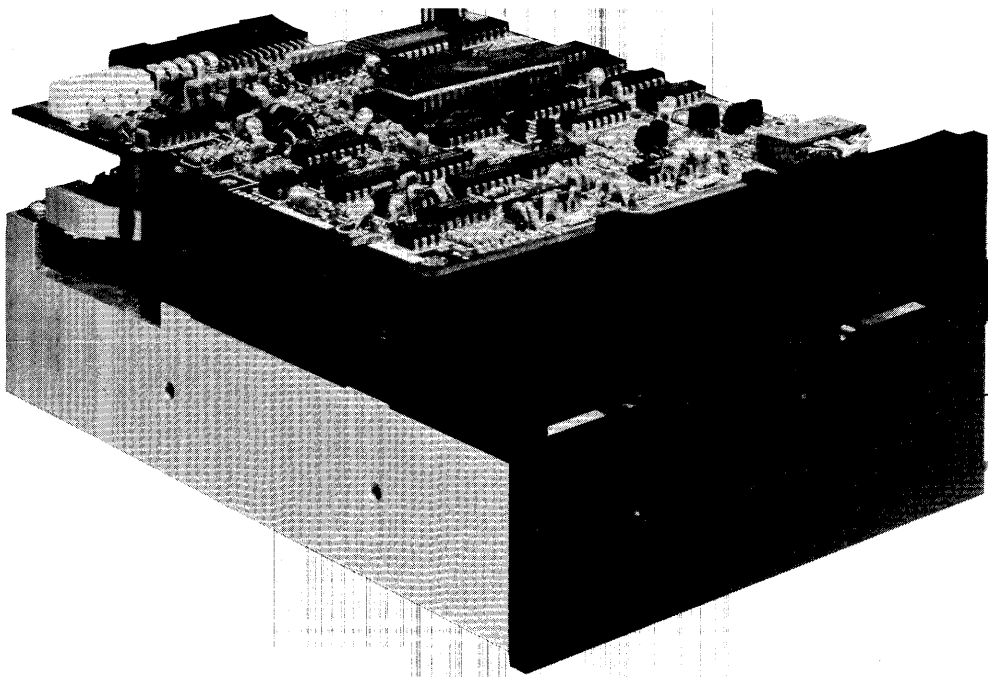


# **Tandon**

## **TM 101-4, TM 102-2**

### **FLEXIBLE DISK DRIVES**



**PRODUCT SPECIFICATION AND USER'S MANUAL**

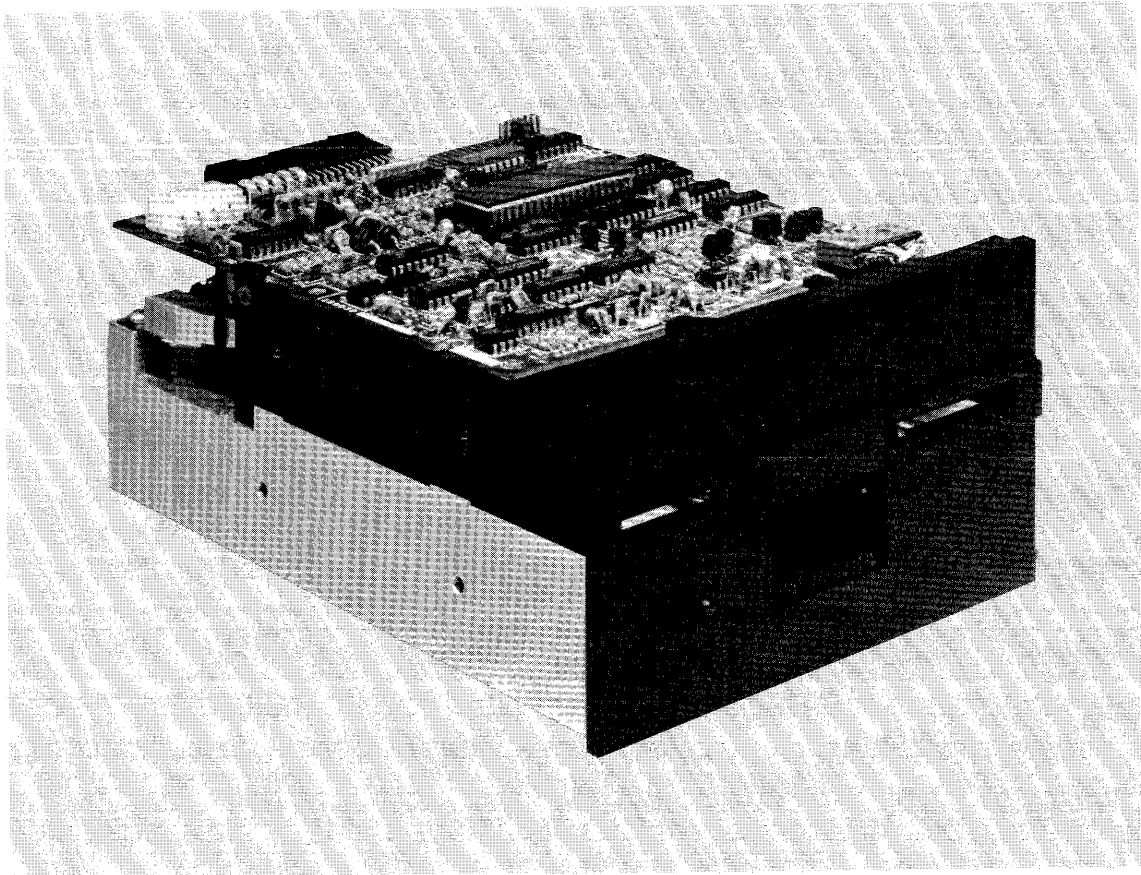
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TM101-4 AND TM102-2  
FLEXIBLE DISK DRIVES  
96 TRACKS PER INCH  
PRODUCT SPECIFICATION AND USER'S MANUAL



