PRELIMINARY

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INSTALLATI GUIDE

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ZEBRA 1700/1750
INSTALLATION GUIDE

INSTALLATION CHECKLIST

Before unpacking or installing the ZEBRA® 1700/1750, please read the Installation Guide for a comprehensive overview of the system. Following this, check off and proceed with the following steps:

1. Carefully unpack.

2. Connect terminal(s) to the LINE connector(s) located on the back panel. See Section 4.0.

3. Turn ZEBRA on, and load the operating system. See Section 5.

```
**********************************************
*                                            *
*              C A U T I O N                 *
*                                            *
*  BEFORE disconnecting peripherals,         *
*  unplugging power cords, or removing       *
*  boards from ZEBRA, system power must      *
*  be OFF.                                   *
*                                            *
**********************************************
```

For further description of the ZEBRA and its subsystems, refer to documents delivered with the system:

Document No.	Title
88A00757A	PICK Operator Guide
88A00803A	ZEBRA XENIX Installation, Operation and Administration Guide
88A00820A	ZEBRA 1700/1750 Hardware Reference Manual
88A00824A	ZEBRA 700/750, 1700/1750, and 3750 Local Area Network (LAN) Installation Guide

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1.0 SYSTEM DESCRIPTION

The General Automation Series ZEBRA® 1700/1750 is a compact, desk-top computing device which supports the PICK® or the XENIX™ operating system. It consists of an MC68000®-based CPU, a 20MB or 40MB 5-1/4-inch Winchester disk drive, a 1/4-inch tape streamer or 5MB removable Winchester and a multi-port communications interface. Optionally, the ZEBRA 1700/1750 may include: 1) additional disk storage in an Expansion Enclosure, 2) additional memory, 3) Local Area Network (LAN) controller, and 4) six or twelve additional serial Input/Output (I/O) ports.

1.1 SPECIFICATIONS

Size:	5" high by 17-1/4" wide by 16" deep.
Weight:	Thirty (35) pounds.
Color:	Bone white with black front panel.
Power Requirements:	100/120 VAC, 3 Amps. 220/240 VAC, 1.5 Amps. 48/63 Hz, single phase. 115 VAC ±5% isolated line to breaker box with separate breaker is preferred.
Environmental:	55°F to 85°F ambient temperature; 70°F is optimum. Maximum temperature change per hour: 25°F. 20% to 80% relative humidity, non-condensing; 65% is optimum.
CPU Speed:	10 MHz clock rate.
Fixed Winchester:	20MB or 40MB formatted.
Removable Winchester or Cartridge Tape:	5MB 45MB standard 1/4-inch cartridge with QIC-24 data format.

Communications Ports:

Line 00 - Line 04: Line 06 - Line 11 Line 12 - Line 17	RS-423, 9-pin connector, 9600 baud, asynchronous, serial 8 bits with 1-1/2 stop bits. Line 0 is normally used with a local CRT terminal; Lines 1-4 are available for support of RTS, CTS, DTR and DSR.
Line 05:	RS-423, 25-pin connector, 9600 baud, asynchronous, serial 8 bits with 1-1/2 stop bits.
Parallel Printer:	Cable connector (36-pin) for Centronix-compatible parallel printer.
Network 1,2	Two coax connectors provided if the LAN option is selected.

2.0 INSTALLATION

2.1 MOUNTING

The ZEBRA 1700/1750 may be placed on any flat, level surface firm enough to support its weight of approximately 30 pounds. A suitable spacing must be maintained between the unit and a wall or other surface to ensure adequate ventilation and proper strain relief of the signal cables.

2.2 INPUT POWER SELECTION

ZEBRA is configured at the factory for operation from power sources of 100-120 or 220-240 VAC, single-phase 48/63 Hz. The input power selected is called out on the General Automation nameplate on the back panel.

For guidance in resetting the system for operation at a different voltage level, contact your OEM/Distributor office.

```
**************************************************
*                                                *
*                   C A U T I O N                *
*                                                *
* Before applying AC power to the unit, be sure that *
* the fuse rating (3 Amp for 115 VAC, 1.5 Amp for    *
* 230 VAC) is correct for the voltage to be applied. *
*                                                *
**************************************************
```

2.3 COMMUNICATIONS PORTS

"Port" is a general name for a communications input/output connector. With ZEBRA, a "port" is identified on the back panel as a "LINE" for ZEBRA using the PICK operating system, and as a "tty" for ZEBRA using the XENIX operating system.

Figure 2-1 shows the location of communications ports on the ZEBRA 1700/1750 rear panel. Lines 00 through 04 are 9-pin RS-423 asynchronous ports, with serial I/O cable connectors. Line 05 is a 25-pin "D" connector which supports DTE, for connection to a synchronous modem. It may also be used with a CRT or a printer. Line 00 drives the system operator console for bootload and diagnostic purposes, but is available as a standard CRT port when not required for system operation or diagnostics.

The remaining ports, Lines 1 through 4, can drive up to four additional CRT terminals or serial I/O printers. These ports support RTS, CTS, DTR, and DSR as specified in Table 2-1. Currently, the ports support DCE; with hardware rework and jumper arrangements, DTE can be achieved.

