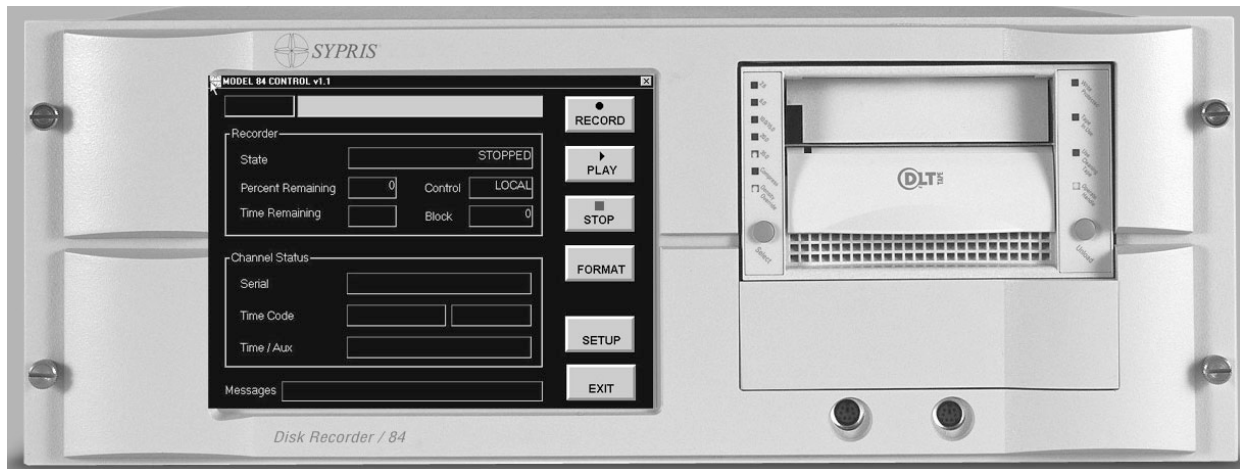




# TECHNICAL MANUAL

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## Operating instructions for **MODEL 84** Disk Recorder



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## Notes

# Caution Symbols & Notes

You must be aware of safety when you install and use this system. The Technical Manual provides various procedures.



## Caution

The caution symbol means you should pay special attention to:

- Important instructions for using the system, or
- Important instructions for maintaining the system.

Also, in this *Technical Manual*, you will find **Notes** with supplemental information on the use of the Disk Recorder.

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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, full-height or Half-height 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 EXCEPTION 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 Inc.

January, 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 ASSEMBLIES OR DEVICES, THE HANDLER MUST WEAR A STATIC CONTROL WRIST STRAP CONNECTED TO THE HANDLER'S 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, component 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.

**NOTES**

**NOTES**

# Chapter 1

## Getting Started

### 1.1 How to Use This Manual

This Manual is divided into four chapters and three appendices. This chapter includes information on:

- Model 84 Features (right hand column).
- System Capabilities (1-2).
- Unpacking the Model 84 (1-3).
- Rack Mounting the Unit (1-4).
- Connecting the Jumper Cables (1-4).
- Connections to User Equipment (1-7).
- Powering up the System (1-8).
- Powering Down the System (1-9).

Once the Model 84 is unpacked and connected to user equipment, turn to *Chapter 2: Using the Model 84*. This chapter has complete details on setting up the unit, and for using it to record, retrieve, play back and archive data.

*Chapter 3: Operating the Model 84 Disk Recorder Remotely*, contains information on remote operation of the Model 84 and a list of remote commands.

*Chapter 4: Maintenance*, has important information on routine maintenance, packaging the recorder for shipment, and corrective maintenance.

Finally, a table of model codes, a list of accessories supplied, the technical specifications of the Model 84 and information on recorded data formats can be found in *Appendices A, and B* respectively.

### 1.2 Model 84 Features

The Model 84 Disk Recorder is a highly-specialized, disk-based, single-channel telemetry recording system that allows the transfer of a single stream of digital PCM instrumentation data. It is designed to capture large amounts of digital data in real time, and to efficiently manage this information. As such the Model 84 provides users with a smooth transition from legacy rotary or longitudinal tape recorders to disk-based recorders offering the latest advances in computer and networking technology.

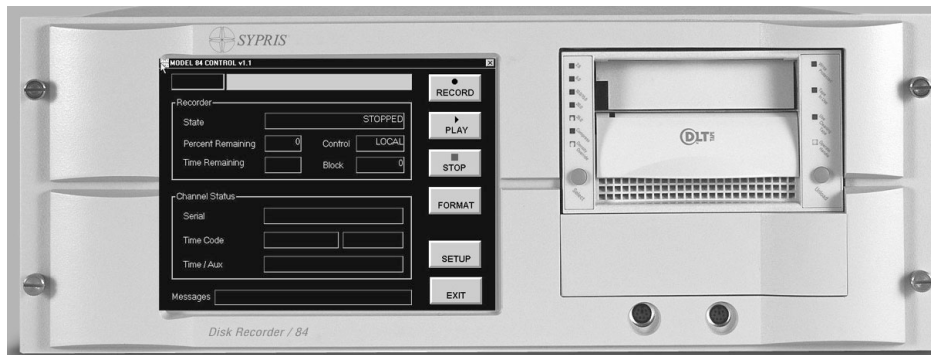


Figure 1-1 Model 84 Front Panel

In addition, the Model 84 features.

- IRIG Time Code Interface which accepts IRIG A, B and G time code for tagging data records.
- Auxiliary channel for voice annotation.
- High speed Ultra-wide or Ultra-160 SCSI Port.
- Rear-panel SCSI Port.
- Internal Disk Array Subsystem accommodates as many as four disk drives.

### NOTE

The configuration of disk array subsystems supplied with factory-configured models are identified by system model codes.

- Onboard Serial ECL (or Serial RS-422/TTL) interface.
- Front-panel touchscreen works like a control panel, with touch buttons and status displays for local control of the Disk Recorder.
- RS-232 Interface for remote operation.
- Six interfaces — Serial Clock and Data In, Serial Clock and Data Out, Time Code In, Time Code Out, Auxiliary In, and Auxiliary Out.
- Built around Pentium<sup>®</sup>-class, Windows NT<sup>®</sup> workstation with system disk, RAM and floppy diskette (which can be installed in drive bay or rear panel).
- Fits in any 19-inch wide RETMA rack that is at least 24 inches deep and has seven or more inches of vertical rack space.
- Front panel connectors for mouse and keyboard (optional).
- Connection for external monitor (optional).

### NOTE

When the cable on the rear panel above J7 is connected to J7, the controller drives the front-panel display. When that cable is disconnected, the cable of an external monitor can be connected to J7. The front-panel touchscreen is then disabled, and the external monitor activated

When an external monitor is not used, command screens are displayed on the flat panel display, which is mounted behind the touchscreen.

## 1.3 System capabilities

The Model 84 Disk Recorder is designed to capture large amounts of digital instrumentation data and to efficiently manage this information.

The Model 84 Disk Recorder can record up to 560 GBytes of instrumentation data to an internal disk-based RAID, or up to 9 TBytes to an external RAID. In addition, the Model 84 can record or playback data at any rate up to 150 Mbits/sec, continuously.

The Model 84 Disk Recorder records in either Single-file or Multi-files Mode. In the case of Single-file Mode, serial data is written to the RAID as one continuous file with the name File-00-.dat. The Disk Recorder logs the starting block number (the block number offset into the data file where a record session begins) for each recording session.

In Multi-files storage mode, where each record session begins at the beginning of the data file, the starting block number is always 1. The file-

names for each recording session can be viewed on the Disk Recorder display with the Record Log Reader.

### NOTE

For more information on Single-file and Multi-files Modes, see page 2-3.

The Model 84 can be used to archive data via a network or to peripheral drives via a high-speed, Ultra-wide or Ultra-160 SCSI Port.

Other Model 84 capabilities include:

- IRIG time code interface accepts an IRIG time code signal (A, B or G), translates it into a date/time string and tags data records for fast recall during playback.
- Transfers to and retrieves data via a network or to standard archive devices such as DLT, DDS-4, 8mm, CD-R/CD-RW and DVD-RAM drives, or reproduces it in its original form.
- All disk array subsystems, regardless of number or size of drives are capable of supporting sustained write/read data transfer rates of up to 150 MBits/Sec. Data capacity, however, is dependent upon both the number and size of the drives which comprise the RAID. The total RAID capacity is simply the sum of the capacities of the individual drives.
- Internal disk array is configured as a RAID level-0 striped disk array. The RAID Controller breaks data down into blocks and writes each to a separate disk drive in a continuous sequence, allowing greatly increased I/O performance compared to that of single disk systems.

### NOTE

Model 84 Disk Recorders provide network connectivity and can transmit data files, copied from the internal RAID, to remote equipment over a 10baseT/100baseT network using TCP/IP protocols such as FTP.

