Operating Instructions for
MODEL 80
Disk Recorder
Instructions For
Model 80
Disk Recorder
CAUTION

Installation of user-software may result in system conflicts which can render the Disk Recorder unusable. Contact Sypris Data Systems Technical Support to verify software compatibility before installing any software on your Disk Recorder.

NOTE

Do not install any software from media included with the Disk Recorder. All required software is pre-installed, pre-configured, and fully tested before the Disk Recorder is shipped from the factory. Software media is supplied for backup purposes only.

Sypris Data Systems Technical Support
1-800-937-9220
6:00 a.m. – 6:00 p.m. (MT)
Monday – Friday
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WARRANTY

Sypris Data Systems (hereafter known as the Company) warrants, under its Repair/Exchange policy, all equipment purchased from and/or manufactured by it or bearing its nameplate to be free from defects in workmanship and material, under normal use and service for 12 months as follows: (1) after built-in self-test, user diagnostic procedures, telephone service consulting, and procedures established by the Company have been followed, the Company may, at its option, direct Buyer to return, transportation prepaid, those parts of the equipment claimed to be defective to the Company's designated service center, and (2) if found by the Company's inspection to be defective in workmanship or material, at the Company's option, it will be repaired or exchanged free of charge and returned-shipped lowest cost transportation prepaid. If inspection by the Company does not disclose any defect in workmanship or material, the Company's then current service charges will apply. Only the warranty remaining on the original equipment will apply to the repaired or replaced equipment. During the warranty period, the Company may, at its option, provide on-site support and service. The applicable warranty period starts on the original date of shipment of the equipment from factory by the Company.

The foregoing warranty does not apply to contracts for repair, maintenance, or calibration. WITH EXCEPTON OF THE 12 MONTH WARRANTY SET FORTH ABOVE, SYPRIS DATA SYSTEMS MAKES NO EXPRESS WARRANTIES, NO WARRANTIES OF MERCHANTABILITY, AND NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. In no event will Sypris Data Systems be responsible for any indirect, special or consequential damages including damages caused by delay in implementing the warranty, with respect to any claim by Buyer or any third party on account of or arising from this agreement or the use of any equipment, documentation, and services provided.

Sypris Data Systems
April 2003
ESDS DEVICE HANDLING

CAUTION

This unit contains devices subject to damage from electrostatic discharge (ESD). Handle electrostatic discharge sensitive (ESDS) devices in accordance with the following precautions and instructions. Refer to DOD-HDBK-263 and DOD-STD-1686 for additional ESD information.

1. ESDS components and circuit cards are shipped in special static dissipative shipping containers. Ensure that all required precautions are taken before opening the containers. Retain the containers for use when shipping ESD components. All static dissipative containers are identified with a warning label alerting the handler that the contents are ESD sensitive.

2. Because most Sypris Data Systems circuit cards contain ESDS components, all circuit cards should be treated as being ESD sensitive. Individual components are not generally identified as being ESDS, except in packaging.

3. ESDS components should only be handled under the following conditions:
   a. WHEN HANDLING ESDS ASSEMBLIES OR DEVICES, THE HANDLER MUST WEAR A STATIC CONTROL WRIST STRAP CONNECTED TO HIS OR HER SKIN. The wrist strap must then be connected, through a 1 megohm resistor, to a static dissipative table top or to the equipment chassis ground. (NOTE: Most wrist straps have the 1 megohm resistor built in.) The static dissipative table top must be connected to ground through a 1 megohm resistor.
   b. Handle ESDS components by the case or body whenever possible, and minimize touching of the leads.
   c. Avoid the use of air blasts or aerosol sprays on ESDS circuit cards or components.
   d. Pack and unpack ESDS components and devices only in static-free environments on a static dissipative table top. The handler must wear a wrist strap during packing or unpacking.
   e. Keep all common plastics and clothing away from ESDS devices.
   f. All soldering irons, test equipment, and equipment chassis must be grounded. Grounded power cords must be plugged in, even if the equipment is turned off.
   g. Solder suckers must be of the antistatic type.
   h. Brushes must be of natural bristle.

4. Ensure that all ESDS devices are properly packaged in static dissipative coverings when in storage or transit.
SECTION 1
INTRODUCTION

1-1 GENERAL
This manual explains how to operate the Sypris Data Systems Model 80 disk recorder. Figure 1-1 shows a typical unit.

This manual contains information about only the disk recorder – for information about the ARMOR multiplexer/demultiplexer or other equipment used with the disk recorder, refer to the documentation for that equipment.

This manual has four sections:

Section 1 – INTRODUCTION
Describes the disk recorder, including its options, equipment list, and specifications.

Section 2 – INSTALLATION
Describes how to install the disk recorder, and provides power requirements and information on rackmounting and interconnections.

Section 3 – OPERATION
Provides instructions for performing various functions with the disk recorder:

• Disk recorder – emulates the Model 64 tape drive to record data from the ARMOR controller and play it back.
• ARMOR controller – functions as the host PC that controls the ARMOR.
• Archival/distribution interface – copies recorded data to installed or connected archival devices or to a network.

Section 4 – MAINTENANCE
Provides instructions for routine and corrective maintenance. This includes instructions for cleaning the disk recorder, packaging it for shipment.

1-2 DESCRIPTION
The Model 80 disk recorder is a multipurpose device that enhances and simplifies recording and archiving in data acquisition systems that include the ARMOR multiplexer/demultiplexer.

The disk recorder provides three ARMOR-related functions:

Figure 1-1. Model 80 Disk Recorder (typical)
• **Host PC for the ARMOR**
  
  The disk recorder connects to the Host PC port on the ARMOR and issues commands to the ARMOR system by means of the ARMOR setup and control software on the disk recorder. The user selects ARMOR command functions from the interactive on-screen graphical user interface (GUI) on the front-panel touchscreen.

• **Data Recorder**
  
  The disk recorder connects to the TAPE DATA and TAPE CONTROL buses on the ARMOR and functions as a data recorder and reproducer. The disk recorder emulates the Model 64 tape drive, supports all of its protocols, and appears to be a Model 64 to the ARMOR. However, rather than use magnetic tape media as in the Model 64, the disk recorder writes the multiplexed data stream from the ARMOR to its internal disk-array subsystem. The disk array uses level-0 Redundant Array of Independent Disks (RAID) technology, which allows the disk recorder to store data at rates of up to 80 megabits per second (streaming) and capacities of 54 to 288 Gigabytes (depending upon the installed disk array configuration).

• **Archival Drive/Distribution Interfaces**
  
  Data from the RAID can be copied to an optional storage device or to a network for archival storage or distribution.

  The disk recorder provides three front-panel half-height drive bays for optional removable-media storage devices, such as DLT, CDR/RW, or DVD-RAM. A rear-panel SCSI bus connector may be attached to an external SCSI storage device such as a DTF-2 tape drive. Each disk recorder is supplied with factory-installed copy-utility programs that are compatible with the data formats of all supported storage devices.

  Additionally, data files can be copied from the internal disk array of a disk recorder to remote equipment for analysis or archiving, using standard Ethernet.

1-2.1 **Physical Description**

  The disk recorder is a highly specialized rack-mounted data recorder and storage system containing an internal disk-array subsystem and ARMOR-compatible interfaces. It is designed to fit into a 19-inch wide RETMA equipment rack that is at least 24 inches deep. Standard rack mounting uses industry-standard slides. The disk recorder requires seven inches of vertical rack space.

  The front panel contains the touchscreen display, connectors for an optional keyboard and mouse, and three half-height drive bays.

  The rear panel contains a 3.5-inch diskette drive (if not mounted in a front-panel bay), the power input, and the following connectors:

  - J3 - Host Connects to the HOST PC connector on ARMOR
  - J5 Connects to a 10BaseT/100BaseT Ethernet network
  - J7 VGA Connects to an optional external VGA monitor
  - J10 SCSI Connects to an optional external SCSI storage device
  - J12 Connects to the TAPE DATA 1 connector on ARMOR
  - J14 Connects to the TAPE 1 CONTROL connector on ARMOR

  **NOTE**

  Rear-panel connectors J6, J8, and J11 are not used.
1-2.2 Functional Description
The disk recorder appears to the ARMOR as a Model 64 tape drive to which the ARMOR can record and play back data. Additionally, the disk recorder appears to the ARMOR as the host computer from which the ARMOR receives its setup and operational commands.