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# SECTION 1

## GENERAL DESCRIPTION

### INTRODUCTION

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

Tandon Corporation's Model Number TM101-4 and TM102-2 drives are full feature, micro-processor-controlled, 5-1/4-inch flexible disk drives. The drives are compact data storage devices that use an ANSI Compatible industry standard 5-1/4-inch diskette. Both drives are 96 tracks per inch, double-sided recording devices.

These drives are capable of reading and writing in single-density format on a diskette, using a proprietary read/write head patented by Tandon. In addition, the drives have a double density capability when a Modified Frequency Modulation (MFM) or other appropriate recording techniques are used. The TM101-4 drive has a data transfer rate of 250,000 BPS. The TM102-2 drive has a data transfer rate of 500,000 BPS. The encoding and decoding of the data is done by the user's controller. Each drive doubles data storage capabilities by using both sides of the diskette.

#### 1.1 SCOPE OF THE DOCUMENT

This document contains a description of the major features, physical and functional specifications, mounting and power requirements, the interface, and typical timing characteristics of the TM101-4 and TM102-2 drives.

#### 1.2 PURPOSE OF THE DRIVE

The TM101-4 and TM102-2 drives are rotating disk memories designed for random access data entry, storage, and retrieval applications. Typical applications include intelligent terminal con-

trollers, micro-computers, word processing systems, data communication systems, error logging, program loading, and point-of-sale terminals.

#### 1.3 MAJOR FEATURES

##### MICROPROCESSOR CONTROL

The TM101-4 and TM102-2 drives feature an on-board microprocessor. This microprocessor provides five major features:

1. Crystal controlled, self-calibrating spindle motor speed.
2. Momentary motor start for improved media centering.
3. Improved head positioning accuracy with reduced hysteresis.
4. Write current switching for optimal data recording quality.
5. Programmable Ready signal.

##### WRITE PROTECT

When a write protected diskette is inserted in 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 COMPATABILITY

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

## 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 a spindle drive system, a head positioning system, and a read/write 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 motor start circuit momentarily, and the cone clamping system, 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 crossing detector, and digitizing circuits. No data decoding

capabilities are provided.

The drives have the following optical sensors:

1. A Track 0 sensor detects when the Head/Carriage Assembly is positioned over Track 0.
2. An index sensor is positioned to generate a digital signal when the index hole on the diskette is detected. The index sensor is a high resolution device that distinguishes holes placed close together, i.e., index and sector holes in a hard-sectored diskette.
3. A write protect sensor disables the write electronics when a write protect tab is applied to the diskette.
4. A diskette in-place sensor provides an optional signal on the interface when the diskette is inserted.

### 1.5 PHYSICAL DESCRIPTION

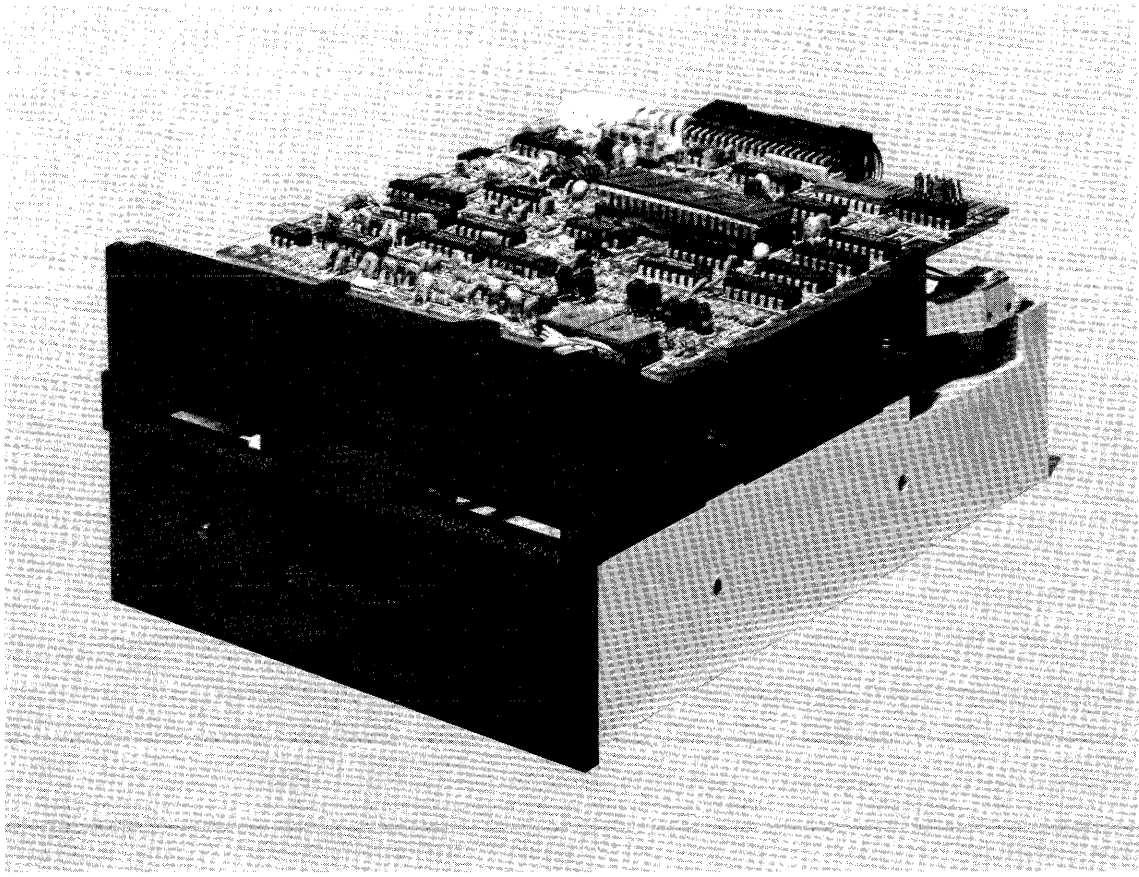
A representative drive is shown in Figure 1-1. The drive can be mounted in a vertical or horizontal plane. However, the logic circuit board must be on the uppermost side when the drive is mounted horizontally.

