

Tape Archiving Devices

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IMPORTANT INFORMATION

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ARCHIVING DEVICES

1.1 Using a CD Recorder with the Digital Recorder

The CD-ROM disks are created by attaching a SCSI CD Recording device to the SCSI port of the Digital Recorder. The unit may be a CD Recordable (CD-R), or a CD Rewritable (CD-RW) device.

Requirements are:

Minimum Write Speed	4X
Minimum Read Speed	16X

NOTE:

See accompanying data for models tested and recommended.

The CD recorder must have a cable that connects to a standard 50-pin High Density SCSI-2 port. The address must be set to Zero (0), and the cable must be properly terminated at 110 Ohms. Failure may result in error messages being displayed on the Digital Recorder when attempting to create CD's.

Do not attempt to archive to the CD unit without a CD properly inserted into the unit. Doing so will generate a "**MEDIUM NOT PRESENT**" error message.

Creating A CD-ROM with Video Files

The Digital Recorder must be set for SELECTIVE ARCHIVE operation. This is programmed through the Digital Recorder menu system. Use the installer password to gain access to the menu system. For additional information on the menu system and passwords, refer to the Digital Recorder programming manual below.

The steps to programming the Digital Recorder are:

❑ Main Menu → Video Archive Setup

From the Main menu, select the **Video Archive Setup** option, and the following sub-menu appears. Select the **Archive Mode** option, and press the **ENTER** button key. The other two options in this menu do not apply to CD-ROM operations.

Archive Mode
Archive Setting
Erase Medium
Exit

❑ Main Menu → Video Archive Setup → Archive Mode

In this menu, highlight **Selective Archive**, and press the **ENTER** button. This activates the Selective Archive mode. At this time, exit the menus by pressing the **MENU** button until the unit returns to the Live mode.

Archiving OFF Selective Archive Restore from archive Background archive
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NOTES on Selective Archiving:

Selecting an archive mode in the above menu does **not** cause an archiving or restoring operation to begin. Instead, it causes the search function to operate differently when activated from the Live or Play modes.

You must exit the menu system and press the **SEARCH** button key. The search parameter window then appears.

In order to identify the files to be sent to the CD, it is necessary to engage the search function to create a list of files available on the Digital Recorder Hard Disk. Since a CD can hold only about 650 Megabyte, and there are several Gigabytes in the Digital Recorder, careful selection of what is to be recorded is necessary.

The maximum file size that can be archived on a CD is about 550MB, due to the overhead and housekeeping requirements of the system. If a search shows a file that is larger than this, it will be necessary to “filter” the search (place tighter restrictions on it) until the search results return a file size that can be archived. The Search operation and use of the search filters is explained in the Digital Recorder manual.

Use the **Button Panel** keys as indicated to perform various functions.

Place an “X” in the [] braces to mark the files to be archived onto the CD-ROM. Selected files should not total more than 550MB. When the limitation is reached, attempts to mark additional files for archiving will not be successful. When multiple small files are selected for archive, the total available space on the CD will be less than 550MB.

Starting CD Recording Operations

Press the **RECORD** button on the Digital Recorder to activate the archiving function. During the recording of the CD-ROM, the unit will return to the Live mode and display a progress bar, which displays the progress of the CD-Write operation. During this operation, the unit will not record cameras. Stringing recorded data onto the same CD disk at different times is supported. A 550MB is approximately equal to 1/2 hour of video recorded at 30 frames per second.

Limitations on CD Operations:
• Restore function not available. Copying a wavelet file (with .60d extension) from CD disk to the Digital Recorder hard disk drive is not supported.
• Erasing a wavelet file (with .60d extension) on CD disk is not supported.
• Playing a wavelet file (with .60d extension) from the Digital Recorder hard disk to CD disk is not supported.
• Background archiving to CD disk is not supported.

Exiting the Search Operation

Exit the Search operation with the MENU Bar.

