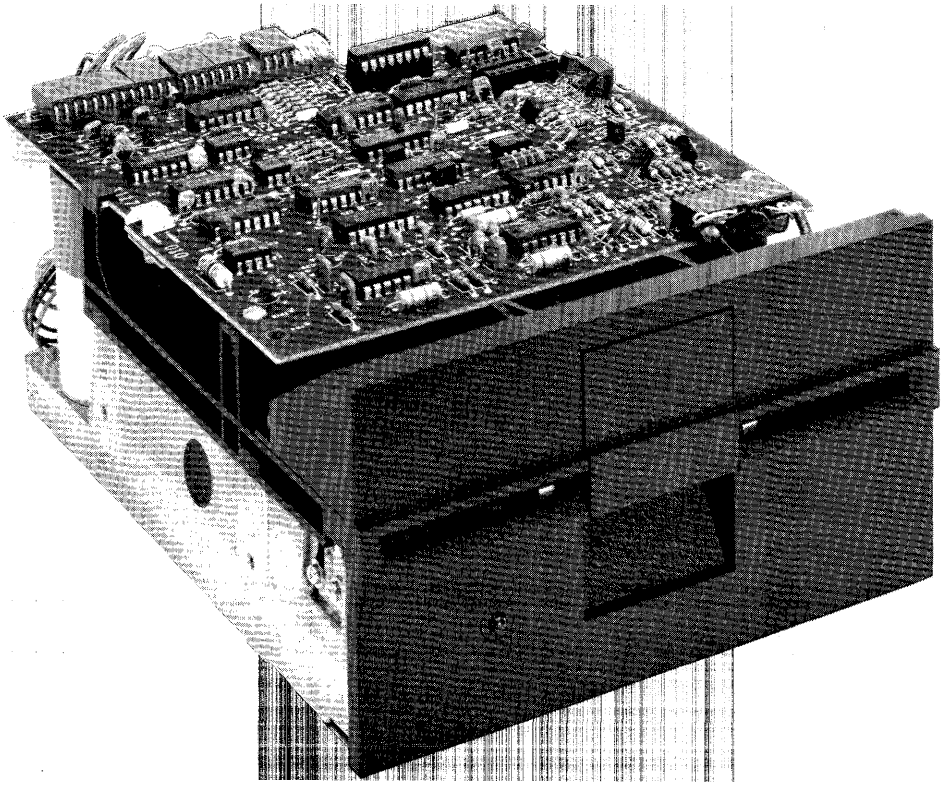
Tandon

TM100-1, TM100-2

FLEXIBLE DISK DRIVES



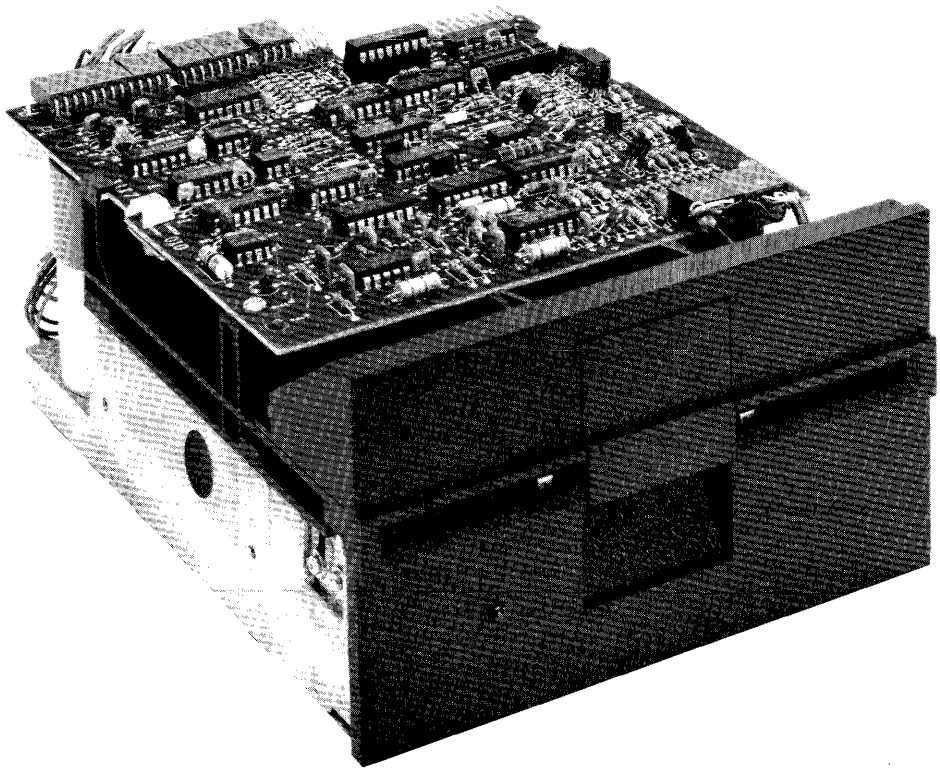
PRODUCT SPECIFICATION AND USER'S MANUAL

NOTICE

This document is intended to provide the user with detailed information adequate for the efficient installation, operation, and service of the equipment involved.

However, while every effort has been made to keep the information contained herein current and accurate as of the date of publication, no guarantee is given or implied as to its accuracy.

TM100-1, TM100-2
5-1/4-INCH FLEXIBLE DISK DRIVES
48 TRACKS PER INCH
PRODUCT SPECIFICATION AND USER'S MANUAL



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CONTENTS

ILLUSTRATIONS

FIGURES

TABLES

SECTION 1

GENERAL DESCRIPTION

INTRODUCTION

This document provides required information in order to evaluate and incorporate Tandon's disk drive into a system.

Tandon Corporation's Model Number TM100-1 and TM100-2 are full-feature, 5-1/4-inch, flexible disk drives. They are compact data storage devices that use an ANSI-compatible, industry standard, 5-1/4-inch diskette.

Model Number TM100-1 and TM100-2 drives each have forty-eight (48) tracks per inch. The TM100-1 is a single-sided recording device. The TM100-2 is a double-sided recording device.

Both drives are capable of reading and writing in single-density format on a diskette, using a proprietary read/write head patented by Tandon. The drives have a double density capability when Modified Frequency Modulation (MFM) or other appropriate recording technique is used. Encoding and decoding of the data is done by the user's controller.

1.1 SCOPE OF THE DOCUMENT

This document contains the major features, physical and functional specifications, mounting and power requirements, the interface, and typical timing characteristics of the TM100-1 and TM100-2 drives.