1-2.2.1 General
The disk recorder is built around a Pentium®-class, Windows NT® workstation (complete with system disk, RAM, and floppy diskette), containing a disk array subsystem consisting of up to four hard drives and a RAID controller assembly.

The basic workstation has a flat-panel touchscreen display, supported by a VGA/flat-screen video adapter, touchscreen controller, and flat-panel inverter assemblies.

The data and control interface with the ARMOR is provided by the disk recorder’s on-board RS-232 serial interface, a parallel data interface card that emulates the Model 64 tape drive, and a parallel control interface card.

The workstation has on-board IDE and SCSI buses to support the various optional archival storage devices that can be installed in the disk recorder.

1-2.2.2 Touchscreen Display
The flat-panel display on the front panel is used in combination with a touchscreen for user input. The touchscreen is implemented by a touchscreen controller that interfaces with the workstation board via COM1. (Touchscreen inputs emulate mouse inputs.) The flat-panel display is implemented by a controller card mounted on the rear of the flat-panel display. The input to the display is J7 on the rear panel.

The command screens of the disk recorder are displayed on the flat-panel VGA display that is mounted behind the touchscreen. The command screens provide control-panel representations containing touch buttons and status displays, which allow complete local control of the disk recorder/ARMOR system.

To input commands or select available options, lightly touch a fingertip to the “pushbutton” or active selection field on the touchscreen display. The touchscreen senses this fingertip contact as x/y coordinate data, which is applied to the touchscreen controller. The touchscreen controller converts the coordinate data into serial position and selection data that is routed to the CPU via COM1 for use by the ARMOR Setup and Control Software and other system programs.

1-2.2.3 RAID Disk Array
The internal disk array is configured as a RAID level-0 striped disk array. The RAID controller breaks data down into blocks and writes each block to a separate disk drive. This process of striping data blocks across multiple drives in a continuous sequence allows greater I/O performance than single-disk systems.

The configurations of disk array subsystems supplied with factory-configured disk recorders are identified by the system model code as shown in Table 1-1. All disk array subsystems, regardless of number or size of drives comprising the array, are RAID level-0 and are capable of supporting write/read data transfer rates of up to 80 megabits per second. Data capacity, however, depends upon both the number and size of the drives that comprise the RAID. The total RAID capacity is simply the sum of the capacities of the individual drives in the RAID.
1-2.2.4 Armor Interfaces

The disk recorder connects to the ARMOR via three independent interfaces: Host PC, Tape Data, and Tape Control. These interfaces utilize emulation software and firmware that lets the disk recorder appear as a Model 64 tape drive to the ARMOR.

1-2.2.4.1 Host PC

The Host PC interface lets the disk recorder function as the host computer for the ARMOR. All ARMOR setup and control operations that are accomplished via the ARMOR Setup and Control Software program in the disk recorder are linked with the controller module on the ARMOR via the RS-232 serial interface on the COM2 port of the disk recorder.

1-2.2.4.2 Tape Data

The Tape Data interface is implemented via a PCI-V64E Parallel Interface card in one of the PCI slots of the disk recorder. The PCI-V64E card and its supporting software transparently emulate the Model 64 tape drive’s 8-bit parallel data bus (Native I/O Interface).

1-2.2.4.3 Tape Control

The Tape Control interface is implemented by a Parallel Control Interface card located in the ISA slot of the disk recorder. This interface supports all relevant Model 64 tape drive control signal lines and protocol.

1-2.2.5 Archival Drive/Distribution Interfaces

Data can be copied from the disk array to optional archival drives, such as DLT, CDR/RW, DVD-RAM, Model 64, etc., using various media for archival and distribution purposes.

Front-panel-mounted devices connect to the workstation system board via on-board IDE, Ultra-wide SCSI, and/or Ultra2/LVD SCSI interface connectors. For factory-installed archival drives, device drivers are installed and configured at the factory.

Each disk recorder, regardless of drive configuration, also contains a rear-panel Ultra-wide SCSI port.

All disk recorders provide for network connectivity and can transmit data files, copied from the internal RAID, to remote equipment over an industry-standard Ethernet 10baseT/100baseT network by means of TCP/IP protocols (Ping, FTP, and Telnet).

1-3 OPERATION

All disk recorder operations are controlled with the front-panel touchscreen display.

On power up, the disk recorder automatically loads the Windows NT Workstation® operating system and displays several system icons on the touchscreen display.

1-3.1 Disk Recorder

For disk recorder-related operations, double-touch or double-click the ARMOR I HOST icon. A typical screen is shown below.

From this point on, disk recorder operations such as Record, Stop, Read Setup From Tape, Play from PBN, Play from IRIG Time, Format, FFWD, FREV, and tape monitor, function identically to those of a Model 64 tape drive (TAPE 1) that is under ARMOR control.
NOTE

Detailed instructions for performing ARMOR operations using the ARMOR Setup and Control Software are provided in the ARMOR technical manual, *Operating Instructions For ARMOR Multiplexer/Demultiplexer*. You should be familiar with Sections 5 and 6 of this manual before attempting to operate the disk recorder.

1-3.2 Host PC

When you power up the disk recorder and select the *ARMOR I HOST* icon on the touchscreen, the disk recorder will initiate the ARMOR Setup and Control Software, thereby becoming the ARMOR system controller device (Host PC). All ARMOR functions are accessible via the touchscreen when the disk recorder functions as the Host PC.

1-3.3 Archival/Distribution Interface

The disk recorder can be used to copy recorded data from the internal disk array to optional storage drives. Factory-configured disk recorders are available with various types of accessible storage drives. Drives are identified by logical drive IDs; this simplifies the transfer of data files from the disk array to a selected storage drive. Automatic file-naming conventions and file-splitting capabilities are supported by pre-installed software utility programs.

The various drives in the disk recorder are assigned the following drive letters:

<table>
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<th>Description</th>
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<tr>
<td>A</td>
<td>3.5-inch diskette drive (rear panel)</td>
</tr>
<tr>
<td>C</td>
<td>NT/system drive</td>
</tr>
<tr>
<td>D</td>
<td>User drive (partition on C:)</td>
</tr>
<tr>
<td>E</td>
<td>RAID disk array</td>
</tr>
<tr>
<td>F</td>
<td>DVD-RAM Drive (optional)</td>
</tr>
<tr>
<td>G</td>
<td>CD-ROM Drive (optional)</td>
</tr>
<tr>
<td>H</td>
<td>Backup drive (partition on C:)</td>
</tr>
</tbody>
</table>

Additionally, the disk recorder can copy data from the internal RAID to an external SCSI storage device through the rear-panel SCSI port.

The disk recorder can also transmit data files copied from its internal RAID to remote equipment via its Ethernet network interface, using TCP/IP protocols (Ping, FTP, and Telnet).

1-4 MODEL CODE

Factory-configured disk recorder units are identified by use of a seven-character model code, printed on the identification label on the left side panel of the unit.

The model code is in the form “MET80XXXXX”, where the first five character positions (MET80) represent the disk recorder model family, and the sixth, seventh, eighth, and ninth character positions, respectively, identify the specific RAID configuration and the archival storage devices that are installed.

The model code is defined in Table 1-1.

1-5 ACCESSORIES SUPPLIED

Accessories supplied with the disk recorder are listed in Table 1-2.

