IBM DisplayWrite Series

DisplayComm BSC Version 1.10

Productivity Family

Personal
Computer
Software

6138730

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Preface

This manual provides guidelines and reference material for using the IBM Personal Computer DisplayComm Binary Synchronous Communications (BSC) Licensed Program.

Assumptions

If you are communicating with IBM Personal Computers or other compatible word-processing equipment, this manual assumes that you are familiar with the particular equipment that you are using. You should refer to the publications for the equipment to which you are connecting for any necessary information concerning that equipment and how it handles BSC protocols. If you are connecting to a host system, this manual assumes you are already familiar with the terminal operation for the host system to which you are connecting. You should refer to the host system publications to understand how to use that system.

Also, this program uses some of the IBM Personal Computer Line Editor (EDLIN) and IBM Personal Computer Disk Operating System (DOS) facilities. Rather than repeat selected portions of the DOS manual, we sometimes refer you to them for additional information.

Prerequisites

You need to know how the BSC Licensed Program will be used in your office. Before continuing with this guide, you should have an in-depth discussion with the person(s) in your office who is responsible for the ordering, planning, and implementing the BSC Licensed Program. This may be your supervisor, the person whose job responsibilities are dedicated to communication, or the system network planner at your host site.

This discussion should include such things as:

- The names of the locations with which you will communicate

- The type of communication equipment at each location
- The type of information to be communicated and any specific formatting requirements
- The types of files you will be transferring, DOS files and/or word-processing text documents
- The procedures to follow when communicating.

Most importantly, review the remote locations' publications to help make decisions for Chapters 2, 3, and 4.

Organization Of This Manual

This manual has two parts with eight chapters, three appendixes, a glossary of terms, and a bibliography.

PART ONE. Operator Reference

- Chapter 1 introduces communication and discusses the role of the BSC Licensed Program.
- Chapter 2 helps you plan for communication options concerning the physical data link and the BSC Licensed Program.
- Chapter 3 describes how to set up your communication system, which keys are important to you, and how to set up your BSC Licensed Program disk.
- Chapter 4 explains how to establish a communication session to send or receive documents.
- Chapter 5 discusses some additional tasks you can perform with the BSC Licensed Program.
- Chapter 6 helps you find out what may have caused an error in your communication session.

PART TWO. Host Programming Reference

- Chapter 7 describes the data link characteristics of the IBM Personal Computer when running the BSC Licensed Program.

- Chapter 8 presents information about the the host programming necessary to connect the IBM Personal Computer as a terminal.

- Appendix A contains the BSC Licensed Program translate tables.

- Appendix B contains information about BSC Licensed Program OCL support.

- Appendix C contains keyboard and template information for use with the BSC Licensed Program.

- Glossary lists terms and definitions used in this manual.

- Bibliography lists associated publications you or your host programmers may need as supplemental information for host communication.

Publications You May Find Useful

- *IBM Personal Computer Disk Operating System*
- *IBM Personal Computer Technical Reference*
- *IBM Personal Computer Guide To Operations*
- *Document Content Architecture, Revisable-Form Text,* SC23-0758
- *IBM Personal Computer DisplayWrite 2 Procedures Guide*
- *IBM Personal Computer DisplayWrite 2 Reference.*

Also refer to the Bibliography for related publications on particular host systems.

Data Security

All magnetic media are subject to physical damage, erasure, and loss for a variety of reasons, including operator error, accidental occurrences, and machine malfunction. In addition, magnetic media are subject to theft. Therefore, an integral part of any information system should be to establish and implement backup procedures, and other appropriate security procedures. The customer, not IBM, is solely responsible for establishing and implementing all such procedures.

Note: All menus are representative and not exact copies of what you may see on your display.

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PART ONE. OPERATOR REFERENCE

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Chapter 1. Introduction

Notes:

When Binary Synchronous Communication (BSC) is installed on an IBM Personal Computer, text information can be sent and received over communication lines, such as a telephone line. This information may be sent to and received from many locations and types of equipment. This is done during a communication session.

A typical communication session consists of:

- Determining if you are going to send only, receive only, or send and receive in the same session.
- Determining what information to send and to what destination if you are sending. A destination is commonly known as a remote location.
- Calling the remote location that will receive the information or answering the remote location's telephone call.
- Sending and/or receiving the information.
- Ending the communication session.

The IBM Personal Computer DisplayComm BSC Licensed Program can send the same information to more than one location and can also be set up to do the sending and receiving in an unattended mode. This means that you do not need to be present during the actual communication session.

System Assumptions

Your system must have a minimium of 256K storage. This minimum storage does not include loading of device drivers or queue enhancers.

If you have a CONFIG.SYS file for your system, DOS will read and interpret it before loading the BSC Licensed Program. Therefore, if you have specified commands (BUFFERS=) in your CONFIG.SYS file that cause the size of DOS to increase beyond that normally expected, there

may not be enough available storage to load the BSC Licensed Program. For more information, see the chapter on "Configuring Your System" in your DOS manual.

The BSC Licensed Program has an optional keystroke queue enhancer program (KQE.COM) that provides a larger keyboard buffer and also filters out excess typematic repetitions of outboard keys. This driver uses more storage and is not required for the BSC Licensed Program to run properly.

If your system has more than the minimum storage and you wish to use an IBM 5218 printer, you must load the IBM 5218 Printer Driver before you load the BSC Licensed Program. Refer to "IBM 5218 A03/A04 Printer Driver Program and Printer Sharing Device" in your Guide To Operations manual.

What You Need to Use Binary Synchronous Communication

The IBM Personal Computer has the following equipment and program requirements:

- A 256KB storage size
- DOS 2.1
- A two drive system with two dual-sided (360K diskette) drives or a fixed disk system with a dual-sided diskette drive.
- A BSC Adapter, Item Number 1502075
- A standard EIA RS-232-C Interface Cable, Item Number 1502067
- The DisplayComm BSC Licensed Program disk.
- The appropriate telephone communication equipment.

- **Telephone lines**, also known as communication lines, can be divided into three types:

  — Switched lines (dial-up lines). These require a telephone call to the remote location when the information is received.

  — Nonswitched lines. These permanently connect two locations. You do not need to call the remote location to establish a communication session.

  — Switched backup lines. These are a combination of a switched and nonswitched lines that allow the IBM Personal Computer to use a switched line if the nonswitched line is out of order, or to communicate with other locations that cannot be directly connected.

- **Telephones** (if using a switched line) can be one of two types:

  — A telephone with up to six keybuttons across the front. You will only use the Data, Talk, and the optional Auto Answer buttons during a communication session.

  — A telephone with an exclusion key. This type of telephone has a white key on top of the cradle and no buttons on the front.

- **Modems** are devices that translate information signals to telephone signals and vice versa. A modem is usually located near to the communicating equipment due to cable length considerations.

  Because telephone lines handle voice signals, the text characters of information sent and received must be converted into signals the telephone lines can communicate.

This conversion is called **mo**dulation/**dem**odulation. Modulation occurs when the information is sent while demodulation occurs at the remote location.

Many types of modems are available, but the sending and receiving locations must have compatible modems to communicate.

Chapter 2. Planning for Binary Synchronous Communication

Notes:

When you use your IBM Personal Computer for communication with the DisplayComm BSC Licensed Program loaded, it will emulate an IBM 2770, 2780, or 3780 and all protocol requirements for these terminals apply. While emulating the terminals listed, you can communicate with many other machine types besides another IBM Personal Computer. These include:

- IBM Displaywriter System
- IBM Mag Card II/6240 Mag Card Typewriter
- IBM Office System 6 Information Processor
- IBM 6640 Document Printer
- IBM 6670 Information Distributor
- IBM 5520 Administrative System
- Host Computers.

First Things First

Before continuing through this chapter, you must determine if your IBM Personal Computer will be part of a new or existing communication network and if it will be attached to an appropriately programmed host computer.

- **New Network**. Coordinate your communication line and modem choices with the remote location to ensure compatibility.
- **Existing Network**. Contact the coordinator for the existing network.
- **Host Computer**. Contact the data-processing department to discuss any communication line or modem requirements.

Ordering the Communication Line

You must make several communication line choices before ordering a communication line.

Choosing a Switched or Nonswitched Line

Switched lines typically use the same equipment and lines as regular telephones and work the same way. The operator at one location calls another location to establish a connection maintained only during the communication session. (Network telephone lines, such as WATS lines, are also switched lines.)

Nonswitched lines (sometimes called dedicated, leased, or private lines) are permanently connected between an IBM Personal Computer and one remote location. No telephones are necessary because the two locations can communicate on that line only.

Advantages of a Switched Line

- Flexibility. You can communicate with more than one location.
- Cost. You are charged for long distance calls only when you use the line and only for the time actually used. This could be an advantage if you have a low volume of data to transmit.

Advantages of a Nonswitched Line

- Fixed monthly rate. If you have a large volume of data to transmit, this rate could be an advantage.
- Availability. The line is always available and connected.

Note: You can also choose a modem that supports a nonswitched line as the primary communication line and a backup switched line. If there are problems with your nonswitched line, you will have an alternative switched line.

Choosing a Line Speed

The line speed is the rate at which the IBM Personal Computer sends and receives information during a communication session and is specified in terms of bits per second (bps).

The higher the line speed, the more information sent in a given period. Generally, if you have a large volume of documents to send or receive, you will want a higher line speed. However, modems that support higher line speeds may be more expensive. The IBM Personal Computer supports line speeds of 1200 to 4800 bps.

Ordering a Modem

This section lists the modem functions necessary for the IBM Personal Computer to communicate successfully and optional features you may wish to use. Keep in mind that functions built into one modem may be optional on another and not offered at all on a third. In addition, different terminology may be used for the same function on different modems.

Choosing a Duplex or a Half-Duplex Modem

Duplex transmission allows you to transmit information in both directions at the same time.

Half-duplex transmission also allows you to transmit information in both directions, but not at the same time.

Although the BSC Licensed Program operates only in half-duplex mode, you can use either a duplex or half-duplex modem. A duplex modem eliminates turnaround time, the time spent waiting for the communication equipment to change from send to receive. A half-duplex modem can cause delays in transmissions that require frequent line turnarounds.

Choosing Modem Options

The modem you choose may offer the following modem functions. Remember these functions are optional and do not affect the IBM Personal Computer's basic performance.

- Modem diagnostics. Some modems can perform a self-diagnostic check for possible transmission problems. Modem diagnostics can help you locate the source of transmission problems.

- Auto answer support. This allows an IBM Personal Computer to be set up for unattended communication sessions.

- Switched line backup for a nonswitched line. This option makes it possible for an IBM Personal Computer using a nonswitched line as its primary communication line to go to a backup switched line if there is a problem with the nonswitched line.

Information to Provide Modem Supplier

When ordering a modem, you must provide certain information to the modem supplier. The following information will help your modem supplier understand the IBM Personal Computer's requirements. **You do not need a full understanding of this information.**

1. Make copies of the following pages and give them to your modem supplier.

2. Indicate any desired optional features.

3. Ask the modem supplier how the strapping options will be set for Answer Tone Generation and Half Speed.

The answers to these questions should be indicated on the Port Modem and Line Description worksheet at the end of this chapter.

Required Modem Functions

The functions listed in this section are required for any modem to be used for BSC on the IBM Personal Computer.

The modem must:

- Adhere to the EIA RS232C Voltage Interface Specifications (CCITT V.24) in countries other than the United States and Canada
- Support synchronous operation
- Provide clocking signals
- Provide serial bit transfer, not parallel
- Not use reverse channel
- Not put any signals on EIA interface pin 18 (no outbound signals from the modem)
- Support manual dialing of the telephone for switched line. The IBM Personal Computer will support either manual or automatic telephone answering.

Optional Modem Functions

The following modem functions are optional:

- Answer Tone Generation (Check one):

  Yes_____
  No _____

- The modem can have either switched RTS/CTS (turned on/off at line turnaround) for half-duplex modems or continuous carrier (RTS/CTS always on) for duplex modems.

- If local and/or remote loopback capability is to be used, Data Set Ready (DSR) must be held On during loopback test.

Unsupported Modem Functions

The following modem functions are *NOT* supported for BSC:

- Automatic dialing of telephone
- Simplex operation
- Transmit signal element timing (DTE source). The IBM Personal Computer does not provide bit clocking to the modem.

Port Modem and Line Description Worksheet

Prior to using the BSC Licensed Program Product disks, you must personalize them.

Personalization consists of:

- **Creating a Workstation Description** (optional).
- **Creating a Printer Description** (optional).
- **Creating a Modem and Line Description** which includes a description of the telephone line and modem used by your system.
- **Creating a Communication Setup** which tells the IBM Personal Computer with whom you will establish the communication sessions and how the information is to be sent and received during communication sessions.
- **Specifying the Receive Format Defaults** (optional) which determines the document format for the information received (if no formatting instructions are communicated with the document) during communication sessions; for example, margins and tabs, line spacing, and so on.

Note: The words "document" and "file" mean the same thing in this book.

Read the explanation for each of the items. Then, on the worksheet, circle the correct choices for your communication requirements. When you are finished, file the worksheet in a communication file folder. Make sure the worksheet is available when it is time to personalize the BSC Licensed Program disk.

PORT MODEM AND LINE DESCRIPTION WORKSHEET

ID	ITEM	CHOICE	POSSIBLE CHOICES
a	Terminal ID		Up to five letters or numbers
b	Network Facility	____(1)	1 = Switched 2 = Dedicated 3 = Dedicated with Switched Backup
c	Continuous Carrier	____(2)	1 = Yes 2 = No
d	Half Speed Capability	____(2)	1 = Yes 2 = No
e	Answer Tone Generation	____(2)	1 = Yes 2 = No

Note: The defaults are shown in parentheses.

Worksheet Items

- **Terminal ID** (if specified) is sent by the IBM Personal Computer when it connects on a switched line. The IBM Personal Computer does not need a Terminal ID, but some host computers may require it. Consult your data-processing personnel.

- **Network Facility** specifies the type of communication line. The default is **1**, Switched. The other options are a dedicated (nonswitched) line or, if your modem supports it, a dedicated line with a switched backup line.

- **Continuous Carrier** specifies whether the modem supports duplex. The default is **2**, No.

- **Half Speed Capability** indicates whether the attached modem supports half speed. This allows you to send your data at half the speed that it would normally be sent, which may enable successful communication on a noisy line. If you are unsure if your modem has half speed capability, contact your modem supplier.

- **Answer Tone Generation** determines whether a called IBM Personal Computer will generate an answer tone following the connection of a switched line. The default is **2**, No.

Notes:

1. If you have two BSC adapter cards, you can have two modems, and you should repeat the steps in this chapter and fill out one Modem and Line Description worksheet for each modem.

2. If you have Synchronous Data Link Control (SDLC) on your IBM Personal Computer, then you cannot have two BSC adapter cards.

Chapter 3. Getting Started

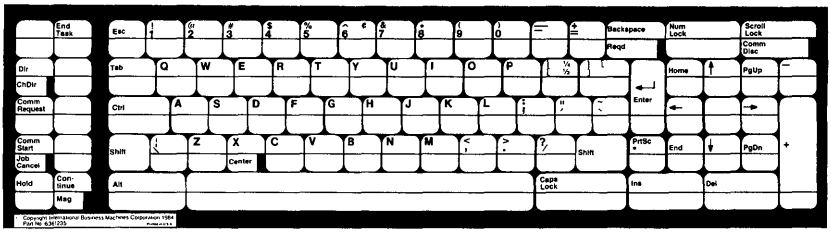
Notes:

You are ready to set up the DisplayComm BSC Licensed Program disk so you can begin to communicate data. Before you prepare the licensed program disk for use in your network, there are some things you should know. First, the IBM Personal Computer keyboard acts differently when the BSC licensed program is active. Second, the IBM Personal Computer display screen presents different displays from what you are used to seeing with DOS. Let's take a look at the keyboard first, and then we will look at the screen.

The BSC Keyboard

For BSC, the IBM Personal Computer keyboard has the layout shown in the following illustration.

You can see some keys have different functions when the program is running. Take out the keyboard template supplied with the BSC Licensed Program package, look over the template for a few minutes, and then we will continue.



OK, you can see the keys in the middle of the keyboard remain virtually unchanged. On some of the inboard keys, you see graphics on both the left and right side of the key.

The data-processing (DP) characters are on the left, and the word-processing (WP) characters are on the right of the key.

Notice that some of the keys in the outside sections have changed. We will list these keys and how they function when BSC is running.

- **End Task** is on the F2 key and is used to terminate the communication task and return to the Setup Selection menu.

- **Dir (Directory)** is on the F3 key and is used to display all the documents or files in a directory.

- **ChDir (Change Directory)** is on the F3 key. Pressing Ctrl + ChDir allows you to name a new default directory.

- **Comm Reqst (Communication Request)** is on the F5 key and displays the Communication Request Tasks menu. This menu provides options to send a document, display the send queue, select or delete the send job, or change the session options.

- **Comm Start (Communication Start)** is on the F7 key and is used to initiate a communication link, to restart a suspended session, or to retry communication after an error.

- **Job Cancel** is on the F7 key and is valid only when ON-LINE SEND or ON-LINE RECEIVE is in progress. Pressing CTRL + Job Cancel terminates the job being sent or received and causes a completion message to be recorded in the Session Summary.

- **Hold** is on the F9 key and is valid whenever the Session Summary is displayed. Hold causes the IBM Personal Computer to stop storing data on or sending data from a disk at the completion of the current Session Summary entry. The Hold key functions like the IBM Personal Computer Pause key. This allows you to change disks, manipulate the send queue, or change session options.

To resume sending or receiving, press the Comm Start key.

- **Continue** is on the F10 key and is used only in situations where you may be prompted to press Continue rather than press Enter.

- **Msg (Message)** is on the F10 key. Pressing Ctrl + Msg will clear displayed messages.

- **Esc (Escape)** cancels menu functions and clears prompts.

- **Center** is on the X character key. Pressing Ctrl + Center allows you to set center tabs on the Margins and Tabs menu.

- **Reqd (Required Backspace)** is on the Backspace key. Pressing Ctrl + Reqd allows you to insert required backspaces for underlining words in a document message.

- **Comm Disc (Communication Disconnect)** is on the Scroll Lock key and is active any time a communication session is active. Pressing Ctrl + Comm Disc causes the IBM Personal Computer to disconnect from the communication line. The Communication Status field is cleared, but the current communication setup and send queue are not altered.

  Pressing Ctrl + Comm Disc when a session is not active and you are in Print Tasks, serves as a control break to allow you to do additional Print Tasks while a current print job is active.

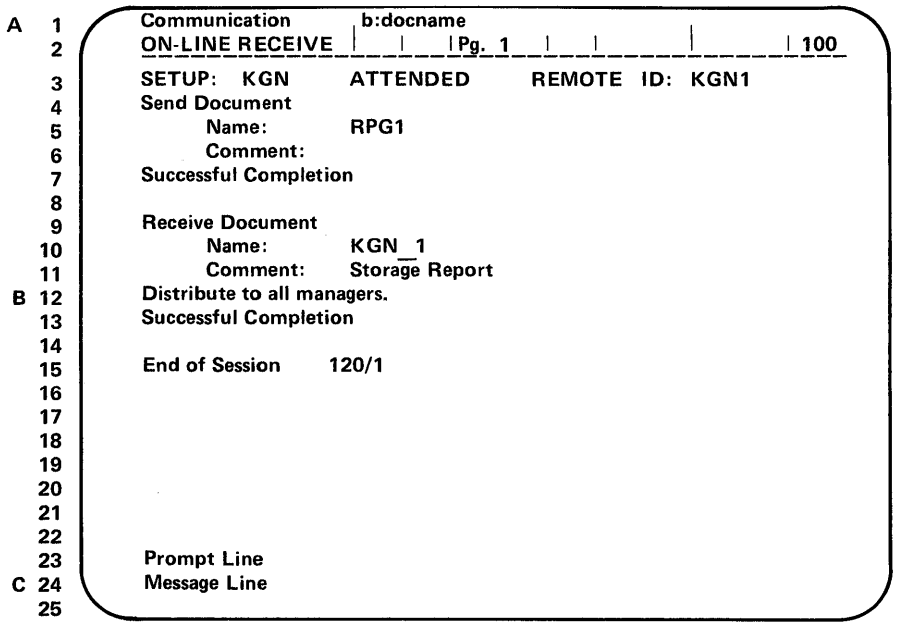
- **End** is used to set flush right tabs in the Margins and Tabs menu and is the Boundary Down key when you are viewing a Session Summary.

You can place the BSC Licensed Program Template on your keyboard for reference when running the BSC Licensed Program.

The BSC Display

During a BSC communication session, the IBM Personal Computer display changes from the screen you use in DOS or Basic operations to a screen that helps you keep up with what the communication session is doing. We have an example to show you.

The display has three major areas: the Status lines (A), the Viewport (B), and the Prompt and Message lines (C).



Status Lines

First Status Line: Two fields in this line are active during a BSC session, the Context field (1) and the Document Name Field (2).

Second Status Line: Four fields in this line are active during a BSC session, the Link Status Field (3), the Transmission Indicator Field (4), the Page Number Field used during Document Conversion Utilities (5), and the Program Modification Level (6).

Viewport

The Viewport is composed of the Session Header line or menu name (line 3), the main display area (lines 4-21), the Information Text lines (lines 22 and 23), and the prompts and messages lines (lines 24 and 25) reserved so the BSC Licensed Program can communicate with you.

When you are communicating, you will be working almost exclusively with the Session Summary.

The Session Summary

The Session Summary is the focal point for everything that happens when communication is active. It looks like the screen on the previous page. Study the screen carefully.

You will notice that the Status Lines tell you what the session and communication link are doing.

The first Status Line indicates that communication is active and, if applicable, what document is being communicated.

The second Status Line indicates that you are on-line and receiving a document.

Status Terms of the Link Status Field: Possible status terms you may see in the Link Status Field of the second Status Line include the following:

- **(blank)**
- **CONNECTED** appears briefly after the communication line is established. ON-LINE normally replaces CONNECTED to indicate that the remote location is active after the line is established. CONNECTED appears immediately after pressing Comm Start when using a dedicated line. CONNECTED also appears briefly after the remote location has disconnected from the session.

- **ON-LINE** displays to indicate the remote location is active and the communication session may proceed. During the actual session, a blank (nothing) normally follows ON-LINE if no communication activity occurs, or another status term follows it, such as BID, SEND, or RECEIVE.

- **READY** indicates your station may proceed with establishing the communication line.

Status Terms of the Transmission Indicator Field: Possible status terms you may see in the Transmission Indicator Field of the second Status Line include the following:

- **BID** displays when the local station is trying to gain control of the communication line to send documents. Under normal conditions, BID will be quickly followed by SEND.

- **BUSY** indicates that the local station is delaying communication. For example, the remote station has been trying to send a document while the local station is trying to access a disk. Under normal conditions, BUSY is automatically replaced by ON-LINE as soon as information is being communicated again.

- **HOLDING** displays in the Communication Status Field after Hold is pressed and the current Session Summary entry is processed. Press Comm Start to release the hold condition.

- **INACTIVE** indicates in a receive mode there was no line activity (nothing being received) for 20 seconds. In a send mode, the send job is cancelled. A Document Cancelled code appears in the Session Summary to indicate the problem.

- **RECEIVE** indicates your station is the receiving station. The term ON-LINE normally precedes RECEIVE.

- **REJECT** indicates the local IBM Personal Computer is not receiving information because of a disk error or is unable to send because the remote CPU will not accept

data. An error message will be displayed in the Session Summary.

- **SEND** indicates your station is the sending station. Normally, ON-LINE precedes SEND.

- **WAITING** appears at your station when the remote station has pressed Hold or is busy. The remote station will release the hold condition as soon as they resume activity.

Session Header Line (line 3): The Session Header Line has three fields that can provide communication status information. The SETUP Field has the name of the active communication setup, and the ATTENDED/UNATTENDED Field indicates whether the IBM Personal Computer is operating in Attended or Unattended mode. If IDs are exchanged during a session, the SESSION ID Field displays the last Session ID (up to six characters) received.

Summary Viewport (lines 4-19): When data is being sent or received, the Summary Viewport has entries that describe the most recent communication activity. The example Session Summary shows the type of information included in these entries.

Each entry identifies a job. Entries for send or receive jobs also can display a comment (information text) that precedes the job's text and a successful/unsuccessful completion message.

At the end of a session, the BSC Licensed Program issues a message indicating the total number of blocks sent/received successfully and the total number of blocks retransmitted because of communication errors. In the example, 120 blocks were transmitted successfully during the session, and one was retransmitted.

Note: The Session Summary can have many more job entries than one Summary Viewport can hold. You can view additional entries by using the Cursor Up and Cursor Down keys. The End (Boundary Down) key will take you to the

end of the Session Summary and the Home key will return you to the top of the Session Summary.

Information Text Lines (lines 21-22): The Information Text Lines show you how to start a session, create or revise a send queue, or specify session options.

Prompt and Message Lines (lines 24-25): When the BSC Licensed Program is active, these lines provide you with information the BSC Licensed Program issues so that you can see what is happening or enter responses the BSC Licensed Program needs to continue.

Using DOS With the BSC Licensed Program

The IBM Personal Computer Disk Operating System (DOS) is a group of programs that control your system and enable you to do work with your computer. Before you can do anything with the BSC Licensed Program, you must first load DOS.

Before you begin to work with the BSC Licensed Program, it must be copied onto two diskettes or onto the fixed disk. In addition, because the BSC Licensed Program uses several DOS files, these files must be copied, or they must reside on your fixed disk. The setup program provided on your BSC Licensed Program disk guides you through the steps to copy the BSC Licensed Program and necessary DOS files. In order to safeguard the original disk, always use the backup disks or the copy of the programs on your fixed disk for your work. Keep the original BSC Licensed Program disk in a safe place.

Have two blank work disks available, if you have a system with two diskette drives. Use one of the two following procedures, depending on your system type and preferred load procedure, to prepare your BSC Licensed Program for use.

Note: The DOS programs may be used with both diskettes and fixed disks. Throughout this book the term disk is used to refer to either a diskette or a fixed disk. Where diskette is

used, it applies only to the flexible disk (diskette) media. Also, while DOS commands in this manual are shown in uppercase, both uppercase or lowercase work.

Backing Up and Preparing the BSC Licensed Program Diskette for a Two-drive System

This procedure automatically prepares backup disks for program use.

1. Insert your DOS disk in Drive A and your BSC Licensed Program disk in Drive B.

2. Power on the IBM Personal Computer.

3. Type the date and time when prompted.

4. At the DOS Command Screen, type:

   B:SETUP

   and press Enter.

5. Follow the prompts on the display to run the setup procedure.

   Note: Be sure to insert the correct disk in the specified drive throughout the setup procedure.

Backing Up and Preparing the BSC Licensed Program for a Fixed Disk System

This procedure automatically moves your BSC Licensed Program to your fixed disk for program use.

1. Power on the IBM Personal Computer.

2. Type the date and time when prompted.

3. At the DOS Command Screen, insert the BSC Licensed Program diskette and type:

   A:SETUP

   and press Enter.

4. Follow the prompts on the display to run the setup procedure.

This setup procedure simply copies your BSC Licensed Program to the DOS partition on your fixed disk, and this becomes the copy you use for BSC Licensed program operations.

For The Experienced DOS User

If the BSC Licensed Program is not your primary application, it is possible that you would not want it resident on your fixed disk for space reasons. If this is the case, refer to your DOS manual and use the FORMAT, DIR, COPY, and ERASE commands to move the programs to a backup diskette and erase them from the fixed disk. One way to accomplish this is to:

1. Format a blank diskette and name it BSC Backup.
2. Get a directory of your original BSC Licensed Program diskette and write down all the file names except the SETUP.COM file.
3. Use COPY to copy all the files recorded in step two from your fixed disk to your BSC Backup diskette.
4. Use ERASE to erase all the files recorded in step two from your fixed disk.
5. Use COPY to copy the DOS COMMAND.COM and PRINT.COM files from your fixed disk to your BSC Backup diskette.

Then you will be able to load DOS from the fixed disk, set your default drive to A:, and then load the BSC Licensed Program from the BSC Backup diskette.

BSC Licensed Program Options

Now that you have backed up and set up your base BSC Licensed Program, you have several options that you should consider before you try to personalize or load it.

There is a BSC.BAT file included on your BSC Licensed Program disk. After you run Setup, it will reside either on your fixed disk or on your BSC Backup Vol. 1. This BSC.BAT file is used to load the DOS Background Print program plus any optional programs and commands that you want to use prior to loading the BSC Licensed Program. There is one optional program and one optional mode command that we will discuss here.

The Keystroke Queue Enhancer Program (Optional)

The Keystroke Queue Enhancer (KQE.COM) is a supplemental program that buffers keystrokes to help minimize keystroke loss. The BSC Licensed Program disk contains this program and the setup procedure automatically places the KQE line in the BSC.BAT file for you.

The Mode Command For Using a Monochrome Display With a Color Adapter (Optional)

If you have a composite video monochrome display attached to a color adapter, some display characters may be difficult to read using DisplayComm. DOS has a MODE command that you can execute to handle this configuration. You must add the MODE command to your BSC.BAT file if you want to use it. You use the EDLIN (line editor) facility of DOS to accomplish this. Refer to the "Line Editor" chapter of your DOS manual for information about how to start EDLIN, edit an existing file, and insert new lines.

Insert the line:

MODE BW80

in your BSC.BAT file preceding the BSC Licensed Program load command (BSCPG.COM).

Notes:

1. The BSC.BAT file is the only BSC Licensed Program file you should modify with EDLIN.

2. The DOS MODE.COM file must be copied from the DOS diskette onto your BSC Backup Vol. 1 diskette or must reside in the root directory of your fixed disk in order to use the MODE BW80 command.

At this point, you have set up, backed up, and modified your BSC.BAT file (if necessary) to reflect your operating environment and load preference. Next, you need to personalize your BSC Licensed Program for your particular communication environment. Let's get started.

How to Personalize Your Program Disk

Prior to using the BSC Licensed Program disks, you must personalize them. Generally, personalization of the disk is done only once and changed only if your communication requirements change. Personalization consists of:

1. **Using Change Profile Task to Create a Communication Setup.** A communication setup tells the BSC Licensed Program with whom you will establish the communication sessions and how the information is to be sent and received during communication sessions.

2. **Creating a Modem and Line Description.** This description includes the kind of telephone line and modem your system uses.

3. **Specifying the Receive Format Defaults (optional).** The Format Defaults determine the document format for the information being received (if no formatting instructions are communicated with the document) during communication sessions; for example, margins and tabs, line spacing, and others. See "Additional BSC Tasks" in Chapter 5 for details.

4. **Describing the Work Station (optional).** You can tell the BSC Licensed Program what kind of printer and keyboard you have. See "Additional BSC Tasks" in Chapter 5 for details.

The BSC Licensed Program is a menu-driven application. When active, the program will present menus to guide you through whatever task you are trying to perform. The menus will prompt you for any needed variables, depending on the task you are doing.

Loading Your BSC Licensed Program

At this time, your BSC Licensed Program is in one of two forms:

- On fixed disk, in which case you won't have to insert any disks in order to load.

- On two diskettes for your two-drive system, in which case you load DOS and the BSC Licensed Program from the a: drive.

For this load example, we will assume that you have a two-drive system and two BSC Backup disks. If you have a fixed disk system, you would skip any step that has you insert a disk.

If you have two BSC Backup disks, the arrangement by disk of the BSC Licensed Program is:

BSC Backup Vol. 1:
BSC Initialization Programs, Work Station Profile Tasks, and Print Tasks.

BSC Backup Vol. 2:
Communication Profile Tasks, the Communication Session Program, and Document Utilities.

You must load the BSC Licensed Program disk before you can personalize it for use, so let's try it.

1. Load the DOS Program.

2. Type in the date and time when prompted.

3. When you are at the DOS Command Screen, remove the DOS disk and insert the BSC Backup Vol. 1.

4. Type:

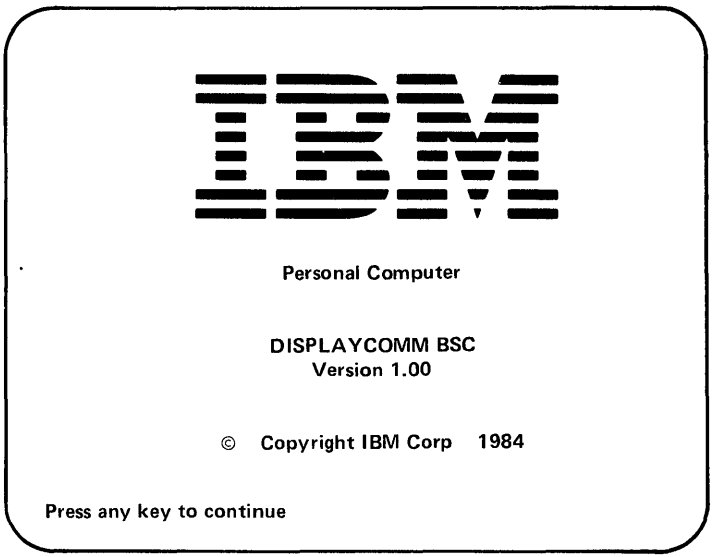
   BSC

   and press Enter.