1.2 PURPOSE OF THE DRIVE

The TM100-1 and TM100-2 drives are rotating disk memories designed for random access data entry, storage, and retrieval applications. Typical applications include intelligent terminal controllers, microcomputers, word processing systems, data communication systems, error logging, program loading, and point-of-sale terminals.

1.3 MAJOR FEATURES

WRITE PROTECT

When a write protected diskette is inserted into the drive, the write electronics are disabled.

DAISY CHAIN CAPABILITY

The drive provides the address selection and gating functions necessary to daisy chain a maximum of four units at the user's option. The last drive on the daisy chain terminates the interface. The terminations are accomplished by a resistor array plugged into a DIP socket.

INTERNAL TRIM ERASE

The drive provides the control signals necessary for proper trim erasure of data.

INDUSTRY STANDARD INTERFACE COMPATIBILITY

The drive is compatible with controllers that use an industry standard interface.

TRACK 0 SWITCH

The Track 0 switch is provided to generate a logic level at the drive interface, indicating the read/write head is positioned at the outermost track.

INDEX SENSOR

An index sensor is provided to generate electrical pulses at the drive interface coincident with sensing Index/Sector holes on the diskette.

ACTIVITY INDICATOR

An activity indicator, located on the front panel, is automatically illuminated when the drive is selected.

1.4 FUNCTIONAL DESCRIPTION

The drives are fully self-contained, and require no operator intervention during normal operation. Each drive consists of electronics to generate and interpret control signals, a head positioning system, a read/write system, and a spindle drive system.

When the front latch is opened, access is provided for insertion of a diskette. The diskette is held in place by plastic guide rails. Its location is ensured when the diskette is inserted until a back stop is encountered.

Closing the front latch activates the cone clamping mechanism, resulting in accurate centering and clamping of the diskette. The drive hub is held at a constant speed of 300 RPM by a servo-controlled D. C. motor. The heads remain in contact with the recording media until the front latch is opened.

The heads are positioned over the desired track by means of a four-phase stepper motor/band assembly and its associated electronics. This positioner uses a one-step rotation to cause a one track linear movement.

Data recovery electronics include a low-level read amplifier, differentiator, zero crossover detector, and digitizing circuits. No data decoding capabilities are provided.

The drive has the following sensors:

1. A Track 0 switch detects when the head/carriage assembly is positioned at Track 0.

2. An index/sensor is positioned to generate a digital signal when an index/sensor hole on the diskette is detected.

3. A write protect switch disables the write electronics when a write protect tab is applied to the diskette.

1.5 PHYSICAL DESCRIPTION

A representative drive is shown in Figure 1-1. The drive can be mounted in a vertical or horizontal plane. However, the logic circuit board must be on the uppermost side when the drive is mounted horizontally.

The spindle is belt driven by a D. C. motor with an integral tachometer. The servo control circuit and tachometer control the speed of the spindle.

The read/write head assembly is positioned by a split band positioner mounted to a stepper motor. The read/write head(s) is a glass-bonded, ferrite/ceramic structure with a life expectancy of 20,000 operating hours.

The electronic components of the drive are mounted on two printed circuit boards. The logic circuit board is mounted above the chassis. The spindle motor control circuit board is mounted at the rear of the chassis. Power and interface signals are routed through connectors plugged directly into the logic circuit board.

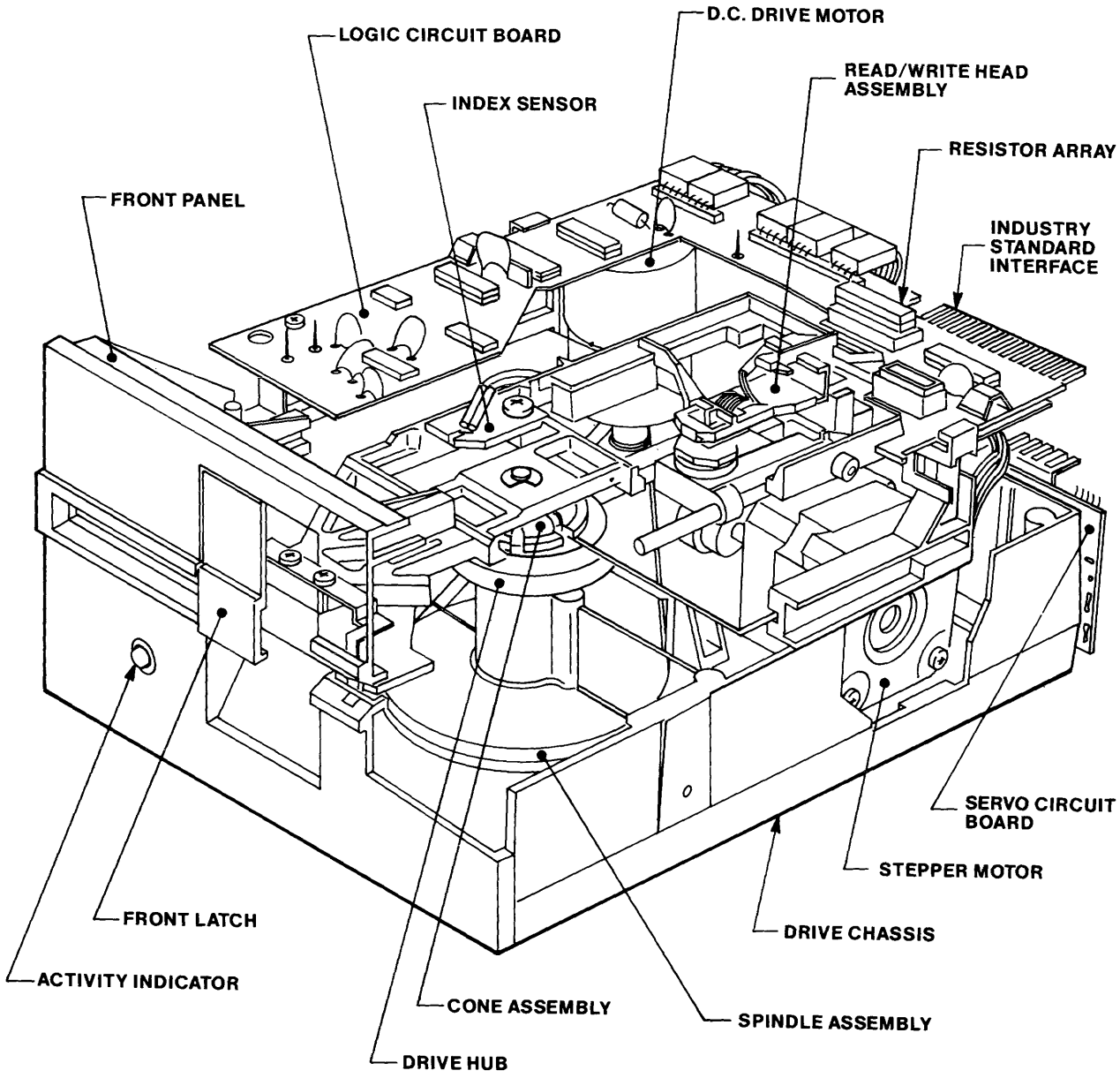


FIGURE 1-1
DISK DRIVE

SECTION 2

PRODUCT SPECIFICATIONS

INTRODUCTION

This section contains the mechanical, electrical reliability, and environmental specifications for the TM100-1 and TM100-2 drives.

