVGA/6300
- Paradise 1024
- Paradise/VGA
- PowerGraph VGA
- PowerView VGA
- STB VGA EM-16
- Tecmar VGA
- Trident SVGA
- Tseng EVA/480
- US Video VGA
- VGA Wonder
- VgaWonder 1024

If you use one of the adapters listed above, you can view a 33 x 80 screen on Model 3 terminals and a 44 x 80 screen on Model 4 terminals. The 28 x 132 screen size for Model 5 terminals is supported by the IBM VGA adapter with a multiscan monitor, all non-IBM VGA adapters, and the Everex EGA adapter. On most adapters, an 8 x 12 character set is used in 132-column mode to enhance readability.

If you use an adapter that is not in the above list, you may need to use the scroll keys to view characters that extend beyond the 24 lines by 80 columns screen size. The adapter will emulate Model 3, 4, and 5 support by performing horizontal scrolling, vertical scrolling, and fast scrolling (panning 10 characters at a time).

Screen Size Adjusts Automatically

Barr 3270 automatically changes the screen size when the application requests a different screen size and when you hot-key to a session that has a different screen size.

Display 3270 Field Attributes

Barr 3270's Reveal option shows the attributes of the selected 3270 field displayed on the screen. The Reveal function also displays the null locations in the 3270 buffer. This feature helps 3270 programmers verify screen images.

Screen Capture

Barr 3270 software lets you capture screen images to a disk file. The Screen Save feature captures selected individual screens. The Record Screen feature captures a series of consecutive screens displayed during a session. Captured screen images can be printed and included in documentation for your application.

2.3 3270 Keyboard Features

Barr 3270 supports most of the popular 3270 keyboards and offers extensive support for international keyboards. Additionally, the keyboard map can be viewed on the screen, eliminating the need for printed keyboard templates.

Keyboard Help Screens

During your 3270 sessions, you can access help screens to view information about using the keyboard, including:

- A list of the available 3270 functions
- Maps of PC keys to 3270 functions

- Information about cursor and scroll keys
- Instructions for exiting the program.

You can activate the help menu from any point in a 3270 session by pressing **Ctrl** **F2**.

Keyboard Map Editor

You can alter the default 3270 keyboard map by using the Keyboard Map Editor during software installation. The editor is interactive, is easy to use, and allows you to assign several PC key combinations to a single 3270 key.

Supported Keyboards

Barr 3270 software supports these keyboards:

- DCA IRMAKey
- IBM 83/84 Keys (AT)
- IBM Enhanced 101/102 Keys
- IBM Foreign 102 Key
- IBM PC XT
- IRMA 3270 Keyboard
- Key Tronic KB3270/PC

International Keyboard Support

Barr 3270 software supports many international keyboards. The Keyboard Training Utility helps the software learn the correspondence between the key scan codes and their printable legends as defined by the **DOS KEYB** utility. This implementation guarantees truly universal support for all international keyboards.

The supported international keyboards are listed below.

Austrian/German	Finnish/Swedish
Austrian/German (Alternate)	Finnish/Swedish (Alternate)
Belgian	French
Brazilian/Portuguese	International
Canadian (French)	Italian
Danish/Norwegian	Japanese (English)
Danish/Norwegian (Alternate)	Portuguese
English (UK)	Spanish
English (US) (437)	Spanish (Alternate)
English (US) (850)	Spanish Speaking

2.4 Selector Light Pen Support

Barr 3270 offers three ways to use the 3270 selector light pen function. You can use:

- An actual light pen,
- A mouse to emulate a light pen, or
- The standard 3270 Cursor Select function.

To use an actual light pen you need an FT-356 light pen and an adapter with light pen support. (Refer to the *Systems Integration Notes* booklet for information about obtaining an FT-356 light pen.)

To use a mouse for selector light pen emulation you need a mouse and a mouse driver compatible with Microsoft Mouse Driver version 6.25 or later. Mouse functions are accessed through the mouse driver. The left and right mouse buttons are used to emulate selector light pen functionality.

Barr 3270 also allows you to use the Cursor Select key for the light-pen-selector function. In the software, Cursor Select displays on the 3270 keyboard help screen as **Cursor Sel**.

2.5 Ease of Operation Features

Many features simplify and extend the operation of your 3270 sessions.

Automatic Session Logon

During installation, you can specify a character-coded logon string that is sent to the host during logon. This allows the software to automatically logon to your 3270 applications when the host connection is established.

Concurrent DOS, RJE, and 3270 Sessions

With RJE+3270 you can simultaneously maintain several sessions. A DOS session, up to four 3270 sessions, and multiple RJE sessions can be active at the same time.

Hot-key Between Sessions

Barr software offers two ways to hot-key between sessions:

- You can move from one RJE+3270 session to any other session using hot-keys. For example, you can hot-key from a 3270 session to the DOS session.
- Or, you can step through only the 3270 sessions using the jump key function.

Full Support for Color

If you have a color video adapter, Barr 3270 uses the color attribute to improve the readability of text on the screen.

2.6 3270 File Transfer Features

Barr 3270 software supports applications that use the Entry Level High-Level Language Application Program Interface (EHLLAPI), including IND\$FILE file transfer. EHLLAPI is a subset of HLLAPI and is referenced as HLLAPI in the software and elsewhere in this manual.

IND\$FILE File Transfer Protocol

Barr 3270 supports the popular IBM IND\$FILE Send and Receive protocols in the MVS/TSO, MVS/CICS, and VM/CMS environments.

Concurrent File Transfer and Interactive Work

With Barr 3270 you can perform file transfers in either the foreground or background. You can monitor the file transfer while it takes place, or you can transfer a file in a 3270 session while you are working interactively in another 3270, RJE, or DOS session. Files may be transferred simultaneously from several 3270 sessions.

High-Speed File Transfer

Barr 3270 uses many techniques to maximize the speed of file transfers, including:

- Use of the Write Structured Field (WSF) version of IND\$FILE
- Support for large inbound data packet sizes, and
- Use of a sophisticated queue scheduler that insures optimum line utilization.

2.7 Diagnostic Features

Built-in diagnostic tools and implementation of comprehensive 3270 messages help end-users and support personnel resolve problems quickly.

NetView Support

Barr 3270 supports the NetView enhanced network management program installed on many mainframe computers, including Operator and Application Alerts as well as Response Time Monitoring. Additionally, the Barr software supports the SNA commands Request Maintenance Statistics (REQMS) and Record Formatted Maintenance Statistics (RECFMS).

Detailed Error Messages

Error messages related to the PC environment display on the console in self-explanatory text. Error messages related to your 3270 sessions display in the Operator Information Area (OIA) on the last line of your 3270 session screen and include the corresponding IBM DFT error message number.

Notes:

Install software files for your 3270 sessions.

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This chapter outlines the installation steps for the 3270 portion of the RJE+3270 software and tells you how to install four files used for 3270 emulation. Text points you to Chapter 5 of the *BARR/RJE* manual for additional installation instructions.

3.1 Installation Steps for RJE+3270

To install the RJE+3270 package, perform these general steps:

- Follow the installation steps listed in section 5.1 of the *BARR/RJE* manual to install any Barr hardware, install the software files, and enter the BARR/RJE software parameters.
- Follow the instructions in section 3.2 of this manual to copy the 3270 reference files to the **C:\BARR** directory. Then follow the instructions in Chapters 4-6 to enter 3270 software parameters.
- Remember to save the installation parameters as described in Chapter 20 of the *BARR/RJE* manual.

3.2 Installing the 3270 Software Files

The Barr software disk contains RJE+3270 program and reference files in a self-expanding, compressed format. The automated installation process copies the files to your PC then expands them. The BARR/RJE software files and software installation instructions are listed in section 5.2 of the *BARR/RJE* manual. Additional software files that apply only to 3270 are listed in this section.

3270 Software Files

Once the software files are copied to your PC, these four 3270 files will be located in the **C:\BARR\REF** directory:

RECEIVE.EXE	Program files used to initiate IND\$FILE transfer from the DOS session. These files can be referenced in the C:\BARR\REF directory by specifying the file path, or they can be copied to another directory such as C:\BARR . Refer to section 9.6, <i>File Transfer from the DOS Session</i> , for more information about these files.
SEND.EXE	
FONT7X14.COM	Font files used when displaying 132 columns for 3270 sessions. These files must be copied to the C:\BARR directory if you plan to display screens with 132 columns. Refer to the section <i>3270 Session Options</i> in Chapter 4 for more information about these files.
FONT8X8.COM	

Copying Files to the C:\BARR Directory

To copy these files from the **C:\BARR\REF** directory to the **C:\BARR** directory, use the DOS copy command. For example, this command copies the font files:

```
copy c:\barr\ref\*.com c:\barr
```

3.3 Installation Startup Command

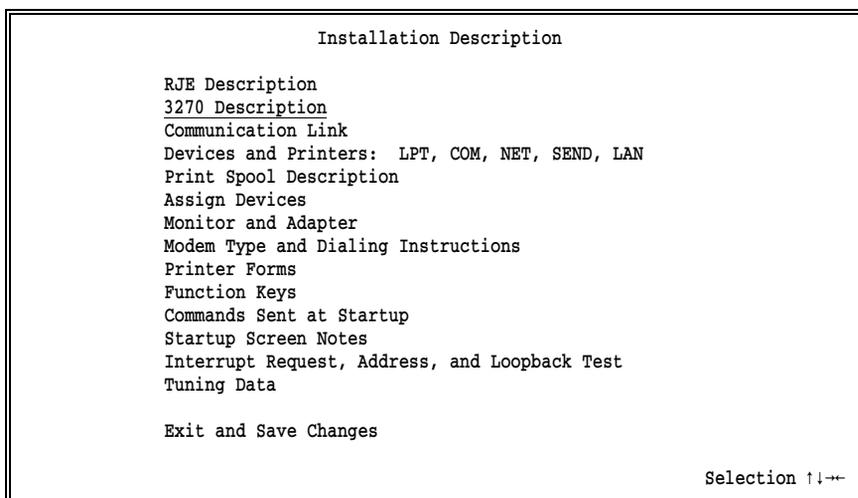
The command to start the RJE+3270 installation program is the same as the command for *BARR/RJE*. At the DOS prompt, type:

```
BARRSNAR i
```

The first two installation screens display product information. The third screen contains the **Installation Description** menu. These screens are similar to the screens documented in section 6.1 of the *BARR/RJE* manual.

3.4 Installation Description Menu

The RJE and 3270 installation parameters are accessed from the **Installation Description** menu.



This screen is similar to the screen documented in section 6.2 of the *BARR/RJE* manual, but has the additional **3270 Description** option. Most of the parameters that affect your 3270 sessions are accessed using this option.

Notes:

Enter installation parameters for the 3270 sessions.

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3270 Description

The 3270 Description contains configuration parameters for your 3270 sessions. From the 3270 Description screen, you specify the number of 3270 sessions to use and define the characteristics of the 3270 sessions.

4.1 3270 Description Screen

To reach the 3270 Description screen, from the **Installation Description** menu select **3270 Description**. The following screen displays:

```

                                3270 Description

Number of 3270 sessions? 1

Keyboard Type? IBM Enhanced 101/102      Edit Keyboard Map? No
Enable Keyboard Type Ahead? Yes

Use Intense Colors? Yes                   Use Selector Light Pen? No
Form Header Enabled? Yes                 Response Time Monitor? No

Enable HLLAPI Interface? Yes             HLLAPI Storage Manager (KBytes)? 0
Enable File Transfer? Yes               Data Packet Size? 4000
Host File Transfer Command? IND$FILE    Xlate Transparent Data to ASCII? No

Session   Name           Models           Character Coded Logon
-----
   1       1             2

```

Enter number

The parameters on this screen fall into four categories: general 3270 options, 3270 printer options, HLLAPI options, and 3270 session information. (The 3270 session options display when you press **Enter**.)

General 3270 Options

The first group of options specify the number of 3270 sessions and setup keyboard, terminal display, and other features.

Number of 3270 sessions?

Enter the number of 3270 sessions to use. Valid values are 0-4. If at least one session is specified, when you complete the parameters on this screen and press **Enter** additional session information displays at the bottom of the screen.

Keyboard Type?

Indicate which type of keyboard is attached to the PC. This option is used for 3270 keyboard emulation. Choices are:

IBM Enhanced 101/102

IBM 101/102-key keyboard.

IBM PC/XT

Similar to the IBM AT keyboard, but some keys are arranged differently.

Key Tronic KB3270/PC

Similar to the IBM 3270PC keyboard. Set the keyboard switches to IBM AT mode. See your Key Tronic KB3270/PC manual for switch settings.

To use the Key Tronic keyboard in IRMA mode, refer to the option **IRMA 3270 Keyboard** below.

IRMA 3270 Keyboard

Similar to the IBM 3270PC keyboard. Set the keyboard switches to IBM AT mode. See your IRMA user manual for switch settings.

This selection also is used when operating the **Key Tronic KB3270/PC** keyboard in IRMA mode. Remember to set the switches on the Key Tronic keyboard to IRMA mode. See your Key Tronic manual for switch settings.

IBM Foreign 102 Key

Same as the IBM Enhanced 101/102-key keyboard, with language-specific key tops. Native language keyboards compatible with the **DOS KEYB** program are supported. When you complete the parameters on the **3270 Description** screen and press **Enter**, the Keyboard Training Utility displays. Refer to section 4.2 for more information about the Keyboard Training Utility.

Default

The software determines whether the keyboard type is **IBM AT** or **IBM Enhanced 101/102**.

IBM AT

IBM 83/84-key keyboard.

Edit Keyboard Map?

Choose whether to edit the keyboard map that controls emulation of the 3270 keyboard. The keyboard map lists the 3270 key functions, shows which PC keys are assigned to perform each function, and allows you to change the default PC key assignments.

No Default. Use the supplied keyboard map.

Yes Edit the keyboard map. When you complete the parameters on the 3270 Description screen and press **Enter**, the **Edit Keyboard Map** screen displays. Refer to section 4.3 for more information about editing the keyboard map.

Enable Keyboard Type Ahead?

When the system is busy processing input, the keyboard is locked. This option controls whether the keyboard processor retains or discards keystrokes that are entered after the keyboard locks.

Note: This option applies only to keyboard locks caused by input processing, not to keyboard locks resulting from other conditions.

Yes Default. You can continue typing when the keyboard locks during input processing. The type-ahead buffer holds 63 characters or 31 commands. If the type-ahead buffer fills before the keyboard is unlocked, subsequent keystrokes result in an error beep. (This value-added feature is available only with 3270 emulation programs, not with 3270 terminals.)

No The keyboard processor discards any keystrokes entered after the keyboard locks. Until the keyboard buffer is processed and the keyboard unlocks, keystrokes result in an error beep.

Use Intense Colors?

Choose whether to use intense colors on the 3270 session screens. The normal 3270 display of dark-colored characters against a black background may be hard to read on some PC video monitors. Characters displayed with intense colors provide greater contrast and are easier to read.

Yes Default. Use 3270 intense field colors to enhance screen readability.

No Use normal 3270 field colors.

Use Selector Light Pen?

This feature allows you to use a selector light pen or emulate a selector light pen with a mouse. To use a light pen, an FT-356 light pen and either an adapter with light pen support or an external light pen interface are required. (Refer to the *Systems Integration Notes* booklet for information about obtaining an FT-356 light pen.) To emulate a light pen with a mouse, a mouse and a mouse driver compatible with Microsoft Mouse Driver version 6.25 or later are required.

No Default. The selector light pen feature is not used. The keyboard **Cursor Select** function can be used for the selector-light-pen-detection function.

Yes Use the selector light pen feature.

Response Time Monitor?

Choose whether to enable the NetView Response Time Monitor (RTM). Use of this feature requires NetView support at the host computer.

For more information about NetView, refer to Chapter 24 of the *BARR/RJE* manual. (NetView Operator Alerts are enabled by the **NetView Alerts?** parameter on the Tuning Data, Modem and Line Control screen.)

No Default. Do not use the Response Time Monitor.

Yes Enable the Response Time Monitor for 3270 terminal sessions.

3270 Printer Options

Two options affect LU Type 1 (SCS) printer streams.

3270 Description			
Number of 3270 sessions? <u>1</u>			
Keyboard Type? <u>IBM Enhanced 101/102</u>		Edit Keyboard Map? <u>No</u>	
Enable Keyboard Type Ahead? <u>Yes</u>			
Use Intense Colors? <u>Yes</u>		Use Selector Light Pen? <u>No</u>	
Form Header Enabled? <u>Yes</u>			
Enable HLLAPI Interface? <u>Yes</u>		HLLAPI Storage Manager (KBytes)? <u>0</u>	
Enable File Transfer? <u>Yes</u>		Data Packet Size? <u>4000</u>	
Host File Transfer Command? <u>IND\$FILE</u>		Xlate Transparent Data to ASCII? <u>No</u>	
Session	Name	Models	Character Coded Logon
1	<u>1</u>	<u>2</u>	_____
Enter number			

Form Header Enabled?

Choose whether to add a form header to 3270 LU Type 1 printer files. When this feature is enabled, the Barr software processes any Select Vertical Channel, Lines-per-Form, and Lines-per-Inch commands that occur in the 3270 printer data stream. This format information is stored at the beginning of the file as a Barr file header and is used when the file prints. Other fields in the file header are blank unless values are supplied by the Assign Devices options described in section 5.6. The Barr file header format is described in section 14.6 of the *BARR/RJE* manual.

Yes Default. Include the form header.

No Omit the form header.

Note: When files are directed to the Barr Print Spool or when Receive Mode is set to **S/370 Channel**, a form header always is included — even if **Form Header Enabled?** is **No**.

Xlate Transparent Data to ASCII?

For LU Type 1 printer streams, choose whether to translate transparent data to ASCII. Transparent data appears within a transparency command (hexadecimal **35**) string. During data translation from EBCDIC to ASCII, this option controls whether all data — including transparent data strings — is translated to ASCII or whether transparent data strings are not altered in the translation process. The option takes effect only when the Assign Devices **Receive mode** is set to **ASCII**.

No Default. Normal data is translated from EBCDIC to ASCII. However, data within transparency command strings is not translated, allowing data transparency to be maintained.

This selection is useful if special codes, such as printer commands, are imbedded in the data at the host. For example, the ASCII printer control codes to reset an HP LaserJet printer (hexadecimal **1B 45**) can be placed in a transparent data string. When the data is received to the PC, the hexadecimal string **1B 45** from the host remains hexadecimal **1B 45** at the PC. The unaltered command is sent to the printer when the file is printed.

Yes The entire data file — including data within transparent strings — is converted to ASCII using the Barr EBCDIC to ASCII Translation Tables. For more information about data translation, refer to Appendix B of this manual and to section 19.1 of the *BARR/RJE* manual.

HLLAPI Options

Barr 3270 software supports applications that use the Entry Level High-Level Language Application Program Interface (EHLLAPI), including 3270 file transfer. EHLLAPI is a subset of HLLAPI and is referred to simply as HLLAPI in the Barr software and in this manual.

If you are writing HLLAPI application programs, you can request these software development materials from Barr Systems:

- *BARR/3270 EHLLAPI* manual
- Language Interface Modules (LIM) for the BASIC, Microsoft C, COBOL, and Pascal programming languages

To use the HLLAPI features, specify the following options on the 3270 Description screen:

3270 Description			
Number of 3270 sessions? <u>1</u>			
Keyboard Type? <u>IBM Enhanced 101/102</u>		Edit Keyboard Map? <u>No</u>	
Enable Keyboard Type Ahead? <u>Yes</u>			
Use Intense Colors? <u>Yes</u>		Use Selector Light Pen? <u>No</u>	
Form Header Enabled? <u>Yes</u>		Response Time Monitor? <u>No</u>	
Enable HLLAPI Interface? <u>Yes</u>		HLLAPI Storage Manager (KBytes)? <u>0</u>	
Enable File Transfer? <u>Yes</u>		Data Packet Size? <u>4000</u>	
Host File Transfer Command? <u>IND\$FILE</u>		Xlate Transparent Data to ASCII? <u>No</u>	
Session	Name	Models	Character Coded Logon
1	<u>1</u>	<u>2</u>	_____
			Enter number

Enable HLLAPI Interface?

Choose whether to enable HLLAPI.

Yes Default. Enable the HLLAPI Interface. This option is required for 3270 file transfer.

No Disable the HLLAPI interface. The remaining HLLAPI options on the 3270 Description screen are ignored.

Performance Tuning: If you are not using the HLLAPI interface, disable this feature to free memory for other program features.

HLLAPI Storage Manager (KBytes)?

When you enable the HLLAPI feature you may need to allocate memory space for applications requiring Storage Manager support. Up to 32 kilobytes of memory can be specified. The default value is 0. Few applications require the Storage Manager. Before increasing this value, check the documentation for your application to determine whether the Storage Manager is required.

Enable File Transfer?

Select whether to use 3270 file transfer. The IND\$FILE program must be installed at the host computer. For more information on 3270 file transfer, refer to Chapter 9.

Yes Default. Use the IND\$FILE file transfer protocol. The option **Enable HLLAPI Interface?** must be set to **Yes** to use file transfer.

No Do not use the file transfer protocol.

Performance Tuning: If you are not using 3270 file transfer, disable this feature to free program memory for use by other program features.

Data Packet Size?

Specify the size of the inbound data packet. In 3270 file transfer, a *packet* is the amount of data sent to the host before a response is required. Valid sizes are 1000-8000 bytes. The IBM default packet size is 4000 bytes. Ask host support personnel which data packet size is required for your application.

Host File Transfer Command?

Specify the name of the host IND\$FILE file transfer program. The most common program name is **IND\$FILE**, but the name may be different at your site. Ask host support personnel for the correct file transfer command.

3270 Session Options

When you finish entering the general 3270 options, 3270 printer options, and HLLAPI options on the **3270 Description** screen, press **Enter** to display the 3270 session options. The number of 3270 sessions must be greater than 0 for this information to display.

If two sessions are defined, the lower portion of the screen looks like this:

Session	Name	Models	Character Coded Logon
1	1	2	_____
2	2	2	_____

Specify the following information for each 3270 session:

Session

Each session automatically is assigned a number from 1-4. The assigned number cannot be changed.

Name

A name of up to 10 characters that you assign to the session. By default, the session name is the same as the session number. However, you may want to assign a session name that is more relevant to your application, such as **CICS** or **TSO**. The first character of the name can be used to hot-key to the session, so assign each session a name with a unique first character.

For printer sessions, the session name also is used on the Assign Devices menu, where each 3270 printer session appears as a Source device. Display terminal sessions do not appear on the Assign Devices menu.

Models

For interactive 3270 sessions, select the model number of the terminal you wish to emulate. The model number indicates the maximum display screen size. For printer sessions, select **Printer** as the model.

The largest model number in each terminal model range indicates the maximum display screen size. Note that model selections 3, 4, and 5 use a larger screen size than model 2, and as a result they use more PC memory. A printer session uses the same amount of memory as a model 2 session.

The maximum screen size for the terminal session or the buffer size for the printer session also must be specified in the LOGMODE for the LU. Refer to Appendix D for more information about LOGMODEs.

- 2 Emulate a 3278 or 3279 Model 2 terminal with a maximum display screen size of 24 x 80.
- 2,3 Emulate a 3278 or 3279 Model 3 terminal with a maximum display screen size of 32 x 80.
- 2,3,4 Emulate a 3278 or 3279 Model 4 terminal with a maximum display screen size of 43 x 80.
- 2,3,4,5 Emulate a 3278 or 3279 Model 5 terminal with a maximum display screen size of 27 x 132. To use a 132-character display, you must install the Barr font files as described in section 3.2.

Printer

Emulate a 3287 printer with a 24 x 80 (1920 character) buffer size. The printer type — either LU Type 1 or LU Type 3 — must be specified using a LOGMODE. The software determines the LU type when the 3270 session binds to the host application.

The 3270 printer session acts like a host-connected 3287 printer. The data stream for the LU Type 1 (SCS) printer is the same as the data stream for an RJE SCS printer, but the LU Type 1 stream does not support data compaction or compression. The data stream for the LU Type 3 (DSC) printer is similar to a display terminal data stream, but the LU Type 3 stream also contains print control orders.

Typically, the application program controls the 3270 printer sessions, although some applications allow the printer sessions to respond to commands issued from a 3270 terminal session.

3270 printer devices must be assigned to a Destination device on the Assign Devices menu. Refer to Chapter 5, *Assign Devices*.

Character Coded Logon

Enter up to 40 characters of logon data that automatically are sent to the host during logon. This feature allows you to automatically connect to a particular host application during startup — it saves you from having to manually start the application each time you start the program.

The logon information can include any command normally typed at logon time, such as the application name or LOGMODE value. The format used for the data depends on the requirements at your host.

For example, to logon to VM/CMS using the LOGMODE for file transfer, you would enter a command similar to this one in the Character Coded Logon field:

```
NYVM LOGMODE=SNX32702
```

The character coded logon is sent only at initial program startup — it is not sent when a program restart occurs.

If you prefer to logon manually from the 3270 session screen, leave the logon field blank.

