WINCHESTER PERIPHERAL CHASSIS INSTALLATION AND CHECKOUT

Order Number: 121766-004

Intel Corporation, 3065 Bowers Avenue, Santa Clara, CA 95051

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This manual is the complete guide to the installation of the Winchester peripheral chassis on a Series II or Series III Microcomputer Development System. The manual provides step-by-step instructions for the physical installation of the chassis and controller and includes system initialization procedures and a complete confidence test for verifying the integrity of the system once the chassis has been installed.

Supporting documentation can be found in the following Intel manuals:

- Intellec Series II Model 22X/23X Installation Manual, Order Number 9800559
- Intellec Series III Microcomputer Development System Installation and Checkout Manual, Order Number 121612
- Winchester Peripheral Chassis ISIS-II(W) Supplement, Order Number 121899
- Winchester Peripheral Chassis Field Service Manual, Order Number 121968
- Upgrade Preparation Kit Installation Manual, Order Number 121721

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CHAPTER 1
GENERAL INFORMATION

1-1. INTRODUCTION

This chapter presents a brief description of the Winchester peripheral chassis and outlines the chassis' specifications. Also presented in this chapter is an introduction into the installation requirements and into the information contained in the remaining chapters of this manual.

The Winchester peripheral chassis houses a 35 megabyte disk drive (Priam model 3450) and a requisite power supply. The chassis includes space for the addition of a second disk drive or a start/stop cartridge tape (both of which are currently unavailable). The chassis, when installed on a Series II or Series III development system, provides an additional on-line mass storage capacity of 22 million bytes (formatted). When a peripheral chassis is attached to a Series II or III, the system must run under the ISIS-II(W) operating system; the Winchester drive is identified as units F0 (:F0:) through F3 (:F3:). Table 1-1 lists the supported configurations for the various drive combinations.

Table 1-1. Drive Configurations

Configuration	Device Unit Number :F0:	:F1:	:F2:	:F3:	:F4:	:F5:	:F6:	:F7:	:F8:	:F9:
W + DD	W	W	W	W	DD	DD	(DD)	(DD)		
W + SD	W	W	W	W	SD	SD	(SD)	(SD)		
W + IS	W	W	W	W	IS	*				
W + DD + SD	W	W	W	W	DD	DD	(DD)	(DD)	SD	SD
W + DD + IS	W	W	W	W	DD	DD	(DD)	(DD)	IS	*
W + SD + IS	W	W	W	W	SD	SD	(SD)	(SD)	IS	*

W = Winchester Disk
DD = Double-Density Flexible Disk
SD = Single-Density Flexible Disk
IS = Integrated Single-Density Flexible Disk
* = Not Available
(DD),(SD) = Optional to Configuration

Note that it is possible for a development system to support both the Winchester peripheral chassis and a Model 740 hard disk drive. The peripheral chassis and Model 740 each run under their respective operating systems and cannot be supported concurrently; the peripheral chassis runs under ISIS-III(W), and the Model 740 runs under ISIS 4.1.

To install a peripheral chassis, the iMDX 704 (iSBC 215B) controller is installed in the mainframe and an internal cable is installed between the controller card and the development system's rear panel; an external cable then connects the development system with the peripheral chassis. For compatibility with the controller, the development system must use an 8085-based Integrated Processor Card (IPC) rather than an 8080-based Integrated Processor Board (IPB). Also, some earlier models of the 8080-based Series II must be brought up to latest ESD-level protection with the addition of one or more Upgrade Preparation Kits (UPK's). All of this information and the actual step-by-step procedures are contained in Chapter 2. Once the physical installation is complete, any defective tracks must be identified to the system and Alternate tracks must be assigned before the entire system can be verified as operational and turned over to the customer. Information for identifying bad tracks and for the complete testing of the system is contained in Chapter 3.

1-2. SPECIFICATIONS

Specifications for the Winchester peripheral chassis are outlined in the following table.

Table 1-2. Specifications

Drive Characteristics	
Type:	Winchester sealed disc
Tracks per Inch:	480
Sectors per Track:	70
Tracks per Surface:	525
Recording Surfaces:	5
Recording Technique:	MFM (modified frequency modulation
Bytes per Sector:	128
Track Density:	6670 bits/in. (innermost track)
Transfer Rate:	6.4 megabytes/second
Rotational Speed:	3600 rpm

Table 1-2. Specifications (Continued)

Drive Characteristics (Continued)	
Access Times	
Track to Track:	10 ms max
Full Stroke:	90 ms
Physical Characteristics	
Width:	16.9 in (42,9 cm)
Height:	11.3 in (28,7 cm)
Depth:	24.3 in (61,7 cm)
Weight:	55 lbs (25 kg)
Electrical Characteristics	
AC Power Requirements: (Chassis)	110 Vac, 60 Hz, 5A (max) 220 Vac, 50 Hz, 3A (max)
DC Power Requirements: (Controller)	5 Vdc, 2.5A (typ), 3.25A (max)
Environmental Characteristics	
Chassis	
Temperature:	15°C to 35°C operating -9°C to 60°C storage
Humidity:	10% to 90% non-condensing
Controller	
Temperature:	0°C to 55°C operating -55°C to 85°C storage
Humidity:	To 90% non-condensing
Equipment Supplied	
iMDX 750-(A/B) Winchester Subsystem	
iMDX 761-(A/B)1:	Peripheral chassis with 35-Mbyte Winchester drive
iMDX 704:	iSBC 215B controller with firmware
iMDX 2009:	ISIS-II(W) software diskettes and literature kit
iMDX 712:	Series II/III backpanel and internal cable and external interface cable

Table 1-2. Specifications (Continued)

Equipment Supplied (Continued)	
iMDX 761-(A/B)1:	Peripheral chassis with 35 Mbyte Winchester drive
iMDX 704:	iSBC 215B controller with firmware
iMDX 2009:	ISIS-II/III software diskettes and literature kit
iMDX 712:	Series II/III backpanel and internal cable and external interface cable
Model:	Integrated Processor Card (IPC)

-(A) designation indicates 115 volt operation;-(B) designation indicates 230 volt operation.

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2-1. INTRODUCTION

This chapter includes information on preinstallation requirements, development system upgrade, and the complete installation procedure for the Winchester peripheral chassis. Test procedures, which are used to verify system operation following installation, are contained in Chapter 3.

