DataGeneral

Customer Documentation

Installing and Operating Your Model 6590 Series Cartridge Tape Drive

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Notice

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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 or her own expense will be required to take whatever measures may be required to correct the interference.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

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Preface

This manual describes how to install, operate, and maintain your Model 6590 Series Cartridge Tape Drive (CTD), a high-performance, high-capacity 8-mm device designed to store over 2,000 Mbytes of formatted data. The CTD is designed for operation in a number of different Data General systems including ECLIPSE® MV/Family computer storage subsystems, and AViiON™ systems.

You can install the CTD in a number of different Data General systems; some systems, however, require that the CTD be installed by a Data General Field Engineer. Be sure to check your CPU or subsystem owner's manual for this information before proceeding.

How This Manual is Organized

We have organized this manual as follows:

Chapter 1	Provides an overview of the CTD.
Chapter 2	Explains how to install the CTD in your CPU or subsystem.
Chapter 3	Provides instructions for operating and maintaining the CTD.
Appendix A	Describes the operation of the CTD in AOS/VS and AOS/VS II operating systems.
Appendix B	Lists performance, power, safety, and environmental specifications.

Contacting Data General

- If you have comments on this manual, please use the prepaid Comment Form that appears at the back. We want to know what you like and dislike about this manual.
- If you need additional manuals, please use the enclosed TIPS order form (USA only) or contact your Data General sales representative.

Telephone Assistance

If you are unable to solve a problem using any manual you received with your system, and you are within the United States or Canada, contact the Data General Service Center by calling 1-800-DG-HELPS for toll-free telephone support. The center will put you in touch with a member of Data General's telephone assistance staff who can answer your questions.

Free telephone assistance is available with your warranty and with most Data General service options. Lines are open from 8:30 a.m. to 8:30 p.m., Eastern Standard Time, Monday through Friday.

For telephone assistance outside the United States or Canada, ask your Data General sales representative for the appropriate phone number.

End of Preface

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Chapter 1
Your Model 6590 Series Cartridge Tape Drive

Your Data General Model 6590 Series Cartridge Tape Drive (CTD) is a high-performance, high-capacity, 5-1/4 inch cartridge tape drive. It is designed for use with Data General systems to provide off-line storage of data. The CTD has a number of special features:

- Advanced helical scan recording technology which writes very narrow tracks at an acute angle to the edge of the tape in a diagonal pattern. This creates a track length which is actually longer than the width of the tape itself, resulting in a high number of tracks per inch (TPI).
- Industry standard, removable, rewritable 8-mm tape cartridges which require no preformatting or other media conditioning prior to use. This cartridge tape can store up to 2,000 Mbytes of formatted data depending on tape length.
- An integrated SCSI controller with sustained bus data transfer rates of up to 246 Kbytes/sec (1.2 Mbytes/sec burst rate) with a parity protected data stream
- Full disconnect, arbitration, reconnect support
- Onboard error correction code (ECC) capable of correcting a burst as long as 264 bytes in error and as many as 80 additional random errors in each data block
- Read-after-write error checking and automatic re-write without host intervention or tape repositioning
- Integrated 256 Kbyte speed-matching data buffer
- Effective head-to-tape speed of 150 inches/sec

CAUTION: Data General offers the Model 6590 Series CTD solely to back up data stored on disk products. The CTD supports only the DumpLoad II, DumpLoad 3, and PCOPY backup utilities for AOS/VS systems. Data General does not offer software distribution on the 8-mm media for the Model 6590 Series CTD.

This CTD is designed for backup applications and should not be exercised with the AOS/VS CONTEST or Advanced Diagnostic EXecutive System Exerciser diagnostic programs.

NOTE: The CTD requires preventive maintenance in the form of regular cleaning of the tape heads after every 30 hours of CTD operation. Do not use cleaning kits other than the one designed for the CTD and provided by Data General. Cleaning procedures for the CTD are provided in Chapter 3.

For pricing and product information, call your Data General sales representative or systems supplier. You can also order directly from the *DG/DIRECT Computer Users' Catalog*. Outside of the United States, call your Data General Sales Office. Model numbers and a short description of the CTD supplies are listed below.

Model No.	Description
10548	1-Gigabyte Tape Cartridge (box of 1)
10549	2-Gigabyte Tape Cartridge (box of 1)
10584	CTD Cleaning Kit This kit removes both tape particles and contaminants from the tape heads. The kit is good for 12 cleanings. This is the ONLY cleaning kit designed for use with this Cartridge Tape Drive.
10607	Starter Kit This kit includes five Model No. 10549 cartridge tapes and one Model No. 10584 cleaning kit.

End of Chapter

Chapter 2
Installing the CTD

NOTE: You can install the CTD in a number of different Data General systems; some systems, however, require that the CTD be installed by a Data General Field Engineer. Be sure to check your CPU or subsystem handbook for this information before proceeding.

This chapter provides instructions for installing the CTD in your CPU or storage subsystem. The CTD is installed in the same manner as any full-height drive with a few exceptions. This chapter includes instructions for unpacking and inspecting the CTD, setting the DIP switches, attaching the mounting bracket, and connecting the SCSI bus and power cables.

Preparing to Install the CTD

This section provides instructions for preparing the CTD for installation in your CPU. It includes unpacking and inspecting the drive, setting the drive's DIP switches, and selecting an expansion slot in the CPU to house the CTD.