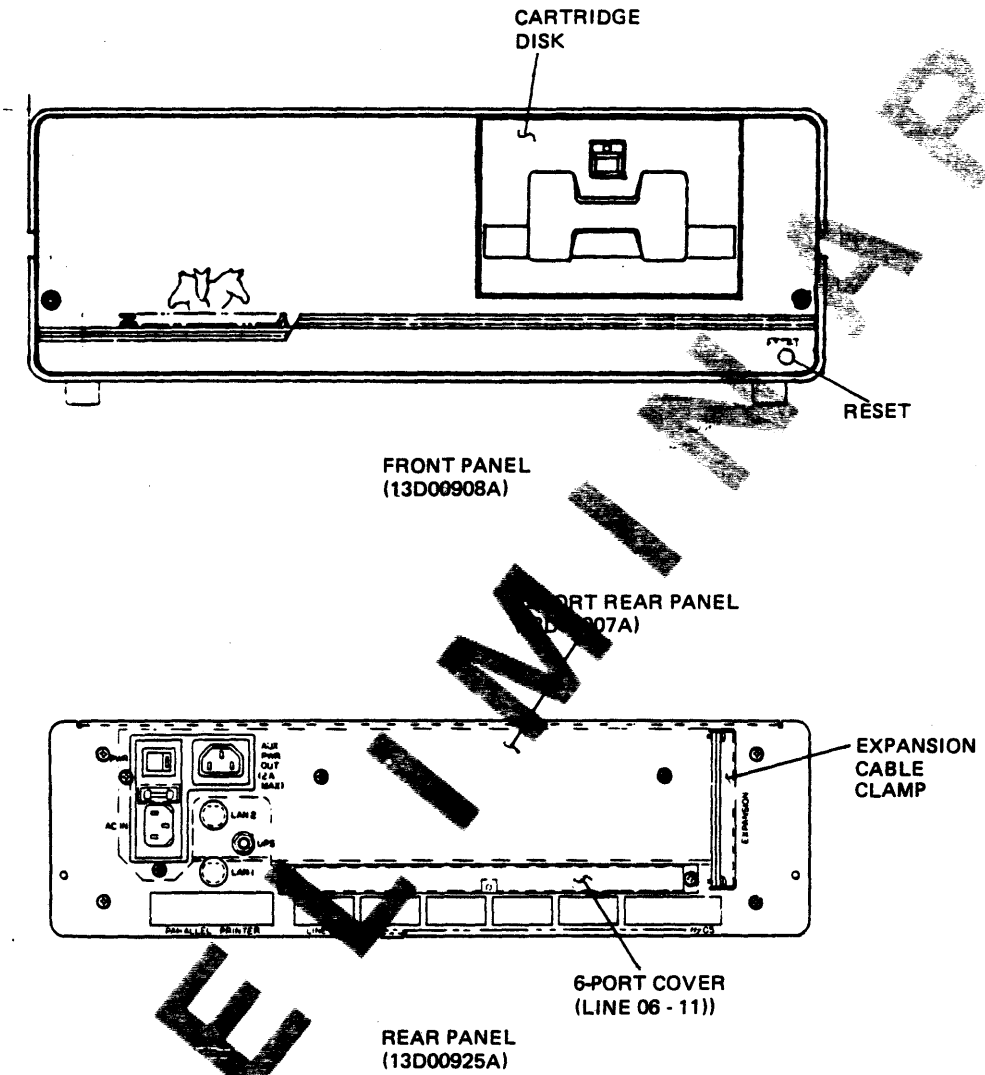

Figure 2-1. ZEBRA 1700/1750 Cabinet (13D00925A)

2.3.1 I/O Port Expansion

Twelve (12) serial I/O ports, in sets of six, can be added to the system. One (1) motherboard expansion slot is required for each set. For further information on additional I/O ports, contact your ZEBRA distributor or General Automation, Inc.

2.3.2 I/O Port Baud Rates

Lines 04 and 05 are handled by a different driver than the driver used for Lines 00 through 03 and allow three additional baud rates. The baud rates for all ports are as follows:

Lines 00 - 03 Lines 06 - 11 Lines 12 - 17	Lines 04 - 05
-	50.0
75.0	75.0
110.0	110.0
134.5	134.5
150.0	150.0
300.0	300.0
600.0	600.0
1,200.0	1,200.0
1,800.0	1,800.0
2,000.0	2,000.0
2,400.0	2,400.0
-	3,600.0
4,800.0	4,800.0
-	7,200.0
9,600.0	9,600.0
19,200.0	19,200.0

2.4 MOTHERBOARD

The ZEBRA 1700/1750 motherboard and the five slots (J1-J5) for mounting standard and optional boards are illustrated in Figure 2-2. Memory boards must be mounted in J5 and J4. Memory board and other ZEBRA board locations are defined in Table 2-1 with system options shown in parentheses. Prior to POWER ON for the first time, the user should verify that boards are firmly mounted in the slots.