2.1 MECHANICAL SPECIFICATIONS

The physical dimensions of the drive are located in Figure 2-1.

2.2 ELECTRICAL AND OPERATIONAL SPECIFICATIONS

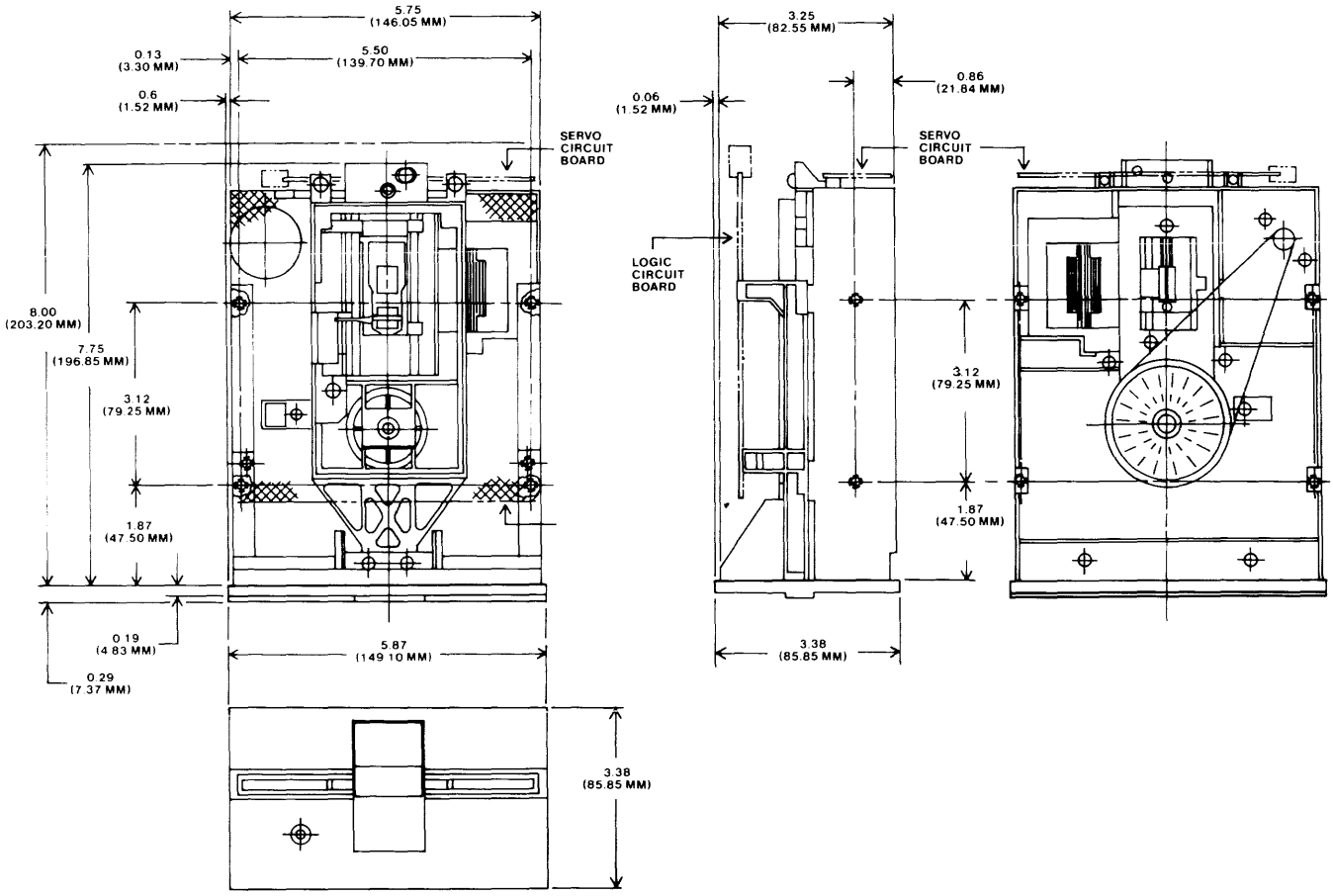
The electrical and operational specifications are located in Table 2-1.

2.3 RELIABILITY SPECIFICATIONS

The reliability specifications are located in Table 2-2.

2.4 ENVIRONMENTAL SPECIFICATIONS

The environmental specifications are located in Table 2-3.



NOTES: 1. DIMENSIONS ARE GIVEN IN INCHES. METRIC EQUIVALENTS ARE IN PARENTHESES.
2. TOLERANCE ON ALL DIMENSIONS ±0.020 INCH, UNLESS OTHERWISE SPECIFIED.
3. WEIGHT IS APPROXIMATELY 3 POUNDS (1.35 KILOGRAMS).

