WANG

Binary Synchronous I (BSCI) Telecommunications Package Operator's Manual

(INTERIM)

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(INTERIM)

2780
3780
3741
HASP
2200-2200

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CHAPTER 1 INTRODUCTION

The Binary Synchronous I (BSCI) Package is designed to give the user a flexible package for synchronous communications. Enclosed in the package are four (4) emulators:

IBM 2780/3780 Emulation
IBM 3741 Emulation
HASP Multileaving Emulation
2200 to 2200 Communications

The package has been combined to allow any user to easily configure the package to fit his unique communications requirements. Unlike previous TC packages, there is no lengthy SYSGEN process. Instead, the user "configures" a system by answering a series of questions. The answers are then saved on disk under a user-specified description. The package then allows the selective loading of one to twelve user-defined configurations. Therefore, on one diskette, there may reside a number of configurations for any of the above emulators.

Since each emulator is unique yet is contained in the same parameter selection scheme, this manual attempts to provide general discussion first, followed by detailed discussion for each emulation.

To accommodate mini-diskettes, a separate package has been developed which is similar in operation, but does not have all four emulators on a single disk. This BSCI package (#195-2057-8) is comprised of three mini-diskettes. The emulators are split as follows:

— diskette 1 — 2780/3780
— diskette 2 — 3741
— diskette 3 — HASP and 2200-2200

The only difference in operation is when selecting which emulation during configuration. At that time, either two or no choices are presented.

CHAPTER 2 CONFIGURATION GENERATION

2.1 GENERAL OPERATION

The BSCI diskette contains four emulators. To gain access to all the emulators, a "front-end" parameter selection module has been added. The function of this module is to:

1. Choose an Emulation (2780, 3780, 3741, HASP or 2200-2200).
2. Specify User Parameters.
3. Save these Parameters in a disk file.
4. Allow the loading of an Emulator given a set of user-defined parameters (hereafter referred to as a *"configuration"*).

Upon entry to the package, the user has the option of *loading* a configuration, or *generating* a configuration. If the user chooses to generate a new configuration, the user is prompted for a choice of emulators, followed by a series of questions unique to the given emulator. These responses are then *saved* on disk under a user-prescribed description and control is returned to the beginning of the program. From here, the user may generate another configuration or load the configuration just defined (displayed in a menu under the user-prescribed description).

The question and answer procedure is unique yet provides easy display and operator flexibility. All questions are performed on one or two screens allowing both forward and backward "walking" through the questions.

To run the system:

1. Place the program diskette in the fixed drive 310.
2. Key CLEAR (EXEC)
3. Key SELECT DISK 310 (EXEC)

if on a Wang 2200, WCS, or PCS II:

4. Key LOAD DC F "START" (EXEC)
5. Key RUN (EXEC)

or if on a system 2200VP or 2200MVP:

4. Key LOAD RUN (EXEC).

The CRT will blank and a menu will appear.

display

WANG 2200 TELECOMMUNICATIONS EMULATORS (date)
TO OPERATE - Press S.F. KEY or DIGIT corresponding to name, or
position # via RETURN or BACKSPACE and key RUN, DELETE or RECALL

'1 CREATE A NEW CONFIGURATION

At this time the user must *create a configuration* to be saved on disk. This procedure involves the specification of parameters unique to his system. To CREATE A NEW CONFIGURATION key RUN or SF'1.

2.1.1 Emulator Selection

The CRT will blank and a menu will appear. (Note: On mini-diskette versions this menu will vary depending on which diskette is loaded. If only one emulator exists on that diskette, the screen will automatically proceed to the next step.)

display

```
  #  WHAT EMULATION?
TO OPERATE—Press S.F. KEY or DIGIT corresponding to name, or
position # via RETURN, SPACE or BACKSPACE and key RUN

# '1 for Multileaving HASP
  '2 for IBM 2780
  '3 for IBM 3780
  '4 for IBM 3741
  '5 for 2200 to 2200
```

The user then chooses the desired emulator by pressing the appropriate Special Function key. The corresponding set of questions is then loaded and presented to the user in the following format:

display

```
  PARAMETER                          CURRENT SELECTION
#(Question #1)                       (selected option from below)
 (Question #2)                       (selected option from below)
  — etc. —                                 — etc. —

OPTIONS FOR — (Selected Question)      ACTIVE KEYS
1  (description 1)                    —DIGITS—
2  (description 2)                    —RETURN—
3  (description 3)                    —BACKSPACE—
     — etc. —                         —RECALL—
                                      —RUN—
```

2.1.2 Parameter Selection

The # is always located to the left of the selected question. It is moved using the RETURN or BACKSPACE key. The options for the selected question are displayed in the lower left corner of the screen. An option is chosen for the current question by keying the appropriate DIGIT for the option. When keyed, the current selection field to the left of the question will change to the corresponding description. By "walking" through the questions and making the desired selections a configuration is generated. When all parameters are as desired, the RUN key is pressed and control proceeds to the next screen. Note that the RUN key is only active when the first question is selected. This forces the user to answer all questions, necessary because some questions are optional depending on the selection of previous replies. The following keys allow easy selection of the parameters:

DIGITS —	Allow selection from one option to another within a given question.
RETURN —	Advances to the next logical question. (Note that some questions are only asked based on previous replies.)
BACKSPACE —	Backspaces to the previous question.
RECALL('15)—	Resets all the selections to their initial setting. This is especially useful when in RECALL mode.
RUN—	Active only when positioned at the first question, it is used when all the desired selections shown are correct. The prompting then proceeds to the next set of questions or the SAVE/RUN phase.

2.1.3 Saving a Configuration

The selection of parameters may take one or two screens, depending on the emulator chosen. After the RUN key is pressed on the *last* parameter screen, the user is prompted for saving or loading the configuration.

display

```
SAVE IT OR RUN?
TO RUN PRESS S.F. KEY OR DIGIT CORRESPONDING TO NAME OR
POSITION VIA RETURN AND BACKSPACE AND KEY RUN

#    '1 FOR RUN CREATED VERSION
     '2 FOR SAVE CREATED VERSION
```

The following keys are then active:

- '0 to abort and return to 'START'.
- '1 to proceed to the loading of the specified emulator and parameters. The configuration is not saved on disk for later loading.
- '2 to save the parameters on disk for later loading. The user is prompted for a description which is later displayed on the main menu.

display

```
SAVE THE PARAMETERS YOU HAVE GENERATED
EXISTING CALLS -

'2   FOR (user described calling sequences)
●
'n

          THESE PARAMETERS

Emulator Type      =    (emulator name)
Input Capability   =    (input module description)
Output Capability  =    (output module description)

Key 1-40 byte           ....!....1....!....2....!....3....!....4
DESCRIPTION        =?   (prompt for user description)
```

Respond with desired description or SF '0 to abort configuration and return to main menu. Duplicate names are allowed since all configurations are positional and referenced by number.

2.1.4 Loading a Configuration

Once the user types a 40-byte description and keys RETURN, the main menu reappears.

display

```
  WANG 2200 TELECOMMUNICATIONS EMULATORS  Release 4.0.  4/07/78
TO OPERATE — Press S.F. KEY or DIGIT corresponding to name, or
position # via RETURN or BACKSPACE and key RUN, DELETE or RECALL

#   '1   CREATE A NEW CONFIGURATION
    '2   LOAD user defined configuration
    '3   LOAD another user defined configuration
```

To begin emulation using one of the above configurations the user keys function key 2 through n. The emulator is then loaded in and the emulation begins. Refer to the sections entitled "Operation of the Emulators" for operating instructions for a particular emulator. In the loading process, the parameters selected at configuration time will be displayed.

