96768900

CONTROL DATA CORPORATION

BATCH TERMINAL CONTROLWARE INSTALLATION HANDBOOK

2780 EMULATION
3780 EMULATION
200 USER TERMINAL (MODE 4A) EMULATION

CDC® COMPUTER SYSTEMS:

CYBER 18-05/5M/10/10M/20

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PREFACE

This manual describes the controlware installation procedures necessary for the user to install the CDC® CYBER 18 batch terminal products. The manual is intended for use by individuals involved in terminal installation and terminal field maintenance. The hardware and controlware descriptions herein are supplied only to provide a brief background and as an aid in configuring batch terminal installations for the field installation and maintenance of the controlware products available for use in CYBER 18 batch terminals.

This manual should be used in conjunction with the following publications:

Publication	Publication Number
CYBER 18 Computer Systems Site Planning Kit	96768510
CYBER 18 Computer Systems with Core Memory Installation Manual	39451500
CYBER 18-05/10 Computer Systems Hardware Maintenance Manual, Volumes 1 and 2	96767500 96767600
CYBER 18-05/10/20 Computer Systems Batch Terminal Controlware Operators Guide	96768920

Field maintenance personnel should require only the latter three manuals. Additional information may be found in the following publications:

Publication	Publication Number
CYBER 18-05/10/20 Computer Systems Batch Terminal Controlware Reference Manual	96768910
CYBER 18 Computer Systems Operational Diagnostic System (ODS) Reference Manual	39452100
CYBER 18 Computer Systems Operational Diagnostic System (ODS) Instant	39451600

This product is intended for use only as described in this document. Control Data cannot be responsible for the proper functioning of undescribed features or parameters.

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CONTROLWARE PACKAGES 1

There are three different controlware packages available for use with CYBER 18 batch terminals, each controlware package reflecting a different type of computer system to which a batch terminal may be connected. The three types are:

- A system using 200 User Terminals
- A system using IBM 2780 terminals
- A system using IBM 3780 terminals

The controlware installation packages are punched-card decks and are loaded into the terminal controller via the card reader prior to terminal operation.

The controlware information for all three types of installation decks is structured so that it can be easily tailored to suit a particular terminal installation. Tailoring is accomplished through the use of a selection card that is punched prior to the initial installation of the controlware and that is used to match the controlware loaded to the terminal's hardware configuration. Section 4 of this manual describes the procedures for identifying the system requirements for a particular terminal. Section 5 describes the procedure and format for punching the selection card. Secion 6 gives detailed instructions for installing the controlware in the terminal controller.

In addition to the offline functions contained in the terminal controlware package, a complete set of offline diagnostics, run under control of the operational diagnostic system (ODS), is available as separate, peripheral-unit card decks. Using the diagnostics contained on these decks in conjunction with the system maintenance manuals, a support person can quickly and efficiently troubleshoot, isolate, and correct nearly any hardware malfunction occurring within the terminal equipment.

This section provides a product number/equipment number cross-reference listing for use in identifying the equipment configurations of various terminal installations. The listing gives the product number and then the equipments included within that product. To simplify the listing, the part numbers for the cabling equipment required to interconnect the various equipments have been omitted. Reference throughout this manual to a CYBER 18-05 or 18-10 assumes either an 18-05 or 18-5M and 18-10 or 18-10M.

The communications console consists of the following 120 vac, 50/60 Hz equipment:

18-05/10 Basic Central Processing Unit (AA136-A)

1882-8 8K-Word Memory Module (BT219-A)

1828-1 Card Reader/Line Printer Controller (FH301-A)

1843-1 Communication Line Adapter (FJ441-A)

1828-2 Card Reader/Line Printer/Communication Line Adapter Controller (FC109-A, FC539-A)

1811-1 Keyboard Display (CC614-C/D)

1811-1 Keyboard Display Memory Expansion (XA150-A)

1811-2 Keyboard Display (CC555-G/H, CA150-A/C)

18-05/10 Basic Operators Panel (GH508-A)

722-10 Conversational Display Terminal

CARD READER/LINE PRINTER

A CYBER 18 batch terminal configuration includes one card reader and one line printer from the following available types:

CARD READER

1829-30 300/600 cpm switched to 300 cpm (120 vac, 50/60 Hz) (CB104-K, CB104-L)

1829-60 300/600 cpm switched to 600 cpm (120 vac, 50/60 Hz) (CB104-K, CB104-L)

LINE PRINTER

1827-30 300 lpm (120 vac, 50/60 Hz) (CL408/CL411)

1827-32 300 lpm (120 vac, 50/60 Hz) (CT105-B)

1827-60 600 lpm (110 vac, 50/60 Hz) (CT103-A)

1827-90 900 lpm (110 vac, 50/60 Hz) (CT106-A)

CONTROLWARE

A CYBER 18 batch terminal has the following controlware options:

200 User Terminal (Mode 4A) Emulation Controlware Card Deck (MD426-A)

2780 IBM Terminal Emulation Controlware Card Deck (MD427-A)

3780 IBM Terminal Emulation Controlware Card Deck (MD428-A)

HARDWARE OPTIONS

A batch terminal can have the following hardware options:

1832-4 Magnetic Tape Controller (one required per terminal using magnetic tape transports) (FA107-A)

1832-4 Seven- or Nine-Track Magnetic Tape Transport Translator (BW812-A)

1860-72 Seven-Track Magnetic Tape Transport (120 vac, 50/60 Hz) (BW101)

1860-92 Nine-Track Magnetic Tape Transport (120 vac, 50/60 Hz) (BW303-A)

1882-8 8K-Word Memory Module Increment (to 32K in a terminal) (BT219-A)

1860-1 Seven-Track Magnetic Tape Subsystem

1860-2 Dual Seven-Track Magnetic Tape Subsystem

1860-3 Nine-Track Magnetic Tape Subsystem

1860-4 Dual Nine-Track Magnetic Tape Subsystem

This section describes the general structure of the controlware card decks used with the batch terminals. Table 3-1 lists an actual and a functional part breakdown of the controlware card deck. The actual breakdown column indicates the card groupings into which the deck can physically be divided, and the functional column indicates the functions that occur for the actual deck parts. The following paragraphs describe functions of the different parts of the controlware card deck.

TABLE 3-1. CONTROLWARE CARD DECK STRUCTURE

Actual Deck Parts	Deck Function
Loader	Selective-loader common package
	Error reporting overlay
	Selection-card-read overlay
Selection Card	Selection card
Controlware	Move-loader overlay
	Selective-loader overlay
	Controlware for applications package
	Loader cleanup overlay
	Patch processing overlay
Patch Card(s)	Patches
End-of-Loader Card	End-of-loader card

LOADER

The loader card deck consists of:

- Selective-loader common routine
- Hardware error reporting overlay routine
- Selection-card-read overlay routine

The loader card deck is separated from the rest of the controlware card deck by the selection card.

SELECTIVE-LOADER COMMON ROUTINE

The selective-loader common routine provides common functions for the selective-loader overlay cards interspersed throughout the controlware portion of the deck.

The system uses overlay routines for loading each device's controlware because placing the entire loader in memory at one time requires too much memory area. The loader overlays for each function run one-at-a-time in an area of memory reserved for that purpose. Once an individual overlay has accomplished its task of loading its associated controlware, it is replaced by the overlay for the next portion of controlware to be loaded. When the entire controlware deck is loaded, the memory area used by the loader routines is released for use by the operating system as memory buffer areas.

The function of the selective-loader common routine is to control and coordinate the activities of the loader overlays. The overlays, in turn, determine where and how a given controlware routine is to be loaded into memory and then build a routine address table (RAT) so that the operating system can readily locate and use the controlware routines. This form of loader is necessary to incorporate controlware flexibility into the system; that is, it is required to allow a given applications routine to be loaded or not loaded, depending upon the hardware configuration of the terminals.

An additional feature of the selective-loader common routine is that it monitors the controlware load process and enables the display of load-status messages on the display screen.

ERROR REPORTING OVERLAY

During terminal operation, the system maintains a hardware error log. On subsequent controlware loads, the error reporting overlay routine accesses the error log and displays the information contained therein on the display screen. If terminal power is not turned off in the interim, the error log maintains hardware error information for all periods of terminal operation between subsequent controlware loads. Once controlware loading is completed, a printout of the error log information appearing on the display screen† may be made by pressing the US key or the CONTROL US key (display-to-print control). An example of such a printout is included in section 5 of this manual.

SELECTION-CARD-READ OVERLAY

The selection-card-read overlay routine reads in and interprets the terminal configuration information punched on the selection card. The routine is then used to determine whether a given portion of the controlware should be loaded or not loaded by making comparisons between the information read in from the selection card and the header information preceding each controlware routine.

†On the 1811-1 CRT only

SELECTION CARD

The selection card is a single card in the controlware deck that contains information defining the configuration of a specific terminal installation. The card can be made to match a specific terminal installation in only one manner: by initially coming as a blank card and being punched to reflect a particular terminal installation. The card is initially punched by terminal service personnel when they install a terminal, but it may be replaced by a new selection card to reflect a different terminal configuration at any time. Procedures for punching the selection card are included in section 5.

CONTROLWARE

The controlware portion of the card deck contains:

- A move-loader overlay
- The selective-load overlay routines (described under Loader, above)
- The actual monitor, applications, and utility routines
- The loader-cleanup overlay
- The patch-processing overlay

MOVE-LOADER OVERLAY

The move-loader overlay moves the selective loader routines up to the high end of the uppermost 8K-word memory module available in the system. The number of 8K-memory modules is placed in column 1 of the selection card image in core. After the loader has been moved, memory is cleared up to the beginning of the loader.

LOADER-CLEANUP OVERLAY

The loader-cleanup overlay performs some final loading and housekeeping activities.

PATCH-PROCESSING OVERLAY

The patch-processing overlay routine enables any patch cards to be read that are included at the back of the deck, moves the patch information contained on the cards to the designated area of memory, and releases the memory area used by the loader so that it becomes available for use by the operating system as a memory buffer area.

PATCH CARD(S)

Patch cards may be included at the end of a controlware card deck to correct problem areas without requiring a complete reassembly of the deck. The patch cards contain a code indicating which routine is to be patched, an address indicating where in the routine the patch should begin, a hexadecimal count of the number of memory words to be patched, and the patch codes themselves (see section 7).

END-OF-LOADER CARD

The end-of-loader card informs the system that the end of the controlware deck has been reached and that the load process is complete.

Because there are a number of hardware and controlware combinations available for configuring a batch terminal, this section identifies the basic combinations and indicates how to determine exactly what terminal configuration is being installed. This information is necessary to correctly punch the controlware selection card and to assure that the user is getting the correct system.

There are three different controlware options available for use in batch terminals:

- 200 User Terminal emulation controlware
- 2780 emulation controlware
- 3780 emulation controlware

In addition, there are a number of hardware configurations for the terminal. For example, there are terminals without magnetic tape capabilities (i.e., no magnetic tape controller and smaller memory), there are terminals with magnetic tape capabilities but no magnetic tape transports, and there are terminals with both magnetic tape capabilities and one or more magnetic tape transports.

Table 4-1 indicates the various tape transport possibilities for different terminal configurations. The table is to be used in the following manner:

1. Ask all of the questions posed in the table and answer them yes (Y) or no (N).
2. Match your answers with the vertical Y or N columns.
3. Move down the matching column until an X is encountered.
4. Move across from the X to determine the terminal's product configuration (hyphens indicate that the corresponding question is irrelevant).

Although table 4-1 does not specifically identify a particular terminal configuration, it does indicate the various tape transport product configurations available. Each terminal configuration using tape transports can use between one and three transports and has three available memory sizes (16K, 24K, or 32K words).