1-6 SPECIFICATIONS

Disk recorder specifications are given in Table 1-3.
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<td>C</td>
<td>CD R/W</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>3.5-inch diskette drive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>G</td>
<td>DVD-RAM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>DDS-4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>Special</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Chassis Handles</td>
<td>O</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>Front-Panel Handles</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Added Functions</td>
<td>A</td>
<td>PCI-V64-002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>Special</td>
</tr>
</tbody>
</table>

### Table 1-1. Model Code Legend

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Purpose</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>J3</td>
<td>Cable Assembly to HOST PC on ARMOR</td>
<td>16823378-010</td>
</tr>
<tr>
<td>J12</td>
<td>on disk recorder to TAPE DATA on ARMOR</td>
<td>16828624-010</td>
</tr>
<tr>
<td>J14</td>
<td>on disk recorder to TAPE CONTROL on ARMOR</td>
<td>16828624-110</td>
</tr>
</tbody>
</table>

### Table 1-2. Accessories Supplied

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Purpose</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kit, Keyboard and Mouse</td>
<td>Input data without use of touchscreen (optional)</td>
<td>16830464-101</td>
</tr>
<tr>
<td>Kit, Rack Mount</td>
<td>Install disk recorder in 24-30-inch deep equipment rack</td>
<td>16822688-002</td>
</tr>
</tbody>
</table>

### Table 1-3. Disk Recorder Specifications

<table>
<thead>
<tr>
<th>DATA Rate (streaming)</th>
<th>1 kilobit/sec to 80 Megabits/second</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity (max)</td>
<td>108, 144, 216, or 288 Gigabytes, depending upon the size of the installed RAID subsystem</td>
</tr>
<tr>
<td>POWER Volts</td>
<td>90 - 135 Vac 180 - 270 Vac</td>
</tr>
<tr>
<td>Frequency</td>
<td>47 to 63 Hz</td>
</tr>
<tr>
<td>Current</td>
<td>1.8A (typical) @ 115 Vac</td>
</tr>
<tr>
<td>ENVIRONMENT Temperature</td>
<td>41 to 104° F (5 to 40° C) – Operating – 40 to 158° F (– 40 to 70° C) – Storage</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>5 to 80% (non-condensing)</td>
</tr>
<tr>
<td>PHYSICAL Size</td>
<td>7H x 17W x 22.5D (inches) 17.78H x 43.18W x 57.15 (cm)</td>
</tr>
<tr>
<td>Weight (w/o slides)</td>
<td>40 pounds (18.14 kg) typical (with 72 GB Disk Array and DLT option – weight depends upon installed options)</td>
</tr>
<tr>
<td>Mounting</td>
<td>Standard 19-inch (48.26 cm) RETMA rack mount in 24 – 30 inch (609.6 – 762 cm) deep rack with supplied industry-standard slides</td>
</tr>
</tbody>
</table>
SECTION 2
INSTALLATION

2-1 GENERAL
This section provides installation and setup information for the Model 80 Disk Recorder. Only information applicable to the Disk Recorder is provided. Installation instructions and specific data I/O requirements for Model 64 and ARMOR systems are provided in the appropriate system technical manuals.

CAUTION
This equipment contains ESDS devices. Proper ESDS device handling procedures must be followed. Refer to the ESDS DEVICE HANDLING information at the front of this manual.

CAUTION
The Disk Recorder contains no user-serviceable components. All internal components are properly configured prior to shipment from the factory. To avoid damage to the Disk Recorder, do not remove covers or disturb any internal switch/jumper settings.

CAUTION
To avoid equipment damage, turn power OFF before connecting or disconnecting any cables.

2-2 UNPACKING
Removing the Disk Recorder and associated components/accessories from the shipping carton requires no special instructions, except to exercise normal care.

2-2.1 Backup Media
The Disk Recorder is shipped with manufacturers documentation packages and software media which support devices and application programs installed in the Disk Recorder. Store these media as backup copies. All applicable software on these media have been pre-installed and configured in the Disk Recorder and these media will not be required for routine operations.

Retain the User Instructions for the storage drive (DLT, CDR/RW, DVD-RAM, if supplied) for ready reference when operating the Disk Recorder.

NOTE
It is recommended that the shipping carton and packing materials be retained for use when reshipping the Disk Recorder.

2-3 CLAIMS
After unpacking, carefully inspect the Disk Recorder and associated components for evidence of shipping damage. If damage is found, immediately notify the carrier, initiate a claim procedure, and notify your Sypris Data Systems representative.

2-4 RACK MOUNTING
The Disk Recorder is designed to be installed into standard 19-inch RETMA racks on extendable slide assemblies. The slide assemblies supplied with the Disk Recorder can be used with racks with depths of 24, 26, 28 and 30-inches. However, due to inadequate cable clearance, the 24-inch deep rack may be used only in open-back configuration (unless right-angle cables are used).
NOTE

The rear of the Disk Recorder should be accessible while installed in the rack to ease cable connection and access to the rear-mounted diskette drive.

When mounting the Disk Recorder, refer to the instructions supplied with the Rack Mount Slide Kit for detailed step-by-step installation instructions. Installation of the Disk Recorder is identical to that for the Model 64, Buffered VLDS, and VLDS, except for the following:

Use the bottom set of holes in the movable slide when attaching the slide to the sides of the Disk Recorder.

2-5 POWER CONNECTION

2-5.1 Voltage Selection Switch

The Disk Recorder may be operated from 115 Vac or 230 Vac. Prior to connecting the power cord to the Disk Recorder, ensure that the voltage selection switch is set for the local facility power. See Figure 2-2.

2-5.2 Power Cable

The power switch is located on the rear of the Disk Recorder and is not accessible when the Disk Controller is mounted in the rack. To simplify turn on/off, the Disk Recorder power cable should be connected to a switched facility power source; preferably the same source that provides power to the ARMOR, Model 64, and any other devices, connected to the Disk Recorder.

In the United States and Canada, use the UL/CSA ac power cable supplied with the Disk Recorder, or an equivalent. Wherever the Disk Recorder is installed, an ac power cable with the polarities and a connector compatible with the power-input socket on the Disk Recorder must be used. Required polarities for the ac power cable are shown in Figure 2-1.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Conductor Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Line or Active Conductor (Live or Hot)</td>
<td>Brown</td>
</tr>
<tr>
<td>N</td>
<td>Neutral Conductor</td>
<td>Blue</td>
</tr>
<tr>
<td>E</td>
<td>Earth Ground</td>
<td>Green</td>
</tr>
</tbody>
</table>

Figure 2-1. Power Cable Polarities

One of the following is required when connecting the Controller to 230 Vac, or facility power in countries other than the United States and Canada.

1. Use a Harmonized (International) ac power cable and a purchased adapter that converts the cable to the type of wall plug used in the country of installation.

CAUTION

Above modification to be performed only by technically trained personnel.

2. Use a purchased ac power cable that is compliant with the Controller polarity and input-power socket requirements and wall-plug standards established in the country of installation.

3. In countries requiring IEC 950 compliance, use ONLY use a purchased 230V rated IEC 950 approved ac power cable that meets the Controller polarity and input-power socket requirements.
2-6 INTERNAL CABLE CONNECTIONS – J1, J2, AND J4

When packed for shipment from the factory, the internal cables that extend through the rear panel are intentionally disconnected from their connectors to minimize the possibility of shipping damage to their mating connectors. Locations of rear panel connectors on the Disk Recorder are identified in Figure 2-2.

1. Insert the two cables (front-panel mouse and keyboard) with 6-pin mini-DIN connectors into J1 and J2 on rear panel. Although either cable may be connected to either connector, the longer cable should be connected to J2.

2. Connect cable (touchscreen/display) with DB9 connector to connector J4. Tighten the connector shell hardware to secure the cable.

CAUTION

Ensure that cable is connected to J4 only. DO NOT connect cable to identical connector J3.

2-7 ARMOR CONNECTIONS – J3, J12, AND J14

All connections with the ARMOR Multiplexer/Demultiplexer unit are made at the rear panel of the Disk Recorder.

Refer to ARMOR Operator’s Manual for locations of referenced connectors on the ARMOR unit.

Locations of rear panel connectors on the Disk Recorder are identified in Figure 2-2. An interconnecting diagram is provided in Figure 2-3, and the required Disk Recorder-to-ARMOR cables are listed in Table 2-1.

