iSeries and AS/400 Tape Users Handbook

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iSeries and AS/400 Tape Users Handbook for QIC, 8mm, 1/2” Reel

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PREFACE Introduction

This manual pertains to users of Quarter Inch Cartridge (QIC), 8mm, and 1/2” tape drives. This manual contains information about planning for, using, and caring for your tape system. It provides basic information on recommendations and procedures that should be followed when using tape systems.

Mechanical or electrical errors may some day cause your hard disk to fail, or you may lose valuable data as a result of a user error or accident. With a reliable tape backup of your data, you will be able to restore your information.

Tape devices can also be used for data transfer, system updates, archiving data, software distribution, and security procedures as well as simple backups. Your tape device should be an integral part of your entire data management system.

Because your backup system will most likely be used for more than backing up your data, you need to consider some of the following points when choosing your tape device:

- Cost (hardware, media, and software)
- Efficiency
- Reliability
- Capacity
- Ease of use

- Current technology

PREFACE.1

Who Should Use This Guide: This manual is for the use of customers or their representatives who set up or operate an IBM tape system.

1.0 Chapter 1. Protect Your Investment

Your data is too important to lose. Most data loss is due to human intervention (human error). It can take days or weeks to reproduce data that has been lost. Data loss can cause your business to suffer financial hardship or even failure.

The next time you think backing up your data is too expensive or time consuming, consider the cost of re-creating data that was not backed up. The investment in a quality tape system, quality tape media, and recommended cleaning cartridges is well worth the expense.

Human error is the most common cause of lost data. However, data can be lost or destroyed in other ways:

Criminal data loss

A disgruntled employee or a malicious competitor can cause unrecoverable damage.

Natural Disasters

Unforeseen disasters can destroy your data quickly. Your valuable data could be destroyed by one of the following examples:

Climate control system failure	Power outage
Earthquake	Power surges
Fire	Smoke/dust contamination
Plumbing leaks	Storm Damage

Theft

A burglary of your business can mean lost data that was stored on stolen hard disks.

Viruses

Data-destroying software viruses can be introduced to your computer system unknowingly from new software or electronic bulletin boards.

The best insurance you can buy cannot replace your lost data. Protect your investment. Backup your valuable data.

2.0 Chapter 2. Tape Drive and Cartridge Care

Your tape drive system and the tape cartridges you use with your system are the tools that are required to backup your valuable data. The quality and care of these tools can affect the reliability of the information recovered in the event of data loss.

2.1 Choosing a Tape Cartridge

Tape cartridges are not all alike. The tape composition and length, and the construction of the cartridge itself can all affect the quality and capacity of the recording and the performance of your tape drive. A poor quality tape cartridge may appear to work adequately in your system, yet it can leave contamination in the tape path or impede the speed of the recording.

Tape cartridges come in a variety of sizes, types, and qualities. The width and length of the tape, the composition of the tape, and size, shape, and construction of the cartridge shell must all be considered when selecting the tape cartridge to use with your system. Only data and cleaning cartridges recommended by your tape-drive manufacturer should be used. Generic tape media is used for audio and video recording purposes. Data grade tape media is the only type of tape media that should be used for backup and data processing.

Saving money by using generic media for data purposes will do little to save your business if your data is destroyed and your backup tapes fail because of inferior media.

2.2 Caring For Your Tape System

Tape systems require special care and handling. Unfortunately, since the tape cartridges used in current systems resemble the tape cartridges used in audio and video recording, they are often stored and handled in ways that can destroy or corrupt the data stored on them.

Computer tape systems used to be housed in climate-controlled rooms and were handled by special personnel that cleaned the tape paths on a regular basis. With highly-sophisticated equipment becoming smaller and more affordable, these high capacity tape devices are now used regularly by all levels of computer operators. They can be found everywhere from business offices to submarines. Their size and low power requirements allow them to be installed almost anywhere. Many of these environments are not recommended by the tape drive manufacturer Tape drives record data using densities similar to hard disk drives. Because most computer systems are not located in a dust-free, climate-controlled environment, you must exercise special

care when dealing with tape cartridges and tape drives. They need to be treated as a valuable asset used to protect your business data.

