

**STORAGE MODULE DISK  
INTERCONNECT (SMDI)  
SUBSYSTEM**

**MAINTENANCE MANUAL**



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## **1.1 Overview**

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The purpose of this manual is to provide qualified technical personnel with the information necessary to maintain and upgrade the various Storage Module Disk Interconnect (SMDI) subsystems manufactured by the Emulex Corporation. SMDI is a family of high-capacity disk subsystems compatible with Standard Disk Interconnect (SDI) disk controllers manufactured by Digital Equipment Corporation (DEC).

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### **1.1.1 The Contents of This Manual**

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This manual consists of the following sections:

- **Section 1 (Introduction)** describes the subsystem in general terms. It lists available drives, illustrates logical configurations, and gives general, electrical, and environmental specifications.
- **Section 2 (Theory of Operation)** discusses subsystem logical blocks: adapters, signals, and addressing hierarchy.
- **Section 3 (Installation)** details the various subsystem configurations, and it lists the required site preparations for each of them. It discusses FCC compliance, and inspection and unpacking procedures. In addition the section describes the user panels and their correlation to disk drives and to SDI cable egress panel drive identification.
- **Section 4 (Subsystem Upgrading)** covers installing add-on disk-drive kits, adapter chassis, adapter boards, and internal and external cabling. In addition, it describes subsystem accessories and spare parts.
- **Section 5 (Troubleshooting)** tells how to check the adapters and the disk drive switches and jumpers, it lists the diagnostic tests, including error codes, and it discusses Emulex technical support.
- **Appendix A (Adapter Switch Settings)** gives the required adapter switch settings and configuration PROM revision levels for the various disk drives.
- **Appendix B (Disk Drive Parameters and Specifications)** provides the required parameters for, and specifications of, the various disk drives. It includes specific switch settings and jumper locations for each drive supported by the subsystem.

### 1.1.2 Related Documentation

For related documentation, see the following:

1. *SMDI User's Manual*, Emulex publication number SM8050901-00.
2. The respective illustrated parts breakdowns (IPB) of the four basic models. You can order these IPBs from Emulex Document Control according to the part numbers given in Table 1-1.

Table 1-1. Part Numbers of SMDI Models

Model	Part Number
Low-boy (42-inch) with SM80 adapter	SM8020001-XX
High-boy (60-inch) with SM80 adapter	SM8020004-XX
Low-boy (42 inch) with SM70 adapter	SM7020001-XX
High-boy (60-inch) with SM70 adapter	SM7020002-XX

Figures 3-1 and 3-2 explain the various model names, and Table 3-1 lists the various configurations.

### 1.1.3 Acronyms Used in This Manual

Table 1-2 spells out the acronyms that recur in this manual.

Table 1-2. Acronyms Used in This Manual

Acronym	Meaning
DBN	Diagnostic Block Number
DSA	Digital Storage Architecture*
ECC	Error Correcting Code
EDC	Error Detecting Code
ESDI	Extended Small Device Interconnect
FCT	Factory Control Table
LBN	Logical Block Number
LUN	Logical Unit Number
MDL	Manufacturer's Defect List
PDM	Portable Disk Module
RBN	Replacement Block Number
RCT	Replacement and Caching Table
RTCS	Real Time Controller Status
RTDS	Real Time Drive Status
SDI	Standard Disk Interconnect*
SMD	Storage Module Drive**
SMDI	Storage Module Disk Interconnect
XBN	External Block Number

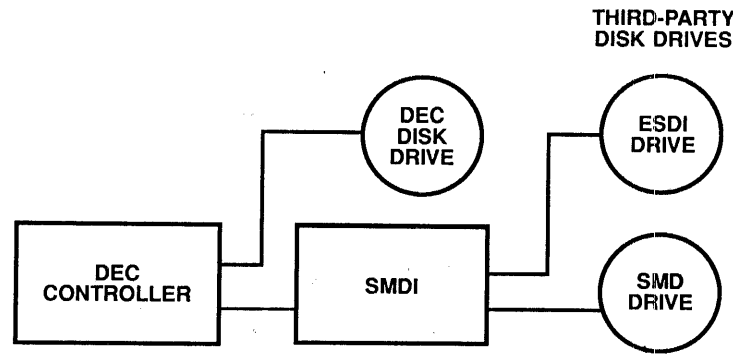
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## 1.2 General Description

SMDI is a complete disk subsystem for use with SDI disk controllers. It can be used with a DEC KDA50, KDB50, or UDA50 disk controller or an HSC50 or HSC70 cluster controller. SMDI offers higher performance than similar DEC subsystems because it contains industry-standard Storage Module Drives (SMD) that offer higher capacity, faster transfer rates, and better reliability than the equivalent DEC drives. SMDI offers packaging advantages over the DEC solutions because of its 5.25-inch Extended Small Device Interconnect (ESDI) drives in removable drawers and eight-inch drives in fixed configurations.

Figure 1-1 illustrates, in a simplified logical block diagram, how the SMDI subsystem fits into the DEC system.



SM8002-2104

Figure 1-1. The SMDI Subsystem in the DEC System

SMDI can be configured with a maximum configuration of twelve S821 SMD disk drives in a cabinet, providing 10.48 gigabytes of storage. Several configurations of disk drive and cabinet are available for your SMDI subsystem.

In addition to 8-inch or 14-inch SMD drives, you can select 5.25-inch Enhanced Small Disk Interface (ESDI) disk drives in Portable Disk Modules (PDMs). These PDMs can be moved between subsystems, allowing for data interchange and data security between centralized computer centers and remote independent sites. Table 1-3 lists the drives that are currently available.

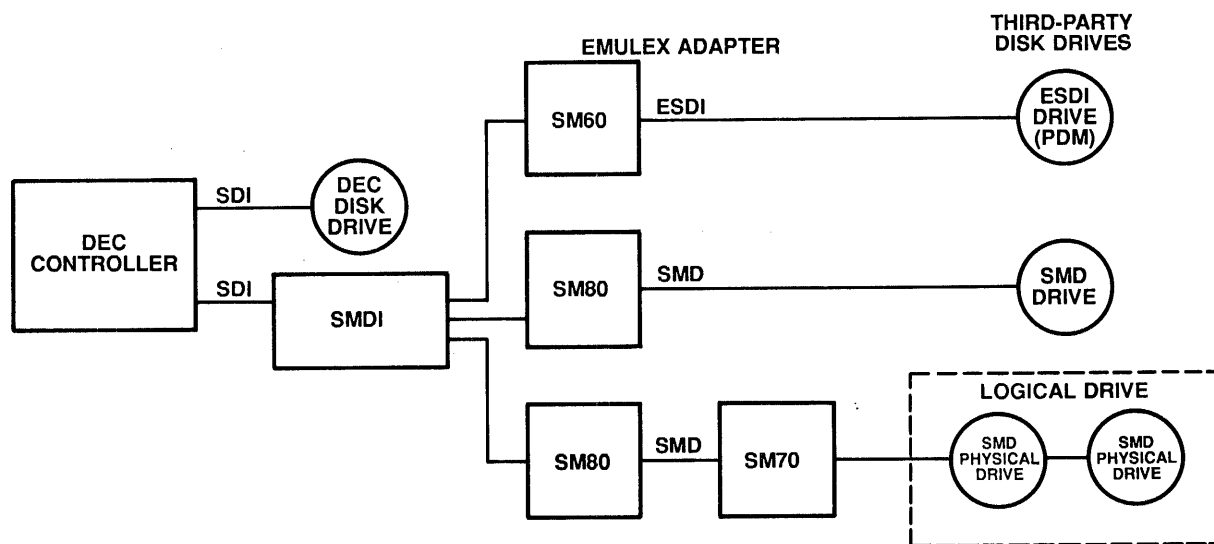
Table 1-3. SMDI Disk Drives

Disk Drive (Model)	Capacity (MB formatted)	Disk Size and Type
S660	598	5.25-inch ESDI
S680	288	5.25-inch ESDI
S820	663	8-inch SMD
S821	873	8-inch SMD
S883	1055	14-inch SMD

Table 3-1 lists the various configurations of the subsystem in addition to giving their site requirements.

Adapters for each logical disk drive provide compatibility with SDI-compatible controllers. An SM80 adapter for each SMD drive and an SM60 adapter for each ESDI drive allow for transparent conversion of SDI to SMD and SDI to ESDI data and control signals. An SM70 adapter allows the doubling up of two physical drives so that the controller sees them as one logical drive.

SMDI subsystems come completely assembled, with disk drives pre-formatted at the factory. Figure 1-2 is a block diagram of logical configurations of the SMDI subsystem.



SM8002-2105

Figure 1-2. Logical Configurations of the SMDI Subsystem

### 1.3 Basic SMDI Models

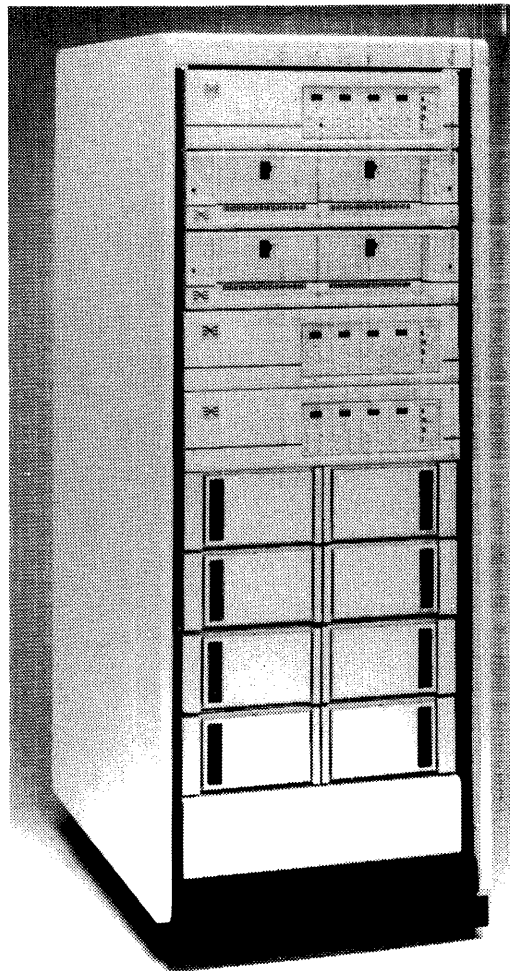
The SMDI subsystem has two possible cabinet heights and three possible adapters. The low-boy cabinet, which is 42 inches high, can hold four S680 5.25-inch drives, four eight-inch drives, or two 14-inch drives. The high-boy cabinet, which is 60 inches high, can hold up to 12 S820 eight-inch drives, or four S883 14-inch drives.

The basic model has the SM80 adapter. Models with PDMs have the SM60 adapter instead, and those that concatenate two physical drives as one logical drive add the SM70 adapter to the SM80.

All models of the subsystem include at least the following components:

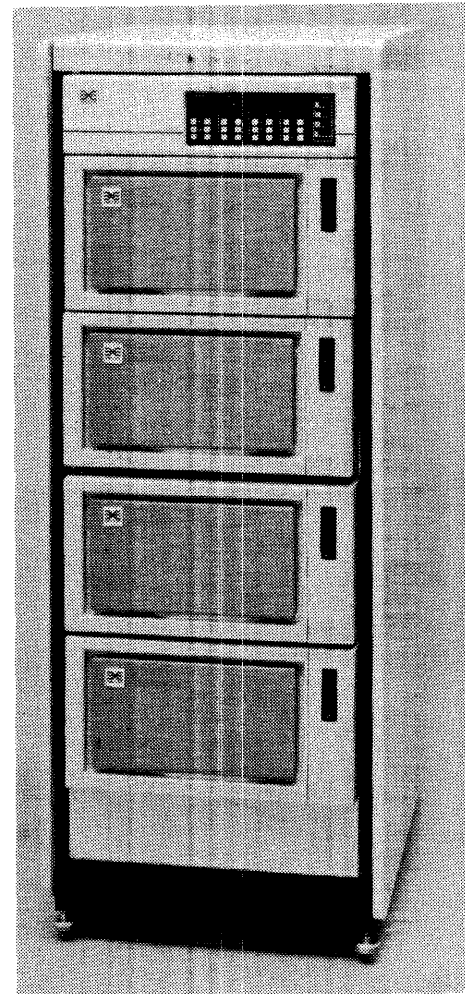
- Cabinet.
- From one to twelve disk drives.
- One SM80 or SM60 adapter per disk drive.
- From one to three SMDI chassis. Each chassis holds 4 adapters and 4 user panels, which have indicator lights and control switches for each drive.
- Power distribution unit.
- Cable adapter panel.
- Internal SMD cables.
- Internal SDI cables.
- Grant plug.

Figure 1-3 is a photograph of an SMDI subsystem in a high-boy cabinet with eight 8-inch disk drives and four 5.25-inch disk drives. Figure 1-4 shows an SMDI subsystem with four 14-inch disk drives. Figure 1-5 shows the SM600 configuration with one of the PDMs extended.



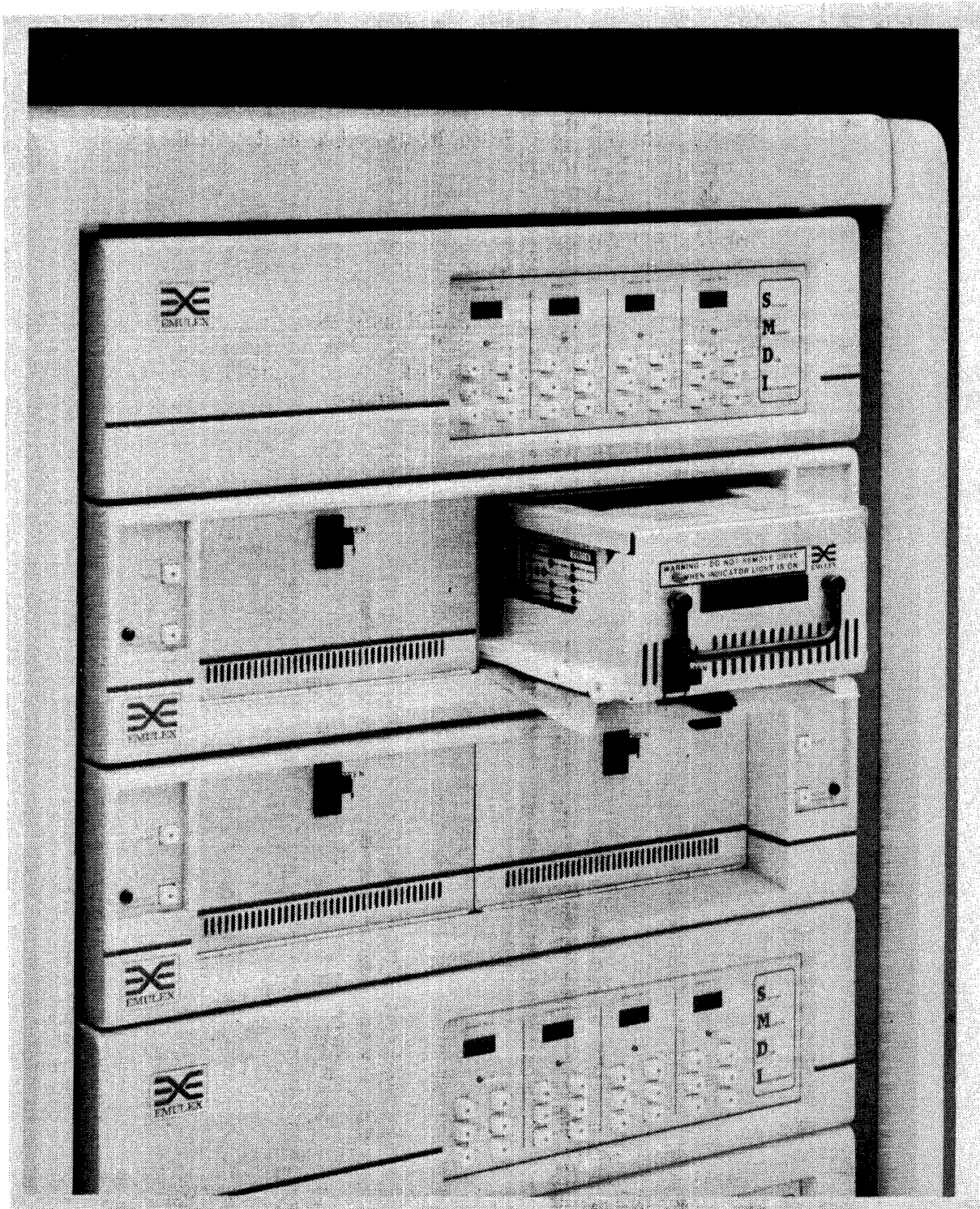
SM8002-1768

Figure 1-3. Emulex SMDI Subsystem  
(High-Boy Cabinet, 5.25-inch and 8-inch Drives)



SM8002-1382

Figure 1-4. Emulex SMDI Subsystem  
(High-Boy Cabinet, 14-inch Drives)



SM8002-1769

Figure 1-5. The SM600 Configuration, with the Portable Drive Module (PDM) Extended

**1.4 General and Electrical Specifications**

Table 1-4 gives general and electrical specifications for the SMDI subsystem.

Table 1-4. SMDI General and Electrical Specifications

Parameter	Description
<b>Drives Supported</b>	S660 (Maxtor XT-8760E) S680 (Maxtor XT-4380E) S820 (CDC 9720-850) S821 (CDC 9720-1123) S851 (Fujitsu 2351) S883 (CDC 9783)
<b>Controllers Supported</b>	DEC KDA50 DEC KDB50 DEC UDA50 DEC HSC50 cluster controller DEC HSC70 cluster controller
<b>Electrical Power Requirements</b>	
Domestic (30 A service line required)	9602 cabinet (high-boy): 208 VAC, 3-phase, 30 A max. 9642 cabinet (low-boy): 110 VAC, single-phase, 30 A max.
International (service line as per local requirements)	9602 cabinet (high-boy): 240 VAC, 24 A 9642 cabinet (low-boy): 240 VAC, 12 A
<b>Power Receptacle Requirements</b>	
Domestic	9602 cabinet: Hubbell 2810, 208 VAC, 3-phase, 30 A; NEMA L21-30R, 208 VAC 3-phase, 30 A  9642 cabinet: Hubbell 2610, 120 V, 30 A; NEMA L5-30R, 120 V, 30 A
International	As per local requirements

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## **1.5 Environmental Specifications**

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Table 1-5 provides environmental specifications for the SMDI subsystem.

Table 1-5. SMDI Environmental Specifications

Parameter	Description
Operating Temperature	50°F (10°C) to 89°F (32°C)  Maximum temperature is reduced 1°F per 1000 feet (1.8°C per 1000 meters) altitude
Relative Humidity	20% to 80% with a maximum wet bulb of 82°F (28°C) and a minimum dewpoint of 36°F (2°C)



**2.1 Overview**

This section of the manual discusses the logical blocks of the SMDI subsystem. The SMDI product line allows standard OEM disk drives to be accessed by DEC Digital Storage Architecture (DSA) controllers that implement the DEC Standard Disk Interconnect (SDI). SMDI supports both the ESDI and the SMD families of disk drives.

ESDI 5.25-inch Winchester drives are supplied as Portable Drive Modules (PDMs). These install in SM600 chassis, up to two drives per SM600. The chassis are cabled to SM60 adapters, one SM60 per installed PDM. SMD disk drives of various physical sizes and storage capacities are cabled to SM80 adapters. Cabling can be direct, one SM80 per SMD drive, or paired. Paired cabling connects two physical drives, concatenated as one logical drive, to an SM700 cable adapter chassis, and then to SM80 adapters, one adapter per pair of SMD drives (see Figure 2-1).

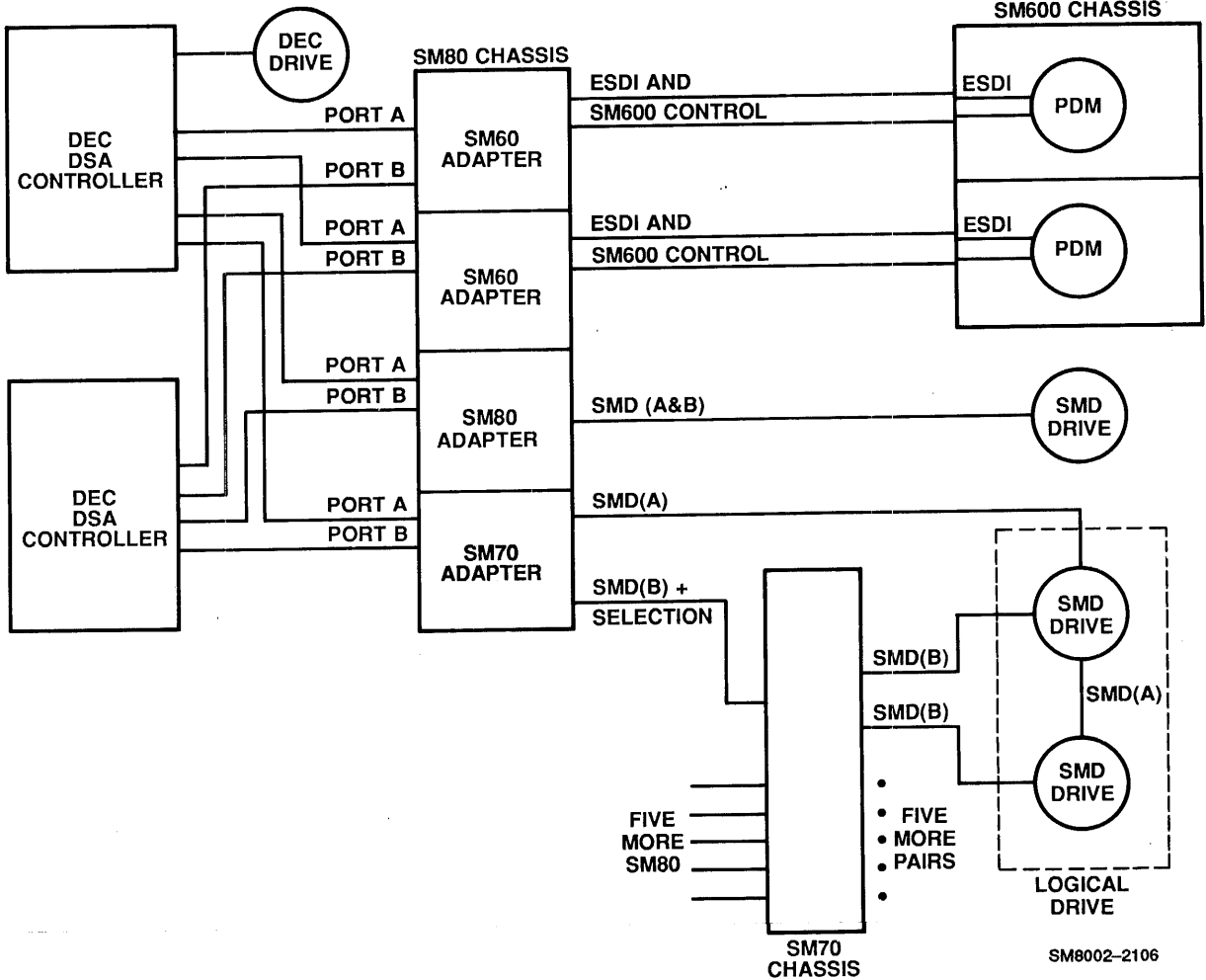


Figure 2-1. Logical Blocks of the SMDI Subsystem

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## 2.2 SM60 and SM80 Adapters

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Up to four SM60 and/or SM80 adapters reside in each SMDI chassis. Each adapter has two external interfaces, one of which connects to the drive or drive pair. The other interface consists of two SDI ports, each of which can be attached to a different DSA controller (UDA50, KDA50, KDB50, HSC50, or HSC70).

The adapter, either SM60 or SM80, performs the following three functions:

- It provides the status and control signals that the DSA controller expects from RA-type drives.
- It controls the operation of the ESDI drive or SMD drive or SMD drive pair.
- It provides a real-time channel for read and write data between the SDI and the drive.

---

## 2.3 SDI Signals

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An SDI port consists of four signal lines: two from the DSA controller and two from the SMDI adapter. One signal in each direction is devoted to status information. The other is used to transmit both control information (commands and responses) and data to and from the drive.

SDI signals consist of a series of pulses, each about 12 nS wide, which are of alternating polarity and are transmitted on a coaxial cable. The cable is coupled to the controller and adapter logic by pulse transformers, which provide electrical isolation and allow cabling and uncabling in an active system.

All signals are self-clocking. A pulse of either positive or negative polarity signals the start of a bit cell. Depending on the data being transmitted, the bit cell might contain another pulse, of the opposite polarity, immediately following the initial pulse. A fixed timing circuit at each end determines whether the cell contains one or two pulses.

The next bit cell is defined by the next pulse after the fixed sample time. A clock signal derived from the SDI pulses thus has a fixed initial phase and a trailing phase whose duration depends on the actual clock rate. SDI signals can accommodate drives of widely varying data rates: from 3 MHz to 22 MHz.

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### 2.3.1 Real Time Controller Status (RTCS) and Real Time Drive Status (RTDS)

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Instead of a number of discrete status and control signals, the controller and adapter communicate their status over single lines, called Real Time Controller Status (RTCS) and Real Time Drive Status (RTDS). The status and control signals are represented by bits in continuously transmitted 16-bit frames of serial data. Each frame consists of the following bits:

- Eight "0" bits
- A "1" bit for synchronization
- Six signal bits
- A parity bit, which enforces even parity

When a frame has been received with proper parity, the status information is derived from the signal bits. A frame cannot be received until at least eight consecutive "0" bits are detected. Frames with incorrect parity are ignored, and status information remains unchanged.

RTCS consists of the following four signals:

- Ready to Receive. Set when the controller can accept the response to a command.
- Write Gate. Set during write operations.
- Read Gate. Set during read operations.
- Init. Set to force the adapter to a reset state.

RTDS consists of the following six signals:

- Ready to Receive. Set when the adapter can accept a command.
- Attention. Set when a drive condition must be reported.
- Read/Write Ready. Set when the adapter can accept real-time (READ and WRITE) commands.
- Sector. Set at the start of every sector except sector 0.
- Index. Set at the start of sector 0.
- Available. Set when the adapter can accept an ONLINE command.

---

### 2.3.2 Commands, Responses, and Data

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All activity over the SDI is initiated by the controller, but timed by clocks from the adapter, which derives clocks from the attached ESDI or SMD drive. The controller sends commands and write data to the adapter over a single SDI line. The adapter sends responses and read data to the controller over another SDI line.

Commands and responses are transmitted as a series of one or more 32-bit frames. The first sixteen bits of every frame include a 12-bit sync pattern, namely 26BC (hex). The second sixteen bits consist of a data byte and a frame type byte.

*Single-frame commands and responses* are defined by the frame type. Multiple-frame commands and responses are defined by the data byte in the first frame, which is of the "Start" frame type. Succeeding bytes of data are contained in frames with the "Continue" frame type. The last frame has the "End" frame type and a byte of checksum data. The commands and their responses are described in the following paragraphs.

The DIAGNOSTIC ECHO command is a single frame. Its response is the Diagnostic Echo response, which is the identical frame returned by the adapter.

The SET GROUP command is a single frame. It has no response. The adapter selects the proper drive track, and it signals completion of the command by setting Read/Write Ready in RTDS.

*The multiple-frame commands* all require multiple-frame responses. These commands perform the following functions:

- They request status and configuration information.
- They initiate state transitions, for example, Available to Online or Online to Available.
- They control drive orientation, for example, Seek or Home.

If no special information is required, the adapter responds in a standard way with either a successful response or an error-status response. Otherwise it responds with the requested data or an error-status response.

*The real-time commands* are all single-frame commands without responses. The adapter either accepts and carries out the real-time command, or it posts an error status. Real-time commands are accepted only in the Online state and when Read/Write Ready is set in RTDS, that is, when cylinder and group selection is completed and no error condition exists. A real-time command, once accepted, is held in abeyance until the next sector or index pulse, which provides data-timing synchronization between the drive and the controller.

The command continues until the controller turns off READ GATE or WRITE GATE in RTCS. Some real-time commands have an implied initial READ GATE for accessing header information. The implied READ GATE is turned off when the controller turns on an explicit READ GATE or WRITE GATE in RTCS. Commands can also be terminated by errors detected by the drive or adapter, including detecting the next sector or index pulse before the controller terminates the command normally.

During the operation of a real-time command, data passes in the appropriate direction directly between the drive and the controller. The adapter automatically sets up the data path in response to the command, and tears it down at command termination. The operation of real-time commands is invisible to the control program in the adapter unless error conditions arise.

---

## 2.4 Adapters and Chassis

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The SM60 and SM80 adapters are similar, except for the difference in their drive interfaces. They are controlled by a PROM program executed by an 8085 microprocessor.

The control program performs the following functions:

- It carries out initialization and self-tests when power is applied.
- It controls drive operation in response to switches on a user panel at the front of the SMDI chassis.
- It communicates with DEC DSA controllers over the SDI ports that are enabled by switches on the user panel.
- It responds to the controllers' requests for status and configuration information and for state changes and drive positioning.
- It executes built-in diagnostic tests in response to operator controls or SDI commands.
- It displays state and status information on the user panel.
- It checks for certain errors that occur during real-time commands, but otherwise is not involved in executing the commands.

The SM600 chassis accepts up to two ESDI drives in PDMs. It groups the ESDI signals to and from each drive as well as its own control and status signals onto standard SMD-type cables. Thus connections to the SMDI chassis are always made with the same cables regardless of the type of adapter (SM60 or SM80).

The SM700 chassis accepts data cables ("B" cables) from up to twelve SMD drives. It connects them in pairs to up to six SM80 adapters in one or two SMDI chassis. Control lines from the SMDI chassis select which drive in each pair is to send and receive "B" cable signals.

---

## 2.5 Addressing Hierarchy

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Data on drives attached to SMDI adapters is oriented and formatted according to the DEC Digital Storage Architecture (DSA). A hierarchy consisting of the following four levels defines the physical location of a block: cylinder, group, track, and sector. This is the addressing mechanism used between the DSA controller and the drive.

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### 2.5.1 The Cylinder Level

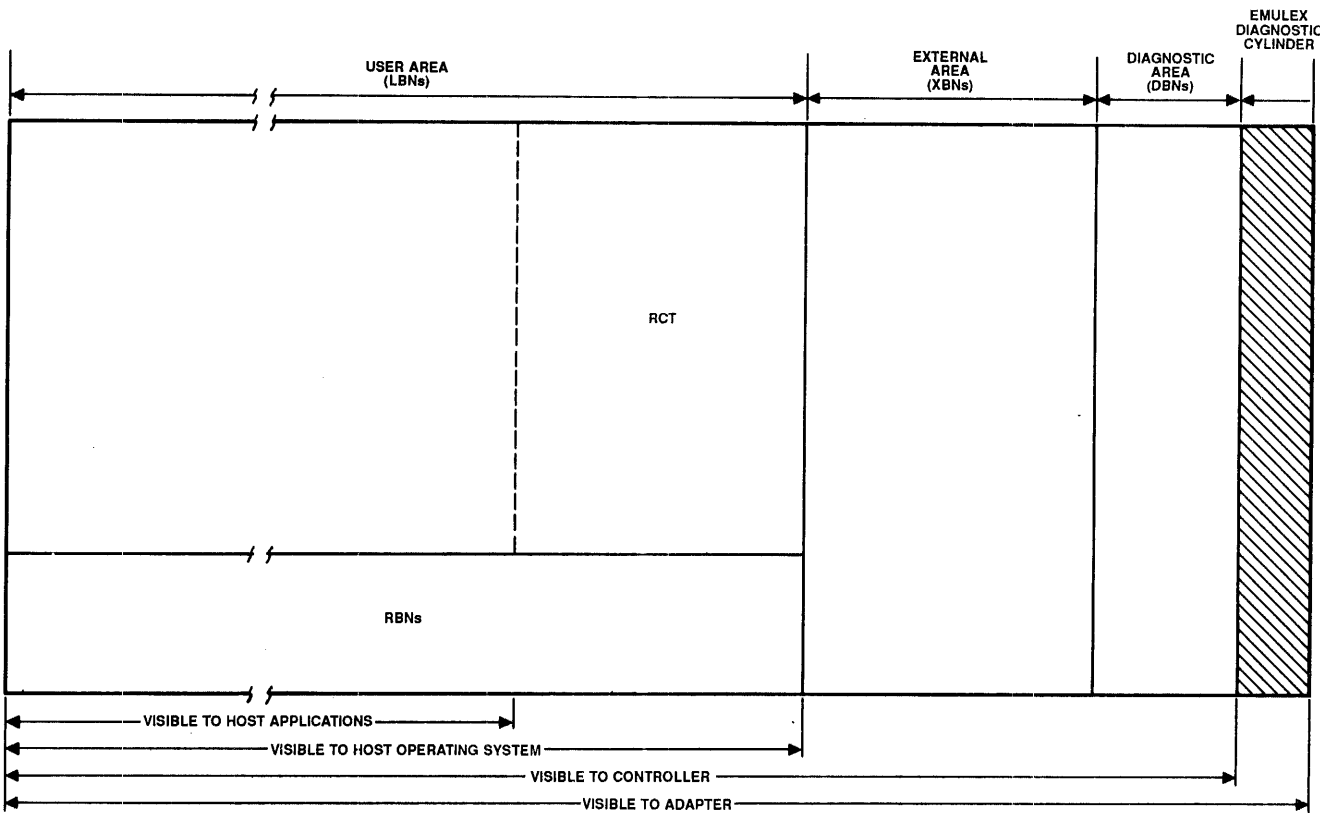
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The highest level of selection is the cylinder. The controller selects a cylinder by issuing a SEEK command. The adapter responds when the seek has been initiated at the drive. It reports completion of the seek operation by setting Read/Write Ready in RTDS. According to DSA the cylinders on a drive are divided into separately identifiable areas with different access rules.

Figures 2-2 through 2-4 schematically illustrate cylinder mapping for an SMD drive, an ESDI drive, and paired SMD drives, respectively. The drawings show the cylinders to scale, except that they truncate the user area in order to fit on the page. The main area is the *user area* and a Replacement Block Number (RBN) address space. In the last part of the user area, the LBNs are used for a Replacement and Caching Table (RCT), which maps the usage of RBNs in the user area. The controller allows the host system to access only the LBNs in the user area.