1. Connect J3 on Disk Recorder to HOST PC connector on ARMOR unit using cable 16823378-010.

2. Connect J12 on Disk Recorder to TAPE 1 DATA connector on ARMOR using cable 16828624-010.

3. Connect J14 on Disk Recorder to TAPE 1 CONTROL connector on ARMOR using cable 16828624-110.

---

Figure 2-2. Model 80 Rear Panel (typical)
Data stored in the Disk Recorder may be downloaded to a SCSI storage device, such as a SCSI-configured DTF-2 tape drive (or equivalent) for archival/distribution purposes. Refer to Figure 2-3 during the following steps.

1. Connect J10 on Disk Recorder to one of the SCSI connectors on the SCSI storage device using the cable supplied with the device.

2. Connect the SCSI bus terminator (supplied with the storage device) to the remaining SCSI connector on SCSI storage device.

**2-9 VIDEO OUT – J13 (OPTIONAL)**

The Disk Recorder supports the use of an optional (user-supplied) VGA monitor. The monitor cable connects to J13 on the rear of the Disk Recorder.

**2-10 KEYBOARD AND MOUSE (OPTIONAL)**

The Disk Recorder may be operated by means of the external keyboard and mouse when use of the built-in touchscreen/display is not possible nor desirable.
The keyboard and mouse cables connect to the two receptacles located on the front panel of the Disk Recorder. Refer to Figure 2-4. Either device may be plugged into either connector.

2-11 NETWORK CONNECTION – J5 (OPTIONAL)

When desired, the Disk Recorder may connected to a network via connector J5. J5 is a type RJ-45 connector. The Disk Recorder is factory configured to connect to Ethernet 10baseT/100baseT networks using TCP/IP protocols (ping, FTP, Telenet). Software setup and/or communication parameter configuration may also be required to connect to a network. Refer to Section 3 for instructions.

NOTE

Avoid simultaneous networking and data acquisition/archiving operations. Diversion of system resources may compromise system performance and data integrity.

2-12 ARMOR-TO-USER’S DATA I/O EQUIPMENT CONNECTIONS

ARMOR data I/O connections are determined by the specific ARMOR system configuration. Refer to the System Configuration Data provided in Appendix A of the ARMOR technical manual, Operating Instructions For ARMOR Multiplexer/Demultiplexer which was supplied with your ARMOR, for specific data I/O connections and requirements.
SECTION 3
OPERATION

3-1 GENERAL
This section provides operating instructions for the Disk Recorder. Only information relating to the Disk Recorder is provided. Operating information for the ARMOR Multiplexer/Demultiplexer and Model 64 tape drive is provided in the appropriate Operating Instructions for those systems.

NOTE
It is assumed that the user is familiar with ARMOR operations. References are made to various ARMOR operations which relate to the Disk Recorder, but the actual operations are not described. The technical manual, Operating Instructions for ARMOR Multiplexer/Demultiplexer, provided with the ARMOR, should be readily available for reference.

Information in this section assumes that the Disk Recorder is installed and connected to the ARMOR (and Model 64 if applicable) as described in Section 2 of this manual. It is also assumed that the ARMOR is connected to the user’s I/O equipment as specified by the System Configuration Data contained in Appendix A of the ARMOR technical manual supplied with your particular ARMOR.

3-2 FUNCTIONAL ROLES
The Disk Recorder performs three functional roles:

- The primary role of the Disk Recorder is to emulate the Model 64 tape drive. It can be used to record (store in the Disk Recorder’s internal RAID) multiplexed data that is output from the ARMOR, and it can be used to playback (from RAID) recorded data to the ARMOR for output to the user’s I/O equipment as demultiplexed data. The Disk Recorder can be configured to store data in the RAID as one continuous file or as consecutively named individual files.

- The Disk Recorder fills the role of Host PC for the ARMOR, allowing the user to command the ARMOR unit via the Disk Recorder’s built-in computer and front-panel touchscreen/display. The ARMOR Setup and Control Software Program that is used to command the ARMOR is resident on the Disk Recorder’s system disk and is executed by the Disk Recorder’s built-in computer. User interface with the ARMOR Setup and Control Software is via the front panel touchscreen/display.

- The Disk Recorder functions as an archival drive/distribution interface, allowing data to be copied from the Disk Recorder’s RAID to various (optional) internal and external storage devices, or to be transmitted to remote equipment via standard network connection.

3-3 POWERING UP THE SYSTEM

NOTE
For convenience, the Disk Recorder, ARMOR, and other system components may be connected to a common and switched power source.
Apply power to the Disk Recorder, ARMOR, and user’s I/O interface equipment. If a common power source is not used, the equipment powerup sequence should be Disk Recorder, then the ARMOR, then user’s data I/O equipment (in that order).

**NOTE**

The Windows NT® operating system may require from 2 to 4 minutes to complete the boot process. No error messages should be displayed during a normal boot. If you encounter an error message during boot, access the Event Viewer (Start → Programs → Admin Tools → Event Viewer) and look for the most recent red-flag entry to determine the cause of the error message. If the problem cannot be resolved contact Sypris Data Systems technical support services.

Additionally, the operating system may also request user input during the boot process. Ignore these requests and allow the boot to proceed on its own.

Upon powerup, the Disk Recorder will automatically load the Windows NT Workstation® operating system and display the Windows desktop environment on the front-panel touchscreen/display.

### 3-4 DISK SETUP

The Disk Setup program is used to establish the Record Storage Method (how ARMOR record data is stored in the Disk Recorder’s internal RAID) before beginning Record operations. The Disk Setup program can also be used to specify the playback filename before beginning Playback operations.

#### 3-4.1 Record Storage Methods

Two Record Storage Methods are possible: Single File and Multiple Files. The Record Storage Method affects the record operation only. There is no difference between the Single File method and the Multiple Files method for the Play and Format commands.

##### 3-4.1.1 Single File

In the single-file method, ARMOR data is written to the RAID as one continuous file, which is identified by the filename, “File-00-.dat.” Each time the Record command is issued, the new record data is appended to the existing file (at end-of-data) in the RAID. Also, each time the Record command is issued, the filename “File-00-.dat” is set as the default playback filename, so that when the Model 80 is later commanded to play, data is played back from the file “File-00-.dat”.

Consequently, ARMOR data stored in the RAID can be copied to an archival device only as a single file. Specific recording sessions cannot be individually copied.

The Model 80 logs the starting PBN for each recording. The starting PBN is the PBN offset into the data file where each record session begins. In the single file storage method, this feature allows the independent retrieval of the ARMOR setup information for a specific recording session when using the ARMOR’s Read Setup From Tape feature, even though the data for that specific session cannot be copied independently. The starting PBN for each recording session can be viewed by means of the Disk Recorder’s PBN Reader. A typical Single File Mode PBN Reader display is shown in Figure 3-4.

##### 3-4.1.2 Multiple Files

In the Multiple Files method, individual recording sessions are stored in the disk array as individual data files, which are automatically assigned sequential filenames of File-01-.dat through File-99-.dat. Each time the Record
command is issued, a new file is opened and data is written to the new file. Also, each time the Record command is issued, the new filename is set as the default playback filename, so that when the Model 80 is later commanded to play, data is played back from the last file recorded (the new file).

Because each data file stored in the RAID is an independent entity, with its own unique filename, a specific recording session can be copied to an archival recording device.

The Model 80 logs the starting PBN for each recording. The starting PBN is the PBN offset into the data file where each record session begins. In the multiple files storage method, where each record session begins at the beginning of the data file, the starting PBN is always 1. The filenames for each recording session can be viewed by means of the Disk Recorder’s PBN Reader. A typical Multiple Files Mode PBN Reader display is shown in Figure 3-5.

3-4.2 Playback File

Each time the Model 80 is commanded to record, it sets the default playback filename to the name of the current record data file. In the Single File Storage Method, the filename is always “File-00-.dat”. In the Multiple Files Storage Method, the filename is “File-nn-.dat”, where nn is the recording number from 1 to 99. In normal operation, therefore, the user does not have to set the playback filename. However, before commanding the Model 80 to play, the user may change the playback filename through the Disk Setup program. If the user modifies the playback filename, the new name remains until the next recording.