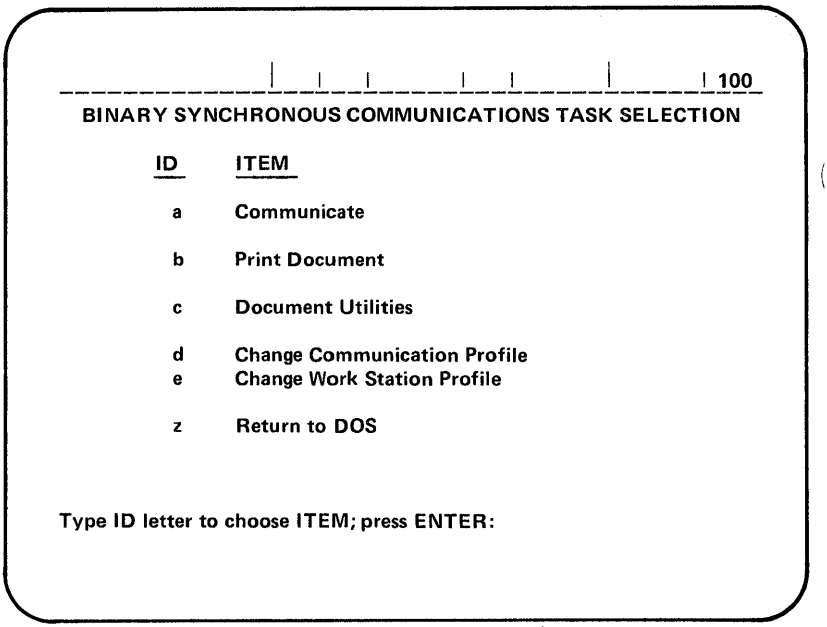
   Note: To load the BSC Licensed Program from a drive other than the DOS default drive, use a drive specifier and directory path with the command.

5. Press Enter when prompted for List Device Name.

6. The BSC IBM LOGO displays.



Press any key, and the BSC Licensed Program loads and displays the Binary Synchronous Communication Task Selection menu.



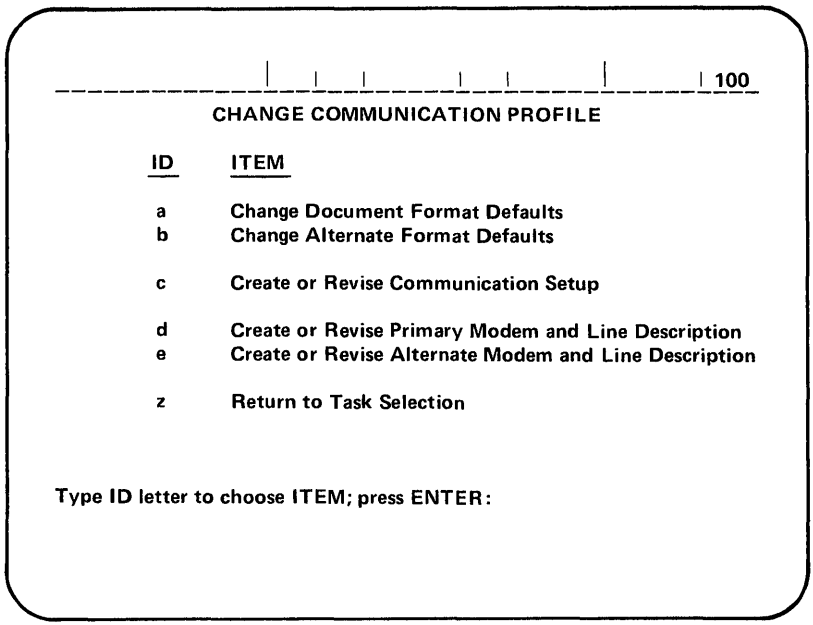
Change Profile Tasks

You need to change the communication profile to describe your environment to the BSC Licensed Program, so insert the BSC Backup Vol. 2 and select the Change Communication Profile task:

Type **d** and press Enter.

Note: Remember that your BSC Licensed Program is active now, so use the BSC keyboard template.

Now the Change Communication Profile menu displays.



Let's start by creating a setup.

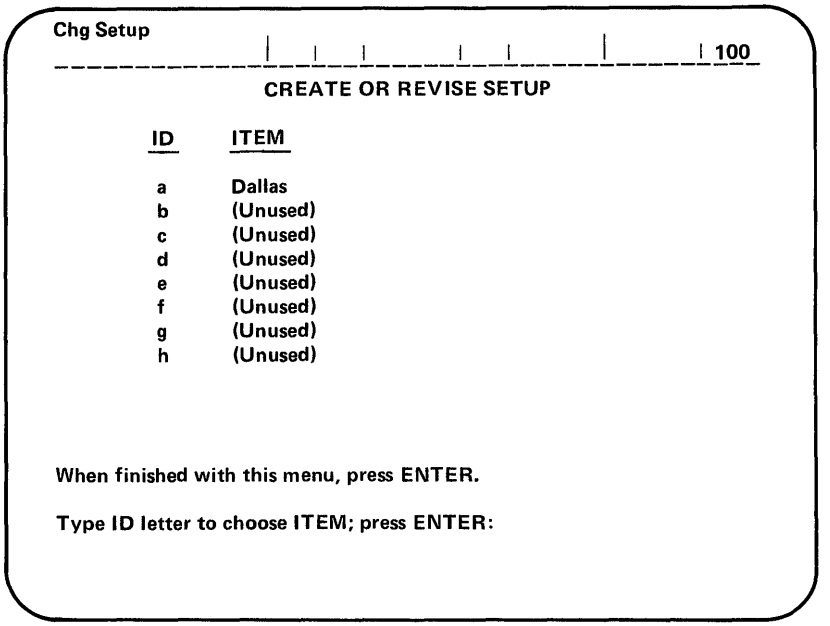
Type **c** and press Enter.

The Create or Revise Setup menu displays.

A communication setup defines the operating characteristics of a communication session. For any communication to take place, at least one setup must be stored on the BSC Backup Vol. 2.

Setups allow you to communicate with other locations without respecifying all the communication information each time you communicate.

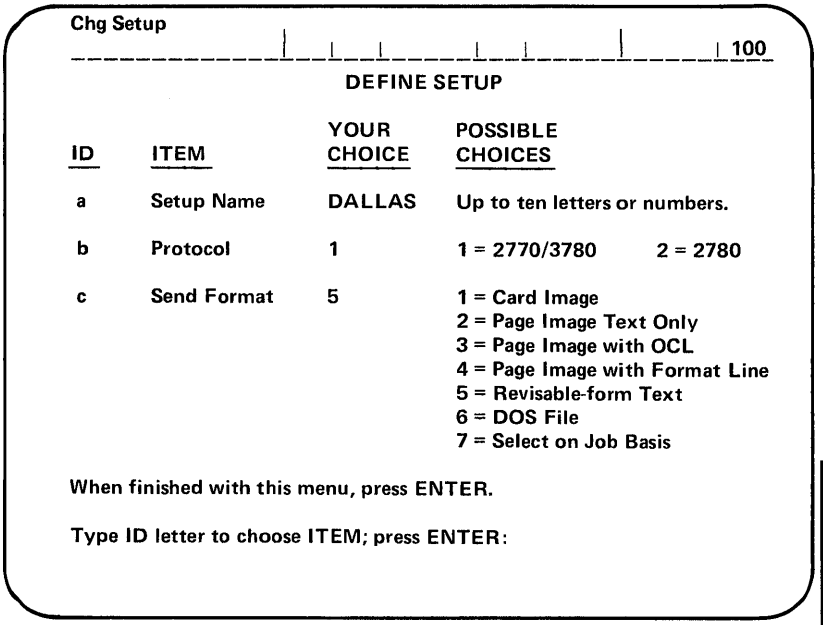
You can create and store up to eight setups on the BSC Backup Vol. 2. disk and can revise any previously defined setup.



Type the ID of the first **Unused** setup, press Enter, and the Define Setup menu displays.

Defining a Setup's General Characteristics

Consult with your supervisor or coordinator to decide how to select the options for your network since you may want to use the defaults for each item. Follow the prompts on the menus to select IDs and record your options. The defaults you can change or create display under the menu column headed by *YOUR CHOICE*. The Define Setup menu that follows is an example.



Menu Items:

- **Setup Name** indicates the name given to the setup. The default is the current name. When an unused setup is first defined, a name must be specified in this menu. You should try and use a meaningful Setup Name such as the location with which you will use this setup to communicate.

- **Protocol** specifies whether the IBM Personal Computer emulates the protocol characteristics of an IBM 2770/3780 or an IBM 2780. What the host needs or supports will determine the protocol. The default is **1**, 2770/3780.

- **Send Format** specifies which data stream format the IBM Personal Computer uses to send data. The default is **5**, Revisable-form Text.

  – Card Image is for host Job Control Language (JCL) use.

- Page Image Text Only is used for sending text documents with no Operator Control Language (OCL) or Format Line. This may also be called Print Image.

- Page Image with OCL is specified to communicate with IBM products that recognize OCL. If specified, IBM 6670 Print Options will be included in the Change Setup Session Options menu. For all other Send Format choices, IBM 6670 Print Options are not applicable.

- Page Image with Format Line is specified to communicate with an IBM Mag Card II or an IBM 5520. If selected, the Code Set will not be included in the Communication Setup menu and will default to Extended Binary-Coded Decimal Interchange Code (EBCDIC).

- Revisable-form Text is used for word-processor text documents communicated between devices that support this IBM data stream. This includes the IBM Displaywriter System or another IBM Personal Computer using the BSC Licensed Program.

- DOS File is used for straight DOS File transfer with no conversion between IBM Personal Computers or an IBM Personal Computer and an appropriately programmed host computer.

- If Select on Job Basis is selected, you will specify the send format when adding a job to the send queue. In this case, the valid send formats will appear in the Send Document menu when adding your jobs to the send queue.

Note: Refer to Chapter 7, "Data Link and Data Stream Characteristics," for more information about Send Formats.

By the way, you can type the ID and option together on one line, separating the two with a space. For example, to select a DOS File Send Format, type **c**, a space, 6, and press Enter.

When you are finished with the Define Setup menu, press Enter again, and the Communication Setup menu displays automatically. (Menu items vary depending on the Send format you specified in the Define Setup menu.)

```
Chg Setup
________________|__|__|_____|__|_______|_______| 100
                      COMMUNICATION SETUP

                                   YOUR    POSSIBLE
ID  ITEM                           CHOICE  CHOICES

a   Modem Port                     1       1 = Primary  2 = Alternate
b   Primary                        2       1 = Yes    2 = No
c   Block Size                     2       1 = 128    2 = 256  3 = 512
d   CPU Mode                       2       1 = Yes    2 = No
e   Insert New Line Codes          2       1 = Yes    2 = No
f   Transparency                   2       1 = Yes    2 = No
g   Code Set                       1       1 = EBCDIC  2 = 7-Bit

h   Change Setup Session Options
i   Create or Revise Session ID's

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:
```


In this menu, several operating parameters for the communication link associated with the setup named in the Define Setup menu are specified.

Menu Items:

- **Modem Port** identifies the modem port and the corresponding modem and line description used during a session.

- **Primary** specifies whether the IBM Personal Computer bids as a BSC primary station. If both stations specify primary, a lockout may occur. The default is **2**, No.

- **Block Size** specifies the block size the BSC Licensed Program will use when sending data. The default is **2**, 256 bytes.

- **CPU Mode** determines certain protocol characteristics the BSC Licensed Program uses during a session. **Yes** normally is selected for IBM Personal Computer to Host sessions. The default is **2**, No.

- **Insert New Line Codes** indicates whether the BSC Licensed Program inserts New Line (NL) control codes at record (line) boundaries of a received data stream. The default is **2**, No.

  Note: Insert New Line Code option has no function when a DOS File is received.

- **Transparency** specifies whether the BSC Licensed Program sends data in BSC transparency mode. The default is **2**, No. If Yes is selected, the Code Set must be EBCDIC.

- **Code Set** specifies the Code Set that the BSC Licensed Program uses when sending data. The default is **1**, EBCDIC.

  If 7-bit is specified, Yes is invalid for Transparency.

Notes:

1. If the Send Format option of the Define Setup menu specifies Page Image with Format Line, this Code Set defaults to EBCDIC and will not be displayed here.

2. If the Send Format option of the Define Setup menu specifies Revisable-form Text or DOS File, neither the Transparency nor the Code Set options will display.

3. If the Send Format option of the Define Setup menu specifies Select on Job Basis and you are planning to use either DOS File transfer or Revisable-form Text, you must specify Transparency as Yes and Code Set as EBCDIC.

4. If you are sending DOS Files, you will actually be sending an ASCII DOS File in a transparent EBCDIC data stream. The protocol control characters will be

EBCDIC although the content of the file remains ASCII. If you send DOS Files to a host, the host must support EBCDIC communication protocols. The host may store and forward as is. If the host is to process the data, the host must have an application to convert the file to EBCDIC.

Once you have entered your choices for IDs **a** through **g**, you are ready to set up the session options and create a list of session IDs. Let's define the setup session options first.

Type **h** and press Enter.

The Change Setup Session Options menu displays.

```
Chg Setup
                                                                    | 100
----------------------------------------------------------------------------
                    CHANGE SETUP SESSION OPTIONS

                                      YOUR    POSSIBLE
ID   ITEM                             CHOICE  CHOICES

a    Keyboard ID                      1       1 = 999
b    Use This Keyboard ID             2       1 = Yes       2 = No
     For All Send Documents
c    Receive Default Format           1       1 = Document Default Format
                                              2 = Alternate Default Format
d    Delete Send Queue Entry          2       1 = Yes       2 = No
     After Sending
e    Send Document Messages           2       1 = Yes       2 = No
f    6670 Print Options               2       1 = Yes       2 = No
g    Append Next Document             2       1 = Select on Job Basis   2 = No
h    Wait for Response                2       1 = Select on Job Basis   2 = No

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:
```

Menu Items:

- **Keyboard ID** specifies the default keyboard ID the BSC Licensed Program uses for send and receive translates. The default is the keyboard number of the current physical (Home) keyboard.

  Refer to Appendix C for information about supported keyboards and character sets. Refer to the receiving

location publications to see if a particular keyboard is required.

Notes:

1. This item has no function for DOS File transfer unless you are receiving and converting a DOS File.

2. For non-US keyboards, see Appendix C, "National Language Keyboard Support."

- **Use This Keyboard ID For All Send Documents** allows you to send documents to remote stations that do not support a variety of keyboards. The default is **2**, No.

  If this option is Yes, the BSC Licensed Program ignores any keyboard ID specified by an individual send document and uses the keyboard that the Keyboard ID option identifies to send the document.

  Note: This item has no function in DOS File transfer.

- **Receive Default Format** specifies the set of default values the BSC Licensed Program uses to initialize received data sets. The default is **1**, Document Default Format.

  Note: This item has no function in DOS File transfer.

- **Delete Send Queue** allows you to specify the automatic deletion of processed send queue entries. The deletion occurs when the last block of data is acknowledged by the receiving location. The default is **2**, No.

  Each send queue entry is deleted after successful processing even if it is appended to another entry. This can require requeueing of documents if the second, third, and following documents are not sent successfully.

- **Send Document Messages** allows you to enter a message of up to 80 characters to be sent with the document.

Note: It is possible to send messages with DOS File transfer, but results are unpredictable, and it is not recommended.

- **6670 Print Options** specifies whether the Print Format and the Number of Copies options will appear in the Send Document menu. In addition, the BSC Licensed Program will generate mid-line typestyle and keyboard changes for the IBM 6670. The default is **2**, No.

  This option only displays if Send Format specifies either Page Image with OCL or Select on Job Basis and Protocol specifies 2770/3780 in the Define Setup menu. In all other cases, it defaults to No.

- **Append Next Document** indicates a BSC protocol job delimiter is sent automatically after every send job if you choose the default **2**, No. If Select on Job Basis is specified and you later attempt to add a job to the send queue, you then must decide whether a delimiter is sent at the end of the job. Append Next Document will append or tie multiple documents together as one send job.

- **Wait for Response** causes the BSC Licensed Program to suspend processing of the send queue. Upon successful completion of the send job, the IBM Personal Computer will wait until a successful completion is received or until you press Comm Start. This option is ignored if the send job does not complete successfully. Select on Job Basis causes the Wait for Response option to display on the Send Document menu when you are building your Send Queue. No indicates the IBM Personal Computer will continue with the next send job immediately. The default is **2**, No. Yes cannot be specified for both Append Next Document and Wait for Response on the same send job.

When you have made all your selections for session options, press Enter again to return to the Communication Setup menu. Now all you have left to do is to create session IDs.

With the Communication Setup menu displayed, type **i** and press Enter. The Create or Revise Session IDs menu displays.

With this menu, you assign a local ID to yourself and remote IDs to the places with which you will be communicating.

```
Chg Setup                  |  |  |      |  |      |      | 100
----------------------------------------------------------------
               CREATE OR REVISE SESSION ID'S

                          YOUR
ID  ITEM                  CHOICE

a   Local ID
b   Remote ID #1
c   Remote ID #2
d   Remote ID #3
e   Remote ID #4


Valid ID's can be up to twenty characters (letters or numbers).

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:
```

Menu Items:

- **Local ID** identifies the ID the IBM Personal Computer sends when it and a remote station exchange session IDs. No Local ID is the default.

  A Local ID must be defined if any Remote IDs are specified. If a Local ID is defined and no remote IDs are specified, the IBM Personal Computer accepts as valid any Remote ID it receives during a session.

- **Remote ID** identifies remote stations that are authorized to conduct a session with your IBM Personal Computer. When session IDs are exchanged, the BSC Licensed Program checks the received Remote ID against the Remote IDs listed here. If the received Remote ID is not

listed here, the BSC Licensed Program cancels the session. The default is no Remote IDs.

If any Remote IDs are specified, the Send Document menu has the Session ID option. You should try to use meaningful Remote IDs, for example, the department to which you will send while using this setup.

Note: Do not specify Session IDs for DOS File Transfer.

At this point, you have completed the communication setup part of personalization. Press Enter as many times as it takes to return to the Change Communication Profile menu.

Note: Repeat the previous steps for each setup you want to create.

Creating or Revising Port Modem and Line Descriptions

With the Change Communication Profile menu displayed, type **d** and press Enter, and the Port Modem and Line Description menu displays.

A modem and line description is a profile of the port modem and line facilities used for communication. The description that is active depends on the value specified by the Modem Port option of the current communication setup.

This is the time to refer to the worksheet that was filled out during Chapter 2, "Planning." You will be entering the values from the worksheet to describe your communication link.

```
Chg Description                                                    100
------------------------------------------------------------------------
                 PORT MODEM AND LINE DESCRIPTION

                                   YOUR     POSSIBLE
ID  ITEM                           CHOICE   CHOICES

a   Terminal ID                             Up to five letters or
                                              numbers
b   Network Facility               1        1 = Switched
                                            2 = Dedicated
                                            3 = Dedicated with
                                                Switched Backup
c   Continuous Carrier             2        1 = Yes      2 = No
d   Half Speed Capability          2        1 = Yes      2 = No
e   Answer Tone Generation         2        1 = Yes      2 = No

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:
```

When you have entered all the options from your worksheet, press Enter to return to the Change Communication Profile menu.

Note: If you have two BSC adapters and two modems, type **e** and press Enter to create a description for the alternate modem and line. Follow the same instructions as you just did and, when you are done, return to the Change Communication Profile menu again.

Type **z** and press Enter to return to the BSC Task Selection menu.

The BSC Task Selection menu displays. If you want to create a work station description or specify document defaults, refer to Chapter 5, "Additional BSC Tasks," for information.

At this point, you have set up and personalized your BSC Licensed Program to reflect your particular operating environment and load procedure. Now let's look at how to establish a communication session.

Chapter 4. Preparing and Conducting Communication

Notes:

Before you can send documents, you must create a Send Queue that contains the names of the documents (jobs) to be sent. The Send Queue is a list of instructions, text documents, or messages to be communicated to another location or a host computer. You create the Send Queue so you can communicate to other locations using the DisplayComm BSC Licensed Program.

If you are going to communicate with an IBM 5520 or a host computer, you need to use sign-ons, passwords, and distribution information before you can send documents, messages, or instructions. You must use whatever line editor or typing tasks you have available to create these required control information documents.

After you have created the necessary control information documents, they must be added to the send queue just like the text documents to be communicated.

Refer to Chapter 8, "Host Programming Considerations," for information about the format and contents of these documents.

Warning: Printing on the IBM 5218 while DisplayComm BSC is communicating is not allowed.

How to Build a Send Queue

Again we will assume a two-drive system for this load example. If you have a system with a fixed disk, ignore the steps that tell you to insert a disk.

To access the BSC Licensed Program facility loading manually:

1. Load DOS.

2. Type the date and time when prompted.

3. At the DOS Command screen, remove the DOS disk and insert the BSC Backup Vol. 1.

4. Type:

   BSC

   Include any drive specifier or directory path if necessary, and press Enter.

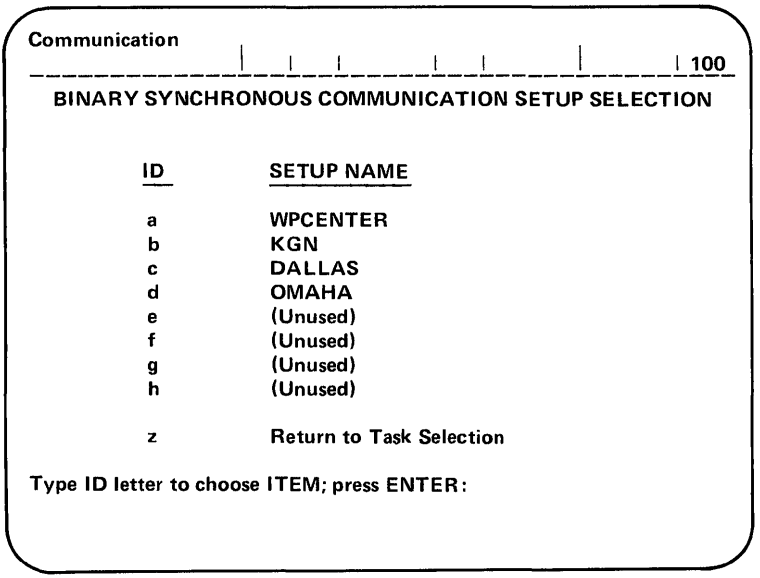
5. When prompted, type the Device Name for the DOS Background printer (for example, LPT1), and press Enter.

6. Press any key when the BSC IBM LOGO displays. The BSC Licensed Program loads and displays the Binary Synchronous Communication Task Selection menu.

```
                                                        100
BINARY SYNCHRONOUS COMMUNICATIONS TASK SELECTION

        ID          ITEM

        a           Communicate

        b           Print Document

        c           Document Utilities

        d           Change Communication Profile Tasks
        e           Change Work Station Profile Tasks

        z           Return to DOS


Type ID letter to choose ITEM; press ENTER:
```

Insert the BSC Backup Vol. 2, type **a**, press Enter, and the Binary Synchronous Communication Setup Selection menu displays. See the menu example that follows.

Note: Optional Print, Document Utilities, and Work Station Profile Tasks can be found in Chapter 5, "Additional BSC Tasks."



This menu shows four named (used) communication setups. Up to eight setups can be stored on the BSC Backup disk. Each stored setup specifies operating parameters such as the protocol and Code Set associated with the setup name.

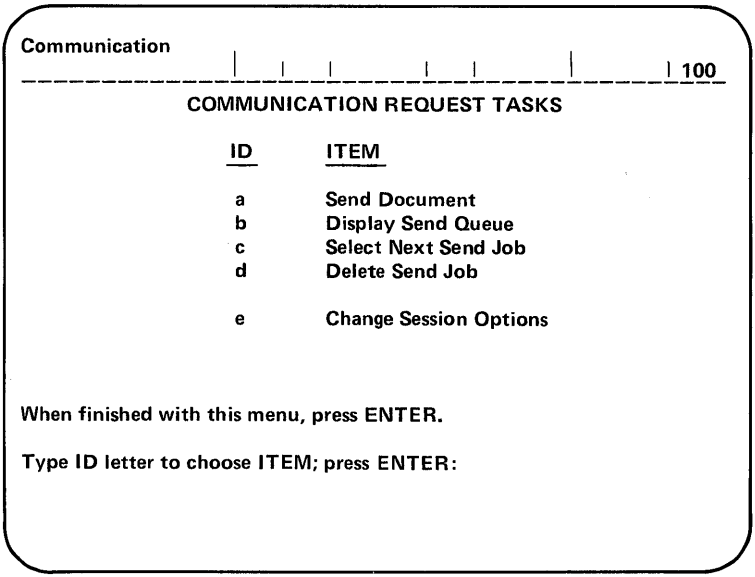
To initiate a session, select a previously defined setup from the Binary Synchronous Communication Setup Selection menu. The parameters defined in the setup are used for the session.

Selecting a valid communication setup from the BSC Setup Selection menu will cause the system to display the Session Summary.

Note: If this is a receive only job and you have no documents to send, press Comm Start now to activate the session. Otherwise, continue below.

Press Comm Reqst to display the Communication Request Tasks menu.

Note: Except for the Send Document item (ID **a**), entering an ID from this menu causes a second menu to display.



How to Add a Document (Job) to the Send Queue

Type **a** and press Enter to add a document to the send queue.

When prompted, type the name of the document you want to send and press Enter. Repeat the previous steps for all documents (jobs) that you want to add to the Send Queue. If no additional Send Job options need to be specified, the system will display a message indicating the document is added to the send queue.

Note: When entering a document name to send, DOS doesn't check to see whether the file has a .TXT extension signifying a text document. This means that if you want to send a text document with the .TXT extension, you must include it in the document name entered.

By the way, at the document name prompt, you can also press the Dir key, type a Directory name for a specific directory, or press Enter to display the default directory and select the Send Document name from the directory. When

you use Dir and select a document from the Directory, pressing Enter returns the display to the Communication Request Tasks menu and queues the document. Repeat these steps for all the documents (jobs) you want to add to the Send Queue.

When you have queued all the documents for your Session Setup, press Enter again to return to the Session Summary. At this point, you can press Comm Start to activate the session or press End Task to return to the BSC Task Selection menu.

Note: If you change the current directory after building a send queue, the new directory will be used to create send document names, not the directory used when the queue was created.

If you are trying to add a document to the Send Queue and the active setup does not specify all the send job options necessary to communicate the job or you have set up to Select on a Job Basis, the Send Document menu automatically displays.

The values specified in the Send Document menu apply only to one send job, and these values must be entered before the system will add the job to the Send Queue. As long as the setup remains active, the Send Document menu will display for each job you attempt to add to the Send Queue.

How to Specify Send Job Options

The following figure is an example of a Send Document menu with all the possible options to be specified. Depending on your setup, not all options will display on the menu.

```
Communication
                                                                    100
                              SEND DOCUMENT

                                 YOUR    POSSIBLE
ID  ITEM                         CHOICE  CHOICES

a   Message
b   Send Format                  5       1 = Card Image
                                         2 = Page Image Text Only
                                         3 = Page Image with OCL
                                         4 = Page Image with
                                             Format Line
                                         5 = Revisable-form Text
                                         6 = DOS File
c   Send From Page               0       0 = First Page
                                         1 = 9999.9.9
d   Send Through Page            0       0 = Last Page
                                         1 = 9999.9.9
e   Append Next Document         2       1 = Yes      2 = No
f   Wait for Response            2       1 = Yes      2 = No
6670 Options (valid only for Page Image with OCL)
g   Print Format                 100     100 - 107
h   Number of Copies             1       1 - 99

When finished with this menu, press ENTER.
Type ID letter to choose ITEM; press ENTER:
```

Menu Items:

- **Message** displays if Send Document Messages is specified in the Change Session Options menu. You may enter up to 80 characters of message text.

  When **a** is selected, the BSC Licensed Program prompts "Type message; press ENTER."

  Note: If you are transferring DOS Files, using Message will cause unpredictable results and therefore should not be used. If you are sending messages to a host computer, it must have message support.

- **Send Format** specifies which data stream format the BSC Licensed Program uses to send data. The default is **5**, Revisable-form Text. This option displays only if the communication setup specifies Select on Job Basis for the Send Format option.

  Page Image with Format Line does not appear if the communication setup specifies 7-bit code.

Revisable-form Text and DOS File do not appear if the communication setup specifies non-transparent.

Note: Refer to Chapter 7, "Data Link and Data Stream Characteristics," for information about send formats.

- **Send From Page** specifies the beginning page. This option is valid only when sending to an IBM 6670 using Page Image with OCL send format. If DOS File send format was specified in the setup, this has no function and will not appear on this menu.

  Note: If you are sending to a location using remote IDs, then an option to specify remote IDs will display on this menu rather than the Send From Page and Send Through Page items.

- **Send Through Page** specifies the last page to be sent to an IBM 6670. If DOS File send format was specified in the setup, this has no function and will not appear on this menu.

- **Append Next Document** indicates whether the BSC Licensed Program will send this job and the next job as one data set. Yes indicates the BSC Licensed Program will append the next send job to this job. **No** indicates that a BSC protocol job boundary will be sent after this job. The default is **2**, No.

- **Wait for Response** causes the BSC Licensed Program to suspend processing of the Send Queue upon successful completion of the send job. The IBM Personal Computer will wait until either a response is received from the remote location or until you press Comm Start. The default is **2**, No.

  Yes cannot be specified for both Append next Document and Wait for Response on the same send job.

- **Print Format** specifies which of eight possible IBM 6670 stored formats is to be used with the send job. The default is **100**. This option displays only if the communication setup specifies Yes for IBM 6670 Print

Options. If DOS File send format was specified in the setup, this has no function and will not appear on this menu.

- **Number of Copies** specifies the number of copies the IBM 6670 is to print. The default is **1**. This option displays only if the communication setup specifies Yes for IBM 6670 Print Options. If DOS File send format was specified in the setup, this has no function and will not appear on this menu.

Follow the prompts and make any necessary changes to the Send Document menu. When you have finished, press Enter. The system returns to the Communication Request Tasks menu and displays a message indicating the document is added to the Send Queue.

Press Enter again to return to the Session Summary.

At this time, you can press Comm Start to activate the session, or you can press End to return to the BSC Task Selection menu.

Note: If you wish to read the information about the rest of the Communication Request Tasks, refer to Chapter 5, "Additional BSC Tasks."

How to Establish a Session

Once you have loaded the BSC Licensed Program, selected a setup, created a Send Queue, displayed the Session Summary, and inserted the disk containing the Send Queue documents, press Comm Start to activate the communication hardware and establish the session.

This is when the Session Summary becomes the focal point of the entire session.

When you press Comm Start, the Link Status Field of the Session Summary displays READY.

You then dial the remote location (if using a switched line), and when both stations go to DATA, the Link Status Field displays CONNECTED, and then ON-LINE.

Note: If you are using a dedicated line, pressing Comm Start will cause the Link Status Field to display READY, CONNECTED, and ON-LINE automatically.

Disk Handling During a Session

All disk and directory functions of DOS apply, which means you must have the correct Send or Receive Disks inserted and the correct Default Drive and Directory specified. If you need more information about DOS disk handling or directories, refer to your DOS manual. If a send job's disk is not inserted when the system comes to the job, the system enters an error completion message in the Session Summary and moves to the next Send Queue entry.

When the BSC Licensed Program receives data, it is automatically stored as a document on the disk. The IBM Personal Computer stores data on the a: disk unless you specify another disk drive in the Change Session Options menu.

If the disk becomes full during a receive job, the system cancels the job, places an error completion code in the Session Summary, and displays an error message.

Sending Documents

After entering the Send state, the Link Status Field displays ON-LINE SEND, and the IBM Personal Computer accesses the send queue and begins transmitting jobs to the remote station. Normally, it starts at the top of the queue and sends jobs sequentially. As it sends a job, the system makes an entry for it in the Session Summary. This is how you can tell that the send document communication is working.

At this point, you have loaded your BSC Licensed Program, selected your setup, created your Send Queue, established a session, and sent your documents to a remote station. Read

on to see what else you can do before, during, and after a session.

Receiving Documents

To put the IBM Personal Computer in the receive state, you should:

1. Choose option **a** (communicate) from the Binary Synchronous Communications Task Selection menu.

2. Select a previously defined setup from the Binary Synchronous Communications Setup Selection menu.

3. Press Comm Start to activate the session.

When the IBM Personal Computer is in the Receive state, it automatically stores any data sent by a remote station on a work disk and displays a record of that data in the Summary Viewport. The IBM Personal Computer generates the name displayed for the receive job, and it always has the form:

SET-XXXX or SET-XXXX.TXT

where SET = the first three characters of the active communication setup name, XXXX = a sequentially assigned number that uniquely identifies the received data, and .TXT = the extension that indicates data that has been converted to a text document.

If the IBM Personal Computer cannot generate a unique name, it terminates all receive activity and inserts an error message into the Session Summary.

If no disk is inserted when a receive job starts, the received job will be cancelled. Insert a disk and press Comm Start to continue.

Storing the Session Summary

You can create a permanent record of session activity by accessing the Change Session Options menu through the Communication Request Tasks menu. Specify Yes for the Summary to Disk option. This causes the IBM Personal Computer to store all of the information in the Session Summary as a document on disk. Refer to Chapter 5, "Additional BSC Tasks," for information about specifying storage of Session Summaries.

To create the Session Summary document, the system scans for a document with the specified name. If a document with that name does not exist, the system automatically starts a new Session Summary document. If a document with the name already exists, the system appends the new Session Summary document to it as a new page.

The IBM Personal Computer will store the information that displays in the Session Summary unless one of the following occurs:

- You change the Summary to Disk option to **No**.
- The disk is full or becomes full during the session.
- An existing document with the specified name has an I/O error.

When started in the middle of a session, the Session Summary document begins with the next line that displays in the Summary Viewport.

Selective Sending

The Valid Remote IDs option of the Send Document menu enables you to specify which remote locations will receive a specific send job. When the IBM Personal Computer processes a Send Queue after a session ID exchange, it checks the IDs specified in the Send Document menu against the ID in the REMOTE ID field of the Session Header line. If the IDs do not match, the system does not send the job to

the current remote station and moves to the next entry in the queue.