1.2 The Tape Drives

The Autoloader has a SELECT key, an EJECT key, an LCD display, and two status LEDs for tape present and busy status (Tape Present and Busy). The SELECT key is automatically disabled once the tape load sequence begins. Tape selection will be controlled by software. The EJECT key will unload a tape from the drive and eject the full magazine from the Autoloader. The magazine has a write-protection tab, which prevents data being written to all tapes in the magazine.

NOTE:	Single tape Autoloader operations are similar to the multiple tape Autoloaders operations.
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1.3 Loading the Magazine

For correct operation, the magazine should contain from one to eight data tapes, depending on the unit being used.

NOTE:	For complete instructions on how to load your autoloader, please refer to the manufacturer's instruction manual.
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Alternate Mode of Operation: One Data Tape

SONY TSL-S9000L: (DDS3) - This unit requires a single data tape in Slot 8. Proceed as follows:

1. The tape should be labeled as tape 1 before being inserted into the magazine. In this mode, the Autoloader functions as a single-tape drive device.
2. If Slot 8 of the magazine contains a cleaning tape, the cleaning tape will be loaded into the drive, the tape heads will be cleaned, and the tape will be returned to the magazine.

Alternate Mode of Operation: Four Data Tapes

SONY TSL-SA300C: (AIT1) - This unit requires four data tapes in the magazine. Proceed as follows:

1. The tapes should be labeled as tape 1 to 4 before they are inserted into the magazine.
2. **All four tapes must be loaded in order for this unit to work.**
3. Insert tapes 2 and 1 (in that order) into the bottom shelf.
4. Insert tapes 3 and 4 (in that order) into the top shelf.

Alternate Mode of Operation: Seven Data Tapes

SONY TSL-S9000L: (DDS3) - This unit requires seven data tapes and one cleaning tape in the magazine. Proceed as follows:

1. The tapes should be labeled as tape 1 to 7 before they are inserted into the magazine.
2. The magazine should contain seven tapes in slots 1 to 7, and a cleaning tape in slot 8 to operate correctly.

Alternate Mode of Operation 1: Eight Data Tapes

SONY TSL-S9000L: (DDS3) - This unit requires eight data tapes and no cleaning tape. Proceed as follows:

1. In this case, it is the operator's responsibility to clean the tape drive periodically. Because data can be lost if the heads become dirty during archiving, this mode of operation is not recommended for continuous background archiving.
2. The tapes should be labeled as tape 1 to tape 8 before they are inserted into the magazine.
3. Insert tapes 3, 2, and 1 (in that order) into the bottom shelf.
4. Insert tapes 4, 5, 6, and 7 (in that order) into the top shelf.
5. Insert tape 8 in the last slot. Tape 8 is a data tape.

Drive Operation

When a magazine is inserted into the Autoloader, the changer cycles through all the tapes to ensure that the magazine is full. If any tape slots are empty, the magazine is ejected from the drive.

Once all tapes have been detected, Tape 1 is loaded into the drive. The tape headers are read and compared to the volume files on the disk to find a match.

- If a matching volume is found, the volume files for the other tapes in the magazine are sought on the disk. No other tapes are loaded.
- If no matching volume file is found on the disk, all the tapes in the magazine are loaded in sequence. Each tape's headers are saved to the disk.

Only when the headers from all the tapes in the magazine have been stored on the disk, can the device be used for archiving.

Volume Information

The Wavelet data headers that are stored at the beginning of a tape are stored in special files on the hard disk. This volume information is stored on the hard disk to enable the contents on a tape to be recovered quickly in case the tape drive was powered down while recording.

The volume information on the disk is also used to reference other tapes in the magazine. This speeds up the magazine loading process, as only one tape has to be read to know the contents of the other tapes in the magazine. For this reason, it is not advisable to change the order of the tapes in a magazine.

The software currently supports 32 volume partitions on the hard disk. When all available partitions on the hard disk have been allocated, the oldest partition will be cleared and reused. Each time a tape is loaded, the time stamp in the corresponding partition is updated. When factory settings are selected, all volume partitions are erased.

