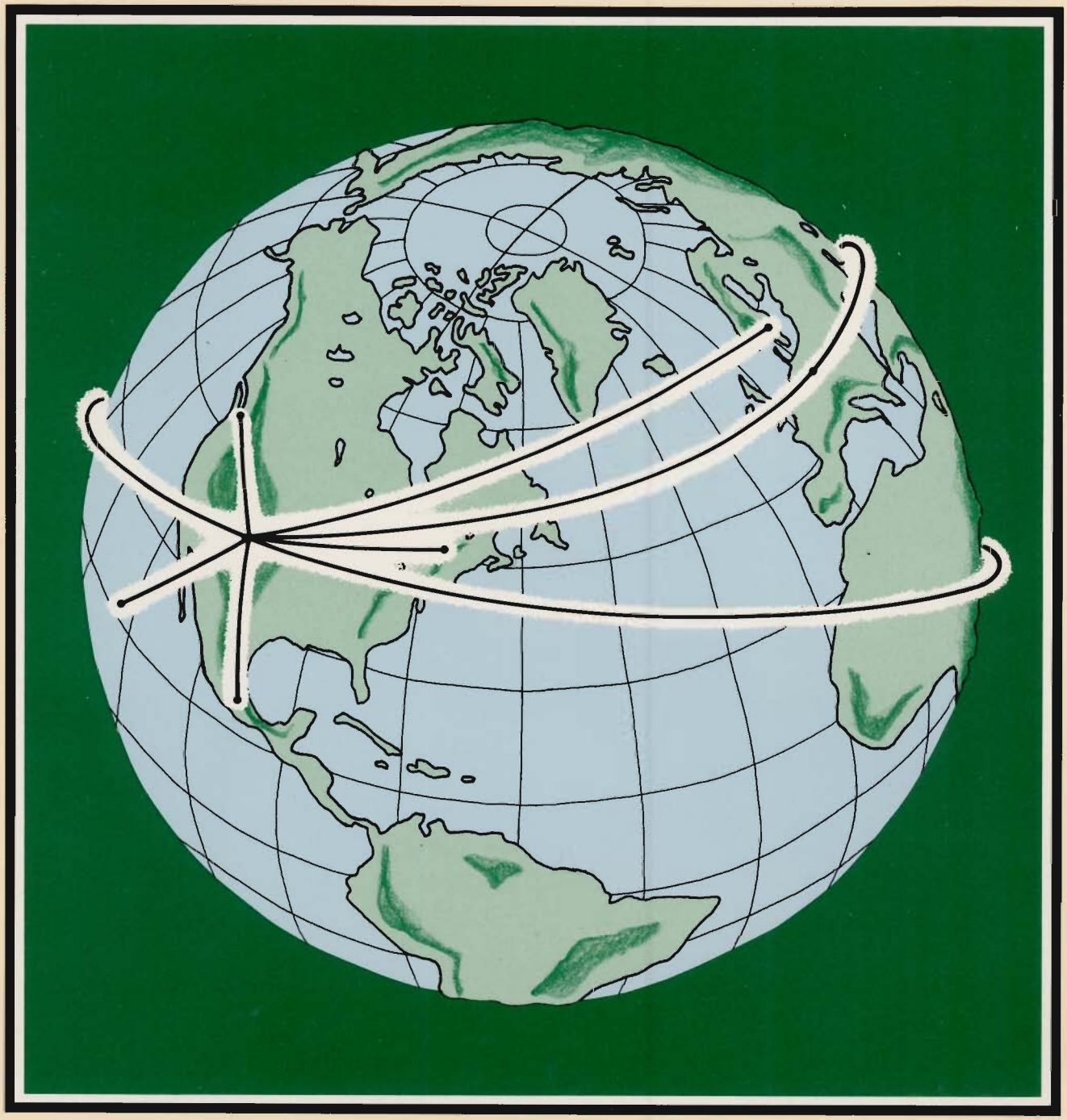
HEWLETT PACKARD

BASIC Asynchronous Terminal Emulator

for the HP 9000 Model 20



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BASIC Asynchronous Terminal Emulator

for the HP 9000 Model 20

Part No. 97056-90000

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Printing History

New editions of this manual will incorporate all material updated since the previous edition. Update packages may be issued between editions and contain replacement and additional pages to be merged into the manual by the user. Each updated page will be indicated by a revision date at the bottom of the page. A vertical bar in the margin indicates the changes on each page. Note that pages which are rearranged due to changes on a previous page are not considered revised.

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Chapter 1
Introduction

The HP 97056 BASIC Asynchronous Terminal Emulator is a program that enables your HP 9000 Model 20 Computer to communicate with other computers or with terminals. The emulator can operate with a variety of formats to match the format of the system you wish to connect to.

This chapter provides a checklist to record the information necessary to connect to the remote system. A startup procedure then describes how to use this information to configure the emulator.

Necessary Hardware and Software

You should have received the following items with Option 97056:

Supplied Equipment	HP Part Number
HP 97056 BASIC Asynchronous Terminal Emulator Program Disc	97056-10000
BASIC Asynchronous Terminal Emulator User's Guide	97056-10001

To run the emulator, your computer must have:

Necessary Equipment	HP Product Number
BASIC Language System	HP 97050A
Asynchronous Serial Interface (ASI) Card with male connector	HP 27128A Option 1
OR	
Asynchronous Serial Interface Card with female connector	HP 27128A (No option)

The female cable is recommended for most applications. The ASI card should be installed according to the instructions in ASI Installation Manual (HP 27128-90001). Make a note of which slot the card is installed into, because this is the select code that you may have to specify when running the emulator.

Communications Options

Modes

The terminal emulator operates in two modes to meet the communication requirements of the remote system:

- **Line mode** lets you type and edit an entire line before sending it to the remote system. In this mode, you also have type-ahead and line recall capabilities.

  In the line mode, RETURN and EXECUTE are defined as end-of-line keys to send a line of characters to the remote system. The difference is that RETURN causes the line you type to be held until a prompt is received. EXECUTE causes the line to be sent even if a prompt is not received.

- **Character mode** sends each character to the remote system as you type it. This mode is used if the remote system does not accept burst data or if you want an immediate response after a key is pressed. This mode is slower than the line mode, and restricts editing capabilities to those provided by the remote system.

Handshaking

Four types of handshaking are provided in the program to ensure accurate data transfer:

- **Device ENQ/ACK** handshaking sends an ENQ character from the remote system and then waits for the terminal emulator to respond with an ACK character before continuing transmission. This type of handshake is common protocol for the HP 3000 and HP 1000 systems.
- **Host ENQ/ACK** handshaking has the terminal emulator send an ENQ character and then waits for the remote system to respond with an ACK character before continuing transmission. Host ENQ/ACK handshaking uses a default value of 80 characters between the transmission of ENQ signals, and waits five seconds before timing out.

The default characters for the ENQ/ACK modes are ENQ = CHR$(5) and ACK = CHR$(6)

- **Host XON/XOFF** (Transmit On/Transmit Off or DC1/DC3) allows the emulator to pace the data transfer coming from the remote system by sending the XOFF character to the remote sytem whenever its buffer is nearly full. When buffer space is available, the emulator sends the XON character to cause the data transfer to resume.
- **Device XON/XOFF** handshake directs the terminal emulator to stop transmission of data to the remote system whenever the XOFF character is received. When the remote system is again ready to receive data, the XON character is sent to the emulator and data can again be sent from the terminal emulator.

The default characters for the XON/XOFF modes are CHR$(17) for XON (DC1) and CHR$(19) for XOFF (DC3).

