MITSUBISHI ELECTRIC

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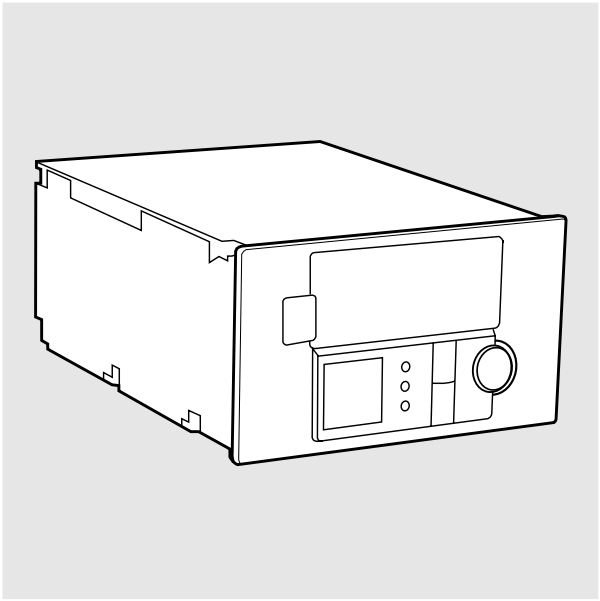
HP DDS AUTOLOADING DRIVES

User Guide



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Birmingham Business Park
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Contents

The software needed to control the SCSI Autoloading DDS (Digital Data Storage with Data Compression) tape drives depends on your operating environment; ask your Apricot supplier for details. The Autoloading DDS-2 drive uses 120-metre DDS-2 cartridges and the Autoloading DDS-3 drive uses 125-metre cartridges. Both drives can use earlier DDS format cartridges (the DDS-3 drive can read DDS-2 cartridges, but not vice versa). The drive automatically detects the format of the cartridge when it is inserted into the drive. The drive uses a magazine to allow multiple DDS cartridges to be loaded automatically. A six cartridge magazine is supplied with the drive.

Note
Data stored on DDS-2/3 cartridges will not be readable by first generation DDS drives.

Data compression

A built in compression algorithm can typically double, and in some cases quadruple, tape capacity. The drive writes compressed data by default, unless it finds uncompressed data already on the cartridge, in which case it writes uncompressed data. The drive can also write uncompressed data under software control.

Note
A switch on the rear of the drive allows it to default to writing uncompressed data. Refer to 'Configuration switches' later in this document for further information.

When reading a cartridge, the drive automatically distinguishes compressed and uncompressed data and either decompresses it or passes it through unaltered as appropriate. It has the capability to read and write both DDS uncompressed and DDS-DC compressed data and data cartridges. Data compression and decompression is transparent to the host software.

Caution
Use cartridges bearing the DDS or DDS MRS (Media Recognition System) symbols, you cannot play audio DAT cartridges with these drives, even on multimedia systems.

Data capacity

The DDS-2 drive writing uncompressed data has a nominal capacity of 1.3 Gbytes on a 60-metre cartridge, 2.0 Gbytes on a 90-metre cartridge and 4.0 Gbytes on a 120-metre cartridge DDS-2 cartridge, with a sustained transfer rate of 400 Kbytes/second. At a data compression ratio of 4:1 the DDS-2 drive has a nominal maximum capacity of 5.2 Gbytes on a 60-metre cartridge, 8.0 Gbytes on a 90 metre cartridge, and 16.0 Gbytes on a 120-metre DDS-2 cartridge; the substantial transfer rateis increased by the same ratio. The compression ratio and transfer rate achievable in any particular case depend on the characteristics of the data being compressed, and may be higher or lower than these nominal figures.

The DDS-3 drive writing uncompressed data has a nominal capacity of 1.3 Gbytes on a 60-metre cassette, 2.0 Gbytes on a 90-metre cassette, 4.0 Gbytes on a 120-metre DDS-2 cassette, and 12.0 Gbytes on a 125-metre DDS-3 cassette, with a sustained transfer rate of 2000 Kbytes/second.

Modes of Operation

The autoloader has two modes of operation:

Stacker Mode

In Stacker mode (also known as Sequential mode), you can select which cartridge you want by using the Select and Load buttons on the front panel. When a cartridge is ejected from the embedded drive after a host UNLOAD command, the autoloader automatically moves the next available cartridge from the magazine into the drive. The autoloader does not depend on the host computer sending SCSI Medium Changer commands to move cartridges to and from the magazine.