Be sure to read this entire chapter carefully before starting the procedure. Clear a flat, stable work area and have a #2 phillips screwdriver, a flat-tip screwdriver, and a copy of your CPU owner's manual at hand.

Unpacking and Inspecting the Drive

CAUTION: Your CTD is sensitive to shock and should be handled with care. Jolting or dropping may damage the unit. When installing the unit, try to use even motions; slide the drive into the slot slowly. When attaching the brackets, use a screwdriver, not a ratchet tool. Do not open the cover of the drive. The drive contains no serviceable parts.

Some components of the drive may be damaged by static electricity. For this reason the drive is packaged in an anti-static bag. Before you unpack the drive, we recommend you set up an Electrostatic Discharge (ESD) kit and establish a static-safe work environment. Because nonconducting objects cannot be grounded, make sure that the work area is free of all nonconductors such as styrofoam cups, packaging material, wrappers, and vinyl materials such as covered notebooks.

Set up your ESD kit; then carefully unpack and inspect your CTD for any damage. If any component appears damaged, call your Data General Service Center or your Data General distributor. Check the model number and serial numbers on the CTD against those listed

on the packing slip. Call your Data General Service Center or your Data General Distributor if there is any discrepancy. Save the plastic shipping bag, packing materials, and packing lists to use if you have to return the CTD.

Setting the DIP Switches

NOTE: This CTD uses DIP switches instead of jumpers to configure the SCSI ID number. Some CPUs require you to configure these switches in a very specific way. Refer to the CPU owner's manual for specific configuration rules.

Prior to installing the CTD you will need to check the default configuration of the CTD's DIP switches against the configuration specified for your CPU. These switches are located on the back of the drive as shown in Figure 2-1.

You may need to reset switches 1, 2, and 3 to configure the SCSI ID number. Your CPU may require that a certain type of drive have a specific number. If your CPU does not list any SCSI ID number assignment rules, you can assign any number to the drive, provided no other device (or the CPU itself) uses the same number.

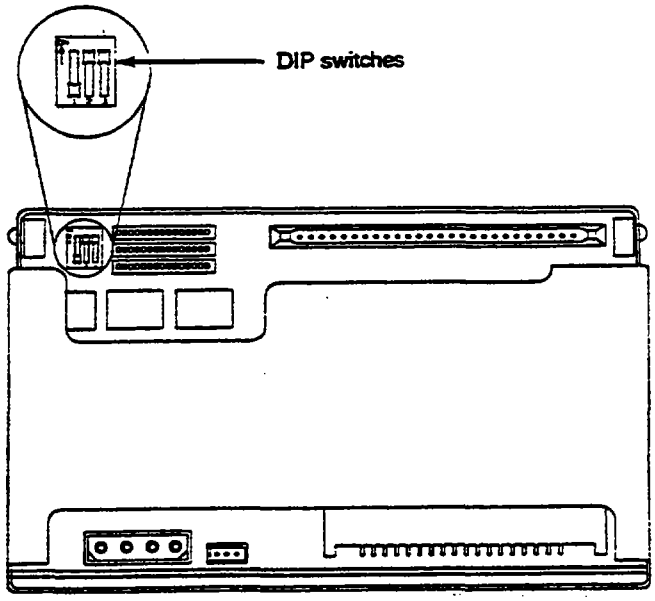

Figure 2-1 DIP Switch Locations

The CTD is shipped with switch 1 set to OFF and switches 2 and 3 set to ON. To change the number use the tip of a pen or similar object to move one or all of these three switches. Table 2-1 shows how to configure the switches to set the SCSI ID numbers.

NOTE: If you change a switch setting when the drive is turned on, turn the power off once, then on again.

Table 2-1 Setting the SCSI ID Numbers

Unit Number	Switch 1	2	3
0	OFF	OFF	OFF
1	ON	OFF	OFF
2	OFF	ON	OFF
3	ON	ON	OFF
4	OFF	OFF	ON
5	ON	OFF	ON
6	OFF	ON	ON

Selecting an Expansion Slot

Before you attempt to install the CTD you need to determine which of the CPU or subsystem drive slots to use. The CTD is a full-height drive and can generally be installed in any slot designed for a full-height drive. Your CPU owner's manual will provide you with guidelines for choosing an expansion slot.

Selecting an Expansion Slot in a Model 10565 Mass Storage Subsystem

If you are planning to install a CTD in a Model 10565 Mass Storage Subsystem, we recommend that you use the subsystem's two lower expansion slots rather than the upper expansion slots.

Installing the CTD in the CPU

Install the CTD in your CPU or subsystem using the general installation instructions in the system owner's manual. These instructions include guidelines for attaching the mounting assembly to the drive and installing the drive and mounting assembly in the system. If the owner's manual provides instructions for installing a number of different drives, but does not specifically name the Model 6590 Series CTD, follow the instructions for installing any full-height drive or full-height cartridge tape drive. The sections below include instructions for attaching the mounting bracket, and attaching the SCSI bus and power cables to the drive.

Attaching the Mounting Assembly

CAUTION: Use the mounting screws included with the CTD. If you do not, use caution in choosing mounting screws. Screws should not penetrate the mounting holes more than 0.2 mm.

Most installations require you to attach a mounting bracket or similar assembly to the drive. Some systems use a type of drive cage into which you mount the drive, instead of mounting brackets. The directions for attaching the drive to the mounting assembly are in the CPU or subsystem owner's manual. Figure 2-2 shows the locations of the bracket mounting holes on the CTD.