Appending Documents

When the Appending Documents option of the Send Document menu is **Yes**, the IBM Personal Computer overrides a job's protocol boundary and appends the next job in the Send Queue directly to it. The system does not alter any formatting boundaries within a job, however. It only appends succeeding jobs until it reaches the end of the Send Queue or a job specifies **No** for the Append Next Document option.

Note: This means that once the IBM Personal Computer is on-line, it must be put in Hold state to add appended documents. Otherwise, the first job may finish before the next job gets into the queue.

If a send job cannot complete, the IBM Personal Computer normally terminates only that job. It then enters an Unsuccessful Completion message in the Session Summary and moves to the next job in the Send Queue. But if Append Next Document is Yes, the system skips all successive jobs that are appended and the first document that specifies Append Next Document = No. The system also enters one error completion message for the set of concatenated documents.

How to Terminate a Session

You can terminate a session by pressing Comm Disc. After the data link is disconnected, you can press either Comm Start to establish another session or End Task to return to the Binary Synchronous Communication Setup Selection menu. From this menu, you can choose another communication setup, return to the BSC Task Selection menu to initiate a communication session, or return to DOS.

On switched lines, the IBM Personal Computer automatically terminates a session if the modem unexpectedly drops Data Set Ready (DSR), the remote station sends a disconnect or

an invalid ID, or the system is unattended and a timeout occurs.

Note: If you are using the Keystroke Queue Enhancer, it must be disabled when you finish with the BSC Licensed Program and return to DOS. To accomplish this, type the command:

KQE N

and press Enter to disable the Queue Enhancer.

Chapter 5. Additional BSC Tasks

Notes:

This chapter provides information about tasks with which you need to be familiar, but may use only occasionally.

Additional BSC Task Selection Menu Tasks

You can find the Print Tasks and Work Station Profile Tasks on the BSC Backup Vol. 1.

How to Use Print Tasks

Print Tasks allow you to process print or convert documents (jobs) or to display the print queue or cancel a print job.

Selecting Print Document (ID **b**) from the BSC Task Selection menu causes the system to prompt you for the document name that you want to print and/or convert. When you enter a valid document name, the Print Document menu displays.

```
------------------|--|--|-----|--|-----|------| 100
                          PRINT DOCUMENT

                               YOUR    POSSIBLE
ID ITEM                        CHOICE  CHOICES

a  From Page                   0       0 = First Page     1 – 9999.9.9
b  Through Page                0       0 = Last Page      1 – 9999.9.9
c  Print Quantity              1       1 – 99

d  Converted Document Name

e  Print                       1       1 = Foreground  2 = Background
                                       3 = To Disk (Convert Only)
f  Cancel on Error             2       1 = Yes       2 = No

g  Change Printer Description

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:
```

Menu Items:

IDs **a** through **d** allow you to specify pages to be converted, number of copies to print, and the document name for storing converted output, if needed.

Note: Documents created when you specify a Converted Document Name are not deleted. This means that if you have an error during the Print process or if you want to use the same Converted Document Name again, you must delete the first one created.

ID **e** allows you to print and/or convert a document. You can specify Foreground to print the document with the BSC Licensed Program, or you can specify Background if you want to print a document using DOS Background Print. Refer to "Printing in the Foreground" and "Printing in DOS Background" in this chapter for more details about Foreground and Background Print.

Warning: Printing on the IBM 5218 while DisplayComm BSC is communicating is not allowed.

If you want to convert the document and put the output on disk for printing later, you can specify To Disk for this item. If Print = To Disk and you do not specify a Converted Document Name, a default name is assigned that consists of the input document name plus the .PRN extension.

ID **f** allows you to choose to continue printing a job even if it has errors. This is useful for reviewing preliminary drafts.

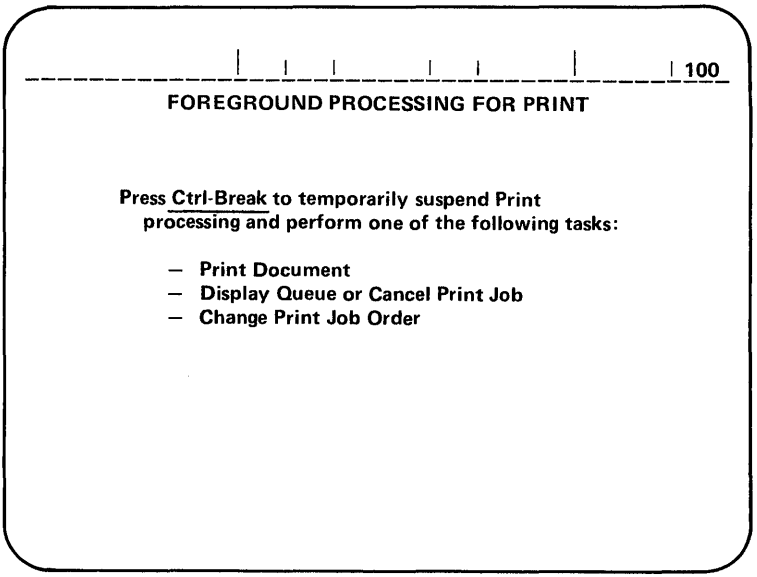
ID **g** allows you to change your printer description for this print job. See the Printer Description menu in the "Change Work Station Profile Task" in this chapter.

Notes:

1. As with other menus with variable options, you may type the menu item ID, followed by a space and then by your choice. Follow the prompts on the display.

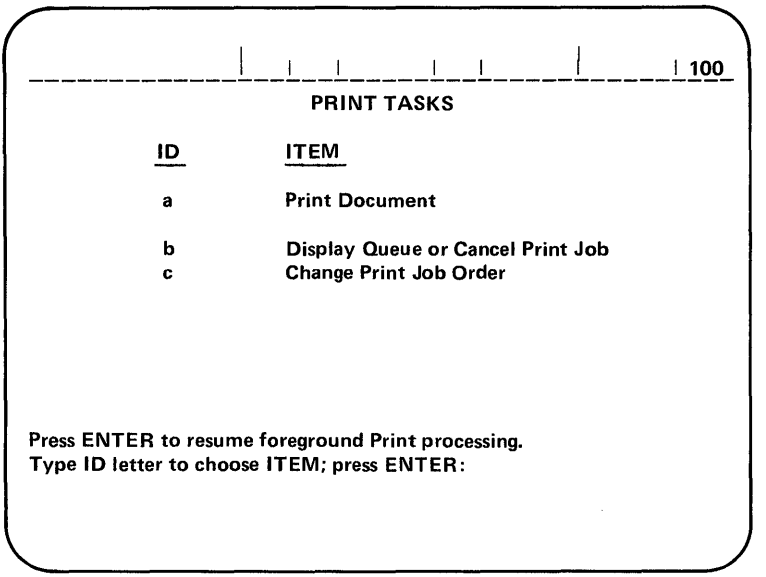
2. When jobs are queued to print, the disk containing the documents (jobs) must be inserted.

When you have made all your selections on the Print Document menu, press Enter again and the Foreground Print Processing screen displays. This screen displays continuously during the Print process unless you want to interrupt the process. In either case, after all the documents in the Print Queue are processed, control returns to the BSC Task Selection menu.



Note: Pressing Ctrl + Comm Disc performs the Ctrl-Break function when you are using print tasks.

Press Ctrl + Comm Disc (Break) while this screen is displayed if you want to suspend processing on the current Print job and display the Print Tasks menu.



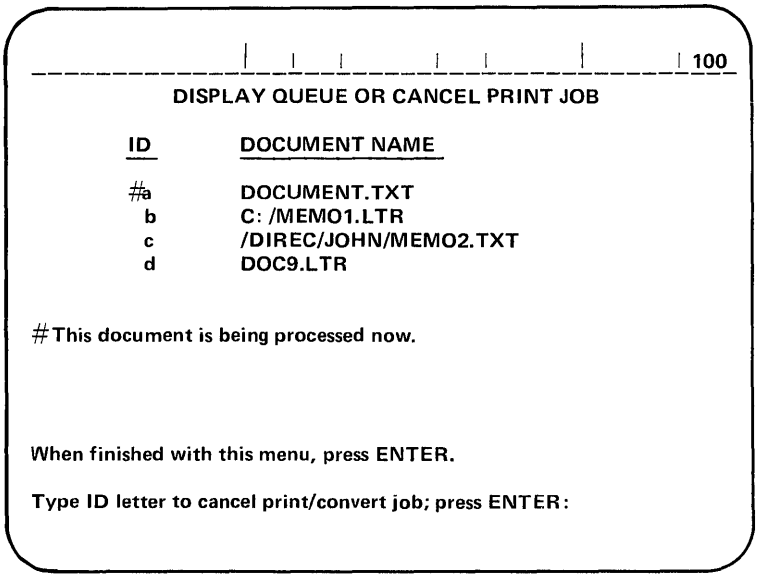
If you select ID **a** from the Print Tasks menu, the Print Document menu displays so you can queue another document.

If you select ID **b** or ID **c** from the Print Tasks menu, one of the menus on the following pages displays with information about the print queue. These menus allow you to either cancel a print job or change the order of a print job in the queue. Follow the prompts on the display.

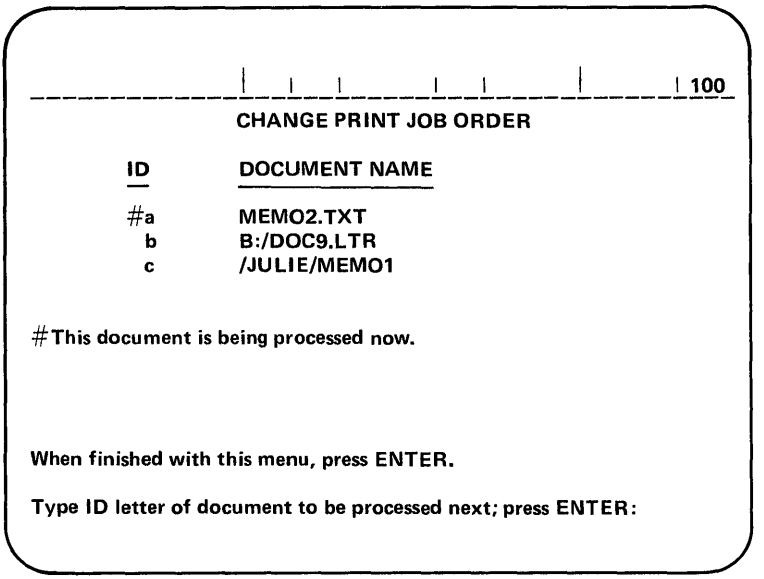
As you can see on the preceding display, when you are finished adding documents or manipulating the print queue, pressing Enter again resumes the print job that was suspended.

Note: In order to manipulate the DOS Background Print queue after you have added print jobs to it, you must exit the BSC Licensed Program and return to DOS.

Display Queue or Cancel Print Job



Change Print Job Order



How Printing in the BSC Foreground Works

If you choose to print a document using the BSC Licensed Program foreground print, this is what happens:

1. The document is placed at the end of the BSC foreground print queue.

2. When the document becomes the active Print job, it is checked to see if it needs conversion.

3. If the document needs conversion, it is converted and printed one line at a time unless you specified a Converted Document Name. If you specified a Converted Document Name, the output is written to the document that you named. The Converted output document is then printed.

Warning: Printing on the IBM 5218 while DisplayComm BSC is communicating is not allowed.

How Printing in the DOS Background Works

If you choose to print a document using DOS Background Print, this is what happens:

1. The document is placed at the end of the BSC foreground print queue.

2. When the document becomes the active Print job, it is checked to see if it needs conversion.

3. If the document needs conversion, the output is placed in a converted output document. If you did not specify a Converted Document Name, the output document is assigned a default name consisting of the input document name plus the .PRN extension.

   Note: If the document that you want to print in DOS Background already has the .PRN extension, you must type the document name including the .PRN extension.

4. The converted output document is then passed to DOS for Background Print queuing.

5. While DOS is queuing the document, the DOS Background Print queue is displayed. If you specified Print = Attended in the Printer Description menu, the DOS Background Print queue remains displayed until you press Enter. If you specified Print = Unattended in the Printer Description menu, the DOS Background Print queue displays momentarily then returns control to the BSC Licensed Program.

Warning: Printing on the IBM 5218 while DisplayComm BSC is communicating is not allowed.

How to Use Document Utilities

The Document Utilities are located on the BSC Backup Vol. 2. Selecting Document Utilities (ID c) from the BSC Task Selection menu causes the Document Utilities menu to display.

```
                                                            100
                          DOCUMENT UTILITIES

          ID          ITEM

          a           Copy Document
          b           Delete Document
          c           Rename Document
          d           Recover Documents
          e           Compress Documents

          f           Convert Text Document to Revisable-form Document
          g           Convert Revisable-form Document to Text Document

          z           Return to Task Selection



Type ID letter to choose ITEM; press ENTER:
```

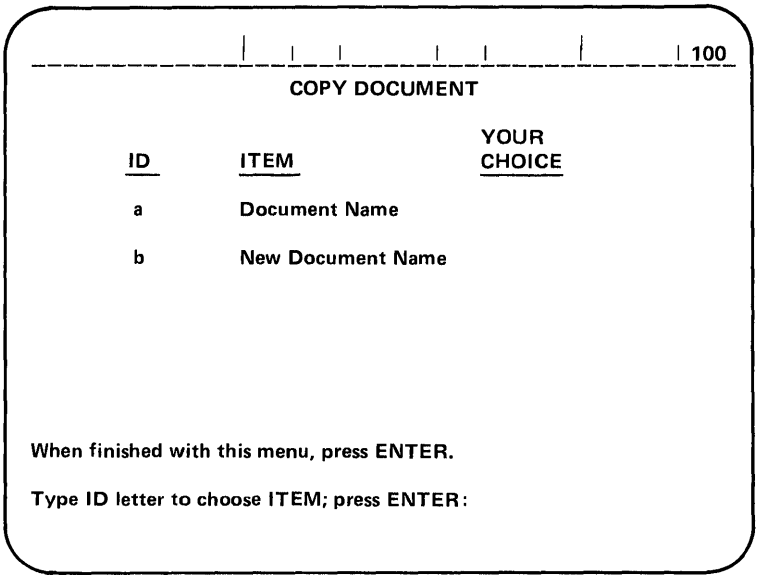
The Document Utilities menu allows you to perform document recovery, deletion, naming, copying, and conversion tasks.

Menu Items

IDs **a** through **c** allow you to copy, delete, or rename documents by presenting menus that prompt you to enter document names to be copied, deleted, or renamed. Follow the prompts on the display.

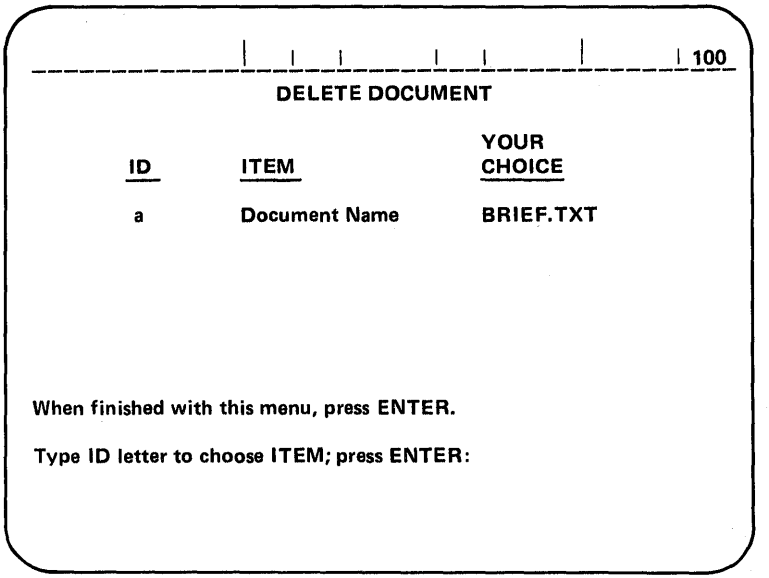
The Document Utilities menus follow.

Copy document



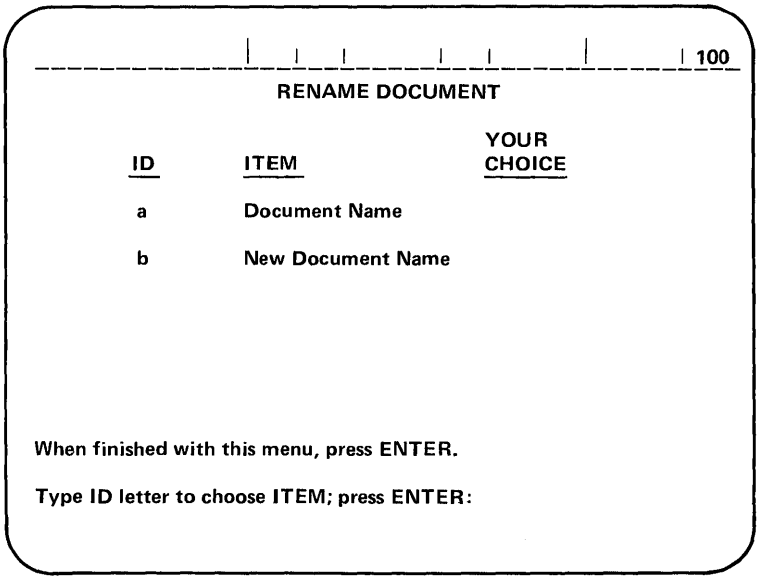
Note: Documents are compressed during this copy. Neither the Copy function nor the Compress function will change the timestamp of a dataset.

Delete Document



Note: Directories, System Documents, and Program Files (document extensions of .DIC, .COM, .PG1, .PG2, or .PG3) cannot be deleted using this menu.

Rename Document



Recover Documents

ID **d** in the Document Utilities menu displays the Recover Documents menu. The Recover Documents menu allows you to recover a document that has had an error. You can also enter a Directory name and recover all the documents in the Directory that have had errors and need recovery.

100

RECOVER DOCUMENTS

ID	ITEM	YOUR CHOICE
a	Document Name	DEPT22/JULIE

To recover more than one document in a directory, a directory name may be specified.

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:

Notes:

1. This menu is used to recover BSC Licensed Program documents only.

2. If you do not enter a document or directory name in this menu, you must press the Esc (Escape) key to exit the menu.

Compress Documents

ID e in the Document Utilities menu displays the Compress Documents menu. The Compress Documents menu allows you to compress (remove unused space) from within the document you name. You can also enter a Directory name and compress all the documents in the Directory.

```
 |  |  |      |  |      |      | 100
-----------------------------------------------
            COMPRESS DOCUMENTS

                                  YOUR
   ID      ITEM                   CHOICE

   a       Document Name          BRIEF.TXT


To compress more than one document in a directory, a directory name may be
specified.

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:
```

Notes:

1. *This menu is used to compress BSC Licensed Program documents only.*

2. *If you do not enter a document or directory name in this menu, you must press the Esc (Escape) key to exit the menu.*

3. *The Compress function will not change the timestamp of a dataset.*

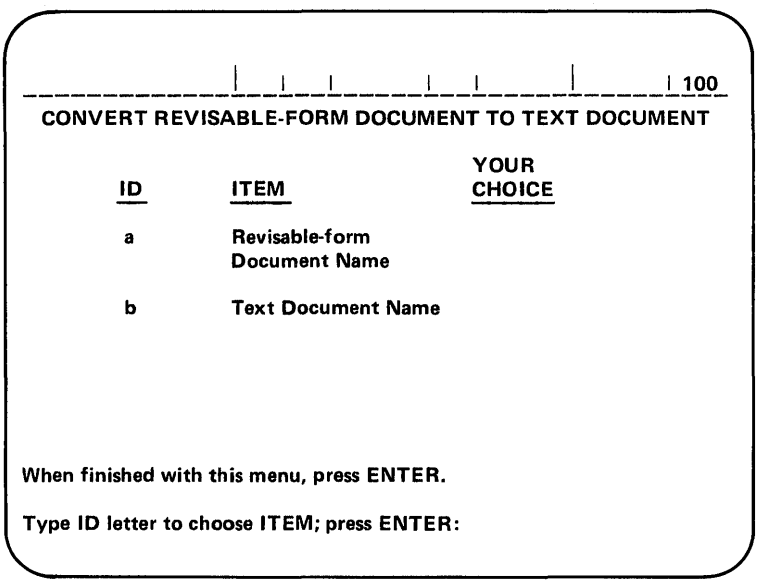
Convert Text Document to Revisable-Form Document

ID **f** in the Document Utilities menu allows you to convert a BSC Licensed Program internal format document to a DOS File containing Revisable-form Text. This file can be used by an IBM Personal Computer application written to handle Revisable-form Text. Refer to Chapter 7, "Data Link and Data Stream Characteristics," for information about Revisable-form Text data streams.

```
                                                        100
CONVERT TEXT DOCUMENT TO REVISABLE-FORM DOCUMENT

                                          YOUR
ID          ITEM                          CHOICE

a           Text Document Name

b           Revisable-form
            Document Name

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:
```

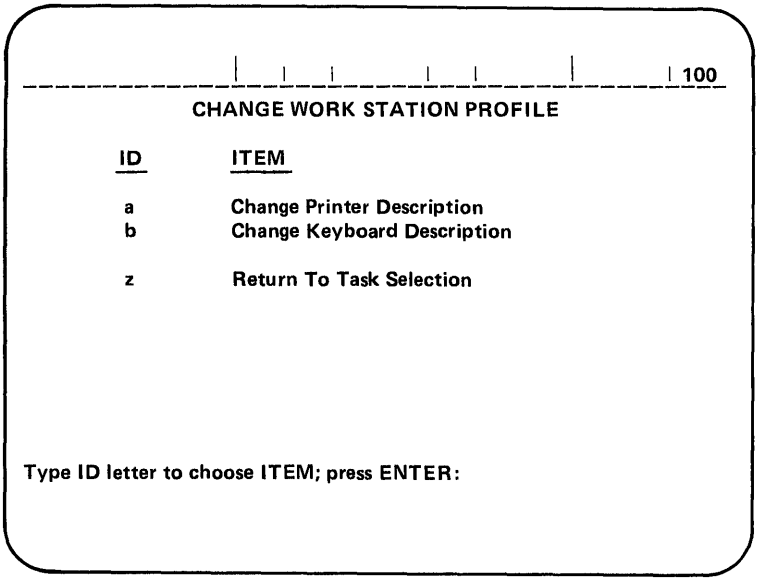
Convert Revisable-Form Document to Text Document

ID **g** in the Document Utilities menu allows you to convert Revisable-form DOS files to the BSC Licensed Program internal format document for use by the BSC Licensed Program Print Tasks or the DisplayWrite 2 Licensed Program (if available).



How to Use Work Station Profile Tasks

The Work Station Profile Tasks are located on the BSC Backup Vol. 1. Selecting Change Work Station Profile (ID **e**) from the BSC Task Selection menu causes the Change Work Station Profile menu to display. From this menu, you can choose to go to the Printer Description menu or the Keyboard Description menu. You can also return to the BSC Task Selection menu.



Changing Printer Description

The Printer Description menu provides for describing the printer type, the logical name, the print mode, and the paper-handling capabilities to be used for the print jobs.

Selecting Change Printer Description (ID **a**) from the Change Work Station Profile menu displays the following menu.

```
Chg Description                                                    100
-----------------------------------------------------------------------
                       PRINTER DESCRIPTION

                         YOUR       POSSIBLE
ID   ITEM                CHOICE     CHOICES

a    Printer Type        1          1 = Class A
                                    2 = Class B
                                    3 = Class C
                                    4 = Class D
b    Device Name         1          1 = LPT1 (PRN)
                                    2 = LPT2
                                    3 = LPT3
c    Print Mode          2          1 = Attended     2 = Unattended
d    Draft Mode          1          1 = Yes          2 = No
e    Paper Handling      3          1 = Cut Paper, Manual Feed
                                    2 = Cut Paper, Automatic Feed
                                    3 = Continuous Paper
When finished with this menu, press ENTER.
Type ID letter to choose ITEM; press ENTER:
```

Menu Items:

ID **a** allows you to specify the type of printer you are using:

Class A	IBM Graphics or a compatible printer.
Class B	IBM Matrix or a compatible printer.
Class C	IBM 5218 or a compatible printer
Class D	NEC[1] 3550 or a compatible printer.

Notes:

1. *It is the responsibility of the customer to determine printer compatibility.*

2. *Printer Class A provides limited support of the IBM 5182 Color Printer.*

ID **b** allows you to assign a device name to your printer. You can have more than one printer attached to your IBM Personal Computer.

Note: The IBM 5218 Printer Driver requires additional hardware and software. If you have an IBM 5218 Printer, the IBM 5218 Device Driver will take LPT1 if it is the only printer on the system or LPT2 if it is one of two printers on the system. It should be the same device name specified in the IBM 5218 Device Driver configuration. Refer to the Guide To Operations "IBM 5218 A03/A04 Printer Driver Program and Printer Sharing Device."

Warning Printing on the IBM 5218 while DisplayComm BSC is communicating is not allowed.

ID **c** allows you to specify whether the print process will stop after a job and wait for you to acknowledge an error message (attended) or continue (unattended) the next job.

ID **d** allows you to specify whether or not you want a matrix printer to double-strike each character printed to make it darker. Normally, when you are ready to print the final document on a matrix printer, you will specify No so that the printed output will be double-struck (for Class A and B printers only).

[1]NEC is a trademark of the Nippon Electric Co., Ltd.

ID e, Paper Handling. Choose the option that corresponds to what your printer has installed.

Changing Keyboard Description

Selecting Change Keyboard Description (ID **b**) from the Change Work Station Profile allows you to change your Home Keyboard (default character set) to be used when typing to select menu options, answer prompts and messages, and type messages. The Home Keyboard default is DP (103-B). If you want to specify WP (001) keyboard as your Home Keyboard, Change Keyboard Description allows you to do so. Refer to Appendix C for more information about keyboards.

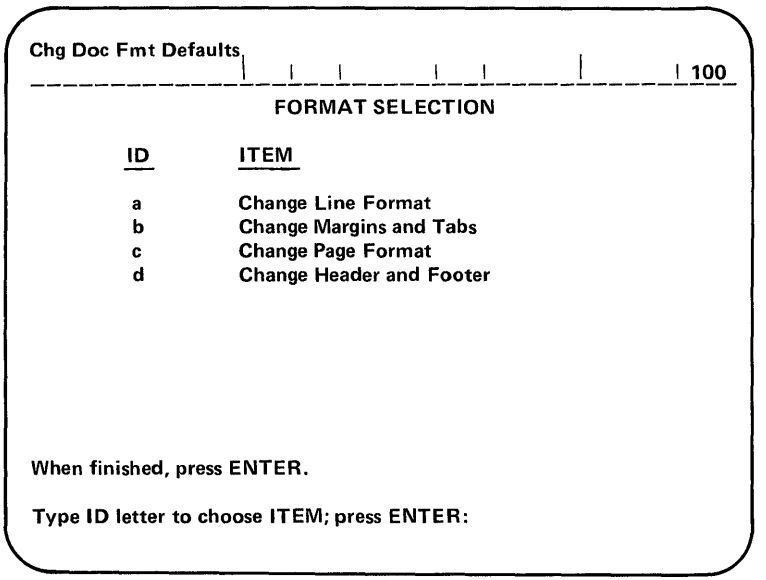
Additional Communication Profile Tasks

Except for DOS Files and documents received with the format already imbedded in the data stream, each document stored on an IBM Personal Computer disk is initialized with a set of default values based on either the Document Format defaults or the Alternate Format defaults. Through the Change Communication Profile menu, you can define Document Format and Alternate Format defaults for communication use only. When defined, these defaults are stored on the BSC Licensed Program disk. The IBM Personal Computer uses the new default values the next time the BSC Communicate task is selected.

How to Change Document and Alternate Document Formats

Selecting Change Document Format Defaults, ID **a**, or Change Alternate Format Defaults, ID **b**, from the Change Communication Profile menu causes the Format Selection menu to display.

Format Selection



Make your selections on the following menus depending on how you want the printed output to look when you print a received document.

Line Format: Choosing ID a, Change Line Format, causes the following menu to display. The Line Format menu allows you to redefine how the printed lines will display for your text documents.

Chg Document Fmt   100

LINE FORMAT

ID	ITEM	YOUR CHOICE	POSSIBLE CHOICES		
a	Line Spacing	1	1 = Single	2 = Double	3 = Triple
			4 = Half	5 = 1 and ½	
b	Line Alignment	1	1 = Left	2 = Justify	
			3 = ½ Justify		
c	Typestyle Number	26	1-39 (10 Pitch)	80-111 (12 Pitch)	
			154-175 (Proportional)		
			215-230 (15 Pitch)	240-249 (5 Pitch)	
			250-259 (16.5 Pitch)	260-269 (8.25 Pitch)	
d	Lines/cm or in.	2	1 = 2.09/cm or 5.3/in.		
			2 = 2.36/cm or 6/in.		
			3 = 3.15/cm or 8/in.		
			4 = 9.45/cm or 24/in.		
e	Adjust Line Endings	1	1 = Yes	2 = No	
f	Zone Width	6	1-30		

When finished with this menu, press ENTER.
Type ID letter to choose ITEM; press ENTER:

Note: If you select invalid choices, such as wrong line spacing, for your printer and you specify Cancel on Error = No in the Print menu, the BSC Licensed Program will use default values. If you specified Cancel on Error = Yes, invalid choices will cause the job to be cancelled and an error message to be issued.

Margins and Tabs: Choosing ID **b**, Change Margins and Tabs, causes the following menu to display. The Margins and Tabs menu allows you to redefine the page dimensions of your text documents.

```
Chg Document Fmt
                                                          100
<...2....:....3....:....4....:....5....:....6....:....7....>....8....:....9..

                          MARGINS AND TABS

CHANGE MARGIN:  Move the cursor to < (left margin) or > (right margin).
                Press SPACE or BACKSPACE to change the margin.

SET TAB:        Move the cursor to where you want a tab setting.
                For FLUSH LEFT TAB, press TAB  For CENTER TAB, press CENTER
                For Decimal Tab, press .       For FLUSH RIGHT TAB, press END
                For Comma Tab, press ,

CLEAR TAB:      Move the cursor to the tab setting; press DEL.

MOVE TABS:      Move the cursor to the tab setting. Press SPACE or
                BACKSPACE to move tabs.

SET ALL TABS:   Move the cursor to < (left margin). Type the number
                for spacing between tab settings; press ENTER.

CLEAR ALL TABS: Move the cursor to < (left margin); press DEL.

When finished with this menu, press ENTER.
```

Page Format: Choosing ID c, Page Format, causes the following menu to display. The Page Format menu allows you to redefine the first and last lines of your text documents along with paper handling if you have an IBM 5218 Printer.

```
Chg Doc Fmt Defaults
-----------------|---|---|-------|---|-------| 100----
                              PAGE FORMAT

                            YOUR    POSSIBLE
ID  ITEM                    CHOICE  CHOICES

a   First Typing Line,      7       1 - 999
    First Page
b   First Typing Line       7       1 - 999
    Following Pages
c   Last Typing Line        60      2 - 999
d   Paper or Envelope Size  3       1 = 210x297 mm or 8.27x11.69 in. (A4)
                                    2 = 297x210 mm or 11.69x8.27 in. (A4L)
                                    3 = 215.9x279.4 mm or 8.5x11 in. (P4)
                                    4 = 279.4x215.9 mm or 11x8.5 in. (P4L)
                                    5 = 215.9x355.6 mm or 8.5x14 in. (Legal)
                                    6 = 355.6x215.9 mm or 14x8.5 in. (Legal L)
                                    7 = 241.3x104.8 mm or 9.5x4.13 in. (Env.)
                                    8 = 220x110 mm or 8.66x4.44 in. (DL Env.)
                                    9 = Other in mm
e   Printing Paper Source   1       1 = Top                   2 = Bottom
                                    3 = Bottom,This page only 4 = Manual Feed
                                    5 = Envelope
When finished, press ENTER.
Type ID letter to choose ITEM; press ENTER:
```

Notes:

1. Paper or Envelope Size and Printing Paper Source only apply when sending to a location with a printer that has these devices and options or if you have an IBM 5218 Printer attached to your IBM Personal Computer. Refer to the manuals for the receiving location printer for information on these items.

2. If you select invalid choices such as wrong paper size or paper source for your printer and you specify Cancel on Error = No in the Print menu, the BSC Licensed Program will use default values. If you specified Cancel on Error = Yes, invalid choices will cause the job to be cancelled and an error message to be issued.

Header and Footer: Choosing ID **d**, Change Header and Footer, causes the following menu to display. The Header and Footer menu allows you to define the header and footer placement in your received documents.

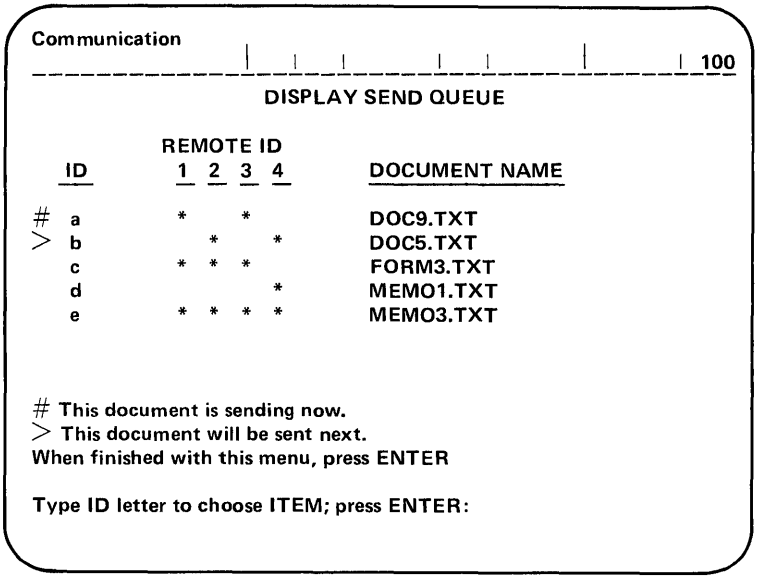
```
Chg Doc Fmt Defaults                                          | 100
                         HEADER AND FOOTER

                         YOUR       POSSIBLE
ID  ITEM                 CHOICE     CHOICES

a   First Header Line    3          1 - 999
b   Print Header On      1          1 = All Pages
                                    2 = All But First Page

c   First Footer Line    63         2 - 999
d   Print Footer On      1          1 = All Pages
                                    2 = All But First Page

When finished, press ENTER.

Type ID letter to choose ITEM; press ENTER:
```

Additional Communication Request Tasks

You can find the additional Communication Request Tasks on the BSC Backup Vol. 2.