HARDWARE IDENTIFICATION

While all possible memory and tape transport hardware combinations may never be used and are not all relevant to selection-card preparation, terminal installation personnel must be aware of all possible combinations to ensure that the user has the proper terminal configuration

TABLE 4-1. TAPE UNIT CONFIGURATION POSSIBILITIES

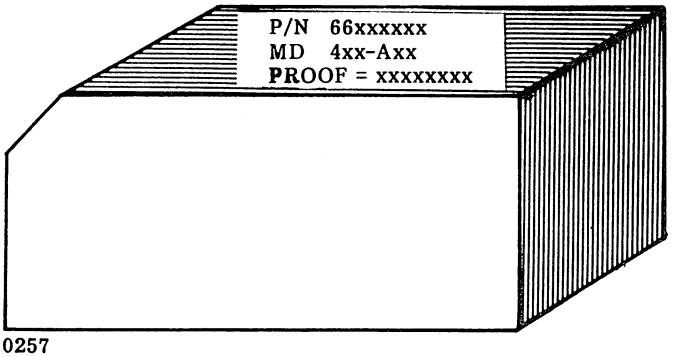
Conditions	1	2	3	4	5
Terminal controller has greater than 8K of memory	N	Y	Y	Y	Y
7-track tape transport in terminal	–	N	Y	N	Y
9-track tape transport in terminal	–	N	–	Y	Y
Tape capability not used	–	X	–	–	–
Terminal with 1860-72 tape transports	–	–	X	–	–
Terminal with 1860-92 tape transports	–	–	–	X	–
Terminal with 1860-72 and 1860-92 tape transports	–	–	–	–	X

installed to meet his requirements. Section 2 of this manual contains a product versus equipment number cross-reference listing. This listing, used in conjunction with the CYBER 18-05/10 Computer Systems Hardware Maintenance Manual and a listing of user requirements, should enable installation personnel to verify that a particular user's requirements have been met. The verification process consists of inspecting the various pieces of hardware to ensure that the equipment numbers correspond with the desired product configuration. A list of equipment numbers, product numbers, and quantities of each equipment and product should be made as a quick reference for punching the selection card.

CONTROLWARE IDENTIFICATION

Figure 4-1 is an illustration of a controlware deck. The first card is an identification card bearing the part number of the controlware; it is usually a different color than the rest of the deck. The part number, controlware equipment number, and proof number are written on the top of the deck. This information identifies the deck and also acts as a guide for re-establishing the proper sequence of the deck if the deck is accidentally dropped.

When a deck is first received, it should be accompanied by controlware identification sheets (specifically requested when ordering a new deck). These sheets contain deck identification information (part number, equipment



0257

Figure 4-1. Controlware Deck

number, and revision level), product usage information, a brief description of the deck's structure, a list of related materials (manuals, etc.), deck-ordering information, and initial installation documentation procedures for engineering support services.

If the controlware identification sheet and the controlware identification card are not available (e.g., re-installation of an old deck), the correctness of the deck can be verified by comparing the information written across the top of the deck to the controlware identification tag inside the terminal controller near the terminal equipment number tag. Section 2 of this manual also identifies controlware decks via a listing of their equipment numbers and their respective product-emulation types.

This section describes how to locate and punch the controlware-deck selection card. Since the 2780/3780-emulation punching procedures differ slightly from those of the 200 User Terminal emulation selection card, both procedures are described.

There are two principal sources for obtaining the information required for punching a selection card: notes made during installation of the terminal hardware and requirements specified by the terminal user. Appendix D contains a terminal-configuration sheet for listing the selection-card punching parameters of an individual terminal.

SELECTION CARD LOCATION

All cards in the controlware portion of a controlware deck except the selection card (section 2) have punches in rows 7 and 9 of the first card column. These 7 and 9 punches facilitate locating the selection card as illustrated in figure 5-1.

CAUTION

A controlware card deck has a specific sequence. This sequence cannot be altered or the deck does not load properly. Furthermore, the cards in the deck are not marked as to sequence all of the way through. The portion of the deck starting about five cards after the selection card and running up to about five cards from the end of the deck is punched with binary-sequence numbers in column 79; the rest of the deck is not marked as to sequence.

SELECTION CARD PUNCHING

2780/3780 EMULATION SELECTION-CARD PUNCHING

The 2780/3780 emulation selection cards are punched as illustrated in table 5-1. Note that there is a slight difference in the punching of columns 23 through 30 of the 2780 and 3780 emulation selection cards. Figure 5-2 contains examples of selection-card punching for various terminal types, both with and without magnetic tape transports.

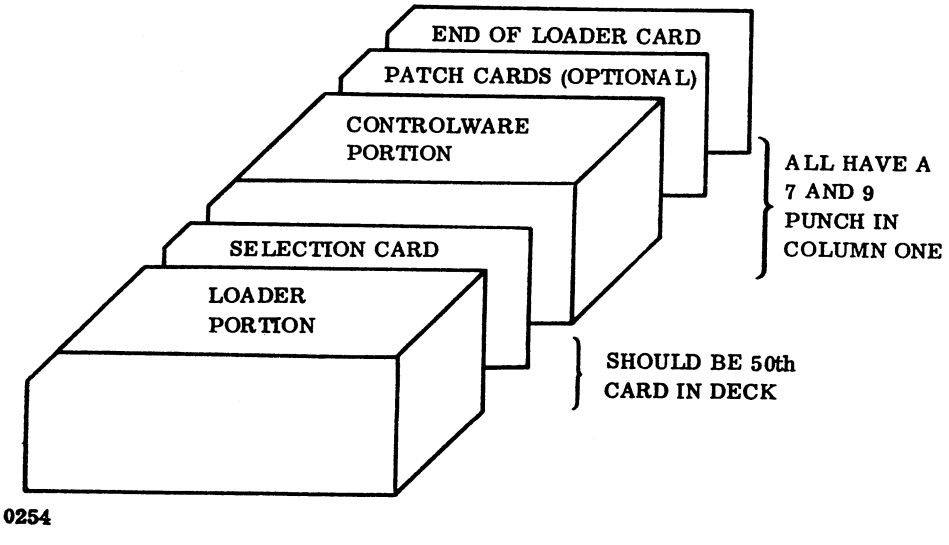


Figure 5-1. Card Deck Layout and Selection Card Placement

TABLE 5-1. 2780/3780 EMULATION SELECTION-CARD PUNCHING

Column	Character	Meaning
1	1, 2, 3, or 4 or Blank	Indicates the number of 8K-word memory modules in the terminal controller. Automatically inserted by the loader.
2	1, 2, or 3	Indicates the number of magnetic tape transports in the terminal. Leave blank if there are no tape transports.
18	R	Displays an R on the screen to suffix messages requiring an operator response and also enables the keyboard error-response key. Automatically inserter by the loader.
41-44	Greater than 9	Enter in decimal the desired word size of first magnetic tape buffer. Minimum entry is 9 (nine-word buffer); blank causes default to 69-word buffer. Maximum entry is limited by buffer area available after controlware is loaded.
45-48	Greater than 9	Same as for columns 41 through 44 if second tape transport is present.
49-52	Greater than 9	Same as for columns 41 through 44 if third tape transport is present.
57-59	7 or 9	Enter either a 7 or a 9 in each column. Entries correspond with track size of tape transports 1, 2, and 3, respectively. Default to 9 if a 7 is not entered.
60-80	Not used	

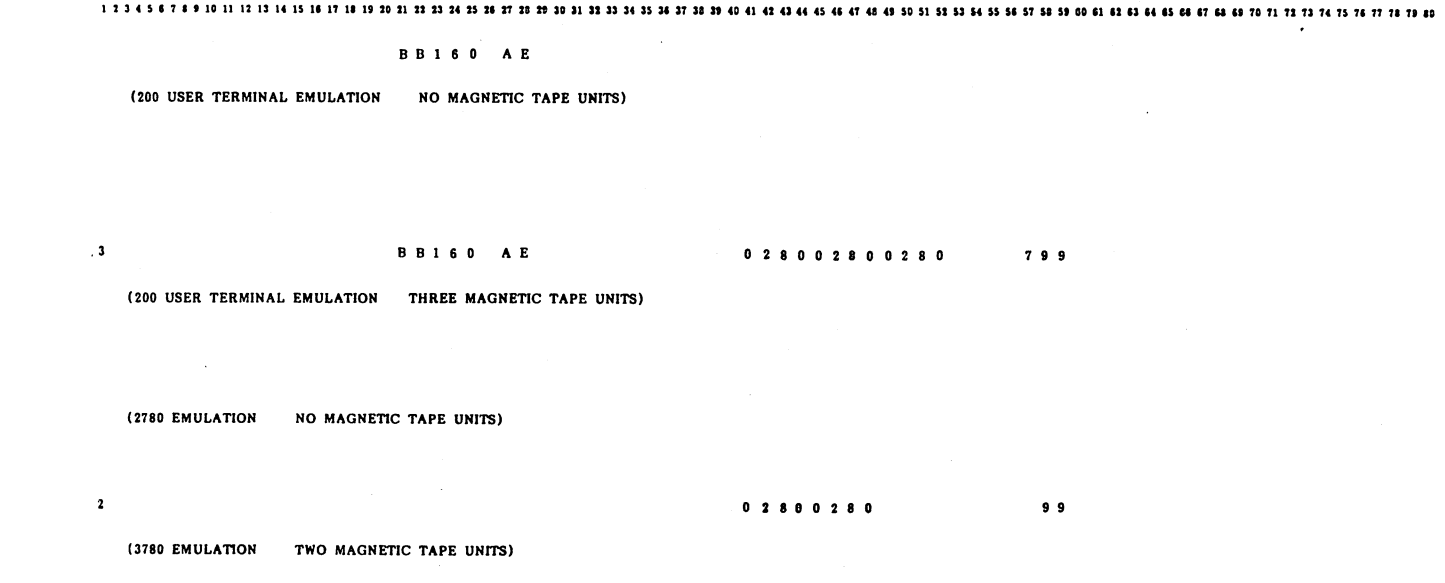


Figure 5-2. Selection-Card Punching

200 USER TERMINAL EMULATION SELECTION-CARD PUNCHING

Table 5-2 indicates how the 200 User Terminal emulation selection card is punched. Notice that some of the selections punched on the card (operating parameters) are also key selectable or alterable once the controlware is installed (see the CYBER 18-05/10/20 Computer Systems Batch Terminal Controlware Operators Guide for specific information). The selection card is Hollerith punched, so it may be punched on any 026 or 029 code keypunch machine available at the terminal site.

If operating modes are not selected from the keyboard or by use of a selection card, the terminal automatically defaults to the following operating modes.

- Hollerith 026 punch-coded cards
- External binary-coded decimal (EXT BCD) and ASCII transmission-line code sets selectable by GS key
- Block mode
- Site address 160_8
- Alternate mode of data set operation

When the selection-card punching is completed, reassemble the deck in its proper card sequence. The controlware card deck is now ready for installation.

