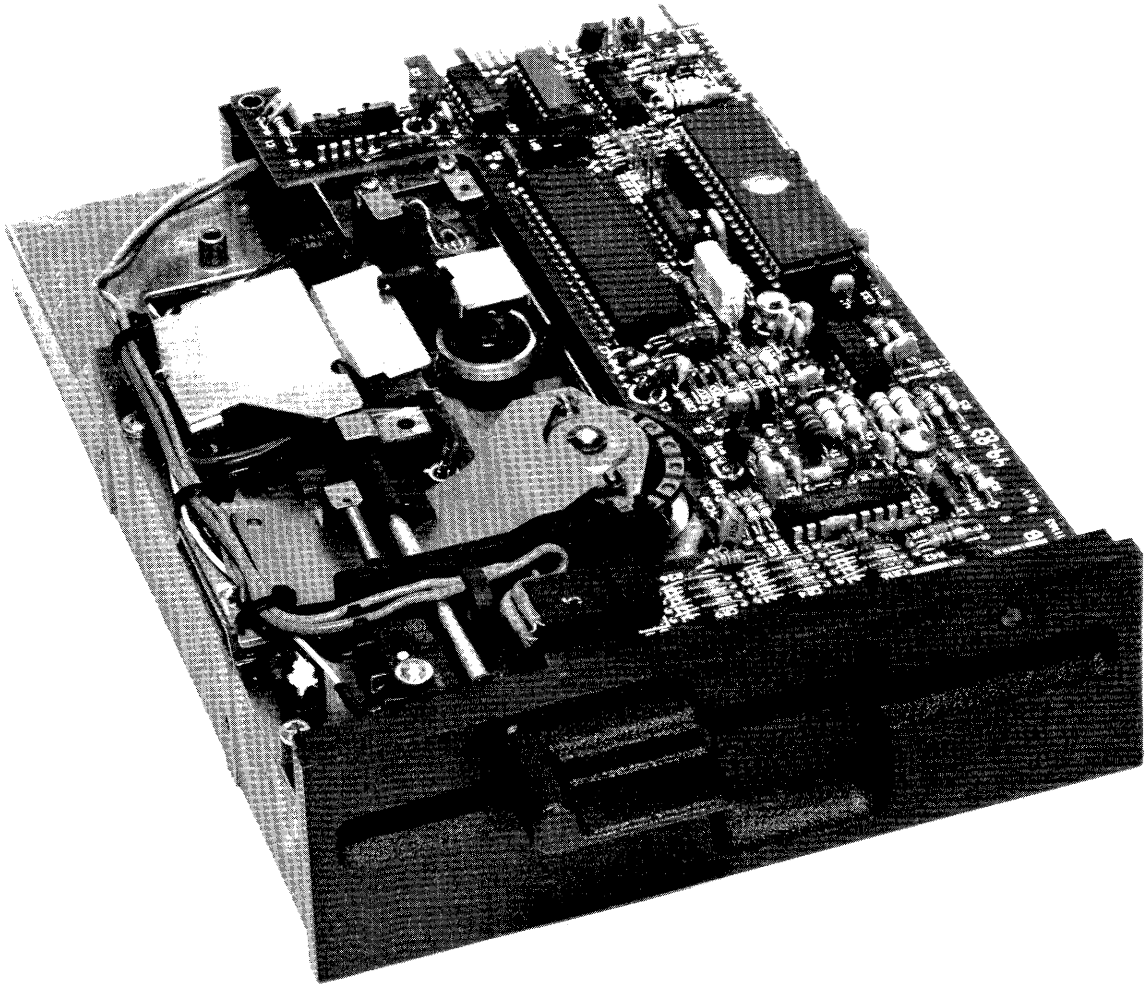
Tandon

TM65 SERIES THIN LINE™

FLEXIBLE DISK DRIVES



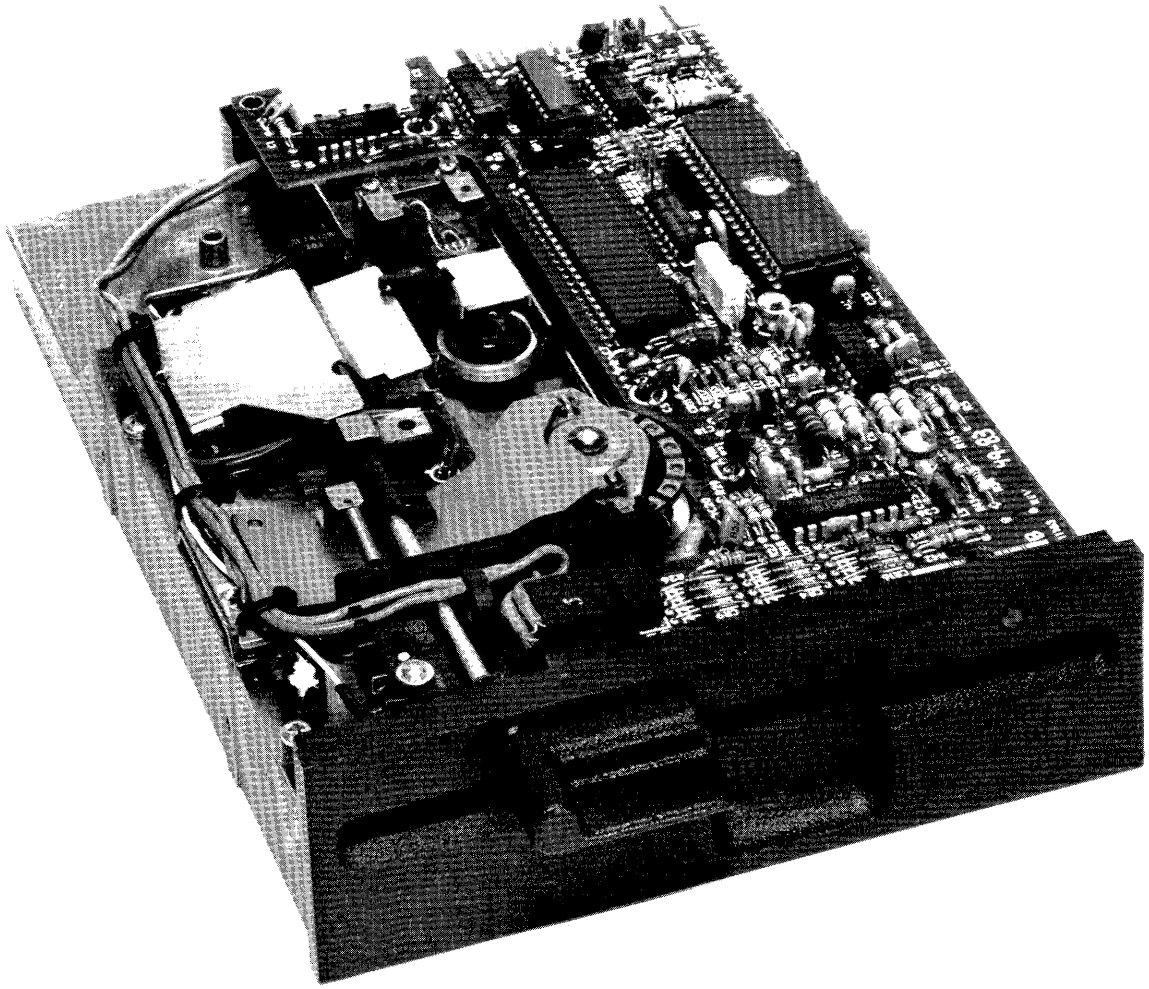
PRODUCT SPECIFICATION AND USER'S MANUAL

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.

TM65 SERIES THINLINE™
5-1/4-INCH, SINGLE AND DOUBLE-SIDED, FLEXIBLE DISK DRIVES
48 AND 96 TRACKS PER INCH
PRODUCT SPECIFICATION AND USER'S MANUAL



Tandon CORPORATION
20320 PRAIRIE STREET
CHATSWORTH, CALIFORNIA 91311

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SECTION 1

GENERAL DESCRIPTION

INTRODUCTION

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

Tandon Corporation's TM65 series of drives are full feature, one-half height, 5-1/4-inch ThinLine™ flexible disk drives. The drives are compact data storage devices that use an ANSI-compatible, Industry Standard 5-1/4-inch diskette.

Model Number TM65-1L is a single-sided, 48 tracks per inch, recording device. The TM65-2L is a double-sided, 48 tracks per inch, recording device. Model Number TM65-4 is a double-sided, 96 tracks per inch, recording device.

The drives are capable of reading and writing digital data using FM, MFM, or MMFM techniques. Encoding and decoding of the data is done by the user's controller.

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 TM65 series of drives.

1.2 PURPOSE OF THE DRIVE

These 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, microprogram loading, and point-of-sale terminals.

1.3 MAJOR FEATURES

MICROPROCESSOR CONTROL

The TM65-4 drive features an onboard microprocessor, providing four major features:

1. Momentary motor start for improved media centering.
2. Improved head positioning accuracy with reduced hysteresis.
3. Write current switching for optimal recording quality.
4. Programmable Ready signal.

NOTE

Through the use of LSI circuitry, the microprocessor has been eliminated on the TM65-1L and TM65-2L.

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 COMPATIBILITY

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.

COMPACT SIZE

The reduced height of the drive enables it to occupy only one-half the mounting space required for a conventional drive.

1.4 FUNCTIONAL DESCRIPTION

The drives are fully self-contained, and require no operator intervention during normal operation. Each drive consists of a direct drive spindle motor, 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 aluminum guide rails. Its location is ensured when the diskette is inserted until a back stop is encountered and the ejection mechanism latches.