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

The read/write double-head assembly is positioned by a split band positioner mounted to a microprocessor-controlled stepper motor. The read/write heads are glass-bonded, ferrite/ceramic structures with a life expectancy of 20,000 operating hours.

Operator access for diskette loading is provided via a horizontal slot located at the front of the drive.

The electronic components of the drive are mounted on a single printed circuit board, located above the chassis. Power and interface signals are routed through connectors plugging 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 TM101-4 and TM102-2 drives.

#### 2.1 MECHANICAL SPECIFICATIONS

Figure 2-1 contains the physical dimensions of the drive.

#### 2.2 ELECTRICAL AND OPERATIONAL SPECIFICATIONS

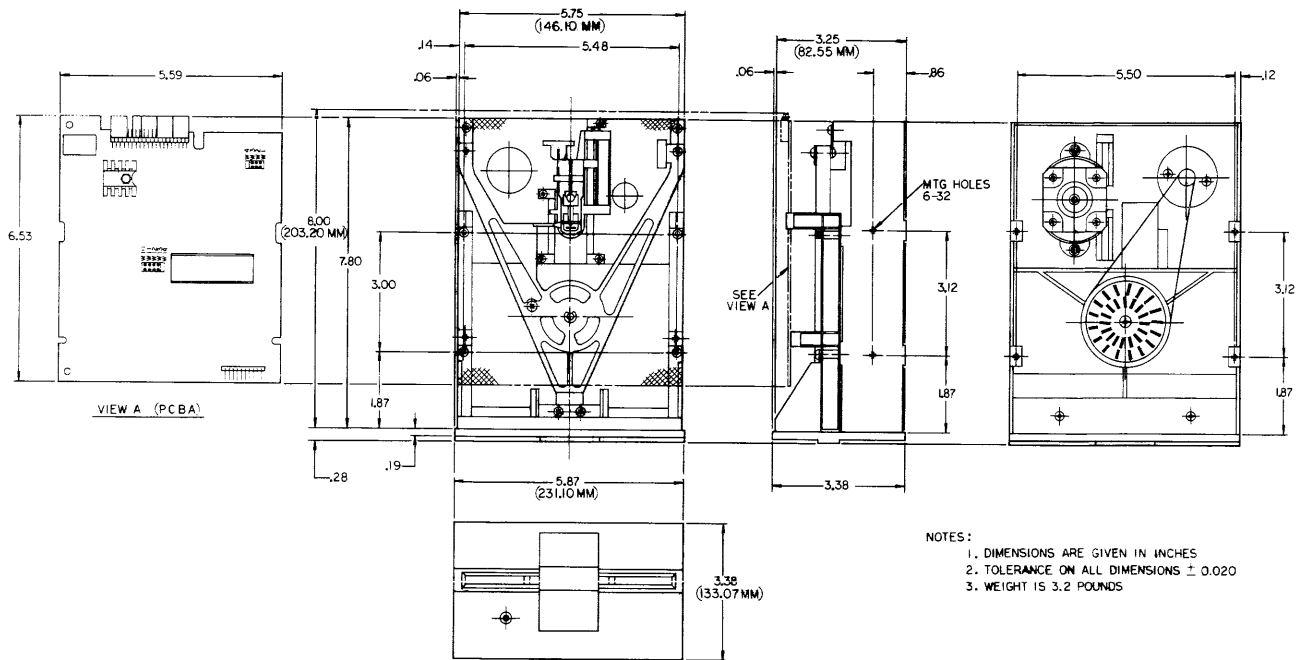
The Electrical and Operational Specifications are located in Table 2-1.