4.2 Keyboard Training Utility

If you select **IBM Foreign 102 Key** as your keyboard type, the Keyboard Training Utility must be used to provide keyboard information to the Edit Keyboard Map feature. For each PC key, the Keyboard Training Utility teaches the software the correspondence between the internal key scan code and the printable ASCII character shown on the key top. The Edit Keyboard Map feature uses this information to display the name of PC keys that perform 3270 key functions. When you complete the Keyboard Training Utility, the Edit Keyboard Map screen displays.

Note: Your PC must be configured to use the correct native language character set before you use the Keyboard Training Utility. If your PC is not yet configured for your language, load the appropriate code page and issue the **DOS KEYB** and **COUNTRY** commands with the correct language-specific parameters. Refer to your DOS manual for more information about this process.

Note: You also must set up the Barr software Translation Tables to use your language. Refer to *Choose Language for Translation Tables* in section 19.1 of the *BARR/RJE* manual.

The Keyboard Training Utility screen displays when you choose **IBM Foreign 102 Key** as your keyboard type and select **Yes** for the **Edit Keyboard Map?** option. Instructions display at the top of the screen.

```

Keyboard Training Utility

Press each key with a printable graphics character.

Program will learn correspondence between key and its ASCII value.

Dead key combinations are ignored.

Press Esc when done.

These are the keys you have entered:

_____

```

- Press every PC key that is labeled with a printable graphics character, including letters, numbers, and punctuation. As each key is entered, its ASCII representation displays on the last line of the screen. To be sure you do not miss any keys, type the keys one row at a time. Enter single keystrokes only. Do not enter two-key, or *dead-key*, combinations that include **(Shift)**, **(Ctrl)**, or **(Alt)**. (For example, the characters **é** and **ü** require two keystrokes and thus are not entered.) Each key is handled separately by the Keyboard Map.

These are the keys you have entered:

```
'1234567890--=\qwertyuiop[ ]asdfghjkl;'zxcvbnm,./
```

- When you are finished entering all the printable graphics characters, press **Esc** to display the Edit Keyboard Map utility.

4.3 Edit Keyboard Map

During 3270 sessions, the PC keyboard emulates a 3270 terminal keyboard. You can customize keyboard emulation with the Edit Keyboard Map option. The keyboard map contains a list of 3270 key functions. When you *edit* the keyboard map, you change which PC key is assigned to perform a specific 3270 key function.

Guidelines for Changing Key Maps

Either a single keystroke or a combination of two keys can be assigned to emulate a 3270 key. Two-key combinations include a shift-status key — **Shift**, **Ctrl**, or **Alt** — and another key. Additionally, more than one PC key can be assigned to perform the same 3270 key function. This feature is useful for frequently-used 3270 key functions or when the workstation is shared by people who prefer different key mappings. (Configuration files also can be used to store different keyboard maps. Refer to section 20.4 of the *BARR/RJE* manual for more information about configuration files.)

When making key assignments, use only the PC keys that produce *nonprintable* characters. For example, either **F1** or **Ctrl F1** can be assigned to emulate the 3270 **PF1** function, because these keys result in nonprintable characters. Keys which produce *printable* characters should be assigned only in combination with **Ctrl** or **Alt**. For instance, do not map the **A** key to a 3270 function because this key produces the printable letter **a**. Instead, map **Ctrl A** or **Alt A** to the function.

Caution: If a printable key — such as the **Spacebar**, a letter, a number, or a punctuation mark — is mapped to a 3270 key function you cannot use that key as a normal character. For example, if lowercase letter **a** (**A**) or uppercase letter **A** (**Shift A**) is mapped to a 3270 function, you cannot type that letter during data entry or command entry.

If you want to change the default map to match a 3270 keyboard that you are familiar with, refer to Appendix E for a list of common keyboard maps.

Edit Keyboard Map Screen

To access the Edit Keyboard Map screen, from the 3270 Description screen set the **Edit Keyboard Map?** option to **Yes** and press **Enter**.

```

Select Function and Press Enter.

Press Esc when done.

                                IBM Enhanced 101/102 Keyboard
PF1      PF11      PF21      Attn      Field Mark  Insert
PF2      PF12      PF22      Home     Key Click   Delete
PF3      PF13      PF23      Test     AltCursor   File Trans
PF4      PF14      PF24      Reset    EraseEof    Quit
PF5      PF15      PA1       Enter    EraseInput  Jump Key
PF6      PF16      PA2      Ident    Cursor Sel  Show Map
PF7      PF17      PA3      Clear    Save Scr   Escape
PF8      PF18      Dup      Blink    Record Scr
PF9      PF19      ←        Sys Req  Help Notes
PF10     PF20      →        Newline  Reveal

                                PF1      F1
                                Selection ↑↓←→

```

Instructions display at the top of the screen:

- To edit the mappings of individual keys, select a 3270 key from the list. Refer to *Edit Key Mappings* later in this section.
- To exit the **Edit Keyboard Map** screen, select the **Escape** function in the last column of the screen or press **Esc**.

The list of 3270 key functions displays in six columns, and the keyboard type you selected earlier displays at the top of the list. The key mapping for the selected key displays on the bottom line of the screen. (Default PC key mappings vary, depending on the selected keyboard type.)

From this screen you also can:

- View the mappings of individual keys as you move the cursor around the screen. Refer to *Display Individual Key Mappings* later in this section.
- View a list of the current mappings of all 3270 keys, using the **Show Map** selection. Refer to *Display All Key Mappings* later in this section.

Several items on this screen are value-added features rather than standard 3270 key functions. The nonstandard functions, which display in the last two columns, are **Save Scr**, **Record Scr**, **Help Notes**, **Reveal**, **File Trans**, **Quit**, **Jump Key**, **Show Map**, and **Escape**.

The 3270 key functions and value-added functions are described in Chapter 8, *3270 Terminal Emulation*.

Display Individual Key Mappings

Select a 3270 key function with the cursor. The 3270 key function and the PC key mapped to it are shown at the bottom of the screen. For example:

```

Select Function and Press Enter.

Press Esc when done.

IBM Enhanced 101/102 Keyboard
PF1      PF11    PF21    Attn    Field Mark  Insert
PF2      PF12    PF22    Home   Key Click   Delete
PF3      PF13    PF23    Test   AltCursor   File Trans
PF4      PF14    PF24    Reset  EraseEof    Quit
PF5      PF15    PA1     Enter  EraseInput  Jump Key
PF6      PF16    PA2     Ident  Cursor Sel  Show Map
PF7      PF17    PA3     Clear  Save Scr    Escape
PF8      PF18    Dup     Blink  Record Scr
PF9      PF19    ←       Sys Req Help Notes
PF10     PF20     →       Newline Reveal

Enter    R.Ctrl

Selection ↑↓←→

```

- Cursor to the 3270 **Enter** function in the fourth column of the screen and note which key is assigned to it. For the **IBM Enhanced 101/102** keyboard, **Enter** is mapped to the right **(Ctrl)** key by default.

If several PC keys are mapped to a 3270 key function, the list of PC keys on the bottom of the screen may wrap to the next line. Additionally, the keys you assign may not display in the order they were assigned because the display order is based on internal key scan codes.

Display All Key Mappings

The **Show Map** option lets you view a complete list of the 3270 key mappings. This option is available only in the Installation Description, not during program operation.

The list of key definitions is divided into three columns, with the first PC key assignment displayed next to each 3270 key function. Additional keys mapped to a given function, or keys with names that are too wide to fit next to the 3270 function, display below the 3270 function.

- Select the **Show Map** option in the last column of the Edit Keyboard Map screen.

The sample screen shows the default mappings for the **IBM Enhanced 101/102** keyboard:

Current 3270 Key Definitions		
PF1	<u>F1</u>	PF23 <u>Shift F11</u>
PF2	<u>F2</u>	PF24 <u>Shift F12</u>
PF3	<u>F3</u>	PA1 <u>Insert</u>
PF4	<u>F4</u>	PA2
PF5	<u>F5</u>	Home (Ext.)
PF6	<u>F6</u>	PA3
PF7	<u>F7</u>	Dup
PF8	<u>F8</u>	Shift Insert
PF9	<u>F9</u>	← <u>Shift Tab</u>
PF10	<u>F10</u>	Delete
PF11	<u>F11</u>	→ <u>Tab</u>
PF12	<u>F12</u>	Attn <u>Ctrl F7</u>
PF13	<u>Shift F1</u>	Home <u>Home</u>
PF14	<u>Shift F2</u>	Test <u>Alt F10</u>
PF15	<u>Shift F3</u>	Reset <u>R.Alt</u>
PF16	<u>Shift F4</u>	Enter <u>R.Ctrl</u>
PF17	<u>Shift F5</u>	Ident <u>Alt F9</u>
PF18	<u>Shift F6</u>	Clear <u>- (Keypad)</u>
PF19	<u>Shift F7</u>	Shift - <u>(Keypad)</u>
PF20	<u>Shift F8</u>	Blink <u>Ctrl F4</u>
PF21	<u>Shift F9</u>	Sys Req
PF22	<u>Shift F10</u>	Alt Print Screen
		Newline <u>Enter</u>
		Field Mark
		Shift Home (Ext.)
		Key Click <u>Alt F11</u>
		AltCursor <u>Alt F5</u>
		EraseEof <u>Ctrl F6</u>
		EraseInput <u>Alt F4</u>
		Cursor Sel <u>Ctrl F5</u>
		Save Scr
		Ctrl * (Keypad)
		Record Scr
		Alt * (Keypad)
		Help Notes <u>Alt F8</u>
		Reveal <u>Ctrl F1</u>
		Insert <u>Ins</u>
		End (Ext.)
		Delete <u>Del</u>
		Page Down
		File Trans <u>Ctrl F3</u>
		Quit <u>Ctrl Esc</u>
		Jump Key <u>Alt N</u>
		Any key

- Press **Enter** or **Esc** to return to the **Edit Keyboard Map** screen.

If a key symbol displays on more than one key on the keyboard, the screen indicates which key to use:

- **(Ext.)** indicates that a key is on the extended keypad.
- **(Keypad)** indicates that a key is on the numeric keypad.
- **R.** indicates the key is on the right side of the keyboard.

For example, the screen above shows that the **PA2** function is mapped to the **Home** key on the extended keypad, the **Clear** function is mapped to both **[-]** and **[Shift] [-]** on the numeric keypad, and **Enter** is mapped to the right **[Ctrl]** key.

When several key combinations are assigned to a single 3270 function, the key assignments may wrap to the next line. If wrapping occurs, the last 3270 key definition on the screen is bumped off the screen.

Edit Key Mappings

By default, each 3270 key already is assigned to a single PC key or to a two-key combination. However, key assignments can be added or changed as desired. You can select a different key to perform a 3270 key function or you can unassign a function that will not be used. You also can add key assignments, so that several key combinations perform a single 3270 key function.

Select Function and Press Enter.

Press Esc when done.

IBM Enhanced 101/102 Keyboard

PF1	PF11	PF21	Attn	Field Mark	Insert
PF2	PF12	PF22	Home	Key Click	Delete
PF3	PF13	PF23	Test	AltCursor	File Trans
PF4	PF14	PF24	Reset	EraseEof	Quit
PF5	PF15	PA1	Enter	EraseInput	Jump Key
PF6	PF16	PA2	Ident	Cursor Sel	Show Map
PF7	PF17	PA3	Clear	Save Scr	Escape
PF8	PF18	Dup	Blink	Record Scr	
PF9	PF19	←	Sys Req	Help Notes	
PF10	PF20	→	Newline	Reveal	

PF1 _____ F1 _____

Selection ↑↓←→

To edit the map for a 3270 key function:

- Move the cursor to the 3270 key function. Note whether the 3270 key already is mapped to a PC key. (If not, the key display is blank at the bottom of the screen.) For example, select **PF1** from the list and note to which PC key it is assigned. On the **IBM Enhanced 101/102** keyboard, the **PF1** function is assigned to the **F1** key by default.
- Press **Enter** to reach the **Edit Key Map** screen.

For **PF1**, the **Edit Key Map** screen looks like this:

Press Space Bar to undefine key mappings.

Enter keys for: PF1 _____

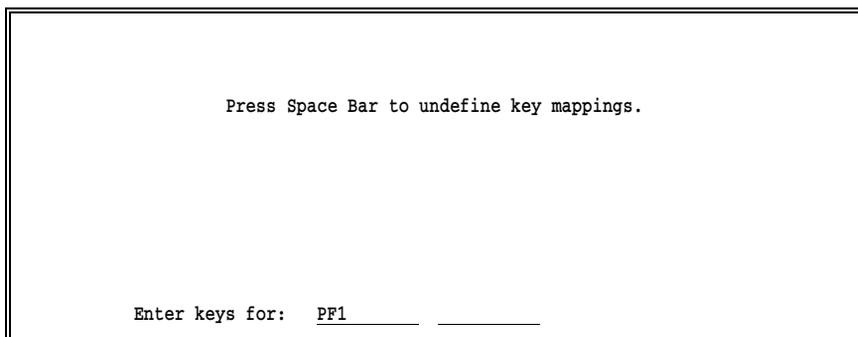
From this screen, you can:

- Unmap a 3270 key function and leave it unassigned, by pressing the **Spacebar**.
- Map a 3270 key function to an additional PC key or change the assignment to a different PC key by pressing the desired key(s).

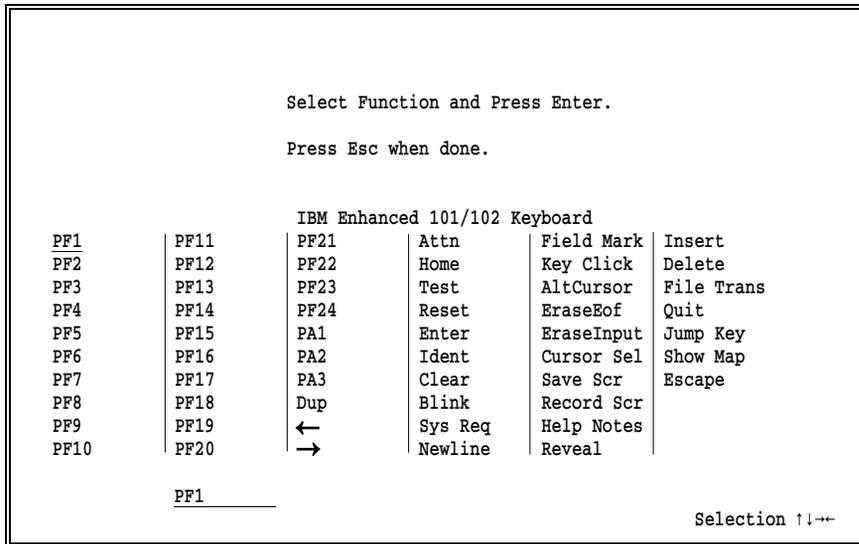
Unmap a Key

You can disable, or *unmap*, 3270 key functions that you do not plan to use. However, it is not necessary to unmap a key if you simply want to change the assignment of the PC key from one 3270 function to another. During key mapping, the software automatically will unmap the 3270 key function that is using the desired PC key. (Refer to *Accidental Unmapping of Another Key Definition* later in this section.)

On the **Edit Key Map** screen, note that only the 3270 key function displays — the current PC key assignment does not display.



- Press the **Spacebar** to unmap the key and return to the **Edit Keyboard Map** screen.

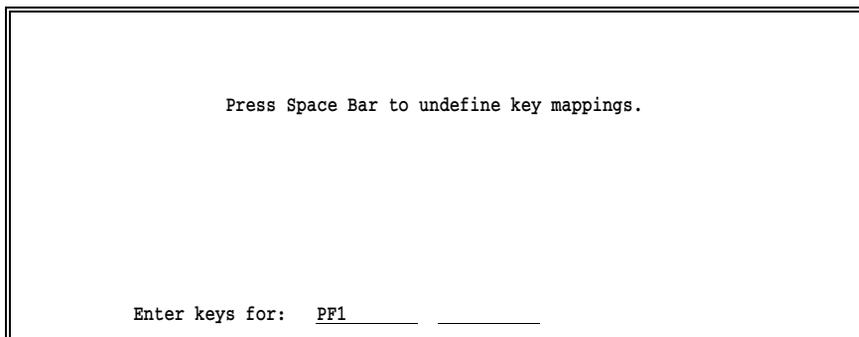


The cursor remains on the 3270 key on the **Edit Keyboard Map** screen, and the last line of the screen shows that no PC key is assigned to the 3270 key function. The sample screen above shows that the PC key assignment for **PF1** has been removed.

Map a Key

Before you change or add a key mapping, you may want to review the complete list of key maps using the **Show Map** function. Unless you are familiar with the current key assignments, you may inadvertently unmap another assignment. The software automatically unmaps a 3270 key function when its assigned PC key gets mapped to another 3270 function.

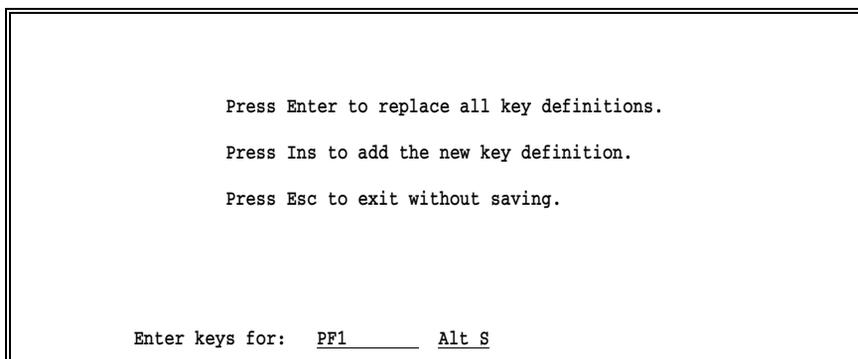
To map the selected 3270 key function to a new PC key:



- Press the PC key. To assign a two-key combination, hold the first key while pressing the second key. For example, assign the combination **Alt S**.

Note: You *must* make a PC key assignment before you can exit the **Edit Key Map** screen. If you attempt to exit the screen at this point by pressing **Enter** or **Esc**, you will unmap the 3270 key function to which the PC **Enter** or **Esc** key currently is assigned. Refer to *Accidental Unmapping of Another Key Definition* later in this section for instructions on how to correct this condition.

When you assign a PC key, instructions for saving your changes display at the top of the screen:



Use the following keys:

- Enter** Replace all previous key definitions for the 3270 key with the new key definition.

Note: Any key you press — other than **Ins** or **Esc** — causes the current key definition to be replaced.

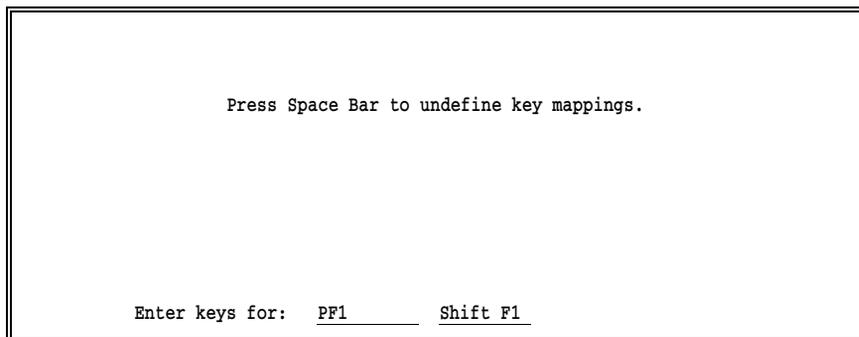
- Ins** Add the new key definition to the existing key definitions by pressing **Ins** on the *numeric keypad*. (**Insert** on the *extended keypad* will *replace* the key definition.)

- Esc** Discard changes to the current key definition and return to the **Edit Keyboard Map** screen. If the selected PC key already was assigned to another 3270 key function, the original 3270 key function remains unmapped — it is not restored when you cancel the current assignment.

Accidental Unmapping of Another Key Definition

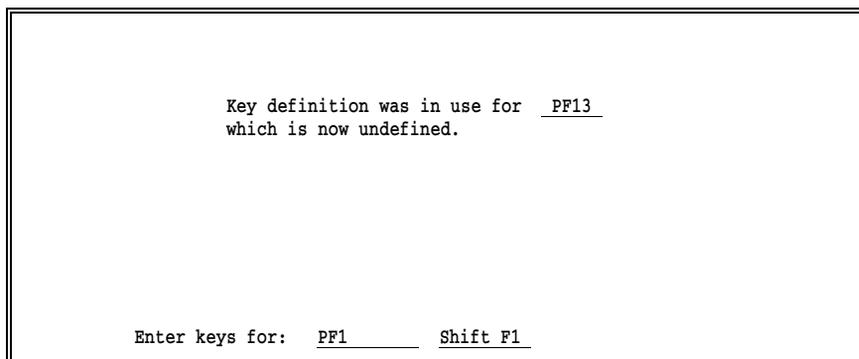
If the PC key or two-key combination you choose already is assigned to another 3270 key function, an error message displays. Note which 3270 key was mapped to the PC key, because the original mapping is deleted. If this happens by accident, to correct the situation you must reassign both 3270 key functions. Assign the current 3270 key function to a different PC key, then remap the 3270 key function that was unmapped.

Suppose you assign **(Shift) (F1)** to the **PF1** function, not realizing **(Shift) (F1)** already is assigned to **PF13**:

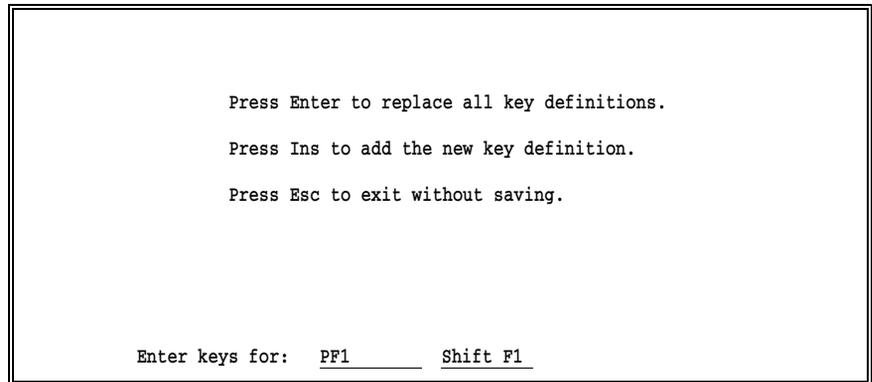


➤ Press **(Shift) (F1)**.

The following screen displays:



When you make a duplicate assignment, the **Save Key Map** screen displays an error message and pauses for about five seconds. In this example, the message warns that **PF13** has been unmapped. Then new instructions automatically display at the top of the screen:



To cancel the new assignment:

- Press **Esc**. Remember to remap the unmapped 3270 key function to its original PC key. (In this example, you would need to remap **PF13** to **Shift F1**.)

To complete the new assignment:

- Press **Enter** or **Ins**. Remember to map the unmapped 3270 key function to a different PC key. (In this example, you would need to make a new PC key assignment for **PF13**.)

Notes:

Assign 3270 printer devices to a Destination.

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This chapter describes how to route output from a 3270 printer to a Destination device and discusses which file options and Assign Devices options apply to 3270 output. For a general discussion of device assignment and a description of other devices, refer to Chapter 11 of the *BARR/RJE* manual.

The 3270 printer sessions defined in the **3270 Description** display on the Assign Devices screen. 3270 terminal sessions do not display on this screen, because data automatically is routed between the host application and the corresponding 3270 session.

The Assign Devices menu can be accessed both during software installation and program operation. Default device assignments are made in the Installation Description. Changes to the assignments can be made from the **Operation** menu during program operation.

5.1 Assignment Screen

The Assign Devices screen shows the current assignment of Source and Destination devices. The number of 3270 printer sessions that you specified on the 3270 Description screen is reflected here.

To reach the device assignment screen, from the Installation Description menu select **Assign Devices**.

```

                                Assign Devices

SEND1~RD1  SEND2~SCREEN  KEYBOARD~COMMAND  CON~SCREEN  LOG~NUL  PR1~LPT1
PU1~SUSPEND  PR_3~SUSPEND  PR_4~SUSPEND

                                Select SOURCE~DESTINATION.          Escape  Selection ↑!→

```

Devices display on the Assign Devices screen in **SOURCE~DESTINATION** pairs that are separated by an arrow. The arrow indicates the direction of data flow. The Source device displays before the arrow, and the Destination device displays after the arrow.

3270 Source Devices

The Source device names for 3270 printers begin with **PR_** followed by the first six non-blank characters of the 3270 session name specified on the 3270 Description screen.

The sample screen above shows two 3270 printer sessions, **PR_3** and **PR_4**. (The 3270 sessions named **3** and **4** were assigned to be 3270 printers on the **3270 Description** screen.)

Valid Destinations

By default, the 3270 printer devices are assigned to a Destination of **SUSPEND**. To receive 3270 print data, you need to assign the 3270 printer devices to a device other than **SUSPEND**.

A 3270 printer session can write to any of the available Destination devices, including the Print Spool. Refer to section 11.3 of the *BARR/RJE* manual for a description of the available devices.

