DATAPOINT

# Model 9330 Disk/Tape Subsystem

## Operating Guide/Product Specification

61888

March 1985

## WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Document No. 61888.


System features are subject to change without notice.

DATAPOINT

# Model 9330 Subsystem Addendum

Model 9334, 9335, and 9339 Disk/Tape Subsystems

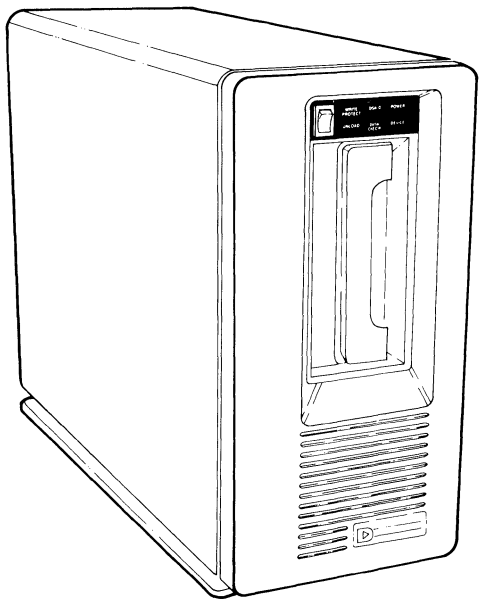
**CAUTION**

Since the DATAPOINT 9330 series tape drives are designed primarily for streaming operation, extended periods of start/stop operation over short sections of tape without tape retensioning may result in tape damage. Tape retensioning is accomplished by removing and reinserting the tape or by turning the power to the unit off and on.

Operating Guide/Product Specification

61888 April 1985

# Model 9330 Disk/Tape Subsystem



Operating Guide/Product Specification

61888 March 1985

# Preface

The DATAPOINT 9330 Series Disk/Tape Subsystems are compact data storage units for DATAPOINT 8600 Processors. The mid-capacity fixed-disk subsystem has streaming tape backup capability.

This manual describes subsystem operation and maintenance procedures and contains product specifications for installing and operating the subsystem.

The *9330 Technical Reference*, Document No. 61994, is available for those who require detailed information about subsystem design and operation. See DATAPOINT *Software & Documentation Price Schedule*, Document No. 60231.

# CONTENTS

# Chapter 1.
# 9330 SERIES DISK/TAPE SUBSYSTEM

## Overview

### Introduction

The DATAPOINT Model 9330 Series Disk/Tape Subsystems are compact information storage units for DATAPOINT processors. The mid-capacity disk subsystem has streaming tape backup capability. This chapter includes:

- a Part/Function table,
- a subsystem diagram, and
- cable and connector descriptions.

### Description

The 9330 Disk/Tape Subsystem is contained in a slim vertical cabinet that allows the most efficient use of available space.

The subsystem uses Winchester disk and streaming cartridge tape technology for reliable performance and quick backup.

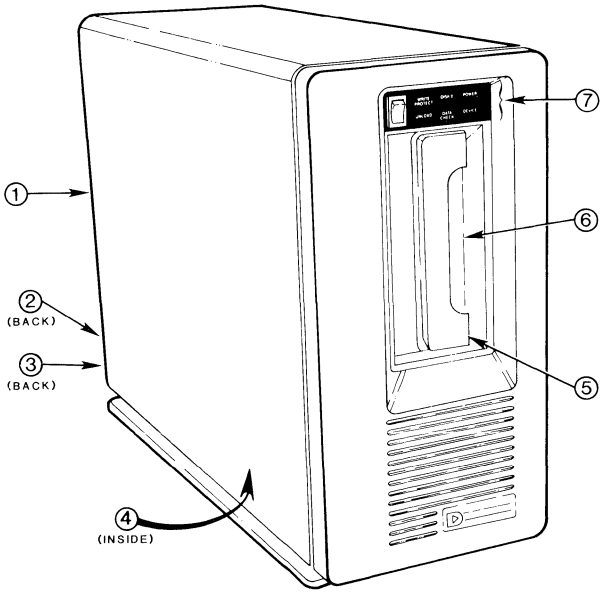
## Part/Function table

The disk/tape subsystem's major parts and their functions are listed below.

| KEY | PART | FUNCTION |
|---|---|---|
| 1 | Enclosure | contains subsystem electronics |
| 2 | Power cord | connects the device to the AC power source |
| 3 | Power switch | turns device power on or off |
| 4 | Disk drive | 28 or 65 MB disk drive assembly |
| 5 | Tape drive | 65 MB tape drive assembly |
| 6 | Ejection lever | partially ejects the tape cartridge for easy removal |
| 7 | Control panel | contains the write protect switch, disk light, and status lights |

## Disk/Tape subsystem diagram

This is a diagram of the disk/tape subsystem.