2.1.5 Other Functions

From the main menu, other special functions to maintain configurations may be performed. They include:

Deletion	—	a configuration may be deleted by positioning # to a desired configuration (using the SPACE, RETURN or BACKSPACE key) and keying SF'9 (DELETE). The configuration is then deleted from both the menu and disk. Keying '9 from the first position will force the loading of the 9th configuration (if defined).
Recall	—	a configuration may be modified by keying SF'15 (RECALL) followed by the numeric key corresponding to the configuration to be modified. The parameters are then loaded and the parameter selection screen appears. When the parameters are changed, key RUN just as when creating a new configuration. The RUN/SAVE screen will appear. Specify SAVE and type a user description. It may be the same name or different. The old configuration is *not replaced* but *added.* To replace, simply delete the old configuration. (Note: duplicate names are allowed).
Clear	—	all existing configurations may be deleted by keying RESET and SF'31. When RUN is again keyed, all configurations are deleted.
Setting CRT length	—	the default CRT length is 64. If 80 column is desired, a modification to the START module is required. In the module START on line 12, change L=64 to L=80. L is a common variable and referenced by all the emulators; therefore, it need only be changed once in the start module.

2.2 CONFIGURATION OPTIONS FOR 2780

For 2780 Emulation, the following questions will be prompted for after selection of 2780 in WHAT EMULATION?

	PARAMETER	SELECTIONS
?1	MODEM TYPE	1=Synchronous 2000-4800 2=2400 BPS Null - Modem 3=4800 BPS Null - Modem
?2	MODEM OPERATES	1=Dial up line 2=Leased line
?3	RECORD BLOCKING	1=Multi-record 2=Single record
?4	RECEIVE TRANSPARENCY?	1=To disk in ASCII 2=To disk w/o translation

On a second screen, the following questions will be asked:

?3 (DISK ACCESS METHOD) asked if disk is specified	1=via Search, System over 8K 2=via On Error, System to 8K
?4 (RECEIVE DISK) asked if ?2 response is disk. and if ?3 response is 1.	1=Dedicated 2=Shared

Explanation of 2780 Options

Modem Type	Normally, #1 will be selected for use on modems between 2000 bps and 4800 bps. When using a Wang null modem an internal baud rate must be selected as 2400 bps or 4800 bps (#2 or #3).
Modem Operates	If a dial-up line is being used select #1, else choose #2.
Record Blocking	Depending on the other device being communicated with, single or multiple records per block may be chosen. It is imperative that it be set correctly or blocks may be rejected on send or receive.
Receive Transparency	When transparent data is received, it is optionally translated to ASCII from line code (EBCDIC) by choosing #1. If #2 is chosen, the EBCDIC line code will be placed on disk. NOTE: Transparency to the printer is routed to the printer in HEX.
Send From	The send device may be *either* disk or card reader.
Receive To	There are two receive streams; print (including console messages) and punch. Print and punch may go to the printer (#1) or to disk (#3). Normally #2 *is chosen* allowing print streams to the printer, and punch streams to disk in TC file format. If both streams go to disk (#3) the print is spooled to disk by placing the printer control byte as the first character of each record. Spooled print files may be printed off-line using a utility found in the TC Support Utilities, Rel. 2.0.
Disk Access Method	Normal operation uses the search method (#1). To run the emulator in under 8K of memory, the On Error method (#2) may be chosen. This method does not validate file names on send and will not automatically open consecutive receive files. NOTE: This Question is only asked if disk is specified.
Receive Disk	When a disk file is opened for receive, space is allocated for the remainder of the disk surface selected. This locks out other users trying to use that disk surface (on an MVP or multiplexed disk). When #2 is selected, only 500 sectors are allocated for receive leaving the remainder for other users. This limits the receive file size, however, to 500 sectors. Asked only where applicable.

2.3 CONFIGURATION OPTIONS FOR 3780

For 3780 Emulation, the following questions will be prompted for after selection of 3780:

	PARAMETER	SELECTIONS
?1	MODEM TYPE	1 = Synchronous 2000-4800 2 = 2400 BPS Null - Modem 3 = 4800 BPS Null - Modem
?2	MODEM OPERATES	1 = Dial up line 2 = Leased line
?3	RECORD BLOCKING	1 = Multi-record 2 = Single record
?4	RECEIVE TRANSPARENCY?	1 = To disk in ASCII 2 = To disk w/o translation
?5	RECEIVED DATA	1 = Space Compressed 2 = Horizontal Tabs
?6	(TRANSMITTED DATA) asked if ?5 response = 1.	1 = Compressed 2 = As Is

A second screen will prompt for the following questions:

		Input/Output Modules
?1	SEND FROM	1 = Disk 2 = Card Reader
?2	RECEIVE TO	1 = All streams to printer 2 = Printer and disk 3 = All streams to disk
?3	(DISK ACCESS METHOD) asked if disk specified	1 = via Search, system over 8K 2 = via On Error, system to 8K
?4	(RECEIVE DISK) asked if ?2 response is disk. and if ?3 response is 1.	1 = Dedicated 2 = Shared

Explanation of 3780 Options

Modem Type	Normally, #1 will be selected for use on modems between 2000 bps and 4800 bps. When using a Wang null modem, an internal baud rate must be selected as 2400 bps or 4800 bps (#2 or #3).
Modem Operates	If a dial-up line is being used select #1, else choose #2.
Record Blocking	Depending on the other device being communicated with, single or multiple records per block may be chosen. It is imperative that it be set correctly or blocks may be rejected on send or receive.
Receive Transparency	When transparent data is received, it is optionally translated to ASCII from line code (EBCDIC) by choosing #1. If #2 is chosen, the EBCDIC line code will be placed on disk. NOTE: Transparency to the printer is routed to the printer in HEX.
Receive Data	Normally, a 3780 has space compression which eliminates blanks (#1). Optionally, this feature may be overridden and compression using horizontal tabs may be specified (#2).

Transmitted Data	Transmitted data may be sent with (#1) or without (#2) space compression.
Send From	The send device may be *either* disk or card reader.
Receive To	For 3780, only one data stream exists, print. It may be routed to the printer (#1) or to disk (#3). The selection of #2 will result in streams being routed to the printer. When #3 is selected the print is spooled to disk by placing the printer control byte as the first character of each record. Spooled print files may be printed off-line using a utility found in the TC Support Utilities, Rel. 2.0.
Disk Access Method	Normal operation uses the search method (#1). To run the emulator in under 8K of memory, the On Error method (#2) may be chosen. This method does not validate file names on send and will not automatically open consecutive receive files. NOTE: This Question is only asked if disk is specified.
Receive Disk	When a disk file is opened for receive, space is allocated for the remainder of the disk surface selected. This locks out other users trying to use that disk surface (on an MVP or multiplexed disk). When #2 is selected, only 500 sectors are allocated for receive leaving the remainder for other users. This limits the receive file size, however, to 500 sectors. Asked only where applicable.