TABLE 5-2. 200 USER TERMINAL EMULATION SELECTION-CARD PUNCHING

Column	Character	Meaning
1	1-4	Enter the number of 8K-word memory modules contained in the batch terminal controller. If magnetic tape is provided, at least two memory modules are required. Automatically inserted by the loader.
2	1-3	Enter the number of tape transports provided. If none is provided, leave blank.
3-16		Not currently used
17	D or blank	D is punched only if a T is punched in column 30 and the controller has an 8K-word memory.
18	R	Error message displayed on the screen that require an operator response are suffixed by an R. Automatically inserted by the loader.
	Blank or other	Error messages are not suffixed by an R.
19	R	Implements automatic reset option. When in the block mode, the screen information sent to the main central computer, after the EXT or SEND key is pressed, always starts with the first character position on the first line of the screen, and ends at the final cursor position.
	Blank or other	When in the block mode, the screen information sent to the main central computer, after the EXT or SEND key is pressed, always starts with the first character of the current keyboard input and ends at the final cursor position.
20	9	Causes a selection of 029 card punch format at load time
	Blank or other	Defaults to 026 card punch format
21		Selects ASCII or BCD as the transmission code type to be selected on initial controlware load. See description for column 28 of the selection card.
	A	Selects ASCII
	B	Selects BCD
	Blank or other	Selects BCD
22	B	Select block mode

TABLE 5-2. 200 USER TERMINAL EMULATION SELECTION-CARD PUNCHING (Continued)

Column	Character	Meaning
	L	Select line mode
	Blank	Default to block mode
	Other	Default to block mode
23-25	160_8-177_8	To establish the site address as other than 160_8 (70_{16}), columns 23 through 25 must be punched with the different address. A site address of 166 would require a 1 in column 23, a 6 in column 24, and a 6 in column 25.
	Blank	Defaults to site address 160_8
	Other	(Other than 160_8 through 177_8.) Defaults to 160_8
26	C	Code set modification cards follow controlware deck (see appropriate reference manual for modification procedures).
	Blank	No code set modification
27	A	Select alternate mode of data set operation between the terminal and the higher level processor.†
	S	Select simultaneous mode of data set operation between the terminal and the higher level processor.†
	Blank	Default to alternate
28		The tables for only two transmission codes are in core at one time. The tables for ASCII are always loaded. Through column 28 of the selection card, the user may select either internal BCD or external BCD as the code type to be loaded with the ASCII table
	E	Select external BCD
	I	Select internal BCD
	Blank or other	Defaults to external BCD
29		Not currently used
30	T or blank	T is punched if communication-line trace feature is desired; if not, leave blank. If T is centered here and controller has 8K-word memory, a D must be entered in column 17; if memory is larger than 8K words, column 17 should be left blank because entering a D in column 17 deletes the display-to-print and card-to-print utilities. See section 7 of this manual for a description of the trace feature.
31-40		Not currently used
41-44		Enter in decimal the desired word size of the first magnetic tape buffer. Leaving the entry blank causes a default to 138 characters (one print line).
45-48		Same as above for second tape transport
49-52		Same as above for third tape transport
53-56		Not currently used
57-59		Enter either a 7 or a 9 in each column. Entries correspond with track size of tape transports 1, 2, and 3, respectively. Defaults to 9 if a 7 is not entered.
60-80		Not currently used

†All two-wire communications lines (two-wire connected modems) use A; all four-wire communications lines (four-wire connected modems) use S.

This section describes the preparations of the terminal for controlware loading and the installation procedures. Because there are a number of variables in the controlware and hardware configurations of a batch terminal, it is important to use this manual in conjunction with the CYBER 18-05/10 Computer Systems Hardware Maintenance Manual and the CYBER 18-05/10/20 Computer Systems Batch Terminal Controlware Operators Guide.

CLA INTERRUPT AND EQUIPMENT CODE

If the hardware configuration of the system is a CYBER 18-10/20/30 on which the communication line adapter is set for interrupt and equipment code 2 instead of the batch controlware standard of 10, insert the following patch cards just before the last card of the controlware deck:

DDT 7 1 0101

DDT 18 1 2900

DDT 1C 1 8002

For users with a dual channel CLA, patch cards may be used for channel 1 as follows:

If the CLA is on interrupt line 10/equipment code 10, use

DDT 7 1 509

DDT 18 1 2D08

If the CLA is on interrupt line 2/equipment code 2, use

DDT 7 1 109

DDT 18 1 2908

DDT 1C 1 8002

Additional information concerning patch cards is contained in the CYBER 18-05/10/20 Computer Systems Batch Terminal Controlware Operators Guide listed in the preface.

INSTALLATION PREPARATION

Once system identification and selection-card punching is completed, but before loading the controlware, the appropriate sections of the CYBER 18-05/10 Computer Systems hardware maintenance manual and the operators guide should be referenced to verify and/or carry out proper equipment interconnection, internal jumper and switch settings, external (operator) control and switch settings, and terminal power-on procedures.

The keyboard display furnished as part of the CYBER 18 is also used in other Control Data products. CYBER 18 products require a fixed setting of some of the keyboard-display switches that other products do not. For this reason a decal is attached describing the fixed switch settings for CYBER 18 applications of the keyboard display. Figure 6-1 is an example of the 1811-1 display terminal and decal. Figure 6-1.1 is an example of the 722-10 display terminal and switch setting decal.

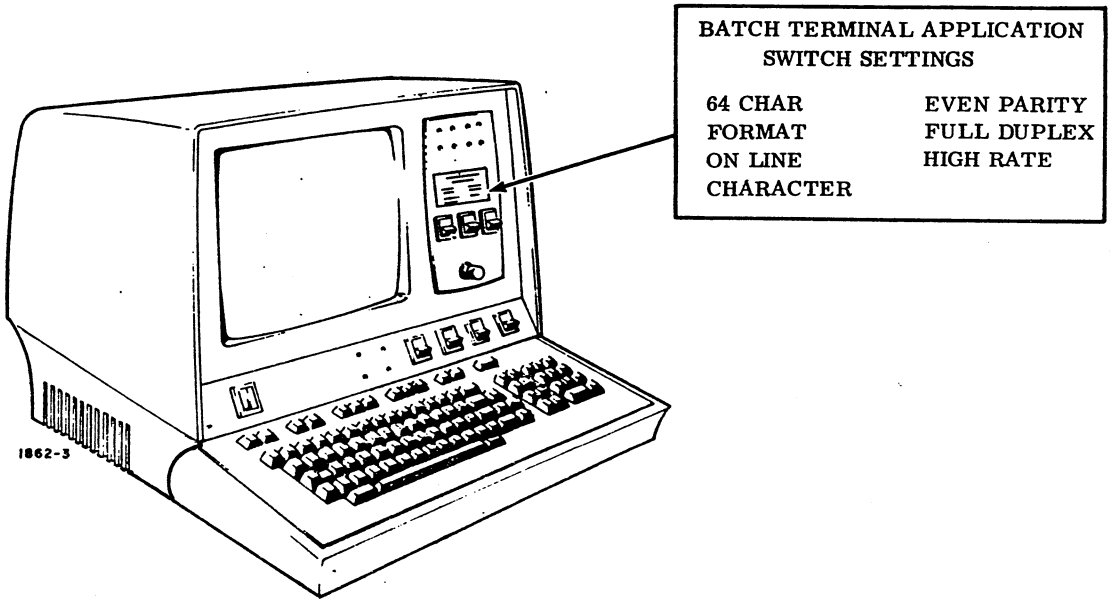
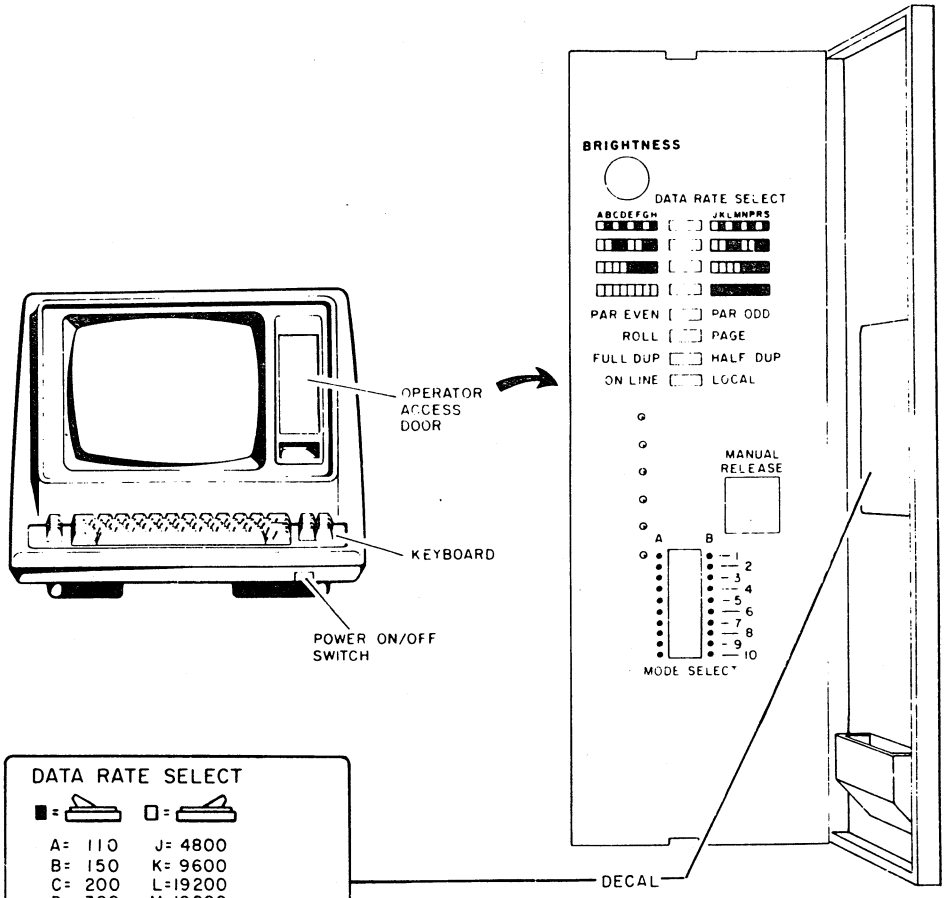


Figure 6-1. 1811-1 CYBER 18 Batch Terminal Decal Layout



DATA RATE SELECT

■ = ▭ □ = ▭

A= 110	J= 4800
B= 150	K= 9600
C= 200	L=19200
D= 300	M=19200
E= 600	N=19200
F=1200	P=19200
G=1800	R=19200
H=2400	S=19200

MODE SELECT

A= ▭ B= ▭

1	A=NORMAL	B=TRANSPARENT
2	A=NORMAL	B=DATA ONLY
3	A=PARITY ENABLE	B=PARITY DISABLE
4	A=1 STOP BIT	B=2 STOP BITS
5	A=ADV	B=752
6	A=NORMAL	B=AUTO LF
7	A=DISABLE BELL	B=EOL BELL
8	A=RTS CONSTANT	B=RTS SWITCHED
9	A=DTR CONSTANT	B=DTR SWITCHED
10	A=60 Hz REFRESH	B=50 Hz REFRESH

SWITCH SETTINGS

TOGGLE SWITCHES

DATA RATE: BETWEEN 2400 AND 9600 BPS
PAR EVEN/PAR ODD: PAR EVEN
PAGE/ROLL: OPERATOR CHOICE
FULL DUP/ HALF DUP: FULL DUP
ONLINE/LOCAL: OPERATOR CHOICE

MODE SELECT SWITCHES

1 NORMAL
2 NORMAL
3 PARITY ENABLE
4 1 STOP BIT
5 752
6 NORMAL
7 DISABLE BELL
8 RTS SWITCHED
9 DTR SWITCHED
10 60 Hz (OR 50 Hz DEPENDING ON SITE POWER)

IF SWITCH IS RESET, REINITIALIZE THE TERMINAL BY POWERING IT OFF AND ON OR BY PRESSING THE MANUAL RELEASE SWITCH. THE NEW LINE AND CR KEYS ARE FUNCTIONALLY EQUIVALENT. EACH KEY CAUSES THE CARRIAGE TO RETURN AND THE CURSOR TO ADVANCE.