# Cables and Connectors

## Introduction

The subsystem has two external cables:

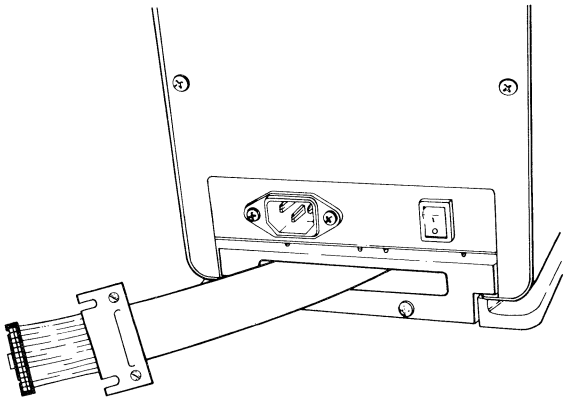
- a Micro Bus interface cable to your processor or other micro bus peripheral, and
- an AC power cord.

## Interface cable

The interface cable connects the subsystem to your processor. It must be installed by a DATAPOINT Customer Service Engineer.

After installation, you can disconnect the subsystem at the processor only.

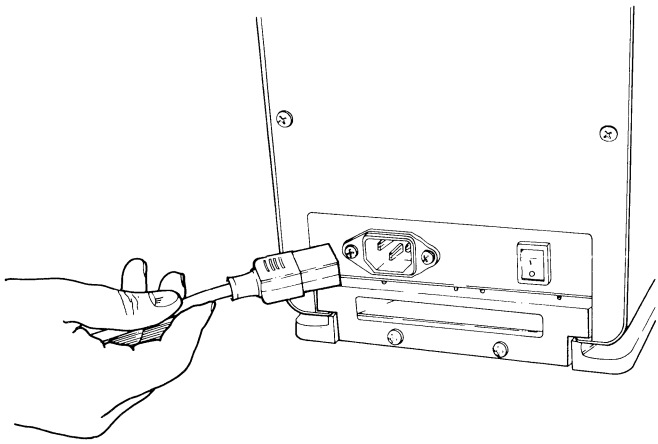
## Interface cable diagram



## AC power cord

The power cord for the subsystem is detachable. It is connected to the socket located on the back of the cabinet at the lower left.

## Power cord connector diagram



# Chapter 2.
# OPERATION

## Overview

### Introduction

This chapter describes subsystem controls and status lights and contains information on:

- getting started,
- powering on the unit and booting the disk or tape,
- write protecting the disk,
- inserting, removing, and write protecting a tape cartridge, and
- interpreting and responding to control panel lights.

## Introduction

Your disk/tape subsystem requires little physical preparation for operation. The necessary preparation includes the following:

- Your DATAPOINT Customer Service Engineer installs the Micro Bus interface cable that connects the subsystem to the processor and connects the power cord to the subsystem and the appropriate power source.
- If your subsystem is disk/tape or tape-only, it is shipped with a mock cartridge in the tape drive. This cartridge must be removed before you use your subsystem.

## Mock cartridge

The 9330 disk/tape subsystem is shipped with a mock cartridge installed to prevent shipping damage to the tape drive. Remove the mock cartridge using the cartridge ejection lever and discard it immediately.

Note:

Reinserting the mock cartridge can damage the tape drive. This should only be done by trained personnel.

# Power Switch

## Introduction

The power switch is located on the rear of the disk/tape subsystem on the right side.

## Operation

The power switch is a rocker switch mounted vertically. Press the top of the switch to turn on the subsystem and press the bottom of the switch to turn off the subsystem.

Note:

Your subsystem cannot be powered up unless it is connected to a processor that is powered.

## What to expect

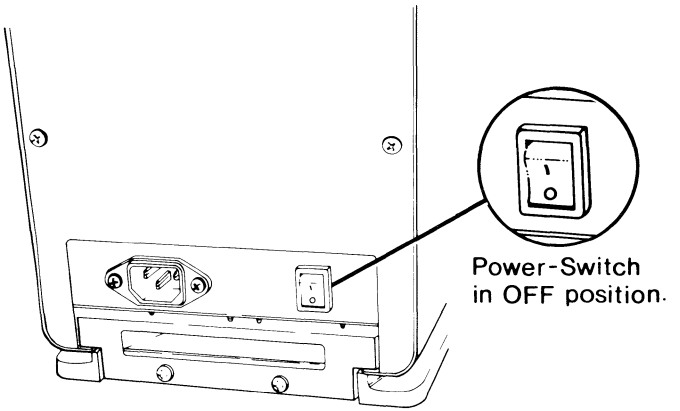
When you turn on a subsystem that is properly connected to a powered processor, the power-on-reset (POR) diagnostics begin. During this process, the POWER light flashes. When the diagnostics are successful, the POWER light remains on. If the POR diagnostics fail, the POWER light continues to flash.