2.3 Using Your Tape System

Most tape drive systems provide multiple retries and error recovery handling procedures to prevent data loss. These procedures do not completely protect your system, however. The manufacturer's recommendations for cleaning, storage, and handling should be strictly followed to ensure an efficient reliable tape backup system. The following sections describe some recommendations that can help prevent problems in your tape system.

2.3.1 Tape Selection

Use the tape cartridges recommended by the manufacturer of your tape system. The tape cartridges should be data grade media, such as the IBM data grade cartridge originally supplied with your drive.

2.3.2 Over Using Tape Cartridges

Using a tape cartridge beyond its normal lifetime can cause a failure in your backup system. Tape systems with mechanical loaders or library type systems often experience this problem as the system does not know when a tape has been over used. When a tape cartridge is over used, the tape begins to break down, leaving particles that can contaminate or damage the tape system or other tape cartridges.

Tape cartridges that are frequently used (for regular, scheduled backup) should be replaced at regular intervals. Also, tapes that are involved in tape related errors, are physically damaged, or that are exposed to extreme temperatures should be replaced immediately.

To ensure that your tapes are in good condition, you should monitor the tape volume statistics on your system as follows:

1. Use the Start System Service Tools (STRSST) command.
2. Select option 1 (Start a service tool) on the System Service Tools menu.
3. Select option 1 (Error log utility) on the Start a Service Tool menu.
4. Select option 4 (Work with tape/diskette lifetime statistics) on the Error Log Utility menu.
5. Select the type of removable media for which you want data on the Select Media Option display. The Work with Lifetime Statistics display appears.

2.3.3 Storing Tape Cartridges

Tape cartridges should be stored in their protective case or placed in a dust-tight container designed for tape storage. Temperature and humidity should be kept constant at a level comfortable for you. Always store tape cartridges on edge. Do not store cartridges flat for an extended period of time. If cartridges are exposed to extreme temperature or humidity changes, let the cartridge adapt for 24 hours or the amount of time spent in the different environment before using.

2.3.4 Cleaning

Use the cleaning cartridges recommended by the tape system manufacturer. Use high quality cartridges, such as the IBM cleaning cartridge originally supplied with your drive.

Follow the recommended tape drive cleaning schedule. Clean your tape drive after any media-related error occurs. **With new media, clean after initial use, and every 2 hours for the next 5 cartridge loads**. Log the use of the cleaning cartridge on the cartridge label and discard the cartridge when fully used.

Note: Some tape systems display an amber LED or display a message to signal that cleaning is needed. Follow the tape drive manufacturer's recommendations when this indicator or message is shown.

2.3.5 Environment

Tape drives should be placed above floor level, preferably at a desk-top or higher level. Do not place the tape drive near outside doorways, printers, copiers, or high-traffic hallways. Remove tape cartridges from the tape drive when not in use. Maintain a constant temperature and humidity that is comfortable to you. Avoid high humidity areas.

Note: Nighttime settings of heating and air conditioning may require you to adjust the timing of your tape drive use.

2.3.6 Troubleshooting

If a tape operation fails, clean the drive and retry the operation. If the failure occurs again clean the drive, use a new tape cartridge, and retry the operation. Ensure that the tape cartridge and tape drive manufacturer's recommendations are being followed.
Sometimes several cleanings may be required to correct a problem.

Ensure labels are correctly positioned on the tape cartridges and the edges are not peeling off. Contact your IBM Authorized Service Representative if problems persist.