Closing the front latch on the TM65-4 activates the motor start circuit momentarily, resulting in accurate centering and clamping of the diskette. The drive hub on all versions is held at a constant speed of 300 RPM by a servo-controlled, direct drive, brushless D. C. motor. The heads remain in contact with the recording media until the front latch is opened. If media is not present and the front latch is closed, the heads will remain separated from each other on double-sided drives.

The heads are positioned over the desired track by means of a four-phase stepper/band assembly and its associated electronics. This positioner uses a one-step rotation for 96 TPI to cause a one track linear movement, and a two-step rotation for 48 TPI to cause a one track linear movement.

Data recovery electronics includes an integrated read amplifier, differentiator, zero crossover detector, and digitizing circuit. No data decoding capabilities are provided.

The drive has the following sensors:

1. An optical index sensor generates a digital signal when the index hole on the diskette is detected.

2. An optical write protect sensor disables the write electronics when a write protect tab is applied to the diskette.

3. A motor start switch provides momentary motor spin-up to help center the diskette when the front latch is closed (TM65-4 only).

4. An optical Track 0 sensor detects when the head/carriage assembly is positioned at Track 0.

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 read/write head assembly is positioned by a split band positioner mounted to a 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 two printed circuit boards. The logic circuit board is mounted above the chassis. The motor control circuit board is mounted directly to the spindle motor. Power and interface signals are routed through connectors plugging directly into the logic circuit board.

The spindle is driven by a direct drive, brushless D. C. spindle motor with integral tachometer and speed control circuit. All of the electronics associated with the spindle motor are mounted on the motor itself. A 50 and 60 Hertz strobe pattern is printed directly on the motor, allowing visual verification of the motor's speed.