2-2. PREINSTALLATION REQUIREMENTS

The physical characteristics of the peripheral chassis are given in table 1-2. Make sure that the site selected will accommodate and support the chassis. Note that the chassis may be placed in either a horizontal (bottom) or vertical (right side) position. The chassis must be located within six feet (1.8 meters) of the development system. The chassis uses forced air cooling. To ensure adequate air circulation within the chassis, a minimum of six inches (25 centimeters) must be provided between both the front and rear of the chassis and any vertical surface. Also, make sure that computer listings, plastic bags, or other materials that can restrict airflow are not placed near the front of the chassis.

The peripheral chassis includes an attached 3-wire power cord that must be connected to a 3-conductor (grounded) ac outlet (a 3-to-2 wire adapter must never be used).

2-3. DEVELOPMENT SYSTEM PREPARATION

Before installing the peripheral chassis:

1. Perform the confidence and diagnostic tests described in the appropriate installation or service manual to ensure that the development system is operational (refer to the preface of this manual for a list of related publications).

NOTE

Do not proceed with development system preparation until the system is functioning properly.

2. Upgrade the development system (if necessary) to maximize its immunity to electrostatic discharge (ESD) and to ensure compatibility with the peripheral chassis (refer to paragraph 2-4). Note that later models of the Series II and Series III's do not require upgrading.

3. Install the rear panel provided with the iMDX 712 package on the development system as described in paragraph 2-7.

4. Install the iMDX 704 (iSBC 215B) controller in the system's card cage as described in paragraph 2-8.

2-4. DEVELOPMENT SYSTEM UPGRADES

Series II development systems may require one or both of the following upgrades according to their model and manufacturing version.

- Installation of one or more Upgrade Preparation Kits (designated as INK-xxx) as described in paragraph 2-5
- Installation of an 8085-based Integrated Processor Card (IPC) as described in paragraph 2-6

2-5. UPK REQUIREMENTS

UPK upgrades only are applicable to earlier models of the Series II development system and expansion chassis. To determine if an upgrade is necessary, examine the serial number tag on the rear panel of the development system and, if installed, on the rear of the expansion chassis. If the serial number on the development system or expansion chassis is prefixed by a letter other than 'D' an Upgrade Preparation Kit (INK-xxx) is not required.

If the serial number is prefixed with a 'D,' check for the presence of an 'F' suffix. If the 'F' suffix is missing, an INK is required (the Series II requires an INK-001, P/N: 123185-005; the expansion chassis requires an INK-002, P/N: 123185-002). Note that even with an 'F' suffix, the development system may still require an INK-001 because earlier reliability improvement program (RIP) upgrades used the same 'F' prefix. The major difference between the RIP and UPK upgrade for the Series II is that the IOC board in a 'ripped' system may be the earlier 1001241-07 assembly rather than the 1002104-xx assembly (the 1002104 assembly is included in the INK-003, P/N: 123185-003). Also, the improved internal power cables and high-capacity fans were not included in the RIP program (these parts are available in the INK-007, P/N: 123185-006).

NOTE

When installing a UPK on the Series II, do not reinstall the rear panel as the panel will be replaced when performing the procedure in paragraph 2-7.

2-6. INTEGRATED PROCESSOR CARD

The 8085-based Integrated Processor Card (IPC) is required to ensure compatibility between the development system and the peripheral chassis. An IPC is provided with the Series II Model 225 and with all Series III development systems; an Integrated Processor Board (IPB) was provided with the earlier Series II Models 220 and 230. The iMDX 750I 'Winchester subsystem with IPC' (MDS 505) is ordered if the development system to be upgraded includes an IPB; the iMDX 750 'Winchester subsystem' is ordered if the system to be upgraded already includes an IPC. Note that when the targeted system already includes an IPC, the IPC itself may have to be upgraded. Remove the IPC from the card cage and verify that the following modifications have been made:

- Integrated circuit A79 is an Intel 8202A and not an 8202.
- Bus controller 'piggy-back' assembly (123605) is installed at location A96 in place of an Intel 8219.

The components required for the above modifications can be found in a Series II Accessory Kit, part number 123992. Note that this accessory kit also includes the enhanced IOC firmware PROM set.

When replacing an IPB with an IPC, remember that the IPC has a full 64K of memory and that the optional 32K RAM board must be removed from the card cage.

2-7. REAR PANEL REPLACEMENT

The subsystem's iMDX 712 package includes a special development system rear panel (with modified interface connector cutouts) that replaces the standard Series II/III rear panel. To replace the rear panel, follow the procedures in paragraphs 2-8 and 2-9.

2-8. REMOVING THE REAR PANEL. To remove the Series II/III rear panel:

1. Power-down the development system and attached peripherals, disconnect power cord(s), and disconnect all cables attached to the development system's rear panel.

2. If the development system includes the low-profile drive chassis, remove the two aluminum ground strips between the system and drive chassis and lift the chassis off of the development system.

3. Remove the development system top cover.

WARNING

Hazardous voltages are present within the development system. Make sure that the power is off and that the line cord is removed before proceeding.

4. Refer to figure 2-1 and disconnect the cables from connectors J14, J15, and J16 and, if the development system includes an integral drive, disconnect the drive interface cables from connectors J17 and J18. Disconnect any associated cable ground braids at the IOC.

5. If the development system includes optional hard or flexible disk drives, remove the card cage front panel and disconnect the interface cable from the controller interface board so that the cable can be removed with the rear panel.

6. Refer to figure 2-1 and remove the rear panel mounting screws. Pull the panel away from the development system and, if present, guide the disk controller interface cable out of the chassis.

7. Place the rear panel assembly face down on a padded flat surface and remove the eleven screws that secure the IOC board to the rear panel.

8. If a drive interface cable is attached to the rear panel, remove the cable and mounting hardware; the rear panel may be discarded.

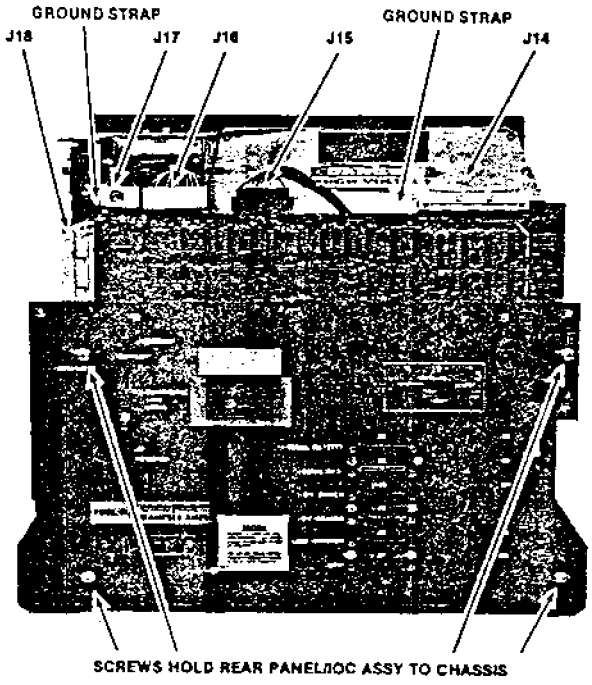

Figure 2-1. Rear Panel Removal

2-9. INSTALLING NEW REAR PANEL. To install the new rear panel, proceed as follows:

1. Remove the rear panel and internal cable assembly (part number 125367) from the iMDX 712 package.

2. Mount the internal cable assembly's P10 connector to the inside of the rear panel's J10 connector cutout (see figure 2-2).