FIGURE 2-1
DISK DRIVE OUTLINE DRAWING

TABLE 2-1
ELECTRICAL AND OPERATIONAL SPECIFICATIONS

Media	ANSI-compatible, 5-1/4-inch diskette
Media Life (for reference only)	4×10^6 passes per track
Tracks Per Inch	48 TPI, both drives
Tracks Per Drive	
TM100-1	40 tracks
TM100-2	80 tracks
Track Spacing	0.529 millimeters, 20.8 milinches
Head Life	20,000 media contact hours
Disk Rotational Speed	300 RPM $\pm$ 1.5 percent
Average Rotational Latency	100 milliseconds
Instantaneous Speed Variation (ISV)	$\pm$ 3 percent
Motor Start Time	250 milliseconds, maximum
Motor Stop Time	150 milliseconds, maximum
Seek Time, track-to-track	5 milliseconds
Head Settling Time	15 milliseconds
Average Track Access Time, including head settling time	75 milliseconds
Typical Recording Modes	FM, MFM, MMFM
Data Transfer Rate	250,000 bits per second, double density
Flux Reversals Per Inch (FRPI), inside track	
Both Models, Side 0	5,535 FRPI
TM100-2, Side 1	5,877 FRPI

TABLE 2-1 (CONTINUED)
ELECTRICAL AND OPERATIONAL SPECIFICATIONS

Unformatted Recording Capacity	
TM100-1	250 kilobytes per disk
TM100-2	500 kilobytes per disk
D. C. Voltage and Current Requirements	
+12 volts D. C. Power	+12 volts ± 0.6 volt, 900 milliamperes, average, 100 millivolts peak-to-peak ripple.
+5 volts D. C. Power	+5 volts ± 0.25 volt, 600 milliamperes, average, with less than 100 millivolts peak-to-peak ripple.
Shipment	When prepared for shipment by Tandon, the drive meets the requirements of NSTA preshipment test procedure Project 1A.

TABLE 2-2
RELIABILITY SPECIFICATIONS

Error Rates, maximum, exclusive of external sources, e.g.: electronics, defective and contaminated diskettes	
Soft Errors (Recoverable)	One in 10^9 bits
Hard Errors (Nonrecoverable)	One in 10^{12} bits
Seek Errors	One in 10^6 seeks
Mean Time Between Failures	8,000 hours, 25 percent duty cycle
Mean Time To Repair	30 minutes

TABLE 2-3
ENVIRONMENTAL SPECIFICATIONS

Temperature	
Operating, media dependent	10°C to 46°C, 50°F to 115°F
Nonoperating	−40°C to 71°C, −40°F to 160°F
Relative Humidity	
Operating, noncondensing, media dependent	20-to-80 percent
Nonoperating, noncondensing	5-to-95 percent
Altitude	
Operating or nonoperating	152.4 meters, 500 feet, below sea level, to 15,240 meters, 50,000 feet, above sea level

SECTION 3

OPERATION

INTRODUCTION

This section contains information on how to unpack, check out, install, and operate the TM100-1 and TM100-2 drives.

3.1 UNPACKING THE DRIVE

The drives are packaged in protective containers to minimize the possibility of damage during shipment. The following list is the recommended procedure for unpacking the drive.

1. Place the container on a flat work surface.
2. Remove the upper half of the container.
3. Remove the drive from the lower half of the container.
4. Check the contents of the container against the packing slip.
5. Investigate the contents of the container for possible damage.
6. Notify the carrier immediately if any damage is found.

3.2 PREINSTALLATION CHECKOUT

Before applying power to the drive, the following inspection should be conducted:

1. Check to ensure the front latch opens and closes.
2. When the latch is moved to an open position, the head arm raises.
3. Remove the cardboard shipping insert, and retain for future shipment.
4. Ensure the front panel is secure.
5. Ensure the drive belt is in place.
6. Manually rotate the drive hub. It should rotate freely.
7. Ensure both circuit boards are secure.
8. Ensure the connectors are firmly seated.

3.3 MOUNTING THE DRIVE

The drive has been designed to be mounted horizontally or vertically. When mounted horizontally, the logic circuit board side of the drive must be the top side.

Four 6-32 tapped mounting holes are provided on the bottom of the drive, and two 6-32 tapped mounting holes on each side, for attachment to user-supplied mounting brackets. When installed in either plane, horizontal or vertical, only two mounting screws are required to securely hold the drive in place.

Any mounting scheme in which the drive is part of the structural integrity of the enclosure is not permitted. Mounting schemes should allow for adjustable brackets or incorporate resilient members to accommodate tolerances. In addition, it is recommended that mounting schemes include no more than two mounting surfaces.

The drive is manufactured and tested with some critical internal alignments that must be maintained. Hence, it is important that the mounting hardware not introduce significant stress on the chassis.

DUST COVER

The design of an enclosure should incorporate a means to prevent contamination from loose items, e.g., dust, lint, and paper chad, since the drive does not have a dust cover.

COOLING

Heat dissipation from a single drive is normally 15 watts, 51 BTU per hour, under high load conditions. When the drive is mounted so the components have access to a free flow of air, normal convection cooling allows operation within the specified temperature range.

When the drive is mounted in a confined environment, air flow must be provided to maintain specified air temperatures in the vicinity of the motors, printed circuit board, and diskettes.

When forced air is used, air flow must be directed outward from the drive. Do not intake air through the drive or heads and diskettes.

3.4 INTERFACE CONNECTIONS

Interface connections for the TM100-1 and TM100-2 are made via a user-supplied, thirty-four pin, flat ribbon connector, 3M Part Number 3463-0001 or Amp Part Number 583717-5, using contact Part Number 1-583616-1 for twisted pair or its equivalent. This connector mates directly with the circuit board connector at the rear of the drive. The D. C. power connector is a four-pin connector at the rear of the drive. The interface description of the connectors, and the location of each one, is contained in this section. Interface lines are located in Table 3-1. D. C. power connector pin assignments are located in Table 3-2.

The signal wire harness should be of the flat ribbon or twisted pair type, 26-to-28 gauge conductor, compatible with the connector to be used. The recommended cable length is ten feet maximum.

TABLE 3-1
DRIVE INTERFACE LINES AND PIN ASSIGNMENTS

Input Control Lines:
Controller-To-Disk Drive

Ground	Pin	Signal
1	2	Connector Clamp
3	4	Spare
5	6	Drive Select 3
9	10	Drive Select 0
11	12	Drive Select 1
13	14	Drive Select 2
15	16	Motor On
17	18	Direction Select
19	20	Step
21	22	Composite Write Data
23	24	Write Enable
31	32	Side Select

Output Control Lines:
Disk Drive-To-Controller

Ground	Pin	Signal
7	8	Index/Sector
25	26	Track 0
27	28	Write Protect
29	30	Composite Read Data
33	34	Spare

INPUT CONTROL LINES

DRIVE SELECT LINES

The Drive Select lines provide a means of selecting and deselecting a drive. These four lines select one of the four drives attached to the controller.

When the signal logic level is true (low), the drive electronics are activated, and the drive is conditioned to respond to Step or Read/Write commands. A Drive Select line must remain stable in the true (low) state until a Step or

Read/Write command is completed. When the signal line logic level is false (high), the input control lines and output status lines are disabled.

The drive address is determined by a jumper select on the logic circuit board. Drive Select lines 0 through 3 provide a means of daisy chaining a maximum of four drives to a controller. Only one can be true (low) at a time. An undefined operation results if two or more drives are assigned the same address or if two or more Drive Select lines are in the true (low) state simultaneously.