#### 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.



**FIGURE 2-1**  
**DISK DRIVE OUTLINE DRAWING**

**TABLE 2-1  
ELECTRICAL AND OPERATIONAL SPECIFICATIONS**

<p>Data Transfer Rate</p> <p style="padding-left: 40px;">TM101-4</p> <p style="padding-left: 40px;">TM102-2</p> <p>Flux Reversals Per Inch (FRPI), inside track</p> <p style="padding-left: 40px;">TM101-4, Side 0</p> <p style="padding-left: 40px;">TM101-4, Side 1</p> <p style="padding-left: 40px;">TM102-2, Side 0</p> <p style="padding-left: 40px;">TM102-2, Side 1</p> <p>Unformatted Recording Capacity</p> <p style="padding-left: 40px;">TM101-4</p> <p style="padding-left: 40px;">TM102-2</p> <p>D. C. Voltage and Current Requirements</p> <p style="padding-left: 40px;">+ 12 volts D. C. Power</p> <p style="padding-left: 40px;">+ 5 volts D. C. Power</p> <p>Shipment</p>	<p style="padding-left: 40px;">250,000 bits per second</p> <p style="padding-left: 40px;">500,000 bits per second</p> <p style="padding-left: 40px;">5,535 FRPI</p> <p style="padding-left: 40px;">5,877 FRPI</p> <p style="padding-left: 40px;">11,070 FRPI</p> <p style="padding-left: 40px;">11,754 FRPI</p> <p style="padding-left: 40px;">1 megabyte per disk</p> <p style="padding-left: 40px;">2 megabytes per disk</p> <p style="padding-left: 40px;">+ 12 volts <math>\pm</math> 0.6 volt at 900 milliamperes, average; 1.4 amperes, maximum, surge current required for 50 milliseconds</p> <p style="padding-left: 40px;">+ 5 volts <math>\pm</math> 0.25 volt at 600 milliamperes, average, with less than 100 millivolts peak- to-peak ripple</p> <p>When prepared for shipment by Tandon, the drive meets the re- quirements of NSTA preshipment test procedure Project 1A.</p>
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**TABLE 2-1 (CONTINUED)  
ELECTRICAL AND OPERATIONAL SPECIFICATIONS**

Media	ANSI-compatible 5-1/4-inch diskette
	TM101-4 requires a 96 TPI certified diskette
	TM102-2 requires a 12,000 BPI certified diskette
Media Life (for reference only)	$4 \times 10^6$ passes per track
Tracks Per Inch	96 TPI, both drives
Tracks Per Drive	160 tracks per drive, 80 tracks per side
Track Spacing	0.264 millimeters, 10.4 milinches
Head Life	20,000 media contact hours
Disk Rotational Speed, microprocessor controlled	300 RPM $\pm$ 1.5 percent
Instantaneous Speed Variation (ISV)	$\pm$ 3 percent
Motor Start Time	250 milliseconds, maximum
Motor Stop Time	150 milliseconds, maximum
Seek Time, Track to Track	3 milliseconds, minimum
Head Settling Time	15 milliseconds
Average Track Access Time, including head settling time	90 milliseconds

**TABLE 2-2  
RELIABILITY SPECIFICATIONS**

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

**TABLE 2-3  
ENVIRONMENTAL SPECIFICATIONS**

<p>Temperature</p> <p>Operating, Media Dependent</p> <p>Nonoperating</p> <p>Relative Humidity</p> <p>Operating, noncondensing, Media Dependent</p> <p>Nonoperating, noncondensing</p> <p>Altitude</p> <p>Operating or Nonoperating</p>	<p><math>10^{\circ}\text{C}</math> to <math>46^{\circ}\text{C}</math>, <math>50^{\circ}\text{F}</math> to <math>115^{\circ}\text{F}</math></p> <p><math>-40^{\circ}\text{C}</math> to <math>71^{\circ}\text{C}</math>, <math>-40^{\circ}\text{F}</math> to <math>160^{\circ}\text{F}</math></p> <p>20-to-80 percent</p> <p>5-to-95 percent</p> <p>152.4 meters, 500 feet, below sea level, to 15,240 meters, 50,000 feet, above sea level</p>
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# SECTION 3

## OPERATION

### INTRODUCTION

This section contains information on how to unpack, check out, install, and operate the TM101-4 and TM102-2 drives.

#### 3.1 UNPACKING THE DRIVE

The drives are packaged in protective containers to minimize the possibility of damage during the 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 that 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 that the front panel is secure.
5. Ensure that the drive belt is in place.
6. Manually rotate the drive hub. It should rotate freely.
7. Ensure that the circuit board is secure.
8. Ensure that 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, as are two 6-32 tapped mounting holes on each side for attachment to user-supplied mounting brackets (see Figure 2-1, page 2-2). 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 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 TM101-4 and TM102-2 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, AMP Mate-n-Lok Part Number 1-480424-0, which mates with the connector on the logic circuit board 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, page 3-5.

The signal wire harness should be of the flat ribbon or twisted pair type, 22-to-24 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**

<b>Input Control Lines: Controller-To-Disk Drive</b>		
<b>Ground</b>	<b>Pin</b>	<b>Signal</b>
1	2	Special Option
3	4	Special Option
5	6	Drive Select 3 or Optional Ready
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
<b>Output Control Lines: Disk Drive-To-Controller</b>		
<b>Ground</b>	<b>Pin</b>	<b>Signal</b>
7	8	Index/Sector
25	26	Track 0
27	28	Write Protect
29	30	Composite Read Data
33	34	Ready or Optional Drive Select 3

## 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, then the drive is condi-

tioned 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 in less than 150 milliseconds. 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 at

least three milliseconds.

The drive electronics ignore step pulses when one of five 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.
4. When trying to seek beyond Track 79.
5. When the latch is opened.

## **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 double-frequency 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 the nominal data rate  $\pm 0.1$  percent, and the repetition of the high-to-low transitions, while writing all ones, be equal to twice the nominal data rate  $\pm 0.1$  percent.

## **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

The Side Select interface line defines which side of a two-sided diskette is used for information 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 the hard sectored diskettes.

### TRACK 0

When the drive is selected, the Track 0 interface signal, if true (low) indicates to the controller that the read/write heads are positioned on 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 are 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  $1 \pm 0.25$  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.