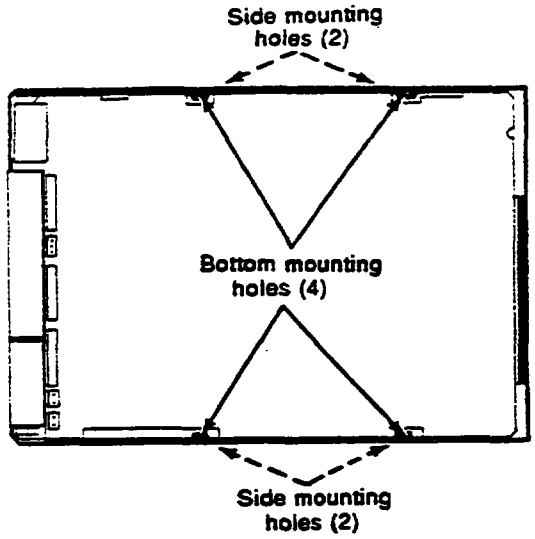

Figure 2-2 Mounting Hole Locations

Refer to the CPU or subsystem owner's manual for instructions on installing the drive and the mounting assembly inside the system. Once you have installed the drive you will need to connect the SCSI bus cable and internal power supply cables.

Connecting the SCSI Bus Cable

CAUTION: Before connecting the SCSI bus cable, be sure that the power cable is not plugged in the CTD.

Once the CTD is installed, connect the SCSI bus cable (from the SCSI PCB) to the SCSI connector on the rear of the CTD (see Figure 2-3). Make sure that Pin 1 of the SCSI connector and the stripe on the SCSI bus cable line up. You may need to twist the SCSI bus cable to make Pin 1 and the stripe line up properly.

Either or both of the SCSI connectors (on the CTD and on the SCSI bus cable) may have arrows printed on them to indicate the location of Pin 1. Be sure that the arrow and the stripe on the bus cable, or the arrows on both connectors line-up. If you have multiple devices installed in the system, you will need to daisy-chain them using a multi-connector SCSI bus cable.

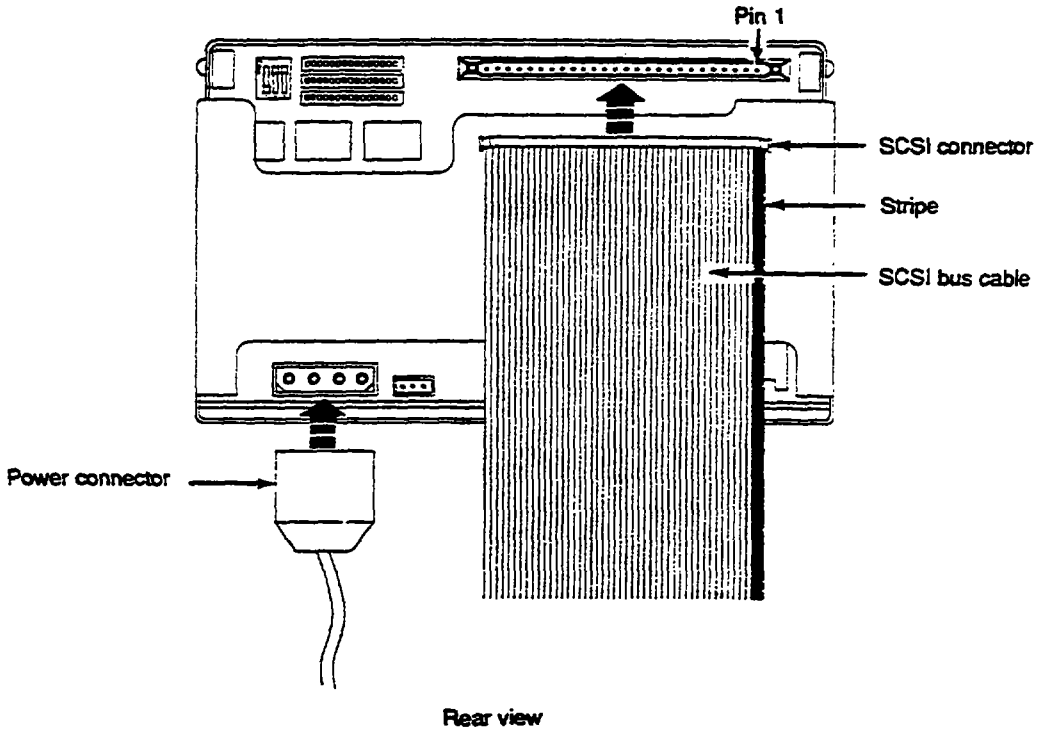

Figure 2-3 Connecting the SCSI Bus and Power Cables

Connecting the Power Cable

Connect the internal power cable leading from the system's power supply to the power connector on the rear of the CTD (see Figure 2-3). The connectors are designed so that they fit together in only one way. If they do not fit, do not force them. Turn the connector upside down and try again. Be sure that the connectors are firmly attached. Table 2-2 lists the pin assignments for the CTD power connector.