Figure 6-1.1. 722-10 Batch Terminal Switch Settings

1811 SWITCH SETTINGS

The decal indicates the position that the rocker switches must be in for batch terminal operation. Please note that some of the rocker switches are two-position switches and some are three-position switches and that switch settings must therefore be made accordingly. Two-position switches are in proper position when the side nearest the switch caption indicating the desired operating mode is fully depressed. For batch terminal applications, all switches listed on the decal have their top sides fully depressed, except for the EVEN PARITY switch, which has its bottom side fully depressed.

NOTE

The switch settings are the same for the 1811-2, except the switches are located on the keyboard. In addition, for the 1811-2, insure that the page mode switch is depressed.

722 SWITCH SETTINGS

The SWITCH SETTINGS listed in figure 6-1.1 are the settings used for batch terminal operation. Some of the switches are rocker switches and some are dip switches. Pressing down on the side of the switch which is closest to the setting caption sets the switch properly.

CONTROLWARE INSTALLATION PROCEDURES

This portion of the manual describes the actual controlware installation process. Before carrying out the loading process, all of the procedures described or referenced in the preceding portions of this manual should be performed or verified.

CONTROLWARE LOADING

To load the controlware into the batch terminal, perform the following:

1. Check to ensure that all terminal equipments are on and ready for operation according to the instructions in the operators guide.
2. Ensure that the keyboard display switches are set according to the batch terminal operation decal.
3. Remove the controlware identification card from the front of the controlware deck.

At the card reader:

4. Remove the card weight and any cards from the card reader hopper and stacker areas.
5. Place the card deck face down with the 9s row toward the back of the hopper in the card reader and replace the card weight.

At the basic operators panel:

6. Press STOP.
7. Press MASTER CLEAR.
8. Press AUTO LOAD. (For CYBER 18-10/10M/20 use DEADSTART.)

At the card reader:

9. Press RESET. The card reader begins reading the cards and the controlware begins loading. Reading should continue until the card reader hopper is empty.

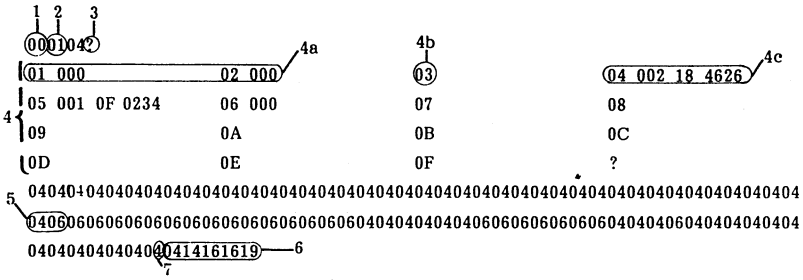
As the controlware loads, numbers appear on the display screen. These numbers indicate that the system is tracking the loading procedure. If no errors occur during the loading procedure, the number 19 appears on the display screen as the load finishes. If an error does occur during the loading process, a number other than 19 appears on the display screen, the loading process stops, and the process must be started over. Before beginning a reload, however, check the loader error messages and subsequent load hardware error reporting (appendix A) to determine the nature of the error, the corrective action to be taken, and what to anticipate on the reload attempt.

Figure 6-2 shows a display screen image as it would appear upon the completion of a successful subsequent load attempt. Note that the success of an initial loading attempt (initial load after terminal controller power on) produces a display that is similar but that does not contain hardware error information.

TERMINAL VERIFICATION AFTER LOADING

Once controlware installation is completed, verify terminal operation in the following manner, using the operators guide to run the verification checks.

1. Set up and run some applicable offline operations (utilities).
2. Perform some online terminal-to-terminal operations in the case of a 2780/3780 emulation installation having other terminals to communicate with.
3. Have user supply a job that has known results for online submission to the central computer system if the terminal being verified is a 200 User Terminal emulation-type or a 2780/3780 emulation-type without other terminals to communicate with. Run the job and then compare returned information with known results.
4. If problems are encountered during verification, diagnose and correct problems using the CYBER 18-05/10 Computer Systems Hardware Maintenance Manual.
5. Make a couple of duplicate controlware card decks on a duplicating keypunch machine once terminal operation has been verified. This should always be done because card decks have a limited lifespan and a spare deck should be available for use at all times.



SIGNIFICANCE OF CHARACTERS (HEXADECIMAL NOTATION) DISPLAYED DURING CONTROLWARE LOADING:

1. 00 INDICATES THAT LOADER HAS STARTED.
2. 01 INDICATES THAT FIRST CARD OF DECK HAS BEEN READ.
3. NONPRINTING DISPLAY CONTROL CHARACTERS APPEAR AS QUESTION MARKS (?) IN A PRINTOUT OF A DISPLAY.
4. EXAMPLE OF HARDWARE ERROR REPORTING SINCE LAST CONTROLWARE LOAD. DOES NOT APPEAR ON FIRST LOAD AFTER TERMINAL CONTROLLER IS POWERED ON, BUT ONLY ON SUBSEQUENT CONTROLWARE LOADS.
   a. INDICATES LOGICAL UNITS 01 AND 02 HAVE HAD NO ERRORS (000) SINCE LAST CONTROLWARE LOAD.
   b. INDICATES LOGICAL UNIT 03 WAS NOT ASSIGNED (NOT PRESENT) DURING LAST CONTROLWARE LOAD.
   c. INDICATES LOGICAL UNIT 04 HAS HAD TWO ERRORS SINCE LAST LOAD (002); THE LAST ERROR (18) WAS A CARD FAIL-TO-FEED ERROR; CARD READER STATUS AT THE TIME OF THE ERROR WAS 4626.
5. EACH 04 INDICATES THE BEGINNING OF A CONTROLWARE COMPONENT TO BE LOADED; EACH 06 INDICATES THE BEGINNING OF A COMPONENT TO BE BYPASSED. WHETHER A CONTROLWARE COMPONENT IS LOADED OR BYPASSED DEPENDS UPON THE LOAD REQUIREMENTS PUNCHED ON THE SELECTION CARD.
6. AFTER THE LAST CONTROLWARE COMPONENT WAS LOADED (04), A PATCH CARD WAS PROCESSED AND PATCHED INTO MEMORY (14), TWO PATCH CARDS WERE BYPASSED (16), AND THE LOAD WAS SUCCESSFUL (19).
7. A BLANK INDICATES AN 1811-1 CRT.

Figure 6-2. Example of Controlware Load Display, Including Hardware Error Reporting

Patch cards provide a means of correcting controlware problems without the necessity of producing an entirely new controlware card deck. Although patch cards can be used to alter the controlware considerably, such usage requires a high level of controlware programming expertise, so patching is best restricted to such things as altering constants, masks, or jump addresses within a particular routine. Even in these latter instances, patching requires programming knowledge, so it should not be attempted by anyone not familiar with controlware modification techniques.

FORMAT

Patch cards are punched in hexadecimal notation on a Hollerith 026 or 029 keypunch. Each patch card must contain the following entries; only the first 60 columns of a card can be used for patching entries, the remaining 20 may be used as a comment field.

nam addr coun patc patc patc patc

Where:

nam is a three-character mnemonic name assigned to the routine to be patched. Routine names are obtained from a controlware list tape. The list tape is a restricted-distribution item and is therefore available only at regional task support offices.

addr is the hexadecimal address where the patch starts relative to the start of the routine.† The start of each routine has a relative address of zero. Leading zeros are not required.

coun is the hexadecimal count of the number of word locations to be patched. Leading zeros are not required.

patc is the hexadecimal patch. A full word entry must be made and portions of the word not to be altered must be entered as they appear in the original word. Leading zeros are not required.

Patch cards are inserted in the controlware deck just prior to the end-of-loader card (see section 3 for deck structure) and the controlware deck is reloaded using the loading procedures described in section 6.

† If the absolute memory address of a location to be patched is known (e.g., via display-core utility), 000 is entered in the nam field and the absolute memory address of the start of the patch is entered in the addr field.

MAINTENANCE UTILITIES, MEMORY DUMP AND HANG 1 ERROR MESSAGE DISPLAY

This section contains information regarding:

- The maintenance utilities available in the terminal and their use in terminal maintenance procedures
- The production and use of a special memory dump card deck, known as the crash dump card deck
- The HANG 1 error-message display

This section of the manual does not include routine operating procedures for the terminal. Such information is found in the operators guide. Appendix C of this manual contains a listing of the online hardware error codes.

MAINTENANCE UTILITIES

The maintenance utilities available in the terminal are:

- Display core†
- Modify core†
- Trace (200 User Terminal emulation only)

These utilities are restricted to use by maintenance personnel. The general-use utilities are described in the operators guide under Offline Processing.

DISPLAY CORE

The display core utility is used to display any 96 (60_{16}) sequential words of memory. This enables the contents of memory locations to be checked prior to making any core modifications.

Although the location of the various routines in memory is relative to the numbers and types of applications routines loaded, memory is always loaded in the general format shown in figure 8-1. Once the beginning of the routine address table (RAT) is located for any given controlware load, the rest of the routine starting addresses become easy to find. A memory-dump printout, described later in this section, further simplifies the location and modification of the controlware stored in memory.

Although the display core utility is an offline procedure, it does not require that the terminal be brought to an offline condition to perform it.

The following procedures describe how to use the display core utility.

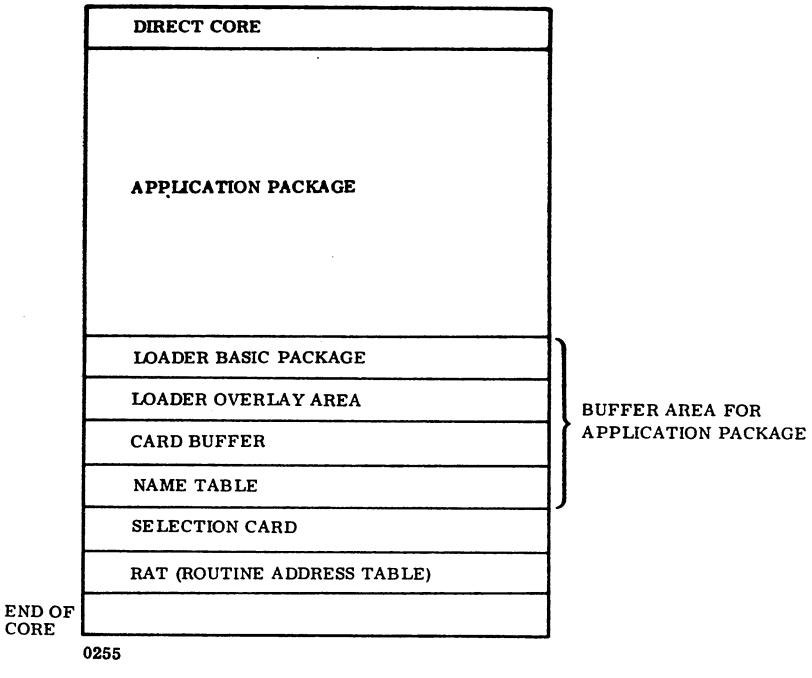


Figure 8-1. General Memory Format

† Not available on 2780 and 3780 emulation using 8K words of memory

From the keyboard:

	Procedure	Results/Comments
1.	Press RESET key to reset cursor	When performing any of the utility functions, it is not necessary to press the RESET key on the keyboard display if the cursor has not been moved since the previous operation.
2.	Key in the following:	
	DIS,xxxx	Where xxxx is the hexadecimal starting address of the memory area to be displayed. Leading zeros need not be entered in address field.
3.	Press the US key or the CONTROL US key†	Memory display now appears on screen, and it always contains 96 (60_{16}) sequential memory word locations from start address.

NOTE

If no address value is entered in step 2, the start address of the display is the last specified value. This simplifies the process of recalling memory display after performing intervening operations.