MOTOR ON

When this signal is true (low), the drive motor accelerates to its nominal speed of 300 RPM, and stabilizes at this speed in less than 250 milliseconds. When the signal line logic level goes false (high), the drive decelerates to a stop. This signal is not gated with Drive Select.

The motor activates momentarily when the front latch is closed. This motor start function remains active for approximately five seconds, unless Motor On is in the true (low) condition.

DIRECTION SELECT AND STEP LINES (TWO LINES)

When the drive is selected, a true (low) pulse on the Step line, with a time duration greater than 200 nanoseconds, initiates the access motion. The direction of motion is determined by the logic state of the Direction Select line when a step pulse is issued. The motion is toward the center of the disk if the Direction Select line is in the true (low) state. The direction of motion is away from the center of the disk if the Direction Select line is in the false (high) state.

To ensure proper positioning, the Direction Select line should be stable at least 100 nanoseconds prior to issuing a corresponding step pulse, and remain true (low) 100 nanoseconds after it.

The access motion is initiated on the trailing edge of the step pulse. The time period between consecutive trailing edges of step pulses should be not less than five milliseconds.

The drive electronics ignore step pulses when one of three conditions exists:

1. The write enable is true (low).
2. The direction select is false (high), and the head is positioned at Track 0.
3. The drive is not selected.

COMPOSITE WRITE DATA

When the drive is selected, this interface line provides the bit serial composite write data pulses that control the switching of the write current in the selected head. The write electronics must be conditioned for writing by the Write Enable line.

For each high-to-low transition on the Composite Write Data line, a flux change is produced at the write head gap. This causes a flux change to be recorded on the media.

When a single-density (FM) type encoding technique is used in which data and clock form the combined Write Data signal, it is recommended that the repetition of the high-to-low transitions, while writing all zeros, be equal to one-half the maximum data rate, 125 kilohertz ± 0.1 percent, and the repetition of the high-to-low transitions, when writing all ones, be equal to the maximum data rate, 250 kilohertz ± 0.1 percent.

Host controllers may implement write precompensation circuits that recognize worst case patterns and adjust the write data waveform. Although a value cannot be specified for write precompensation, Tandon suggests a value of 250 nanoseconds for systems using MFM double density recording format.

WRITE ENABLE

When this signal is true (low), the write electronics are prepared for writing data and the read electronics are disabled. This signal turns on write current in the selected read/write head. Data is written under the control of the Composite Write Data and Side Select input lines. When the Write Enable line is false (high), all write electronics are disabled.

When a write protected diskette is installed in a drive, the write electronics are disabled, irrespective of the state of the Write Enable or Side Select lines.

SIDE SELECT, TM100-2

The Side Select interface line defines which side of a two-sided diskette is used for data transfer.

A false (high) level on this line selects the read/write head on side zero, the lower head, of the drive. A true (low) level on this line selects the read/write head on side one, the upper head of the drive.

OUTPUT CONTROL LINES

INDEX/SECTOR

The index/sector signal is a composite of the index pulse and sector signals.

An index pulse is provided once every revolution, 200 milliseconds nominal, to indicate the beginning of a track to the controller. The leading edge of this signal must always be used to ensure timing accuracy. The index/sector line remains in the true (low) state for the duration of the index pulse, which is nominally four milliseconds.

The sector signal portion appears only when using hard sectored diskettes.

TRACK 0

When the drive is selected, the Track 0 interface signal, when true (low), indicates to the controller that the read/write head(s) are positioned at Track 0. This signal remains true (low) until the heads are moved from Track 0.

WRITE PROTECT

When the Write Protect line goes true (low), the diskette is write protected and the write electronics are disabled. It is recommended the controller not issue a Write command when the Write Protect signal is true (low).

When the Write Protect line is false (high), the write electronics can be enabled.

COMPOSITE READ DATA

This interface line transmits the readback data to the controller when the drive is selected. It provides a pulse for each flux transition detected from the diskette. The Composite Read Data output line goes true (low) for a duration of 1 ± 0.25 microseconds for each flux change detected from the diskette.

The leading edge of the Composite Read Data output pulse represents the true position of the flux transitions on the diskette's surface.

TYPICAL INTERFACE CHARACTERISTICS

Lines between the controller and the drive have the following characteristics:

V_{out} True = +0.4 volt maximum at I_{out} = 48 milliamperes, maximum

V_{out} False = +2.4 volts minimum open collector at I_{out} = 250 microamperes, maximum

Figure 3-1 contains the characteristics of the electrical interface. Figure 3-2 contains the control and data timing requirements.

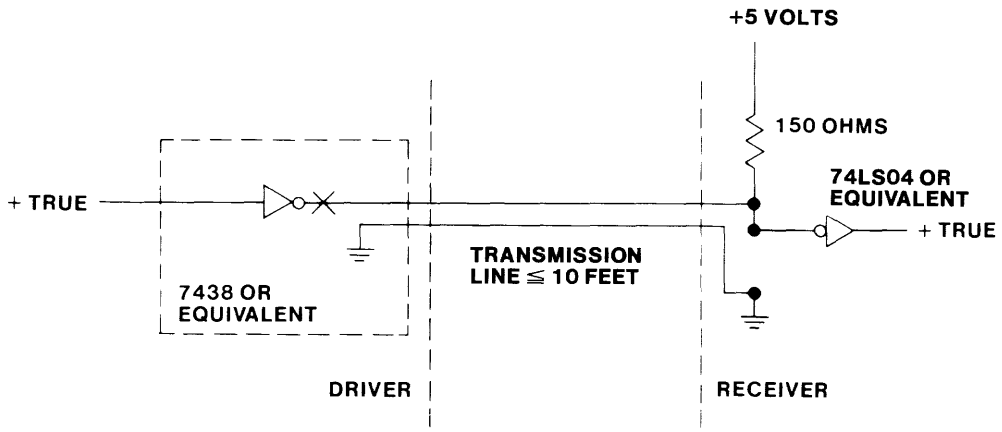


FIGURE 3-1
ELECTRICAL INTERFACE CHARACTERISTICS

3.5 D. C. POWER

D. C. power is supplied to the drive via a four-pin AMP connector, J2, mounted on the circuit board. The mating connector, not supplied, is AMP Part Number 1-480424-0, using AMP contact Part Number 606191-1. Pin assignments are found in Table 3-2. The conductor should be 16-to-18 AWG, minimum.