Table 2-2 Power Connector Pin Assignments

Pin Number	Function
1	+12 V DC supply
2	Ground
3	Ground
4	+5 V DC supply

Finishing the Installation Procedure

Once you have fully connected the CTD you can reinstall the CPU or subsystem cover and reconnect all cables according to the directions in the system owner's manual. If system diagnostics are available that test the operation of the peripherals installed in the CPU or subsystem, use them to test the operation of the drive prior to first use. However, do not use AOS/VS CONTEST or Advanced Diagnostic EXecutive System Exerciser diagnostic programs.

End of Chapter

Chapter 3
Operating and Maintaining the CTD

This chapter provides instructions for operating and maintaining the CTD. Be sure to read this section carefully and to observe all warnings and cautions before attempting to use the unit.

Operating the CTD

This section provides operating instructions for the CTD including using the LEDs, applying power to drive, setting the write-protect switch, and inserting and ejecting a cartridge tape.

Using the LEDs

The CTD has two LEDs on its front panel. These LEDs illuminate at various times to indicate the state of the CTD. Figure 3-1 shows the location of the LEDs on the front panel of the CTD.

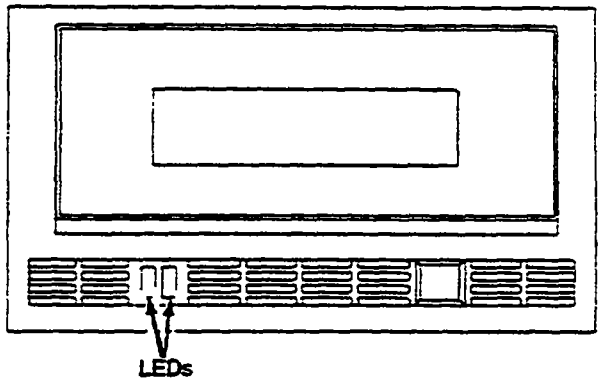

Figure 3-1 LED Locations

The activity of the LEDs is summarized below.

Amber and green LEDs on steadily	Indicates that the power-up self-test is in progress. Both LEDs will stay on for a maximum of 120 seconds. If the test is successful, both LEDs go out.
Amber and green LEDs flashing	Indicates that the power-up self-test has failed.

Green LED on steadily	Indicates that a data cartridge is loaded in the drive and the unit is ready for operation.
Amber LED flashing (variable intervals)	Indicates activity on the SCSI interface between the CPU and the CTD. This type of activity can occur any time the CTD is in the ready state.

Applying Power to the CTD

The CTD is designed to be wired directly into the power system of the CPU or subsystem in which it is installed. When power is applied to the CTD, it performs an internal power-up self-test. Observe the LED indicators on the front of the CTD to ensure the unit has passed this self-test. The self-test takes approximately 70 seconds to complete.

Setting the Write-Protect Switch

The 8-mm cartridge tape used by the CTD is equipped with a Write-Protect Switch (see Figure 3-2) to prevent unintentional writing to the tape. Check the switch position before inserting the tape in the CTD.

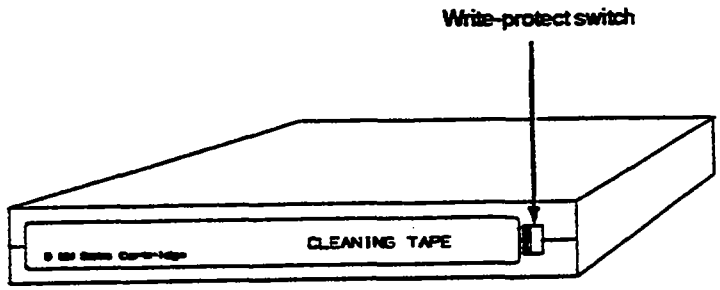

Figure 3-2 Setting the Write-Protect Switch

Follow these instructions to set the Write-Protect Switch:

1. Insert the tip of your fingernail into the Write-Protect Switch.
2. Slide the switch to the left. The red tag in the recessed area of the switch will show. The tape is now write protected.
3. Slide the switch to the right when you want to record data (the red tag in the recessed area of the switch will not show).

Inserting a Tape

To insert a tape into the CTD follow these steps:

1. Ensure that the Write Protect switch on the cartridge tape is set correctly for the operation you want to perform.

2. If the drive door is closed, press the Unload switch (see Figure 3-3). Any tape currently in the drive will rewind and eject. Remove this tape. If no tape is in the drive, the drive door will open.

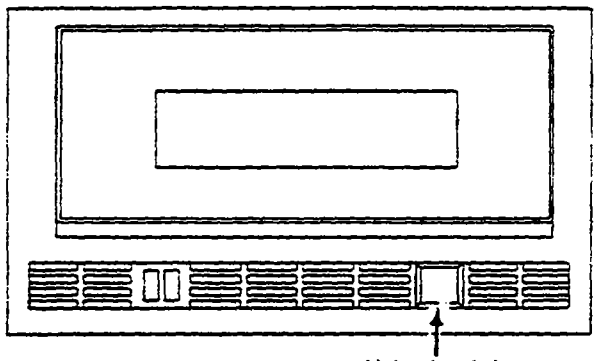

Figure 3-3 The Unload Switch

3. Insert the cartridge tape, label side up, with the tape lid facing toward the drive.

4. Gently close the drive door. The cartridge tape will automatically load. Within a minute the green LED will turn on, indicating that the tape is loaded and ready.