Error Message

Either of the following messages may be displayed when an attempt to initiate one of the utilities is made. The two error messages are:

UT DEV BUSY	The device requested by the utility is already in use.
UT FMT ERROR	Either the entry used to request the utility is illegal or the utility requested is not loaded, or an attempt has been made to get two utilities to run concurrently; e.g., tape-to-tape and card-to-print.

The messages are automatically erased after 5 seconds and a new display core or modify core command may be entered.

MODIFY CORE

This utility permits temporary patches to be made to the controlware. The patches are temporary in that they only remain in the system until the system controlware is reloaded. This type of temporary patching determines whether a given patch corrects a controlware problem. If the temporary patch works, it can be made permanent by the production of a patch card (see section 7).

The following procedure describes how to modify the contents of memory.

From the keyboard:

	Procedure	Results/Comments
1.	Press RESET key to reset cursor or the CONTROL and y keys on the 722-10	It is not necessary to press the RESET key on the keyboard display if the cursor has not been moved since the previous operation.
2.	Key in the following: MOD,xxxx,y_1, y_2,y_3,...y_n	Where xxxx is the hexadecimal starting address of the memory area to be modified, and y_1, y_2, etc. are the hexadecimal entries (patches to be sequentially entered in memory starting at address location xxxx.
3.	Press the US key or the CONTROL US key†	Memory is now modified according to the values entered in step 2.

If the area of memory modified had been displayed prior to modification, a display of modifications can be called up by simply keying in DIS and pressing the US key.

Error Message

Either of the following messages may be displayed when an attempt to initiate one of the utilities is made. The two error messages are:

UT DEV BUSY	The device requested by the utility is already in use.
UT FMT ERROR	Either the entry used to request the utility is illegal or the utility requested is not loaded, or an attempt has been made to get two utilities to run concurrently; e.g., tape-to-tape and card-to-print.

The messages are automatically erased after 5 seconds and a new display core or modify core command may be entered.

TRACE

The trace utility is available only in the 200 User Terminal emulation controlware. Its loading is enabled

†When using the 722-10 Conversational Display Terminal, US is keyed in by pressing the CONTROL and - keys simultaneously.

via selection-card punching (see section 5). When implemented, the trace utility enables either display or printer monitoring of the communication line activites of the terminal.

To initiate the trace utility, perform the following.

From the keyboard:

	Procedure	Results/Comments
1.	Press RESET key to reset cursor or the CONTROL and y keys on the 722-10	It is not necessary to press the RESET key on the keyboard display if the cursor has not been moved since the previous operation.
2.	Key in the following:	
	TRA,x,y	Where x is F or E; F enables a full trace for monitoring all communication-line activity. E enables a partial trace for monitoring all communication-line activity except POLL-REJECT sequences. y is 2 or 5; 2 enables the trace to the display, and 5 enables the trace to the line printer.
3.	Press the US key or the CONTROL US key†	Trace begins operating by sending communication-line information to the selected device.

Figure 8-2 shows an example of one line of a trace output.

To discontinue the trace utility, press the STX key or the CONTROL STX key.††

The hexadecimal output from the trace utilities appears in the following format:

R1R2R3R4 R5R6R7R8 S1S2S3S4 S5S6S7S8

Where:

R1R2 is the first-word address of buffer holding received data

R3R4 is the byte count of received data

R5 is the station address of terminal

R6 is the message-type indicator for received messages.

05	=	Poll
07	=	Alert
0C	=	Reset-write
10	=	Diagnostic-write
11	=	Write
12	=	Clear-write

R7 is the E-code indicator for received messages.

42	=	E1, write message to display
20	=	E2, write message to line printer
21	=	E3, write message to card reader
22	=	E4, same as E1
00	=	Message was either Poll or Alert

R8 is 00

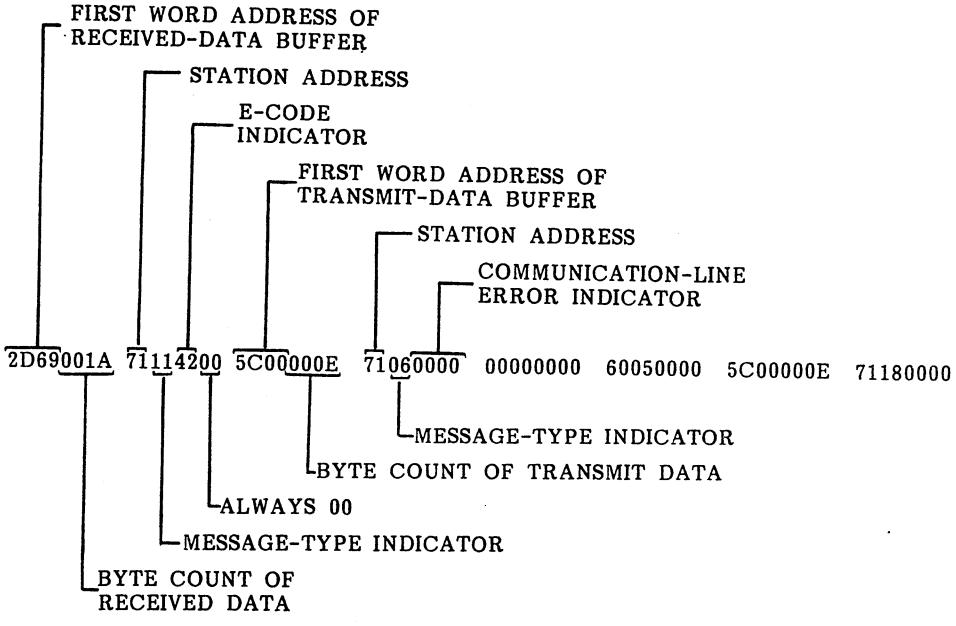


Figure 8-2. Typical Example of Trace Output

†When using the 722-10 Conversational Display Terminal, US is keyed in by pressing the CONTROL and - keys simultaneously.

††When using the 722-10 Conversational Display Terminal, STX is keyed in by pressing the CONTROL and B keys simultaneously.

S1S2 is the first-word address of buffer holding transmit data

S3S4 is the byte count of transmit data

S5 is the station address of the terminal

S6 is the message-type indicator for transmit message

06	=	Acknowledge
13	=	Read
15	=	Error
18	=	Reject

S7 is The E code for transmitted messages

42	=	E1, message from keyboard
20	=	E2, card reader or line printer not ready
21	=	E3, card reader or line printer ready

S8 is the communication-line error indicator

01	=	No start-of-heading (SOH) character
02	=	Illegal site address
03	=	Station-address error
04	=	Illegal control code in message
05	=	Data buffer overflow
06	=	No end-of-text (ETX) character
07	=	Parity error

Error Message

The following message is displayed when an error is made during the entry of a trace request:

TRA FMT ERROR

The message automatically erases after five seconds and the trace request may then be entered again.

CRASH DUMP

A crash dump is a routine enabling the entire contents of the terminal controller memory to be printed out on the line printer. The routine is called a crash dump because it is used strictly for maintenance purposes. It is not a standard feature utility routine of the terminal controlware; rather, it is a special routine supplied only as a keypunch listing. This listing can be punched onto cards via an 026 or 029 keypunch; the resulting deck then becomes a crash dump card deck.

Once the crash dump deck is punched, a memory dump can be obtained by loading the crash dump routine into memory via the card reader. The procedure for loading the crash dump deck is the same as that used for loading the controlware card deck.

MEMORY DUMP

The memory dump is a useful tool for carrying out patching procedures. Its principal function here is locating routines so that they can be:

- Displayed by the display core utility
- Modified temporarily via the modify core utility
- Tested by letting the system run with the modification

If the modified system does not run satisfactorily, the original contents of memory can easily be restored without the necessity of reloading the controlware deck by using the modify core utility and the memory dump listing. Once a workable modification is found, controlware deck patch cards can be produced to make the modification permanent.

To obtain a memory dump listing:

1. Punch the card deck as listed in figure 8-3. Figure 8-3 lists card codes necessary for dumping an 8K memory. Change the 8 in column 21 of card three to 2, 4, 6, or 8 for dumping 8K, 16K, 24K, or 32K memories, respectively. Change the pqrs on the second card and the last card to the desired starting location of the dump routine. On 8K systems, use 1600. On larger systems, use 2800.

2. Ensure that the line printer is loaded with sufficient forms and is ready (START indicator is lit).

3. Remove any cards from the card reader hopper and stacker areas.

4. Place the crash dump deck in the hopper of the card reader with the deck face down and its 9s row toward the back of the hopper.

5. Press the RESET indicator/switch.

6. Press the STOP switch on the basic operators panel.

7. Press the MASTER CLEAR switch on the basic operators panel.

8. Press the AUTO LOAD switch on the basic operators panel.

The card reader reads the crash dump deck and, as soon as the deck is loaded, the contents of the terminal controller memory begin dumping to the line printer. Lines containing all zeros are not printed.

Figure 8-4 shows a sample portion of a memory dump listing.

80-COLUMN PUNCHED CARD LAYOUT

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
K 7 1 0 0 8 0 0 0 G
K p q r s G   L
1 8 0 5 G 0 0 0 0 0 G 8 0 0 0 G 2 0 2 0 G 0 0 0 0 G 5 8 5 3 G 5 8 0 1 G 0 0 0 0 G
E 8 F E G 0 D F 8 G 5 8 2 1 G 5 8 5 3 G C 8 F 4 G 6 8 F 6 G 0 C 0 F G C E F 4 G
0 1 1 5 G 0 6 A 2 G C 8 F 1 G 0 9 1 0 G 6 8 E F G 1 8 1 1 G 5 8 4 2 G C 0 0 0 G
0 1 2 0 G 6 8 3 4 G E 8 E 9 G 5 8 1 0 G C 8 E 6 G 6 8 3 0 G 0 A 0 F G 0 7 C 2 G
5 8 3 0 G E C E 2 G 5 8 0 9 G D 8 E 0 G 0 6 4 4 G 5 8 3 9 G C 8 D D G 9 8 D A G
0 1 2 1 G 1 8 E 4 G 0 0 0 0 G 0 0 0 0 G 0 A 0 3 G 0 7 C 1 G 0 A 0 2 G 6 8 1 D G
0 8 4 4 G 0 F E 4 G 0 9 F 5 G 0 1 3 1 G 0 9 0 7 G 0 9 3 A G 0 4 8 3 G C 0 1 5 G
0 4 8 3 G C 3 1 4 G D 8 1 2 G 0 6 2 B G E 8 0 F G 0 8 4 4 G 0 7 C 1 G 0 4 8 1 G
C 2 0 D G 0 B 0 0 G 0 3 F E G 0 7 2 6 G 0 6 8 6 G 0 9 F A G 0 1 0 2 G 0 9 0 6 G
1 8 F 5 G 1 C E 1 G 0 2 0 1 G 0 2 0 0 G 0 0 0 0 G 4 0 4 C G 2 0 2 0 G 2 0 2 0 G
0 0 0 0 G 0 8 4 4 G E 8 B 1 G 0 F 6 2 G 0 1 1 2 G 0 A 0 2 G 0 7 C 4 G 1 C F 8 G
0 0 0 0 G E 8 F 0 G 0 A 0 1 G 0 B 0 0 G 0 3 F E G 1 C F A G 0 0 0 0 G E 8 E A G
0 A 2 0 G 0 B 0 0 G 0 3 F E G 0 B 0 0 G 0 2 F E G 0 F C E G 0 1 2 1 G 1 8 F B G
1 C F 5 G
K p q r s G           J 1 0 G           K 7 1 2 0 0 0 0 0 +
```

NOTES: 1. SHOWN IN COLUMN 59 OF LAST CARD IS AN 026 PLUS (+) OR AN 029 AMPERSAND (&).

2. IN THE SECOND AND LAST LINES OF THE CRASH DUMP ROUTINE, REPLACE THE LETTERS p, q, r, AND s WITH THE 4-DIGIT HEXADECIMAL ADDRESS DESIRED FOR THE STARTING LOCATION OF THE LOAD OF THE ROUTINE INTO MEMORY. THE DUMP PROGRAM USES 68_{16} WORDS OF MEMORY. TYPICALLY, IT IS LOADED INTO A SYSTEM BUFFER AREA AND p, q, r, AND s ARE REPLACED BY 1C00 ON 8K MEMORY SYSTEMS OR 2800 ON SYSTEMS WITH MORE MEMORY.

Figure 8-3. Crash Dump Routine Keypunch Listing

HANG 1 ERROR MESSAGE

A HANG 1 error message may appear on the display screen during terminal operation. When it does, the display screen goes blank except for the HANG 1 message. This message indicates a controller malfunction that prevents proper terminal operation. To determine the nature of the malfunction and correct it, perform the following:

1. Press the ESC key.

2. Key in HG. Eight hexadecimal digits (xxxxxxxy) appear on the display screen.

If the last digit (y) is 8_{16} or greater, a memory parity error has occurred. Go to the CYBER 18-05/10 system maintenance manual and perform memory checks for the terminal controller. If the last digit is less than 8, obtain a crash dump printout, fill out a controlware technical assistance request (TAR), and send both the dump and the TAR to the regional technical support group because the problem cannot be readily corrected on-site.

STARTING ADDRESS OF
CRASH DUMP ROUTINE