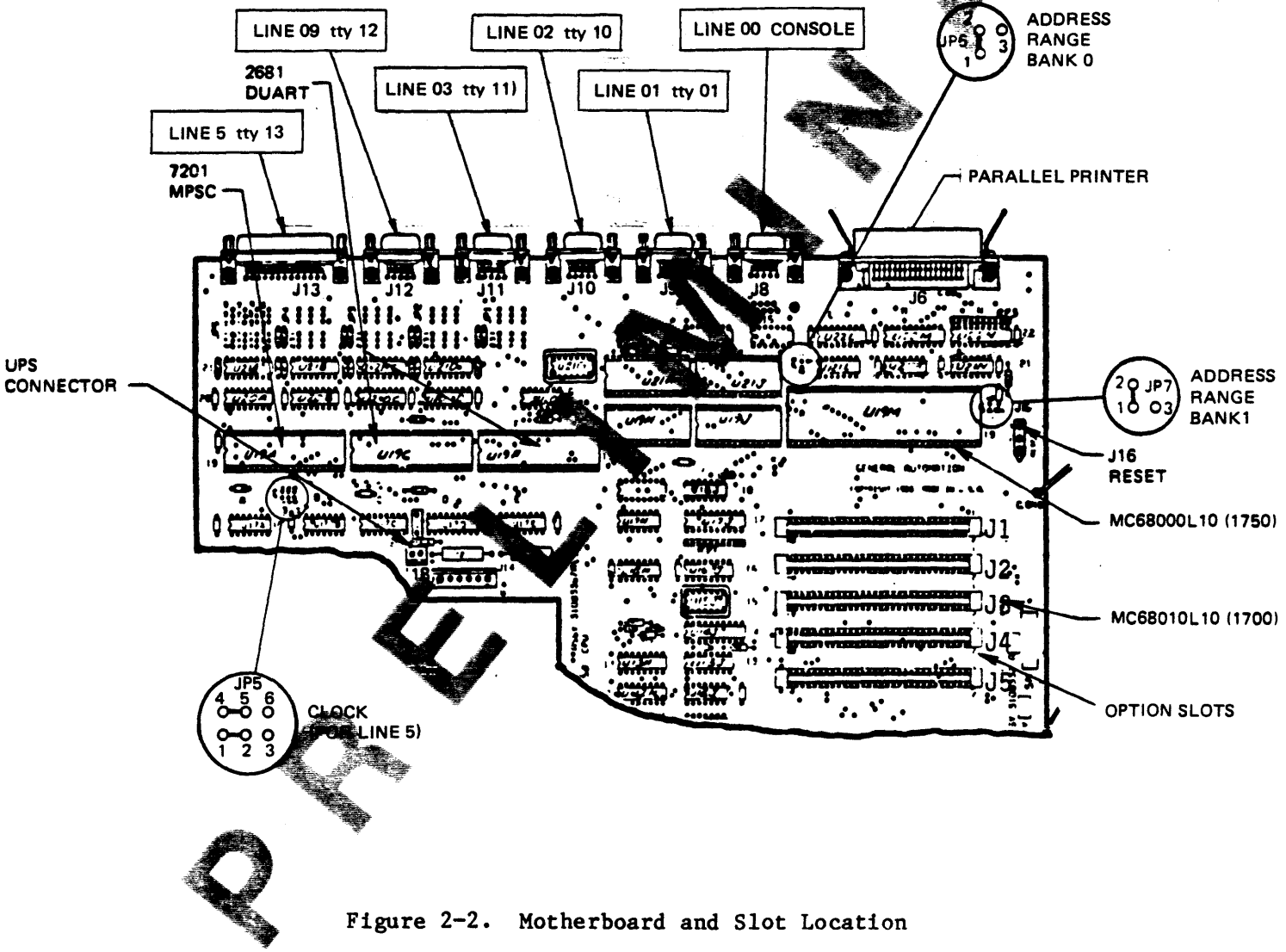

Figure 2-2. Motherboard and Slot Location

Table 2-1. Board Locations

Slot	1700	1750
J5	384KB	(128KB or 384KB)
J4	(512KB)	(512KB)
J3	MMU	(LAN)
J2	(LAN or 6-Port)	(6-Port)
J1	(6-Port)	(6-Port)

NOTES:
1. Parentheses () indicate an option.
2. MMU may be in any slot (J2 or J3) that is vacant.
3. LAN may be in any slot (J2 or J3) that is vacant.
4. Memory slots J5 and J4 MUST be used in sequence (i.e., use J5 first, then J4 if you have a 2nd memory board. With a single memory board, use J5 only.

2.5 I/O DEVICE CABLING

I/O device cables of three types, in lengths from 25 to 1,000 feet, are available from GA. The cables are:

1. 25-pin connector at SYSTEM (LINE 05 [illegible]13) and REC end of cable.

2. 9-pin connector at SYSTEM (LINE [illegible]E-LINE 04 tty 12) and 25-pin at REC end of cable.

3. 50-pin connector at each end of the Parallel Printer cable.

Should the user want to build the cables, the connector pin assignments and signals carried by each pin are defined in the following sections.

IMPORTANT SAFETY NOTE

Cable shields should be connected to pin 1 at the SYSTEM (9-pin) end ONLY. Be sure that the cables do not connect pin 1 at the system (9-pin) end to pin 1 at the REC (25-pin) end, and that cable shields are not connected to pin 1 at the rec (25-pin) end. Failure to observe this precaution could result in ground-loop currents in the cable which might be detrimental to successful operation of the system.

2.5.1 25-Pin Cable (21A01617A)

This cable is an 8-wire, shielded data communications cable, terminated at each end with a 25-pin male connector. The SYSTEM end has pin 1 connected to the shield. The signal and pin assignments for this cable are shown in Figure 2-3.

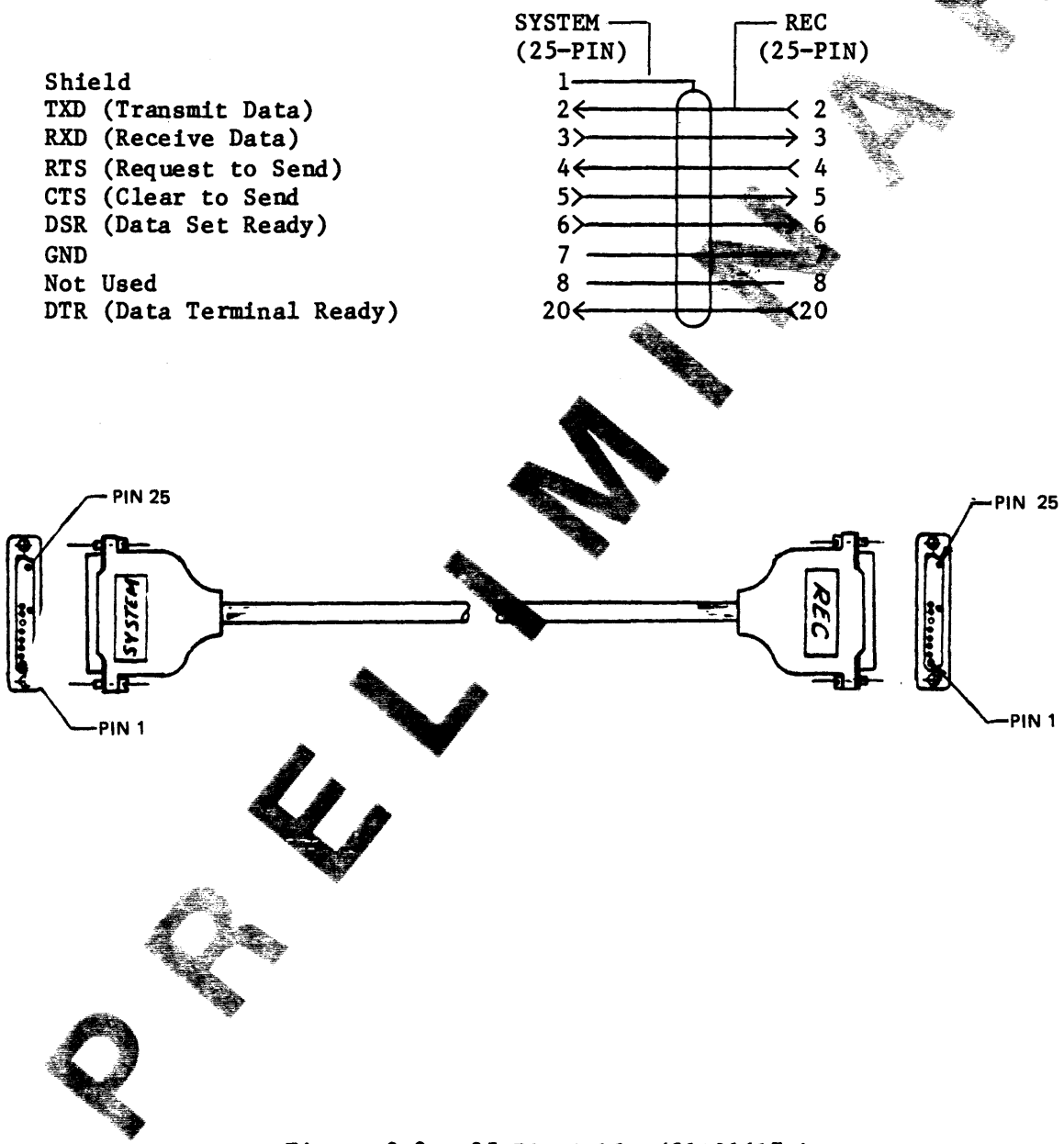

Figure 2-3. 25-Pin Cable (21A01617A)