Ejecting a Tape

To unload a cartridge tape follow these steps:

1 Press the Unload switch. The green LED will turn off.

2. The CTD will rewind, unload, and eject the tape unless one of the following conditions exist:

   - The CTD is not powered on.
   - The CTD is not in an idle state (data is being written to or read from the tape or the tape is being loaded or unloaded).
   - There is a contingent connection to or from the host computer.

- A command has been issued from the host computer to prevent ejection of the tape.
- The CTD has been writing in buffered mode and the buffer is not empty.

NOTE: The 2-Gbyte cartridge tape takes approximately 2 minutes to rewind.

Maintaining the CTD

Your CTD is a highly reliable drive requiring only regular cleaning to maintain optimum performance. This section describes the cleaning procedure and what steps to take if your operating system should indicate hard errors when attempting to access the drive. It also describes how to handle and store your cartridge tapes.

Cleaning the CTD

Your CTD needs regular preventive maintenance. Perform the cleaning procedure every 30 hours of drive operation. Data General can supply you with a cleaning kit designed specifically for the CTD. Consult your Data General sales representative or the DG/DIRECT catalog for ordering information.

CAUTION: Do not use any cleaning solution or cleaning cartridge other than the ones provided in the CTD cleaning kit. Other solutions or cartridges may damage the CTD.

The CTD cleaning kit consists of a cleaning cartridge and cleaning solution. This cleaning cartridge is good for cleaning the CTD 12 times before it must be discarded. Follow this procedure for using your cleaning kit.

NOTE: Read all the instructions for cleaning your CTD before attempting the procedure. If you don't, the solution will evaporate on the tape before you are able to insert it into the CTD.

1. Turn on power to the CPU or storage subsystem to apply power to the CTD. Both the amber and the green LEDs will go on to indicate that the self-test is in progress. When the power-up self-test completes (both LEDs go out), press the Unload switch to open the drive door and eject any tape that may currently be in the drive.

WARNING: Use cleaning solution only in well ventilated areas. Avoid contact with skin and eyes. Use gloves to avoid prolonged skin exposure. DISPOSAL: In case of spills, allow solution to evaporate. DO NOT flush contents down waterways or septic systems.

2. Remove the cap from the bottle of cleaning solution.

3. Hold the cleaning cartridge as shown in Figure 3-4.

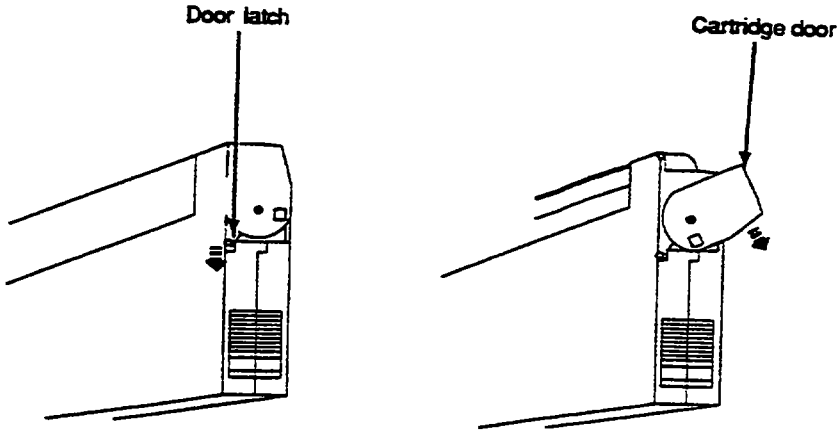

Figure 3-4 Tape Cleaning Cartridge

4. Open the cartridge door by first pressing down on the door latch located on the side of the cartridge (see Figure 3-4). With the door latch held down, push the cartridge door towards the front of the cartridge.

5. Hold the door open and apply the cleaning solution to the tape starting at the point where the tape enters the cartridge on the take-up reel side (see Figure 3-5). Squeeze the solution bottle gently to apply the solution in a steady stream to the surface of the tape. The tape will absorb the solution immediately; do not over-saturate the tape.

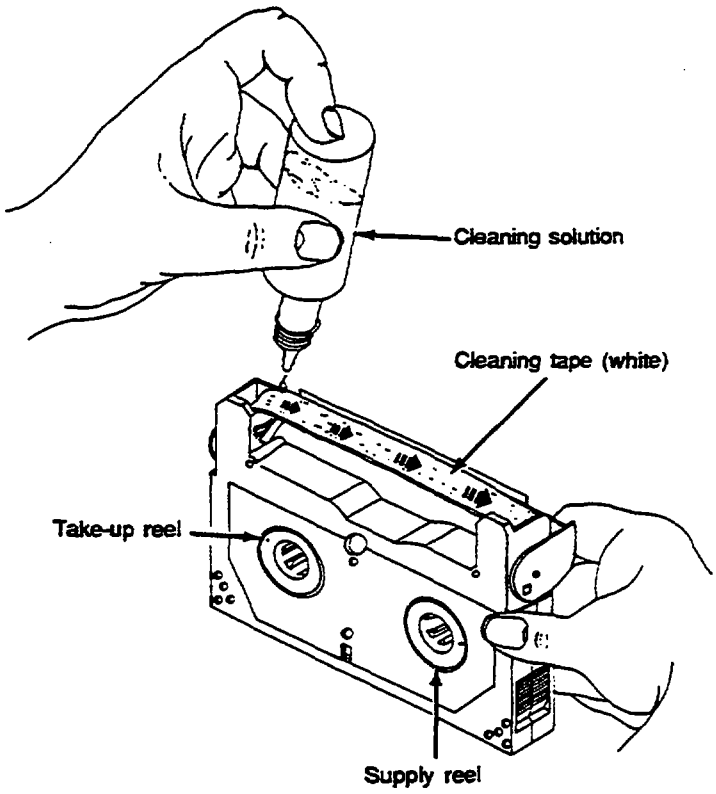

Figure 3-5 Applying the Cleaning Solution

6. Work across the length of the tape towards the supply reel side of the cartridge. Make sure that all of the exposed tape is completely saturated with the cleaning solution.