Random Mode

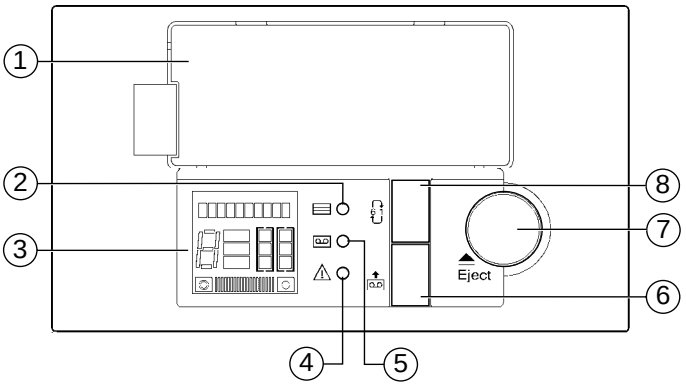
In Random mode (or Changer mode), the host views the autoloader as two devices:

- A tape drive to which SCSI Sequential Access commands can be sent.
- A changer mechanism to which SCSI Medium Changer commands can be sent.

The controlling host computer therefore has full random access to any cartridge.

Front panel

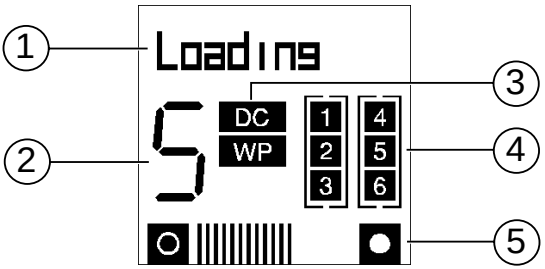
The front panel of the Autoloader DDS drives includes a ten character display, three LEDs and three buttons. The front panel is illustrated below:



1 Door through which the magazine is loaded
2 Magazine Present light
3 Liquid Crystal Display (LCD)
4 Operator Attention Required light
5 Tape Activity light
6 Load Tape button
7 Eject button
8 Select button

Front panel display

The front panel display has five display regions as shown below:



1 The ten character display is used to indicate the status of the drive and potential error conditions.

2 The numeric display indicates the number of the current cartridge loaded in the drive, or the cartridge selected when you repeatedly press the Select button.

3 **DC** indicates when Data Compression is being used when writing to tape.

WP indicates when the cartridge is Write Protected.

4 The lit numbered boxes indicate which magazine slots contain a cartridge.

5 These lines indicate how much of the tape has been used. The more lines shown, the more of the tape has been used.

Front panel buttons

SELECT button

The SELECT button allows the user to sequentially select any of the cartridges present in the magazine, once the cartridge magazine has been autoloaded into the unit. Pressing the SELECT button repeatedly cycles through the cartridges available in the magazine.

LOAD TAPE button

The **LOAD TAPE** button is used to unload the selected cartridge from the magazine into the drive. This puts the drive into Stacker mode; when the selected cartridge is ejected following a host UNLOAD command, the drive will automatically load the next highest numbered cartridge.

In Random mode, the **LOAD TAPE** button is disabled.

EJECT button

The **EJECT** button starts the unload process. The drive unloads any currently loaded cartridge, and the changer mechanism returns the cartridge to the magazine. The magazine is then ejected. The button can also be used to force ejection in an emergency.

Front panel LEDs

The following section summaries the operation of the three front panel LEDs.

Magazine Present (green)

Steady green	when a cartridge magazine is installed into the autoloader.
Flashing green	when a magazine is in the process of being installed, checked or ejected.

Tape Activity (green)

Steady green	indicates that a cartridge is present in the drive.
Flashing rapidly	data is being read/written, or that activity other than cartridge load/unload is occurring.
Flashing slowly	the cartridge is being loaded/unloaded.

Operator Attention Required (amber)

Steady amber	indicates a serious hardware error has occurred.
Flashing amber	indicates a user-recoverable error has occurred.

Read the top line of the LCD and take corrective action if possible.

These errors are:

- A hard fault condition which the drive cannot clear.
- The heads need cleaning.
- The tape is nearing the end of its usual life.
- There is a tape in the autoloader but no magazine is present.
- The front panel door is open when it should not be.
- A firmware upgrade is taking place.

LCD Messages

Messages displayed by the LCD can be of three types:

- Normal operation status messages
- Information messages
- Error messages

Normal Operation Status Messages

The status messages that appear on the LCD cover the five functional states of the autoloader operation. Only one of the states has control of the LCD text display at any one time:

Reset At power-on, the Reset state has control of the LCD.

Firmware Upgrade state Following the self-test, if a firmware upgrade is taking place, the Firmware Upgrade state takes control of the LCD.

Magazine Load state If no firmware upgrade is being performed, control of the LCD passes to the Magazine Load state, and remains there until the magazine has been loaded.

Cartridge Load state After the magazine has been loaded, control of the LCD passes to the Cartridge Load state until a cartridge has been moved to the drive and loaded.

Tape Motion state Once a cartridge has been loaded, the Tape Motion state covers activity involving the tape, including reading and writing data.

The following table shows the messages which can be displayed within each functional state, and indicates how control of the LCD passes to other states. Messages in brackets are not actually displayed, since control has already passed to the next functional state.