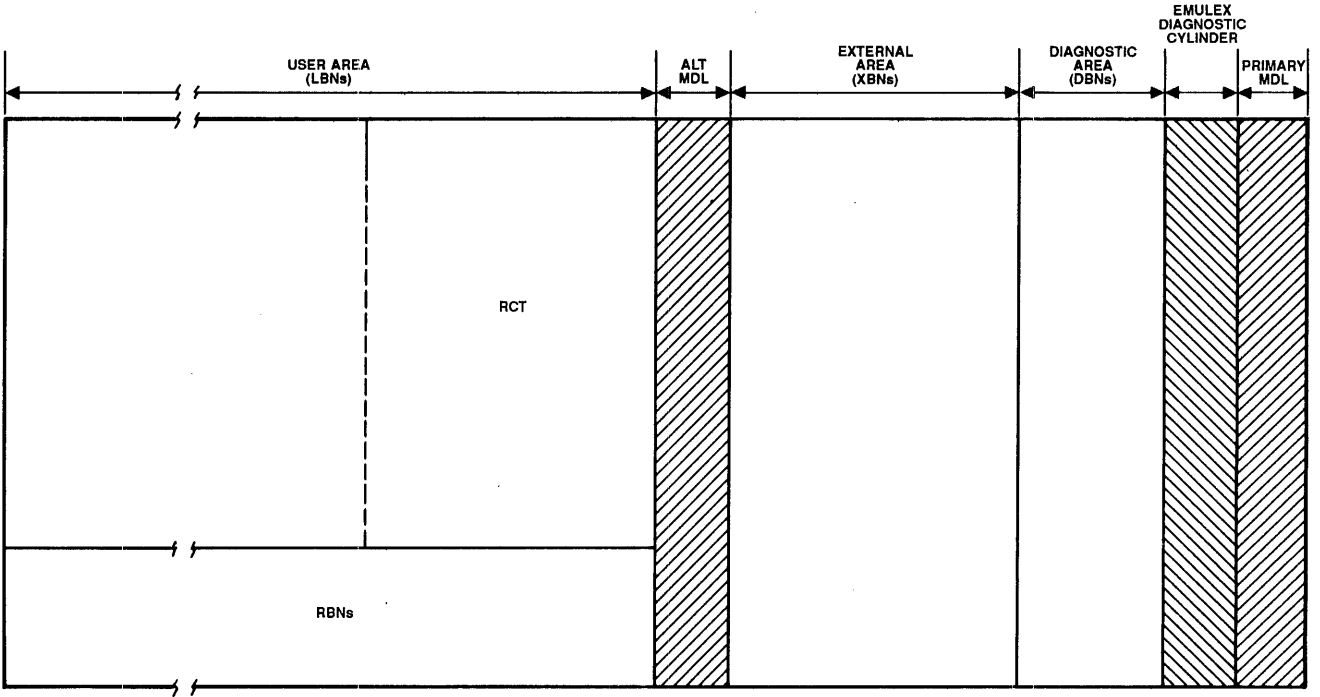
A second set of cylinders forms the *external area*, which contains an External Block Number (XBN) address space. This area is used for the Factory Control Table (FCT), which lists defective areas on the disk by their physical location. A third set of cylinders forms the diagnostic area, which contains a Diagnostic Block Number (DBN) address space. This area is accessible only when the controller sets a special diagnostic mode.

For Emulex SMDI drives, a cylinder (the Emulex Diagnostic Cylinder) on each drive is reserved outside the DSA organization for diagnostic usage by the adapter control program. Likewise, the primary and alternate Manufacturer's Defect List (MDL) cylinders on ESDI drives are not mapped into the DSA format. Figures 2-2 through 2-4 show the Emulex Diagnostic Cylinder and the primary and alternate MDLs against a hatched background in order to indicate their inaccessibility.



SM8002-2107

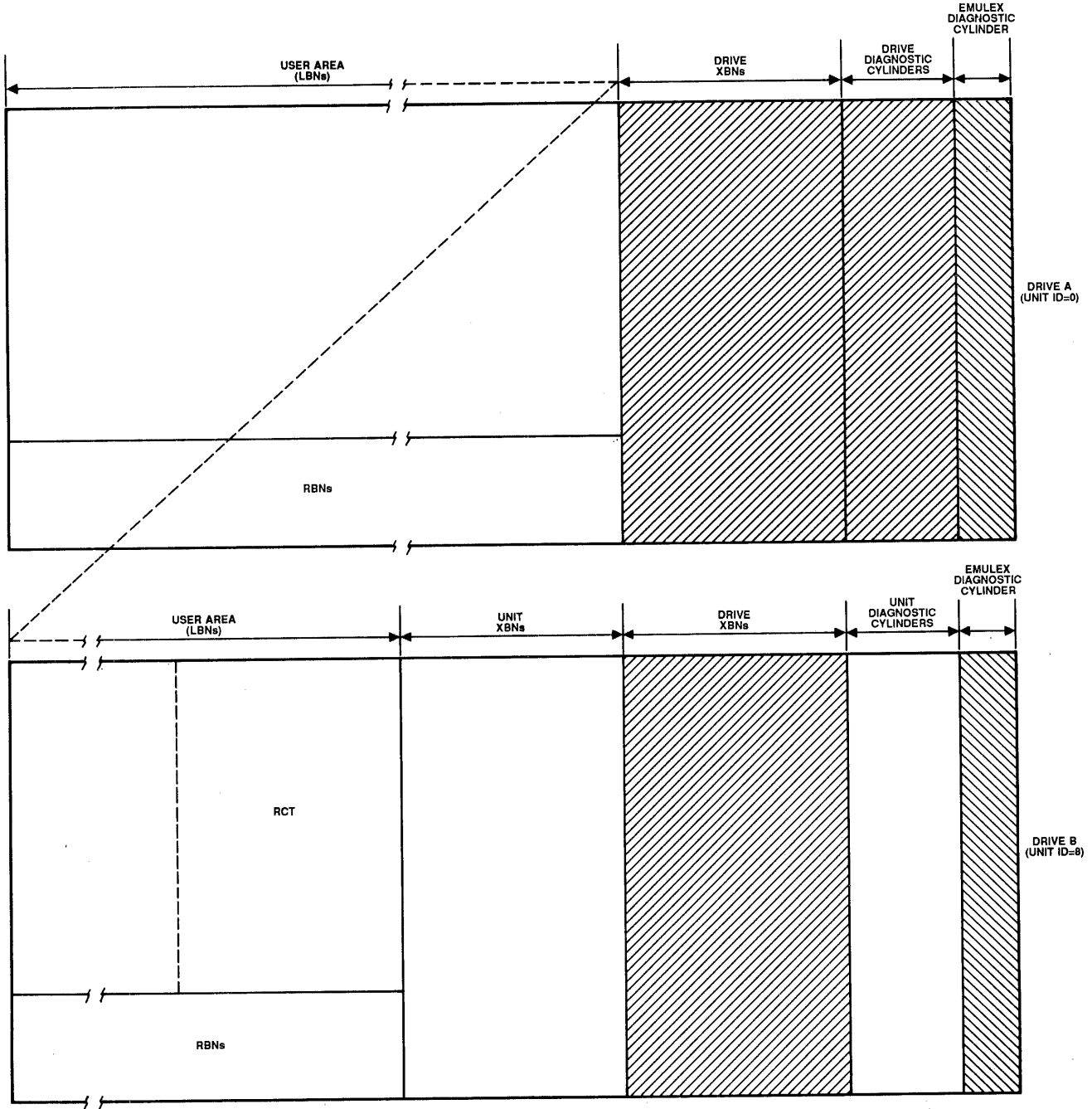
Figure 2-2. Cylinder Mapping for an SMD Drive



SM8002-2108

Figure 2-3. Cylinder Mapping for an ESDI Drive

For drives attached in pairs through an SM700 chassis, the user area spans both drives. Each drive has its own external, diagnostic, and Emulex diagnostic areas to allow reformatting as an individual drive. The first drive (drive unit 0) has the start of the user area. Only the user area and the Emulex diagnostic area of this drive are accessible in dual-drive operation.



SM8002-2109

Figure 2-4. Cylinder Mapping for Paired SMD Drives



The second drive (drive unit 8) has the end of the user area and an external area for the drive pair. In addition to these, the diagnostic area and Emulex diagnostic area of this drive are accessible in dual-drive operation, but the drive's individual external area is not accessible.

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### 2.5.2 The Group Level

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The second level of the hierarchy is the group. A cylinder contains one or more groups. Within a cylinder the time to select one group instead of another has a predictable value. A group offset is defined to allow minimal rotational delay when accessing the first logical sector of a track in one group immediately after accessing the last logical sector of a track in the previous group and selecting the new group.

The controller selects the group at the same time as the cylinder in a SEEK command. Subsequently, without issuing a new SEEK, the controller can issue a SELECT GROUP command. The adapter then selects the appropriate drive head, and it reports completion of the selection operation by setting Read/Write Ready in RTDS.

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### 2.5.3 The Track Level

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The third level is the track. A group contains one or more tracks. The controller selects a track in the data byte of a real-time command frame.

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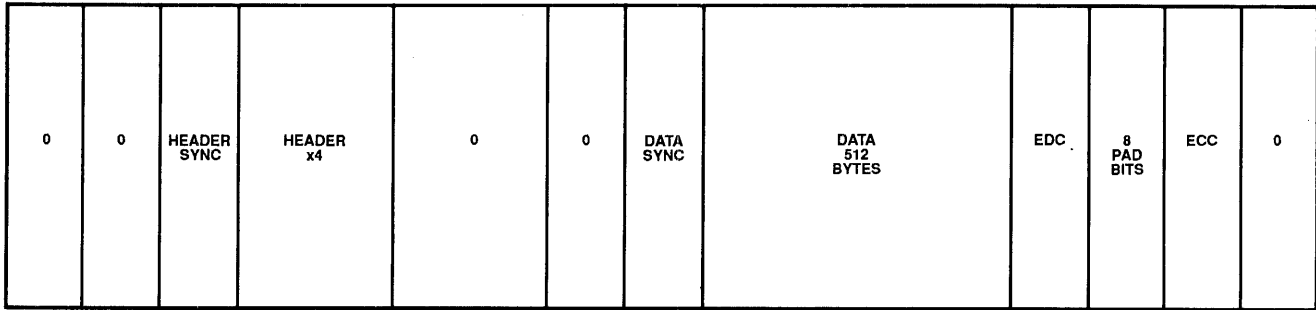
### 2.5.4 The Sector Level

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The fourth level is the sector. A track contains a fixed number of sectors. These are numbered, starting with sector 0, which is identified by the index pulse. The controller uses the index and sector pulses reported in RTDS to keep track of the drive's orientation. It issues a real-time command after the start of the sector that precedes the sector to be accessed.

For drives that implement multiple groups per cylinder, a group offset, specified as a number of sectors, defines the relationship between physical sector number and relative logical sector number on a track. On tracks in group 0, physical sector 0 corresponds to the first logical sector on the track. For a group offset of  $n$ , on tracks in group  $m$ , physical sector  $n$  times  $m$  (modulo the number of sectors on the track) corresponds to the first logical sector on the track.

The data within a sector is divided into two fields: the header and the data. Each field is preceded by a gap of zeros for obtaining bit synchronization. The first part of each field is a sync word, which is identical to the sync word in an SDI command/response frame. Figure 2-5 depicts the sector format.



SM8002-2110

Figure 2-5. Sector Format

The header field consists of four repetitions of a 32-bit header code. This code has a 4-bit type identifier in the high-order position and a 28-bit block number. Blocks within a DSA address space (LBNs, RBNs, XBNs, and DBNs) have a particular type identifier, and are numbered consecutively, starting with zero.

The data field consists of 512 bytes of data for SMDI implementations, followed by a 16-bit Error Detecting Code (EDC), eight pad bits, and a 170-bit Error Correcting Code (ECC). The EDC is a cyclic bit-wise checksum with a seed of 45 (hex). It is normally recorded in true form, but is inverted to implement a forced error flag. This indicates that the data recorded in the sector is not valid even if it is otherwise retrieved without error.

The ECC is a Reed-Solomon code that allows correcting of up to eight 10-bit errors. It is implemented so that the controller can apply error correction with a minimum of computation. Both the EDC and the ECC are transparent to the adapter and the drive.

In the user area, bad sectors in the LBN space, but not including blocks in the RCT, are marked as bad. They are revectorred to the nearest available replacement block (in the RBN space). Replacement blocks are evenly distributed through the user space, one per track in SMDI implementations.

A bad LBN might be marked as being a primary replacement. This indicates that accesses to it are to be revector to the replacement block on the same track. This is indicated by a particular header type code. If the primary replacement RBN is itself bad, or has been assigned to another LBN, the bad LBN is marked as a non-primary replacement. Depending on the controller, the replacement RBN number might be available in the data area (secondary replacement), or the controller might be forced to look for the LBN in the RCT (tertiary replacement). If the header area of an LBN is bad, tertiary replacement and revectoring might be forced.

The RCT exists in four identical copies in SMDI implementation. The first block of an RCT copy is a control block, in which the progress of LBN replacement operations is recorded, in case the sequence is interrupted before completion. The second block is used to hold data copied from the bad LBN that is being revector. This block will have the forced error flag set if data could not be read and corrected.

The remaining blocks in each copy describe the current usage of each block in the RBN address space. Either the controller or the host system maintains the RCT. When new information is written to an RCT block, it is written to all copies. When information is read, it is read from the first copy that can be retrieved without error.



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## **3.1 Overview**

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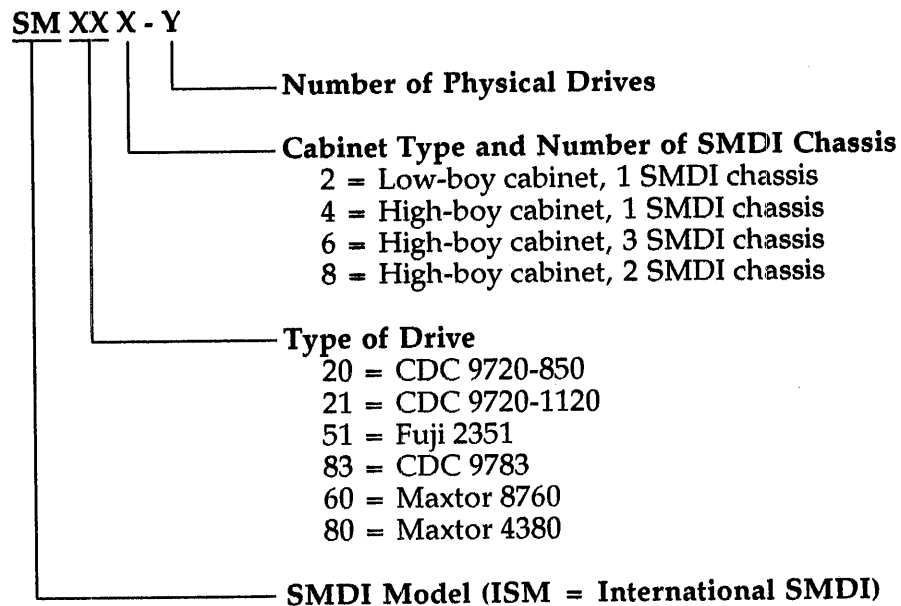
This section provides details about site requirements and procedures for unpacking, inspecting, and installing your SMDI. It gives specifications, to assist you in preparing your site, and it discusses assigning unit numbers to drives, cabling, installation with the various controllers, powering-up the SMDI, and running internal diagnostics.

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### **3.1.1 Names of SM600 and SM800 Family SMDI Models**

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Figure 3-1 will help you interpret the names of SM600 and SM800 family SMDI models, that is, those without the SM70 adapter.



*Figure 3-1. Interpreting the Names of SM600 and SM800 Family SMDI Models*

### 3.1.2 Names of SM700 Family SMDI Models

Figure 3-2 will help you interpret the names of SM700 family SMDI models, i.e., those that employ the SM70 adapter to double up two physical drives as one logical unit.

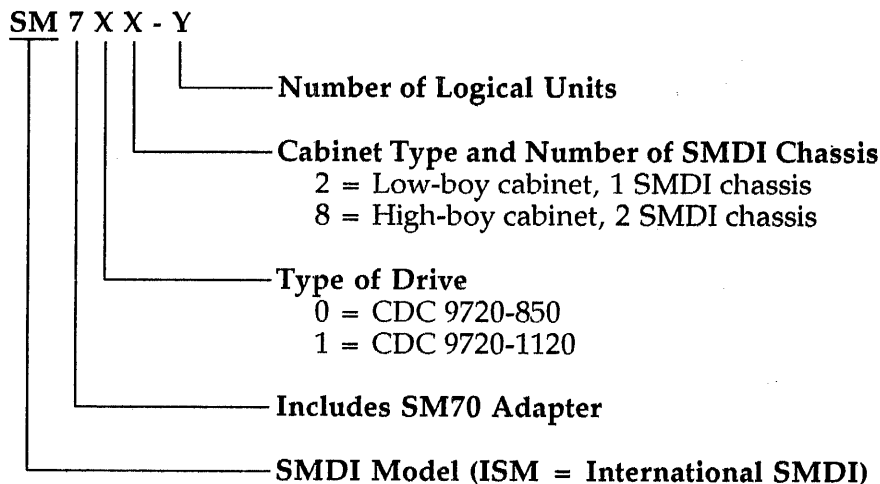


Figure 3-2. Interpreting the Names of SM700 Family SMDI Models

## 3.2 Configurations and Site Requirements

Table 3-1 provides a list of the various SMDI configurations, along with their associated site requirements in the following areas: weight, heat output, and maximum AC power for floor strength and installation equipment. The power requirements of the SMDI subsystem depend on the type of power distribution unit mounted in the SMDI cabinet. The unit in the 9642 cabinet (low-boy) requires 110 VAC, single-phase, for domestic, or 240 VAC, single-phase, for international, installation. The unit in the 9602 cabinet (high-boy) requires 208 VAC, three-phase, for domestic, or 240 VAC, single-phase, for international installation.

The SMDI subsystem must be installed in a room with adequate air conditioning. Table 3-1 lists the load that each SMDI subsystem configuration places on an air conditioning system in watts. To convert from watts to BTU/hour, multiply the watts by 3.4134. The weight of your subsystem must not exceed the strength of the flooring where it will be installed. The weight will determine the type of equipment required for installation.

### WARNING

SMDI subsystems are extremely heavy. Trying to move an SMDI cabinet into position without the proper equipment can injure you and damage the equipment.

Table 3-1. Configurations and Site Requirements for SMDI Subsystems

Subsystem Configuration (Model Number)*	Weight (Pounds)	Heat Output (Watts)	Max. Continuous AC Ratings (Domestic)	Max. Continuous AC Ratings (International)
SM2X2-1	260	420	110 VAC	240 VAC
-2	300	565	Single Phase	Single Phase
-3	370	710	12.5 A	8 A
-4	410	855	NEMA L5-30R	
SM2X4-1	340	420	208 VAC	240 VAC
-2	380	565	Three Phase	Single Phase
-3	450	710	8 A	8 A
-4	490	855	NEMA L21-30R	
SM2X8-1	370	420	208 VAC	240 VAC
-2	410	565	Three Phase	Single Phase
-3	480	710	15 A	15 A
-4	520	855	NEMA L21-30R	
-5	580	1275		
-6	620	1420		
-7	690	1565		
-8	730	1710		
SM2X6-1	400	420	208 VAC	240 VAC
-2	440	565	Three Phase	Single Phase
-3	510	710	22 A	22 A
-4	550	855	NEMA L21-30R	
-5	610	1275		
-6	650	1420		
-7	720	1565		
-8	760	1710		
-9	820	2130		
-10	860	2275		
-11	930	2420		
-12	970	2565		
SM802-1	220	362	110 VAC	240 VAC
-2	230	397	Single Phase	Single Phase
-3	260	484	7A	3.5 A
-4	270	519	NEMA L5-30R	

\* In the model number, the number after the dash indicates the number of logical drives. The SM7XX series of subsystems has two physical drives for each logical drive.

(Continued on next page)

Table 3-1. Configurations and Site Requirements for SMDI Subsystems (Continued)

Subsystem Configuration (Model Number)*	Weight (Pounds)	Heat Output (Watts)	Max. Continuous AC Ratings (Domestic)	Max. Continuous AC Ratings (International)
SM808-1	360	420	208 VAC	240 VAC
-2	370	565	Three Phase	Single Phase
-3	470	710	22 A	22 A
-4	480	855	NEMA L21-30R	
-5	570	1275		
-6	580	1420		
-7	680	1565		
-8	690	1710		
SM806-1	360	420	208 VAC	240 VAC
-2	370	565	Three Phase	Single Phase
-3	470	710	22 A	22 A
-4	480	855	NEMA L21-30R	
-5	570	1275		
-6	580	1420		
-7	680	1565		
-8	690	1710		
-9	780	2130		
-10	790	2275		
-11	890	2420		
-12	900	2565		
SM832-1	360	790	110 VAC	240 VAC
-2	530	1305	Single Phase	Single Phase
			15 A	9 A
			NEMA L5-30R	
SM834-1	440	790	208 VAC	240 VAC
-2	610	1305	Three-phase	Single Phase
-3	790	1820	18 A	18 A
-4	970	2335	NEMA L21-30R	
SM602-1	220	362	110 VAC	240 VAC
-2	230	397	Single Phase	Single Phase
-3	260	484	7 A	3.5 A
-4	270	519	NEMA L5-30R	

\* In the model number, the number after the dash indicates the number of logical drives. The SM7XX series of subsystems has two physical drives for each logical drive.

(Continued on next page)



Table 3-1. Configurations and Site Requirements for SMDI Subsystems (Continued)

Subsystem Configuration (Model Number)*	Weight (Pounds)	Heat Output (Watts)	Max. Continuous AC Ratings (Domestic)	Max. Continuous AC Ratings (International)
SM608-1	360	420	208 VAC	240 VAC
-2	370	565	Three Phase	Single Phase
-3	470	710	22 A	22 A
-4	480	855	NEMA L21-30R	
-5	570	1275		
-6	580	1420		
-7	680	1565		
-8	690	1710		
SM606-1	360	420	208 VAC	240 VAC
-2	370	565	Three Phase	Single Phase
-3	470	710	22 A	22 A
-4	480	855	NEMA L21-30R	
-5	570	1275		
-6	580	1420		
-7	680	1565		
-8	690	1710		
-9	780	2130		
-10	790	2275		
-11	890	2420		
-12	900	2565		
SM7X2-1	320	620	110 VAC	240 VAC
-2	430	910	Single Phase	Single Phase
-3	530	1200	22 A	14 A
-4	640	1490	NEMA L5-30R	
SM7X8-1	430	620	208 VAC	240 VAC
-2	540	910	Three-phase	Single Phase
-3	640	1200	22 A	22 A
-4	750	1490	NEMA L21-30R	
-5	850	2055		
-6	960	2345		

\* In the model number, the number after the dash indicates the number of logical drives. The SM7XX series of subsystems has two physical drives for each logical drive.

### 3.3 Maintaining FCC Class A Compliance

The SMDI subsystem is a completely enclosed subsystem that complies with FCC Class A limits for radiated and conducted interference (RFI). As such, no special steps need be taken to ensure compliance with FCC requirements. To block radiated interference, the SMDI subsystem is completely enclosed in the cabinet. Furthermore, a filter in the power distribution panel of the cabinet blocks conducted interference. You must ensure that nothing is done to reduce the effectiveness of either the SMDI cabinet shielding or the power filter.

### 3.4 Inspection and Unpacking

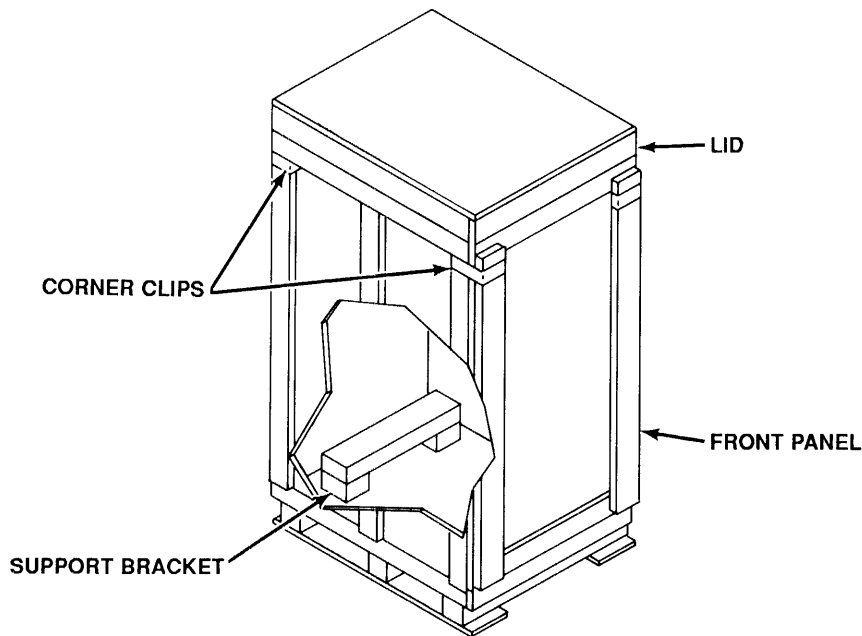
#### 3.4.1 Inspecting the Shipping Crate

Emulex products are shipped in special crates designed to provide full protection under normal shipping conditions. Immediately upon receipt, inspect the shipping crate for evidence of possible damage incurred in transit. Any obvious damage to the crate, or indications of actual or probable equipment damage, should be reported to the carrier company in accordance with instructions on the form included in the crate.

#### 3.4.2 Unpacking the Subsystem

Select a working space with enough room to convert the front panel of the crate into a ramp. Unpack your SMDI subsystem and verify that all components listed on the shipping invoice are present. The unpacking procedure is as follows:

1. Remove the vertical bands that hold the lid on the shipping crate.



SM8002-2111

Figure 3-3. The Closed Shipping Crate

2. With an assistant, lift the lid off the crate.
3. Remove the clips from the four corners of the crate.
4. Lift and remove the front panel of the crate, but do not discard it because it also functions as the ramp on which to roll the subsystem off the shipping palette.
5. Remove the U-shaped ramp-support bracket, which is made up of one long and two short 2x4s, from the palette. Place it on the floor, standing on its two short legs, in front of the open crate, where it can support the off-loading ramp.
6. Place one end of the front panel on the palette, in front of the SMDI subsystem, to make a ramp. Use the velcro fasteners that are provided to fasten one end of the panel to the palette and the other end to the two-foot ramp-extension wedge (see Figure 3-4).

**CAUTION**

Be sure that someone helps you unload the subsystem, and that you use the ramp-extension wedge, so that the subsystem does not drop the last two inches from the ramp to the floor.

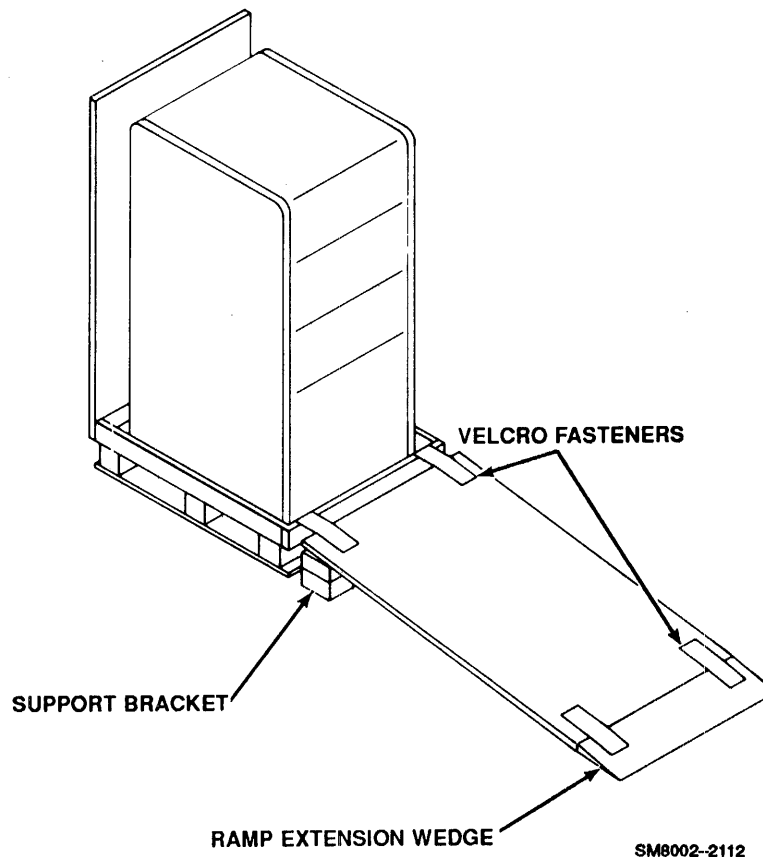
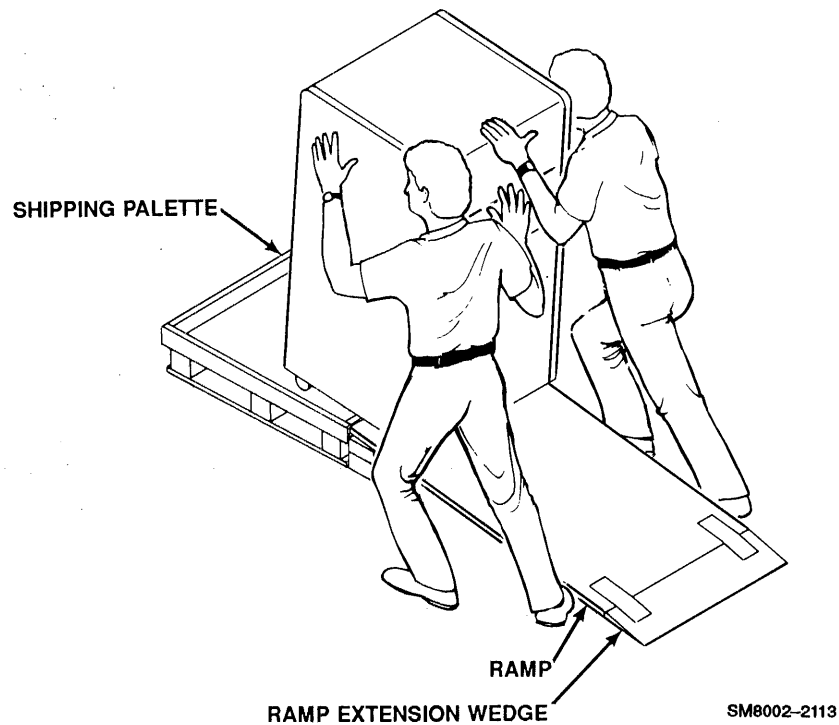


Figure 3-4. Converting the Front Panel into a Ramp

7. Remove the back and side panels of the crate, and the styrofoam blocks from inside the crate.
8. With an assistant, roll the subsystem on its casters down the ramp (see Figure 3-5). Remove the plastic bag from the subsystem, but save all packing materials in case you must reship it.



*Figure 3-5. Rolling the Subsystem down the Ramp*

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### **3.4.3 Visually Inspecting the Subsystem**

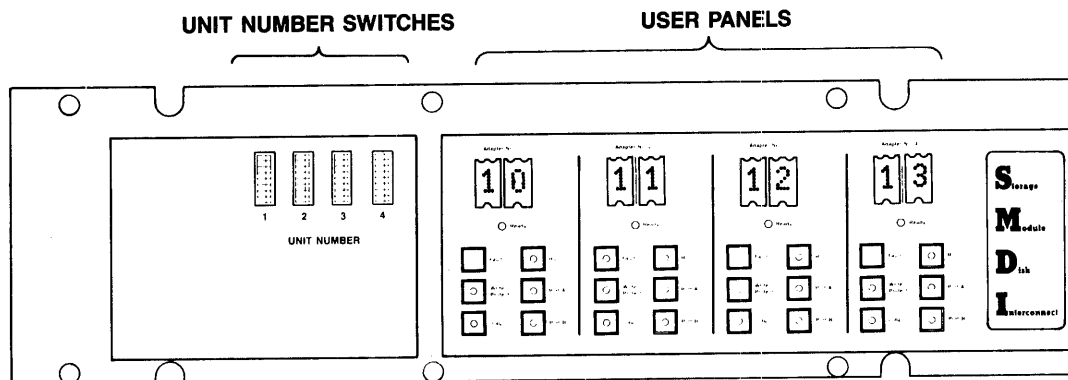
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Verify that the model or part number (P/N) designation, revision level, and serial numbers agree with those on the shipping invoice and purchase order. Visually inspect the subsystem for such items as bent or broken connector pins, damaged components, or any other visual evidence of physical damage. Confirm that there are no cracks or dents in the cabinet, and no damaged components.

These verifications are important to confirm warranty. If you find evidence of either physical damage or identity mismatch, notify an Emulex representative immediately.

### 3.5 SMDI Front Panel

The front panel of the SMDI chassis contains four Unit Number switches and four user panels (one for each drive). The Unit Number switches are on the left side of the chassis, behind the front faceplate. The faceplate is held on by pressure snaps, and can be pulled off easily. Each of the four user panels includes a 2-digit display as well as LEDs and switches (see Figure 3-6).

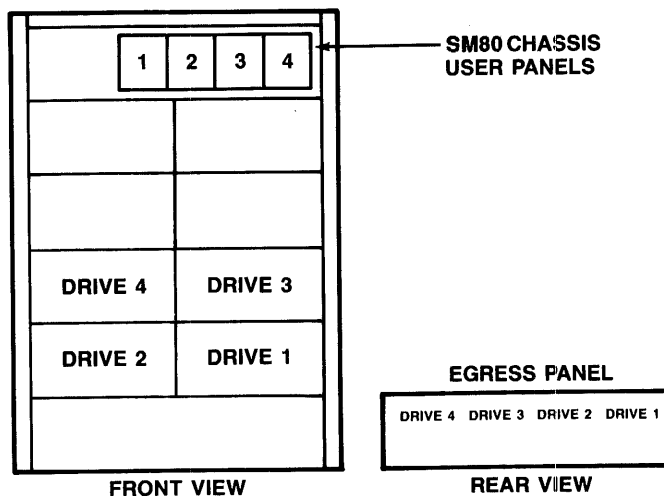


SM8002-1665A

Figure 3-6. SMDI Displays, LEDs, and Switches

#### 3.5.1 User Panel Arrangement

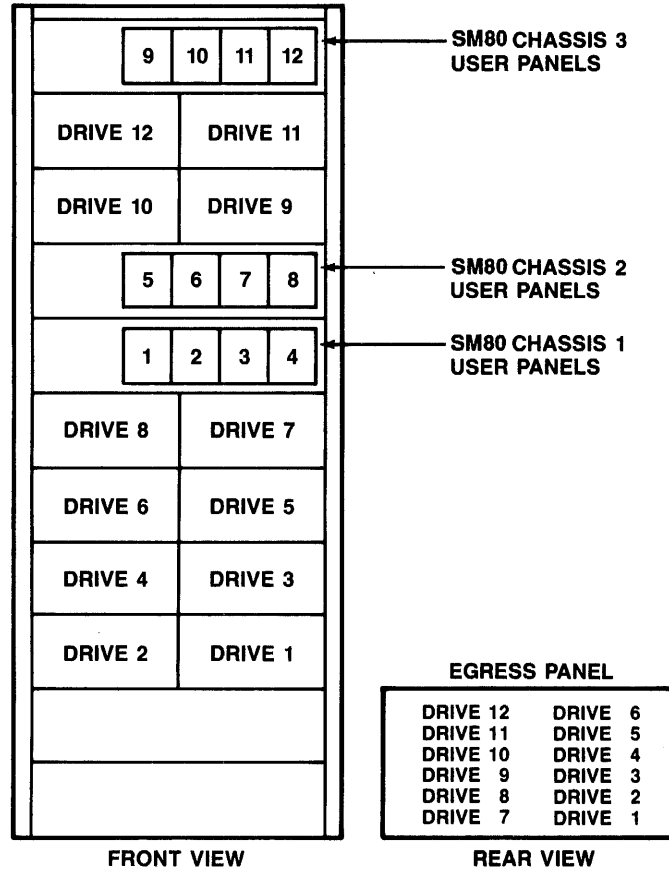
Model SM2X2-4, a low-boy cabinet, holds only one SMDI chassis. The bottom right drive corresponds to the user panel for adapter number 1; the bottom left corresponds to adapter number 2. Drive 3 is above drive 1, and drive 4 is above drive 2. Figure 3-7 correlates user panels, disk drives, and SDI cable egress panel connectors. The user panels and drives are in the front of the cabinet; the egress panel is in the rear.