5.2 Menu Selections

After you make an assignment, the Assign Devices screen is updated to reflect your selection and a menu line displays on the bottom line of the screen.

A sample assignment is shown in section 5.3.

```

Assign Devices

SEND1-RD1  SEND2-SCREEN  KEYBOARD-COMMAND  CON-SCREEN  LOG-NUL  PR1-LPT1
PU1-SUSPEND  PR_3-SUSPEND  PR_4-SUSPEND

Continue      Escape      Receive mode  Options      Help

```

Choose from the following options:

Continue

Select this option to make another assignment. The cursor returns to the assignment area of the screen.

Escape

When you are finished making assignments, select **Escape** or press the **[Esc]** key. You are returned to the Installation Description screen.

Receive mode

Assign a Receive mode to a device. The Receive mode selections will display at the bottom of the screen. Refer to section 5.5 for more information about Receive modes.

Options

Assign options to a device. The Assign Devices options screen will display. Refer to section 5.6 for more information about these options.

Help

This option displays a help screen that contains hints for using the Assign Devices menu:

```
The name before the arrow is a source of files.
The name after the arrow is a destination that will
receive files. The blinking arrow signals the assignment
that is to be modified.
The * indicates receive mode is set.
Any Key
```

5.3 Sample Assignment

Steps for directing 3270 printer output to a Destination are the same as those for assigning RJE output to a Destination. This example shows how to assign 3270 printer output to write to a PC parallel printer.

Assigning a Printer as a Destination

From the Assign Devices menu:

```

                                Assign Devices

SEND1->RD1  SEND2->SCREEN  KEYBOARD->COMMAND  CON->SCREEN  LOG->NUL  PR1->LPT1
PU1->SUSPEND  PR_3->SUSPEND  PR_4->SUSPEND

                                Select SOURCE->DESTINATION.           Escape  Selection ↑↓→←
```

- Select the Source device and press **[Enter]**. For example, select **PR_3**.

The list of Destination devices displays.

```

Assign Devices

DESTINATION? (FILE) SCREEN NUL SUSPEND LPT1 COMMAND RD1

Selection ↑↓→

```

- Select the Destination. For example, select **LPT1**.

The assignment screen is updated to reflect your selection.

```

Assign Devices

SEND1→RD1  SEND2→SCREEN  KEYBOARD→COMMAND  CON→SCREEN  LOG→NUL  PR1→LPT1
PU1→SUSPEND  PR_3→LPT1  PR_4→SUSPEND

Continue      Escape      Receive mode      Options      Help

```

- Select **C**ontinue to make another assignment, or press **Esc** to return to the Installation Description menu.

5.4 Assigning (FILE) as a Destination

File name assignments and file options for 3270 output are outlined in this section. For a complete description of the (**FILE**) parameters and options, refer to section 11.5 of the *BARR/RJE* manual.

Follow the steps below to reach the screen where the file name and file options are assigned:

```

Assign Devices

SEND1→RD1  SEND2→SCREEN  KEYBOARD→COMMAND  CON→SCREEN  LOG→NUL  PR1→LPT1
PU1→SUSPEND  PR_3→SUSPEND  PR_4→SUSPEND

Select SOURCE→DESTINATION.      Escape      Selection ↑↓→

```

- Select the Source device and press **Enter**. For example, select **PR_3**.

A list of Destinations displays:

```

                                Assign Devices

DESTINATION? (FILE) SCREEN NUL SUSPEND LPT1 COMMAND RD1

                                                                Selection ↑↓←→

```

➤ Select **(FILE)** as the Destination and press **Enter**.

(FILE) Parameters

When **(FILE)** is selected as a Destination, the following screen displays:

```

                                Assign Devices

Beginning of file name: _____
Ending of file name is not used.      New File      Log      Enter character

```

Beginning of file name

The requirements for the beginning portion of the file name are the same as those described in the *BARR/RJE* manual.

Ending of file name

When assigning a file name ending for 3270 output, the options **not used** and **from file** are the most common selections. However, **from file** is valid only for LU Type 1 output. Values for the **jobname**, **formname**, and **fcbyname** options can be obtained if the Barr OUTPUT statement is enabled. These options are used for applications that require printer forms or when files are being routed to the Print Spool. The **source filename** option is not a valid selection — it applies only when the Source device is **SEND** or **SPOOL**.

New File, Append, Replace, Replace Cond.

Any of these options can be enabled for 3270 printer output.

Log/No Log

This option allows you to enable or disable console messages. The messages display when 3270 print output is being written to disk.

5.5 Receive Modes

To reach the Receive mode menu:

```

                                Assign Devices

SEND1~RD1  SEND2~SCREEN  KEYBOARD~COMMAND  CON~SCREEN  LOG~NUL  PR1~LPT1
PU1~SUSPEND  PR_3~LPT1  PR_4~SUSPEND

Continue      Escape      Receive mode      Options      Help

```

➤ Select **Receive mode**.

```

                                Assign Devices

SEND1~RD1  SEND2~SCREEN  KEYBOARD~COMMAND  CON~SCREEN  LOG~NUL  PR1~LPT1
PU1~SUSPEND  PR_3~LPT1  PR_4~SUSPEND

ASCII      N ASCII lines      Variable ASCII lines      Transfer files      Transparent
Binary      DOS (obsolete)      Fixed length                S/370 Channel      PostScript ↑↓↔

```

Any of the available receive modes can be assigned to 3270 print output. The most common selections for 3270 output are **ASCII**, **S/370 Channel**, **Transparent**, and **PostScript**. Refer to section 11.9 of the *BARR/RJE* manual for more information about receive modes.

5.6 Options for Assign Devices

The Assign Devices options may be used for 3270 output, as outlined below. Options may be set differently for each device. The available options display when you select **Options** from the menu line at the bottom of the Assign Devices menu. For a complete description of these options, refer to section 11.10 of the *BARR/RJE* manual.

```

                                Assign Devices

SEND1~RD1  SEND2~SCREEN  KEYBOARD~COMMAND  CON~SCREEN  LOG~NUL  PR1~LPT1
PU1~SUSPEND  PR_3~LPT1  PR_4~SUSPEND

Continue      Escape      Receive mode      Options      Help

```

► **Select Options.**

The following screen displays:

```

                                Assign Devices

OUTPUT statement used in file? No      Class:1  Spool header from data? No
Ignore 0 lines from start of file.  Create separator files? No
Write spool header to file? No      Choice? + -

```

Several of these options can be used to add information to the Barr file header. The file header applies only to LU Type 1 (SCS) output. To include 3270 *format* information in the file header, set **Form Header Enabled?** to **Yes** on the 3270 Description screen. If you do not want a file header placed in the file:

- On the 3270 Description screen, set **Form Header Enabled?** to **No**.
- On the options screen, leave **Output statement used in file?**, **Spool header from data?**, and **Write spool header to file?** at their default values of **No**.

Output statement used in file?

This option can be used for 3270 printer output to place information in the Barr file header. The parameters that may be specified (**jobname**, **formname**, **filename**, etc.) are useful when directing output to the Print Spool. If you are using this option, remember to alter your application program to include the OUTPUT statement in the data at the host.

Class: n

An output class can be assigned to 3270 output, although an equivalent designation does not exist at the host. The assigned value is included in the file header and is useful when writing to the Print Spool.

Spool header from data?

The software can extract a **formname** or **jobname** from the 3270 output. This option is useful when writing to the Print Spool. Remember to include the desired information in the file at the host.

Ignore n lines from start of file.

This option can be used to delete lines from the beginning of the 3270 output file.

Create separator files?

Applies only to RJE output. For 3270 output, leave this option set to the default of **No**.

Write spool header to file?

This option can be used to enable the file header when 3270 output is directed to a destination of (**FILE**).

Adjust tuning parameters that affect data format, printer output, program performance, and data communications.

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6.4 Modem and Line Control	69
6.5 Restart Actions	70

Some RJE+3270 tuning parameters apply to both RJE and 3270 sessions, while other parameters apply only to RJE sessions or only to 3270 sessions. This section outlines which tuning parameters affect the 3270 sessions and indicates whether the parameters affect 3270 display data, 3270 printer output, or 3270 file transfer. For more information about Tuning Data, refer to Chapter 19 of the *BARR/RJE* manual.

Tuning Data Menu

To reach the tuning parameters, from the **Installation Description** menu select **Tuning Data**. The following menu displays:

```

                                     Tuning Data

                                     These parameters seldom need changing.

                                     Edit ASCII and EBCDIC Translation Tables
                                     Printer Control
                                     Reader Control
                                     Additional Parameters
                                     Modem and Line Control
                                     Restart Actions
                                     Escape

                                     Selection ↑↓→←
```

Options for each menu choice are discussed in the sections that follow. The **Reader Control** selection applies only to RJE, not to 3270, and is described in section 19.3 of the *BARR/RJE* manual.

6.1 Edit ASCII and EBCDIC Translation Tables

Data translation affects 3270 terminal data, 3270 file transfer, and 3270 printer output. When you select this option, the translation table menu displays:

```
          Edit ASCII and EBCDIC Translation Tables

          Translate control codes to Control codes
              (as in Appendices B.4 and B.5)
          Translate control codes to Question marks
              (normal case)
          Choose Language for translation tables
          Edit translation tables
          Assign translation tables to devices

          Escape

                                           Selection ↑↓←→
```

On this screen, the option **Assign translation tables to devices** applies only to 3270 printer output, not to 3270 display data. The remaining options apply to both 3270 printer and 3270 display data.

However, none of these options affect IND\$FILE transfer. Data translation for IND\$FILE transfer is controlled by the host, not the Barr software.

For more information about translation of 3270 data, refer to Appendix B of *this manual*. Appendix B in the *BARR/RJE* manual discusses data translation for RJE only.

For more information about the options on this screen, refer to section 19.1 of the *BARR/RJE* manual.

6.2 Printer Control

Forms overlay options and two other print options apply to 3270 printer output. However, forms overlay is not commonly used for 3270 printer output. When you select Printer Control, the following screen displays:

```

Printer Control

Enable the FCBL0AD mechanism? No
FCBL0AD halve? No

Forms are mounted by? Operation screen
Disable form mount error messages? No

Search for form overlay by? FORMNAME
Use default overlay file if overlay not found? No
Default overlay file: STD
Suspend printing if Overlay not found? No

Insert tabs to compress data on disk? No
Selective binary data? No
Maximum print position: 255
Printer error timeout in minutes: 10

Choice? + -

```

If a forms overlay directory is specified for the Destination device to which the 3270 print output is assigned, these options apply:

```

Search for form overlay by?
Use default overlay file if overlay not found?
Default overlay file:
Suspend printing if Overlay not found?

```

These options also apply to 3270 print output:

```

Maximum print position:
Printer error timeout in minutes:

```

For more information about the options on this screen, refer to section 19.2 of the *BARR/RJE* manual.

6.3 Additional Parameters

The additional parameters apply to RJE+3270 program operation. When you select Additional Parameters, the following screen displays:

```
Additional Parameters

Memory allocated for buffers: 100000
Extended memory allocated for buffers: 0 Kbytes

Number of minutes before screen save: 9999
Test mode? No
Line trace buffer size? 32000
Line Trace Format? Short

Disable Installation Description? No
Disable Receive mode in Assign Devices? No
Disable DOS session? No
DOS session executes AUTOCMD.BAT? No
Initial session is? OPER
Hot key uses? Ctrl-Alt

Fast scroll used on CGA color monitor adapter? No
Use VERIFY OFF to improve disk performance? Yes
XPAF special: Vertical Channel Select sets print column to zero? No

Enter number
```

For more information about the options on this screen, refer to section 19.4 of the *BARR/RJE* manual.

6.4 Modem and Line Control

The modem and line control options affect RJE+3270 communications. When you select Modem and Line Control, the following screen displays:

```
Modem and Line Control

Start communications at time: __:__
Communication role? Remote

Minimum number of LUs: 2
Maximum number of LUs: 99

Constant RTS? No
Ignore DSR=0? No
Drop DTR on exit? Yes
Full duplex multi-drop line? No
Line speed when using SME cable: 9600

Token Ring Adapter: Primary
PC Service Access Point: 04
Token Ring Max Out: 2
Token Ring Max In: 1

Number of Gateways in GatePool: 0
Method of Gateway Pooling: Statistical
Netview Alerts? No

Enter number
```

On this screen, the option **Communication role?** applies only to RJE. The software does not perform the host role for 3270 PC-to-PC communications. The type of host connection you are using determines which of the remaining options apply.

For more information about the options on this screen, refer to section 19.5 of the *BARR/RJE* manual.

6.5 Restart Actions

Restart actions affect 3270 sessions as well as RJE sessions. When you select this option, the following screen displays:

```
Restart Actions

Disconnect if idle? No
  Idle time period: 30
  Exit from program after disconnect? Yes

Reconnect periodically? No
  Reconnect time interval:   :  

Choice? + -
```

If you are using the option **Reconnect periodically?**, be aware that the software does not send character-coded logon information for your 3270 sessions when reconnecting at the specified interval. The logon information needs to be entered manually from the 3270 session after a restart occurs. Character-coded logon information is sent only at initial program startup.

For more information about character-coded logon for 3270 sessions, refer to section 4.1.

For more information about the options on this screen, refer to section 19.6 of the *BARR/RJE* manual.

Communications Diagnostics

Check the bind data to verify the 3270 session parameters.

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Table 7-1. Bind Data for 3270 Sessions.....	74

Communications Diagnostics

Diagnostic programs built into RJE+3270 aid in the troubleshooting of communications problems. These programs are accessed from the **Diagnostics** menu.

The diagnostic programs apply to both 3270 and RJE sessions and are documented in Chapter 24 of the *BARR/RJE* manual. An option to display bind data is included in the diagnostics. However, bind data that displays for 3270 sessions is different than bind data for RJE sessions. 3270 bind data is described in this chapter.

Bind Data

In SNA communications, bind data defines the operational rules for each session partner — the 3270 terminal and the host computer. The **Bind Data** option allows you to view the bind data for each communications session.

Bind data originates from the VTAM LOGMODE table, physical unit definition, and the 3270 application, as described in *Appendix D*.

- To reach the Diagnostics menu, from the **Operation** menu select **Advanced**, then select **Diagnostics**.

```

                                     Diagnostics
Communications Statistics             VTAM Commands
Line Trace                           Memory Dump
Bind Data                          Escape
                                     Selection ↑↓←→

```

- Select **Bind Data**.

```

LU 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
   31 01 03 03 B3 A3 70 80 00 07 86 86 00 00 01 10 20 00 91 00 C0 00 00 01 00 40
  2 31 01 03 03 B1 90 30 80 00 07 87 F8 00 00 02 00 00 00 00 00 18 50 00 00 7E 00
  3 31 01 03 03 B1 90 30 80 00 07 87 F8 00 00 02 00 00 00 00 00 18 50 00 00 7E 00
  4 31 01 03 03 B1 90 30 80 00 07 87 F8 00 00 02 00 00 00 00 00 18 50 00 00 7E 00

```

- Scroll through the LUs using the **↑** and **↓** keys. You may need to hit the arrow keys more than once to change the display.

This screen displays the bind data for all 3270 and RJE LUs. The left-most column displays the LU number. The line with a blank LU number contains an RJE bind data sample, while the other lines contain actual bind data. The bind data bytes are numbered 0-25 on the top line of the display. See Table 7-1 for a description of byte values.

The bind data corresponds to the LOGMODE data described in Appendix D, *3270 LOGMODEs*, and varies depending on the LU Type. For more information about bind data, refer to the IBM publication *SNA Sessions Between Logical Units*.

Table 7-1. Bind Data for 3270 Sessions

Byte	Values	Description	LOGMODE
0	31	Bind command code	
1	01	Activation code is non-negotiable	
2	03	FM profile	FMPROF=X'03'
3	03	TS profile	TSPROF=X'03'
4	B1	Primary LU protocol; no compression on receive	PRIPROT=X'B1'
	A1	Primary LU protocol; no compression on receive	PRIPROT=X'A1'
	91	Primary LU protocol; no compression on receive	PRIPROT=X'91'
5	90	Secondary LU protocol; no compression on send	SECPROT=X'90'
	A0	Secondary LU protocol; no compression on send	SECPROT=X'A0'
	B0	Secondary LU protocol; no compression on send	SECPROT=X'B0'
6	30	Common LU protocol	COMPROT=X'3080'
7	80		
8	00	Reserved	

Bind Data for 3270 Sessions (continued)

Byte	Values	Description	LOGMODE
9	01	LU Types 1 and 3: VTAM to terminal pacing (PACING = 1)	SRCVPAC=X'01'
10	85	Output buffer size = 256	RUSIZES=X'8585'
	86	Output buffer size = 512	RUSIZES=X'8686'
	87	Output buffer size = 1024	RUSIZES=X'8787'
11	C6	Input buffer size = 768	RUSIZES=X'87C6'
	87	Input buffer size = 1024	RUSIZES=X'8787'
	F8	Input buffer size = 3840	RUSIZES=X'87F8'
12*	00	LU Types 1 and 3: VTAM to terminal pacing (PACING = 1; same as byte 9)	PSNDPAC=X'01'
13	00	Reserved (same as byte 8)	
14	01	LU Type 1	PSERVIC=X'01
	02	LU Type 2	PSERVIC=X'02
	03	LU Type 3	PSERVIC=X'03
15	00	LU Type 1: No FM header LU Type 2: Query Supported LU Type 3: Query Supported	PSERVIC=X'0200
	80	LU Type 2: 3270 file transfer	PSERVIC=X'0280
16	00	Reserved	PSERVIC=X'020000
17	00	Reserved	PSERVIC=X'02000000
18	00	Not used	PSERVIC=X'0200000000
19	00	Not used	PSERVIC=X'020000000000

*For single-stage pacing, bytes 9 and 12 have the same value. For multi-stage pacing, bytes 9 and 12 can have different values. However, these bytes are not checked by the Barr software.

Bind Data for 3270 Sessions (continued)

Byte	Values	Description	LOGMODE
20*	18	Default number of rows = 24	PSERVIC=X'02000000000018
	1B	Default number of rows = 27	PSERVIC=X'0200000000001B
	20	Default number of rows = 32	PSERVIC=X'02000000000020
	2B	Default number of rows = 43	PSERVIC=X'0200000000002B
21*	50	Default number of columns = 80	PSERVIC=X'0200000000001850
	84	Default number of columns = 132	PSERVIC=X'0200000000001884
22*	18	Alternate number of rows = 24	PSERVIC=X'020000000000185018
	1B	Alternate number of rows = 27	PSERVIC=X'02000000000018501B
	20	Alternate number of rows = 32	PSERVIC=X'020000000000185020
	2B	Alternate number of rows = 43	PSERVIC=X'02000000000018502B
23*	50	Alternate number of columns = 80	PSERVIC=X'02000000000018501850
	84	Alternate number of columns = 132	PSERVIC=X'02000000000018501884
24*	01	Session screen size = Not supported	PSERVIC=X'0200000000001850185001
	02	Session screen size = 24 x 80	PSERVIC=X'0200000000001850185002
	03	Session screen size = Unspecified	PSERVIC=X'0200000000001850185003
	7E	Session screen size = Default (Primary)	PSERVIC=X'020000000000185018507E
	7F	Session screen size = Alternate	PSERVIC=X'020000000000185018507F

Bind Data for 3270 Sessions (continued)

Byte	Values	Description	LOGMODE
25	00	Reserved	PSEVIC=X'020000000000185018507E00'

*** Notes for Bytes 20-24:**

The meaning of bind data bytes 20-24 depends on the LU Type:

- For LU Type 1, bytes 20-24 are not used.
- For LU Type 2, the meaning of bytes 20-23 varies, depending on the value of byte 24. Refer to the list below.
- For LU Type 3, bytes 20-24 must have the values **185018507F**.

Byte Values for LU Type 2

For LU Type 2, byte 24 of the bind data indicates whether to use the primary and alternate screen size values. Possible values for byte 24 are listed below.

Value	Description
01	Not supported by Barr software (12 x 40).
02	Model 2 terminal. The screen size is 24 x 80 (1920 characters). Bytes 20-23 are not used.
03	Unspecified screen size — bytes 20-23 contain zeros. The primary screen size is 24 x 80. The alternate screen size is determined from the Model type set on the 3270 Description screen. When the Barr software receives a Query from the mainframe application, it sends a Query Reply containing the screen size settings.
7E	The primary screen size is set by bytes 20-21. An alternate screen size is not used, so bytes 22-23 are ignored.
7F	The primary screen size is set by bytes 20-21 and the alternate screen size is set by bytes 22-23.

Notes:

Start and operate your 3270 terminal sessions.

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3270 Terminal Emulation

When the RJE+3270 software is started, you can monitor the process of connecting to the host from either the Operation screen or from a 3270 session. This chapter tells you how to access the 3270 terminal sessions and describes the startup process viewed from a 3270 session screen. Once the 3270 session is activated, you can display the 3270 keyboard help screen to assist you with 3270 key functions. You also can issue a command to change the terminal model type.

8.1 Access the 3270 Session Screen

To access the 3270 session screen(s) use one of these methods:

- Use the **Sessions** option on the RJE+3270 **Operation** menu to move between sessions, as described below.
- Hot-key directly to a 3270 session from any screen. (Refer to section 22.4 of the *BARR/RJE* manual.)
- Set **Initial session is?** to a 3270 session on the Tuning Data, Additional Parameters screen. This displays the first 3270 session at software startup. (Refer to section 19.4 of the *BARR/RJE* manual.)

To access a session using the **Sessions** option, from the **Operation** menu:

	Operation	
Command to Host	Send Files to RD1	<u>Advanced</u>
Quit	Send Files to SCREEN	Mount Forms
		Selection ↑↓←→

- Select **Advanced**.

```

                                Advanced
          Assign Devices          Diagnostics
          Sessions              Escape
                                Selection ↑↓←→

```

- Select **Sessions**.

```

          You can go directly to another session by pressing:
          Ctrl-Alt-session

On next screen the session is the first character of session name.
                                Any key

```

- Press any key to display the session choices.

```

Select →←  OPER  DOS  PRINT  1  2  3  4

```

- Select the desired 3270 session. In this example, the 3270 sessions are named 1-4. Choose session 1.

The 3270 screen for session 1 displays:

```

                                Waiting for Logical Unit Activation

                                4B          1          R 1 C 1 16:17  Ctrl-F2=Help

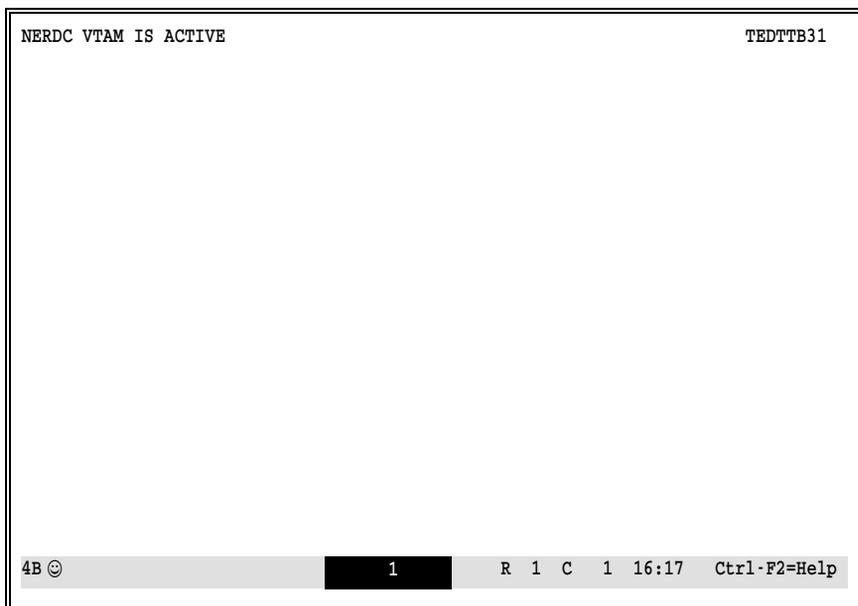
```

The bottom line of the 3270 screen is called the Operator Information Area (OIA). Information about your terminal session displays on this line and is updated during session logon and operation. Refer to Appendix A for a complete description of the OIA.

8.2 Monitor Session Startup

If you want to monitor the startup process for a 3270 session, quickly navigate to the session screen after program startup.

During connection to the host, a **Waiting for Logical Unit Activation** message displays on each 3270 session screen until the session is activated. When the host activates a session by sending an ACTLU command, the session is connected to VTAM and the 3270 screen displays another message. The exact message you will see depends on the configuration at your host. For example, the message you see may be similar to this:



At this point, you can start a 3270 application by issuing a command. Or, if the Character Coded Logon field was used to provide logon information, the application automatically will start. For example, if you start a VM application, you may see an application logon screen similar to this one:

IBM Enhanced 101/102 Keyboard					
PF1	PF11	PF21	Attn	Field Mark	Insert
PF2	PF12	PF22	Home	Key Click	Delete
PF3	PF13	PF23	Test	AltCursor	File Trans
PF4	PF14	PF24	Reset	EraseEof	Quit
PF5	PF15	PA1	Enter	EraseInput	Jump Key
PF6	PF16	PA2	Ident	Cursor Sel	Escape
PF7	PF17	PA3	Clear	Save Scr	
PF8	PF18	Dup	Blink	Record Scr	
PF9	PF19	←	Sys Req	Help Notes	
PF10	PF20	→	Newline	Reveal	
	PF1	F1			

Selection ↑↓←→

The help screen display is similar to the **Edit Keyboard Map** screen in the Installation Description. However, the **Show Map** function is not available on the help screen.