3. If optional flexible disk drives are included, mount the drive interface cable to the rear panel's J8 and J9 connectors with the hardware removed in the preceding paragraph. Make sure that the cable's ground lead is connected to a ground lug.

NOTE

The orientation of connector cutouts J8 and J9 is reversed on the new panel (J8 now is on the bottom).

4. Before replacing the IOC on the new rear panel, check the level of IOC firmware installed. (The IOC firmware is contained in the four 16K PROMs at locations A50 through A53; a set of enhanced firmware PROMs is included in the Series II accessory kit, 123992, and also is available as a Model 510 IOC Firmware Enhancement Kit.) Position the IOC board on the panel and secure the board in place with the eleven mounting screws.

5. Position the rear panel assembly in place on the back of the development system while guiding the attached cable assembly(s) along the side of the chassis and through the front opening into the card cage area. Make sure that the cable assembly is not pinched between the IOC and the power supply. Secure the panel to the development system with the four screws previously removed.

6. Reconnect the internal cables and ground braids to their appropriate connectors on the IOC board (connectors J14, J15, and J16 and, with an integral drive, connectors J17 and J18; see figure 2-1).

7. Replace the development system's top cover and, if included, the low-profile drive chassis. Reconnect all cables and ground strips that were removed previously.

8. Inspect old rear panel for UL caution sign, service information, and Intel serial number tag. Attach new labels and accurately duplicate the data on the Intel serial number tag using a pen or pencil.

WARNING

A new UL caution label can only be installed on the new rear panel if it was present on the old rear panel.

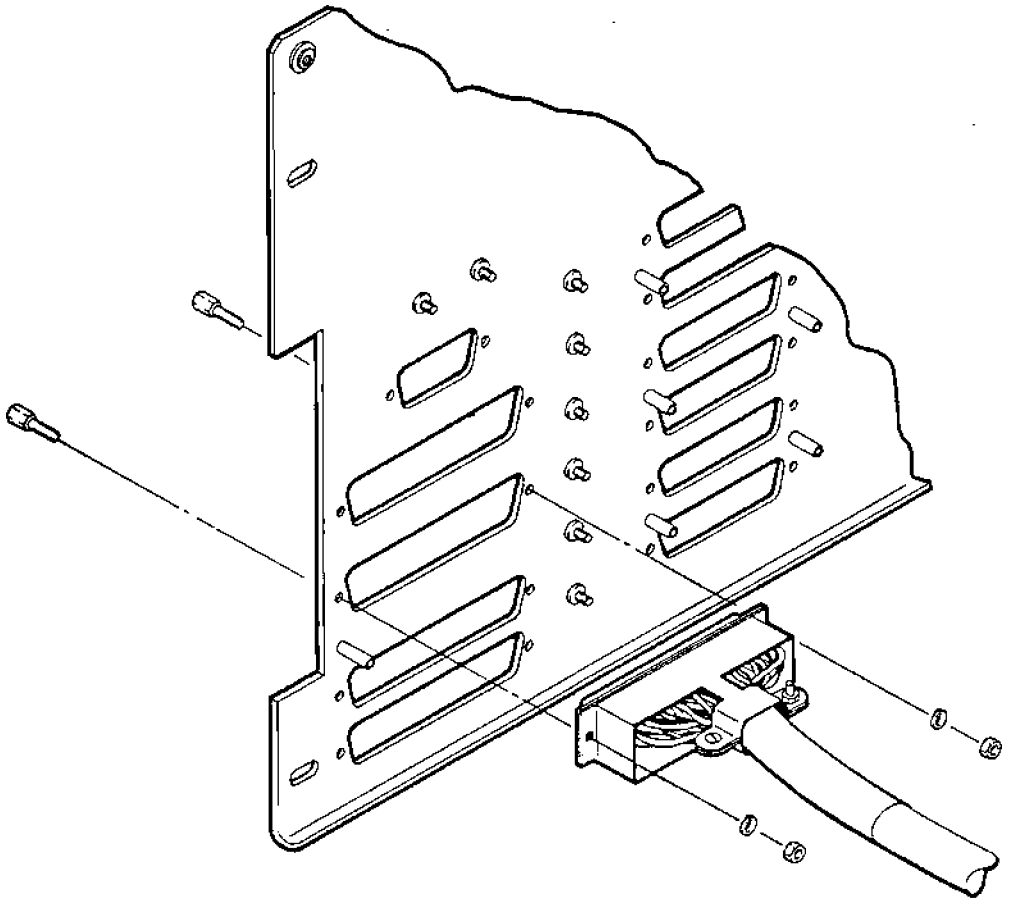

Figure 2-2. Internal Cable Mounting

The operational status of the development system should be verified at this time. Make sure that the IPC is installed in slot 1 of the card cage and, if present, that the flexible disk controller board set is installed in slots 5 and 6 (interface board in slot 6) and that the interface cable connector is in place on the controller interface board. Apply power to the development system and verify system performance using appropriate confidence and diagnostic tests. Note that if the screen remains blank after power is applied, the brightness control pot on the IOC was probably turned down inadvertently when the rear panel was changed. Do not continue with the installation procedures until the development system is fully operational.

2-10. CONTROLLER INSTALLATION

The iMDX 704 controller is an iSBC 215B disk controller with modified firmware (a 215B cannot be used in place of the iMDX 704). Note that whenever the controller is installed in the card cage, the flexible disk drive unit number(s) is increased by four (e.g., drive unit :F0: becomes :F4:). Install the iMDX 704 controller as follows:

1. Verify the position of all relocatable jumpers (refer to figure 2-3 and table 2-1).

2. Verify that the address switches are set to the correct positions (see figure 2-3). The wake-up address for the controller is 50H (S2-8 and S2-10 'on'). The system uses an 8-bit data bus (S2-1 'off') and 8-bit I/O addressing (S2-2 'off').