Note:

If a tape cartridge is present at power on, a retensioning process is started. See *Power On and Boot* in this chapter.

## Power switch diagram

The following diagram shows the subsystem power switch in the off position.



At power on

If a tape cartridge is present when you power on the subsystem, the tape is started and a 4-minute retensioning process begins that prepares the tape cartridge for operation. You must wait until retensioning is complete before accessing the tape.

Note:

On a disk/tape subsystem, you can access the disk during the retensioning period.

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Disk/Tape subsystem boot

When you boot your disk/tape subsystem, the operating system looks first for a tape cartridge. When a tape cartridge is present, the tape is booted. When no tape cartridge is present, the disk is booted.

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Tape-only subsystem boot

When you boot your tape-only subsystem, the process is the same as for a disk/tape subsystem. When a tape cartridge is present, the tape is booted.

---

Comment

Boot procedures can vary with the processor or software. See the proper operating guide for specific instructions.

# Disk Drive Operation

## Introduction

The only disk drive control on the 9330 subsystem is the write protect switch located on the control panel. This switch prevents writing to the disk and, therefore, protects information integrity.

## How to write protect your disk

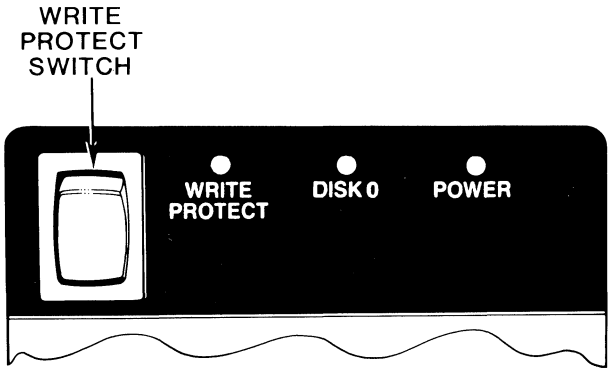
To write protect your disk, move the write protect switch to the on position by pressing the top of the switch. The WRITE PROTECT status light is on when your disk is protected.

## Caution

Each subsystem unit is protected individually. Write protecting your disk/tape subsystem does not protect a disk expansion unit. Be sure to properly protect the desired unit.

Write protect switch diagram

The following diagram illustrates the write protect switch in the off position.



# Tape Drive Operation

## Introduction

The 9330 disk/tape and tape-only subsystems have two tape drive-related controls you will use. They are:

- the cartridge ejection lever and
- the cartridge write protect button.

## The cartridge ejection lever

The cartridge ejection lever is located beside the cartridge insertion slot. It closes the cartridge slot when a tape is inserted and helps when removing a tape.

## How to insert a tape cartridge

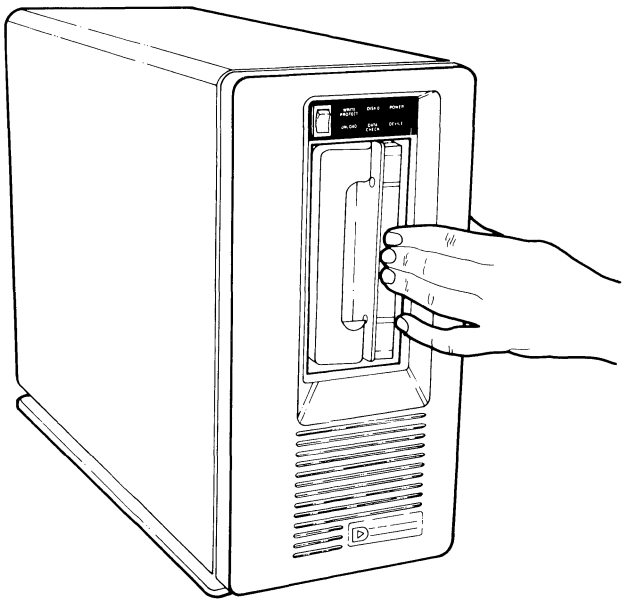
The tape cartridge and drive slot design allows you to insert a cartridge only one way. To insert a tape cartridge (DATAPOINT part number 80925), align the cartridge with the slot as shown in the diagram. Push the cartridge firmly into the slot until the ejection lever snaps closed.