How to Display the Send Queue

When you select Display Send Queue, ID **b** from the Communication Request Tasks menu, the Display Send Queue menu displays. This menu enables you to review the current send queue and its status.



The format of the Display Send Queue menu can change, depending on the communication status and whether session IDs are defined.

If remote IDs are defined, the menu has an additional REMOTE ID field as shown. This field identifies the remote station(s) that will receive a specific document. For example, only remote stations 2 and 4 will receive **DOC5.TXT**.

If the current send job completes while this menu is displaying, the system enters the Hold state. It remains in the Hold state until you finish with the menu and return to the Communication Request Tasks menu. Processing of the send queue then continues.

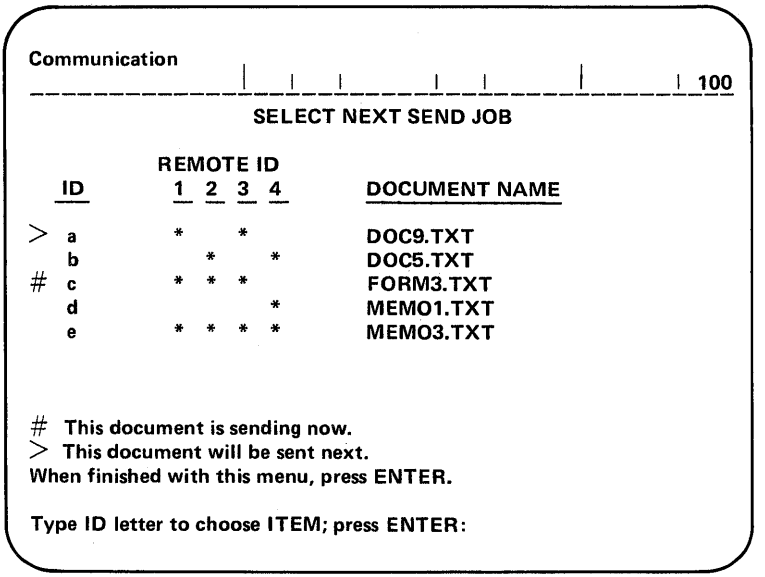
You can also access the Send Document menu (if available) by selecting a job's ID from this menu. This allows you to review or revise the send document options for that job. Only the current send job cannot be accessed.

Note: When revising a specific job's options or manipulating the send queue, you must pay close attention to the Append

Next Document option. Revising a send job or manipulating the send queue can cause unwanted appending of jobs or system errors.

How to Select the Next Send Job

When you choose Select Next Send Job, ID c in the Communication Request Tasks menu, the system displays the Select Next Send Job menu. This menu allows you to start or restart the sending process from any job in the send queue.

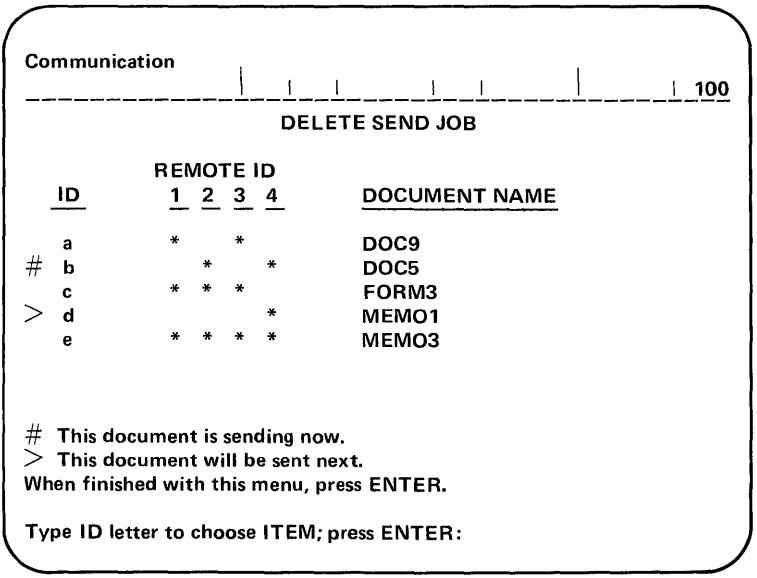


To select the next send job, enter the job ID. This causes the IBM Personal Computer to redisplay the menu with > beside the specified job.

If the current send job completes while this menu is displaying, the system enters the Hold state. It remains in the Hold state until you finish with the menu and return to the Communication Request Tasks menu. Processing of the send queue continues.

How to Delete a Send Job

When you select ID **d**, Delete Send Job, in the Communication Request Tasks menu, the system displays the Delete Send Job menu. With this menu, you can delete any document from the send queue, except the job currently being sent.



If the current send job completes while this menu is displaying, the system enters the Hold state. It remains in the Hold state until you finish with the menu and then returns to the Communication Request Tasks menu. Processing of the send queue then continues.

How to Change Session Options

When you select **e**, Change Session Options, in the Communication Request Tasks menu, the system displays the Change Session Options menu. You can change the Attended, Summary to Disk, and Receive Disk options without terminating the current session. The Half Speed and Switched Backup options only can be changed when communication is inactive.

Communication

1 ... 100

CHANGE SESSION OPTIONS

ID	ITEM	CHOICE	POSSIBLE CHOICES
a	Attended	1	1 = Yes 2 = No
b	Summary to Disk	2	1 = Yes 2 = No
c	Receive Disk Drive	A	One-character Drive Specifier
d	Convert Received Jobs to Text Documents	1	1 = Yes 2 = No
e	Half Speed	2	1 = Yes 2 = No
f	Switched Backup	2	1 = Yes 2 = No

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:

Menu Items:

- **Attended** indicates whether the IBM Personal Computer is operating in Attended or Unattended mode. When Attended is selected, the system will not drop the line after a timeout or error. The default is **1**, Yes.

  When **Unattended** is selected, the system handles the timeout or error as follows:

  - Switched Line: Drops line.
  - Dedicated Line: Does not drop line.

- **Summary to Disk** indicates whether the Session Summary is stored on a disk. If it is selected, you will receive a prompt for the document name. The default is **2**, No.

  Note: When you store the Session Summary, you should give it a different name from any document you will be sending or receiving.

- **Receive Disk Drive** specifies which disk drive is used to store received data. The default is **A**.

- **Convert Received Jobs to Text Documents** allows you to specify whether received files will be converted to the internal BSC Licensed Program format while they are being received. You may wish to convert received jobs if you are planning to print them using the BSC Licensed Program Print Tasks or if you have the DisplayWrite 2 Licensed Program and wish to edit them. The default is **1**, Yes.

  Note: This item must be set to 2, No, for DOS File transfer.

- **Half Speed** indicates whether the attached modem's half speed capability is used for the session. The option displays if the modem and line description specifies **Yes** for Half Speed Capability and Data Terminal Ready (DTR) is down. The default is **2**, No.

- **Switched Backup** indicates whether switched line will be used for further communication activity. The option displays if the active modem and line description specifies Dedicated With Switched Backup for Network Facility and DTR is down. The default is **2**, No.

Chapter 6. What Happened?

Notes:

From time to time, you may experience a problem when using the DisplayComm BSC Licensed Program. In many instances, the IBM Personal Computer presents a prompt or message. You should refer to the Messages section of this chapter for the cause and action.

In some instances, a problem can occur for which no prompt or message is given. This chapter is designed as an aid to try to resolve this type of problem.

This chapter consists of five parts:

- **Preliminary Check** helps you determine that the IBM Personal Computer is correctly set up for communication.
- **Terminal-to-Terminal** problem determination helps you isolate problems in communicating with non-computer equipment.
- **Terminal-to-Host-Computer** problem determination helps you isolate problems in communicating with an appropriately programmed host computer.
- **Suspected Machine Problem** helps you determine whom to contact if you have problems with your modem, Personal Computer, or the host computer.
- **Messages** can help tell you what has gone wrong.

Preliminary Checks

Preliminary checks should be done to determine that the IBM Personal Computer is correctly set up for communication. Check whether:

- Your BSC Licensed Program disk is loaded and personalized properly.
- The correct setup is selected for this session.

- The IBM Personal Computer cables are plugged in and secure.
- **READY** is displayed in the Link Status field.
- No unresolved messages are displayed (see messages and prompts).
- The modem is ready for communication.
- The remote location is available, set up, and ready to communicate.
- The host computer is available, setup, and ready to communicate.

Terminal-To-Terminal Problem Determination

Symptom: You cannot establish the communication line.

Explanation 1: No answer from the remote location is received.

Action: Check that:

- You are calling the correct telephone number.
- The modem is plugged in, and both locations have compatible modems.
- Someone is at the remote location.
- While the remote location may be set up for unattended communication, the telephone at the remote location does not have auto answer activated.
- The cables at the remote location may not be connected securely.

Explanation 2: The line is busy.

Action: Check that:

- You are calling the correct telephone number.
- You have received a regular busy signal. Wait and try again.
- Remote location may not be disconnected from a previous communication session.

Symptom: The communication line is established, but drops immediately (before sending or receiving).

Action: Check whether:

- A power failure occurred or modem became unplugged at either location.

- Both locations are using compatible program disks (if both locations are IBM Personal Computers).
- Both locations have compatible modems.
- Both locations have compatible communication setups.

Symptom: The communication line is established and drops during the session (after sending or receiving has begun).

Action: Check whether:

- A power failure occurred or modem became unplugged at either location.
- A prompt or message is on the display.
- The communication setup may specify automatic disconnection after 20 seconds of line inactivity (no sending or receiving in unattended mode using a switched line).
- The telephone line may be down. Also, excessive line noise may cause the line to be disconnected. Try to reestablish the telephone line.
- Either location pressed Comm Disc.

Symptom: Communication was successful, but the document prints incorrectly.

Explanation: The format is incorrect.

Action: Check whether:

- The Receive Format Defaults match the format of the original document.
- The Send Format used is compatible with the receiving machine.
- An incorrect keyboard is specified.

- The document contains data that was received as Stop codes. The Stop codes must be replaced by the appropriate codes (for example, format changes) prior to printing the document.

Symptom: You receive incorrect or unexpected characters.

Explanation: Incompatible keyboards can cause incorrect or unexpected characters to be received and to print.

Action: The sender should send the document again.

Terminal-to-Host-Computer Problem Determination

Symptom: You cannot establish the communication line.

Explanation: No answer is received from the host computer.

Action: Check whether:

- You are calling the correct telephone number.
- The host computer is available for communication.
- While the host computer modem may support Auto Answer, Auto Answer is not activated.
- The cables at the host computer modem are connected securely.
- The power at the host computer modem wall outlet is On by calling the host computer location.

Symptom: The IBM Personal Computer does not answer the host computer.

Action: Check that:

- The correct BSC Licensed Program disk is loaded and the disk is personalized for your system.
- The IBM Personal Computer cables are connected securely.
- The modem and line description are defined correctly.
- The correct communication setup is selected.
- **READY** is displayed in the Communication Status field.

- While the IBM Personal Computer may be set up for unattended communication, the telephone does not have Auto Answer activated.

- The modem is powered On.

- The modem is plugged into the correct port on the IBM Personal Computer.

Symptom: The communication line is established, but drops immediately (before sending or receiving).

Action: Check whether:

- The correct BSC Licensed Program disk is loaded and the disk is personalized for your system.

- A power failure occurred or the modem became unplugged at either location.

- The modems are compatible at both locations.

- The IBM Personal Computer communication setup is compatible with host computer requirements.

- Equipment was changed at the IBM Personal Computer or host computer.

- The correct terminal ID is specified in the communication setup (if used).

- The correct logon and/or password is in the send queue.

Symptom: The communication line is established and drops during the session (after sending or receiving has begun).

Action: Check whether:

- A prompt or message is displayed on the display screen.

- A power failure occurred or a modem became unplugged at either location.

- The IBM Personal Computer communication setup may specify automatic disconnection after 20 seconds of line inactivity (no sending or receiving).

- The telephone line may be down. Also, excessive line "noise" may cause the line to disconnect. Try to reestablish the telephone line.

- The host computer has failed.

- The host computer program has undergone changes.

- The host computer sign-on procedure or password has changed.

Symptom: Communication was successful, but the document prints incorrectly.

Explanation: The format is incorrect.

Action: Check whether:

- The Receive Format Defaults are correct.

- The host computer is sending information that the IBM Personal Computer does not recognize.

- If the IBM Personal Computer is receiving in Card Image, the Insert New Line Codes option specifies **Yes**.

Symptom: Lost data.

Action: Try sending the data again. If still unsuccessful, check with your host computer personnel.

Symptom: Incorrect or unexpected characters

Explanation: Incorrect Keyboard ID specified in the communication setup can cause incorrect or unexpected characters to be received and to print.

Action: Check with your host computer personnel for the correct Keyboard ID (character set) to use.

Error Messages

- *System Messages*

  Have any messages been received either in your output data, at the host operator's console, or on the host's console log? If they have, refer to the appropriate programming guide for the meaning of the message, its cause, and the recommended response.

  Once the cause of the message has been identified, correct it (if possible) and continue with the session.

- *IBM Personal Computer Messages*

  Have any messages or prompts been issued by the IBM Personal Computer? If so, take the action recommended. For example, if the IBM Personal Computer aborted a receive job because the receive data disk became full, have you inserted a new disk?

  Once the cause of the message has been identified and you have corrected it (if possible), continue with the session.

System Configuration

- *Does the problem involve a new or a modified resource?*

  1. Have recent hardware changes been made? For example, has a new modem been installed at either location, or have configuration changes been made to the communication controller?

  2. Has the existing host software system been modified? For example, has a new release of a program product or program maintenance been applied?

  If the answer to these or related questions is yes, does backing out the change fix the problem? If it does, (a)

verify that the changes were made correctly, and (b) review how these changes affect the use of other system resources. If it does not, continue with the next step.

- *Do other non-IBM Personal Computer terminals in the system have the same problem?*

  If they do, notify the appropriate host personnel that the cause of the problem probably is a host hardware or software resource. If they do not, continue with the next step.

- *Do other IBM Personal Computers in the system have the same problem?*

  If they do, continue with problem isolation. If they do not, check the system hardware and software with the problem against that of an IBM Personal Computer that operates correctly. Are there differences in:

  – Modem type or modem setup?

  – Communication setup or sign on procedure?

  Make the necessary changes, and retry the session.

Suspected Machine Problem

If you suspect a problem with the modem, refer to documentation supplied by the modem manufacturer.

If you suspect a problem at the host computer equipment, check with your host computer personnel.

If you suspect an IBM Personal Computer machine problem, contact your coordinator.

Messages

This section provides:

- **Common Services Messages**. A listing of Common Services Messages (Print Tasks, Document Utilities, Disk Handling, and Document Conversion) that can display while the BSC Licensed Program is active.

- **Communication Messages**. An alphabetical listing of communication messages that can display while the BSC Licensed Program is active. It includes the situations that cause the message to display and the actions you take.

- **Revisable-form Text Conversion Messages**. A listing of error messages that can display when converting Revisable-form Text documents being received.

- **Summary Codes**. A numerical listing of the error and document cancelled codes that can display in the Session Summary entry. It includes the situations that cause the code to display and the actions you take.

Note: Messages listed here with @C, @N, or (...) actually display variables such as a dataset name or drive specifier in the field.

Common Services Messages

(...) added to print queue.

Cause: You have successfully added a document to the Print queue.

Action: No action is required.

(...) already exists.

Cause: You are trying to create output to a document that already exists.

Action: Verify that you are using the proper name or use another name and retry the operation.

(...) already in use.

Cause: You tried to open a document that is already open.

Action: Verify the document name. It is possible that the document needs recovery or that someone else has it opened.

(...) cancelled. Already converted.

Cause: You tried to convert a document that did not need conversion, and Print = To Disk.

Action: No action is required unless you want the document to be printed. In that case, change Print to Foreground or Background.

(...) cancelled at request.

Cause: You cancelled the job from the Print queue.

Action: No action is required.

(...) cancelled. Task not available.

Cause: You requested printing by DOS Background Print (Print=Background in the Print Document menu), and the PRINT.COM file could not be loaded and executed.

Action: Return to DOS, load DOS Background Print by executing the PRINT command, and retry the print job.

(...) cannot be recovered.

Cause: The document you named has unrecoverable errors.

Action: Recreate the document.

(...) contained formatting errors.

Cause: You had errors in the job, but you specified Cancel on Error=No in the Print Document menu.

Action: No action required.

(...) converted.

Cause: Your document conversion is complete.

Action: No action is required.

(...) copied.

Cause: Your document copy task is completed.

Action: No action is required.

(...) deleted.

Cause: Your delete document task is completed.

Action: No action is required.

(...) full.

Cause: You are trying to write to a full document.

Action: Retry the operation using another document.

(...) has no pages. Job cancelled.

Cause: You tried to convert a document that has no pages.

Action: Check that you have specified the correct document.

(...) is invalid program dataset.

Cause: You are trying to load an invalid program dataset.

Action: Load a valid program dataset.

(...) is invalid Dictionary program.

Cause: You are trying to load an invalid Dictionary program.

Action: Load a valid Dictionary program.

(...) is unsupported type.

Cause: You are trying to open a program or a document the BSC Licensed Program doesn't support, or you are trying to convert a file that is incorrect for the conversion option you chose.

Action: Verify the document name and retry the operation.

(...) is write protected.

Cause: You are trying to write to a protected document.

Action: Verify the correct document name and retry operation.

(...) may print wrong in background.

Cause: The DOS Background Print has detected a X '09' or X '1A' in a converted document.

Action: Exit from BSC and cancel the Backgroun Print job.

(...) needs recovery.

Cause: Some previous error occurred on the document.

Action: Use the Recover Documents item of the Document Utilities Task to recover the document.

(...) not found.

Cause: You tried to use a document that is not present on the disk in use.

Action: Insert the proper disk or enter the proper document name.

(...) recovered. Check for lost data.

Cause: A document has been recovered.

Action: Check the document for errors.

At least @N warning errors found during conversion.

Cause: You have had nonterminal conversion errors in the conversion process.

Action: Examine the converted document for errors and retry the operation.

Background print must be preloaded. Press Enter to return to DOS.

Cause: You did not load DOS Background Print before you loaded the BSC Licensed Program, and DOS Background Print was loaded into an area of memory needed by the BSC Licensed Program.

Action: Return to DOS, load DOS Background Print, reload the BSC Licensed Program, and requeue any jobs remaining to be printed.

Compress documents complete.

Cause: The compress documents task is complete.

Action: No action is required.

Cannot open document. Maximum number of documents open.

Cause: DOS has a limit to the number of documents that may be opened at one time. The BSC Licensed Program is attempting to open more documents than DOS allows in the DOS CONFIG.SYS statement.

Action: Refer to the DOS Reference Manual for information about the DOS CONFIG.SYS statement which allows you to change the number of documents that may be opened at one time.

Cannot rename document to a different drive.

Cause: You used a different drive specifier in the new document name.

Action: Use the proper drive.

Default extension caused converted document name to exceed 44 characters.

Cause: The Converted Document name you chose was greater than 40 characters and had no extension when you chose to have the document converted, but when the system tried to add the default .PRN extension, it exceeded the 44-character limit. Or the input document name exceeded 40 characters, and the system tried to create a converted document name with the default extension.

Action: Specify a converted document name with 40 characters or fewer.

Directory error for (...).

Cause: The Directory is full, or the specified Directory cannot be found.

Action: Create your document using a different Directory.

Disk Error Accessing program (...).

Cause: You are trying to access a Program and either no disk is inserted or the drive has an error.

Action: Verify that a disk is inserted and retry the operation.

Disk error on Drive @C.

Cause: You are trying to access a user document and either no disk is inserted or the drive has an error.

Action: Verify that a disk is inserted and retry the operation, or try your backup disk.

Diskette in Drive @C is unsupported type.

Cause: You have inserted an unformatted disk.

Action: Format the disk using the DOS FORMAT command.

Diskette on Drive @C is write protected.

Cause: You tried to write to a protected disk.

Action: Insert the proper disk and retry the operation.

Disk full on Drive @C.

Cause: You are trying to write to a full disk.

Action: Retry the operation using another disk.

Disk full on Drive @C. Restart task using another disk.

Cause: The output disk you specified is full.

Action: Use another disk and retry the operation.

Invalid choice at this time. Summary Store document currently open.

Cause: You are trying to open a new Summary Store document, and a Summary Store document is already open and being used.

Action: No action is required. Use the existing Summary Store document.

Invalid choice. Document name cannot exceed 44 characters.

Cause: You have selected a document name from the Directory which, when concatenated with the Directory name you specified, is longer than 44 characters, or you have typed a document name which, when concatenated with a default extension, is longer than 44 characters.

Action: Use the ChDir key to select the Directory you wanted and then select or type your document name.

Invalid choices. Type or change choices marked with **.

Cause: You tried to print more than one copy with Print After Convert=None, or you specified Paper Handling with a Matrix Printer or invalid From and Through Page numbers.

Action: Correct the Print Document menu choices and retry the operation.

Invalid codes found. (...) cancelled.

Cause: One of the formatting controls in your document is incorrect, or there are more Tabs on a line than Tab Stops.

Action: Examine the document for the invalid format controls or too many tabs and correct or delete them.

Invalid key.

Cause: You have pressed a key which is invalid at this time.

Action: No action is required.

Invalid lines/cm. (...) cancelled.

Cause: You specified a Lines Per Inch/Cm in the Line Format menu that is not available on your printer, and Cancel on Error = Yes.

Action: Correct the Line Per Inch/Cm option in the Line Format menu, or print your job with Cancel on Error = No.

Invalid paper type. (...) cancelled.

Cause: You specified a paper or envelope size in the Page Format menu or a Paper Handling option in the Printer Description menu that is incorrect for your printer, and Cancel on Error = Yes.

Action: Redefine your paper or envelope size in the Page Format menu or the Paper Handling option in the Printer Description menu, or change Cancel on Error to No.

Long line on (...). Job cancelled.

Cause: A line in your document is too long and tried to print past the right edge of the paper, and Cancel on Error = Yes.

Action: Check your document for long lines and try to shorten them, or change Cancel on Error to No.

Long page on (...). Job cancelled.

Cause: A page of your document is too long and tried to print past the end of the page, and Cancel on Error = Yes.

Action: Check your document for too many lines for one page and try to shorten them, or change Cancel on Error to No.

No Documents found for (...).

Cause: You have entered a directory name or a search document name in a directory that the system cannot find.

Action: Verify the document and/or Directory name and retry the operation.

Page not found. (...) cancelled.

Cause: You tried to convert from or through pages that are not found.

Action: Verify page numbers and retry the operation.

Printer error. (...) cancelled.

Cause: Your printer or file has an error, or you are trying to use the same printer that DOS is using, or no printer is attached.

Action: Correct the error and retry the operation, or wait until the printer is available.

Print Queue full.

Cause: The maximum of 10 print jobs are queued.

Action: Wait for a job to finish and retry the operation.

Processing complete for (...).

Cause: Your print job has successfully completed.

Action: No action is required.

Program (...) not found.

Cause: The disk you inserted does not contain the program name entered.

Action: Check to see that you are using the correct program disk.

Recover documents complete.

Cause: The recover document task is complete.

Action: No action is required.

Software error. Record screen and error status. Press any key to return to DOS.

Cause: A program error occurred because of an unanticipated abnormal condition such as:

- A damaged program
- Documents that were altered by a program.

Action: Check your documents to see if a program has altered them, or if they are not altered, use a backup copy of the program, and then load the program and try again.

Specified document(s) invalid for this task.

Cause: You are trying to rename or delete a directory, a write-protected document, or a program data set or file.

Action: Specify the proper document name and retry the operation.

Terminating error found. Conversion cancelled.

Cause: You have termination errors in the conversion process.

Action: Examine the original document for errors and retry the operation.

Too many characters in program directory path.

Cause: You have too many characters in your program directory path.

Action: Put your programs in a directory that has a shorter path.

Unknown DOS critical error detected.

Cause: A critical DOS error has occurred that the BSC Licensed Program cannot resolve or that prohibits the BSC Licensed Program from continuing.

Action: Correct the error (if possible).

or

If unable to correct the error, you may have to reload DOS and the BSC Licensed Program to retry your job.

Unsupported pitch. (...) cancelled.

Cause: You specified a Pitch in the Line Format menu that is not available on your printer, and Cancel on Error = Yes.

Action: Correct the Pitch option in the Line Format menu, or print the job with Cancel on Error = No.

Communication Messages

(...) added to Send Queue.

Cause: The document name that displays in the message has been added to the Send Queue.

Action: No action is required.

(...) converted.

Cause: You have a successful completion.

Action: No action is required.

A setup name must be specified.

Cause: You are defining a communication setup and have not specified a setup name in the Define Setup menu.

Action: Specify a setup name, and press Enter to continue.

Cannot choose job being sent.

Cause: You are in the Delete Send Jobs menu and have selected the document currently being sent.

Action: No action necessary if selected in error.

Or, if you are trying to cancel the job currently being sent:

1. Press Enter twice to return to the Session Summary.
2. Press Job Cancel to cancel the sending of the document.

Cannot revise options for job being sent.

Cause: While in the Display Send Queue menu, you have selected the document that is currently being sent.

Action: No action required if selected in error.

Or, if you are trying to change the send document options for the current document, you must press Job Cancel and queue the document again. Then, change the send document options before sending the document again. Or, use Select Next Send Job to resend the same job.

Communication error. Unable to disconnect.

Cause: The line description (switched or dedicated) in the Port Modem and Line Description menu is incorrect.

Action: Choose Return to Task Selection, and then select Change Communication Profile. Choose Create or Revise Modem and Line Description to check for the correct line description entry (switched or dedicated) in the Port Modem and Line Description menu.

Cause: The modem port in the communication setup is incorrect.

Action: Choose Return to Task Selection and then select Change Communication Profile to review the Communication Setup menu. Check for the correct modem port.

Cause: The modem is not plugged in, or the cable is not plugged into the correct port.

Action: Check to see that the modem cable is plugged in and the cable is plugged into the correct port.

Cause: The system has determined that there is a mechanical problem with the communication equipment, for example, still connected.

Action: Contact your coordinator.

Default keyboard XXX used for document.

Cause: No Keyboard ID was received with the document. The default Keyboard ID XXX listed in the message was used to receive the document.

Action: Check the document for incorrect or unexpected characters. If the document is correct, no further action is necessary. If the document is incorrect, use Change Communication Profile in BSC Task Selection to specify the Keyboard ID of the remote location. Then, ask the remote location to send the document again.

Cause: The receiving BSC Licensed Program does not support the Keyboard ID received with the document. The default Keyboard ID listed in the message was used to receive the document.

Action: Check with the sender to see if the Keyboard ID was specified correctly (typographical error) or if the Keyboard ID specified is one supported by the BSC Licensed Program.

Cause: The Keyboard ID specified in the document being sent by the IBM Personal Computer is not supported during communication. Or, you chose to override the document Keyboard ID in the Change Setup Session Options menu in the communication setup.

Action: If Keyboard ID is not supported during communication, create a new document using a supported

Keyboard ID. Send the new document. If you chose to override the Keyboard ID, no action is necessary.

Disk error. Receive stopped.

Cause: Check for:

- Dust or scratches on the receive disk.
- An uninitialized disk.
- No disk inserted.

Note: ***Reject*** may be flashing in the Communication Status field. Also, check the Session Summary entry for additional document cancelled information.

Action: Press Hold and if the receive disk contains dust, is scratched, or is uninitialized, insert another receive disk, and then press Comm Start to continue.

Disk error. Summary store stopped.

Cause: The disk specified for storing the Session Summary is not in the Disk Unit. Or, the disk specified for the Session Summary document contains an error or is not a formatted disk.

Action: Insert the correct receive disk, press Comm Reqst to Change the Session Options, and choose **Yes** for Summary to Disk again. Press Comm Start to continue.

Disk full on Drive @C. Restart Task using another disk.

Cause: Your Conversion Output disk is full.

Action: Insert another disk with more free space and retry the operation.

Disk full. Receive stopped.

Cause: The disk used to receive documents is full.

Action: Press Hold and insert another receive disk, and then press Comm Start to continue. Be sure the new disk is initialized and contains adequate space for storing the received document(s). The sender should resend the document if the entire document was not received when receiving stopped.

Disk full. Summary store stopped.

Cause: The disk used to store the Session Summary is full.

Action: Press Hold and insert another receive disk. Press Comm Reqst and choose Change Session Options. Choose **Yes** for Summary to Disk again in the Change Session Options menu. When finished, press Comm Start to continue.

Document contains footnotes. Summary store stopped.

Cause: This message occurs only when the document you have elected to store your Session Summary information in also contains footnote information.

Action: The document in which you store Session Summary information should not contain footnote information. After you have chosen **Yes** for Summary to Disk in the Change Session Options menu, make sure when you are responding to the prompt **Type document name; press Enter** that you do one of the following:

1. Type a document name for a document which you know does not contain footnotes.

2. Type a new document name. This creates a new document which will contain all your summary store information.

HOLD will be honored upon completion of current job.

Cause: You pressed Hold while a document was being communicated.

Action: When ready, press Comm Start to continue.

Invalid session ID.

Cause: The local or remote ID you are trying to enter in the Create or Revise Session ID'S menu is invalid.

Action: Re-enter the ID. It can be up to 20 letters and/or numbers.

Link Status was BUSY.

Cause: This message may display in the Session Summary after an unsuccessful document transmission to indicate that the communication status was busy at the time the document was cancelled. The IBM Personal Computer was in a processing mode (no sending or receiving activity).

Action: Send the cancelled document again.

Link Status was INACTIVE.

Cause: This message may display in the Session Summary after an unsuccessful document transmission to indicate that the communication status was inactive at the time the document was cancelled. In a receive mode, this message generally indicates that the problem is with the other end of the communication line. The communication line is still established, but no data is being received.

In terminal-to-terminal (non-computer) communication, this message may indicate that the other end of the line has gone to TALK on the data set.

In terminal-to-host-computer communication, this message may indicate that the host computer is failing.

Action: Terminal-to-Terminal: Determine if the other station has gone to TALK on the data set, or have the remote station transmit the job again.

Terminal-to-Host-Computer: Check with your computer personnel to determine if there is a mechanical problem at the host computer. Reestablish the communication session, if necessary.

Link Status was REJECT.

Cause: This message may display in the Session Summary after an unsuccessful document transmission to indicate that the communication status was REJECT at the time the document was cancelled.

In terminal-to-host-computer communication, this message may indicate that there is a problem at the host computer.

Action: Resolve any previous receive problem and press Comm Start to try to continue with the session. Reestablish the line as necessary.

Terminal-to-Host-Computer: Check with your computer personnel to determine if there is a problem at the host computer.

Link Status was WAITING.

Cause: This message may display in the Session Summary after an unsuccessful document transmission to indicate that the communication status was WAITING at the time the document was cancelled. The remote station was in a processing mode (no sending or receiving activity).

Action: Contact the remote location to determine the problem.

Local ID must be specified.

Cause: You have specified a remote ID(s), but not a local ID.

Action: You must specify a local ID if remote IDs are being used.

No jobs in send queue.

Cause: You are in the Communication Request Tasks menu and have tried to select one of the following items, but there are no jobs in the send queue.

- Display Send Queue
- Select Next Send Job
- Delete Send Jobs

Action: Either no action is required, or you must build a send queue before you can select one of the above items in the Communication Request Tasks menu.

Press Comm Disc before pressing End Task.

Cause: You pressed End Task to end the communication session before pressing Comm Disc.

Action: Press Comm Disc, and then press End Task.

Send queue is full.

Cause: You have selected the Send Document item in the Communication Request Tasks menu and the send queue contains the maximum number of documents (20).

Action: Wait until a document in the queue is sent, and then delete it from the queue. Then, add the new job to the queue.

Or, display the send queue and delete a job you do not want to send. Then add the new job to the queue.

Session ID's will not be exchanged when 6670 Print Options are selected.

Cause: Remote IDs cannot be sent to an IBM 6670. You are creating a communication setup and have chosen Yes for both IBM 6670 Print Options and Create or Revise Session IDs.

Action: This message is informing you that during a communication session using this communication setup, the Valid Remote IDs item will not display in the Send Document menu if you have also selected Yes for IBM 6670 Print Options.

If you do want to be able to specify remote IDs during a communication session to other product types, you should not choose Yes for IBM 6670 Print Options. In general, you should have a separate communication setup created for sessions with the IBM 6670. In the IBM 6670 setup, IBM 6670 Print Options should be Yes and valid remote IDs should not be specified.

Underlines substituted for characters in document.

Cause: This message displays in the Session Summary when sending a document that contains characters that are not supported by the Keyboard ID being used by the sending location.

Action: Tell the remote location operator to review the document for underlines (which represent substitute characters), and to revise the document.

Use Change Communication Profile Tasks to create a setup.

Cause: The BSC Licensed Program disk that you loaded contains no communication setups.

Action: Use Communication Profile Tasks to create a setup.

Or, load another BSC Licensed Program disk that contains the desired communication setup.

Cause: You have selected an unused setup in the Binary Synchronous Communications Setup Selection menu.

Action: Choose a named setup to continue.

Or, if you are trying to define a new setup, you must use Communication Profile Tasks.

