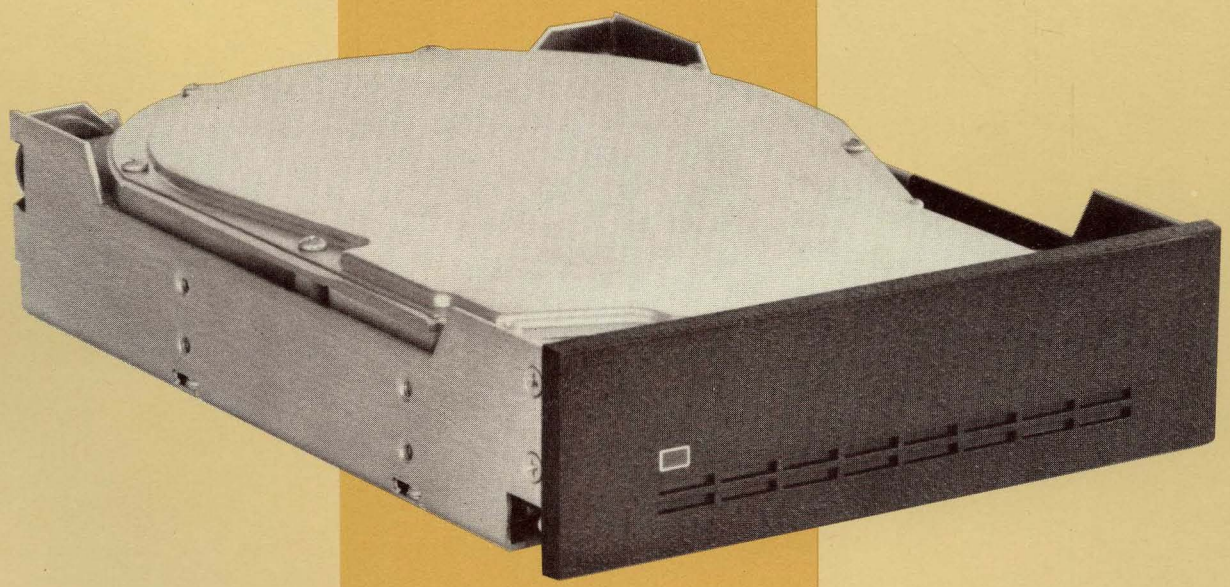
Tandon

TM755

RIGID DISK DRIVE



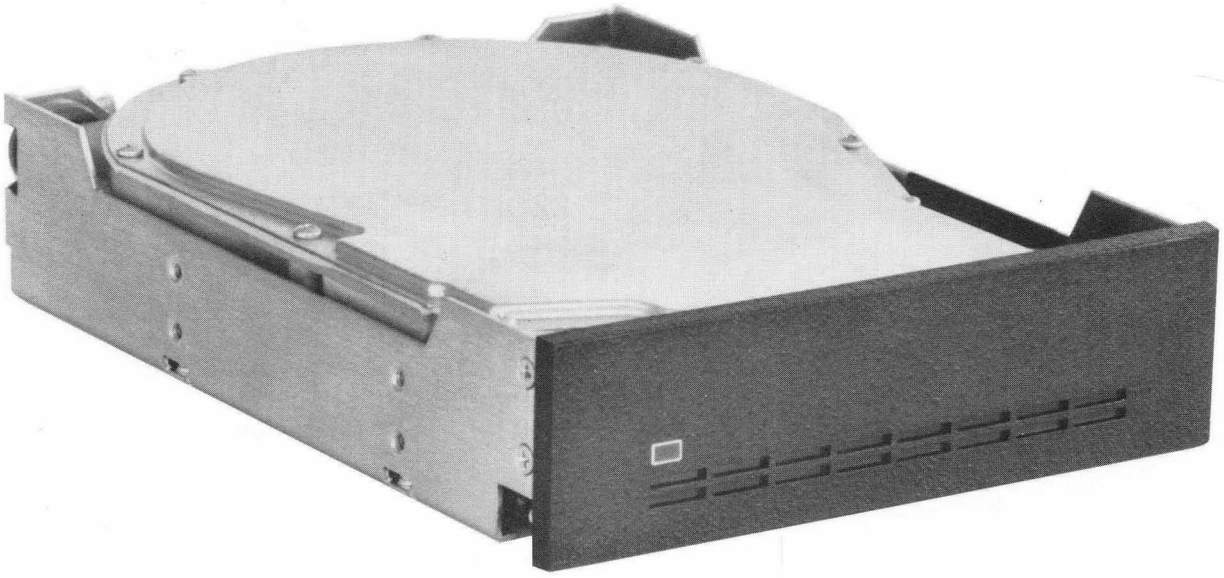
PRODUCT SPECIFICATION AND USER'S MANUAL

3/20/85

MODEL NUMBER TM755

5-1/4 INCH RIGID DISK DRIVE

PRODUCT SPECIFICATION AND USER'S MANUAL



Tandon CORPORATION
20320 PRAIRIE STREET
CHATSWORTH, CALIFORNIA 91311

COMPLIMENTARY COPY / NOT FOR RESALE

© COPYRIGHT 1985 TANDON CORPORATION

CONTENTS

ILLUSTRATIONS

FIGURES

TABLES

SECTION 1

GENERAL DESCRIPTION

INTRODUCTION

This manual provides useful information to assist the customer when incorporating the Tandon rigid disk drive into a system.

The TM755 disk drive is a low cost , compact unit that uses standard 3370 type Whitney technology and 5-1/4 inch plated media. The form factor and voltage requirements for the drive are identical to those of Tandon Corporation's TM65 family of flexible disk drives.

The storage media is contained within the drive in a fixed, nonoperator-removable configuration.

1.1 SCOPE OF THE DOCUMENT

Section 1 of this manual contains a general description of the disk drive. Section 2 contains the product specifications. Section 3 provides information on operation of the drive.

1.2 MAJOR FEATURES

MICROPROCESSOR CONTROL

The TM755 drive features an onboard microprocessor, providing six major functions:

1. Self-calibration on power-up.
2. Seek timing for the head positioning mechanism.
3. Write current switching for optimal data recording quality.
4. Power and track fault detection.
5. Accurate spindle motor speed control.
6. Host independant seek diagnostic modes.

DAISY CHAIN/RADIAL CAPABILITY

The circuit board provides address selection and gating functions that allow a user to daisy chain up to four drives or configure the drive for radial connection. A SIP resistor pack is used to terminate the interface. The resistor pack is removed from its SIP socket on all drives except the last one in a daisy chain. When a single-drive system or a radial configuration is used, the resistor pack remains plugged into the SIP socket.

INDUSTRY STANDARD INTERFACE COMPATIBILITY

The drive is compatible with controllers that use an ST506/412 industry standard interface.

OPTIONAL ACTIVITY INDICATOR AND FRONT PANEL

An optional activity indicator and front panel is available. The activity indicator is located on the front panel of the drive. It is automatically illuminated when the drive is selected. In addition, the indicator is used to show a particular fault condition, if an error occurs.

AIR FILTRATION

A self-contained, recirculating air filtration system supplies clean air through a 0.3-micron filter. A secondary absolute breather filter is provided to allow pressure equalization between the head disk assembly and ambient atmosphere without contamination. The entire head-disk-actuator compartment is sealed to ensure an ultraclean environment.

1.3 FUNCTIONAL DESCRIPTION

The drive is fully self-contained and requires no operator intervention during normal operation. During the power-up sequence, the spindle motor reaches 3,600 RPM, and the positioning mechanism recalibrates the recording heads back to Track 0. The heads go through a seek and back to cylinder zero as part of the recalibration sequence. If the heads are positioned on cylinder zero, the drive is ready for operation.

If the drive does not pass the power-up seek test, the activity lamp will flash on and off as long as the drive is not selected. To recover from this failure, one must turn power to the drive off and back on.

The type of fault can be identified from the flash sequence as follows:

— — - microprocessor checksum error.
— - — microprocessor RAM error.
— - - spindle not turning at nominal speed.
- — — unable to load heads.
- — - unable to seek.

The head is positioned over the desired track by means of a voice coil, closed loop linear positioning system, its associated electronics, and a servo pattern written on the servo surface of the media.

When power is removed from the drive, the counter EMF from the spindle motor generates the signals and power to move the heads to the innermost position. The heads are latched over the landing zone, located outside of the data area.

Typically, the drive uses MFM write and read data recording methods. Data recovery electronics include a low-level read amplifier, AGC circuitry, differentiator, a zero-crossover detector, and digitizing circuits. No data decoding feature is provided on the drive. Index is decoded from the servo pattern, written on the servo surface.

1.4 PHYSICAL DESCRIPTION

The TM755 drive is shown in Figure 1-1. The drive contains 130 millimeter storage media, providing five recording surfaces and one servo surface, rotating at 3,600 RPM, using a direct drive, brushless D. C. motor. The recording is accomplished by non-contact 3370 Whitney type heads that are moved by a voice coil, closed loop, linear positioner.

The head disk assembly is enclosed in a sealed cast aluminum housing, which includes an air filtration system to ensure a contamination-free environment. The housing is shock mounted to a metal frame. An optional front panel may be attached. Threaded holes are provided on the sides and bottom of the drive for mounting onto a chassis.

In addition, the drive includes the read/write control electronics and the servo spindle control electronics. The read/write and servo preamplifiers are mounted on the positioner (as close as possible to the heads) to ensure optimum signal integrity.

For greater reliability, automatic gain control (AGC) circuits compensate for head and media variations. The AGC circuits also compensate for temperature drifts in both the servo and read/write channels.

State of the art surface mount technology is employed whenever possible, to reduce space and increase reliability.