   NOTE

   When the address switches are set correctly, only switch positions S2-8 and S2-10 will be 'on'; all other switch positions will be 'off.'

3. Insert the iMDX 704 controller into a vacant slot in the card cage and slide the controller partially into its slot. Note that to keep the iMDX 704 controller from monopolizing the bus in the presence of other Intel disk controllers, the iMDX 704 must be given the lowest priority (i.e., must be located above all other disk controllers in the card cage).

4. Connect the internal Winchester subsystem interface cable to the controller. The cable's P1 connector mates with the controller's J1 connector, and the cable's P2 connector mates with the controller's J2 connector. Note that the white dot on the cable connectors aligns with pin 1 of the controller's J1/J2 connectors (pin 1 is indicated by a triangle on the top of the connector). Slide the controller all the way into its slot.

Table 2-1. iMDX 704 Jumper Configuration

Function	Jumper
Drive Compatibility: Determines specific disk drive. Set as shown in figure 2-3 for Winchester peripheral subsystem.	W1, W2, W5, W6-10, W13-17, W22
Interrupt Priority Level: Selects the controller's internal interrupt request signal. Left open as shown in figure 2-3.	W19
Any Request: Determines conditions when controller will surrender bus. With one Winchester drive, controller will relinquish control to any device, lower or higher priority. Jumper is placed between pins W18-1 and W18-3.	W18
Common Bus Request: Determines bus arbitration access frequency. For compatibility with other drive options, the controller must arbitrate for the bus on each access. Jumper is placed between W23-1 and W23-2.	W23
Voltage Selection: Selects the voltage source. W20 and W21 are left open.	W20, W21
iSBX Multimodule Interface: A set of five jumper locations that determine the configuration of the iSBX bus interface. Of the five locations, jumpers are placed between W3-1 and W3-2, W4-1 and W4-2. W11, W12, and W24 are left open.	W3, W4, W11, W12, W24

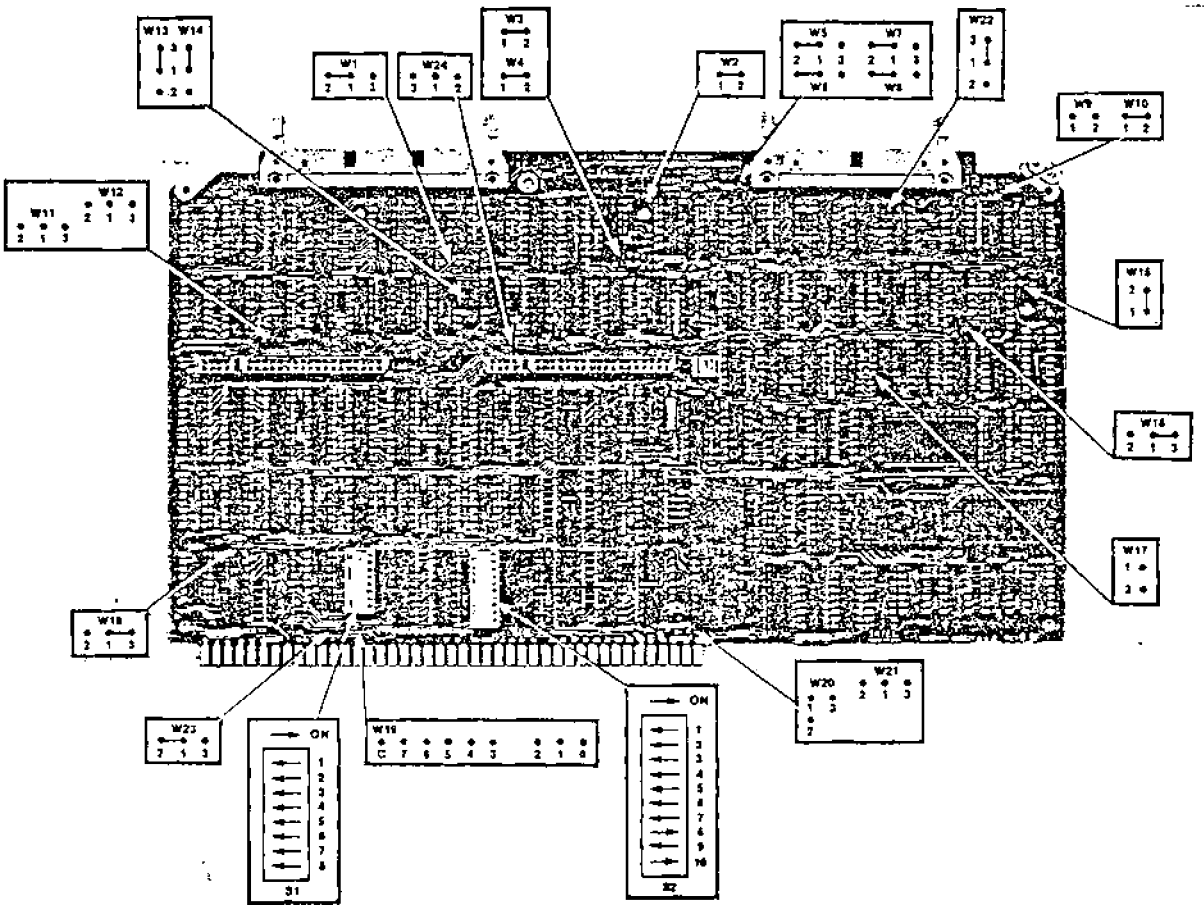

Figure 2-3. Controller Jumper/Switch Configuration

2-11. INSTALLING THE PERIPHERAL CHASSIS

Preparation of the development system must be completed before the the peripheral chassis is installed. After the development system is prepared and system operation is verified, install the chassis as follows:

1. Remove the peripheral chassis form its packing container and set the chassis in an area that allows access to the rear panel. DO NOT CONNECT THE AC LINE CORD.

2. Remove the five cover-retaining screws from the back of the chassis.

3. Lift the back of the cover and slide the cover back to clear the front panel. When clear of the front panel, lift the cover off and set it aside.

4. On the Winchester drive itself, verify that switches 5H and 6K on the Read/Write Digital Control Board are set as shown in figure 2-4.

5. On the scrambler board (mounted on the inside of the chassis' rear panel behind the interface connectors), verify that the toggle switch is set to position '1.' This switch will be used to identify the second peripheral chassis (position '2') when two chassis are interfaced to the controller.

6. Remove the defective track information label from the drive assembly top mounting bracket and place on outside of chassis. This information will be used to perform the alternate track mapping procedure in Chapter 3.