TABLE 3-2
D. C. POWER CONNECTOR PIN ASSIGNMENTS

Pin	Supply Voltage
1	+12 volts D. C.
2	12 volts return
3	5 volts return
4	+5 volts D. C.
Pin	**Signal**
Ground lug 3/16-inch quick disconnect	Chassis ground from controller

The chassis should be connected to earth ground to ensure proper operation. The conductor should be 16-to-18 AWG, minimum.

3.6 DRIVE ADDRESS AND OPTION PATCHING

The drive address and option patching is determined by the programmable shunt located at 1E on the logic circuit board. The DS0 through DS3 jumpers determine the drive address. The MX jumper is used only in single drive systems. See Figure 3-3.

The program shunt is AMP Part Number 435704-7. The shunt positions can be cut using AMP's tool, Part Number 435705. The shunt is installed in a DIP socket. At the user's option, it can be removed and replaced by a DIP switch.

DS0 THROUGH DS3 JUMPERS

When daisy chaining two or more drives to a controller, the Drive Select (DS) jumpers patch the drive select control signal to enable the logic of the proper drive. Normally, all the shunt jumpers would be cut, except for the DS jumper

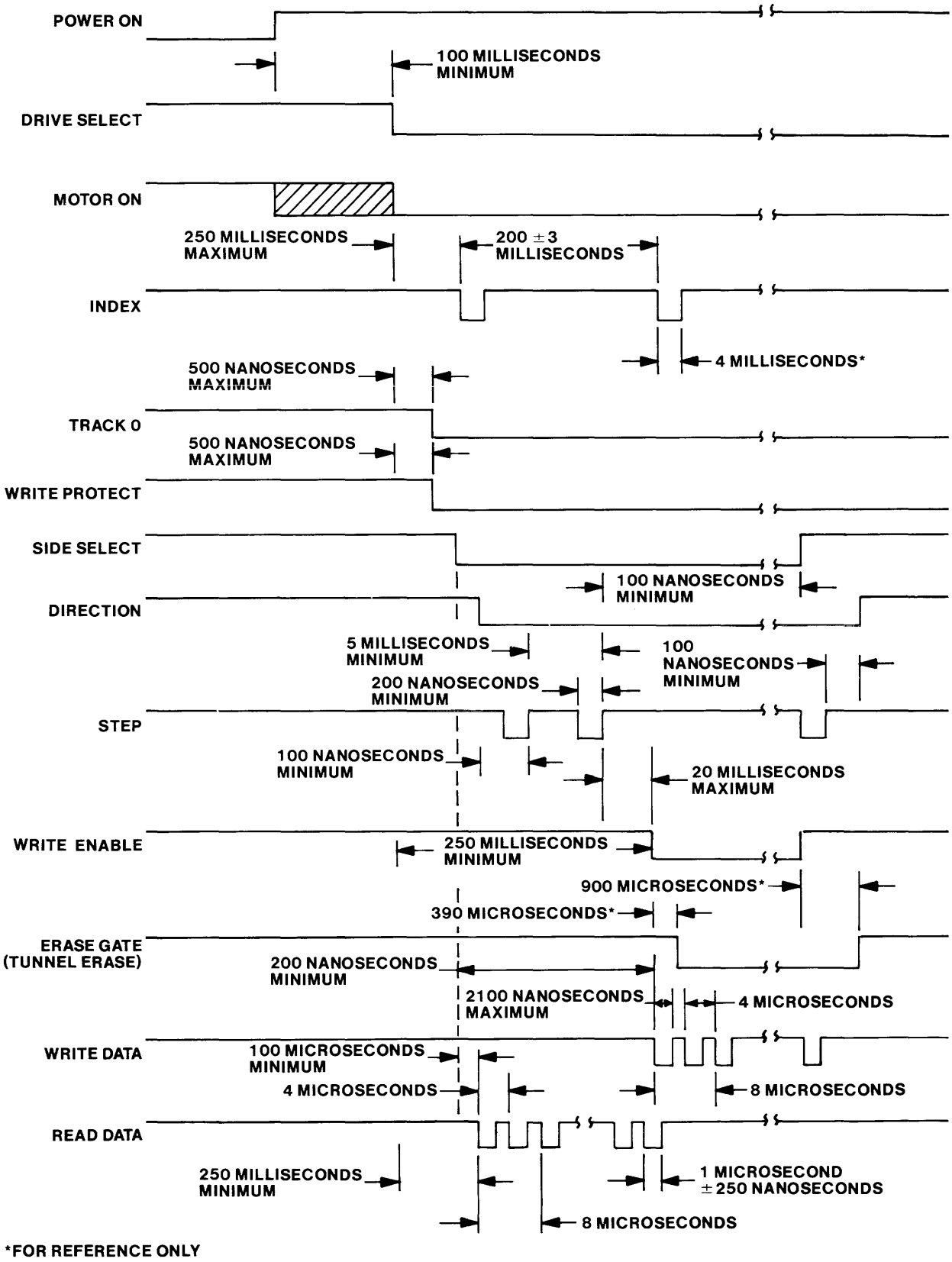


FIGURE 3-2
CONTROL AND DATA TIMING REQUIREMENTS

that addresses each individual drive in the daisy chain. The terminator resistor pack, RP1, located on the logic circuit board should be installed in the last drive of the daisy chain. All other drives on the interface must have the resistor pack removed.

MX JUMPER

The Multiplex (MX) jumper is used only in single drive systems when the user requires the drive logics to be enabled at all times. If the drive is not selected through the DS jumper, and the MX jumper is not cut, the drive logics are enabled but the front panel L.E.D. is not on. The MX jumper must be cut in a multiple drive system.

HS AND HM JUMPERS

HS and HM jumpers are not used, and must be cut.

POWER SAVE OPTION

When shipped from the factory, the drive is configured with a jumper at R51, 0 ohm resistor, for the TM100-1 and TM100-2 drives. R51 maintains 200 milliamperes of current to the stepper motor whether or not the drive is selected. Maintaining power to this motor prevents the head carriage from moving when the drive is not selected. The jumper at R51 may be moved to position R50, which removes the power to the stepper motor when the drive is not selected, for a savings of approximately 3.8 watts per drive. When R50 is used, the user must ensure the track location when the drive is reselected.

SIDE SELECT (W1)

For use in double-sided drives:

W1	SIDE SELECT
–	For use in single-sided drives, TM100-1.
X	For use in double-sided drives, TM100-2.