Caution:

The ejection lever operates with some force. For the most satisfactory operation, keep your thumb or finger to the right side of the cartridge.

## Cartridge insertion diagram

The following diagram shows how to insert a tape cartridge.



## How to remove a tape cartridge

To remove a cartridge, press the cartridge ejection lever away from the slot. The cartridge is partially ejected for easy removal.

The lever stays in the open position until a new cartridge is inserted.

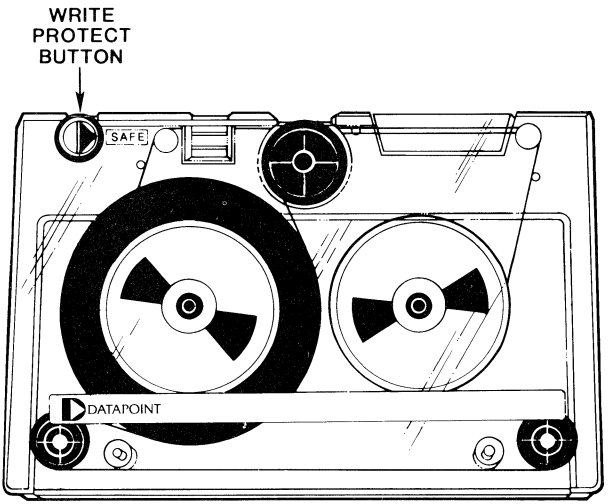
## How to write protect a tape cartridge

The write protect button on the tape cartridge prevents information overwriting. The button is located on the plastic side of the cartridge.

Use a screwdriver or a coin to turn the button until the arrow points to the SAFE label.

## Tape cartridge write protect button diagram

The following diagram shows the write protect button in the safe position.



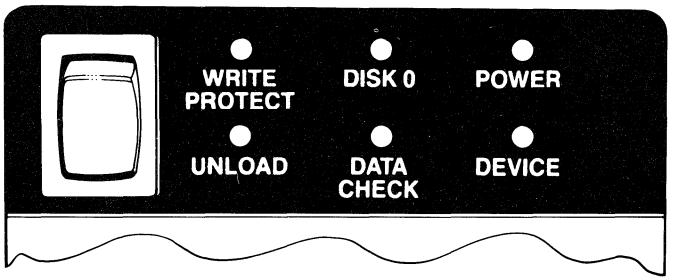
# Control Panel Status Lights

## Introduction

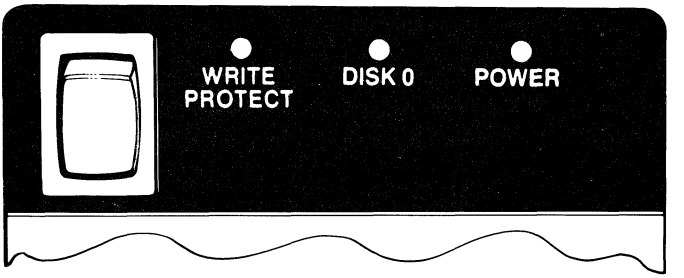
The control panel status lights indicate subsystem operation and condition. Each of the subsystems uses a different combination of status lights. The following table lists the lights and shows which subsystem uses each light.

| STATUS LIGHT | DISK/TAPE | DISK EXPANSION | TAPE ONLY |
|---|---|---|---|
| WRITE PROTECT | • | • | |
| DISK 0 | • | | |
| DISK 1 | | • | |
| POWER | • | • | • |
| UNLOAD | • | | • |
| DATA CHECK | • | | • |
| DEVICE | • | | • |

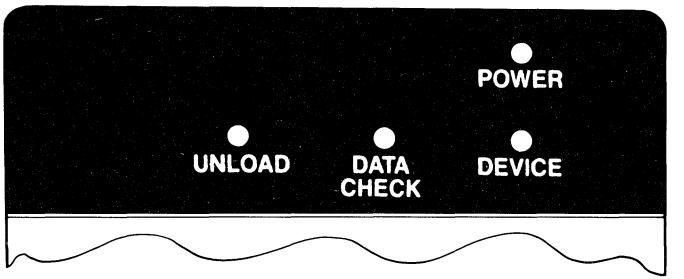
Disk/Tape control panel




Disk expansion control panel




Tape-only control panel



## How to use the status lights

The following table tells you when each status light is on, what it means, and what action (if any) you should take.