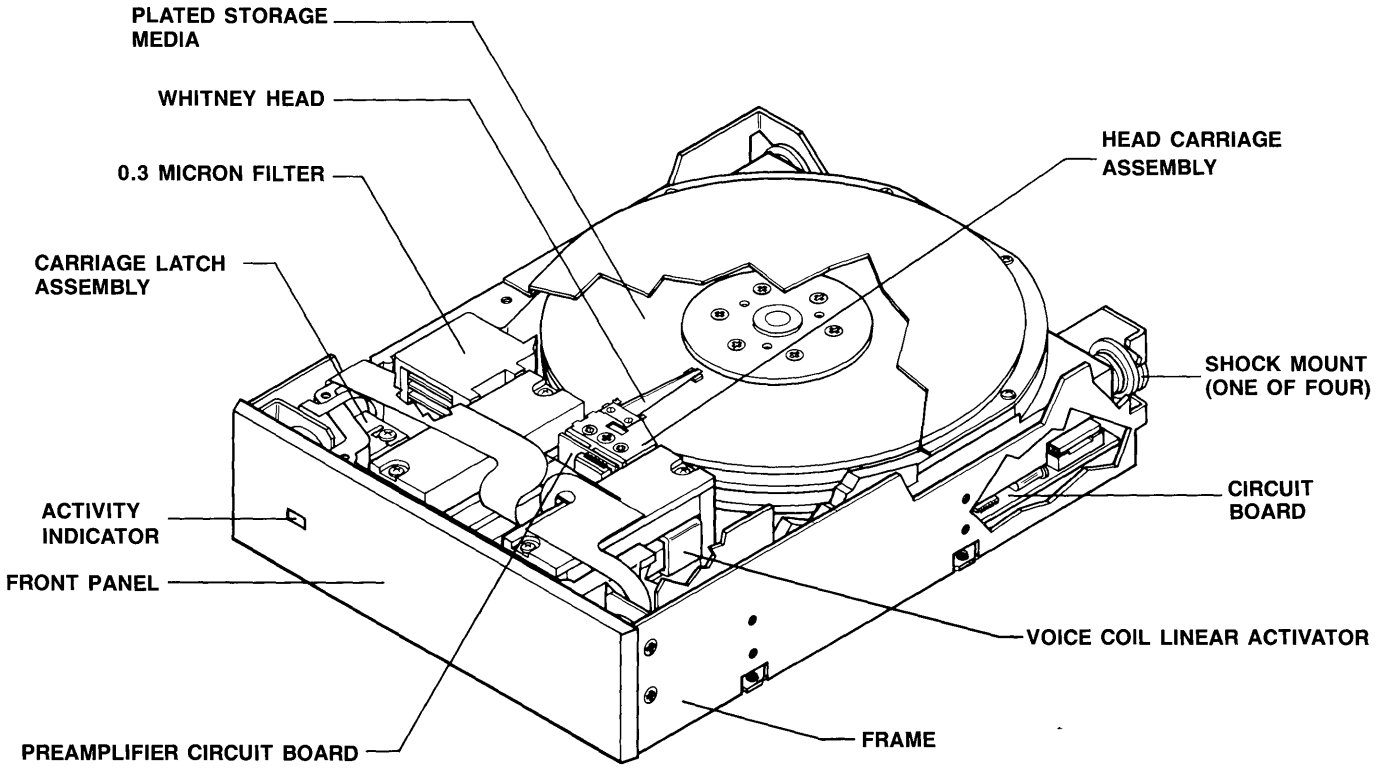


FIGURE 1-1
DISK DRIVE

SECTION 2

PRODUCT SPECIFICATIONS

INTRODUCTION

This section contains the mechanical, electrical and operational, reliability, and environmental specifications for the TM755 drive.

2.1 MECHANICAL SPECIFICATIONS

The mechanical and physical dimensions are contained in Figure 2-1.

2.2 ELECTRICAL AND OPERATIONAL SPECIFICATIONS

The electrical and operational specifications are contained in Table 2-1. Typical starting current requirements at nominal voltage are contained in Figure 2-2.

2.3 RELIABILITY SPECIFICATIONS

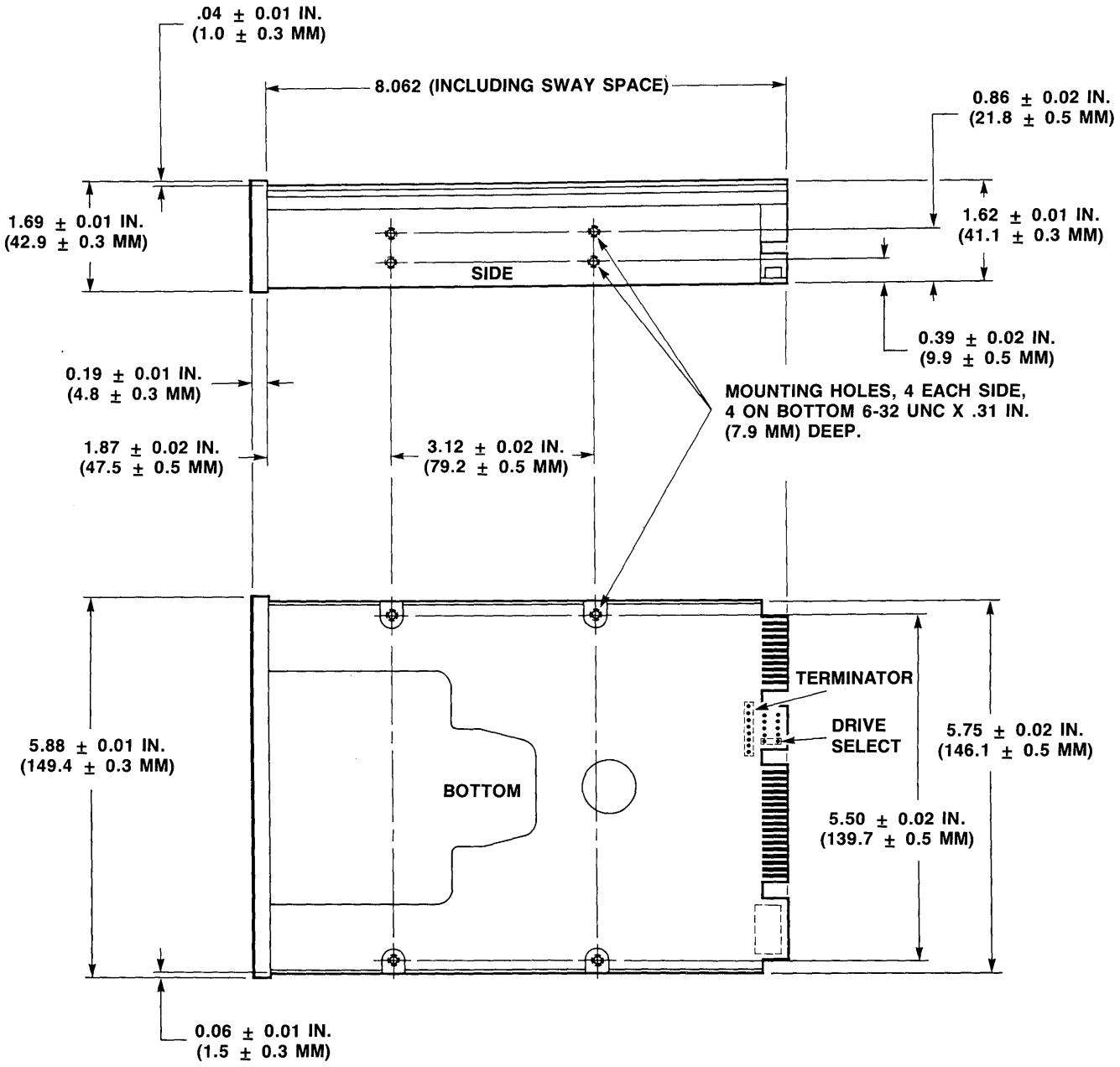
The reliability specifications are contained in Table 2-2.

2.4 ENVIRONMENTAL SPECIFICATIONS

The environmental specifications are contained in Table 2-3.

2.5 RECOGNITION AND CERTIFICATION

This product is recognized under U. L. EMRT2, Component, Data Processing Equipment, Electronic and certified under CSA Standard Number C22.2.



NOTE: WEIGHT IS 4.3 POUNDS, 1.95 KILOGRAMS

FIGURE 2-1
DISK DRIVE OUTLINE DRAWING

TABLE 2-1
ELECTRICAL AND OPERATIONAL SPECIFICATIONS

Media	Hard coated, 130 millimeter, plated aluminum disks
Tracks Per Inch	960 TPI
Spacing, track to track	1.04 milinches
Number Of Cylinders	981 cylinders
Number Of Tracks	4,905 tracks
Disk Speed	3,600 RPM $\pm$ 0.5 percent
Average Latency	8.33 milliseconds
Motor Start Time	15 seconds, typical 20 seconds, maximum
Motor Stop Time	12 seconds, typical 20 seconds, maximum
Seek Time, track to track, including head settling time	5 milliseconds
Average Track Access Time, using buffered seek, including head settling time (Does not include time to receive step pulses)	35 milliseconds
Maximum Access Time, using buffered seek, including head settling time (Does not include time to receive step pulses)	65 milliseconds
Transfer Rate	5 megabits per second
Maximum Flux Reversals Per Inch (FRPI)	9,528 FRPI
Unformatted Recording Capacity Per Drive	51.09 megabytes
Unformatted Recording Capacity Per Surface	10.2 megabytes
Unformatted Recording Capacity Per Track	10.4 kilobytes

TABLE 2-1 (CONTINUED)
ELECTRICAL AND OPERATIONAL SPECIFICATIONS

POWER REQUIREMENTS

START UP: + 12 volts D. C. ± 5 percent, 2.5 amperes maximum, not to exceed 20 seconds.

RUNNING: + 12 volts D. C. ± 5 percent, 1.4 amperes typical during continuous full length seeks, 0.9 ampere typical while positioner in on a track, with no more than 100 millivolts Perodic and Random Deviation (PARD).

+ 5 volts D. C. ± 5 percent 0.9 ampere typical, 1.1 amperes maximum, with no more than 100 millivolts Periodic and Random Deviation.

POWER DISSIPATION

Typical power requirements at 5.0 volts and 12.0 volts are 15 watts with the positioner on a track and 20 watts with the positioner doing continuous full stroke seeks.

POWER SEQUENCING

No power sequencing is required. The microprocessor starts the spindle motor when both voltages are present.