7. Place the nozzle of the cleaning solution bottle into the cartridge at the point where the tape enters the cartridge on the supply reel side. Squeeze the bottle gently to allow the cleaning solution to flow into the cartridge in a steady stream for approximately 4 to 6 seconds.

8. Remove the cleaning solution bottle from the cartridge and set it aside.

9. Allow the cartridge door to close. **Immediately** place the cleaning cartridge into the CTD and close the door of the unit. The rest of the cleaning process is automatically performed by the CTD.

10. When the process is complete, the CTD unloads and ejects the cleaning cartridge.

NOTE: The cleaning solution evaporates quickly. Be sure to replace the bottle cap tightly and store in a cool place.

11. Make a check mark in one of the boxes on the label of the cleaning cartridge to keep track of how many times you have used the cartridge.

12. Store the cleaning kit in a safe place for future use.

CAUTION: Do not re-use the cleaning cartridge after you have used it 12 times. Using the cartridge more than the recommended number of times may damage the CTD.

Solving Problems

You may also need to clean the CTD if the software or operating system reports a hard error during an operation. If a hard error occurs, clean the drive; then repeat the operation. If the problem recurs, repeat the operation using another cartridge tape. If the problem persists, contact the nearest Data General service center or your Data General sales representative.

Handling and Storing Cartridge Tapes

Take special care in handling and storing your cartridge tapes, especially those on which you have recorded data. If you are using tapes to store data, you may want to invest in special tape storage box to protect the tapes from damage. Follow these guidelines:

- Never touch the magnetic media itself.
- After storing data on the tape, set the Write-Protect switch to prevent accidental overwriting of the tape.
- Always label tapes with contents and recording date to prevent mixups. Also indicate the date on which the tape was first used.
- Store the tapes in a vertical position (never on their sides) in a clear plastic case. Store the case in a clean, dust-free area where the temperature range is 5° to 32° C (41° to 90° F) and humidity is between 40 to 60%.
- Never store tapes next to equipment that produces a magnetic field.

End of Chapter

Appendix A
Using the CTD with the AOS/VS Operating System

This appendix supplies information on using your CTD in an AOS/VS system. It includes information on generating the AOS/VS system so that you fully use the CTD's special features, store the maximum amount of data on the cartridge tape, and obtain optimum performance from the drive.

AOS/VS System Generation

When you generate your AOS/VS system after installing a Model 6590 Series CTD observe the following:

- You must specify the maximum record size of 32,768 bytes/record in order to store 2 Gbytes in a single file.
- If you install both a Model 6590 Series CTD and a 21-Mbyte tape drive in the Combined Storage Subsystem, you must specify a record size of 16,384 bytes/record when generating the AOS/VS system. The 21-Mbyte tape drive cannot accept more than 16,384 bytes/record. This limits the CTD to file sizes of 1 Gbyte when both units are installed in the same controller.

Performance Constraints

Use the CTD in buffered mode to obtain optimum drive performance. Specify the /MAXCAP switch when using the Dump II or Dump 3 utilities under MV/AOS.

The CTD can move between files on the cartridge tape faster than it can read data in a single file. Because of this, dividing data into several different files increases drive performance. For example, divide a file consisting of 1000 Mbytes of data into ten files, each containing 100 Mbytes of data. When you request to load data from file 7, the CTD will scan over files 0-6 at ten times normal speed to read file 7. If all the data were recorded in one file, the CTD would have to read all the data at normal speed.

NOTE: Using too many files will reduce the amount of data that can be stored on the tape cartridge. Be sure to read the section on Capacity Constraints before specifying file sizes.

Capacity Constraints

The filemark created each time you create a unique file consumes as much space as 2 Mbytes of data. Creating a large number of small files significantly reduces tape capacity.

The drive always creates physical data blocks of 1 Kbyte regardless of the logical block size you specify. If you specify logical block sizes that are not multiples of 1 Kbyte, the drive will pad the physical block at the end of each record to create a block of 1 Kbyte. This significantly reduces tape capacity. For example, if you specify a logical block size of 512 bytes, only 512 bytes of data can go into each 1-Kbyte physical block, reducing the tape capacity by 50%.

Tape defects can slightly reduce tape storage capacity by causing physical blocks to be rewritten farther down the tape. This is transparent to the host.

Some software may not be able to put more than 65,536 blocks in any one file. This causes problems with large files and/or small block sizes. For example, a 2-Gbyte file requires 131,072 blocks if the logical block size is 16 Kbytes. Doubling the logical block size to 32 Kbytes reduces the number of logical blocks required to 65,536.

End of Appendix

Appendix B
Specifications

This appendix lists specifications for the CTD and the standard cartridge tape it uses.

Recording Parameters

Table B-1 lists the recording parameters for the CTD.