2.4 CONFIGURATION OPTIONS FOR 3741

When 3741 is chosen in reply to WHAT EMULATION?, the following questions will be prompted for:

PARAMETER	SELECTIONS
?1 MODEM TYPE	1 = Synchronous 2000-4800 2 = 2400 BPS Null - Modem 3 = 4800 BPS Null - Modem
?2 MODEM OPERATES	1 = Dial up line 2 = Leased line
?3 RECORD BLOCKING	1 = Multi-record 2 = Single record
?4 TERMINAL I.D.?	1 = No 2 = Yes
?5 (1-4 CHARACTER I.D.) asked only if ?4 response = 2	respond with alpha/numeric characters

A second screen will prompt for the following questions:

	Input/Output Modules
?1 SEND FROM	1 = Disk 2 = Card Reader
?2 RECEIVE TO	1 = All streams to printer 2 = Printer and disk 3 = All streams to disk
?3 (DISK ACCESS METHOD) asked if disk specified	1 = via Search, system over 8K 2 = via On Error, system to 8K
?4 (RECEIVE DISK) asked if ?2 response is disk. and if ?3 response is 1.	1 = Dedicated 2 = Shared

Explanation of 3741 Options

Modem Type	Normally, #1 will be selected for use on modems between 2000 bps and 4800 bps. When using a Wang null modem, an internal baud rate must be selected as 2400 bps or 4800 bps (#2 or #3).
Modem Operates	If a dial-up line is being used select #1, else choose #2.
Record Blocking	Depending on the other device being communicated with, single or multiple records per block may be chosen. It is imperative that it be set correctly or blocks may be rejected on send or receive.
Terminal ID	This is an optional feature on a 3741 which imbeds a 1-4 character terminal ID at the start of a message. If desired #2 should be selected. NOTE: This is *not* a terminal ID to be used as an address on a multi-point line.
Send From	The send device may be *either* disk or card reader.
Receive To	There are two receive streams; print (including console messages) and punch. Print and punch may go to the printer (#1) or to disk (#3). Normally #2 is chosen allowing print streams to the printer, and punch streams to disk in TC file format. If both streams go to disk (#3) the print is spooled to disk by placing the printer control byte as the first character of each record. Spooled print files may be printed off-line using a utility found in the TC Support Utilities, Rel. 2.0.
Disk Access Method	Normal operation uses the search method (#1). To run the emulator in under 8K of memory, the On Error method (#2) may be chosen. This method does not validate file names on send and will not automatically open consecutive receive files. NOTE: This Question is only asked if disk is specified.
Receive Disk	When a disk file is opened for receive, space is allocated for the remainder of the disk surface selected. This locks out other users trying to use that disk surface (on an MVP or multiplexed disk). When #2 is selected, only 500 sectors are allocated for receive leaving the remainder for other users. This limits the receive file size, however, to 500 sectors. Asked only where applicable.

2.5 CONFIGURATION OPTIONS FOR HASP MULTILEAVING

When HASP is selected, the following questions are asked:

	PARAMETER	POSSIBLE SELECTIONS
?1	INPUT DEVICE	1. Disk 2. Card Reader
?2	TRANSPARENT SEND?	1. Send as is 2. Translate to EBCDIC before send.
?3	PRINT STREAMS TO	1. Printer 2. Disk (spooled)
?4	PUNCH STREAMS TO	1. None 2. Disk in ASCII. 3. Disk w/o translation.

where selections and meanings are:

?2 TRANSPARENT SEND? 1. Send as is

Data streams are NOT translated by the 2200 or telecommunications controller.

?2 TRANSPARENT SEND? 2. Translate to EBCDIC before send

Data streams are translated by the telecommunications controller to EBCDIC.

?4 PUNCH STREAMS TO 3. Disk w/o translation.

Punch streams are NOT translated and are written to the receive disk surface in TC format in the code received by the telecommunications controller.

?3 PRINT STREAMS TO 1. Printer
and ?4 PUNCH STREAMS TO 1. None

means printer output is routed to the line printer (215). The punch stream is inactive and the disk receive module is not loaded. This is the *only* configuration that will operate within a 16K 2200 configuration.

?3 PRINT STREAMS TO 2. Disk (spooled)

means punch streams are inactive while printer output is routed to the receive disk surface in TC format with a vertical format control byte written preceding text data. These files may then later be listed with an off-line utility.

?4 PUNCH STREAMS TO 2. Disk in ASCII.

Punch streams are translated to ASCII and written to the receive disk surface in TC format.

?4 PUNCH STREAMS TO 3. Disk w/o translation.

Punch streams are NOT translated and are written to the receive disk surface in T.C format in the code received by the telecommunications controller.

For a response of 2 to question C, or a response of 2 or 3 to question D, the disk receive module is loaded and prompt E given.

?5 MULTIPLEXED DISKS:
1. No opens receive files to the balance of the disk.
2. Yes reserves a maximum of 500 sectors per file.

2.6 CONFIGURATION OPTIONS FOR 2200 TO 2200 OPERATION

The following two questions are asked when 2200 to 2200 is selected:

	PARAMETER	SELECTIONS
?1	MODEM TYPE	1 = Synchronous 2000-4800 2 = 2400 BPS Null - Modem 3 = 4800 BPS Null - Modem
?2	MODEM OPERATES	1 = Dial up line 2 = Leased line

Explanation of Parameters:

Modem Type — Normally, #1 will be selected for use on modems between 2000 bps and 4800 bps. When using a Wang null modem, an internal baud rate must be selected as 2400 bps or 4800 bps (#2 or #3).

Modem Operates — If a dial-up line is being used select #1, else choose #2.

CHAPTER 3 OPERATION OF THE 2780, 3780, 3741 AND 2200-2200 EMULATORS

3.1 GENERAL OPERATION

Each emulation program provides two-way communications utilizing five modes of operation: CONTROL, BID, SEND, RECEIVE, and ATTENTION, as described in Table 3-1. A particular mode may be entered many times or not at all, depending upon operator input and the number of messages originating from the remote end of the line.

At any given time, only one mode of operation is in effect. For example, after loading, CONTROL mode is entered. The display shown in Figure 3-1 appears on the CRT, with the word CONTROL in the lower right corner under the mode label as follows:

— MODE —
CONTROL

Once in the CONTROL mode, the system waits indefinitely if no action occurs; however, when action occurs and the system enters another mode, the name of the current mode is displayed under the mode label in the lower right corner. Keep in mind that transmission (sending data or messages) is initiated by the operator, and reception is initiated by the remote end of the line — after a communications link has been established.

During each mode of operation, one or more currently active keyboard controls are displayed on the second line of the CRT. For example, during the CONTROL mode the first two lines of the CRT appear as follows:

ACTIVE KEYBOARD CONTROLS
'0 = CONTROL '1 = ATTN '2 = SEND '3 = SEND TRSP C/R = KYBD

The operator should be familiar with the action associated with each active control key, as described in Table 3-2.

Tables 3-1 and 3-2 should be studied carefully and kept readily available by anyone operating a communications program — until thoroughly familiar with a communications application. The active keyboard controls, as well as the action associated with each control, are device-independent for four of the five modes of operation (CONTROL, BID, SEND, AND RECEIVE); hence, Table 3-2 applies to any communications program, regardless of the particular I/O configuration specified for the configuration.

On the other hand, the active keyboard controls for the ATTENTION mode are device-dependent, as shown in Table 3-3. Keep in mind that the system enters the ATTENTION mode from the CONTROL mode only if the operator presses special function key I. However, there is no need to enter the ATTENTION mode until a prompt appears on the CRT indicating that a receive-device is not ready, or until the operator desires to adjust the paper in a printer via a special function key (if the printer is the designated output device), or desires to erase a disk file which is not automatically closed by the system.

3.2 INITIAL OPERATOR ACTION

Since data reception is controlled by the remote end of the line, the designated output device should be ready when the remote end begins to transmit data. For this reason, each emulation program automatically checks the device ready status of its designated output device. If the device is not ready, a message is displayed when the system first enters the CONTROL mode.