Note: In the following section, the term L3 refers to the Revisable-form Text data. The term L3P refers to the BSC Licensed Program internal form of the data.

Revisable-form Text Conversion Error Messages

Errors may occur during Revisable-form Text data conversion of a document. A data conversion error may be either a non-terminating error where the data conversion process will continue or a terminating error where the data conversion process will be terminated. A terminating error will cause the Send/Receive document to be cancelled. If an error occurs, a data conversion error message will display in the Session Summary. It will be written into the Summary document provided that the Summary Store is turned On. Data conversion error messages will be preceded by an error location message identifying the structural unit in which the errors are found.

Non-terminating Error Messages

There are four types of non-terminating data conversion errors which may be caused by either data stream errors or limitations in transforming the data stream from one format to another. The non-terminating error messages are used to identify those errors that occurred in the structural unit specified in the preceding error location message. A non-terminating error message is of the following form:

Warning XX Data Conversion Error CCTTFF

The CCTTFF field is provided to permit further isolation of the error. It is defined as:

- CC. Hexidecimal number representing the class field.
- TT. Hexidecimal number representing the type field.
- FF. Hexidecimal number representing the format field. If the error occurred in a multi-byte control, this value will be blank.

Where xx is a decimal number that identifies the error type and is one of the following values:

- Error type 01. Invalid format parameter

- Error type 02. Invalid construct
- Error type 03. Invalid margin
- Error type 04. Conflicting format parameters.

If there are more than ten errors found in any structural unit, the following message will be generated:

Additional data conversion errors found.

If there are more than 30 errors in a document, the following message will be generated:

Document contains more data conversion errors.

Terminating Error Messages

When a terminating error is found in data conversion, the Send/Receive document in process will be cancelled. A terminating error message is of the following form:

Data conversion terminating error CCTTFF

Unsuccessful completion is then displayed in the Session Summary as follows:

Document Cancelled 85 Document contents error.

The following section describes exception conditions that can result in termination of the Receive function.

Unless otherwise indicated, the suggested operator action for all of the Revisable-form Text errors is as follows:

Suggested Operator Action (L3 to L3P): This error condition should only occur if the originator of the document generated an invalid condition. Contact the document's originator and provide as much information as available to permit error correction. The previously received portion of the document will remain on the disk with an indication that the document needs recovery.

Suggested Operator Action (L3P to L3): This error condition should only occur if there is an error condition within the BSC Licensed Program. Follow your normal problem determination procedures.

Data Conversion Terminating Error CCTTFF

You have an invalid line format change. The term **CCTTFF** is replaced by one of the following message identifiers:

- D201. The Set Line Parameters multi-byte control is missing from the Line Format Change sequence.
- D405. The Set Line Parameters multi-byte control was incomplete or invalid.
- D406. One of the following occurred: The Set Tabs or the Set Line Parameters multi-byte control was missing.
- cctt. Any other class (cc) and type (tt) fields with blanks for the 'FF' means that an erroneous multi-byte control occurred in the middle of a Line Format Change or that the Line Format Change did not contain the required ending controls.
- ccttff. For the structured fields that follow, either a graphic character or single-byte control erroneously occurred in the middle of a Line Format Change or the Line Format Change did not contain the required ending controls.
  - E801nn. Top margin text for all pages.
  - E802nn. Top margin text for odd-numbered pages.
  - E803nn. Top margin text for even-numbered pages.
  - E804nn. Bottom margin text for all pages.
  - E805nn. Bottom margin text for odd-numbered pages.

- E806nn. Bottom margin text for even-numbered pages.

- E80700. Body text for the specified page.

Data Conversion Termination Error E10400

You have an invalid page number (L3 to L3P). Termination of the Receive function will occur if a new page is received and the preceding page was numbered (named) '9999.9.9'.

Data Conversion Terminating Error CCTTFF

You have invalid structured field lengths. L3 and L3P both support structured fields. A structured field is invalid if either its length field contains a value less than 5 or its length field contains a value that is larger than the total reserved buffer capacity.

For the preceding message, the term **CCTTFF** will be as follows:

- For errors caused by a length value less than 5:

  - 000000. The error occurred on the first structured field in the data stream.

  - ccttff. The error occurred while processing the structured field that occurred immediately after the structured field that is indicated by the terms: class (cc), type (tt), and format (ff). The predictability of these terms depends on whether the previous structured field was valid.

- For errors caused by a length value that is too large for the buffer:

  - ccttff. The error was caused by the structured field indicated by the class (cc), type (tt), and format (ff) terms.

Data Conversion Terminating Error CCTTFF

You have invalid structured field sequences. L3 and L3P both support a specific sequence of structured fields within a structure that must be present and in the required order.

Termination of the Receive function (L3 to L3P) will occur if any of the page image parameter, line parameter, or tab parameter structured fields are either missing or out of order.

Termination of the Send function (L3P to L3) will occur if any of the page media, page parameter, line parameter, or horizontal tab structured fields are either missing or out of order.

The term CCTTFF is unpredictable.

Disk I/O Error CCTTFF

You have reached an unexpected end of data (L3P to L3 sending).

The term CCTTFF is unpredictable.

Data Conversion Terminating Error E80700

You have a delayed termination condition. A delayed termination condition occurs when the normal end of document is processed after one of the following errors occurred previously in the document:

- One or more invalid structured field sequences occurred earlier in the document.
- One or more structural units was truncated.

Data Loss

The following sections identify instances where loss of information can occur. If any of the instances occur and the maximum number of pending messages has not been exceeded, the following warning messages will be generated.

Warning 02 Data Conversion Error CCTTFF

Unknown structured fields are to be deleted. If an unknown (not architected) structured field is received in the data stream, it will be deleted. Processing of the document will continue. The operator may elect to use the document that was received rather than have the original document corrected and retransmitted.

Deletion of Unsupported Structured Fields

Warning 02 Data Conversion Error EA0100

Include Deleted (L3 to L3P). If an Include structured field is found in the document, it will be treated as an unknown structured field and deleted.

Suggested Operator Action (L3 to L3P): The L3 architecture uses the Include structured field to replace the function of the Primary and Alternate Format document defaults. If this error occurs, you should contact the originator of the document. The originator can replace the Include with the referenced format defaults and re-transmit the document.

Warning 01 Data Conversion Error CCTTFF

You have invalid self-identifying parameters (L3 to L3P). L3 supports two structured fields that contain self-identifying parameters: Auto Outline Format and Footnote Format. If one of the following problems is found during validation, the entire structured field will be deleted from the data stream.

- The structured field length value is not equal to the sum of the lengths of the self-identifying parameters.

- A required self-identifying parameter is not present.

- The length value of any self-identifying parameter is either 0 or 1.

The identifier CCTTFF is:

- E90400. Auto-Outline Format structured field

- E90300. Footnote Format structured field

Warning 02 Data Conversion Error CCTTFF

Truncated structural units (L3 to L3P). The L3 architecture permits the size of individual structured fields to be extended by appending additional information to the end of the defined parameters. The receiving system is required to preserve this information. It also permits any number of Punctuation Format structured fields to occur in the Document Parameters.

It is possible that the cumulative size of the converted structured fields in a structural unit may become larger than can be supported by the BSC Licensed Program. This can occur for any of the defined structural units.

The term **CCTTFF** will be replaced with the class (CC), type (TT), and format (FF) of the structured field that was deleted. The following list identifies which structured fields could be deleted.

- Document Parameters structural unit (only)

  - E20500. Document Parameters

  - E9cc00. Punctuation Format

- Document Format and Alternate Format

  - E90300. Footnote Format

- E90400. Auto-Outline Format

- Document Parameters, Document Format, and Alternate Format
  - E10300. Format Unit Prefix
- Document Format, Alternate Format, and specified Page
  - E40200. Print Medium
  - E40300. Operator Message
  - E50100. Margin Text Parameters, Top
  - E50400. Margin Text Parameters, Bottom
  - E50800. Page Image Numbering
  - E60300. Line Numbering
  - E80100. Margin Text Top All
  - E80200. Margin Text Top Odd
  - E80300. Margin Text Top Even
  - E80400. Margin Text Bottom All
  - E80500. Margin Text Bottom Odd
  - E80600. Margin Text Bottom Even
- Specified Page
  - E30100. Activate Primary Master Format
  - E30200. Activate Alternate Master Format
  - E30300. Return to Master Format

- Specified Page
  - E80700. Body Text

An exception is the case of a deleted Punctuation Format structured field from the Document Parameters. The BSC Licensed Program does not support the Punctuation Format field.

Deletion of Unsupported Multi-byte Controls

Warning 02 Data Conversion Error CCTTFF

Incomplete multi-byte controls are to be deleted. If a multi-byte control is the last text data and if all of the control is not contained in the structured field, it will be deleted if the next valid structured field is not the same type.

The term **CCTTFF** will be the class (CC), type (TT), and format (FF) fields from the first valid field that was located subsequent to the incomplete control. Any of the following structured fields may be listed in the CCTTFF field:

- E10400. Text Unit Prefix
- E10600. End Unit Prefix
- E50400. Margin Text Parameters, Bottom
- E803nn. Top Margin Text for even numbered pages
- E806nn. Bottom Margin Text for even numbered pages

The erroneous control is deleted from the document.

Warning 01 Data Conversion Error CCTT

You have invalid self-identifying parameters (L3 to L3P). L3 supports a number of multi-byte controls that contain self-identifying parameters. If the multi-byte control length value (adjusted for the size of the multi-byte control header) is not equal to the sum of the lengths of the self-identifying

parameters, a required self-identifying parameter is not present, or the length value of any self-identifying parameter is either 0 or 1, the entire multi-byte control will be deleted from the data stream.

The identifier CCTT is one of the following multi-byte controls:

- D960. Report Layout
- D962. Computation
- D964. Group Computation
- D969. Column Heading Text
- D96A. Auto-Outline
- D972. Begin Conditional Text
- D981. Include Text Unit
- D982. Insert
- D985. Footnote Reference

Note: Since the invalid multi-byte control has been deleted, there is no way to determine where it occurred on the page identified by the error location message.

Warning 01 Data Conversion Error D405

A Set Line Parameter multi-byte control was received that was not immediately preceded by a Begin Line Format Change multi-byte control.

Warning 01 Data Conversion Error D201

A Set Tabs multi-byte control was received that was not immediately preceded by a Begin Line Format Change control followed by a Set Line Parameter control.

Warning 01 Data Conversion Error D406

An End Line Format Change Multi-byte control was received that was not immediately preceded by the following sequence of contiguous multi-byte controls:

- Begin Line Format Change
- Set Line Parameters
- Set Tabs

You have a line format change sequencing error. L3 and L3P both support a sequence of contiguous multi-byte controls referred to as a Line Format Change. If any of the above invalid L3 control sequences are found during the L3-to-L3P transform, the invalid sequence is deleted.

Deletion of Invalid Structured Field Sequences

Warning 02 Data Conversion Error CCTTFF

Both L3 and L3P support specific sequences of structured fields. For example, for the data stream to be valid, the structured field **A** must be immediately followed by any one of a predetermined set of structured fields. An exception condition exists whenever this constraint is not satisfied.

If this condition occurs and the structured field is not a required, ordered second-level structured field, the structured field that occurred out of sequence will be deleted.

The converter will continue to examine, delete, and present a warning message as described for any structured fields that are out of order. This process will continue until one of the following events occurs:

- One of the expected structured fields is encountered. This will resynchronize the data stream conversion and normal processing will continue.

- End of data is reached without encountering any of the expected structured fields. The Send or Receive function will be terminated.

- A new page or End of Document structural unit is encountered in the data stream. This will resynchronize the data stream conversion. When the end of the document is processed, a termination condition message will be displayed.

Warning 03 Data Conversion Error CCTTFF

Margin Text is to be truncated (L3-to-L3P Transform). An L3 document can include margin text containing significantly more data than L3P supports. If this occurs, the input L3 Margin Text will be truncated to fit within the L3P limitation (256 bytes of text data).

The term 'CCTT' defines the type of margin text that is being processed and will be one of the following:

- E801. Top margin text for all pages.

- E802. Top margin text for odd-numbered pages.

- E803. Top margin text for even-numbered pages.

- E804. Bottom margin text for all pages.

- E805. Bottom margin text for odd-numbered pages.

- E806. Bottom margin text for even-numbered pages.

The term 'FF' defines the sequencing of the margin text structured fields for this type of margin text.

Suggested Operator Action (L3 to L3P): This is an exception condition that may occur, for example, if the sending system is an IBM 5520. If the margin text that was deleted is significant, you should contact the document's originator. If it is not, you should modify the contents of the margin text.

Deletion of Structured Field Parameters (L3 to L3P)

Warning 01 Data Conversion Error E60200

- Alignment Character. Assuming both parameters are complete, this will only be deleted if the associated Position parameter is deleted.

- Position. Assuming both parameters are complete, this will only be deleted if the resulting value is either zero or greater than 255 or if it is less than the preceding position value.

Suggested Operator Action (L3 to L3P): If the error occurred in either the Document or Alternate Format, you can use the various format menus to examine the tab format. If the error occurred on a specific page of the document, you can use the various format menus to examine the different tab formats.

Deletion of Multi-Byte Control Parameters (L3 to L3P)

Warning 01 Data Conversion Error D201

Set Tabs Multi-byte Control. If both the alignment character and position parameters are complete, this will only be deleted if the resulting value is either greater than 255 or if it is less than the preceding position value.

Suggested Operator Action: You can use the various format menus to examine the different tab formats.

Data Modification

This section identifies changes that may be made to the converted data. The following types of changes can occur:

- A construct may be replaced with different data.

- The same parameter may have a different semantic interpretation.

- The same parameter may have a different range of permitted values.

- Text data may be modified.

Some of the differences are tolerated, but some of them can result in a different interpretation or meaning for the document. Parameters can be altered in both L3-to-L3P and L3P-to-L3 transforms. These limitations are not necessarily considered as problems during document interchange, and they may not result in reported exceptions.

Changed Multi-byte Controls

Warning 01 Data Conversion Error CCTTFF

Page End Insertion (L3 to L3P and L3P to L3). If a Body Text field does not end in Page End single-byte control and the next valid field is not the same type, a Page End control will be inserted.

The class (CC), type (TT), and format (FF) fields will be one of the following fields:

- E10400. Text Unit Prefix

- E10600. End Unit Prefix

If you want to retain and use the existing received document, you should review the text at the end of the specified page and at the top of the next page if one exists.

Changed Structured Field Parameters (L3 or L3P)

Warning 01 Data Conversion Error CCTTFF

Padded Structured Fields. If a structured field with fixed field parameters in the input data stream does not include all of the parameters that are required to create the appropriate structured field in the output data stream, the output structured field will be padded with zeros.

The class (CC), type (TT), and format (FF) fields will be one of the following structured fields:

- Receive (L3 to L3P)
  - E20500. Document Parameters
  - E50100. Margin Text Parameters, Top
  - E50400. Margin Text Parameters, Bottom
  - E50700. Page Image Parameters
  - E50800. Page Image Numbering
  - E60100. Line Parameters
- Send (L3P to L3)
  - E10103. Text Unit Prefix
  - E20500. Document Parameters
  - E50100. Margin Text Parameters, top
  - E50400. Margin Text Parameters, bottom
  - E50700. Page Parameters
  - E50800. Page Numbering
  - E60100. Line Parameters

Warning 01 Data Conversion Error E60100

Line Parameters Structured Field (L3 to L3P). If any of the following changes occurs, an attempt will be made to notify the operator:

- If the Left Margin is equal to zero, it is replaced with a value of 1.

- If the Right Margin is less than or equal to the Left Margin, they are replaced with values equivalent to 10 character positions (left margin) and 75 character positions (right margin) from the left paper edge.

- If the Font Width is either equal to 0 or is greater than 512, it will be replaced with a value of 120 (12 pitch).

- If the line density is either equal to 0, or is greater than 1440, it will be replaced with a value of 240 (6 lines per inch).

Suggested Operator Action (L3 to L3P): If the error occurred in either the Document or Alternate Format, you can use the various format menus to examine the line format. If the error occurred on a specific page of the document, you can use the various format menus to examine the different line formats.

Warning 04 Data Conversion Error E50700

Page Image Parameters Structured Field (L3 to L3P). If the Page Width value is less than a value of 1440 (for example, 1.0 inch), the Page Width parameter will be replaced with a value of 1440.

Page Depth. If the Page Depth value is less than or equal to either the First Body Text Line (first page) or the First Body Text Line (subsequent pages), the Page Depth parameter will be replaced with a value that is 1440 units larger than the largest of the two body text line parameters. If the values are too large to permit this, the maximum possible Page Depth value will be used.

Suggested Operator Action (L3 to L3P): If the error occurred in either the Document or Alternate Format, you can use the various format menus to examine the page format. If the error occurred on a specific page of the document, you can use the various format menus to examine the different page formats.

Warning 04 Data Conversion Error E10400

Text Unit Declaration Structured Field (L3 to L3P). If the Name parameter is invalid, it will be replaced with a value that is one greater than the immediately preceding page Name value. A Name parameter is considered invalid if it is either less than or equal to the immediately preceding page Name value or if it contains data that is not a valid numeric character.

If this error occurs, it is possible that it may be repeated for every subsequent page. The pages may be renamed by paginating the document. However, some documents contain page dependent functions and should not be paginated (for example, documents using either footnote controls or Include multi-byte controls).

Changed Multi-byte Control Parameters

Warning 01 Data Conversion Error CCTT

Padded Multi-byte Controls. If a multi-byte control with fixed field parameters in the input data stream does not include all of the parameters required to create the appropriate multi-byte control in the output data stream, the output multi-byte will be padded with zeros.

The class (CC) and type (TT) fields will be one of the following multi-byte controls:

- Receive (L3 to L3P)
  - D101. Set GCGID through GCID
  - D105. Set CFID through GFID
  - D115. Insert Escaped Graphic
  - D405. Set Line Parameters
  - D40A. Begin Underscore

- D472. Begin Overstrike
- D862. Begin Column Layout
- D881. Set Visual Attributes

- Send (L3P to L3)
  - D405. Set Line Parameters
  - D472. Begin Overstrike
  - D862. Begin Column Layout

Warning 01 Data Conversion Error D472

Begin Overstrike Multi-byte Control (L3 to L3P). If the character parameter of a received Begin Overstrike multi-byte control is not a valid graphic character (for example, greater than X'39' and less than X'FF'), it will be changed to a slash (X'61').

Warning 04 Data Conversion Error CCTT

Invalid Multi-byte Control Count. If the count field of any multi-byte control contains a count less than 2, it will be set to 2.

The identifying term 'CCTT' can be replaced by any class (CC) or type (TT) field.

Warning 01 Data Conversion Error D105

Set CFID Thru GFID Multi-btye Control (L3 to L3P). If the Font Width is either equal to 0 or is greater than 512, it will be replaced with a value of 120 (12 pitch).

Depending on how the document is to be used, you may choose to review the text on the indicated page and then ignore the condition if no problem has been created.

Warning 01 Data Conversion Error D405

Set Line Parameters Multi-byte Control (L3 to L3P). If any of the following changes occur, an attempt will be made to notify you.

- If the Left Margin is equal to zero, it is replaced with a value of 1.
- If the Right Margin is less than or equal to the Left Margin, they are replaced with values equivalent to 10 character positions (left margin) and 75 character positions (right margin) from the left paper edge.
- If the Font Width is either equal to 0 or is greater than 512, it will be replaced with a value of 120 (12 pitch).
- If the line density is either equal to 0 or is greater than 1440, it will be replaced with a value of 240 (6 lines per inch).

You should review the text for the indicated page to determine if there are any serious problems. If that page contains an Override Master Format control, you should also review any margin text that may be contained in that control.

Summary Codes

The error codes on the following pages display in the Session Summary for an unsuccessful job.

1 Bid failed due to remote.

Cause: The remote station sent a disconnect in response to the line bid. The session was cancelled, and the communication line was dropped. READY is displayed in the status field for a switched line. ON-LINE is displayed in the status field for a dedicated line.

Action: Check with the remote station for the reason for disconnect. The caller should call back.

2 Bid failed due to remote.

Cause: The remote station would not allow the local station to initiate sending. The local station will wait for the remote station to send a document before it will automatically try to reinitiate sending.

Action: Press Comm Start to restart sending. If the error occurs again, check with the remote station to find out why it will not receive documents.

3 Bid failed due to remote.

Cause: The remote station gave an improper response or no response after the local station tried to initiate sending a document. The local station will wait for the remote station to send a document before it will automatically try to reinitiate sending.

Action: Press Comm Start to restart sending. If the error occurs again, and CONNECTED displays in the status field:

Dedicated Line: The remote location is not ready to communicate. Retry at intervals.

Switched Line: Verify that the Port Modem and Line Descriptions and the communication setups are compatible (Code Sets in particular) at both locations.

11 Incorrect ID exchange.

Cause: The remote session ID was invalid. The session was cancelled, and the communication line was disconnected.

Action: Check that the session IDs are specified correctly in the active communication setup, and reestablish the communication line.

12 Incorrect ID exchange.

Cause: The local session ID was rejected by the remote station. The session was cancelled, and the communication line was disconnected.

Action: Check that the session IDs are specified correctly in the active communication setup, and reestablish the communication line.

13 Incorrect ID exchange.

Cause: The remote station did not respond within one minute after a session ID exchange was initiated. The session was cancelled, and the communication line was disconnected.

Action: Check that the correct communication setup was selected, and reestablish the communication line.

14 Incorrect ID exchange.

Cause: The remote station disconnected during a session ID exchange. The session was cancelled, and the communication line was disconnected.

Action: Check with the remote station to determine why the disconnect was sent, and reestablish the communication line.

15 Incorrect ID exchange.

Cause: The wrong communication setup was selected, or the remote station failed to give the correct response after the local station tried to initiate a session ID exchange. The session was cancelled, and the communication line was disconnected.

Action: Select the correct communication setup, or check to be sure the remote location is using a communication setup with IDs and that the IDs are correct. Reestablish the communication line.

21 Local operator cancel.

Cause: You pressed Comm Disc. The current document and the session were cancelled, and the communication line was disconnected. The Communication Status field is blank.

Action: Press End Task to exit the Session Summary, or press Comm Start to ready the IBM Personal Computer for the next communication session.

22 Local operator cancel.

Cause: You pressed Job Cancel. The active send or receive document is cancelled. The local station will bid for the line to send any documents remaining in the send queue.

Action: If necessary, send the cancelled document again.

23 Local operator cancel.

Cause: You pressed Hold during a bid for the line.

Action: Press Comm Start when ready to continue the session.

31 Communication link failure.

Cause: The communication line failed. An item in the Modem and Line Description is specified incorrectly.

Action: If the message occurred immediately, you may need to specify Yes for Continuous Carrier in the Port Modem and Line Description menu.

Cause: The communication line failed. The modem port number may be specified incorrectly in the communication setup, or the modem cable is not plugged into the modem port specified in the communication setup.

Action: Verify that the modem port number is specified correctly in the Communication Setup menu, and the modem cable is plugged into the modem port specified in the communication setup.

Cause: The local BSC Licensed Program, system, or modem may be malfunctioning.

Action: For a suspected modem problem, refer to the documentation supplied by the modem manufacturer. For a suspected BSC Licensed Program problem, contact your coordinator.

32 Communication link failure.

Cause: The communication line disconnected.

Action: Check for an unplugged modem, a power failure, or a communication line problem. The remote location may also have hung up the telephone.

41 Link disconnected due to no activity.

Cause: The communication line was disconnected because no documents were sent or received for 10 minutes during unattended communication. READY is displayed in the Communication Status field.

Action: If a document was cancelled, the document should be sent again.

42 Link disconnected due to no activity.

Cause: The communication line was disconnected because 20 seconds passed without any line activity during unattended communication. READY is displayed in the Communication Status field.

Action: If a document was cancelled, the document should be sent again.

51 Cancelled due to remote.

Cause: The document was cancelled because the remote station ended the document abnormally.

Action: Check with the remote station for an explanation of the abnormal end. The sender should retransmit the document.

52 Cancelled due to remote.

Cause: The document was cancelled because the remote station ended the session abnormally. The communication line is disconnected, and READY is displayed in the Communication Status field.

Action: Check with the remote station for an explanation of the abnormal session end. Reestablish the communication line and send the document again.

53 Cancelled due to remote.

Cause: The document was cancelled because a block of text was transmitted and the remote station indicated that the block was in error. The block of text was retransmitted 15 times before the document was cancelled. The local station will automatically bid for the line and send any additional documents in the send queue.

Action: Check the communication setup for the correct block size. Reestablish the communication line, and send the document again. If the problem occurs again, contact your coordinator.

54 Cancelled due to remote.

Cause: The document was cancelled because the remote station did not properly acknowledge receiving a block of text. The local station will automatically bid for the line and send any additional documents in the send queue.

Action: Check with the remote location to see what the problem is. Reestablish the line, and send the document again.

55 Cancelled due to remote.

Cause: The document was cancelled because the remote host computer interrupted the transmission and requested to send while the local station was sending. The local station will automatically bid for the line and send any additional documents in the send queue after the remote host computer sends a document.

Action: The document should be sent again. Press Comm Start to restart communication.

62 Data set needs recovery.

Cause: The document was cancelled because the IBM Personal Computer encountered a send document that needs recovery.

Action: Run Recover Document and retry the task.

63 Disk full.

Cause: The document was cancelled because the disk used to receive is full, or the page number exceeds 9,999.

Action: Remove the full disk and insert another receive disk in the disk drive. Press Comm Start. The sender should retransmit the cancelled document.

If using a Dual Disk Drive, you may leave the full disk in the unit, and insert a new receive disk in the other disk drive. Press Comm Reqst and select Change Session Options to

change the receive disk drive. When finished, press Comm Start. The sender should retransmit the cancelled document.

64 Name exceeds 9,999.

Cause: The document was cancelled because the receive document name (number) assigned automatically by the BSC Licensed Program exceeds 9,999.

Action: Remove the disk and insert another receive disk in the Disk Drive. Press Comm Start. The sender should retransmit the cancelled document.

If using a Dual Disk Drive, you may leave the full disk in the drive, and insert a new receive disk in the other disk drive. Press Comm Reqst and select Change Session Options to change the receive disk drive. When finished, press Comm Start. The sender should retransmit the cancelled document.

65 Document, path, or drive not found; index full.

Cause: The document was cancelled because the send or receive document is not stored on the disk in the specified drive or the index is full.

Action: The caller should call back and the sender should retransmit the document. Specify the correct document name or drive specifier when adding the document to the send queue or use another disk if the receive disk index is full.

66 Insufficient DOS control blocks.

Cause: Insufficient storage to open another file.

Action: Wait until a file is closed or refer to "Configuration Commands" in your DOS manual to specify that more files can be opened at once.

67 Write-protected disk.

Cause: The receive disk is write-protected.

Action: Use a different disk that is not write-protected.

68 Document exceeds maximum size.

Cause: The document being received has reached its maximum size (1.2 mega-bytes) and is full.

Action: The document being sent may be split into two or more smaller documents. These may be sent separately.

69 Damaged, unformatted, or missing disk; other (new) error.

Cause: The disk has a bad surface (dust or scratch).

Action: Use another disk.

70 Document already in use.

Cause: The document was cancelled from the send queue because it was in use at the time it was to be transmitted. This condition occurs when the Session Summary is still active (On). (It may also cause Summary Code 81 or 82.)

Or the document may need recovery.

Action: Press Comm Reqst and choose Change Session Options to turn the Summary to Disk off. Send the document again.

Or recover the document and retry the task.

81 Document contents error.

Cause (Receive): The document was cancelled because it contained no text.

Action: Use whatever Typing Tasks you have available to verify that the document has no text. If the receive document contains no text, the sender should correct it, if necessary, and send the document again.

Cause (Send): You are communicating with a host computer, and No may be specified for CPU Mode in the Communication Setup menu.

Action: Verify that Yes is specified for CPU Mode in the communication setup.

Cause (Receive): You are communicating with a host computer and receiving Card Image data with OCL (Operator Command Language). No may be specified for Insert New Line Codes in the Communication Setup menu.

Action: Verify that Yes is specified for Insert New Line Codes in the communication setup.

82 Document contents error.

Cause: The document being sent was cancelled because the document type is not supported for the send format specified in the active communication setup.

Action: Check to be sure you are not trying to send a DOS File as Revisable-form Text, Page Image, or Card Image.

83 Document contents error.

Cause: The document being sent was cancelled because it contains invalid data. There is a disk format problem.

Action: Use Recover Document task and then try sending the document again.

84 Document contents error.

Cause: The document was cancelled because the received data was not recognized.

Action: Have the sending location check the send document data and retry the send operation.

PART TWO. HOST PROGRAMMING REFERENCE

Chapter 7. Data Link and Data Stream Characteristics

Notes:

Data Link Characteristics

The IBM Personal Computer Binary Synchronous Communication (BSC) facility supports both half-duplex and duplex physical data links that operate from 600 to 4800 bps. The connection, which can be over switched or non-switched lines, must be point-to-point. Multi-point lines are not supported.

Protocol Characteristics

The IBM Personal Computer can be connected over a point-to-point data link as an IBM 2770/3780 or 2780 terminal. When the IBM Personal Computer emulates an IBM 2770/3780 or 2780, the data link control protocols it uses conform to the subset of BSC protocols described in the component description manuals for these terminals.

In both the IBM 2770/3780 and 2780 modes, the IBM Personal Computer can operate with an EBCDIC or a 7-Bit code structure. The code structure used during a session depends on the value specified in the Code Set option of the communication setup.

Redundancy Checking

During a session, the systematic insertion of information redundant to the message data error-checks each block of data. The active code set determines the type of checking method used:

- Cyclic Redundancy Checking (CRC) is used with EBCDIC. With this checking method, a 16-bit field of redundant information is sent after ETB or ETX control code that defines the end of a data block. The receiver compares this 16-bit field with a 16-bit field it accumulated while receiving the data block. If the fields are equal, the receiver responds with an ACK0 or ACK1; if not, the receiver responds with a NAK. A negative acknowledgement causes the sender to retransmit the data block.

Redundancy checking for the IBM 2780 operating mode is identical to that for the IBM 2770/3780 operating mode, with two exceptions:

1. CRC or LRC may occur within a block, not just at block boundaries.

2. Within a block, checking characters follow an ITB control code. At the end of a block, checking characters follow ETB or ETX.

- Vertical Redundancy Checking (VRC) and Longitudinal Redundancy Checking (LRC) are used with 7-Bit code. VRC involves the checking of an odd parity bit that follows each 7-bit character. LRC involves the sending of an 8-bit field of redundant information after each ETB or ETX. The field is sent with odd parity, and the procedure for checking it is similar to the check for a CRC field.

The BSC Licensed Program does not limit the number of times it will receive a block that is retransmitted because of a miscompare. It will send NAKs indefinitely.

In CPU mode, the BSC Licensed Program will re-send a block of text indefinitely when NAK responses are received. In non-CPU mode, the BSC Licensed Program will resend a block a maximum of 15 times. When the sixteenth NAK is received, the job is terminated by sending an EOT.

Component Selection

When sending, the BSC Licensed Program does not generate component selection sequences at the beginning of a document.

When receiving, the BSC Licensed Program recognizes component selection codes. The codes affect how documents are stored on disk (see CPU Mode Operations) and how New Line Codes are inserted into the data (see Data Stream Blocking).

When receiving, the BSC Licensed Program deletes component selection codes from the data stream. All received data is stored on disks.

CPU Mode Operation

In CPU mode, the BSC Licensed Program adjusts certain protocol characteristics to improve compatibility with an IBM System/370. When the CPU Mode option of the Communication Setup is Yes, the BSC Licensed Program:

- Does not set a limit on the number of times it will retransmit a block of text in response to a NAK.
- Does not send EOTs from the Control state during attended operation.
- Ends each document sent with ETX EOT. This sequence defines a document boundary and causes the BSC Licensed Program to rebid for the line before sending another document from the send queue.
- Does not assume a document boundary when a received document ends with ETX.
- Recognizes polling as polling and does not begin a new document as it does in non-CPU mode.

Note: In CPU mode with nontransparent data, ETX STX DC code will be considered a document boundary if:

- The protocol job did not begin with a DC code.
- The protocol job began with a different DC code.
- The protocol job contains a different DC code on a previous ETX STX sequence.

Explicit, unique DC codes must be present in the received data stream for the document boundary to be created.

Transparency

Transparency is valid only for EBCDIC. When a transparent data stream is sent from the IBM Personal Computer, DLE codes precede data link control codes. All blocks sent as transparent contain a multiple of 80 bytes of data. CRC checking occurs at the end of the block following DLE ETB or DLE ETX.

Page Image and Card Image data streams can be sent as either transparent or nontransparent. Card Image data consists of a separate line for each 80 bytes.

Block Size

When emulating an IBM 2770/3780 terminal, the IBM Personal Computer can send and receive data blocks up to 512 bytes in length. The value specified for the Block Size option of the active setup determines the maximum block size used to send data.

Data Stream Blocking

When the IBM Personal Computer is sending data in the IBM 2770/3780 mode, the Block Size, Transparency, and Send Format options of the active setup determine how the data stream is blocked.

- When Card Image data is sent as transparent, all line-end and page-end codes are removed from the data stream. Each line is padded with spaces to a length that is a multiple of 80 bytes, creating blocks that contain 80, 160, 240, 320, 400, or 480 bytes.

  When Card Image data is sent as nontransparent, all line-end codes are replaced by the Interchange Record Separator (IRS) control code, and all page-end codes are removed. As many whole lines as will fit within the specified block size are sent as a block. If a single line is longer than the specified block size, it will span several blocks; in all other cases, IRS ends a block.

- Revisable-form Text data is always sent as transparent. Data conversion on the document may be necessary. The data stream is arbitrarily segmented into 80, 240, or 480-byte blocks, depending on the value specified for Block Size in the communication setup. The final block is padded with nulls to the next 80-byte level. In receiving, trailing nulls are removed.