SM8002-1910

Figure 3-7. Correlation of User Panels, Disk Drives, and SDI Cable Egress Panel in Model SM2X2-4

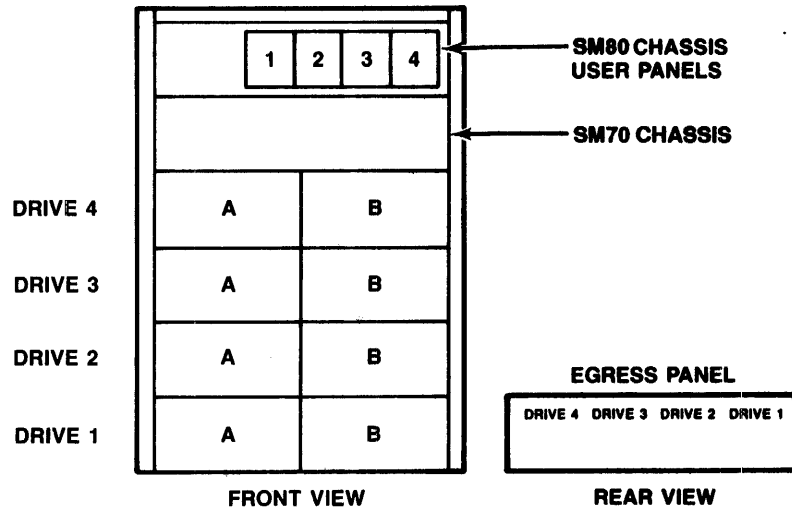
Model SM2X6-12, a high-boy cabinet, can contain up to three SM80 chassis. From the front, drive 1 is in the lower right-hand corner of the cabinet. It is controlled from user panel 1. The drives are then sequentially numbered from right to left, and from bottom to top. The user panels, on the other hand, are numbered sequentially from *left to right*, and from bottom to top (see Figure 3-8).



SM8002-1912

Figure 3-8. Correlation of User Panels, Disk Drives, and Egress Panel Drive Identification in Model SM2X6-12

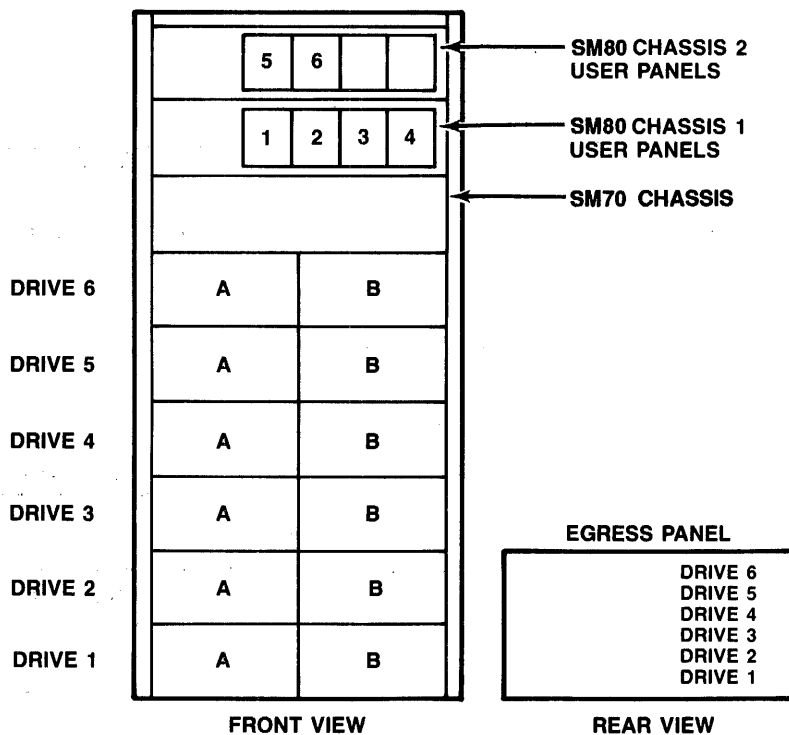
Model SM7X2-4, a low-boy cabinet, contains one SM80 chassis, up to four logical drives (up to eight physical drives), and an Emulex SM70 adapter for each logical drive. The first X in the model number represents the drive type, either 850 MB or 1120 MB, and the final digit represents the number of logical drives. Figure 3-9 correlates logical drives (from 1 through 4), the two physical drives (A and B) that make up a logical drive, SMDI user panel, and SDI cable egress panel connectors.



SM8002-1911

Figure 3-9. Correlation of User Panels, Disk Drives, and Egress Panel Drive Identification in Model SM7X2-4

Model SM7X8-6, a high-boy cabinet, can contain up to two SM80 chassis. Figure 3-10 correlates logical drives (from 1 through 6), the two physical drives (A and B) that make up each logical drive, SMDI user panels, and SDI cable egress panel connectors.



SM8002-1909

Figure 3-10 Correlation of User Panels, Disk Drives, and Egress Panel Drive Identification in Model SM7X8-6



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### 3.5.2 Unit Number Switches

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Set the Unit Number switches, which are located on the left side of the SM80 chassis, behind the front faceplate (see Figure 3-11). VMS and various disk utilities refer to SDI drives with a decimal unit number. If possible select a number less than 99. If you cannot, Emulex provides the ability to specify hexadecimal numbers to accommodate display of numbers larger than 99.

Switch SW1-3 on each adapter determines whether the display of the unit number, which appears below the corresponding adapter number on the SMDI user panel, should be interpreted as decimal or hexadecimal digits. In the default setting (SW1-3 set to ON), the display gives two decimal digits, with a range in unit numbers from 0-99, decimal. If SW1-3 is changed to OFF, the display gives two hexadecimal digits, with a range 0-FB hex (0-251 in decimal values).

#### WARNING

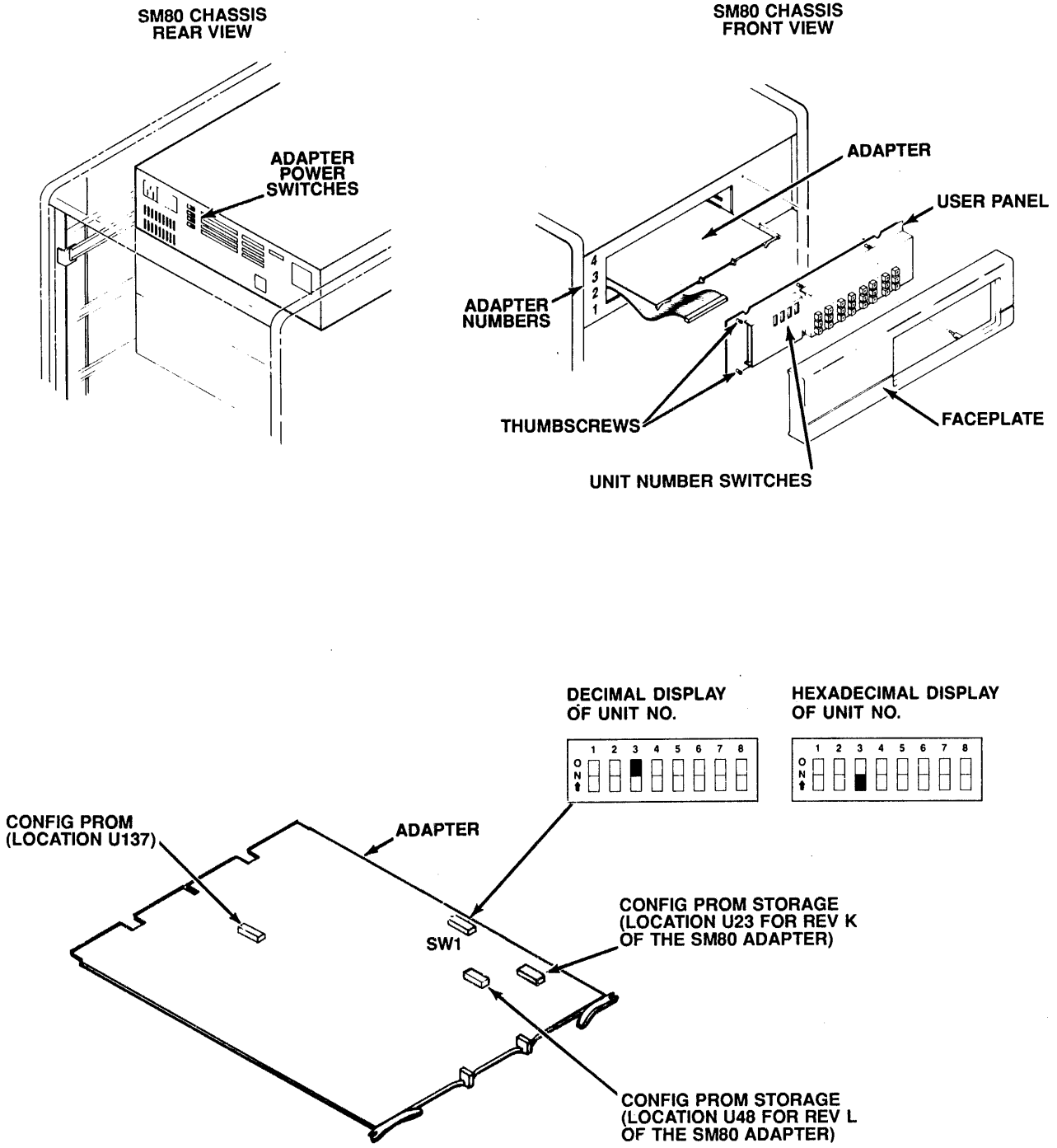
Before removing any adapter, turn off the power for its slot. Adapter power ON/OFF switches are located on the back of the SM80 chassis. Like the adapters themselves, the switch with the highest number is at the top. If the fan assembly is on the back of the cabinet, loosen its two thumbscrews, and swing it out, in order to gain access to the switches.

Using Figure 3-11 as a guide, remove the faceplate and metal user panel by turning their six thumbscrews and pulling them directly forward. Use a small tool, such as a screwdriver, to change the switch setting.

Each unit in the SMDI cabinet must have its own unit number, that is, a unique switch setting. If decimal display mode is selected on the disk drive adapter (SW1-3 set to ON, the default setting), the unit numbers must be in the range 0-99 decimal (00-63 hex). If you need more than 99 (decimal) unit numbers, set SW1-3 OFF, and use hexadecimal numbering. If an invalid unit number is selected (more than 99 in decimal mode or more than FB in hexadecimal mode), the unit number display flashes "FF" until a valid setting is placed in the unit number switches.

#### NOTE

The unit-identification plug or switch located on each SMD drive must be set to 0 for either a single-drive unit or for drive A of a dual-drive (SM70 adapter) unit. It must be set to 8 for drive B of a dual-drive unit. The unit-identification plug or switch located on each ESDI drive must be set to 1.



SM8002-2032

Figure 3-11. Accessing the Adapter and Setting Switch SW1-3

Each drive corresponds to a switchpack containing eight switches, which represent binary numbers as follows: switch 1 is bit 0, switch 2 is bit 1, and so forth. OFF represents 0, and ON represents 1. Thus all switches OFF = 00 hex, and all switches ON = FF hex. Table 3-2 gives the full set of possible values in both decimal (Dec) and hexadecimal (Hex).

Table 3-2. Unit Number Switch Settings

Dec	Hex	Unit No. Switch 87654321	Dec	Hex	Unit No. Switch 87654321	Dec	Hex	Unit No. Switch 87654321
0	0	00000000	42	2A	00101010	84	54	01010100
1	1	00000001	43	2B	00101011	85	55	01010101
2	2	00000010	44	2C	00101100	86	56	01010110
3	3	00000011	45	2D	00101101	87	57	01010111
4	4	00000100	46	2E	00101110	88	58	01011000
5	5	00000101	47	2F	00101111	89	59	01011001
6	6	00000110	48	30	00110000	90	5A	01011010
7	7	00000111	49	31	00110001	91	5B	01011011
8	8	00001000	50	32	00110010	92	5C	01011100
9	9	00001001	51	33	00110011	93	5D	01011101
10	A	00001010	52	34	00110100	94	5E	01011110
11	B	00001011	53	35	00110101	95	5F	01011111
12	C	00001100	54	36	00110110	96	60	01100000
13	D	00001101	55	37	00110111	97	61	01100001
14	E	00001110	56	38	00111000	98	62	01100010
15	F	00001111	57	39	00111001	99	63	01100011
16	10	00010000	58	3A	00111010	100	64	01100100
17	11	00010001	59	3B	00111011	101	65	01100101
18	12	00010010	60	3C	00111100	102	66	01100110
19	13	00010011	61	3D	00111101	103	67	01100111
20	14	00010100	62	3E	00111110	104	68	01101000
21	15	00010101	63	3F	00111111	105	69	01101001
22	16	00010110	64	40	01000000	106	6A	01101010
23	17	00010111	65	41	01000001	107	6B	01101011
24	18	00011000	66	42	01000010	108	6C	01101100
25	19	00011001	67	43	01000011	109	6D	01101101
26	1A	00011010	68	44	01000100	110	6E	01101110
27	1B	00011011	69	45	01000101	111	6F	01101111
28	1C	00011100	70	46	01000110	112	70	01110000
29	1D	00011101	71	47	01000111	113	71	01110001
30	1E	00011110	72	48	01001000	114	72	01110010
31	1F	00011111	73	49	01001001	115	73	01110011
32	20	00100000	74	4A	01001010	116	74	01110100
33	21	00100001	75	4B	01001011	117	75	01110101
34	22	00100010	76	4C	01001100	118	76	01110110
35	23	00100011	77	4D	01001101	119	77	01110111
36	24	00100100	78	4E	01001110	120	78	01111000
37	25	00100101	79	4F	01001111	121	79	01111001
38	26	00100110	80	50	01010000	122	7A	01111010
39	27	00100111	81	51	01010001	123	7B	01111011
40	28	00101000	82	52	01010010	124	7C	01111100
41	29	00101001	83	53	01010011	125	7D	01111101

(Continued on next page)

Table 3-2. Unit Number Switch Settings (Continued)

Dec	Hex	Unit No. Switch 87654321	Dec	Hex	Unit No. Switch 87654321	Dec	Hex	Unit No. Switch 87654321
126	7E	01111110	170	AA	10101010	214	D6	11010110
127	7F	01111111	171	AB	10101011	215	D7	11010111
128	80	10000000	172	AC	10101100	216	D8	11011000
129	81	10000001	173	AD	10101101	217	D9	11011001
130	82	10000010	174	AE	10101110	218	DA	11011010
131	83	10000011	175	AF	10101111	219	DB	11011011
132	84	10000100	176	B0	10110000	220	DC	11011100
133	85	10000101	177	B1	10110001	221	DD	11011101
134	86	10000110	178	B2	10110010	222	DE	11011110
135	87	10000111	179	B3	10110011	223	DF	11011111
136	88	10001000	180	B4	10110100	224	E0	11100000
137	89	10001001	181	B5	10110101	225	E1	11100001
138	8A	10001010	182	B6	10110110	226	E2	11100010
139	8B	10001011	183	B7	10110111	227	E3	11100011
140	8C	10001100	184	B8	10111000	228	E4	11100100
141	8D	10001101	185	B9	10111001	229	E5	11100101
142	8E	10001110	186	BA	10111010	230	E6	11100110
143	8F	10001111	187	BB	10111011	231	E7	11100111
144	90	10010000	188	BC	10111100	232	E8	11101000
145	91	10010001	189	BD	10111101	233	E9	11101001
146	92	10010010	190	BE	10111110	234	EA	11101010
147	93	10010011	191	BF	10111111	235	EB	11101011
148	94	10010100	192	C0	11000000	236	EC	11101100
149	95	10010101	193	C1	11000001	237	ED	11101101
150	96	10010110	194	C2	11000010	238	EE	11101110
151	97	10010111	195	C3	11000011	239	EF	11101111
152	98	10011000	196	C4	11000100	240	F0	11110000
153	99	10011001	197	C5	11000101	241	F1	11110001
154	9A	10011010	198	C6	11000110	242	F2	11110010
155	9B	10011011	199	C7	11000111	243	F3	11110011
156	9C	10011100	200	C8	11001000	244	F4	11110100
157	9D	10011101	201	C9	11001001	245	F5	11110101
158	9E	10011110	202	CA	11001010	246	F6	11110110
159	9F	10011111	203	CB	11001011	247	F7	11110111
160	A0	10100000	204	CC	11001100	248	F8	11111000
161	A1	10100001	205	CD	11001101	249	F9	11111001
162	A2	10100010	206	CE	11001110	250	FA	11111010
163	A3	10100011	207	CF	11001111	251	FB	11111011
164	A4	10100100	208	D0	11010000	252	FC	Not Allowed.
165	A5	10100101	209	D1	11010001	253	FD	Not Allowed.
166	A6	10100110	210	D2	11010010	254	FE	Not Allowed.
167	A7	10100111	211	D3	11010011	255	FF	Not Allowed.
168	A8	10101000	212	D4	11010100			
169	A9	10101001	213	D5	11010101			

---

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3.6

Powering up the SMDI

Power up the SMDI subsystem as follows:

- 7/12/88
1. Plug the subsystem AC power cord into the appropriate AC socket. Turn ON the main breaker on the power distribution unit located at the rear of the SMDI cabinet.

**NOTE**

In 42-inch SM70 cabinets, you must remove the front kick plate in order to gain access to the breaker.

2. The SMDI performs its power-up self-test. If the self-test is successful, the unit number will be displayed in the unit number displays, and the fault light remains OFF.
3. For drives with manual controls, press the Start switch on the front panel of the drive. The drives should not spin up. If any drive does, the Local/Remote switch is in the Local position. See Appendix B, and set the switch to the Remote position.
4. Run the SMDI internal diagnostics (see the next subsection).
5. For each drive in the subsystem, press (1) the Run switch and (2) the Port A or B switches on the front user panel, and wait for the drives to spin up. When the Ready LED lights, the subsystem is ready for operation.

---

## 3.7 SMDI Internal Diagnostics

---

The SMDI internal diagnostics should be run on each drive before the SMDI subsystem is brought online. Running the diagnostics is a simple process, as follows:

1. Turn OFF all the switches on the user panel.
2. One of the diagnostic tests requires that loopback plugs be placed on the transition panel or at the controller end of the SDI cable. Unplug each SDI cable from the transition panel or from the controller, and install a loopback plug. The plug goes either directly into the transition panel, or, with a double male adapter, to the end of an SDI cable. Because the loopback plug at the end of the cable tests the entire communication path, from the drive to the controller, it is the preferred testing method. Install plugs on both port A and port B.
3. Power up the SMDI (see subsection 3.6).
4. Make sure no errors are posted on the Unit Number display. If any errors are pending, or if you are not sure what the display means, press the Fault switch to clear the error condition.
5. Press the Diagnostic switch. The Diagnostic LED should go on. To include the optional user panel test in the diagnostic sequence, press the Write Protect switch. The Write Protect LED should go on.
6. Press the Run switch. SMDI begins running a series of diagnostic tests. The number of the test currently running is displayed in the Unit Number display and should change frequently.
7. If the Write Protect LED is on, after a few seconds the Ready LED lights to signal the start of the user panel test. Press each switch on the user panel on, then off, to make sure the corresponding LED turns on and off in concert with the switch. *Press the Diagnostic and Run switches on before continuing testing.*

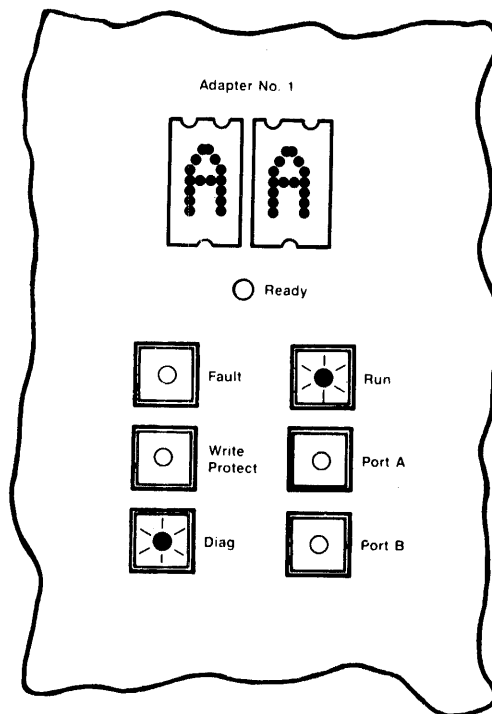
Set each Unit Number switch on in turn, and make sure that the hexadecimal number displayed in the 2-digit display matches the Unit Number switch setting. When the unit number equals FF (all unit number switches on), the test is finished and SMDI goes through the rest of its diagnostic sequence.

8. Be sure to reset the Unit Number switches after the diagnostics are finished and before turning off the Diagnostic switch. Leave the Run switch on so that the drive does not spin down. Put the Write Protect switch in the appropriate position.

If a test fails, the Fault LED lights up, and the Unit Number display shows an error code. Most error codes indicate hardware failures that are not user serviceable; if one of these error codes is displayed, call Emulex Technical Support, at (800) EMULEX-3 outside California or (714) 662-5600 inside California, for instructions.

Some of the error codes indicate easily corrected problems (for example, bad cables, drives not connected, loopback connector not installed). Tables 5-2 and 5-3 list these error codes and suggest some remedies.

If the diagnostics complete successfully, the Unit Number display reads AA hex (see Figure 3-12). Press the Diagnostic switch to end the diagnostics. When they are completed successfully on all drives, the subsystem is ready to be brought online.



SM8002-1666

Figure 3-12. Successful Diagnostic Display Status on a User Panel

If you plan to use the drive right away, leave the Run switch on, reattach the SDI cabling, and select a port. Be sure to remove the SDI loopback connectors before attempting to enable the port switches. If port A or B is enabled and the SDI loopback connectors are left in place, the adapter will hang, with either a blank display or a flashing FF hexadecimal. To clear this condition, cycle the adapter power switch on the rear of the appropriate adapter OFF, then back ON again (see Figure 3-11).

---

## 3.8 External SDI Cables

---

The SMDI subsystem requires external SDI cables from the transition panel at the back of the SMDI cabinet to the transition panel on your SDI controller. The SMDI transition panel contains two ports for each drive (A and B).

If both the A and B ports are used, they must be attached to similar but separate controllers (for example two HSC50 or HSC70 controllers) on a cluster or system that supports automatic failover. If this is done, both ports should be enabled by pressing the Port A switch and the Port B switch. SMDI supports static dual porting only, not dynamic dual access. Only one port can be active at a time, so only one port LED will light at a time.

External cables between the SMDI and the controller are not standard equipment with the subsystem. However, they can be ordered as options from Emulex, in various lengths to suit your needs.

---

## 3.9 Installation with the HSC50 or HSC70

---

Before installing the SMDI with the HSC50 or HSC70, please note the following points. First, do not attempt to format the drives; they come formatted from the factory. Second, HSC software must be version 370 or above. Older versions use a Replacement Block Number (RBN) that is represented by a maximum 15-bit word, and will not recognize the higher RBNs required for drives larger than 1.2 GB.

To install the SMDI with the HSC50 or HSC70, perform the following steps:

1. Ascertain the drive unit numbers of existing SDI disks by running `<SETSHO> SHO DISKS`. Select unused unit numbers for your SDI disks, making sure that no two units have the same numbers. Enter the numbers on the user panel (see subsection 3.5.2).
2. Ascertain requestor (K.SDI) `<SETSHO> SHO REQ`. Verify that you have REV 34 or higher.

### NOTE

Below REV 37, SERDES overrun errors can be reported when ILEXER is running in the user area (see step 7).

Locate the corresponding male connectors for the external SDI cable (see the section on "General Information" in the HSC50 or HSC70 Service Manual or, if there is one, a chart on the back of the HSC unit).

3. Connect the external SDI cable from the SMDI chassis Port A for each drive to the selected connector on the HSC, which you ascertained from the HSC manual. Now run Port B if dual porting.



4. On the SMDI, depress the Port Select Switch(es): A or B or both.
5. On the HSC, run SHO DISKS again, as you did in step 1. New disk units should be shown in the list.
6. Run the VERIFY utility on each disk in order to confirm that the disk drive has been properly formatted, and is ready for use. The VERIFY utility will print out the contents of the FCT and RCT tables, and will then scan the disk. If it finds a block that has a problem with ECC or transient errors, it will print out the LBN; these blocks can then be revectorred with the DKUTIL utility. The VERIFY utility finishes by printing the statistics for the run, and confirming that the drive is OK.

Run the VERIFY utility as follows:

```
HSC> RUN DD1:VERIFY
```

```
VERIFY-Q Enter the unit number to verify (U) [D0]? D0
VERIFY-Q Was this unit just FORMATted (Y/N) [Y]? Y
VERIFY-Q Print informational (non-warning) messages (Y/N) [N]? Y
VERIFY-Q Report transient errors by block (Y/N) [N]? Y
```

7. Run the ILEXER drive-reliability diagnostic, which can test 12 disks simultaneously for the specified number of minutes, on all drives in the SMDI chassis. To run ILEXER, do the following:

```
HSC50> RUN DD1:ILEXER
```

```
ILEXER>D>17:35 Execution Starting
```

```
ILEXER>D>Tape Interface Not Available
```

```
Drive Unit Number (U) []? D8
Access User Data Area (Y/N) [N]? Y
Are You Sure (Y/N) [N]? Y
Start Block Number (D) [0]? 0 (To ensure that testing spans both physical
drives, use 800000 for SM70X units, and 1200000 for SM71X units.)
End Block Number (D) [0=MAX]? 0
Initial Write Test Area (Y/N) [N]? Y
Terminate Test on Drive Following Initial Write (Y/N) [N]? N
Data Pattern (0-15) (D) [15]? 15
Sequential Access (Y/N) [N]? N
Read Only (Y/N) [N]? N
Write Only (Y/N) [N]? N
Data Compare (Y/N) [N]? Y
Data Compare Always (Y/N) [N]? N
Another Drive (Y/N) []? N (Or Y if testing more than one at a time)
Average Disk Transfer Size in Sectors (1 to 400) [10]? 10
Run Time in Minutes (1 to 37767) [10]? 60
Hard Error Limit (DN) [20]? 20
Narrow Error Report (Y/N) [N]? N
Enable Soft Error Reports (Y/N) [N]? Y
```

ILEXER will begin execution, printing a progress report every 30 seconds. This time period can be changed by typing <ctrl-G>, and answering the number of seconds between progress reports. The test will run for the specified number of minutes, unless the hard error limit is reached. If it is, the drive will be dropped from testing; all other drives will continue the test. To prevent data compare errors, always select that the data option pattern be written on the disk.

8. After running ILEXER successfully, log into VMS and perform INITIALIZE, MOUNT, and BACKUP/VERIFY on each drive. You can abbreviate these commands as INIT, MOU, and BAC/VER, respectively. From the VMS system, drives attached to the SM60 adapter are referred to as units "DJ...", and those attached to the SM80 adapter are referred to as units "DU...."

SM7XX units of the SMDI (those with the doubled-up CDC drives and the SM70 adapter) require special parameters with the VMS INIT command. This is both to accommodate the large capacity and to optimize use of the separate head positions in the two drives of each unit. SM71X units (those with the CDC 9720-1120 drive) require the parameter "/CLUSTER SIZE = 4" to override the default ("/CLUSTER SIZE = 3"). This is optional for SM70X units (those with the CDC 9720-850 drive).

The default parameter "/INDEX = MIDDLE" is not recommended for SM7XX units because it actually places the index file at the end of drive A and the beginning of drive B. Therefore, use the following parameters to place the index file in the middle of the second drive:

SM70X units: /INDEX = 1944810

SM71X units: /INDEX = 2560950

9. Check Dual Port Failover by deselecting the port switch that has the illuminated LED (Select).

---

### 3.10 Installation with the KDA50, KDB50, or UDA50

---

To install the SMDI with the KDA50, KDB50, or UDA50, perform the following steps:

#### NOTE

Do not attempt to format the drives; they come formatted from the factory.

1. If necessary ascertain the controller mnemonic with the VMS utility MCR SYSGEN SHO/CON.
2. Ascertain the drive unit numbers for the SDI disks by logging into VMS and performing SHO DEV D<CR>. Make sure that no two units have the same number. Then set the switches on the SMDI user panel (see subsection 3.5.2).

3. Connect the external SDI cable from the SMDI chassis, Port A or B, to the cable panel for the appropriate controller on the back of the system.
4. On the SMDI, depress the Port Select Switch, either A or B.
5. With VMS, perform SHO DEV D. New disk units should be shown in List.
6. With VMS, perform INITIALIZE, MOUNT, and BACKUP/VERIFY on all disks in SMDI (you can abbreviate these commands as INIT, MOU, and BAC/VER, respectively). Diagnostics are not necessary.

SM7XX units of the SMDI (those with the doubled-up CDC drives and the SM70 adapter) require special parameters with the VMS INIT command. This is both to accommodate the large capacity and to optimize use of the separate head positions in the two drives of each unit. SM71X units (those with the CDC 9720-1120 drive) require the parameter `"/CLUSTER SIZE=4"` to override the default (`"/CLUSTER SIZE=3"`). This is optional for SM70X units (those with the CDC 9720-850 drive).

The default parameter `"/INDEX=MIDDLE"` is not recommended for SM7XX units because it actually places the index file at the end of drive A and the beginning of drive B. Therefore, use the following parameters to place the index file in the middle of the second drive:

SM70X units: `/INDEX=1944810`

SM71X units: `/INDEX=2560950`



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## **4.1 Overview**

---

This section describes the procedure for installing disk-drive add-on kits, adapter boards, and adapter chassis. It details internal and external cabling, and it describes subsystem accessories and spare parts.

You can upgrade those of your existing drives that are supported by SMDI, and add them to your subsystem, by ordering one or more drive add-on kits. Call Emulex for pricing details. Emulex Field Service or an equivalent third-party service organization does the installation.

---

## **4.2 Installing Drive Add-on Kits**

---

Installing a drive add-on kit in the SMDI subsystem 19-inch rack requires a standard screwdriver and a Phillips-head screwdriver. Removing and replacing the back panel on the subsystem cabinet requires an Allen wrench.

### **NOTE**

All expressed and implied warranties concerning the mechanical and electrical reliability of this subsystem will be considered null and void if the subsystem is operated with any of the cover plates or outer shells removed from the disk drives. These covers must be in place to maintain proper air flow and cooling throughout the subsystem chassis.

---

## **4.3 Preparing for Installation**

---

Prepare for installation of drive add-on kits as follows:

1. Power down the subsystem, and unplug the unit from all electrical outlets before installing any add-on kits.
2. Check the contents of your drive add-on kit (see subsection 4.4).
3. Choose a location for your add-on drive and adapter (subsection 4.5).
4. Remove both the back panel of the subsystem cabinet and the filler plates from the drive slots that you wish to fill (subsection 4.6).
5. Install the drive add-on kit (subsection 4.6.1 or 4.6.2, depending on your add-on drive).

In addition to the above-mentioned steps that you take before drive installation, plan on the following steps after it. These steps are detailed later in this section of the manual.

1. For each add-on drive, you must install an adapter (SM60, SM70, or SM80) in the subsystem chassis.
2. You might need to install an additional SM80 chassis.
3. Internal and external cabling.
4. Installing the power cord.

## 4.4 Checking Your Drive Add-on Kit Contents

Table 4-1 lists the contents of each drive add-on kit package for domestic models. To obtain the model numbers of the corresponding international models, add the prefix *I* to the domestic model number. Each drive comes with a manufacturer's manual, which provides parts lists and drawings.

Table 4-1. Contents of Drive Add-On Kits

Add-On Kit Model Number	Description
S820-1	663 MB 8-inch SMD disk drive, SM80 adapter, drive terminator card, drive mounting tray assembly, SMD A and B cables.
S820-2	Two 663 MB 8-inch SMD disk drives, two SM80 adapters, two drive terminator cards, drive mounting tray assembly, SMD A and B cables.
S821-1	873 MB 8-inch SMD disk drive, SM80 adapter, drive terminator card, drive mounting tray assembly, SMD A and B cables.
S821-2	Two 873 MB 8-inch SMD disk drives, two SM80 adapters, two drive terminator cards, drive mounting tray assembly, SMD A and B cables.
S883	1.05 GB 14-inch SMD disk drive, SM80 adapter, drive terminator card, SMD A and B cables.
S851	365 MB 14-inch SMD disk drive, SM80 adapter, drive terminator card, SMD A and B cable set.
S680	288 MB 5.25 inch ESDI PDM, SM60 adapter.
S660	598 MB 5.25 inch ESDI PDM, SM60 adapter.
SM600	SM600 chassis, SMD A and B cables.
S721-1	1.75 GB 8-inch paired SMD disk drives, SM80 adapter, drive terminator card, drive mounting tray assembly, SMD A and B cables.

---

## **4.5 Choosing a Location for Add-on Drives**

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Before you install your drive add-on kit, decide where you will place each drive and corresponding adapter in the subsystem cabinet. Subsystem models with 14-inch drives have up to four drives stacked vertically. The 8-inch and the 5.25-inch PDM disk drives can stack up to four drives in the low-boy cabinet, and up to twelve in the high-boy (see Figures 3-7 through 3-10).

### **WARNING**

Power down the subsystem, and unplug the unit from all electrical outlets before installing any add-on kits. Adjust the levelers at the four corners of the base of the cabinet. For stability, pull out the foot, adjust its leveler, install the bottom drives first, and do not pull more than one drive at a time forward on its slides (see Figure 4-1).