7. Reposition the top cover on the chassis and replace the five cover-retaining screws.

8. Remove the external interconnect cable (125309) from the iMDX 712 package. Connect one end of this cable to connector J10 on the development system rear panel and connect the other end of this cable to the peripheral chassis' J1 connector. Secure the cable connectors to their corresponding panel mating connectors with the screws provided. Make sure that the cable ground leads are connected to adjacent ground lugs on BOTH rear panels.

CAUTION

All cable assembly ground leads must be connected to panel ground lugs to maximize immunity to ESD.

9. Place the peripheral chassis in its permanent location. Note that the chassis can be positioned either horizontally or vertically.

CAUTION

For proper drive operation, the chassis must be level in respect to its mounting surface to within two degrees.

10. Make sure that the chassis' front panel ON/OFF switch is in the OFF position (OFF side of switch pushed in). Do NOT connect the ac line cord until the Winchester drive has been unlocked as described in the following paragraph.

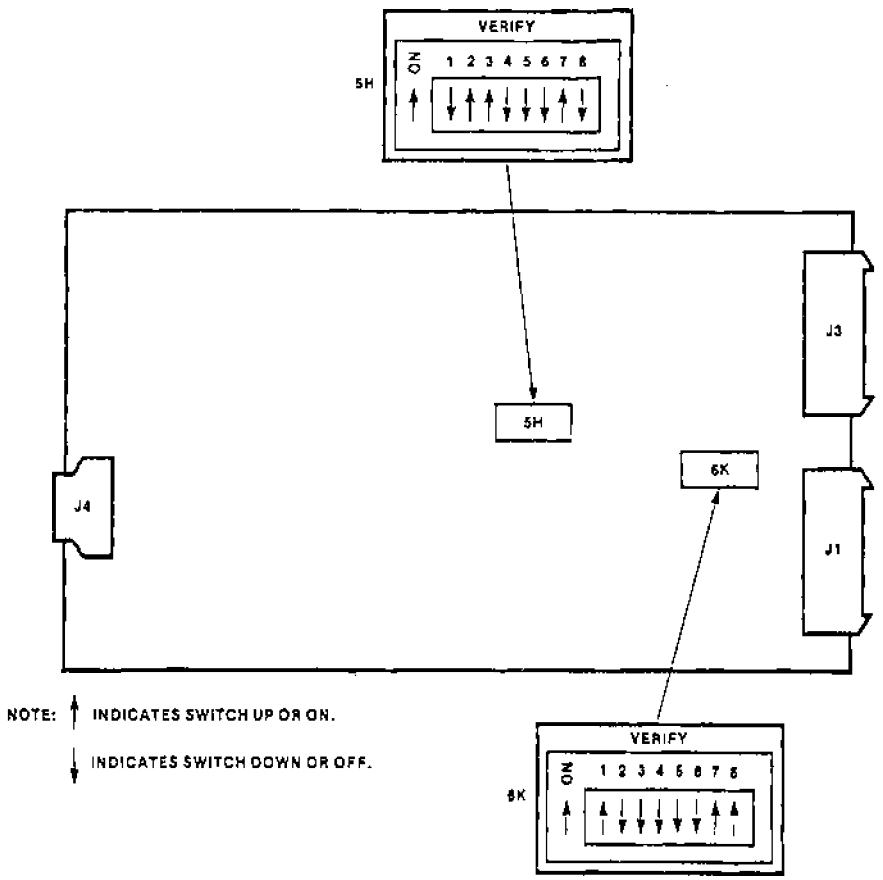

Figure 2-4. Drive Switch Settings

2-12. UNLOCKING THE DRIVE

When shipped from the factory, the Winchester drive's carriage and spindle are locked mechanically to prevent possible damage to the disk surfaces or heads. Before power can be applied to the peripheral chassis, the drive must be unlocked. To unlock the drive:

1. Make sure that the peripheral chassis' ON/OFF switch is OFF and that the ac power cord is disconnected.

2. Pull out the four quick-disconnect fasteners on the front cover panel and set the cover aside.

3. Refer to figure 2-5 and note the location of the drive's locking lever. Move the locking lever to the right to clear the ledge and then down to the unlocked position (the lever is fully unlocked when positioned in the notch).

CAUTION

Never move or jar the peripheral chassis when the drive is unlocked, as damage to the surfaces or heads could result.

4. Position the front cover panel on the chassis and press the quick-disconnect fasteners in to lock in place.

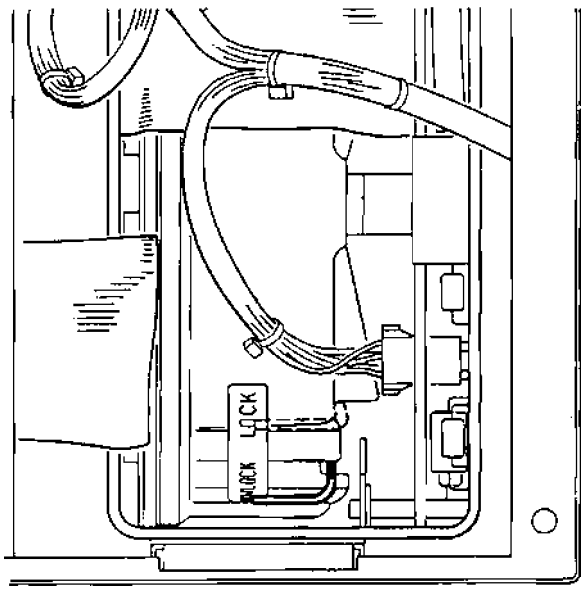

Figure 2-5. Drive Locking Lever

2-13. POWER UP PROCEDURE

The following procedure is used to power up the peripheral chassis:

1. Make sure that the drive's carriage and spindle are unlocked (refer to paragraph 2-12).

2. Apply power to the development system.

CAUTION

If power is applied to the peripheral chassis before it is applied to the development system, data on the drive could be overwritten.

3. Make sure that the peripheral chassis' ac line cord is connected to the ac source.

4. Press the ON side of the chassis' front panel ON/OFF switch. Note that the switch face must be pressed in all the way (until the switch face is parallel with the front panel). The LED in the switch face will light and the fans will turn.

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CHAPTER 3
CONFIDENCE TEST

3-1. INTRODUCTION

This chapter describes the confidence test that is used to verify the operational status of the Winchester subsystem following installation or whenever the development system or peripheral chassis is modified or repaired. Also included in this chapter are descriptions of the power-down, initialization, and alternate track mapping procedures.

NOTE

The alternate track mapping procedure hereafter referred to as ALTMAP should be used only at installation or drive replacement. Reassigning alternate tracks on drives containing customer data may overwrite customer files.