3-4.3 Setting the Record Storage Method or Playback Filename

1. From the Windows NT® desktop, touch: START/PROGRAMS/DISK RECORDER/DISK SETUP. The Disk Recorder Setup screen will be displayed. See Figure 3-1.
2. Select the setup parameters as follows:

**Record Storage Method:**
Select either *Single File* or *Multiple File* as desired.

**Playback File:**
Click the down arrow on the right side of the edit box to display the *.dat files on the RAID. Click on a filename to select it. **Filenames must be 15 characters or less.**

3. Click OK to enter settings into system memory.

The Record Storage Method and the Playback Filename may be changed at any time and do not require a system reboot to take affect. The Model 80 reads the Record Storage Method each time it is commanded to record. The Model 80 reads the playback filename each time it is commanded to play.

**3-5 ARMOR SETUP AND CONTROL**
The Disk Recorder can assume total control of all ARMOR setup and operational functionality via the ARMOR Setup and Control Software.

**NOTE**
If the Disk Recorder fails to communicate with the ARMOR after powerup or if the ARMOR Setup and Control Software should appear to lock up, exit the ARMOR Setup and Control Software, cycle ARMOR power, then restart the ARMOR Setup and Control Software to restore normal operation.

1. Ensure that the ARMOR unit is powered up (POWER indicator on front panel illuminates).

2. Double touch (double click) the ARMOR I HOST icon on the Disk Recorder touchscreen/display to initialize the ARMOR Setup and Control Software program. The Primary Control screen shown in Figure 3-2 is displayed when the program is ready.

3. Refer to Sections 5 and 6 of the ARMOR technical manual, *Operating Instructions For ARMOR Multiplexer/Demultiplexer*, for detailed instructions on how to set up and operate the ARMOR system.

![Figure 3-2. ARMOR Primary Control Screen (typical)](image)
NOTE

References to Host PC, host computer, and/or tape drive in the ARMOR technical manual can be construed to be references to the Disk Recorder.

CAUTION

Use of the tape drive FORMAT function will ERASE all data files named “File-nn-.dat”, where nn is a sequential number from 00 to 99, stored in the Disk Recorder’s disk array! The data files are deleted directly without going to the Recycle Bin and are therefore not recoverable! DO NOT attempt a FORMAT operation unless you want to clear the disk array!

3-6 RECORDING ARMOR DATA

With minor exceptions, recording ARMOR output data to the disk array within the Disk Recorder is similar to recording data to tape in a Model 64 tape drive.

1. Verify all data connections between the user’s data I/O equipment and the ARMOR.

NOTE

Specific data connections for your particular ARMOR are detailed in the System Configuration Data provided in Appendix A of the technical manual supplied with your ARMOR.

2. After system power-up and after the ARMOR Setup and Control Software is initialized, touch the TAPE 1 command button to establish the ARMOR-to-Disk Recorder interface. See Figure 3-2.

3. Ensure that the ARMOR setup is valid for the type(s) for data you expect to record. Refer to sections 5 and 6 of the ARMOR technical manual Operating Instructions For ARMOR Multiplexer/Demultiplexer, which was supplied with your ARMOR, for detailed descriptions of ARMOR setup parameters.

Figure 3-3. ARMOR Play Mode Setup Screen (typical)
4. To clear the Disk Recorder’s disk array before you begin to record data, touch the FORMAT command button on the Primary Control screen. When the Model 80 is commanded to FORMAT, it deletes the Single File Method data file (“File-00-.dat”) and all of the Multiple Files Method data files (“File-nn-.dat”, where nn is a sequential number from 1 to 99). It also sets the default playback filename to blank (no playback file), until the next recording is initiated. When the FORMAT command button indicates it is again active (background color will lighten and the FORMAT nomenclature will display in green color), the disk array is cleared.

5. Ensure that the user’s I/O equipment is providing data to the ARMOR.

6. Touch the RECORD command button to initiate data recording.

The record operation will continue until disk array capacity is reached or until the STOP command button is touched.

**NOTE**

Status of the data transfer from the ARMOR to the disk array is indicated by changes in the PBN value shown on the Tape Monitor in the upper left corner of the ARMOR Primary Control screen.

The PBN reported by the Model 80 during recording reflects the PBN in the current data file. When recording with the Single File method, the starting PBN for a particular recording will therefore be the filesize in PBNs at the start of the current recording. When recording with the Multiple Files method, the starting PBN for a particular recording will always be 1 (since each recording starts with a new file).

The Percent Meter during recording reflects the percentage of the available disk space utilized by the current recorded data file; i.e. the ratio of the current filesize to the sum of the current filesize plus the free space on the RAID. The Percent Meter does not consider disk space allocated to other files on the RAID, including previous files recorded in the Multiple Files method.

### 3-7 PLAYING ARMOR DATA

With minor exceptions, playing data from the disk array within the Disk Recorder to the ARMOR (and consequently back to the user’s equipment) is similar to playing data from a tape drive to the ARMOR.

Normally, when the Model 80 is commanded to play, it plays back data from the last data file recorded. However, you may use the Disk Setup program to change the playback file before starting the playback operation. See the section titled “Disk Setup” for detailed instructions on changing the playback filename.

1. Verify all data connections between the user’s data I/O equipment and the ARMOR.

**NOTE**

Specific data connections for your particular ARMOR are detailed in the *System Configuration Data* provided in Appendix A of the technical manual supplied with your ARMOR.

2. After system power-up and ARMOR Setup and Control Software initialization, touch the TAPE 1 command button to establish the ARMOR-to-Disk Recorder interface. See Figure 3-2.
3. Touch the PLAY command button to display the Play Mode Setup screen shown in Figure 3-3.

4. Enter the desired data playback parameters (play speed, play location, etc.) on the Play Mode Setup screen.

5. After the play selections have been made, touch the OK button to begin the data playback operation.

When data playback begins, the PLAY command button becomes active (background color lightens and the PLAY nomenclature changes from black to green).

The data playback operation will continue until the STOP command button is touched or end-of-file is encountered.

NOTE

Status of the data transfer from the disk array to the ARMOR is indicated by changes in the PBN value shown on the Tape Monitor in the upper left corner of the ARMOR Primary Control screen. The PBN reported by the Model 80 during playback indicates the PBN offset into the current data file. The Percent meter reflects the percentage of the playback file that has been played back.

If the ARMOR Software displays the error message “Failure Setting Tape to Play”, check that the Playback filename is correct. See the section titled “Disk Setup” for detailed instructions on changing (or checking) the playback filename. Use Windows Explorer to check that the playback file exists on the RAID.

3-8 ARCHIVING DATA

Data may be copied from the Disk Recorder’s disk array to any installed archival recording device. The methods used depend upon the storage format that was in use when the data was recorded to the RAID and the type of device to which the data is being copied.

3-8.1 Using the PBN Reader

The PBN Reader is a software utility that allows the user to identify the recording sessions that comprise the ARMOR data currently stored in the Disk Recorder’s disk array.

From the Windows NT® desktop, touch: Start → Programs → Disk Recorder → PBN Reader. The PBN Reader screen will be displayed.

Typical PBN Reader displays for PBN Reader – Single-File Mode and PBN Reader – Multiple-Files Mode are shown in Figures 3-4 and 3-5, respectively. Note that the starting PBN for each recording session is listed.

The two displays are similar, but in addition to the starting PBN, the PBN Reader Multiple-File Mode display also lists the individual filenames for each file (recording session) currently stored in the disk array.

3-8.1.1 Single File Mode

When data is stored in Single File Mode, all data in the disk array is stored under a single filename which is shown in the display screen header as shown in Figure 3-4. Therefore, the PBN information shown on this screen serves no purpose when copying data to an archive drive; the complete file must be copied in its entirety.