### READY

The Ready signal indicates the operational status of the drive. There are four ready signal conditions selectable by use of programming jumper connectors (see Section 3.6).

Ready status must be reinitiated by toggling the Drive Select line.

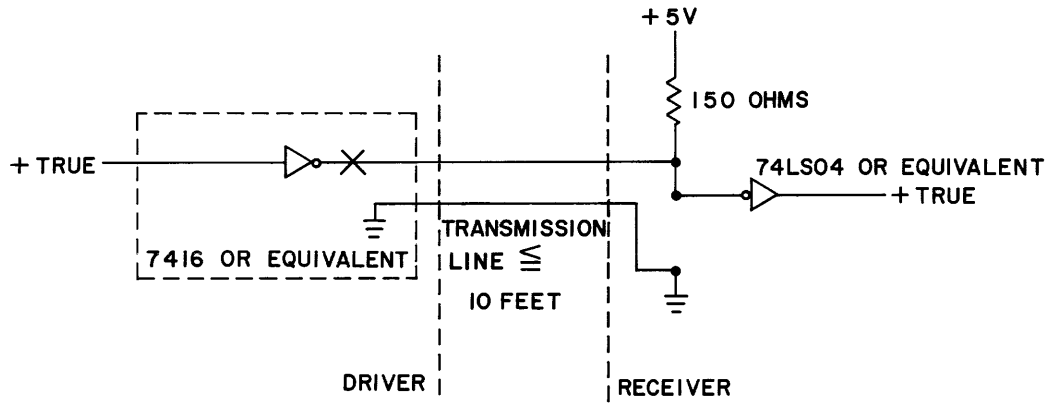
## TYPICAL INTERFACE CHARACTERISTICS

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

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

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

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



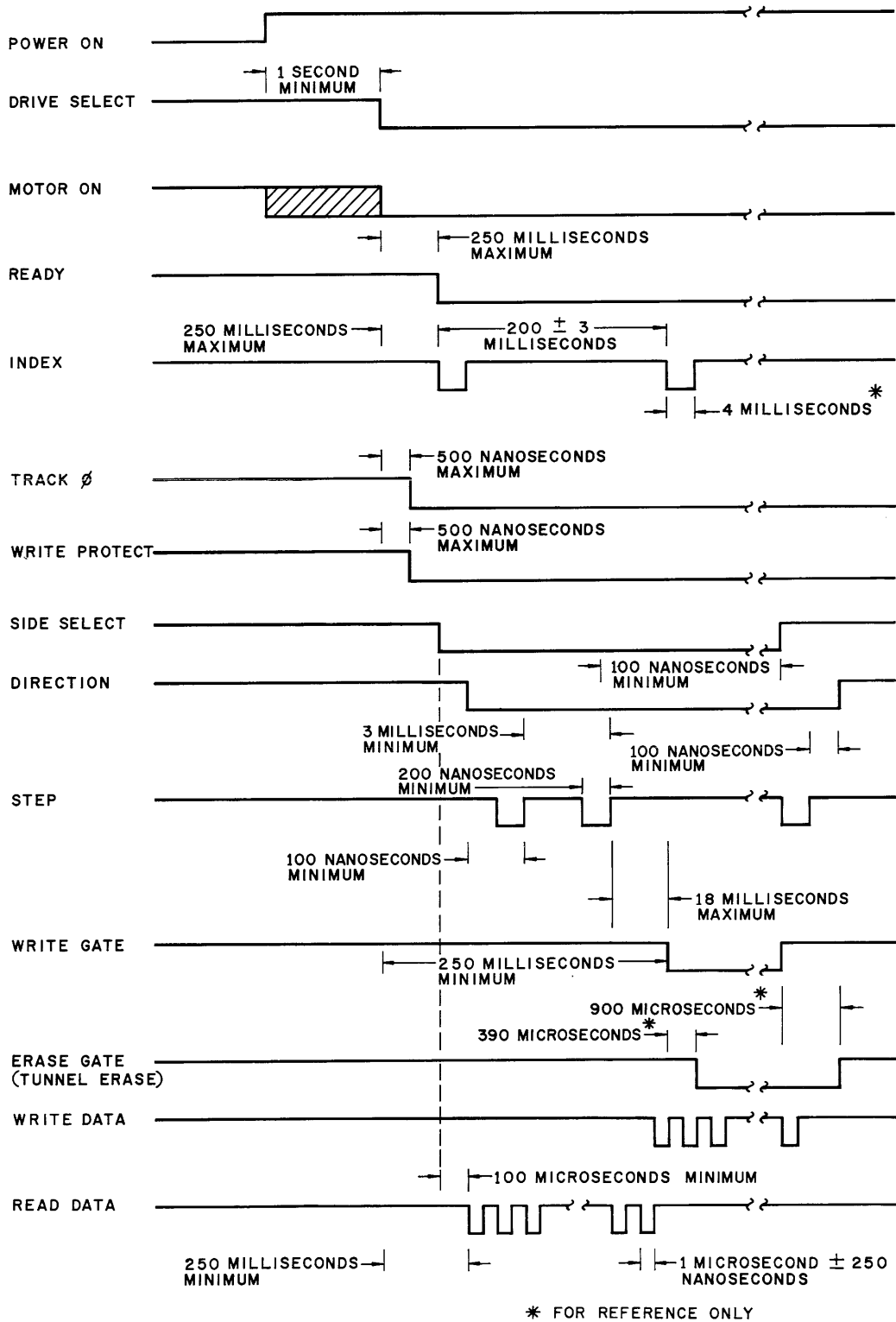
**FIGURE 3-1**  
**ELECTRICAL INTERFACE CHARACTERISTICS**

### 3.5 D. C. POWER

D.C. power is supplied to this drive through a four-pin AMP connector, connected to the circuit board, J2. 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 chassis should be connected to earth ground to ensure proper operation.