Reset	Firmware Upgrade	Magazine Load	Cartridge Load	Tape Motion
Self Test				
(Test OK)	FW Upgrade			
	FW Check			
	FW Program			
	New FW !!!			
	(NoUpgrade)	Insert Mag		
		Mag Check		
		Mag Eject		
		(Mag Loaded)	Mag Loaded	
			SemiLoaded	
			Unloading	
			Cleaning	
			FW Tape	
			(Tape Loaded)	Ready xxm
				Read
				Write x.y
				Search >>
				Search <<
				Rewind
				Format
				Erase
				Locate
				Partition

Each of these status messages is described below:

Cleaning A cleaning cartridge has been loaded into the DDS drive.

Erase The drive is erasing data from the tape.

Format The drive is creating a 1- or 2-Partition tape, or changing the size of the partitions on an existing 2-Partition tape.

FW Check The data to upgrade the firmware is being checked for compatibility.

FW Program The embedded DDS drive is being upgraded with the new firmware.

FW Upgrade Data to upgrade the firmware is being read, either from a tape or through the SCSI bus.

Insert Mag	There is no magazine present in the autoloader; you are being asked to insert one.
Loading	Either a cartridge is being moved from the magazine and placed into the drive mechanism, or the drive is loading a semi-loaded cartridge.
Locate	The drive is moving the tape to a point specified by the host.
Mag Check	The autoloader is examining the magazine to find which slots are occupied.
Mag Eject	The autoloader is ejecting the magazine.
Mag Loaded	A magazine is present in the autoloader, and the magazine check has been completed.
New FW!!!!	The firmware has been successfully upgraded.
Partition	The drive is switching to the other partition on a 2-Partition tape.
Read	The drive is reading data from the tape.
Read only	If a write-protected tape is loaded, the "Ready xxm" message alternates with a "Read-Only" message.
Ready xxm	A cartridge is loaded in the drive, and the drive is ready to repond to commands which cause tape motion. "xxm" is the length of the currently loaded tape, so for example, "Ready 90m" will be displayed when a 90m tape is loaded . If a write -protected tape is loaded, "Ready xxm" alternates with a "Ready Only" message.
Rewind	The drive is rewinding the tape to the beginning of the current partition.
Search >>	The drive is searching forwards (towards the end of the tape) for a record, filemark, setmark, or EOD (End of Data). In SCSI terms, it is responding to a SCSI SPACE command with a positive Count field.

Search << The drive is searching backwards (towards the beginning of the tape) for a record, filemark, setmark, or EOD (End of Data). In SCSI terms, it is responding to a SCSI SPACE command with a negative Count field.

Self Test The autoloader is performing its power-on self-test routine.

SemiLoaded A cartridge is in the drive, but not loaded (the tape has not been threaded).

Unloading Either the drive is unloading a cartridge, or a semi-loaded cartridge is being ejected and moved back to its slot in the magazine.

Write x.y The drive is writing data to tape. "x.y:1" is the cumulative compression ratio since power-on, or since the compression ratio was last cleared. For example, "Write 2.1" means a compression ratio of 2:1:1. The compression ratio will only be displayed after about 1 megabyte of data has been written since power-on.

Information Messages

The LCD shows the following information messages:

Config: xxy "xx" is the hexadecimal value of the configuration switches on the underside of the autoloader, and "y" is the hexadecimal value of the option switches on the rear of the autoloader. The message is displayed for 2 seconds following the SCSI ID message after power-up.

Eject Mag The Eject Button has been pressed. It may be some time before the magazine is ejected, since the drive must first finish the operation on which it is currently engaged and then return the cartridge to the magazine.

ForceEject Forced ejection of cartridge and magazine is in progress. (See "Forcing Ejection"). It finishes when the magazine is ejected.

HP C1553A or HP C1557A The product identifier. It is displayed for 2 seconds during power-up.

Load Tape This is displayed when the Load Tape button is pressed.

SCSI ID:x "x" is the SCSI address of the autoloader. The message displayed is displayed for 2 seconds following the product identifier message.

Select Tape This is displayed when the Select button is pressed and for a short time after the button is released.

Stray Tape: Insert Empty Mag A cartridge is present in the drive mechanism, but there is no magazine present. To retrieve the cartridge, insert an empty magazine.

Error Messages

The LCD can also display a range of error messages relating to the autoloader's operation.

If the Operator Attention Required light shows amber when an error message is displayed, either a fault has been detected with the autoloader mechanism, or there is a possibility that data may be lost.

A description of some of the error messages together with suggested corrective action is provided later on.

Loading the Magazine and Cartridges

Place as many cartridges as you need into the magazine making sure that the small arrows on the magazine and cartridge line up. You can insert up to a maximum of 6 cartridges.