- Operation via a touchscreen mounted in front of the recorders's flat panel display where touchscreen inputs emulate mouse clicks.

### NOTE

If an external monitor is used, a mouse must be connected to the front of the Disk Recorder and used to operate the control software.

## 1.4 Unpacking the Model 84

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



### CAUTION

This equipment contains ESDS devices. You must follow the ESDS device-handling procedures explained in the ESDS DEVICE HANDLING information in 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 damaging the Disk Recorder, do not remove covers or disturb any internal switch or jumper settings.

### 1.4.1 Backup Media

The Disk Recorder is shipped with manufacturers' documentation packages and software media that support devices and application programs installed in the Disk Recorder. **Store these media as backup copies.** All applicable software on these media have been installed and configured in the Disk Recorder at the factory, and these media will not be required for routine operations.

Retain the user instructions for the storage drive (DLT, DDS-4, CD-R/CD-RW, DVD-RAM, if supplied) for reference when operating the Disk Recorder.

## NOTE

Keep the shipping carton and packing materials for reshipping the Disk Recorder.

### 1.4.2 Claims

After unpacking, carefully inspect the Disk Recorder and associated components for shipping damage. If damage is found, immediately notify the carrier, submit a claim, and notify your Sypris Data Systems representative.

## 1.5 Rack Mounting

The Disk Recorder is designed to be installed in 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, to ensure adequate cable clearance, a 24-inch deep rack may be used only in an open-back configuration unless right-angle cables are used.

## NOTE

The back of the Disk Recorder should be accessible while installed in the rack to ease cable connections and provide 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 installation instructions. Use the **bottom** set of holes in the movable slide to attach the slide to the sides of the Disk Recorder.

## 1.6 Connecting the Jumper Cables

On the rear of the Disk Recorder are two sets of connectors with matching red and yellow markings. Connect the jumper (part numbers 16831719-001 and -002) cables so that yellow is connected to yellow at both ends and red connected to red.

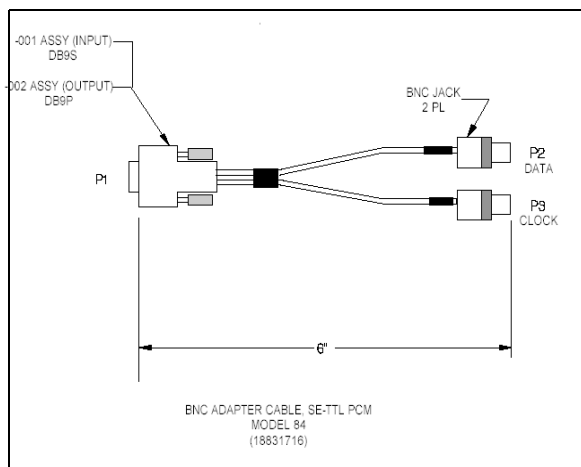
### 1.6.1 PCM: Signal Format

1. The Model 84 — 32 Mbps unit — has the capability of either single-ended, TTL (SE-TTL) or RS-422 input signals. The switch (S1-1) on the Digital Interface card is used to select either signal-ended TTL or RS-422.

2. The phase relationship between clock and data, for both the input and output, are selectable via two switches that are located on the Digital Interface Card. One switch (S1-4) inverts the input clock, and the other (S1-5) inverts the output clock. The factory default setting for both switches is for “no inversion.” With this default setting, the falling edge of the incoming clock must occur at the middle of the data cell. Likewise, the output clock will have its falling edge at the middle of the data cell.

### 1.6.2 PCM: SE-TTL

1. There are two adapter cables (part numbers 16831716-001 and 002). Each has a DB9 connector on end and two BNC Jacks on the other. One is labeled INPUT and the other is labeled OUTPUT (see see Figure 1-2 and Table 1.1). These are used to connect the PCM input and output data and a clock to and from the Model 84. Plug the INPUT cable into the top connector (labeled PCM IN) on the Digital Interface Card at the extreme right on the rear of the chassis. Plug the OUTPUT cable into the bottom connector (labeled PCM OUT) on the same card.



**Figure 1-2 BNC Adapter Cable SE-TTL PCM**

2. Connect the input data and clock coaxial cables to the input DATA and CLOCK

BNCs. Connect the output data and clock to the proper output BNCs.

**Table 1.1**  
IRIG-AUX Input/Output BNC Connectors  
(with Adapter Cable)  
Input/Output Connector BNC Jack  
Mating Connector BNC Plug

Signal	BNC Connector
Data	P2 - Center
	P2 - Shield
Clock	P3 - Center
	P3 - Shield

### 1.6.3 PCM: RS-422

1. The RS-422 input and output connections are on the PCM IN and PCM OUT (DB9) connectors on the Digital Interface Card at the extreme right on the rear of the chassis. The signal and pin connections are shown in Table 1.2 and Table 1.3.

**Table 1.2**  
RS-422 Input Connectors  
PCM IN Connector DB9P  
Mating Connector DB9S

Signal	RS-422 (up to 10 Mbps) Pin
Data In +	1
DATA IN -	6
Shld/Gnd	2
Clock In +	4
Clock In -	9
Shld/Gnd	5

**Table 1.3**  
**RS-422 OM**  
**PCM OUT Connector DB9S**  
**Mating Connector DB9P**

Signal	RS-422 (up to 10 Mbps) Pin
Data Out +	1
Data Out -	6
Shld/Grnd	2
Clock Out +	4
Clock Out -	9
Shld/Gnd	5

### 1.6.4 IRIG-AUX

1. The recording of IRIG A, B or G or AUX analog data is optional and may be independently enabled or disabled via the operating software. These channels are digitized and recorded in digital form, along with PCM data.

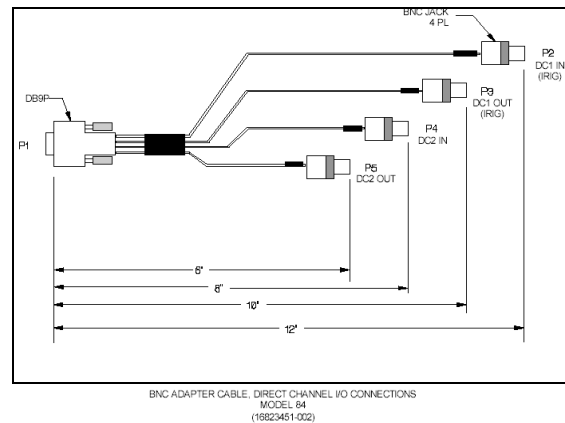
The sampling rate for the A/D conversion is derived from the input PCM clock. There is a minimum PCM rate required to record each IRIG time code (A, B or C).

- IRIG B requires a minimum PCM Rate of 20 Kbps.
- IRIG A requires a minimum PCM Rate of 100 Kbps.
- IRIG requires a minimum PCM rate of 600 Kbps.

2. There is an adapter cable (part number 16823451-002) with a DB9 connector at one end and 4 BNC jacks at the other end (see Figure 1-3 and see Table 1.4 ) Connect his cable to the DB9 connector on the rear of the unit labeled IRIG (DC1) - AUX (DC2).
3. Connect the IRIG time code input to the DC1 IN jack, and connect the IRIG output

from the Model 84 to the DC1 OUT jack. The input termination is 600 ohms, and the maximum input amplitude is 3 Vp-p.

4. Connect the AUX input to the DC2 IN jack, and connect the AUX output from the Model 84 to the DC2 OUT jack. The input termination is 600 ohms; the maximum input amplitude is 3 Vp-p, and the BW is 10 KHz.



**Figure 1-3 BNC Adapter Cable**  
**IRIG-AUX/IO Connections**

5. If it is desired to not use BNC terminated coaxial cables, the signals may be connected directly to the DB9 connector. See Table 1.5 for the signal pin connections.

**Table 1.4**  
IRIG-AUX Input/Output BNC Connections  
(with Adapter Cable)

Input/Output Connector    BNC Jack  
Mating Connector            BNC Plug

Signal	From
DC1 In (IRIG)	P2 - Center
	P2 - Shield
DC1 Out (IRIG)	P3 - Center
	P3 - Shield
DC2 In (AUX)	P4 - Center
	P4 - Shield
DC2 Out (AUX)	P5 - Center

**Table 1.5**  
IRIG-AUX Input/Output Connections  
(without Adapter Cable)

IRIG-AUX Connector    DB9S  
Mating Connector        DB9P

Signal	Pin
DC1 IN (IRIG)	9
DC1 IN SHLD	6
DC1 Out (IRIG)	8
DC1 Out SHLD	6
DC2 In (AUX)	4
DC2 IN SHLD	6
DC2 Out (AUX)	3
DC2 Out SHLD	6

**NOTE**

Please note the limitations of Disk Recorder as described in the front of this user guide.