WRITE FLIP-FLOP CONTROL (W2, W3)

W2 and W3 control the set and preset lines of the write flip-flop, IC-5C. W2 is installed for the standard configuration, W3 is for special use.

W2	W3	WRITE FLIP-FLOP CONTROL
X	–	Disables set and preset lines on the write flip-flop only during internal N Write.
–	X	Disables set and preset lines on the write flip-flop continuously.

WRITE PROTECT CONTROL (W4, W5)

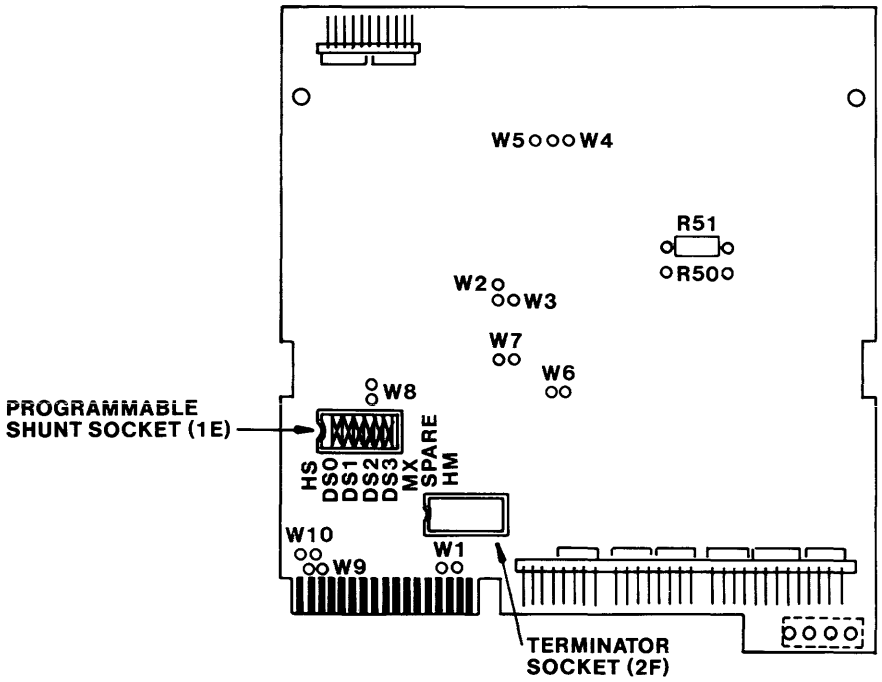
Write Protect Control from the write protect switch is disabled with W5 installed. Standard Write Protect Control is enabled with W4 installed.

W4	W5	WRITE PROTECT CONTROL
X	–	Write Protect Control responds to a write protected diskette.
–	X	Write Protect Control is inhibited.

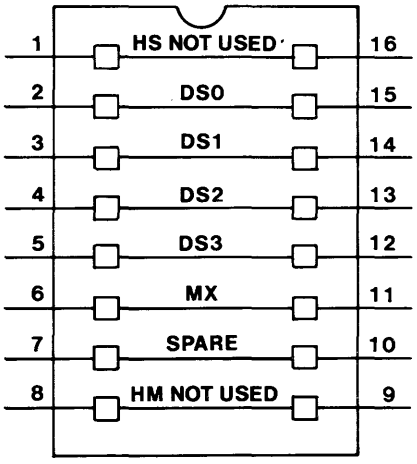
ACTIVITY L.E.D. CONTROL (W6, W7, W9)

The Activity L.E.D. may be illuminated by an optional input line, J1-4 (N In Use). Normally, the Activity L.E.D. is controlled with Drive Select, W6 installed.

W6	W7	W9	ACTIVITY L. E. D. CONTROL
X	–	–	Activity L.E.D. is controlled with Drive Select.
–	X	X	Activity L.E.D. is controlled with N In Use, J1-4.



LOGIC CIRCUIT BOARD



PROGRAMMABLE SHUNT SOCKET 1E

FIGURE 3-3
LOGIC BOARD WITH PROGRAMMABLE SHUNTS AND OPTION PATCHING LOCATIONS

DRIVE SELECT 3 ENABLE (W8)

Removal of this jumper allows interface J1-6 to be used as an alternate input/output line. W8 is normally installed.

W8	DRIVE SELECT 3 ENABLE
X	Allows drive to be selected via J1-6.
–	Disables Drive Select 3 line.

DOOR LOCK SOLENOID (W10)

This jumper is used in conjunction with an optional door lock solenoid. The W10 jumper is normally not installed.

W10	DOOR LOCK SOLENOID
X	Enables door lock solenoid via J1-2.
–	Disables door lock circuits.

3.7 DISKETTES

The TM100-1 and TM100-2 drives use an ANSI-compatible, 5-1/4-inch diskette. Diskettes are available with a single index hole or with multiple (index and sector) holes.

Diskettes with a single hole are used when soft sector format is required. Multiple hole diskettes provide sector information through the use of an index sensor and electronics.

Figure 3-4 illustrates the diskette used with the drive. This recording media is a flexible diskette enclosed in a protective jacket. The protected diskette, free to rotate within the jacket, is continuously cleaned by its soft fabric lining during normal operation.

LOADING THE DISKETTE

The drive is loaded by inserting the diskette, head aperture forward, into the front slot of the drive. Access to the diskette loading slot is obtained by opening the front latch.

The diskette should be carefully inserted until it is solidly against the back stop.

CAUTION

Damage to the center of the diskette may result if the door is closed when the diskette is not properly inserted. This prevents reliable recovery of the recorded data.

WRITE PROTECT TAB

The drive is equipped with a write protect switch assembly. This switch operates in conjunction with a diskette that has a slot cut in the protective jacket. Figure 3-5 contains the location of the slot.

When the slot is covered with an optically opaque, self-adhesive tab, the diskette is write protected. The tab must be removed to write on the diskette. Figure 3-5 contains information on how to install a tab to cover the slot.

DISKETTE HANDLING AND STORAGE

It is important the diskette be handled and stored correctly so the integrity of the recorded data is maintained. A damaged or contaminated diskette can impair or prevent recovery of data, and can result in damage to the read/write head(s).

Figure 3-5 contains an illustration of the physical configuration of the diskette. The 5.125-inch diskette is oxide-coated, flexible mylar. It is enclosed in a 5-1/4-inch square protective jacket. Read/write head access is made through an aperture in the jacket. In addition, openings for the drive hub and diskette index hole are provided.

Figure 3-6 provides some helpful hints on the care and handling of the drive and diskettes. In addition, to ensure trouble-free operation and to enhance the service life of the diskette, the following handling procedures should be observed.