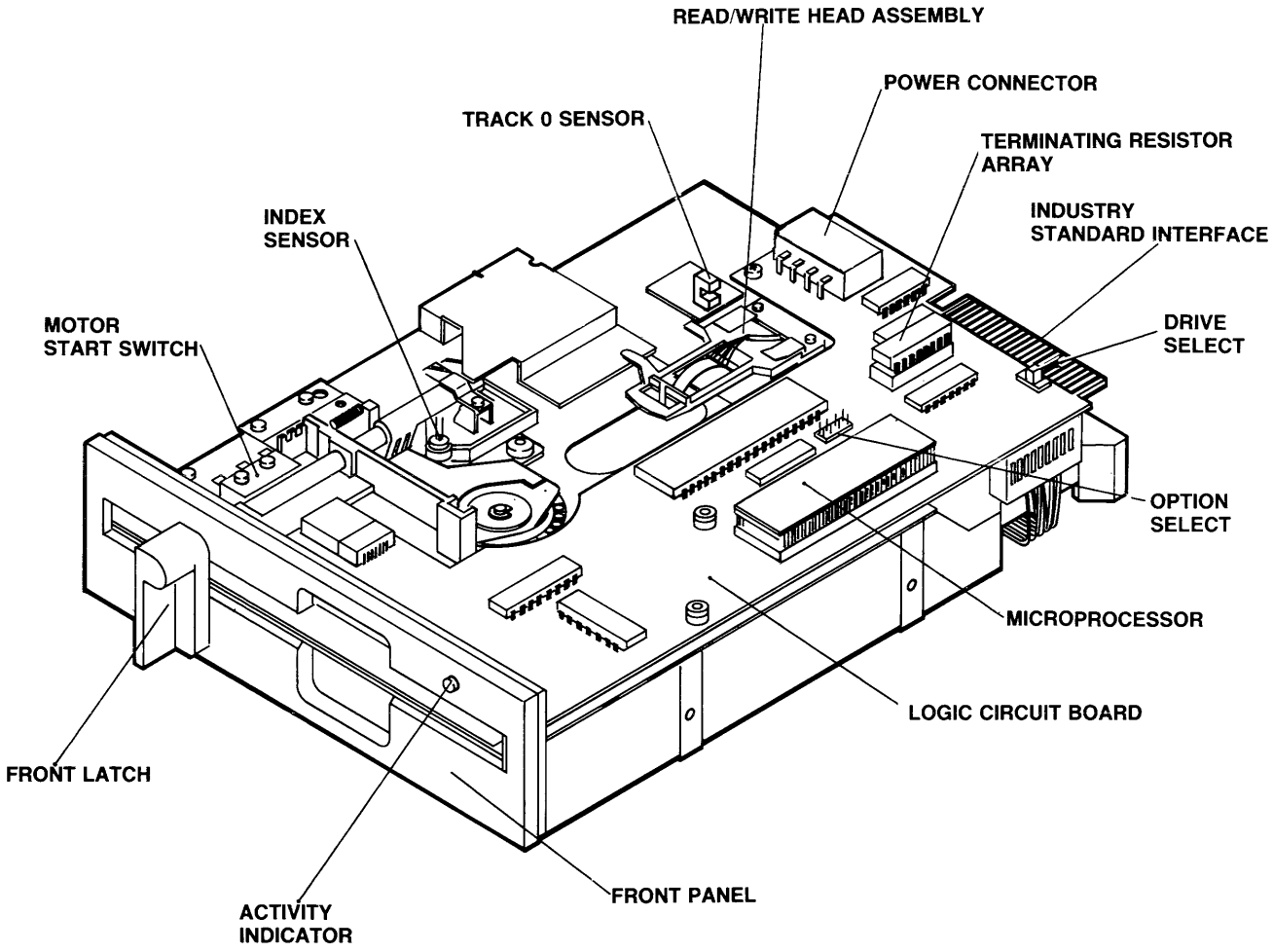


FIGURE 1-1
TM 65-4 DISK DRIVE WITH HEAD SHIELD REMOVED

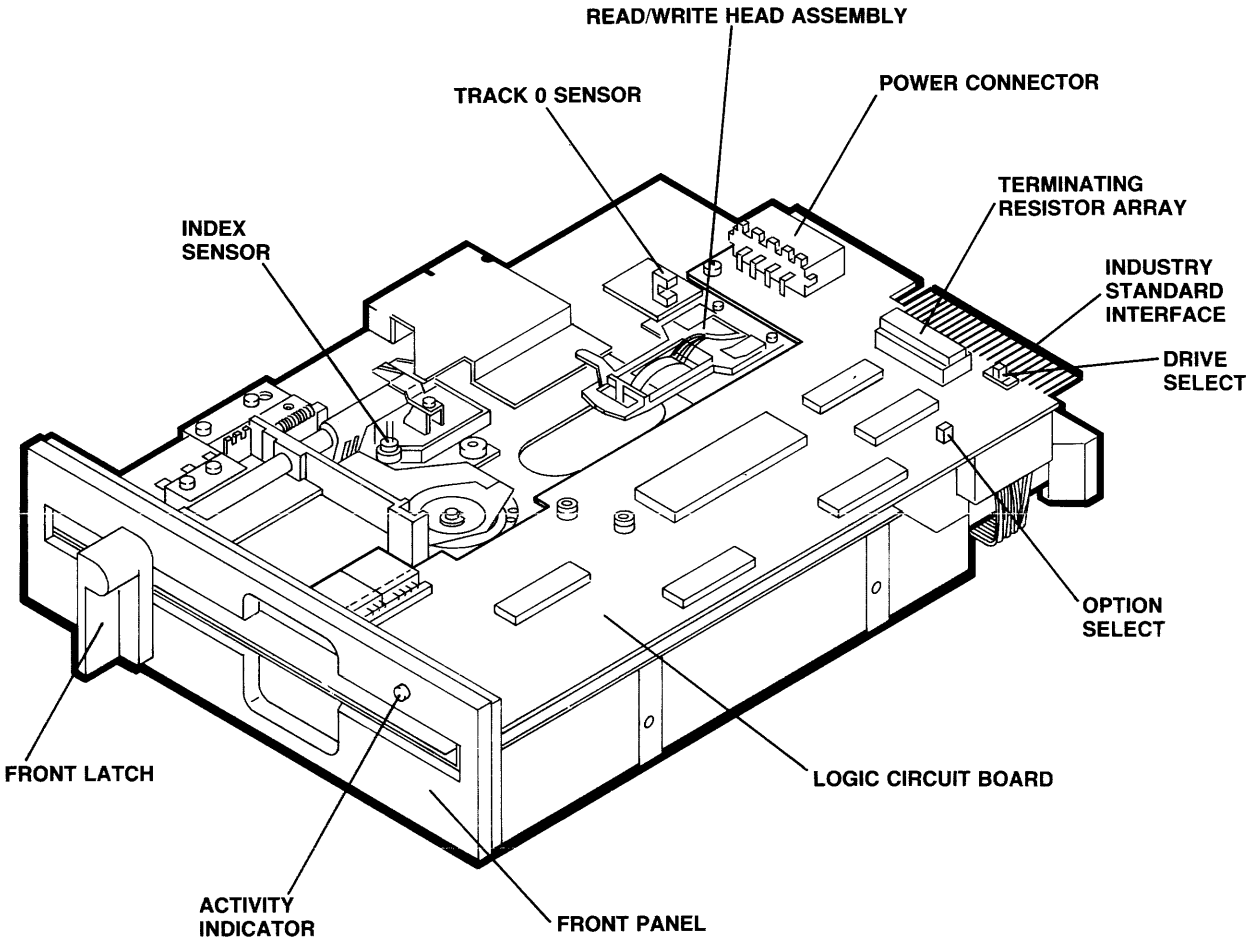


FIGURE 1-2

TM 65-2L DISK DRIVE WITH HEAD SHIELD REMOVED

SECTION 2

PRODUCT SPECIFICATIONS

INTRODUCTION

This section contains the mechanical, electrical and operational, reliability, and environmental specifications for the TM65 series of disk 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