 **CAUTION**

Avoid simultaneous networking and data acquisition or archiving operations, which might divert system resources and compromise system performance and data integrity.

**1.7 Connections to User Equipment**

 **WARNING**

All connections to user equipment must be made before powering up the Disk Recorder.

All connections to user equipment are made at the rear panel of the Disk Recorder, as shown in Figure 1-4



**Figure 1-4 Model 84 Rear Panel**

**1.7.1 Video Out: J7 (Optional)**

The Disk Recorder supports an optional, user-supplied VGA monitor. The monitor cable connects to J7 on the rear of the Disk Recorder. The front-panel display is disabled when an external monitor is used.

**1.7.2 Keyboard and Mouse (Optional)**

The Disk Recorder can be operated with an external keyboard and mouse when it is not possible nor desirable to use the built-in touch-screen display. The keyboard and mouse cables

connect to the two receptacles on the front panel. Either device may be plugged into either connector.

### 1.7.3 SCSI Device Connection: J10 (Optional)

Data stored in the Disk Recorder may be transferred to a SCSI storage device, such as a SCSI-configured DLT tape drive (or equivalent) for archiving and distribution purposes.

1. Connect J10 on the 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 other SCSI connector on the SCSI storage device.

### 1.7.4 Network Connection: J5 (Optional)

The Disk Recorder can be connected to a network at J5, which is an RJ-45 connector. The Disk Recorder is factory-configured to connect to Ethernet 10baseT/100baseT networks using the TCP/IP protocols (Ping and FTP).

### 1.7.5 RS-232 and RS-422 Control Ports

The Model 84 can also be connected to user data acquisition equipment and operated remotely via an RS232 cable.

## 1.8 Powering up the system

The Model 84 Disk Recorder may be operated from 115 or 230 Vac.

### NOTE

If the Model 84 is being used with an expansion chassis, be sure to power up the chassis,

before powering up the Model 84.



### CAUTION

Before you connect the power cord to the Disk Recorder, make sure the voltage selection switch is set for the local facility power.

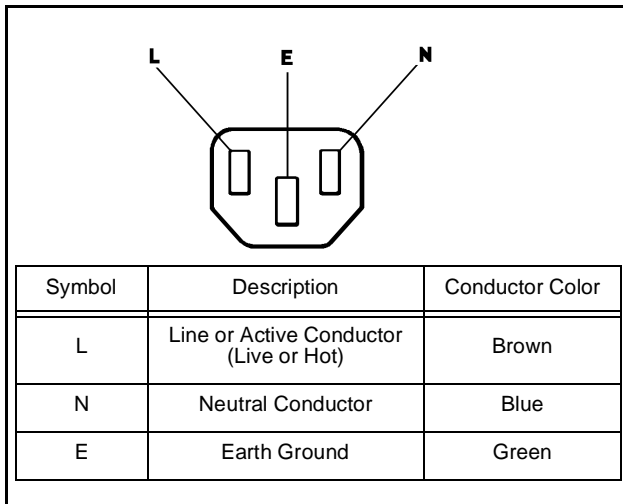
When the Disk Recorder is powered up, it displays the Windows NT Desktop with a Disk Recorder icon. Double touch or double-click this icon and the CONTROL screen is displayed. This screen is shown in Figure 1-2. From this point on, the Disk Recorder operation can be controlled by touching (or clicking) buttons for RECORD, PLAY, etc.

### 1.8.1 Power Cable

The power switch is on the back of the Disk Recorder and is not conveniently accessible when the Disk Recorder is mounted in a rack. To simplify turning power on or off, the Disk Recorder power cable should be connected to a switched facility power source; preferably the same source that provides power to 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 1-6.

One of the following types of power cable is required when connecting the Disk Recorder to 230 Vac or facility power in countries *other* than the United States and Canada.



**Figure 1-5 : Power Cable Polarities**



### CAUTION

Modifications to power cabling must be performed *only* by technically trained personnel.

- 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.
- Use a purchased ac power cable that complies with the Disk Recorder polarity and input-power socket requirements and wall-plug standards of the country of installation.
- In countries requiring IEC 950 compliance, use **only** a purchased, 230V rated, IEC 950-approved ac power cable that meets the Disk Recorder polarity and input-power socket requirements.

## 1.9 Internal Cable Connection: J1, J2, and COM2

When shipped 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.

1. Insert the two cables (front-panel mouse and keyboard) with 6-pin mini-DIN connectors into J1 and J2 on the rear panel. Although either cable may be connected to either connector, the preferred solution is to connect the longer cable to J2.
2. Connect the DB9 connector of the long touchscreen cable to the COM2 port. Tighten the connector shell hardware to secure the cable.

## 1.10 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 playback) operation is in progress, select STOP on the Primary Control screen to end the operation.
2. Select EXIT on the Primary Control screen to exit the software and return to the Windows desktop.

**Notes**

**Notes**

# Chapter 2

## Using the Model 84 Disk Recorder

### 2.1 General Information

The Model 84 Disk Recorder's primary role is to record a single stream of PCM data that is output from user equipment. It stores the data in an internal, disk-based RAID, and plays back the data from the RAID to user equipment. The Model 84 can be configured to store data in the RAID as one continuous file or as consecutively-numbered files.

In addition, the Model 84 Disk Recorder functions as an archival drive/distribution interface, and can copy data from the RAID to various optional internal and external storage devices, or transmit it to remote equipment.

This chapter provides operating instructions for the Sypris Data Systems Model 84 Disk Recorder. Information is provided *only* about the Disk Recorder. Operating information for any other equipment used with the Model 84 Disk Recorder can be found in the documentation provided with those devices.

The chapter is divided into sections as follows.

- Getting Started (right column).
- Initial Setup (page 2-2).
- Recording Data (page 2-6).
- Playback (page 2-7).
- Playing Back Data Recorded with a Different Setup (page 2-8).
- Archiving Data (page 2-10).
- Network Operation (page 2-14).

### 2.2 Getting Started

When the Model 84 is powered up, it automatically loads the Windows NT<sup>®</sup> Workstation operating system and displays the Windows<sup>®</sup> desktop on the front-panel touchscreen display.

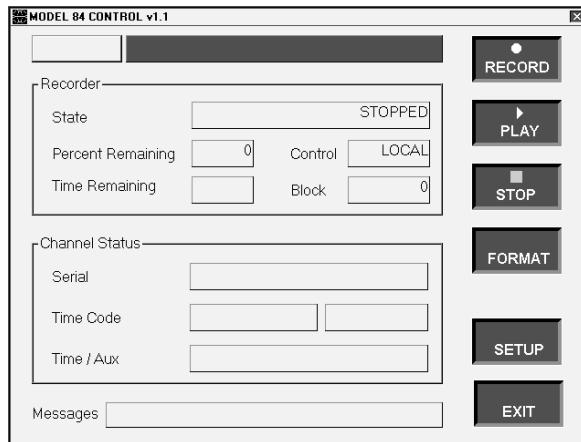
#### NOTE

The Windows NT operating system may take from two to four minutes to complete the boot process. No error messages should be displayed during a normal boot. If you encounter an error message during boot, use the Event Viewer (Start > Programs > Admin Tools > Event Viewer) to 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.

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

The Windows desktop display will have a Model 84 Disk Recorder icon. Touch or double-click this icon to begin Disk Recorder operation.

Double-touching or double-clicking the Disk Recorder icon brings up the Model 84 Control screen shown in Figure 2-1.



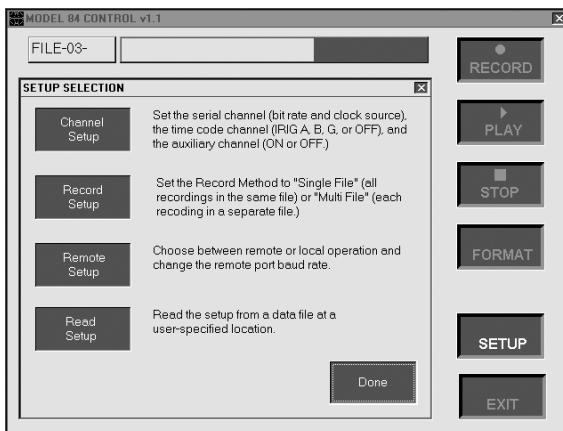
**Figure 2-1 Model 84 Control Screen**

This screen is used to control all Disk Recorder functions: RECORD, PLAY, STOP, FORMAT, SETUP AND EXIT.