| IF THIS LIGHT IS ON... | THEN... |
|---|---|
| POWER | the subsystem has operating power.<br><br>Note:<br><br>The POWER light flashes two times each second if the power-on diagnostics failed. |
| DISK 0<br>or<br>DISK 1 | the disk is selected and is responding to commands. |
| UNLOAD | the tape drive is not operating and you can remove or insert a tape cartridge. Do not remove or insert a tape cartridge with this light off. |
| DATA CHECK | • excessive read or write errors have occurred or<br>• the tape heads need cleaning. See *Tape head cleaning*. |
| DEVICE | a fault has been detected in the tape drive. Call DATAPOINT Customer Service. |

# Chapter 3.
# MAINTENANCE

## Overview

### Introduction

The 9330 Disk/Tape subsystem requires minimum on-site maintenance. Reasonable care in using tape cartridges, regular tape head cleaning, and occasional cabinet cleaning helps maintain efficient operation. This chapter discusses:

- tape cartridge care,
- the DATA CHECK light and tape head cleaning,
- disk and tape drive maintenance,
- subsystem care, and
- operating precautions.

# Tape Cartridge Care

## Introduction

A tape cartridge is a magnetic storage device and care is necessary to ensure reliability. Stored information can be lost through mishandling and exposure to harmful environments.

## Tape cartridge care

To protect the reliability of your tape cartridges, observe the following precautions.

A tape cartridge should be:

- kept in its protective case when not in use and
- stored at normal room temperature.

A tape cartridge should not be:

- dropped or otherwise physically abused,
- subjected to liquid spills or excessive dust, or
- exposed to heat or magnetic devices.

## Comment

A cartridge that is cooler or warmer than normal should be brought to room temperature before use.

# DATA CHECK Light and Tape Head Cleaning

## Introduction

The DATA CHECK status light indicates a problem with the tape cartridge or the tape heads. A regular schedule for tape head cleaning should be established; with normal use, cleaning should be performed once a week. The following paragraphs tell you what to do if the DATA CHECK light illuminates.

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## What to do when the DATA CHECK light is illuminated

The DATA CHECK light may illuminate because of excessive read or write errors due to a defective cartridge or because of a dirty tape head. This light always indicates a possible tape problem and should not be ignored. To determine the cause of the problem, you should:

- backup the cartridge that caused the signal as soon as possible, then
- remove the cartridge, observing the UNLOAD status light, and
- insert a second tape cartridge you know is good, observing the UNLOAD status light. Mark the new cartridge so it can be identified as your test cartridge.

If the DATA CHECK light is on with the new cartridge, remove the second cartridge, observing the UNLOAD light, and clean the tape head.

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## How to clean the tape heads

Clean the tape heads using the tape head cleaning kit (DATAPOINT part number 81021) listed in the DATAPOINT *Direct Supplies & Accessories Catalog*, Document No. 80000. The procedure is:

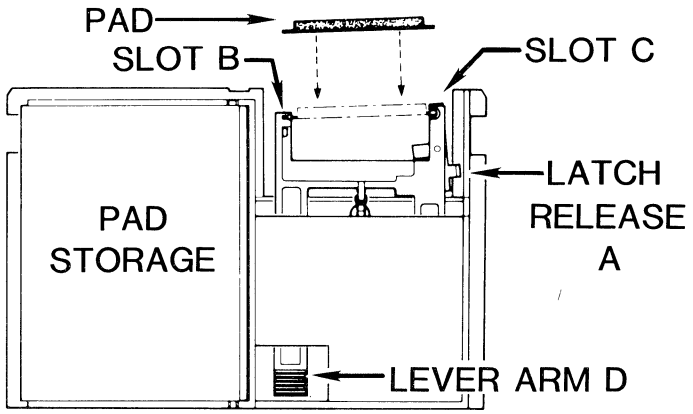
| STEP | ACTION |
|---|---|
| 1 | Insert a cleaning pad in Slots *C* and *D* following the directions packed with your cleaning cartridge. |
| 2 | Place a few drops of cleaning solution on the pad. |
| 3 | Insert the cleaning cartridge into the drive. |
| 4 | With the cleaning cartridge in place, tap Lever *D* 10 to 20 times. |
| 5 | Remove the cleaning cartridge. |

Reinsert the test cartridge. The DATA CHECK light should remain off. If it doesn't, the tape drive is not working properly, and you should call DATAPOINT Customer Service.

Note:

Replace the cleaning pad after five uses. Additional pads and cleaning fluid (DATAPOINT part number 81023) are available through the DATAPOINT *Direct Supplies & Accessories Catalog*, Document No. 80000.

Tape head cleaning cartridge




How to check for a defective cartridge

When you have determined that the tape heads are clean, check the original cartridge by reinserting and retrying the original cartridge, observing the UNLOAD status light.

If the DATA CHECK light does not remain off when the original cartridge is reinserted after cleaning, the cartridge is defective and must be replaced.