2.4 Retensioning of Quarter Inch Cartridge (QIC)

The tape within a QIC tape cartridge can become loose, causing the magnetic head of the tape drive to lose contact with the tape during use. Tape cartridges must maintain a consistent tension to prevent gapping. Whenever a tape is loaded, exposed to temperatures different from the normal storage environment, or used repeatedly over a small section of the tape, the tape should be retensioned. Ensuring the tape cartridge has the correct tension will help to maintain reliable, error-free use.

For lower capacity QIC data cartridges (less than 13GB cartridge capacity), the drive default is to do an 'auto-retention as part of the cartridge load sequence. Auto-retention means a retention pass will be done each time a cartridge is loaded. For the 13GB, 16GB, 25GB cartridges, the drive default is to do a conditional retention as part of the cartridge load sequence. Conditional retention means a retention pass will be done during the cartridge load sequence only if the drive determines it is required.

2.5 Operating/Storage/Transportation Environments

In general keep the tape unit within the following environments to ensure reliable tape use: Note: For your specific tape drive follow the manufacturer's recommended guidelines. Do not locate your tape system in a high humidity environment.

	Operating	Storage	Transportation
Temperature	41 to 90øF (5 to 32øC)	41 to 90øF (5 to 32øC)	-40 to 125øF (-40 to 52øC)
Relative Humidity	20-80%	20-80%	20-80%
Wet Bulb	79øF (26øC)	79øF (26øC)	79øF (26øC)

2.6 Storage

Follow these storage guidelines to maintain reliable data cartridges:

- Remove all data cartridges from the tape drive when the drive is not in use.
- Store data cartridges in their protective covers.
- Store data cartridges in a secure operating environment.
- Store data cartridges away from direct sunlight.

2.7 Archiving Data

Many variables can affect the shelf life of an archived data tape cartridge. The quality of the tape cartridge and tape system, the storage environment, and method of storage can all affect the recovery of the information stored on the cartridge.

Physical damage to the medium is the most probable cause for unsuccessful recovery of archived information. Damage can be caused by broken or poorly maintained equipment, a contaminated environment, or mishandling.

Contamination can occur at any time throughout the storage process. Contamination can either preexist on the tape, be created during the recording process (typical of dirty environments), or be passed on by a dirty tape or drive.

Some tape media manufacturers state that long term storage on tape can vary between 10 and 30 years. Use the following archive guidelines to ensure reliable long-term data storage:

- Always store the tapes within the recommend storage temperature and relative humidity.

  Make sure the environment is kept clean and constant when transporting tapes. Drastic changes in temperature or humidity can damage tapes. Transport cartridges in a sealed container to avoid contamination.

  Always maintain a constant environmental atmosphere. A consistent storage and operating environment reduces media exposure to climatic stress.

- Tape cartridges should always be stored in their protective cases. The storage case helps prevent damage from dust and physical misuse.

  When the tape cartridges are not in use or being stored, they should be in their storage cases and stood on edge in a designated storage location. Do not stack cartridges on the flat side or stack other items on top of the tape cartridges. Handle your tape cartridges with care to reduce archival problems.

- Always keep your tape system and cartridges in a clean environment. Smoking, eating, or drinking should be avoided. Printers and copiers can produce paper and toner dust. Locate the tape system away from these items. High-traffic areas near hallways and doors can also produce excess dust and dirt.

  The tape drive must be kept clean. A poor performing drive could contaminate the tape, damage the tape, and/or produce an inferior backup.

- An important information should be recorded on the tape label. Information, such as the model and number of the system or tape drive, the date, the density, any error statistics, and a log number should be included. The operating environment and compression mode should also be noted.

- Stored tapes should be exercised at least once every 12 months. Run the tape from beginnning of tape (BOT) to end of tape (EOT) and back to BOT at normal operating speeds. Tapes stored in a warmer environment should be exercised more frequently.

- Retrieval of archived data should be performed on a tape unit that is clean and fully operational. Try to make the recovery environment the same as the operating environment. Allow tapes at least 24 hours to acclimate to the environment of the tape unit.