Table B-1 Recording Parameters

Parameter	Value
Linear recording density	2126 FR/mm 54,000 FR/inch
Linear data density	1701 bits/mm 43,200 bits/inch
Track width	0.025 mm 0.00098 inch
Track pitch	0.031 mm 0.00122 inch
Track density	32.26 tracks/mm 819 tracks/inch
Areal recording density	
Flux	68.6 KFR/mm^2 44.2 MFR/i^2
Bit	54.9 Kbits/mm^2 35.4 Mbits/i^2
Track angle	4.9°
Wrap angle	221°
Edge guard band	1.0025 mm 0.039 inch
Recorded track length	71.673 mm 2.812 inches

Performance Specifications

Table B-2 lists the performance specifications for the CTD interface and servo.

Table B-2 Performance Specifications

Parameter	Value
Nominal tape speed	10.89 mm/sec (.429 inch/sec)
Short term variations	± 3%
Long term variations	± 0.5%
File search tape speed	108.9 mm/sec (4.3 inches/sec)
Rewind tape speed (nominal)	817 mm/sec (32 inches/sec)
Reposition time*	988 ms (nominal)
Drum rotation period	33.3 ms ± 0.1%
Effective head-to-tape speed (nominal)	148.4 inches/sec
Data transfer rate	246 Kbytes/sec
SCSI burst data rate	1.2 Mbytes/sec

Read/Write/Search/Rewind times (by cartridge size in Mbytes):

Size	Read/Write (min)	Search (min:sec)	Rewind (min:sec)
1024	82	8:15	1:15
2048	161	16:05	2:15

* From the time the stop command is issued to the motion control system, to the time the tape is repositioned

Power Specifications

The CTD operates on standard +5 and +12 V DC. It does not use AC power nor does it provide over-voltage or over-current protection. Table B-3 lists the power specifications.

Table B-3 Power Specifications

Parameter	Value
±5 V Input*	
Nominal Tolerance	± 5%
Minimum supply voltage rise time (0 V — 95% of rated voltages)	5 ms (0 to 4.65 V)
Current requirements	
Idle	1.65 A
Operational (avg)	2.02 A
(surge)	2.7 A
Power dissipation	10.5 W (max)
±12 V Input	
Nominal Tolerance	± 5%
Minimum supply voltage rise time (0 V — 95% of rated voltages)	5 ms (0 to 11.4 V)
Current requirements	
Idle	0.26 A
Operational (avg)	0.41 A
(surge)	0.50 A
Power dissipation	5.4 W (max)

* The minimum current draw on +5 V is 1.2 A.

Safety Specifications

The CTD meets the following regulatory agency standards for safety:

- Underwriters Laboratory UL 478
- CSA standard C22.2 No. 154
- FCC Rules, Part 15, Subpart J
- IEC 380
- National Safe transit specification, project 1A

Safety agency certification requires that the supplied voltages for a Model 6590 Series CTD be supplied from one of the following:

- A safety extra-low-voltage source (per IEC 380)
- A Class 2 transformer rated at 30 V rms sinusoidal or less
- An isolating transformer with open-circuit potential or no-load output of not more than 42.4 V peak. The energy available is limited so the current under any condition of load, including short circuit, is not more than 8 A after one minute.

Environmental Specifications

Tables B-4 and B-5 list the environmental specifications for the CTD. Table B-4 lists the conditions for normal operation of the CTD. Table B-5 lists the conditions for units in storage or transit.

Table B-4 Environmental Specifications - Operating Conditions

Parameter	Value
Temperature range	5° to 40° C (with 10° C/hour max gradient) 26° C wet bulb temperature
Relative humidity	20% to 80%; noncondensing
Altitude	-305 to 2440 m (-1000 to 8,000 ft)
Electrostatic Discharge	Error-free operation at and below 10 kV ESD
Vibration	0.100 inch double amplitude, constant displacement at 5 to 10 Hz; 0.5 G peak at 10 to 2,000 Hz constant level (X-Y-Z axis, with a sweep rate of 1 octave/min)

(continued)

Table B-4 Environmental Specifications - Operating Conditions

Parameter	Value
Shock	6.0 G at 11 ms half sine in each axis (X-Y-Z) positive and negative (3 shocks in each direction not to exceed 1 shock per minute)
Acoustic noise (per ANIS S12.10)	5.7 Bels (maximum)
Air flow requirements	Air flow within the mounting enclosure should not force air into the tape path. Adequate air flow must be provided through the vents in the rear of the unit to dissipate heat resulting from 15 W of power comsumption. Air flow around the entire unit must be sufficient to prevent temperatures from exceeding 40° C (104° F).
Particulate contamination maximum limits as follows:	
Particle Size (microns)	Particle count/m^4
<1.0	4×10^7
1.0 - 1.5	4×10^6
1.5 - 5.0	4×10^5
5.0 - 10.0	4×10^4
10.0	4×10^3

(concluded)

The specifications listed in Table B-5 apply to CTDs under the following conditions:

- The unit has not been unpacked.
- The storage period does not exceed 3 years.
- The 8-mm data cartridges are not packaged with the unit.