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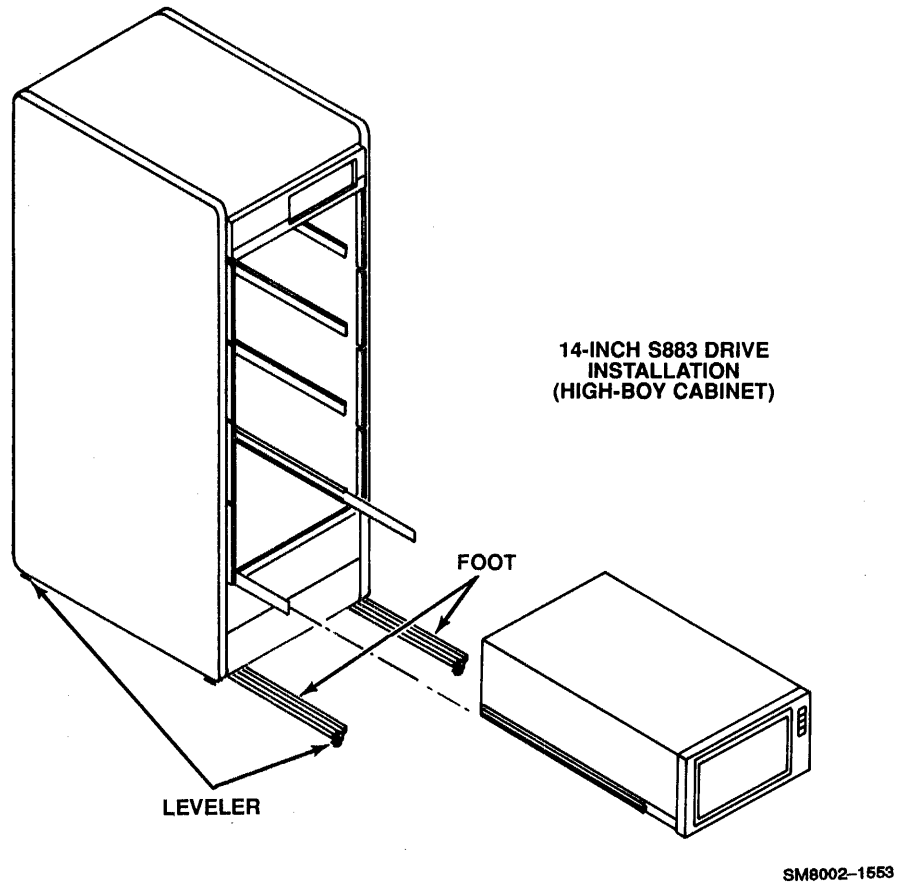
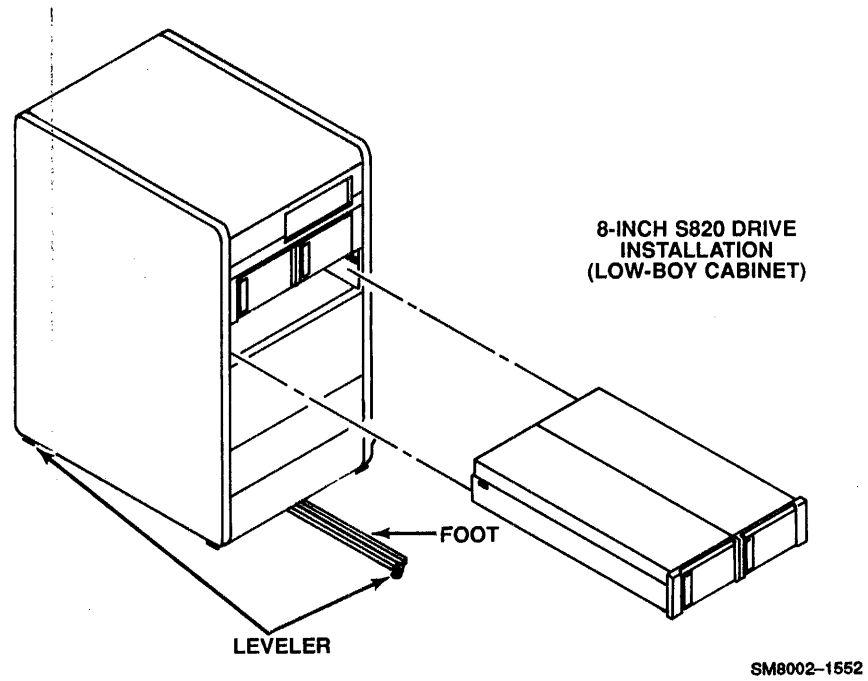
## **4.6 Installing Rack-mount Kits and Disk Drives**

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Remove the back panel of the subsystem cabinet with an Allen wrench. You will have to return the panel to its place after you have added the disk drive(s). Remove the filler plates from the empty drive slots in which you will add drives.

The following pages give the procedures for installing specific drives. Consult the drive manufacturer's manual, which is enclosed with the drive, for the following:

1. List of parts included with the disk drive
2. Instructions for unpacking and preparing the drive for installation in the subsystem cabinet
3. Discussion of drive installation, if you wish more information than appears below



*Figure 4-1. Pulling Out the Foot and Loading the Drives from the Bottom Up*



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#### **4.6.1 Installing S820 (CDC 9720-850) or S821 (CDC 9720-1120) Drives**

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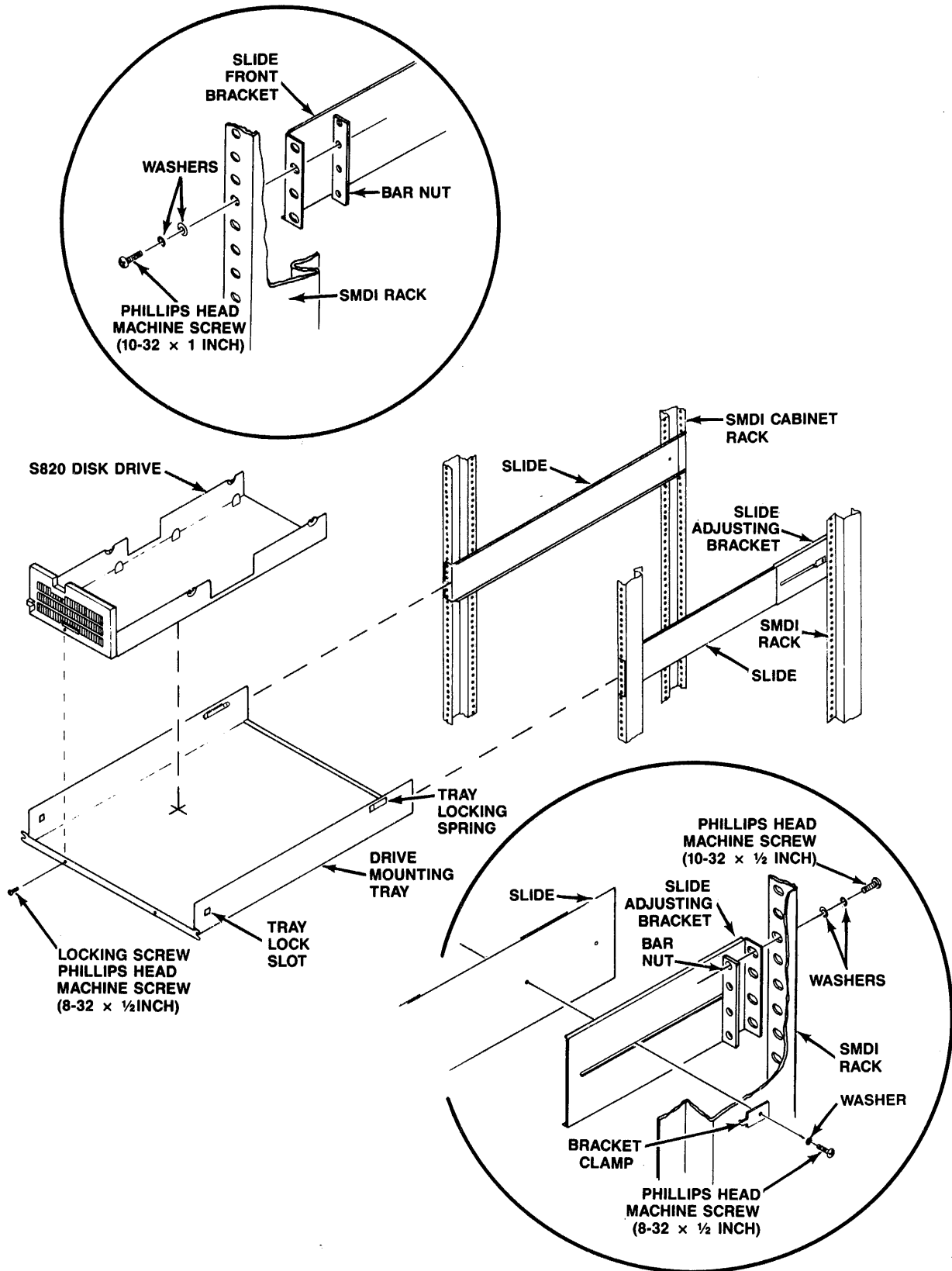
Refer to Figure 4-2, and install your S820 (CDC 9720-850) or S821 (CDC 9720-1123) add-on drive according to the following procedure:

1. Start the procedure by installing the rack-mounting kit. Remove its screws, and note that the four smaller screws (8-32 x 1/2 inch) are for attaching the slide-adjusting brackets on each side of the cabinet to the slides and for locking the two disk drives onto the mounting tray. All the other screws are the same size (10-32 x 1/2 inch).
2. Choose the location in the cabinet where you will install the slides. Count the number of holes down in the rack from the nearest item where you will install the slides in the rack. Count the same number of holes at each corner of the rack, so that the slides align.
3. Loosely attach a slide-adjusting bracket to each slide with a bracket clamp, washers, and screw.
4. Loosely install the slides in the subsystem cabinet rack by securing the front brackets and the slide-adjusting brackets to the cabinet rack with two screws and a bar nut at each corner of the rack. Orient the slides so that the tray will rest on the flat edge of the slides.

Install the screws and the nut plates as follows: for the rack front, screws go in the top and third holes of the front bracket, and for the rack rear, screws go in the top and bottom holes of the slide-adjusting bracket.

5. Set the slide-adjusting brackets as required for proper rack depth. Secure the slides to the rack, and the adjusting brackets to the slides.
6. Lift the drive tray, and guide it onto the slides. Continue pushing until the tray is in the rack. Ensure that there is no binding when you slide the drive tray in and out of the rack.

If you need to remove the tray from the rack, slide it out fully, press the tray locking springs, and remove it. To install a disk drive on a tray, slide the drive into position on the tray, and secure it in place with a locking screw, as shown in Figure 4-2.



SM8002-1556A

Figure 4-2. Installing the S820 (CDC 9720-850) and S821 (CDC 9720-1123)

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#### **4.6.2 Installing the SM600 Chassis and PDM (Portable Drive Module)**

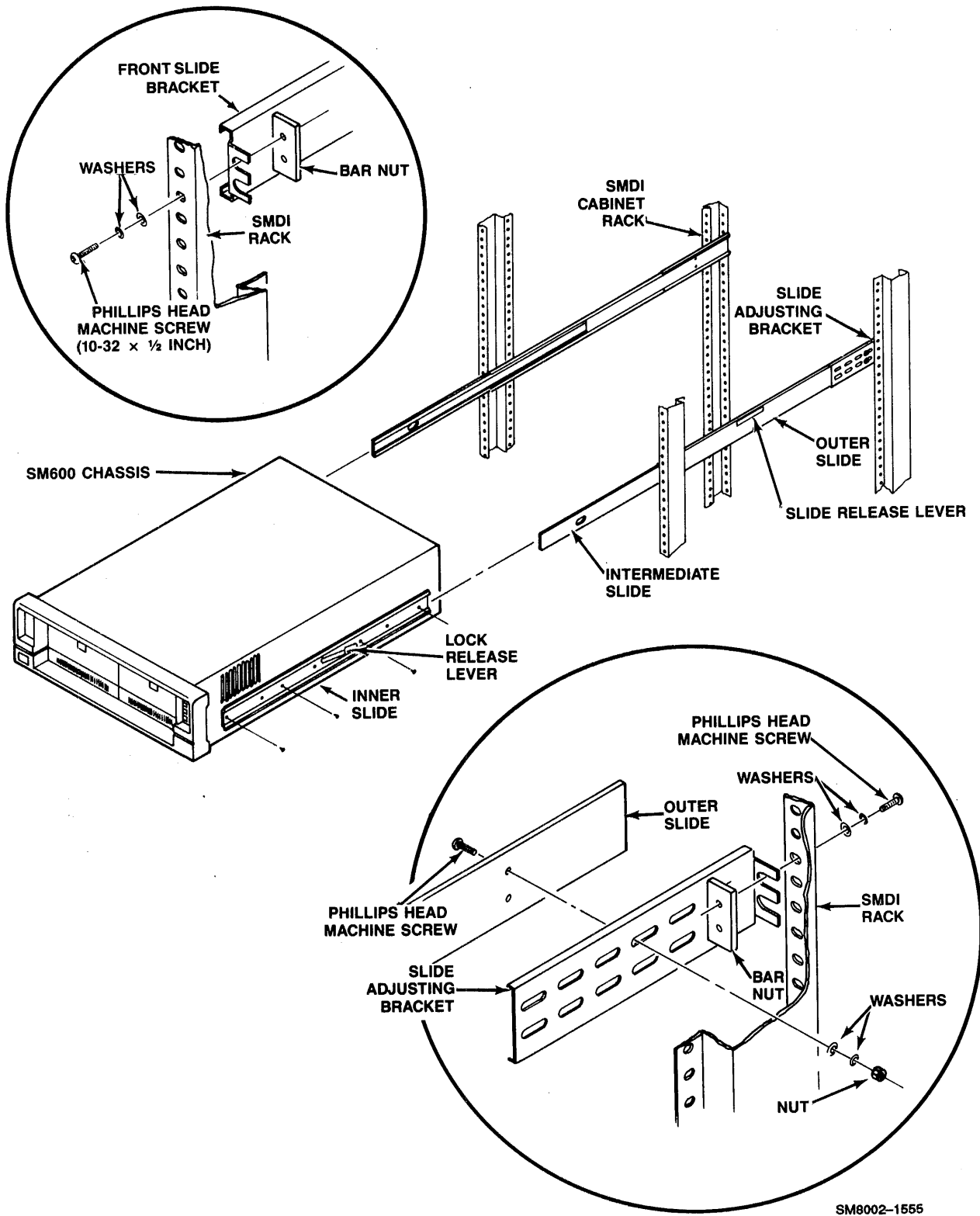
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Refer to Figure 4-3, and install your SM600 Chassis and add-on PDMs (Portable Drive Modules) as follows:

1. Install the inner slides on the SM600 chassis as follows. Position the slides so that the lock release lever facing towards the front of the SM600 chassis is tilted up. The slide release lever should also be tilted up, disengaged from the slide.

Align the four holes adjacent to the lock release lever on each slide with the four holes on the SM600 chassis. Fasten a Phillips-head screw in each of the four holes on each slide, for a total of eight screws.

2. Choose the location in the cabinet where you will install the slides. Count the number of holes down in the rack from the nearest item where you will install the slides in the rack. Count the same number of holes at each corner of the rack so that the slides align.
3. Loosely attach the slide-adjusting brackets to the outer slides.
4. Install the slides in the subsystem cabinet rack using a front slide bracket or slide-adjusting bracket, a bar nut, and two screws, at each of the four corners of the rack.
5. Tighten the screws that fasten the adjusting brackets to the slide assemblies.
6. Pull both intermediate slides to their fully extended position, making sure that each intermediate slide is locked into its extended position.
7. Slide the SM600 chassis into the rack-mounted rails by mating the intermediate slide rails with the inner slide rails on the disk drive. If the chassis resists sliding into the rack, check the mating of the rails.
8. Unlock the slide, and slide the SM600 disk drive chassis into the rack.



SM8002-1555

Figure 4-3. Installing the SM600 Slide Rails and Chassis

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## **4.7 Installing the Adapter Chassis and Board**

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For each add-on drive, you might need to add an SM80 chassis, and you must install an SM60, SM70, or SM80 adapter. Use the following procedure.

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### **4.7.1 Installing an Additional SM80 Adapter Chassis**

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If you need to install an additional SM80 adapter chassis, use Figure 4-3 as a guide. It depicts a drive, but adapter chassis follow the same procedure.

---

### **4.7.2 Installing the Adapter Board**

---

Figure 3-11 depicts adapter installation, and the following procedure describes it:

1. Confirm that the switch on the adapter is set for your type of disk drive. The switch settings for all of the add-on disk drives are shown in Table A-2 in Appendix A.
2. Remove the faceplate and the metal user panel, which cover the slots that hold the adapters, from the subsystem chassis as follows. Pull forward on the faceplate to pop it off the chassis, and remove the screws that secure the user panel in place. Unplug the ribbon cable that is plugged into a connector on the inside of the front panel. You should now be able to lift the panel away from the chassis.
3. Choose a slot for installing the adapter in the adapter chassis. Each adapter slot corresponds to one of the user panels on the adapter chassis. The top slot, adapter number 4, corresponds to the user panel 4. The bottom slot, adapter number 1, corresponds to user panel 1. Place the adapter in the slot so that it will correspond to the user panel that you wish your disk drive to use.
4. Slide the adapter into the slot you have chosen. The board should be oriented so that the switch block is on the top right-hand side. Each adapter has two metal extractor handles. As you slide the adapter into place, make sure that the tips of the extractor handles are inserted into the chassis holes. Push the extractor handles in, until the adapter is firmly seated, and the handles are flush against the front of the adapter. Reconnect the cable connector for the adapter to the user panel. Put the user panel and faceplate back on the adapter chassis.
5. Enable the adapter slot: on the back of the adapter chassis, turn on the power switch that is located to the left of the adapter slot where you placed the PCB (see the top left portion of Figure 3-11).

#### **NOTE**

Some models require you to swing the fan assembly out in order to gain access to the adapter power switch.

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## **4.8 Internal Cabling: SDI and SMD**

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The following subsections detail the internal cabling (SDI and SMD). Use the following order of procedures for each SM80 chassis.

1. Installing internal SDI (flat) cables. This procedure consists of the following steps:
  - a. Routing each SDI cable in the U-channel that runs down the right side of the SMDI cabinet as you view it from the rear.
  - b. Connecting each SDI cable to the transition panel at the bottom of the cabinet.
  - c. Assembling an SDI cable-grounding assembly for each SDI cable, and connecting it, along with the SDI cable, to the SM80 chassis.
2. Assembling each SMD cable-grounding assembly, and attaching it to the SM80 chassis.
3. Connecting each SMD (round) cable to both the SM80 chassis and the SMD cable-grounding assembly.
4. Tightening all the screws that hold the cable-grounding assemblies to the SM80 chassis.

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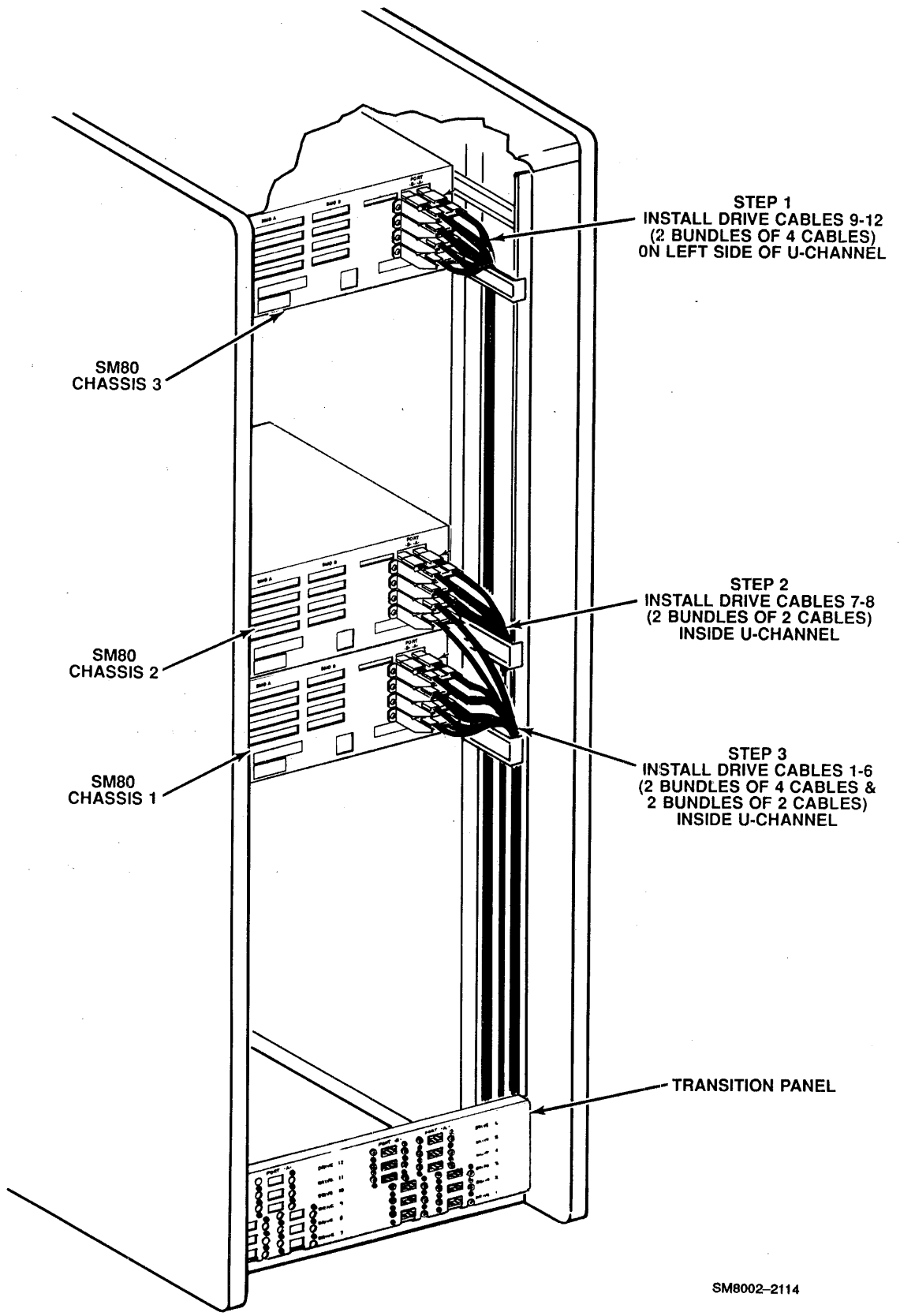
### **4.8.1 Routing Internal SDI Cables**

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When you install an additional SM80 chassis in an SM70 configuration, the internal SDI cables are already installed in the cabinet for you; just connect them to their ports. However, if you are upgrading an SM2X6-12, that is, a twelve-pack, you must install internal SDI cables.

If you are adding an SM80 chassis as part of the high-boy system upgrade, note that earlier versions of the SMDI product require you to install the internal SDI cables. Route two internal SDI cables per drive from the rear of the SM80 chassis, down the right side U-channel as viewed from the rear, to the appropriately labeled port on the transition panel at the bottom of the cabinet (see Figure 4-4). Use cable ties as required to secure the SDI cable in the U-channel. If installed correctly, all cables will fit in the U-channel snugly. Identify cable ends using cable markers.

To secure each cable connector to the transition panel at the bottom of the cabinet, guide the connector through the transition panel from the rear. Attach each cable connector to the transition panel with the two screws supplied, inserting the screws from the front of transition panel.



STEP 1  
INSTALL DRIVE CABLES 9-12  
(2 BUNDLES OF 4 CABLES)  
ON LEFT SIDE OF U-CHANNEL

STEP 2  
INSTALL DRIVE CABLES 7-8  
(2 BUNDLES OF 2 CABLES)  
INSIDE U-CHANNEL

STEP 3  
INSTALL DRIVE CABLES 1-6  
(2 BUNDLES OF 4 CABLES &  
2 BUNDLES OF 2 CABLES)  
INSIDE U-CHANNEL

TRANSITION PANEL

SM8002-2114

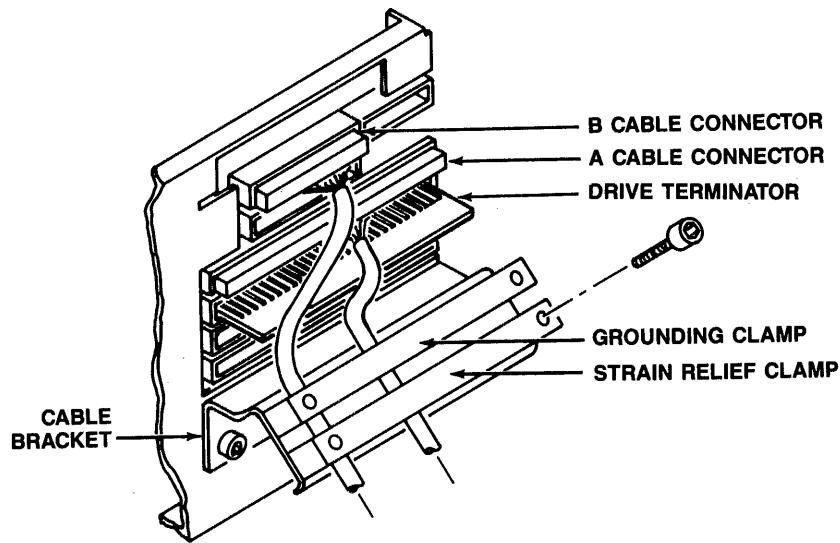
Figure 4-4. Internal SDI Cabling in the U-Channel

#### 4.8.2 Connecting the SMD Cable to the Drive

Load the drives two per tray. Figures 3-7 through 3-10 correlate user panels, disk drives, and egress-panel identification for the respective models. Note that they show drive designations from the front; from the rear, the models without the SM70 adapter have drive one on the left, and the models with the SM70 adapter have drive B on the left. For cabinet stability, drives and trays are loaded and numbered from bottom to top, so that tray number one, holding drive number one, is the lowest.

SM80 chassis are cabled and numbered in the same manner as drives, from the lowest chassis upward. The A and B SMD (round) cables connect each drive to the A and B connectors on the adapter chassis (SM70 or SM80). Each drive add-on kit provides up to three SMD cables, with a section of cable insulation jacket removed to expose the shielding near each end.

The S660 and S680 ESDI drives have a drive terminator included in the SM600 chassis. The SMD drives, however, require you to add a drive terminator to a connector slot (see Figure 4-5).



SM8002-2125

Figure 4-5. Cable Bracket and Cable Assembly on the Disk Drive



Attach a ground wire from the drive terminator to the ground terminal, and fasten a cable bracket to the back of the disk drive to hold the A cable and B cable in place. Press the exposed section of cable shielding into the spring clip of the cable-grounding bracket. The terminator yellow wire connects to GND by (1J2). SM80 upgrading can be in single increments, but with the SM70, each logical unit consists of a *pair* of physical drives.

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### 4.8.3 Connecting the SDI Cables to the SM80 Chassis

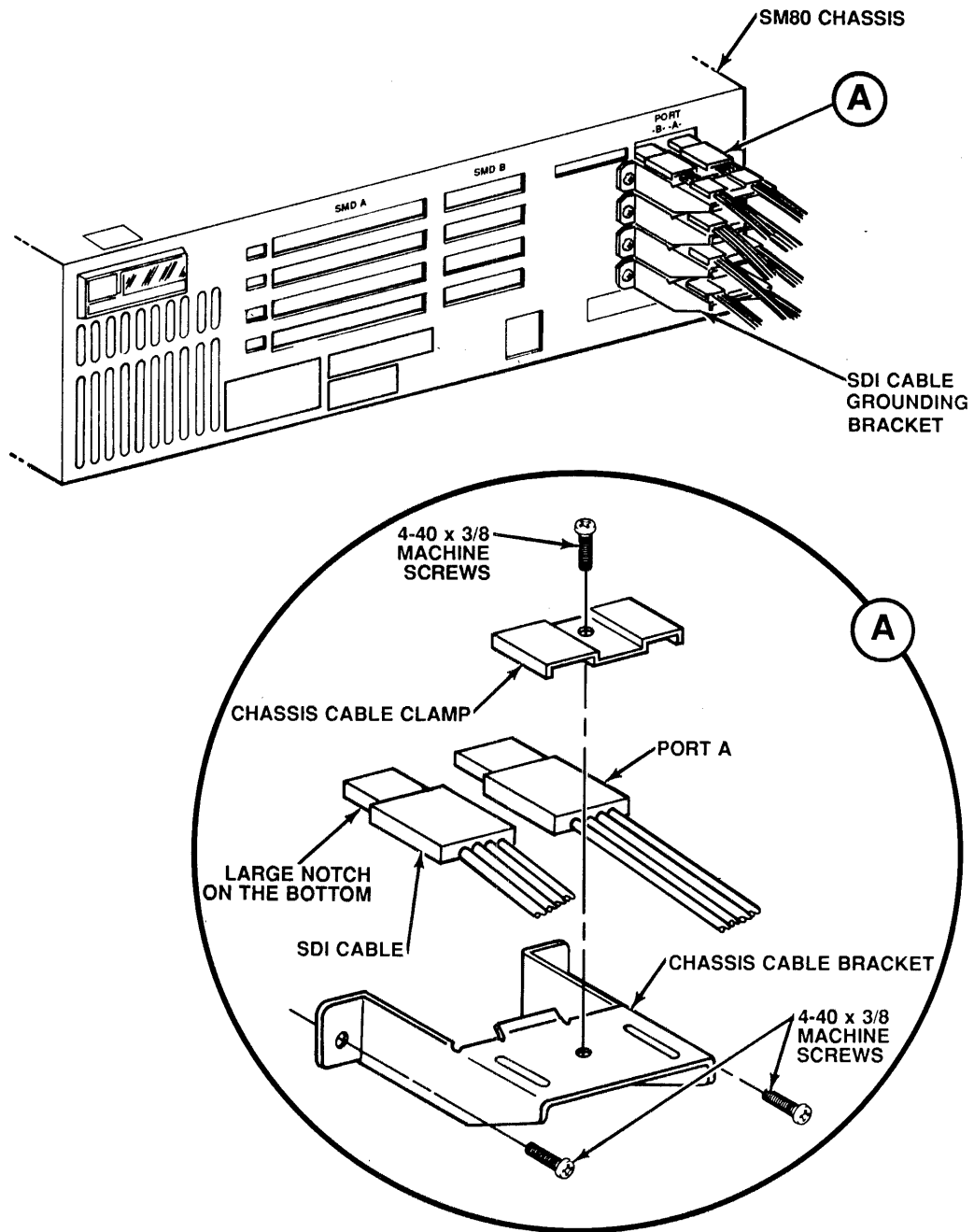
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Connecting each SDI cable to the SM80 chassis consists of the following two procedures: assembling an SDI cable-grounding assembly and mounting this assembly on the rear of the SM80 chassis.

Each SDI cable must connect to the adapter chassis via a cable-grounding assembly (see Figure 4-6). If it does not have one, attach one as follows:

1. Place the two SDI cable assemblies (for port A and port B, respectively) on the cable bracket. Confirm that both cables are right-side-up. As shown in the exploded view of Figure 4-6, the large notch must be at the bottom.
2. Place the cable clamp across the two cables, and attach them to the cable bracket with the 4-40 x 3/8 inch machine screw.

Mount the cables, with their bracket assemblies, on the SM80 chassis in sequence, starting with the bottom cable. Use two 4-40 x 3/8 inch machine screws to attach each cable-bracket assembly to the adapter chassis, *loosely* for the time being (you will tighten these screws after installing the SMD cable-grounding assembly).



SM8002-2126

Figure 4-6. Connecting the SDI Cable-grounding Assembly to the SM80 Chassis

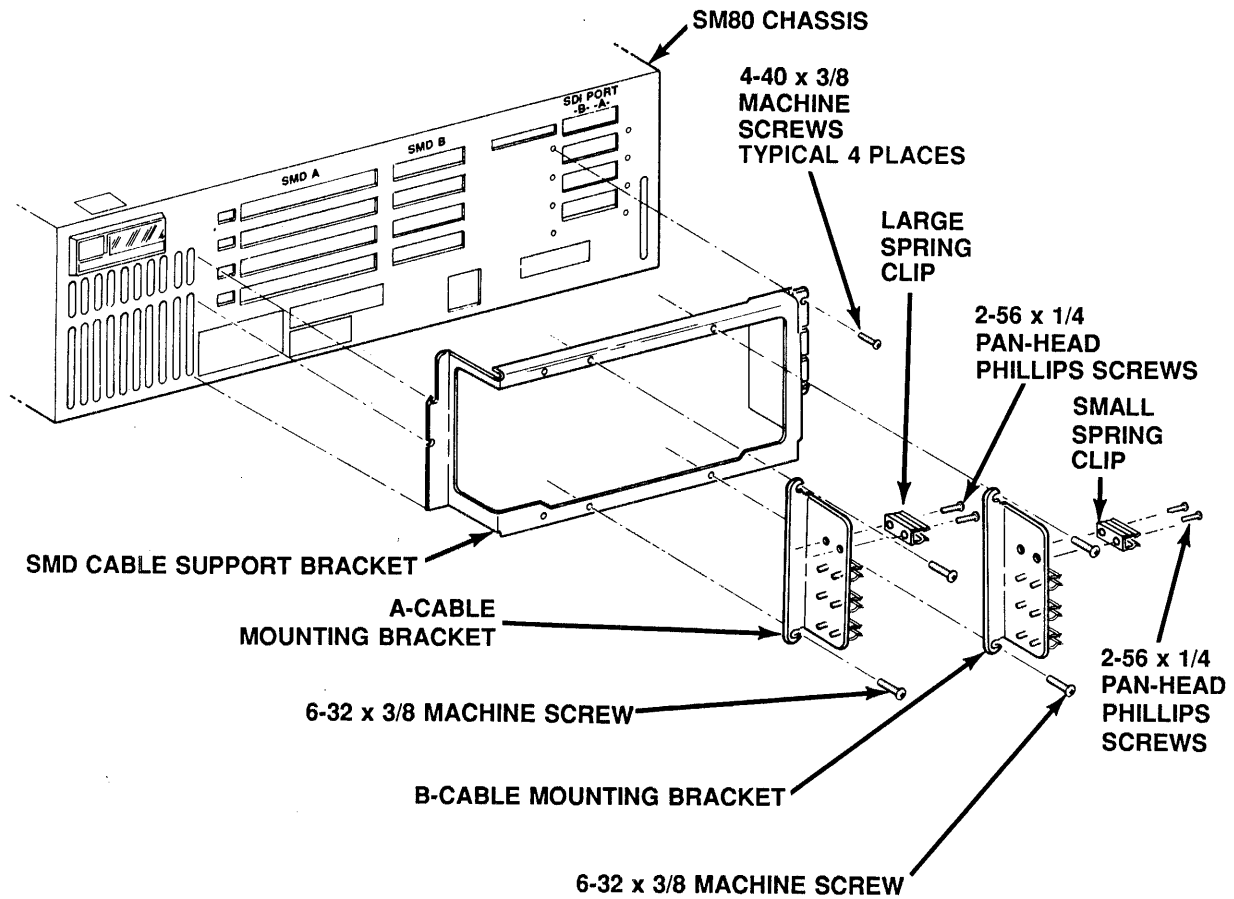
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#### **4.8.4 Attaching the SMD Cable-grounding Assembly to the SM80 Chassis**

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To assemble the SMD cable-grounding assembly, refer to Figure 4-7 and perform the following procedure.

1. Use two 2-56 x 1/4 inch pan-head Phillips screws to attach the larger (0.36-inch diameter) spring clips to the A-cable mounting bracket.
2. Use two 6-32 x 3/8 inch screws with internal stars to attach the A-cable mounting bracket to the SMD cable-support bracket. Use the screw holes that are located just left of the center of the SMD cable-support bracket.
3. Use two 2-56 x 1/4 inch pan-head Phillips screws to attach the smaller (0.26-inch diameter) spring clips to the B-cable mounting bracket.
4. Use two 6-32 x 3/8 inch screws with internal stars to attach the B-cable mounting bracket to the SMD cable-support bracket. Use the screw holes that are located just right of the center of the SMD cable-support bracket.
5. Attach the SMD cable-support bracket to the SM80 chassis as follows:
  - a. Press the left side of the bracket into the vertical vent cutout that is closest to the SMD A-cable connectors on the SM80 chassis. If you must press on the SMD cable-support bracket, do so only on the left side, that is, on the part that goes into the SM80 chassis. To avoid bending the bracket, do not press on the part that extends toward you.
  - b. Slip the right side of the cable-support bracket under the screws that hold the left side of SDI cable-grounding brackets to the SM80 chassis. Tighten all the screws that fasten both sides of the SDI cable-grounding brackets.