3.0 Chapter 3. Keep It Clean

The magnetic head of the tape drive contacts the magnetic tape of the tape cartridge when recording to or reading from the tape. If the magnetic head and tape become separated because of particle contamination or loose tape, read/write errors can occur resulting in lost data. The magnetic tape consists of the following parts:

1. A tape substrate that makes up the body of the tape.

2. A backing material to protect the side of the substrate that does not contact the drive head.

3. A magnetic coating that covers the substrate and contacts the magnetic head of the tape drive.

The rate that your tape drive becomes dirty can vary widely depending on the environment in which it is placed. Tape quality, tape use, tape motion, tape path condition, and climate can all affect your data quality. Cleaning the tape path is very important. Operating the tape drive for an extended time without cleaning can cause particles to build up on the magnetic head and in the tape path. These deposits can cause read/write errors and drive failures. If these deposits cannot be removed using a cleaning cartridge, the tape unit will have to be returned to the manufacturer for proper cleaning. Regular cleaning and proper maintenance of the tape unit will help prevent errors and costly service charges.

3.1 Cleaning Methods

To get the best performance from your tape system, regular head and tape path cleaning should be performed. Regular cleaning with an approved cleaning method will prevent deposit build up as well as maintain the tape path and read/write heads in a clean condition. Use only methods and products approved by your drive manufacturer.

* Only use cleaning products recommended by the manufacturer, do not use poor quality media.

* Log each use of the cleaning cartridge on the label.

* Discard the cleaning cartridge when fully used, do not try to rewind it.

* Refer to the manufacturer’s recommendation for the use and storage of cleaning cartridges.

* Do not insert any foreign objects into the drive mechanism. Follow the manufacturer's recommendations for cleaning, frequency, process, and materials. The following sections recommend what cleaning products to use for IBM tape products.

3.1.1 1/4" QIC Tape Drive Cleaning

Use only the IBM cleaning cartridge designed for your drive model.

For QIC-120 and QIC-525 tape drives use the wet cleaner cartridge P/N 16G8572.

For all other QIC tape drives use the dry cleaner P/N 59H4366
** 6386 device clean time = 3 minutes

3.1.2 8mm Tape Drive Cleaning

Use only the IBM cleaning cartridge designed for your tape drive model. Cleaning cartridges (P/N 16G8467) used in 2.3GB, 5.0GB, and 7.0GB drives are different from Cleaner Cartridge used in the 20.0GB drives. Clean your drive once a month or whenever the top amber LED is turned on (not applicable to 2.3GB drives). Clean your drive after any media-related errors. Clean your 2.3GB drive after every 30 hours of read/write activity. Observe the remaining cleaning material through the cartridge's window and discard the cartridge when fully used.

3.1.3 1/2" Reel Tape Drive Cleaning

Use the following items to clean the drive:

- Tape cleaning kit (IBM PN 352465 or similar kit)
- Cleaning fluid (IBM PN 13F5647 or similar fluid)
- Lint-free cloth (IBM PN 2108930 or similar lint free cloth)
- Rigid cleaning tool (IBM PN 2200574 or similar tool)

When cleaning is complete, dry all tape path components. Do not load a tape when moisture is present in the tape path.

Do not use:

- A Process that are not approved by the drive manufacturer.
- Cleaner solutions containing lubricants.
- Standard hub cleaners or strong alcohol solutions (>20%). These solutions will damage the guides and rollers in the tape path and tape head.
- Aerosol cleaners. The spray is difficult to control and can contain metallic particles.

- Soap and water on the tape path. Soap leaves a thick film, and water may damage electronic parts.
- Cloths and swabs that have been used previously. Although they appear clean, they are dirty.
- Facial tissues. Although they may seem effective, they leave abrasive lint in the tape path.