3-2. ALTMAP COMMAND SUMMARY

The ALTMAP procedure on the Customer Engineer test diskette accesses the defective track information on the Winchester drive and assigns alternate tracks. It will operate with the following commands:

INIT ("A"/"D"/"B")
Reformats the Winchester tracks - "A" indicates that the alternate map track is to be reformatted; "D" indicates that the defect map track is to be reformatted; and "B" indicates that both map tracks are to be reformatted.

MARK (cylinder) (head) [:(alt. cylinder) (alt. head)]
Changes the known state of a track (specified by cylinder and head) from good to defective. If an alternate cylinder and head are specified, they are entered into the alternate map.

AUTO
Automatically assigns alternate tracks to tracks in the defective map. When auto is specified, all defective tracks are assigned alternates starting at cylinder 512, head 0. Alternates are assigned in order, leaving out only the alternate tracks that are assigned as defective in the defective track map.

NOTE

The AUTO command is used during the installation and check-out procedure. If other defective tracks occur after this procedure, it is necessary to use the manual MARK command to assign alternate tracks. The AUTO command will overwrite previously assigned alternate tracks, thereby destroying customer data.

FREE (cylinder) (head)
Changes the known state of a track from defective to good.

NOTE

The FREE command should only be used if a defective track is marked incorrectly. If it is used with a known defective track, this command will erase the customer data assigned to the alternate track.

LIST [(path name)]
Lists all known defective tracks.

COUNT
Lists the number of known defective tracks.

READ ("A"/"D"/"B")
Records changes specified by the MARK and FREE commands in the alternate map ("A"), in the defect map ("D"), or in both maps ("B"). The alternate map will not be written unless alternate tracks are specified through the MARK and or AUTO commands.

QUIT
Exits to ISIS without recording changes.

EXIT
Records changes and exits to ISIS.

WRITE ("A"/"D"/"B")
Writes the defective track map and alternate map on the disk drive. This command must be entered immediately after the MARK or FREE commands are used.

3-3. DEFINING ALTERNATE TRACKS

Before the Winchester drive can be formatted, the list of defective tracks included with the drive (the label attached to the top mounting bracket of the drive chassis) should be verified against the defective track information previously written on the disk; and alternate tracks assigned (mapped) to the defective

tracks. Before proceeding with the following steps, apply power first to the development system and then to the Winchester drive.

1. Insert the SIIWIN.CE Winchester Diagnostic test diskette (P/N 125214-002 for single density, P/N 125215-002 for double density) into the system flexible disk drive (:F4:).

2. Press the RESET switch and immediately type an F. After approximately 10 seconds, the ISIS-II(W) sign-on message will be displayed; the ISIS-II prompt character (-) will be displayed on the next line.

3. Immediately following the prompt, type:

   ```
   :F4:ALTMAP
   ```

4. Press the RETURN key (abbreviated <cr> in the remainder of this appendix). The ALTMAP sign-on message will be displayed and the ALTMAP prompt character (*) will be displayed on the following line:

   ```
   ISIS-II WINCHESTER DEFECTIVE TRACK MAPPER V1.0
   *
   ```

5. To read the list of defective tracks from the drive and to examine the list, type:

   ```
   READ D <cr>
   LIST <cr>
   ```

   A list of the defective tracks will be displayed as shown in the following sample output:

   ```
   *READ D <cr>
   *LIST <cr>
     74,4:XXX,XX
     75,4:XXX,XX
    102,3:XXX,XX
    309,2:XXX,XX
   *
   ```

   In the list output, the numbers preceeding the colon are the track and surface numbers of the defective track (i.e., the first list entry indicates that track 74 on surface 4 had been marked defective). The X's following the colon indicate that an alternate track has NOT been assigned. Compare the list of defective tracks displayed with the drive's defective label; the two lists should be identical. If they are not, verify that the defective track label serial number is the same as the seven digit serial

number on the Priam drive frame (directly above the drive locking lever). If the serial numbers agree, use the information on the drive's defective label. If the serial numbers are different, use the defective track information specified by the drive. Change the serial number on the defective track label and report this problem on your installlation report.

6. To assign and read the alternate track assignments of defective tracks, type:

```
*AUTO <cr>
*READ B <cr>
*LIST <cr>
  74,4:512,0
  75,4:512,1
 102,3:512,2
 309,2:512,3
```

If changes have been made to either the defective track map or the alternate track map and no write commands have been issued after the changes, ALTMAP displays the following message:

```
CHANGES HAVE NOT BEEN WRITTEN
QUIT (Y/N)
```

3-4. READING DEFECTIVE/ALTERNATE MAPS

ALTMAP keeps a copy of the defective track map and the alternate track map in memory. Initially, these memory copies are nulled. In order to load the existing maps into memory, the READ command must be used. If ALTMAP cannot read the specified map(s), one of the following messages will be displayed:

```
CANNOT READ DEFECTIVE TRACK MAP
CANNOT READ ALTERNATE TRACK MAP
```

When a defective track map is read from the disk, the alternate track map is automatically cleared. When the alternate track map is read from the disk, the number of entries is compared to the number of entries in the defecive track map (already stored in memory). If these numbers do not agree, the following message is displayed:

```
ALTERNATE TRACK MAP DOES NOT MATCH DEFECTIVE TRACK MAP
```

3-5. MARKING DEFECTIVE/ALTERNATE TRACKS

If a defect map is not present on the disk, the READ command shold not be used; instead, the MARK command should be used to describe the defective tracks and alternates. Two forms

of the MARK command are recognized:

1. MARK 123 3 : 512 1
   WRITE B

   This causes the track at cylinder 123, head 3 to be marked defective, assigns an alternate at cylinder 512, head 1 and writes this data on the disk.

2. MARK 123 3
   WRITE B

   This causes the track at cylinder 123, head 3 to be marked defective with no alternate currently assigned.

When marking defective tracks and assigning alternates, if the specified alternate track is already in use, the following message is displayed:

ALTERNATE TRACK IN USE

If the alternate already appears in the defective track map, the following message is displayed:

ALTERNATE TRACK IS DEFECTIVE

If an alternate track is specified as defective, it is automatically mapped to cylinder 0, head 0. If it is mapped to any other track, the following message is displayed:

DEFECTIVE ALTERNATE MUST BE MAPPED TO "0 0"

In this case, the original defective track must be freed, and remarked (with a new alternate track).