2.5.2 9-Pin, 25-Pin Cable (21A01624A)

This cable is an 8-wire, shielded data communications cable, terminated at SYSTEM end with a 9-pin male connector and at REC end with a 25-pin male connector. The signal and pin assignments for this cable are shown in Figure 2-4.

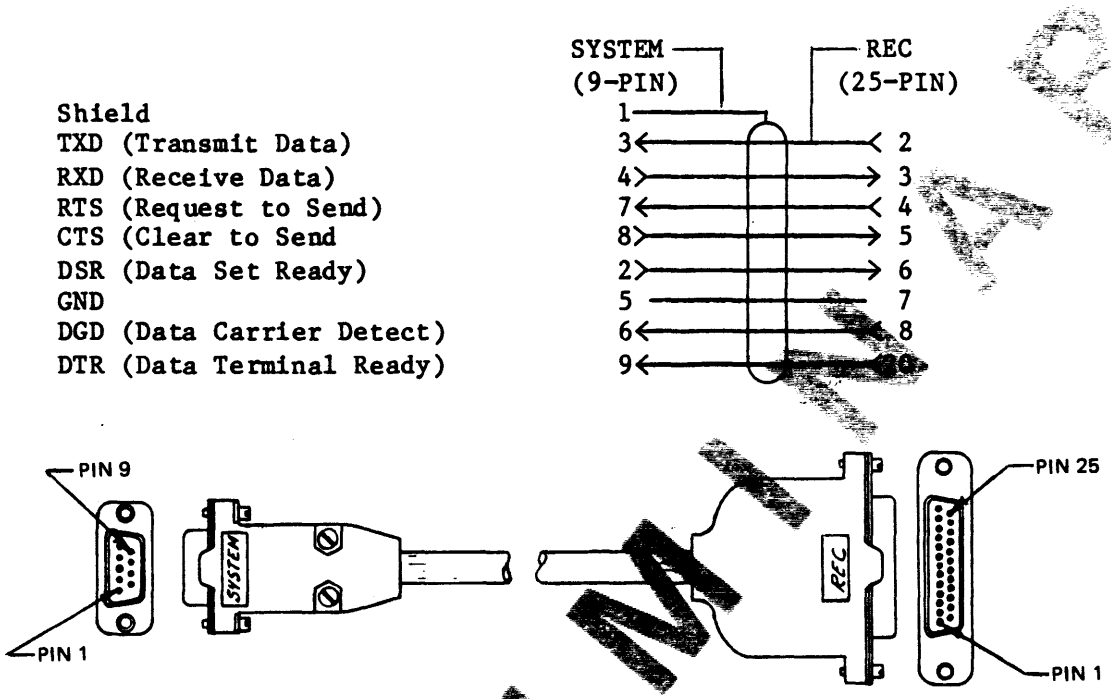

Figure 2-4. 9-Pin/25-Pin Cable

2.5.3 Parallel Printer Cable (21A01078A)

This cable consists of 18 twisted pairs of insulated #24 AWG stranded wire; the length of this cable should not exceed 25 feet. Tables 2-2 and 2-3 define connector pin assignments for printer input and output signals. The assignments are identical at each end of the cable with 36-pin connectors at each end.

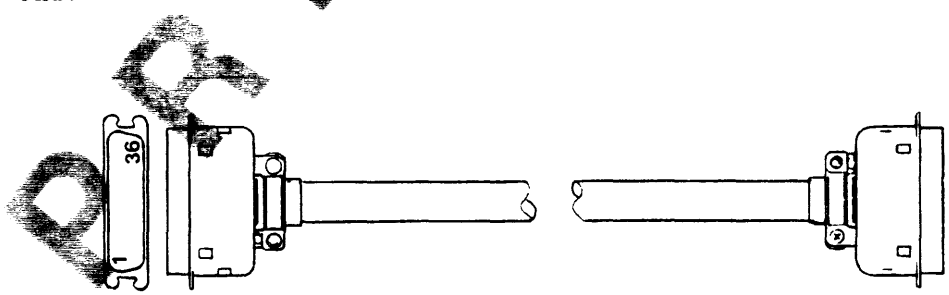

Table 2-2. Printer Input Signals

Signal Name	Description	Connector Pin Signal	Connector Pin Return
DATA STROBE	A low active true pulse (at least 100 nS duration) from the host computer to clock data into the printer. Data lines must stabilize for at least 50 nS before DATA STROBE is sent.	1	19
DATA LINE 1	Eight high active lines from the host computer that form a character byte or a Control Code byte.	2	20
DATA LINE 2		3	21
DATA LINE 3		4	22
DATA LINE 4		5	23
DATA LINE 5		6	24
DATA LINE 6		7	25
DATA LINE 7		8	26
DATA LINE 8	Data Line 8 may be configured to select either the main or alternate character PROM.	9	27
PAPER INSTRUCTION (PI)	Enables EVFU control (when clocked into printer DATA STROBE). DATA STROBE timing is the same as for data lines.	15	14

Table 2-3. Printer Output Signals

Signal Name	Description	Connector Pin Signal	Connector Pin Return
ACKNLG (Demand)	Low active pulse from the printer to indicate that the printer is ready for the next data transfer.	10	28
SLCT (ONLINE)	A high active level from the printer to indicate that the printer is ready to receive data. SLCT automatically goes false when CHECK condition exists (PE false).	13 32	N/A
PE (Paper Error)	A high active level from the printer to indicate a CHECK condition.	12 32	16
BUSY	A high active level from the printer to indicate that the printer cannot receive data.	11	29
+5 VOLT TEST	Supplies +5V (1 amp maximum) output for powering a Printronix Test Exerciser.	18	N/A
CHASSIS GROUND	Connections for cable shield.	17	N/A

2.6 LAN CABLING

If the LAN option was ordered with ZEBRA, the LAN board and cables are factory installed and delivered with the system. During field installation, LAN coaxial cabling (RG62) to interconnect with other ZEBRA's must be installed at Network 1 and 2 connectors on the back panel (see Figure 2-1). The maximum length of this cable is 2,000 feet. For further information on local area networks, starting up a network, or adding or removing stations from a network, contact your OEM or GA.