3.2 Location of The Tape System

Environment and location can affect the operation of your tape backup system. Consider the following when determining where to install your tape backup system:

- Operating temperature requirements of the devices. - When using tape media, the operating temperature should be 5 to 32 degrees C (41 to 90 degrees F). The maximum operating wet bulb temperature is 26 degrees C (79 degrees F).
- Air quality of the location where the devices will be used. (For example, excessive dust could damage your tape system.) Temperature and humidity have been shown to adversely impact tape systems inside or attached to a computer. Avoid placing your tape system in areas such as:

    Areas where the computer shares A/C and heating with manufacturing areas.

    Areas where the A/C and/or the heating are not controlled by a thermostat near the computer.

- Environmental contaminants have been shown to adversely impact tape systems. The type of contaminant and the amount of contaminant present in the area are key in determining the action that is required to prevent failures. Avoid placing your tape system in areas such as:

    Construction in close proximity to the tape system.

    Near building entrances or exits.

    Dusty/dirty environments.

    High traffic areas.

Only a small portion of tape systems found to be installed in the above four areas are affected by one or more of these conditions. These tape systems, however, have required far higher service than similar tape systems installed in areas where these conditions are not present. Tape systems that are installed in these areas should be moved to an environment more suitable for their operation.

4.0 Chapter 4. Tape Backup

Your time and data are too valuable to lose. A reliable backup of your system will allow you to quickly restore your data to the point of the last backup, ensuring a minimal loss of time and resources. The frequency and scope of your backups needs to increase as the dependence on the data and the value of the data increases. Do not rely on a single tape cartridge to reliably back up your data. The value of your data should determine whether your backups are daily, weekly, monthly, or a time limit of your choosing. The value should also determine the length of time for data to be archived. For information on backup strategies, refer to the OS/400 Backup and Recovery Book (SC41-5304) for releases prior to V4R4. For V4R4 and later, refer to the AS/400 Information Center at the following web site: **http://www.as400.ibm.com/infocenter**

It is STRONGLY recommended that BRMS/400 is used for tape management and implementing backup and recovery on your system.

4.1 Compatibility and Interchange

Understand that each tape software application has a unique format for putting data onto tape. These unique formats make it generally impossible to recover data using an application other than the application that was used to backup the data. The same problem can even exist when using different versions of the same product. One way to prevent this from becoming a problem is to include the backup software name, version, and procedure name on the cartridge label. Entering this information into a backup log is an alternative to putting it on the tape label.

4.1.1 QIC Tape Cartridge Compatibility

Capacity and Data Rate by Media Type/Format				Read/Write Support by Tape Drive Type / Feature Code (identified by the front of the tape drive and by FC#s)				
Media Type (IBM P/N)	**AS/400 Format (density)**	**Data Compaction** (Note 2)	**Capacity and Data Rate** (Note 3)	**QIC-2GB (FC#s 6x80) or QIC-2GB (DC) (FC#s 6x81)**	**4/8GB SLR5 QIC-4GB-DC (FC#s 6x82, 4x82) or 7207-122**	**MLR1-S QIC-5010-DC (FC#s 6x83, 4x83)** (note 6)	**MLR1 QIC-5010-DC (FC#s 6x85)** (note 6)	**MLR3 (FC#s 6x86, 4x86)** (note 6)
MLR3-25GB (59H4128)	MLR3	Yes	25GB 2.0MB/s	No	No	No	No	R/W
MLR1-16GB (59H4175)	QIC5010	Yes	16GB 1.5MB/s	No	No	R/W	R/W	R/W
MLR1-2GB (35L0589)	QIC5010	Yes	**2GB 1.5MB/s**	No	No	R/W	R/W	R/W
SLR5-4GB (59H3660)	QIC4DC	Yes*	8GB .76MB/s	No	R/W	R	No	R
SLR5-4GB (59H3660)	QIC4GB	No	4GB .38MB/s	No	R/W	R	No	R
DC9250 (16G8436)	QIC2DC	Yes*	5GB .6MB/s	R/W (note 4)	R/W	R	No	R
DC9250 (16G8436)	QIC2GB	No	2.5GB .3MB/s	R/W	R/W	R	R/W	R
DC9120 (21F8730)	QIC1000	No	1.2GB .3MB/s	R/W	R/W	No	R/W	No
DC6525 (21F8597)	QIC525	No	525MB .2MB/s	R/W	R/W	No	R/W	No
DC6150 (21F8578)	QIC120	No	120MB .12MB/s	R/W	R/W	No	R/W	No
DC6150 (21F8578)	QIC24	No	60MB .092MB/s	R	No	No	No	No