Note
Only use cartridges labelled "DDS Media Recognition System" in the drive. To exploit the full potential of the drive use matching cartridges That is, use DDS-2 cartridges with the DDS-2 drive (HP C1553A). Do not use DDS-3 cartridges with the DDS-2 drive, the drive will simply eject them. Never use DAT cartridges.

To avoid jams, insert the cartridges in the magazine in their proper orientation and fully pushed home.

It is also important that you use the labels correctly:

- Only stick the labels on the areas provided on the cartridge and magazine.

- Ensure that the corners of the cartridges and magazine labels stick firmly to the surface and do not curl at their edges.
- Never stick labels on top of other labels.

To install the magazine, insert it into the slot into the front of the autoloader with the large arrow uppermost and pointing towards the autoloader. Apply steady pressure until the mechanism takes the magazine and pulls it into the autoloader.

The autoloader then performs a self-test routine. This also checks which magazine slots contain cartridges.

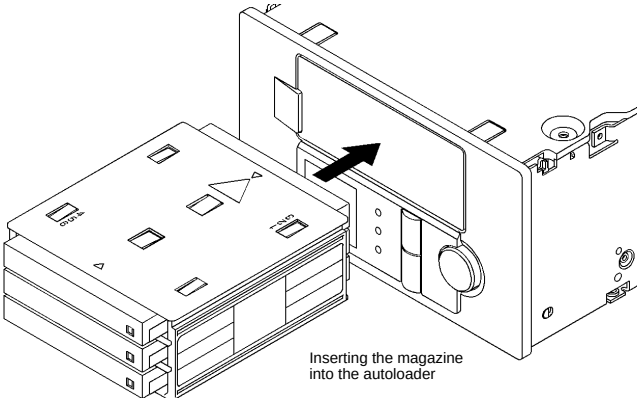
When the self-test and magazine check is complete, if you are using the autoloader in Stacker mode, select the cartridge with which you want the sequence to start by pressing the Select button. When the correct number is displayed, press the Load Tape button to load the cartridge.

In Random mode, the host computer selects and moves a cartridge from the magazine into the drive mechanism.

Note

The drive is configured to use DDS Media Recognition System cartridges. Any cartridge which is not DDS Media Recognition System will be treated as write-protected-you will only be able to read from it, not write to it.

Once the cartridges and magazine are in place the drive then performs a load sequence. This takes a maximum of 25 seconds



Inserting the magazine into the autoloader

from the time the cartridge is inserted to the time the drive is ready to start acting upon the next command from the host. The sequence is as follows:

- The drive mechanism threads the tape and rewinds it to the beginning of Media (BOM). It checks the tape format (such as DDS-2 or audio) and the number of partitions. If the tape is blank the drive leaves the tape at BOM and awaits the next command.
- If the tape is in DDS format and is write-enabled, the drive performs write and read tests. If the error rate is high, the Operator Attention light flashes and "clean me" is displayed on the LCD.
- The drive copies the Tape log from tape into RAM.
- The drive rewinds to BOP (Beginning of Partition) and goes online, awaiting a command from the host.

Once the drive is online, it sends a CHECK CONDITION on receipt of the next SCSI command from the host. The UNIT ATTENTION key is set in the returned REQUEST SENSE data to indicate that the tape may have been changed.

Ejecting the Magazine and Cartridges

To eject a cartridge from the autoloader, press the Eject button.

If the host sends an Unload command, the magazine will not be ejected. An Unload command does not eject the magazine.

If the host has previously sent a PREVENT MEDIA REMOVAL command, the Eject button is disabled and has no effect. The Unload command takes the drive offline and unthreads the tape, but does not eject it. The effects of the PREVENT MEDIA REMOVAL continue until an ENABLE MEDIA REMOVAL command is received, or the drive is reset.

Forcing Ejection

Note

You can lose data if you force ejection of a tape. The tape may also end up invalidly formatted, because EOD (End of Data) may not have been written. Only force ejection as a last resort to recover a cartridge. Never use it as a quick way of ejecting the cartridge.

If you press the Eject button when the drive is busy, it may be a long time before the drive will respond to the request, because it will finish the task it is performing first. This ensures that the task is terminated in a controlled manner, and no data is lost.

If however, you urgently need to unload the cartridge, even at the risk of losing data, you must force ejection as follows:

- Hold the Eject button down for at least 5 seconds. The LCD will display "Force Eject".
- The autoloader waits at least 35 seconds to give the normal ejection procedure a chance to occur.
- After this time, if there is a tape loaded in the drive, it is immediately unthreaded and the cartridge is ejected, regardless of what operation the drive was performing. The cartridge is then returned to its slot in the magazine, and the drive is reset.Since the forced ejection may interrupt any operation, it is possible that the drive will not write (EOD) before the cartridge is ejected. This will cause loss of data, and result in a cartridge with an invalid format. It should however still be possible to read such a cartridge up to the point where the ejection interrupted the writing.
- If no cartridge is loaded in the drive, the autoloader assumes that you want to eject the magazine. Following the 35 seconds, it does this. The autoloader is then reset.