The help screen lists the standard 3270 key functions as well as some value-added, or nonstandard, function keys. Standard 3270 key functions are described in the section *3270 Function Keys*. Value-added key functions are described in the section *Value-Added Function Keys*.

You can execute a 3270 key function using one of these methods:

- Press the PC key(s) mapped to the 3270 key, or
- Select the 3270 key from the help screen.

3270 Function Keys

The standard 3270 functions on the screen are **PF1 - Cursor Sel**, **Insert**, and **Delete**. The actions performed by these 3270 key functions are outlined below. For more information about these 3270 key functions, refer to the IBM publication *3270 Information Display System: 3274 Control Unit Description and Programmer's Guide*.

PF1 - PF24

Program Attention Keys. Each of these keys sends an Attention Identifier (AID) character to the host identifying which key is pressed. The host program takes appropriate action for the selected key. The function performed depends on how the key is defined within the host application.

PA1 - PA3

Program Attention Keys. Each of these keys sends an Attention Identifier (AID) character to the host identifying which key is pressed. The host program takes appropriate action for the selected key. The function performed depends on how the key is defined within the host application.

Dup Duplicate. Enter an asterisk (*) on the display, then advance the cursor to the next unprotected field on the screen. The Dup character tells the Application Program that the same operation is indicated for the remainder of the field. In **EBCDIC to ASCII table two**, the translation for hexadecimal **1C** must be left at the default of **2A (*)** to display an asterisk for the **Dup** function. Refer to section B.5 for more information about data translation.

← **Backtab**. Move the cursor to the first character location of the previous unprotected data field.

→ **Tab**. Move the cursor to the first character location of the next unprotected data field.

Attn

Send status information to the host application program.

Home

Move the cursor to the first unprotected character location on the display screen.

Test

Invoke the 3274 resident test functions.

Reset

Recover from an input-inhibited condition by unlocking the keyboard.

Enter

Program Attention Key. Normally used after data is entered at the terminal by the operator.

Ident

Not implemented.

Clear

Program Attention Key. Also clears the entire display terminal screen to nulls.

Blink

Cursor Blink. Select this key to stop the cursor from blinking. Select the key again to set the cursor to blink. During 3270 emulation, this key functions only when the block cursor is displayed. Refer to **AltCursor** below.

Sys Req

Switch the display terminal between the LU-LU session and the SSCP-LU session.

Newline

Move the cursor to the first unprotected character location on the next line.

Field Mark

Enter a semicolon (;) on the display, which indicates to some host application programs the end of a field in an unformatted buffer or the end of a subfield in a formatted buffer. In **EBCDIC to ASCII table two**, the translation for hexadecimal **1E** must be left at the default of **3B (;)** to display a semicolon for **Field Mark**. Refer to section B.5 for more information about data translation.

Key Click

Select this key to enable clicking sounds on the keyboard as keys are pressed. If key clicking already is activated, select this key to disable key clicking.

AltCursor

Alternate Cursor. Change the cursor display from an underscore to a block cursor or from a block cursor to an underscore.

EraseEof

Erase to End of Field. When the cursor is in an unprotected data field, this key sets to nulls all the character locations from the cursor to the end of the field. If the cursor is on a field attribute or in a protected field, this key locks the keyboard, inhibiting input.

EraseInput

Clear all the unprotected character locations on the display screen to nulls and reposition the cursor to the first unprotected location on the screen. If all the character locations on the screen are protected the cursor is repositioned to row 1, character 1.

Cursor Sel

Cursor Select. Allows the Selector Light Pen detection function to be performed from the keyboard.

Insert

Activate Insert mode. To disable Insert mode, press **Reset** or an AID key.

Delete

Delete a character at the cursor position.

Value-Added Function Keys

In addition to standard 3270 key functions, Barr 3270 software has several nonstandard, or value-added, features. Value-added features are available with 3270 emulation programs but not with 3270 terminals. The extra features are **Save Scr - Reveal** and **File Trans - Escape**. These functions are highlighted on the screen below (but not on the actual software screen) and are described in the remainder of this section.

IBM Enhanced 101/102 Keyboard					
PF1	PF11	PF21	Attn	Field Mark	Insert
PF2	PF12	PF22	Home	Key Click	Delete
PF3	PF13	PF23	Test	AltCursor	File Trans
PF4	PF14	PF24	Reset	EraseEof	Quit
PF5	PF15	PA1	Enter	EraseInput	Jump Key
PF6	PF16	PA2	Ident	Cursor Sel	Escape
PF7	PF17	PA3	Clear	Save Scr	
PF8	PF18	Dup	Blink	Record Scr	
PF9	PF19	←	Sys Req	Help Notes	
PF10	PF20	→	Newline	Reveal	
	PF1	F1			

Selection ↑↓←→

The value-added functions are outlined below. These functions are described in detail later in this section.

Save Scr**Record Scr**

Capture 3270 screens and write them to a disk file.

Help Notes

Display help for additional keys, including scroll keys and special symbols.

Reveal

Display the attributes of a field and the null locations on the screen.

File Trans

Transfer a file to or from a 3270 session. File transfer is described in Chapter 9.

Quit

Quit and exit the software from a 3270 session.

Jump Key

Jump to the next 3270 session. The jump key lets you step through your 3270 sessions, one by one. Its function is similar to the Barr hot-key function. However, the jump key cycles through only the 3270 sessions — it does not display the **Operation** or **DOS** session screens.

Escape

Exit the help screen.

Save Scr

Save Screen. The **save scr** option allows you to save individual screens to a disk file. When you select this command, the current screen is captured and written to the file **SCREEN.DAT**. The file is created if it does not already exist. If **SCREEN.DAT** already exists, the current screen is appended to the file.

To use the **save scr** option:

- Display the screen you want to capture to disk.
- Select the **save scr** function from the help screen or press the PC key that executes the **save scr** command.

The selected screen is written to disk, and the 3270 session screen redisplay.

Record Scr

Record Screen. The **Record Scr** feature lets you save a series of screens to a disk file. When you use **Record Scr**, all screens that display during your 3270 session automatically are captured to disk until you disable the option. This feature is useful for capturing screens that need to be included in documents. Captured screens are appended to the file named **SCREEN.DAT**. If the **SCREEN.DAT** file does not exist, it is created.

Record Scr is a toggle function. You select the option to activate the function, then select the option again to disable the function.

To start recording:

- Select the **Record Scr** function from the help screen or press the PC key that executes the **Record Scr** command.
- Display each of the screens you want to capture to disk.

To stop recording:

- Select **Record Scr** from the help screen, or press the PC key that executes the command.

Help Notes

The **Help Notes** option on the keyboard help screen shows information about other keys you can use during a 3270 session.

To display the Help Notes:

- Select the **Help Notes** option on the help screen or press the PC key that performs the **Help Notes** function.

```

                                Help Notes

3270 keyboard mappings
    ^ => ¬
    [ => ¢
    ] => |

To exit program:
    Quit
    Disconnect and Exit to DOS

Cursor and Scroll Control:
←      - Move Cursor Left
→      - Move Cursor Right
↑      - Move Cursor Up
↓      - Move Cursor Down
Ctrl←  - Scroll ten characters left
Ctrl→  - Scroll ten characters right
Ctrl↑  - Scroll ten lines up
Ctrl↓  - Scroll ten lines down

                                Any key

```

- When you finish reading the Help Notes, press **[Esc]** to return to the 3270 session.

3270 keyboard mappings

Several keys that are on the keyboard of a 3270 terminal, such as the *logical not* symbol (¬), do not appear on the PC keyboard. This screen shows you which PC keys to substitute for these 3270 symbols. The PC key is listed in the left column, and the 3270 key symbol it represents is listed on the right. For example, use the circumflex (^) on the PC keyboard to represent the 3270 logical not symbol.

The mappings for these keys cannot be altered.

To exit program:

You can exit the RJE+3270 program from the 3270 session screen by following the steps listed. Select the **Quit** option from the keyboard help screen, then select **Disconnect and Exit to DOS**. Refer to *Quit* later in this section for more information about exiting the program from a 3270 session.

Cursor and Scroll Control:

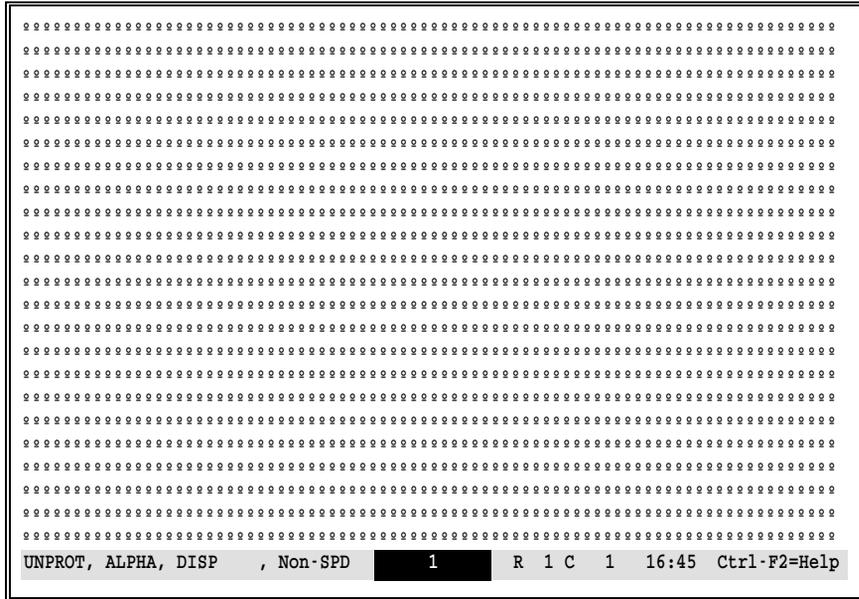
Cursor and scroll keys can be used during a 3270 session to position the cursor or scroll text up, down, left, or right.

Reveal

The Reveal feature displays the attributes of each field and the null locations on the 3270 screen. When the cursor is placed on a field, the attributes for that field display on the first half of the OIA line.

Reveal is a toggle function. Select **Reveal** to enable the reveal function, then select **Reveal** again to disable the function.

- To enable Reveal mode, select the 3270 **Reveal** command or press the PC key that executes the **Reveal** command.



```
UNPROT, ALPHA, DISP, , Non-SPD 1 R 1 C 1 16:45 Ctrl-F2=Help
```

In **Reveal** mode, the 3270 session operates normally. If an error occurs, the normal OIA line redisplay shows an error condition. After a few moments, the field attribute indicators are restored.

- To exit Reveal mode, select **Reveal** again.

The field attributes displayed by Reveal Mode are described in the following table.

Reveal Field Attributes	
UNPROT	Unprotected. The field can be modified.
PROT	Protected. The field cannot be modified.
ALPHA	Alphanumeric. The field may contain letters, numbers or symbols.
NUM	Numeric. The field may contain any of the following numeric symbols: 0123456789, .+-\$* and Dup . (Both * and Dup display as * .) Additionally, the field accepts any character, including non-numeric characters, produced by holding Shift and pressing another key.
DISP	Displayable field.
Non-DISP	Non-displayable field. Field is displayed as blanks.
Int-DISP	Intensified display. Field displays at high intensity vs. normal intensity.
SPD	Selector Light-Pen detectable.
Non-SPD	Not Selector Light-Pen detectable.

Quit

The **Quit** option allows you to disconnect and exit RJE+3270 from a 3270 session.

- Select the **Quit** option from the help screen, or enter the PC key(s) that execute the **Quit** command.

The following command line displays.

```
Disconnect then Exit to DOS      Escape                               Selection --
```

Select one of the following options:

Disconnect then Exit to DOS

Disconnect from your 3270 and RJE sessions, then exit to the DOS prompt.

Escape

To abandon the Quit command and return to your 3270 session, select **Escape** or press the **Esc** key.

You also can use the **Quit** option on the Operation menu to exit the program, as described in section 22.2 of the *BARR/RJE* manual.

8.4 Change the Terminal Model Type

Barr software allows you to change the terminal model type during a 3270 session. The terminal model types specified on the **3270 Description** screen include a range of models. For a given 3270 session, you can emulate any of the terminal model types in the selected model range.

The terminal model type is changed by issuing a command from the Systems Operator (SSCP) session. The command includes the host application name and the name of a LOGMODE that specifies exactly which model type to use. For a discussion of which LOGMODEs are used for the different terminal model types, refer to Appendix D.

For example, suppose that for session 1 you have selected the model range **2,3,4,5** in the **3270 Description**. This selection enables you to emulate terminal model types 2, 3, 4, or 5 during the 3270 session. For your **NYTSO** application, you want to change to a model 4 terminal. The LOGMODE name for a model 4 terminal is **D4C32784**.

Follow these steps:

- ▶ If you are not already in the SSCP-LU session, use the **Sys Req** function to switch to that session.
- ▶ In the SSCP-LU session, type the application name followed by the name of the LOGMODE for the desired terminal type. For this example, the command is:

```
NYTSO LOGMODE=D4C32784
```

- ▶ Select the 3270 **Enter** function.

The LU-LU session automatically is activated. You can then proceed with your 3270 session.

Perform 3270 file transfer between the PC and MVS/TSO, MVS/CICS, and VM/CMS.

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This chapter discusses Barr 3270 file transfer features. It includes instructions for transferring files to and from common host environments and a description of error messages that may display.

9.1 File Transfer Requirements and Features

Barr software uses the host IND\$FILE program for file transfer. IND\$FILE implements structured field transfer, which provides higher throughput than buffer transfer. IND\$FILE also performs data translation. When PC files are sent to the host, IND\$FILE converts them from ASCII to EBCDIC. And when files from the host are being transferred to the PC, IND\$FILE converts them from EBCDIC to ASCII. (The Barr software translation tables and receive modes are not used for IND\$FILE transfer.)

Files can be transferred simultaneously from up to four 3270 terminal sessions.

Requirements

To perform IND\$FILE transfer:

- The IND\$FILE file transfer program must be installed at the host computer.
- The 3270 terminal session must be logged on using an extended LOGMODE and must be at the command-level prompt.

IND\$FILE Programs

Which version of the IND\$FILE file transfer program is required depends on the host operating system:

- For MVS/TSO, program number 5665-311 is required.
- For MVS/CICS, program number 5798-DQH is required.
- For VM/CMS, program number 5664-281 is required.

Extended Logmode

Barr software uses the Distributed Data Management (DDM) architecture protocol to perform 3270 file transfer. With this protocol, the host and the PC communicate using Write Structured Fields (WSF). 3270 WSFs are supported only in 3270 extended mode. Thus, the session from which file transfer is to take place must be connected to the host using an extended LOGMODE. A sample extended LOGMODE for file transfer is given in Appendix D.

Features

Use File Transfer Screen or DOS Command

Barr software allows you to send and receive 3270 files from either the 3270 session or the DOS session.

- From the 3270 session, use the transfer utility screens accessed from the **File Trans** option. (Refer to sections 9.3-9.5.)
- From the DOS session, use the Barr **Send** and **Receive** commands. (Refer to section 9.6.)

The 3270 file transfer session must be active before using either method.

Foreground and Background File Transfer

Files can be transferred from either the foreground or background of a DOS or 3270 session. During foreground file transfer, you start the file transfer from a DOS session or 3270 session and remain in that session until the transfer completes. This method allows you to monitor the progress of the file transfer.

During background file transfer, you start the file transfer from DOS or from a 3270 session. Then you switch to another session to perform interactive work while the transfer takes place in the background.

Adjustable Data Packet Size

Barr 3270 supports inbound data packet sizes of 1,000-8,000 bytes. Which data packet size is required depends on the host application. The data packet size supported by your host must be specified on the **3270 Description** screen.

Messages Showing Transfer Progress

While file transfer is taking place, messages display indicating the progress of the file transfer. If the file transfer does not start, it automatically is canceled after a one minute time-out period.

9.2 File Transfer from a 3270 Session

Before you can begin file transfer from a 3270 terminal session, you must log the session onto the desired host environment — MVS/TSO, MVS/CICS, or VM/CMS — and display the command-level prompt.

File Name Conventions

Follow these conventions for specifying PC file names and host file names when transferring 3270 files.

PC Filename

The name of the PC file to send or receive. PC names must adhere to the DOS file naming conventions. The DOS file format is:

[c:] [path] filename [.ext]

where

c: is the PC disk drive. If a drive is not specified, the default drive is assumed.

path
is the directory path.

filename
is the name of the PC file.

.ext
is the file extension.

Host Filename

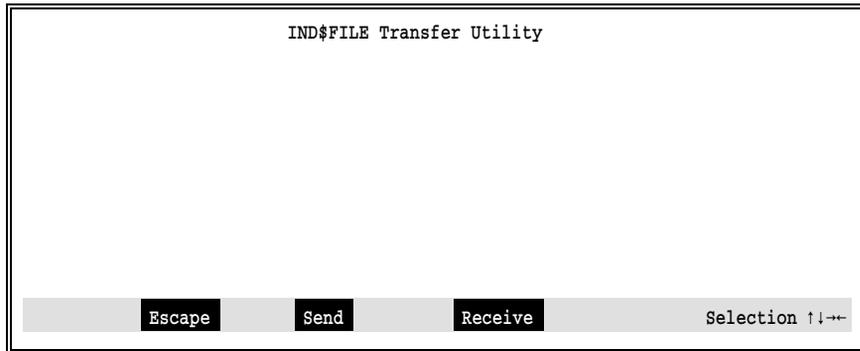
The host file name depends on the operating system used. Host file name requirements for MVS/TSO, MVS/CICS, and VM/CMS are discussed in sections 9.3-9.5.

File Transfer Screens

During a 3270 session, you can access the file transfer screens by using one of these methods:

- ▶ Select the 3270 function **File Trans** from the help menu.
- ▶ Press the PC keys you have mapped to the **File Trans** function. For the IBM Enhanced 101/102 Keyboard, the default keys are **Ctrl F3**.

The following screen displays:



The options on the bottom of the screen display each time the File Transfer utility is selected and after each send or receive transfer.

Escape

Exit the file transfer program and return to the 3270 session.

Send

Transfer a file from the PC to the host. The **IND\$FILE Send Utility** screen displays.

Receive

Transfer a file from the host to the PC. The **IND\$FILE Receive Utility** screen displays.

The send screen is shown below:

IND\$FILE Send Utility	
PC Filename :	_____
Host Filename :	_____
Options :	_____
Enter character	

From both the **Send** and **Receive** screens, you specify the PC and host file names and the file transfer options.

The **PC Filename** must adhere to the DOS file name conventions. Refer to *File Name Conventions* earlier in this section. Conventions for the **Host Filename** and the file transfer **Options** vary depending on the host operating system. **Options** also vary depending on whether the file is sent or received.

Sections 9.3-9.5 describe the host file name conventions and available options for each of the three operating systems. Send and receive transfer examples also are given.

9.3 TSO File Transfer

This section describes using the **IND\$FILE Send Utility** and **IND\$FILE Receive Utility** screens to transfer files between the PC and MVS/TSO.

TSO Send Screen and Options

- At the TSO Ready prompt, run the File Transfer utility by selecting **File Trans** from the help menu or by pressing the PC keys that execute the file transfer function.
- Select the **Send** command.

The **IND\$FILE Send Utility** screen displays:

IND\$FILE Send Utility	
PC Filename :	_____
Host Filename :	_____
Options :	_____
Enter character	

PC Filename

The name of the PC file to send. Refer to *File Name Conventions* in section 9.2.

Host Filename

The name the file will have at the host. For TSO, the host name is a data set member in a partitioned data set (PDS). If the host file already exists, it will be overwritten. The format of the host file name is:

dsn (member)

where

dsn is the data set name.

member is the member name if the dataset is partitioned.

Options

The IND\$FILE program at the host supports several file transfer options, including changes to the file format. More than one option may be specified. If no options are specified, the system default settings are used. The available **Send** options are:

/password

Password required to access the data set if the data set is password-protected.

APPEND

Append the file being sent to an existing TSO file. This option overrides any values specified for **LRECL**, **BLKSIZE**, or **RECFM**.

ASCII

Convert an ASCII PC file to EBCDIC during transfer to the host. To be readable, a file at the host must be in EBCDIC. (The system default is binary, meaning no translation is performed.)

CRLF

Delete the Carriage Return/Line Feed characters from the PC file during transfer to the host.

LRECL(n)

The logical record length (**LRECL**) of the host file, where **n** is the length. If **LRECL** is not specified, a default record length of **80** is assumed. If the **APPEND** option also is specified, **LRECL** is ignored.

BLKSIZE(n)

The number of bytes per data block for the host data set. **BLKSIZE** is ignored if you append to or replace an existing data set. The default **BLKSIZE** is 1 record per block.

RECFM(n)

Record format, where **n** specifies the format to use:

- F** The host file contains fixed-length records. The record length is the default length or the length specified by **LRECL**. Records are padded with blanks if they are shorter than the specified length. For a new file, fixed-length is the default if neither **RECFM** nor **CRLF** is specified.
- V** The host file contains variable-length records. This is the default when **CRLF** is specified.
- U** The host file contains records of undetermined length. This option should be used when transferring transparent files.

SPACE(q[,i])

Specifies the amount of disk space to be allocated for a new data set, where **q** is the initial quantity and **i** is the optional expansion increment size. If **i** is specified, also specify the type of units:

AVBLOCK (value)
TRACKS
CYLINDERS

Here are some examples of the **SPACE** parameter:

SPACE (5)
SPACE (5,2) TRACKS

If the **SPACE** option is not specified, the default storage allocation is the **BLKSIZE**.

Example: Send a File to TSO

This screen shows sample parameters for sending a file to TSO:

IND\$FILE Send Utility	
PC Filename :	<u>F:\SEND\GRADES.DAT</u>
Host Filename :	<u>UF.H0001236.GRADES</u>
Options :	<u>ASCII CRLF</u>
Enter character	

- Use the **↑** and **↓** keys to move between fields.
- To cancel the file transfer before it starts, press **Esc**. Any data entered on the screen is retained, and the command menu line displays.
- After supplying the required information, press **Enter** to start the file transfer.
- To cancel the file transfer after it has started, press **Ctrl Break**. The command-level prompt displays.

In this example, the PC file **GRADES.DAT** in the directory **F:\SEND** is sent to the host where it becomes the data set **UF.H0001236.GRADES**. As the file is transferred to the host, the IND\$FILE program converts the file from ASCII to EBCDIC and discards the ASCII **CR** and **LF** characters.

During the file transfer, progress messages display as described in section 9.7. When the transfer ends, the **Send** and **Receive** command line displays.

TSO Receive Screen and Options

- At the TSO Ready prompt, run the File Transfer utility by selecting **File Trans** from the help menu or by pressing the PC keys that execute the file transfer function.
- Select the **Receive** command.

The **IND\$FILE Receive Utility** screen displays:

IND\$FILE Receive Utility

PC Filename : _____

Host Filename : _____

Options : _____

Enter character

PC Filename

The name the file will have on the PC. Refer to *File Name Conventions* in section 9.2. If a PC file with the same file name and extension exists, it is overwritten.

Host Filename

The name of the host file to receive. The format of the host file name is:

dsn (member)

where

dsn is the data set name.

(member) is the member name if the data set is partitioned.

Options

The IND\$FILE program at the host supports several file transfer options, including changes to the file format. More than one option may be specified. If no options are specified, the system default settings are used. The available **Receive** options are:

APPEND

Append the received file to the end of an existing PC file.

ASCII

Convert the EBCDIC file at the host to ASCII during transfer. To be readable, the PC file must be in ASCII. (The system default is binary, meaning no translation is performed.)

CRLF

Delete the trailing blanks and insert a Carriage Return/Line Feed at the end of each host file record.

Example: Receive a File from TSO

This screen shows sample parameters for receiving a file from TSO:

IND\$FILE Receive Utility	
PC Filename :	<u>F:\RECV\GRADES.DAT</u>
Host Filename :	<u>UF.H0001236.GRADES</u>
Options :	<u>ASCII CRLF</u>
Enter character	

- Use the **↑** and **↓** keys to move between fields.
- To cancel the file transfer before it starts, press **Esc**. Any data entered on the screen is retained, and the command menu line displays.
- Press **Enter** to start the file transfer.
- To cancel the file transfer after it has started, press **Ctrl Break**. The command-level prompt displays.

In this example, the host data set **UF.H0001236.GRADES** is received to the PC file **GRADES.DAT** in the **F:\RECV** directory. As the file is transferred from the host, the IND\$FILE program converts the file from EBCDIC to ASCII and adds the ASCII **CR** and **LF** characters.