1. An 'R/W' indicates both Read & Write support of the associated media type/format. An 'R' indicates Read only.
2. Data Compaction is a term used to describe a data recording option for compacting (or compressing) data prior to writing to the tape media. Selecting the data compaction option, will usually result in an increase in both capacity and data transfer rate. The typical compaction ratio is 2:1, but is dependent upon the type of data. A 'Yes' in the Data Compaction column indicates that the associated media type/format supports data compaction. The OS/400 SAVE command parameter 'COMPACT' is used to select the data compaction option, except for those cases identified by a 'Yes*'. A 'Yes*' indicates that the compaction option is controlled entirely by the format (density) that is selected during the tape initialization operation. The OS/400 SAVE command parameter 'COMPACT' will have **no effect** in these cases.
   - QIC2DC is a compaction format (density) for the DC9250 media type.
   - QIC4DC is a compaction format (density) for the SLR5-4GB media type.
3. Cartridge capacities and data transfer rates shown are for non-compacted data, except for the QIC4DC & QIC2DC cases. For the QIC4DC & QIC2DC formats, the values shown assume a 'typical' 2:1 data compaction. Refer to Note 2. Transfer rates for older format tapes are approximate. Actual rates will vary slightly depending upon the tape drive feature.
4. The QIC2DC recording format is supported by the QIC-2GB (DC) drive type, but not by the QIC-2GB drive type.
5. **Media type MLR1-2GB is a lower priced/capacity 'servo technology' tape that is strongly recommended** for backup & interchange applications with capacity requirements up to 4GB (assuming a typical data compression ratio of 2:1). The benefits of this media include high performance (high data transfer rate), and high reliability inherent to servo technology.
6. **Warning:** Refer to the shaded area of the table. **Use of DC6150 & DC6525 tapes (or any other 550 Oe tape types) may shorten the life of the tape drive and cause higher maintenance.**
   - Do not use DC6150 or DC6525 tapes with tape drive types MLR1-S or MLR3 . These tapes are not supported in these drives and will be rejected. Under worst case condition, even the tape loading process can result in damage.
   - Consider alternatives to DC6150 and DC6525 tape use with tape drive type MLR1.
   - See note 5 for the recommended tape type for backup, interchange, and distribution applications that require a data cartridge capacity of less than 4GB.

As listed in the above chart, the quarter inch tape drives support a large number of media types and formats, all are produced to a written set of specifications. Though all IBM media is written to reliability specifications, IBM recommends using the new technology media (with imbedded servo) on the following quarter inch tape drives: MLR1-S QIC-5010-DC, MLR1 QIC-5010, and MLR3. Use of the recommended media shown in chart 2 will result in the highest level of tape operation reliability and will provide the highest performance. Tape media/format error correction capabilities and utilization of servo tracks (reliability indicators), and data transfer specifications are illustrated in chart 3.

Media recommendations for the MLR1-S QIC-5010-DC, MLR1 QIC-5010, or MLR3 tape drives.