Note

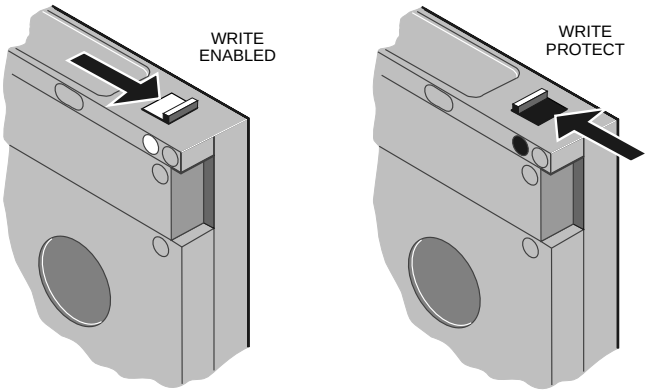
A forced eject overrides any SCSI Prevent Media Removal which may be in effect, and can abort any SCSI operations which may be in progress on the autoloader.

Emergency Removal of a Magazine or Cartridge

In the event of a mechanical jam, the LCD will display “Error x”. If the actions described in the troubleshooting section do not resolve the problem then the magazine and cartridge need to be removed. The procedure for removing the magazine and cartridge should only be performed by a qualified service engineer. Please contact your service engineer as tampering with it yourself may void the warranty.

Write-protecting a cartridge

A cartridge can be write-protected by sliding the white tab on the cartridge so that the recess is revealed. In this position, data can be read from the tape but not written to it.



The tape log, which includes a record of data integrity failures, cannot be updated while the cartridge is write-protected. It follows that the tape log becomes inaccurate if a cartridge is used while write-protected.

Keep your cartridges well away from magnetic objects, and equipment that generates magnetic fields. Avoid extremes of temperature and exposure to direct sunlight; otherwise the data recorded on the tape may become corrupted.

Cleaning the drive

Head cleaning

There are two points at which the drive heads should be cleaned.

- As routine maintenance after every 25 hours of read/write activity.
- When a "Clean Me" message is displayed in the LCD and the Operator Attention LED is flashing amber.

To clean the heads insert a cleaning cartridge, HP 92283K and use as follows:

Note
Do not use an audio DAT cleaning cartridge, the drive will not recognize it as a cleaning cartridge.

Stacker Mode

1. Place the cartridge in one of the magazine slots and insert the magazine into the autoloader.
2. Use the Select button to select the slot in which you placed the cleaning cartridge.
3. Press the Load button to load the cleaning cartridge into the drive. The autoloader will then automatically perform a cleaning cycle.
4. At the end of the cleaning cycle, the drive automatically ejects the cartridge and the changer mechanism replaces it in the magazine.
5. Note the date on the label on the cleaning cartridge, so that there is a record of how many times it has been used. After 25 uses, discard the cartridge.

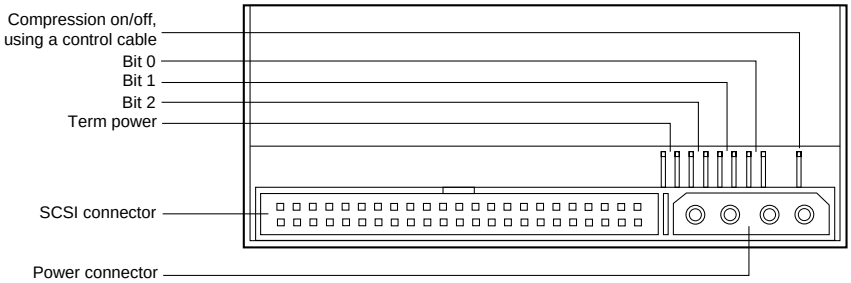
Note
If you decide to leave the cartridge permanently in the magazine, it will reduce the amount of data you can back up to the magazine.

Random Mode

1. The hosts sends a MOVE MEDIUM command to move the cleaning cartridge from the magazine to the drive. The autoloader will only recognise that the cartridge is a cleaning cartridge once it is loaded into the drive.
2. The drive will then carry out a cleaning cycle.
3. The drive automatically ejects the cartridge after the cleaning cycle is complete. The changer returns the cartridge to its magazine slot without further host involvement.

In Random mode, the host can program a routine cleaning cycle (say, once a week) The cleaning cartridge remains in a set position such as slot 6, ready for use at the designated time. Remember, that this will reduce the amount of data you can back up to the magazine, since you will only have five slots available for data cartridges.

Note
Using the SCSI MOVE MEDIUM command, a cleaning cartridge can only be returned to its original source slot in the magazine.



Setting the SCSI ID

The SCSI ID is set using jumpers on the set of pins beside the SCSI connector at the rear of the drive, as shown below:

SCSI Jumper Pins

The three significant bits in the ID give a range of 0 through 7 as shown below:.