Restoring Tape Headers

- If the SCSI link between the Digital Recorder and the tape drive fails while data is being written to the tape, as much data as possible is restored when the link is re-established. Most of the header information is recovered from the disk, with the remaining data recovered from the tape. This recovery operation typically takes several minutes, depending on the relative position of the data from the start of the tape.
- If the power to the drive is interrupted while the drive was writing data to tape, the data recovery process may take considerably longer because the position of the last valid data must be determined. The data recovery process can be aborted by changing Archiving Mode to OFF.

Write-Protection

The magazine can be write-protected by moving the write-protect tab to the Save position. In addition, individual tapes can be write-protected by opening the write-protect tab on the tape.

- If a write-protected tape is chosen for selective archiving, no data will be written to the tape.
- If a write-protected tape is loaded during background archiving, the tape is returned to the carousel, and the next tape in sequence will be loaded.

Blank Tape

If any blank tape is detected during the loading process, the tape will automatically be partitioned into two partitions, and a blank set of headers will be written to the tape, so they are ready to receive recordings.

Tape Capacity

The tape capacity is read from the drive when a new tape is being loaded. The capacity reported by the drive is only an estimate, and varies with the make of the drive and tape. This estimated value is used in computing the percentage of space left while background archiving (or when selecting events to be archived).

During background archiving, information is written until the physical end of medium (EOM) is encountered. When a tape has been filled, the full capacity will be used rather than the estimated capacity reported by the drive. The full capacity will continue to be used until the tape is erased when it is not full, after which the estimated capacity will be used again.

Erase Medium

If more than one volume is detected, the user can use the Erase Medium menu to select one or more volumes to erase. All selections will be off by default. More than one volume can be selected per erase operation.

- If the selected volume is in the tape drive, the header partition on the loaded tape is erased.
- If the selected volume is not in the drive, the selected tape is loaded and the headers are read. The tape is erased only if the headers read from the tape match those on the disk for that position in the magazine.
- If the headers on the tape are different from those on the disk, the tape positions in the magazine must have been changed. In which case, the tape is not erased. The tape in position one must be removed, a new reading of the magazine begins, and tapes will be erased.

The progress bar tracks the erase operation. It reaches 100% when all selected tapes have been erased. The bar is not updated smoothly, but rather in stages during the erase operation. The progress bar does not change while a tape is being selected (up to 3 minutes). The tapes are erased in sequence starting with the lowest selected ID, regardless of which tape was originally in the drive.

NOTE: When Background Archive Mode is active, certain tape functions are not available, such as Erase Medium. In order to erase a tape, switch to Selective Archive Mode.

Stuck Tapes

The Autoloaders do not always boot reliably when powered on with a tape in the drive. During the initialization sequence, one of the tapes from the magazine may become dislodged from the magazine and will have to be removed manually from the Autoloader and replaced in the magazine. This seems to be either a drive or magazine feature, which the software cannot remedy. As a result:

- The use of an uninterruptable power supply (UPS) is recommended when using the Autoloader.
- Be sure that the magazine is ejected from the Autoloader before removing power.

NOTE: If the Autoloader is powered on with a tape in the drive, the headers from that tape are read (and restored if necessary), and the loaded tape is used as the reference tape.

If this occurs, the SELECT key on the Autoloader is enabled until a different tape is loaded.

Do not press the SELECT key at this time. Doing so will cause a new tape to be loaded.

Cleaning Cycle

The cleaning tape is loaded during background archiving without any user intervention. It is loaded when (a) it is the next tape in sequence, and (b) at least two tapes have been written to the End of Media.

The heads are cleaned, and the tape is returned to the magazine. The next tape in sequence is then loaded. The cleaning tape is not used during selective archiving.