Chart 2 **Daily Capacity Requirements** **Weekly backup**

IBM Part Number	< 1GB	> 1GB and < 2GB	>2GB	
35L0589 2GB	**Yes**	**Yes**	**Yes ****	
59H4175 16GB	No	No	Yes	Yes

** Depends on data compression (2:1)

The above P/N's, when used with tape drives MLR1-s QIC-5010-DC, MLR1 QIC-5010, or MLR3 will provide maximum reliability and performance.

Below is a chart showing media capacity, parameters that can be associated with data reliability, and associated data transfer rate.

Chart 3 **Media Performance / Reliability comparison**

IBM Media Part #	Tape Type	Cartridge Capacity	Error Correction Code	Data Transfer Rate **	Servo Tracks	Auto Retension (cart. load time)
21F8578	DC6150	120MB	No *	108KB/s	No	Yes (~ 3 min)
21F8597	DC6525	525MB	Yes	169KB/s	No	Yes (~ 4 min)
21F8730	DC9120	1.2GB	Yes	377KB/s	No	Yes (~ 4 min)
16G8436	DC9250	2.5GB	Yes	503KB/s	No	Yes (~ 5 min)
35L0589	**MLR1-2GB**	**2.0GB**	**Yes**	**1.5MB/s**	**Yes**	**No (~ 30 sec)**
59H4175	MLR1-16GB	16GB	Yes	1.5MB/s	Yes	No (~ 30 sec)
59H4128	MLR3-25GB	25GB	Yes	2.0MB/s	Yes	No (~ 30 sec)

* This format does not provide error correction code protection

** Data transfer rates are stated using drive type MLR1 QIC-5010-DC

Note the transfer rate difference between part number 21F8578 and 35L0589, use of P/N 35L0589 could enable you to take a file that takes .5 hours to back up when using P/N 21F8578 and do it in less than 5 minutes (data dependent).

5.0 IBM and Customer Responsibilities

Tape Drive Care and Action

There are several reasons why you can have problems with your IBM tape drive. This document will talk about each one and the way to resolve them. When you purchase an IBM tape drive, you expect to be able to configure and use it reliably. It is, in fact, our responsibility to deliver you a product that meets this expectation. IBM requires that you will use high quality data grade media, handle and store this media properly, operate the tape drive in a clean environment and keep the tape drive properly cleaned. These become your responsibility in this partnership. We will talk to each of these points.

IBM's Responsibility

IBM is constantly working with its suppliers to provide the best possible tape drive products available. We can only make certain that the drives work to their very best by constantly tuning the products with microcode. When a microcode change is developed, it is made available to you through the IBM service organization or electronic delivery.
For iSeris and AS/400 customers:

> Electronic delivery is also available by downloading PTFs(Program Transmittal Fixes) using ECS (Electronic Customer Support) or , by ordering the accum PTF packages from IBM services. With either method it is a customer responsibility to install the changes.

From time to time, the tape drive may stop functioning due to a component failure. IBM will replace the tape drive unit when this happens. IBM will also do our best to make certain that the SCSI bus is as free of noise as is possible. We provide the correct termination and high quality SCSI cables with our devices.

Your Responsibility

There are 4 kinds of tape drives that are widely used. They are 1/4 inch, 8 mm, 4 mm and DLT formats. For each of these types of drives, there are a wide range of tape qualities available. IBM uses 2 different grades of media. We supply fixes or PTF's on a tape that is designed to be written to once and read from a couple of times. The tape is not designed to be used as a backup medium. When you need to restore files from tape, you need to know that you can depend on retrieving them successfully. IBM does sell media designed as a storage product. We have very high quality standards for our storage tape and price it accordingly. In order to be able to support tape products, we need to constantly test and evaluate. IBM does not do this, on an ongoing basis, for products other than our own. We can not support any product we do not test. The only tape that we can support is the tape that we sell. When the quality of tape being used is called into question, we expect that you will resolve this. When you need to restore data from tape, you need to know that you can count on it being readable.
Any savings incurred by using low cost tape is of no value when you can not access the data