The drive reads the SCSI ID at power-up and during self-test.

SCSI ID	Bit 1	Bit 2	Bit 0
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
7	1	1	1

1=shorted
0=open

Data compression Control

Data compression can be controlled through the jumper on the jumper pin, as shown in the previous diagram. The pin is only monitored at power-on, and controls whether data compression is enabled by default. Any subsequent change to the pin is ignored.

Unconnected pin state (default)

Data compression is controlled by configuration switches 1 and 2 (on the underside of the drive) and through the SCSI MODE SELECT command.

Pin connected to 0V

Data compression is disabled. The setting of configuration switch 1 is ignored. Switch 2 is valid. However, data compression can still be controlled through MODE SELECT. Note that when reading the drive will always decompress compressed data.

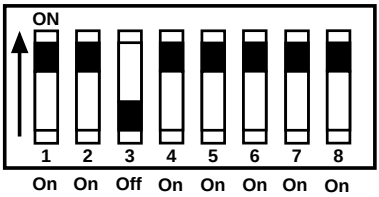
It follows from this that if you want to use this pin, you should set configuration switch 1 on the underside of the drive to ON.

Termination Power

The drive will provide termination power for the SCSI termination resistors if a jumper is set across the two pins marked "Term Power", as marked in the diagram.

Configuration switches

There is a set of configuration switches on the underside of the drive, shown below:



With the drive switched off, use the information below to select the correct configuration for your system.

Note
For the drive to operate correctly, appropriate drivers and application software must be loaded on the host computer.

Data compression

Switches 1 and 2 are normally a used to configure the way in which data compression is set for the drive. The following table shows the available options:

Switch 1	Switch 2	Meaning
On	On	Compression enabled at power-on with host control.
On	Off	Compression enabled at power-on no host control.
Off	On	Compression disabled at power-on. The host is allowed to control compression.
Off	Off	Compression disabled at power-on no host control.

When switch 1 is on, data written to the tape will be compressed without the knowledge of the host.

Media Recognition System (MRS)

Switch 3 is used to configure the drive to respond to DDS Media Recognition System tapes:

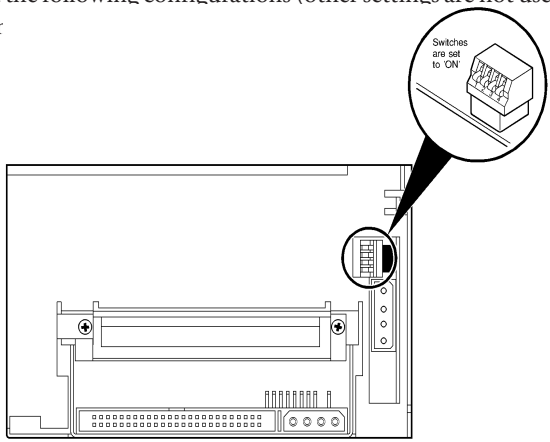
Switch 3	Meaning
On	The Media Recognition System is disabled. All DDS tapes are treated the same, whether they possess the Media Recognition stripes or not.
Off	The Media Recognition System is active. This is the default setting. Non-Media Recognition System tapes are treated as if they are write-protected.

Switches 4 to 8

Switches 4 to 8 are used to specify connectivity and functionality according to host or customer requirements. The default settings for all switches is on.

Option switches

The autoloader option switches are on the rear-panel. The switches are read at power-on. When the autoloader is switched off, you can set the following configurations (other settings are not used at this tim



4	3	2	1	Value	Auto-stack	Auto-eject	Allow Resequencing	LUN 1 Magazine Ready	LUN 0 Drive Inquiry
On	Off	Off	On	1h	Enabled	Enabled			
Off	On	On	Off	6h (HP Series 800)			Enabled	Enabled	Enabled
Off	On	On	On	7h (HP Series 700)			Enabled	Enabled	
On	On	On	On	Fh (Default)					

Auto-stack The autoloader will enter Stacker mode after a magazine has been inserted, and the first cartridge will automatically be loaded.

Auto-eject When the autoloader is in Stacker mode it will eject the magazine after the last cartridge in the magazine is loaded.

Allow Resequencing While the autoloader is in Stacker mode, you can select another cartridge to be loaded into the drive by using the Select and Load buttons. When this option is not enabled, the Load and Select buttons are ignored in Stacker mode.

LUN 1 Magazine Ready A TEST UNIT READY command to LUN 1 will receive a NOT READY status message unless a magazine is present and magazine census data is available. When this option is not enabled, a TEST UNIT READY command will receive a GOOD status report whenever the autoloader has completed the power-on self-tests. This provides a method of detecting whether a magazine is present.

LUN 0 Drive Inquiry The product ID sent in response to an INQUIRY command to LUN 1 will be that of the embedded tape drive. When this option is not enabled the ID sent is that of the entire autoloader.