NOTE

Although individual recording sessions cannot be archived in Single File mode, ARMOR setup information at the starting PBN for each session, can be read by means of the ARMOR’s Read Setup From Tape operation.
Figure 3-4. PBN Reader - Single File Mode (typical)

Figure 3-5. PBN Reader - Multiple Files Mode (typical)
3-8.1.2 Multiple File Mode
For data stored in Multiple File Mode, the automatically-assigned filenames for each file in the disk array are listed in the *Recorded Filename* column on the screen as shown in Figure 3-5. Use of the filename allows the copying of individual recording sessions to an archival recording device.

3-8.2 Drive Identification
System drive (internal and accessible) devices are assigned logical drive identification by default as follows:

- **a:** 3-1/2” floppy diskette (rear panel)
- **b:** Unassigned
- **c:** *NT/system application* disk partition (NTFS) on system hard drive assembly
- **d:** *User* disk partition (NTFS) on system hard drive assembly
- **e:** RAID disk array
- **f:** DVD-RAM (front-panel)
- **g:** CDROM, CD-R, CD-RW (front-panel)
- **h:** *Backup* disk partition (FAT) on system hard drive assembly

3-8.3 DLT (Digital Linear Tape) Drive

**NOTE**
Detailed operating information for the DLT drive is contained in the manufacturer’s documentation that is supplied with your unit. You should read this information before attempting to operate the drive.

The backup utility supplied with Windows NT® is used to archive data to and restore data from the DLT. Use of this utility is described in Windows NT® on-line (help) documentation, therefore it will not be detailed here.

Generally, the process requires the following key steps:

1. On the Windows desktop, double touch the Utilities Folder icon to open the Utilities window shown in Figure 3-6.
2. Double touch the Backup icon to start the utility. The backup screen will be displayed.
3. Select (maximize) the Drives screen.

![Figure 3-6. System Utilities Window (typical)](image)
4. Select E: drive. The E:\ drive screen will be displayed. This screen will list all files currently in the E: drive disk array.

5. Select the file(s) to be backed up to the DLT drive. The file(s) will be highlighted and the checkbox will be checked when a file is selected for backup.

6. Touch the BACKUP button at the top of the screen to begin the backup process. The confirmation screen will be displayed.

7. Enter the desired options on the confirmation. Touch OK when complete.

8. The backup status window will be displayed while the data backup is in progress.

**3-8.4 Compact Disk (CDR/RW)**

**NOTE**

Detailed operating information for the CDR/RW drive is contained in the manufacturer’s documentation that is supplied with your unit. You should read this information before attempting to operate the drive.

Use standard NT copy techniques to copy data from the disk array (drive E:) to the CDR/RW (drive G:).

To copy files larger than the capacity of the CDR/RW media, you may use the Splitty utility (available in the system utilities folder) to divide a file into smaller files that will each fit on the CDR/RW media. Refer to the Splitty readme file for instructions.

**3-8.5 DVD-RAM**

**NOTE**

Detailed operating information for the DVD-RAM drive is contained in the manufacturer’s documentation that is supplied with your unit. You should read this information before attempting to operate the drive.

Use standard NT copy techniques to copy data from the disk array (drive E:) to the DVD-RAM (drive G:).

To copy files larger than the capacity of the DVD-RAM media, you may use the Splitty utility (available in the system utilities folder) to divide a file into smaller files that will each fit on the DVD-RAM media. Refer to the Splitty readme file for instructions.

**3-8.6 Model 64 Tape Drive**

The archiving of data to the externally-connected Model 64 Tape Drive cannot be accomplished by use of standard NT® copy and/or backup techniques such as those used to copy data to the other (internally-mounted) archival drive devices (CDR/RW, DVD-RAM, DLT, etc.).

The Model 64 is connected to the Model 80 through the PCI-V64 PCI to Sypris Data Systems Digital Cassette Recorder Interface. The PCI-V64 Software must be used to copy data files from the Disk Recorder to a tape cassette(s) in an externally-connected Model 64 Tape Drive.

**NOTE**

Before attempting to copy a data file(s) from the Disk Recorder’s disk array to the Model 64, the user should be familiar with the operation of the PCI-V64 and PCI-V64 Software. Please refer to the PCI-V64 Technical Manual for detailed information on the PCI-V64.

1. Ensure that the Model 64 is correctly connected to the Disk Recorder.
2. Execute the PCI-V64 Software by double-touching (double-clicking) the Model 64 Control icon on the Windows desktop or by double-touching the V64CTL entry in the Programs\PCI-V64 folder.

   **NOTE**

   The first time you execute the software after the Model 64 has been powered on, you will receive the following message:

   *ERROR from VLDS_Status_Read: SELECT-0 high indicates VLDS not selected.*

   This message is normal and serves as a reminder that you must select the recorder before you can command it. Touch (click) **OK** to continue.

   The PCI-V64 Software screen will be displayed. A typical screen is shown in Figure 3-7. If the tape drive has been selected, the majority of the information fields on the display will be filled. If the tape drive has not been selected, the majority of the fields on the display will be blank.

3. If you have not selected the tape drive since it has been powered on, select it now by touching the **Select Unit** button. If the tape drive unit number is 0, touch (click) **OK** to continue. Otherwise, touch (click) the **Keypad** button and use the keypad to enter the drive number. See the Model 64 documentation for further information on determining the unit number on the Model 64.

![PCI-V64 Software Screen (typical)](image)

**Figure 3-7.** PCI-V64 Software Screen (typical)
4. Check that the Operating Mode Data Width is set to 8-bit and that the Operating Mode MOde is set to burst. If not, touch (click) the Set Operating Mode button. Use the drop list to select 8-bit burst and touch (click) OK.

5. Check the Operating Mode Bit Density. If the tape will be played back only on a Model 64, the Bit Density should be set to High. If the tape will be played back on a Buffer VLDS, the Bit Density should be set to Low. (The Low bit density setting will work on the Model 64 as well, but the tape cartridge will only have half its normal capacity). If the Bit Density is incorrect, touch (click) the Set Bit Density button. Use the drop list to select the correct density and touch (click) OK.

6. Insert a tape cassette into the Model 64 tape drive.

7. If the tape cassette is new or has been degaussed, format the tape as follows:

   The tape drive state must be SUBLOAD to format a tape. Press the Update Status button to update the Current State of the tape drive. If the tape drive is not in SUBLOAD, touch (click) the SUBLOAD button.

   Touch (click) the Set Format Mode button. Use the drop list to select the proper format for your tape capacity (T120 No Dir Channels or T160 No Dir Channels).

   Touch (click) the Format Tape button. Enter a volume label or accept the default of 0. Touch OK to start the format. Wait approximately 30 seconds for the format to complete. When the format operation is complete, the tape drive Current State should be STANDBY.

8. Touch the Write To Recorder button to begin the copy operation.

9. The Open Window will be displayed. Use this window to select the device, directory, and filename to copy. Touch the down arrow in the Look In Drop List to display the disks and directories. The RAID is normally designated as device E. Touch the E entry to display the files in the RAID data directory. Touch the file that you wish to copy and touch the Open button to complete the selection.

10. The Confirm Transfer Window will display. Touch (click) OK to confirm the transfer.

11. The Model 64 will search till the end of the recording to determine the starting PBN of this recording. When the PCI-V64 Software displays the starting PBN, touch (click) OK to begin the copy operation.

   Progress of the copy operation is indicated by the Progress Bar at the top of the PCI-V64 Window. The PCI-V64 Software will notify you when the copy is complete.

   **NOTE**

   To copy files larger than the capacity of the Model 64 media, you may use the Splitty utility (available in the system utilities folder) to divide a file into smaller files that will each fit on the Model 64 media. Refer to the Splitty readme file for instructions.
CAUTION
If it becomes necessary to abort the write operation before the file transfer is complete, touch (click) the Cancel button. If the Cancel button is not operative and you have a mouse connected to the Model 80, go to the Windows Task Manager and end the V64CTL process to abort the operation. Execute the Task Manager by right clicking on a blank area in the TaskBar at the bottom of the screen.

12. To eject the tape from the Model 64, the tape drive must be in the SUBLOAD state. If the Current State of the Model 64 is not SUBLOAD, touch (click) the SUBLOAD button. To eject the tape, touch (click) the EJECT button.