2.7 EXPANSION ENCLOSURE

The Expansion Enclosure is a system option that can be added to a ZEBRA 1700/1750. The enclosure will contain a disk controller board, fixed disk drives, and/or 1/4" cartridge tape drives. Installation requires only cable connections between the CPU and Expansion Enclosure. If an Expansion Enclosure is ordered, the ZEBRA 1700/1750 Expansion Enclosure Installation Guide (88A00818A) is delivered with the system.

2.8 UNINTERRUPTIBLE POWER SUPPLY (UPS)

If UPS was ordered with your ZEBRA, it must be set up, cabled, and interfaced as described in the ZEBRA 700/750 and 1700/1750 UPS Installation Guide (88A00827A) delivered with the system.

3.0 SYSTEM CONTROLS

There are two system control switches located in the upper-left section of the rear panel and lower-right section of the front panel (see Figure 2-1).

3.1 POWER ON-OFF SWITCH

This switch is a rocker-type toggle switch which controls AC power to the unit. With power supplied through the line cord, when the switch is toggled ON, power is applied to the system. Power to the optional Expansion Enclosure is also controlled by this switch if the Expansion Enclosure power cord is plugged into the power outlet on the rear panel.

3.2 RESET SWITCH

This switch, located at lower right-hand side of front panel, is a momentary contact pushbutton switch. Momentary pressure applied to this switch resets the CPU. The switch is recessed to prevent accidental activation. Use a pen or pencil tip through the hole in the front panel to depress the reset switch.

4.0 OPERATING PROCEDURE

4.1 SYSTEM OPERATOR TERMINAL CONNECTION

Connect a terminal with keyboard to Line 0 of the ZEBRA. The terminal should be set up for 9600 baud rate, full duplex transmission, 7 bits plus one space bit, 1-1/2 stop bits, no parity bit, and uppercase characters.

4.2 REMOTE TERMINAL CONNECTIONS

Up to five CRT terminals may be connected to Lines 1 through 5 of the ZEBRA. These terminals should be set up in the same way as the system operator terminal.

5.0 TURNING ZEBRA ON

Prior to turning on ZEBRA, make sure that your Installation Checklist (page iii) is complete through Item #2.

Turn on the POWER ON switch, press RESET. The console CRT will display:

```
GENERAL AUTOMATION EXECUTIVE - P/N XXXX-X
XXX KBYTES RAM

ENTER BOOT, BACKUP OR RESTORE

OK, _
```

At this point, the user has the option of booting the system, backing up the system (binary), or restoring the system via a binary tape. To boot the system, the user types in "BOOT [CR]" following the OK, prompt. If the operator does not make a keyboard entry within 30 seconds following OK, prompt, an automatic boot will take place, with a display of:

```
OK, BOOT [CR]
ZEBRA HARD DISK LOADER

LOADING AND VERIFYING PICK MONITOR

PICK MONITOR LOADED AND VERIFIED

 xxxK MEMORY
   x  COMM LINES

OPTIONS(X,F,B)=_
```

Following the successful load of PICK, the operator will be prompted to select an option.

During startup and normal operation, the operator will enter X. This will initialize the system and begin the COLDSTART procedure. Options F and B are provided for use by the system operator. A summary of these options is given below.

Option

F Loads entire system from a FILE-SAVE tape or cartridge disk containing the data and dictionary files. Prompt: "(m)ag tape or (c)artridge" will be given. User should enter "m" or "c" as appropriate and mount tape or cartridge with blocksize of 4000 bytes.

B Will return back to the OK, prompt where the Utilities and Diagnostics can be selected (see Section 6.0).

The entry of "X" will result in IPL from disk, automatic logon and display:

```
SPOOLER STARTED
LINKING WORKSPACE FOR LINE 0


<<< R80   GENERAL AUTOMATION  REV: 3.0 C/L 6 >>>
<<< HH:MM:SS     ZEBRA          DD MMM YYY    >>>


 THIS IS THE COLD-START PROCEDURE


 NOW CLEANING UP ACC FILE


TAPE ATTACHED BLOCK SIZE: 4000

HH:MM:SS  DD MMM YYYY

TIME = HH:MM:SS    [CR]
DATE = DD MMM YYYY [CR]

 NOW VERIFYING THE SYSTEM.

[341] ZEBRA PICK R80 3.0  SYSTEM VERIFIED!!!

< CONNECT TIME= XXXX MINS.; CPU XXX UNITS; LPTR PAGES= 0    >
< LOGGED OFF AT HH:MM:SS          ON DD MMM YYY             >


LOGON TO THE GENERAL AUTOMATION PICK ZEBRA 1750 REV:3.0 C/L 6 AT HH:MM:SS
PLEASE ENTER YOUR ACCOUNT NAME >_
```

(Refer to PICK Operator Guide for detail on subsequent steps.)

Your ZEBRA is now ready for use under the PICK Operating System. For complete guidance in using PICK, refer to the PICK set of manuals delivered with your system.

6.0 SYSTEM EXECUTIVE

The System Executive Firmware contains routines that enable the user to modify, dump, or display memory; modify, dump, or display hardware registers, etc. In addition, the user will have this facility to BACKUP, RESTORE, FORMAT, or RELOAD (BOOT) the physical disk in the event the PICK OS is corrupted or the disk drive had to be replaced; these are described in the following sections. In addition, system test and diagnostics routines are provided and are described in Section 7.0.

6.1 BINARY BACKUP AND RESTORE

In order to perform a binary backup (unformatted), enter (after the OK, prompt):

```
OK, BACKUP CD (or BACKUP CT for Cartridge Tape)
```

The system then responds with:

```
Mount Cartridge 1 (y/n):
```

A 'Y' response initiates the saving of data on cartridge one (1). The response may be either upper- or lowercase. Since each IOMEGA cartridge is 5MB, it will take four cartridges to back an entire 20MB system. When cartridge 1 is filled, the system will pr again with "Mount Cartridge 2 (y/n):". This will be repeated until backu complete. Once the data is saved, it can be restored with the co iven after the OK, prompt):

```
OK, RESTORE CD (or RESTORE CT for Cartridge Tape)
```

Again, the system responds with:

```
Mount Cartridge 1 (y/n):
```

A 'Y' response will initiate restoring of data.