During the file transfer, progress messages display as described in section 9.7. When the transfer ends, the **Send** and **Receive** command line displays.

9.4 CICS File Transfer

This section describes using the **IND\$FILE Send Utility** and **IND\$FILE Receive Utility** screens to transfer files between the PC and MVS/CICS.

CICS Send Screen and Options

- At the MVS/CICS command level, display the File Transfer utility by selecting **File Trans** from the help menu or by pressing the PC keys that execute the file transfer function.
- Select the **Send** command.

The **IND\$FILE Send Utility** screen displays:

IND\$FILE Send Utility

PC Filename : _____

Host Filename : _____

Options : _____

Enter character

PC Filename

The name of the PC file to send. Refer to *File Name Conventions* in section 9.2.

Host Filename

The name the file will have at the host. The CICS file name contains 1-8 characters.

Options

The IND\$FILE program at the host supports several file transfer options, including changes to the file format. More than one option may be specified. If no options are specified, the system default settings are used. For MVS/CICS, options must appear in parentheses (). The available **send** options are:

ASCII

Convert an ASCII PC file to EBCDIC during transfer to the host. To be readable, a file at the host must be in EBCDIC. (The system default is binary, meaning no translation is performed.)

BINARY

The file contains binary data that should not be altered before writing to the host file.

CRLF

Delete the Carriage Return/Line Feed characters from the PC file during transfer to the host.

NOCLRF

Do not delete Carriage Return/Line Feed characters before writing the file at the host.

Example: Send a File to CICS

This screen shows sample parameters for sending a file to CICS:

IND\$FILE Send Utility	
PC Filename :	<u>F:\SEND\GRADES.DAT</u>
Host Filename :	<u>GRADES</u>
Options :	<u>(ASCII CRLF)</u>
Enter character	

- Use the **↑** and **↓** keys to move between fields.
- To cancel the file transfer before it starts, press **Esc**. Any data entered on the screen is retained, and the command menu line displays.
- Press **Enter** to start the file transfer.
- To cancel the file transfer after it has started, press **Ctrl Break**. The command-level prompt displays.

In this example, the PC file **GRADES.DAT** in the **F:\SEND** directory is sent to the host where it becomes the data set **GRADES**. As the file is transferred to the host, the **IND\$FILE** program converts the file from ASCII to EBCDIC and discards the ASCII **CR** and **LF** characters.

During the file transfer, progress messages display as described in section 9.7. When the transfer ends, the **Send** and **Receive** command line displays.

CICS Receive Screen and Options

- At the MVS/CICS command level, display the File Transfer utility by selecting **File Trans** from the help menu or by pressing the PC keys that execute the file transfer function.
- Select the **Receive** command.

The **IND\$FILE Receive Utility** screen displays:

IND\$FILE Receive Utility	
PC Filename :	_____
Host Filename :	_____
Options :	_____
Enter character	

PC Filename

The name the file will have on the PC. Refer to *File Name Conventions* in section 9.2.

Host Filename

The name of the host file to receive. The CICS file name contains 1-8 characters and must match the name in the first record of the file in the CICS TS download queue.

Options

The **IND\$FILE** program at the host supports several file transfer options, including changes to the file format. More than one option may be specified. If no options are specified, the system default

settings are used. For MVS/CICS, options must appear in parentheses (). The available **Receive** options are:

ASCII

Convert the EBCDIC file at the host to ASCII during transfer. To be readable, the PC file must be in ASCII. (The system default is binary, meaning no translation is performed.)

BINARY

The file contains binary data that should not be altered before writing to the PC file.

NOCRLF

Do not insert Carriage Return/Line Feed characters at the end of each record before transferring the record to the PC.

CRLF

Insert Carriage Return/Line Feed characters at the end of each record before transferring the record to the PC.

Example: Receive a File from CICS

This screen shows sample parameters for receiving a file from CICS:

IND\$FILE Receive Utility	
PC Filename :	F:\RECV\GRADES.DAT
Host Filename :	GRADES
Options :	(ASCII CRLF)
Enter character	

- Use the **↑** and **↓** keys to move between the fields.
- To cancel the file transfer before it starts, press **Esc**. Any data entered on the screen is retained, and the command menu line displays.
- After supplying the required information, press **Enter** to start the file transfer.

- To cancel a file transfer after it has started, press **Ctrl Break**. The command-level prompt displays.

In this example, the host data set **GRADES** is received to the PC file **GRADES.DAT** in the **F:\RECV** directory. As the file is transferred from the host, the **IND\$FILE** program converts the file from EBCDIC to ASCII and adds the ASCII **CR** and **LF** characters.

During the file transfer, progress messages display as described in section 9.7. When the transfer ends, the **Send** and **Receive** command line displays.

9.5 CMS File Transfer

This section describes using the **IND\$FILE Send Utility** and **IND\$FILE Receive Utility** screens to transfer files between the PC and VM/CMS.

CMS Send Screen and Options

- At the VM/CMS command level, run the File Transfer utility by selecting **File Trans** from the help menu or by pressing the PC keys that execute the file transfer function.
- Select the **Send** command.

The **IND\$FILE Send Utility** screen displays:

IND\$FILE Send Utility	
PC Filename :	_____
Host Filename :	_____
Options :	_____
Enter character	

PC Filename

The name of the PC file to send. Refer to *File Name Conventions* in section 9.2.

Host Filename

The name the file will have at the host. The host file name is in the format:

fn ft [fm]

where

fn is the 1-8 character file name.

ft is the 1-8 character file type.

fm is the optional file mode. The default file mode is **A1**.

Leave the host file name blank if you are using the (**FILE=LST**) option to send files to a user queue instead of a named file.

Options

The IND\$FILE program at the host supports several file transfer options, including changes to the file format. More than one option may be specified. If no options are specified, the system default settings are used. For VM/CMS, options must appear in parentheses (). The available **send** options are:

APPEND

Append the file to an existing CMS file. This option overrides any values specified for **LRECL** and **RECFM**.

FILE=LST

Instead of specifying a host file name, you can specify the **FILE=LIST** option to send files to a user queue.

ASCII

Convert an ASCII PC file to EBCDIC during transfer to the host. To be readable, a file at the host must be in EBCDIC. (The system default is binary, meaning no translation is performed.)

CRLF

Delete the Carriage Return/Line Feed characters from the PC file during transfer to the host.

LRECL n

The logical record length (**LRECL**) of the host file, where **n** is the numeric length value. If **LRECL** is not specified, a default length of **80** is assumed for new files. If the **APPEND** option also is specified, **LRECL** is ignored.

RECFM n

Record format, where **n** specifies the format to use:

- F** The host file will contain fixed-length records. The record length is specified by **LRECL** or is the default length. The records are padded with blanks if they are shorter than the specified length. For a new file, this is the default if neither **RECFM** nor **CRLF** is specified.
- V** The host file will contain variable-length records. This is the default when **CRLF** is specified.

Example: Send a File to CMS

This screen shows sample parameters for sending a file to CMS:

IND\$FILE Send Utility	
PC Filename :	F:\SEND\GRADES.DAT
Host Filename :	STUDENT GRADES A1
Options :	(ASCII CRLF)
Enter character	

- Use the **↑** and **↓** keys to move between fields.
- To cancel the file transfer before it starts, press **Esc**. Any data entered on the screen is retained, and the command menu line displays.
- Press **Enter** to start the file transfer.
- To cancel the file transfer after it has started, press **Ctrl Break**. The command-level prompt displays.

In this example, the PC file **GRADES.DAT** in the **F:\SEND** directory is sent to the host where it becomes the data set **STUDENT GRADES A1**. As the file is transferred to the host, the **IND\$FILE** program converts the file from ASCII to EBCDIC and discards the ASCII **CR** and **LF** characters.

During the file transfer, progress messages display as described in section 9.7. When the transfer ends, the **Send** and **Receive** command line displays.

CMS Receive Screen and Options

- At the CMS command level, run the File Transfer utility by selecting **File Trans** from the help menu or by pressing the PC keys that execute the file transfer function.
- Select the **Receive** command.

The **IND\$FILE Receive Utility** screen displays:

IND\$FILE Receive Utility

PC Filename : _____

Host Filename : _____

Options : _____

Enter character

PC Filename

The name the file will have on the PC. Refer to *File Name Conventions* in section 9.2. If a PC file with the same file name and extension exists, it will be overwritten.

Host Filename

The name of the host file to receive. The host file name is in the format:

fn ft [fm]

where

fn is the 1-8 character file name.

ft is the 1-8 character file type.

fm is the optional file mode. The default file mode is **A1**.

Leave the host file name blank if you are using the (**FILE=LST**) option to receive files from a user queue instead of a named file.

Options

The IND\$FILE program at the host supports several file transfer options, including changes to the file format. More than one option may be specified. If no options are specified, the system default settings are used. For VM/CMS, options must appear in parentheses (). The available **Receive** options are:

APPEND

Append the received file to the end of an existing PC file.

FILE=LST

Instead of specifying a host file name, you can specify the **FILE=LIST** option to receive files from a user queue.

ASCII

Convert the EBCDIC file at the host to ASCII during transfer. To be readable on the PC, the file must be in ASCII. (The system default is binary, meaning no translation is performed.)

CRLF

Delete trailing blanks from each record of the host file and add Carriage Return/Line Feed characters at the end of each record of the PC file.

Example: Receive a File from CMS

This screen shows sample parameters for receiving a file from CMS:

IND\$FILE Receive Utility	
PC Filename :	<u>F:\RECV\GRADES.DAT</u>
Host Filename :	<u>STUDENT GRADES A1</u>
Options :	<u>(ASCII CRLF)</u>
Enter character	

- Use the **↑** and **↓** keys to move between fields.
- To cancel the file transfer before it starts, press **Esc**. Any data entered on the screen is retained, and the command menu line displays.
- Press **Enter** to start the file transfer.
- To cancel a file transfer after it has started, press **Ctrl Break**. The command-level prompt displays.

In this example, the CMS data set **STUDENTS GRADES A1** is received to the PC file **GRADES.DAT** in the **F:\RECV** directory. As the file is transferred from the host, the IND\$FILE program converts the file from EBCDIC to ASCII and adds the ASCII **CR** and **LF** characters.

During the file transfer, progress messages display as described in section 9.7. When the transfer ends, the **Send** and **Receive** command line displays.

9.6 File Transfer from the DOS Session

File transfer for any active 3270 terminal session can be performed from the DOS session using the Barr **Send** and **Receive** commands. This feature allows you to enter file transfer commands in a DOS batch file for frequent transfer of files with the same names or for unattended file transfer.

Be sure that the **SEND.EXE** and **RECEIVE.EXE** files are installed. These files are provided in the **C:\BARR\REF** directory. Refer to Chapter 3, *Software Installation*.

Before file transfer can begin, the 3270 session must be logged on to the desired host environment and be at the command-level prompt.

While the transfer takes place, the 3270 session will be busy. File transfer progress messages display in the DOS session.

Send and Receive Commands

To transfer a file between the PC and the host, type the appropriate file transfer command at the DOS prompt.

To reach the DOS session, use one of these methods:

- From the **Operation** menu, select Advanced, then Sessions. Select DOS from the list of session choices.
- Hot-key to the DOS session.

For more information on accessing the DOS session, refer to section 22.4 of the *BARR/RJE* manual.

Command Format

Use the **Send** command to send a file from the PC to the host. Use the **Receive** command to receive a file from the host to the PC.

The **Send** and **Receive** commands have the same format. The only difference in the commands is the command name. If the **SEND.EXE** and **RECEIVE.EXE** files are not in the current directory or are not specified in the **PATH=** statement of the **AUTOEXEC.BAT** file, be sure to include the correct drive letter and full directory path in the command.

The form of the **Send** command is:

```
Send [/N] pcfile [session:] hostfile [options]
```

The form of the **Receive** command is:

```
Receive [/N] pcfile [session:] hostfile [options]
```

A description of the **Send** and **Receive** command parameters follows:

/N The No Wait option. The letter **N** must be uppercase. If the **/N** option is specified, as soon as the file transfer starts the DOS prompt redisplay. Transfer progress messages do not display. This feature allows you to execute other DOS commands before the file transfer is complete.

pcfile

The name of the PC file to send or receive. If the file is not in the current directory, include the drive letter and full directory path in the file name. DOS file name conventions are described in section 9.2.

session:

The EHLLAPI short name of the 3270 session to be used for the file transfer. Each 3270 display terminal session is assigned a short name of **A-D**, starting at **A** for the first session.

Printer sessions are not assigned short names. A sample configuration showing how short names are assigned to terminal sessions follows:

<u>Session Number</u>	<u>Session Type</u>	<u>Short Name</u>
1	terminal	A
2	printer	(none)
3	terminal	B
4	terminal	C

You must include a colon (:) after the short name (for example, **B:**). The colon serves as a delimiter between the session short name and the host file name. Optionally, a character space may be included after the colon.

If the session parameter is not specified, the first display terminal session is used.

hostfile

The name of the host file to send or receive. The format of the host file name depends on the host operating system. Refer to sections 9.3-9.5 for a description of the host file name formats.

options

Options to be used during the file transfer. The options depend on the host operating system and whether you are using the **Send** or **Receive** command. Refer to sections 9.3-9.5 for a list of the available Send and Receive options.

Examples

In the following examples, Session 3 is the second terminal session, so the session short name is B.

Example 1: Send a File to TSO

This example shows the command syntax for sending a file to TSO:

```
send /N F:\send\grades.dat B: UF.H0001236.student(grades) ASCII CRLF
```

The ASCII file **F:\send\grades.dat** is sent to the EBCDIC host data set **UF.H0001236.student(grades)** via Session 3. Carriage Return and Line Feed characters are discarded during the transfer. Because **/N** for No Wait was specified, the DOS prompt redisplay after the transfer begins.

The TSO file name conventions and Send and Receive options are discussed in section 9.3.

Example 2: Send a File to CICS

This example shows the command syntax for sending a file to CICS:

```
send F:\send\grades.dat B: grades (ASCII)
```

The ASCII file **F:\send\grades.dat** is sent to the EBCDIC host data set **grades** via Session 3. File transfer progress messages will display during the transfer. The DOS prompt redisplay when transfer is complete.

The CICS file name conventions and Send and Receive options are discussed in section 9.4.

Example 3: Send a File to CMS

This example shows the command syntax for sending a file to CMS:

```
send /N F:\send\grades.dat B: student grade A1 (ASCII CRLF)
```

The ASCII file **F:\send\grades.dat** is sent to the EBCDIC host file **student grade A1** via Session 3. Carriage Return and Line Feed characters are discarded during the transfer. Because **/N** for No Wait was specified, the DOS prompt redisplay after the transfer begins.

The CMS file name conventions and Send and Receive options are discussed in section 9.5.

9.7 File Transfer Progress Messages

After a file transfer is started, the progress of the file transfer is continuously displayed and updated on the screen. If the file transfer is started from the 3270 screen, the progress displays on that screen. If the file transfer is started from the DOS session, the progress displays on the DOS session screen (unless **/N** for No Wait was specified).

Transfer progress is measured by the number of data packets and bytes sent or received. If no progress is made, the file transfer automatically is canceled after a one minute time-out period.

Error messages which may display are described in section 9.8.

3270 Screen Message Format

If file transfer is performed from the **IND\$FILE Send Utility** or **IND\$FILE Receive Utility** screens, progress messages display on the bottom half of the screen. The examples in this section show parameters for CMS.

Example 1: File Transfer in Progress

On this screen the sample progress message indicates that a file is in the process of being transferred:

```

                                IND$FILE Send Utility

PC Filename :   F:\SEND\GRADES.DAT
Host Filename :  STUDENT GRADES A1
Options :       (ASCII CRLF)

.

      1 Packets Sent Containing      4,000 Bytes

```

Example 2: File Transfer Complete

When the transfer is complete, the progress message indicates if the transfer was successful:

```

                                IND$FILE Send Utility

PC Filename :   F:\SEND\GRADES.DAT
Host Filename :  STUDENT GRADES A1
Options :       (ASCII CRLF)

.

      3 Packets Sent Containing      10,081 Bytes

TRANS03  File transfer complete

Escape      Send      Receive      Selection ↑↓←→

```

Note that the file transfer command line displays at the bottom of the screen when the file transfer finishes.

Example 3: File Transfer Error

If errors occur during file transfer, an error message displays below the progress message. Error messages may originate from the host or from the Barr 3270 program:

```

                                IND$FILE Receive Utility

PC Filename :   F:\RECV\GRADES.DAT
Host Filename :  STUDENT GRADES A1
Options :       (ASCII CRLF)

.

                                File transfer in progress ...

TRANS34  CMS file not found: file transfer canceled

Escape  Send  Receive  Selection ↑↓→

```

If an error message displays, you can correct the error then attempt to transfer the file again. Or, you can attempt to transfer a different file.

DOS Session Message Format

If the transfer command is issued from a DOS batch file, an exit code indicates the transfer status. Refer to section 9.8 for a list of the exit codes.

If the file transfer command is issued from the DOS session, progress messages display on the DOS session screen. Sample messages are shown below.

Example 1: File Transfer Complete

This sample message indicates a successful send transfer:

```

Use EXIT command to return from DOS.                               Free memory 153824
Press  Ctrl-Alt-Space to change sessions.

Microsoft(R) MS-DOS(R) Version 6.20
      (C) Copyright Microsoft Corp 1981-1993

C:\BARR>send f:\newdata.aug b: newdata aug a1 (ascii crlf)

IND$FILE TRANSFER -- SEND -- BARR SYSTEMS, INC. (C) 1990
  File Transfer In Progress...
    2 Packets Sent Containing      6,272 Bytes

TRANS03  File transfer complete

C:\BARR>

```

Example 2: No Progress Messages

This example shows that /N for No Wait redisplay the DOS prompt while the file transfer continues. Progress messages do not display when the /N option is used.

```
C:\BARR>send /N f:\stock.rpt b: stock rpt a1 (ascii crlf)

IND$FILE TRANSFER -- SEND -- BARR SYSTEMS, INC. (C) 1990
File Transfer In Progress...

C:\BARR>
```

If the transfer command is issued manually, you can check the status of the corresponding 3270 terminal session. The session remains busy until the transfer finishes. However, neither the DOS screen nor the 3270 session indicate if any errors occurred.

9.8 3270 Error Messages

Error conditions detected by either the Barr software or the host are displayed on the screen from which the transfer was initiated. If transfer is initiated from a DOS batch file, an exit code is returned.

Barr Messages

These file transfer messages are displayed by the Barr software.

BARR 3270 HLLAPI/FILE TRANSFER NOT INSTALLED File Transfer Canceled

Explanation: The Barr 3270 file transfer program has not been installed.

User Action: In the Installation Description, enable the HLLAPI and File Transfer options on the 3270 Description screen.

File Transfer Time Out: File Transfer Canceled

Explanation: The file transfer could not be started within the one minute time-out period.

User Action: Check the status of the host connection and the 3270 session. Be sure you are at the correct command-level prompt in the 3270 session.

**DOS File Open Error with DOS Error Code: nn xxxxxxxx
File Transfer Canceled**

In this message, **nn** is a two-digit error code and **xxxxxxx** is a brief description:

01 Disk is Full

Explanation: The PC disk does not have enough free space to receive the file.

User Action: Use another disk or free some disk space.

02 File not Found

Explanation: The file you are trying to send is not in the specified PC directory.

User Action: Verify the PC file name and directory path, then retry.

04 Too many files are open

Explanation: The PC cannot open the file for the operation you want to perform.

User Action: In the PC **config.sys** file, increase the value of the **FILES=** parameter to **40** or more.

06 Directory Full or Read-only file

Explanation: The file you tried to receive is designated read-only, or your subdirectory is full.

User Action: Make sure you are not receiving to an existing file and that there is enough space remaining in your subdirectory.

**File Transfer Communications Error: Session is not Active
File Transfer Canceled**

Explanation: The 3270 session from which file transfer is to take place is not connected to the host operating system.

User Action: Logon and connect the session to the host operating system.

Command Line Too Long for Input Space

Explanation: The length of the file transfer command is greater than the maximum length (256 characters).

User Action: Re-enter the command.

Extended Log Mode Required

Explanation: An extended LOGMODE has not been specified for the 3270 session from which file transfer is to take place.

User Action: Logon to the host with an extended LOGMODE. Refer to Appendix D for an example of an extended LOGMODE.

Session was not Configured or is Printer

Explanation: The session from which file transfer is to take place is configured as a 3270 printer. File transfer can take place only from a terminal session.

User Action: Use a 3270 session that is configured as a terminal or reconfigure the session to be a terminal.

File Transfer Busy — Retry Later

Explanation: Resources required for file transfer currently are not available.

User Action: Retry at a later time.

Control Break Issued: File Transfer Canceled

Explanation: File transfer was aborted when you pressed **Ctrl** **Break**.

User Action: None.

Host Messages

These file transfer messages originate from the host.

TRANS03 File Transfer Complete

Explanation: The file transfer operation has completed successfully.

User Action: None.

TRANS04 File Transfer Complete with Records Segmented

Explanation: The file transfer operation has completed. Any records exceeding the logical record length (**LRECL**) of the file have been split into multiple records.

User Action: Retry with the correct value for **LRECL**.

TRANS06 Command Incomplete: File Transfer Canceled

Explanation: All of the required parameters for the file transfer command were not supplied.

User Action: Retry with the correct number of parameters.

TRANS13 Error Writing File to Host: File Transfer Canceled

Explanation: The host program detected an error in the data file during the Send operation.

User Action: Retry. If the problem persists, contact host support personnel.

TRANS14 Error Reading File from Host: File Transfer Canceled

Explanation: The host program detected an error in the data file during the Receive operation.

User Action: Retry. If the problem persists, contact host support personnel.

TRANS15 Required Host Storage Unavailable: File Transfer Canceled

Explanation: You need 30 kilobytes of main storage (not disk space) on the host for the file transfer, in addition to the normal host storage requirement.

User Action: Contact host support personnel.

TRANS16 Incorrect Request Code: File Transfer Canceled

Explanation: An invalid parameter was sent by the Send or Receive operation.

User Action: Contact host support personnel.

**TRANS17 Missing or incorrect TSO data set name:
File Transfer Canceled**

Explanation: The TSO data set **name** is incorrect or is blank, or the data set is not sequential or partitioned.

User Action: Enter the correct TSO data set name and retry.

**TRANS17 Missing or incorrect CMS file name:
File Transfer Canceled**

Explanation: The CMS file name is missing or is specified incorrectly.

User Action: Enter the correct file name and retry.

TRANS18 Incorrect option specified: File Transfer Canceled

Explanation: An invalid option was specified.

User Action: Specify the correct option and retry.

**TRANS19 Error reading or writing to host disk:
File Transfer Canceled**

Explanation: At the host, not enough space is available for the data.

User Action: Contact host support personnel.

TRANS28 Invalid option xxxxxxxx: File Transfer Canceled

Explanation: The specified option, **xxxxxxx**, is not recognized, is specified as a positional keyword, or has an associated value that is incorrect.

User Action: Retry with the correct option.

TRANS29 Invalid option xxxxxxxx with RECEIVE: File Transfer Canceled

Explanation: The specified option, **xxxxxxx**, cannot be used with Receive transfer.

User Action: Retry after removing the option.

TRANS30 Invalid option xxxxxxxx with APPEND: File Transfer Canceled

Explanation: The specified option, **xxxxxxx**, is not valid with APPEND.

User Action: Retry after removing the option.

TRANS31 Invalid option xxxxxxxx without SPACE: File Transfer Canceled

Explanation: The specified option, **xxxxxxx**, can be used only if the **SPACE** option also is specified.

User Action: Retry after removing the option or adding the **SPACE** option.

TRANS32 Invalid option xxxxxxxx with PDS: File Transfer Canceled

Explanation: Option **xxxxxxx** is not valid when accessing a partitioned dataset (PDS) on the host.

User Action: Retry after removing the option.

TRANS33 Only one of TRACKS, CYLINDERS, AVBLOCK allowed: File Transfer Canceled

Explanation: Space can be specified in only *one* of the following units: **TRACKS**, **CYLINDERS**, or **AVBLOCK**.

User Action: Retry after removing the unwanted option.

TRANS34 CMS file not found: File Transfer Canceled

Explanation: The specified CMS file does not exist or cannot be created.

User Action: Verify the CMS file name and file specification, then retry.

TRANS35 CMS disk is Read-Only: File Transfer Canceled

Explanation: The file mode (**fm**) specified for the CMS Send operation does not allow write access.

User Action: Change to the correct file mode specification and retry.

TRANS36 CMS disk is not accessed: File Transfer Canceled

Explanation: The specified CMS file mode (**fm**) is not in the search order.

User Action: Retry with the correct file mode.

TRANS37 CMS disk is full: File Transfer Canceled

Explanation: Either the host CMS disk is full, the maximum number of files (3400) on the mini-disk has been reached, or the maximum number of data blocks per file (16,060) has been reached.

User Action: Use another disk with enough space or free some disk space by removing unwanted files.