```
L02H0
 0000  1400 0497 0000 0001  0003 0007 000F 001F  003F 007F 00FF 01FF  03FF 07FF 0FFF 1FFF
 0010  3FFF 7FFF FFFF FFFE  FFFC FFF8 FFF0 FFE0  FFC0 FF80 FF00 FE00  FC00 F800 F000 E000
 0020  C000 8000 0000 0001  0002 0004 0008 0010  0020 0040 0080 0100  0200 0400 0800 1000
 0030  2000 4000 8000 FFFE  FFFD FFFB FFF7 FFEF  FFDF FFBF FF7F FEFF  FDFF FBFF F7FF EFFF
 0040  DFFF BFFF 7FFF 0005  0006 0009 000A 0000  000C 2020 04DF FFFD  051C 007F 0000 0000
 0050  434F 5059 5249 474H  5420 434F 4E54 5249  4C20 4441 5441 2043  4F52 502E 2031 3937
 0060  0002 18E2 1AF4 1D06  0003 18E2 1AF4 1D06  0410 7100 0070 0170  0000 1711 0000 0000
 0070  1712 0004 0005 0000  0000 0000 0000 1865  0000 0000 0001 0001  0000 0000 0000 0000
 0090  1D06 0000 0000 0000  03C2 0000 0000 0000  0000 FFFE 0000 0000  0000 0000 1D06 0000
 00A0  0000 0000 0000 0000  0000 0000 0000 0000  0000 0000 0000 0000  0000 0000 0021 0000
 00B0  0000 0000 0000 0006  0188 03BE 03E4 0141  01A2 02B0 0000 0000  02E5 029F 02D0 02E0
 00C0  7FFF 050E 0005 0151  0000 000F 0540 066E  1879 08C7 0950 0A20  7FFF 7FFF 7FFF 7FFF
 00D0  7FFF 7FFF 7FFF 7FFF  7FFF 000F FFFF FFFF  FFFF FFFF FFFF FFFF  FFFF FFFF FFFF FFFF
 00E0  FFFF FFFF FFFF FFFF  FFFF 0000 00D5 00C5  0EF4 0000 02F0 1F4F  0000 0000 7FFF FFFF
 00F0  0000 0000 0000 7FFF  0246 1F18 0000 0000  0103 0005 0007 0003  0004 0004 021D 0000
 0100  0000 54C3 000F 7FFF  021B 54FE 0008 008C  0000 54FE 0000 02F0  0000 54FE 0000 02F0
 0110  021A 54FE 000A 0979  0000 54FE 0000 02F0  0000 54FE 0000 02F0  0000 54FE 0000 02F0
 0120  021B 54FE 0008 044A  0000 54FE 0000 02F0  0000 54FE 000E 0A4F  021B 54FF 000C 0BE2
 0130  0000 54FE 000A 7FFF  0000 54FE 0000 02F0  0000 54FE 0000 02F0  0000 54FE 0000 02F0
 0140  1D93 1D93 1D93 1D93  1D93 1D93 1D93 1D93  1D93 1C91 1C91 0C01  0C01 0401 0401 0001
 0150  0000 0000 0500 0803  016D C000 0164 6816  0A31 6810 C000 0101  E80C 03FE 0DFF 0A07
 0160  07C1 0481 C207 0B00  03FE 0624 0000 18F7  0091 0030 2047 4E41  4818 0164 0000 0000
 0170  0000 0000 0000 0000  0000 0000 0000 0000  120D 0406 FFFF 0007  5208 068E 0190 066R
 0180  1203 1220 0184 0004  1207 1040 0178 0007  520C 08E4 017C 08C7  1203 0621 0180 0001
 0190  0000 0000 0194 0000  0000 0000 0198 0000  0000 0000 019C 0000  0000 0000 01A0 0000
 01A0  0000 0000 01A4 0000  0000 0000 01A8 0000  0000 0000 FFFF 0000  021B 1111 2222 3333
 0180  4444 CCCC AAAA 0000  1093 FFFE 062C 0003  2222 3333 4444 8000  0001 3807 1D93 0003
 01C0  0466 044A 0036 03A6  13A7 0E92 0188 018C  1C91 0003 C02R 60FF  C303 0122 5406 6303
 01D0  0DFB 0141 18F9 C000  0497 6001 1400 0000  0000 01CF 07C1 0F46  A009 68FA 0726 A00A
 01E0  0476 C0EB 0103 0901  88F3 1CF3 C011 1CF1  0000 0000 0000 0000  0000 0000 0000 0000
 0200  0000 0000 0000 0000  0000 0000 0000 0002  0000 0500 0000 0000  0604 0800 0000 0000
 0210  0000 0000 0000 0909  0900 0909 0900 E0FB  E21E 1201 0802 18FE  5C8A 0122 581A C0EF
 0220  053D EE0A E8FA 0DFC  C201 6101 0429 C004  C203 60EF 0476 C0B7  0621 0F22 00C0 0445
 0230  C200 0207 1801 0475  C0E7 0400 0446 5022  024C 680E C088 9000  01FD 0132 C809 54C3
 0240  C807 0803 0068 C088  09FE 60FF 1CF1 0001  0629 0500 5400 023H  E8FB 4101 07A2 042B
 0250  C001 C622 0400 012D  A011 07C2 053F E00A  0101 0622 C622 0131  1815 056E F022 0A09
 0260  1813 053E E00A 056C  A122 0500 0585 3105  056C D222 0486 C02A  0F40 0400 A006 8101
 0270  6101 056C D422 09EE  0126 0911 0486 C005  0500 6818 1818 54C3  027B 036B 036B 0468
 0280  036B 7FFF 036B 027B  0426 0326 027B 027B  027B 027B 036B 027B  029A 0500 C101 6805
 0290  0802 0088 0400 1400  062C 3660 0606 0023  0500 0002 053F E00A  0766 07C2 18BA 03D9
 02A0  0500 482F C622 A02B  0101 0R14 6817 0121  F032 E205 0162 0834  1803 C823 0905 A011
 02B0  1805 0000 6000 2020  02B4 5853 5801 02B7  E8FE 0DF8 5821 5853  C8F4 68F6 0C0F CEF4
 02C0  0115 06A2 C8F1 0910  68EF 1811 5842 C000  0120 6834 E8E9 5810  C8E6 6830 0A0F 07C2
 02D0  5830 ECE2 5809 D8E0  0644 5839 C8DD 98DA  0121 18E4 0000 02D3  0A03 07C1 0A02 681D
 02E0  0844 0FE4 09F5 0131  0907 093A 0483 C015  0483 C314 D812 062B  E80F 0844 07C1 0481
 02F0  C20D 0B00 03FE 0726  0686 09FA 0102 0906  18F5 1CE1 0201 0200  0006 2020 3230 3330
 0300  02D1 0844 E861 0F62  0112 0A02 07C4 1CF8  02C7 E8F0 0A01 0800  03FE 1CFA 02D6 E8EA
 0310  0A20 0800 03FE 0B00  02FE 0FCE 0121 18FB  1CF5 54BE 0500 4C07  0745 052E FF02 0814
 0320  E203 0E04 0104 0178  0034 0000 C622 07C3  A006 053D 330A 0429  C001 056C D422 09F6
 0330  0116 C622 A02B B622  07C3 54BE 582B C106  6203 0500 E0EF C223  68E8 07A4 E000 02EF
 0340  0DFD 07A3 0500 0426  C023 88DF 0101 18F1  C202 013A 0822 053C  330A 6810 C622 A006
 0350  980D 0132 0400 18ED  041E C002 0416 C102  041A C102 053E F006  14B9 000D 042F 0500
 0360  E0B4 0161 54C3 C202  60B4 07A2 046B C122  0429 C101 1CF3 056C  7322 053D 730A 0804
 0370  6202 053E F006 C203  54BC 07A1 F0E6 0DFD  0500 07A3 E202 0171  18FC 041F C002 0416
 0380  C102 041A C102 0400  044D C0E7 0500 C205  0101 180A 0400 0429  C105 F032 0500 4803
 0390  F011 54F4 88C7 14B9  0B00 0500 C8FD 0400  610F 0C00 C108 910A  010F C109 0FCD 0121
 03A0  D10A 0FC2 0139 C10B  910A 0106 E10B 0DFE  C10A 6622 610B E031  C108 A031 0106 0FC1
 03B0  0872 0A01 A10C 0FCD  0872 C00F A109 0874  6109 E10F 1622 08E6  0500 C8FD 610F 0A00
 03C0  610A E105 0142 E6E6  0164 6105 E10F 0400  1622 4106 C202 E105  0400 66E6 053F F008
 03D0  E106 056C B122 6109  052C C003 053D 3009  548D 410A E106 548F  410B C10B 810A 0121
 03E0  A011 610B E10F 1201  0920 0500 E8FD 0400  410F 0AFF 6104 E106  053C F209 052D F203
 03F0  C201 0112 6202 1809  056F F022 0500 4804  E203 54F4 2000 138C  053E F108 E10F 1622
 0400  0B00 0500 0852 0834  0400 1CFA 0A01 60FF  C4E7 90FF 0122 5815  14EA E5E7 017F 0814
 0410  B011 010C C204 013A  09FE 6204 0127 C602  6804 C203 6803 54F4  0000 0000 D0FF 18E8
 0420  040C 54F4 101D 0406  000A 1CFA 54BE 0554  3322 8000 1200 07C3  0744 5400 035E C838
 0430  6202 4836 0426 C002  6203 14B9 044D 0H44  680B E80B C000 0442  0H06 E000 00F3 0309
 0440  1CF5 6008 80F0 0008  001E 0000 54C3 1804  54C3 18F5 E8F3 02FA  56E9 D0E6 E000 0465
 0450  40FF E102 0161 14EA  C203 0103 09FE 6203  18F7 C201 680B C622  680B C202 6102 C0B4
 0460  6202 40B4 E0F8 54F4  1203 0621 18EA 01HC  C201 548C 07A4 E6E7  07A3 0401 C022 0416
 0470  C002 0131 1815 0FC1  0500 0132 C205 011F  0444 C200 020F 0113  E207 0216 180A 0476
 0480  C0EB 0111 1811 0434  5001 0765 1802 C20C  6107 0400 041E C00B  09FE 6106 0726 041E
 0490  D008 6106 14B9 0B00  C032 07C1 18F1 0500  C000 01AC 60B8 0804  6400 02EF 6400 0467
 04A0  C000 0178 60B4 0C00  0811 07C7 0904 6302  07C1 0004 0814 9000  0034 0102 0726 18F6
 04B0  0DFD 0H04 6722 0444  C0E6 00AC 07B5 F0E6  0DFD C202 052E FF02  0132 07C5 18FA 0567
 04C0  FFE6 06HC F4E7 C6E7  07C7 H011 010B 0AFF  6104 C106 0102 0536  FF02 0A00 6106 6105
```

Figure 8-4. Sample Portion of Memory Dump

LOADER ERROR MESSAGES

During controlware loading, the selective loader writes numbers on the display screen to indicate whether the loader is working properly. The messages displayed are in the form of two numeric characters, ranging from 00 to 99. Not all possible number combinations are used, and the numbers that are used are divided into two groups: information-only numbers (00 through 19) and error messages (20 through 99). The following are listings of numbers displayable and their interpretation.

Information-Only Messages:

Number	Significance
00	All of the autoload cards (bootstrap routine) have been read successfully and the selective loader has started executing.
01	The first card has been read from the card reader by the loader.
04	Start of another routine to be loaded
06	Start of a routine to be bypassed by loader
14	Patch card processed and patched into memory
16	Patch card bypassed because routine name on card was not found in memory.
19	Loading is complete. No errors detected.

Error Messages:

Number	Significance
53	Checksum error in the bootstrap routine loaded via the card reader autoload of terminal controller.
56	Memory overflow: controlware being loaded exceeds the memory capacity of the terminal controller.
61	Patch card error. A nonhexadecimal entry encountered in a numeric field of the patch card.
62	Patch card error. Loader expected to find more information on the last card read.
63	Patch card error. Too large a numeric entry on last card read. Largest allowable number is $FFFF_{16}$.
64	The patch count on the last card is too large.
71	Checksum error on the last card read.
72	Sequence error on the last card read. The sequence number is that punched in column 79 of a controlware section card. There are two sequence-number breaks in the controlware section that the system is aware of and corrects for. The first is near the start of the controlware section, and when encountered, the sequence counter resets to 1 and begins a new count. The second is near the end of the deck, and when encountered, the sequence counter resets to the count prior to its reset to 1. Sequence errors other than these two cause the error condition.
76	Card reader error.