Both modes can operate at data rates up to 19 200 bits/second. At rates above 1 200 bits/second, it may be necessary to use one of these handshakes or a large value for the output gap timer to prevent data overruns.

The default rate is 2 400 bits/second.

Remote System Checklist

Before you use the teminal emulator program you must know the following information about the remote system you are connecting to. Each of these parameters is explained in the following chapter, **Startup Procedure**. The default values are for connection to an HP 3000 computer.

The information for this list can usually be obtained from the remote computer's system manager. Examples of how to use this information are given at the end of Chapter 2.

	Parameter	Default	Remote System
1. Does the remote system require character or line editing format?	MODE	Character	_____
2. What gap is required?	GAP	2	_____
3. What number of bits per character does the remote system accept, not counting parity bits? This is normally 8 when no parity is used and 7 when even or odd parity is used.	BITS/CHR	7 bits	_____
4. How many stop bits does the remote system accept?	STOP BITS	1	_____
5. What are the parity requirements?	PARITY	Odd	_____
6. What is the transmission speed of the remote system?	SPEED	2400 bits/sec	_____
7. Does the emulator or the remote system echo characters it receives back to the sending device?	ECHO	No echo	_____
8. Does the emulator or the remote system use ENQ/ACK handshake?	ENQ/ACK	Device (Emulator receives ENQ,sends ACK)	_____
9. Does the emulator or the remote system use XON/XOFF handshake?	XON/XOFF	Off (Neither)	_____
10. Is a modem used to connect the emulator to the remote system? If so, is the emulator to originate or answer the call?	MODEM	Modem off	_____
11. What character does the remote system recognize as a break?	BREAK	CHR$(25) (End of media)	_____
12. What character sequence is sent to the remote system at the end of each line?	OUTSEP	Carriage return	_____
13. What character sequence does the remote system send to the emulator at the end of each line?	INSEP	Carriage return/ linefeed	_____
14. What character sequence does the remote system recognize as end-of-file to mark the end of a file transfer? (:EOF is used for the HP 3000 FCOPY utility)	END OF FILE	:EOF	_____

Note

The terminal emulator program runs only with full-duplex asynchronous modems or hardwired RS-232 lines.

Chapter 2
Startup Procedure

This chapter tells you how to start and configure the emulator program. If the BASIC language system is not already loaded and running, load it. You must also load the binary files MS_B0100, SERIAL_B0100, and IO_B0100 or later releases.

1. Loading the program
Insert the emulator flexible disc into the internal drive. There are two versions of the emulator available, the source code and the compiled version. The compiled version provides better keyboard response on some machines, but does not let you edit the program to make modifications. If you wish to modify the program by changing defaults or keyboard functions, you should use the source code version.

To load the compiled version, type:

```
LOAD "ASYNC_0100:INTERNAL",1
```
and press EXECUTE.

To load the source code version, type:

```
LOAD "ASYNC_SOURCE:INTERNAL",1
```
and press EXECUTE.

2. Select code
If there is only one ASI card, the program automatically connects through that card. For a few seconds the screen displays:

```
Disconnecting
```

If there is more than one ASI card, the following message is displayed:

```
What is the select code you wish to use?
```

Enter the select code (slot number) of the ASI card you wish to use and press RETURN. The following message is then displayed:

```
Terminal ready on (S.C.)
```

S.C. is the active select code.

3. Emulator messages

Up to four messages may then be displayed indicating the state of the emulator. These messages are:

Message	Meaning
`Local`	If the emulator is in local mode (not communicating with the remote computer).
`Disp fns`	If all characters are to be displayed on the screen, including such control characters as carriage return and linefeed.
`echo=(echo mode)`	Tells if characters are to be displayed after they are typed on the keyboard, after they are returned from the remote system, both, or neither.
`Hardcopy on`	If the hardcopy device is enabled.

At the same time, the bottom of the screen displays the following menu:

```
Remote   Disp Fns  Alt Break ClrAllKeys  Create    Purge   Upload   Record
Cursor   Send Ack  Def Key   Clr Key     Disconnect Edit   List     Cat
```

This menu shows the assignments of the special function keys (SFKs), located in the upper-right portion of the keyboard.

4. Emulator status listing

If you wish a listing of the status of the terminal and the communication parameters, press the special function key assigned to the List function (14 30). If the edit function has not already been used, the default values are displayed. Make a note of parameters that do not match those on your Remote System Checklist. If you want this listing to appear on hardcopy, press (PRT ALL) before pressing this key.

5. Editing system parameters

Press the key assigned to the Edit function ((13 29)). The following is displayed:

```
Edit mode:      <--=left   -->=right   STEP=select   RETURN=exit
Prt   HPIB    Mode Gap Bits/chr StopBits Parity Speed Echo  Enq/Ack XonXof Modem
6     off     Char 2   7        1        odd    2400  none  Device  off     off
```

Now set the communication parameters to match those on the Remote System Checklist. Position the cursor to the parameter(s) you wish to change with the arrow keys. Press (STEP) to move forward through the values or (CTRL)(STEP) to move backward through the values until the correct one is displayed. When all of the parameters are set correctly, press (RETURN).

The following table explains the displayed parameters.

Screen Displays	Parameter	Default	Description and Values
Printer	Hardcopy	6(Internal)	Specifies the select code of the hardcopy device. Valid select codes are 0 through 23.
HPIB	HP-IB Address	Off	Specifies the HPIB device address if the hardcopy printer specified above is an HPIB device.
Mode	Emulator mode	Character	Determines the mode in which the emulator operates: either character or line mode.
Gap	Character gap	0	The time delay between characters in byte transmission times. Possible values are 0 through 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 125, 150, 175, 200, 225, and 250.
Bits/char	Bits per character	7	The number of bits per character for both sending and receiving. This does not include the parity bit if odd, even, or no parity is used, but does include the parity bit if one or zero parity is chosen.
StopBits	Stop bits	1	The number of stop bits following each character: values are 1, 1.5, and 2 bits.
Parity	Parity	Odd	The value of the parity bit that is added to the data bits to produce either an even or an odd total for error detection. This bit can also be set to be always logical 1 or 0. Values are even, odd, one, zero, and none.
Speed	Data rate	2400	The speed at which data are transmitted and received in bits per second. Possible values are 50, 75, 110, 135, 150, 300, 600, 900, 1200, 1800, 2400, 3600, 4800, 7200, 9600, and 19200 bits/second.
Echo	Character	None	Determines which characters should be repeated back to the sending device by the receiving device. Options are remote (terminal emulator repeats incoming characters back to the remote system), local (characters from the terminal emulator keyboard or uploading file are displayed on the CRT and sent to the remote system), both, or none.

Screen Displays	Parameter	Default	Description and Values
EnqAck	Enq/Ack handshake	Dev	A handshake to control data exchange. The ENQ character is used to request the status of the device at the other end of the communications line. If the device is ready to accept data, it responds with an ACK character. Options are Host Enq/Ack (terminal emulator issues the ENQ request), Dev Enq/Ack (remote system issues the ENQ request), both, and none.
XonXof	Xon/Xoff	Off	A data control handshake. The receiving device sends an XOFF character when it cannot handle more incoming data, and XON when it is ready to accept more data. Options are Device (remote device sends XON/XOFF), Host (terminal emulator sends XON/XOFF), both, and off.
Modem	Modem	Off	Determines which mode the modem operates in if one is to be used. Modem should be set for `Org` if you call up the remote computer, and `Ans` if the remote computer calls the emulator. Possible settings are Ans, Org, and Off.

Note

If the `modem` parameter is set to `Org` or `Ans`, the emulator attempts connection to the remote sytem as soon as the edit function is exited. This locks out the keyboard and waits for a modem connection. Only (STOP) can abort the emulator. If a connection is not made, the emulator waits the default timeout of 60 seconds and then aborts the program.