If the specified defective track is already marked, the following message is displayed:

TRACK ALREADY MARKED

Alternate tracks may be assigned in two ways: manually, as described above in the MARK command, and automatically, through the AUTO command. The AUTO command assigns alternate tracks for all defective tracks in the defective track map. Alternates are assigned in increasing order starting at cylinder 512 head 0. If more alternates are needed than are available in the area between cylinder 512 and cylinder 522, the following message appears:

ALTERNATE TRACKS EXCEEDED

NOTE

The AUTO command is used only during the installation and check-out procedure. If other defective tracks occur after this procedure, you must use the manual MARK command to assign alternate tracks. The AUTO command will overwrite previously assigned alternate tracks, thereby destroying customer data.

3-6. FREEING TRACKS

If a defective track is marked incorrectly, the FREE command can be used to remove the marked track from the defective track map by typing:

```
FREE (cylinder #) (head #) <cr>
WRITE
```

NOTE

The FREE command should only be used if a defective track is marked incorrectly. If it is used to free a known defective track, this command will erase the customer data assigned to the alternate track.

If the track specified in the FREE command cannot be found in the defective track map, the following message appears:

```
TRACK ALREADY FREE
```

3-7. WRITING THE MAPS

After marking defective tracks and/or assigning alternates, the maps can be written to the disk by means of the WRITE command. Each map can be written individually, or the maps can be written together. When a WRITE command is specified that will change the defective track map, the following message is displayed:

```
THIS COMMAND CHANGES THE DEFECTIVE TRACK MAP
DO YOU WISH TO CONTINUE (Y/N)?
```

If a WRITE command is specified that changes the alternate track map, the following messages appears:

```
THIS COMMAND CHANGES THE ALTERNATE TRACK MAP
DO YOU WISH TO CONTINUE (Y/N)?
```

If the alternate track map has not been completely defined (i.e.,

an alternate track has not been specified for each defective track) and an attempt is made to write the alternate track map to the disk, the following message is displayed:

ALTERNATE TRACKS NOT COMPLETELY SPECIFIED

3-8. INITIALIZING THE MAPS

The disk tracks that contain the defective track and alternate track information must be formatted before they can be initially written. If these tracks have not previously been written, the INIT command should be used. INIT formats the defective track map ("D" parameter), the alternate track map ("A" parameter), or both ("B" parameter). If an error occurs when ALTMAP attempts to format the defective or alternate map tracks on the disks (during INIT), the following message is displayed:

CANNOT INTIALIZE MAP, DISK ERROR: xx

This error indicates that disk controller error "xx" was detected during formatting.

3-9. LISTING THE MAPS

The LIST command will list the bad tracks and alternates as follows:

```
*LIST
  50, 1:515, 2
  62, 3:515, 3
 130, 2:515, 4
```

If an alternate track has not been specified for a defective track, the listing will contain asterisks in place of the alternate track information as in the following example:

```
*LIST
  50, 1:***,**
  62, 3:***,**
 130, 2:***,**
```

The INIT A command formats the alternate track map on the disk. When the carriage return (<cr>) is entered, the INIT command prompts:

INIT WILL REFORMAT THE MAP AREA ON THE DISK
DO YOU WANT TO CONTINUE (Y/N)?

9. Type Y (for yes) and press <cr>; the program again will

prompt:

```
THIS COMMAND CHANGES THE ALTERNATE TRACK MAP
 DO YOU WANT TO CONTINUE (Y/N)?
```

10. Again type Y <cr>; the program will reformat the alternate track map and respond:

```
ALTERNATE TRACK MAP CHANGES RECORDED
*
```

11. Following the ALTMAP prompt (*), type:

```
EXIT<cr>
```

The exit command returns control to the ISIS operating system; the ISIS prompt (-) is displayed on the next line.

3-3. INITIALIZATION PROCEDURE

The initialization procedure is required when the Winchester drive has not been formatted as a system disk (the condition of the drive when shipped from the factory). Remember that the system flexible disk drive is now drive unit :F4: and that the Winchester is identified as drive units :F0: through :F3: (the Winchester is four logical drives). The following procedure formats and initializes Winchester drive unit :F0: as the system disk.

1. Immediately following the ISIS prompt (-), type:

```
:F4:FORMAT :F0:SYSTEM.DSK S FROM 4<cr>
```

2. The following message will appear:

```
FORMATTING WILL DESTROY ALL FILES AND DATA ON DEVICE :F0:
DO YOU WANT TO CONTINUE?
```

3. Type Y (for yes) and press <cr> to initiate the formatting operation; if N (for no) is entered, the formatting operation is aborted and the ISIS prompt is displayed on the next line.

4. Assuming that 'Y'<cr> is typed, the following message is displayed:

```
FORMATTING ...
```

5. The formatting operation requires approximately three minutes. When complete, the message:

   CHECK READ ...

   is displayed to indicate that the data written on the disk during the formatting sequence is being verified.

6. The verification sequence requires approximately four minutes. When complete, the message:

   COPY SYSTEM FILES

   is displayed. As each system file is copied to the disk, its name is displayed on a new line; when the last file (LINK.OVL) has been copied, the ISIS prompt is displayed on the next line. The complete formatting operation (format, verify, and copy files) requires approximately 10 minutes.

The development system now will boot from drive unit 0 whenever the RESET or INTERRUPT 1 switch is pressed or whenever an ISIS abort occurs. Note that an ISIS-II(W) diskette must be installed in drive :F4: to allow the system to boot from the RESET switch.

In order to run the diagnostics, the remaining three Winchester drive units (F1, F2, and F3) must be formatted. Usually, these units are formatted as non-system disks and, when the formatting operation is initiated from the Winchester system disk (F0), require only about six minutes to format each drive unit.

The following example shows the required entry (underlined) and resultant display when drive unit F1 is formatted from the system disk:

```
-FORMAT :F1:NONSYS.DSK FROM 0<cr>
FORMATTING WILL DESTROY ALL FILES AND DATA ON DEVICE :F1:
 DO YOU WANT TO CONTINUE?Y<cr>
 FORMATTING ...
 CHECK READ ...
NON-SYSTEM DISK
-
```

Format the other two drive units by substituting :F2: and :F3: for :F1: in the first line of the example.

3-4. POWERING DOWN THE WINCHESTER

The following sequence must be observed when powering down a development system with an attached Winchester peripheral chassis.

CAUTION

Failure to observe the power-down sequence may result in permanent damage to the disk surface or the loss of data.

1. To initiate a spin-down cycle within the Winchester drive, type:

   SPINDN<cr>

   The system keyboard will be disabled and the following message will be displayed:

   SYSTEM INACTIVE

2. When the drive stops spinning, turn off power to the peripheral chassis at the chassis' front panel ON/OFF switch.

3. Remove any diskettes from their drives and turn off power to the development system.

When powering up the system again, be sure to apply power to the development system before applying power to the peripheral chassis.