Tape Handling and Storage

Most tape is supplied in a sealed cartridge. It is provided this way so that the tape will remain in a clean environment. Opening the cartridge allows dirt and airborne particles to enter and then become a source of contamination. The cartridge should only be opened by the tape drive and not an operator. The tape also is held under proper tension inside the cartridge. If the cartridge is dropped, this tension will be relaxed. Inserting a dropped cartridge into a tape drive is an invitation to a mis-load and a resulting jam. This will ruin the tape and can be the source of physical damage if the cartridge is not removed properly. When the tapes are stored, they must be reinstalled into their protective containers and stored on their end. The storage area needs to be clean, dry, normal room temperature and away from any magnetic fields.

Environmental Issues

All tape operations need to occur in a clean environment. When tape is installed in a tape drive, the clearance between the heads and the tape is measured in microns. Even particles of smoke are larger than the space available between the tape and the heads. The problem factors are dirt, dust, fibers and

airborne particles. Airborne particles are the most difficult to address. The only solution is the filter enclosure that IBM sells. This is a product that encloses the tape drive. It draws air through a filter and supplies the tape drive with clean air. If the
environment is such that dirt is a problem, your options are to relocate the tape drive to a clean area or purchase a filter enclosure.

Tape Drive Cleaning

No matter how clean the environment, dirt will build up on the heads of any tape drive. Every time tape motion occurs, some of the media surface does come off on the heads. Over time, this builds up and will cause the tape head clearance to increase. This causes errors in reading and writing. Most tape drives today, have a cleaning indicator built in to tell you when the drive needs cleaning.
We do not recommend the use of any other brand of cleaner for these tape drives other than IBM brand.
All cleaning cartridges have a limited number of times they can be used. When they have expired, they must be replaced. You must never reuse an expired cleaning cartridge. This will allow previously removed dirt to be reintroduced to the tape drive. When a cleaning cartridge has come to the end, continuing to use it will not clean the tape drive. When you have cleaned the tape drive, you should mark the usage on the cartridge. This is your best guide in determining when your IBM cleaning cartridge has expired.

Summary

As a customer, you have the responsibility to make certain that your tape drive is installed in the cleanest possible environment. You are required to use high quality data grade tapes and clean the tape drive on a regular basis. You also need to store and handle your media properly. We will replace any defective tape drive. It is our objective to work with you to identify the cause of your tape problems and provide a solution. When these requirements are not met, the terms and conditions of warranty or any service agreement become null and void. We will provide service on a time and material or billable basis.

A.0 Appendix A. Purchasing

IBM Media

IBM has announced changes in how your customer can purchase IBM media. Following is a section of the announcement: "One toll free number, 1-888-IBM-MEDIA, will service most of North America. IBM customers will be able to buy from this number or obtain a local supply dealer reference. Please see announcement letter number 396-131, September 10, 1996 for additional details." Note: The phone numbers included here are mainly "Master Distributors". There may be a local retailer or distributor that may be more convenient for you. You can call the number listed here for further assistance in identifying a local contact or to order directly from the "Master Distributor".

Location	**Telephone number**
Africa	31-433-502-756
Asia/Pacific	1-972-881-0733
Australia	1-300-655-333
Belgium	0800-719-50
Canada	1-888-IBM-MEDIA
Central/South America	1-972-881-0733
Denmark	800-15534
Europe (Other)	31-433-502-756
Finland	08001-13110
France	0800-905-871
Germany	0130-818-005
Italy	1678-78349
Japan	03-3808-8486
Latin America	1-972-881-0733
Mexico	525-726-6204
Mid-East	31-433-502-756
New Zealand	0-800-444-592
Norway	800-11389
Puerto Rico	1-888-IBM-MEDIA
Spain	900-983131
Sweden	0207-94270
United Kingdom	0800-968-679
United States	1-888-IBM-MEDIA

URL for IBM Media phone numbers:
http://www.storage.ibm.com/media/index.html

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