Table B-5 Environmental Specifications - Storage/Transit

Parameter	Value
Temperature range:	-40° to 60° C (20° C/hour max. variation)
Relative humidity	10% to 90% (noncondensing)
Altitude	-305 to 7620 m -1000 to 25,000 ft

Physical Specifications

The physical specifications of the CTD are as follows:

Weight	4.5 lbs.
Height	82.5 mm (3.25 inches)
Width	146.0 mm (5.75 inches)
Length	203.2 mm (8 inches)

Cartridge Tape Specifications

Table B-6 lists the physical specifications of the 1-Gbyte and 2-Gbyte cartridge tapes designed for use with a Model 6590 Series CTD.

Table B-6 Cartridge Tape Specifications

Parameter	Value
Media width	08 mm .315 inch
Media length	176 ft (1-Gbyte cartridge) 53.6 mm 346 ft (2-Gbyte cartridge) 105.49 mm
Media type	Metal particle
Cartridge type	P6

End of Appendix

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TIPS ORDERING PROCEDURES

TO ORDER

1. An order can be placed with the TIPS group in two ways:
   a) MAIL ORDER – Use the order form on the opposite page and fill in all requested information. Be sure to include shipping charges and local sales tax. If applicable, write in your tax exempt number in the space provided on the order form.

      Send your order form with payment to:

      Data General Corporation
      ATTN: Educational Services/TIPS G155
      4400 Computer Drive
      Westboro, MA 01581-9973

   b) TELEPHONE – Call TIPS at (508) 870-1600 for all orders that will be charged by credit card or paid for by purchase orders over $50.00. Operators are available from 8:30 AM to 5:00 PM EST.

METHOD OF PAYMENT

2. As a customer, you have several payment options:
   a) Purchase Order – Minimum of $50. If ordering by mail, a hard copy of the purchase order must accompany order.
   b) Check or Money Order – Make payable to Data General Corporation.
   c) Credit Card – A minimum order of $20 is required for Mastercard or Visa orders.

SHIPPING

3. To determine the charge for UPS shipping and handling, check the total quantity of units in your order and refer to the following chart:

Total Quantity	Shipping & Handling Charge
1–4 Units	$5.00
5–10 Units	$8.00
11–40 Units	$10.00
41–200 Units	$30.00
Over 200 Units	$100.00

If overnight or second day shipment is desired, this information should be indicated on the order form. A separate charge will be determined at time of shipment and added to your bill.

VOLUME DISCOUNTS

4. The TIPS discount schedule is based upon the total value of the order.

Order Amount	Discount
$1–$149.99	0%
$150–$499.99	10%
Over $500	20%

TERMS AND CONDITIONS

5. Read the TIPS terms and conditions on the reverse side of the order form carefully. These must be adhered to at all times.

DELIVERY

6. Allow at least two weeks for delivery.

RETURNS

7. Items ordered through the TIPS catalog may not be returned for credit.
8. Order discrepancies must be reported within 15 days of shipment date. Contact your TIPS Administrator at (508) 870-1600 to notify the TIPS department of any problems.

INTERNATIONAL ORDERS

9. Customers outside of the United States must obtain documentation from their local Data General Subsidiary or Representative. Any TIPS orders received by Data General U.S. Headquarters will be forwarded to the appropriate DG Subsidiary or Representative for processing.

TIPS ORDER FORM

Mail To: Data General Corporation
Attn: Educational Services/TIPS G155
4400 Computer Drive
Westboro, MA 01581 - 9973

BILL TO:	SHIP TO: (No P.O. Boxes – Complete Only If Different Address
COMPANY NAME	COMPANY NAME
ATTN:	ATTN:
ADDRESS	ADDRESS (NO PO BOXES)
CITY	CITY
STATE ZIP	STATE ZIP

Priority Code _____ (See label on back of catalog)

Authorized Signature of Buyer (Agrees to terms & conditions on reverse side) | Title | Date | Phone (Area Code) | Ext.

ORDER #	QTY	DESCRIPTION	UNIT PRICE	TOTAL PRICE

A SHIPPING & HANDLING

☐ UPS	ADD
1–4 Items	$ 5.00
5–10 Items	$ 8.00
11–40 Items	$ 10.00
41–200 Items	$ 30.00
200+ Items	$100.00

Check for faster delivery

Additional charge to be determined at time of shipment and added to your bill.

☐ UPS Blue Label (2 day shipping)
☐ Red Label (overnight shipping)

B VOLUME DISCOUNTS

Order Amount	Save
$0 – $149.99	0%
$150 – $499.99	10%
Over $500.00	20%

Tax Exempt # or Sales Tax (if applicable) _____

ORDER TOTAL	
Less Discount See B	–
SUB TOTAL	
Your local* sales tax	+
Shipping and handling – See A	+
TOTAL – See C	

C PAYMENT METHOD

☐ Purchase Order Attached ($50 minimum)
P.O. number is _____. (Include hardcopy P.O.)
☐ Check or Money Order Enclosed
☐ Visa ☐ MasterCard ($20 minimum on credit cards)

Account Number | Expiration Date

Authorized Signature
(Credit card orders without signature and expiration date cannot be processed.)

THANK YOU FOR YOUR ORDER

PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.
PLEASE ALLOW 2 WEEKS FOR DELIVERY.
NO REFUNDS NO RETURNS.

* Data General is required by law to collect applicable sales or use tax on all purchases shipped to states where DG maintains a place of business, which covers all 50 states. Please include your local taxes when determining the total value of your order. If you are uncertain about the correct tax amount, please call 508-870-1600.

Form 702
Rev. 8/87

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