## 2.3 Initial Setup

Before using the Model 84, it must be set up to meet specific user data requirements. To do this:

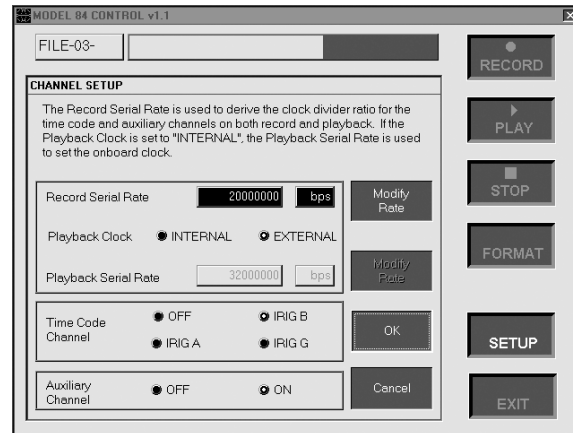
Select (touch or click) SETUP to open the SETUP SELECTION Screen shown in Figure 2-2.



**Figure 2-2 SETUP SELECTION Screen.**

### 2.3.1 Channel Setup

Select (touch or click) Channel Setup to open the CHANNEL SETUP screen shown in Figure 2-3.

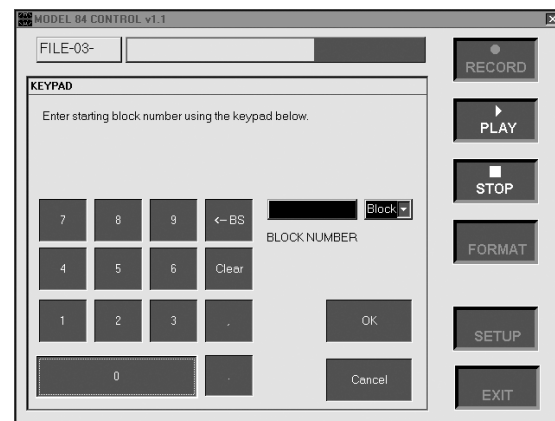


**Figure 2-3 CHANNEL SETUP Screen**

#### 2.3.1.1 Record Serial Rate

First, set the Serial Data Rate.

1. Select (touch or click) Modify Rate.
2. The keypad screen (Figure 2-4) will open. Input a new Serial Data Rate by selecting (touching or clicking) the appropriate numbers on the keypad.



**Figure 2-4 Block Number KEYPAD screen**

3. Select OK to save the new Serial Data Rate

and return to the CHANNEL SETUP screen. Or select Cancel to return to the CHANNEL SETUP Screen *without* saving the new Serial Data Rate.

### NOTE

How the Serial Data Clock is set determines the clock divider ratio for both time code and auxiliary channels. The Auxiliary Channel is sampled at the same rate as the Time Code channel. It is for this reason that a Serial Data Rate must be supplied.

### NOTE

With the Model 84 Disk Recorder, the analog clock is derived from the serial data clock, ensuring that both channels are always correlated.

#### 2.3.1.2 Playback Clock

The default Serial Playback Clock is internal, i.e., the Disk Recorder will supply the Playback Clock. To have user equipment supply the Playback Clock, select (touch or click) External.

#### 2.3.1.3 Time Code

For Time Code, select:

1. OFF (the default); or
2. IRIG A, B or G.

### NOTE

When an IRIG Time Code (A, B or G) is selected, the Disk Recorder will calculate the minimum PCM sample rate required for that time code. If the rate required is higher than the rate set in the CHANNEL SETUP Screen (Figure 2-3), a lower Time Code must be selected (for

example, dropping down from IRIG G to B).

#### 2.3.1.4 Auxiliary channel

If an auxiliary channel is required for another time code or voice annotation, select ON.

#### 2.3.2 Record Setup

1. To prepare the Model 84 to record data, select (touch or click) Setup from the Model 84 CONTROL screen.
2. Choose SETUP on the CONTROL screen. This opens the SETUP SELECTION Screen shown in Figure 2-2.
3. Choose (touch or click) Record Setup.
4. When the Record Setup screen (Figure 2-5) opens, choose either Single File or Multi - files mode.

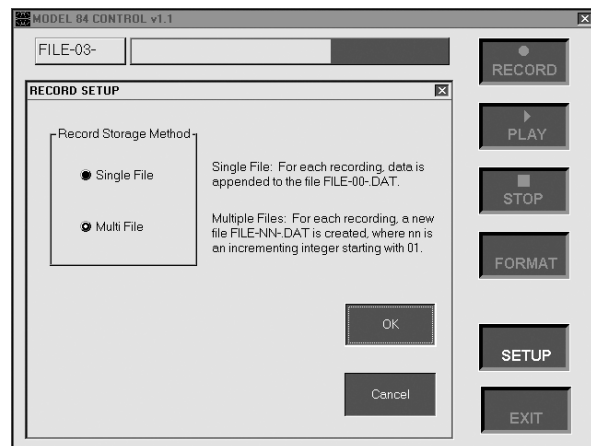


Figure 2-5 RECORD SETUP Screen

In Single-file Mode, serial data is written to the RAID as one continuous file with the filename File-00.dat. Each time the record command is issued, the new serial data is appended to the existing file (at end-of-data). Also, each time the record command is issued, the filename File-00.dat is set as the default playback filename, so that

when the Disk Recorder later receives a command to play, data is played back from that file, File-00.dat.

Consequently, if the single file method is chosen to store data in the RAID, the data can be copied to an archival device *only* as a single file. This means that specific recording sessions cannot be individually copied.

The starting block of a recording session is the block offset into the datafile where each record sessions begins. In the single-file storage method, the Disk Recorder logs the starting block for each recording session. The setup information for a specific recording session can be retrieved by selecting the Record Setup button on the SETUP SELECTION Screen even though the data itself for that specific session cannot be copied independently. The starting block for each recording session can be viewed with the Disk Recorder Record Log Reader.

The Disk Recorder Record Log Reader is a software utility that lets you identify the recording sessions that comprise the data currently stored in the Disk Recorder RAID. To use the Record Log Reader, go to the desktop and touch or click the Sypris Record Log Reader icon. The Record Log Reader Screen opens.

Figure 2-6 shows a typical Single File Record Log Reader display.

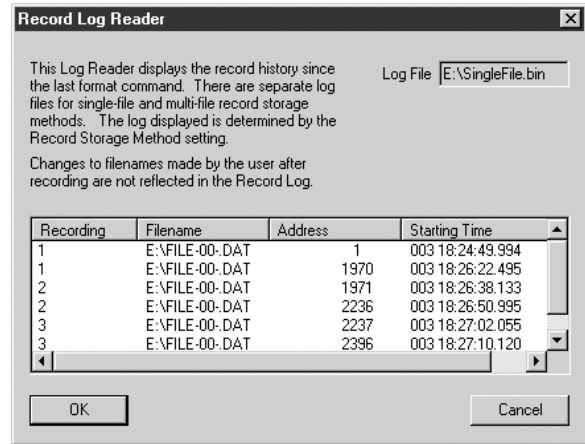


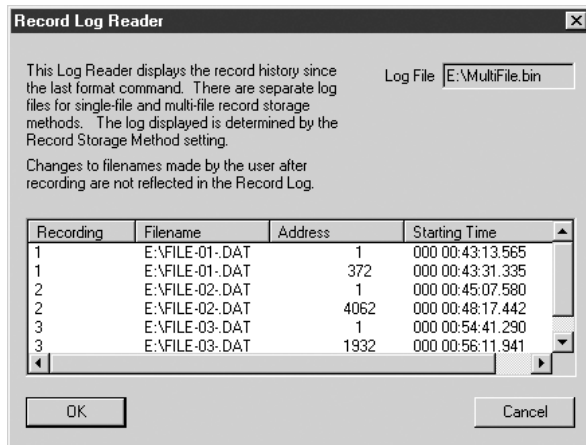
Figure 2-6 Single File Record Log Reader Display

In Multi-files Mode, individual recording sessions are stored in the RAID as individual data files, which are automatically assigned sequential filenames of File-01-.dat through File-99-.dat. Each time a 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 when the Disk Recorder later receives a play command, data is played back from the last file recorded (the new file).

Because the Multi-files method stores each data file in the RAID as an independent entity with its own unique filename, a specific recording session can be copied to an archival recording device.

The Disk Recorder logs the starting block number offset into the data file (where a record session begins) for each recording session. In the Multi-files storage method, where each record session begins at the beginning of the data file, the starting

block number is *always* 1. The filenames for each recording session can be viewed on the Disk Recorder display with the Record Log Reader. Figure 2-7 shows a typical Record Log Reader display for data recorded with the Multiple Files method.



**Figure 2-7 Multiple File Record Log Reader Display**

### NOTE

For more information on Recorded Data Formats, see Appendix B.

5. Select OK to save any change made in the RECORD SETUP screen. Select Cancel to return to the SETUP SELECTION Screen without saving changes.