Generally speaking, unless an operator is certain that no data is to be received, the operator should ready the output device before establishing a connection with a host system or a terminal. In particular, if the output device is a printer which has been turned on and manually selected, no device ready status message appears; if not ready, the message PRINTER NOT READY appears. If the output device is a storage device (a disk), the message RECEIVE DISK FILE NOT OPENED appears. Normally, the operator should press SF'1 to activate the ATTENTION mode and then supply the device-related information described in Table 3-3. After the required information is furnished, the system automatically returns to the CONTROL mode.

Now, in accordance with prearranged and special procedures related to a particular application, the operator may establish a connection with a host computer or another terminal, or the operator may await a telephone call initiated by someone else. In either case, the operator should be familiar with the information in the next section.

3.3 DISPLAYS, PROMPTS AND STATUS MESSAGES

Prompts, as well as status and error messages, appear on the CRT during operation of any emulation program generated from Wang's utility package. The particular locations where specific types of information appear are shown schematically in Figure 3-1, using line numbers (1 through 13) to simplify the discussion which follows.

Some information is device-independent; other information is device-dependent. Some information is common to all modes of operation; other information is related only to specific modes of operation. For example, as discussed previously the active controls which appear on line 2 of the display are related to the current mode of operation as summarized in Tables 3-2 and 3-3. Five controls are active during the CONTROL mode, but only one is active during the BID, SEND, and RECEIVE modes. On the other hand, the number of active controls during the ATTENTION mode depends upon the designated output device. However, by observing the second line on the CRT, the operator knows immediately just which controls are currently active.

Line #:

```
 1  ACTIVE KEYBOARD CONTROLS
 2  (Currently active S.F. & other keys for control beyond input.)
 3
 4  (Send status messages. Prompts for receive-device info. Input indicator.)
 5  (Prompts for send-device info. System action for receive. Input echo.)
 6  (Error messages for send-file names.)
 7  (Receive-device ready/not-ready status messages.)
 8  (Automatic receive-file opening error messages.)
 9  (Reception abort messages.)
10
11  — MODEM SIGNALS —     BLOCKS      BLOCKS
12  DTR DSR RTS CTS CAR   SENT        RECD        — MODE —
13   •   •   •   •   •    xxxx        yyyy        mmmmmmmm
```

Figure 3-1. Screen Layout During Emulation Program Operation

During all modes of operation, the labels shown as uppercase words in Figure 3-1 (see lines 1, 11 and 12) remain unchanged. Also lines 3 and 10 are always blank.

The current mode of operation is displayed in the lower right corner. In the figure, the name of the current mode is denoted by mmmmmmmm on line 13.

In addition to the current mode, other status information appears in the last line of the display. In the screen layout in the figure, asterisks are shown on line 13 under the five modem signal categories DTR, DSR, RTS, CTS, and CAR; however, an asterisk is not always present for each category. Two asterisks are usually present and the other three appear to be blinking on and off if data is currently being transmitted or received. The significance of each modem category is described in Table 3-4.

Table 3-1. Modes of Operation

Mode	Description
CONTROL	The system automatically enters the CONTROL mode first. While in this mode, the system monitors the communications line and the keyboard — awaiting action from either the operator or the remote end of the line. When action occurs, the system branches to an appropriate location in the program and may enter another mode of operation. If no action occurs, the system remains in the CONTROL mode indefinitely.
BID	If the operator initiates data transmission by pressing SF'2 (SEND) or SF'3 (SEND TRSP) during the CONTROL mode, the system prompts the operator to supply input-device-related information shown in Table 3-6, and then enters the BID mode. In this mode, the system bids for control of the line by requesting permission to transmit a message, and continues to do so until one of the following occurs: a) permission is granted by the remote end, b) 16 requests fail, or c) the operator aborts the mode via SF'0 (ABORT). If permission to transmit is granted, the system enters the SEND mode; otherwise, the system returns to the CONTROL mode.
SEND	After entering this mode following successful completion of the BID mode, the system transmits data (normally or transparently depending upon whether SF'2 or '3 initiated the action) and continues to do so until one of the following occurs: a) all data is sent, b) an operator at either end of the line aborts the transmission, or c) transmission difficulties arise such as the line being disconnected. In any event, the system returns to the CONTROL mode.
RECEIVE	Only the remote end of the line can activate the RECEIVE mode. In this mode, the system collects data being sent from the remote end and outputs the data to the designated output device, continuing to do so until one of the following occurs: a) an end-of-transmission code is received, b) an operator at either end of the line aborts the transmission, or c) transmission difficulties arise, such as the line being disconnected. In any event, the system returns to the CONTROL mode. (Note: If outputting to a printer which has insufficient paper, the system may remain in the RECEIVE mode.)
ATTENTION	If the operator presses SF'1 (ATTN) during the CONTROL mode, the system enters the ATTENTION mode and displays the device-related active controls shown in Table 3-3. Normally, an operator activates this mode only for one of the following reasons: a) to form feed, vertical tab, or line feed a printer before additional output is received, b) to supply disk-related information, if a RECEIVE DISK FILE NOT OPENED prompt appears, or c) to erase a file, if the last file opened by the system is not automatically closed.

After the operator supplies information in response to a set of prompts, or presses special function key '0, the system returns to the CONTROL mode.

Table 3-2. Available Operator Controls During Each Mode of Operation

Mode	Active Controls	Action
CONTROL	SF'O = CONTROL	Directs the system to remove any status and error messages remaining from the last SEND and RECEIVE modes. (Note: the number of blocks sent is not altered until the next SEND mode occurs, and the number of blocks received is not altered until the next RECEIVE mode occurs.)
	SF'1 - ATTN	Directs the system to enter the ATTENTION mode, thereby allowing the operator to ready the output device, or supply information via the new set of active controls shown in Table 3-3. (Note: The available controls during the ATTENTION mode are device-dependent and are determined by the designated output device for the communications program being used.)
	SF'2 = SEND	Directs the system to send data in EBCDIC character form - after first requesting operator-supplied, input-device-related information shown in Table 3-6, and successfully bidding for the line.
	SF'3 = SEND TRSP	Directs the system to send data transparently, i.e., to send data in binary form, using special control characters defined by the BSC protocol — otherwise, same as SF'2.
	C/R = KYBD	The RETURN(EXEC) key directs the system to accept a single record to be entered via the keyboard. (This option is useful for sending a sign-on message to the host computer or sending status requests such as $DN to a HASP operating system.) As a visual aid, a 63-character position indicator is displayed, and each entered character appears below the indicator; the BACKSPACE and LINE ERASE keys are active for editing the keyboard input. The RETURN(EXEC) key must be used again to signify the end-of-message and direct the system to begin transmission; no message is sent if the line is blank.
BID	none	
SEND	SF'O = ABORT	Directs the system to terminate the transmission. However, before returning to the CONTROL mode, the system sends the last data block currently in memory and then signals the remote end that transmission is aborted. (Note: Abort procedures vary from host to host — one host may clear the transmission; another may attempt to execute a partial transmission. In the latter case, a "cancel job request," entered as a single record via the keyboard, may be required in addition to the abort signal.)
RECEIVE	SF'O = ABORT	Directs the system to terminate reception. However before returning to the CONTROL mode, the system signals the remote end that an abort request has been made, and then follows the abort procedure used by the remote end.
ATTENTION	See Table 3-3.	(Note: During the ATTENTION mode, the available operator controls are device-dependent, depending upon the designated output device.)