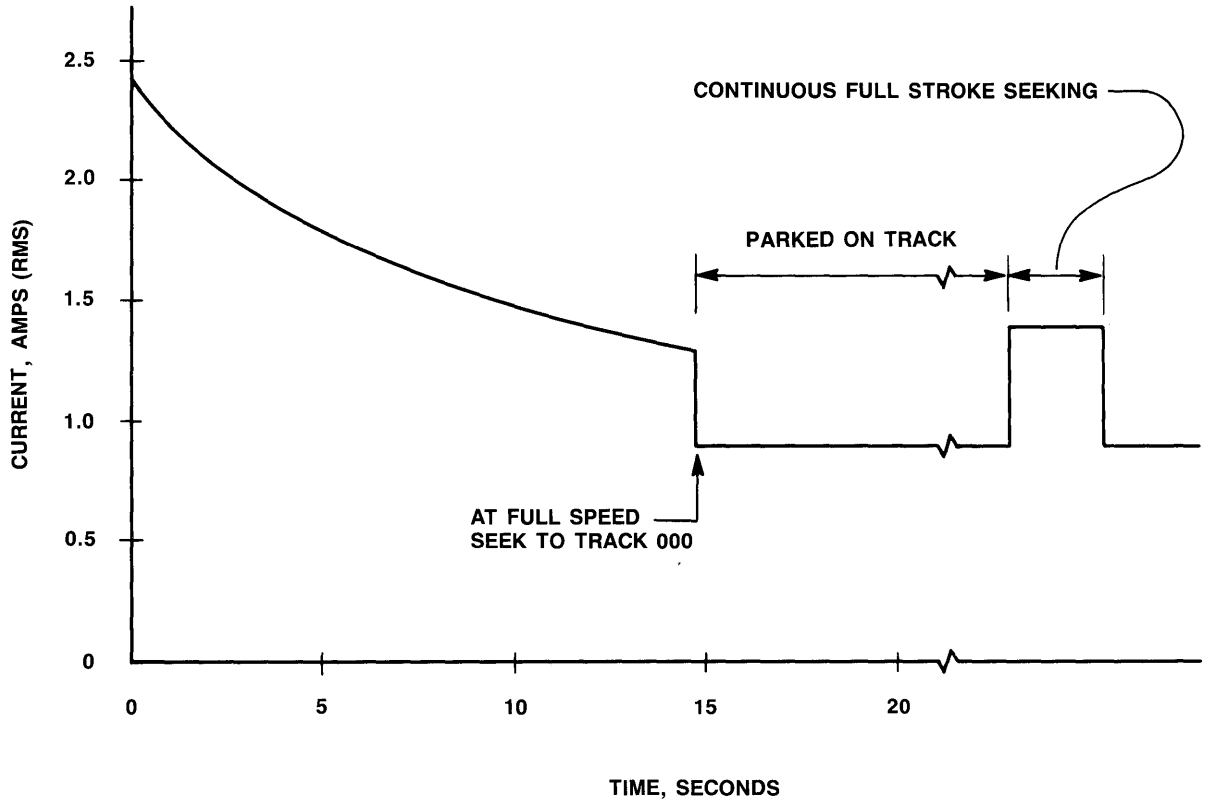


FIGURE 2-2
TYPICAL 12 VOLT STARTING CURRENTS

TABLE 2-2
RELIABILITY SPECIFICATIONS

SOFT AND HARD READ ERROR RATES, EXCLUSIVE OF MEDIA DEFECTS

For data that has been verified previously as error free, and when used in conjunction with a data separator and phase lock loop of good design, the recoverable (soft) read error rate for any subsequent read operation shall not exceed one error in 1×10^{10} bits transferred. A recoverable read error is an error that may be corrected within five attempts to reread the data.

The nonrecoverable (hard) read error rates shall not exceed one error in 1×10^{12} bits transferred. A nonrecoverable read error is an error that may not be corrected within five attempts to reread data, providing that the writing of the data previously has been verified as correct. The seek error rate is not to exceed one error in 1×10^{6} seeks.

MEDIA DEFECTS

Any defects on the media surface will be identified on a defect map provided with each drive. This defect map will indicate the head number, track number, and the number of bytes from index for each defect. Each defect shall be no longer than 16 bits. More than one defect per track is to be counted as one defect. Cylinders 000 and 001 are guaranteed error free.

The defect map if offered as a guide only. The number of defects and their location can change due to customer system variations, such as data separators.

NOTE

On power down, the heads latch in the innermost position, located outside of the data area.

Mean Time Between Failures	11,000 minimum power on hours
Mean Time To Repair	30 minutes, maximum
Component Design Life	5 years, minimum
Preventative Maintenance	Not Required

TABLE 2-3
ENVIRONMENTAL SPECIFICATIONS

Ambient Temperature	
Operating	4 °C to 50 °C, 39 °F to 122 °F
Nonoperating	-40 °C to 60 °C, -40 °F to 140 °F
Temperature Gradient	
Operating	10 °C per hour, 18 °F per hour
Nonoperating	Below that causing condensation
Relative Humidity	8-to-80 percent, noncondensing
Relative Humidity Gradient	
Operating	20 percent per hour
Nonoperating	Below that causing condensation
Maximum Wet Bulb Temperature	26 °C, 78.8 °F, without condensation
Elevation	
Operating	Density Altitude: -457 to 2,972 meters -1,500 to 9,750 feet
Nonoperating	Sea level to 15,244 meters, Sea level to 50,000 feet

SECTION 3

OPERATION

INTRODUCTION

This section contains information pertinent to the handling, inspection, installation, and operation of the TM755 drive.

Each drive is shipped in a protective container which minimizes the possibility of damage during shipment.

3.1 UNPACKING THE DRIVE

For Single-Pack Containers (Figure 3-1)

1. Place the single-pack container on a flat surface.
2. Visually inspect the container for shipping damage.
3. Open the shipping container and remove the inner container.
4. Open the inner container and remove the packaged drive.
5. Remove the drive from its Anti-Static/Dust Protector.
6. Notify the carrier immediately if any damage is found.

For Multi-Pack Containers (Figure 3-2)

1. Place the multi-pack container on a flat surface.
2. Visually inspect the container for shipping damage.
3. Open the shipping container.
4. Remove the top inner foam lid.
5. Remove the packaged drives from their foam cells.
6. Remove the drives from their Anti-Static/Dust Protectors.
7. Notify the carrier immediately if any damage is found.

NOTE

The inside chamber of the drive is a sealed compartment that must not be opened.

When returning the drive to the service center, be sure to use the prior steps in reverse order.