<b>TABLE 3-2</b> <b>D. C. POWER CONNECTOR PIN ASSIGNMENTS</b>	
<b>Pin</b>	<b>Supply Voltage</b>
1	+ 12 volts D.C.
2	12 volts return
3	5 volts return
4	+ 5 volts D.C.
<b>Pin</b>	<b>Signal</b>
Ground lug 3/16 inch quick disconnect	Chassis ground from controller



**FIGURE 3-2**  
**CONTROL AND DATA TIMING REQUIREMENTS**

### 3.6 DRIVE ADDRESS AND OPTION PATCHING

The drive address and option patching is determined by the different jumper configurations required for specific system applications. If jumper configurations are changed, power should be cycled off and on so the microprocessor can recognize the new configuration. Drive address and option patching jumpers are located in figure 3-3. In Section 3.6, an X denotes jumper installation. An asterisk, \*, denotes only plug-in type jumpers.

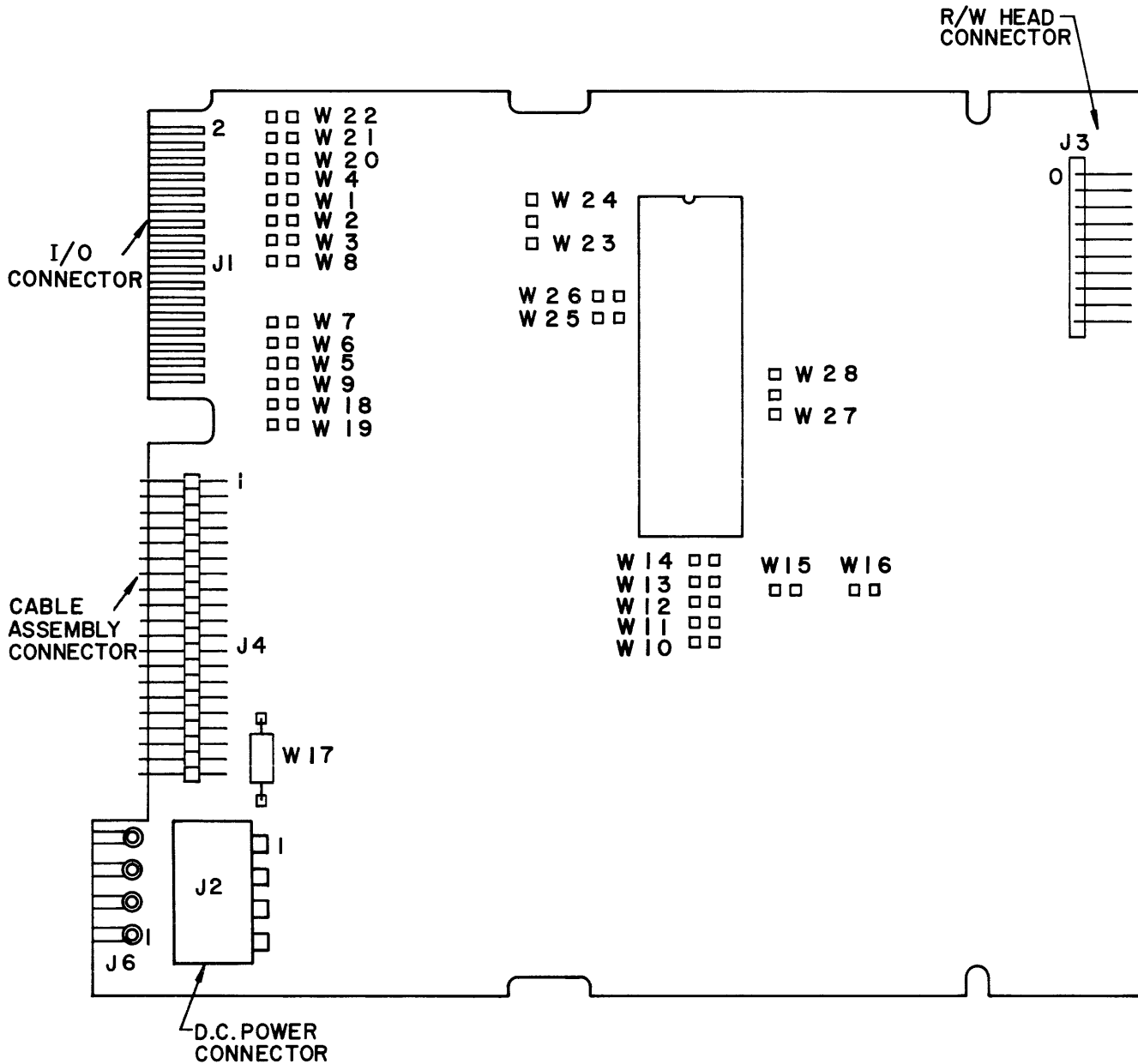


FIGURE 3-3  
DRIVE ADDRESS AND OPTION PATCHING

## DRIVE SELECT (W1 THROUGH W4, W8, W18, W29)

Jumper blocks W1 through W4, W8, W18 and W29 control the drive unit number select. Jumper number W1 is used for Drive 0. W2 is used for Drive 1. W3 is used for Drive 2. W4 and W18 are used for optional Drive 3. W29 is used for Drive 3.