Autoloader Error Messages

The following is a list of the error messsages you could come across together with their meaning and suggested course of action. Messages that are longer than ten characters scroll across the LCD.

OPERATOR ATTENTION REQUIRED LIGHT IS OFF

At BOD

Meaning: A SPACE command encountered BOD (Beginning of Data) unexpectedly. The tape is now positioned at BOD.

Action: None

At EOD

Meaning: A READ or SPACE command encountered the EOD (End of Data) area unexpectedly. The tape is now positioned at EOD.

Action: None.

Media Removal Prevented

Meaning: An eject command has been attempted when Media Removal Prevention is in force.

Action: Try again when the Media Removal Prevention has been removed (either perform a SCSI reset, or the host must send an ENABLE MEDIA REMOVAL command).

Partition 1 too large

Meaning: A command to format the tape has failed because the requested partition 1 size is too large.

Action: Try again with a smaller Partition 1 (controlled through the MODE SELECT command), or a longer tape.

SCSI Error: Check Interface

Meaning: A SCSI command error has been detected.

Action: Check the SCSI connection and try again.

Tape has DC data: Enable DC

Meaning: A READ command has encountered compressed data on the tape, and the drive is not currently configured to decompress data. The host may have disabled data compression, or configuration switch 2 is off so that the host is unable to control the drive's response to compressed data.

Action: Check that the host has not disabled data compression. Make sure that configuration switch 2 is on (the configuration switches are on the underside of the autoloader).

Tape Full

Meaning: A READ, SPACE, WRITE or WRITE FILEMARKS command encountered EOP (End of Partition) unexpectedly.

Action: The required data may be on the next cartridge. Try loading it.

OPERATOR ATTENTION REQUIRED LIGHT IS FLASHING AMBER

Bad Media: Use New Tape

Meaning: A READ or SPACE command has failed because the tape is not DDS format.

Action: Use a DDS-certified tape.

Cannot write Non-MRS Tape (flashing)

Meaning: A WRITE, WRITE FILEMARK or ERASE command has been attempted on a non-MRS tape.

Action: Remove the tape and replace it with an MRS tape.

Clean Me

Meaning: A high error rate has been detected during reading or writing.

Action: Insert a cleaning cartridge to clean the tape heads.

Close Door

Meaning: The front panel door is open. Any autoloader motion will be delayed until the door is closed.

Action: Close the front panel door.

Eject Fail: Try Forced Eject

Meaning: An eject command has failed.

Action: Use a new cartridge, or try forcing ejection.
When you have retrieved the magazine or cartridge, check that any labels are correctly and firmly attached to avoid future failures.

Error x

Meaning: The mechanism has jammed.

Action:
1 Try forcing ejection.
2 Try power-cycling the autoloader.
3 If the problem persists call your Service provider and tell them the value of x.
4 When the magazine, or cartridge has finally been retrieved, check that any labels are correctly and firmly attached to avoid future jams.

ForceEject

Meaning: Forced ejection is in progress.

Action: Allow the 35 seconds to elapse, when ejection should occur.

FW DataErr

Meaning: The autoloader has failed to upgrade the drive firmware, because the new firmware is corrupt.

Action: Obtain a good copy of the firmware upgrade.

FW Read Fail: Try Again

Meaning: A firmware upgrade failed because of an error in reading data from the tape.

Action: Clean the tape heads and try again. If it still fails, call for service.

FW Tape Write Protected

Meaning: A firmware upgrade failed because the tape is write-protected.

Action: Change the write-protect switch on the tape and try again.

FW Write Fail: Try Again

Meaning: A firmware upgrade failed because of an error in writing a modified upgrade count to the tape.

Action: Clean the tape heads and try again. If it still fails call for Service.

Illegal FW

Meaning: The autoloader has failed to upgrade the drive firmware, because the new firmware is incompatible.

Action: Obtain a correct version of the firmware upgrade.

Load Fail: Press Eject or Load Fail: Try New Tape

Meaning: A load command has failed, or a load or change partitions command has failed to read the System area of the tape.

Action: Try again with a new cartridge, or eject the magazine.

New EODmark (flashing)

Meaning: A READ command has encountered blank tape, that is, no DDS-format EOD (End of Data) pattern has been recognised.

Action: This is probably a result of a power-fail while writing to tape.

Read Fail

Meaning: A read has failed.

Action: Clean the tape heads and try again.

Tape Fault: Try New Tape

Meaning: The cartridge in the drive is faulty, possibly because the tape has snapped, or the cartridge has an invalid pattern of identification holes.

Action: Use a new cartridge.

Tape Position Lost: Clean and Retry

Meaning: A WRITE, READ, SPACE or REWIND command has failed to complete. The tape is positioned on the far side of the bad data.

Action: Clean the tape heads and try again.

Tape Stuck: Try Forced Eject

Meaning: The cartridge is stuck in the drive.