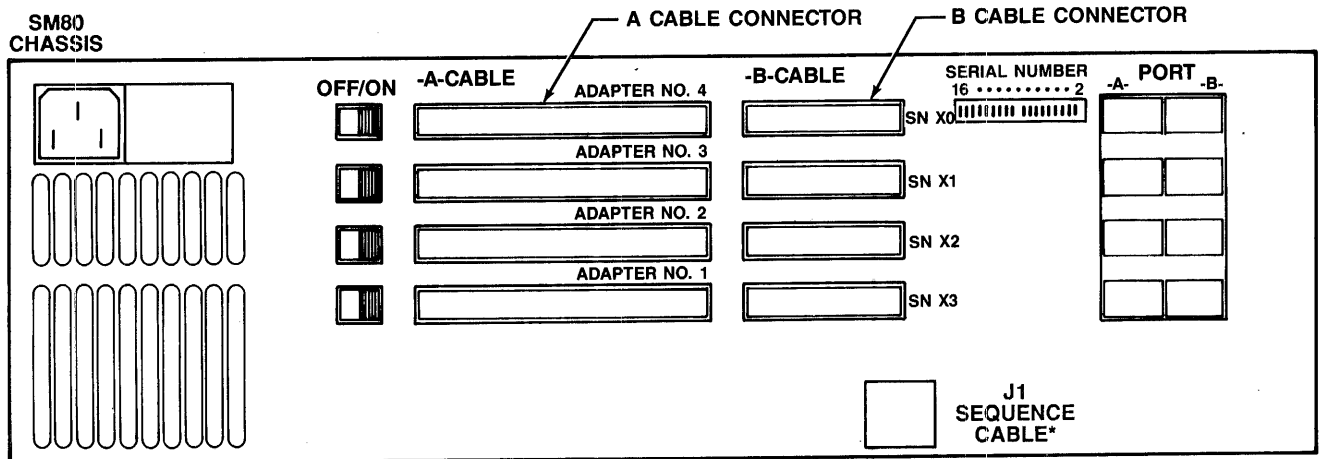
SM8002-2127

Figure 4-7. Connecting the SMD Cable-grounding Assembly to the SM80 Chassis

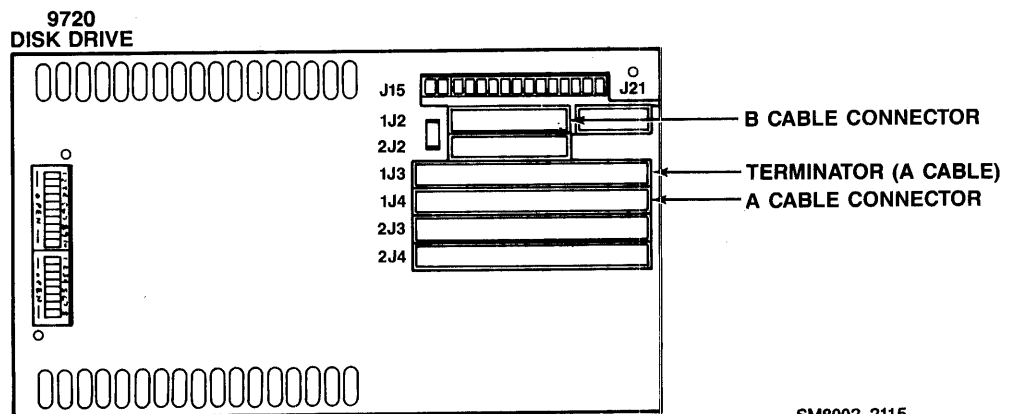
### 4.8.5 Connecting SMD (Round) Cables to the SM80 Chassis

After you have assembled and mounted the SMD cable-grounding assembly to the SM80 chassis, connect the internal SMD cables to the SM80 chassis and to the disk drive. Figure 4-8 illustrates the connectors on the SM80 chassis and the 9720 disk drive. Begin with the bottom cable and work upward for each drive and adapter, according to the following procedure:

1. Plug each SMD cable into the appropriate connector in the row labeled "A Cable" or "B Cable" on the rear panel of the SM80 chassis.
2. Insert each SMD cable into the appropriate spring clip of the SMD cable-grounding assembly. The A cables and their spring clips have a larger diameter (0.36 inches) than the B cables and their spring clips (0.26 inches). If any cable does not fit into its spring clip snugly, check the diameter of both the cable and the spring clip.
3. Insert each SMD cable into the corresponding connector on the drive.



\* MAY CONTAIN AN RJ45 CONNECTOR FOR CONNECTION TO THE SM70 ADAPTER.



SM8002-2115

Figure 4-8. SM80 Chassis and 9720 Disk Drive (Rear View)

A full twelve-pack configuration contains three SM80 chassis, each holding four SM80 adapters. Table 4-2 gives the number of the drive tray, part number of the cable, cable length, and the "from-to" address for model SM2X6-12 (the high-boy cabinet with SM80 adapter).

Table 4-2. Internal SMD Cabling List for Model SM2X6-12

Tray Number	Part Number	Length	From	To
1	SM8011216-01	3 ft.	SMDI 1A	Drive 1 (1J3)
	SM8011215-01	3 ft.	SMDI 1B	Drive 1 (1J2)
	1200068	Terminator		Drive 1 (1J4)
	SM8011216-01	3 ft.	SMDI 2A	Drive 2 (1J3)
	SM8011215-01	3 ft.	SMDI 2B	Drive 2 (1J2)
	1200068	Terminator		Drive 2 (1J4)
2	SM8011216-01	3 ft.	SMDI 3A	Drive 3 (1J3)
	SM8011215-01	3 ft.	SMDI 3B	Drive 3 (1J2)
	1200068	Terminator		Drive 3 (1J4)
	SM8011216-01	3 ft.	SMDI 4A	Drive 4 (1J3)
	SM8011215-01	3 ft.	SMDI 4B	Drive 4 (1J2)
	1200068	Terminator		Drive 4 (1J4)
3	SM8011216-01	3 ft.	SMDI 5A	Drive 5 (1J3)
	SM8011215-01	3 ft.	SMDI 5B	Drive 5 (1J2)
	1200068	Terminator		Drive 5 (1J4)
	SM8011216-01	3 ft.	SMDI 6A	Drive 6 (1J3)
	SM8011215-01	3 ft.	SMDI 6B	Drive 6 (1J2)
	1200068	Terminator		Drive 6 (1J4)
4	SM8011216-01	3 ft.	SMDI 7A	Drive 7 (1J3)
	SM8011215-01	3 ft.	SMDI 7B	Drive 7 (1J2)
	1200068	Terminator		Drive 7 (1J4)
	SM8011216-01	3 ft.	SMDI 8A	Drive 8 (1J3)
	SM8011215-01	3 ft.	SMDI 8B	Drive 8 (1J2)
	1200068	Terminator		Drive 8 (1J4)
5	SM8011216-01	3 ft.	SMDI 9A	Drive 9 (1J3)
	SM8011215-01	3 ft.	SMDI 9B	Drive 9 (1J2)
	1200068	Terminator		Drive 9 (1J4)
	SM8011216-01	3 ft.	SMDI 10A	Drive 10 (1J3)
	SM8011215-01	3 ft.	SMDI 10B	Drive 10 (1J2)
	1200068	Terminator		Drive 10 (1J4)
6	SM8011216-01	3 ft.	SMDI 11A	Drive 11 (1J3)
	SM8011215-01	3 ft.	SMDI 11B	Drive 11 (1J2)
	1200068	Terminator		Drive 12 (1J4)
	SM8011216-01	3 ft.	SMDI 12A	Drive 12 (1J3)
	SM8011215-01	3 ft.	SMDI 12B	Drive 12 (1J2)
	1200068	Terminator		Drive 12 (1J4)

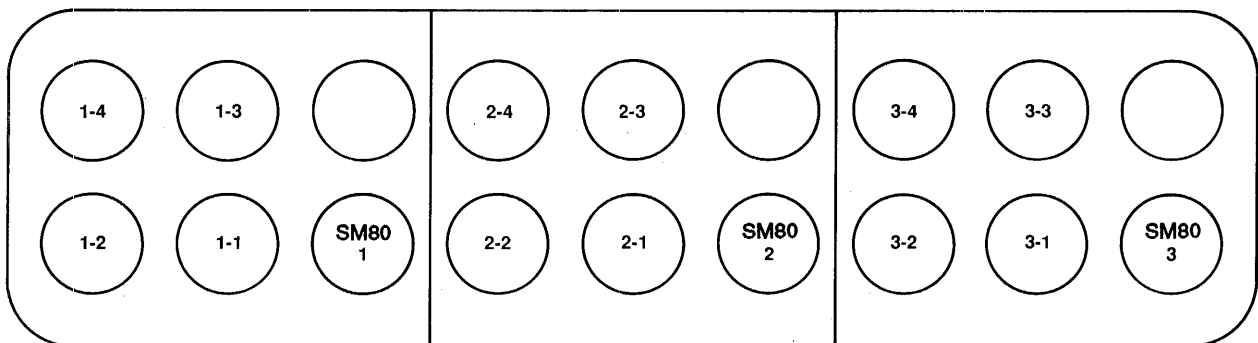
Plug the cables into the adapter connectors that correspond to the adapter that you have installed for your add-on kit disk drive. To make sure that your connector is oriented right side up, confirm that the notches in the chassis connector align with the grooves in the ribbon cable connector.

Plug the other end of the A and B cables into the connectors located on the back of the respective disk drive(s) that you have added. When connecting the SM600 chassis, plug the other end of the A and B cables into the back of the SM600 chassis for drive 1 or drive 2, as required. Table 4-3 identifies the connectors.

Table 4-3. Disk Drive Cable Connectors

Disk Drive	A Connector	B Connector
S820/S821 S883 S851 SM600	1J3 1-J03 CNP41/CNP51 Drive 1 Drive 2	1J2 1-J02 CNP43/CNP53 Drive 1 Drive 2

Disk drive power cords are identified by a tag on the front. If you must plug in power cords, follow the sequence in Figure 4-9 so you do not blow a fuse.



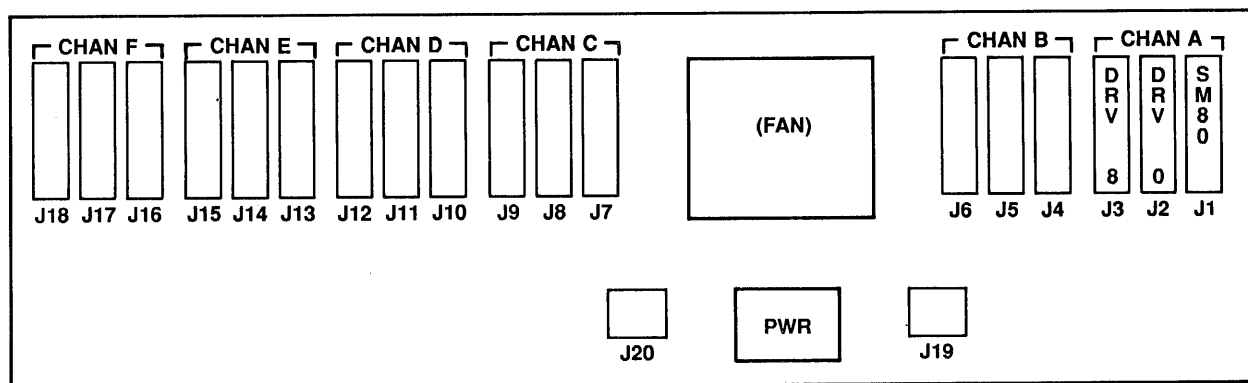
SM8002-2128

Figure 4-9. Routing Power Cords to the Power Distribution Unit of the SM2X6-12

#### 4.8.6 Connecting SMD B Cables to the SM70 Chassis

With subsystems that include the SM70, each drive tray holds a logical drive, which consists of two physical drives, labeled A and B. When you add an SM70 adapter chassis to an existing SM80 adapter chassis, the SMD B cables from the SM80 chassis connect to the SM70 chassis instead of to the disk drive.

The channels and connectors appear on the back of the SM70 chassis as follows: Channel A = (J1-J3); Channel B = (J4-J6); Channel C = (J7-J9); Channel D = (J10-J12); Channel E = (J13-J15); Channel F = (J16-J18). Figure 4-10 shows these channels and connectors.



SM8002-2116

Figure 4-10. SM70 Chassis (Rear View)

For SM70 replacement or for adding drives into an SM70 configuration, note that each SMD B cable connects to the SM70 chassis via a strain-relief grounding bracket. Each bracket holds up to six cables, that is, it will connect up to two channels. Two captive thumbscrews attach each bracket to the SM70 chassis. One cable clamp and two pan-head Phillips machine screws hold each cable to the bracket.

The following subsections give details on connecting the internal SMD B cables to the SM70 adapter chassis. Select the subsection that corresponds to your configuration.



#### 4.8.6.1 SMD Cabling for Model SM7X2-4

Model SM7X2-4 is a low-boy cabinet with up to four logical drives (up to eight physical drives) and an SM70 adapter for each logical drive. For cabinet stability, drives and trays are loaded and numbered from bottom to top, so that tray number one, which holds logical unit number (LUN) one, is the lowest.

Table 4-4 gives the LUN of the tray, part number of the cable, cable length, and "from-to" addresses. When reading the table, note the following: SM70 channels J1, J4, J7, and J10 must be assembled for all configurations regardless of the number of drives in the system (reference LU1).

Table 4-4. Internal SMD Cabling List for Model SM7X2-4

LUN	Part No.	Length	From	To
1	SM8011216-05	4 ft.	SM80 1A	LU 1A (1J3)
	SM8011215-04	2 ft.	SM80 1B	SM70 J1
	SM8011215-04	2 ft.	SM80 2B	SM70 J4
	SM8011215-04	2 ft.	SM80 3B	SM70 J7
	SM8011215-04	2 ft.	SM80 4B	SM70 J10
	SM8011216-01	3 ft.	SM70 J2	LU1A (1J2)
	SM8011215-01	3 ft.	SM70 J3	LU1B (1J2)
	SM8011216-04 1200068	18 in. Terminator	LU1A (1J4)	LU1B (1J3) LU1B (1J4)
2	SM8011216-01	3 ft.	SM80 2A	LU2A (1J3)
	SM8011215-01	3 ft.	SM70 J5	LU2A (1J2)
	SM8011215-01	3 ft.	SM70 J6	LU2B (1J2)
	SM8011216-04	18 in.	LU2A (1J4)	LU2B (1J3)
	1200068	Terminator		LU2B (1J4)
3	SM8011216-01	3 ft.	SM80 3A	LU3A (1J3)
	SM8011215-01	3 ft.	SM70 J8	LU3A (1J2)
	SM8011215-01	3 ft.	SM70 J9	LU3B (1J2)
	SM8011216-04	18 in.	LU3A (1J4)	LU3B (1J4)
	1200068	Terminator		LU3B (1J4)
4	SM8011216-01	3 ft.	SM80 4A	LU4A (1J3)
	SM8011215-01	3 ft.	SM70 J11	LU4A (1J2)
	SM8011215-01	3 ft.	SM70 J12	LU4B (1J2)
	SM8011216-04	18 in.	LU4A (1J4)	LU4B (1J3)
	1200068	Terminator		LU4B (1J4)

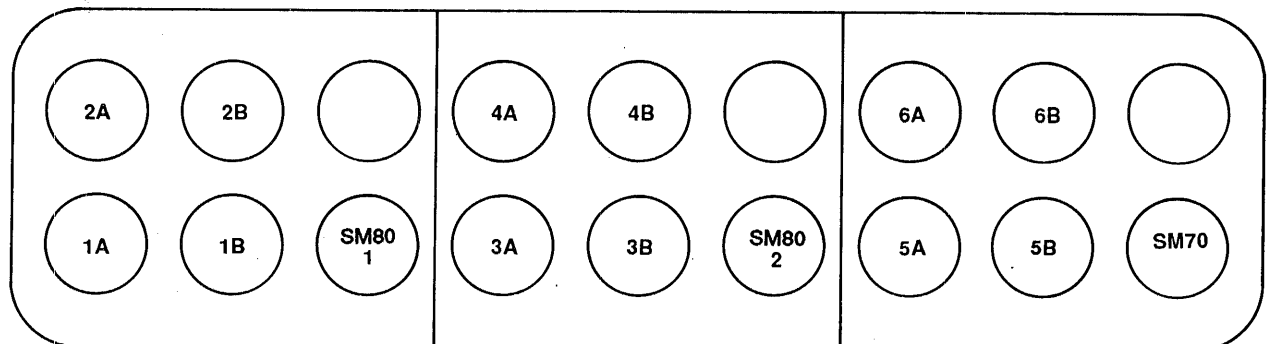
4.8.6.2 SMD Cabling for Model SM7X8-6

Model SM7X8-6 is a high-boy cabinet with up to six logical drives (up to twelve physical drives) and an SM70 adapter for each logical drive. Table 4-5 gives the cabling list. SM70 channels J1, J4, J7, J10, J13, and J16 must be assembled for all configurations regardless of the number of drives in the system (reference LU1). Channel A = (J1-J3); Channel B = (J4-J6); Channel C = (J7-J9); Channel D = (J10-J12); Channel E = (J13-J15); Channel F = (J16-J18).

Table 4-5. Internal SMD Cabling List for Model SM7X8-6

LUN	Part No.	Length	From	To
1	SM8011216-02	5 ft.	SM80 1A	LU 1A (1J3)
	SM8011215-04	2 ft.	SM80 1B	SM70 J1
	SM8011215-04	2 ft.	SM80 2B	SM70 J4
	SM8011215-04	2 ft.	SM80 3B	SM70 J7
	SM8011215-04	2 ft.	SM80 4B	SM70 J10
	SM8011215-04	2 ft.	SM80 5B	SM70 J13
	SM8011215-04	2 ft.	SM80 6B	SM70 J16
	SM8011215-05	4 ft.	SM70 J2	LU1A (1J2)
	SM8011215-05	4 ft.	SM70 J3	LU1B (1J2)
	SM8011216-04 1200068	18 in. Terminator	LU1A (1J4)	LU1B (1J3) LU1B (1J4)
2	SM8011216-02	5 ft.	SM80 2A	LU2A (1J3)
	SM8011215-05	4 ft.	SM70 J5	LU2A (1J2)
	SM8011215-05	4 ft.	SM70 J6	LU2B (1J2)
	SM8011216-04 1200068	18 in. Terminator	LU2A (1J4)	LU2B (1J3) LU2B (1J4)
	3	SM8011216-05	5 ft.	SM80 3A
SM8011215-01		4 ft.	SM70 J8	LU3A (1J2)
SM8011215-01		4 ft.	SM70 J9	LU3B (1J2)
SM8011216-04 1200068		18 in. Terminator	LU3A (1J4)	LU3B (1J3) LU3B (1J4)
4		SM8011216-05	5 ft.	SM80 4A
	SM8011215-01	4 ft.	SM70 J11	LU4A (1J2)
	SM8011215-01	4 ft.	SM70 J12	LU4B (1J2)
	SM8011216-04 1200068	18 in. Terminator	LU4A (1J4)	LU4B (1J3) LU4B (1J4)
	5	SM8011216-05	5 ft.	SM80 5A
SM8011215-01		4 ft.	SM70 J14	LU5A (1J2)
SM8011215-01		4 ft.	SM70 J15	LU5B (1J2)
SM8011216-04 1200068		18 in. Terminator	LU5A (1J4)	LU5B (1J3) LU5B (1J4)
6		SM8011216-05	5 ft.	SM80 6A
	SM8011215-01	4 ft.	SM70 J17	LU6A (1J2)
	SM8011215-01	4 ft.	SM70 J18	LU6B (1J2)
	SM8011216-04 1200068	18 in. Terminator	LU6A (1J4)	LU6B (1J3) LU6B (1J4)

Disk drive power cords are identified by a tag on the front. If you must plug in power cords, follow the sequence in Figure 4-11 so you do not blow a fuse.



SM8002-2117

Figure 4-11. Routing Power Cords to the Power Distribution Unit of the SM7X8-6

## 4.9 External SDI Cabling

The external SDI cables provide the connection between each disk drive in the subsystem cabinet and one or more of the SDI controllers in the host system. The subsystem requires external SDI cables from the transition panel at the back of the cabinet to the transition panel on your SDI controller. The subsystem transition panel contains two ports (A and B) for each drive.

If you use both the A and B ports, attach them to similar but separate controllers on a system that supports automatic failover. If you do this, enable both ports, by pressing the Port A switch and the Port B switch. The subsystem supports static dual porting only, not dynamic dual access. Only one port can be active at a time, so only one port LED will light at a time.

External cables between the subsystem and the controller are not standard equipment with the subsystem. However, they can be ordered as options from Emulex, in various lengths to suit your needs.

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## 4.10 Installing the AC Power Cord

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Once the cabling for the add-on kit is installed, plug the AC power cord of each add-on drive into the power distribution unit in the subsystem cabinet. Power cords are identified by a tag on the front.

### NOTE

Low-boy cabinets have only single-phase circuits, but high-boy cabinets are three-phase, and require balancing the loads on the Power Distribution Unit. This unit is located at the bottom of the subsystem cabinet, behind the fan assembly, as viewed from the front. When routing the power cords, follow the sequence shown in Figure 4-9 or 4-11, as appropriate, so you do not blow a fuse.

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## 4.11 Subsystem Accessories and Spare Parts

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Tables 4-6 and 4-7 list the accessories and spare parts available for the subsystem.

Table 4-6. Subsystem Accessories

Model Number	Description
SDI-12	External SDI cable, 12 foot
SDI-25	External SDI cable, 25 foot
SDI-50	External SDI cable, 50 foot

Table 4-7. Authorized Subsystem Spare Parts

Part Number	Description
SM6010403	SMDI User Panel PCB Assembly
SM8010403	SMDI Backplane Assembly
SM8011801	SMDI Power Supply
SM6010201	SM60 Adapter PCB Assembly
SM7010201	SM70 Adapter PCB Assembly
SM8010201	SM80 Adapter PCB Assembly

For ordering information, contact Emulex Sales Support at the following address and telephone number:

Emulex Corporation  
3545 Harbor Blvd.  
Costa Mesa, CA 92626

California Telephone: (714) 662-5600  
Outside California: (800) EMULEX-3  
TWX (910) 595-2521



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## **5.1 Overview**

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This section tells you how to check the disk drive switches and jumpers and how to check the adapters. The tables in this section list the functions of the various diagnostic tests, and they explain the error codes, for groups of errors as well as specific ones. In addition this section discusses service.

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## **5.2 Checking the Disk Drive Switches and Jumpers**

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SMDI disk drives are preformatted, integrated, and tested at the factory with your SMDI subsystem. If the system does not run, check the disk drive switches and jumpers to confirm that they are set correctly. Refer to Appendix B for the correct parameters, switch settings, and jumper locations for each drive when it is used with SMDI. The drive manufacturer's manual, included with the SMDI subsystem, describes where the switches and jumpers are located, and how to set them.

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## **5.3 Checking the Adapters**

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The SMDI chassis comes installed in the equipment cabinet. The chassis contains one adapter, either an SM60, SM70, or SM80, for each logical disk unit in the subsystem. Each adapter contains a switchpack (SW1) and a configuration PROM at location U137 for providing drive-configuration information (see Figure 3-11 and Appendix A).

The switches are set at the factory to correspond to the required drive. There are no recommended options to be obtained by altering the switch settings, unless you need to change the factory setting of decimal display of unit numbers to hexadecimal (see subsection 3.5.2). If you must check the switch settings, see the appendices to this manual.

## 5.4 Diagnostic Tests

SMDI provides a series of diagnostic self-tests. The number of each test appears on the display while that test is running. Table 5-1 lists them, along with the function of each.

Table 5-1. SMDI Diagnostic Tests

Test	Function
1	PROM Verification
2	Front Panel LED Display
3	Sector Counter Port
4	Read/Write Controls
5	Clock Controls
6	Max Sector Number Output Port
7	SMD/ESDI Cable Ports
8	Operator Panel Controls
9	Timer 5.5
A	Timer 6.5
B	Interrupt 7.5 Status A and B
C	SDI Output Port
D	SDI Command/Response - Data I/O
E	SDI Cable Loopback - Both Ports
F	Diagnostic Data I/O Ports
10	Disk Data Read/Write Verification
11	Seek Error and Fault Error Recovery
12	Interlock Status
13	Control Port Number 9
14	Increment/Decrement Seek Test
15	Alternate Seek Test
16	Random Seek Test
17	Recalibrate Test

When SMDI detects a fault, it lights the red Fault LED, and displays the appropriate error code, always in hexadecimal. Table 5-2 lists group error codes (errors 00 through 2F), while Table 5-3 lists specific error codes (30 through FF).

### NOTE

If you encounter errors while initializing under VMS, see subsection 3.9, paragraph 8, or subsection 3.10, paragraph 6, as appropriate for your SDI controller.



Table 5-2. Group Error Codes

Error Code (Hex)	Probable Problem Area
00	<b>No Error.</b> Diagnostics incomplete because Run switch is not on during test 11.
20	<b>-5 VDC Power Panel Interlock Status Bad.</b>
21	<b>Drive* Not Ready or Not Selected.</b>
22	<b>Drive Offline or Disabled.</b>
23	<b>Rotational Position or Sector Counter Error.</b>
24	<b>SMD/ESDI Error (Timeout, Fault, Seek Error).</b>
25	<b>Read/Write Error.</b>
26	<b>Read/Write Command Overrun.</b>
27	<b>Unrecognized Error Code.</b>
28	<b>Fatal Error.</b>
29	<b>Unexpected Interrupt or Reset.</b>
2A	<b>SDI Transmission Error.</b>
2B	<b>Invalid SDI Command Received.</b>
2C	<b>SDI Command Parameter or Protocol Error.</b>
2D	<b>Drive State Error.</b>
2E	<b>Configuration Error.</b>
2F	<b>Hardware Failure Detected.</b>

\* For SM70 configurations "drive" refers to drive A; drive B errors are explicitly listed as such.

Table 5-3. Specific Error Codes

Error Code (Hex)	Probable Problem Area
30	<b>Loss of Servo Clock.</b>
31	<b>Loss of Read Clock.</b>
32	<b>Read Gate or Write Gate .and. Drive* Not Ready.</b>
33	<b>Read Gate or Write Gate .and. Drive Not On-Cylinder.</b>
34	<b>Multiple Write Gate Transitions.</b>
35	<b>Write Gate .and. Write Protected.</b>
36	<b>Sector Counter Error.</b>
37	<b>Read Gate .and. Write Gate.</b>
38	<b>Drive Fault.</b>
39	<b>Read Gate or Write Gate .and. Fault.</b>
3A	<b>Late Write Gate.</b>
3B	<b>Unexpected Reset.</b>
3C	<b>Drive Busy Input True.</b>
3D	<b>Drive Write Protect Input True.</b>
3E	<b>Drive Unit Select Input False.</b>
3F	<b>7.5 Interrupt with No Error Status Present.</b>
40	<b>-5 VDC Status Bad.</b>
41	<b>Operator Panel Interlock Status Bad.</b>
42	<b>Drive Disabled.</b> The host has detected a hardware error.
43	<b>SM600 Chassis Non-functional.</b> An SMD cable or power cable to the SM600 chassis is not installed correctly.
44	<b>Fatal Error Trap.</b>

\* For SM70 configurations "drive" refers to drive A; drive B errors are explicitly listed as such.

(Continued on next page)

Table 5-3. Specific Error Codes (Continued)

Error Code (Hex)	Probable Problem Area
45	<b>SM600 Chassis Over-temperature Detection.</b> Might indicate that a PDM in an SM600 chassis is overheating. Probably a drive hardware problem.
46	<b>Drive Already Spun Up.</b> Either a user or the host software tried to spin up the drive when it was already spun up. Drive might be in local mode instead of remote mode.
47	<b>SMD/ESDI Command Timeout Occurred.</b> Usually a drive microprocessor failure.
48	<b>SM600 Power-fail Detection.</b>
49	<b>Read/Write Command Overrun.</b>
4A	<b>'Drive Clear' Did Not Clear Attention.</b>
4B	<b>'Drive Clear' Did Not Clear All Error Bits.</b>
4C	<b>'Drive Clear' Did Not Clear Drive Errors.</b>
4D	<b>Drive Spin-Up Failed.</b> Drive hardware error, perhaps due to incorrect installation of an SMD cable or power cable.
4E	<b>Drive Spin-Down Failed.</b> Drive hardware error. Local/remote switch is in remote setting and drive has no remote mode.
4F	<b>Drive Seek or Recalibrate Error.</b> Drive hardware error.
50	<b>SDI Command Already in Progress.</b>
51	<b>SDI Framing Protocol Error.</b> Hardware failure or bad SDI cable.
52	<b>SDI Checksum Error.</b>
53	<b>SDI Parity Error.</b>
54	<b>Invalid Real-time Command</b>

(Continued on next page)

Table 5-3. Specific Error Codes (Continued)

Error Code (Hex)	Probable Problem Area
55	<b>Invalid Microprocessor Command</b>
56	<b>Command Input Buffer Overrun or Underrun</b>
57	<b>Drive Error Set .and. 'No Error Allowed' Flag Set</b>
58	<b>Invalid Head Address.</b>
59	<b>Invalid Cylinder Address.</b>
5A	<b>Changing from 512 to 576 Byte Mode.</b>
5B	<b>Control-in Parity Error.</b>
5C	<b>Control-in Pulse Error.</b>
5D	<b>No Drive Installed.</b> Turn off Run switch and install drive in SM600 chassis.
5E	<b>Configuration Mismatch.</b> The drive in the PDM is not configured for SMDI.
5F	<b>Command/Write Data Pulse Error.</b>
60	<b>Write Protected Drive.</b> A write operation was attempted with a drive that is write-protected on the SMDI user panel.
61	<b>Unexpected Spin-down.</b>
62	<b>Illegal Diagnostic Number.</b>
63	<b>Timeout Length = 0.</b>
64	<b>Run Switch On .and. Drive Disabled.</b>
65	<b>Run Switch Off.</b> The Run switch on the SMDI user panel is off. Press it on.
66	<b>Memory Region Not Found.</b>
67	<b>Drive Unexpectedly Not on Cylinder.</b> Jumper-selected options on the drive might be set incorrectly.

(Continued on next page)

Table 5-3. Specific Error Codes (Continued)

Error Code (Hex)	Probable Problem Area
68	<b>Attempted to Write Past Memory Region.</b>
69	<b>SDI Transmission Timeout.</b>
6A	<b>Drive Not Online.</b>
6B	<b>Read/Write Ready Status Not Set.</b>
6C	<b>Topology Mode Mismatch.</b>
6D	<b>Available Status Not Set.</b>
6E	<b>Invalid Error Recovery Level (&gt;0).</b>
6F	<b>Invalid Subunit Flag or No Subunit #0 Flag.</b>
70	<b>5.5 Timer Error.</b>
71	<b>6.5 Timer Error.</b>
72	<b>SDI Out/Echo Error.</b>
73	<b>Number of Bad Tracks = 1 to 3.</b> This error code, and all those listed from here through 9F, indicate either a drive hardware error, a bad drive cable, or a bad SDI cable. If you suspect a cable, exchange it. If that fails to solve the problem, check the configuration of the drive switches and jumpers.
74	<b>Number of Bad Tracks &gt; 3.</b>
75	<b>Sector Count Not Found.</b>
76	<b>Diagnostic Read Error Latch Failure.</b>
77	<b>Drive Not Spun Up.</b>
78	<b>Drive Not Spun Down.</b>
79	<b>Drive Error Status Set.</b>

(Continued on next page)

Table 5-3. Specific Error Codes (Continued)

Error Code (Hex)	Probable Problem Area
7A	<b>Command Available Time Out.</b>
7B	<b>Drive Init Found.</b>
7C	<b>Unexpected SDI Status 'B' Error Found.</b>
7D	<b>Unused.</b>
7E	<b>Invalid Command Not Detected.</b>
7F	<b>Loss of Control Clock Not Detected.</b>
80	<b>Loss of Command/Write Clock Not Detected.</b>
81	<b>Expected SDI Status 'B' Port A Error Not Found.</b>
82	<b>Cannot Clear Loss of Command/Write Clock Status Bit.</b>
83	<b>Cannot Clear Loss of Control Clock Status Bit.</b>
84	<b>Expected SDI Status 'B' Port B Error Not Found.</b>
85	<b>Unused.</b>
86	<b>Invalid Response Frame.</b>
87	<b>Invalid SDI Data Received.</b>
88	<b>Response Not Detected.</b>
89	<b>Cannot Clear Command Available Status Bit.</b>
8A	<b>Invalid Command Improperly Detected.</b>
8B	<b>Drive Init Not Detected or Not Cleared.</b>
8C	<b>RAM Error - Bank #0.</b>
8D	<b>RAM Error - Bank #1.</b>
8E	<b>RAM Error - Bank #2.</b>
8F	<b>RAM Error - Bank #3.</b>

(Continued on next page)

Table 5-3. Specific Error Codes (Continued)

Error Code (Hex)	Probable Problem Area
90	<b>Loss of Command/Write Clock Improperly Detected.</b>
91	<b>Loss of Control Clock Improperly Detected.</b>
92	<b>Command Available Not Detected.</b>
93	<b>Wrong Command Code Detected.</b>
94	<b>Wrong SDI Data Detected.</b>
95	<b>Sync Detect Failure.</b>
96	<b>Incorrect Number of Sectors.</b>
97	<b>Sector Counter Port Error.</b>
98	<b>Control Port #9 Error.</b>
99	<b>Drive Status Ports A or B Error.</b>
9A	<b>SMD/ESDI Output/Input Ports Error.</b>
9B	<b>Max Sector # Output Port Error.</b>
9C	<b>Interlock Status Port Error.</b>
9D	<b>Read/Write Control Port Error.</b>
9E	<b>Clock Control Port Error.</b>
9F	<b>Disk Data Read/Compare Ports Error.</b>
A0	<b>Interrupt 7.5 Status 'A' Bit 0 Error.</b>
A1	<b>Interrupt 7.5 Status 'A' Bit 1 Error.</b>
A2	<b>Interrupt 7.5 Status 'A' Bit 2 Error.</b>
A3	<b>Interrupt 7.5 Status 'A' Bit 3 Error.</b>
A4	<b>Interrupt 7.5 Status 'A' Bit 4 Error.</b>
A5	<b>Interrupt 7.5 Status 'A' Bit 5 Error.</b>

(Continued on next page)

Table 5-3. Specific Error Codes (Continued)

Error Code (Hex)	Probable Problem Area
A6-A9	<b>Unused.</b>
AA	<b>No Error (Test Passed).</b>
AB-AF	<b>Unused.</b>
B0	<b>Interrupt 7.5 Status 'B' Bit 0 Error.</b>
B1	<b>Interrupt 7.5 Status 'B' Bit 1 Error.</b>
B2	<b>Interrupt 7.5 Status 'B' Bit 2 Error.</b>
B3	<b>Interrupt 7.5 Status 'B' Bit 3 Error.</b>
B4	<b>Interrupt 7.5 Status 'B' Bit 4 Error.</b>
B5	<b>Interrupt 7.5 Status 'A' Bit 5 Error.</b>
B6-BF	<b>Unused.</b>
C0	<b>Program PROM Checksum Error.</b>
C1	<b>Program PROM Verification Flag Error.</b>
C2	<b>Unexpected SDI Status 'A' Error Found.</b>
C3	<b>Cannot Clear Interrupt Status A or B Error Bit.</b>
C4	<b>Configuration PROM Checksum Error.</b>
C5	<b>Seek Error Not Detected.</b>
C6	<b>Drive Fault Not Detected.</b>
C7	<b>Unused.</b>
C8	<b>Seek Error on Other Drive (Drive 8).</b>
C9	<b>Drive Fault on Other Drive (Drive 8).</b>
CA	<b>Number of Bad Tracks = 1 to 3.</b>
CB	<b>Number of Bad Tracks &gt; 3.</b>
CC	<b>Drive Not Spun Up.</b>

(Continued on next page)



Table 5-3. Specific Error Codes (Continued)

Error Code (Hex)	Probable Problem Area
CD	<b>Sync Detect Failure.</b>
CE	<b>Incorrect Number of Sectors.</b>
CF-DA	<b>Unused.</b>
DB	<b>Other Drive Write Protected (Drive 8). (See Error 3D.)</b>
DC	<b>Unused.</b>
DD	<b>Inconsistent Flags and Controls. Might require Cycling Run switch.</b>
DE-DF	<b>Unused.</b>
E0	<b>Write Protected Drive (Drive 8).</b>
E1	<b>Drive 8 Unexpectedly Not on Cylinder.</b>
E2-E4	<b>Unused.</b>
E5	<b>Seek Error Not Detected on Drive 8.</b>
E6	<b>Drive Fault Not Detected on Drive 8.</b>
E7	<b>SMD Command Timeout Occurred for Drive 8.</b>
E8	<b>Seek Error on Other Drive (Drive 0).</b>
E9	<b>Drive Fault on Other Drive (Drive 0).</b>
EA	<b>Number of Bad Tracks = 1 to 3 (Drive 8).</b>
EB	<b>Number of Bad Tracks &gt; 3 (Drive 8).</b>
EC	<b>Drive 8 Not Spun Up.</b>
ED	<b>Sync Detect Failure on Drive 8.</b>
EE	<b>Incorrect Number of Sectors on Drive 8.</b>
EF	<b>Drive 8 Seek or Recalibrate Error.</b>
F0	<b>Loss of Servo Clock from Drive 8.</b>

(Continued on next page)

Table 5-3. Specific Error Codes (Continued)

Error Code (Hex)	Probable Problem Area
F1	<b>Loss of Read Clock from Drive 8.</b>
F2	<b>Read Gate or Write Gate .and. Drive 8 Not Ready.</b>
F3	<b>Read Gate or Write Gate .and. Drive 8 Not On-Cylinder.</b>
F4	<b>Multiple Write Gate Transitions Using Drive 8.</b>
F5	<b>Write Gate .and. Write Protected Using Drive 8.</b>
F6	<b>Sector Counter Error On Drive 8.</b>
F7	<b>Read Gate .and. Write Gate Using Drive 8.</b>
F8	<b>Drive Fault On Drive 8.</b>
F9	<b>Read Gate or Write Gate .and. Fault Using Drive 8.</b>
FA	<b>Late Write Gate Using Drive 8.</b>
FB	<b>Other Drive Write-Protected (Drive 0).</b>
FC	<b>Drive 8 Busy Input True.</b>
FD	<b>Drive 8 Write Protect Input True.</b>
FE	<b>Drive 8 Unit Select Input False.</b>
FF	<b>Invalid Unit Number.</b> (Slow flash, Fault LED not on). Set valid number in Unit Number switches. Unit number can range from 0-99 (decimal) if switch SW1-3 is ON, or from 0-FB (hexadecimal) if SW1-3 is OFF.