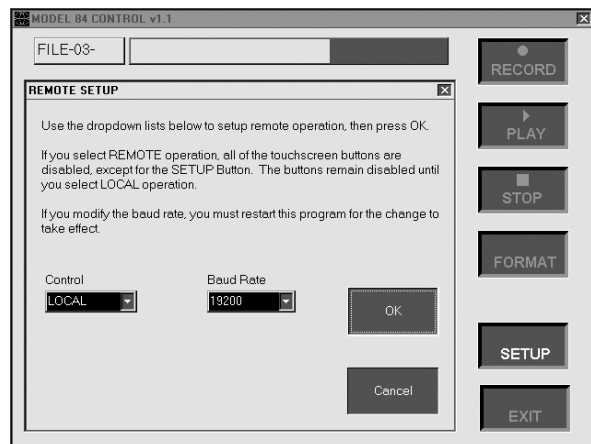
### NOTE

The default state for Record Storage Method is Multi-files as this is the most commonly used mode. However, before recording, it is a good idea to select the RECORD SETUP Screen (Figure 2-5) and then Record Setup and make sure that Multi-files is selected.

### 2.3.3 Remote Setup

The Model 84 can be operated locally or remotely via its RS-232 Port.

1. To operate the Disk Recorder remotely via its RS-232 Port, go to the CONTROL screen and select SETUP.
2. When the SETUP screen opens, select Remote Setup.
3. This opens the REMOTE SETUP screen shown in Figure 2-8.



**Figure 2-8 REMOTE SETUP screen**

4. Touch or click the arrow under Control and select REMOTE.
5. Set the Baud Rate to match the user equipment.

### NOTE

More information on controlling the Model 84 remotely, as well as a list of remote commands can be found in *Chapter 3*.

6. Select OK.
7. The SETUP SELECTION Screen will open. When the Disk Recorder is in REMOTE mode, all menu operations are disabled (grayed out) except REMOTE SETUP, SETUP, and DONE, as the Disk Recorder can now be controlled only via a remote device, and *cannot be controlled locally*.

To return to local control:

- In the REMOTE SETUP Screen, leave the Recorder in LOCAL Mode, and select Cancel to return to the SETUP SELECTION SCREEN or
- Go to the SETUP SELECTION screen,
  1. Select Remote Setup.
  2. Click the arrow to under Control and select Local.
  3. Select Done.

## 2.4 Recording Data

1. On the Model 84 CONTROL Screen (Figure 2-9) select RECORD. The Disk Recorder will begin recording data.

The CONTROL screen will now display Recorder Status by State, Block and, if appropriate, Time Code (see Figure 2-9). The State line shows the status of recording (Initializing, Recording, Locked, No Signal, etc.). The Block line displays block numbers as they increment. If a time code was selected) the time code line will display the time code by day, hour, minutes, seconds and fractions of seconds. If no time code was selected, this line remains blank. This screen also displays Channel Status, including Serial (for example, ECL OFF), Time Code and Auxiliary (if applicable)

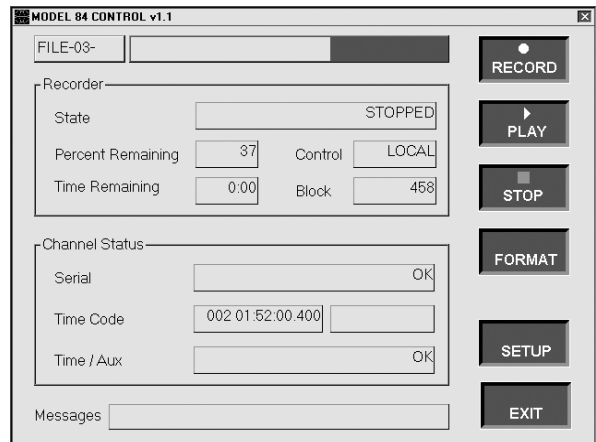


Figure 2-9 MODEL 84 CONTROL Screen

### NOTE

From the time RECORD is selected until actual recording begins may be 8 to 10 seconds, as the Disk Recorder and all other equipment must first be initialized.

2. Recording will continue until STOP is selected or the RAID is filled.

### NOTE

Status of the data transfer from the RAID to user equipment is indicated by changes in the block number value shown in the Recorder Status section of the Model 84 CONTROL Screen. The block number reported by the Disk Recorder during recording indicates the block number offset into the current data file. The Percent (%) meter reflects the percentage of the available disk space that has been recorded.

## 2.5 Playback

To playback data using the setup defined under *Initial Setup* (page 2-2), select **PLAY** on the Model 84 CONTROL Screen.

### NOTE

To playback a record created with different setup information (from the one created in Initial Setup), see “Playing Back Data Recorded With A Different Setup” (page 2-8).

1. The FILE NAME Screen shown in Figure 2-10 opens.

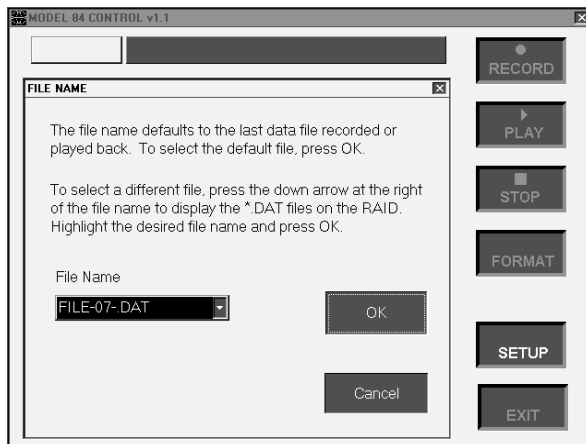


Figure 2-10 FILE NAME Screen

2. The File Name drop-down box defaults to the name of the last file recorded or played back. If the data was recorded using Single-file Mode, the *only* file choice will be File-00.dat. If Multi-files Mode was selected, and more than one file has been recorded, there will be several file names listed in the drop-down box.
3. Select the appropriate file name.
4. Select **OK** to open the **PLAYBACK STARTING LOCATION** Screen (see Figure 2-11) or **Cancel** to return to the

### PLAYBACK FILE NAME Screen.

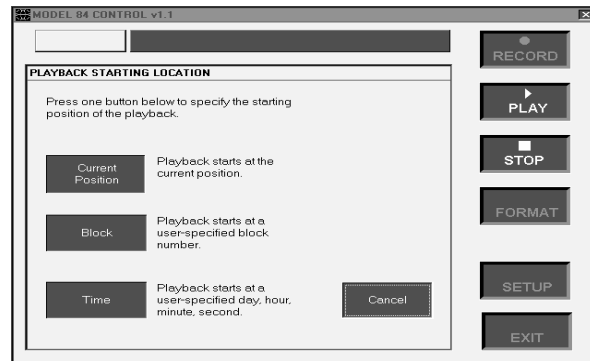


Figure 2-11 PLAYBACK STARTING LOCATION Screen

5. Select a Playback Starting location as follows:

- a) Current Position.

To begin playback where the last recording stopped, select **Current Position**.

- b) Block Number.

1. To begin playback at a specified block number, select **Block**. This opens the keypad screen shown in Figure 2-12.

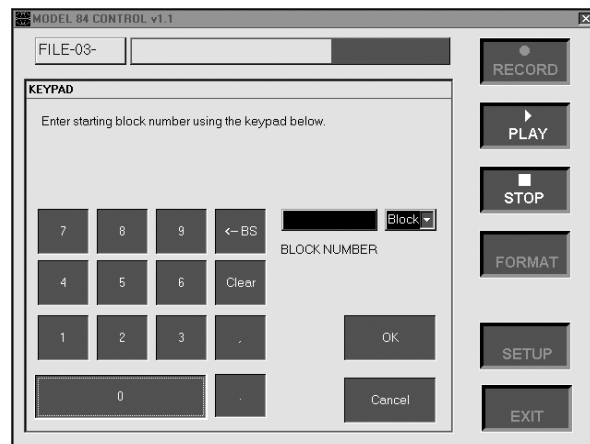


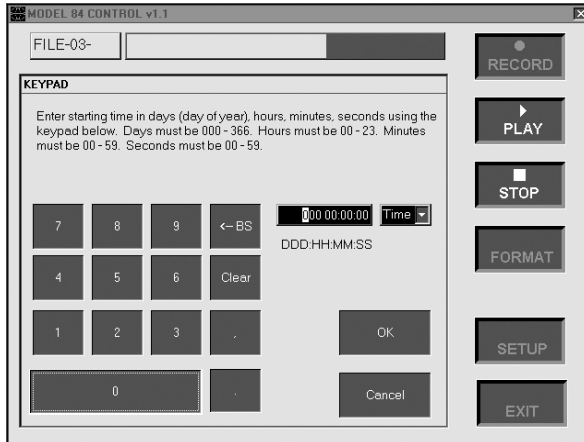
Figure 2-12 Playback by Block Number KEYPAD

2. Enter the starting block number using this keypad.
3. When finished, select **OK** to begin playback at that block number, or **Cancel** to return to the **PLAYBACK**

## STARTING LOCATION Screen.

### c) Time Code

1. To begin playback by time, select Time. This opens the screen shown in Figure 2-13.



**Figure 2-13 Playback by Time KEYPAD**

2. Enter the starting time in days, hours, minutes, and seconds using this keypad. When finished, select OK to begin playback at that time, or Cancel to return to the PLAYBACK STARTING LOCATION Screen.
3. When finished inputting the time, select OK to begin playback, or Cancel to return to the PLAYBACK STARTING LOCATION Screen.