Disk and tape drive maintenance

The fixed-disk and tape drives in your subsystem require no on-site maintenance. If tape or disk drive performance is impaired, call DATAPOINT Customer Service.

# Subsystem Maintenance

## Introduction

A schedule of preventive maintenance that includes cleaning the cabinet contributes to subsystem reliability.

## Preventive maintenance

Protecting your subsystem is the first step in protecting the information on your disk or tape. You should:

- install the subsystem in a clean area free from large temperature variations,
- never put liquids on or near the cabinet, and
- clean the tape drive heads at least once a week.

## Cleaning the subsystem

Regular cleaning helps prolong the useful life of your subsystem. Clean the unit in the following way:

- Regularly remove any dust with a soft cloth.
- For more extensive cleaning, turn off the subsystem, remove the tape cartridge, and clean the cabinet using a mild detergent and a slightly damp cloth.
- Keep cleaning solution away from the tape cartridge slot.
- **DO NOT** attempt to clean inside the tape cartridge slot--damage to the tape drive can occur.

# Operating Precautions

## Introduction

The DATAPOINT 9330 Series Subsystem is designed to minimize maintenance and repair time. This section includes:

- guidelines for efficient subsystem operation and
- a checklist for subsystem failure.

## AC power

Power variations can impair subsystem performance. Ensure that your line power supply is adequate and stable. Contact DATAPOINT Customer Service for any necessary assistance.

## Environment

Protect your subsystem from dust, wide variations in temperature, and excessive moisture for the best operation. Contact DATAPOINT Customer Service for any necessary assistance.

## Backups

Because the information on your disk is important, be especially careful with your tape backups. Establish routines that ensure compliance with the recommended care and maintenance procedures.

## Subsystem failure

As with any machine, your disk/tape subsystem can fail to operate. Should failure occur, follow these steps:

| IF YOUR SUBSYSTEM ISN'T WORKING... | | |
|---|---|---|
| **CHECK...** | **FOR...** | **THEN...** |
| the power cord | poor seating at wall and subsystem, | correct loose connections. |
| the power switch | correct position, | turn on switch. |
| the processor | proper power on and operation, | power on the processor or follow your system procedures for recovery. |
| the AC power source | inactive socket or power failure, | use another wall socket or follow local procedures to restore power. |
| the interface cable | poor seating at your processor, | correct connection with proper orientation. |
| **IF YOUR SUBSYSTEM STILL DOESN'T WORK, THEN...** | | **AND...** |
| remove the tape cartridge, turn off and unplug the subsystem, | | call DATAPOINT Customer Service. |

# Chapter 4.
# PRODUCT SPECIFICATION

## Overview

### Introduction

The DATAPOINT 9330 Series Subsystem has three main technical components:

- a fixed disk drive,
- a cartridge tape drive, and
- a controller.

This chapter contains specifications for the subsystem's components and operating conditions.

### Contents

This chapter includes:

- configuration descriptions and diagrams,
- disk drive specifications,
- tape drive specifications,
- controller specifications,
- physical, power, cable, and
- environmental requirements.

## Configurations

Five versions of the 9330 Series Disk/Tape Subsystem are available. Each configuration is described in the following table.

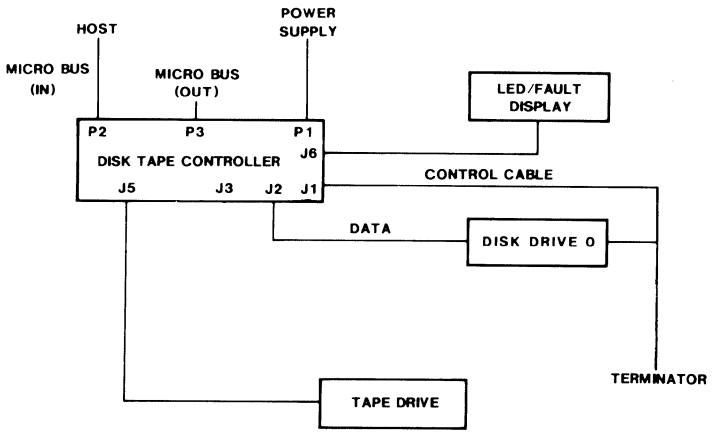
| MODEL CODE | DESCRIPTION |
|---|---|
| 9334 | a disk/tape subsystem with a 65 MB streaming tape drive and a 28 MB disk drive |
| 9335 | a disk expansion unit with a 28 MB disk drive |
| 9336 | a disk/tape subsystem with a 65 MB streaming tape drive and a 65 MB disk drive |
| 9337 | a disk expansion unit with a 65 MB disk drive |
| 9339 | a tape-only configuration with a 65 MB streaming tape drive |

## Comment

All capacities given are formatted disk or tape. The tape capacity is based on 8 K byte blocks.