6. Setting more emulator parameters

After you have pressed (RETURN) and the first set of parameters is stored, a second display appears:

```
Edit mode:          use arrows, ASCII keys or RETURN to exit
Alt break  OUTSEP INSEP PROMPT End file Size
   Em          Cr   Cr Lf  D1    :EOF Cr  010
```

These values can be changed by positioning the cursor with the arrow keys to the value to be changed and then typing in the new value.

The following table explains the displayed parameters. When all the parameters are correct, press (RETURN).

Screen Displays	Parameter	Default	Description and Values
Alt break	Alternate break character	CHR$(25) (End of Media)	A string of 1 to 10 characters that is sent to the host when the key assigned to Alt Brk ((2 18)) is pressed.
OUTSEP	End of line from emulator	CHR$(13) (Carriage return)	A string of up to 6 characters that is sent when (RETURN) or (EXECUTE) is pressed if the emulator is in character mode. If the emulator is in line mode, the string is appended to every line sent after (RETURN) or (EXECUTE) is pressed.
INSEP	End of line from remote system	CHR$(13) and CHR$(10) (Carriage return and Linefeed)	The string of characters (0 through 2 characters long) that is recognized as the end of a line coming from the remote system.
PROMPT	Prompt character	CHR$(17) (DC1)	The character that the emulator recognizes as a prompt when it appears in the input stream of data from the remote system. The prompt can be disabled by setting it to a null string.
End file	End of file	:EOF$^{C}_{R}$	Character or string of characters that is transmitted as the end of a file when completing a file upload (see **Mass Storage Operations** for an explanation of a file upload).
Size	File size	10	The size of the file in sectors. The file size can range from 1 to 999.

7. Mass storage file and device

After you have pressed (RETURN) to store the second set of parameters, a third edit display appears. This display shows the file name and the mass storage device being used.

```
Edit mode:                use arrows, ASCII keys or RETURN to exit
File name (including device name & passwords, if any)
TEST:INTERNAL
```

- If you wish to use a file other than the default TEST, replace the file name TEST with the new file name. If this file has not already been created, you must do so after you leave the edit function by pressing the key assigned to the CREATE function ((4 20)). Then press (Y) to verify the new file name.
- If you wish to use a mass storage device other than the default device INTERNAL, replace INTERNAL with the new device name.

Note

If you have changed the `Modem` field from its default: `off`, you have 60 seconds to make connection with the remote system after you press [RETURN] to leave the edit function. If you are using a modem, read `Connection to the Remote System` before leaving the edit function. If you do not make connection within 60 seconds, the program stops, the ASI card is reset, and the datacomm line is disconnected.

To leave the edit function, press [RETURN].

8. Creating a new mass storage file

Remember, if you have specified a new file name, and have not enabled the modem parameter, you should CREATE and verify the new file name by pressing the Create SFK ([4 20]) and then [Y] to verify the new file name.

9. Connection to the remote system

You are now ready to connect to the remote system. Most computers must receive a carriage return character before you can log in. Press [RETURN] at least once. Log in to the remote system when you receive the prompt message.

10. Re-starting the program

If you wish to re-start the program with different parameters such as `hardwired` rather than a modem connection, type `SCRATCH C` and then press [EXECUTE] while the program is stopped. This causes all parameters to revert to their default values.

Connection to the Remote System

If you are using a direct connection to the remote system, plug the connector into the RS-232 cable from the ASI card. If both lines have male connectors, it is recommended that you use a modem eliminator (HP 13232U) to connect the two.

If you are using a modem or an accoustic coupler:

1. Turn on the modem or acoustic coupler.
2. If you are using an acoustic coupler:
   - Set the duplex switch to FULL. If the coupler has an Originate/Answer switch, set it to Originate.
   - Dial the computer's phone number.
   - When the computer answers with a high-pitched tone, place the handset in the coupler. Be sure the receiver and the transmitter on the handset are in their proper places (this should be marked on the coupler). If the modem has a carrier indicator, it should light up to show that a connection has been made.
   - If the coupler has a line switch, set it to ON-LINE.

OR

If you are NOT using an accoustic modem:

   - Dial the computer's phone number.
   - When the computer answers with a high-pitched tone, press the DATA button until the DATA light is on. Replace the handset.

3. Most computers require a carriage return to start a session. Press (RETURN) or (EXECUTE). The computer should respond with a prompt or command.
4. Log in to the remote computer. If you fail to log in within 60 seconds, the remote system may drop the link, and you must dial the number and try again.
5. Once you have logged in to the remote system, most computers do not log you off until you give the log off command, or until the communications link is broken.

Note

Stopping the emulator program does not necessarily log you off the remote system. It is sometimes possible to stop the program, make several modifications to it, and re-start the program without having to log in to the remote computer again.

Example: Telephone Connection to a VAX Computer

This example demonstrates a connection to a VAX computer. Data is to be sent over the telephone lines through a modem. The first step is to compare the default communication format listed in the Remote System Checklist with the VAX format. The parameters for this example are:

Parameter	Setting
Gap	1
Data bits	8
Parity	Zero
Transmission speed	300
Enq/Ack handshake	Off
XON/XOFF handshake	Host
Modem	Originate

All other parameters are the same as the default values.

The BASIC system and the IO, MS, and SERIAL binary files must now be running on your computer. Insert the program disc into the internal drive and type:

```
LOAD "ASYNC_0100",1
```
and press EXECUTE.

If the ASI card is properly installed, the screen displays:

```
Disconnecting...
```

for a few seconds. The assignments of the special function keys are now displayed at the bottom of the screen.

1. Press the SFK assigned to the edit function (13 29) to change communication parameters.
2. Move the cursor to the Gap parameter with the arrow keys. Press STEP or CTRL STEP until 1 is displayed.
3. In the same way, position the cursor and change the values of Data bits, Parity, Speed, Enq/Ack, Xon/Xoff and Modem.
4. When all of the displayed values are correct, press RETURN. None of the values now displayed have to be changed, but if they did, you would type the new value over the old value.
5. Press RETURN again. The device and file name for mass storage are now listed. If you wish to change either of these, type the new value over the old one. Press RETURN again to return to the terminal emulator. The screen displays:

```
Attempting connection...
```

You now have 60 seconds to connect to the remote computer. If your modem can operate at more than one speed, make sure it is set to 300 bits/second. Dial the computer's number, and when it responds with a high-pitched tone, press the DATA button on the modem and hang up. Several lines of meaningless characters may be displayed on the CRT, and then a prompt appears. Press RETURN at least once to start communication with the VAX computer. The computer then responds with its login message.

Chapter 3
Mass Storage Operations

Mass storage operations can be used to transfer information from the terminal emulator to the remote computer (uploading), or to record data sent from the remote computer to the terminal emulator (downloading). A mass storage file name can contain the path information needed to access the file, including file names, directory names, passwords, media device names, and media labels. For example, if you wish to use the file `Dacomm` protected by the password `Rosebud` in the directory `Test_progs` and stored on an HP 7908 disc on HP-IB#3, the complete file name is:

/Test_progs/Dacomm <Rosebud>: CS80,3

CREATE

If you wish to create a file while the emulator is running, use the edit function to specify the file size and name. After you press [RETURN] to get back to the terminal emulator, press the Create SFK ([4 20]) and then `Y` to verify that you want to create the file. All records are 256 bytes long.

If you want to create a file from the remote system, the command is:

```
ESC,C CREATE FILE file name LENGTH file sizeCR
```

PURGE

To purge a file from the keyboard, press the Purge SFK ([5 21]) and [Y] to verify the purge.