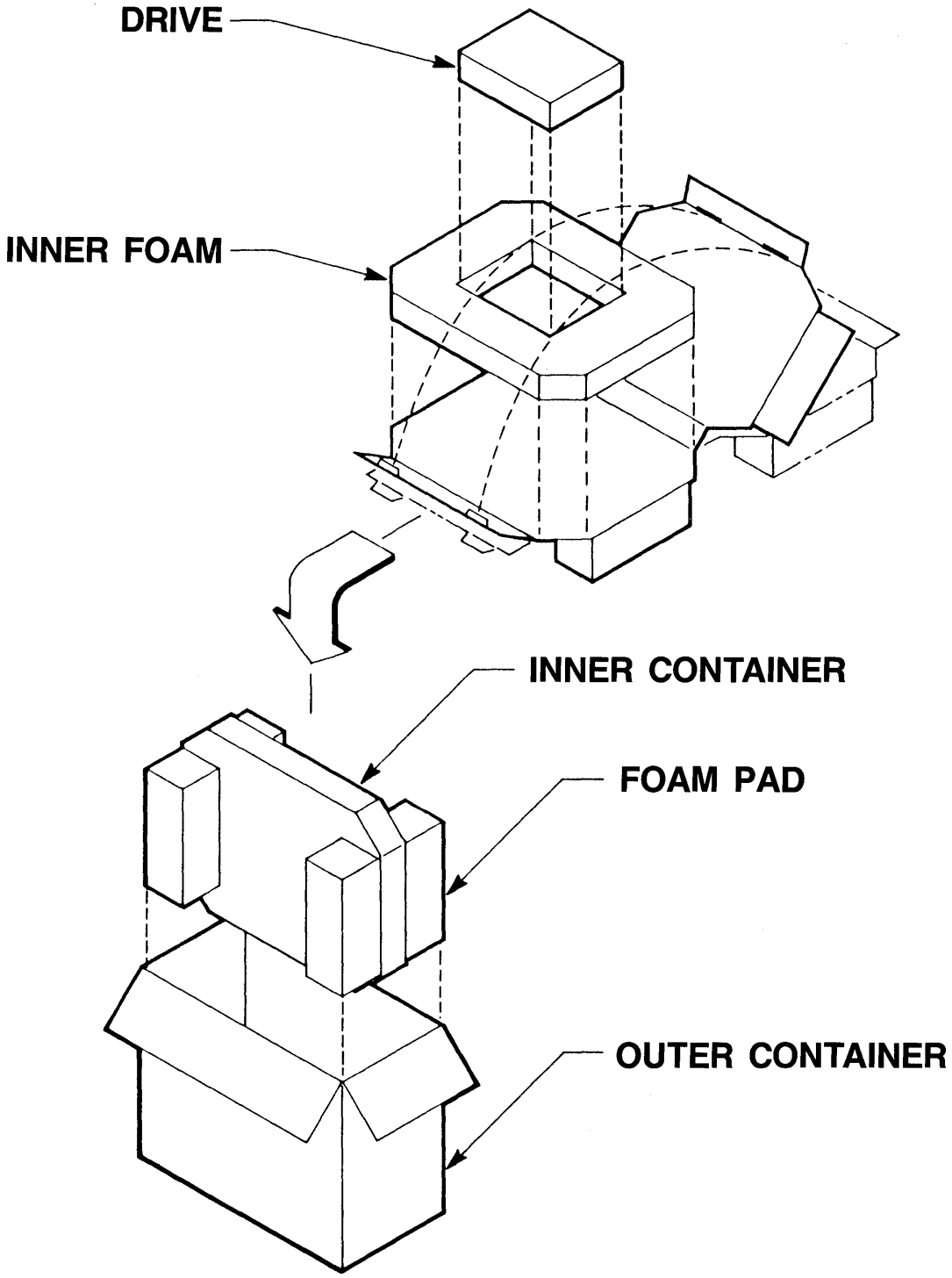


FIGURE 3-1
SINGLE PACK SHIPPING CONTAINER

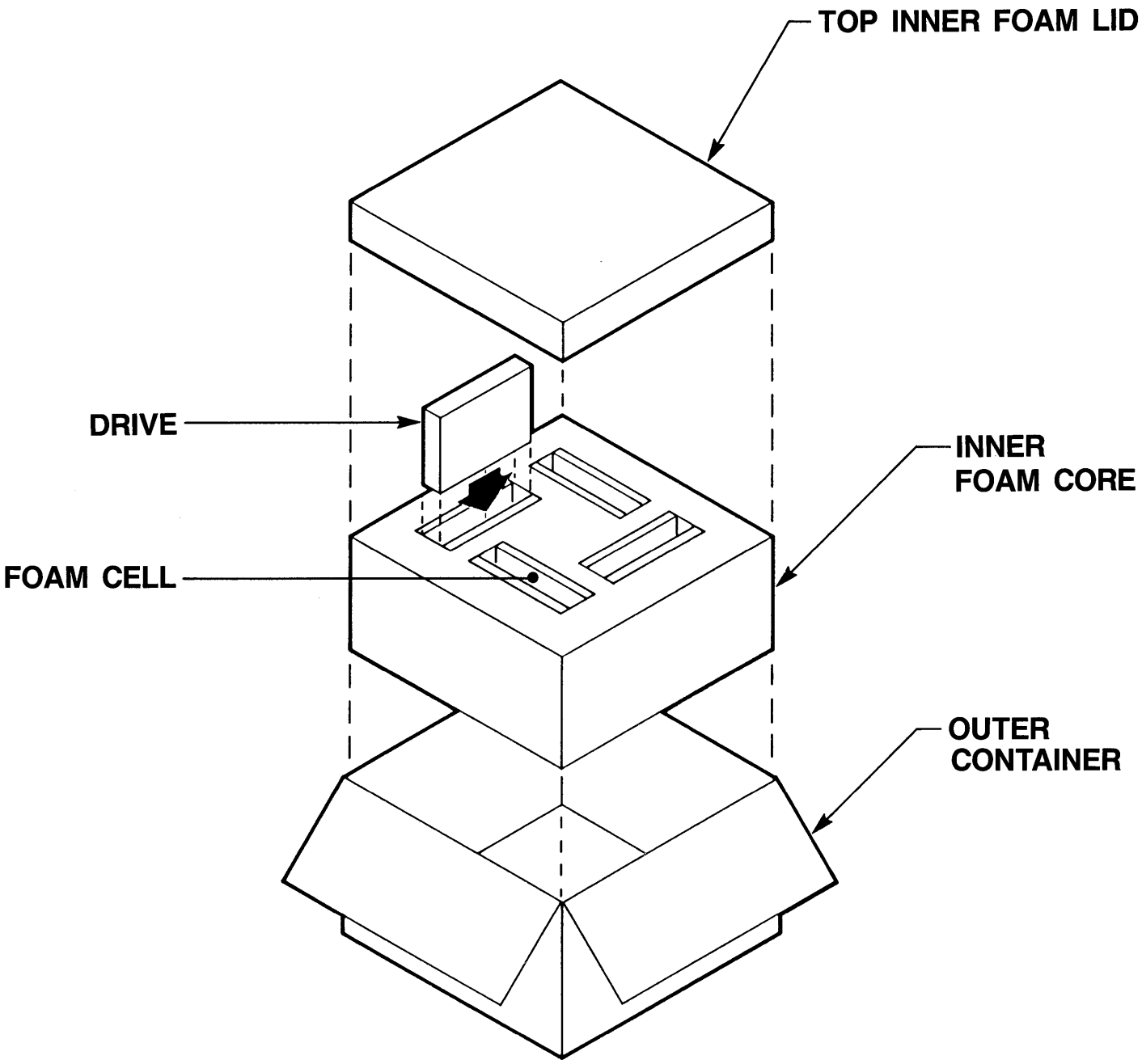


FIGURE 3-2
MULTIPACK SHIPPING CONTAINER

3.2 PREINSTALLATION CHECKOUT

Before applying power to the drive, inspect for the following:

1. The circuit board is secure.
2. The connectors are firmly seated.
3. There is no debris or foreign material between the frame and the casting.
4. The head/disk housing can move freely on the shock mounts of the frame.
5. The termination resistor pack and drive select jumper block are firmly seated and in the correct configuration.

3.3 MOUNTING THE DRIVE

The recommended mounting position is either horizontal with the printed circuit board on the bottom, or vertical on either side. Any mounting position that requires the linear actuator to move in a non-horizontal plane is not recommended. Twelve 6-32 tapped holes are provided for mounting: four on each side and four on the bottom of the frame (see Figure 2-1, page 2-2). The drive is manufactured with some critical internal alignments that must be maintained. Hence, it is important the mounting hardware does not introduce significant stress on the drive.

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.

A sway space is required between the head disk assembly and other assemblies in the user system to allow for movement of the housing on its shock mounts.

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.

FREE AIR FLOW

When the drive is mounted so the components have access to the free flow of air, normal convection cooling allows operation over the specified temperature range (see Table 2-3, page 2-7).

CONFINED ENVIRONMENT

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

3.4 INTERFACE CONNECTORS

The electrical interface between the drive and the host system is via three connectors. J1 provides control signals for the drive (see Figure 3-3). J2 provides for the radial connection of read/write data signals (see Figure 3-4). J3 provides for D. C. power (see Figure 3-5).

Table 3-1 contains interface lines. The interface description of the connectors, and the location of each, is contained in this section.