Action: Try forcing ejection. If this fails call for Service.

UpgradeErr

Meaning: The autoloader has failed to download an upgrade of the firmware through SCSI.

Action: Check the SCSI connection and try again.

Worn Media

Meaning: A high error rate has been detected during writing, suggesting that the tape is nearing the end of its usual life.

Action: Clean the tape heads and replace the cartridge with a new one.

Write Fail: Clean or Write Fail: Use New tape

Meaning: A WRITE, WRITE FILEMARK or ERASE command has failed.

Action: Clean the tape heads. Use a new cartridge.

Write Protected Tape (flashing)

Meaning: A WRITE, WRITE FILEMARK or ERASE command has been attempted on a write-protected tape.

Action: Remove the tape and change it to write-enabled.

THE OPERATOR ATTENTION REQUIRED LIGHT IS STEADY AMBER

Drive Comms Error

Meaning: The autoloader has detected that the drive has stopped communicating with the changer mechanism.

Action: Call for service.

FRU 1 Dead

Meaning: The controller board for the embedded drive has failed its self-test.

Action: Call for service.

FRU 2 Dead

Meaning: The embedded drive mechanism has failed its self-test.

Action: Call for service.

Specifications

Performance specifications apply when using data compression. Power specifications are measured at the tape drive power connector and are nominal values. The compression ratio and transfer rate achievable in any particular case depends on the characteristics of the data being compressed.

Nominal capacities	60-metre cartridge (DDS)	1.3 Gbyte (1:1 base) 2.6 Gbyte (2:1 typical) 5.2 Gbyte (4:1 max[1])
	90-metre cartridge (DDS)	2.0 Gbyte (1:1 base) 4.0 Gbyte (2:1 typical) 8.0 Gbyte (4:1 max[1])
	120-metre cartridge (DDS-2)	4.0 Gbyte (1:1 base) 8.0 Gbyte (2:1 typical) 16.0 Gbyte (4:1 max[1])
	125-metre cassette (DDS-3)	12.0 Gbyte (1:1 base) 24.0 Gbyte (2:1 typical)
Transfer rate	DDS	366 Kbyte/s (1:1 base) 732 Kbyte/s (2:1 typical) 1464 Kbyte/s (4:1 max[1])
	DDS-2	400 Kbyte/s (1:1 base) 800 Kbyte/s (2:1 typical) 1608 Kbyte/s (4:1 max[1])
	DDS-3	1000 Kbyte/s (1:1 base) 2000 Kbyte/s (2:1 typical)

[1] Nominal capacity only; can be exceeded for highly-compressible data.

Unrecoverable errors Less than 1 in 10^{15} data bits

Recording format	ANSI/ECMA (DDS-DC, DDS-2, DDS-3)		
Power specification	Voltage	+12Vdc ±10% +5Vdc ±5%	
	Ripple	+12Vdc: <= 100 mVp-p +5Vdc: <= 50 mVp-p	
	Current (operational)	0.25A @ +12 Vdc, 0.8A @ +5 Vdc	
	Current (peak)	0.8A @ +12 Vdc, 1A @ +5 Vdc	
		Operational	***Non-operational***
Environmental specification	Temperature	+41 to 113°F[1] (+5 to +45°C)	-40 to +148°F[1] (40 to 65°C)
	Thermal gradient	2°C/minute (no condensation)	Below condensation
	Relative Humidity	20 to 80% noncondensing[1]	0 to 90% noncondensing[2]
	Max Wet Bulb Temperature	78.8°F (26°C)	No condensation
	Altitude (metres)	-100 to +4,575	-300 to +15,200
	Shock (1/2 sine wave)	8 g's peak 11msec	50 g's peak 11msec
		[1]Mechanism and media	[2]Mechanism
Vibration	Sweep Test	120mm peak-to-peak (5-17 Hz) 0.73 g peak (17 to 150 Hz) 0.50 g peak (150-500 Hz)	
	Sweep Rate	8 decades per hour	
	Dwell Test (15 min)	0.90 mm peak-to-peak (5-17 Hz) 0.55 g peak (17-150 Hz) 0.25 g peak (150-500 Hz)	

Acoustic level idling (A-wt sum)	45 dBA maximum
Acoustic level operational (A-wt sum)	50 dBA maximum (measured in suitable enclosure at 3-ft distance and operator height)

Regulatory Compliance

All HP DDS drives bear the approval marks of various approving agencies to indicate compliance with specific standards. Verification of compliance to those standards may be obtained from the manufacturer.

MITSUBISHI ELECTRIC PC DIVISION

APRICOT COMPUTERS LIMITED
3500 PARKSIDE
BIRMINGHAM BUSINESS PARK
BIRMINGHAM B37 7YS
UNITED KINGDOM
Tel (44) 121 717 7171 Fax (44) 121 717 3692

http://www.apricot.co.uk