If the magazine volume information is not found to be on the hard disk during the initial loading sequence, the cleaning tape is loaded. If (a) all the tapes in the magazine are full, (b) at least two tapes have received data since the last cleaning cycle, and (c) the background archiving mode is either **No Overwrite** or **Write Once**, the heads are cleaned before the magazine is ejected.

Data Transfer Operations

Four Data Transfer Operations	
• Selective Archive	• Play from Tape
• Restore from Archive	• Background Archive
	• No Overwrite
	• Write Once
	• Continuous

The Selective Archive Mode

If more than one volume is found, a list of available volumes is displayed. The loaded volume is selected by default. Selecting a volume deselects the previously selected volume.

When a volume has been selected, and the menus have been exited, pressing the **SEARCH** key displays (1) the selected events on the disk, and (2) the free capacity of the selected volume. Pressing the **RECORD** key starts the copying of events from the disk to the tape.

If the selected tape is not the tape in the drive, the other tapes in the magazine are loaded in succession until the matching tape is found. If no matching tape is found, no information is archived to the tape. It is possible to select only events that will fit on the tape. The capacity of the tape is determined when the tape is loaded.

The **Remaining Capacity** parameter is only an approximate value. In some cases the EOM may be encountered before the complete event has been written. In this case, the headers on the tape are updated, but the full tape will not be ejected from the drive. A message appears indicating that not all information was archived. In Selective Archive Mode, a tape can be erased.

The Restore from Archive Mode

If more than one volume is found, a list of available volumes is displayed. The loaded volume is selected by default. Selecting a volume deselects the previously selected volume.

When a volume has been selected, and the menus have been exited, pressing the **SEARCH** key displays (1) the selected events on the disk, and (2) the free capacity of the selected volume. Pressing the **RECORD** key starts the copying of events from the tape to the disk.

If the selected tape is not the tape in the drive, the other tapes in the magazine are loaded in succession until the matching tape is found. If no matching tape is found, no information is restored from the tape.

The Play from Tape Mode

If more than one volume is found, a list of available volumes is displayed. The loaded volume is selected by default. Selecting a volume deselects the previously selected volume.

When a volume has been selected, and the menus have been exited, pressing the **SEARCH** key displays (1) the selected events on the disk, and (2) the free capacity of the selected volume.

Pressing the **ENTER** key plays back an event from the Restore Results screen. If the selected tape is not the tape in the drive, the other tapes in the magazine are loaded in succession until the matching tape is found. If no matching tape is found, nothing is played back. **Do not cancel** a search, or start another search, while the autoloader is unloading or loading tapes.

The Background Archive Mode

If the Autoloader is being used with a single tape in Slot 8, the Autoloader functions as a single-tape drive. The tape is unloaded when full regardless of the background archiving setting.

When background archiving begins, all tapes in the magazine are searched to find the most recent event. If all the tapes are blank, Tape 1 is selected.

NOTE:	When Background Archive Mode is active, certain tape functions are not available, such as Erase Medium. In order to erase a tape, switch to Selective Archive Mode.
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During background archiving, the Archive **Percentage**, and **Time Left** parameters indicate the estimated time left **for the magazine**, not just for the current tape. Information is written until the EOM is encountered. This may be slightly greater or less than the reported tape capacity. The remaining time left is recalculated when the next tape is loaded to overcome this difference. If a loaded tape is write-protected or not usable, the archive time is adjusted accordingly when the next tape is loaded.

There are three different settings for background archiving in the Video Archive Setup menu:

- No Overwrite.
- Write Once.
- Continuous.

How the Archive Setting Works

The tape with the most recent recorded event is the starting point.

- If that tape is not full, it is loaded, and archiving begins.
- If full, the magazine is sequentially searched for a tape having some free space.
- If one is found, it is loaded, and archiving begins. Otherwise, the magazine is ejected (see below).

The Archiving Process

The archived information is appended to any existing data on the tape. When a tape becomes full, it is returned to the magazine, and the next tape with free space is loaded.

The Archive **Percentage** and **Time Left** parameters indicate the remaining capacity **of the magazine**. When these decrease to zero, all tapes in the magazine are full, and the magazine is ejected.