Table 3-3. Device-dependent Active Controls During the ATTENTION Mode

Output Device	Active Controls	Action
Disk (Method 2, Srch Catlg)	SF'0 = CONTROL	Directs the system to return to the CONTROL mode.
	SF'1 = OPEN FILE	Prompts the operator successively as follows: ENTER RECEIVE DEVICE ADDRESS 1 = 310 2 = B10 3 = 320 4 = B20 ENTER FILE IDENTIFICATION NOT TO EXCEED 6 CHARACTERS Upon receiving a response to the second prompt, the following message appears: SEARCHING CATALOGUE If the operator-supplied identifier is already in the catalog, the system displays an error message xxxxxx CATALOGUED RE-ENTER, where xxxxxx is replaced by the file identifier code; otherwise, the system opens the first file with the operator-supplied identifier. The allotted space is equal to all the currently available space on the disk. Then, the message RECEIVE FILE xxxxxx01 OPENED appears, and the system returns to the CONTROL mode. (Note: Prior to displaying the first prompt, the system erases any currently open file on the disk.)
	SF'2 = ERASE FILE	Allows the operator to erase one of the following files: a) the last file opened automatically by the system, thereby freeing unused disk space before terminating the communications program, or b) any file in the catalog index (space is not freed unless the file is the last file with respect to the sectors being used currently). The following message appears: ERASE FILE ———— OR ? The message contains the name of the last file opened by the system during current operation of the program. After the operator supplies a different file name or keys RETURN(EXEC) to erase the file named by the system, the following messages appear: SEARCHING FOR FILE FILE ——— ERASED Then, the system returns to the CONTROL mode.

Disk (Method 1 on Error)	SF'O = CONTROL (The first prompt appears immediately.)	Directs the system to return to the CONTROL mode. ENTER RECEIVE DEVICE ADDRESS 1 = 310 2 = B10 3 = 320 4 = B20 Upon receiving a valid response, the system prompts the operator successively as follows: ENTER FILE IDENTIFICATION NOT TO EXCEED 6 CHARACTERS ENTER NUMBER OF SECTORS TO OPEN RECEIVE FILES Upon receiving a response to the above prompt, the system attempts to open the first file. If the file name already exists, the message STOP NAME ALREADY CATALOGUED appears (the operator must key SF'O to resume); otherwise, the system opens the first file and displays the message: RECEIVE FILE xxxxxx01 OPENED Then the system returns to the CONTROL mode.
Printer	SF'O = CONTROL	Directs the system to return to the CONTROL mode.
	SF'13 = FORM FEED	Executes form feed operation and returns to the CONTROL mode.
	SF'14 = VERT TAB	Executes vertical tab operation and returns to the CONTROL mode.
	SF'15 = LINE FEED	Executes line feed operation and returns to the CONTROL mode.

Disk & Printer

Note: If the designated output device for the operating communications program is a disk and printer, the system displays any not ready status messages related to the disk first. Any printer not ready status message, if applicable, appears after operator-supplied information is furnished for the disk. The active controls displayed during the ATTENTION mode depend upon which disk method is in effect. The controls are the same as shown for the particular methods 1 and 2 in the table.

Table 3-4. Modem Signal Categories and Status Messages

Category	Definition	Status Message
DTR	DATA TERMINAL READY	If an asterisk is present, the microcode has been loaded in the Model 2228B controller by the emulation program, and the controller is now operational.
DSR	DATA SET READY	If an asterisk is present, the modem has been placed in the data position. Though the DSR asterisk must be present for data transmission/reception to take place, its presence does not always ensure the possibility. Depending upon the characteristics of the modem being used, the DSR asterisk may appear when the local modem is in the data position and the remote end has not yet completed the communications link (or has disconnected an already established link).
RTS	REQUEST TO SEND	If an asterisk is present, the Model 2228B is signaling the modem that it desires to send data.
CTS	CLEAR TO SEND	If an asterisk is present, the modem is signaling the controller that the modem is ready to send data.
CAR	CARRIER	An asterisk indicates a carrier is present, i.e., the sine wave which carries the transmitted or received signal is present.

Now, observe in Figure 3-1 that additional status information appears in the center of line 13. In particular, xxxx and yyyy represent the number of blocks sent and received, respectively. Initially, both these values are blank. No value appears in the position xxxx until the system enters the SEND mode for the first time and actually transmits data; then xxxx is set to 0000 and incremented by 1 as each block is transmitted. When the transmission is completed, the total number of blocks sent remains fixed — the value of xxxx is not altered by entry into the CONTROL, RECEIVE, ATTENTION, or BID modes — the value is not reset to zero until the system again enters the SEND mode in response to operator action.

Similarly, no value appears in the position yyyy until the system enters the RECEIVE mode in response to action from the remote end of the line. Then yyyy is set to 0000 and incremented by 1 after each block is received. When reception is completed, the total number of blocks received remains fixed. The value of yyyy is not reset to zero until the system again enters the RECEIVE mode.

Other status information related to transmission and reception appears elsewhere on the CRT. See Table 3-5.

Table 3-5. Transmission/Reception Status Messages

CRT Location	Message*	Meaning
Line 4	SEND	The system is either sending or waiting to send non-binary data, i.e., data automatically translated into EBCDIC code.
	SEND TRANSPARENT	The system is either sending or waiting to send binary data (no translation is made).
	TRANSMISSION COMPLETED	The system has completed a send or send transparent operation.
	TRANSMISSION ABORTED	Transmission has been aborted in response to operator action at either end of the line.
Line 9	RECEPTION ABORTED	Transmission has been aborted in response to operator action at either end of the line.

*When the system returns to the CONTROL mode after transmission or reception is completed/aborted, any existing messages on lines 4 and 9 are not cleared since retention of the information removes the necessity for constant monitoring by an operator. By pressing SF'O while the system is in the CONTROL mode, any such messages are removed.

Line 7 of the CRT displays device ready status messages only for the designated output device. If the receive device is a printer, a not ready condition produces the message PRINTER NOT READY; a ready condition produces no message. If the receive device is a disk, a not ready condition produces the message RECEIVE DISK FILE NOT OPENED; a ready condition produces the message RECEIVE FILE xxxxxxyy OPENED, where the first six characters are the operator-supplied file identifier and the last two characters are the sequential two-digit code supplied by the system.

After an operator presses SF'2 or SF'3 to initiate data transmission, device-related prompts appear on the CRT on line 5. Information requested by the prompts is summarized in Table 3-6.

Table 3-6. Device-dependent Information Required Upon Initiation of SEND or SEND TRSP