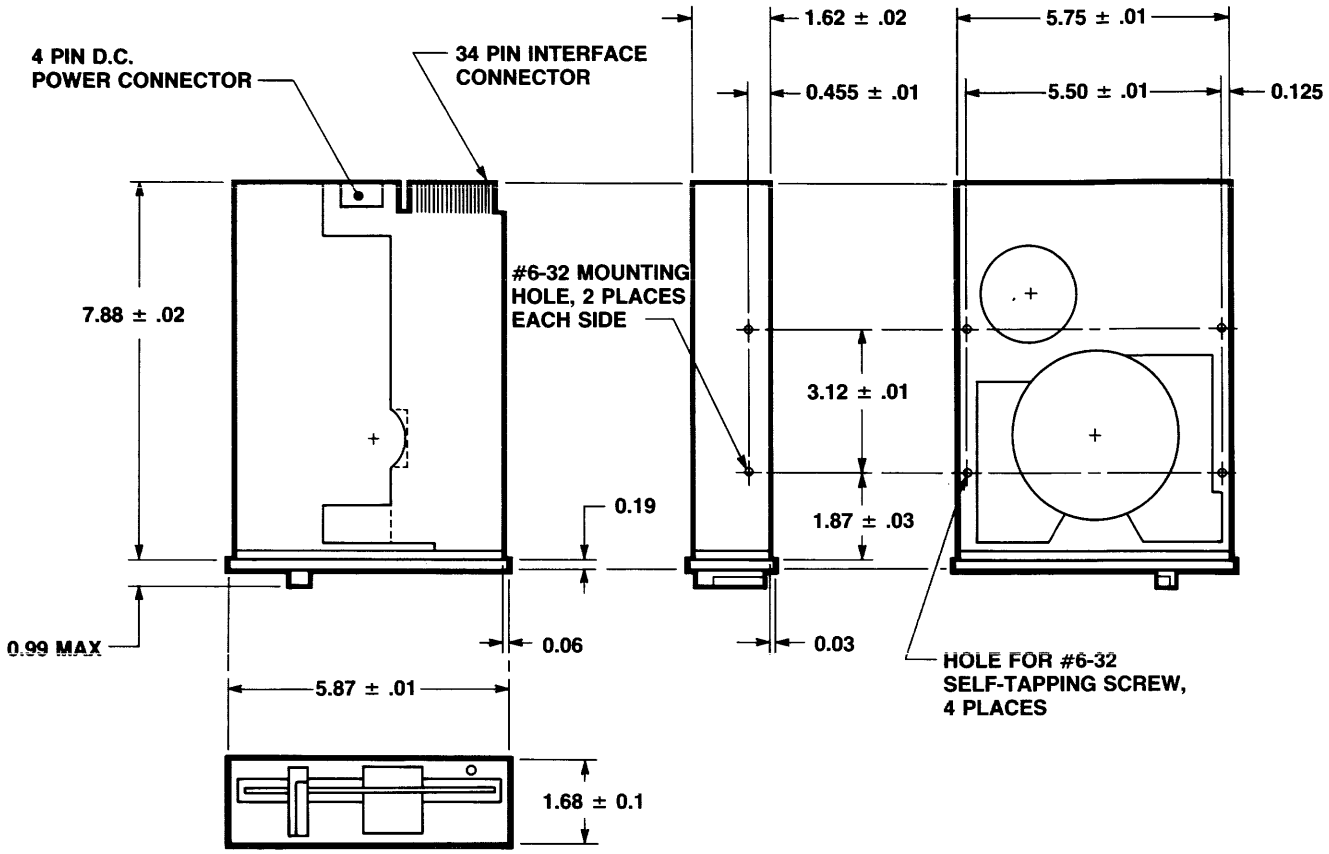
The reliability specifications are located in Table 2-2.

2.4 ENVIRONMENTAL SPECIFICATIONS

The environmental specifications are located in Table 2-3.

This product is recognized under U.L. EMRT2, Component-Data Processing Equipment, Electronic.

Certified



NOTES: ALL DIMENSIONS ARE IN INCHES
WEIGHT IS 2.62 POUNDS, 1.18 KILOGRAMS
DOTTED LINE INDICATES LSI
CIRCUIT BOARD OUTLINE

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	
TM65-1L	48 TPI
TM65-2L	48 TPI
TM65-4	96 TPI
Tracks Per Drive	
TM65-1L	40 tracks
TM65-2L	80 tracks
TM65-4	160 tracks
Track Spacing	
TM65-1L	0.529 millimeters, 20.8 milinches
TM65-2L	0.529 millimeters, 20.8 milinches
TM65-4	0.265 millimeters, 10.4 milinches
Head Life	20,000 media contact hours
Disk Rotational Speed	300 RPM ±1.5 percent
Average Rotational Latency	100 milliseconds
Instantaneous Speed Variation (ISV)	±2 percent
Motor Start Time	250 milliseconds, maximum
Seek Time, track to track	
TM65-1L	6 milliseconds minimum
TM65-2L	6 milliseconds minimum
TM65-4	3 milliseconds minimum

TABLE 2-1 (CONTINUED)
ELECTRICAL AND OPERATIONAL SPECIFICATIONS

Data Transfer Rate	250,000 bits per second, double density
Flux Reversals Per Inch (FRPI), inside track	
All Models, Side 0	5,535 FRPI
TM65-2L and TM65-4, Side 1	5,877 FRPI
Unformatted Recording Capacity, double density	
TM65-1L	250 kilobytes per disk
TM65-2L	500 kilobytes per disk
TM65-4	1 megabyte per disk
Shipment	When prepared for shipment by Tandon, the drive meets the requirements of NSTA pre-shipment test procedure Project 1A.
Head Settling Time	15 milliseconds
Average Track Access Time, including head settling time	90 milliseconds
Typical Recording Modes	FM, MFM, MMFM

D. C. Voltage and Current Requirements

TM65-1L, TM65-2L	TM65-4
+12 volts ± 0.6 volt at 500 milliamperes average, 1.0 amperes maximum, with less than 100 millivolts peak-to-peak ripple.	+12 volts ±0.6 volt at 900 milliamperes average, with less than 100 millivolts peak-to-peak ripple. 850 milliamperes maximum surge current if seek is not performed. If a seek is performed during the motor start interval, surge current is 1.15 amperes maximum for 150 milliseconds.
+5 volts ± 0.25 volt at 300 milliamperes average, 400 milliamperes maximum, with less than 50 millivolts peak-to-peak ripple.	+5 volts ±0.25 volt at 450 milliamperes average with less than 50 millivolts peak-to-peak ripple.