The Write Once Setting

The tape with the most recent recorded event is found, and the next tape in sequence is selected as the starting point. This tape is loaded **and erased**, so that archived information starts at the beginning of the tape.

The Archive **Percentage** and **Time Left** parameters indicate the remaining capacity **of the magazine**. When these decrease to zero, all tapes in the magazine are full, and the magazine is ejected.

When Magazine Ejection Occurs

Insert another magazine. (It must be fully loaded before archiving can begin.)

The magazine changeover operation may take a number of minutes to perform, in which case some data may be lost.

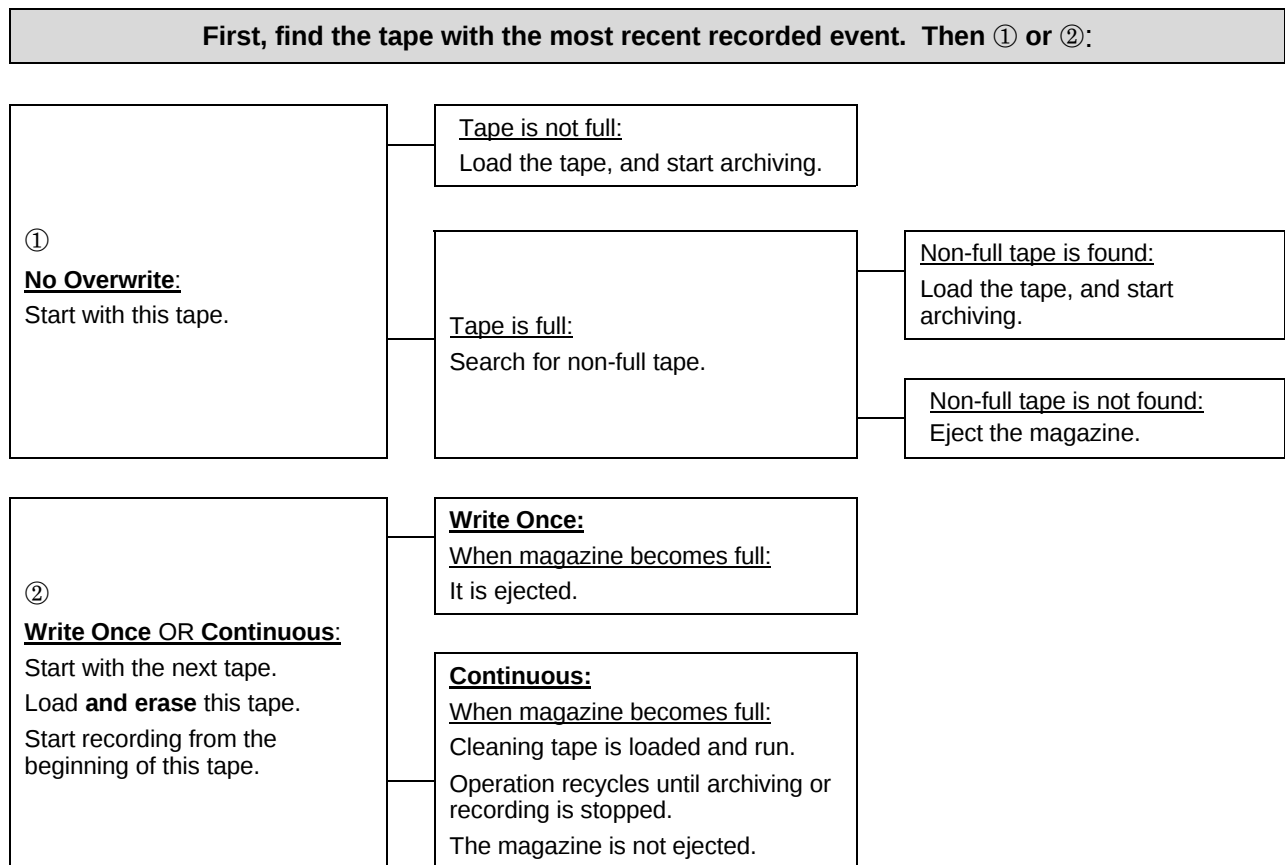
The Continuous Setting

The tape with the most recent recorded event is found, and the next tape in sequence is selected as the starting point. This tape is loaded **and erased** so archived information starts at the beginning of the tape.