- When Page Image data is sent as transparent, blocking occurs. The final block is padded with nulls to the next level of 80, 160, 240, 320, 400, or 480 bytes. When sent as nontransparent, blocking occurs as it does for Card Image data, and variable-length lines are fit into the specified block size. No line-end or page-end codes are altered or removed when Page Image data is sent.

	Transparent	Nontransparent
Card Image	Delete line-end codes. Delete page-end codes. Pad lines to n x 80 bytes with spaces. Replace WP codes with DP codes.	Replace line-end codes with IRS. Delete page-end codes. n lines per block. Replace WP codes with DP codes.
Revisable-form Text	Pass WP codes. Arbitrary blocking to Revisable-form Text n x 80 bytes.. Data conversion. Pad final block to n x 80 bytes with nulls.	Invalid
Page Image	Pass WP codes. Arbitrary blocking to n x 80 bytes.	Pass WP codes. n lines per block.

When the operator has specified that received data should be converted to text documents, the BSC Licensed Program determines the data stream type from the first transmission block.

The absence of an initial Media Image Prefix indicates a non-Revisable-form Text data stream. IRS codes received (transparency) are mapped to NL codes. When the BSC Licensed Program receives transparent, non-Revisable-form

Text data and the Insert New Line Codes option of the Communication Setup menu is Yes, an NL line-end code is inserted every 80 bytes at assumed line boundaries. Trailing blanks also are stripped. Card Image data normally should be received this way.

When the IBM Personal Computer is sending data in the IBM 2780 mode, the Block Size, Transparency, and Send Format options of the active setup determine how the data stream is blocked.

- When Card Image data is sent either transparent or nontransparent, all line-end and page-end codes are removed from the data stream. Each line is padded with spaces to a length that is a multiple of 80 bytes, and an ITB, ETB, or ETX control code and checking characters are then inserted every 80 bytes. Each block contains 80, 160, 240, 320, 400, or 480 bytes of data.

- Page Image data also can be sent either transparent or nontransparent. In both cases, line-end and page-end codes are sent with document text, and blocking occurs with the final block padded with nulls to the next level of 80, 160, 240, 320, 400, or 480 bytes. An ITB, ETB, or ETX control code and checking characters are inserted every 80 bytes.

When the operator has specified that received data should be converted to text documents, the BSC Licensed Program determines data stream type from the first transmission block.

Absence of an initial Media Image Prefix indicates a non-Revisable-form data stream. When the BSC Licensed Program receives transparent, non-Revisable-form data and the Insert New Line Codes option of the Communication Setup menu is Yes, the received data is examined for a punch selection sequence (ESC 4). If punch is selected and the data is transparent, a NL control code is inserted every 80 bytes at assumed line boundaries. If punch has not been selected, an NL control code is inserted at every ITB, ETB, or ETX. Trailing blanks also are stripped. Card Image data normally should be received this way.

Terminal ID Exchange

If the active modem and line description specifies a Terminal ID of up to five characters or numbers, the BSC Licensed Program sends the ID when it first bids for control of a switched line. The remote station uses this ID to identify authorized terminals and terminal types.

If the BSC Licensed Program bids for control of the line first, it inserts the ID between the initial SYN characters and the bid ENQ. It then will accept up to 15 identification characters from the remote station; however, it does no checking on these characters.

In IBM 2780 operating mode, ID Exchange is identical to the IBM 2770/3780 operating mode, except that any Terminal ID sent is limited to two characters. A longer ID is truncated.

If the remote station bids for the line first, the BSC Licensed Program will accept up to 15 identification characters between the SYN and the ENQ. It then will send its ID between SYN and the ACK or NAK response.

Primary/Secondary Status

In a point-to-point configuration, one station is designated the primary station and the other the secondary. When the Primary option of the Communication Setup menu is Yes and bidding for the line occurs, the IBM Personal Computer acts as the primary station. As the primary station, it sends ENQs at 2-second intervals to gain control of the line and does not yield to contention to enter the Receive state.

When the Primary option is No, the IBM Personal Computer acts as the secondary station. It sends ENQs at 3-second intervals, and if contention is detected, it stops bidding for control of the line and sends a response to the remote station's bid. If both stations specify primary, a lockup can occur.

Reverse Interrupt

When the BSC Licensed Program receives a Reverse Interrupt (RVI) in response to a sent data block, it interprets the RVI as a request to halt sending and enter the Receive state. If the end of the send job (ETX) is reached in no more than two blocks, it sends EOT after the ETX (a normal termination). Otherwise, it terminates the send job by sending EOT after an ETB block and waits for a bid from the remote station. Normal bidding for the line resumes after the remote station finishes sending data.

Transmission Delay

When sending or receiving documents, the BSC Licensed Program will accept TTDs and WACKs as pacing indicators from the remote station.

It also will send repeated TTD or WACK sequences when local delays (such as disk storage delays) keep it from processing and sending or receiving data. If the Hold key is pressed, it will send repeated TTD sequences.

The IBM 2780 never sends a WACK, but it will honor a received WACK. The BSC Licensed Program, however, sends and honors WACKs because of local delays by the receiving station. The IBM 2780 also never sends TTD as a transmission delay control. When sending, the BSC Licensed Program will transmit TTDs because of local delays.

Note: TTD or WACK sequences sent by the IBM Personal Computer may cause an unattended remote station to disconnect after 10 minutes. Some host systems also may need to modify their SYSGEN support in order to allow for unlimited TTD and WACK responses.

Space Compression and Expansion

For nontransparent data, the BSC Licensed Program will receive, but not send, space compression sequences. A received sequence begins with the Interchange Group Separator (IGS) control code for EBCDIC or the Group Separator (GS) control code for 7-Bit. A following binary value specifies the number of spaces (from 2 to 63) to be restored to the data stream.

Space compression sequences received with transparent data are not honored.

Remote Job Entry Printer Control

When receiving nontransparent data, the BSC Licensed Program honors a number of 2-character escape sequences as printer carriage controls. The sequences, which may appear at any point in a print line, are executed at the next line end as follows:

7-Bit	EBCDIC	LINE ENDING RECORDED
ESC A	ESC A	Insert Page End (le-FF)
ESC M	ESC M	Zero Index Carriage Return (CR)
ESC Q	ESC /	Single Space (le)
ESC R	ESC S	Double Space (le-LF)
ESC S	ESC T	Triple Space (le-LF-LF)

le = line-end code

A line-end code is denoted by a NL, RNL, or IRS.

All other escape sequences and printer controls received in a nontransparent data stream cause the IBM Personal Computer to resume normal single-line spacing.

Note: The BSC Licensed Program does not honor RJE escape sequences or printer controls when receiving transparent data.

When operating in IBM 2780 mode, the IBM Personal Computer is identical to the IBM 2770/3780 operating mode, except that it detects the punch selection sequence for the purpose of deblocking received data. The punch is selected by an **ESC 4** sequence at the beginning of a nontransparent transmission block.

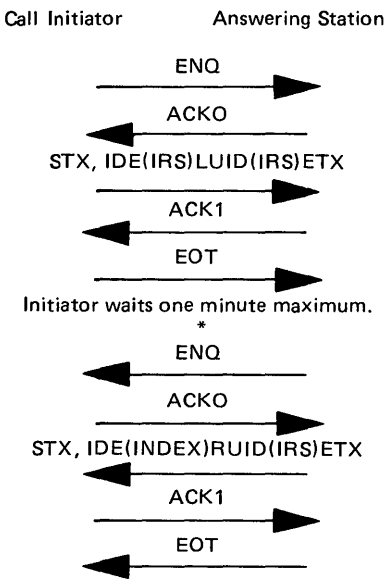
Session ID Exchange

A Session ID exchange follows standard BSC data link protocol. On a switched line, the calling party always initiates a Session ID exchange that occurs at the beginning of a session. On a non-switched line, either station can initiate the exchange. The IDs are sent and received as nontransparent data. Once the exchange is complete and both ID's have been validated, bidding for the line again occurs to allow the sending station to regain control of the line.

The local ID and the remote IDs specified for a communication setup can use uppercase and lowercase alphabetics, numerics, and hyphens. A hyphen in a character position of a remote ID means that any character in that position will be accepted during a Session ID exchange.

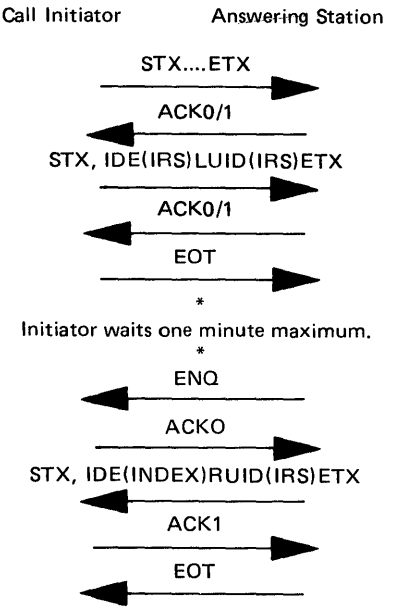
The following diagrams illustrate successful session ID exchanges.

If the IBM Personal Computer is the answering station on a switched data link, it determines whether the remote ID is valid before sending its ID.



Note: Record Separator (RS) is used with 7-bit code in place of Interchange Record Separator (IRS).

This illustration shows the sequence for a Session ID exchange that takes place at a job boundary. The Session IDs are sent as nontransparent data.



The following chart summarizes the timeouts that can occur at the IBM Personal Computer during a BSC session.

Timeout Length	Timeout Purpose	IBM Personal Computer Action After Timeout
250 millisec.	When DSR drops on a switched line, minimum time DTR is turned off.	Turn on DTR, if enabled.
1.8 sec.	Interval of silence before generating an answer tone.	Enable sending of continuous space tone.
2.0 sec.	When bidding as primary station, interval between transmission of ENQs.	Send ENQ a maximum of 15 times before sending EOT and ceasing to bid.
2.0 sec.	Maximum length of a local dealy before TTD or WACK is sent.	Send a TTD or WACK.

Timeout Length	Timeout Purpose	IBM Personal Computer Action After Timeout
3.0 sec.	When bidding as secondary station or soliciting response as primary station, the interval between transmission of ENQs.	Send ENQ a maximum of 15 times before sending EOT and terminating session.
3.0 sec.	Maximum length of time that SYN or non-SYN characters can be continuously received.	Reset receive synchronization.
4.0 sec.	Duration of answer tone transmission (including RTS/CTS delay).	Disable sending of continuous space tone.
10.0 sec	After RTS is turned on, maximum length of time allows to complete a block transmission.	Send error message to operator.
10.0 sec.	After RI is turned on, Interval during which DSR must turn on to obtain "called" status.	Reset called status.
10.0 sec.	When operatins in attended non-CPU mode and in Control state, interval between transmission of EOTs.	Send EOT every 10 sec. to keep remote station from disconnecting.
10.0 sec.	After DTR is turned off on a switched line, interval during which DSR must turn off.	Send error message to operator and record hardware failure. Communications not re-established.
20.0 sec.	In unattended mode, interval during which synchronization must be achieved.	Disconnect by turning off DTR.
10.0 min.	In unattended mode, interval during which a block of data must be sent or received.	Disconnect by turning off DTR.

Data Stream Characteristics

The IBM Personal Computer BSC facility supports Page Image, Card Image, Revisable-form Text formats, and DOS file data streams. When data is sent from the IBM Personal Computer, the type of data stream used depends on the value specified for the Send Format option of either the Send Document menu or the Define Setup menu. When data is received, the data stream associated with the job is determined from its first block.

Card Image (Host and IBM 5520)

The Card Image data stream is used primarily to send Job Control Language (JCL) to an RJE system. When the IBM Personal Computer sends a document via the Card Image data stream, it reformats the document using EBCDIC/DP or 7-bit/DP control codes depending on whether EBCDIC or 7-Bit was specified for Code Set in the active setup. These code sets provide a limited number of 1-byte control codes for the exchange of formatting controls.

Sending a Card Image Data Stream: The BSC Licensed Program formats a Card Image data stream different from a Page Image data stream. The major differences are that it:

- Uses EBCDIC/DP control codes instead of EBCDIC/WP control codes
- Blocks the data stream differently
- Does not send indexes to the first print line.

Receiving a Non-Revisable-form Data Stream: The BSC Licensed Program does not distinguish between Card Image and Page Image data. To store a received data stream as Card Image data, you should specify that the system is to insert an NL line-end code every 80 bytes at assumed line boundaries (only if receiving transparency). This is done through the New Line Codes option of the Communication Setup menu.

Page Image Text Only

The Page Image data stream is used primarily to exchange documents between an IBM Personal Computer and an appropriately programmed host application or a communicating word processor such as the IBM Office System 6. In general, printing a document transmitted as Page Image data produces the same result as printing the original, paginated document on an IBM Personal Computer.

Page Image with OCL (Host, IBM OS/6, IBM 6640, and IBM 6670)

OCL means Operator Control Language. The BSC Licensed Program converts certain format changes that might appear within the document into a language (OCL) that the receiving location understands.

Note: When you use Page Image with OCL, edit and paginate documents before sending them.

Page Image with Format Line (IBM 5520, IBM MAG CARD II, or IBM 6240)

Format line means that the BSC Licensed Program converts certain document format controls and certain format change controls that appear within the document into format line controls that the IBM Mag Card II or the IBM 6240 understands.

Because the Page Image data stream does not have the same structure or use the same code set as the BSC facility internal data stream, the BSC Licensed Program must reformat any document that it sends or receives via the Page Image data stream. Reformatting is based upon the code set (EBCDIC or 7-Bit) that was previously specified for the active setup. If EBCDIC was selected, the BSC Licensed Program reformats the document using 1-byte EBCDIC/WP control codes. If 7-Bit was selected, 7-Bit/DP control codes are used.

Notes:

1. When the IBM Personal Computer is in the Send state and a document is reformatted using 7-Bit/DP control codes, a number of word-processing control codes (such as indent level and superscript) are lost. Appendix B, "BSC Support for Remote Location OCL," shows the correlation between EBCDIC/WP and 7-Bit/DP control codes.

2. When sending documents, you can also select OCL or the Mag Card II Format Line as the on-line control format, along with EBCDIC or 7-Bit control codes. In both cases, the active format for the first text line (except keyboard) becomes the control format for the job. This control format is compared to the format specified by each succeeding line to determine if a format change should be sent. When processing a format change, the BSC Licensed Program only generates the OCL and Mag Card II format controls that it supports. (See Appendix B, "BSC Support for Remote Location OCL.")

Sending a Page Image Data Stream: The following text and formatting controls are converted when the BSC Licensed Program reformats a document and sends it through the Page Image Data Stream:

- Margin Text and Page Numbering. As the BSC Licensed Program converts each page of a document for sending, it inserts any header and footer text into the data stream and creates page numbering where required.

  When bottom margin text is inserted, a paragraph boundary separates margin text from body text. Because of this, the last line of body text on each page will no longer be justified.

- Block Overstrike and Block Underscore. The BSC Licensed Program generates the necessary number of required backspaces and overstrike or underscore characters for these controls.

- Word Underscore. When sending a Page Image data stream that uses EBCDIC, the BSC Licensed Program passes word underscores. In all other cases, it generates the necessary backspace/underscore sequences in the send data stream.

- Centering and Alignment. The BSC Licensed Program generates the appropriate combination of tabs, spaces, and backspaces for these controls. For all alignments except centering, a unit backspace (UBS) precedes backspaces.

- First Line. The BSC Licensed Program converts the first line for all documents to 3 and inserts the appropriate number of indexes to position the first print line (margin text or body text) correctly. For example, if a document specified a first print line of 7, with no margin text, and was triple-spaced, the BSC Licensed Program would insert 1 index into the Page Image data stream to indicate the first print line.

  The BSC Licensed Program inserts the same number of indexes whether the document is sent as Page Image with OCL, Page Image with Format Line, or Page Image Text Only. This can affect the value that the receiving station records for the first print line. If the document was sent as Page Image Text Only, the remote station would use its own default for each received index. A default of 1 would mean that the first print line would be line 4 when the document was printed.

The BSC Licensed Program also generates codes for mid-line typestyle changes and strips out other control sequences, such as begin/end control pairs (IBM 6670 Print options only). It does not strip out any text embedded between a begin/end control pair, however. A document with Begin/End Keep should be paginated before sending to ensure that the correct page boundaries occur. Pagination ensures that document formatting is consistent through the pages.

If not sending to the IBM 6670, the BSC Licensed Program does graphic code translates according to the document's

initial Coded Graphic Character Set ID, unless the active setup specifies that the default keyboard is used for all send jobs. No keyboard changes are transmitted, and a character not represented in the initial character set ID is sent as an underscore. If the BSC Licensed Program does not support a document's initial character set ID, the character set ID of the default keyboard is used.

Receiving a Non-Revisable-form Data Stream: A received job is treated as a non-Revisable-form Text job unless the initial transmission block indicates a Revisable-form Text data stream. The data first is scanned for RJE printer controls before any OCL or Mag Card II Format Lines are processed. The document is reformatted to meet the structure and code set of the BSC Licensed Program internal data stream and stored on a data disk.

If the receive job does not specify a character set ID or the character set ID is not supported, the BSC Licensed Program uses the default character set ID of the active setup to process the document.

Revisable-form Text Format (Documents from Another Word Processor or Host Application Using Revisable-form Text)

Revisable-form Text is recognized by the third through fifth byte of the Media Image header. The Media Image header may either be in the first block or in the first transparent block following the Device Select Code which is in a nontransparent block preceding the first block of the document. If a message header precedes the Revisable-form Text document, it causes the entire job to be processed as non-Revisable-form Text. A Revisable-form Text document should be followed by the ending Job Protocol boundary (EOT). The last block may be padded with blanks or nulls. Any data between the end of the document and the EOT is assumed to be padding and is not recorded by the receiving location. If a series of documents is received without EOTs separating them, only the first document is recognized and all of the others will be lost.

A Revisable-form Text data stream is identified by an initial prefix that is the first unit of a protocol job. The prefix, which provides the information required to create a document on a disk, has four major subfields.

Media Image Header	Document Type	Character Set/ Code Page	Document Comment

Each subfield begins with five bytes of information.

LL	C	T	F	Date (if any)

LL = Length, a 2-byte binary value specifying the length of the subfield. The length always includes the LLCTF bytes and any data defined as part of that subfield. The length may also include the lengths of the following subfields.
C = Class, a 1-byte value
T = Type, a 1-byte value
F = Format, a 1-byte value.

The values for C, T, and F uniquely identify the kind of subfield being defined.

1. Media Image Header

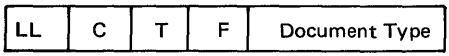
LL	C	T	F

LL = Total length of media image header, document type, character set/code page, and document comment
C = X'CA'
T = X'02'
F = X'01'

The values for LL, C, T, and F identify this as the media image header subfield. When transparent data is received at an IBM Personal Computer, the third through fifth bytes following the job protocol boundary (STX) must correspond to C, T, and F for the data to be processed as a Revisable-form Text job.

Note: Revisable-form Text may be preceded by a nontransparent block containing component selection only (DC code or ESC sequence).

2. Document Type

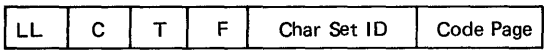


LL = X'07'
C = X'C7"
T = X'06'
F = X'01'

The values for LL, C, T, and F identify this as the document type subfield. The document type must be X'0003' for a Revisable-form Text data stream.

X'0003' = a Revisable-form Text data stream

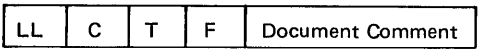
3. Character Set ID and Code Page



LL = X'09'
C = X'C7'
T = X'01'
F = X'01'

The values for LL, C, T, and F identify this as the Character Set ID and Code Page subfield. The 2-byte values for Character Set ID and Code Page define the Character Set ID and the EBCDIC Multilingual Code Page for the following document comment (if any). The transmitted document will specify its own values for Character Set ID and Code Page.

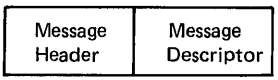
4. Document Comment



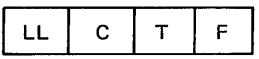
LL = Length of the document comment subfield, including LLCTF and character data
C = X'C2'
T = X'32'
F = X'01'

The values for LL, C, T, and F identify this as the document comment subfield. The comment can be up to 44 bytes in length and can consist of graphics and spaces only.

If a message is included with the Revisable-form Text document, the following structure will appear between the prefix and the document.



5. Message Header



LL = Total length of the Message Header plus the length of the message descriptor
C = X'C6'
T = X'05'
F = X'01'

The values for LL, C, T, and F identify this as the Message Header subfield.

6. Message Descriptor

LL = Total length of the message descriptor
C = X'C3'
T = X'25'
F = X'01'

The values for LL, C, T, and F identify this as the Message Descriptor subfield. The message can be up to 80 bytes of alphanumeric characters. The text begins with an SCG control defining CGCS ID and code page of the message text. (See Document Architecture, Revisable-form Text.)

Sending

In the following section, the term L3 refers to the Revisable-form Text data. The term L3P refers to the BSC Licensed Program internal form of the data.

Once the data stream prefix that describes the document is generated, the document is read from its disk, and each logical page is sent in ascending order. For Revisable-form Text, the document is sent with no conversion if it is in L3 format. If the document is in L3P format, it is converted to L3 format before being sent.

Receiving

A receive job is processed as a Revisable-form Text job if:

- The third through fifth text bytes of the first logical block element correspond to the C, T, and F bytes of the data stream profile.

- The block uses the transparent BSC protocol. (Revisable-form Text jobs may be preceded by a selection sequence.)

A job that meets these criteria is not translated. Instead, the data stream prefix is stripped off, and its information is used to create a new document on a data disk.

If you select Convert Received Jobs to Text Documents to be **2**, No, from the Change Session Options menu, no conversion will occur. The received document name will be appended with an extension of .RF to indicate that this document is stored on disk in L3 format.

If you select Convert Received Jobs to Text Documents to be **1**, Yes, from the Change Session Options menu, the data is converted to L3P internal format. The received document name is appended with an extension of .TXT to indicate that this document is stored on the disk in L3P internal format.

Note: If the data stream is converted from L3 to L3P or L3P to L3 and then converted back, the text data format may be different than the original data stream.

Paragraph Boundary Differences

L3 recognizes more paragraph boundary conditions than are used in L3P. With one exception, this would only be a problem if an L3 document was transformed to L3P, edited in such a manner as to create paragraph boundary sequences recognized by L3, and then subsequently transformed to an L3 document for output. Most of the controls that can cause this condition are not inserted into the data stream by the L3P editing process, but they may be in the data stream as unsupported controls. An L3 paragraph boundary sequence will result if the L3P edit adds the other needed control adjacent to the unsupported control.

The following control sequences are recognized as paragraph boundaries by L3, but not by L3P:

- ..., Carrier Return single-byte control (sbc), Set Discrete Line Parameters multi-byte control (mbc), ...
- ..., Set Discrete Line Parameters mbc, Carrier Return sbc, ...
- ..., Page End sbc, Set Discrete Line Parameters mbc, ...
- ..., Page End sbc, Absolute Baseline Move mbc, ...
- ..., Carrier Return sbc, Absolute Baseline Move mbc, ...
- ..., Absolute Baseline Move mbc, Carrier Return sbc, ...
- ..., Zero Index Carrier Return sbc, Carrier Return sbc, ... (This is the one exception that can occur without having an original L3 document as a base.)

Line Boundaries (L3P-to-L3 Transform)

L3 recognizes more line boundary conditions than are used in L3P. This would only be a problem if an L3 document was transformed to L3P, edited in such a manner as to create additional line boundaries recognized by both L3 and L3P, and then subsequently transformed to an L3 document for output. The controls that can cause this condition are not inserted into the data stream by the L3P editing process, but they may be in the data stream as unsupported constructs.

The following controls are recognized as line boundaries by L3, but not by L3P:

- Algorithm multi-byte control
- Set Discrete Line Parameters multi-byte control

DOS Files

DOS File send format is the normal file format (ASCII) that the IBM Personal Computer uses. No translation takes place before the file is sent, and some of the communication setup options do not apply to DOS File communication.

Note: The DOS File send format allows you to transfer IBM Personal Computer DOS files between IBM Personal Computers with the BSC Licensed Program and to appropriately programmed host systems. Essentially, the BSC Licensed Program sends DOS ASCII files as transparent EBCDIC data streams. This means that the receiving host programmer must write an application to do the conversion necessary to use the file when received.

Chapter 8: Host Programming Considerations

Notes:

This chapter contains reference material for programming an IBM 5520 or host system to accept documents from the IBM Personal Computer.

IBM 5520 Commands

The IBM 5520 uses commands and instructions to control a communication session. Prior to communicating, an IBM Personal Computer must sign on to identify itself to the IBM 5520 and also tell the IBM 5520 the destination of the documents.

Two commands are used:

- ,signon
- ,distribute

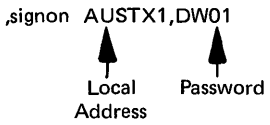
The IBM 5520 also can store documents received from other locations that are to be forwarded to your location. The command to obtain the documents is ,obtain all.

The **,signon**, **,distribute**, and **,obtain all** commands must be added to the send queue along with the documents to be communicated. The following illustration is an example of a send queue.

SEND QUEUE	USE
signon document	Signon command
distribute document	Distribute command
document 1	First document to be sent
distribute document	Distribute command
document 2	Second document to be sent
obtain all document	Obtain documents that the IBM 5520 has for you

The Signon Document

The ,signon command must be the first command an IBM Personal Computer sends to the IBM 5520 to begin a session. A local address identifier follows the ,signon command (typed in lowercase letters) The local address may be followed by a password. For example:



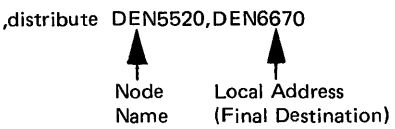
The local address may be up to eight number or letters, and the password may be up to four numbers or letters.

Check with your coordinator for your local address and password.

The Distribute Document

The ,distribute command identifies the destination of the document. The ,distribute command is followed by a node name and the local address of the final destination to which the document should be sent.

A node name is the name assigned to the IBM 5520 to which the local address is attached. The local address identifies the final destination point. The combination of node name and a local address is called a destination ID. For example:



The node name and local address may be up to eight numbers or letters each.

Check with your coordinator for the node name of the IBM 5520 and local addresses of the destination points.

The ,distribute command (typed in lowercase letters) is typed as a separate document. It must be sent as a separate document immediately before **each** document added to the send queue.

The Obtain All Document

Just like the ,signon and ,distribute commands, the ,obtain all command is typed in lowercase letters and must be created as a separate document on the IBM Personal Computer.

If communicating with the IBM 5520 only to obtain documents being held for your location, add the document containing the ,obtain all command after the ,signon document in the send queue.

If you have regular documents to communicate to the IBM 5520 in the same session, add the ,obtain all document to the end of the send queue.

Host Commands

A communication session with a host computer typically consists of:

- Logging on the host computer
- Communicating information
- Logging off the host computer.

The host computer may require you to log on to identify yourself as an authorized user of the host computer system.

A logon procedure usually requires that you send a document that contains a user identification and a password.

When the logon is complete, the host computer typically responds by requesting additional information about what you want to do (for example, access a host computer file to input information or to receive information from the file).

The host computer responses are stored on a receive disk and are reflected in the Session Summary.

When communication is complete, the host computer also may require the IBM Personal Computer to send a document to log off before disconnecting the communication line.

Just as with the IBM 5520, the logon, password, or logoff must be created with whatever Typing Tasks are available and added to the send queue.

The Logon Document

The information to log on is typed as a separate document. Your coordinator will tell you what this logon information should be.

The Logon document always is the first document added to the send queue each time you communicate with a host computer.

Responding to the Host Computer

Each time you log on to the host computer, the host computer may require additional responses before you can send or receive information. Depending on your application and host computer program support, the response information is typed as separate documents or added after the logon information in the Logon document.

The Logoff Document

The information to log off is typed as a separate document. Your coordinator will tell you what this information should be. The Logoff document is the last document added to the send queue each time the IBM Personal Computer communicates with a host computer.

Note: If you are going to transfer a DOS File to a host system and you do not have any kind of word processing (text) licensed program (such as DisplayWrite), you have to

use the line editor facility (EDLIN) of DOS to create signon and other documents for the send queue.

Host Programming

The following information is presented as reference material. You should understand that examples given may not work for your particular host system environment.

RES (OS/VS1)

The Remote Entry Services (RES) facility of OS/VS1 provides a method of transmitting jobs from remote terminals to the VS1 job stream. The IBM Personal Computer is supported by release 7 of the Operating System Virtual Storage, Option 1 (OS/VS1). Once a job has been entered into the job stream, execution of the job proceeds under the supervision of the operating systems job management routines.

Together with the RTAM and VTAM access methods, RES supports the IBM Personal Computer using the BSC Licensed Program as an IBM 2770/3780 communication terminal.

Generation Parameters

As input to Stage 1 of the RTAM generation step, you must specify LINE, TERMINAL, and RTAM macro instructions for the IBM Personal Computer. Specify the macro instructions in this order: LINE macro instructions first, if any, in ascending line number sequence; TERMINAL macro instructions next in ascending terminal identification number sequence; and the RTAM macro instruction last.

The LINE macro instruction specifies both the number and type of BSC line. Specify one LINE macro instruction for each communication line. All LINE macro instructions must appear first in the macro instruction input, and they must be in ascending communication line number sequence; the first LINE macro instruction must have the number 1, the second 2, and so on.

The TERMINAL macro instruction associates an identification number with a work station and specifies the device characteristics of that work station. Specify at least one TERMINAL macro instruction for each work station that can use RTAM. The first TERMINAL macro instruction must immediately follow the last LINE macro (if any).

The RTAM macro instruction completes the macro instruction sequence for Stage 1 of RTAM generation. It determines the internal characteristics of RTAM and must follow the last TERMINAL macro instruction.

Refer to the *OS/VS1 RES System Programmer's Guide* for additional information about macro instructions.

OS/VS2 (MVS)

The IBM Personal Computer is supported by Level 3.8 of MVS.

JES2

The IBM Personal Computer is supported as a remote, nonprogrammable terminal by Release 4.1 of JES2. JES2 RJE support allows you to submit jobs to a host and receive system output as if the operator had submitted the jobs from a local host facility. With this support, job control statements and data sent from an IBM Personal Computer are processed no differently than those sent from local readers and sent to local printers and punches.

Initialization Parameters for JES 2

The following initialization parameters should be included in the JES2 Initialization Deck to use an IBM Personal Computer as an RJE terminal:

- LINEnnn specifies the characteristics of one teleprocessing line for remote or network job processing. This parameter must be specified for each teleprocessing line.
- RMTnnn identifies the characteristics of one remote terminal. If this parameter is not specified, JES2 assumes that the terminal is a basic IBM 2770 with no features.
- Rnnn.PRm specifies remote printer characteristics.
- Rnnn.PUm specifies remote card punch characteristics.
- Rnnn.RDm specifies remote card reader characteristics.

If necessary, refer to the JES2 programming guide that is appropriate for your system for further information about these initialization parameters and all of the subparameters associated with them.

Additional JES2 Considerations

JES2 releases prior to 4.1 convert word-processing control characters to X'00' in nontransparent print or punch output.

Sending Control Statements and Data to JES2

Coding JES2 Control Statements: JES2 control statements, which control the input and output processing of jobs, are coded using JCL.

Signing On to JES2: Once JES2 initialization procedures for the IBM Personal Computer are complete and a communication link has been established, the first document sent on a nondedicated line must be the /*SIGNON control

statement. (JES2 ignores a signon from a remote terminal on a dedicated line.) The signon can be created at the IBM Personal Computer as a regular Card Image document and placed as the first job in the send queue (as a separate job).

Note: JES2 control statements must be entered in uppercase. The BSC Licensed Program does not automatically store keyed data in uppercase.

The format of the /*SIGNON statement (which identifies the IBM Personal Computer to JES2) and an example follows:

Column	Description
1	/*SIGNON
16	RMTnnn
25	password1
73	password2

- RMTnnn defines the remote station requesting sign-on. The numbers must be left-justified with no leading zeroes.

- Password1 defines the password for the line. Password1 can be established at initialization in the LINEnnn initialization parameter or changed by the JES2 $T command.

- Password2 defines the password for the terminal. Password2 can be established at initialization in the RMTnnn initialization parameter. The password ensures that the terminal signing on is a valid station.

Sending Data to JES2: Once the signon is complete, the IBM Personal Computer operator can submit jobs to and receive data from JES2. An example of a send job containing JES2 control statements follows. The send job is created at the IBM Personal Computer as a Card Image document. The job is added to the send queue like any other send job.

```
//TSS 326A      JOB(Z0111,75A,002,20),'KASIRAJ',
//               CLASS=B, Time=(,29),MSGCLASS=A
/*JOBPARM       SECCLAS=U
/*ROUTE         PRINT R7
//STEP1         EXEC PGM=IEBGENER
//SYSIN         DD DUMMY
//SYSPRINT      DD SYSOUT=A
//SYSUT2        DD SYSOUT=A
//SYSUT1        DD *
```


JOB

The beginning of the job. MSGCLASS specifies the output class to system messages and JCL statements for the job are to be written. TIME specifies the maximum amount of time that the job may use the CPU.

EXEC

The first statement of each job step and catalogued procedure step. It identifies the program to be executed or the catalogued procedure to be called.

DD

Statements that specify the data set to be used in a job step and the input and output facilities required for the data set.

Signing Off from JES2: A SIGNOFF statement terminates BSC job stream processing. The format of this statement is:

```
/*SIGNOFF
```

Note: The Comm Disc key can also be used.