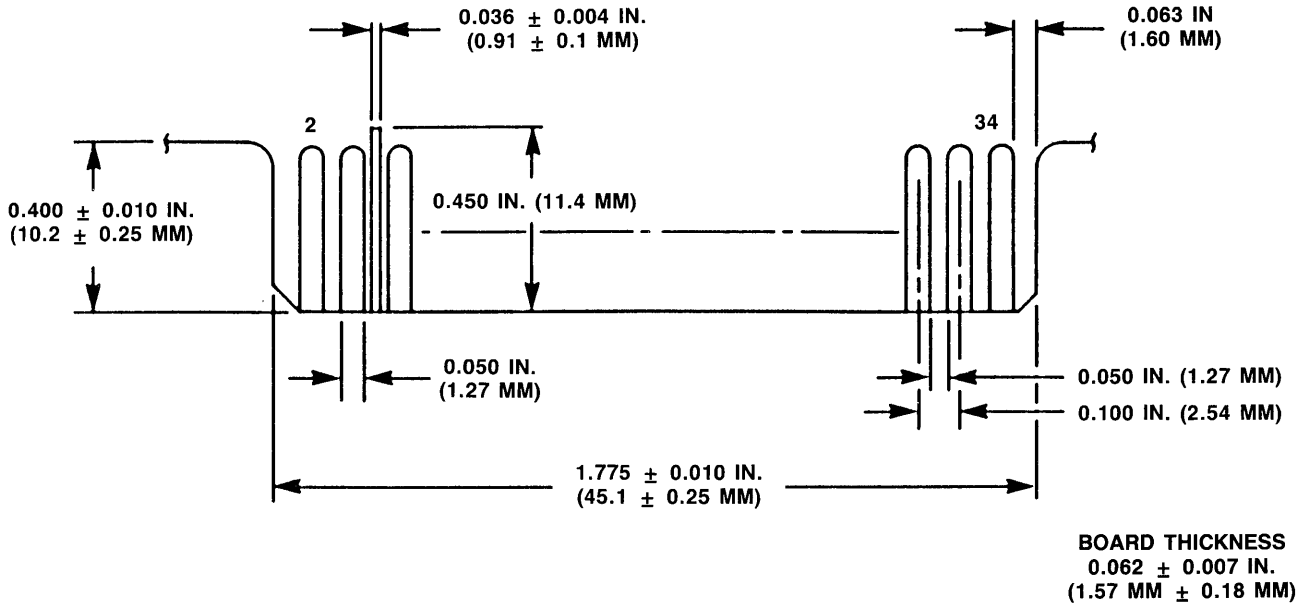


FIGURE 3-3
J1 EDGE CONNECTOR DIMENSIONS

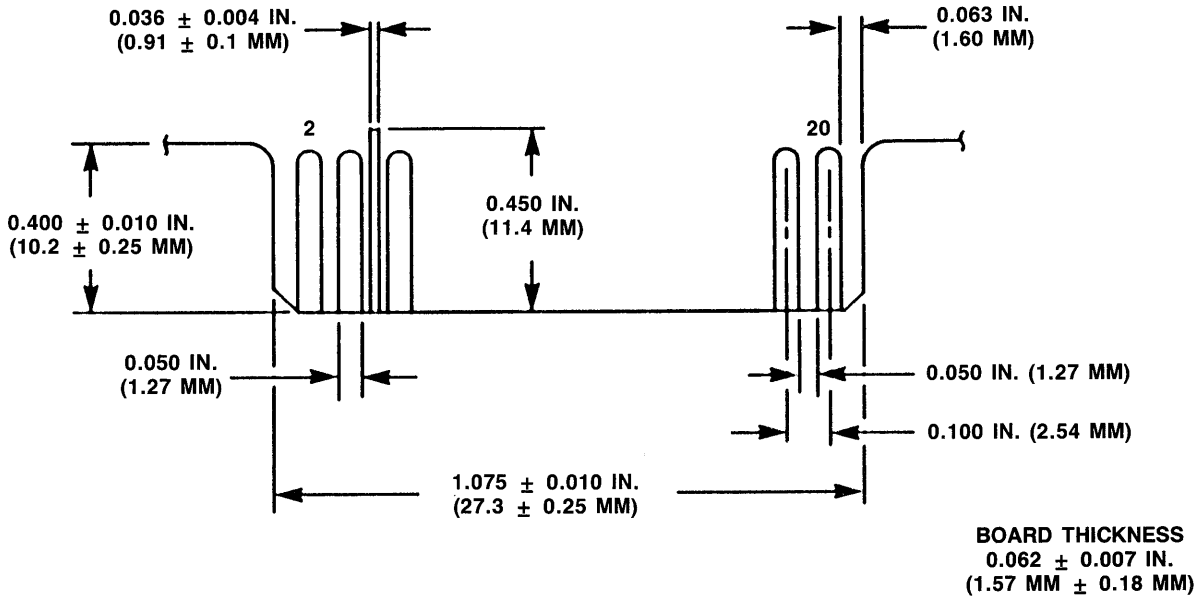


FIGURE 3-4
J2 EDGE CONNECTOR DIMENSIONS

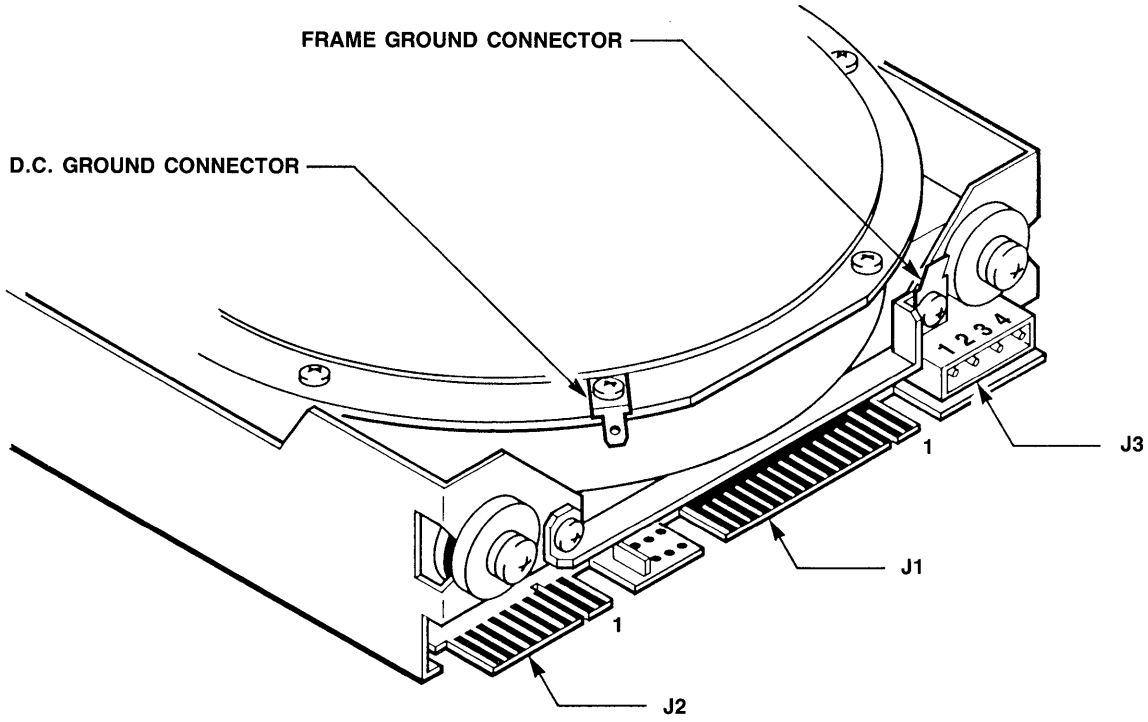


FIGURE 3-5
CONNECTOR LOCATIONS

TABLE 3-1
DRIVE INTERFACE SIGNALS AND PIN ASSIGNMENTS

Connector	Interface Pin Number Signal	Ground	Signal Type	I/O	Name of Signal
P1	2	(1)	S	I	Spare
↑	4	(3)	S	I	Head Select 2^2
|	6	(5)	S	I	Write Gate
|	8	(7)	S	O	Seek Complete
|	10	(9)	S	O	Track 0
34-Pin	12	(11)	S	O	Fault
Ribbon	14	(13)	S	I	Head Select 2^0
Daisy	16	(15)	-	-	Reserved (To J12-7)
Chain	18	(17)	S	I	Head Select 2^1
|	20	(19)	S	O	Index
|	22	(21)	S	O	Ready
|	24	(23)	S	I	Step
|	26	(25)	S	I	Drive Select 0
|	28	(27)	S	I	Drive Select 1
|	30	(29)	S	I	Drive Select 2
↓	32	(31)	S	I	Drive Select 3
P1	34	(33)	S	I	Direction In
P2	1	(2)	S	O	Drive Selected
↑	3	(4)	S	-	Spare (optional +5 Volts)
|	5	(6)	-	-	Reserved
|	7	(8)	-	-	Reserved (To J11-16)
20-Pin	9	(10)	-	-	Spare
Ribbon	11	(12)	-	-	Ground
Radial	13	—	D	I	+ Write Data
|	14	—	D	I	− Write Data
|	15	(16)	-	-	Ground
|	17	—	D	O	+ Read Data
↓	18	—	D	O	− Read Data
P2	19	(20)	-	O	Ground
P3	1			-	+ 12 volts D.C. In
4-Pin	2			-	+ 12 volts D.C. Return
Radial	3			-	+ 5 volts D.C. Return
P3	4			-	+ 5 volts D.C. In

NOTES:

1. S = Single Ended
2. D = Differential
3. I = Drive Input
4. O = Drive Output

J1/P1 CONNECTOR

Connection to J1 is through a thirty-four-pin circuit board connector. Figure 3-3 contains the dimensions of this connector. The pins are numbered 1 through 34. The odd pins are located on the component (microprocessor) side of the circuit board. Pin 1 is located on the end of the circuit board connector closest to the D. C. power connector J3/P3, and is labeled (see Figure 3-5). A key slot is provided between Pins 3 and 5. The recommended mating connector for P1 is 3M ribbon connector P/N 3463-0001, without ears.

J2/P2 CONNECTOR

Connection to J2 is through a twenty-pin circuit board edge connector. Figure 3-4 contains the dimensions of this connector. The pins are numbered 1 through 20. The odd pins are located on the component (microprocessor) side of the circuit board (see Figure 3-5). The recommended mating connector for P2 is 3M ribbon connector P/N 3461-0001, without ears. A key slot is provided between Pins 3 and 5.

J3/P3 CONNECTOR

D. C. power connector J3 is a four-pin AMP Mate-N-Lok connector, P/N 350211-1, mounted on the component (microprocessor) side of the circuit board. The recommended mating connector, P3, is AMP P/N 1-480424-0, utilizing AMP pins P/N 60619-4. J3 pins are labeled on the J3 connector (see Figure 3-5). J3 cabling must be 18 AWG, minimum.

NOTE

A short trace connects Pins 2 and 3 together. This trace can be cut if separation between the +5 volt return and the +12 volt return is required in a given system.

D. C. GROUND CONNECTOR

The D. C. ground connector is Faston AMP P/N 61761-2. The recommended mating connector is AMP P/N 62187-1. To realize error rates (see Table 2-2), it must be connected directly to the centrally located logic ground via an 18 AWG, minimum, cable.

FRAME GROUND CONNECTOR

A frame ground connector, also Faston AMP P/N 61761-2, is provided to allow grounding of the frame to the system chassis, when required.

3.5 INTERFACE LINE DESCRIPTIONS

The interface for the TM755 series drive is available in one configuration. It is compatible with ST506/412 industry standard drives. Compatibility is defined as using the same pin assignment where the signal and function are common. Table 3-1 contains pin assignments.

The interface may be connected in the radial or daisy chain configuration (see Figures 3-6 and 3-7).