In some instances, a load attempt may not progress far enough to provide a significant (greater than 19) error message; that is, either no cards load and no error message appears or just a few load and information-only messages appear. In such instances, the fault can be either in the card reader or in the bootstrap loader of the terminal controller. The procedure for determining the cause of the stoppage in such instances is as follows:

1. Check the card reader setup.
2. Recheck all settings of terminal switches and controls.
3. Re-attempt the load.
4. If second load attempt fails, a quick check of the bootstrap loader and the card reader function can be made by trying to load the crash dump card deck described in section 8 of this manual.
5. If the crash dump deck does not load, go to the CYBER 18-05/10 Computer Systems Hardware Maintenance Manual for the terminal and begin fault isolation procedures.
6. If the crash dump deck does load, try a spare controlware card deck or examine the original one for light-absorbing markings or particles on the back sides of the first few cards and try a reload.
7. If no controlware deck loads past the first few cards, go to the CYBER 18-05/10 Computer Systems Hardware Maintenance Manual and begin fault isolation procedures.
8. If a controlware deck loads far enough to provide a significant error message (greater than 19), continue with the following portion of this section.

Error messages differ from informative messages in that error messages cause the loading process to stop immediately after the error message is detected and displayed. When an error condition occurs on the first attempt to load any controlware deck, perform steps 1 through 6 of the following procedure. Step 6 of the procedure returns to the initial controlware loading procedure, and if the deck loads properly on the second attempt, this section need not be returned to. If a deck fails to load on a second attempt, return to this section for further instructions.

1. Write down the error message number.
2. Remove the cards from the card reader stacker and place them face down on a flat surface.
3. Remove the last card from the back of the portion of deck removed in step 2, and mark it lightly with a pencil on its front side or top edge so that it can easily be identified.
4. Place the marked card back in its original position in portion of deck removed from stacker in step 2.
5. Remove the unread cards from card reader hopper and place them face down on top of cards removed from stacker so that deck is in original sequence.
6. Reload the entire deck and repeat the procedure under Controlware Loading in section 6.

If a deck fails to load on a second attempt, carry out steps 1 through 5 of the preceding procedure and then try loading a spare deck if one is available. If spare deck fails or if one is not available, continue with suggested solutions for various error messages before calling for technical support assistance or filling out a TAR on controlware.

Error Code	Suggested Solution
53	Card reader bootstrap routine is in the portion of the deck preceding selection card. This portion of deck is Hollerith punched and can be interpreted on a keypunch machine. Have this portion of the deck interpreted (failing card in particular if load fails at same card). Obtain a listing of card reader bootstrap codes (e.g., from a card-to-print from any good controlware deck and operating terminal) and make a card-by-card comparison of printouts and interpretations until error is found (checksums are in column 80). Correct error on keypunch and try reload.
56	Contact the customer engineer.
61-64	Patch cards are at end of deck, immediately preceding last card. Identify and check their contents using patch card information in section 7 of this manual. Correct any errors found and try reloading deck.
71	Examine back of last card read. If any light-absorbing marks are present, duplicate card on keypunch capable of binary card punching. Check newly punched card against original to verify punching and try reloading deck.
72	Only controlware portion of deck has binary sequence numbers in column 79. This portion of deck runs from about 5 cards after selection card to about 5 cards from end of the deck (excluding any patch cards). Using the ASCII/hexadecimal/Hollerith conversion table in appendix B of this manual, start checking sequence numbers in column 79 for proper sequence. Correct any discontinuities in sequence and try reloading deck. Gross sequence discontinuities can be also noted via the writing on the top edge of a deck. Missing cards in the controlware portion of a deck render the deck useless.
76	Examine card deck for damaged or mutilated cards. If none are found, go to the Operator Troubleshooting section of the appropriate operators guide or to the visual and mechanical card reader DDLTs in section 6 of the CYBER 18-05/10 Computer Systems Hardware Maintenance Manual.

If suggested solutions do not correct a controlware loading problem, call for technical support personnel having controlware expertise. Fill out TAR on controlware.

SUBSEQUENT-LOAD HARDWARE ERROR REPORTING

The controlware incorporates a means of logging and reporting hardware errors detected during terminal operation. The hardware error log is useful to terminal maintenance personnel as an aid in diagnosing terminal device malfunctions. A display of the error log is obtained simply by reloading the controlware deck after the terminal has been operating for a time. The terminal controller cannot be powered off before the controlware reload or the error log information is lost. That is, the error log contains only operating errors that have occurred since the last controlware load; it therefore assumes that the terminal has been operating for a time.

The following list provides logical unit number assignments for determining the cause of an error (device or controlware) and error code assignments for determining the nature of the error.

Logical Unit Number Assignments	Device
1	Controlware
2	Keyboard display
3	Controlware
4	Card reader
5	Line printer
6	Data set adapter
7	Controlware
8	Magnetic tape transport 1
9	Magnetic tape transport 2
A	Magnetic tape transport 3
B	Unused
C	Controlware
D	Controlware
E	Controlware
F	Unused

Error Number Assignments	Error Type
0	Diagnostic timeout
1	Lost data
2	Alarm
3	Parity error
5	Internal reject
6	External reject
D	No write ring on tape unit
E	Not ready
15	Data not available
16	Stacker full
17	Hopper empty
18	Card feed failure
19	Card jam
1B	Data set adapter initialization failed
1F	Short record
20	No sync match
21	Carrier dropped
26	Out of paper
29	Irrecoverable error
3B	Output ADT failed. ADT is auto-data transfer. An attempt was made by the terminal to transmit data over the communication lines and the transmission was incomplete.)

TABLE B-1. ASCII/BCD/HEXADECIMAL CARD-PUNCH CODE CONVERSIONS

ASCII				BCD				EBCDIC	
026 Card Punch Code	029 Card Punch Code	ASCII Code	Printer CDT Keyboard Character	Internal BCD Code	External BCD Code	026 Card Punch Code	029 Card Punch Code	Hex. Code	029 Card Punch Code
No punch	No punch	$2/0\text{-}20_{(16)}$	space	$30_{(16)}$	$50_{(16)}$	No punch	No punch	40	No punch
11-0 or 11-8-2	11-0 or 12-8-7	2/1-21	! exclamation point	2A	2A	11-0 11-8-2	11-0 12-8-7	4F	12-7-8
8-4	8-7	2/2-22	" quote	4C	4C	8-4	8-7	7F	8-7
0-8-6	8-3	2/3-23	#	3E	5E	0-8-6	8-3	7B	8-3
11-8-3	11-8-3	2/4-24	$	2B	2B	11-8-3	11-8-3	5B	11-8-3
8-6	0-8-4	2/5-25	%	4E	4E	8-6	0-8-4	6C	0-8-4
0-8-7	12	2/6-26	&	3F	5F	0-8-7	12	50	12
11-8-5	8-5	2/7-27	' apostrophe	2D	2D	11-8-5	8-5	7D	8-5
0-8-4	12-8-5	2/8-28	(	3C	5C	0-8-4	12-8-5	8D	12-8-5
12-8-4	11-8-5	2/9-29	)	5C	3C	12-8-4	11-8-5	5D	11-8-5
11-8-4	11-8-4	2/10-2A	*	2C	2C	11-8-4	11-8-4	5C	11-8-4
12	12-8-6	2/11-2B	+	50	30	12	12-8-6	8E	12-8-6
0-8-3	0-8-3	2/12-2C	, comma	3B	5B	0-8-3	0-8-3	6B	0-8-3
11	11	2/13-2D	- hyphen	20	20	11	11	60	11
12-8-3	12-8-3	2/14-2E	. period	5B	3B	12-8-3	12-8-3	4B	12-8-3
0-1	0-1	2/15-2F	/	31	51	0-1	0-1	61	0-1
0	0	3/0-30	0	40	4A	0	0	F0	0
1	1	3/1-31	1	41	41	1	1	F1	1
2	2	3/2-32	2	42	42	2	2	F2	2
3	3	3/3-33	3	43	43	3	3	F3	3
4	4	3/4-34	4	44	44	4	4	F4	4
5	5	3/5-35	5	45	45	5	5	F5	5
6	6	3/6-36	6	46	46	6	6	F6	6
7	7	3/7-37	7	47	47	7	7	F7	7

NOTE: THE BCD TERMINAL IS A 63-CHARACTER DEVICE. ASCII !, [, AND] GRAPHICS ARE ACTUALLY EBCDIC I, { , AND } . FOR COMPLETE EBCDIC CHARACTER SET, SEE BATCH TERMINAL CONTROL-WARE REFERENCE MANUAL 96768910, SECTION 5.

TABLE B-1. ASCII/BCD/HEXADECIMAL CARD-PUNCH CODE CONVERSIONS (Continued)

ASCII				BCD				EBCDIC	
026 Card Punch Code	029 Card Punch Code	ASCII Code	Printer CDT Keyboard Character	Internal BCD Code	External BCD Code	026 Card Punch Code	029 Card Punch Code	Hex. Code	029 Card Punch
8	8	3/8-38	8	48	48	8	8	F8	8
9	9	3/9-39	9	49	49	9	9	F9	9
8-2	8-2	3/10-3A	: colon	4A	40	8-2	8-2	7A	8-2
12-8-7	11-8-6	3/11-3B	;	5F	3F	12-8-7	11-8-6	5E	11-8-6
12-0 or 12-8-2	12-0 or 12-8-4	3/12-3C	<	5A	3A	12-0 12-8-2	12-8-4 12-0	4C	12-8-4
8-3	8-6	3/13-3D	=	4B	4B	8-3	8-6	7E	8-6
11-8-7	0-8-6	2/14-3E	>	2F	2F	11-8-7	0-8-6	6E	0-8-6