From the remote computer, the command is:

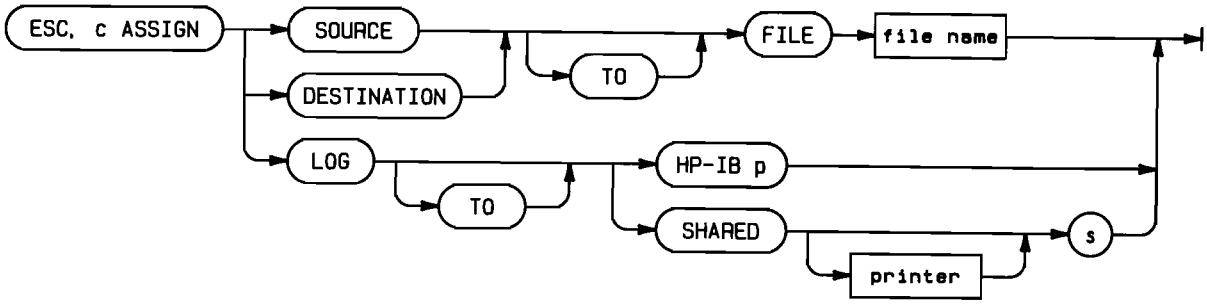
```
ESC,C PURGE FILE file nameCR
```

ASSIGN

A file can be assigned as **Source**, **Destination**, or **Log**. If the file is assigned as Log, the hardcopy printer on the specified select code is used to record datacomm operations.

You can assign a file from the keyboard by using the edit function to store the file name, device type, and select code. The file you specify is automatically used for uploading, downloading, or recording operations.

To assign a file from the remote computer, the following format should be used:



The HP-IB number *p* is comprised of a select code and a primary address. To determine the HP-IB number, multiply the select code by 100 and then add it to the primary address. For example, a device with a select code of 5 and a primary address of 1 would have an HP-IB number of 501.

ENABLE/DISABLE LOG

If the hardcopy device has been assigned, it can be controlled with the commands:

`ESC,c ENABLE LOG CR` to turn the hardcopy device on
and
`ESC,c DISABLE LOG CR` to turn the hardcopy device off.

HANDSHAKE ENABLE/DISABLE

To control the handshaking used for a file transfer, use the commands:

`ESC,c ENABLE HANDSHAKE CR` to turn the handshake on
and
`ESC,c DISABLE HANDSHAKE CR` to turn the handshake off.

Upload

You can upload data from the terminal emulator to the remote computer under either local or remote control. From the keyboard, the edit function should be used to specify the file and to set the End File parameter. After you leave the edit function, press the Upload SFK ([6 22]). To stop recording, press the same key again.

From the remote computer, the command is:

`ESC,c COPY FILE {FROM} SOURCE {TO} DATACOMMCR`
or
`ESC,c ENABLE SENDCR`

To stop recording from the remote computer, use the command:

`ESC,c DISABLE SENDCR`

If your output file includes Outsep$ (end of line from emulator) characters such as carriage return and linefeed, you may encounter troubles with handshake control. For example, if you send a record containing:

HELLO$^{C}_{R}$

to an HP 3000 computer, the HP 3000 receives and processes the record and then sends a D1 prompt to the emulator. If, however, you send the message:

HELLO$^{C}_{R}$ABC$^{C}_{R}$GOOD$^{C}_{R}$BYE$^{C}_{R}$

the emulator sends out the entire record and then waits for a prompt, without examining the record for end of line characters. The HP 3000 responds with the D1 prompt after receiving only the first part of the message. The emulator, however, interprets the prompt as a signal that the HP 3000 has received the entire message. This can result in a loss of data.

Record Verify

Before recording a mass storage file, you can enable or disable the verify function. If the verify function is used, the file is read back after it is recorded to check that the file was accurately recorded.

$^{E}_{C}$,C ENABLE VERIFY$^{C}_{R}$ turns the verify function on
and
$^{E}_{C}$,C DISABLE VERIFY$^{C}_{R}$ turns the verify function off.

RECORD

A file can be recorded from the remote system to a specified file at the terminal emulator. You must specify the file with the edit function, and press the Record SFK ([7 23]). Recording continues until a DISABLE RECORD command is sent from the remote system, the Record SFK is pressed again, or an error occurs (such as no more disc space). If the amount of data being recorded into a file exceeds the file size, the size is automatically increased unless the disc is full.

From the remote system, the command is

$^{E}_{C}$,C ENABLE RECORD$^{C}_{R}$
or
$^{E}_{C}$,C COPY FILE {FROM} DATACOMM {TO} {SOURCE}$^{C}_{R}$

To stop recording, use the command:

$^{E}_{C}$,C DISABLE RECORD$^{C}_{R}$

If you are receiving records from the remote system that are more than 160 characters in length, or if no input separator has been specified with the edit function, then records are truncated to 160 characters. A warning message appears, but the transfer continues even though data have been lost.

FIND

The **FIND** command uses a pointer to identify a particular record or the end of data records on the source file.

The command to find a record is:

```
ESC,c FIND RECORD nCR
```

where *n* is the number of records you want to skip over. For example, the command:

```
ESC,c FIND RECORD 0CR
```

places the sequential file pointer immediately before the first record.

The command to find the end of the data is:

```
ESC,c FIND END {OF} DATACR
```

REPORT

The **REPORT** command is used by the remote system to request the status of a previously executed command from the host. If the last command was successful, the character 1 is returned over the datacomm lines. If the operation failed, the character 0 is returned. From the remote system, the format for the command is:

```
ESC,c REPORT STATUS {OF} commandCR
```

Hardcopy Commands

The hardcopy device can be enabled or disabled with the edit function by setting the hardcopy parameter to either the correct select code or off.

From the remote system, the commands are:

```
ESC,c ENABLE LOGCR
    and
ESC,c DISABLE LOGCR
```

Keyboard Control

The escape codes to control the keyboard are:

```
ESC,c ENABLE KEYBOARDCR
    and
ESC,c DISABLE KEYBOARDCR
```

Example: Recording a File from the Remote System

In this example, a file named HOSTFILE is to be recorded from a remote computer to a file named WORKSP on the internal disc drive. The terminal emulator must already be running.

1. Press the Edit SFK ([13 29]) and then press [RETURN] to view the second set of parameters.
2. Move the cursor to the file size parameter and type in the desired file size. Press [RETURN] to move to the third set of parameters.
3. Type over the default file name of TEST with the new file name WORKSP. The default of INTERNAL is used as the mass storage device.
4. Press [RETURN] to leave the edit function.
5. Log in to the remote computer.
6. Type in the command to list the file HOSTFILE on the remote computer, but do not press [RETURN].
7. Press the Record SFK.
8. Press [RETURN] to start the program listing from the remote system.
9. Press the Record SFK ([7 23]) when the end of the file is reached to stop recording.

Chapter 4
Modifying Default Values

The emulator program ASYNC_SOURCE can be modified to cause it to default to the communications parameters of a given remote system.