Refer to the *OS/VS2 MVS System Programming Library: JES2* and *OS/VS2 MVS JCL* manuals for a description of the JES2 control statements and how to code them.

JES3

The IBM Personal Computer is supported by Release 3.0 of JES3. JES3 RJE support, via Remote Job Processing (RJP), permits the input and output of jobs to and from terminals that are remote from the host installation. RJP provides the facility for attaching an IBM Personal Computer as a remote nonprogrammable IBM 3780 terminal, with job output routed to any remote terminal or local output device. Once a job has been submitted, it is processed the same as if it were entered from the local reader.

Initialization Parameters for JES3

For JES3, both an RJPLINE and an RJPTERM statement must be included in the Initialization Deck when attaching an IBM Personal Computer as an RJE terminal:

- An RJPLINE statement is necessary to define the characteristics of a single BSC line (and its respective adapter) which will be used by the JES3 global processor for remote job processing. Additionally, this statement may assign a specific RJP work station, defined by the N operand of an RJPTERM statement, to this line.

- An RJPTERM statement defines a single remote BSC work station to the JES3 system. This statement causes a default description to be provided for each work station device (printer, punch, or card reader) indicated by the PR, PU, and RD operands, along with the operating characteristics of the work station.

Refer to the JES3 programming guide that is appropriate for your system for further information about these statements and all of the operands associated with them.

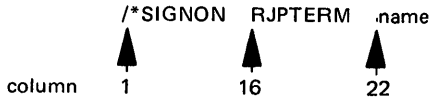
Sending Control Statements and Data to JES3

Coding JES3 Control Statements: JES3 control statements, which control the input and output processing of jobs, are coded using Job Control Language (JCL).

Signing On to JES3: Once JES3 initialization procedures for the IBM Personal Computer are complete and a communication link has been established, the first document sent on a nondedicated line must be the /*SIGNON control statement to JES3. (JES3 ignores a signon from a remote terminal on a dedicated line.) The signon can be created at the IBM Personal Computer as a regular Card Image document and placed as the first job in the send queue.

Note: JES3 control statements must be entered in uppercase. The BSC Licensed Program does not automatically store keyed data in uppercase.

The format of the /*SIGNON statement, which identifies the IBM Personal Computer to JES3, is:



Sending Data to JES3: Once the signon is complete, the IBM Personal Computer can submit jobs to and receive data from JES3. An example of a send job containing JES3 control statements and data to be processed follows. The send job is created at the IBM Personal Computer as a Card Image document. The job is added to the send queue like any other send job.

Note: When a job is submitted from a remote station to JES3, the ORG and DEST parameters of the JOB statement example that follows are not required to route output back to the remote station.

```
/*SIGNON      R161 A
//DOC10       JOB (2500XA),'SMITH',GROUP=AUS1,MSGCLASS=T,
//            NOTIFY=DIS3,TIME=1,PASSWORD=JS,USER=DIS3
//*MAIN       CLASS=GA,ORG=AUSMVS1.R161A
//*FORMAT     PR,DDNAME=SYSIN,DEST=AUSMVS1.R161A
//STEP1       EXEC PGM=IEBGENER
//SYSIN       DD DUMMY
//SYSPRINT    DD SYSOUT=A
//SYSUT2      DD SYSOUT=A
//SYSUT1      DD *,DCB=BLKSIZE=80
      .
      .
 data to be processed
      .
      .
//
```

Signing Off from JES3: A SIGNOFF statement terminates BSC job stream processing. The format of this statement is:

/*SIGNOFF

Note: The Comm Disc key may also be used.

The manual *OS/VS2 MVS JCL* describes the rules for coding JES3 control statements.

POWER/VS RJE Considerations

The following are considerations when using POWER/VS RJE:

- POWER/VS translates characters below X'40' to blanks on nontransparent output. This includes the special word-processing control characters. Data sets containing these characters should be sent in transparent mode. The translate table in module IPW$$TM could also be modified to avoid translation in nontransparent output.

- JSEP = 0 should be specified in the POWER/VS * $$ LST card to prevent output separators from being sent to the IBM Personal Computer. At system generation, the POWER/VS macro can specify this parameter as the default.

- POWER/VS RJE does not support the terminal ID capability.

An example of the line-and-terminal definition for the IBM Personal Computer follows.

```
Column 10       Column 16          Column 72
PLINE           ADDR=X'488',             X
                CODE=EBCDIC,             X
                SWITCH=YES,              X
                TIMEOUT=NO,      Note 1  X
                TRNSP=YES        Note 2
PRMT            REMOTE=10,               X
                ABE=YES,                 X
                BE=YES,                  X
                HFC=NO,          Note 3  X
                LIST=132,                X
                SCE=YES,         Note 4  X
                TRNSP=YES,       Note 2  X
                TYPE=2780
```

Notes:

1. TIMEOUT=NO should be specified in the PLINE definition for POWER/VS to avoid signing off the IBM Personal Computer when the BSC Licensed Program sends a long sequence of WACKs or TTDs.

2. Transparency does not have to be used unless word-processing control characters need to be preserved.

3. HFC=NO should be specified in the terminal definition for POWER/VS because the BSC Licensed Program does not support horizontal format control.

4. The space compression or expansion parameter (SCE=YES) can be used to have POWER/VS send compressed data to the IBM Personal Computer. The BSC Licensed Program properly expands the data before printing. However, the BSC Licensed Program does not compress data before sending it.

VM/370-RSCS

The IBM Personal Computer is supported as a remote nonprogrammable BSC terminal by Release 1 of RSCS. RSCS is a single-purpose operating system for a virtual machine, dedicated to processing files spooled to it and transmitting those files via communication lines to remote stations. The transmission path between RSCS and any single remote station is defined as a *link*. A link definition consists of a linkID and other information unique to the transmission path to be used. A table of these link definitions is stored in the RSCS virtual machine.

Generation Parameters for VM/370

Before an IBM Personal Computer can be used as an RSCS RJE terminal, the RSCS operator at the host must code a LINK control statement that creates an entry for the IBM Personal Computer in the RSCS directory. This control statement assigns a linkID to the IBM Personal Computer and can provide other information about the transmission path, such as the type of line driver to be used and the classes of files that may be transmitted on the link. Link attributes apply to the link when the RSCS operator activates it by a START command.

Additional RSCS Considerations

When defining the IBM Personal Computer/RSCS interface, the following also should be considered:

- RSCS converts word-processing control characters to periods (".") in nontransparent print output.

- Unless TEXT is specified at signon, RSCS converts lowercase characters to uppercase in nontransparent print output.

- Data sets can be concatenated via the SPOOL DEV CONT command.

- The one-line file ID header printed by CMS print can be avoided by using the CMS MOVE command to print files or by printing the file with the carriage control parameter.

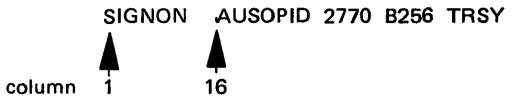
- The RSCS SIGNON buffer size operands must be larger than the maximum expected print lines.

Sending Commands and Data to RSCS

After the RSCS operator initializes the appropriate NPT task (START LINKID) and the communication link is established, the IBM Personal Computer must sign on to RSCS in order to send or receive data. The signon can be created at the IBM Personal Computer as a regular Card Image document and placed as the first job in the send queue.

Note: RSCS commands do not have to be in uppercase..

An example of an RSCS SIGNON command with the operands necessary for an IBM Personal Computer follows. The command is queued and sent as a normal send job.



AUSOPID

LinkID. The IBM Personal Computer's assigned location identifier. This must match

the NPT task linkid of the START command, or the signon will be rejected.

2770

Type. The IBM Personal Computer is emulating an IBM 2770 terminal.

B256

Line buffer extension. The size (in bytes) of the line buffer extension.

TRSY

Transparency. TRSY indicates the BSC Licensed Program will operate in transparent mode.

Once the signon is complete, the IBM Personal Computer operator can use the RSCS commands and procedures for transferring files that are described in the RSCS reference and operations manual.

Access to RSCS and VM/370 is terminated by the LOGOFF command.

Refer to the appropriate RSCS programming guide for your system for further information about RSCS control statements and commands.

IBM 3704/3705 Generation Parameters

When attaching an IBM Personal Computer as an RJE terminal, both a GROUP and a LINE macro instruction must be included in either the 3705 Partitioned Emulator Program (PEP), or Emulator Program (EP) configuration:

- A GROUP macro instruction indicates the beginning of a sequence of LINE macros for lines within a group. The macro mainly is used to specify whether the lines are switched or nonswitched and for asynchronous or binary synchronous communication. Other operands can specify characteristics that all lines in the group have in

common or procedural options applied to all lines in the group.

- A LINE macro instruction represents one communication line attached to the communication controller and specifies operating parameters such as the address in the communication controller to which the line is attached and the speed of the line.

Refer to the appropriate 3704/3705 control program generation and utilities guide for your system for further information about these macro instructions and all of the operands associated with them.

CICS/VS BTAM

The IBM Personal Computer is supported as a remote nonprogrammable BSC terminal by the Customer Information Control System/Virtual Storage (CICS/VS). CICS/VS is an IBM System/370 program product that controls online Data Base/Data Communication (DB/DC) applications. CICS/VS and the applications under its control run under any System/370 virtual storage operating system—DOS/VS, OS/VS1, or OS/VS2 (SVS or MVS).

Together with the Basic Telecommunication Access Method (BTAM), CICS/VS supports the IBM Personal Computer using the BSC Licensed Program as a 2770/3780 Communications Terminal.

Generation Parameters for CICS

Before an IBM Personal Computer can be used as a VM terminal, the DFHTCT macros must be coded to specify the appropriate (1) data set control information, (2) communication lines, and (3) terminal types for BSC switched and leased lines.

Refer to the IBM Customer Information Control System/Virtual Storage (CICS) System Programmer's Reference Manual for information about macro instructions.

Special Programming Considerations

Some special considerations are dependent on which host environment is in use. On the following pages, special programming considerations for Remote Job Entry, RES, IBM OS/VS2 JES2, VM/370 RSCS, and CICS/VS are discussed.

Remote Job Entry (RJE) Considerations

Remote job entry programs such as RES, JES 2, and JES 3 will make the IBM Personal Computer look like a local card reader, punch, and printer to an application program. Any application program that receives input from a local card reader, writes to a local printer, or punches to a local punch can communicate with an IBM Personal Computer via RJE support without programming changes. Modifications to JCL may be required to specify a terminal destination on the system output card. Even this may not be necessary if the job output is sent to the same IBM Personal Computer that entered the JCL to start the job.

Although the IBM Personal Computer can be made to look like a local card reader, punch, or printer by an RJE program, it has several features which are not found on unit record equipment.

The BSC Licensed Program is primarily for text document communication. As such, the data sent from or received at an IBM Personal Computer should be viewed as variable length lines rather than punched-card records of 80 characters or less. It is possible, for instance, to record a single line up to 5000 characters long on a magnetic card. The IBM Personal Computer output may also contain word-processing control characters that are not part of the standard EBCDIC Code Set. In order for existing RJE and application programs to work with these records, the BSC Licensed Program has setup options that control the way data is presented to the CPU. They are the Block Size, Record Length and Transparency options.

Data transmitted to the IBM Personal Computer in nontransparent mode may be sent using the PRINT option, but for data sent in transparent mode, the PUNCH option must be selected.

Magnetic card code is converted to and from standard EBCDIC by the BSC Licensed Program. Since magnetic card code is a 7-bit code, only EBCDIC code points which represent supported graphics or EBCDIC/WP word-processing control characters can be recorded.

Inputting JCL Statements

JCL statements should always terminate with a Carrier Return and never a Page End character. This will ensure that the CPU will receive and interpret the transmitted system control records correctly.

The BSC Licensed Program does not automatically convert alphabetic characters to uppercase. JCL must be typed in uppercase. Commas and periods (normal in JCL) may be typed with the shift lever down for convenience. This poses a problem if keyboard ID 100 or 102 is selected as the input keyboard. Normally the BSC Licensed Program will map uppercase/lowercase commas to the same code point for transmission and uppercase/lowercase periods to another code point for transmission. In the case of keyboards IDs 100 or 102 uppercase/lowercase commas and uppercase/lowercase periods are four different code points. The positions occupied by uppercase comma and uppercase period on the keyboard do not represent commas and periods respectively for keyboard ID 100 or 102. Mistakes in use of uppercase comma and/or period with keyboard IDs 100 or 102 will result in JCL errors.

Word-Processing Control Characters In The Output

Since most RJE terminals do not support word-processing characters, some convert these characters to X'00' or X'40' when they are found in nontransparent output data. If line endings are not changed (adjust or justify) and lines are not greater than 80 characters, this conversion can be avoided by transmitting the data in the Transparency=Yes and Insert NL=No or Insert NL=Yes mode.

Horizontal Tabs

Some RJE terminals have a horizontal format control option that can be specified when the RJE is SYSGENed. This option should not be specified for use with an IBM Personal Computer.

Addition and Deletion of Blanks

IBM Mag Card II keying rules state that the user should insert two blanks between a period and a Carrier Return when in adjust mode.

RJE terminals delete trailing blanks in nontransparent data and add trailing blanks in nonblocked transparent data.

The deletion of trailing blanks can cause a line ending in a period and two blanks to print with just one blank following the period if the data is adjusted so that the period does not end the line. The BSC Licensed Program converts a Carrier Return (CRE) to a blank in adjust mode if it is preceded by two or more blanks.

The user can avoid the deletion or addition of blanks by transmitting data in Transparency=Yes, Page Image=Yes mode.

ESC Sequences

In addition to the usual word-processing control characters, ESC sequences are honored so that formatting of SYSOUT data can be performed.

The ESC sequences honored by the BSC Licensed Program follow. These sequences can occur in data at any time within a line, but are not executed until a line-ending character occurs.

7-bit/DP Code Sequence	EBCDIC/DP&WP Code Sequence	Operation performed after Printing
ESC Q	ESC /	Single Vertical Space
ESC R	ESC S	Double Vertical Space
ESC S	ESC T	Triple Vertical Space
ESC A	ESC A	Page Eject
ESC M	ESC M	ZICR

The BSC Licensed Program honors no other escape sequences.

RES Considerations

Horizontal Format Control should not be specified.

Output Separators

VS1 output separators do not need to be specified.

Transparency

Although RES will, under certain circumstances, allow the special word-processing control characters to pass without translation in nontransparent data, it is recommended that these characters only be transmitted to the IBM Personal Computer as transparent data to avoid any translation at all.

Hyphen/Required Hyphen

The BSC Licensed Program uses a syllable hyphen to split words across line boundaries ('adjust' or 'justify'). The hyphen currently defined in the EBCDIC/DP code chart is recognized by the BSC Licensed Program as a required hyphen. It is recommended, therefore, that a hyphen entered in a CPU data base not be used in that data for syllabication unless that the IBM Personal Computer not process data for 'adjust' or 'justify'.

Print Format Control

RES begins a 'print' data set in such a way that text processing is affected. Printing begins with an ESCA - blank - ESC/ sequence which causes the BSC Licensed Program to insert a leading blank page followed by the recorded data.

RES ends a 'punch' data set with three blank 80-character records. This action is taken to clear out all punch stations at what RES believes is an IBM 2770 or 3780. These three records are supplied in both transparent and nontransparent data streams and will be considered by the BSC Licensed Program to be part of the text.

IBM OS/VS2 JES2 Considerations

&BSHTAB=NO
Should be specified with the IBM Personal Computer to avoid format control.

&TPIDCT=0
Can be specified if the user does not want separator pages.

&PRTRANS=NO
Should be specified so that lowercase is not converted to uppercase.

&WAITIME=
Specifies the time between jobs. A value could be specified to allow a time interval between

jobs so that the IBM Personal Computer operator can send data before the output queue empties.

RMTnnn 2770/3780 DISCINTV=0
Will prevent the terminal from being disconnected on inactivity. Infinite WACKs TTDs, NAKs and ENQs issued by the BSC Licensed Program are considered inactivity by JES II.

RMTnnn 2770/3780 NOTABS
Also turns off horizontal format control.

RNNN.PRm NOSEP
Stops separators on the printer.

Rnnn.PRM SUSPEND
Allows interrupt of output at the printer.

Rnnn.PUm NOSEP
Stops separators on the punch.

Rnnn.PRm SUSPEND
Allows interrupt of output at the punch.

VM/370 RSCS Considerations

Signon to RSCS

Before the IBM Personal Computer can sign on to the host as a remote terminal, the RSCS operator must have started the appropriate task for that link at the host.

Once the operator has successfully started the appropriate task, a SIGNON card must be submitted as a unique job from the IBM Personal Computer. After an acknowledgement of the SIGNON message has been received at the IBM Personal Computer the operator may then enter other commands and data.

General Considerations

RSCS converts word-processing control characters to periods (".") in nontransparent output.

RSCS converts lowercase characters to uppercase in nontransparent output unless TEXT option is used.

Data sets can be concatenated via the SPOOL DEV CONT command.

The one-line file ID header printed by CMS print can be avoided by using the CMS MOVE command to print files.

The RSCS SIGNON buffer size parameters must be larger than the maximum expected print lines.

A complete description of the SIGNON and other RSCS remote Operator commands, with detailed formats, can be found in the IBM VM/370 RSCS User's Guide.

CICS/VS Considerations

Record Deblocking for Nontransparent Transmissions

Data received from an IBM 2270/3780 is deblocked to ETX, ETB, RS, and US characters. These characters are moved with the data to the TIOA but are not included in the data length (TIOATDL). The application programmer should be aware that such characters as NL, CR, and LF are passed in the TIOA as data.

The application programmer should always check for an RS/IRS (x'1E') in the TIOA when working with textual data since the IRS represents the Carrier Return recorded on the card at the end of that line of data. The IRS along with the data should be written to the data base.

One effect of this deblocking is that if multiple null lines are transmitted to CICS/VS in nontransparent mode, these null lines will be deleted by the deblocking routine and will not

be passed to the application program. This means that the paragraph boundaries are destroyed. If the data is transmitted using the Transparency=Yes and Page Image=Yes options, all characters will pass through the deblocking routine unaltered.

Record Deblocking for Transparent Transmissions

With one exception, no deblocking is done for transparent transmissions from the terminal. The exception to that rule is the handling of a buffer containing a terminal identification (TRMIDNT in TCT) for switched operations that is transmitted using Transparency=Yes and Card Image=Yes.

If the only data recorded in the job is the four character TRMIDNT (followed by a Carrier Return), the transmitted buffer will contain the terminal ID (TRMIDNT) followed by an IRS (X'1E') and 75 blanks to pad the transmitted record to 80 characters. CICS/VS deblocks the buffer two records, one containing the four character TRMIDNT and one containing the 75 blanks. CICS/VS examines the record of blanks for a valid transaction ID. Not finding one, CICS/VS issues an error message. This deblocking can be prevented by using Card Image=Yes to transmit the TRMIDNT.

Invalid Page End Codes

When identifying the terminal to CICS/VS, Card Image=Yes should be specified. This will prevent Page End characters from being sent as a part of the terminal identifier. An invalid terminal identifier will cause CICS/VS to disconnect the terminal.

RVI

RVIs generated by CICS/VS can be a problem since the IBM Personal Computer cannot temporarily suspend transmission to receive a message. By observing the following guidelines most of the RVI associated problems can be eliminated.

- An application program should not issue a message to the IBM Personal Computer until all data has been read.

- For existing applications which may issue messages, such as at the beginning of data collection, do not enter any data until the messages have been received.

- For all applications, do not enter another transaction ID or its data from the terminal until all messages from the current transaction have been received.

- After identifying the terminal to CICS/VS, do not enter transaction IDs or data until the READY has been received by the terminal.

- Do not use the terminal with inherently interactive transactions.

If an invalid transaction ID is detected by CICS/VS or an error is detected by an application program, an RVI will probably be issued by CICS/VS preparatory to returning an error message to the terminal.

Asynchronous Transaction Processing

The asynchronous transaction processing facility (ATP) can be used to avoid many of the problems associated with RVIs. Data should be entered using Transparency=Yes and Page Image=Yes.

Host Access Method Considerations

BTAM

Depressing the Comm Disc key on the IBM Personal Computer can result in an EOT being sent to the application program. Since an EOT is detectable by BTAM, programs should designed to interrupt a CANCEL condition and perform a true cancellation.

When BTAM receives on NAK to an ENQ, an error message is generated at the CPU. When BTAM receives seven TTDs, an error message is generated at the CPU.

The user should use caution with the READ INTERRUPT (TRV) macro since it causes issuance of an RVI to the terminal.

EP

The EP should be SYSGENed to handle unlimited WACKs and TTDs. This is done by specifying WACKCNT at 225 and TTDCNT at 255 in the GROUP macro. In the BUILD macro, ENABLTO should specify the count to be 4.5 seconds or greater to allow enough time to connect.

The application programmer should be aware that in a communication network utilizing high function TP controllers such as the 370X/EP, the application does not have control over the link level protocol and as a result may encounter difficulty making use of some BSC Licensed Program features such as the Session ID exchange since they depend to some extent on link level considerations.

Notes:

1. The data set to which the document is being sent should be opened at a CICS master terminal.

2. If using a switched line, the first document sent to the CPU should consist only of the terminal identification, TRMIDNT in the TCT of your CICS system generation, in the first four character positions.

3. Three appended documents are required for sending a document to the CPU:

    - The first should only consist of the transaction ID, RCV1, in the first four character positions and should be sent card image.

- The second should be the document to be stored by the CPU and should be sent page image.

- The third should consist of the characters, EOJ, on the first three character positions and should be sent card image.

The data set to which the document was sent should be closed at the CICS master terminal.

Appendix A. Data Stream Translation Tables

Line Code Translates

The BSC Licensed Program internal data stream is based on EBCDIC/Multilingual, a code set different from the EBCDIC/DP, EBCDIC/WP, and 7-Bit/DP code sets used with Page Image and Card Image data streams. Because of this, the BSC Licensed Program must translate to or from EBCDIC/Multilingual the Page Image and Card Image data that is transmitted across the data link. This translation is based on:

- The IBM Personal Computer's send/receive state
- The type of data stream
- The type of line code (EBCDIC or 7-Bit)
- The data stream's Coded Graphic Character Set (CGCS)
- The current internal multilingual page.

Graphic Codes

For Page Image and Card Image data, the translation of a number of graphics to and from line code depends only on whether EBCDIC or 7-Bit code is in use. The translation of all other graphics is based on the active character set and the line code in use.

The control code acronyms used in this chapter are defined in the chart that follows on the next page.

ACK	Acknowledge	NBS	Numeric Backspace
BEL	Bell	NL	New Line; Carrier Return
BS	Backspace	NSP	Numeric Space
CAN	Cancel	NUL	Null
CR	Carriage Return (ZICR)	POC	Program-Operator Comm.
CUn	Customer Use/	PP	Presentation Position
DCn	Device Control/	RES	Restore
DEL	Delete	RFF	Required Form Feed
DLE	Data Link Escape	RHY	Required Hyphen
DS	Digit Select	RNL	Required New Line
EM	End of Medium	RPT	Repeat
ENQ	Enquiry	RS	Record Separator
EO	Eight Ones	RSP	Required Space
EOT	End of Transmission	SBS	Subscript
ESC	Escape	SEL	Select
ETB	End of Transmission Block	SHY	Syllable Hyphen
ETX	End of Text	SI	Shift In
FF	Form Feed	SO	Shift Out
FMT	Format	SOH	Start of Header
FS	Field Separator	SOS	Start of Significance
GE	Graphic Escape	SP	Space
GS	Group Separator	SPS	Superscript
HT	Horizontal Tab	STP	Stop or Bell
HYP	Hyphen	STX	Start of Text
IFS	Interchange File Separator	SUB	Substitute
IGS	Interchange Group Separator	SW	Switch
INP	Inhibit Presentation (Bypass)	SYN	Synchronous Idle
IRS	Interchange Record Separator	TRN	Transparent
IRT	Index Return	UBS	Unit Backspace
IT	Indent Tab	US	Unit Separator
IUS	Interchange Unit Separator	VT	Vertical Tab
LF	Line Feed or Index	WUS	Word Underscore
NAK	Negative Acknowledge	/nn	

Control Codes

When sending Page Image and Card Image data, EBCDIC/Multilingual controls are translated according to the following charts. For Page Image data, the EBCDIC/WP and 7-Bit columns are used. For Card Image data, the EBCDIC/DP and 7-Bit columns are used.

When receiving Page Image or Card Image data, the same rules apply to the translation of EBCDIC/WP, EBCDIC/DP, and 7-Bit/DP control codes into EBCDIC/Multilingual.

Notes:

1. Although the BSC Licensed Program can support all the control codes, the IBM Personal Computer may not support all of them.

2. For information about the variable graphics in Revisable-form Text data streams, refer to *Document Content Architecture, Revisable-form Text*.

Transmit Control Translates for Non-Revisable-Form Text

On-Line Representation	EBCDIC Multilingual	EBCDIC WP	EBCDIC DP	7-Bit DP
00	NUL	#	#	#
01	SOH	SOH	SOH	SOH
02	STX	STX	STX	STX
03	ETX	#	#	#
04	SEL	#	#	#
05	HT	HT	HT	HT
06	RNL	RNL	IRS*	RS*
07	DEL	DEL	DEL	DEL
08	GE	#	#	#
09	SPS	SPS	#	#
0A	RPT	RPT	#	FF@
0B	VT	VT	VT	VT
0C	FF	FF	#	FF@
0D	CR	CR	IRS*	CR*
0E	SO	SO	SO	SO
0F	SI	SI	SI	SI
10	DLE	#	#	#
11	DC1	DC1	DC1	DC1
12	DC2	DC2	DC2	DC2
13	DC3	DC3	DC3	DC3
14	RES	#	#	#
15	NL	NL	IRS*	RS*
16	BS	BS	BS	BS
17	POC	#	#	#
18	CAN	CAN	CAN	CAN
19	EM	#	#	#
1A	UBS	UBS	#	#
1B	CU1	#	#	#
1C	IFS	IFS	IFS	FS
1D	IGS	#	#	#
1E	IRS	IRS	IRS*	RS*
1F	IUS	#	#	#
20	DS	#	#	#
21	SOS	#	#	#
22	FS	#	#	#
23	WUS	WUS	#	#
24	INP	#	#	#
25	LF	LF	LF	LF
26	ETB	#	#	#
27	ESC	ESC	ESC	ESC

ON-Line Representation	EBCDIC Multilingual	EBCDIC WP	EBCDIC DP	7-Bit DP
28	reserved	#	#	#
29	reserved	#	#	#
2A	SW	SW	#	#
2B	FMT	FMT	#	#
2C	reserved	#	#	#
2D	ENQ	#	#	#
2E	ACK	ACK	ACK	ACK
2F	BEL	BEL	BEL	BEL
30	reserved	#	#	#
31	reserved	#	#	#
32	SYN	#	#	#
33	IRT	IRT	IRS*	RS*
34	PP	#	#	#
35	TRN	#	#	#
36	NBS	NBS	BS	BS
37	EOT	#	#	#
38	SBS	SBS	#	#
39	IT	IT	HT	HT
3A	RFF	RNL	IRS*	RS*
3B	CU3	#	#	#
3C	DC4	DC4	DC4	DC4
3D	NAK	#	#	#
3E	reserved	#	#	#
3F	SUB	SUB	SUB	SUB
40	SP	SP	SP	SP
41	RSP	RSP	SP	SP
60	HYP	RHY	RHY	RHY
CA	SHY	SHY	RHY	RHY
E1	NSP	NSP	SP	SP
42-FE	Any invalid graphic			
FF	EO	∓	∓	∓

Notes:

1. # Deleted from data stream.

2. * Deleted from data stream in 2770/3780 transparent and 2780 (transparent or non-transparent) Card Image.

3. @ Deleted from data stream in Card Image.

Receive EBCDIC Control Translates for Non-Revisable-Form Text

EBCDIC/WP and EBCDIC/DP Received	EBCDIC/DP Meaning	EBCDIC/Multilingual Displayed/Recorded
00	NUL	@
01	SOH	SOH@@
02	STX	STX@@
03	ETX	ETX@@
04	SEL	SEL
05	HT	HT
06	RNL	RNL
07	DEL	@
08	GE	GE
09	SPS	SPS
0A	RPT	RPT
0B	VT	VT
0C	FF	FF
0D	CR	CR
0E	SO	SO
0F	SI	SI
10	DLE	DLE@@
11	DC1	@
12	DC2	@
13	DC3	@
14	RES	RES
15	NL	NL
16	BS	BS
17	POC	POC
18	CAN	CAN
19	EM	NL
1A	UBS	UBS
1B	CU1	CU1
1C	IFS	IFS
1D	IGS	IGS#
1F	IUS	IUS@@
20	DS	DS
21	SOS	SOS
22	FS	FS
23	WUS	WUS
24	INP	INP
25	LF	LF

EBCDIC/WP and Received	EBCDIC/DP Meaning	EBCDIC/Multilingual Displayed/Recorded
26	ETB	ETB@@
27	ESC	ESC#
28	reserved	@
29	reserved	@
2A	SW	SW
2B	FMT	FMT
2C	reserved	@
2D	ENQ	ENQ@@
2E	ACK	ACK
2F	STP	STP
30	reserved	@
31	reserved	@
32	SYN	SYN@@
33	IRT	IRT
34	PP	PP
35	TRN	TRN
36	NBS	NBS
37	EOT	EOT@@
38	SBS	SBS
39	IT	IT
3A	RFF	RFF
3B	CU3	CU3
3C	DC4	@
3D	NAK	NAK@@
3E	reserved	@
3F	SUB	SUB
40	SP	SP
41	RSP	RSP
60	HYP	HYP
CA	SHY	SHY
E1	NSP	NSP
42-FE	Any Invalid Graphic	SUB
FF	EO	@

Notes:

1. @ Deleted from data stream.

2. # Character plus following character converted and removed from data stream.

3. @@ Deleted when used as data link control.

Receive 7-Bit Control Translates for Non-Revisable-Form Text

7-Bit/DP Received	Meaning	EBCDIC/Multilingual Displayed/Recorded
00	NUL	@
01	SOH	SOH@@
02	STX	STX@@
03	ETX	ETX@@
04	EOT	EOT@@
05	ENQ	ENQ@@
06	ACK	ACK
07	BEL	STP
08	BS	BS
09	HT	HT
0A	LF	LF*
0B	VT	VT
0C	FF	FF
0D	CR	CR*
0E	SO	SO
0F	SI	SI
10	DLE	DLE@@
11	DC1	@
12	DC2	@
13	DC3	@
14	DC4	@
15	NAK	NAK@@
16	SYN	SYN@@
17	ETB	ETB@@
18	CAN	CAN
19	EM	NL
1A	SUB	SUB
1B	ESC	ESC#
1C	FS	FS
1D	GS	GS#
1E	RS	NL
1F	US	IUS@@
20	SP	SP
7F	DEL	@

Notes:

1. *@ Deleted from data stream.*
2. ** Received CR-LF sequence converted to RNL.*
3. *# Character plus following character converted and removed from data stream.*
4. *@@ Deleted when used as data link control.*

Fixed Graphics

ON-line 7-Bit Representation	Graphic	ON-line and Internal EBCDIC Representation
2C	,	6B
2D	–	60
2E	.	4B
2F	/	61
30	0	FO
31	1	F1
32	2	F2
33	3	F3
34	4	F4
35	5	F5
36	6	F6
37	7	F7
38	8	F8
39	9	F9
3A	:	7A
3F	?	6F
41	A	C1
42	B	C2
43	C	C3
44	D	C4
45	E	C5
46	F	C6
47	G	C7
48	H	C8
49	I	C9
4A	J	D1
4B	K	D2
4C	L	D3
4D	M	D4
4E	N	D5
4F	O	D6
50	P	D7
51	Q	D8
52	R	D9
53	S	E2
54	T	E3

ON-line 7-Bit Representation	Graphic	ON-line and Internal EBCDIC Representation
55	U	E4
56	V	E5
57	W	E6
58	X	E7
59	Y	E8
5A	Z	E9
5F	¯	6D
61	a	81
62	b	82
63	c	83
64	d	84
65	e	85
66	f	86
67	g	87
68	h	88
69	i	89
6A	j	91
6B	k	92
6C	l	93
6D	m	94
6E	n	95
6F	o	96
70	p	97
71	q	98
72	r	99
73	s	A2
74	t	A3
75	u	A4
76	v	A5
77	w	A6
78	x	A7
79	y	A8
7A	z	A9

Appendix B. BSC Support for Remote Location OCL

The BSC Licensed Program OCL support for communication enables the IBM Personal Computer and other word-processing products to exchange and print simple text documents. When exchanged, these documents should be print-ready; any required pagination or editing should be done before they are sent or received.

When sending a print-ready document, the BSC Licensed Program transmits any OCL that you have keyed into the text with the rest of the document. It does not process the OCL. When receiving a document, the BSC Licensed Program treats unrecognized OCL commands as text and ignores unsupported OCL instructions.

These operating characteristics affect documents that specify:

- Mid-line keyboard changes. A document sent from an IBM Personal Computer cannot specify a keyboard change except when sent to an IBM 6670. Underscore codes replace all graphics the initial document keyboard ID does not support.

- Mid-line typestyle changes. Mid-line typestyle changes are sent and received as Stop codes except when sent to an IBM 6670. An IBM Personal Computer or remote operator can edit received text for these Stop codes. When communicating with an IBM 6640, you can indicate a mid-line typestyle change by preparing a Stop list and inserting a ,STOP subcommand at the beginning of the document.

- Headers and Footers. When sending a document with headers and footers, the BSC Licensed Program merges them with the text and does centering. If the document requires repagination, the receiving operator must manually reposition the headers and footers.

When receiving a document with headers and footers, the BSC Licensed Program recognizes headers and footers specified with the ,MARGIN command.