TRANS99 Host program error xx xxxxxxxx: File Transfer Canceled

Explanation: A host program error, **xx xxxxxxxx**, has occurred.

User Action: Contact host support personnel.

Batch Exit/Termination Codes

For batch operation, Barr software returns the following exit/termination codes. These exit codes can be used by the batch process to determine whether the transfer was successful.

- 1 The IND\$FILE program at the host could not start the file transfer due to an operations error. For example, the communications line is not connected or the 3270 session is not at the command-level prompt.

- xx** If a two-digit exit/termination code is returned, it indicates that the transfer started. The exit code is derived from the **TRANSxx** code returned by the host program. Refer to *Host Messages* earlier in this section for an explanation of the **TRANSxx** codes.

OIA Symbols and Session Information

A description of symbols that display in the Operator Information Area.

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Table A-4. Keyboard and Data Mode Symbols	137
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OIA Symbols and Session Information

The Operator Information Area (OIA) displays on the last line of the 3270 session screen. The information on this line applies only to 3270 terminal sessions, not to 3270 printer sessions. The OIA display contains dark characters on a white background.

During a terminal session, symbols in the first half of this area indicate the system connection status, error conditions, and the keyboard state. The meaning of these symbols depends on their location in the OIA, and the symbols change as each corresponding status changes. The second half of the OIA provides the session name, cursor location, and current time.

The locations of the various types of information in the OIA are shown below. Column positions are significant only for the first three items.

4B?	X ()	↑	^	1	R 1 C 1	12:15	Ctrl-F2=Help
System Status (1-3)	Input Status (9-17)	Keyboard Mode and Data Mode (19-34)	Session Name	Cursor Position	Time	Help Cue	

System Status Symbols

System Status symbols indicate when the system is ready and show the status of the workstation connection process. These symbols display in locations 1-3. A different symbol displays in each location.

4B?	X ()	↑	^	1	R 1 C 1	12:15	Ctrl-F2=Help
System Status (1-3)							

Table A-1. System Status Symbols

Location	Symbol	Description
1	4	The terminal is connected to a controller or gateway and is ready.
2	B	This symbol appears upon the completion of the SNA ACTPU/ACTLU (activate PU or LU) command sequence and is turned off by the execution of DACTPU (deactivate PU) or DACTLU (deactivate LU).
3	?	This workstation session is connected to the host, but not to the Session Services Control Point (SSCP) or an Application Program.
	☺	This workstation session is connected to the SSCP, or VTAM. The SSCP-LU session is active.
	■	This workstation session is connected to the host application program. The LU-LU session is active.

Input Status Symbols

When data input is disabled, groups of symbols indicate the cause. Only one group of symbols at a time will display in locations 9-17. When no symbols display in this section, the keyboard is ready for input.

If the keyboard type-ahead feature is enabled, you can continue entering data when either the Busy or System Lock symbols display. When the keyboard is restored to a Ready-for-Input state, data in the type-ahead buffer is processed.

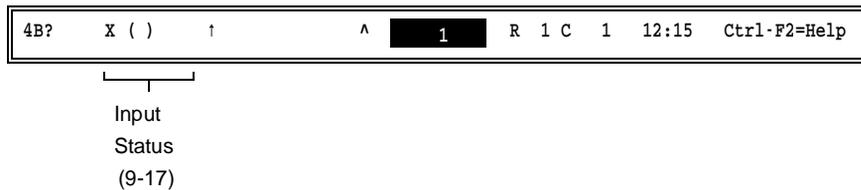


Table A-2. Input Status Symbols

Location	Symbol	Description
9-17	X ()	Busy processing input. Keyboard input is inhibited. Wait for process to complete.
	X SYS	System Lock. The host has locked the keyboard. A message may display on the screen. Press Reset to restore the keyboard.
	X ?+	What? The last input was not accepted. Press Reset to restore the keyboard and try again.
	X -f	Minus function. The requested function is unavailable. Press Reset to restore the keyboard.
	X < ☺ >	Go elsewhere. You tried to enter characters in a protected location. Press Reset to restore the keyboard.
	X ☺ >	Too much data. The data entered exceeds the field length. Press Reset to restore the keyboard.
	X ☺ NUM	Non-numeric data entered in numeric field. This field can accept only numeric data. Press Reset to restore the keyboard.
	XPROGnnnn	Programming error. The controller detected a programming error in the data received from the host computer. Look up the number nnnn in the XPROG Sense Codes table below to determine the exact error. When you are ready to continue, press Reset to restore the keyboard. If the error persists, contact host support personnel. Under some error conditions a sense code will display on the console instead of the OIA line.

Table A-3. XPROG Sense Codes

Sense Code	Probable Cause
1003	One of the following conditions occurred: <ul style="list-style-type: none"> • Data followed an RB, RM, RMA, or EAU command. • An invalid command was received. • An invalid order was received. • Invalid structured field was received or the structured field type is not supported.
1005	One of the following conditions occurred: <ul style="list-style-type: none"> • RA or GE order with an invalid character was received. • SFE, MF, or SA order with an invalid attribute was received. • An invalid address was received following an order.
2002	Chaining error.
2003	Bracket state error.
2005	Data Traffic Reset state.

Keyboard and Data Mode Symbols

Symbols in this section indicate which mode the keyboard is in and whether a data field is numeric. More than one symbol can display at the same time in locations 19-34.

4B?	X ()	↑	^	1	R	1	C	1	12:15	Ctrl-F2=Help
-----	-------	---	---	---	---	---	---	---	-------	--------------

Keyboard Mode
and Data Mode
(19-34)

Table A-4. Keyboard and Data Mode Symbols

Location	Symbol	Description
19	↑	Caps Lock is on.
29-31	NUM	Numeric. The current field accepts only numeric data.
34	^	Insert. The keyboard is in Insert mode.

Session Information

The second half of the OIA contains additional information about your session.

4B?	X ()	↑	^	1	R 1 C 1	12:15	Ctrl-F2=Help	
					Session Name	Cursor Position	Time	Help Cue

Session Name

The 3270 session name. On color monitors, the session name displays on a color background, with a different background color for each session. On monochrome monitors, the session name displays on a black background.

Cursor Position

R indicates the row number and **C** indicates the column position of the cursor.

Time

Current time of day (PC time). If the display is incorrect, use the DOS **time** command to set the PC time.

Help Cue

Press **Ctrl F2** to access the keyboard help screen.

Notes:

ASCII and EBCDIC Standards

These tables and standards provide information about ASCII-to-EBCDIC and EBCDIC-to-ASCII translation of 3270 data.

Contents

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ASCII and EBCDIC Standards

Computers use a coding system to define the correspondence between the graphic symbols we see on paper and on screen and the hexadecimal codes manipulated in the computer. Graphics include letters, numbers, punctuation, and other symbols. The PC and the mainframe each use a different coding system to represent these symbols.

The PC uses the ASCII (American Standard Code for Information Interchange) coding system. ASCII codes are defined in the American Standard Code for Information Interchange publication *ANSI X3.4-1986* from the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

The mainframe assumes the EBCDIC (Extended Binary-Coded Decimal Interchange Code) coding system. EBCDIC codes are defined in the IBM publication, *System 370 Reference Summary*, GX20-1850.

Both the ASCII and EBCDIC standards include *control codes* that do not have a graphic representation. These codes are used for control functions by printers and communication protocols. In the coding standards, the control codes are represented symbolically by two- and three-character abbreviations. For example, the control code for End of Transmission is represented as **EOT**.

Data Translation

When data is transferred between the mainframe computer and the remote PC, data must be translated to the appropriate coding system so that the graphic symbols can be viewed, printed, or written to disk.

Translation tables in the Installation Description control the translation of symbols between EBCDIC and ASCII. The RJE+3270 translation tables are used only for 3270 terminal sessions and for 3270 printing. The translation tables are not used for IND\$FILE file transfers.

During a 3270 terminal session, when data is sent from the PC to the mainframe, the RJE+3270 software must translate the data from ASCII to EBCDIC. When data from the mainframe is received by the PC for a terminal session or for printing, the opposite translation — from EBCDIC to ASCII — must be made.

Note: Data translation for RJE is different than data translation for 3270 sessions. For details about RJE data translation, refer to Appendix B of the *BARR/RJE* manual.

B.1 Sending ASCII Data

RJE+3270 translates from the ASCII character set to the EBCDIC character set when sending 3270 display data to the mainframe. The 3270 data stream does not contain carriage control characters.

Section B.4 describes the ASCII-to-EBCDIC Translation Tables.

B.2 Receiving ASCII Data

Data at the host computer is in EBCDIC. As data is received by the PC for either 3270 display or 3270 printing, it is translated from EBCDIC to ASCII.

For 3270 LU Type 1 and LU Type 3 printing, carriage control is defined by the data stream.

Section B.5 describes the EBCDIC-to-ASCII Translation Tables.

B.3 EBCDIC and ASCII Translation

During data translation, the representation for a symbol in one coding system is converted to the representation for that symbol in the other coding system. In many cases, an identical symbol exists in both coding systems so translation is straightforward. For example, the letter **A** is represented as hexadecimal **41** in ASCII and **C1** in EBCDIC.

In a few cases, an identical symbol does not exist in both coding systems but an equivalent character can be substituted. For example, the EBCDIC logical not (¬) symbol is represented by the ASCII circumflex (ˆ), the alternate representation for this symbol.

In other cases, an equivalent symbol does not exist because all the graphic symbols do not appear in both the ASCII and EBCDIC coding systems. In these cases, the software substitutes a question mark (?) for the symbols. For example, when converting from EBCDIC to ASCII, the EBCDIC hexadecimal **62** does not have an equivalent representation in ASCII, so the software substitutes an ASCII question mark (hexadecimal **3F**).

RJE vs. 3270 Data Translation

RJE+3270 has four translation tables: two EBCDIC to ASCII tables and two ASCII to EBCDIC tables. **EBCDIC to ASCII Table One** and **ASCII to EBCDIC Table One** are designed for use with RJE, while **EBCDIC to ASCII Table Two** and **ASCII to EBCDIC Table Two** are designed for use with 3270. Thus, the translations differ slightly for Table One (for RJE) and Table Two (for 3270) of each pair.

To help you remember which tables apply to 3270, on your screen the 3270 tables are labeled **used by 3270 display emulation**.

Translation of Control Codes

The default translation tables in the RJE+3270 program do *not* translate any control codes. Instead, question marks (?) are substituted for control codes. (**Translate control codes to Question marks** is the default option.)

If necessary, you can alter the translation tables to suit your application by using the **Translate control codes to Control codes** option. This option alters the following entries:

00-1F and 80-9F of ASCII to EBCDIC Table One (for RJE)
 00-1F of ASCII to EBCDIC Table Two (for 3270)
 00-3F of EBCDIC to ASCII Table One (for RJE)
 00-3F of EBCDIC to ASCII Table Two (for 3270)

Refer to section 19.1 of the *BARR/RJE* manual for more information about modifying the translation tables.

The tables in sections B.4 and B.5 show the ASCII-to-EBCDIC and EBCDIC-to-ASCII translations that are made when the **Translate control codes to Control codes** option is selected. The differences between Table One for RJE and Table Two for 3270 are listed below each table. (The default tables used when **Translate Control Codes to Question Marks** is selected are not shown in this appendix.)

Extended ASCII Codes

For the ASCII to EBCDIC tables, **Translate control codes to Control codes** allows you to use Extended ASCII codes for 80-FF. On the PC keyboard, extended ASCII characters can be displayed by holding **[Alt]** and entering the decimal code for the symbol. Refer to the ASCII code pages in your DOS manual for a list of ASCII symbols and their decimal codes.

B.4 ASCII-to-EBCDIC Translation Tables

A S C I I	E B C D I C	G r a p h i c																					
00	00	NUL	20	40	SP	40	7C	@	60	79	'	80	00	NUL	A0	40	SP	C0	7C	@	E0	79	'
01	01	SOH	21	5A	!	41	C1	A	61	81	a	81	01	SOH	A1	5A	!	C1	C1	A	E1	81	a
02	02	STX	22	7F	''	42	C2	B	62	82	b	82	02	STX	A2	7F	''	C2	C2	B	E2	82	b
03	03	ETX	23	7B	#	43	C3	C	63	83	c	83	03	ETX	A3	7B	#	C3	C3	C	E3	83	c
04	37	EOT	24	5B	\$	44	C4	D	64	84	d	84	37	EOT	A4	5B	\$	C4	C4	D	E4	84	d
05	2D	ENQ	25	6C	%	45	C5	E	65	85	e	85	2D	ENQ	A5	6C	%	C5	C5	E	E5	85	e
06	2E	ACK	26	50	&	46	C6	F	66	86	f	86	2E	ACK	A6	50	&	C6	C6	F	E6	86	f
07	2F	BEL	27	7D	'	47	C7	G	67	87	g	87	2F	BEL	A7	7D	'	C7	C7	G	E7	87	g
08	16	BS	28	4D	(	48	C8	H	68	88	h	88	16	BS	A8	4D	(	C8	C8	H	E8	88	h
09	05	HT	29	5D	)	49	C9	I	69	89	i	89	05	HT	A9	5D	)	C9	C9	I	E9	89	i
0A	25	LF	2A	5C	*	4A	D1	J	6A	91	j	8A	25	LF	AA	5C	*	CA	D1	J	EA	91	j
0B	0B	VT	2B	4E	+	4B	D2	K	6B	92	k	8B	0B	VT	AB	4E	+	CB	D2	K	EB	92	k
0C	0C	FF	2C	6B	,	4C	D3	L	6C	93	l	8C	0C	FF	AC	6B	,	CC	D3	L	EC	93	l
0D	0D	CR	2D	60	-	4D	D4	M	6D	94	m	8D	0D	CR	AD	60	-	CD	D4	M	ED	94	m
0E	0E	SO	2E	4B	.	4E	D5	N	6E	95	n	8E	0E	SO	AE	4B	.	CE	D5	N	EE	95	n
0F	0F	SI	2F	61	/	4F	D6	O	6F	96	o	8F	0F	SI	AF	61	/	CF	D6	O	EF	96	o
10	10	DLE	30	F0	0	50	D7	P	70	97	p	90	10	DLE	B0	F0	0	D0	D7	P	F0	97	p
11	11	DC1	31	F1	1	51	D8	Q	71	98	q	91	11	DC1	B1	F1	1	D1	D8	Q	F1	98	q
12	12	DC2	32	F2	2	52	D9	R	72	99	r	92	12	DC2	B2	F2	2	D2	D9	R	F2	99	r
13	13	DC3	33	F3	3	53	E2	S	73	A2	s	93	13	DC3	B3	F3	3	D3	E2	S	F3	A2	s
14	3C	DC4	34	F4	4	54	E3	T	74	A3	t	94	3C	DC4	B4	F4	4	D4	E3	T	F4	A3	t
15	3D	NAK	35	F5	5	55	E4	U	75	A4	u	95	3D	NAK	B5	F5	5	D5	E4	U	F5	A4	u
16	32	SYN	36	F6	6	56	E5	V	76	A5	v	96	32	SYN	B6	F6	6	D6	E5	V	F6	A5	v
17	26	ETB	37	F7	7	57	E6	W	77	A6	w	97	26	ETB	B7	F7	7	D7	E6	W	F7	A6	w
18	18	CAN	38	F8	8	58	E7	X	78	A7	x	98	18	CAN	B8	F8	8	D8	E7	X	F8	A7	x
19	19	EM	39	F9	9	59	E8	Y	79	A8	y	99	19	EM	B9	F9	9	D9	E8	Y	F9	A8	y
1A	3F	SUB	3A	7A	:	5A	E9	Z	7A	A9	z	9A	3F	SUB	BA	7A	:	DA	E9	Z	FA	A9	z
1B	27	ESC	3B	5E	;	5B	AD	[	7B	C0	{	9B	27	ESC	BB	5E	;	DB	AD	[	FB	C0	{
1C	1C	FS	3C	4C	<	5C	E0	\	7C	4F	!	9C	1C	FS	BC	4C	<	DC	E0	\	FC	4F	!
1D	1D	GS	3D	7E	=	5D	BD	]	7D	D0	}	9D	1D	GS	BD	7E	=	DD	BD	]	FD	D0	}
1E	1E	RS	3E	6E	>	5E	5F	^	7E	A1	~	9E	1E	RS	BE	6E	>	DE	5F	^	FE	A1	~
1F	1F	US	3F	6F	?	5F	6D	-	7F	3F	DEL	9F	1F	US	BF	6F	?	DF	6D	-	FF	3F	DEL

When **Translate control codes to Control codes** is selected, Table One for RJE matches the table above. Column one contains the ASCII hexadecimal codes for the graphic or control symbols in column three. The EBCDIC codes for the same graphic symbol are shown in column two. The right half of Table One (80-FF) is a copy of the left half (00-7F), which causes the parity bit to be ignored during translation between ASCII and EBCDIC.

Table Two (for 3270) differs from Table One (for RJE). When **Translate control codes to Control codes** is selected, the values for codes 80-9F in Table Two differ from Table One. The following list shows other differences that exist when either **Translate control codes to Control codes** or **Translate control codes to Question marks** is selected.

Legend	ASCII Graphic	ASCII-to-EBCDIC
Broken Vertical Line	|	7C → 6A
Escape	ESC	9B → 4A
Asterisk	*	AA → 5F
Vertical Line	|	B3 → 4F

B.5 EBCDIC-to-ASCII Translation Tables

EBCDIC	ASCII	Graphic																					
00	20	SP	20	??	DS	40	20	SP	60	2D	-	80	??	A0	??	C0	7B	{	E0	5C	\		
01	01	SOH	21	??	SOS	41	??		61	2F	/	81	61	a	A1	7E	-	C1	41	A	E1	??	
02	02	STX	22	??	FS	42	??		62	??		82	62	b	A2	73	s	C2	42	B	E2	53	S
03	03	ETX	23	??	WUS	43	??		63	??		83	63	c	A3	74	t	C3	43	C	E3	54	T
04	??	SEL	24	??	BYP	44	??		64	??		84	64	d	A4	75	u	C4	44	D	E4	55	U
05	09	HT	25	0A	LF	45	??		65	??		85	65	e	A5	76	v	C5	45	E	E5	56	V
06	??	RNL	26	17	ETB	46	??		66	??		86	66	f	A6	77	w	C6	46	F	E6	57	W
07	7F	DEL	27	1B	ESC	47	??		67	??		87	67	g	A7	78	x	C7	47	G	E7	58	X
08	??	GE	28	??	SA	48	??		68	??		88	68	h	A8	79	y	C8	48	H	E8	59	Y
09	??	SPS	29	??	SFE	49	??		69	??		89	69	i	A9	7A	z	C9	49	I	E9	5A	Z
0A	??	RPT	2A	??	SM	4A	??	¢	6A	??	!	8A	??		AA	??		CA	??		EA	??	
0B	0B	VT	2B	??	CSP	4B	2E		6B	2C		8B	??	AB	??			CB	??		EB	??	
0C	0C	FF	2C	??	MFA	4C	3C	<	6C	25	%	8C	??	AC	??			CC	??		EC	??	
0D	0D	CR	2D	05	ENQ	4D	28	(	6D	5F		8D	??	AD	5B	[		CD	??		ED	??	
0E	0E	SO	2E	06	ACK	4E	2B	+	6E	3E	>	8E	??	AE	??			CE	??		EE	??	
0F	0F	SI	2F	07	BEL	4F	7C	|	6F	3F	?	8F	??	AF	??			CF	??		EF	??	
10	10	DLE	30	??		50	26	&	70	??		90	??	B0	??	D0	7D	}	F0	30	0		
11	11	DC1	31	??		51	??		71	??		91	6A	j	B1	??	D1	4A	J	F1	31	1	
12	12	DC2	32	16	SYN	52	??		72	??		92	6B	k	B2	??	D2	4B	K	F2	32	2	
13	13	DC3	33	??	IR	53	??		73	??		93	6C	l	B3	??	D3	4C	L	F3	33	3	
14	??	RES	34	??	PP	54	??		74	??		94	6D	m	B4	??	D4	4D	M	F4	34	4	
15	??	NL	35	??	TRN	55	??		75	??		95	6E	n	B5	??	D5	4E	N	F5	35	5	
16	08	BS	36	??	NBS	56	??		76	??		96	6F	o	B6	??	D6	4F	O	F6	36	6	
17	??	POC	37	04	EOT	57	??		77	??		97	70	p	B7	??	D7	50	P	F7	37	7	
18	18	CAN	38	??	SBS	58	??		78	??		98	71	q	B8	??	D8	51	Q	F8	38	8	
19	19	EM	39	??	IT	59	??		79	60	‘	99	72	r	B9	??	D9	52	R	F9	39	9	
1A	??	UBS	3A	??	RFF	5A	21	!	7A	3A	:	9A	??	BA	??	DA	??		FA	??			
1B	??	CU1	3B	??	CU3	5B	24	\$	7B	23	#	9B	??	BB	??	DB	??		FB	??			
1C	1C	FS	3C	14	DC4	5C	2A	*	7C	40	@	9C	??	BC	??	DC	??		FC	??			
1D	1D	GS	3D	15	NAK	5D	29	)	7D	27	’	9D	??	BD	5D	]		DD	??		FD	??	
1E	1E	RS	3E	??		5E	3B	;	7E	3D	=	9E	??	BE	??			DE	??		FE	??	
1F	1F	US	3F	1A	SUB	5F	5E	¬	7F	22	“	9F	??	BF	??			DF	??		FF	??	EO

B ASCII and EBCDIC

When **Translate control codes to Control codes** is selected, Table One for RJE matches the table above. Column one contains the EBCDIC hexadecimal codes for the graphic or control symbols in column three. ASCII codes for the same graphic symbol are shown in column two. The double question marks (??) in column two show characters not available in ASCII. These characters will be translated to an ASCII question mark (?).

The following list shows how Table Two (for 3270) differs from Table One (for RJE). The first two differences occur only with the default selection of **Translate control codes to Question marks**. The next four differences exist when either **Translate control codes to Control codes** or **Translate control codes to Question marks** is selected.

<u>Legend</u>	<u>EBCDIC Graphic</u>	<u>EBCDIC-to-ASCII</u>
Duplicate	*	1C → 2A
Field Mark	;	1E → 3B
Cent sign	¢	4A → 9B
Vertical Line	|	4F → B3
Logical Not	¬	5F → AA
Broken Vertical Line	|	6A → 7C

B.6 Legend of Characters

Characters and symbols that display in the translation tables (B.4 and B.5) are listed below.

Control Characters

ACK	Acknowledge
BEL	Bell
BS	Backspace
BYP	Bypass
CAN	Cancel
CR	Carriage Return
CSP	Control Sequence Prefix
CU1	Customer Use 1
CU3	Customer Use 3
DC1	Device Control 1
DC2	Device Control 2
DC3	Device Control 3
DC4	Device Control 4
DEL	Delete
DLE	Data Link Escape
DS	Digit Select
EM	End of Medium
ENQ	Enquiry
EO	Eight Ones
EOT	End of Transmission
ESC	Escape
ETB	End of Transmission Block
ETX	End of Text
FF	Form Feed
FS	File Separator
GE	Graphic Escape
GS	Group Separator
HT	Horizontal Tabulation
IR	Index Return
IT	Indent Tab
LF	Line Feed

Control Characters

MFA	Modify Field Attribute
NAK	Negative Acknowledge
NBS	Numeric Backspace
NL	New Line
NUL	Null
POC	Program-Operator Communication
PP	Presentation Position
RES	Restore
RFF	Required Form Feed
RNL	Required New Line
RPT	Repeat
RS	Record Separator
SA	Set Attribute
SBS	Subscript
SEL	Select
SFE	Start Field Extended
SI	Shift In
SM	Set Mode
SO	Shift Out
SOH	Start of Heading
SOS	Start of Significance
SPS	Superscript
STX	Start of Text
SUB	Substitute
SYN	Synchronous Idle
TRN	Transparent
UBS	Unit Backspace
US	Unit Separator
VT	Vertical Tabulation
WUS	Word Underscore

Graphic Characters

Graphic Characters

SP	Space (Normally Nonprinting)	<	Less Than
!	Exclamation Point	=	Equals
“	Quotation Marks (Diaeresis)	>	Greater Than
#	Number Sign	?	Question Mark
\$	Dollar Sign	@	Commercial At
%	Percent Sign	A...Z	Uppercase Latin Letters
&	Ampersand	[]	Opening, Closing Bracket
'	Apostrophe (Closing Single Quotation Mark; Acute Accent)	\	Reverse Slant
(	Opening Parenthesis	^	Circumflex
)	Closing Parenthesis	_	Underline
*	Asterisk	`	Opening Single Quotation Mark (Grave Accent)
+	Plus	a...z	Lowercase Latin Letters
,	Comma (Cedilla)	{ }	Opening, Closing Braces
-	Hyphen (Minus)	‡	Broken Vertical Line
.	Period (Decimal Point)	~	Tilde
/	Slant	¢	Cent (IBM Extension)
0...9	Digits 0 through 9	¬	Logical Not (IBM Extension)
:	Colon	|	Vertical Line (IBM Extension)
;	Semicolon		

Notes:

Printer Escape Sequences

Rules for coding printer escape sequences in the LU Type 3 printer stream are presented in this section.