To change default values, load the program ASYNC_SOURCE or stop it if it is already running. Then type:

```
EDIT Defaults [EXECUTE]
```

```
 1250 Defaults:RESTORE Defaults
 1255       READ Hard_sc,Hard_hpib,Screen,Recordfile$,Filesize,Bitsperchar,Check
,Speed
 1260       DATA 6  ,       -1 ,       1, TEST:INTERNAL,    10,        7,       1 ,
 2400
 1265       READ Gap,Echo,Modem,Con,Enqack,Xonxoff,Stopbits,Mdm_rate
 1270       DATA 2 ,   0  , 0  , 60 ,  1  ,     0 ,      1  ,      1
 1275       Defstorage$=""
 1280       Outsep$=Cr$
 1285       Insep$=Cr$&Lf$
 1290       Prompt$=CHR$(17)
 1300       Alt_brk$=CHR$(25)
 1305       Eof$=":EOF"&Outsep$
 1310       GOSUB Setall
 1315       Hardcopy=Verify=Disp_fns=0
 1320       Curse=Charmode=Remote=Commonok=Prompthandshake=1
 1325       CHECKREAD OFF
 1330       IF Verify THEN CHECKREAD ON
```

Select Code Default

The terminal emulator program scans until it finds a valid interface select code unless a default is specified. To specify a default select code:

1. Change line 1370 to read:

   ```
   1370 B3:  Sc=n
   ```

   where *n* is the default select code.
2. Delete line 1375.
3. Type RE-STORE "ASYNC_SOURCE", [RETURN].

The emulator program uses that select code unless the specified interface is not installed. In that case, it scans for a valid select code.

Other Defaults

Most of the default values are located after the label `Defaults` in line 1250 of the emulator program. Several of the options are listed in `READ` statements with their corresponding default values in the following `DATA` statements.

```
1255 READ Hard_sc, Hard_hpib, Screen, Recordfiles$, Filesize, Bitsperchar,Check,
Speed
1260 DATA 6   ,   -1,    1, TEST:INTERNAL,  10,     7,    1,  2400
1265 READ Gap,Echo,Modem,Con,Enqack,Xonxoff,Stopbits,Mdm_rate
1270 DATA 2,0,0,60,1,0,1,1
```

The remaining parameters are assignments that can also be changed.

```
1280 Outsep$=Cr$
1285 Insep$=Cr$&Lf$
1290 Prompt$=CHR$(17)
1300 Alt_brk=CHR$(25)
1305 Eof$=":EOF"&Outsep$
```

When modifying the options, the following rules must be followed:

1. `Hard_sc` must be a valid select code from 0 through 23 and `Hard_hpib` is a secondary address from 0 through 31 and −1 (off).
2. `Screen` must be a valid select code.
3. `Recordfile$` can be up to 80 characters in length.
4. `Filesize` can be from 1 to 999 bytes.
5. `Bitsperchar` must be in the range from 5 to 8.
6. `Check` may assume only the values 0 (no parity), 1 (odd parity), 2 (even parity), 3 (zero parity), or 4 (one parity).
7. `Speed` must be a legal data rate of 50, 75, 135 (actually 134.5), 150, 300, 600, 900, 1200, 1800, 2400, 3600, 4800, 7200, 9600, or 19200.
8. `Stopbits` may only be set to 1, 1.5, or 2.
9. `Mdm_rate` can be set for dual-speed modems. This value can be set to 0 for low speed (usually 300 bits/second) or 1 for high speed (usually 1200 bits/second).
10. `Insep$` and `Prompt$` may contain up to two characters.
11. `Outsep$` is the end-of-file sequence sent to the remote sytem to terminate each line. It may contain up to six characters.
12. `Alt_brk` can be up to 10 characters in length.
13. `Eof$` can be up to eight characters in length.
14. `Gap` can be from 0 through 254.
15. `Modem` must be set to 0 (off), 1 (modem originate mode), or 2 (modem answer mode).
16. `Con` specifies the timeout value to wait for the modem connection in seconds. This parameter can range from 0 through 254.
17. `Enq/Ack` enables or disables the ENQ/ACK handshake. The values for ENQ/ACK are 0 (off), 1 (device), 2 (host), and 3 (both).
18. `Xonxoff` controls the XON/XOFF handshake. Values are 0 (off), 1 (device), 2 (host), and 3 (both).

Chapter 5
Adding Keyboard Functions

Commands to the BASIC interpreter cannot be executed while the emulator is running, but you can define non-ASCII keys to execute desired commands. For example, you might wish to define a key to list directory information from the current mass storage device to the internal printer. In BASIC, you would type the command `CAT TO PRT`.

To add such a keyboard function:

1. Stop the program by pressing [STOP].
2. Select a non-ASCII key such as [SHIFT][TAB], from the following list of definable keys.
3. Write down the number that corresponds to the key. In this case, the value is 264. This number is referred to as the **location value**.
4. Type `EDIT Map` and press [EXECUTE]. This accesses the part of the program at line label `Map` as shown below:

```
6095        !  Highest used is: 36
6100 Map:   DATA -17,0,1,34,   1,6,1,6,      0,0,6,0,      6,0,1,6
6105        DATA -25,-11,-22,-15,-5,-5,-19,-12,-35,-21,1,1,6,1,6,28
6110        DATA 29,-24,33,1,  1,10,1,3,     6,1,0,6,      6,6,1,1
6115        DATA 0,0,1,1,      6,0,6,6,      -16,0,0,0,    1,0,6,1
6120        DATA 1,8,-7,-32,   9,-23,-26,36,36,36,36,36,36,36,1
6125        DATA 1,1,1,1,      1,1,1,1,      1,1,1,1,      1,1,1,6
6126   !Control :
6130        DATA -17,0,1,34,   1,1,1,0,      0,0,1,0,      0,0,1,1
6135        DATA -25,-11,-22,-15,-5,-5,-19,-12,-35,-21,1,1,1,1,1,1
6140        DATA 1,-24,33,1,   1,10,1,3,     1,1,0,1,      0,0,1,1
6145        DATA 0,0,1,1,      1,0,6,1,      -16,0,0,0,    1,0,6,1
6150        DATA 1,8,-7,-32,   9,-23,-26,1,1,1,1,1,  1,1,1,1
6155        DATA 1,1,1,1,      1,1,1,1,      1,1,1,1,      1,1,1,1
6165        DATA 259,290,276,277
6175        DATA 284,286,296,318,310,263,268,300,301,414,406,271,266,261,351,299
,311,308
6176        DATA 024,008,002,001
6177        DATA 068,067,071,065,066,085,086,083,084,072,070,077,076,075,074,069
,072,070
6210        DATA -1
```

   Note that there are 16 integers in each DATA line. Integers in the first line are assigned location values 256 through 272, integers in the second line are assigned location values 273 through 289, and so forth.

5. The line preceding the label `Map` contains the comment `Highest used is:` *36* where *36* is the largest integer in the map data. Add one to this integer, and store it in place of the previous value. In this example, the new value would be 37.

6. Scroll to the DATA line containing the location value you found in step 3 and change the current integer to the number you just saved in the comment statement. In this example, scroll to the first DATA line where the first integer is in location 256. Move the cursor to the integer in location 264, the ninth position in the line. Change this value to the new high number (37, in this case). A positive value locks out the keyboard if the terminal is in line mode and is caught in a `Hold`, that is, waiting for a response from the remote system. A negative value does not.

```
6095        !  Highest used is: 37
6100 Map:  DATA -17,0,1,34,  1,6,1,6,     37,0,6,0,      6,0,1,6
6105       DATA -25,-11,-22,-15,-5,-5,-19,-12,-35,-21,1,1,6,1,6,28
6110       DATA 29,-24,33,1,  1,10,1,3,     6,1,0,6,      6,6,1,1
6115       DATA 0,0,1,1,      6,0,6,6,      -16,0,0,0,    1,0,6,1
6120       DATA 1,8,-7,-32,   9,-23,-26,36,36,36,36,36,36,36,36,1
6125       DATA 1,1,1,1,      1,1,1,1,      1,1,1,1,      1,1,1,6
6126   !Control :
6130       DATA -17,0,1,34,   1,1,1,0,      0,0,1,0,      0,0,1,1
6135       DATA -25,-11,-22,-15,-5,-5,-19,-12,-35,-21,1,1,1,1,1,1
6140       DATA 1,-24,33,1,   1,10,1,3,     1,1,0,1,      0,0,1,1
6145       DATA 0,0,1,1,      1,0,6,1,      -16,0,0,0,    1,0,6,1
6150       DATA 1,8,-7,-32,   9,-23,-26,1,1,1,1,1,  1,1,1,1
6155       DATA 1,1,1,1,      1,1,1,1,      1,1,1,1,      1,1,1,1
6165       DATA 259,290,276,277
6175       DATA 284,286,296,318,310,263,268,300,301,414,406,271,266,261,351,299
,311,308
6176       DATA 024,008,002,001
6177       DATA 068,067,071,065,066,085,086,083,084,072,070,077,076,075,074,069
,072,070
6210       DATA -1
```