The Archive **Percentage** and **Time Left** parameters indicate the remaining capacity **of the magazine**. When these decrease to zero, the cleaning tape is loaded and run. This operation recycles until archiving or recording is turned off. The magazine is not ejected in this mode.

Background Archiving Summary

The following chart summarizes the sequence of operation for each type of background archiving.



Archiving Error Messages

The Archiving Error Messages has been expanded to display different text strings. The alarm relay will only be set if the string is **Archiving Failed**.

Mode	Message	Reason
Selective Archive	Medium not present.	The tape cannot be selected.
" "	Not all data was archived.	1) Reached EOM on the tape. 2) The Archive Mode is turned OFF.
" "	Medium is write-protected.	Cannot write to tape as write tab is open.
" "	Archiving Failed. [†]	1) The write command failed. 2) The drive is disconnected.
Restore From Archive	Medium not present.	The tape cannot be selected.
" " "	Not all data was archived.	The Archive Mode is turned off.
" " "	Can't read medium.	1) The read command failed. 2) The drive is disconnected.
Play From Tape	Can't read medium.	1) The read command failed. 2) The drive is disconnected.
Background Archive	Archiving Failed. [†]	1) The write command failed. 2) The drive is disconnected.
[†] The alarm relay is set if this message appears.		

The Archiving Icon

When the unit exits Record mode during archiving, a white tape icon appears in the bottom right hand corner of the monitor. It indicates that archiving is in progress. The icon remains until all information has been written to tape, and the tape headers have been updated.

If the tape or magazine becomes full before all the information has been written to the tape, the magazine is ejected, and the archive icon remains on the monitor. The icon is cleared when a new tape or magazine is loaded.

Turning off the Archive mode in the menus can also clear the icon. This action also flushes the remaining data buffers. This operation may take a while if a tape is being loaded or the magazine is being ejected.

NOTE: The Digital Recorder should not be turned off if the archive icon is visible and data is still being written to tape.

1.4 Tape Archiving Devices

Tape Archiving Devices			
DAT Drives - DDS3	Accessories		
Sony Single Tape	Tape	Terminator	Cable P/N or Description
SDT-S9000L	DG-D125MA	50-pin male Centronics active	50-pin Centronics male to 50-pin High Density male
SDT-S9000L/BB	DG-D125MA	50-pin male Centronics active	50-pin Centronics male to 50-pin High Density male
SDT-S9000L/BM	DG-D125MA	50-pin male Centronics active	50-pin Centronics male to 50-pin High Density male
SDT-S9000L/N	DG-D125MA	50-pin male Centronics active	50-pin Centronics male to 50-pin High Density male
SDT-S9000L/ME	DG-D125MA	50-pin male Centronics active	50-pin Centronics male to 50-pin High Density male
H. P. Single Tape	Tape	Terminator	Cable
DAT-24 C1537D	C5708A	K2291	K2286
DAT-24 C1556D	C5708A	K2291	K2286
Sony Multi Tape	Tape	Terminator	Cable
TSL-S9000L	DG-D125MA	50-pin male Centronics active	50-pin Centronics male to 50-pin High Density male
TSL-S9000L/BM	DG-D125MA	50-pin male Centronics active	50-pin Centronics male to 50-pin High Density male
TSL-S9000L/LB	DG-D125MA	50-pin male Centronics active	50-pin Centronics male to 50-pin High Density male