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Printer Escape Sequences

Using Escape Sequences in the 3270 Data Stream

Barr 3270 software allows a limited set of printer escape sequences, such as the printer control language for HP LaserJet printers (HP PCL), to be passed to a printer by a 3270 LU Type 3 (DSC) application. The data stream must be unformatted in order to use the escape sequences.

Escape sequences are special printer instructions. For example, an escape sequence is used to tell the printer to print characters in bold type.

This feature is for LU Type 3 data streams only. No special processing is required for escape sequences in the LU Type 1 data stream, because LU Type 1 (SCS) data streams support transparency.

LU Type 3 Line Processing

As data is sent to the printer, Barr software counts the number of characters processed for each line. When the maximum number of characters-per-line is reached, the software sends a new line character (hexadecimal **15**) to the printer to start a new print line. For unformatted data, the maximum line length is 132.

Sometimes nonprintable characters, called escape sequences, are used in the data. To prevent the software from counting the escape sequence characters as part of the printable line, do the following:

- Use the EBCDIC escape character, hexadecimal **27**, as the first character of the escape sequence. When the escape character is encountered, the software will stop incrementing the character counter for the remainder of the line.
- Include a new line character (hexadecimal **15**) in the data stream, following the escape sequence. A new line character will not be inserted by the software. The application must include a new line in the data stream. Counting will resume for the next line only when a new line character is encountered in the data stream.

Escape Sequence Notes

When using the escape sequence feature, note these four points:

1. The total number of characters per line may not exceed 255. This is the size of the Barr internal program buffer. (The buffer can become full only if both printable characters and escape characters occur in a data line. When only printable characters are in the buffer, Barr software writes the line to the printer after 132 characters are processed.) If the software character counter reaches 255, the software will send the data to the printer. Also, if a new line character is not included the data stream, the data will overwrite the last character printed until a new line character is encountered.
2. The application program is responsible for inserting the new line character at the end of data lines that contain an escape sequence. The software will not issue a new line character if an escape sequence has been encountered in the line.
3. Characters **00-3F** are converted to an EBCDIC hyphen (-). Therefore, do not include these characters in escape sequences — they will not generate the desired results.
4. When the Receive Mode is set to ASCII, the translation table EBCDIC to ASCII Table One is used. The EBCDIC escape character, hexadecimal **27**, must be mapped to the character **1B (27-1B)** in EBCDIC to ASCII Table One. This mapping will insure that the escape character is sent to the printer.

3270 LOGMODEs

Determine which LOGMODEs to use for your 3270 sessions.

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3270 LOGMODEs

Each 3270 LU must be assigned a Logon Mode Table Entry, or LOGMODE. The LOGMODE specifies the type of 3270 emulation to be performed. Different LOGMODEs are required for terminal emulation, file transfer, and printer emulation. For terminal emulation, the LOGMODE specifies which terminal model to emulate and whether file transfer is supported. For printer emulation, the LOGMODE indicates the type of 3270 printer to emulate — LU Type 1 or LU Type 3. If you use more than one type of emulation, you will need to use more than one LOGMODE.

Section D.1 lists several 3270 LOGMODEs from the IBM-supplied Logon Mode Table ISTINCLM (for use with MVS and VSE). The default LOGMODEs for LU Type 1 and LU Type 2 sessions can be used without modification. However, the LOGMODE for LU Type 3 sessions must be modified slightly to meet Barr software requirements. LOGMODE parameters and alternate parameter values are described in section D.2.

Refer the host systems programmer to the *Host Programmer's Guide to 3270 LOGMODEs*, which contains a copy of Appendix D. The host programmer will determine if the required LOGMODEs are available at your host computer and will tell you the names of the LOGMODEs to use.

For more information on LOGMODEs, refer to the IBM publication *VTAM Version 3 Releases 1 and 1.1 Customization*.

Specifying a LOGMODE

The name of the LOGMODE to use with each LU can be specified using any of these methods:

- In the host definition, include the **DLOGMOD** parameter in the LU Macro. (Refer to *RJE+3270 Host Parameters* in Chapter 8 of the *BARR/RJE* manual.)
- On the Barr software 3270 Description screen, include the **LOGMODE** parameter in the **Character-Coded Logon** field. (Refer to *3270 Session Options* in section 4.1)
- During the 3270 session, use the **LOGMODE** command. (Refer to section 8.4.)

The first two methods indicate which LOGMODE to use at program startup. The last method allows you to specify or change the LOGMODE during a 3270 session.

LU Logon Process

The LOGMODE specified for each LU is used during the LU Logon process. LU Logon initiates a session between an application program on the mainframe and a remote terminal. The protocols and parameters to use during the session are defined by the LOGMODE.

During LU Logon, VTAM searches the Logon Mode Table for the specified LOGMODE. VTAM then sends the bind image from the table to the application. The application fine tunes the bind image if necessary, changing items such as pacing or RU size, then returns the modified bind image to VTAM. Finally, VTAM sends the bind image in a message to the remote terminal. This message is called the Bind Request. If the bind is acceptable, the remote returns a positive response to the bind. If the bind is rejected, the remote sends a negative response.

At logon, you can display the bind data in the Barr software to verify the session parameters. Refer to Chapter 7, *Communications Diagnostics*, for more information about bind data.

D.1 Sample LOGMODES

For each LU, which LOGMODE you use depends on the LU Type required for your application. LU Type 2 is the most common 3270 LU Type and is presented first in this section. LU Types 1 and 3 are 3270 printer LUs and are listed next.

LU Type 2 LOGMODES

3270 terminal emulation and 3270 file transfer require a LOGMODE which supports LU Type 2. The LOGMODE specifies the terminal model — 2, 3, 4, or 5 — and the maximum display screen size. The sample LOGMODES which follow are provided in the IBM-supplied Logon Mode Table, ISTINCLM.

Example 1: 3274 Model 1C Terminal with Model 2 Screen (Remote SNA)

```

D4C32782 MODEENT LOGMODE=D4C32782,          X
      FMPROF=X'03',                          X
      TSPROF=X'03',                          X
      PRIPROT=X'B1',                         X
      SECPROT=X'90',                         X
      COMPROT=X'3080',                       X
      RUSIZES=X'87F8',                       X
      PSERVIC=X'020000000000185000007E00'

```

Primary screen size: 24 x 80 (1920 characters)

Alternate screen size: none

Example 2: 3274 Model 1C Terminal with Model 3 Screen (Remote SNA)

```

D4C32783 MODEENT LOGMODE=D4C32783,          X
      FMPROF=X'03',                          X
      TSPROF=X'03',                          X
      PRIPROT=X'B1',                         X
      SECPROT=X'90',                         X
      COMPROT=X'3080',                       X
      RUSIZES=X'87F8',                       X
      PSERVIC=X'020000000000185020507F00'

```

Primary screen size: 24 x 80 (1920 characters)

Alternate screen size: 32 x 80 (2560 characters)

Example 3: 3274 Model 1C Terminal with Model 4 Screen (Remote SNA)

```

D4C32784 MODEENT LOGMODE=D4C32784,          X
      FMPROF=X'03',                          X
      TSPROF=X'03',                          X
      PRIPROT=X'B1',                         X
      SECPROT=X'90',                         X
      COMPROT=X'3080',                       X
      RUSIZES=X'87F8',                       X
      PSERVIC=X'02000000000018502B507F00'

```

Primary screen size: 24 x 80 (1920 characters)

Alternate screen size: 43 x 80 (3440 characters)

Example 4: 3274 Model 1C Terminal with Model 5 Screen (Remote SNA)

```
D4C32785 MODEENT LOGMODE=D4C32785, X
      FMPROF=X'03', X
      TSPROF=X'03', X
      PRIPROT=X'B1', X
      SECPROT=X'90', X
      COMPROT=X'3080', X
      RUSIZES=X'87F8', X
      PSERVIC=X'02000000000018501B847F00'
```

Primary screen size: 24 x 80 (1920 characters)
Alternate screen size: 27 x 132 (3564 characters)

Example 5: File Transfer Extended LOGMODE with Model 2 Screen

```
SNX32702 MODEENT LOGMODE=SNX32702, X
      FMPROF=X'03', X
      TSPROF=X'03', X
      PRIPROT=X'B1', X
      SECPROT=X'90', X
      COMPROT=X'3080', X
      RUSIZES=X'87F8', X
      PSERVIC=X'028000000000185000007E00'
```

Primary screen size: 24 x 80 (1920 characters)
Alternate screen size: none

To enable file transfer, be sure that byte 2 of the **PSERVIC** parameter has a value of **80**.

LU Type 1 LOGMODE

A 3270 printer that uses the SCS character set requires a LOGMODE that supports LU Type 1. This sample LOGMODE is included in the IBM-supplied Logon Mode Table, ISTINCLM.

Example: LU Type 1 Printer with SNA Character Set (SCS)

SCS	MODEENT LOGMODE=SCS,	X
	FMPROF=X'03',	X
	TSPROF=X'03',	X
	PRIPROT=X'B1',	X
	SECPROT=X'90',	X
	COMPROT=X'3080',	X
	PSNDPAC=X'01',	X
	SRCVPAC=X'01',	X
	RUSIZES=X'87C6',	X
	PSERVIC=X'01000000E100000000000000'	

The value for byte 5 (data stream flag values) of the **PSERVIC** parameter typically is **E1**, although this byte is not used by the Barr software.

LU Type 3 LOGMODE

A 3270 data-stream compatible (DSC) printer requires a LOGMODE that supports LU Type 3. The sample LOGMODE **BARRDSC** is a modified copy of the **DSC2K** LOGMODE included in the IBM-supplied Logon Mode Table, ISTINCLM.

Example: LU Type 3 (DSC) Printer with 2K Buffer

BARRDSC	MODEENT LOGMODE=BARRDSC,	X
	FMPROF=X'03',	X
	TSPROF=X'03',	X
	PRIPROT=X'B1',	X
	SECPROT=X'90',	X
	COMPROT=X'3080',	X
	PSNDPAC=X'01',	X
	SRCVPAC=X'01',	X
	RUSIZES=X'8787',	X
	PSERVIC=X'030000000000185018507F00'	

Buffer size: 24 x 80 (1920 characters)

For LU Type 3, Barr software requires the pacing parameters **PSNDPAC=X'01'** and **SRCVPAC=X'01'**.

To create the required LOGMODE, the host programmer must perform these steps:

1. Copy the **DSC2K** LOGMODE from IBM.
2. Change the MODEENT and LOGMODE names to **BARRDSC**.
3. Add the pacing parameters.

CICS: When defining a 3270 printer for a CICS application, note that the LOGMODE cannot be set using the **DLOGMOD** parameter in either the software Character-Coded Logon field or the host LU Macro. CICS uses its own default bind — it ignores the **DLOGMOD** parameter. To override the CICS default bind, add the parameter **LOGMODE=BARRDSC** to the Terminal Characteristics Table (TCT).

D.2 Parameter Descriptions and Alternate Values

Several of the LOGMODE parameters can have other values. The following tables describe the possible values for each parameter. After each table, a detailed description of the parameters is provided.

Some LOGMODE values are dependent on the LU Type. In particular, pacing parameters are required for LU Types 1 and 3, and values for the PSERVIC parameter vary for LU Types 1, 2, and 3.

To use values other than those included in the IBM-supplied LOGMODEs, the host programmer must perform these steps:

1. Copy the supplied LOGMODE.
2. Change the MODEENT and LOGMODE names.
3. Then modify the new LOGMODE.

LOGMODE Values Independent of the LU Type

These LOGMODE parameter values are not dependent on the LU Type. They can be the same for LU Types 1, 2, and 3.

nnnnnnnn	MODEENT LOGMODE=nnnnnnnn,	Logon Mode name
	FMPROF=X'03'	Function Management Profile
	TSPROF=X'03'	Transmission Management Profile
	PRIPROT=X'B1'	No Compression on receive
	A1	No compression on receive
	91	No compression on receive
	SECPROT=X'90'	No Compression on send
	A0	No Compression on send
	B0	No Compression on send
	COMPROT=X'3080'	Common LU Protocols
	. . .	
	RUSIZES=X'8787'	Send/Receive Request Unit size: 1024/1024
	87C6	Send/Receive Request Unit size: 1024/768
	87F8	Send/Receive Request Unit size: 1024/3840

MODEENT Macro

The **MODEENT** Macro defines protocols used within the LU and defines the capabilities of the 3270 device.

nnnnnnnn

The **MODEENT** Macro name is the name of the Logon Mode Table Entry to use with the 3270 session. This name is usually the same as the **LOGMODE** name.

LOGMODE=nnnnnnnn

The name of the **LOGMODE** entry used during LU Logon. Either an IBM default **LOGMODE** or a customized **LOGMODE** may be specified, depending on the requirements of your application.

FMPROF=X'03'

Function management profile.

TSPROF=X'03'

Transmission management profile.

PRIPROT=X'B1'

Primary LU protocol. This parameter indicates whether compression is used when data is received. Receive compression is not used for 3270 sessions. Typically the value **B1** is used to disable receive compression. Other valid values for disabling receive compression are **A1** and **91**.

SECPROT=X'90'

Secondary LU protocol. The value of this parameter indicates whether or not compression is used when data is sent. For 3270 sessions, send compression is not used. Typically the value **90** is used to disable send compression for 3270 sessions. Other valid values for disabling send compression are **A0** and **B0**.

COMPROT=X'3080'

The common LU protocols for this Logon mode. For 3270 sessions, the required value is **3080**.

RUSIZES=X'8787'

Send and receive Request Unit sizes — the size of the buffers used for sending and receiving data. The value **8787** indicates send and receive buffer sizes of 1024. Other common values are **87C6** (send 1024, receive 768) and **87F8** (send 1024, receive 3840). For a list of other valid values, refer to the IBM publication *SNA Sessions Between Logical Units*, Appendix B, *RU Sizes Valid in Bind Session*.

Coax Attachment: When the Communication Link is Coax, the second byte of **RUSIZES** should not specify a value greater than **MAXDATA**.

LOGMODE Values Dependent on the LU Type

For 3270 sessions, pacing is required only for LU Types 1 and 3.

PSNDPAC=X'01'	LU Types 1 and 3: Primary send pacing
SRCVPAC=X'01'	LU Types 1 and 3: Secondary receive pacing

PSNDPAC=X'01'

Primary send pacing. The value **X'01'** is required.

SRCVPAC=X'01'

Secondary receive pacing. The value **X'01'** is required.

PSERVIC Values by LU Type

The **PSERVIC** parameter defines the presentation services profile. It contains 12 bytes of information represented as pairs of hexadecimal digits. Byte values differ depending on the LU Type.

In this section, values for LU Type 2 (terminal sessions) are presented first, followed by values for LU Types 1 and 3 (printer sessions).

Bytes 1-12 of the **PSERVIC** correspond to bytes 14-25 of the bind data. When the RJE+3270 software logs onto the host, you can check the bind data to verify that the **PSERVIC** byte values are set correctly. Refer to Chapter 7, *Communications Diagnostics*, for more information about displaying the 3270 bind data.

PSERVIC for LU Type 2

This sample shows a typical **PSERVIC** parameter for LU Type 2 (from LOGMODE **D4C32782**). Both the usual byte values and alternate byte values are listed.

```

PSERVIC=X'020000000000185000007E00'
02 _____ Byte 1: LU Type 2
00 _____ Byte 2: Query supported
      : 3270 file transfer
80 _____
18 _____ Byte 7: Primary no. of Rows = 24
20 _____ : Primary no. of Rows = 27
2B _____ : Primary no. of Rows = 32
1B _____ : Primary no. of Rows = 43
50 _____ Byte 8: Primary no. of Cols.= 80
84 _____ : Primary no. of Cols.=132
18 _____ Byte 9: Alt. number of Rows = 24
20 _____ : Alt. number of Rows = 27
2B _____ : Alt. number of Rows = 32
1B _____ : Alt. number of Rows = 43
50 _____ Byte 10: Alt. no. of Cols. = 80
84 _____ : Alt. no. of Cols. = 132
01 _____ Byte 11: Scr. size not supported
02 _____ : Screen size = 24 x 80
03 _____ : Unspecified screen size
7E _____ : Primary screen size
7F _____ : Alternate screen size

```

PSERVIC=X'020000000000185000007E00'

For LU Type 2, the most significant bytes are 1, 2, and 7-11. Byte 1 indicates the LU Type, byte 2 specifies whether the terminal supports query or file transfer, and bytes 7-11 affect the display screen size. Bytes 7 and 8 indicate the number of rows and columns

for the primary screen, while bytes 9 and 10 indicate the size of the alternate screen. The value for byte 11 determines whether bytes 7-10 are used.

Primary vs. Alternate Screen Sizes

The 3270 terminal can display either of two screen sizes — the primary screen size or the alternate screen size. The size of the primary and alternate screens is based on the terminal's physical configuration. However, which screen size is used depends on the 3270 application program. The host computer determines whether the application requires the primary or alternate screen size. If the terminal screen size needs to be changed, the host sends the Erase Write Alternate command to tell the terminal to switch between the primary and alternate screens.

PSERVIC Byte 11

Byte 11 of the PSERVIC parameter indicates which screen sizes are available. In the example above, byte 11 has a value of **7E**. Possible values for byte 11 are listed below.

<u>Value</u>	<u>Description</u>
01	Not supported by Barr software (12 x 40).
02	Model 2 terminal with a screen size of 24 x 80 (1920 characters). Bytes 7-10 are not used.
03	Unspecified screen size — bytes 7-10 contain zeros. The primary screen size is 24 x 80. The alternate screen size is determined from the Model type set on the 3270 Description screen. During the bind process, when the Barr software receives a Query from the mainframe it sends a Query Reply containing the screen size settings.
7E	The primary screen size is set by bytes 7-8. An alternate screen size is not used, so bytes 9-10 are ignored.
7F	The primary screen size is set by bytes 7-8 and the alternate screen size is set by bytes 9-10.

PSERVIC for LU Type 1

This is a typical PSERVIC parameter for LU Type 1 (from the **SCS** LOGMODE).

```

PSERVIC=X'01000000E100000000000000'
01 _____ Byte 1: LU Type 1
00 _____ Byte 2: No FM header
           E1 _____ Byte 5: Data stream flags

```

PSERVIC=X'01000000E100000000000000'

For LU Type 1, the most significant bytes are 1, 2, and 5. The value for byte 5 (data stream flag values) typically is **E1**, although this byte is not used by the Barr software.

PSERVIC for LU Type 3

Barr software requires these values for LU Type 3 (from the **BARRDSC** LOGMODE):

```

PSERVIC=X'030000000000185018507F00'
03 _____ Byte 1: LU Type 3
00 _____ Byte 2: Query supported
           18 _____ Byte 7: Primary no. of Rows = 24
           50 _____ Byte 8: Primary no. of Cols. = 80
           18 _____ Byte 9: Alt. no. of Rows = 24
           50 _____ Byte 10: Alt. no. of Cols. = 80
           7F _____ Byte 11: Alternate screen size

```

PSERVIC=X'030000000000185018507F00'

For LU Type 3, the most significant bytes are 1, 2, and 7-11. Byte 1 indicates the LU Type, byte 2 specifies that query is supported, and bytes 7-11 specify the maximum display/print buffer size. The maximum buffer size supported by the Barr software is 24 x 80 (1920 characters), values for bytes 7-8 and 9-10 cannot be greater than **1850**. The buffer size does not affect the maximum length of the print line.

Notes:

Keyboard Maps

Use these popular keyboard maps as a guide when changing the default keyboard map.

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Notes:

Keyboard Maps

This appendix shows keyboard maps used by other 3270 software packages for the IBM AT (83/84-key) and IBM Enhanced 101/102-Key keyboards. You can use these maps as a guide to change the default keyboard map in the Barr software to a map you already are familiar with.

E.1 Attachmate Keyboard Maps

These keyboard maps are used by Attachmate EXTRA! Extended™ for DOS.

Attachmate PC/AT Map

3270 Key	PC Key(s)	3270 Key	PC Key(s)
PF1	 	PF24	 
PF2	 	PA1	 
PF3	 	PA2	 
PF4	 	PA3	 
PF5	 	Dup	
PF6	 	Field Mark	
PF7	 	Tab	
PF8	 	Backtab	 
PF9	 	Attn	
PF10	 	Home	 (numeric keypad)
PF11	 	Test	 
PF12	 	Reset	
PF13	 	Enter	
PF14	 	Clear	
PF15	 	SysReq	 
PF16	 	Newline	 (numeric keypad)
PF17	 	Key Click	 
PF18	 	Erase EOF	
PF19	 	Erase Input	 
PF20	 	Cursor Select	
PF21	 	Capture	 (numeric keypad)
PF22	 		
PF23	 		

Attachmate IBM Enhanced Keyboard

3270 Key	PC Key(s)	3270 Key	PC Key(s)
PF1	F1	PF24	Shift F12
PF2	F2	PA1	Pg Up
PF3	F3	PA2	Pg Dn
PF4	F4	PA3	Shift Pg Dn
PF5	F5	Dup	Shift Ins
PF6	F6	Field Mark	Shift Home
PF7	F7	Tab	Tab
PF8	F8	Backtab	Shift Tab
PF9	F9	Attn	Shift Esc
PF10	F10	Home	Home (numeric keypad)
PF11	F11	Test	Alt Pause
PF12	F12	Reset	Esc
PF13	Shift F1	Enter	Right Ctrl
PF14	Shift F2	Clear	Pause
PF15	Shift F3	SysReq	Alt Prt Sc
PF16	Shift F4	Newline	Enter
PF17	Shift F5	Key Click	Alt Cursor
PF18	Shift F6	Erase EOF	End
PF19	Shift F7	Erase Input	Alt End
PF20	Shift F8	Cursor Select	Scroll Lock
PF21	Shift F9	Capture	Alt Scroll Lock
PF22	Shift F10		
PF23	Shift F11		

E.2 IRMA Keyboard Maps

These keyboard maps are used by IRMA Remote™ SNA.

IRMA PC/AT Map

3270 Key	PC Key(s)	3270 Key	PC Key(s)
PF1	Alt 1	PA1	Ctrl J
PF2	Alt 2	PA2	Ctrl K
PF3	Alt 3	PA3	Ctrl L
PF4	Alt 4	Dup	Ctrl G
PF5	Alt 5	Field Mark	Ctrl H
PF6	Alt 6	Tab	Tab
PF7	Alt 7	Backtab	Shift Tab
PF8	Alt 8	Attn	F1
PF9	Alt 9	Home	Home (numeric keypad)
PF10	Alt 0	Test	(not implemented)
PF11	Alt -	Reset	F10
PF12	Alt =	Enter	Ctrl Enter
PF13	Ctrl 1	Clear	F2
PF14	Ctrl 2	SysReq	Alt F1
PF15	Ctrl 3	Newline	F9
PF16	Ctrl 4	Key Click	F8
PF17	Ctrl 5	Cursor Blink	F5
PF18	Ctrl 6	Alt Cursor	Alt F5
PF19	Ctrl 7	Erase EOF	(not implemented)
PF20	Ctrl 8	Erase Input	F4
PF21	Ctrl 9	Cursor Select	Alt F2
PF22	Ctrl 0	Show Attr	Ctrl F2
PF23	Ctrl -		
PF24	Ctrl =		

IRMA IBM Enhanced Keyboard

3270 Key	PC Key(s)	3270 Key	PC Key(s)
PF1	Alt 1	PA1	Ctrl J
PF2	Alt 2	PA2	Ctrl K
PF3	Alt 3	PA3	Ctrl L
PF4	Alt 4	Dup	Ctrl G
PF5	Alt 5	Field Mark	Ctrl H
PF6	Alt 6	Tab	Tab
PF7	Alt 7	Backtab	Shift Tab
PF8	Alt 8	Attn	F1
PF9	Alt 9	Home	Home (numeric keypad)
PF10	Alt 0	Test	(not implemented)
PF11	Alt -	Reset	F10
PF12	Alt =	Enter	Enter
PF13	Ctrl 1	Clear	F2
PF14	Ctrl 2	SysReq	Alt F1
PF15	Ctrl 3	Newline	Ctrl Enter
PF16	Ctrl 4	Key Click	F8
PF17	Ctrl 5	Cursor Blink	F5
PF18	Ctrl 6	Alt Cursor	Alt F5
PF19	Ctrl 7	Erase EOF	F6
PF20	Ctrl 8	Erase Input	F4
PF21	Ctrl 9	Cursor Select	Alt F2
PF22	Ctrl 0	Show Attr	Ctrl F2
PF23	Ctrl -		
PF24	Ctrl =		

E.3 Rabbit Keyboard Maps

These keyboard maps are used by RabbitStation™ SNA Remote.