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	11,000 hours, 100 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 TM65 series of drives.

3.1 UNPACKING THE DRIVE

The drives are shipped 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, top side up.
2. Cut the tape that holds the tab in the slot on the front side of the container.

   CAUTION

   Container may spring open when the tape is cut.

3. Remove drive from plastic bag.
4. Inspect the drive for possible damage.
5. Notify the carrier immediately if any damage is found.
6. Save the shipping container for future use.

3.2 PREINSTALLATION CHECKOUT

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

1. Remove the cardboard shipping insert, and retain for future shipment.

   CAUTION

   Turning the front latch to the open position will cause the shipping insert to eject. Remove the insert slowly to prevent damage to the upper slider.

2. Check to ensure that the front latch rotates easily. It should remain in the open position when rotated fully counterclockwise (horizontal to front panel).
3. When the latch is moved to an open position, the head arm raises.
4. Ensure the front panel is secure.
5. Manually rotate the drive hub. It should rotate freely.
6. Ensure both circuit boards are secure.
7. 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.

Two 6-32 tapped mounting holes are provided on each side and four holes for self tapping screws are provided on the bottom of the drive 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. Under no circumstances should four or more mounting screws be used.

Two drives may be mounted in a single, full-size drive enclosure, 3.25-inches high. A two-

hole mounting scheme per drive is recommended for mounting in a two drive configuration.

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 9 watts, 31 BTU per hour for the LSI version and 13 watts, 44 BTU per hour for the microprocessor version 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 forced air is used, air flow must be directed outward from the drive. Do not intake air through the drive or heads and diskettes.

The use of forced air flow is recommended when two drives are mounted within a single enclosure.

3.4 INTERFACE CONNECTIONS

Interface connections for the TM65 series drives 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 located 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 3-7.

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	Spare
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	Ready*

*TM65-4 Standard, see Table 3-3. TM65-2L Optional. Contact your Tandon representative.

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 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 may be gated with Drive Select as an option.

On the TM65-4, the motor activates momentarily when the front latch is closed. This motor start function remains active for approximately three 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 three milliseconds for the TM65-4 and six milliseconds for the TM65-1L and TM65-2L.

The drive must be stepped at either three or six milliseconds, depending upon the jumper options. If selection of other step rates is desired, consult your local Tandon representative.

The drive electronics ignore step pulses when one of the following 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 on the TM65-4.
5. When the door latch is opened on the TM 65-4.

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.

The microprocessor on the TM65-4 automatically decreases write current by 25 percent, when writing on the inner tracks, for optimal recording quality. Write current is switched at Track 40.

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, TM65-2L AND TM65-4

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. Side Select is ignored by the TM65-1L.

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 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 ±0.25 microsecond 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, TM65-4 ONLY

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

Ready is defined as drive selected and door closed only, or drive selected, door closed, diskette inserted and up to speed. Diskette inserted means that at least one index pulse has been detected. Up to speed means that 250 milliseconds have elapsed since the motor has been turned on. Ready goes false when the motor is turned off or the door is opened.

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.

3.5 D. C. POWER

D. C. power is supplied to this drive via a four-pin AMP connector, J2, mounted on the logic circuit board. The mating connector, not supplied, is AMP Part Number 1-480424-0, using AMP contact Part Number 60619-1. Pin assignments are found in Table 3-2.

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

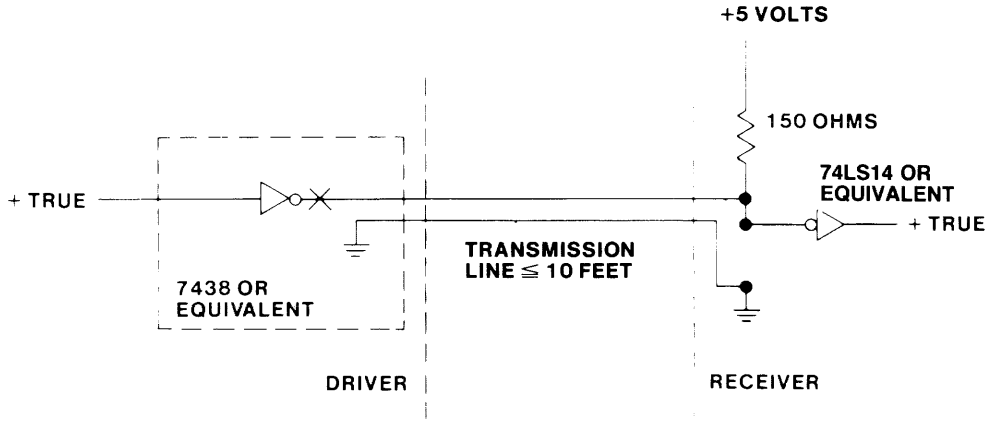
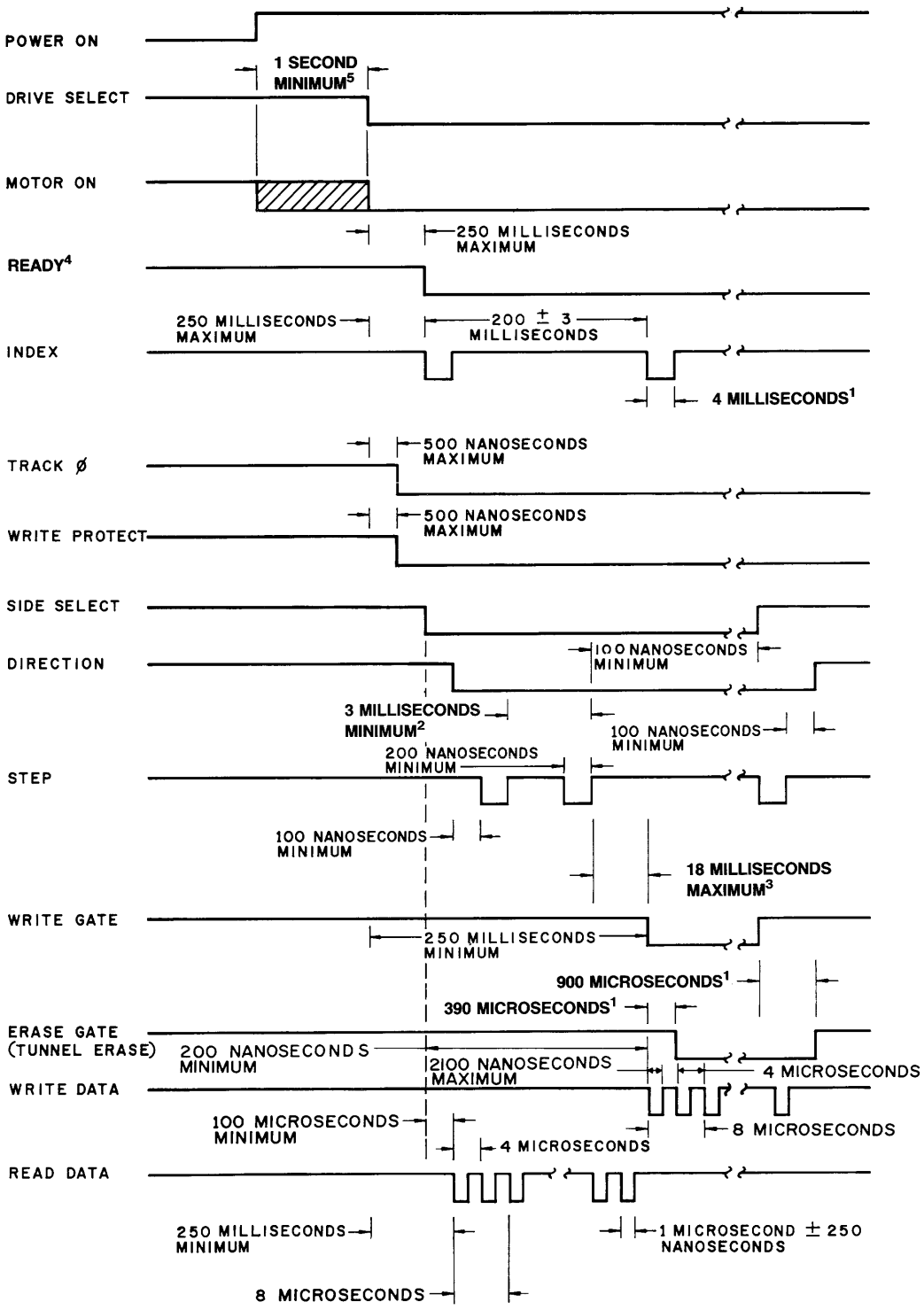