Tape Archiving Devices			
AIT Drives - AIT1	Accessories		
Sony Single Tape	Tape	Terminator	Cable
SDX-S300C	SDX1-25C	68-pin male High Density active	68-pin High Density male to 50-pin High Density male
SDX-S300C/BB	SDX1-25C	68-pin male High Density active	68-pin High Density male to 50-pin High Density male
SDX-S300C/BM	SDX1-25C	68-pin male High Density active	68-pin High Density male to 50-pin High Density male
SDX-S300C/ES	SDX1-25C	68-pin male High Density active	68-pin High Density male to 50-pin High Density male
Sony Multi Tape	Tape	Terminator	Cable
TSL-SA300C	SDX1-25C	68-pin male High Density active	68-pin High Density male to 50-pin High Density male
TSL-SA300C/BM	SDX1-25C	68-pin male High Density active	68-pin High Density male to 50-pin High Density male

ALTERNATE SOURCES		
DAT Tapes		
Source	Part Number	Description
Maxell	HS-4/1255	For Sony or H. P. DAT drives
Terminators		
Source	Part Number	Description
http://www.cable4pc.com/	X-824	CN50-M, Active, for Sony DAT Drive
http://www.cable4pc.com/	X-854	HPDB68M, Active, for Sony AIT Drives
CompuPlus	40-0027	Centronics 50-pin Male, Active, for Sony DAT Drives
CompuPlus	40-0025	High Density 68-pin Male, Active, for Sony AIT Drives
Cables		
Source	Part Number	Description
http://www.cable4pc.com/	X-656	HPDB50-M - CN50-M, 50-pin Centronics male to 50-pin High Density male, for Sony DAT
http://www.cable4pc.com/	X-776	HPDB68M - HPDB50-M, 68-pin High Density male to 50-pin High Density male, Sony AIT
CompuPlus	40-0036	50-pin Centronics male to 50-pin High Density male, for Sony DAT
CompuPlus	40-0021	68-pin High Density male to 50-pin High Density male, for Sony AIT

The Digital Recorder unit provides a 50-pin High-Density, Female, SCSI-2 port for the archive system. The Archive system must be an External DAT External or AIT drive. Current acceptable models are as shown above.

CAUTION: The SCSI bus must be terminated properly. Otherwise, the system will not operate properly. Units are not always packaged with the cables and terminators.

The SCSI device address **MUST** be set to zero (0) or the device will not be recognized. Consult the device manual for information on how to set the address. Units are not always shipped with the address set to zero.

Wherever possible, of the TSL-SA300C AIT units as this incorporates the latest tape technology that is more suitable for multi-tape passes without the need for repeated head cleaning. Both Autoloaders will display "CleanReq" in the LCD screen when their heads need cleaning.

(AIT2 and DDS4 units should also work with this software and will be tested as soon as they become available. Their operation would be as AIT1 and DDS3 respectively).

CD-ROM Archiving Devices

The CD-ROM disks are created by attaching a SCSI CD Recording device to the SCSI port of the Digital Recorder. The unit may be a CD Recordable (CD-R), or a CD Rewritable (CD-RW) device.

Requirements are:	Current models tested by Impac Technologies include:
Minimum Write Speed = 4X	Yamaha CRW - 4416SXZ
Minimum Read Speed = 16X	Yamaha CRW - 8424SXZ

The CD recorder must have a cable that connects to a standard 50-pin SCSI-2 port. The address must be set to Zero (0), and the termination switch on the CD recorder must be set to ON. Failure to do so may result in error messages being displayed on the Digital Recorder when attempting to create CD's. Do not attempt to archive to the CD unit without a CD properly inserted into the unit. Doing so will generate a "**MEDIUM NOT PRESENT**" error message.

ALTERNATE SOURCES		
Yamaha CD-R SCSI Cables		
Source	Part Number	Description
http://www.cable4pc.com/	X-673	HPDB50-M - HPDB50-M, 50-pin High Density male to 50-pin High Density male
CompuPlus	40-0032	50-pin High Density male to 50-pin High Density male

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