6.2 BOOT

At the OK, prompt, enter 'BOOT'

```
OK, BOOT
```

The system responds with:

```
ZEBRA HARD DISK LOADER

LOADING AND VERIFYING PICK MONITOR
```

```
PICK MONITOR LOADED AND VERIFIED

xxxx MEMORY
  x  COMM LINES

OPTIONS (X, F, B)=
```

At this point, a coldstart may be performed by entering 'X' for the X option, or a fileload by entering 'F' for the F option. Currently, the B option returns to the firmware prompt OK,.

NOTE

> The sequence up to the Options message will occur automatically if nothing is keyed for 30 seconds after RESET is pushed.

6.3 PICK OS RESTORE

To carry out ABS RESTORE, enter BOOT CD (for Cartridge Disk) or BOOT CT (for Cartridge Tape) at the OK, prompt during startup. This will result with the prompt:

```
Mount Cartridge 1 (y/n):
```

There are no default entries. If you enter 'N', you will return to OK, prompt. If you enter 'Y', you will receive the following prompts:

```
ZEBRA SYSGEN LOADER

RESTORE SYSTEM-R

RESTORE ABS-A

ENTER OPTION
```

Enter one of the options. Option A loads ABS (operating system). After entering 'A', the screen will display:

```
LOADING AND VERIFYING PICK MONITOR

PICK MONITOR LOADED AND VERIFIED

LOADING AND VERIFYING ABS

LOADING ABS FRAME > xxxx
```

The display of xxxx will flicker with numbers as frames are loaded. When loaded, the system will jump to BOOT and display the message:

```
ABS LOADED AND VERIFIED

xxxx MEMORY
  x  COMM LINES

OPTIONS(X, F, B)
```

Option R is a combination of options A and F. It loads ABS (operating system) and FILES (user files). Option R steps are the same as ABS through "mmm MEMORY, cc COMM LINES." Following this, the prompt will be displayed:

```
SPOOLER STARTED
MOUNT CARTRIDGE AND PRESS RETURN
```

If an ABS (operating system) is recorded at the front of the FILE-SAVE tape, the system will take a few minutes to get past the ABS. The blinking red light on the front of the panel indicates that the cartridge is being accessed. Once ABS is passed, the names and sizes of the files will be brought to the screen. When loaded, the system responds as it does for COLD-START procedure.

6.4 CARTRIDGE AND HARD DISK FORMAT PROCEDURE

Before using the removable cartridge disk to perform file-saves or T-DUMPs, the cartridge must be formatted. To format an IOMEGA cartridge disk, you must be at the firmware prompt OK. You must ensure that the cartridge is not write protected by ensuring that the write-protect switch on the cartridge is not adjacent to the circle mark. At the OK, prompt, enter:

```
OK, FORMAT CD MODEL 0
```

The system responds with:

```
Disk Configured, Proceed With Format (y/<n>):
```

At the ´(y/<n>)´ prompt, enter ´Y´. The system will respond with the following messages. Note that messages within braces ({}) will appear only if any tracks are to be relocated. If the allowable number of defects is not exceeded, the system will continue.

```
Initializing..
Checking..
{Defective Track At Head: ´X´ (n), Cylinder: ´XX´ (nnn), Status: ´XX´}
Format Complete, {Defective Tracks:} ´XX´
Add Defect (Head, Cylinder):
{Mapping Alternate Tracks}
```

At the 'Add Defect (Head, Cylinder):' prompt, hit RETURN and if any tracks are to be relocated, it will be done automatically. (Or you may specify tracks that the system has not found by entering Head and Cylinder numbers in hexadecimal, separated by commas.)

Should there be a need to format the 20MB hard disk drive, then, at the firmware prompt OK,, enter:

```
OK, FORMAT DISK 0 MODEL 3
```

During formatting, the defective head and track numbers are displayed. When formatting is completed, the number of defective tracks is displayed and the user is prompted to enter additional tracks from the manufacturer's defect list. The format of the response is defined as follows:

```
Add Defect (Head, Cylinder):  [!] head cylinder
```

The user responds with the head and cylinder number of the additional defective track. If the numbers are preceded with an exclamation point (!), they are taken to be decimal. A null input will terminate the defect list and all defective tracks are then remapped. After mapping, a 2048-byte configuration table/defect map is written into the first sector on track 0, head 0. See 1700/1750 Hardware Reference Manual (88A00820A) for further information.

After the hard disk has been formatted, you will need to reload the entire system, either with a SYSGEN cartridge or a previously binary-saved cartridge.

7.0 DIAGNOSTICS

This section provides guidance for use of the General Automation ZEBRA Diagnostics package. The programs are designed to minimize user training by using menus and self-explanatory prompts wherever possible. Format control characters are designed for the ADM-11™ terminal. Other terminals may be used; however, display formatting for those terminals is not provided.

Normal or abnormal termination of Diagnostics will return control to the Executive. Exit from Diagnostics to the Executive is either by QUITing or by generating a break with the ADM-11 CTRL-BREAK keyboard command.

Diagnostics is entered with the Executive command:

```
DIAGNOSTIC
```

followed by a display of:

```
GENERAL AUTOMATION DIAGNOSTICS - P/N 1574-X
Formatted Output (<y>/n):  Y
```

A "Y", entered by the user, indicates an ADM-11 terminal or equivalent. The descriptions of the display operations are for the ADM-11 terminal. Other terminals will be spaced down three lines for a clear display and exhibit other minor differences in the display format.

7.1 MAIN MENU

Following the clearing of the terminal screen, the main menu is displayed:

```
        SYSTEM DIAGNOSTICS

    1.  QUIT
    2.  CPU TESTS
    3.  CPU DIAGNOSTICS
    4.  SASI TESTS
    5.  SASI DIAGNOSTICS
    6.  SERIAL TESTS
    7.  PARALLEL PRINTER TESTS
    8.  LOCAL AREA NETWORK TESTS
```

The user is then prompted for a program number:

```
    Enter program number (<1>): _
```

Note that the default (in this case, program number one (Quit)) is indicated by bracketing it with < >. This is standard practice for all prompts. All prompts terminate with a colon (:) and other input will be ignored until this character appears (Note: One character may be buffered, but will not be echoed until the prompt is displayed.)