FIGURE 3-1
ELECTRICAL INTERFACE CHARACTERISTICS



NOTES: [1]FOR REFERENCE ONLY
[2]SIX MILLISECONDS FOR TM65-1L AND TM65-2L
[3]TWENTY-ONE MILLISECONDS FOR TM65-1L AND TM65-2L
[4]TM65-4 STANDARD/TM65-2L OPTIONAL, CONTACT YOUR TANDON REPRESENTATIVE
[5]TM65-4 ONLY

FIGURE 3-2
CONTROL AND DATA TIMING REQUIREMENTS

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

STEPPER MOTOR POWER SAVE (TM65-4)

The +12 volts is applied to the stepper motor only while stepping. This voltage is reduced to +5 volts, 50 milliseconds after the last step has been completed.

In order to conserve peak power in the system, the stepper motor power is delayed when the spindle motor is first turned on unless a seek operation is requested at this time.

RESTORE

The Restore operation on the TM65-4 returns the heads to Track 0 during the power up sequence. Restore operation on the TM65-1L and TM65-2L is accomplished by the host controller.

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 on the TM65-4, power should be cycled off and on so the microprocessor can recognize the new configuration.

DS0 THROUGH DS3 JUMPERS (ALL DRIVES)

This option allows the user to daisy chain up to four drives, and to enable one drive at a time. Drive Select is implemented by shorting one of the four connections, using a shorting plug.

The terminator resistor pack, RP1, located on the logic circuit board should be installed in the last drive of the daisy chain (Figure 3-3, 3-4). All other devices on the interface must have the resistor pack removed.

S1 THROUGH S4 OPTION JUMPERS (TM65-4)

Disk drive configurations are available via jumper options S1, S2, S3, and S4. A specific combination of 16 bits define a configuration. If an unused configuration is jumpered, the Front Panel L.E.D. blinks until the power is turned off and a defined configuration is jumpered (Figure 3-3).

All options do automatic centering while the latch is being closed.

Table 3-3 shows the options available. An X denotes jumper installation, and a dash (–) denotes jumper removed.

NOTE

The ready signal, with the door closed and one index pulse detected, is delayed 250 milliseconds after power on (after 1 second delay).

If jumper configurations are changed, power should be cycled off and on so the microprocessor can recognize the next configuration.

TABLE 3-3
TM65-4 OPTIONS

S1	S2	S3	S4	Ready Is A Function Of:	Drive Motor On Is A Function Of:	Motor Off Delay
—	—	—	X	Door Closed, up to speed and drive selected	Drive Select or Motor On	None
—	—	X	—	Door Closed, up to speed and drive selected	Drive Select and Motor On	None
—	X	—	—	Door Closed, up to speed and drive selected	Motor On	3 seconds
—	X	X	—	Door Closed, up to speed and drive selected	Motor On	None
X	—	—	—	Door Closed and drive selected	Drive Select and Motor On	None
X	—	—	X	Door Closed up to speed and drive selected	Drive Select or Motor On	3 seconds
X	—	X	X	Door Closed and drive selected	Motor On	3 seconds
X	—	X	—	SELF SEEK CYCLE, 3 Millisecond Step Rate		

NOTE: Motor stops when door is opened:

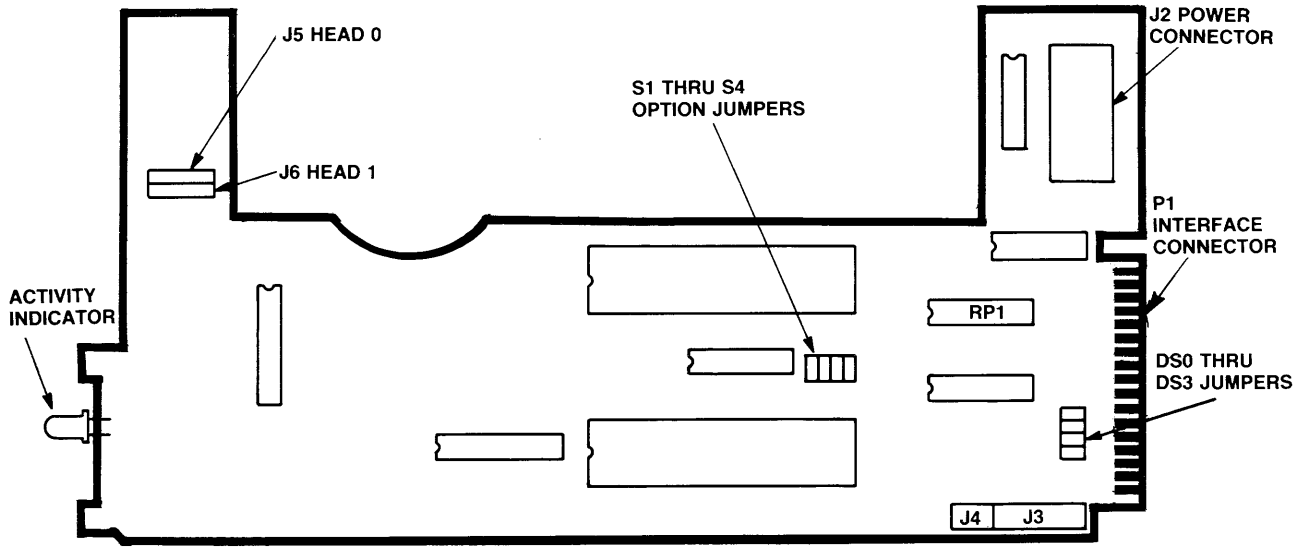


FIGURE 3-3
LOGIC CIRCUIT BOARD OPTION LOCATIONS, TM65-4

JP2 AND JP7 OPTION JUMPERS (TM65-1L, TM65-2L)

Disk drive configuration options are provided by JP2 and JP7 (Figure 3-4).

DRIVE SELECT CONTROL (JP2)

The JP2 jumper is used only in single drive systems when the user requires the drive logic to be enabled at all times. The DS0 through DS3 Drive Select lines are disabled with JP2 installed, eliminating need for the host controller to issue a Drive Select signal.

JP2	DRIVE SELECT CONTROL
X	Drive Selected at all times.
—	Drive Select controlled by DS0 through DS3.

MOTOR ON CONTROL (JP7)

Connecting JP7, A to C, allows spindle motor control via J1, pin 16. If the B to C jumper is installed, the spindle motor is controlled by Drive Select.

C-A	C-B	MOTOR CONTROL
X	–	Spindle motor controlled by Motor On signal
–	X	Spindle motor controlled by Drive Select.

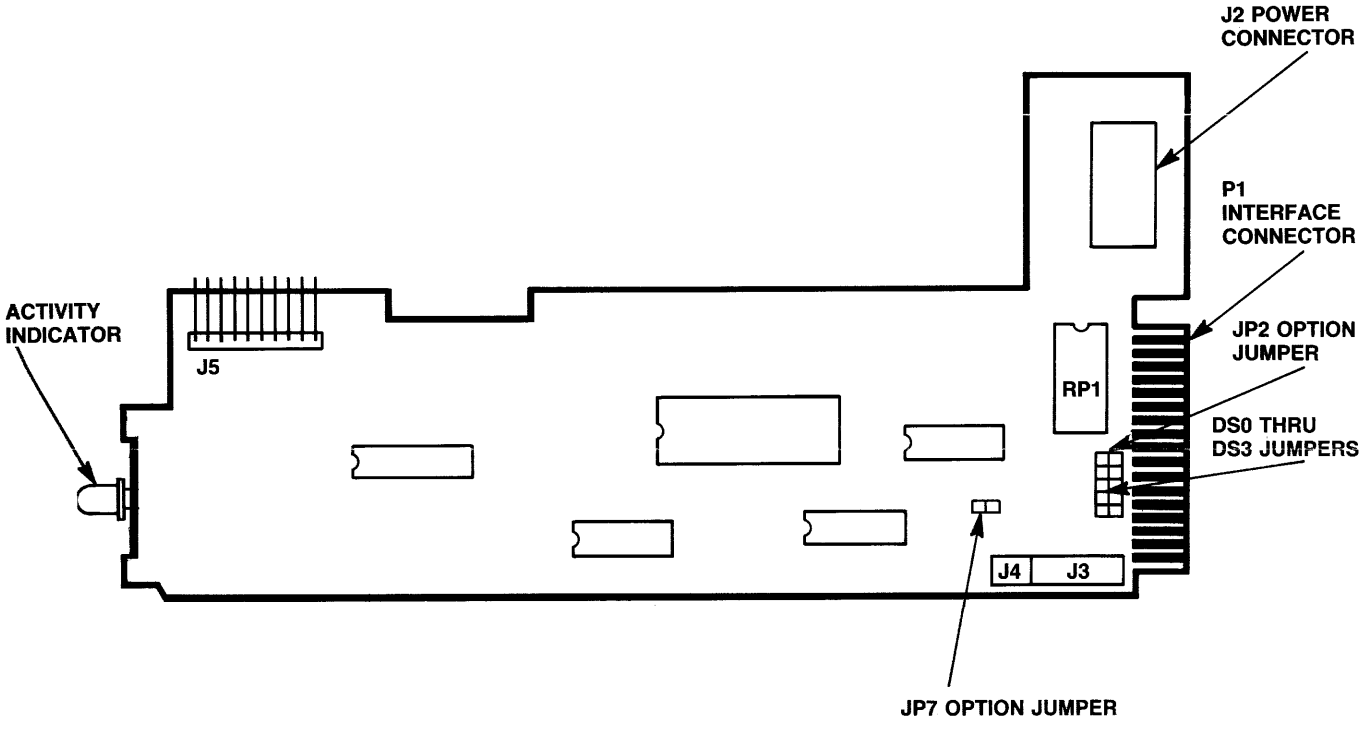


FIGURE 3-4
LOGIC CIRCUIT BOARD OPTION LOCATIONS
TM65-1L, TM65-2L

3.7 DISKETTES

The TM65 series of 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 TM65-4 drive requires the use of 96 TPI certified media. Use of 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 3-5 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 Sensor Assembly. This sensor 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 3-6 contains information on how to install a tab to cover the slot.