7. Press (RETURN) to store the modified line.
8. Type `EDIT Dokey` and scroll down one line to access the following statement.

```
1815 Dokey:IF K>100 THEN Udf
1820       ON K+1 GOTO As_is,Err,Err,Hr,Err,Cp,Ar,Ck,Dk,E,S,Tn,Rn,Err,Z,Cak,S,Bk,
Err,U,Err,A,Abk,Sts,P,Rm,Cat,Err,Rc,Sr,Err,Err,Stp,B,Cln,Cu,Fk
```

Add a line label for your new function to the end of the `ON K+1 GOTO` line and press (RETURN). To add the `Cat_to_prt` function, change the line to:

```
1815 Dokey:IF K>100 THEN Udf
1820       ON K+1 GOTO As_is,Err,Err,Hr,Err,Cp,Ar,Ck,Dk,E,S,Tn,Rn,Err,Z,Cak,S,Bk,
Err,U,Err,A,Abk,Sts,P,Rm,Cat,Err,Rc,Sr,Err,Err,Stp,B,Cln,Cu,Fk,
Cat_to_prt
```

9. Insert the new function in the program before or after existing functions, but do not attempt to add the function between the lines of other functions. For example, to place the `Cat_to_prt` function at the end of the program, add the lines:

```
6583 Cat_to_prt: CAT  TO PRT
6593             GOTO Key1
```

Note that new functions must end with a `GOTO Key1` statement.

10. Execute the command `SCRATCH C`.
11. RE-STORE the program if you want the function to be permanent.
12. Press (RUN) to start the emulator program again.

Definable Keys

Key	Location Value
↓	310
←	284
→	286
↑	318
ROLL ↓	301
ROLL ↑	300
CLEAR LINE	259
CLR SCR	299
CONT	291
HOME	296
RECALL	287
STEP	307
TAB	265
TAB CLEAR	315
TAB SET	317
TO END	295
0 16	272
1 17	273
2 18	274
3 19	275
4 20	276
5 21	277
6 22	278
7 23	279
8 24	280
9 25	281
10 26	321
11 27	322
12 28	323
13 29	324
14 30	325
15 31	326
CTRL ↓	406
CTRL ←	380
CTRL →	382
CTRL ↑	414
CTRL ROLL ↓	397
CTRL ROLL ↑	396
CTRL CLR LN	355
CTRL CLR SCR	395
CTRL CLR→END	357
CTRL CONT	387
CTRL HOME	392
CTRL RECALL	383
CTRL TAB SET	413
CTRL TO END	391
CTRL 0 16	282

Key	Location Value
CTRL 1 17	283
CTRL 2 18	319
CTRL 8 24	343
CTRL 9 25	344
CTRL 10 26	345
CTRL 11 27	346
CTRL 12 28	347
CTRL 13 29	348
CTRL 14 30	349
CTRL 15 31	350
SHIFT ↓	308
SHIFT ↑	311
SHIFT ROLL ↓	268
SHIFT ROLL ↑	263
SHIFT BACK SPACE	290
SHIFT BREAK	256
SHIFT CAPS LOCK	309
SHIFT CLEAR SCN	351
SHIFT DEL CHR	269
SHIFT DEL LN	271
SHIFT EXECUTE	312
SHIFT INS CHR	267
SHIFT INS LN	266
SHIFT PRT ALL	289
SHIFT RECALL	288
SHIFT RETURN	293
SHIFT TAB	264
SHIFT TAB CLEAR	265
SHIFT TAB SET	317
TO END	295
SHIFT 0 16	327
SHIFT 1 17	328
SHIFT 2 18	329
SHIFT 3 19	330
SHIFT 4 20	331
SHIFT 5 21	332
SHIFT 6 22	333
SHIFT 7 23	334
SHIFT 8 24	335
SHIFT 9 25	336
SHIFT 10 26	337
SHIFT 11 27	338
SHIFT 12 28	339
SHIFT 13 29	340
SHIFT 14 30	341
SHIFT 15 31	342

Appendix A
Multiple Partitions

You can run two copies of the emulator in two partitions at the same time. To do this, you must have two ASI cards installed, and each copy of the emulator must be set to a different ASI select code. Only the copy of the emulator running in the foreground process has access to the keyboard, but the partitions can be switched by pressing [SHIFT] [STEP]. See the BASIC Programming Techniques Manual for more information on partitions.

Appendix B
Special Function Keys

When the terminal emulator is running, the bottom of the display shows the functions assigned to the Special Function Keys (SFKs).

Function	Key	Description
Remote/local	Remote (0 16)	This is a toggle key that alternates between remote and local mode. In remote mode, the emulator can communicate with the remote system. In local mode, the emulator program maintains a connection with the remote system but ignores all incoming characters. Any characters from the emulator keyboard are displayed without being transmitted to the remote system.
Display non-ASCII characters	Disp Fns (1 17)	Enables all non-ASCII characters to be displayed on the emulator screen.
End of Media	Alt Brk (2 18)	Sends an End of Media character to the remote system. The default character is CHR$(25), and may be altered with the edit function.
Reset key defaults	Clr All Keys (3 19)	Causes any user-defined non-ASCII keys to revert to their default values.
Create mass storage file	Create (4 20)	Enables you to create a file for mass storage use, such as uploading or recording. The message: `Type Y to verify create of` *filename* is displayed, where *filename* is the mass storage file specified with the edit function.
Purge file	Purge (5 21)	To purge a file, press this key. The program responds with: `Type Y to verify purge of` *filename* where *filename* is the mass storage file specified with the edit function.
Upload	Upload (6 22)	Press this key to begin loading information from the mass storage medium to the remote computer; press this key again to terminate uploading. Press (Y) for handshaking, (N) for no handshaking. Uploading is terminated when an End of File is reached or an illegal data item is found (refer to **Mass Storage Operations** for more information).

Function	Key	Description
Record	Record (7 23)	Enables you to record data onto the mass storage medium; press this key again to turn off recording (refer to **Mass Storage Operations** for more information).
Cursor control	Cursor (8 24)	Turns the cursor on and off.
Send ACK	Send Ack (9 25)	Sends the ACK character to the remote system. Sometimes this re-establishes "hung up" communications.
Redefine SFKs	Def Key (10 26)	Enables you to define any non-ASCII key with a sequence of keystrokes. The message: `Define Key mode; enter key to be changed` is displayed when this key is pressed. Press the key you wish to define, type in the keys of the new definition, and then press the defined key again to exit. (STOP) can not be part of the key definition, and the cursor positioning keys do not work. If you type an incorrect key, start the definition again. Recursive definitions are not allowed.
Clear key	Clr Key (11 27)	Clears any user-defined key back to its default value. Press this key and then the key that is to be cleared. The message: `udk`*n*` key definition cleared` is then displayed where *n* is the number of the key that has returned to its default value.
Disconnect	Disconnect (12 28)	Stops the emulator program and disconnects from the remote computer.
Edit	Edit (13 29)	Enables you to change many of the parameters of the emulator program, including hardcopy, mass storage, and communications format. See **Startup Procedure** for a full explanation and an example of its use.
List status	List (14 30)	Produces a listing of all the important emulator parameters. If you wish to direct this listing to a printer, press (PRT ALL) before you press this key.
Catalog of files	Cat (15 31)	Produces a listing of mass storage files.