3-9 NETWORK OPERATION

3-9.1 Network Setup
The Disk Recorder must be properly configured in order to establish network communications.

CAUTION
All required network support software is pre-installed at the factory. A network administrator must assign a static IP Address and manually set the TCP/IP properties as described below. **DO NOT USE DHCP FOR AUTOMATIC TCP/IP ADDRESS ASSIGNMENTS.** It is highly advised that all network operations on the Model 80 be suspended during record and playback sessions.

1. From the NT desktop, select then right-click on the Network Neighborhood icon.
2. On the Network screen, click on the Protocols tab to display the Protocols screen.
4. On the TCP/IP Properties screen, enter the appropriate IP Address, Subnet Mask, and Default Gateway values for your network.

When the correct values are entered, click on OK to re-display the Network screen.

5. On the Network screen, click Close.

6. At this point, you will be instructed to reboot the system so the new network settings can be recognized. Click on Yes to reboot.

7. After the system reboot is complete, you may verify your network setup by use of the following:
   a. Click on the MSDOS icon to open a DOS window.
   b. Use the ping command to ping to a known network address (example: C:\ping 198.59.17.54).
   c. A reply similar to the one shown below indicates that the network setup is functioning properly.

```
Pinging 198.59.17.54 with 32 bytes of data: 
Reply from 198.59.17.54: bytes=32 time=2ms TTL=255 
Reply from 198.59.17.54: bytes=32 time=1ms TTL=255 
Reply from 198.59.17.54: bytes=32 time=1ms TTL=255 
Reply from 198.59.17.54: bytes=32 time=1ms TTL=255 
```

3-9.2 Data File Transmission Over the Network
Data file transmission over the network is accomplished by use of standard TCP/IP protocols (i.e., Ping, FTP, Telnet). Typically, connec-
Activity with the server is verified by use of *Ping*, and data files are transmitted and received via *FTP* (file transfer protocol) service.

### 3-10 POWERING DOWN THE SYSTEM

**CAUTION**

Improper system power down may result in loss of data.

Use the following procedure when powering down the Disk Recorder.

1. If a record (or play back) operation is in progress, touch the **STOP** command button on the Primary Control screen to terminate the operation.

2. Touch the **EXIT** command button on the Primary Control screen to exit the ARMOR Setup and Control GUI display and return to the Windows NT® desktop environment.

3. Touch the **START** button in the Task Bar, then select *shut down* from the pop-up menu. The *Shut Down Windows* dialog box will appear. When prompted with the message, *Are you sure you want to: Shut down the computer?*, select **YES**.

   The Window NT Workstation® signature screen will be displayed for a time, followed by the message, *Please wait while the system writes unsaved data to the disk.***

   **CAUTION**

   To ensure against data loss, do not remove power from the Disk Recorder until the message, *It's now safe to turn off your computer*, is displayed.

4. When the message, *It's now safe to turn off your computer*, is displayed, you may turn the Disk Recorder OFF.
SECTION 4
MAINTENANCE

4-1 GENERAL
This maintenance section is divided into two sub-sections:

• Routine Maintenance

This sub-section provides general cleaning procedures and instructions for packing the Disk Recorder for shipment.

• Corrective Maintenance

This sub-section is intended for use by qualified persons such as service technicians and system administrators, whom are well-versed in software installation techniques and workstation service procedures.

WARNING
The Disk Recorder contains dangerous high voltages and no user-servicable internal components. To avoid personal injury, always disconnect the Disk Recorder from the power source before removing any cover.

CAUTION
This equipment contains ESDS devices. Proper ESDS device handling procedures must be followed. Refer to the ESDS DEVICE HANDLING information at the front of this manual.

4-2 ROUTINE MAINTENANCE
This sub-section provides routine maintenance information. It covers external cleaning, touchscreen cleaning, and packaging the Disk Recorder for shipment.

4-2.1 External Cleaning
Clean the external surfaces on the Disk Recorder (as required) as follows:

1. Turn Disk Recorder power OFF and disconnect power cord.

2. Use a lint-free cloth dampened with a mild commercial cleaning agent to wipe down the exterior surfaces of the Disk Recorder. Do not clean the touchscreen with this cleaning agent. See paragraph 4-2.2 for touchscreen cleaning procedure.

3. Ensure that the fan exhaust port and air inlet holes in the rear panel are clean and unobstructed. If necessary, use a low velocity vacuum to remove dust/debris from fan exhaust port and air inlet holes. Refer to Figure 4-1 for locations of fan exhaust port and air inlet holes.

Figure 4-1. Fan Exhaust Port and Air Inlet Holes
4-2.2 Touchscreen Cleaning

When required, the touchscreen may be cleaned as follows:

1. Turn Disk Recorder power OFF and disconnect power cord.
2. Use a clean lint-free cloth dampened with an ammonia-based glass cleaner or denatured alcohol and carefully wipe the surface of the touchscreen. Use light pressure to prevent scratching the touchscreen surface. If a spray applicator is used, spray the cloth only – do not spray directly on the touchscreen.

4-2.3 Packaging the Disk Recorder for Shipment

If the original shipping carton and packing materials are available, they should be reused when packaging the Disk Recorder for shipment. If not available, use the following procedure when packaging the Disk Recorder for shipment.

NOTE

If available, the original shipping carton and packing materials should be reused when packaging the Disk Recorder for shipment.

1. Disconnect all interconnecting and power cables from rear of Disk Recorder.
2. Disconnect the three cables that extend through the rear panel from connectors J1, J2, and J4. This is to prevent the connectors and system board from being damaged during shipment.
3. Remove diskette from the 3-1/2” floppy drive on rear panel (if applicable).
4. Remove any media present in front-panel archival drives (if applicable).

5. Ensure that all internal assemblies are properly secured and all internal cables are connected (no loose assemblies).
7. Place the Disk Recorder in a heavy-duty corrugated cardboard carton having approximately the same dimensions as the unit.
8. Using a packing material that will not settle or deform, pack all sides of the Disk Recorder so all voids are filled.

Seal the carton and place it in an extra strength outer carton. The outer carton must be large enough to allow room for a minimum of 2 inches of packing material on all sides of the inner pack.

9. Insert packing material tightly between the inner and outer cartons.
10. Seal the outer carton and mark it FRAGILE, DO NOT DROP, and THIS SIDE UP to designate operating orientation.

4-3 CORRECTIVE MAINTENANCE

This sub-section provides special instructions intended for use by qualified persons such as service technicians and system administrators whom are familiar with software installation techniques and workstation service procedures. It includes information for software upgrade and system disk replacement, and it provides generic instructions for the installation of archival recording devices in the front-panel drive bays.

CAUTION

The following instructions are intended for use only by service technicians and system administrators that are familiar with software installation techniques and workstation service procedures.
4-3.1 Software Reinstallation and Upgrade

4-3.1.1 General

Regardless of the factory-configuration, all Disk Recorders are shipped from the factory containing a complete suite of application and device driver software which is capable of supporting all available configurations and all supported archival devices. Installation media is provided for all installed software.

Because the software suite provides basic workstation operations in addition to providing Disk Recorder functionality, there are complex configuration requirements for the proper integration of the numerous diverse programs that make up the suite (e.g.; operating system, applications, device drivers, utilities, etc.). These requirements make reinstallation of certain individual software applications impractical because of the potential for system conflicts which can make the Disk Recorder unusable.

Generally, only factory-authorized software upgrades, or a reinstallation of a specific application under the direct supervision of a factory technical support representative, should be attempted.

4-3.1.2 Upgrade

Periodically, upgrades may be released to support operational enhancements which may be made to the ARMOR or Disk Recorder. In most cases, software upgrade kits will consist of a set of distribution diskettes and detailed installation instructions.

A typical upgrade process consists of the insertion of the distribution diskette(s) into the rear-mounted diskette drive, then copying the *.exe file to the control program directory on the system drive (C:) as detailed in the supplied instructions. The existing *.exe file will be replaced with the upgraded *.exe file provided on the upgrade distribution diskette.