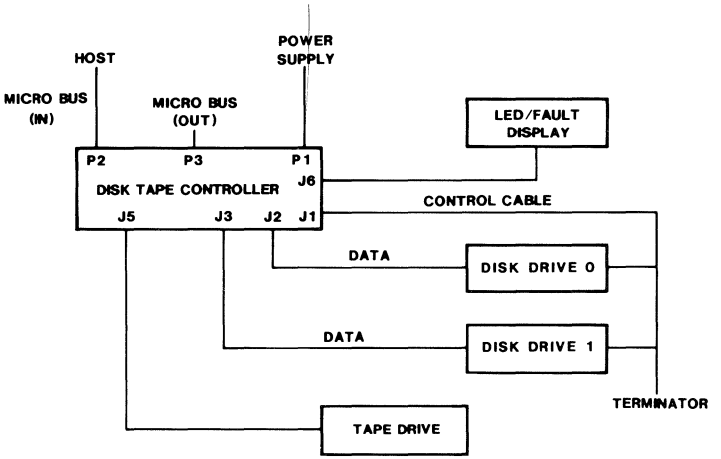
## Disk/Tape subsystem block diagram

The following diagram illustrates the basic components of the disk/tape subsystem.



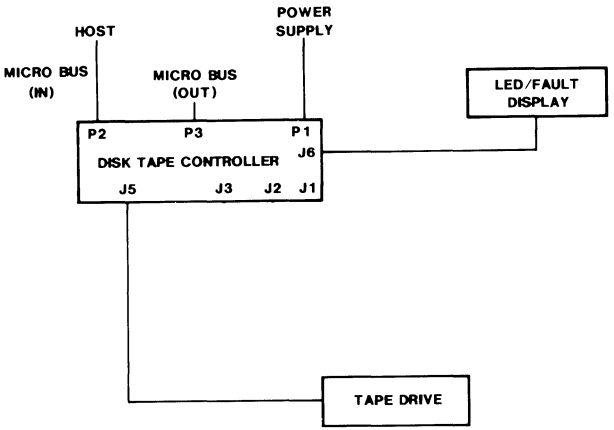
## Disk expansion subsystem block diagram

The following diagram illustrates the basic components of the disk expansion subsystem.



## Tape-only subsystem block diagram

The following diagram illustrates the basic components of the tape-only subsystem.



# Disk Drive Specifications

## Fixed disk description

General performance specifications of the fixed disk include:

| DESCRIPTION | SPECIFICATION | |
|---|---|---|
| | MODEL 9334/35 28 MB DISK | MODEL 9336/37 65 MB DISK |
| Disk drive | 28 MB Winchester technology | 65 MB Winchester technology |
| Disk surfaces | 5 | 9 |
| Tracks per surface | 697 | 924 |
| Sectors per track | 32 | 32 |
| Bytes per sector | 256 | 256 |
| Bytes per track | 8192 | 8192 |
| Bytes per drive | 28.5 MB (user capacity) | 68.1 MB (user capacity) |

## Fixed disk timing

| DESCRIPTION | SPECIFICATION | |
|---|---|---|
| | MODEL 9334/35 28 MB DISK | MODEL 9336/37 65 MB DISK |
| Bit transfer rate | 5 MB | 5 MB |
| Rotation speed | 3600 RPM | 3600 RPM |
| Rotation delay | 8.33 ms | 8.33 ms |
| Head positioning | average 45 ms | average 35 ms |
| Track to Track positioning time | 9 ms | 8 ms |
| Start time | 30 sec maximum | 30 sec |

# Tape Drive Specifications

## Tape drive timing

Tape drive timing specifications are:

| DESCRIPTION | SPECIFICATION | | |
|---|---|---|---|
| | MINIMUM | NOMINAL | MAXIMUM |
| Tape velocity | 50 ips | 55 ips | 60 ips |
| Effective recording density | - | 8000 bps | - |
| Initialization time (600-ft cartridge) | 130 s | - | 340 s |
| Access time (from rest) | - | 61 ms | - |
| Start/Stop distance | 1.20 in. | 1.40 in. | 1.90 in. |
| Interblock gap size | 0,56 in. | 0.60 in. | 0.76 in. |
| Repositioning time | 325 ms | 350 ms | 395 ms |
| Positioning time | 270 ms | 290 ms | 325 ms |
| Command reinstruct time | - | - | 5.4 ms |
| Head positioning time (track to adjacent track) | 670 ms | 740 ms | 810 ms |