Appendix C
Keyboard Commands

Several keys have command definitions that work both in line and character edit modes, while some work only in one mode.

When the emulator is in character edit mode, the commands can affect every line displayed on the screen. When the emulator is in line edit mode, many commands effect only the keyboard entry area: the two lines at the bottom of the screen.

Key	Line Mode Definition	Character Mode Definition
TAB SET	Sets a tab stop at the keyboard cursor position.	Not available.
TAB CLEAR	Clears a tab at the keyboard cursor position.	Not available.
TAB	Moves the keyboard cursor to the next tab stop on the line.	Not available.
SHIFT TAB	Moves the cursor left to the previous tab stop.	Not available.
STEP	Changes option to next value each time it is pressed; works only in edit function.	Same as line mode.
CTRL STEP	Changes option to previous value each time STEP is pressed; works only in edit function.	Same as line mode.
RECALL	Retrieves items sent to the recall buffer in last-in, first-out order; all lines sent with RETURN or EXECUTE are stored in the recall buffer.	Not available.
SHIFT RECALL	Retrieves items from the recall buffer stack in last-in, first-out order; SHIFT RECALL is used after RECALL has been pressed.	Not available.
DEL CHR	Deletes the character at the cursor position in the keyboard entry area.	Not available.
DEL LN	Not available.	Deletes the line at the CRT area cursor position.

Key	Line Mode Definition	Character Mode Definition
INS CHR	Turns on the insert mode character at the cursor position in the keyboard entry area; insert mode is turned off by pressing INS CHR, EXECUTE, RECALL, SHIFT RECALL, CLEAR SCN, CLEAR LINE, or RETURN.	Not available.
INS LN	Not available.	Inserts a blank line at the CRT area cursor position.
CLEAR LINE	Clears the keyboard entry area.	Transmits a cancel character (CHR$(24)) to the remote system. This command clears the CRT line containing the cursor if the emulator is in Local mode.
CLR SCR	Clears the entire CRT, including the keyboard entry area.	Same as line mode.
SHIFT CLEAR LINE	Clears the keyboard entry area from the cursor position to the end of the line.	Clears current CRT line from the cursor to the end of the line.
SHIFT CLEAR SCN	Not available.	Clears the CRT screen from the cursor position to the end of the screen.
↑	Moves the cursor to the upper of the two lines in the keyboard entry area.	Moves the cursor in the CRT area up one line.
↓	Moves the cursor to the lower of the two lines in the keyboard entry area.	Moves the cursor in the CRT area down one line.
ROLL ↑	Scrolls the screen up one line	Same as line mode.
ROLL ↓	Scrolls the screen down one line	Same as line mode.
CTRL ↑	Not available	Moves the cursor to the top of the CRT screen.
CTRL ↓	Not available.	Moves the cursor to the bottom of CRT screen.
SHIFT ↑	Moves the CRT cursor to the top of CRT memory.	Moves the cursor to the top of CRT screen.
SHIFT ↓	Moves the CRT cursor to one line below the bottom of CRT memory.	Moves the cursor to one line above the bottom of the CRT screen.

Key	Line Mode Definition	Character Mode Definition
SHIFT ROLL ↑	Scrolls the screen up 12 lines.	Scrolls the screen up 24 lines.
SHIFT ROLL ↓	Scrolls the screen down 12 lines.	Scrolls the screen down 24 lines.
←	Moves the keyboard entry cursor left one position.	Moves the CRT cursor left one position.
→	Moves the keyboard entry cursor right one position.	Moves the CRT cursor right one position.
SHIFT ←	Moves the keyboard entry cursor to the left margin of the keyboard entry area.	Moves the CRT cursor left margin of the CRT screen.
SHIFT →	Moves the keyboard entry cursor to the right margin of the current line in the keyboard entry area.	Moves the cursor to the right margin (column 80) of the CRT screen.
BACK SPACE	Moves the keyboard entry cursor left one position.	Transmits a backspace character (b/s or CHR$(8) to the remote computer. If the emulator is in Local mode, this key moves the cursor back one position.
STOP or PAUSE	Stops or pauses execution of the emulator program but may not disconnect datacomm activity when connection is through a modem. Use the Disconnect SFK (8 24) to properly terminate the program.	Same as line mode.

Note

Pressing STOP does not disconnect the datacomm line and program options remain in memory. However, if you do press STOP followed by RUN, the datacomm line is disconnected before being reconnected.

The command `SCRATCH C` destroys options and the datacomm line remains active. The command `SCRATCH ALL` disconnects the datacomm line and deletes the program from memory.

Appendix D
Escape Codes

Several functions of the terminal emulator can be controlled by escape codes. Some of these codes can come from the remote computer or from the keyboard if the terminal is in local mode. To input an escape code, press [ESC] and then the appropriate key.

Escape Code	Meaning
ESC 1	Sets a screen tab at the column of the cursor.
ESC 2	Clears the screen tab at the column of the cursor.
ESC 3	Clears all screen tabs.
ESC @	Causes the program to pause one second.
ESC A	Moves the cursor up one row.
ESC B	Moves the cursor down one row.
ESC C	Moves the cursor right one column.
ESC D	Moves the cursor left one column.
ESC E	Resets the CRT and clears control features.
ESC F	Moves the cursor to the row after the last row of the CRT memory, first column.
ESC H	Moves the cursor to the first row of the CRT memory, first column.
ESC J	Clears the screen from the cursor position.
ESC K	Clears the line from the cursor position.
ESC L	Inserts a blank line before the cursor line.
ESC M	Deletes the cursor line and closes up the gap.
ESC P	Deletes the character at the cursor position.
ESC Q	Turns on the insert character mode.
ESC R	Turns off the insert character mode.
ESC S	Rolls the screen up one line.
ESC T	Rolls the screen down one line.
ESC U	Rolls the screen printout area up 24 lines.
ESC V	Rolls the screen printout area down 24 lines.
ESC Y	Enables the Display Functions mode.
ESC Z	Disables the Display Functions mode.
ESC l	Freezes all lines on the CRT above the cursor line.
ESC m	Unfreezes all the display lines on the CRT.

<table>
<tr><th>Escape Code</th><th>Meaning</th></tr>
<tr><td>ESC&a</td><td>Moves the cursor to the specified address. This command is to be followed by one or more of the following parameters. The letter portion of the last parameter must be capitalized to indicate the end of the listed parameters.

num r Move to row number num
num c Move to column number num
num y Move to screen row number num
sign num r Move up/down number num of rows:
− is up, + is down
sign num y Move up/down number num of screen rows
sign num c Move left/right number num of columns:
− is left, + is right

For example, the escape code command from the host that would move the cursor one row down and two columns to the left is:

Escape code: ESC&a+1r−2C
+1r: One row down
−2C: Two columns to the left</td></tr>
<tr><td>ESC&d<char></td><td>Turns the highlighting features on and off

<table>
<tr><th><char></th><th>Function</th></tr>
<tr><td>@</td><td>Clears all highlight features</td></tr>
<tr><td>A</td><td>Blinking</td></tr>
<tr><td>B</td><td>Inverse video</td></tr>
<tr><td>C</td><td>Inverse video, blinking</td></tr>
<tr><td>D</td><td>Underline</td></tr>
<tr><td>E</td><td>Underline, blinking</td></tr>
<tr><td>F</td><td>Underline inverse video</td></tr>
<tr><td>G</td><td>Underline inverse video, blinking</td></tr>
</table>

This example shows how to send a message highlighted in inverse video and blinking modes from the remote system to the emulator.