4-3.2 Restoring the Complete Factory-Default Software Suite

If the Disk Recorder becomes unusable because of damage to the installed software suite or individual file corruption, restoration of the complete factory-default software suite provides the quickest and most problem-free method of restoring normal operation.

To restore the Disk Recorder’s software suite to factory-default (as shipped from the factory) condition, you will need the two diskettes from the DOS-boot/Norton Ghost™ diskette set (part number 16831173-001) which was supplied with your Disk Recorder.

NOTE

Prior to performing the factory-default software restoration, the user should copy the ghostpe.pdf (Adobe Acrobat®) file, which contains the Norton Ghost User’s Guide, from Disk 1 of the DOS-boot/Norton Ghost diskette set to an available computer/workstation so that a copy of the User’s Guide will be available (either on-screen or hardcopy) during the procedure.

At the time of manufacture, a copy (image file) of the drive C: partition, complete with directory structure, was cloned onto the drive H: partition. In case of software damage/corruption on drive C: (assuming the system disk is physically undamaged), the H: partition can be cloned back to the C: partition, thereby replicating the original factory-installed (default) software suite.

CAUTION

This procedure will destroy all existing data on the C: drive partition. Critical user-installed data files should be backed up (if possible) before attempting this procedure.
NOTE

The following procedure must be run in a DOS environment.

The following steps summarize the procedure used to clone the factory-default software partition from the H: drive. For full details refer to the section titled Cloning a partition from an image file from page 36 in the Norton Ghost™ User’s Guide (available from the ghostpe.pdf file on Disk 1 of 2).

1. Turn Disk Recorder OFF.
2. Connect keyboard and mouse to front panel connectors on Disk Recorder.
3. Insert the diskette labeled Disk 1 of 2 in diskette drive on rear panel.
4. Turn power ON and allow Disk Recorder to boot up in DOS mode. During the boot process, a generic mouse driver will be installed and the system will continue to boot until the A:> prompt is displayed on the Disk Recorder’s display screen.
5. Remove the diskette labeled Disk 1 of 2 from the rear panel drive and insert the diskette labeled Disk 2 of 2.
6. At the DOS prompt, type ghostpe and press ENTER start the Ghost utility. The welcome/about screen is displayed; click OK to continue.
7. From the pop-up menus, select in turn: Local, Partition, and From Image. The File name to load image from dialog box will be displayed.
8. On the File name to load image from dialog box, select the h: Local drive and the defaults.gho filename. When you highlight the defaults.gho filename, the select Source Partition dialog box will be displayed.

9. The Source Partition dialog box displays the details of the defaults.gho partition. Select the defaults.gho source partition by highlighting. The Destination Drive dialog box will be displayed.

10. The Destination Drive dialog box displays the details of every disk that Norton Ghost can find on the Disk Recorder. Factory-configured disks contain three partitions of 3, 2, and 1 GB each.

Select (highlight) the 3 GB partition (partition 1). Details of this partition should be similar to those shown below.

<table>
<thead>
<tr>
<th>PART</th>
<th>TYPE</th>
<th>DESC</th>
<th>LABEL</th>
<th>SIZE</th>
<th>DATA SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>07</td>
<td>NTFS</td>
<td>SYSTEM DISK</td>
<td>3074</td>
<td>1034</td>
</tr>
</tbody>
</table>

Upon selection, the “Proceed with partition load? Yes No” dialog box will be displayed.

CAUTION

This will be your last chance to back out! Choose carefully, as this is the partition that will be overwritten.

11. Check the details displayed and ensure that the correct options have been selected.
12. Click Yes to overwrite the destination disk (partition).
13. When the partition copy is complete, remove the diskette from the rear panel drive and reboot the Disk Recorder.

4-3.2.1 If needed, scandisk or a similar utility may be run to verify the integrity of the C: disk.
4-3.3 System Disk Replacement

The Disk Recorder’s system disk (drive C:) is located at the top of the disk array cage behind the touchscreen/display.

Authorized factory-replacement system disk assemblies are available from Sypris Data Systems. These disks contain the complete suite of Disk Recorder software; everything required for Disk Recorder operations from the basic Windows NT® operating system to driver software for all supported archival drive devices. All applications on the disk have been tested, configured, and are ready to run as a system. Do not attempt to install an unauthorized disk from any source other than Sypris Data Systems in the Disk Recorder.

Use the following procedure to remove and replace the system disk assembly.

**WARNING**

The Disk Recorder contains dangerous high voltages. To avoid the potential for personal injury, always disconnect the Disk Recorder from the power source before removing any cover.

**CAUTION**

Replacement of the system disk involves the disassembly of various chassis parts, the connecting of cable assemblies, and the use of common hand tools. If you are not familiar with workstation servicing techniques, refer this procedure to a qualified service technician.

Figure 4-2. CCA Holddown Assembly Removal
1. Turn Disk Recorder power OFF, then disconnect power cord from rear of unit.

2. Disconnect all cables from rear of Disk Recorder.

3. Remove Disk Recorder from equipment rack.
   
   Loosen four (4) captive screws that secure front panel of Disk Recorder to rack, then extend unit on its rack-mount slides until slide stops engage.

   Release slide stops on each side and pull the unit free of the slides. Remove the to the work bench.

4. Remove top cover from Disk Recorder (two screws each side).

5. Remove the CCA Holddown assembly (two screws each side). Refer to Figure 4-2.

   **NOTE**
   
   Refer to Figure 4-3 for locations of items referenced in the following steps.

   **CAUTION**
   
   Use extreme care when handling SCSI cables. They can be easily damaged.

6. Disconnect the SCSI cable from the connector at the top edge of the RAID Controller card. (This will ensure adequate relief for the SCSI cable when RAID
drive cage is raised in the following steps.)

NOTE
The system disk is the top-most drive assembly in the RAID drive cage.

7. Release RAID drive cage from chassis (two captive screws, see Figure 4-3). Carefully raise cage assembly far enough to gain access to the power and IDE cables on the system disk. Disconnect both cables from system disk.

8. Again, carefully raise and tilt the cage assembly far enough to gain access to the screws/washers (two on each side of cage) that secure the system disk in the cage assembly. Remove screws/washers.

9. Remove system disk from the RAID drive cage.

10. Verify that jumpers (if applicable) on the new disk assembly are properly set before installing assembly in drive cage. Refer to documentation supplied with new disk assembly for correct settings.

11. Install the new system disk by reversing the actions described in the previous steps.

4-3.4 Installing Archival Drives In Front-panel Drive Bays

NOTE
Disk Recorders are factory-supplied in various configurations which may contain one or more archival recording devices. If a different or additional archival drive is to be installed in an existing Disk Recorder, it should be returned to Sypris Data Systems for the reconfiguration. This is the only method that guarantees continued warranty support. Contact your Sypris Data Systems representative for information.

CAUTION
Installation of an archival drive in an existing Disk Recorder requires, as a minimum, disassembly of various chassis parts, connection of cables, and installation of software driver program(s). Depending upon the type of drive, installation may also require that plug-in circuit cards be removed from the system board to gain access to cable connectors on the system board, and the selection of IRQ and address settings.

Because of the complexity of some of these tasks, there is potential for equipment damage or software operating system/application conflicts which may result in faulty operation of the archive drive or Disk Recorder. Sypris Data Systems may not assume warranty responsibility for damage caused by user installation of an internal archive drive.

The Disk Recorder accommodates various removable-media drive assemblies in its front-panel drive bays. In general, any combination of drive types that can be fit into the three 5.25” half-height drive bays may be installed.

Factory-configured Disk Recorders are available with a variety of preinstalled archival drive devices (refer to model code information in Section 1). Other (third-party) drive devices, not offered by Sypris Data Systems, may also be
usable with the Disk Recorder. If you elect to install a third-party device, please refer to the manufacturer’s installation instructions.

**CAUTION**

Installation of a drive device in a front-panel drive bay involves disassembly of the Disk Recorder chassis assembly, connection of data and power cabling, and may require the installation of a software driver (for 3rd party drives). If you are not familiar with these tasks, you should refer the drive installation to a qualified technician.