Rabbit PC/AT Map

3270 Key	PC Key(s)	3270 Key	PC Key(s)
PF1	Alt 1	PF24	Alt]
PF2	Alt 2	PA1	Ctrl Num Lock
PF3	Alt 3	PA2	Ctrl Scroll Lock
PF4	Alt 4	PA3	(not implemented)
PF5	Alt 5	Dup	5 (numeric keypad)
PF6	Alt 6	Field Mark	Scroll Lock
PF7	Alt 7	Tab	Tab
PF8	Alt 8	Backtab	Shift Tab
PF9	Alt 9	Attn	F1
PF10	Alt 0	Home	Home (numeric keypad)
PF11	Alt -	Test	Alt F10
PF12	Alt =	Reset	+ (numeric keypad)
PF13	Alt Q	Enter	Enter
PF14	Alt W	Clear	- (numeric keypad)
PF15	Alt E	SysReq	Alt F1
PF16	Alt R	Newline	Prt Sc
PF17	Alt T	Key Click	F10
PF18	Alt Y	Alt Cursor	Alt F5
PF19	Alt U	Cursor Blink	F5
PF20	Alt I	Erase EOF	F6
PF21	Alt O	Erase Input	Alt F4
PF22	Alt P	Cursor Select	(not implemented)
PF23	Alt I		

Rabbit IBM Enhanced Keyboard Map

3270 Key	PC Key(s)	3270 Key	PC Key(s)
PF1	F1	PF24	Shift F12
PF2	F2	PA1	Ctrl Num Lock
PF3	F3	PA2	Ctrl Scroll Lock
PF4	F4	PA3	(not implemented)
PF5	F5	Dup	5 (numeric keypad)
PF6	F6	Field Mark	Scroll Lock
PF7	F7	Tab	Tab
PF8	F8	Backtab	Shift Tab
PF9	F9	Attn	Ctrl F7
PF10	F10	Home	Home (numeric keypad)
PF11	F11	Test	Alt F10
PF12	F12	Reset	+ (numeric keypad)
PF13	Shift F1	Enter	Enter
PF14	Shift F2	Clear	- (numeric keypad)
PF15	Shift F3	SysReq	Alt F1
PF16	Shift F4	Newline	* (numeric keypad)
PF17	Shift F5	Key Click	Alt F11
PF18	Shift F6	Alt Cursor	Alt F5
PF19	Shift F7	Cursor Blink	Ctrl F4
PF20	Shift F8	Erase EOF	Ctrl F6
PF21	Shift F9	Erase Input	Alt F4
PF22	Shift F10	Cursor Select	Ctrl F5

Notes:

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Glossary

ACK

In bisynchronous communications, a positive acknowledgment character used to indicate that a message was received correctly.

AID

Attention Identifier. A character that is sent to the host when a Program Attention Key, such as PA1 or PF1, is pressed. The function performed depends on the host application.

Analog

Refers to data represented by a physical variable that varies in a continuous rather than discrete manner and is usually represented by an electrical signal.

ANSI

American National Standards Institute, Inc. ANSI establishes standards for transmission codes and protocols.

Application Program

Software that performs a specific application or task, such as word processing, accounting, or financial planning. In contrast, a utility or system program is used to carry out file management and housekeeping functions during or in conjunction with application software tasks.

APPLID

In SNA, VTAM communicates with many applications. The APPLID is the identifying name of a VTAM application.

ASCII

American Standard Code for Information Interchange. A standard that specifies the correspondence between 128 graphic and control symbols to a 7-bit code. This standard is used by PCs.

Asynchronous Communication

A communications technique in which each character is transmitted as a discrete unit. The character transmitted is preceded by a start bit and followed by one or more stop bits. As each character is bracketed by start and stop bits, varying amounts of time can elapse between characters. Contrasts with synchronous communication. Also called *start-stop* communications.

Attributes

Parameters that describe files and printers. Or, for 3270 display, characteristics of a field or byte, such as protected or underlined.

Backup

A procedure for making a duplicate copy of data that can be used if the primary data are lost or destroyed.

Batch File

A PC DOS file that contains a sequence of DOS commands. You enter the name of the batch file on the keyboard; PC DOS then executes all the commands stored in the batch file as if they were typed from the keyboard.

Baud

The number of changes in line condition per second. The term is commonly used as a measure of the speed of information transmission expressed in bits-per-second. The use of baud to mean bits-per-second is valid for the RS232 side of the modem.

Binary Synchronous Communication (Bisync)

See Bisynchronous Communication (BSC).

Bind

In SNA communications, operation in which the host and remote Logical Units (LUs) initiate a session and agree upon the protocol to be used within that session.

Bisynchronous Communication (BSC)

A low-level data-link line protocol for synchronous communications first used by IBM. It only supports half-duplex communications.

Bit

Binary digit. The name of an elementary unit of information that has two states. Usually the two states are called 0 and 1.

Block

A contiguous vector of bits that is read or written as a unit.

Boot

Prepare a computer for use by loading the operating system. Usually the operating system automatically is loaded when the computer is powered on. See also Bootstrap.

Bootstrap

At start-up of a computer system, the first record read from disk contains a program used to read the remainder of the operating system into memory. The first record read is called the bootstrap program.

BPS

Abbreviation for bits-per-second. A unit of measure for the rate that information is transferred.

BSC

Acronym for Binary Synchronous Communication.

Buffer

An area of computer memory that is used for performing input or output operations. Data are read into a buffer or written from a buffer.

Byte

The name of an 8-bit group.

Card

80 consecutive characters of information, or one line.

Carriage Control

Characters used to control vertical spacing of print lines.

Central Host Computer

See Host Computer.

Centronics Printer Interface

A common parallel interface for printers. Developed by Centronics Corporation.

Channel Attached

Direct method of attaching printers to S/370 mainframes.

Character

A single letter, digit, symbol, space, or punctuation mark.

Character Coded Logon

In SNA communications, commands in character form entered by an end user. These commands, such as LOGON and LOGOFF, must be in the syntax defined in the user's unformatted system services definition table. Also known as *unformatted*.

Clocking

An electrical signal that occurs at a fixed rate. It is used to control the speed of other circuits. In synchronous communications, both send and receive data have a clocking signal.

Coaxial Cable

A heavily shielded and insulated carrier wire with high immunity to electrical interference and a low data error rate. Coax is capable of carrying multiple streams of data on one line. This type of cable is similar to the cable commonly used in the cable TV industry.

COM1, COM2, COM3, COM4

Asynchronous serial ports 1, 2, 3, and 4 on the PC.

Command

Something you instruct the computer to do, such as run a program.

Communication Control Unit

A communications device that controls the transmission of data over lines in a network. Types of control units are transmission control units and communication controllers.

Communication Controller

A communication control unit that manages line control and data transfer through a network. Operations are controlled by one or more programs stored and executed in the unit. Examples are the IBM 3705, 3725, and 3745 Communication Controllers.

Communication Link

The physical connection and link protocol between the remote workstation and the host computer.

Communications Protocol

A specification of data and control message formats and their meanings. This specification is followed by both the sender and receiver in a communication link.

Compaction

In SNA communications, to increase throughput in data transmission two bytes are sent as one byte. The receiver *decompacts* the data to the original two bytes.

Compiler

Programs that convert instructions written in high-level languages to the machine language that the computer can interpret.

Compression

To increase throughput in data transmission, one character is substituted for a sequence of duplicate blanks and two characters for a sequence of non-blank characters. The receiver *decompresses* the data to their original state.

CON

RJE Console.

Configuration

A specific combination of hardware that forms a system. When referring to IBM PC, the term *configuration* describes characteristics such as the type of video adapter, the number and description of printers, the amount of memory, and description of serial ports.

Console

The device used to control the operation of a computer, including a keyboard and display or printers.

Control Codes

Any character used to facilitate transmission of data between the PC and the host.

Control Unit

See Communication Control Unit.

CPU

Central Processing Unit. The component of a computer system that performs instruction sequencing, logic and arithmetic, and controls input/output. In a microcomputer, this is a single chip.

CRC

Cyclical redundancy check. A form of error correction that catches all one-, two-, and three-bit errors in a sequence.

Data

A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by human or automatic means.

Data Link Control (DLC) Protocol

Communication rules for the orderly exchange of information between two nodes on a data link. The lowest level protocol of SNA and BSC.

Dataproducts Interface (DPI)

The Dataproducts interface, which originated with the Dataproducts Corporation, is used for driving high-speed printers and typesetting equipment.

DAVFU

Direct Access Vertical Forms Unit. A control sequence of characters used to define a vertical print form. The DAVFU convention was first established by Dataproducts Corporation.

Dedicated Line

See Leased Line.

Demodulate

The reverse operation of modulate. Transforming an analog signal into the digital information it represents. See also Modem.

Device

An input and output unit connected to the computer such as a printer, plotter, or monitor.

Device Address

A number that uniquely identifies a device.

Dial-Up Line

A telephone line connected to the switched telephone network where the destination is selected by dialing a multi-digit number. Also called a switched line or a dial line. Opposite of *leased line* or *dedicated line*.

Disconnect

Terminate a physical connection.

Display

A TV-like device used to display information.

DOS

IBM Personal Computer *Disk Operating System*. (See PC DOS).

DSC

Data-stream compatible.

EBCDIC

Extended Binary-Coded Decimal Interchange Code. The standard specifies the correspondence between 256 graphic and control symbols to an 8-bit code. EBCDIC was first used with the IBM System/360.

Encrypt

Systematic alteration of data which prevents unauthorized persons from viewing and using the data.

Extension

In a file name, one to three characters that follow the period. Example: STUDY5.JOB.

FCBLOAD

Forms Control Buffer Load. A record sent from a host to a remote to specify vertical forms control.

FCC

Federal Communications Commission.

File Transfer

Transfer of files between two computer systems.

Flag

In SNA communications, an 8-bit character used to introduce and end SDLC transmission frame. It is coded in binary as 01111110.

Flow Control

Mechanism used to control the rate that data is sent to devices (such as printers) so that data are not sent faster than they can be accepted. See also Pacing and Virtual Route Pacing.

Formatted Logon

In SNA communications, a Logon message that is coded into fields, including the Remote Name, Password, LOGMODE table, and APPLID.

Frame

In SNA communications, a consecutive string of bits that are sent as a unit. The frame begins with a flag followed by an address, control byte, data, Cyclical Redundancy Check (CRC), and ends with a flag.

Front-End Processor

A processor that relieves the host computer of certain processing tasks, such as line control, message handling, code conversion, and error control. Examples include the 3725 and 3745.

Full-Duplex

A communication link that allows simultaneous transmission of data in both directions (in contrast to half-duplex).

Function Keys

The 40 key options — , , , , and ,  — on the left or top of the keyboard.

Gateway

A device that uses protocol conversion to connect dissimilar communications systems or networks. For example, RJE+3270 serves as a gateway between a local area network and a mainframe. (In contrast, a bridge connects systems or networks with similar architectures.)

Graphic Symbols

Symbols that are represented by a picture in contrast to ones with an alphabetic name such as *carriage return*.

Half-Duplex

A communication link that only allows for transmission of data in one direction at a time (in contrast to full-duplex).

Hardware

The physical components in a computer system, such as processor, memory, display, and printer. These are the *hard* components of a computing environment as opposed to the *soft* information components that include programs and data processed by the computer.

Hardware Key

A small device used for software protection that plugs into the computer's parallel port. A printer cable may be attached to the other end of the key. The key is provided with some RJE+3270 host connections, such as Token Ring.

HASP

Houston Automatic Spooling Priority system. A popular enhancement to the IBM Operating System that was used for many years as a job entry system for both local readers and printers as well as RJE terminals.

Header

Data at the start of a file that describes the file and how the file is to be printed.

Hexadecimal

A notation for writing numbers that employs base 16. The digits in this notation are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F.

Host Computer

A computer that controls the communications network and has databases and large computing and memory capacity. Other computers can connect to the host to share its resources.

IBM

International Business Machines Corporation.

IBM PC

International Business Machines Personal Computer.

IBM PS/2

International Business Machines Personal System/2.

IDBLK/IDNUM

In SNA communications, identification data used for dial-up devices. See also Xid.

Input

Information that is read into a computer.

Installation Description

Process in which installation parameters are entered into the RJE+3270 software.

Interface

The connection between any two components in a system. The term is used for the connection between both software and hardware components.

Interrupt

Mechanism used to stop a program for an event needing immediate attention.

I/O

Abbreviation for Input/Output. This represents data transfer between a mainframe and peripheral equipment.

JCL

Job Control Language. A language interpreted by the operating system.

JES2 and JES3

Job Entry Subsystems of the IBM MVS Operating System. These subsystems are used for entering jobs into the MVS Operating System and dispensing the output from the jobs. JES2 and JES3 are replacements for the earlier HASP II program that was used for this same purpose.

Job

An independent unit of work that is processed by the host computer operating system. A job consists of Job Control Language statements, programming language statements, and data to be processed. The output from a job includes printed output and updates to files on disk or tape.

K

Abbreviation for Kilobyte.

Kilobyte

A unit of computer memory that is 1024 bytes. Each byte is eight bits long. 1024 in decimal notation is the same as 1000000000 in binary notation. In computer literature, the Kilo prefix means *times 1024*.

LAN

See Local Area Network.

Language

A language consists of a set of symbols, the rules that define what sequences of symbols are syntactically correct, and the meanings attached to various parts of the language. Some languages include FORTRAN, C, COBOL, ALGOL, English, and French.

Leased Line

A communication link provided by the telephone company that is dedicated for use by one customer. It is also called a private line service and may be a privately owned cable between two points.

Line

Connection between one computing unit and another computing unit. These units may be a central host computer and a remote terminal. In this manual, the line usually refers to a line coming out of a communications controller that is connected to a modem by an RS232 cable.

Line Speed

The number of binary digits that can be sent over a communication line in one second. Line speed is expressed as bits per second (bps).

Line Trace

A recording of the frames sent and received on a communication line useful for diagnosing communications problems.

Local Area Network (LAN)

A high-speed communications network within a limited geographic area. Typically, several PCs are linked together within a single building or campus. (In contrast, a wide area network may span hundreds or thousands of miles.)

Logical Unit

In SNA communications, an independent stream of data that is multiplexed with other streams within a Physical Unit.

LOGMODE

In SNA communications, a list of parameters specifying the type of session to establish between a mainframe application and a remote workstation. VTAM uses the LOGMODE during the Bind operation.

Logoff

In SNA communications, to terminate a session.

Logon

In SNA communications, to initiate a session or to initiate a session between an application program and a Logical Unit.

Logon Data

In SNA communications, a Logical Unit sends a message in response to Logon. This entire Logon sequence or message is the Logon Data.

Loopback

A testing procedure in which transmitted data are returned as received data.

LPT1, LPT2, LPT3

PC parallel printer ports 1, 2, and 3.

Macro

An instruction in a source language that points to a sequence of instructions in the same language to replace it. The macro can also specify values for parameters in the replacement instructions.

Mainframe

Term used for a large central computer that offers a full set of computing services. The term originated in the days when the central processor, memory, and input/output channels were located in one central housing called the mainframe. Synonymous with Host Computer.

Message

The longest unit of information, transmitted as a consecutive series of bits. In asynchronous communication, a message is a single character. In synchronous communication, a message is a block of characters preceded by some sync characters and terminated by an end-of-block marker.

MLU

See Multiple Logical Unit RJE.

MODEENT

In SNA communications, the macro that defines the LOGMODE table entry.

MODETAB

In SNA communications, the table of LOGMODE definitions.

Modem

(*Modulate/Demodulate*) A device designed to interface between a digital communication link and an analog communication link. Usually the digital communication link is a computer or terminal. The analog communication link is usually a telephone line. Modulate is to convert a digital signal from the computer into an analog signal capable of being transmitted by the telephone system. Demodulate is the opposite of modulate.

Multileaving

In HASP communications, a communications protocol that allows one communication link to send data in both directions at the same time. In each direction multiple streams of data can flow to several printers or disk files. It uses the BSC (Binary Synchronous Communication) data link protocol.

Multiple Logical Unit RJE

In SNA communications, the most sophisticated RJE protocol supported by SNA. It enables several Logical Units to simultaneously send and receive multiple streams of data.

Multiple Session RJE

See Multiple Logical Unit RJE.

Multiplex

To concentrate multiple streams of data on one medium.

Multipoint Line

In SNA and 3780 communications, a line that has more than one Physical Unit (PU) communication with the central host computer. These Physical Units share the line, with only one sending on the line at one time. Also known as *multidrop line*.

Multistation Adapter Unit (MAU)

A centrally located unit to which Token Ring nodes are connected. The MAU repairs the ring by removing non-functioning nodes from the ring, thus maintaining the integrity of the ring even if there is a malfunction.

MVS

Multiple Virtual Storage operating system. A large IBM Operating System that operates on System/370, 3081, and 3091 processors.

NAK

In bisynchronous communications, a Negative Acknowledgment character used to indicate a problem with receiving a message.

NCP

Network Control Program. In SNA communications, a program that controls the operation of a communication controller. It is generated by the user from a library of IBM-supplied modules.

NetBIOS

Network Basic Input/Output System is a standard interface between PC software and LAN adapters such as Token Ring, Ethernet, or ARCNET adapters.

Non-Transparent Transmission

In bisynchronous communications, an obsolete standard that does not allow transmission of all 256 characters.

Non-Switched Line

See Leased Line.

NRZI

In SNA communications, a method of coding data transmission so that the sender changes the signal for a binary 0 to the opposite state and leaves the signal for binary 1 in the same state. Also known as *invert on zero coding*.

NUL

Device that deletes output.

Offline

Disconnected from the system. Processing that is performed in isolation.

OIA

Operator Information Area. The display of session status information on the last line of a 3270 session screen.

Online

Connected to the system. Processing that is performed during direct communications between a workstation and a computer.

Operand

A JES2 command used to modify the verb or the command or identify the job or system facility to be acted upon.

Operating System

A master program that manages the resources of the computer. The operating system provides a set of services to all programs for input/output, data management, program loading, memory allocation, and communication facilities for job entry and output dispatching.

Operator Commands

Commands sent to the host computer.

OS

Operating System.

Output

Data produced by a computer program.

Pacing

In SNA communications, a method to control the flow of data from VTAM to the remote.

Parallel Interface Port

A device interface to the computer that reads and writes groups of bits at the same time. A common way for printers to be connected to the PC.

Parameter

A variable that is given a constant value for a specified application.

Parity

A bit appended to a group of binary digits to assure that the sum of bits is either even or odd. This serves as an error-detection scheme for data communications.

PC DOS

The operating system supported by IBM on the IBM PC.

PCM

Pulse Code Modulation code. A coding scheme used for the digital transmission of telephone calls. The analog telephone signal is sampled 8,000 times a second. For each sample an 8-bit code is constructed. This digital code is sent within the telephone system. The 8-bit code is converted back to the analog signal prior to being put on the local telephone line.

Peripheral Devices

Equipment attached to the computer that is controlled by the computer or serves as memory or a source of information. Examples of peripheral devices include disk drives, printers, and communications devices such as modems.

Physical Unit

In SNA communications, an independent unit attached to an SDLC line.

Plot Output

Output from the host computer that is to be written to a graphics plotter device.

PR1

RJE printer 1.

Print Server

A program or processor attached to a local area network that manages file printing.

Print Spooling

Capability for managing the printing of files on one or more printers.

Printer Control Data

Data used to specify the operating mode of the printer.

Printer Forms Commands

Commands sent to the host to manage printing of special forms.

Production Disk

A disk used in daily operation of the PC.

Program Attention Key

On the 3270 keyboard, the group of keys including PF1-PF24 and PA1-PA3.

Program

A set of instructions that provide step-by-step details for performing a task. Instructions for a computer can be written in a high-level language like FORTRAN, BASIC, or PASCAL. Instructions that are in a form directly usable by the computer are called *machine language instructions*.

Protocol

See Communications Protocol.

Protocol Conversion

Translation between two computer protocols (such as ADLC and SDLC) so that two dissimilar systems can communicate.

PU1

RJE punch device 1.

Punch

Output from the host computer that consists of a file of lines up to 80 characters long. Typically this type of data is processed rather than printed.

Queue

A list of items waiting for service in a system.

Reader

A logical device that reads jobs from the RJE workstation and sends them to the host system. At the host, jobs are placed in a job queue for processing.

Receive

To obtain data from a communications line (in contrast to *send*).

Receive Mode

Options that control the manner in which files are received.

Remote

A terminal attached via a communication link to a mainframe computer.

RJE

Remote Job Entry. A computing environment in which you can create programs and data on the PC, then transmit them to the mainframe, receive the printouts at high speed on disk or printers, and control the status of jobs by using remote operator commands.

RS232

Refers to EIA Standard RS232C for connecting data communication equipment to data terminal equipment, including the connection of terminals and computers to modems. Many computer peripheral devices also use this interface for connection to the computers. See Serial Interface Port.

RSCS

Remote Spooling Communications Subsystem of the IBM VM Operating System. RSCS is a remote job entry system that is compatible with BARR/HASP.

S/370

IBM mainframe machine architecture. See also Channel Attached.

SCS

SNA Character Set.

SDLC

Synchronous Data Link Control. A low-level communications protocol for synchronous communications. It is defined for both full-duplex and half-duplex operation. SNA uses SDLC as its low-level communications protocol.

Serial Interface Port

Interface ports that send and receive data one bit at a time using the RS232 standard.

Serial Port Input

Files read from a serial port (COM1-COM4). These files can be printed, sent to the host, or routed on the LAN.

Session

SNA communications between two Logical Units that start with a Logon and end with a Logoff. Or, a screen or group of screens devoted to a particular activity.

Signoff Command

In HASP communications, a command sent to terminate a terminal session.

Signoff File

In HASP communications, a file of data that signals the mainframe computer to end communications with your PC.

Signon

In HASP communications, the process of the terminal identifying itself to a host computer with the host granting access.

SNA

Systems Network Architecture. SNA is IBM's formal definition of its communications network. SNA describes a multilayered communications environment that usually uses SDLC as its lowest level communications protocol.

Software

Refers to the programmable instructions for operating the physical machinery of a computer system. Examples: programs, data bases, and files (in contrast to the hardware components such as the processor, printer, and disk drive).

Software Disk

A flexible magnetic-coated mylar disk used to record information. Synonymous with flexible disk or floppy disk.

SOH

Start-of-header character, in the bisynchronous communications protocol.

Spool Directory

Installation Description parameter which specifies the location of files to be printed by the Barr Print Spool.

Spooling

Simultaneous Peripheral Operations On-Line. Spooling denotes a system that allows several independent flows of data to proceed concurrently. For example, files can be sent from disk to the host computer while other files are being printed. See also Print Spooling.

SSCP

See System Services Control Point.

Standard

A set of rules established by an industry or governmental organization. Usually implies an extensive review process.

Switched

See Dial-up Line.

SYNC

Character sent before a bisynchronous communications protocol message or block.

Synchronous Adapter

Communications adapter that allows connection to a synchronous modem.

Synchronous Communication

Mode of communication in which blocks of characters are sent as a unit without start and stop bits for each character. Unlike asynchronous communication, the timing for data is obtained from the carrier signal and is not a function of time-from-the-start bit.

System Services Control Point (SSCP)

A focal point within an SNA network for managing session services for end users of the network. This includes the configuration, coordinating network operator and problem determination requests, and providing directory support.

Tab Character

A character that causes advancement of the printer to a tab stop.

Terminal

The end of a communication line. A simple terminal is a keyboard and a TV-like display. More powerful terminals include disk storage, a computer, printers, and plotters.

Timeout

An elapsed time period without a transmission or other expected event occurring.

Token Ring Interface Coupler (TIC)

An interface adapter installed in the 3745 or 3725 Front-end Processor to connect to a Token Ring Network.

Token Ring Network

High-speed communication network that consists of physical equipment and architecture. This is the IBM architecture for Local Area Networks. The network is characterized by a ring structure with a single token continuously circling the ring.

Translation

Process of converting from one coding convention to another.

Transmit

To send data from one place to another for reception.

Transparent Transmission

A variation of binary synchronous communication that allows transmission of all 256 characters.

Turnaround

Transmission in the reverse direction, that is, reversal from send to receive or from receive to send. This usually refers to a half-duplex communication channel.

Tuning Data

Parameters that assist in easy operation of BARR/RJE and RJE+3270.

UCS

Universal Character Set. Some printers require loading a UCS buffer to match the print train or band installed. Example printers: IBM 3203 and IBM 3211.

USSTAB

Unformatted System Services Definition Table. A mainframe system table that defines character-coded commands.

VAX

A super-minicomputer made by Digital Equipment Corporation.

Vertical Forms Control

Specification for spacing of lines on print form.

Virtual Route Pacing (VPacing)

In SNA communications, pacing used to control data flow between the application and VTAM.

VM

IBM's Virtual Machine Operating System. A popular operating system for interactive computing. It creates a computing environment in which every user appears to have his own IBM 370 computer.

VTAM

Virtual Telecommunications Access Method. An IBM operating systems program that resides on the mainframe controlling SNA communications between the mainframe applications software and the remote terminals.

Xid

In SNA communications, an SDLC command and response passed between host and remote that provides initial identification of the remote to the host. Contains IDNUM and IDBLK data.

XON/XOFF

A control character used to restore (XON) or suspend (XOFF) the flow of data.

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