## NOTE

In all cases, Playback will continue until the recording has been completely played back or until STOP is selected.

## NOTE

Status of the data transfer from the RAID to user equipment is indicated by changes in the block number value shown in the Recorder Status section of the Model 84 CONTROL Screen. The block number reported by the Disk Recorder during playback indicates the block number offset into the current data file. The Percent (%) meter reflects the percent of the playback file that has been played back.

If the Disk Recorder software displays the error message "Failure Setting Recorder to Play," check that the playback filename is correct. See page 2-7, *Playback*, for detailed instructions on changing (or checking) the playback filename. Use Windows Explorer to check that the file exists on the RAID. If playing back from a specified location, verify that the specified location is within the bounds of the file.

## 2.6 Playing Back Data Recorded with a Different Setup

There may be times when it is necessary to playback a file created using a setup different than that of the last recording made or to playback a file created with a setup different than the current setup. The process for doing this is virtually the same whether the recording was created in Single-file Mode or Multi-files Mode. In either case, you must set up the Model 84 with the correct setup information for the particular recording before playing back that recording.

### 2.6.1 Setting up the Model 84 with the Correct Setup Information

Setup information for a particular data file can be entered manually or read from the data file itself.

To input the setup information manually:

1. Open the Model 84 CONTROL Screen.
2. Select CHANNEL SETUP.
3. On the CHANNEL SETUP screen:
  - a) Enter the record Serial Data Rate.
  - b) Choose a Playback Clock (internal or external).
  - c) If appropriate, enter the Playback Serial Rate.
  - d) If appropriate, select a Time Code channel and/or an Auxiliary Channel.
4. Select OK to return to the SETUP SELECTION Screen.
5. Press DONE.

### 2.6.2 To Read Setup Information from the Data File

The second way to obtain setup information is from the data file itself. The procedure is slightly different depending on whether the data was recorded in Single-file Mode or Multi-files Mode. The difference is regarding the location of setup information in the data file. Every time a recording is started, the Model 84 writes the setup information as the next block in the data file (the first block for the first recording). In Multi-files Mode, each recording is contained in a separate file. Therefore, the setup information is always and only at the beginning of the data file (at block 1). In Single-file Mode, multiple recording sessions are contained in the same data file named FILE-00-.DAT. The setup information for the first recording is always at block 1. If

there are other recording is in FILE-00-.DAT, then the setup information for any subsequent recording is located later in the file.

1. If the recording to be playback was made in Single-file Mode, use the Model 84 Record Log Reader to find the starting block number of the recording. Go to the desktop and double-click or double-touch the Model 84 Record Log Reader icon. The Model 84 Record Log Reader screen will open. Note the starting block number for the recording of interest.
2. On the Model 84 CONTROL Screen, select SETUP.
3. When the SETUP SELECTION Screen opens, select Read Setup.
4. The FILE NAME Screen opens. Use the drop-down box to select the desired file. (In single-file Mode, the only file shown in the drop-down box will be File-00.dat.)
5. The PLAYBACK STARTING LOCATION Screen opens (Figure 2-11). Select Block.
6. Touch or click on the keypad to input the appropriate starting block.
7. Select OK.
8. The CONTROL Screen opens. The STATE Line displays “Starting Read Setup,” and then “Stopped.” The message box will display “Setup found at block number\_\_.” The block number displayed should match the block number you entered.
9. If desired, use the CHANNEL SETUP screen to examine the setup parameters read from the data file.

### 2.6.3 To playback the data:

1. Select PLAY.
2. The PLAYBACK STARTING LOCATION screen opens. Select Block.
3. The KEYPAD screen opens. Touch or click number keys to input the appropriate start-

ing block number.

4. Click OK.
5. The control screen opens. The State Line displays “Initializing,” “Starting Playback and then “Playing.”

## 2.7 Archiving Data

Data may be copied from the Disk Recorder RAID to any installed archival recording device. The methods used depend on 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.

### 2.7.1 Using the Record Log Reader

The Record Log Reader is a software utility that lets you identify the recording sessions that comprise the data currently stored in the Disk Recorder RAID.

On the desktop, touch or click the Sypris Record Log Reader icon. The Record Log Reader Screen opens.

Typical Record Log Reader displays for Record Log Reader – Single-file Mode and Record Log Reader – Multi-files Mode — are shown in Figure 2-6 and Figure 2-7. Note that the starting block number for each recording session is listed.

The Record Log Reader display is the same for both modes, except that in Multi-files Mode, it lists the individual filename for each recording session currently stored in the RAID, in addition to the starting block address.

### 2.7.2 Single-file Mode

When data is stored in Single-file Mode, all data in the RAID is stored under a single filename shown in the display screen header.

Therefore, the block 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, setup information at the starting Scan Address for each session can be read by using the Read Setup function in the SETUP SELECTION Screen. Reading setup from the data file (using the READ SETUP function) causes the setup to be loaded into the program. After read setup completes, the user may examine the setup by clicking on the Channel Setup button on the SETUP SELECTION Screen. The data setup just read from the data file will then be utilized by the program for all subsequent operations.

### 2.7.3 Multi-files Mode

For data stored in Multi-files Mode, the automatically assigned filenames for each file in the disk array are listed in the Recorded File Name column on the screen. By using the file names, you can transfer individual sessions to storage devices.

### 2.7.4 Drive Identification

System drive (internal and accessible) devices are assigned logical drive identifications by default as follows:

- a: 3.5-inch floppy diskette (rear panel)

- b: Unassigned
- c: NT system application disk partition (NTFS) on the system hard drive
- d: User disk partition (NTFS) on the system hard drive
- e: RAID
- f: DVD-RAM (front-panel)
- g: CD-ROM, CD-R, CD-RW (front-panel)
- h: Additional user partition on the system hard drive

### 2.7.5 DDS-4 or DLT (Digital Linear Tape) Drive

#### NOTE

Detailed operating information for the DLT drive is contained in the manufacturer's documentation supplied with the unit. 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.

Generally, the process requires the following key steps:

1. On the desktop, touch or click the Utilities Folder icon to open the Utilities window.
2. Touch or click the Backup icon to start the utility. The backup screen opens.
3. Select (maximize) the Drives Screen.
4. Select the E: drive. The E: drive Screen opens. This screen lists all files currently in the E: drive RAID.

5. Select the files to be backed up to the DLT drive. The files are highlighted and the check box is checked when a file is selected for backup.
6. Select BACKUP at the top of the screen to begin the backup process. A confirmation screen opens.
7. Enter the desired options on the confirmation screen and select OK.
8. The backup status window is open while the data backup is in progress.

### 2.7.6 Compact Disk (CD-R/CD-RW)

#### NOTE

Detailed operating information for the CD-R/CD-R-W drive is in the manufacturer's documentation supplied with your unit. Read this information before attempting to operate the drive.

Use standard Windows NT copy techniques to copy data from the RAID (drive E:) to the CD-R/CD-RW (drive G:).

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

### 2.7.7 DVD-RAM

#### NOTE

Detailed operating information for the DVD-RAM drive is contained in the manufacturer's documentation for your unit. Read this information before attempting to operate the drive.

Use standard Windows NT copy techniques to copy data from the RAID (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 fit on the DVD-RAM media. Refer to the Splitty Readme file for instructions

### 2.7.8 Model 64 Tape Drive

#### NOTE

Serial data transferred from a Model 84 to a Model 64 cannot be reproduced on either device. It can *only* be archived.

However, it is possible to dub data from a Serial Model 64 to a Model 84. To do this, connect the data outputs on the Model 64 to the data inputs of the Model 84.

For this operation, the Model 84 must have the PCI-V64 option installed.