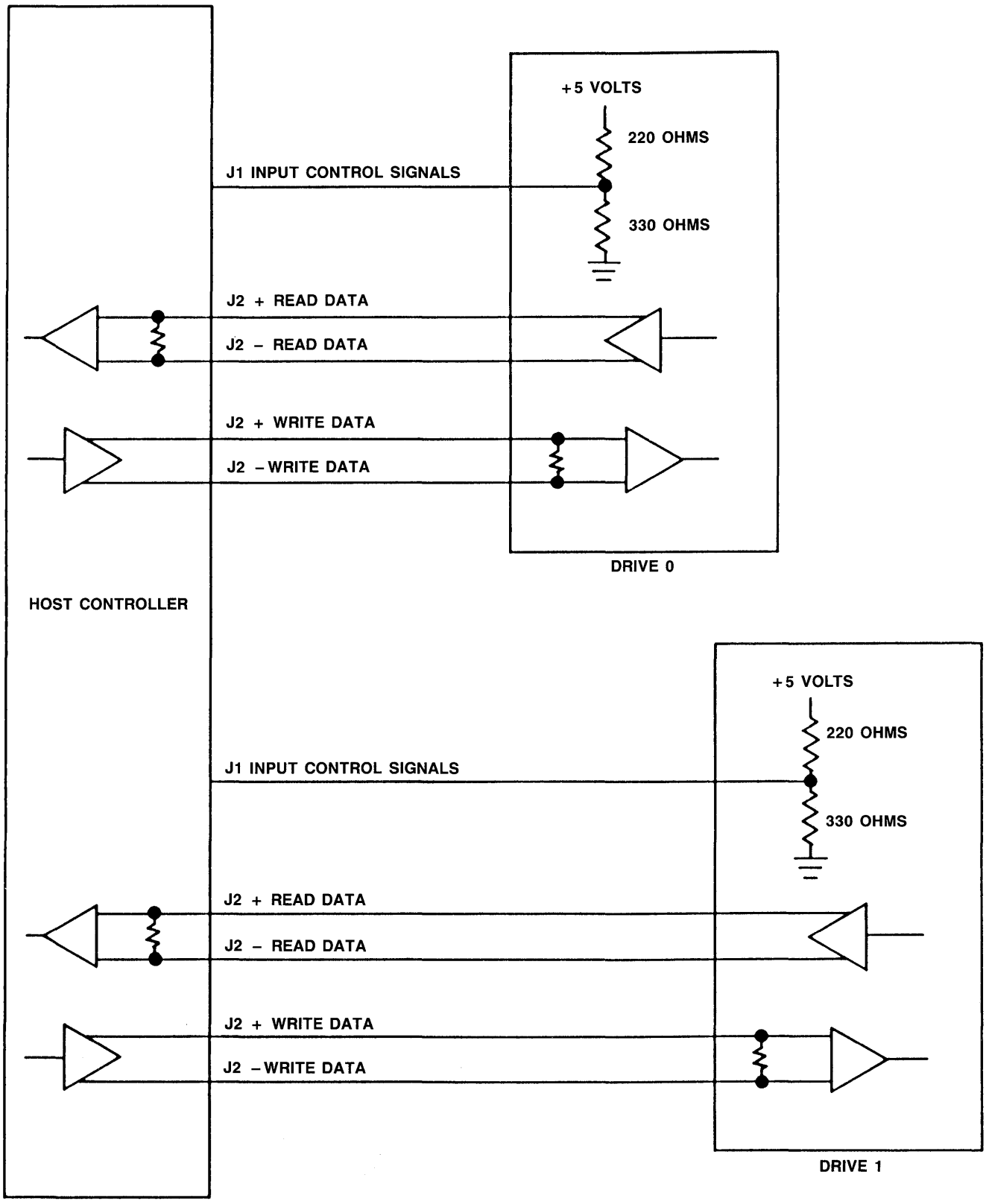


FIGURE 3-6
RADIAL CONFIGURATION

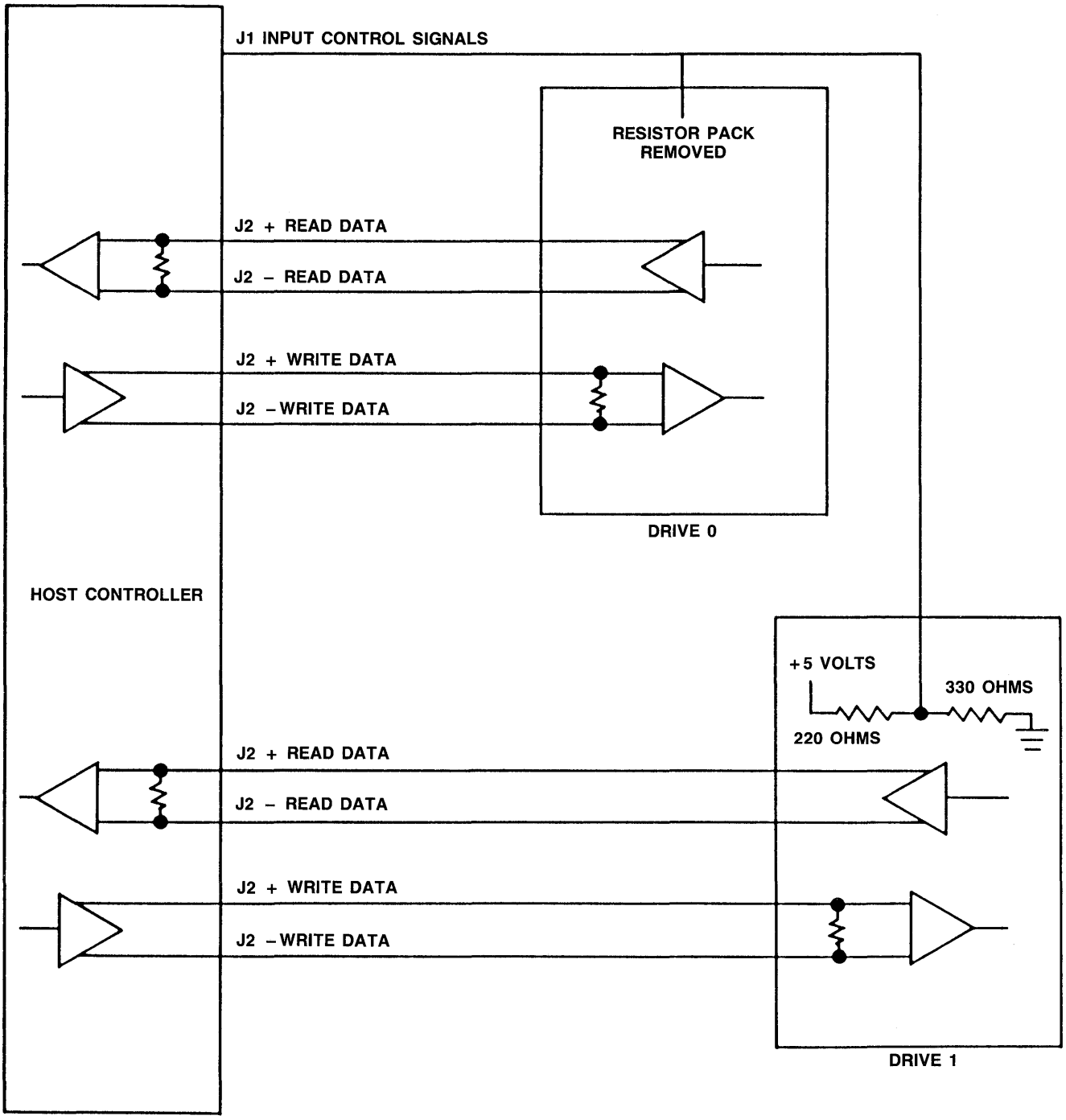


FIGURE 3-7
DAISY CHAIN CONTROL LINES

INPUT CONTROL SIGNALS

The input control signals are of two kinds: those to be multiplexed in a multiple drive system and those that do the multiplexing. The input control signals to be multiplexed are: Write Gate, Head Select Line 2^0, Head Select Line 2^1, Head Select Line 2^2, Step, and Direction In. The multiplexing signal is Drive Select 0, Drive Select 1, Drive Select 2 or Drive Select 3.

The input signals have the following electrical specifications, as measured at the drive. Figure 3-8 illustrates the recommended circuit.

True:	0.0 volt D. C. to 0.4 volt D. C. at I = -40 milliamperes, maximum
False:	2.5 volts D. C. to 5.25 volts D. C. at I = 250 microamperes, maximum (open)

All input lines share a 220/330 ohm resistor pack for line termination. Only the last drive in the chain should have the resistor pack installed.

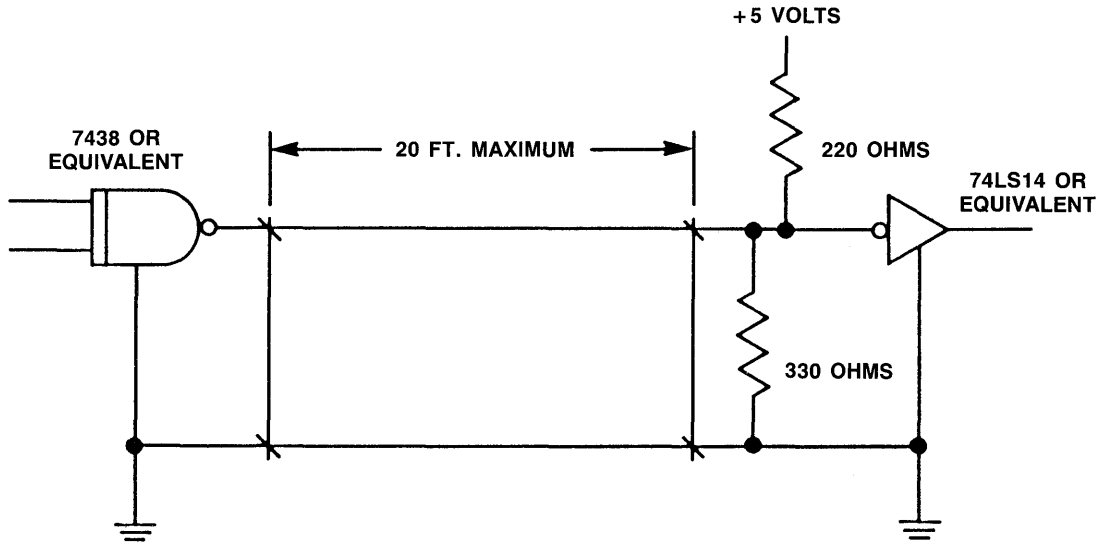


FIGURE 3-8
CONTROL SIGNAL/DRIVER RECEIVER CIRCUIT COMBINATION

WRITE GATE

The active state of this signal or logical zero level enables write data to be written on the disk. The inactive state or logical one level of this signal enables the data to be transferred from the drive. In addition, the inactive state enables the step pulse to step the read/write actuator.

HEAD SELECT LINES 2^0,2^1,2^2

These three lines provide for the decoding of each read/write head in a binary coded sequence. Head Select line 2^0 is the least significant line. The heads are numbered 0 through 4; heads 5, 6, and 7 are invalid: when all Head Select lines are false, Head 0 is decoded. Table 3-2 describes which head is chosen for each Head Select line.

Head recovery time (head-to-head select, write-to-read recovery, or read-to-write recovery) is 8 microseconds maximum.

TABLE 3-2
HEAD SELECT LINES

Head Select Line			Head Selected
2^2	2^1	2^0	TM755
1	1	1	0
1	1	0	1
1	0	1	2
1	0	0	3
0	1	1	4
0	1	0	Invalid Code
0	0	1	Invalid Code
0	0	0	Invalid Code

STEP

This interface line is a control signal that causes the read/write heads to move in the direction defined by the Direction In line.

The access motion is initiated at the logical false-to-logical true transition or the falling edge of this signal pulse. Any change in the Direction In line must be made at least 100 nanoseconds before the false-to-true edge of the step pulse. The quiescent state of this line should be held logically false.

The seek is interpreted as nonbuffered, if the step pulses are more than 250 microseconds apart. In a nonbuffered seek mode, the read/write head moves at the rate of incoming step pulses. The Direction In line must be stable 100 nanoseconds, minimum, before the falling edge of the first step pulse and 100 nanoseconds minimum, after the falling edge of the last step pulse. The minimum pulse width of the step pulse is one microsecond. Figure 3-9 illustrates the step mode timing.

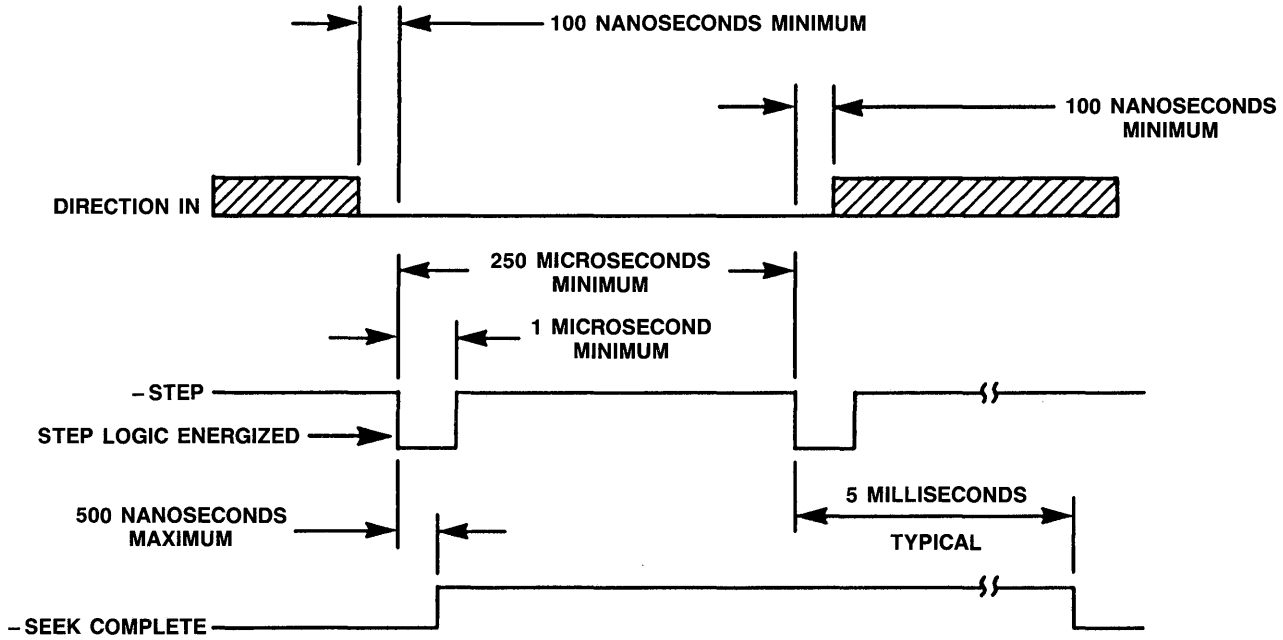


FIGURE 3-9
STEP MODE TIMING

BUFFERED SEEK

In a buffered seek mode, the controller may burst step pulses to the drive at a repetition rate of 50 to 250 microseconds. They are accepted until the time after the last pulse exceeds 250 microseconds, at which time the drive begins the seek operation. At the end of the seek operation, the microprocessor checks for any additional step pulses that occurred during the seek operation before seek complete is activated. If more pulses are received than there are cylinders left to move, the heads stop at the maximum cylinder (see Figure 3-10).