The drive is always selected when W8 is installed.

W1*	W2*	W3*	W4*	W8*	W18	W29	DRIVE SELECT
X	—	—	—	—	—	—	Selects Drive 0 via J1-10.
—	X	—	—	—	—	—	Selects Drive 1 via J1-12.
—	—	X	—	—	—	—	Selects Drive 2 via J1-14.
—	—	—	X	—	—	X	Selects Drive 3 via J1-6.
—	—	—	X	—	X	—	Selects Drive 3 via J1-34 (optional).
—	—	—	—	X	—	—	Multiplex: Used in a single drive system that does not provide drive select lines.

## SIDE SELECT (W5, W6, W7)

W5 and W6 are standard. W7 is an option; it is used alone.

W5	W6	W7	SIDE SELECT
X	X	—	For single-sided and double-sided drives.
—	—	X	Direction (J1-18 N FWD) is used for optional side select.

## READY I/O (W9, W19)

Ready is output on Pin 6 only when W9 is installed. Ready is output on Pin 34 only when W19 is installed.

W9	W19	READY
X	—	Ready signal on J1-6 (optional).
—	X	Ready signal on J1-34.

## READY OPTION MODES (W10, W11)

The Ready option jumper programming is defined as:

W10	W11	READY IS A FUNCTION OF
—	—	Latch closed; diskette in place; and diskette not changed or removed.
—	X	Latch closed. Does not require drive select line to be toggled to reinitiate ready line.
X	—	Latch closed; diskette in place; and diskette not changed or removed; index pulses detected; motor enabled and up to speed.
X	X	Latch closed; index pulses detected; motor enabled and up to speed. Does not require drive select line to be toggled to reinitiate ready line.

## MOTOR ON (W12)

The standard operation has a Motor On signal controlling the drive motor. W12 is deleted.

The motor can be controlled by Drive Select or Motor On when W12 is installed.

W12*	MOTOR IS ENABLED BY
—	Motor On.
X	Motor On or Drive Select.

## STEP CONFIGURATION (W13, W14)

Optional drive configurations can be selected using W13 and W14. W13 and W14 deleted is standard.

W13*	W14*	STEP CONFIGURATION IS
—	—	For use at three millisecond step rate.
—	X	Self-Seek cycle.
X	—	For use within six millisecond or slower step rate.
X	X	Not used.

## STEPPER MOTOR CONTROL (W15, W16)

The power to the stepper motor is controlled by Drive Select when W15 is in place. The stepper motor is enabled all the time when W16 is in place.

W15	W16	STEPPER MOTOR CONTROL OPTION
X	—	Power is available to the stepper motor only when the drive is selected. On reselection, the user must ensure track location.
—	X	Power is continuously available to the stepper motor.

## GROUND ISOLATION (W17)

The power ground is isolated from the chassis ground when W17 is removed. Ground isolation can also be accomplished by deletion of the chassis-to-PCBA ground jumper.

W17	GROUND
—	Isolates the logic ground from the chassis ground.
X	Connects the logic ground to the chassis ground. In addition, the chassis-to-PCBA ground jumper must be in.

## SPECIAL I/O J1-4 (W20, W21, W27, W28)

Diskette inserted status (output), W20 only.

“In Use” illuminates the front panel L.E.D. when the drive is selected, W21 and W27 are installed, W28 is deleted, and a true (low) signal is applied to J1, Pin 4.

W20	W21	IN USE, DISK IN
X	—	Provides “Disk In” signal to the system via J1-4.
—	X	Provides “In Use” signal from the system to the drive via J1-4.

W21	W27	W28	ACTIVITY L.E.D.
X	X	—	Activity L.E.D. function of “In Use”, from the system, and Drive Select.
—	—	X	Activity L.E.D. function of Drive Select only.

## DOOR LOCK SOLENOID (W22)

The door lock solenoid can be activated from J1, Pin 2, with both W22 and the optional door lock solenoid installed.

W22	DOOR LOCK SOLENOID
—	For drives with no door lock solenoid.
X	For drives with a door lock solenoid (optional).

## WRITE PROTECT INHIBIT (W23, W24)

The standard Write Protect feature is W23 only. Write Protect control is inhibited when W24 is installed and W23 removed.

W23	W24	WRITE PROTECT
X	—	Write Protect control, in response to a write protected diskette, inhibits Write Gate, thus disallowing the flow of write data to the read/write heads.
—	X	Write Protect control is inhibited.

## ERASE TYPE (W25, W26)

W25	W26	ERASE
X	—	Erase delay used with standard tunnel erase read/write heads.
—	X	No erase delay. Straddle erase read/write heads used (optional).

## 3.7 DISKETTES

The TM101-4 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. The TM102-2 drives require the use of high density, high coercivity, media. This media must be certified for use at data bit densities in excess of 12,000 BPI. Use of any other media results in poor data reliability.

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.