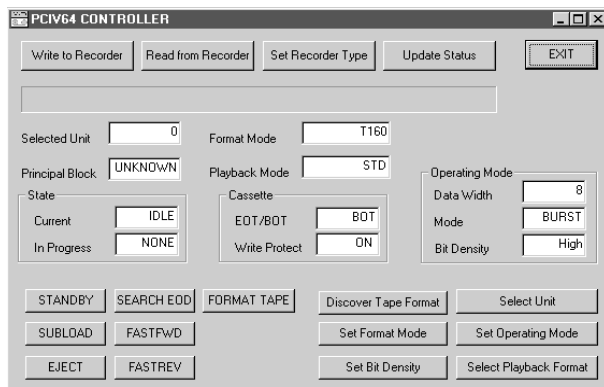


Figure 2-14 PCI-V64 Controller

The archiving of data to an externally-connected Model 64 tape drive cannot be accomplished by using standard NT copy or backup techniques such as those used to copy data to the other (internally-mounted) archival drive devices (CD-R/CD-RW, DVD-RAM, DLT, etc.).

The Model 64 is connected to the Disk Recorder through the PCI-V64 to Sypris Data Systems Digital Cassette Recorder Interface. The PCI-V64 software must be used to copy data files from the Disk Recorder to tape cassettes in an externally-connected Model 64 tape drive.

#### NOTE

Before attempting to copy data files from the Disk Recorder RAID to the Model 64, you should be familiar with the operation of the PCI-V64 and PCI-V64 software. 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. Run the PCI-V64 software by touching or clicking the Model 64 Control icon on the Windows desktop or by touching or clicking the V64CTL entry in the Programs\PCI-V64 folder.

#### NOTE

The first time the software is run after the Model 64 has been powered on, the following message will appear:

**ERROR from  
VLDS\_Status\_Read: SELECT-  
0 high indicates VLDS not  
selected.**

This message is normal. It reminds you that you have to select the recorder before you can command it. Select OK to continue.

The PCI-V64 software screen opens. A typical screen is shown in Figure 2-14. If the tape drive has been selected, most of the information fields on the display are filled. If the tape drive has not been selected, most fields will be blank.

3. If you have not selected the tape drive since it was powered on, select it now by selecting Select Unit. If the tape drive unit number is 0, select OK to continue. Otherwise, select Keypad and use the keypad to enter the drive number. See the Model 64 documentation for further information on determining the unit number of the Model 64.
4. Check that the Operating Mode Data Width is set to 8-bit and that the Operating Mode is set to BURST. If not, select Set Operating Mode. On the drop-down list, select 8-bit burst, then 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, select Set Bit Density. On the drop-down list, select the correct density, then 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:
  - a) .The tape drive state must be SUBLOAD to format a tape. Select Update Status to update the Current State of the tape drive. If the tape drive is not in SUBLOAD, select SUBLOAD.
  - b) Select Set Format Mode. On the drop-down list, select the proper format for your tape capacity (T120 No Dir Channels or T160 No Dir Channels).
  - c) Select Format Tape. Enter a volume label or accept the default of 0. Select OK to start the formatting. Wait 30 seconds for the formatting to finish. When formatting is complete, the tape drive Current State should be STANDBY.
8. Select Write To Recorder to begin the copy operation.
9. The Open window opens. Use this window to select the device, directory, and filename to copy. Use the down arrow in the Look In drop-down list to display the disks and directories. The RAID is normally designated as device E:. Select E: to display the files in the RAID data directory. Select the file that you wish to copy and select Open to complete the selection.
10. The Confirm Transfer window opens. Select OK to confirm the transfer.

The Model 64 will search to the end of the recording to determine the starting PBN of this recording. When the PCI-V64 Software displays the starting PBN, select 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 notifies 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 fit on the Model 64 media. Refer to the Splitty Readme file for instructions.



## CAUTION

To abort the write operation before the file transfer is complete, select Cancel. If the Cancel button is not operative and you have a mouse connected to the Disk Recorder, go to the Windows Task Manager and end the V64CTL process to abort the operation. Open the Task Manager by right-clicking a blank area in the Taskbar at the bottom of the screen.

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, select SUBLOAD. To eject the tape, select EJECT.

## 2.8 Network Operation

### 2.8.1 Network Setup

To establish network communications, the Disk Recorder must be properly configured.



## CAUTION

All required network support software is 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, which automatically assigns IP addresses.** You are **strongly** advised to suspend all network operations on the Disk Recorder during record and playback sessions.

1. On the desktop, right-click the Network Neighborhood icon.
2. On the Network Screen, select the Protocols tab.
3. On the Protocols Screen, select TCP/IP, then select Properties.
4. On the TCP/IP Properties Screen, enter the appropriate IP Address, Subnet Mask, and Default Gateway values for your network.
5. When the correct values are entered, select OK to re-display the Network Screen.
6. On the Network Screen, select Close.
7. At this point, you are instructed to reboot the system so the new network settings can be recognized. Select Yes to reboot.
8. After the system reboots, you may verify your network setup as follows:
  - a) Select the MSDOS icon to open a DOS window.

- b) Use the Ping command to ping a known network address (example: C:\ping 198.59.17.54). Replies similar to the one shown below indicate 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*

### **2.8.2 Transmitting Data Files Over the Network**

To transmit data files over the network, use standard TCP/IP protocols such as FTP. Typically, connectivity with the server is verified by using Ping, and data files are transmitted and received by using FTP (the file transfer protocol).

**Notes**

**Notes**

# Chapter 3

## Operating the Model 84 Disk Recorder Remotely

### 3.1 Remote Operation

The Model 84 can be operated remotely via its RS-232 Port. For example, a user could connect a laptop computer directly to the serial port of the Model 84 and communicate with the Model 84. Remote commands to the Model 84 are in the form of ASCII characters.

This interface supports remote control via an attached device, as well as via an interactive conversation directly using English-like commands. These commands are typed in with a terminal emulator on the computer (such as Hyperterm). The user can also develop a computer program which generates the Model 84 commands and parses the responses from the Model 84.

### 3.2 Remote Commands

The Model 84 accepts these commands:

PLAY	Start playback at a specified block or time or at the current location.
RECORD	Start recording.
STOP	Stop record or playback.
FORMAT	Erase all Model 84-generated data files on the RAID.
SET	Set one of the following parameters: PLAYFILE, BITRATE, CLOCK, TIMECHANNEL, AUXCHANNEL, RECMODE CHANNEL, RECMODE.
GET	Get one of the following parameters: PLAYFILE, BITRATE, CLOCK, TIMECHANNEL, AUXCHANNEL, RECMODE.
RSTAT	Get Recorder Status, including Recorder State, Current Block Number, Data Percent, and Time.

CSTAT	Get Channel Status for the serial channel, time channel, and auxiliary channel.
HELP	Provide information on Model 84 commands.

The user may enter the entire command word or an abbreviation that contains enough characters to distinguish the command from other commands. For example, the STOP command may be entered as STOP, STO, or ST. The STOP command cannot be entered as S, because it could be confused with the SET command. All commands to the Model 84 end with a carriage return/linefeed.

The Model 84 acknowledges all commands by echoing the command and appending the status of the command. The command status is enclosed in quotes. When a response contains data, the data is also enclosed in quotes. All responses from the Model 84 end with a carriage return/linefeed.

**NOTES**

**NOTES**

# Chapter 4

## Maintenance

### 4.1 General Information

This chapter contains information as follows:

- Routine Maintenance (right-hand column)
- Cleaning the Touchscreen (right hand column)
- Packaging the Disk Recorder for Shipment (4-2)
- Corrective Maintenance (4-2)
- Reinstalling and Upgrading Software (4-3)
- Installing Archival Drives in front-panel Drive Bays (4-3)

This subsection is intended for qualified persons such as service technicians and system administrators, who are experienced in installing software and servicing workstations.



#### WARNING

The Disk Recorder contains dangerous high voltages and no user-serviceable 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 subsection 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 the 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.
3. Make sure the fan exhaust port and air inlet holes in the rear panel are clean and unobstructed. If necessary, use a low-velocity vacuum cleaner to remove dust or debris from the fan exhaust port and air inlet holes.

#### 4.2.2 Cleaning the Touchscreen

When required, the touchscreen may be cleaned as follows:

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

### 4.3 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 they are not available, use the following procedure.

#### 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 the rear of the Disk Recorder.
2. Disconnect the cables that extend through the rear panel from connectors J1, J2, J7, and COM2. This prevents the connectors and system board from being damaged during shipment.
3. Make sure there is no diskette in the 3.5-inch floppy drive on the rear panel.
4. Remove all media from the front-panel archival drives.
5. Ensure that all internal assemblies are properly secured and all internal cables are connected (no loose assemblies).
6. Enclose the Disk Recorder in an ESD-protective plastic bag.
7. Place the Disk Recorder in a heavy-duty corrugated cardboard carton having slightly larger dimensions than 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 two inches of packing material on each side 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.

### 4.4 Corrective maintenance

This sub-section provides special instructions for qualified persons such as service technicians and system administrators who are familiar with installing software and servicing workstations. It includes information for upgrading software and replacing the system disk, and it provides general instructions for installing archival recording devices in the front-panel drive bays.