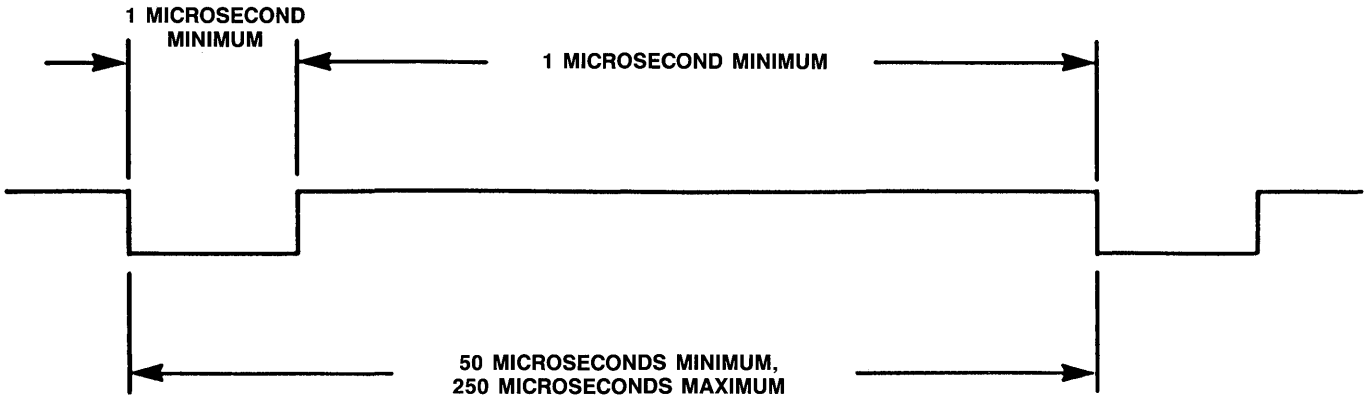


FIGURE 3-10
BUFFERED SEEK STEP PULSES

IMMEDIATE SEEK

If the controller bursts step pulses with a repetition rate of less than 50 microseconds, the drive will not wait until all step pulses are received, but will start to seek immediately. The remaining step pulses will be received during the seek operation causing the seek-profile to be constantly updated. This mode of operation can significantly improve the seek-time for longer seeks, when the pulse repetition rate is slow. The pulse repetition rate must not be less than two microseconds. The duty cycle may be varied, provided the one microsecond minimums are met (see Figure 3-11).

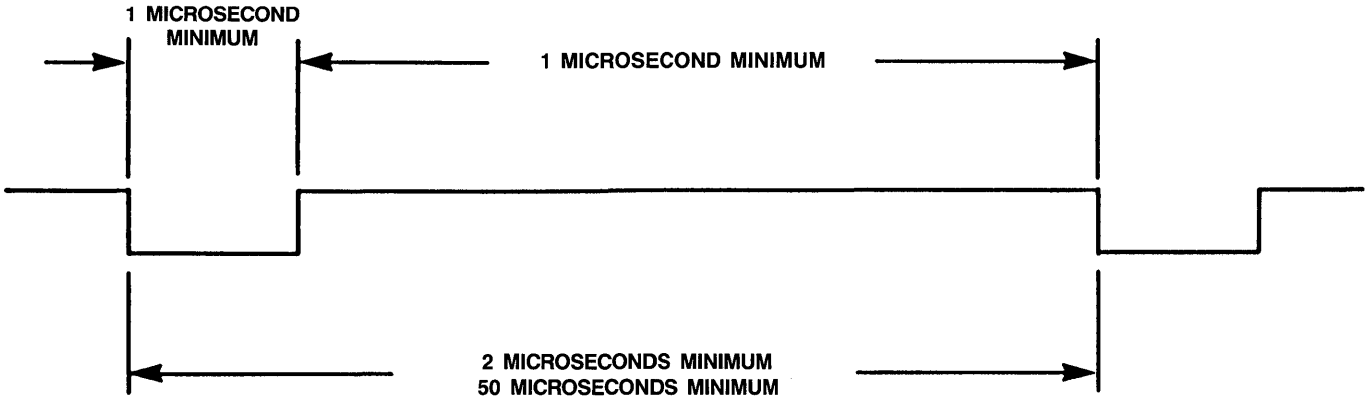


FIGURE 3-11
IMMEDIATE SEEK STEP PULSES

DIRECTION IN

This signal defines the direction of motion of the read/write heads when the Step line is pulsed. An open circuit or logical false defines the direction as "out". If a pulse is applied to the Step line, the read/write heads move away from the center of the disk. If this line is true, the direction is defined as "in", and the read/write heads move in toward the center of the disk.

Seek Complete must be true prior to changing directions and the application of additional step pulses.

REDUCED WRITE CURRENT

The Reduced Write Current line (Pin 2) is left open and is not used in the TM755 drive. The microprocessor automatically controls write current.

DRIVE SELECT 0 THROUGH DRIVE SELECT 3, AND DRIVE SELECT R

These control signals enable the selected drive's input receivers and output drivers. When logically false, the output drivers are open circuits and the input receivers do not acknowledge signals presented to them.

Drive addresses are assigned via a program jumper (2 pin plug - see Figure 3-13). Selecting the appropriate jumper location determines which select line activates the drive. See Section 3.6.

NOTE

Only one drive may be selected at a time.

OUTPUT CONTROL SIGNALS

The output control signals are driven with an open collector output stage capable of sinking a maximum of 40 milliamperes in a true state, with a maximum voltage of 0.4 volt measured at the driver. When the line driver is in the false state, the drive transistor is off, and the collector cutoff is a maximum of 250 microamperes.

All J1 output lines are enabled by the respective Drive Select lines.

SEEK COMPLETE

The Seek Complete signal goes true when the read/write heads have settled on the final track at the end of a seek. Reading or writing should not be attempted when Seek Complete is false. An automatic seek retry will occur, if a seek is not successful, before Seek Complete is asserted.

Seek Complete goes false:

1. When a recalibration sequence is initiated by the microprocessor at power on because the read/write heads are not over Track 0.
2. 500 nanoseconds, maximum, after the trailing edge of a step pulse or a series of step pulses.
3. When power is momentarily lost, Seek Complete is false when power is restored and remains false until an automatic recalibration is completed.

TRACK 0

The Track 0 signal indicates a true state only when the drive's read/write heads are positioned at Track 0, the outermost data track.

FAULT

The Fault signal is used to indicate a condition exists in the drive that could cause improper writing or seeking on the disk. When this line is true, further writing is inhibited, as are other drive functions, until the condition is corrected.

Fault is caused by any of the following write conditions:

1. Write Gate active and no write transitions.
2. Write Gate active and no write current.
3. Write Gate active and a faulty head connection.
4. Write Gate active and an illegal head selected.

NOTE

If either the +5 volts or +12 volts (or both) drop below the specified limits, a Reset is generated, and the drive goes through a new power-up cycle when both voltages are restored.

INDEX

The Index signal is provided once each revolution, 16.7 milliseconds nominal, to indicate the beginning of the track. Normally, this signal is false and makes the transition to true to indicate Index. Only the transition from logical false to logical true (the leading edge) is valid. The Index signal has a nominal pulse width of 50 microseconds.

READY

When true, the Ready signal, together with Seek Complete, indicates that the drive is ready to read, write, or seek, and the I/O signals are valid. When this line is false, all controller-initiated functions are inhibited.

The Ready line goes false (high) if the servo control recognizes a seek problem or the spindle drive motor speed is out of tolerance. If a seek error occurs, the microprocessor attempts to rezero the servo and return to the target cylinder. If successful, the drive indicates ready again. Otherwise, the drive is shut down, and can only be restarted by turning power off and back on.

The maximum time after power on for Ready to be true is twenty seconds. Ready, Track 0, and Seek Complete come true sequentially during power on.

SELECT STATUS

A Status line is provided at the J2/P2 connector to inform the host system of the selection status of the drive.

The Drive Selected line is driven by a TTL open collector driver (see Figure 3-8). This signal goes active only when the drive is programmed as Drive X, X = 0, 1, 2, or 3, by programming the drive select jumper on the drive, and the Drive Select X line at J1/P1 is activated by the host system, or if the drive is programmed for Radial Mode (see Figure 3-13).

DATA TRANSFER SIGNALS

All lines associated with the transfer of data between the drive and the host system are differential in nature and may not be multiplexed. These lines are provided at the J2/P2 connector on all drives. Signal levels are defined by RS-422A. Two pair of balanced lines are used for the transfer of data: MFM Write Data and MFM Read Data. Figure 3-12 illustrates the driver/receiver combination used with the drive for data transfer signals.