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## 5.5 Service

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If you have a problem with your SMDI subsystem, you can get help by contacting Emulex Technical Support at the address or phone numbers given below. If you ascertain that the subsystem contains a defective component, return the component to an authorized Emulex repair center for service.

**Do not return a component to Emulex without authorization.** Before you return a product to Emulex, whether it is under warranty or not, you must contact the factory or the factory representative for return-shipment instructions and a Return Materials Authorization (RMA) number. A component returned for service without an authorization will be returned to the owner at the owner's expense.

In the continental United States, Alaska, and Hawaii contact:

Emulex Technical Support  
3545 Harbor Boulevard  
Costa Mesa, CA 92626

Telephone: (714) 662-5600  
(800) 854-7112 (outside California)  
TWX (910) 595-2521

Outside the United States, contact the distributor from whom the SMDI was initially purchased.

After you have received an RMA, package the subsystem or peripheral device, preferably using the original packing material, and send it, **postage paid and insured**, to the address provided by the Emulex representative.



# Appendix A

## Configuration PROMs and Switch Settings on the Adapter

### A.1 Overview

The adapter contains an eight-position switch (SW1) and a configuration PROM (See Figure 3-11), which are set at the factory for proper subsystem operation. Subsection A.2 defines the various switch settings. Subsection A.3 indicates the following:

- The adapter required by each drive
- The minimum revision level required for configuration PROMs
- The required settings of SW1-6 through SW1-8 for the various drives.

You should not have to handle the PROM or switch, except to set SW1-3 for decimal or hexadecimal display of the unit number.

### A.2 Definition of SW1

Table A-1 defines the function and factory (default) setting of each of the eight switches on switchpack SW1, and it references the corresponding subsections in this manual.

Table A-1. Adapter Switch (SW1) Definitions/Factory Configuration

Switch	OFF (0)	ON (1)	Factory	Function	Subsection
SW1-1	-	-	OFF (0)	Factory Setting	A.2
SW1-2	-	-	OFF (0)	Factory Setting	A.2
SW1-3	Hexadecimal	Decimal	ON (1)	Unit Number Display Radix	3.5.2
SW1-4	-	-	OFF (0)	Factory Setting	A.2
SW1-5	-	-	OFF (0)	Factory Setting	A.2
SW1-6	-	-	NS	Drive Selection	A.3
SW1-7	-	-	NS	Drive Selection	A.3
SW1-8	-	-	NS	Drive Selection	A.3
ON(1) = Closed OFF(0) = Open			Factory = Factory switch setting NS = No standard		

### A.3 Settings for Particular Drives

Location U137 on the adapter holds the active configuration PROM (see Figure 3-11). Location U23 is a storage socket for holding the alternate configuration PROM on revision K of the SM80 adapter, while location U48 holds the alternate configuration PROM on revision L of the SM80 adapter. When PROM G140 is installed at location U137, PROM G39 is stored either at location U23 or U48, depending upon the revision level of the SM80 adapter. When PROM G39 is installed at location U137, PROM G140 is stored either at location U23 or U48, depending upon the revision level of the SM80 adapter.

If you have any problem, make sure that the configuration PROM and switch settings conform with the requirements given in Table A-2.

Table A-2. Configuration PROMs and Switch Settings for Particular Drives

Drive	Configuration PROM Minimum Revision Level	----- SW1 -----		
		6	7	8
S820 (CDC 9720-850)	G39B	0	1	1
S821 (CDC 9720-1120)	G39C	0	0	1
S883 (CDC 9783)	G39A	1	1	0
S851 (Fujitsu 2351)	G39A	0	0	0
SM600 Chassis and Maxtor PDMs (XT4380E or XT8760E)	G99B	0	0	0
SM70X (2 CDC 9720-850s)	G140A	1	0	0
SM71X (2 CDC 9720-1120s)	G140A	0	1	0

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## **B.1 Overview**

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This appendix provides parameters, switch settings, jumper locations, and specifications for the respective drives supported by the SMDI subsystem.

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## **B.2 The S820 Drive (CDC 9720-850)**

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### **B.2.1 S820 Drive Parameters**

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Use the following values to select switch settings for the S820 drive. Note that each drive will have one of the following three types of control board. Type 1 has three six-position switch blocks; it is labeled 54412506. Types 2 and 3 each have two 10-position switch blocks. Type 2 is labeled 54412509, and Type 3 is labeled 54412517. In the following list of drive parameters, values that differ for the different control boards are followed by the control board label number in parentheses.

#### **Power Supply**

- Main circuit breaker = ON

#### **Control Board Switches**

- Write Protect Switch = Normal
- Sector Select Switches = 64 sectors per track
- Logical Address Switches = Logical Address 0 (Logical Address 8 for Drive B of SM70X configuration)
- Sector Clock Switch = B (for boards numbered 54412509 and 54412517) or .8 (for board number 54412506)
- Sweep Cycle Function = Disabled (54412509 and 54412517. Board number 54412506 has no sweep cycle function.)

#### **I/O Board Switches**

- Index/Sector Switch (Channel 1) = Index/Sector on "B" Cable
- Index/Sector Switch (Channel 2) = Don't Care
- SMD Mode = SMD-E
- Cylinder Address Mode = Extended Cylinder Address
- Reserve Mode = Don't Care
- Local/Remote Switch = Remote
- Device ID jumpers = Don't Care
- Ready/Power OK = Ready

## B.2.2 Switch Settings and Jumper Locations for the S820 Drive

This subsection defines the switch settings and jumper locations for the control boards and the I/O board of the S820 drive.

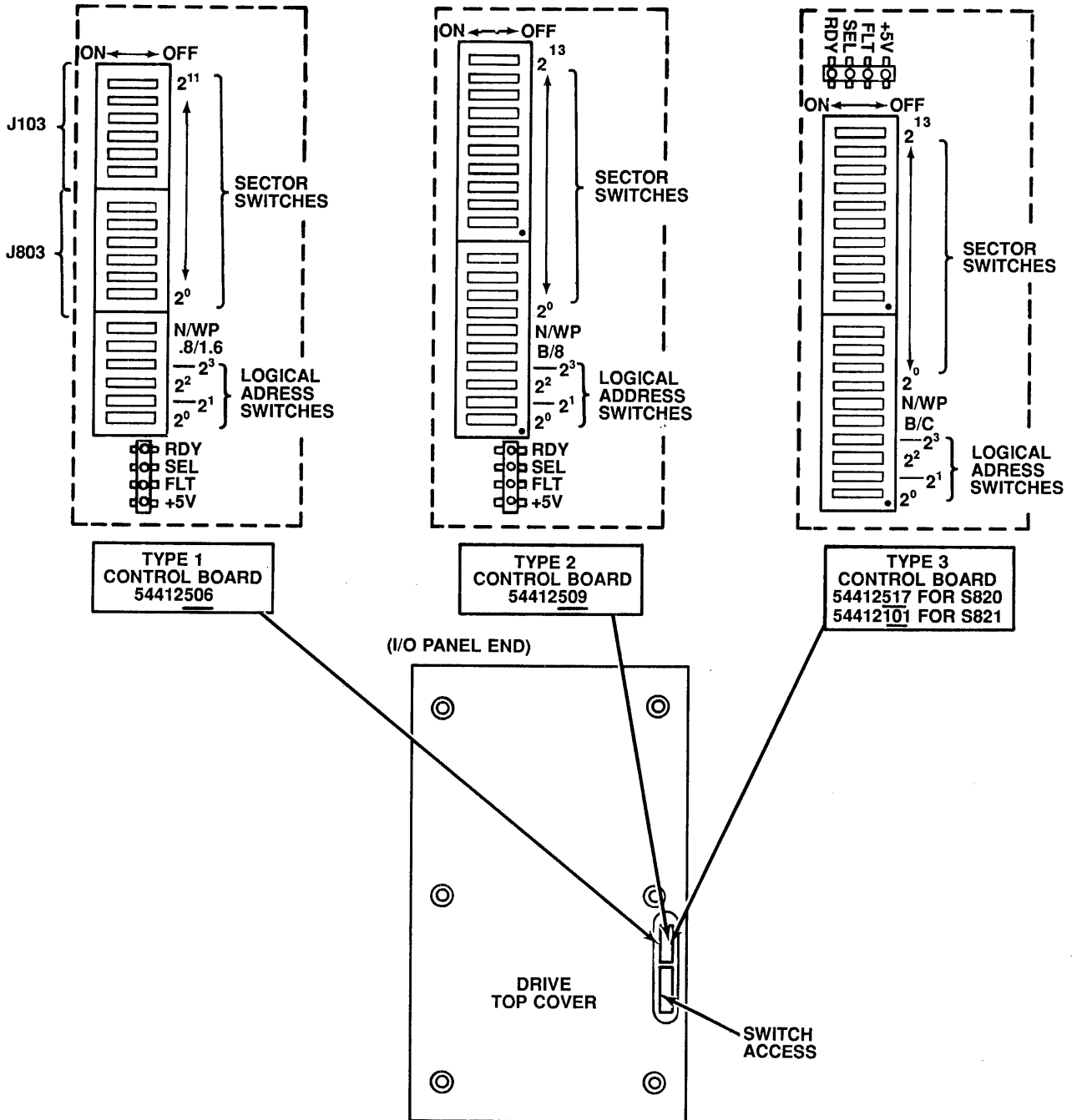
Table B-1. Switch Settings for Control Board 54412506

Switch		Logical Address 0	Logical Address 8 (SM70)
1	2 <sup>0</sup>	Closed	Closed
2	2 <sup>1</sup>	Closed	Closed
3	2 <sup>2</sup>	Closed	Closed
4	2 <sup>3</sup>	Closed	Open
Switch		Position	Function
5	.8/1.6	Open	.8 MHz Sector Clock
6	N/WP	Closed	Write Protect Switch
J803 Sector Switches		Position	
1	2 <sup>0</sup>	Closed	
2	2 <sup>1</sup>	Open	
3	2 <sup>2</sup>	Closed	
4	2 <sup>3</sup>	Open	
5	2 <sup>4</sup>	Closed	
6	2 <sup>5</sup>	Open	
J103 Sector Switches		Position	
1	2 <sup>6</sup>	Closed	
2	2 <sup>7</sup>	Closed	
3-6	2 <sup>8-211</sup>	Open	



Table B-2. Switch Settings for Control Boards 54412509 and 54412517

Switch		Logical Address 0	Logical Address 8
1	2 <sup>0</sup>	Closed	Closed
2	2 <sup>1</sup>	Closed	Closed
3	2 <sup>2</sup>	Closed	Closed
4	2 <sup>3</sup>	Closed	Open
Switch		Position	Function
5	B/8 or B/C	Open	1.6 MHz Sector Clock
6	N/WP	Closed	Write Protect Switch
Sector Switches		Position	
7	2 <sup>0</sup>	Open	
8	2 <sup>1</sup>	Open	
9	2 <sup>2</sup>	Closed	
10	2 <sup>3</sup>	Open	
1	2 <sup>4</sup>	Closed	
2	2 <sup>5</sup>	Open	
3	2 <sup>6</sup>	Closed	
4	2 <sup>7</sup>	Open	
5	2 <sup>8</sup>	Open	
6-10	2 <sup>9</sup> -2 <sup>13</sup>	Closed	

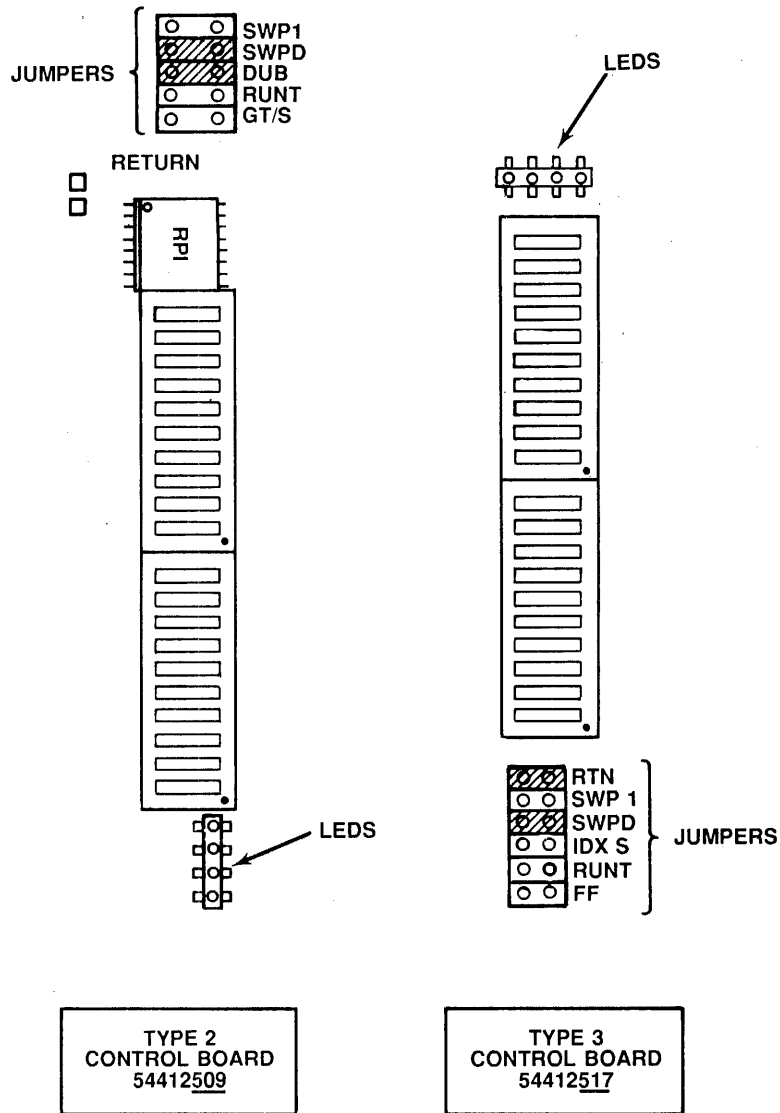


SM8002-2129

Figure B-1. Control Board Switches and Indicators for the S820 and S821 Drives

Table B-3. Jumper Locations for the S820 Drive

JUMPER	POSITION	FUNCTION
<b>With Control Board 54412509:</b>		
SWP1	Disconnected	Sweep cycle on SEEK only.
SWPD	Connected	Disable sweep cycle.
DUB	Connected	Factory set.
RUNT	Disconnected	Enable runt sector.
GT/S	Disconnected	Factory set.
<b>With Control Board 54412517:</b>		
RTN	Connected	Return if sweep cycle enabled.
SWP1	Disconnected	Sweep cycle on SEEK only.
SWPD	Connected	Disable sweep cycle.
IDXS	Disconnected	factory set.
RUNT	Disconnected	Enable runt sector.
FF	--	Reserved for future use.

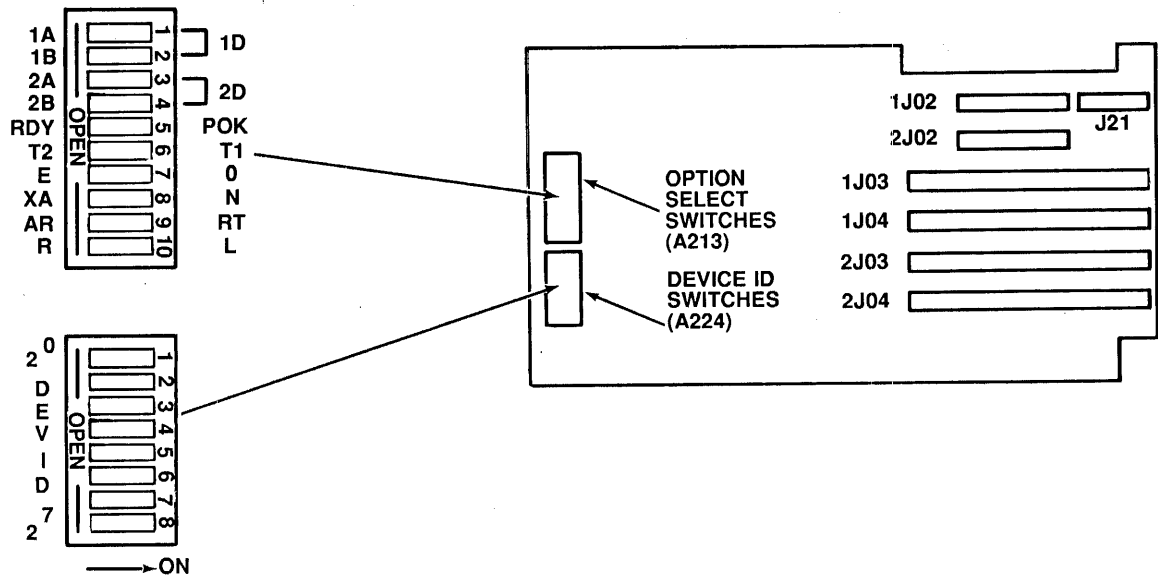


SM8002-2130

Figure B-2. Control Board Jumpers for the S820 and S821 Drives

Table B-4. I/O Board Switches for the S820 and S821 Drives

Switch	Position	Function
1 1A/1D	1D - Closed	Disable channel 1 Index/Sector on "A" cable.
2 1B/1D	1B - Open	Enable channel 1 Index/Sector on "B" cable.
3 2A/2D	2D - Closed	Disable channel 2 Index/Sector on "A" cable.
4 2A/2D	2D - Closed	Disable channel 2 Index/Sector on "B" cable.
5 RDY/POK	RDY - Open	Normal I/O ready status.
6 T2/T1	T2 - Open	Enable tag 2 extended cylinder address.
7 E/O	E - Open	SMD-E mode.
8 XA/N	XA - Open	Extended cylinder address.
9 AR/RT	AR - Open	Absolute reserve (dual channel only).
10 R/L	R - Open	Remote power ON.
1-8 DEV ID	2 <sup>0</sup> -2 <sup>7</sup> - N/A	Device type ID.



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Figure B-3. I/O Board Switches for the S820 and S821 Drives

---

**B.2.3 S820 Drive Specifications**

---

Table B-5 gives S820 disk drive specifications (the figures are approximations; they might vary with your subsystem configuration).

Table B-5. S820 Drive Specifications

<b>Parameter</b>	<b>Description</b>
<b>Formatted Capacity</b>	663 MB
<b>Transfer Rate</b>	19.72 MHz (2.465M bytes/sec)
<b>Average Latency</b>	8.33 milliseconds (disk rotates at 3600 rpm)
<b>Seek Time</b>	
Full	35 milliseconds maximum
Average	16 milliseconds
Single Track	5 milliseconds maximum

---

## **B.3 The S821 Drive (CDC 9720-1123)**

### **B.3.1 S821 Drive Parameters**

---

Use the following values to select switch settings for the S821 drive:

#### **Power Supply**

- Main circuit breaker = ON

#### **Control Board Switches**

- Write Protect Switch = Normal
- Sector Select Switches = 71 sectors per track
- Logical Address Switches = Logical Address 0 (Logical Address 8 for Drive B of SM70X configuration)
- Sector Clock Switch = B
- Sweep Cycle Function = Disabled

#### **I/O Board Switches**

- Index/Sector Switch (Channel 1) = Index/Sector on "B" Cable
- Index/Sector Switch (Channel 2) = Don't Care
- SMD Mode = SMD-E
- Cylinder Address Mode = Extended Cylinder Address
- Reserve Mode = Don't Care
- Local/Remote Switch = Remote
- Device ID Jumpers = Don't Care
- Ready/Power OK = Ready

**B.3.2 Switch Settings and Jumper Locations for the S821 Drive**

The following tables define the switch settings and jumper locations for the control board and the I/O board of the S821 drive.

**NOTE**

Model S821 uses the Type 3 Control Board only, not types 1 or 2. Its layout and jumper locations are the same as those of the Type 3 Control Board, shown in Figure B-2, but it has a different part number (54412101).

Table B-6. Control Board Switch Positions for the S821 Drive

Switch	Logical Address 0	Logical Address 8
1    2 <sup>0</sup>	Closed	Closed
2    2 <sup>1</sup>	Closed	Closed
3    2 <sup>2</sup>	Closed	Closed
4    2 <sup>3</sup>	Closed	Open
Switch	Position	Function
5 B/8 or B/C	Closed	Sector clock switch
6 N/WP	Closed	Write protect switch
Sector Switches	Position	
7    2 <sup>0</sup>	Open	
8    2 <sup>1</sup>	Open	
9    2 <sup>2</sup>	Closed	
10   2 <sup>3</sup>	Closed	
1    2 <sup>4</sup>	Closed	
2    2 <sup>5</sup>	Closed	
3    2 <sup>6</sup>	Closed	
4    2 <sup>7</sup>	Open	
5    2 <sup>8</sup>	Closed	
6    2 <sup>9</sup>	Open	
7-10 2 <sup>10</sup> -2 <sup>13</sup>	Closed	



Table B-7. Control Board Jumpers for the S821 Drive

Jumper	Position	Function
RTN	Connected	Return if sweep cycle enabled.
SWP1	Disconnected	Sweep cycle only on SEEKS.
SWPD	Connected	Disable sweep cycles.
IDXS	Disconnected	Factory set.
RUNT	Disconnected	Enable runt sector.
FF	--	Reserved for future use.

**NOTE**

The I/O board switch positions for the S821 drive are the same as those for the S820. Refer to Table B-4 and Figure B-3.

**B.3.3 S821 Drive Specifications**

Table B-8 gives S821 disk drive specifications (the figures are approximations; they might vary with your subsystem configuration).

Table B-8. S821 Drive Specifications

Parameter	Description
<b>Formatted Capacity</b>	873 MB
<b>Transfer Rate</b>	22 MHz (2.75M bytes/sec)
<b>Average Latency</b>	8.33 milliseconds (disk rotates at 3600 rpm)
<b>Seek Time</b>	
Full	35 milliseconds maximum
Average	16 milliseconds
Single Track	5 milliseconds maximum

## **B.4 The S883 Drive (CDC 9783)**

### **B.4.1 S883 Drive Parameters**

---

Use the following values for selecting switch settings for the S883 drive. The CDC manual, which is included with the disk drive, gives the location of the switches.

#### **Back Panel (Power Supply) Switches**

- Main circuit breaker = ON

#### **Front Panel Switches**

- Logic Plug = 0
- START Switch = ON
- FAULT Indicator = OFF (press switch to clear fault)
- Write Protect Switch = OFF

#### **Status/Fault Display Switches (behind front panel)**

- Diagnostic Mode Switch = OFF
- Diagnostic Execute Switch = OFF
- Diagnostic Step Switch = OFF

#### **Control Board Switches**

- Write Protect Jumper = Normal
- Sector Select Switches = 78 sectors per track

#### **I/O Board Switches**

- Index/Sector Switch (Channel 1) = Index/Sector on "B" Cable
- Index/Sector Switch (Channel 2) = Don't Care
- Channel 1 Switch = Enabled
- Channel 2 Switch = Don't Care
- SMD Mode = SMD-E
- Cylinder Address Mode = Extended Cylinder Address
- Reserve Mode = Don't Care
- Local/Remote Switch = Remote
- Device ID Switches = Don't Care

## B.4.2 Switch Settings and Jumper Locations for the S883 Drive

This subsection defines the switch settings and jumper locations for the control board and the I/O board of the S883 drive.

Table B-9. Control Board Switches for the S883 Drive

Switch F556		Position
1	2 <sup>0</sup>	Open
2	2 <sup>1</sup>	Closed
3	2 <sup>2</sup>	Closed
4	2 <sup>3</sup>	Closed
5	2 <sup>4</sup>	Closed
6	2 <sup>5</sup>	Open
Switch F563		Position
1	2 <sup>6</sup>	Open
2	2 <sup>7</sup>	Open
3	2 <sup>8</sup>	Closed
4	2 <sup>9</sup>	Open
5	2 <sup>10</sup>	Open
6	2 <sup>11</sup>	Open

Table B-10. Control Board Jumpers for the S883 Drive

Jumper	Position	Function
NRM/WP	NRM	Disable WRITE PROTECT.

Table B-11. I/O Board Switches for the S883 Drive

Switch C503		Position	Function
1	1A	Closed	Disable Channel 1 Index/Sector on "A" cable. Enable Channel 1 Index/Sector on "B" cable. Disable Channel 2 Index/Sector on "A" cable. Disable Channel 2 Index/Sector on "B" cable. Enable Channel 1. Disable Channel 2. SMD-E Mode. Extended Cylinder Address. Absolute reserve (dual channel only). Remote power-up.
2	1B	Open	
3	2A	Closed	
4	2B	Closed	
5	1D	Open	
6	2D	Closed	
7	SO	Open	
8	XA	Closed	
9	AR	Open	
10	RL	Open	
Switch E103		Position	Function
1-8	2 <sup>0-27</sup>	N/A	Device type ID not used.

### B.4.3 S883 Drive Specifications

Table B-12 gives S883 disk drive specifications (the figures are approximations; they might vary with your subsystem configuration).

Table B-12. S883 Drive Specifications

Parameter	Description
<b>Formatted Capacity</b>	1055 MB
<b>Transfer Rate</b>	22 MHz (2.75M bytes/sec)
<b>Average Latency</b>	9.16 milliseconds (disk rotates at 3274 rpm)
<b>Seek Time</b>	
Full	30 milliseconds maximum
Average	16 milliseconds
Single Track	5 milliseconds maximum

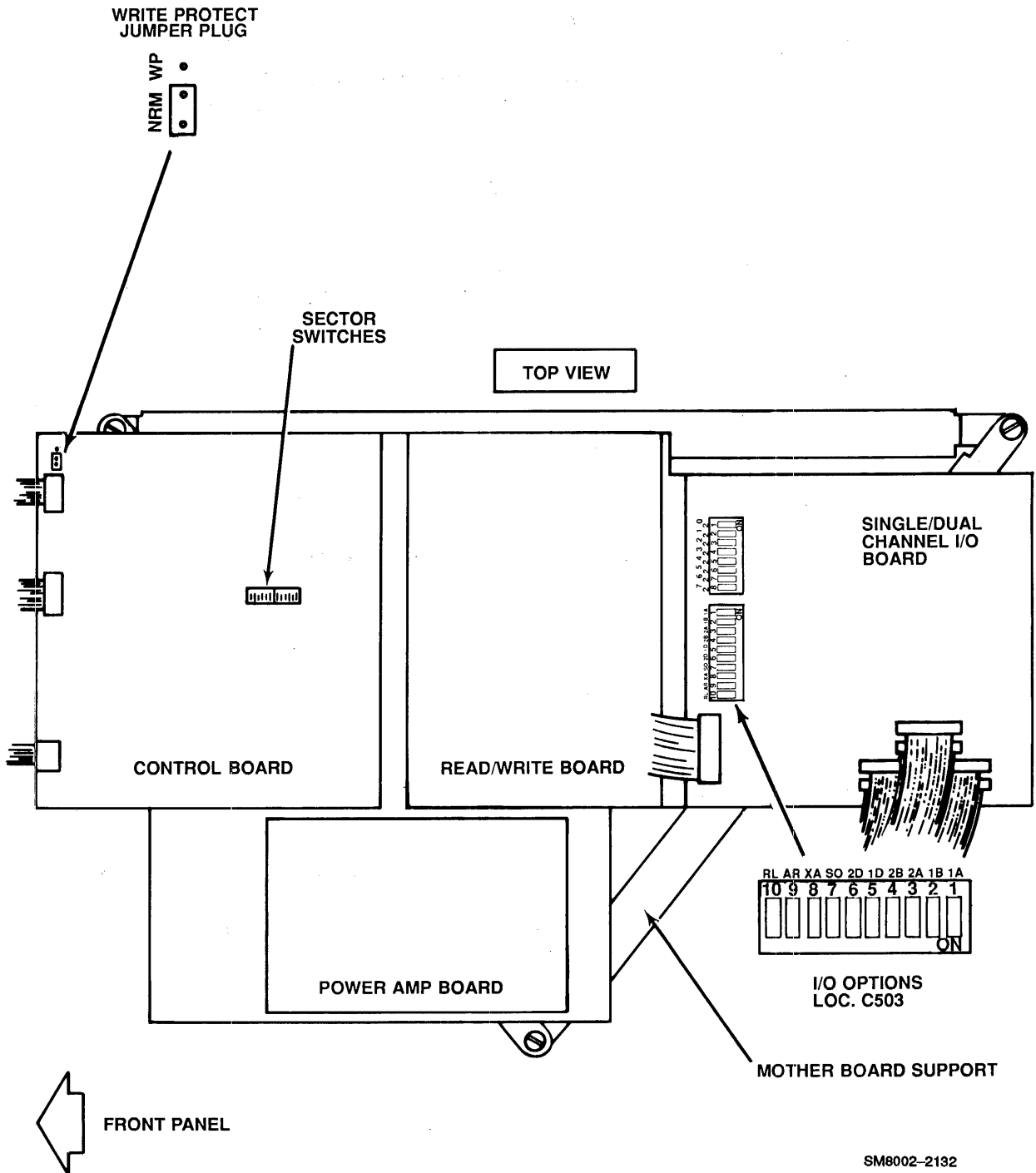


Figure B-4. S883 Control Board Switches and I/O Board Switches

## **B.5 The S851 Drive (Fujitsu 2351)**

### **B.5.1 S851 Drive Parameters**

---

Use the following values in selecting switch settings for the S851 drive. The Fujitsu manual, which is included with the disk drive, gives the switch and jumper locations.

#### **Back Panel (Power Supply) Switches:**

- Main Line Switch = ON
- Local/Remote Switch = Remote
- AC Current = 120 VAC (domestic) or 220 VAC (European)
- Grounding = user's choice

#### **Front Panel Switches**

- Start Switch = ON
- Write Protect Switch = OFF
- Fault LED = OFF
- Start/Ready/Power on LEDs = ON

#### **Indicator Unit Switches (located at rear of drive)**

- State Switch = State 0
- MRTZ Switch = OFF

#### **Interface PCB Switches**

- Drive Address Switches = 0

#### **Logic PCB Jumpers**

- Tag 4,5 Capability Jumper = Disable
- Seek End Status Jumper = Seek End issued after Offset Command is reset
- Unit Ready Jumper = Unit Ready issued even if drive in fault condition
- Sector Count = 44 sectors per track

**B.5.2 Switch Settings and Jumper Locations for the S851 Drive**

This subsection defines the switch settings and jumper locations for the S851 drive.