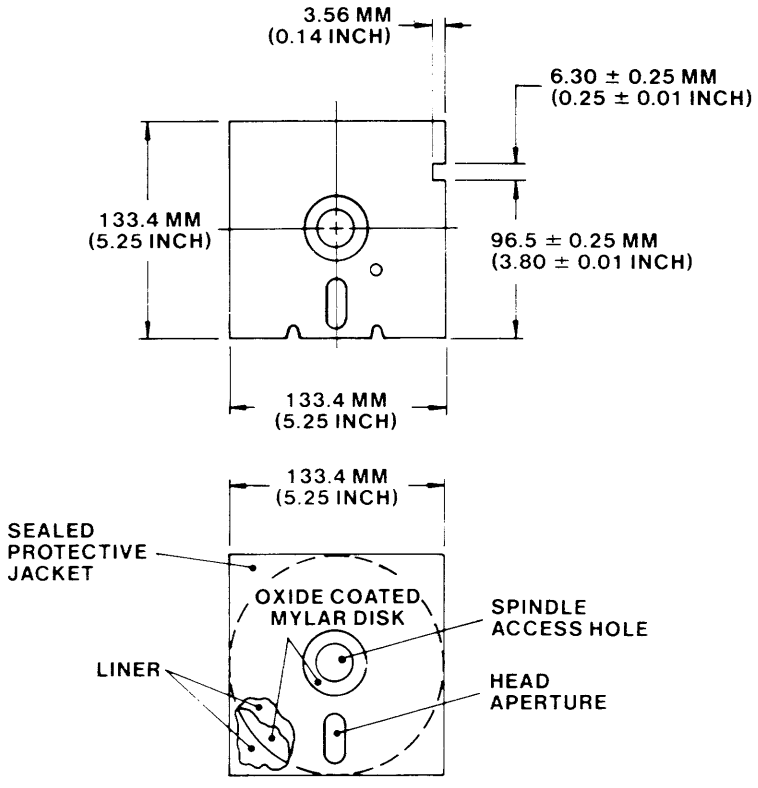


FIGURE 3-5
RECORDING MEDIA

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 3-6 contains an illustration of the physical configuration of the diskette. The 5-1/4-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 3-7 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 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.

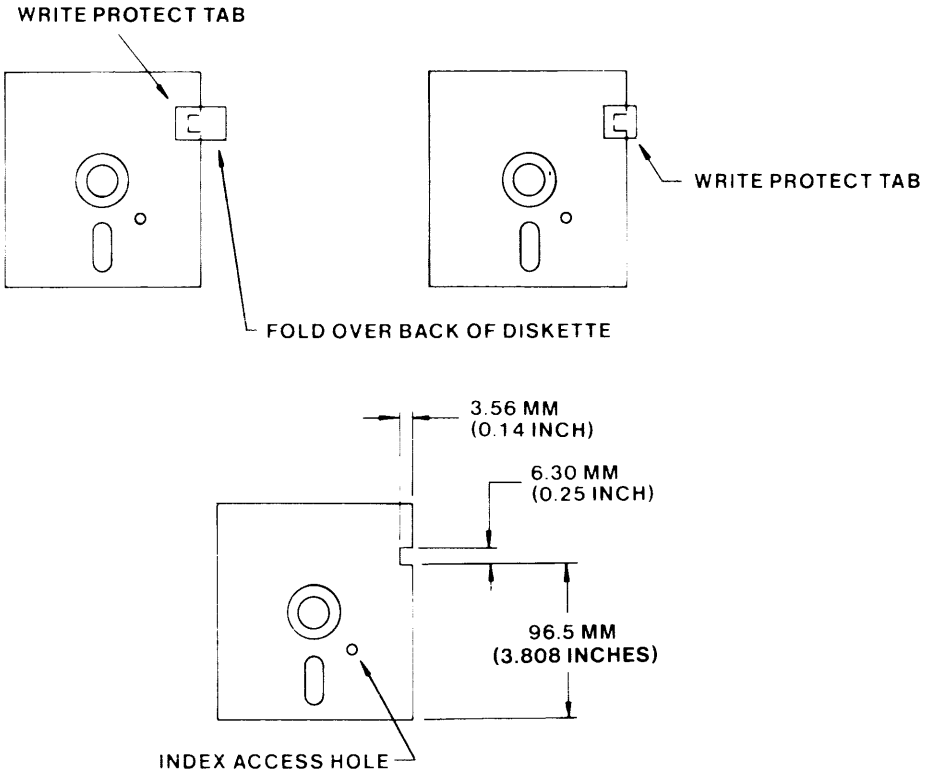
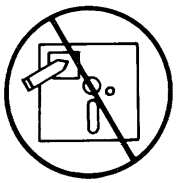
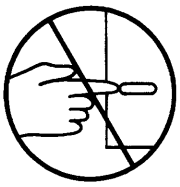


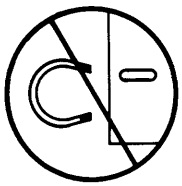
FIGURE 3-6
WRITE PROTECT TAB



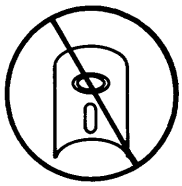
DO NOT WRITE ON THE JACKET WITH PEN OR PENCIL. USE A FELT TIPPED PEN.



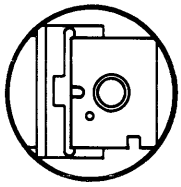
DO NOT TOUCH PRECISION SURFACE WITH YOUR FINGERS.



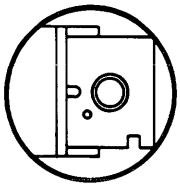
KEEP THE DISKETTE AWAY FROM MAGNETIC FIELDS.



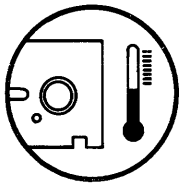
HANDLE WITH CARE; BENDING AND FOLDING MAY DAMAGE DISKETTE.



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.



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

FIGURE 3-7
DISKETTE CARE AND HANDLING

Tandon
CORPORATE OFFICES
20320 PRAIRIE STREET
CHATSWORTH, CA 91311

TELEPHONE NUMBER: (818) 993-6644
TELEX NUMBER: 194794
TWX NUMBER: 910-494-1721

P/N 179061-001B (T5020B 10-84) MAILING ADDRESS: PO BOX 2107, CHATSWORTH, CA 91311 PRINTED IN U.S.A.