Input Device	Prompts Requiring Responses After SF'2 = SEND or SF'3 = SEND TRSP Activated
Card Reader	END OF FILE AT HOPPER EMPTY (1 = YES)? READY CARD READER. KEY RETURN/EXEC TO CONTINUE? Valid responses to the first prompt are as follows: a) Key 1 EXEC to answer yes. b) Key RETURN(EXEC) to answer no. The successive prompts appear initially and, also, after each hopper empty condition is sensed — unless the condition occurs following a "yes" answer; then, the system returns to the CONTROL mode after transmitting the last batch of cards.
Disk (Method 2, Srch Calog)	ENTER SEND DEVICE ADDRESS AS 1 = 310 2 = B10 3 = 320 4 = B20 ENTER FILE NAME x Initially, x is 1. As soon as the operator supplies the name of a file to be transmitted, the system searches the catalog to determine the validity of the name. If not valid, the message RE-ENTER appears below the invalid name, and a new name is awaited. If valid, the system increments the value of x by 1 and requests the name of the next file to be transmitted. The process continues until the operator keys RETURN(EXEC) without supplying a name, or the value of x reaches 5 (or 10 if the program was generated for communication between two Wang systems). Then, the following prompt appears if x is 1: SEND FILES SEPARATELY OR COMBINED AS ONE (1 = SEPARATE) Valid responses are as follows: a) Key 1 EXEC if the files are to be sent as separate messages (or files) within a single transmission. b) Key RETURN(EXEC) if the files are to be combined and sent as a single message (or file), thereby appearing to the remote end as though the files originated as a single file (or a stream of cards). Afterwards, the system enters the BID mode. Upon successful completion of the BID mode, the system enters the SEND mode and transmits the specified files before returning to the CONTROL mode. (If the BID mode is unsuccessful, or transmission is aborted, or line difficulties develop, the system returns to the CONTROL mode prematurely.)
Disk (Method 1, On Error)	ENTER SEND DEVICE ADDRESS AS 1 = 310 2 = B10 3 = 320 4 = B20 ENTER FILE NAME x Initially, x is 1. As soon as the operator supplies the name of a file to be transmitted, the system checks the catalog to determine the validity of the name. If not valid, the message STOP NAME NOT CATALOGUED appears below the invalid name. The operator must key SF'0 to return the system to the CONTROL mode, then key SF'2 or SF'3 and name the files from the beginning. If a file name is valid, the system increments the value of x by 1 and requests the name of the next file to be transmitted. The process continues until the operator keys RETURN(EXEC) without supplying a name, or x reaches 5 (or 10 if the program was generated for communication between two Wang systems). Then, the following prompt appears if x is 1: SEND FILES SEPARATELY OR COMBINED AS ONE (1 = SEPARATE)

Valid responses are as follows:

a) Key 1 EXEC if the files are to be sent as separate messages (or files) within a single transmission.

b) Key RETURN(EXEC) if the files are to be combined and sent as a single message (or file), thereby appearing to the remote end as though the files originated as a single file (or a stream of cards).

Afterwards, the system enters the BID mode. Upon successful completion of the BID mode, the system enters the SEND mode and transmits the specified files before returning to the CONTROL mode. (If the BID mode is unsuccessful, or transmission is aborted, or line difficulties develop, the system returns to the CONTROL mode prematurely.)

3.4 ERROR MESSAGES

As indicated in Table 3-6, an error message may occur when the system is processing operator-supplied names of the disk files to be transmitted. Depending upon the disk method in effect for the communications program, an invalid file name produces the following message:

a) RE-ENTER, if Method 2 is in effect, or
b) STOP NAME NOT CATALOGUED, if Method 1 is in effect.

The recovery technique for Method 1 is described in Table 3-6.

As indicated in Table 3-3, an error message may occur during the ATTENTION mode when the system is processing the operator-supplied file identifier for receive-to-disk files. If Method 2 is in effect, the system searches the catalog index and accepts the identifier only if the 6 (or less) supplied characters are unique with respect to the first 6 (or less) characters in every currently catalogued name — thereby ensuring the capability to open as many as 99 sequentially named files. On the other hand, if Method 1 is in effect, the system appends the characters 01 to the 6 (or less) supplied characters to create the first file name, and then checks the catalog for the uniqueness of only the first file name. An invalid file identifier produces the following message:

a) xxxxxx CATALOGUED RE-ENTER, if Method 2 is in effect, or
b) STOP NAME ALREADY CATALOGUED, if Method 1 is in effect.

The recovery technique for Method 1 is described in Table 3-3.

Other error messages may occur during the ATTENTION mode (or subsequently) when the system attempts to open a file and cannot do so because of space limitations on the disk.

For example, the message

a) INSUFFICIENT SPACE ON RECEIVE DISK, if Method 2 is in effect, or
b) STOP INSUFFICIENT SPACE ON RECEIVE DISK, if Method 1 is in effect,

can occur at the time the first file is being opened, or can occur when the system closes a file and attempts to open the next file.

To recover, the operator normally removes the platter having insufficient space and mounts a new, indexed platter at the same location. If Method 2 is in effect, the system is in the CONTROL mode; therefore, the operator should key SF'1 (ATTN) and supply a new file identifier for reception of additional files from the remote end. If Method 1 is in effect, key SF'0 followed by SF'1 and supply a new file identifier for reception of additional files.

If the system is in the RECEIVE mode and the file being received to disk overflows the allotted space, the following message code appears:

ERR 62

whether Method 1 or 2 is in effect. Keep in mind that Method 2 opens each receive file by temporarily allotting all the currently available space on disk to the file (and freeing any unused space when the file is closed); but Method 1 opens each receive file by allotting the exact number of sectors specified by the operator (and does not free any space when the file is closed).

The system remains in the RECEIVE mode if reception to disk is interrupted by a Code 62 error message. By keying SF'0 many times, the system may return to the CONTROL mode; however, such a procedure is not a recommended recovery method. Usually the operator should clear the system, reload the program, contact the remote end of the line to request retransmission of all files, and exercise care to provide ample space on the receiving disk platter.

At some point in the loading or operation of an emulation program, the message

SYSTEM ERROR!

may occur. If so, the operator must clear the system and reload the program. An operator should exercise caution to avoid one source of such an error — do not touch HALT/STEP followed by SF'0 when the system is in the SEND mode. (Do not touch RESET at any time during program operation.) If repeated attempts to operate the program produce a SYSTEM ERROR, call the Wang Service Representative.

3.5 MVP CONSIDERATIONS — (BACKGROUND)

When running on a 2200MVP system, SF'30 is activated allowing the user to "jump" into background operation. When pressed, the emulator releases the console to any partition which is available. Normal operation continues utilizing any selected I/O devices. To return to foreground operation, a $RELEASE TERMINAL command must be issued to "jump" back into the partition running the emulator. The emulator detects the terminal and regains normal operation. When going into background mode, the receive devices should be enabled to allow receive without operator intervention since no messages will be displayed and reception will be suspended. Transmission may also be initialized prior to entering background mode with the actual transmission taking place in background.

NOTE: Because separate $GIO's are used on an MVP, the emulators will not run on an MVP running in VP mode. The loader thinks it is an MVP causing $GIO failures on the VP operating system.

CHAPTER 4 OPERATION OF THE HASP MULTILEAVING EMULATOR

After a loading configuration has been selected the following display will appear:

display

PARAMETER	CURRENT SELECTION
INPUT DEVICE	(DISK or CARD READER)
TRANSPARENT SEND?	(as specified)
PRINT STREAMS TO	(as specified)
PUNCH STREAMS TO	(as specified)
(MULTIPLEXED DISK)	(as specified)

```
**********************************************************************************
*                                                                                *
* LOADING SYSTEM          WANG 2200 TELECOMMUNICATIONS                           *
*                         (user described name)                                  *
*                                                                                *
**********************************************************************************
```

The HASP Emulator loader module program loads the 2228B microcode, dimensions arrays and variables, sets some variables, etc., and then loads the emulator requested. The HASP Emulator then enters the dynamic display shown on the previous pages (DISPLAY TYPE 1).

> **NOTE:**
>
> If the disk receive module is loaded the emulator will go to PROMPT A and then PROMPT B before showing the standard displays described below.

Dial your host computer. At the tone depress the DATA button on the modem. Line 15 of the display will display LINE DISCONNECTED if the connection has not been established. Key SF'4 to activate the SIGNON sequence to your host system. A SIGNON prompt will occur on the CRT. Key in your appropriate SIGNON sequence followed by (EXEC). Refer to the instructions for CONSOLE ENTRY for keyboard instructions, if necessary.

HASP Emulator CRT displays -

Two types of on-line displays occur within the HASP system.