Table B-13. Interface PCB Switches for the S851 Drive

SW1	Position
1-1	OFF
1-2	OFF
1-3	OFF
1-4	OFF

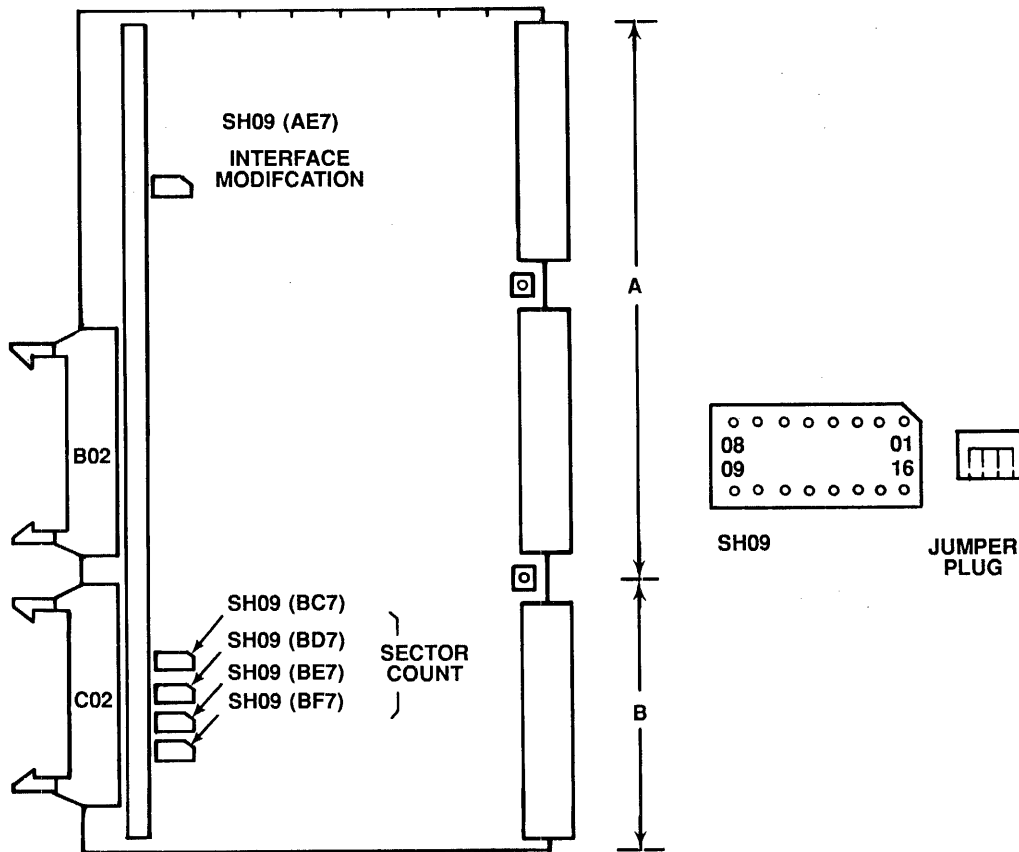
Table B-14. Jumper Locations for the S851 Drive

LOGIC PCB JUMPERS		
AE7 Jumper Position	Function	
03-04	Disable tag 4, 5	
06-07	Seek end issued after OFFSET command is reset.	
09-10	UNIT READY issued if the drive is in fault condition.	
SECTOR COUNT JUMPERS		
BC7 Jumper Position	State	Count
2-3	ON	1
5-6	ON	2
9-10	ON	4
12-13	ON	8
BD7 Jumper Position	State	Count
2-3	ON	16
5-6	ON	32
9-10	ON	64
13-14	OFF	128

(Continued on next page.)

Table B-14. Jumper Location for the S851 Drive (Continued)

BE7 Jumper Position	State	Count
3-4	OFF	256
5-6	ON	512
10-11	OFF	1024
13-14	OFF	2048
BF7 Jumper Position	State	Count
3-4	OFF	4096
6-7	OFF	8192
10-11	OFF	16,384
13-14	OFF	Spare



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Figure B-5. Sector Count and Interface Selection for the S851 Drive



You must remove the logic PCB in order to set the sector count or to change the interface options. Use the extractor tools that came with the drive.

---

### B.5.3 S851 Drive Specifications

---

Table B-15 gives S851 disk drive specifications (the figures are approximations; they might vary with your subsystem configuration).

Table B-15. S851 Drive Specifications

Parameter	Description
<b>Formatted Capacity</b>	365 MB
<b>Transfer Rate</b>	1.859 MB/s
<b>Average Latency</b>	7.5 milliseconds
<b>Seek Time</b>	
Full	35 milliseconds maximum
Average	18 milliseconds
Single Track	5.5 milliseconds maximum

## B.6 The S680 Drive (Maxtor XT-4380E)

### B.6.1 S680 Drive Parameters

Confirm that the jumpers on the S680 (Maxtor XT-4380E) drive are set for the following configuration:

- Drive Number = Number 1
- Mode = Hard Sector Mode
- Sector Size = 654 bytes per sector (with 32 sectors) or 634 bytes per sector (with 33 sectors)
- Local/Remote Spin up and down = Remote

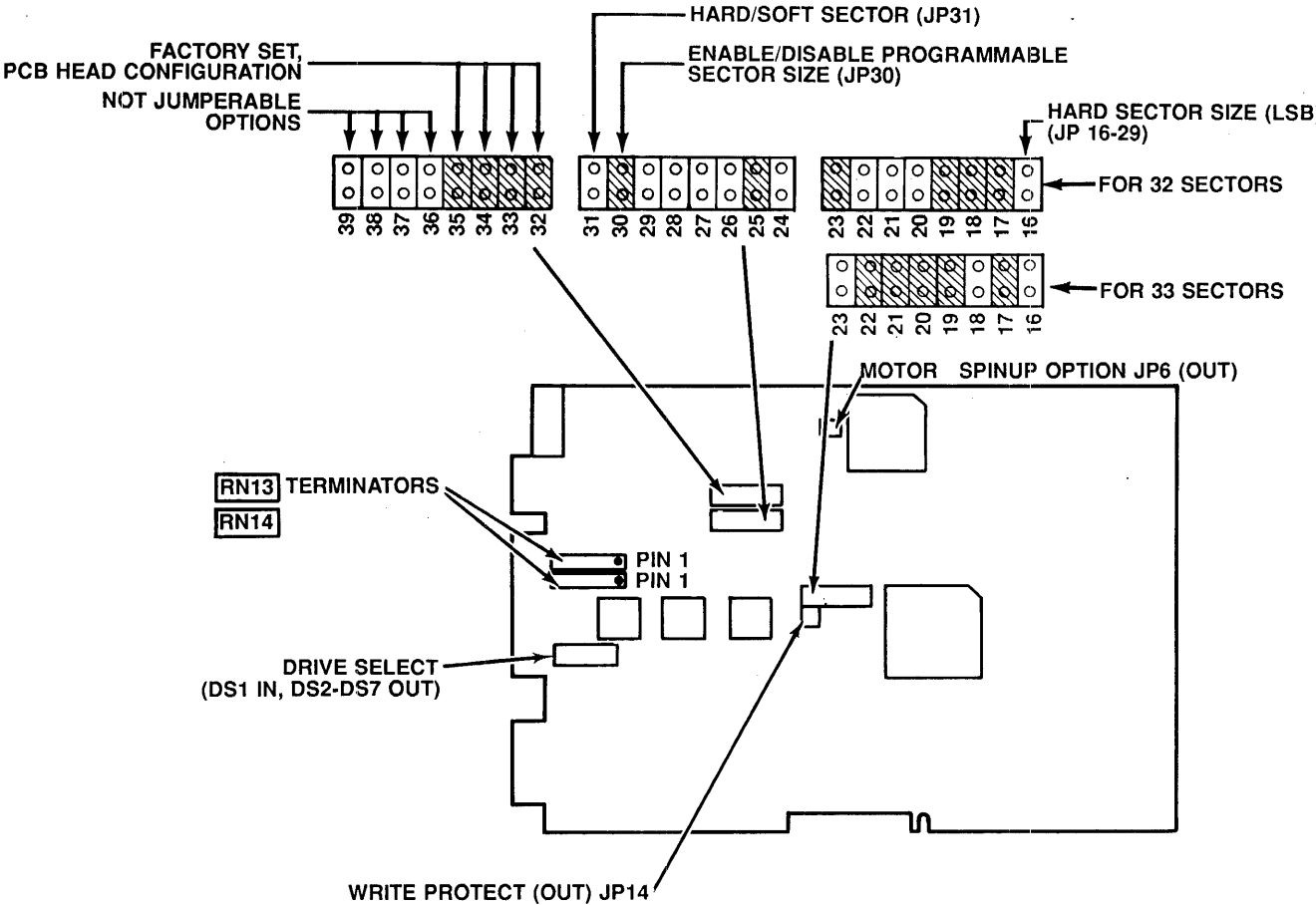
In addition, confirm that the drive termination resistor packs on the drives have been removed, because they will interfere with the drive termination provided on the SM600 chassis.

### B.6.2 Jumper Locations for the S680 Drive

This subsection defines the jumper locations for the S680 drive. If your drive is configured for 32 sectors (654 bytes per sector), select the jumper locations from column two of Table B-16. If it is configured for 33 sectors (634 bytes per sector), select the jumper locations from column three.

Table B-16. Jumper Locations for the S680 Drive

Jumper	32 Sectors	33 Sectors	Description
DS1	IN	IN	Drive Select 1
DS2-7	OUT	OUT	Drive Select 2-7
JP6	OUT	OUT	Remote spinup enabled
JP14	OUT	OUT	Not write-protected
JP16	OUT	OUT	Sector size byte count 1
JP17	IN	IN	Sector size byte count 2
JP18	IN	OUT	Sector size byte count 4
JP19	IN	IN	Sector size byte count 8
JP20	OUT	IN	Sector size byte count 16
JP21	OUT	IN	Sector size byte count 32
JP22	OUT	IN	Sector size byte count 64
JP23	IN	OUT	Sector size byte count 128
JP24	OUT	OUT	Sector size byte count 256
JP25	IN	IN	Sector size byte count 512
JP26	OUT	OUT	Sector size byte count 1024
JP27	OUT	OUT	Sector size byte count 2048
JP28	OUT	OUT	Sector size byte count 4096
JP29	OUT	OUT	Sector size byte count 8192
JP30	IN	IN	Programmable hard sector size
JP31	OUT	OUT	Hard sector mode
JP32-35	IN	IN	15 data heads



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Figure B-6. Jumper Locations for the S680 Drive

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**B.6.3 S680 Drive Specifications**

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Table B-17 gives specifications for the S680 (Maxtor XT-4380E) disk drive. The figures are approximations; they might vary with subsystem configurations.

Table B-17. S680 Drive Specifications

<b>Parameter</b>	<b>Description</b>
<b>Formatted Capacity</b>	288 MB (32 sectors) or 298 MB (33 sectors)
<b>Transfer Rate</b>	10 MHz (1.25M bytes/sec)
<b>Average Latency</b>	8.33 milliseconds
<b>Access Time</b>	
Maximum	35 milliseconds
Average	18 milliseconds
Track-to-Track	3 milliseconds maximum

## B.7 The S660 Drive (Maxtor XT-8760E)

### B.7.1 S660 Drive Parameters

Confirm that the jumpers on the S660 (Maxtor XT-8760E) drive are set for the following configuration:

- Drive Number = Number 1
- Mode = Hard Sector Mode
- Sector Size = 641 bytes per sector
- Local/Remote Spin up and down = Remote

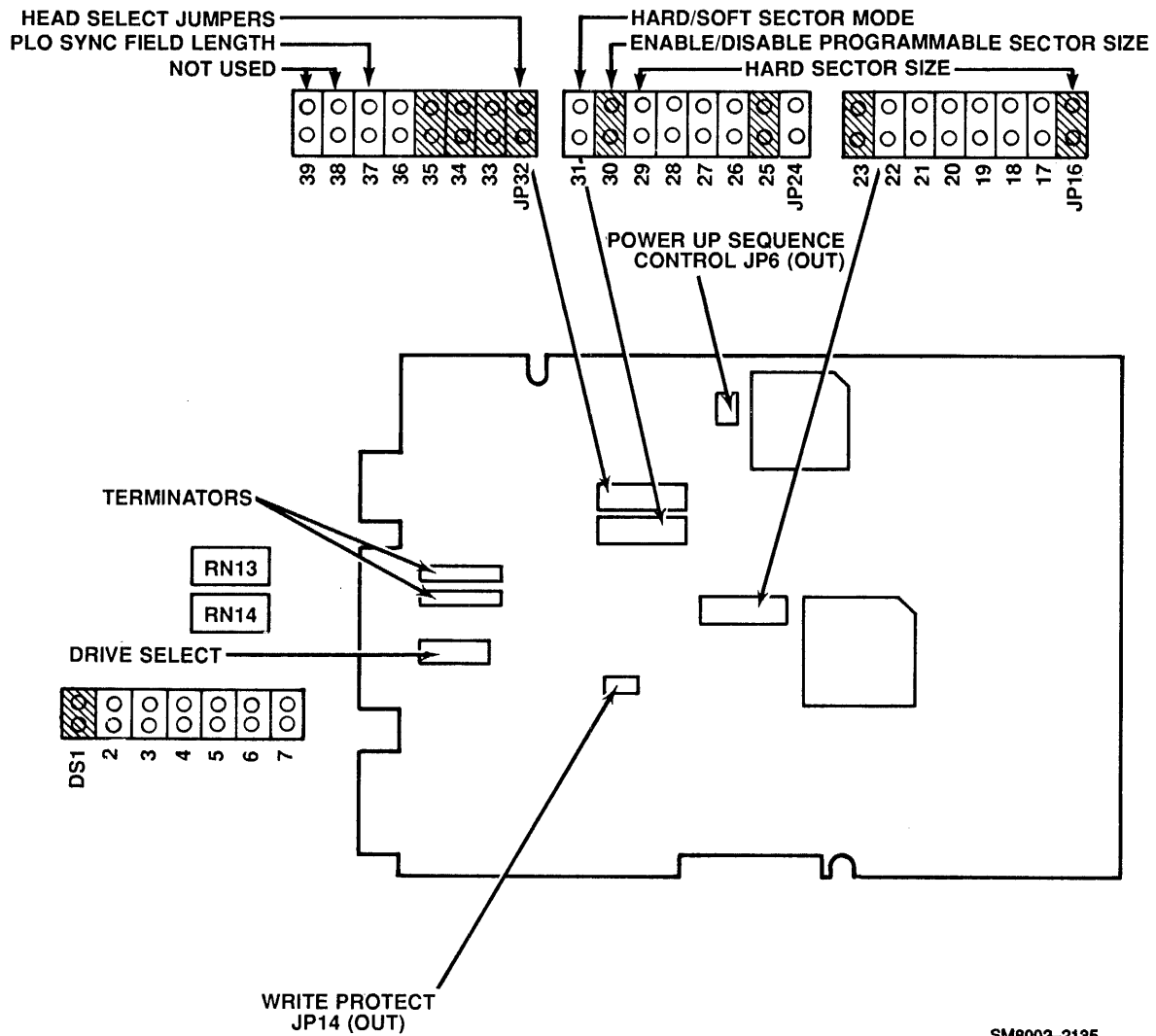
In addition, confirm that the drive termination resistor packs on the drives have been removed, because they will interfere with the drive termination provided on the SM600 chassis.

### B.7.2 Jumper Locations for the S660 Drive

Table B-18 defines the jumper locations for the S660 drive.

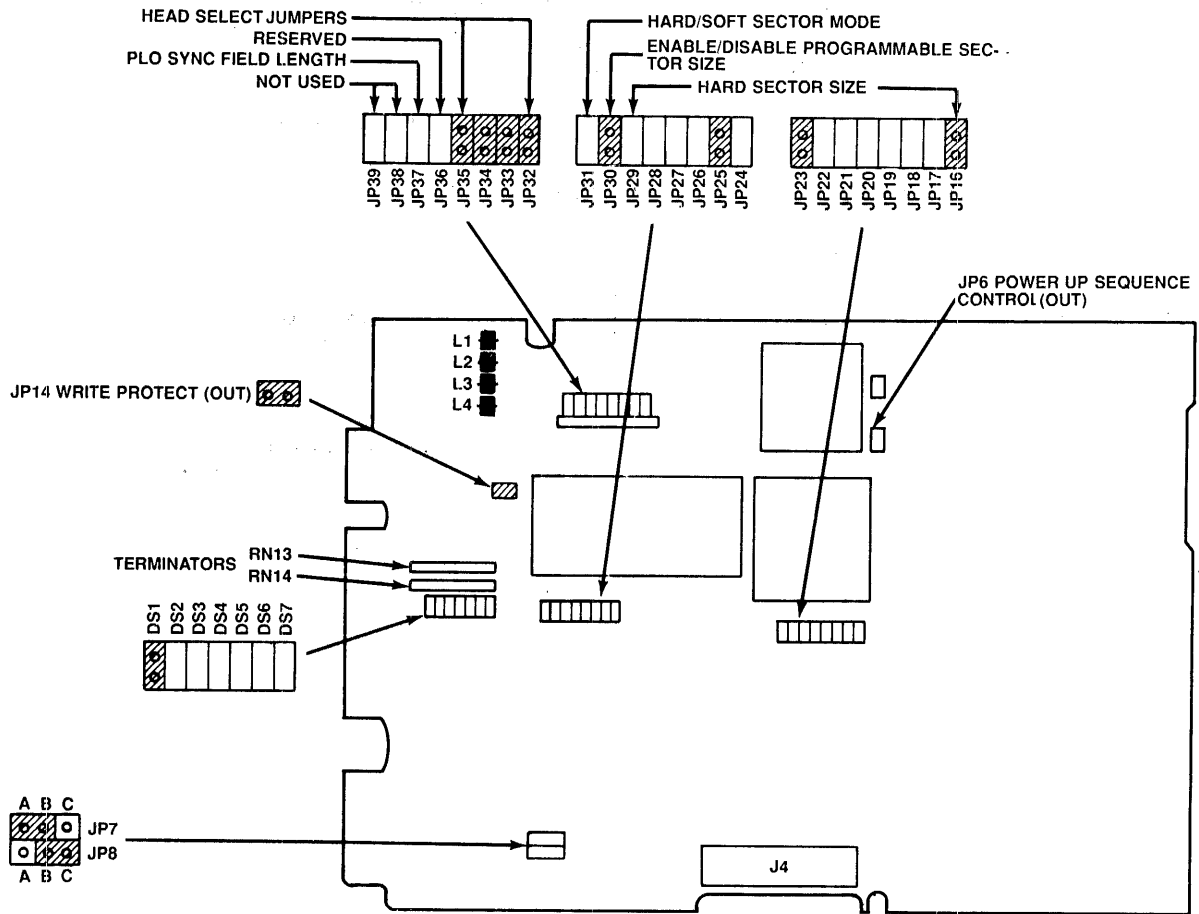
Table B-18. Jumper Locations for the S660 Drive

Jumper	Location	Description
DS1	IN	Drive Select 1
DS2-7	OUT	Drive Select 2-7
JP6	OUT	Remote spinup enabled
JP7	A-B	Read gate delay (board numbers
JP8	B-C	1015468 and 1014520 only)
JP14	OUT	Not write-protected
JP16	IN	Sector size byte count 1
JP17	OUT	Sector size byte count 2
JP18	OUT	Sector size byte count 4
JP19	OUT	Sector size byte count 8
JP20	OUT	Sector size byte count 16
JP21	OUT	Sector size byte count 32
JP22	OUT	Sector size byte count 64
JP23	IN	Sector size byte count 128
JP24	OUT	Sector size byte count 256
JP25	IN	Sector size byte count 512
JP26	OUT	Sector size byte count 1024
JP27	OUT	Sector size byte count 2048
JP28	OUT	Sector size byte count 4096
JP29	OUT	Sector size byte count 8192
JP30	IN	Programmable hard sector size
JP31	OUT	Hard sector mode
JP32-35	IN	15 data heads
JP37	OUT	14-byte PLO sync-field length



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Figure B-7. Jumper Locations for the S660 Drive (Board 1014150)



SM8002-2136

Figure B-8. Jumper Locations for the S660 Drive (Boards 1015468 and 1014520)

---

**B.7.3 S660 Drive Specifications**

---

Table B-19 gives specifications for the S660 disk drive. The figures are approximations; they might vary with subsystem configurations.

Table B-19. S660 Drive Specifications

<b>Parameter</b>	<b>Description</b>
<b>Formatted Capacity</b>	597 MB
<b>Transfer Rate</b>	15 MHz (1.87M bytes/sec)
<b>Average Latency</b>	8.33 milliseconds
<b>Access Time</b>	
Maximum	35 milliseconds maximum
Average	18 milliseconds
Track-to-Track	3 milliseconds maximum





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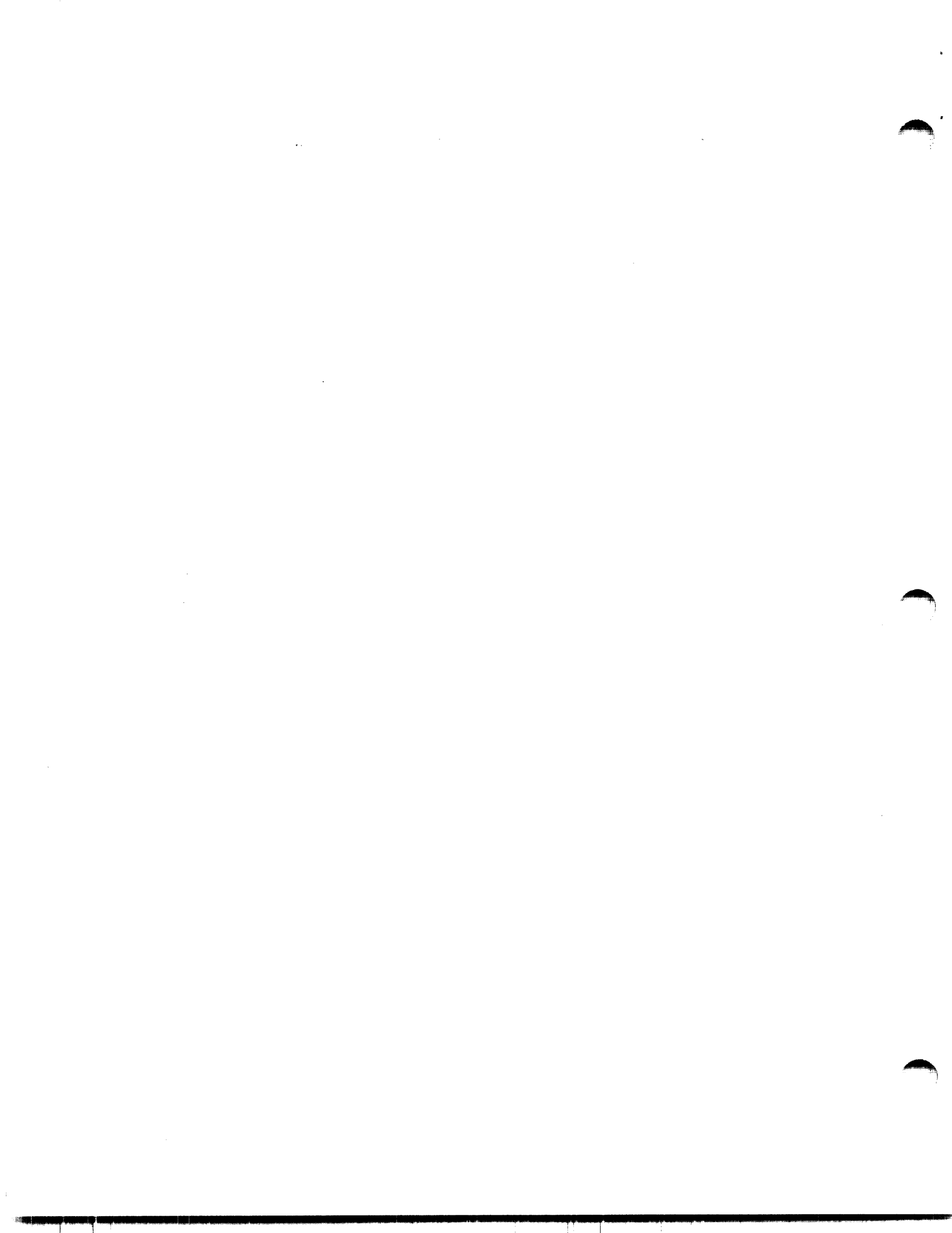
;
;      DIAGNOSTIC TESTS
;-----
;
;      TEST #      FUNCTION
;-----
;
;      1          FROM VERIFICATION
;      2          FRONT PANEL LED DISPLAY
;      3          SECTOR COUNTER PORT
;      4          READ/WRITE CONTROLS
;      5          CLOCK CONTROLS
;      6          MAX SECTOR # OUTPUT PORT
;      7          SMD/ESDI CABLE PORTS
;      8          OPERATOR PANEL CONTROLS
;      9          TIMER 5.5
;      A          TIMER 6.5
;      B          INTERRUPT 7.5 STATUS A & B
;      C          SDI OUTPUT PORT
;      D          SDI COMMAND/RESPONSE - DATA I/O
;      E          SDI CABLE LOOP BACK - BOTH PORTS
;      F          DIAGNOSTIC DATA I/O PORTS
;      10         DISK DATA READ/WRITE VERIFICATION
;      11         SEEK ERROR/FAULT ERROR RECOVERY
;      12         INTERLOCK STATUS
;      13         CONTROL PORT #9
;      14         INCREMENT/DECREMENT SEEK TEST
;      15         ALTERNATE SEEK TEST
;      16         RANDOM SEEK TEST
;      17         RECALIBRATE TEST

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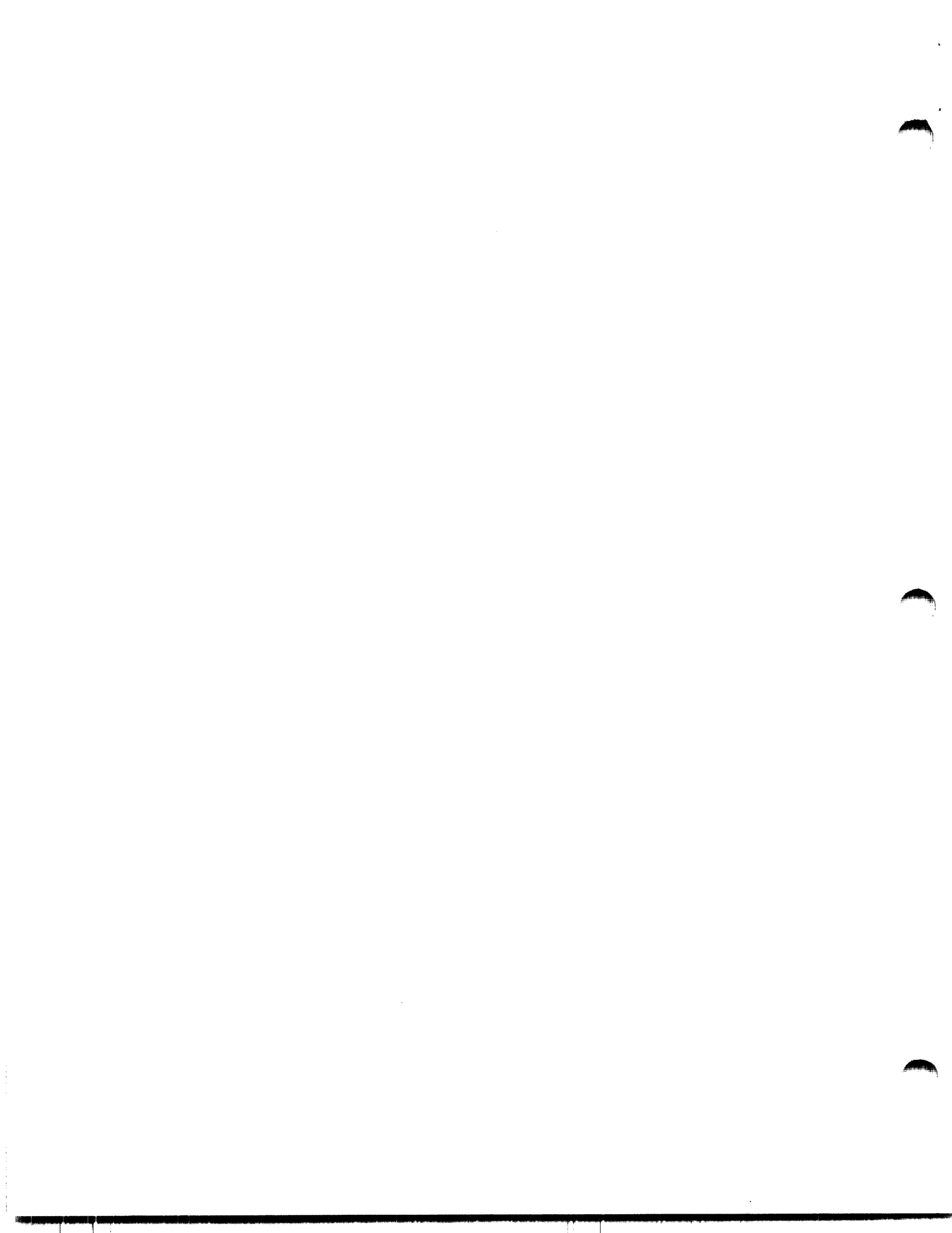
GROUP ERROR CODES

CODE #	MEANING
20	-5 VDC POWER/PANEL INTERLOCK STATUS BAD
21	DRIVE NOT READY OR NOT SELECTED
22	DRIVE OFFLINE OR DISABLED
23	ROTATIONAL POSITION OR SECTOR COUNTER ERROR
24	SMD/ESDI ERROR (TIMEOUT, FAULT, SEEK-ERROR)
25	READ/WRITE ERROR
26	READ/WRITE COMMAND OVERRUN
27	UNRECOGNIZED ERROR CODE
28	FATAL ERROR
29	UNEXPECTED INTERRUPT OR RESET
2A	SDI TRANSMISSION ERROR
2B	INVALID SDI COMMAND RECEIVED
2C	SDI COMMAND PARAMETER OR PROTOCOL ERROR
2D	DRIVE STATE ERROR
2E	CONFIGURATION ERROR
2F	HARDWARE FAILURE DETECTED



SPECIFIC ERROR CODES

CODE #	MEANING
30	LOSS OF SERVO CLOCK
31	LOSS OF READ CLOCK
32	R/G OR W/G .AND. DRIVE NOT READY
33	R/G OR W/G .AND. DRIVE NOT ON-CYLINDER
34	MULTIPLE WRITE GATE TRANSITIONS
35	WRITE GATE .AND. WRITE PROTECTED
36	SECTOR COUNTER ERROR
37	READ GATE .AND. WRITE GATE
38	DRIVE FAULT
39	R/G OR W/G .AND. FAULT
3A	LATE WRITE GATE
3B	UNEXPECTED RESET
3C	DRIVE BUSY INPUT TRUE
3D	DRIVE WRITE PROTECT INPUT TRUE
3E	DRIVE UNIT SELECT INPUT FALSE <i>B CABLE ON SMD OUT OR CENTER CABLE ON SMD</i>
3F	7.5 INTERRUPT WITH NO ERROR STATUS PRESENT
40	-5 VDC STATUS BAD
41	OPERATOR PANEL INTERLOCK STATUS BAD
42	DRIVE DISABLED
43	SM600 CHASSIS NONFUNCTIONAL
44	FATAL ERROR TRAP
45	SM600 OVER-TEMPERATURE DETECTION
46	DRIVE ALREADY SPUN UP
47	SMD/ESDI COMMAND TIMEOUT OCCURRED
48	SM600 POWER-FAIL DETECTION
49	READ/WRITE COMMAND OVERRUN
4A	'DRIVE CLEAR' DID NOT CLEAR ATTENTION
4B	'DRIVE CLEAR' DID NOT CLEAR ALL ERROR BITS
4C	'DRIVE CLEAR' DID NOT CLEAR DRIVE ERRORS
4D	DRIVE SPIN-UP FAILED
4E	DRIVE SPIN-DOWN FAILED
4F	DRIVE SEEK/RECAL ERROR
50	SDI COMMAND ALREADY IN PROGRESS
51	SDI FRAMING PROTOCOL ERROR
52	SDI CHECKSUM ERROR
53	SDI PARITY ERROR
54	INVALID REAL-TIME COMMAND
55	INVALID MICROPROCESSOR COMMAND
56	COMMAND INPUT BUFFER OVERRUN/UNDERRUN
57	DRIVE ERROR SET .AND. 'NO ERROR ALLOWED' FLAG SET
58	INVALID HEAD ADDRESS
59	INVALID CYLINDER ADDRESS
5A	CHANGING FROM 512 TO 576 BYTE MODE
5B	CONTROL-IN PARITY ERROR
5C	CONTROL-IN PULSE ERROR
5D	NO DRIVE INSTALLED
5E	CONFIGURATION MISMATCH
5F	COMMAND/WRITE DATA PULSE ERROR





SPECIFIC ERROR CODES (CONT.)

CODE #	MEANING
60	WRITE PROTECTED DRIVE
61	UNEXPECTED SPIN-DOWN
62	ILLEGAL DIAGNOSTIC NUMBER
63	TIMEOUT LENGTH = 0
64	RUN SWITCH ON .AND. DRIVE DISABLED
65	RUN SWITCH OFF
66	MEMORY REGION NOT FOUND
67	DRIVE UNEXPECTEDLY NOT ON CYLINDER
68	ATTEMPTED TO WRITE PAST MEMORY REGION
69	SDI TRANSMISSION TIMEOUT
6A	DRIVE NOT ON-LINE
6B	READ/WRITE READY STATUS NOT SET
6C	TOPOLOGY MODE MISMATCH
6D	AVAILABLE STATUS NOT SET
6E	INVALID ERROR RECOVERY LEVEL (>0)
6F	INVALID SUB-UNIT FLAG/NO SUB-UNIT #0 FLAG
70	5.5 TIMER ERROR
71	6.5 TIMER ERROR
72	SDI OUT/ECHO ERROR
73	NUMBER OF BAD TRACKS = 1 TO 3
74	NUMBER OF BAD TRACKS > 3
75	SECTOR COUNT NOT FOUND
76	DIAGNOSTIC READ ERROR LATCH FAILURE
77	DRIVE NOT SPUN UP
78	DRIVE NOT SPUN DOWN
79	DRIVE ERROR STATUS SET
7A	COMMAND AVAILABLE TIME OUT
7B	DRIVE INIT FOUND
7C	UNEXPECTED SDI STATUS 'B' ERROR FOUND
7D	unused
7E	INVALID COMMAND NOT DETECTED
7F	LOSS OF CONTROL CLOCK NOT DETECTED
80	LOSS OF COMMAND/WRITE CLOCK NOT DETECTED
81	EXPECTED SDI STATUS 'B' PORT A ERROR NOT FOUND
82	CANNOT CLEAR LOSS OF COMMAND/WRITE CLOCK STATUS BIT
83	CANNOT CLEAR LOSS OF CONTROL CLOCK STATUS BIT
84	EXPECTED SDI STATUS 'B' PORT B ERROR NOT FOUND
85	unused
86	INVALID RESPONSE FRAME
87	INVALID SDI DATA RECEIVED
88	RESPONSE NOT DETECTED
89	CANNOT CLEAR COMMAND AVAILABLE STATUS BIT
8A	INVALID COMMAND IMPROPERLY DETECTED
8B	DRIVE INIT NOT DETECTED OR NOT CLEARED
8C	RAM ERROR - BANK # 0
8D	RAM ERROR - BANK # 1
8E	RAM ERROR - BANK # 2
8F	RAM ERROR - BANK # 3



SPECIFIC ERROR CODES (CONT.)