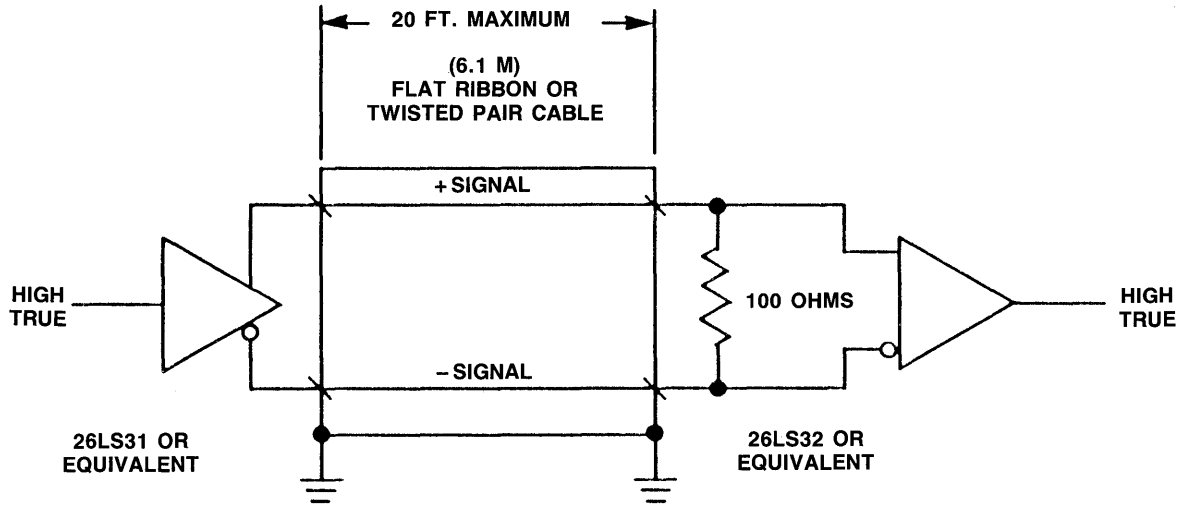


FIGURE 3-12
DATA TRANSFER LINE DRIVER/RECEIVER

MFM WRITE DATA

This is a differential pair of lines that define the flux transition to be written on the track. The transition of the + MFM Write Data line going more positive than the − MFM Write Data line causes a flux reversal on the track if Write Gate is active. This signal must be driven to an inactive state, + MFM Write Data more negative than − MFM Write Data, by the host system when in a read mode.

The delay from the leading edge of Write Gate to the Write Data pulse is 400 nanoseconds, maximum.

Host controllers may implement write precompensation circuits that recognize worst case patterns, and adjust the write data waveform. The TM755 has been designed to meet all specifications without precompensation. Although Tandon does not recommend precompensation, users can experiment with values (up to 15 nanoseconds) at various track locations and compare the results to those without precompensation. In some systems precompensation may slightly improve margins; in others it may adversely affect performance.

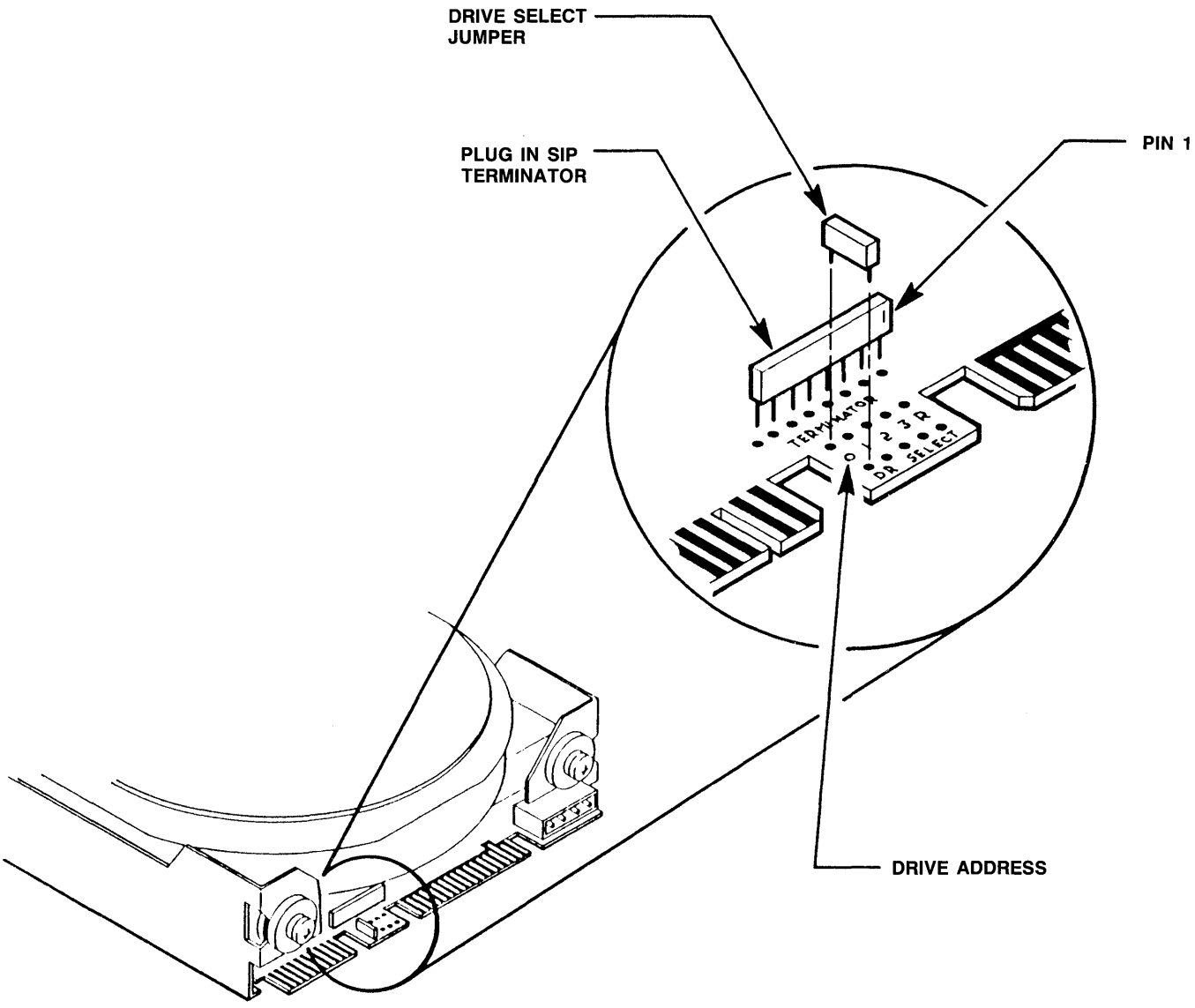
MFM READ DATA

The data recovered by reading a prerecorded track is transmitted to the host system via the differential pair of MFM Read Data lines. The transition of the + MFM Read Data line going more positive than the − MFM Read Data line represents a flux reversal on the track of the selected head.

3.6 DRIVE ADDRESS

This option allows the user to daisy chain up to four drives, and to enable one drive a a time. Drive Select is implemented by shorting one of four connections, using the Drive Select Jumper. The R location is used for radial configurations. The drive is selected at all times with the R jumper installed. Drive address jumper locations are shown in Figure 3-13.

The terminator resistor pack, located next to Drive Select, should be installed in the last drive of a daisy chain. All other drives should have the terminator pack removed. For a radial configuration, all drives should have the terminator resistor pack installed. Orient the resistor pack with Pin 1 closest to the D. C. power connector, J3. See Figure 3-13.



NOTE: SOME DRIVES HAVE EITHER THE TERMINATOR SIP OR DRIVE SELECT JUMPER OR BOTH MOUNTED ON THE BOTTOM. TOP MOUNT CONFIGURATION SHOWN.

FIGURE 3-13
DRIVE ADDRESS AND TERMINATOR PACK

3.7 HANDLING

From various drop tests conducted, it has been established that drives subjected to shock loads in excess of twenty G's may be damaged, and consequently not meet published performance specifications for data reliability, margins, and function.

In order to avoid media or head damage, it is recommended that:

1. Drive mounting designs incorporate some type of shock dampening consideration.

2. Shipping cartons protect the drive within the system to withstand twenty G's.

3. Individual drives are handled carefully; e. g., receiving and in-process personnel are properly trained, surface mats are used on working surfaces to prevent the possibility of "handling shock", and padding is placed on racks and carts.

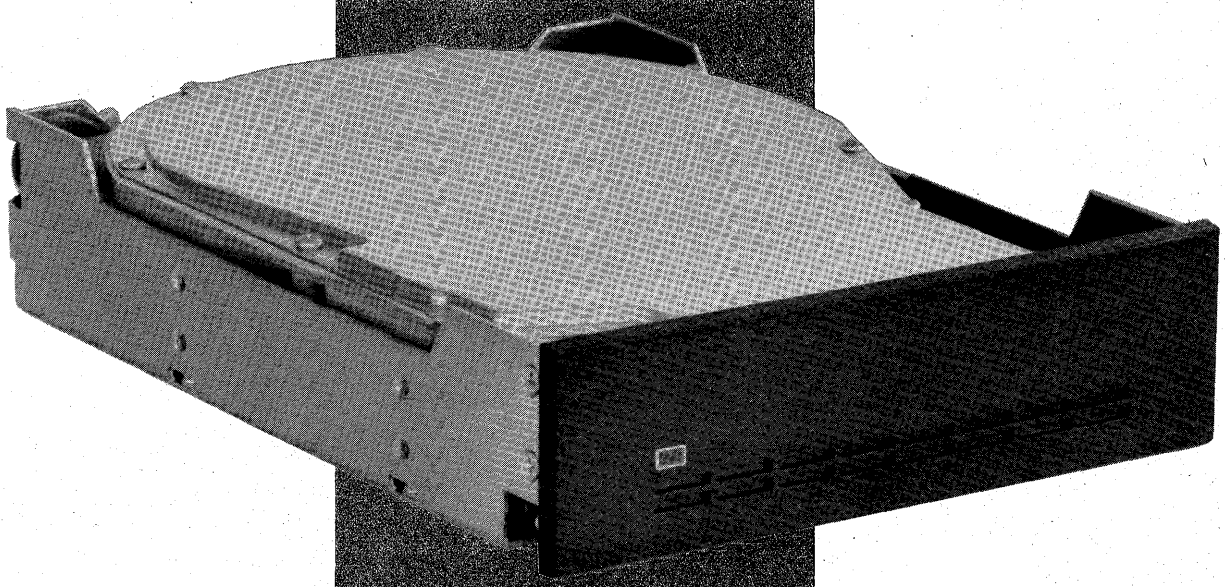
CAUTION

The critical aspects of handling these drives must be emphasized. Tandon provides technical assistance on packing and handling to customers upon request.

Tandon

TM755

RIGID DISK DRIVE



PRODUCT SPECIFICATION AND USER'S MANUAL

3/20/85

NOTICE

This document, and the information contained herein, is copyright by Tandon Corporation and may not be duplicated or reproduced, in whole or in part, without the prior written approval of Tandon Corporation.

This document is intended to provide the user with detailed information adequate for the efficient installation and operation 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.

Tandon
CORPORATE OFFICES
20320 PRAIRIE STREET
CHATSWORTH, CA 91311

TELEPHONE NUMBER: (818) 993-6644
TELEX NUMBER: 194794
TWX NO.: 910-494-1721

P/N 179060-001A (T5029A 3-85)
MAILING ADDRESS: P.O. BOX 2107, CHATSWORTH, CA 91311
PRINTED IN U.S.A.