## Tape cartridge description

General performance characteristics of the tape cartridge (DATAPOINT part number 80925) include:

<table>
<tr><th>DESCRIPTION</th><th>SPECIFICATION</th></tr>
<tr><td>Tape cartridge</td><td>removable, 1/4 in.</td></tr>
<tr><td>Block size</td><td>256 bytes to 8 K bytes</td></tr>
<tr><td>Formatted capacity</td><td>Capacity is a function of block size. The following table gives examples.
<table>
<tr><td>BLOCK SIZE</td><td>1K</td><td>2K</td><td>4K</td><td>8K</td></tr>
<tr><td>CAPACITY (MB)</td><td>47</td><td>57</td><td>64</td><td>68</td></tr>
</table></td></tr>
<tr><td>Average data transfer rate</td><td>Transfer rate is a function of block size. The following table gives examples.
<table>
<tr><td>BLOCK SIZE</td><td>1K</td><td>2K</td><td>4K</td><td>8K</td></tr>
<tr><td>TRANSFER RATE (K bits/sec)</td><td>264</td><td>321</td><td>360</td><td>383</td></tr>
</table></td></tr>
<tr><td>Read time</td><td>24 minutes maximum</td></tr>
</table>

Comment

The streaming tape drive operates at an instantaneous data transfer rate of 440 K bits/second. The host I/O subsystem must maintain an average data transfer rate to sustain streaming operation.

# Controller Specifications

## Controller specifications

The 9330 subsystem microprocessor-based controller is the interface between the host processor and the subsystem's components. The specifications are:

| PART | SPECIFICATION |
|---|---|
| Interface | DATAPOINT Micro Bus with:<br>• 8-bit command/address bus,<br>• 8-bit data bus,<br>• polled or interrupt mode. |
| Disk interface | ST506 |
| Tape interface | proprietary |

## Controller features

| FEATURE | DESCRIPTION |
|---|---|
| Data buffers | two 8 K buffers for disk/tape operations |
| ECC | hardware 32-bit polynomial, 11-bit burst error correction |
| Diagnostics | internal with on-board power/fault indication |
| Variable interleave | 3 to 1 minimum achievable |
| Overlapped seek | allows both drives to be positioned simultaneously |
| Head and cylinder switching | automatic during a multisector transfer if the end of track 0 is reached. The controller issues a seek and resumes transfer. |
| Retry and error correction option | user selectable and programmable from the host |
| Disk/Tape copy | host independent, tape maintains streaming at any interleave factor |
| Write protect | control panel switch |
| Defective/Alternate track processing | automatic, transparent to the host |

## Equipment dimensions

| DIMENSION | SPECIFICATION |
|---|---|
| Height | 14.46 inches (36.73 cm) |
| Width | 7.00 inches (17.78 cm) |
| Depth | 19.12 inches (48.56 cm) |
| Weight | 50 pound (22.68 kg) maximum |

## Power requirements

| REQUIREMENT | SPECIFICATION |
|---|---|
| AC line cord | 6-foot with 3-prong plug |
| AC input voltage | • 120 VAC, +10/-15% standard<br>• Field configurable for operation at 100, 110, 220, 230, or 240 VAC +10/-15% |
| Frequency | 50 to 60 Hz ±2% |
| Power consumption | 220 watts maximum (active) |

## Cable Specifications

The following table lists the specifications for the interconnecting cables in the 9330 subsystem.

| CONNECTOR | CABLE | DATAPOINT PART NUMBER |
|---|---|---|
| J1 | disk drive control | 10-3372-6002 3M |
| J5 | tape drive control | 10-3431-6002 3M |
| J3 | data signals | 10-3428-6002 3M |
| J6 | status lights | 10-3428-6002 3M |
| P1 | power supply | 10-350431-1 AMP |
| P2, P3 | host interface | 10-65823-073 BERG |

# Environmental Requirements

## Temperature and humidity specifications

| REQUIREMENT | SPECIFICATION |
|---|---|
| Operating temperature | 60° to 90° Fahrenheit<br>16° to 32° Celsius |
| Storage temperature | 14° to 122° Fahrenheit<br>-10° to 50° Celsius |
| Relative humidity | 20 to 80% noncondensing |

## Environmental conformance

| DESCRIPTION | REGULATION |
|---|---|
| Acoustic level | DATAPOINT PNC 45 |
| Radiated and conducted emissions | FCC part 15, subpart J, with proper installation, Class A, VDE pending |
| Regulatory compliance | UL 478, CSA C 22.2 No. 154-1975 |

# INDEX