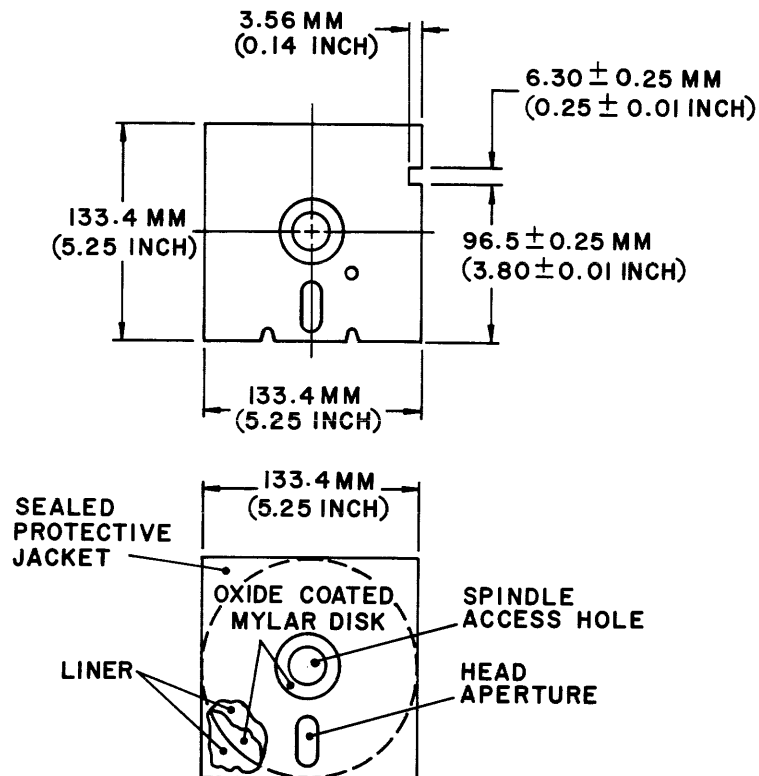


FIGURE 3-4  
RECORDING MEDIA

## LOADING THE DISKETTE

The drive is loaded by inserting the diskette with its 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

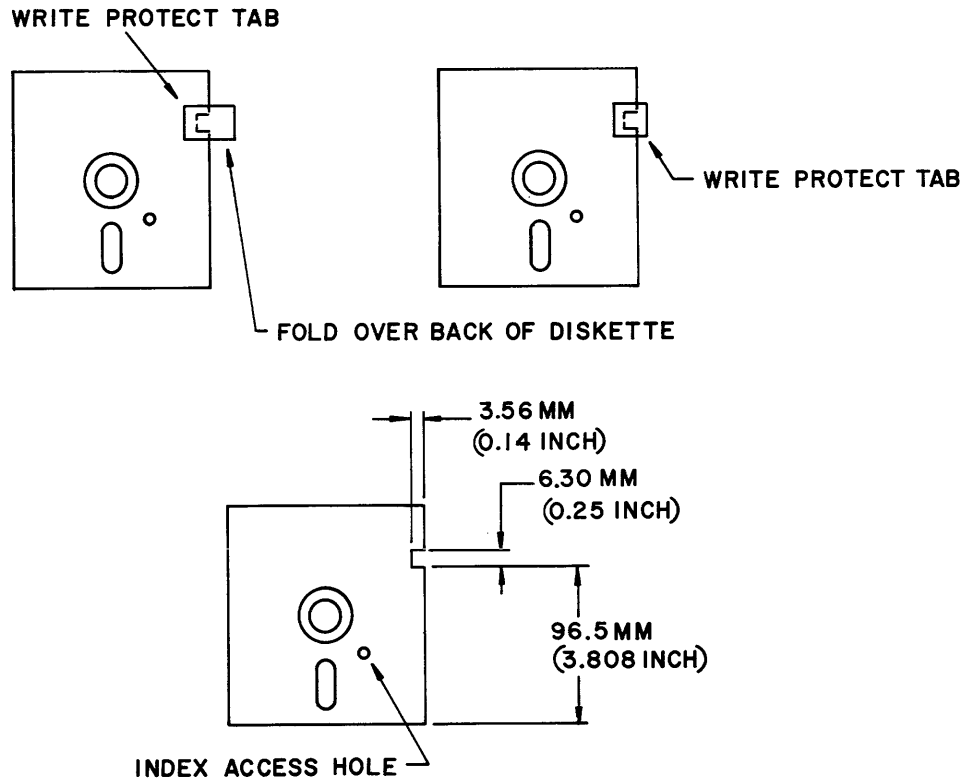
*Damage to the center of the diskette may result if the door is closed when the diskette is not properly inserted. This prevents reliable recovery of the recorded data.*

## WRITE PROTECT TAB

The drive is equipped with a Write Protect Sensor Assembly. This sensor operates in conjunction with a diskette that has a slot cut in the protective jacket.

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.





**FIGURE 3-5  
WRITE PROTECT TAB**

## 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 heads.

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 follow-

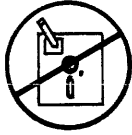
ing handling procedure should be observed.

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.

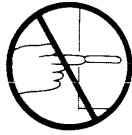
### NOTE

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.

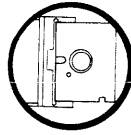
3. To avoid warping, do not store the diskette in direct sunlight.
4. Do not use a lead pencil or a ballpoint pen to write on the label. Use a felt tipped pen, and mark lightly on the label.



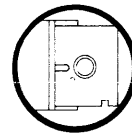
DO NOT WRITE ON THE JACKET WITH PEN OR PENCIL. USE A FELT TIP PEN.



DO NOT TOUCH PRECISION SURFACE WITH YOUR FINGERS.



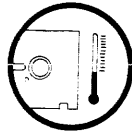
TO AVOID DAMAGE TO THE DISKETTE AND TO YOUR DRIVE, INSERT DISKETTE CAREFULLY UNTIL BACKSTOP IS ENCOUNTERED.



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 CARE AND HANDLING**

**Tandon**

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