#### CAUTION

The following instructions are intended only for service technicians and system administrators who are familiar with installing software and servicing workstations.

## 4.4.1 Reinstalling and Upgrading Software

### 4.4.2 General

All Disk Recorders are shipped from the factory with a complete suite of application and device driver software installed to support all the installed devices. Backup media are provided for installed software.

Because the software suite provides basic workstation operations as well as 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 reinstalling certain software applications impractical because of the potential for system conflicts that 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.

### 4.4.3 Upgrading Software

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

An upgrade is typically installed by inserting the distribution diskettes into the diskette drive, then copying the \*.exe file to the control program directory on the system drive (C:) as detailed in the supplied instructions. The previous \*.exe file will be replaced with the upgraded \*.exe file provided on the distribution diskette.

## 4.5 Installing Archival Drives in Front-panel Drive Bays

### NOTE

Disk Recorders are delivered in various configurations that may contain archival recording devices. If a different or additional archival drive is to be installed, the drive and the Disk Recorder should be returned to Sypris Data Systems for reconfiguration. This is the only method that guarantees continued warranty support. Contact your Sypris Data Systems representative for information.



### CAUTION

Installing an archival drive in an existing Disk Recorder requires, as a minimum, disassembling various chassis parts, connecting cables, and installing software driver programs. Depending upon the type of drive, installation may also require removing plug-in circuit cards to gain access to cable connectors on the system board, and reselecting IRQ and address settings.

Because of the complexity of some of these tasks, there is potential for equipment damage or software operating system and application conflicts that may result in faulty operation of the archive drive or Disk

## NOTES

Recorder. Sypris Data Systems may not assume warranty responsibility for damage caused by users installing 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 fit into the three, 5.25-inch, half-height drive bays may be installed.

Factory-configured Disk Recorders are available with various archival drive devices installed. Other, third-party drives, 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**

Installing a drive in a front-panel drive bay involves disassembling the Disk Recorder chassis assembly and connecting data and power cabling. For third-party drives, it might also require installing driver software. If you are not familiar with these tasks, you should refer the drive installation to a qualified technician.

# APPENDIX A

## SPECIFICATIONS

<b>GENERAL</b>	
Monitor	VGA LCD with color-touch screen
Processor	Pentium class
User Interface	Graphical user interface uses front panel VGA LCD display with touch screen
Data Compatibility	IRIG 106, Chapter 10 (Pending)
Mounting	Standard 19-inch RETMA rack 24 to 30 inches deep with industry-standard slides
Remote Control	Supported through RS-232 Port
Software (Operating System)	Microsoft NT V4.0 SP6
Optional Accessories	Bit Sync, Expansion Bays
Archival drive configurations	Internal SCSI or IDE; External SCSI
<b>PERFORMANCE</b>	
Data Rate	
TTL	Up to 32 Mbits/sec
ECL	Up to 150 Mbits/sec
Data Capacity	Internal minimum 72 GBytes Maximum 560 GBytes External maximum TBytes
Time Code	IRIG A, B, G
Bit Error Rate	$10^{-14}$
File System	NTFS
Network Support	10 baseT/100 baseT; 1 Gbit optional
Data Archiving	Standard computer peripherals, including: DLT, CD, DVD, DDS, LTO and DTF
<b>SOFTWARE</b>	
	Windows NT <sup>™</sup> 4.0 Workstation File-management utilities Drivers for installed archival device
<b>ACCESSORIES</b>	
	Rack mount kit Keyboard and mouse Adapter cables for BNC connections Various jumper cables
<b>OPTIONS</b>	
Chassis Handles	Industry standard
Expansion Bay	Full- or half-height
Bit Sync	Model 9917 full-size PCI board with two independent inputs

Reverse playback software	Allows downloaded data to be recorded in reverse, and to be replayed as if data was recorded normally
<b>OPTIONAL ARCHIVAL DRIVE CONFIGURATIONS</b>	
Standard industry offerings	DLT, 4 or 8mm tape, CD-R, CD-R/W, DVD-R, DVD-R/W, DVD+RW, DVD-RAM. Other configurations are also available upon request. Note: Front-panel mounted devices connect to the workstation system board via onboard IDE, Ultra-wide SCSI, and/or Ultra2/LVD SCSI interface connections.
<b>PHYSICAL</b>	
Size	7H x 17W x 22.5L inches (17.78H x 43.18W x 57.15L cm)
Weight (w/o slides)	40 lbs. (18.14 kg) typical with 72 GByte Disk Array and DLT option. Weight depends upon installed options.
Mounting	Standard 19-inch (48.26 cm) RETMA rack mount in 24 to 30 inches (609.6 to 762 cm) deep rack with industry-standard slides
<b>POWER</b>	
Input Voltage	90 to 135 Vac 180 to 270 Vac 47 to 63 Hz
Frequency Current	1.8A (typical) at 115 Vac
<b>ENVIRONMENTAL</b>	
Operating Temperature	41 TO 104 <sup>0</sup> F (5 TO 40 <sup>0</sup> C)
Storage Temperature	-40 to 158 <sup>0</sup> F (40 to 70 <sup>0</sup> C)
Relative Humidity	5 to 80% (non-condensing)

# APPENDIX B

## RECORDED DATA FORMAT

The Model 84 records data in files on the RAID drive, designated as “E:” under Windows Explorer. There are two methods of recording data: Single-file Method and Multi-file Method.

In the Single-file Method, data is written to the RAID as one continuous file with the filename FILE-00-.DAT. Each time the record command is issued, the new data is appended to the existing file (at end of data). In the Multi-file Method, individual recording sessions are stored in the RAID as separate data files, which are automatically assigned sequential filenames of FILE-01-.DAT through FILE-99-.DAT. Each time a record command is issued, a new file is opened and data is written to the new file.

The Model 84 records data from three channels: a serial channel, a time code channel, and an auxiliary channel. The data from all three channels is recorded in the same file. Data is organized into packets. There are three types of packets: setup packets, data packets, and filler packets.

The Setup Packet contains the setup information for a particular recording. Every time the record command is issued, a setup packet is written as the first packet in the recording. The setup packet is always the first packet in any data file. In the Single-file Method, where multiple recordings are contained in the same file, a data file may contain multiple setup packets (one for each recording, spread throughout the file). In the Multi-file Method, where the file contains data from only one recording, a data file contains only one setup packet (the first packet in the file).

Data packets contain the recorded data from the serial, time code, and auxiliary channels. Each data packet contains data from one channel only.

The Filler Packet is the last packet written for each recording. It is written to end the recording (and begin the next recording in the Single-file Method) on a block boundary.

A packet has two parts: a packet header and a packet body. The packet header, which is 28 bytes in length, identifies the channel to which the data belongs. The packet body contains data from either the serial, time code, or auxiliary channel. The serial data consists of raw (not frame-synchronized or frame-aligned) serial bits packed into 32-bit words. The time code and auxiliary data consists of 8-bit samples packed into 32-bit words. The length of each packet varies, but the packets are always long-word aligned (the packet length is always a multiple of four bytes). The packet header includes information on the length of the packet. The format of the packet header is presented in Table 1. The contents of the packet header is presented are Table 2.

# Table 1

## Packet Header Format

Byte Offset Sync (LSB)	Content
1	Sync (MSB)
2	Channel ID (LSB)
3	Packet Length (LSB)
4	Packet Length (MSB)
5	Packet Length
6	Packet Length
7	Packet Length (MSB)
8	Data Length (LSB)
9	Data Length
10	Data Length
11	Data Length (MSB)
12	Header Version
13	Sequence Number
14	Reserved
15	Data Type
16	Reference Time (LSB)
17	Reference Time
18	Reference Time
19	Reference Time
20	Reference Time
21	Reference Time (MSB)
22	Header Checksum (LSB)
23	Header Checksum (MSB)
24	Reserved
25	Reserved
26	Reserved
27	Reserved

## Table 2

### PACKET HEADER CONTENTS

Content	Bytes	Description
Sync	2	Static sync pattern (0xEB25)
Channel ID	2	Unique Channel Identifier 0 = setup or fill; 1 = serial data 3 = time code 4 = auxiliary
Packet Length	4	Length in bytes of entire packet including header
Data Length	4	Number of data bytes in packet
Header Version	1	Integer version of the packet
Packet Sequence Number	1	A counter that increments from 0 to 255 for every packet
Reserved	1	Used for internal purposes only
Data Type	1	Indicates the type of data in packet 0 = Filler 1 = Setup 9 = PCM 33 = Analog
Reference Time	6	10 MHz counter value that corresponds to the first sample in the packet
Header Checksum	2	The 16-bit arithmetic sum of all the header bytes, excluding the HEADER CHECKSUM bytes.

## Notes