7.1.1 Quit

This function returns the user to the Executive.

7.1.2 CPU Tests

This menu item is called with:

```
    Enter program number (<1>): 2 CR
```

Following clearance of the screen, the CPU Tests submenu is displayed:

```
        CPU TESTS

    1.  QUIT
    2.  LOCAL MEMORY
    3.  SEGMENT MAP
    4.  PAGE MAP
    5.  ALL
```

This submenu provides access to test functions that will continuously test various CPU hardware blocks in order to verify the hardware and test its reliability over an extended period of time.

Quit - This function returns the user to the main menu.

Local Memory - This function first checks the parity circuit (if there is less than one megabyte of memory present), then scans for any unmapped local memory. If unmapped memory is detected, the operator is notified. This function then continuously, destructively, exercises local memory by writing a rotating bit pattern and its complement, in word increments, through a rotating address field throughout all selected local RAM memory, with the exception of areas reserved by the Executive. The amount of memory tested is displayed. The user is given the option of halting on errors and selecting the address range. The test is terminated by entering any character from the keyboard.

Segment Map* - This function continuously, non-destructively, maps two megabytes of logical address space into two megabytes of physical address space for each context proceeding from context 0 to context 15, and within each context from segment map entry 0 to segment map entry 63. The user is given the option of halting on error and looping on failure. The test is terminated by entering any character from the keyboard.

Page Map* - This function continuously, non-destructively, maps all pages as non-accessed, non-used, local memory. The user is given the option of halting on error and looping on failure. The test is terminated by entering any character from the keyboard.

All - This function continuously runs all the above tests in sequence until terminated by any character from the keyboard or by halting on an error if that option has been selected by the user.

*This test is usable only on the ZEBRA 1700.

7.1.3 CPU Diagnostics

This menu item is called with:

Enter program number (<1>): 3 CR

Following clearance of the screen, the CPU Diagnostics submenu is displayed:

CPU DIAGNOSTICS

1. QUIT
2. LOCAL MEMORY
3. SEGMENT MAP
4. PAGE MAP
5. ALL

This submenu provides access to diagnostic functions that will test various CPU hardware blocks for the purpose of troubleshooting.

Quit - This function returns the user to the main menu.

Local Memory - This function first checks the parity circuit (if there is less than one megabyte of memory present), then scans for any unmapped local memory. If unmapped memory is detected, the operator is notified. This function then, destructively, verifies local memory by writing a rotating bit pattern and its complement, in word increments, through a rotating address field throughout all selected local RAM memory, with the exception of areas reserved by the Executive. The user is given the option of selecting the address range. The amount of memory tested is displayed upon completion of the diagnostic.

Segment Map* - This function non-destructively verifies segment mapping capability by mapping two megabytes of logical address space into two megabytes of physical address space for each context proceeding from context 0 to context 15, and within each context from segment map entry 0 to segment map entry 63. The user is given the option of looping on failure.

Page Map* - This function performs a rudimentary non-destructive verification of the page map by mapping all pages as non-accessed, non-used, local memory. The user is given the option of looping on failure.

All - This function performs all the above diagnostic functions in sequence.

*This test is usable only on the ZEBRA 1700.

7.1.4 SASI Tests

This submenu provides access to test functions that will continuously test various SASI devices to verify the hardware and test its reliability over an extended period of time. This menu item is called with:

```
Enter program number (<1>):  4 CR
```

This is followed by display of:

```
Enter Device Number (<0>-7):
Enter Logical Unit Number (<0>-3):
Enter Control Field Byte (<$00>):
Halt on Error (y/<n>):
```

This display prompts the user to enter the SASI device number (0-7, 0 default), the logical unit number (0-3, 0 default), whether to disable retry and/or error correction, and whether to loop or halt on an error condition. Error counts will be logged and displayed when tests are halted. Device 7 is assumed to be the SYSGEN tape controller. Each of the parameters described above may be changed with submenu item 8, Change Parameters.

Following entry of the parameters, the SASI Tests submenu is displayed:

```
        SASI TESTS

1.  QUIT
2.  OMTI CONTROLLER
3.  DISK SEEK/READ
4.  DISK WRITE/READ
5.  TAPE WRITE/READ
6.  TAPE WRITE
7.  TAPE READ
8.  CHANGE PARAMETERS
```

Quit - This function returns the user to the main menu.

OMTI Controller - This function first commands the OMTI controller to perform its own RAM diagnostic and then proceeds to perform a loop of writing an incrementing pattern to the buffer memory and then reading it back and comparing it.

Disk SEEK/READ - This function recalibrates the disk and then performs a random read on all logical addresses selected.

Disk WRITE/READ - This function prompts the user for the starting logical address and sector count. The default starts at 8 for 248 sectors, which is a reserved area on disk. Each sector is filled with its logical address and then read for confirmation, sequentially.

Tape WRITE/READ - This function erases the tape, writes a block with its block number, writes a filemark, rewinds, spaces to the block it wrote, reads the block, spaces to the end of tape (append) and then continues with the block and filemark writes, etc.

Tape WRITE - This function prompts the user for the tape block count (default all of tape), erases the tape and writes tape with the specified byte pattern (D5 hex default).

Tape READ - This function prompts the user for the tape block count (default all of tape), rewinds the tape and reads and compares the tape with the specified byte pattern (D5 hex default).

Change Parameters - To be determined.

If an error occurs during OMTI test, the appropriate status is displayed and the user is prompted to enter a return key returning the appropriate menu, unless loop on error or no halt on error has been set. Looping or testing ceases when a key is pressed. Errors that can be sensed are: SASI returned status (sense status), SASI bus error (host interface timeout) or a SASI phase error which displays the expected and received phase state. All messages are ASCII text with appropriate hex values.