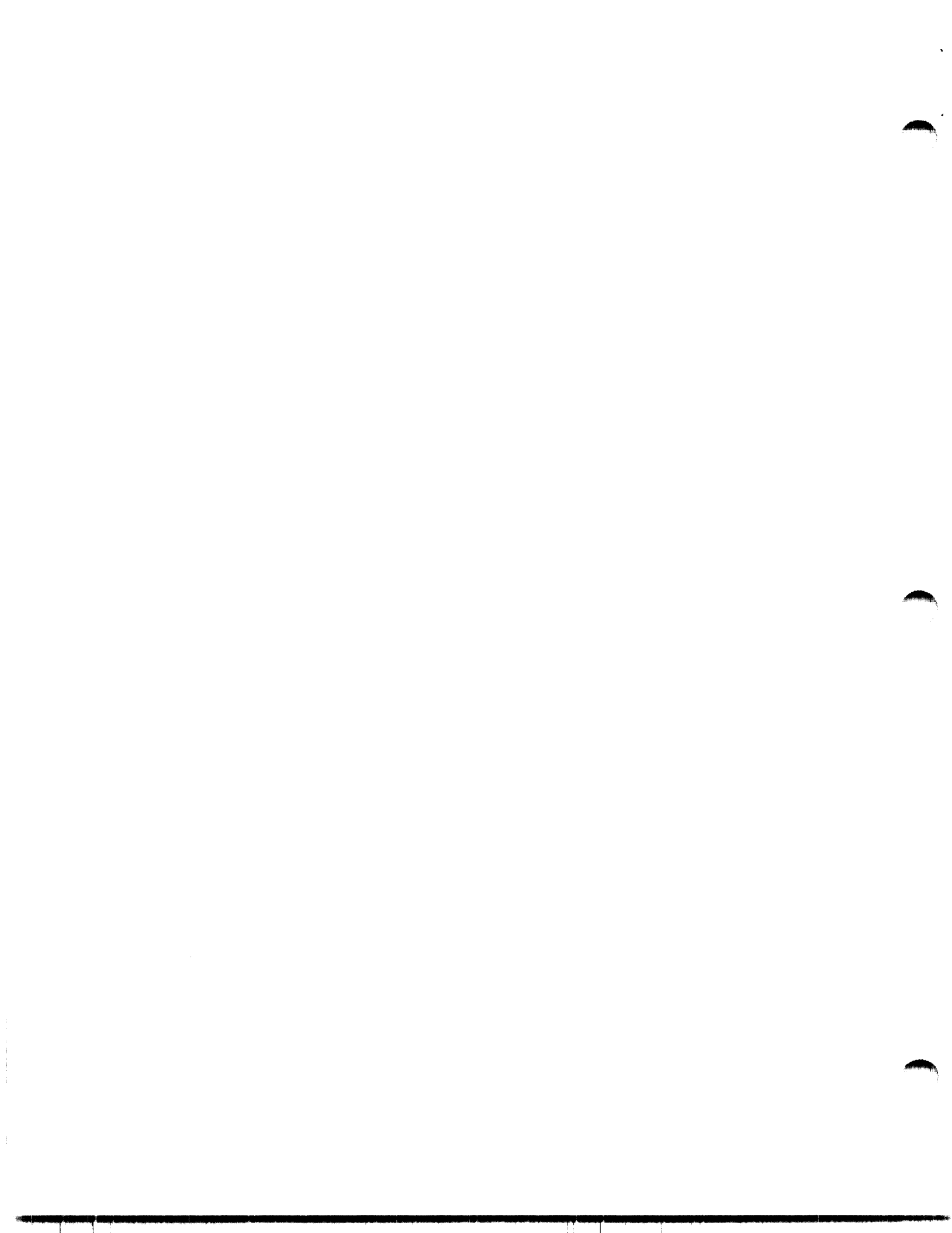
CODE #	MEANING
90	LOSS OF COMMAND/WRITE CLOCK IMPROPERLY DETECTED
91	LOSS OF CONTROL CLOCK IMPROPERLY DETECTED
92	COMMAND AVAILABLE NOT DETECTED
93	WRONG COMMAND CODE DETECTED
94	WRONG SDI DATA DETECTED
95	SYNC DETECT FAILURE
96	INCORRECT NUMBER OF SECTORS
97	SECTOR COUNTER PORT ERROR
98	CONTROL PORT #9 ERROR
99	DRIVE STATUS PORTS A OR B ERROR
9A	SMD/ESDI OUTPUT/INPUT PORTS ERROR
9B	MAX SECTOR # OUTPUT PORT ERROR
9C	INTERLOCK STATUS PORT ERROR
9D	READ/WRITE CONTROL PORT ERROR
9E	CLOCK CONTROL PORT ERROR
9F	DISK DATA READ/COMPARE PORTS ERROR
A0	INTERRUPT 7.5 STATUS 'A' BIT 0 ERROR
A1	INTERRUPT 7.5 STATUS 'A' BIT 1 ERROR
A2	INTERRUPT 7.5 STATUS 'A' BIT 2 ERROR
A3	INTERRUPT 7.5 STATUS 'A' BIT 3 ERROR
A4	INTERRUPT 7.5 STATUS 'A' BIT 4 ERROR
A5	INTERRUPT 7.5 STATUS 'A' BIT 5 ERROR
A6-A9	unused
AA	NO ERROR (TEST PASSED)
AB-AF	unused
B0	INTERRUPT 7.5 STATUS 'B' BIT 0 ERROR
B1	INTERRUPT 7.5 STATUS 'B' BIT 1 ERROR
B2	INTERRUPT 7.5 STATUS 'B' BIT 2 ERROR
B3	INTERRUPT 7.5 STATUS 'B' BIT 3 ERROR
B4	INTERRUPT 7.5 STATUS 'B' BIT 4 ERROR
B5	INTERRUPT 7.5 STATUS 'B' BIT 5 ERROR
B6-BF	unused
C0	PROGRAM PROM CHECKSUM ERROR
C1	PROGRAM PROM VERIFICATION FLAG ERROR
C2	UNEXPECTED SDI STATUS 'A' ERROR FOUND
C3	CANNOT CLEAR INTERRUPT STATUS A OR B ERROR BIT
C4	CONFIGURATION PROM CHECKSUM ERROR
C5	SEEK ERROR NOT DETECTED
C6	DRIVE FAULT NOT DETECTED
C7	unused
C8	SEEK ERROR ON OTHER DRIVE (DRIVE 8)
C9	DRIVE FAULT ON OTHER DRIVE (DRIVE 8)
CA	NUMBER OF BAD TRACKS = 1 TO 3
CB	NUMBER OF BAD TRACKS > 3
CC	DRIVE NOT SPUN UP
CD	SYNC DETECT FAILURE
CE	INCORRECT NUMBER OF SECTORS
CF-DA	unused



SPECIFIC ERROR CODES (CONT.)

CODE #	MEANING
DB	OTHER DRIVE WRITE-PROTECTED (DRIVE 8)
DC	unused
DD	INCONSISTENT FLAGS AND CONTROLS
DE-DF	unused
E0	WRITE PROTECTED DRIVE (DRIVE 8)
E1	DRIVE 8 UNEXPECTEDLY NOT ON CYLINDER
E2-E4	unused
E5	SEEK ERROR NOT DETECTED ON DRIVE 8
E6	DRIVE FAULT NOT DETECTED ON DRIVE 8
E7	SMD COMMAND TIMEOUT OCCURRED FOR DRIVE 8
E8	SEEK ERROR ON OTHER DRIVE (DRIVE 0)
E9	DRIVE FAULT ON OTHER DRIVE (DRIVE 0)
EA	NUMBER OF BAD TRACKS = 1 TO 3 (DRIVE 8)
EB	NUMBER OF BAD TRACKS > 3 (DRIVE 8)
EC	DRIVE 8 NOT SPUN UP
ED	SYNC DETECT FAILURE ON DRIVE 8
EE	INCORRECT NUMBER OF SECTORS ON DRIVE 8
EF	DRIVE 8 SEEK/RECAL ERROR
F0	LOSS OF SERVO CLOCK FROM DRIVE 8
F1	LOSS OF READ CLOCK FROM DRIVE 8
F2	R/G OR W/G .AND. DRIVE 8 NOT READY
F3	R/G OR W/G .AND. DRIVE 8 NOT ON-CYLINDER
F4	MULTIPLE WRITE GATE TRANSITIONS USING DRIVE 8
F5	WRITE GATE .AND. WRITE PROTECTED USING DRIVE 8
F6	SECTOR COUNTER ERROR ON DRIVE 8
F7	READ GATE .AND. WRITE GATE USING DRIVE 8
F8	DRIVE FAULT ON DRIVE 8
F9	R/G OR W/G .AND. FAULT USING DRIVE 8
FA	LATE WRITE GATE USING DRIVE 8
FB	OTHER DRIVE WRITE-PROTECTED (DRIVE 0)
FC	DRIVE 8 BUSY INPUT TRUE
FD	DRIVE 8 WRITE PROTECT INPUT TRUE
FE	DRIVE 8 UNIT SELECT INPUT FALSE
FF	INVALID UNIT NUMBER

CABLE ON SM70 -4T 4 OR RT CABLE



HSC Console error printout

ERROR-E Drive Detected Error at 7-Aug-1987 15:21:46.62

Command Ref #	00000000	!
RA82 Unit #	7.	!
Err Seq #	277.	!
Format Type	03	! MSCP Error Format
Error Flags	40	! MSCP Error Flags
Event	00EB	! MSCP Event code
Request	1B	! Request Byte
Mode	06	! Mode Byte
Error	80	! Error Byte
Controller	00	! Controller Byte
Retry/Fail	00	! Retry Count (Always 0)
Extended Status	0A	! Previous Command Code
	20	! Interface Error Status
	89	! Low Cylinder Address
	05	! High Cylinder Address
	0D	! Current Group/track
	5C	! SMDI Error/LED Code
	2A	! SMDI Group Code
Requestor #	3.	! HSC requestor number
Drive port #	3.	! HSC port number

ERROR-I End of error.

COMMAND REFERENCE NUMBER

The number of the command that caused the error. The error log message may be received before or shortly after the end message of the command that caused the error. The reference number will be zero if the error does not correspond to a specific outstanding command.

UNIT NUMBER

The number of the unit to which the error relates, or 4095 if the error does not relate to a specific unit. This field may contain the unit number of any unit of the drive or formatter if the error relates to an entire multi-unit drive or formatter.





## ERROR FORMAT

The value in this field will define the format of the error log message.

- 0        Controller errors
- 1        Host memory access errors with Bus Address
- 2        Disk Transfer Errors
- 3        SDI Errors

## ERROR FLAGS

- 01        Sequence number reset

Set when the error log sequence number has been reset by the MSCP server since the last error log message sent to the receiving class driver. Cleared when the sequence number has not been reset, implying that the 'Sequence Number' field may be used to detect missing error log messages. Always set if the MSCP server does not implement error log sequence numbers.

- 80        Operation continuing

Set while the retry sequence for an operation is continuing, and while the error log message is reporting unprocessed completions retries. Cleared when the retry sequence is completed. If the successful flag is also cleared, an unrecoverable error will be reported. If the successful flag is set, this flag is undefined.

- 40        Operation successful

Set when the operation that caused an error log message has been successfully completed. The error log message summarizes the retry sequence that was necessary to successfully complete the operation. Cleared when the operation has not yet been successfully completed.



## EVENT CODE

Identifies the specific error or event being reported by this error log message. The meaning of this code is displayed on the first line of this error printout.

## REQUEST BYTE

Bit 0	RU bit	A logical 1 in this bit position indicates that the RUN/STOP Switch is pushed in (RUN). A logical 0 indicates the switch is out (STOP).
Bit 1	PS bit	A logical 1 in this bit position indicates that the port select switch for this controller is pushed in (selected). A logical 0 indicates that the switch is out.
Bit 2		Not used
Bit 3	EL bit	A logical 1 in this position indicates that there is loggable information in the extended status area. A logical 0 indicates that no information is available in the extended status area.
bit 4	SR bit	1 = Drive up to speed 0 = Drive not up to speed
bit 5	DR bit	A logical 1 indicates that there is a request for a diagnostic to be loaded. A logical 0 indicates that no diagnostic is being requested.
bit 6	RR bit	Indicates that the drive needs an internal adjustment. This bit is not used by the SMDI subsystem.
bit 7	OA bit	A 1 in this bit position indicates that the drive is unavailable to the controller. A 0 in this position indicates that the drive is available to the controller.



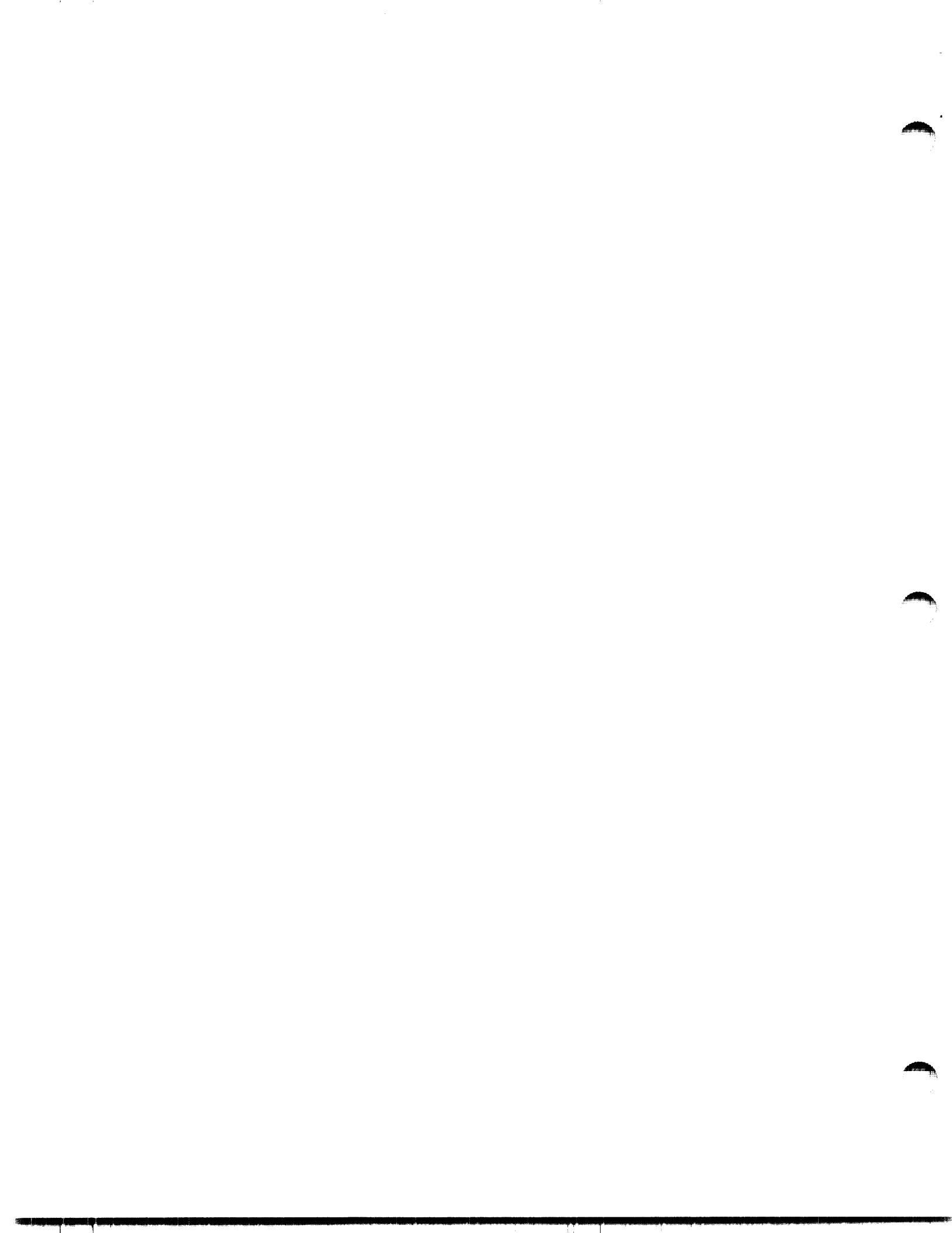
## MODE BYTE

- bit 0 S7 bit A logical 1 in this bit position indicates that the 576 byte sector format is selected. A logical 0 indicates that the 512 byte sector format is selected. All SMDI drives will use the 512 format.
- bit 1 DB bit A logical 1 in this bit position indicates that the diagnostic cylinders on the drive can be accessed.
- bit 2 FO bit A logical 1 in this bit position indicates that the drive can be formatted.
- bit 3 DD bit A logical 1 in this bit position indicates that the drive has been disabled by a controller error routine or diagnostic.
- bit 4-7 These bits indicate the write-protect status of the sub-unit represented. (e.g, 0001 indicates that subunit 0 of the selected drive is write-protected.)



## ERROR BYTE

bit 0,1,2	Not used
Bit 3 WE bit	A logical 1 in this position indicates that a write lock error has occurred.
Bit 4 DF bit	A logical 1 in this position indicates a failure in the initialization routine of the drive.
Bit 5 PE bit	A logical 1 in this position indicates that improper command codes or parameters were issued to the drive.
Bit 6 RE bit	A logical 1 in this position indicates that an error occurred in the transmission of a command between the drive and the controller. The error could be a checksum error or an incorrectly formatted command string.
Bit 7 DE Bit	A logical 1 in this position indicates that a drive error has occurred and that the drive FAULT led may be on. If this bit is set then byte 6 of the extended status will contain the SMDI error code.





## CONTROLLER BYTE

bits 0-3

This is a four bit drive status code indicating various states of drive operation. At the present time, only three codes are valid.

0000 = drive normal operation  
1000 = drive is off-line due to diagnostics.  
1001 = drive is off-line due to another drive having the same unit identifier.

bits 4-7

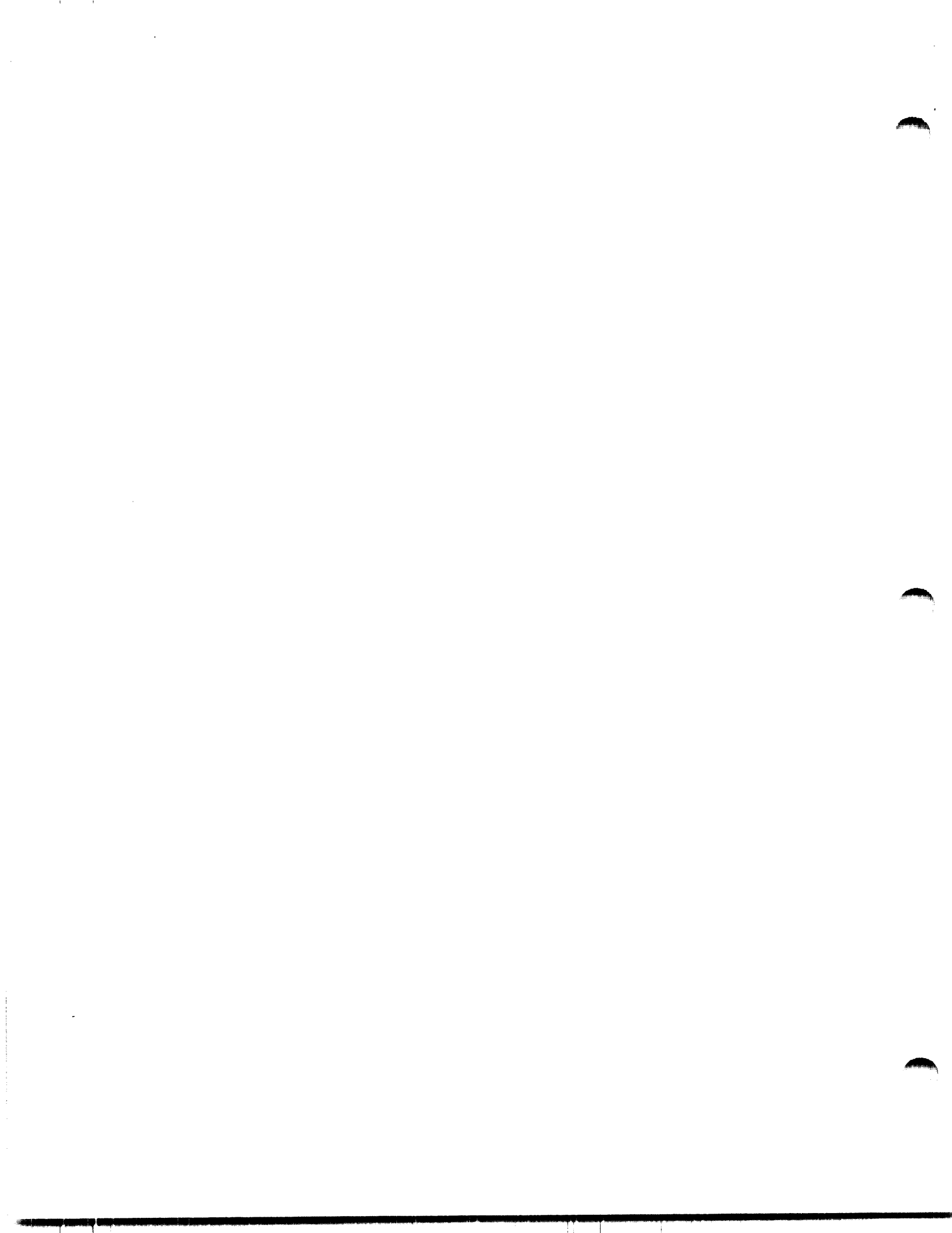
This is a four-bit representation of the sub-units that have their attention-available messages suppressed in the controller. The right most position represents subunit 0. the left most position represents subunit 3.

## RETRY/FAIL

This byte on the SMDI is always 0 and has no meaning. The following information is only valid on a DEC RA type drive.

This byte contains one of two types of information depending upon the status of the DF bit of the ERROR byte. The DF bit monitors the drive initialization process. The DF bit remains a 0 if initialization is successful. In this case, the RETRY/FAIL byte contains the retry count from the previous operation. i.e., a seek operation required 14 retries to be successful. If a get status command is initiated, this byte contains the number 14.

The DF bit being set indicates that the drive initialization failed; therefore, byte 8 now contains a specific drive error code. This error code can be looked up in the appropriate drive service manual.



## EXTENDED STATUS BYTES

The following paragraphs describe the contents of the extended status bytes for a EMULEX SMDI disk drive.

### Byte 0

This byte contains the controller command function code last executed by the drive. The codes are listed as follows, with and without parity.

NO PARITY	PARITY	
01	81	Change Mode
02	82	Change Cont Flags
03	83	Diagnose
04	84	Disconnect
05	85	Drive Clear
06	86	Error Recovery
07	87	Get Common Charater
08	88	Get Subunit Charater
09	89	Get Status
0A	8A	Initiate Seek
0B	8B	Online
0C	8C	Run
0D	8D	Read Memory
0E	8E	Recalibrate
0F	8F	Write Memory
10	90	Topology

### Byte 1

This byte contains the SDI error status bits 3,4,5, and 7. All other bits are unused.

#### Bit 3 Overrun error

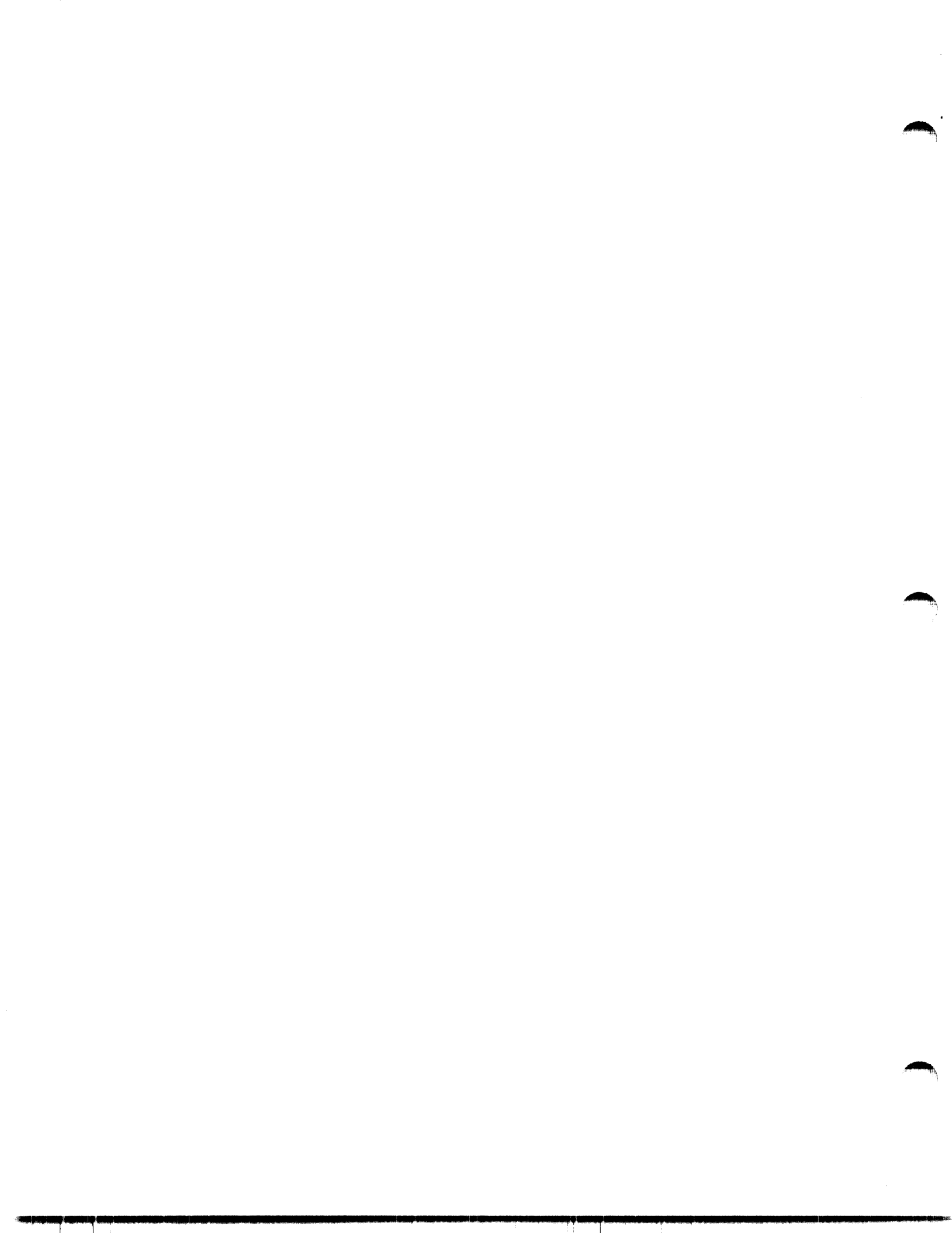
This bit sets when either a read or a write command extends past the sector or index pulse that the operation started from.

#### Bit 4 Parity error found

This bit sets when a parity error is discovered during the transmission of a real-time command on the real-time controller state line.

#### Bit 5 Control pulse error

This bit sets during the transmission of a real-time command if two or more pulses of the same polarity are detected on the real-time controller state line.



Bit 7 Data pulse error

This bit sets during the transmission of a real-time command if two or more pulses of the same polarity are detected on the write command data line.

Byte 2

This byte contains the low order bits of the cylinder address of the last seek operation.

Byte 3

This byte contains the high order bits of the cylinder address of the last seek operation.

Byte 4

This byte contains the present RA81 group address. An RA81 "group" is equivalent to a track in SMDI terminology.

Byte 5

This byte contains the hexadecimal error codes that are displayed by the SMDI LED's. Refer to the SMDI manual for the definition of these codes.

Byte 6

SMDI Group code errors.

20	-5 VDC or panel interlock bad
21	Drive not ready or not selected
22	Drive offline or disabled
23	RPS or sector counter error
24	Timeout, fault or seek error
25	Read/Write error
26	Read/Write command overrun
27	Unrecognized error code
28	Fatal error trap
29	Unexpected interrupt or reset
2A	SDI transmission error
2B	Invalid SDI command received
2C	SDI command error
2D	Unused
2E	Drive state error
2F	Hardware failure detected



REQUESTOR BYTE

The number of the requestor that the drive is connected to.

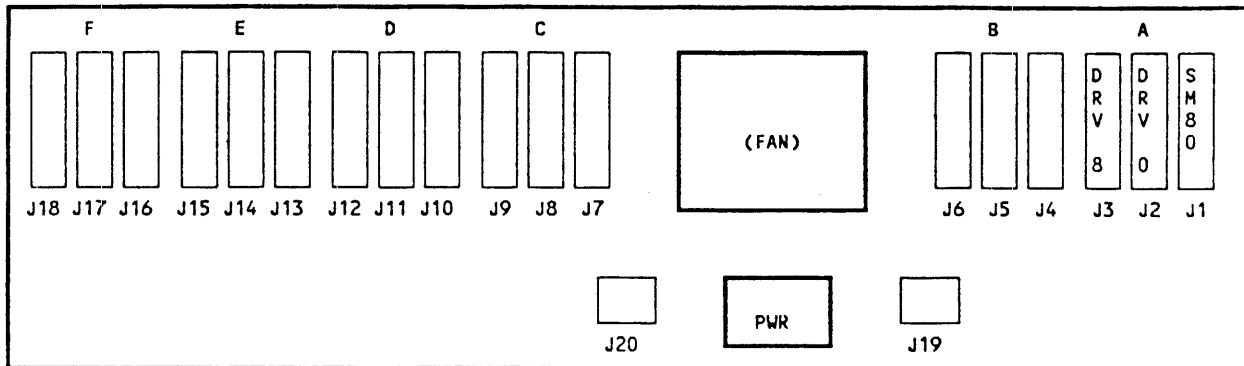
DRIVE PORT BYTE

The port number of the requestor that the drive is connected to.





# SM70 Chassis Back View



## Connector Descriptions:

J1, J4, J7, J10, J13, J16:

Connect to SM80 adaptor board "B" cable connector on appropriate SMDI chassis. In the 12-pack (6 logical drives), the drive pair connecting to channel A will connect to adaptor 1 on the bottom SMDI (bottom drive pair connects to bottom board).

J2, J5, J8, J11, J14, J17:

Connect to drive with ID = 0 (usually the drive to your right as you face the back of the cabinet, which would be the last drive in the A-cable daisy-chain).

J3, J6, J9, J12, J15, J18:

Connect to drive with ID = 8 (usually the drive to your left as you face the back of the cabinet, which would be the first drive in the A-cable daisy-chain).

J19: Connect through the RJ-type cable connector to the SMDI chassis with four SM80 adaptor boards. This connector handles drive selection for channels A, B, C, and D.

J20: Connect through another RJ-type cable (same type as above) to the SMDI chassis with the remaining two adaptor boards. This connector carries the selection signals for channels E and F.

## Notes:

The physical layout, cabling, and drive arrangement could change at any time, either due to a change in manufacturing procedure or due to "customer preference" (on-site modification).

The SM80 boards that select drives via J20 must be installed in the slots for adaptors 1 and 2 in the bottom of the SMDI chassis.



## VMS Considerations

### INITializing the disk pair:

#### CLUSTERSIZE:

Use this formula (from help on INIT command)

Number of blocks in user area

-----  
255 \* 4096

#### INDEXF file placement:

Normal default would split between both drives

Center INDEXF on second drive for best results

INIT/INDEX=BLOCK:nnnnnn

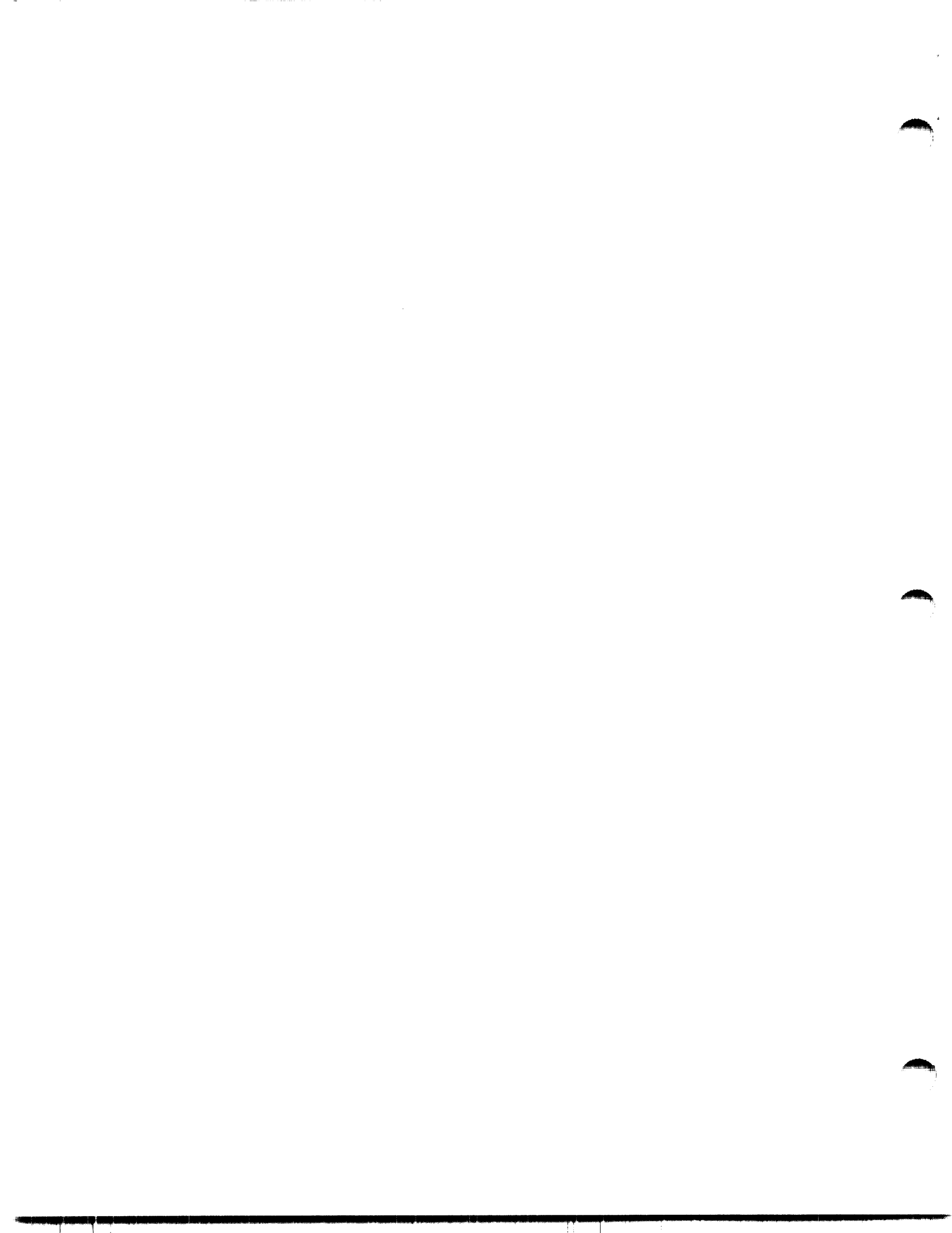
Consult manual page 2-19, end of sect. 2.9.

### BACKUP clustersize considerations:

BACKUP uses a default clustersize of 3

Use INIT/CLUSTERSIZE to init disk...

... then use BACKUP/NOINIT to restore.



## Miscellaneous

### Revisions:

SM80 board artwork must be revision C minimum

SM80 firmware prom G40D

SM80 as SM700 uses config prom G140A

- otherwise uses standard G39 config prom
- both proms on board, one in "carrier"
- see manual appendix A, page 2

Different backplane assy. - SM7010402-00

### HSC50/70 In-Line Diagnostics:

Use large enough parameters to test BOTH drives

### Caution:

Line voltage is passed through board to pwr supp.

AC fan taps line voltage via spade lugs on top

Terminal strip in front is also "hot"