PRINT "ESC&dCTESTING EXAMPLEESC&dCR"</td></tr>
</table>

Note

Display enhancements are not space-dependent, as they are on many terminals. You may have to turn off enhancements if you do not want them to appear on a following line. Sometimes turning the cursor off corrects enhancement behavior.

Other Escape Codes

Mass storage escape codes are listed and explained in the **Mass Storage Operations** chapter.

Appendix E
Program Messages

The following list describes the messages which may be displayed when you are running the terminal emulator.

`<file name> created to <file size> records`
A CREATE operation has been successfully completed. This tells how many records were created in the file.

`<file name> purged`
A PURGE operation has been successfully completed.

`<Key name> key definition cleared`
This verifies completion of the Clear SFK. The key specified by `<Key name>` is now back to its default definition.

`All key definitions cleared`
All key definitions have been reset to their original values. This verifies the success of the Clear All Keys SFK.

`Attempting connection...`
The emulator is attempting to establish a connection over the data communications channel. If a hardwired connection is used, this message only appears for a fraction of a second. If a modem connection is used, this message appears until connection is made or a timeout occurs.

`Cannot define that key - aborted`
An attempt has been made to redefine an ASCII character key. This is not allowed; Define key mode has been exited.

`Card Buffer overflow`
The emulator can not keep up with incoming data, so some data are being lost. Possible solutions for this problem are lowering the data rate or using an ENQ/ACK or an XON/XOFF handshake at both ends of the data line.

`Datacomm not in active state resulted in error <error number>`
Datacomm was not active so a statement could not be executed. Press [STOP] and then press [RUN] to start the program again.

`Define key mode: Enter key to be changed`
Define key mode has been entered. You should now press the key you want to redefine.

`Define key mode: Hit <Key name> to exit`

Define key mode is in progress. If you press any key other than <key name> or (STOP), it will be entered into the definition. If you press <key name>, Define key mode is exited and the definition is complete.

`Definition buffer full - ignored`

Define key mode cannot be entered because the redefiniton buffer is full.

`Definition buffer full - Defintion complete`

The attempt to define a key was successful, but the buffer is now full and there is no more room for new definitions.

`Definition complete`

This verifies that Define key mode has been successfully exited.

`Disconnecting...`

A disconnect is being executed.

`Display functions off`

Display functions mode (which displays all control characters) has been disabled for both the screen and the hardcopy device.

`Display functions on`

Display functions mode (which displays all control characters) has been enabled for both the screen and hardcopy device.

`Do you want to use the prompt handshake for uploading?`

Type `Y` if you wish to proceed with uploading using the one-line-per-prompt handshake. Otherwise, the file is sent all at once.

`Edit mode: <-=previous,->=next,STEP=select,RETURN=exit`

One of the first two parts of edit mode is in effect. Use (←) and (→) to move the cursor to the proper field. Use (STEP) or (SHIFT)(STEP) to select a different value, and then press (RETURN) to enter the next part of edit mode.

`Edit mode exited`

EDIT mode has been successfully exited and any new key values are now active.

`End of file reached`

The destination file used for recording is too small and recording has been aborted. Try creating the file to a larger size and re-recording it.

The following messages may also appear with the above warning:

`ERROR` *n* in terminating file transfer
`ERROR` *n* in executing CAT
`ERROR` *n* with Hardcopy device...turning off hardcopy

`Enter key to be cleared`

Clear key mode has been entered; enter the key with the definition you want to clear.

`Error n in file transfer...Terminating.`
The specified error number has caused a file transfer to halt and the emulator program to stop.

`File assignment of <file name> unsuccessful`
Assignment of a file for recording or uploading has failed because there is a missing file, a missing device, or the file is protected against recording.

`File creation/purge failed`
An attempted CREATE or PURGE from the keyboard failed for one of the following reasons: (1) the file already exists for CREATE (2) the file doesn't exist for PURGE (3) an illegal file name has been given (4) the device specified is missing or (5) the mass storage device is protected.

`File recording aborted due to error #<error number>`
An attempted start of recording from the keyboard failed due to the BASIC error number specified.

`File usage conflict`
An attempt has been made to upload and record at the same time.

`Hardcopy on`
The hardcopy printer has been enabled.

`Hold`
This message appears if the emulator is in line mode and the user attempts to send a line by pressing RETURN before a prompt has been received. This message tells the user that the line he has just typed is being held in a buffer until the next prompt is received.

`Initializing`
The program COMmon area was not recoverable, so all variables are initialized to their default values.

`Keystroke buffer overflow`
Key redefinitions resulted in a buffer overflow. This probably means that there is a recursive definition. Examine the definitions using the List SFK.

`Local`
Local mode has been entered. Output from the remote computer is ignored and data from the keyboard are executed as though they were data from the host.

`OPEN LINK CLOSED OR DISCONNECTED...`
This message appears if the carrier detect or the data set ready modem line has dropped. After this message is displayed, the ASI card is reset and the program stops.

`No ASI card installed`
No interfaces were found when the program started, or there is no driver with the BASIC operating system. Install the card or BASIC with the appropriate driver. This message is also displayed if the ASI is set for the same select code as another device.

PARITY OR FRAMING ERROR OR DATA OVERRUN

The parity or the handshake parameters on the emulator do not match those of the host, data is coming in too fast, or there is noise on the communications line. If the problem is due to incorrect handshake or parity, use the Edit function to set the correct values. The emulator ignores these errors unless a RECORD or UPLOAD is taking place when the error occurred.

Program stopped and datacomm disconnected

The program has been exited without the Disconnect SFK and datacomm has been disconnected. If you are connected to a telephone line through a modem, you should hang up.

Purge/create not verified

An attempted PURGE or CREATE from the keyboard was not verified by pressing [Y]. No operation was completed.

RECORD LONGER THAN 160 CHARACTER...TRUNCATED

There has been an attempt to record an incoming file with separators that are more than 160 characters apart. This does not terminate recording, but does indicate that data have been lost.

Recording on <file name>

Recording has successfully begun on the file name specified.

Recording stopped

Recording has been stopped from the keyboard. The file is intact and the mass storage device may be removed without loss of data.

Remote

Local mode has been exited and communications with the host computer have resumed.

Terminal ready on <Sc> [Local][Disp_fns][Echo=][Hardcopy on]

The terminal is ready on the specified select code. There can be up to four messages indicating the status of the emulator.

Timeout on select code <sc>...ABORTING

An operation involving the ASI card has taken more than three seconds. This is an indicator that something could be wrong with the ASI card. After the message is displayed, the program stops.

Type Y to verify CREATE of <file name>

A CREATE operation is attempted if you press [Y] to verify it. Otherwise, no operation is performed.

Type Y to verify PURGE of <file name>

A PURGE operation is attempted if you press [Y] to verify it. Otherwise, no operation is performed.

`Unexpected error in setting up datacomm (<error message>) FATAL!`
An unexpected error happened in setting up datacomm, and the program has stopped. Inspect the line specified in the message for possible errors.

`Uploading <file name> with handshake`
Uploading has successfully begun using the prompt handshake.

`Uploading <file name> without handshake`
Uploading has successfully begun without using the prompt handshake.

`Uploading stopped`
Uploading has been prematurely stopped from the keyboard.

`What is the select code you wish to use?`
There are two or more datacomm interfaces in the computer. Enter the select code of the one you wish to use.