7.1.5 SASI Diagnostics

This submenu provides access to diagnostic functions that will test various SASI devices for the purpose of troubleshooting. This menu item is called with:

```
Enter program number (<1>):  5 CR
```

This is followed by display of:

```
Enter Device Number (<0>-7):
Enter Logical Unit Number (<0>-3):
Enter Control Field Byte (<$00>):
Halt on Error (y/<n>):
```

This display prompts the user to enter the SASI device number (0-7, 0 default), the logical unit number (0-3, 0 default), whether to disable retry and/or error correction, and whether to loop or halt on an error condition. Error counts will be logged and displayed when tests are halted. Device 7 is assumed to be the tape controller. Each of the parameters described above may be changed with submenu item 8, Change Parameters.

Following entry of the parameters, the SASI Diagnostics submenu is displayed:

```
        SASI DIAGNOSTICS

 1.  QUIT                          13.  COPY COMMAND (TAPE)
 2.  SASI COMMAND                  14.  [illegible] TAPE CARTRIDGE
 3.  SENSE STATUS                  15.  [illegible]PY COMMAND (DISK)
 4.  RECALIBRATE                   16.  SCAN DATA COMMANDS
 5.  REWIND                        17.  ASSIGN DISK PARAMETERS
 6.  REQUEST SENSE                 18.  RAM DIAGNOSTICS
 7.  READ DATA                     19.  WRITE ECC
 8.  SET DISK BLOCK SIZE           20.  READ IDENTIFIER
 9.  WRITE DATA                    21.  REQUEST LOGOUT
10.  SEEK                          22.  READ DATA BUFFER
11.  WRITE FILEMARK                23.  WRITE DATA BUFFER
12.  SPACE (TAPE POSITIONING)      24.  CHANGE PARAMETERS
```

Quit - This function returns the user to the main menu.

If an error occurs during program execution, the appropriate status is displayed and the user is prompted to enter a return before returning to the appropriate menu, unless an error has been set. Looping ceases when a key is pressed. Errors that can be sensed are: SASI returned status (sense status), SASI bus error (host interface timeout) or a SASI phase error which displays the expected and received phase state. All messages are ASCII test with appropriate hex values.

SASI Command - This function allows the issuance of any command to the SASI device. It will request the parameter block bytes from the user, with a zero default, for the appropriate number of bytes depending upon the command class. The lun and control fields are automatically set. If a data-out phase is detected, the user will be asked to supply the required amount of data, in the same fashion as the WRITE DATA command used in the ADES package. If a data-in phase is detected, the date will be displayed, in the same fashion as the READ DATA command used in the ADES package.

Sense Status - This function senses status and displays it to the user.

Recalibrate - This function recalibrates the drive. (Disk only.)

Rewind - This function rewinds the tape. (Tape only.)

Request Sense - This function requests sense status and displays it to the user.

Read Data - This function prompts the user for the starting logical address and the sector/block count. The data read is displayed to the user.

Set Disk Block Size - This function prompts the user for the disk block (sector) size.

Write Data - This function prompts the user for the starting logical address, the sector/block count and the data to be written.

Seek - This function prompts the user for the seek logical address. (Disk only.)

Write Filemark - This function writes a filemark on the tape. (Tape only.)

Space (Tape Positioning) - This function prompts the user for the space type (block, filemark, append). (Tape only.)

Copy Command (TAPE) - This function prompts the user for the function (backup, restore), the disk device number and logical unit number, the number of disk sectors and the disk logical address. The tape is assumed to be at device 7, logical unit number 0.

Erase Tape Cartridge - This function erases the tape cartridge.

Copy Command (DISK) - This function prompts the user for the source logical address, the sector count, the destination logical unit number and destination logical address. The source logical unit number is the one specified when the diagnostics menu was entered.

Scan Data Commands - This function prompts the user for the scan type (equal, high or equal, low or equal), the logical address and sector count. (Disk only.)

Assign Disk Parameters - This function prompts the user for the step pulse width, step period, step mode, number of heads, cylinder address, reduced write current cylinder, device type and sectors per track. (Disk only.)

RAM Diagnostics - This function causes the SASI device to perform the pattern test on the sector buffer. (Disk only.)

Write ECC - This function prompts the user for the logical address, the data to be written and the four ECC bytes. (Disk only.)

Read Identifier - This function displays the user for the logical address and displays the cylinder number, head number, flags and sector number. (Disk only.)

Request Logout - This function displays the last retry and permanent error counts. (Disk only.)

Read Data Buffer - This function displays the devices data buffer. (Disk only.)

Write Data Buffer - This function prompts the user for data to be written to the devices data buffer. (Disk only.)

Change Parameters - To be determined.

7.1.6 Serial Tests

This submenu provides access to test functions that will continuously test the selected serial port (2-5), in order to verify the hardware and test its reliability over an extended period of time. This menu is called with:

Enter program number (<1>): 5 CR

Following clearance of the screen, the Serial Tests submenu is displayed:

SERIAL TESTS

1. QUIT
2. ECHO TEST
3. CONTINUOUS TRANSMIT

Quit - This function returns the user to the main menu.

Echo Test - In this function, a character received by the test port is retransmitted to both the test and the console ports. Error status is reported to the console. The test is terminated upon receipt of an ESC (hex 1B) character.

At startup, the operator is asked for the port to test, baud rate, character length, number of stop bits, and the types of parity (none, odd, or even). This test is status driven.

Continuous Transmit - This function transmits the entire printable ASCII character set to the test port. The test is terminated by pressing any key on the console port.

At startup, the operator is asked for the port to test, baud rate, character length, number of stop bits, and the type of parity (none, odd, or even). This test is interrupt driven.

7.1.7 Parallel Printer Tests

This submenu provides access to a test function that will continuously exercise the parallel printer port, in order to verify the hardware and test its reliability over an extended period of time. This menu item is called with:

Enter program number (<1>): 6 CR

Following clearance of the screen, the Parallel Printer Tests submenu is displayed:

PARALLEL PRINTER TESTS

1. QUIT
2. CONTINUOUS PRINT

Quit - This function returns the user to the main menu.

Continuous Print - This function continuously transmits the entire printable ASCII character set parallel printer port. The test is terminated by pressing any key on the console keyboard.

7.1.8 Local Area Network Tests

This submenu provides access to a test function that will continuously test the LAN in order to verify the hardware and test its reliability over an extended period of time. These tests are available only in the extended diagnostics. The LAN Tests submenu is:

LOCAL AREA NETWORK TESTS

1. QUIT
2. RAM TEST

Quit - This function returns the user to the main menu.

RAM Test - This function writes and read/compares the LAN memory. The test is terminated by pressing any key on the console keyboard.