1. Display Type 1, the "HASP Work Station Emulator" described on the following page is the standard display. This display describes valid interaction, the status of the telecommunications queues, text sent as console or SIGNON messages, and System 2200 errors encountered.
2. Display Type 2 is for console output messages.

4.1 DISPLAY TYPE 1 — HASP WORK STATION EMULATOR

```
                    HASP WORK STATION EMULATOR ACTIVE SF KEYS
'0 = Control   '1 = ATTN   '2 = Send   '3 = Console   '4 = SIGNON   '5 = End File

  STATUS              — File      — STREAM    — DEVICE
  aaaaaaaaaa          nameLbbb    Rcv Disk    eee          fffffff
                                  Rcv Print   215

  mmmmmmmmmm          nameLnnn    Snd pppp    qqq          rrrrrr
  sssssssssssssssssss

  ttttttttttttttttttttttttttttttttttttt
```

where:

Code	Meaning	Typical Values
aaaaaaaa	Rcv disk status =	(spaces) or OPEN or Receiving or Done or Mount New Disk
nameLbbb	Rcv disk file name	
eeee	Rcv disk device address	None or disk file designation.
fffffffff	Status information	(name) — written
mmmmmm	Send Device status	Sending or Done
nameLnnn	Current send file name	
pppp	Send Device type (Card or Disk)	
qqqq	Send Device address	
rrrrrrrr		
ssssssss	Special conditions of Send Device	
ttttttttt	2200 error messages e.g., ERROR = 64 AT LINE = 6500 LINE DISCONNECTED	

NOTE:

The above display occurs during normal HASP interaction.

a. Data received from the host system for Punch queues will automatically be written to the open receive disk file.
b. Data for printing will be automatically listed on the printer at address 215.
c. Incoming console messages will activate the console output mode shown below.

Responses to prompts while in Display Type 1:

Display

HASP WORK STATION EMULATOR ACTIVE SF KEYS
'0 = CONTROL '1 = ATTN '2 = Send '3 = Console '4 = SIGNON '5 = End File
'2 = Abort (if card reader)

SF Key		Description
'0	CONTROL —	Clears the error line 15 and returns to display type 1.
'1	ATTN —	Calls the attention logic for off-line disk receive processing (i.e., assignment of receive file names). If disk receive is not loaded, SF'1 is inactive. If pressed, the following display will appear:

Attention Routine - Communications Inactive
'0 = Control '1 = Open Rcv File '2 = ERASE File '3 = Write End File

Refer to ATTENTION routine prompts covered later.

'2	Send —	Activates request for Card or Disk Send, whichever was selected at configuration time.
'3	Console —	Activates the CONSOLE ENTRY routine for entry of any console message through the keyboard.
'4	Signon —	Activates the CONSOLE ENTRY routine for the entry of a SIGNON message. (Note: SIGNON may only be performed from the keyboard and not from disk on the card reader).
'5	End File —	(Active only if card reader was selected for a Send Device.) Toggles the End File indicator ON/OFF. If set ON, EOF will be displayed starting in position 1 of the Send Device line. If set OFF, spaces are displayed on the Send Device line.

4.2 DISPLAY TYPE 2 — CONSOLE OUTPUT MODE

Display

CONSOLE OUTPUT MESSAGES
. . . Scroll display of console messages received.

> **NOTE:**
>
> The only exit from the console output mode back to Display Type 1 is by positive operator action, keying '0 or '3 or (EXEC).

4.3 CONSOLE ENTRY AND SIGNON PROMPTS

CONSOLE ENTRY — activated by keying '3 CONSOLE ENTRY.
SIGNON ENTRY — activated by keying '4 SIGNON.

action if in Display Type 1 — CRT clears
or if in Display Type 2 — the scrolled information is retained and

display

```
CONSOLE ENTRY        (or SIGNON ENTRY)        '0 ABORT
....I....1....I....2....I....3....I....4....I....5....I....6
```

respond key '0 to ABORT REQUEST and return to HASP interaction
or key (EXEC) with no data to clear CONSOLE MESSAGE line on main display
or key message of 1 to 80 characters terminated by (EXEC)

action On exit Display Type 1 will be restored with the display
SIGNON (or CONSOLE) Message Sent
(keyed text)

The following edit keys may be used in the CONSOLE ENTRY mode:

'7 Position cursor to position 1.
'8 ERASE from current cursor position.
'9 DELETE one character.
'10 INSERT one space.
'11 Move cursor 5 positions to the right though not beyond position 80.
'12 Move cursor 1 position to the right though not beyond position 80.
'13 Move cursor 1 position to the left though not before position 1.
'14 Move cursor 5 positions to the left though not before position 1.
'15 Position the cursor to position 80.
LINE ERASE to delete keyed data and put cursor on position 1.

> NOTE:
>
> When (EXEC) is keyed all console data displayed is transmitted. If no data is displayed, i.e., count = 0, no data is transmitted. The program returns to HASP on-line and Display Type 1.

4.4 SEND ROUTINE PROMPTS

Prompts for initiating data file transmission. Data file transmission is activated by keying '2 SEND when the HASP Emulator is interactive with the host computer.

4.4.1 Disk Send

response '2 SEND
action activates request for transmission of standard data files.

display Send from disk
'0 ABORT

> **NOTE:**
>
> The operator may abort any of the following requests by keying S.F. '0 to return the emulator to the interactive condition noted in Display Type 1.

display Send 1 = Normal 2 = Transparent
respond key 0 or 1 or 2 and (EXEC).

display ENTER DISK ADDRESS. 1 = 310 2 = B10 3 = 320 4 = B20?
respond key 0 or 1 or 2 or 3 or 4 and (EXEC).

display the valid address is placed on display line 1.

display ENTER FILE NAME d?
respond key valid file name and (EXEC)
or key (EXEC)

> **NOTE:**
>
> Prompt is repeated for as many as nine file names.

display the last entered file name is placed on display line 1.
as LAST FILE NAMED = name
or RE-ENTER = name

display SEND FILES SEPARATELY OR COMBINED AS ONE (1 = SEPARATE)?
respond 1 and (EXEC) or (EXEC).
action As each file is transmitted the display will show:

Sending file name Snd Disk 310

When completed the display will show:

DONE file name Snd Disk 310

> **NOTE:**
>
> S.F. '2 may used to Abort transmission.

4.4.2 Card Send

condition *where the card reader input module is loaded.*

display '2 SEND

action activates request for transmission of standard data files.

display Initiate Card Send
'0 ABORT
'0 = Abort '1 = Normal '2 = Transparent '3 = Binary

'1 Cards are sent in EBCDIC in non-transparent mode.

'2 Cards are sent in EBCDIC in transparent mode. If a card containing a "/$" in col. 1-2 is encountered, the remaining cards in the deck are sent in binary mode.

'3 Data is read from reader in binary mode (i.e., 2 bytes per card position) and sent in transparent mode.

Display on the CRT line assigned to the Send Device.

If '1 keyed, SEND NORMAL CARDS
If '2 keyed, SEND TRSP CARDS
If '3 keyed, SEND BINARY CARDS

The following SF keys may be used to control the card reader operation once the transmission has begun:

S.F. '2 may be used to Abort transmission.

S.F. '5 End of File (active only if card reader is Send Device). Toggles the End File indicator ON/OFF. If set ON, EOF will be displayed starting in position 1 of the Send Device line. If set OFF, spaces are displayed on the Send Device line.