11-8-6	0-8-7	3/15-3F	?	2E	2E	11-8-6	0-8-7	6F	0-8-7
8-5	8-4	4/0-40	@	4D	4D	8-5	8-4	7C	8-4
12-1	12-1	4/1-41	A	51	31	12-1	12-1	C1	12-1
12-2	12-2	4/2-42	B	52	32	12-2	12-2	C2	12-2
12-3	12-3	4/3-43	C	53	33	12-3	12-3	C3	12-3
12-4	12-4	4/4-44	D	54	34	12-4	12-4	C4	12-4
12-5	12-5	4/5-45	E	55	35	12-5	12-5	C5	12-5
12-6	12-6	4/6-46	F	56	36	12-6	12-6	C6	12-6
12-7	12-7	4/7-47	G	57	37	12-7	12-7	C7	12-7
12-8	12-8	4/8-48	H	58	38	12-8	12-8	C8	12-8
12-9	12-9	4/9-49	I	59	39	12-9	12-9	C9	12-9
11-1	11-1	4/10-4A	J	21	21	11-1	11-1	D1	11-1
11-2	11-2	4/11-4B	K	22	22	11-2	11-2	D2	11-2
11-3	11-3	4/12-4C	L	23	23	11-3	11-3	D3	11-3
11-4	11-4	4/13-4D	M	24	24	11-4	11-4	D4	11-4
11-5	11-5	4/14-4E	N	25	25	11-5	11-5	D5	11-5
11-6	11-6	4/15-4F	O	26	26	11-6	11-6	D6	11-6
11-7	11-7	5/0-50	P	27	27	11-7	11-7	D7	11-7

NOTE: THE BCD TERMINAL IS A 63-CHARACTER DEVICE. ASCII !, [, AND] GRAPHICS ARE ACTUALLY EBCDIC I, { , AND } . FOR COMPLETE EBCDIC CHARACTER SET, SEE BATCH TERMINAL CONTROL-WARE REFERENCE MANUAL 96768910, SECTION 5.

TABLE B-1. ASCII/BCD/HEXADECIMAL CARD-PUNCH CODE CONVERSIONS (Continued)

ASCII				BCD				EBCDIC	
026 Card Punch Code	029 Card Punch Code	ASCII Code	Printer CDT Keyboard Character	Internal BCD Code	External BCD Code	026 Card Punch Code	029 Card Punch Code	Hex. Code	029 Card Punch
11-8	11-8	5/1-51	Q	28	28	11-8	11-8	D8	11-8
11-9	11-9	5/2-52	R	29	29	11-9	11-9	D9	11-9
0-2	0-2	5/3-53	S	32	52	0-2	0-2	E2	0-2
0-3	0-3	5/4-54	T	33	53	0-3	0-3	E3	0-3
0-4	0-4	5/5-55	U	34	54	0-4	0-4	E4	0-4
0-5	0-5	5/6-56	V	35	55	0-5	0-5	E5	0-5
0-6	0-6	5/7-57	W	36	56	0-6	0-6	E6	0-6
0-7	0-7	5/8-58	X	37	57	0-7	0-7	E7	0-7
0-8	0-8	5/9-59	Y	38	58	0-8	0-8	E8	0-8
0-9	0-9	5/10-5A	Z	39	59	0-9	0-9	E9	0-9
8-7	12-8-2	5/11-5B	[	4F	4F	8-7	8-4	C0	12-0
12-8-5	0-8-2	5/12-5C	\	5D	3D	0-8-2	12-0	E0	0-8-2
0-8-2	11-8-2	5/13-5D	]	3A	5A	11-8-2	0-8-2	D0	11-0
12-8-6	11-8-7	5/14-5E	^	5E	3E	12-8-6	11-8-7		
0-8-5	0-8-5	5/15-5F	_ underline	3D	5D	0-8-5	0-8-5	6D	0-8-5

NOTE: THE BCD TERMINAL IS A 63-CHARACTER DEVICE. ASCII !, [, AND] GRAPHICS ARE ACTUALLY EBCDIC I, { , AND } . FOR COMPLETE EBCDIC CHARACTER SET, SEE BATCH TERMINAL CONTROL-WARE REFERENCE MANUAL 96768910, SECTION 5.

HARDWARE ERROR MESSAGE LISTING C

These errors may occur during operation and are displayed on the screen.

Card Reader Errors

Message	Definition
READER ALR	Alarm †
READER CFF	Card feed failure
READER EXR	External reject
READER INR	Internal reject
READER JAM	Card jammed
READER LDT	Lost data †
READER DNR	Device not ready
READER SFL	Stacker full
READER SRC	Short record
READER TOE	Timeout error
READER HMT	Hopper empty
READER IHP	Illegal Hollerith punch

Line Printer Errors

Message	Definition
PRINTER ALR	Alarm †
PRINTER EXR	External reject
PRINTER INR	Internal reject
PRINTER PAR	Parity error
PRINTER OOP	Out of paper
PRINTER DNR	Device not ready
PRINTER TOE	Timeout error

Data Set Errors

Message	Definition
COMM ERROR DIF	Data set initialization failed
COMM ERROR DNA	Data not available
COMM ERROR GHI	Ghost interrupt
COMM ERROR EXR	External reject
COMM ERROR INR	Internal reject
COMM ERROR CDP	Carrier dropped
COMM ERROR LDT	Lost data †
COMM ERROR NSM	No sync match
COMM ERROR OAF	Output ADT failed
COMM ERROR PAR	Parity error
COMM ERROR DNR	Device not ready
COMM ERROR TOE	Timeout error

Magnetic Tape Errors

Message	Definition
MAG TAPE ALR	Alarm †
MAG TAPE IRE	Irrecoverable error
MAG TAPE NWR	No write ring
MAG TAPE PAR	Parity error
MAG TAPE DNR	Device not ready
MAG TAPE SRC	Short record
MAG TAPE TOE	Timeout error

Cyclic Encoder Errors (2780/3780 only)

Message	Definition
ENCODER EXR	External reject
ENCODER IXR	Internal reject

† This message requires an operator response. The message indicates that an error condition occurred but the actual cause of the error cannot be determined by the software. The device may be in either a ready or a not ready condition.

TERMINAL CONFIGURATION SHEET

Figure D-1 is a terminal configuration sheet for batch terminals. This form should be reproduced so that one can be filled out to reflect the configuration of each terminal to be maintained. As the copy forms are filled in, they can be punched and included as part of this manual.

Below are the instructions for completing the configuration sheet. Note that entries 1 through 8 are made by physical inspection of the equipment during terminal installation, while entries 9 through 16 are made as a result of analysis of the individual user's requirements for terminal operation.

1. Enter the name of the terminal site at which the terminal is being installed.

2. Enter the general terminal and controlware types (for example, CYBER 18-10-1/200 UT).

3. This entry should reflect a particular terminal; it can be any unique name or number assigned to a specific terminal. The terminal controller serial number may be a good identifier to use.

4. Enter the amount of memory in terminal controller (8K, 16K, 24K, or 32K).

5. Enter the number of magnetic tape transports (0 to 3) used in the terminal.

   a. Enter the magnetic tape transport track sizes and designate the transports having a translator with the letter T (for example, nine-track/T). †

   b. Enter the device address assigned to each magnetic tape transport in the terminal (for example, 0 = tape transport 1, 1 = tape transport 2, 2 = tape transport 3).

6. Enter the print speed and type of the line printer used in the terminal (for example, 300 lpm CL408-C).

7. Enter the card-read speed of the card reader used in the terminal (for example, 300 or 600 cpm).

8. Enter the type of controlware used in this terminal (for example, MD426-Axx).

User-supplied entries (2780/3780 only):

9. Enter the magnetic tape transport type (7- or 9-track) for each tape unit on the system.

10. Enter the number of words required for each tape transport buffer; entries are made in decimal.

User-supplied entries (200 UT only):

11. Answer yes or no, depending upon user's requirements.

12. Enter the type of transmission-line code to be used.

13. Enter either "Line" or "Block."

14. Enter either yes or no.

15. Enter either two-wire or four-wire.

16. Enter the number of words required for each tape transport buffer. The entries are made in decimal; defaults to 138 characters if entry is left blank.

The column to the right side of the form represents the 80 columns of a selection card. Once the selection card has been punched. the blanks in the column can be filled in to record the manner in which the selection card was punched.

† Tape transports use internal jumper connections to set their device addresses. The CYBER 18-05/10 Computer Systems Hardware Maintenance Manual describes where these jumpers are and how they are set to give the desired device address. Note that the device address setting in a batch terminal must directly follow the number of tape transports in the terminal; that is, if only two tape transports are used in a terminal, their address jumpers must be set to 0 and 1, and not to either 1 and 2, or 0 and 3. Normally, a tape transport having a translator installed has its address jumpers set to device address 0. In terminals that have mixed track sizes and therefore two tape transports with translators, one should have its address jumpers set to 0 and the other should be set to reflect its position in the terminal (for example, 1 or 2, depending upon whether there are two or three tape transports in the terminal).

GENERAL INFORMATION

1) NAME OF TERMINAL SITE _____

2) TERMINAL TYPE _____

3) TERMINAL ID _____

4) AMOUNT OF CONTROLLER MEMORY _____

5) NUMBER OF MAGNETIC TAPE TRANSPORTS IN TERMINAL _____

6) LINE PRINTER SPEED _____

7) CARD READER SPEED _____

8) TYPE OF CONTROLWARE USED _____

USER-SUPPLIED INFORMATION

2780/3780 ONLY

9) a) MAGNETIC TAPE TRANSPORT TYPES:

TAPE TRANSPORT 1 _____ TAPE TRANSPORT 2 _____ TAPE TRANSPORT 3 _____

b) DEVICE ADDRESS FOR EACH TAPE TRANSPORT IN TERMINAL:

TAPE TRANSPORT 1 _____ TAPE TRANSPORT 2 _____ TAPE TRANSPORT 3 _____

10) MAGNETIC TAPE TRANSPORT BUFFER SIZE(S) IN DECIMAL:

TAPE TRANSPORT 1 _____ TAPE TRANSPORT 2 _____ TAPE TRANSPORT 3 _____

USER-SUPPLIED INFORMATION

200 UT ONLY

11) WILL ASCII, EXTERNAL BCD, OR INTERNAL BCD BE USED ON THE TRANSMISSION LINES? _____

12) WILL PRINCIPAL MODE OF OPERATION BE EITHER LINE OR BLOCK? _____

13) WILL A MODIFIED COMMUNICATION-LINE CODE SET BE USED? _____

14) WILL COMMUNICATION-LINE CONNECTION BE TWO- OR FOUR-WIRE? _____

15) MAGNETIC TAPE TRANSPORT BUFFER SIZE(S) IN DECIMAL:

TAPE TRANSPORT 1 _____ TAPE TRANSPORT 2 _____ TAPE TRANSPORT 3 _____

Figure D-1. Terminal Configuration Sheet

COMMENT SHEET

MANUAL TITLE CDC® Batch Terminal Controlware Installation Handbook

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COMMENTS: This form is not intended to be used as an order blank. Your evaluation of this manual will be welcomed by Control Data Corporation. Any errors, suggested additions or deletions, or general comments may be made below. Please include page number.

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