3-5. DRIVE CONFIDENCE TEST

The drive confidence test is executed to ensure that the Winchester subsystem is operating properly following installation of the peripheral chassis on the development system. For convenience, the CE diagnostic test program is used for the confidence test. Note that this test is not intended to be an exhaustive troubleshooting test.

During execution of the confidence test, if any individual test fails, carefully check the installation procedures to make sure that all instructions were performed correctly; check the jumpers and switch settings on the controller and drive, and check the seating of all cable connectors. When proper installation has been verified and a test still fails, refer to the Peripheral Chassis Field Service Manual.

The confidence test is based on STFS (System Test Foundation Software); the individual STFS test commands are described in table 3-1. Note that any of the commands can be abbreviated to the first three letters of the command name (the Test command also can be abbreviated with the letter T). Commands are entered following the STFS prompt (*) and are terminated by pressing the RETURN key (indicated by <cr>).

Table 3-1. STFS Command Descriptions

COMMAND	DESCRIPTION
CLEAR	Sets the test summary table's test execution and error counts to zero for the test(s) specified (if no test is specified, the entire table is cleared).
DESCRIBE	Describes the status (recognized or ignored) for the test(s) specified (if no test is specified, the status of all tests is displayed).
ESCAPE	Interrupts test execution and returns control to STFS. The escape sequence is initiated by pressing the ESC key.
EXIT	Ends test session and returns control to ISIS.
IGNORE	Prevents execution of specified test(s). An ignored test must be recognized before it can be executed. When the confidence test is initialized, tests 0BH, 0EH, 10H, and 17H are ignored by default.
INITIALIZE	Invokes the confidence test program and initializes summary table and internal values.
RECOGNIZE	Enables previously ignored test(s) to be executed.
SUMMARY	Displays summary table of the number of test iterations and test failures for specified test(s) since last Initialize or Clear command. The EO (error only) parameter can be used with the Summary command to limit table entries to only tests with non-zero error counts.
TEST	Loads and executes test(s) specified. When multiple tests are specified, tests always are executed in numerical order; when no test number is specified, all recognized tests are executed. The ON ERROR, ON NOERROR, COUNT, and FOREVER parameters can be used with the Test command to further define test execution.

3-6. INDIVIDUAL TEST TIMES

A number of the individual tests in the CE test require a significant amount of time to execute. Table 3-2 outlines the approximate test times for these tests; tests omitted from the table execute in 10 seconds or less.

Table 3-2. Test Execution Times

Test Number	Test Name	Time
00H	Reset Test	1 minute
09H	Worst Case Seek	2.5 minutes
10H*	Platter Verify	10 minutes
15H**	Write/Read/Compare	2-2.5 hours
16H**	Write All/Read/Compare	2-2.5 hours
17H*	Format Entire Drive	5 minutes

*Initially ignored, must be recognized to execute.

**Destructive test (destroys data on disk), excluded automatically during test initialization.

3-7. RUNNING THE CONFIDENCE TEST

The following description assumes that the CE diskette containing STFS and the SIIWIN.CE programs has been installed in drive unit :F4:, that ISIS has been booted ('-' prompt displayed), and that the Winchester drive has been properly formatted (i.e., all four drive units formatted, :F0: formatted as system disk).

Invoke the STFS test manager by typing:

```
:F4:STFS<cr>
```

The STFS sign-on message will be displayed on the second line, and the STFS prompt (*) will be displayed on the following line.

In response to the STFS prompt, invoke and initialize the confidence test by typing:

```
INI :F4:SIIWIN.CE<cr>
```

When the carriage return is entered, the test sign-on message is displayed along with the following announcements:

```
WINCHESTER CUSTOMER ENGINEER DIAGNOSTIC
      FOR ISIS-II(W) PERIPHERAL CHASSIS Vx.y
 I/O MAP SWITCHES MUST BE SET AT 0005H,
 ALL INITIALIZE NUMBERS MUST BE DECIMAL
  IS THE DATA ON THIS UNIT BACKED-UP (Y or N)
```

Enter N<cr> (for 'no'); tests 15H and 16H (the destructive data tests) automatically are deleted from the confidence test. When the carriage return is entered, the test asks:

```
DO YOU WANT TO USE THE INITIALIZATION DEFAULTS (Y or N)
```

Enter Y<cr>(for 'yes') to use the standard default values (e.g., 128 bytes/sector, 70 sectors/track). When the carriage return is entered, the following messages are displayed:

```
PASS
MIO/VERSION x.xx
USER RETURN
*
```

At this point, the Test command is entered (following the STFS prompt) to define the tests to be executed. Assuming that all recognized tests are to be run (T<cr> entered), the ignored tests are listed, and then each test is announced and executed; the statement 'passed' or 'failed' is displayed following test execution. Figure 3-1 shows a sample display using the Test (T) command.

When all tests 'pass' as shown in figure 3-1, the confidence test is complete and the peripheral chassis can be considered to be in proper running order. If a test fails, repeat the individual test; if the test continues to fail, refer to the Peripheral Chassis Field Service Manual. When testing is complete, use the Exit command to return to ISIS.

```
*T<cr>
TEST 000BH                                  **** IGNORED ****
TEST 000EH                                  **** IGNORED ****
TEST 0010H                                  **** IGNORED ****
TEST 0017H                                  **** IGNORED ****
0000H RESET TEST                            "PASSED"
0001H TRANSFER STATUS                       "PASSED"
0002H BUFFER I/O TEST                       "PASSED"
0003H ROM CHECKSUM TEST                     "PASSED"
0004H RAM WINDOW TEST                       "PASSED"
0005H RAM ADDRESS TEST                      "PASSED"
0006H FORMAT TEST                           "PASSED"
0007H MICRO-DIAGNOSTICS                     "PASSED"
0008H SEEK/VERIFY TEST                      "PASSED"
0009H WORST CASE SEEK TEST                  "PASSED"
000AH WRITE/READ TEST                       "PASSED"
000CH PLATTER/HEAD TEST                     "PASSED"
000DH SECTOR SELECTION                      "PASSED"
000FH TRACK VERIFY                          "PASSED"
0011H ALTERNATE TRACK TEST                  "PASSED"
0012H ZERO FILL TEST                        "PASSED"
0013H DATA OVERRUN TEST                     "PASSED"
0014H AUTO-INCREMENT TEST                   "PASSED"
DATA ON UNIT IS NOT BACKED UP
USER RETURN
*
```

Figure 3-1. Confidence Test Sample Display

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