1. Return the diskette to the protective jacket when not in use.

2. Avoid exposing the diskette to any magnetizing force in excess of 50 oersted.

NOTE

The 50-oersted level magnetizing force is reached at a distance of approximately three inches from a typical source, e.g., motors, generators, or transformers.

3. To avoid warping, do not store the diskette in direct sunlight.

4. Do not use a lead pencil or a ballpoint pen to write on the label. Use a felt tipped pen, and mark lightly on the label.

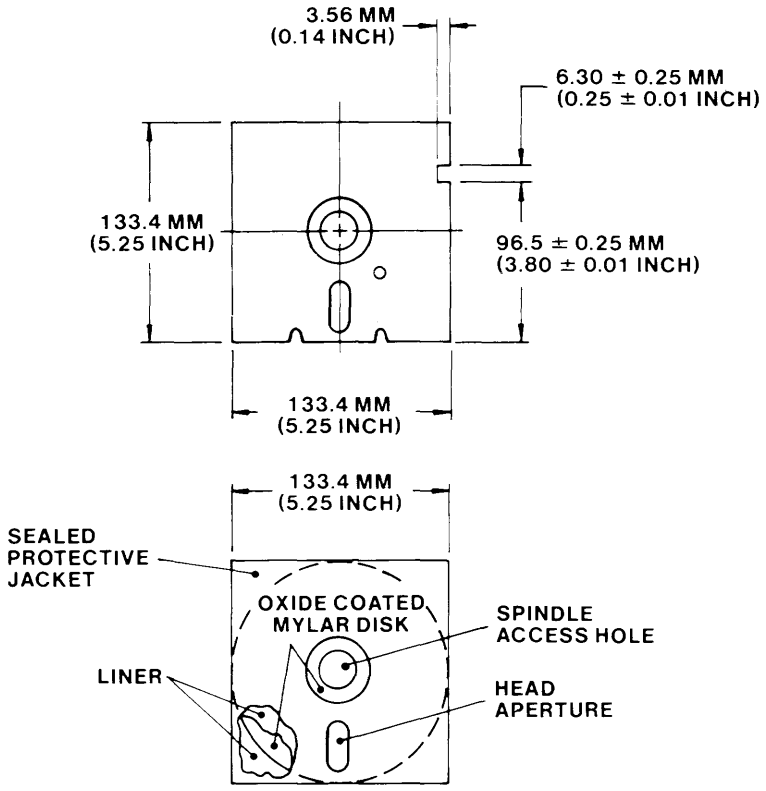


FIGURE 3-4
RECORDING MEDIA

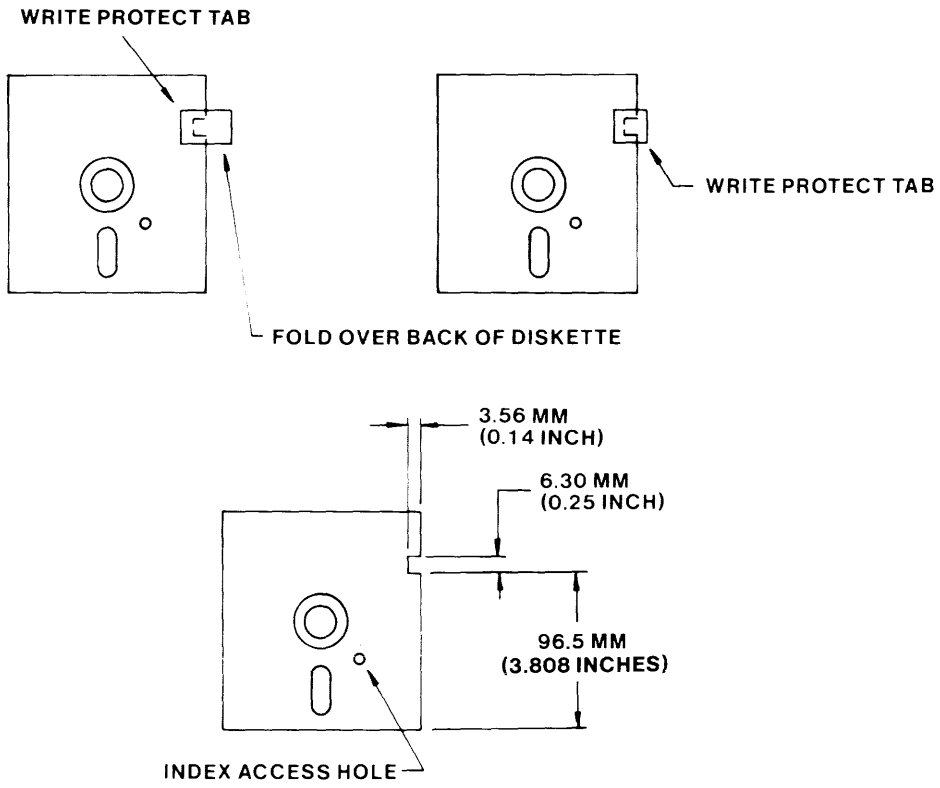
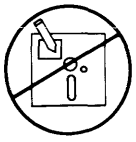
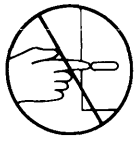


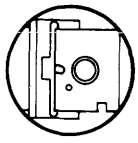
FIGURE 3-5
WRITE PROTECT TAB



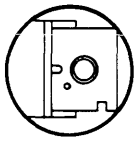
DO NOT WRITE ON THE JACKET WITH PEN OR PENCIL. USE A FELT TIPPED PEN.



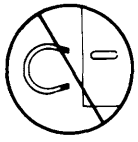
DO NOT TOUCH PRECISION SURFACE WITH YOUR FINGERS.



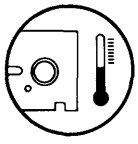
TO AVOID DAMAGE TO THE DISKETTE AND TO YOUR DRIVE, INSERT DISKETTE CAREFULLY UNTIL THE BACKSTOP IS ENCOUNTERED.



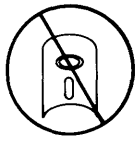
RETURN THE DISKETTE TO ITS JACKET WHEN NOT IN USE.



KEEP THE DISKETTE AWAY FROM MAGNETIC FIELDS.



DISKETTES SHOULD BE STORED AT
10°C to 52°C
50°F to 125°F



HANDLE WITH CARE; BENDING AND FOLDING MAY DAMAGE DISKETTE.

FIGURE 3-6
DISKETTE HANDLING AND STORAGE

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