Sending Documents

The OCL data stream the BSC Licensed Program generates to represent a document always has the following basic form:

,NAME

IBM Personal Computer Document Comment

,PRINT

Text-processing instructions for the initial format

Page-end Code

Text

(Imbedded in the text may be any number or combination of the following:

,MODIFY

Text-processing instructions for a format change

,END

OCL Commands and Instructions Generated by the BSC Licensed Program

When sending a document, the BSC Licensed Program generates the following OCL commands and instructions when necessary:

```
,IDENTIFICATION          FIRST LINE 3
,NAME                    INPUT X Y
,PRINT X                 INTERLINE SPACING X Y
,MODIFY                  MARGIN X
,END                     OUTPUT X
,DEFINE                  QUANTITY X
PLAY X                   TABS X1....Xn
ADJUST X1                JUSTIFY X1
```

,IDENTIFICATION

Causes the IBM Personal Computer and the receiving machine to exchange and check IDs at the beginning of a communication session.

,NAME

Indicates IBM Personal Computer document comments. These comments may contain special characters that are available only on certain keyboards. When sent via the ,NAME command, the special characters will be garbled if the IBM Personal Computer and the receiving machine do not specify the same default keyboard that has these characters.

,PRINT X

Indicates the start of document text-processing parameters. The BSC Licensed Program only generates the X operand if the active setup specifies IBM 6670 Print Options. The value generated for X will be in the range 100 - 107.

,MODIFY

Indicates a page or line format change. Text-processing instructions that follow specify new values for the changed format parameters. Permitted instructions are:

```
INPUT          TABS
PLAY           OUTPUT
ADJUST         INTERLINE SPACING
JUSTIFY        MARGIN
```

Notes:

1. No Y operand is generated for INPUT commands generated with ,MODIFY.

2. Mid-line typestyle changes are represented as Stop codes.

,END

Indicates the end of OCL that specifies text-processing formats.

,DEFINE

Used only when IBM 6670 Print Options are specified for the active setup. The only code defined is the Stop code, which is defined as an OCL delimiter.

PLAY X

Specifies that the receiving machine should honor all normal line-end codes when printing the document. The text will not be adjusted or justified.

X indicates the right margin.

ADJUST X 1

Specifies a 50% justification on the text of a document. All syllable hyphens (except those preceding a line-end code) are deleted from the text and become valid line-end points.

X specifies a right margin with a value of n.

The 1 specifies that all input line endings are preserved.

JUSTIFY X 1

Specifies a 100% justification on the text of a document. All syllable hyphens (except those preceding a line-end code) are deleted from the text and become valid line-end points.

X specifies a right margin with a value of n.

The 1 specifies that all input line endings are preserved.

FIRST LINE 3

Indicates the first line for printed text. FIRST LINE always is set at 3. If the first line with graphic content is after 3, indexes are inserted. If graphics occur above line 3, the entire page is shifted down.

INPUT X Y

Specifies the pitch and character arrangement of the input keyboard.

X specifies the pitch of the input keyboard:

X = 10 indicates 10 pitch (Pica).
X = 11 indicates 11 pitch (Proportional, PSM)
X = 12 indicates 12 pitch (Elite).

Y specifies the character arrangement of the input keyboard. See Appendix C, "Keyboard ID (Code Set) Considerations," for a complete listing of the available keyboards.

Note: INPUT and OUTPUT always specify the same pitch. For Proportional pitch, this may cause a tab overrun or underrun and a columnar shift at the receiving machine, since odd-numbered tab stops may be truncated during the character-to-Pica conversion.

INTERLINE SPACING X Y

Specifies both the number of lines to space for each indexing operation of the printer and the number of lines to print per inch.

X specifies the number of lines to space per index. Permitted values are 0.5, 1.0, 1.5, 2.0, and 3.0. Other values indicate an error condition.

Y specifies the number of lines to print per inch. Permitted values are 5.3, 6.0, and 8.0. Other values indicate an error condition.

MARGIN X

Specifies the left margin. X is the leftmost printing position.

OUTPUT X

Defines the pitch and style of the font to be used for printing. X indicates the assigned ID of the output font.

Note: When sending ID 202 and 203, use the following parameters:

INPUT 1 Y
OUTPUT 192 or OUT 193

QUANTITY X

The BSC Licensed Program only generates this instruction if the setup specifies IBM 6670 Print Options. X will be the value defined for the Number of Copies option.

TABS X1....Xn

Sets tab stops at values X1....Xn from the left edge of the paper and clears all previous tab stops. When X has more than one value, the values are in ascending numerical order. For example,

TABS 5 10 15

sets stops at 5, 10, and 15 relative to the left edge of the paper.

Margin and tab specifications are sent in characters if the pitch is 10 or 12. They are sent in Picas if the pitch is 11 (PSM).

Note: The BSC Licensed Program never generates this instruction with only one

operand. For a single tab or for multiple tabs, it always generates:

TABS X1 X2....Xn

where X1 = X2.

Because of this, the BSC Licensed Program never generates an instruction for a tab grid.

Receiving Documents

The BSC Licensed Program recognizes and processes the following OCL commands and instructions:

,PRINT	PLAY X
,FILE	ADJUST X
,POSTAL	JUSTIFY X
,SEGMENT	FIRST LINE X
,IDENTIFICATION	INPUT X Y
,INFORMATION	INTERLINE SPACING X Y
,NAME	LAST LINE X
,COVER	MARGIN X
,END	OUTPUT X
,FEED	SCAN ADJUST X Y
,KEEP X	TABS X1....Xn
,MARGIN TEXT X Y	
,MODIFY	

,PRINT

Creates a text document from the data that follows the command. The text document is formatted according to the current text-processing format on the the program disk. The text-processing format may be modified temporarily by OCL instructions that follow the ,PRINT command.

Note: The BSC Licensed Program ignores both a MERGE instruction and an X operand that specifies an option list.

,FILE

The BSC Licensed Program treats this as ,PRINT.

,POSTAL

The BSC Licensed Program treats this as ,PRINT.

,SEGMENT

The BSC Licensed Program treats this as ,PRINT.

,IDENTIFICATION

Causes the IBM Personal Computer and the receiving machine to exchange and check IDs at the beginning of a communication session.

,INFORMATION

Specifies that the file is to be used as information text and output as part of the Session Summary at the IBM Personal Computer.

,NAME

Interpreted as a document comment for the text document that follows. The comments may contain characters available only on certain keyboards. When received via the ,NAME command, the special characters will be garbled if the sending machine and the IBM Personal Computer do not specify the same default keyboard.

,COVER

Causes the BSC Licensed Program to terminate the current output page regardless of the last line specification, and format the next page according to the command's instructions. Possible instructions are:

INPUT	MARGIN
PLAY	OUTPUT
ADJUST	INTERLINE SPACING
JUSTIFY	SCAN ADJUST
FIRST LINE	LAST LINE
TABS	

,COVER is permitted anywhere within the text of a job. Margin text is inhibited for the next page, and only the page of text immediately following the command and its instructions is printed on the page. Succeeding pages are treated as normal text for the current job. Because of this, each page that is different from the current job requires a separate ,COVER command.

,END

Indicates the end of OCL that specifies text-processing formats.

,FEED

Causes the BSC Licensed Program to terminate the current output page regardless of the last line specification.

,KEEP X

Governs page boundary decisions made by the paginator. A ,KEEP or ,KEEP 1 command stops the paginator from making page boundary decisions for the text that follows. A ,KEEP 0 command allows the paginator to make page boundary decisions.

,MARGIN TEXT X Y

Identifies a file that has headers and/or footers and specifies where this margin text is to appear.

The BSC Licensed Program always must receive two ,MARGIN TEXT commands. It uses the first command for the top margin text and the second command for the bottom margin text.

The OCL for documents with top margin text should be only:

,MARGIN TEXT n n
,MARGIN TEXT n 0

The OCL for files with bottom margin text should be only:

,MARGIN TEXT n 0
,MARGIN TEXT n n

In both cases, 0 for the Y operand causes the BSC Licensed Program to turn off the indicated margin text for all successive pages.

Note: Margin text cannot overlap the main text of a document (the area between the active first line and last line). If it does, an error condition occurs. X specifies the first line on which top or bottom margin text is to appear:

X = 0	Specifies margin text off.
X = n	Specifies the beginning of margin text as n.
X = b	Specifies the machine default.

If X is less than the machine minimum or greater than the machine maximum line number, an error condition occurs.

Y specifies the page on which the top or bottom margin text is to appear. For the BSC Licensed Program, only the current or the next page can be specified.

Y = 0	Specifies turn off the top or bottom margin text.
Y = 1	Specifies begin margin text on the first or the current page.
Y = 2,b	Specifies begin margin text on the next page.

,MODIFY

Indicates a page or line format change. Text-processing instructions that follow specify new values for the format parameters that are changed.

Permitted instructions are:

INPUT X Y	SCAN ADJUST X Y
PLAY X	TABS X
ADJUST X	OUTPUT X
JUSTIFY X	INTERLINE SPACING X Y
FIRST LINE X	MARGIN X
LAST LINE X	

PLAY X

Specifies that the receiving machine should honor all normal line-end codes when printing the document. The text will not be adjusted or justified.

X indicates the right margin.

ADJUST X Y

Specifies a 50% justification on the text of a document. All syllable hyphens (except those preceding a line-end code) are deleted from the text and become valid line-end points.

X = n Use a right margin of n.
X = b Use the active right margin.

The Y parameter, which specifies whether line endings are preserved, is ignored. Line endings are always preserved when text is written to the disk. You may later manually edit the text or initiate an adjust operation.

JUSTIFY X Y

Specifies a 100% justification on the text of a document. All syllable hyphens (except those preceding a line-end code) are deleted from the text and become valid line-end points.

X = n Use a right margin of n.
X = b Use the active right margin.

The Y parameter, which specifies whether line endings are preserved, is ignored. Line endings are always preserved when text is written to the disk. You later may manually edit the text or initiate an adjust operation.

FIRST LINE X

Indicates the first line for printed text. Line one is the first print line of the sheet.

X = n	Start printing text on line n.
X = b	Use the active X value.

INPUT X Y

Specifies the pitch and character arrangement of the input keyboard.

X specifies the pitch of the input keyboard:

X = 10 indicates 10 pitch (Pica).
X = 11 indicates 11 pitch (Proportional, PSM).
X = 12 indicates 12 pitch (Elite).
X = b indicates use the active pitch.

Y specifies the character arrangement of the input keyboard. A value for Y equal to an unsupported keyboard indicates an error condition. See Appendix C, "Keyboard ID (Code Set) Considerations," for a complete listing of the available keyboards.

INTERLINE SPACING X Y

Specifies both the number of lines to space for each indexing operation of the printer and the number of lines to print per inch.

X specifies the number of lines to space per index. Permitted values are 0.5, 1.0, 1.5, 2.0, 2.5, and 3.0. Other values indicate an error condition.

Y specifies the number of lines to print per inch. Permitted values are 5.3, 6.0, and 8.0. Other values indicate an error condition.

LAST LINE X Y

Indicates the last line value to be used in determining page boundaries. The last line is determined by counting the first print line on the sheet as 1.

X = n Use a last line value of n.
X = b Use the active X value.

The Y parameter, which specifies whether repagination should be done, is ignored. Page boundaries will not be altered as text is written to the disk. You later may manually edit the text or perform a repagination.

MARGIN X

Specifies the left margin. X is the leftmost printing position.

OUTPUT X

Defines the pitch and style of the font to be used for printing. X indicates the assigned ID of the output font.

SCAN ADJUST X Y

Specifies (a) whether scan adjust is on or off and (b) the scan zone width.

This instruction alters line endings to fit the text within the specified right margin. It always takes the rightmost line ending within the Zone Width, which extends to the left of the right margin. Spacing between words and characters is not altered.

X indicates whether Scan Adjust is on or off.

X = 0 Scan Adjust off.
X = 1 Scan Adjust on.
X = b Specifies no change.

Y specifies the Zone Width as read from the input margin scale (characters in 10 or 12 pitch, Picas in PSM).

Y = n Use a Zone Width of n.
Y = b Use the active Zone Width.

TABS X1....Xn

Sets tab stops at values X1....Xn from the left edge of the paper and clears all previous tab stops.

If only one operand X is specified and its value is between 1 and 12, then a tab grid is set up at intervals of X relative to the left margin. If X has more than one value, the values are in ascending numerical order.

Examples:

Tabs 5 10 15	Sets stops at 5, 10, and 15 relative to the left edge of the paper.
Tabs 10	Sets stops every 10 positions relative to the left margin.

The following chart shows how the BSC Licensed Program calculates margin and non-grid tab settings in sixtieths of an inch from the left paper edge. Tabs for an input pitch of 10 or 12 use characters. Tabs for an input pitch of 11 (PSM) use Picas.

Input Pitch	Output Pitch	Margins	Fixed Tabs
10	10, PSM	6 x M	6 x T
12	12, PSM	5 x M	5 x T
10	12	6 x M	5 x T + LM
12	10	5 x M	6 x T − LM
PSM	10, 12, PSM	10 x M	10 x T

BSC Licensed Program Support of the Format Line

The BSC Licensed Program supports the MCII Format Line to allow for the exchange of print-ready documents with products such as the IBM MAG CARD II, IBM OS/6, IBM 6670, or IBM 5520. This feature provides a common level of format interchange among these and other word processing products.

The acronyms used in this description are:

BSP	Backspace
PFX	Prefix
RCR	Required Carrier Return
RSP	Required Space
SP	Space
STP	Stop
UBS	Unit Backspace
WUS	Word Underscore
Format C	X'2B' Code Point

Sending Format Lines

When you select a Page Image with Format Line data stream, format changes generate MCII Format Feature (MCII FF) controls or Stop codes according to the following guidelines:

1. A format change with changes supported by MCII FF generates the appropriate MCII FF controls. Each control complies with the following format:

PFX-STP-UBS(s)-WUS(s)-(B)SP-Space codes and Stop codes-STP-RCR

2. The Prefix-Stop sequence is sent as a Format C on the communication line.

3. A format change with changes not supported by MCII FF generates a Stop code.

4. A format change with a combination of Format A and C generates the appropriate combination of MCII FF controls and Stop codes.

5. A mid-line typestyle change (or return) generates a Stop code.

6. A format change with a left margin change generates a Stop code to allow for a manual margin change. MCII FF controls for the corresponding tabs and right margin follow the Stop code.

7. Line spacing of 1-1/2 is treated as 1. Line spacing of 3 is treated as 2.

Receiving Format Lines

When the BSC Licensed Program processes page image or card image data streams, it generates format changes to correspond to MCII FF controls. The basic format line is:

PFX-STP-controls-RCR at the left margin or acting left margin if an indent level is active

The following conditions apply for format line decode operations:

1. The Prefix-Stop sequence is received as a Format C on the communication line.

2. Invalid codes within a format line are ignored during control decode operations.

3. If conflicting controls exist, the last control decoded becomes effective.

4. For controls that require two successive codes, more than two codes are equivalent to two codes.

5. Controls not explicitly specified are considered "no change" operations.

Affected Format Line Controls

The format line controls affected are Scan Adjust, Line Spacing, and Tabs/Margin.

Scan Adjust: Scan Adjust is controlled by:

UBS	Scan Adjust On
UBS-UBS	Scan Adjust Off

Line Spacing: Line spacing is controlled by:

WUS	Single Spacing
WUS-WUS	Double Spacing

Tabs/Margin: Only one of these control sequences is allowed within a format line. Any Scan Adjust or Line spacing controls must precede the Tabs/Margin control. The following format line control clears tabs and sets new tabs (relative to the left margin) at each Stop code position. It also sets the right margin at the last Stop code position:

RSP-Space codes and Stop codes-STP-RCR

The following format line control clears all tabs:

RSP-STP-RCR

The following format line control changes the right margin without affecting tabs:

SP-Space codes-STP-RCR

Appendix C. Keyboard ID (Code Set) Considerations

The keyboard ID option on the Change Setup Session Options menu determines how a document is translated for communicating. The keyboard ID used when communicating information to a host computer is dependent on the program support of the host computer. In a host computer environment, the keyboard ID often is referred to as the Character Set ID. Check with your coordinator, or host network coordinator, for the correct Keyboard ID (Character Set ID) to use when creating documents to be sent to a host computer.

In order to send a text document as Page Image or Card Image, the BSC Licensed Program must translate the character data into line-codes. The receiving machine must translate the line-codes back into character data. Both machines perform the translation using keyboard IDs. For complete communication, both locations should use the same keyboard ID.

A text document contains not only data, but also the ID of the keyboard used to create that data. Using a send format of Page Image with OCL, the BSC Licensed Program sends this keyboard ID with the data and uses this keyboard ID to do the translation.

The receiving machine may not support all of the keyboard IDs supported by the BSC Licensed Program. You should use the Change Setup Session Options menu to specify a keyboard ID supported by the remote location.

Using send formats of Page Image text only, Page Image format line, and Card Image, the BSC Licensed Program cannot send the keyboard ID with the data stream. You must specify the keyboard ID to use for the translation. It should be the same keyboard ID assumed or specified at the receiving location.

When the BSC Licensed Program receives a data set, it may attempt to convert it to a text document. On receiving a document that contains OCL, the BSC Licensed Program looks for a keyboard ID to translate the data and stores that ID with the document. If a document is received that contains no OCL or the OCL does not specify a keyboard ID the BSC Licensed Program uses the keyboard ID you specify. It should be the same keyboard ID assumed or specified at the sending machine.

The keyboard ID option on the Keyboard Description menu defines what characters you get when typing on the engraved IBM Personal Computer keys. Only the engraved keyboard and one corresponding word processing (WP) or data processing (DP) keyboard can be specified as your home keyboard. The home keyboard does not affect how a document is communicated.

The BSC Licensed Program supports more keyboard IDs for line-code translation than most text programs support for keying, displaying, or printing.

National Language Keyboard Support

The IBM Personal Computer DP Keyboards supported for World Trade are slightly different from the DP Character Sets the host may expect. For instance, a document created on the IBM Personal Computer using the Spanish DP 246 keyboard should be sent and received using DP keyboard 305 as the specified Keyboard ID in the Change Setup Session Options menu. Spanish DP keyboard 305 is the closest match to IBM Personal Computer DP keyboard 246. There are some graphics on the normal DP keyboards that are missing on the IBM Personal Computer version of DP keyboards.

These considerations do not effect the character set if the WP keyboards are specified.

The following chart lists the IBM Personal Computer WP and DP keyboards supported and the DP keyboard IDs that should be specified in the Change Setup Session Options

menu for sending and receiving. Also listed are the graphics that IBM Personal Computer DP keyboards do not support. These graphics, if received, will be converted to underscores.

Keyboards Supported

There are twelve IBM Personal Computer (DP and WP) home keyboards supported for typing and displaying. These include:

Country	WP	IBM PC/DP	DP Keyboard to Specify for Sending and Receiving
U.S.	001	103-B	103
U.K.	067	252	313
France	251	248	289
Italy	041	247	293
Germany	029	249	265
Spain	045	246	305

Missing Graphics (Receiving Document)

IBM PC/ DP Keyboard	Missing Graphics
313	¦ ¯ \ ¬
289	None
293	ç #
265	None
305	None

Missing Graphics (Sending Document)

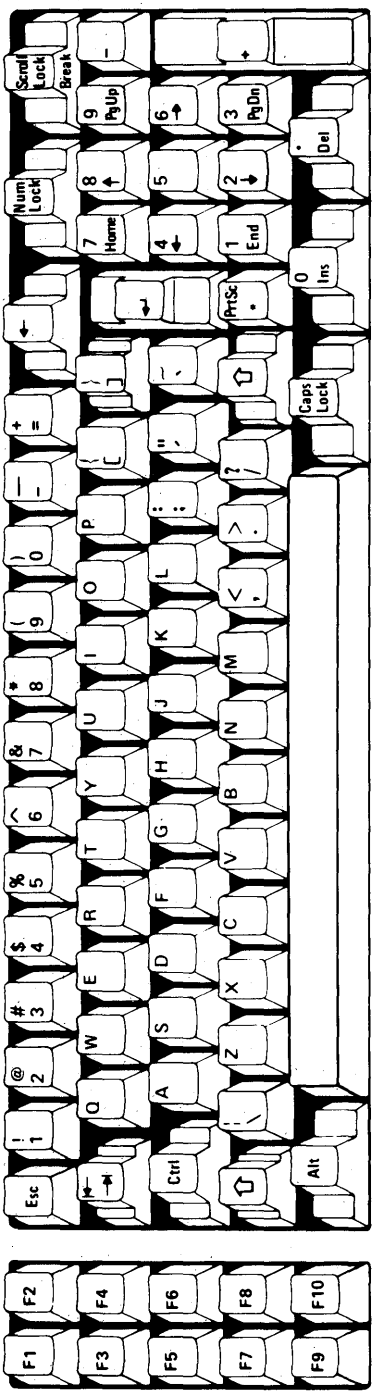
IBM PC/ DP Keyboard	Missing Graphics
252	^ ~] [
248	@ #] [\ ^
247	@ °] [\
249	@] [\
246	Ç ç ´ ^ ! ¡ ¿ $ #

The BSC Licensed Program can receive, convert, and handle keyboard ID (code sets) as outlined in the following keyboard extension chart.

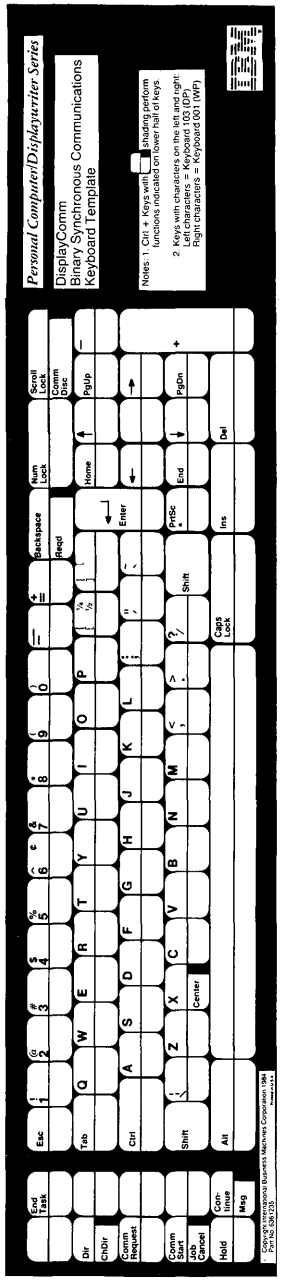
Country	Mode	PC Extension	Comm Extension
U.S.	DP	103—B	103
	WP	1	
U.K.	DP	252	313
	WP	67	
France	DP	248	289
	WP	251	
Italy	DP	247	293
	WP	41	
Germany	DP	249	265
	WP	29	
Spain	DP	246	305
	WP	45	
Norway	WP	55	
Swed/Fin	WP	53	
Denmark	WP	57	
Swiss—Ger	WP	51	
Swiss—Fr	WP	49	
Nether'ds	WP	43	
Canada—Fr	WP	39	
Japan—Eng	WP	69	
S. Africa	WP	81	
Latin—Am	WP	25	
Symbols	WP	201—A	
		201—B	
		201—C	
		201—D	
Symbols	WP	202—A	
		202—B	
		202—C	
		202—D	
Symbols	WP	203—A	
		203—B	
		203—C	
		203—D	

Note: The Symbols keyboard character sets cannot be received, they can only be sent to an IBM 6670.

The IBM Personal Computer Keyboard



The BSC Licensed Program Keyboard Template



Appendix D. IBM 5218 Printer Information

If you have an IBM 5218 Printer attached, it may prompt you for service. In addition to the labelled printer service lights, there is a small rectangular area in which you may see a two-digit number. Using this number, the printer can prompt you for a paper or a printhead change.

The following chart explains the load paper numbers that may appear on the printer:

LIGHT	NUMBER	DESCRIPTION
Load Paper		Load printer manually, or, load tractor feed
Printer Exception + Load Paper	01	Load bottom paper drawer
Printer Exception + Load Paper	02	Load top paper drawer
Printer Exception + Load Paper	04	Load envelope hopper
Setup		Rotate manual insertion gate forward to allow automatic paper feed

When you see a number in the rectangular area on your IBM 5218 Printer and the Change Font light is on, use this chart to help you respond. The number indicates which print wheel to use.

Use the following chart and the numbers on the front of a printwheel to determine which typestyle and pitch should be used with each number that may appear on the printer.

Note: If the Change Font light is on and the number **01** displays, press Start on the printer. Another number for a printwheel change may display. To eliminate the repeated display of the number **01**, change the default for the character set in the IBM 5218 device driver program from *U. S. English(US)* to *U. K. English(UK).*

NUMBER	TYPESTYLES	PITCH	KEYBOARD
10	011, 012, 013	10	001
11	085, 086, 087	12	001
12	221, 222, 223	15	001
13	158, 159, 160	PSM	001
15	011, 012, 013	10	025
16	085, 086, 087	12	025
17	221, 222, 223	15	025
18	158, 159, 160	PSM	025
20	011, 012, 013	10	029
21	085, 086, 087	12	029
22	221, 222, 223	15	029
23	158, 159, 160	PSM	029
25	011, 012, 013	10	039
26	085, 086, 087	12	039
27	221, 222, 223	15	039
28	158, 159, 160	PSM	039
30	011, 012, 013	10	041
31	085, 086, 087	12	041
32	221, 222, 223	15	041
33	158, 159, 160	PSM	041
35	011, 012, 013	10	043

NUMBER	TYPESTYLES	PITCH	KEYBOARD
36	085, 086, 087	12	043
37	221, 222, 223	15	043
38	158, 159, 160	PSM	043
40	011, 012, 013	10	045
41	085, 086, 087	12	045
42	221, 222, 223	15	045
43	158, 159, 160	PSM	045
45	011, 012, 013	10	049 & 051
46	085, 086, 087	12	049 & 051
47	221, 222, 223	15	049 & 051
48	158, 159, 160	PSM	049 & 051
50	011, 012, 013	10	053
51	085, 086, 087	12	053
52	221, 222, 223	15	053
53	158, 159, 160	PSM	053
55	011, 012, 013	10	055 & 057
56	085, 086, 087	12	055 & 057
57	221, 222, 223	15	055 & 057
58	158, 159, 160	PSM	055 & 057
60	011, 012, 013	10	067
61	085, 086, 087	12	067
62	221, 222, 223	15	067
63	158, 159, 160	PSM	067
65	011, 012, 013	10	069
66	085, 086, 087	12	069
67	221, 222, 223	15	069
68	158, 159, 160	PSM	069
70	011, 012, 013	10	103
71	085, 086, 087	12	103
72	221, 222, 223	15	103
73	158, 159, 160	PSM	103
E1	-	-	201
E2	-	-	202
E3	-	-	203

Some printwheels show unique character set numbers. Use the following chart to determine which character set corresponds to each number that may appear on the printer.

NUMBER	TYPESTYLES	PITCH	KEYBOARD	CHARACTER SET
75	011, 012, 013	10	246	920
76	085, 086, 087	12	246	920
77	221, 222, 223	15	246	920
78	158, 159, 160	PSM	246	920
80	011, 012, 013	10	247	923
81	085, 086, 087	12	247	923
82	221, 222, 223	15	247	923
83	158, 159, 160	PSM	247	923
85	011, 012, 013	10	249	922
86	085, 086, 087	12	249	922
87	221, 222, 223	15	249	922
88	158, 159, 160	PSM	249	922
90	011, 012, 013	10	248, 251	921
91	085, 086, 087	12	248, 251	921
92	221, 222, 223	15	248, 251	921
93	158, 159, 160	PSM	248, 251	921
95	011, 012, 013	10	252	924
96	085, 086, 087	12	252	924
97	221, 222, 223	15	252	924
98	158, 159, 160	PSM	252	924

Glossary

The terms in this glossary are associated with the IBM Personal Computer's BSC facility and are defined as used in this publication.

The glossary includes definitions from:

- *American National Standard Vocabulary for Information Processing* (copyright 1970 by American National Standards Institute, Inc.). Definitions taken from ANSI are preceded by an asterisk (*).
- *ISO Vocabulary of Data Processing*, developed by the International Standards Organization, Technical Committee 97, Subcommittee 1. ISO precedes definitions from this source.
- *IBM Data Processing Glossary*, GC20-1699.

The glossary does not include terms that are defined in nontechnical dictionaries and that have no special meaning in data processing. Some terms may have different meanings in other contexts.

access method. A data management technique for transferring data between main storage in a central processing unit and an input/output device.

ASCII. * American National Standard Code for Information Interchange. The standard code, using a coded-character set consisting of 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control and graphic characters.

Binary Synchronous Communication (BSC). A uniform procedure, using a standardized set of control characters and control sequences, for synchronous transmission of binary-coded data between stations.

bps. Bits per second. The number of bits sent (per unit of time) between transmission of the first bit and delivery of the last bit.

BSC. Binary Synchronous Communication (BSC).

CCITT Recommendation V.28. A standard electrical interface for data communication terminals and their interface with signal converters implemented by the International Telephone and Telegraph Consultative Committee (CCITT). CCITT is an international organization that promotes the standardization and coordination of worldwide communication facilities.

code set. (ISO) The complete set or representations defined by a code or by a coded character set.

communication adapter. A hardware device used with the IBM Personal Computer that provides an EIA RS-232C compatible interface.

communication controller. A type of communication control unit (for example an IBM 3705) whose operations are controlled by a program stored and executed in the unit.

communication link. The electrical path between data processing devices in a communication configuration.

communication setup. A stored profile that defines the operating characteristics (such as protocol and code set) of a communication session between an IBM Personal Computer and a remote station. For any communication to take place, at least one setup must be stored on the BSC program disk.

concatenate. To join two strings, data sets, files, or logical records to form one whose length is the sum of the two joined.

Cyclic Redundancy Check (CRC). A system of error checking performed at both the sending and receiving station after a block check character has been accumulated.

Data Communication Equipment (DCE). The common carrier's lines, devices and facilities that interconnect data terminal equipment.

Data Set Ready (DSR). A circuit that initiates the communication link once DTR has been activated.

Data Terminal Ready (DTR). A circuit that activates the communication hardware.

DCE. Data Communication Equipment.

DP. Data Processing.

DSR. Data Set Ready.

DTR. Data Terminal Ready.

EBCDIC. * Extended binary coded decimal interchange code. A coded character set consisting of 8-bit coded characters. See code set.

EIA. Electronics Industries Association. An organization that promotes standardization and cooperation among electronic equipment industries.

EIA RS-232C Interface. The standard interface for binary synchronous communication that provides signal conversion for obtaining the voltage levels specified in the EIA Specification RS-232C and the CCITT Recommendation V.28. For the IBM Personal Computer system, the interface is packaged on the communication adapter card and is connected to an external modem with a cable.

full-duplex line. A communication line with two independent data paths over which data can be transmitted in both directions simultaneously.

half-duplex line. A communication line with a single data path over which data can be transmitted in either direction (but not simultaneously).

JES2. A functional extension of the Houston Automatic Spooling (HASP) program that receives jobs into the system and processes all output data produced by the job.

JES3. A functional extension of the Attached Support Processor (ASP) program that receives jobs into the system and processes all output data produced by the job.

Longitudinal Redundancy Check (LRC). A system of error checking performed at the receiving station after a block check character has been accumulated.

modem clocking. A time base oscillator supplied by the data set for regulating the bit rate of transmission.

Multiple Virtual Storage (MVS). A virtual storage facility that allows each user a private address space. MVS is provided by OS/VS2 Release 2 and subsequent releases.

non-switched communication network. A network in which a communication line is permanently connected to a station.

OCL. Operator Control Language.

Operator Control Language (OCL). A programming language used with the family of word processors.

OS/VS2. The IBM System/370 Operating System that supports multiprogramming with a fixed number of tasks.

Remote Job Entry (RJE). Submission of a job through an input unit that has access to a computer through a data link.

RJE. Remote Job Entry.

Remote Spooling Communications Subsystem (RSCS). The component of VM/370 that transfers spool files between VM/370 users, remote stations, and local batch systems via HASP-compatible telecommunication facilities.

RSCS. Remote Spooling Communications Subsystem.

Session ID. An identification code that can be exchanged between an IBM Personal Computer and a remote station during a communication session. If the exchanged ID's are validated, the session continues; if not, the session is terminated.

Session Summary. A record of a session's activity.

Terminal ID. An identification code used by the host to identify authorized terminals and terminal types.

truncate. (1) To terminate a computational process in accordance with some rule, for example. to end the evaluation of a power series at a specified term. (2) To remove the beginning and/or ending elements of a string, data set, file, or logical record.

Vertical Redundancy Check (VRC). In data communication, an odd parity check performed on each character of a transmitted block of ASCII-coded data as the block is received.

Virtual Machine Facility (VM/370). A time sharing system control program that consists of: (1) a control program (CP) that manages the resources of an IBM System/370 computing system in such a way that multiple remote terminal users have a functional simulation of a computing system (a virtual machine) at their disposal, and (2) the conversational monitor system (CMS), which provides general time sharing, program development, and problem solving facilities.

WP. Word Processing.

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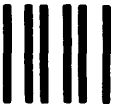

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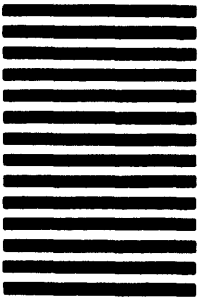

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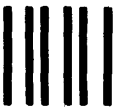

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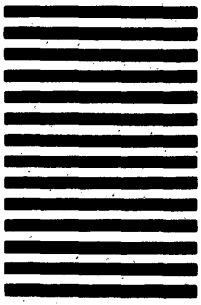

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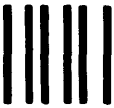

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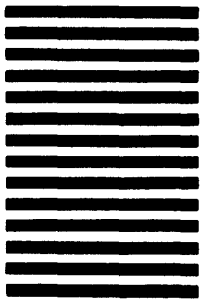

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