> **NOTE:**
>
> The EOF flag is used when sending card data. If the flag is off when the card hopper empties, the emulator waits for more cards before completing transmission. If the flag is on when the hopper empties, an ETX is transmitted and file transmission is completed.

4.5 DISK RECEIVE

4.5.1 Storage of Received Data Files

Disk data for transmission and reception is stored in the standard Wang telecommunications file data format. The disk receive routine is designed to sequentially fill the catalog area of each disk surface specified. If large volumes of data are expected the operator should maintain a scratch disk in the alternate receive disk port. The program ping-pongs between primary and overflow surfaces filling the primary, then the overflow surface, and then automatically returning to the primary, etc.

4.5.2 File Naming:

The disk receive function provides the capability to receive overflow files on multiple disk surfaces. To accomplish this the following file naming convention is used:

characters 1-4 an operator supplied root name.
character 5 an alphabetic volume designator (starts with "A").
characters 6-8 a numeric sequence number (001 - 999).

The *sequence number* is automatically incremented for each new file received. If perchance 999 files are received on a surface the volume designator would be incremented.
The *volume designator* is automatically incremented for each new disk surface.

> **NOTE:**
>
> If a received file overflows a disk surface, a partial file is written to one surface and the balance written as a separate file to the next surface. The files are named with a common sequence number but differing volume designators.

The following user interaction is prompted after the HASP Emulator module is first loaded.

4.5.3 Assign Overflow Receive Disk Surface (***PROMPT A***)

This prompt occurs only if the receive to disk module has been loaded.Two disk surfaces may be specified to receive Punch streams from the host system. The surfaces are treated in a ping-pong manner with data alternately filling first one disk, then the other. This prompt is requested of the user only once at startup time. Thus, an overflow surface is active for the entire duration of a session. Care should be taken to keep a disk in the overflow drive to prevent loss of data should that surface be required. The overflow logic is *disabled* if no surface ID is specified at startup time.

display HASP Disk Rcv — Overflow Surface
1 = (F)310 2 = (R)B10 3 = (F)320 4 = (R)B20 5 = (F)330 6 = (R)B30
Disk = ?

respond (EXEC) or 1 or 2 or 3 or 4 or 5 or 6 and (EXEC)
where
(EXEC) causes *no selection* and exit to prompt B.
or
other response selects alternate surface as noted below.

display ddd = Unavailable.
repeat of prompt 1.

condition operator entered unavailable disk unit.
correction Reenter a valid response.

display Repeat of prompt 1

condition — operator entered an invalid response.
correction — Reenter a valid response.

response — valid available disk address — (EXEC)
Go to prompt B.

4.5.4 Open Receive Disk File (***PROMPT B***)

This prompt occurs only if the receive to disk module has been loaded. Open Receive Disk file. This display entered at LOAD time and also from ATTN key during HASP Emulation allows the operator to open a receive disk file. This prompt is off-line to TC interaction.

display Open Receive Disk File
1 = (F)310 2 = (R)B10 3 = (F)320 4 = (R)B20 5 = (F)330 6 = (R)B30 Disk = ?

respond — (EXEC) or 1 or 2 or 3 or 4 or 5 or 6 and (EXEC)
where
(EXEC) exits to mainline TC interaction.
other response selects surface for receive file.

display ddd = Unavailable.
Repeat of prompt 1.

condition — operator keyed an invalid response
or
the disk unit is unavailable
correction — Reenter a valid response.

display DISK = ddd nnnn SECTORS AVAILABLE
ENTER FILE IDENTIFICATION NOT TO EXCEED 4 CHARACTERS?

respond — unique four character name for a file and (EXEC).

display SEARCHING CATALOG

action — The program searches the catalog area of the disk specified for a four character match.

display (name) CATALOGUED. RE-ENTER

condition — If a match is found the user is asked to enter a new name. Go back to prompt 2.

display ABOVE DISK FILLED PICK ANOTHER

condition — If insufficient space is found, the program will request that a new disk surface be used. Go back to prompt 1.

else — If a match is not found, the program assigns the remainder of the cataloged area of the disk (only 500 sectors if shared disks were specified at configuration time) to the file naming it (name)A001. The main display will show:

status	File	Stream	Device
open	nameA001	Rcv Disk	B10

4.5.5 ATTENTION Routine Prompts

The ATTENTION routine is activated by keying '1 ATTN when the HASP Emulator is interactive with the host computer. These prompts are activated only if the disk receive module has been loaded.

display HASP ATTENTION Mode (Communications temporarily suspended).

Receive	Disk	Sectors	File	Status
Primary =	B20	9577	ROOTA001	Open
Overflow =	310			

prompt '0 = Control '1 = Open Rcv File '2 = ERASE

response **'0 Control**
action return control to the emulator and Display Type 1.

response **'1 Open Rcv File**
action If a Rcv File is open:
display Rcv Disk file (name) is Open

action If a Rcv File is not open:
Refer to the prompt B sequence to open a file.

response **'2 ERASE File**
action If a Rcv File is not open:
display Rcv Disk file (name) is Not Open

action If a Rcv File is open:
The opened file is ERASED and control is returned to Display Type 1. No Rcv File is then open.

action If a Rcv File is ....:

prompt ON DISK ddd ERASE FILE nameyyyy?

respond (EXEC)
or valid data file name and (EXEC)

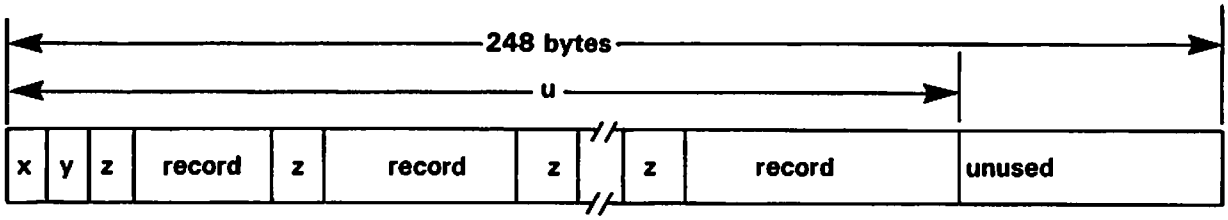
display SEARCHING
action the file name specified is removed from the disk catalog.

display the device code None on the display signifies that there is no open file for the disk receive queue.

APPENDIX A
THE TC FILE FORMAT

The "telecommunications (TC) file format" for disk data files is defined as follows:

1. Records are packed into a one-dimensional alphanumeric array having four elements, each 62 bytes long, e.g., DIM A$(4)62. The array is saved into a single sector by using the DATA SAVE DC or DATA SAVE DA statements.
2. In packing the TC records into the array, element boundaries are ignored; the array is treated as if it were simply 248 contiguous bytes of storage.
3. Within the 248 bytes of storage, three types of control bytes are used (see x, y and z in the following diagram).



x = a one-byte hexadecimal code indicating whether the sector is or is not the last sector in the file; in particular x = HEX(F0) denotes "is the last sector", x = HEX(00) denotes "not the last sector."

y = a one-byte hexadecimal value denoting "the number of used bytes plus one" in the array. For example, in the diagram, y is the hexadecimal equivalent of u + 1.

z = a one-byte hexadecimal value preceding each record to denote "the record length in bytes." For example, if the record contains 39 bytes, z = HEX(27) since $(27)_{16} = (39)_{10}$.

record = one complete record with trailing spaces truncated (except in the first record) — individual records do not overlap from one 248-byte array to the next.

Data Entry 1's SAVE or SAVE N command does not truncate trailing spaces in the first record of a file. Thus, the length of the first record is always 80 or 128 bytes.

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