MEMOREX

101 OEM
Disc Storage Drive
Product Specification

101.80-00

Publication Number 101.80-00

February 1980 edition

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1.0 SCOPE

This document describes the characteristics and specifications of the Memorex® 101 Disc Storage Drive.

2.0 GENERAL DESCRIPTION

The 101 Disc Storage Drive is a non-operator-removable media, random access memory device used for data storage in a data processing system. The 101 drive consists of a disc stack, spindle with associated drive motor, stepping motor, band actuator, read/write heads, air-filtration system, and electronics. The discs, pre-amp, heads, and actuator mechanism are all part of a unit assembly enclosed in a sealed, protective cover. This unit is called the Memorex 101 HDA.

Data is stored on the disc stack which contains 4 recording surfaces. Data is accessed by 1 moving head per surface. The drive is equipped with 4 moving data heads. Data is recorded on the disc surfaces using The VFO feature provides encoding from standardized serial write data to MFM write data, and decoding of MFM read data to standardized read data. Standardized data is defined as a serial stream of data which only changes state when switching from ones to zeros or vice-versa. With this feature, the interfacing controller needs only to generate or accept serial standardized data (NRZ type). Data is read or written at a 4.742-MHz rate (592.8 kb/s).

An open loop system positions the read/write heads. The heads are attached to a carriage whose motion is determined by a five-phase permanent magnet stepper motor and capstan around which is wrapped a metallic band. The positioning to the data tracks is then achieved by the wrapping and unwrapping of the band around the capstan.

There is no specific head landing zone. The moving heads come to rest on the disc at any time the disc array is below the operating speed.

The 101 has been designed to achieve high reliability for low cost including very low power utilization.

3.0 PERFORMANCE CHARACTERISTICS

3.1 Data Access

Access time to data records comprises two primary factors for 101 Disc Drives: head positioning time and rotational latency time.

Data may be recorded on 244 tracks per moving head. These tracks are addressable as 000 to 243. Track 000 is toward the outside of the disc and 243 is toward the inside. Each track is subdivided into segments called sectors. After formatting by the customer, data is accessed by specifying the desired address consisting of a cylinder, head, and sector number. This address is recorded at the location of the record on the disc.

Positioning times are measured from initiation to arrival of the heads at the desired track, including head settling time. The maximum positioning time is 120 milliseconds. It is defined as the time required to move the heads from cylinder 000 to 243, or vice-versa. The maximum single track positioning time is 19.0 milliseconds, defined as the time required to move the heads between any adjacent pair of cylinders. The average positioning time is 70 milliseconds.

The average rotational latency time is 10.12 milliseconds, at a nominal rotation speed of 2964 RPM. Latency time is defined as the time required to rotate to a particular record location on a track.

3.2 Data Capacity

The data capacity of one 101 Disc Drive is 11,687,170 bytes (maximum) of moving head data, based on the number of bits recorded on an unformatted track.

3.3 Data Transfer Rate

The nominal bit rate is 4.74 MHz, (592.8 kilobytes per second.)

3.4 Error Rates

3.4.1 Conditions

All of the following conditions and definitions must be adhered to in determining error rates.

3.4.1.1 Clocking Circuits

The Memorex VFO Data Separator/MFM Data Encoder feature shall provide the only clocking circuits used to determine the 101 machine error rate. No substitutions are allowed.

3.4.1.2 Media Defects

Media defects will be negotiated with the customer.

3.4.1.3 Interface

The specified interface logic level and timing shall be adhered to. All specified terminations shall be in place.

3.4.2 Read Error Definitions

The type of error shall be determined using the diagrammed algorithm shown in Figure 2, where ERP means Error Recovery Procedure. The media defects must be excluded from the error definition, and the data written on the HDA must be verified as being correct.

3.4.2.1 Recoverable Errors

An error can be recovered by applying the ERP described in paragraph 3.4.3. ERPs are methods provided by the using system to initiate certain machine instructions via the interface to assist in recovering the recorded data. These include read retrys, rezero and reseek. All errors correctly read following any one of these procedures shall be considered recoverable errors. Initiating the ERP shall count as one error regardless of the number of errors read during the procedure. There shall be no more than one recoverable error per 10^{10} read data bits.

3.4.2.2 Unrecoverable Errors

An unrecoverable error is defined as an error that cannot be eliminated by the ERP, and consequently is classified as a machine failure.

3.4.3 Minimum Error Recovery Procedure

The minimum procedure to be used before an error can be classified as unrecoverable is described by the procedure given in Figure 3.

3.4.4 Recoverable Position Errors

The recoverable position error rate shall not exceed one position error in 10^6 executions causing head movements.

In the event of a position error, the error status is to be cleared and the heads repositioned to track 000. If, after one retry, the error condition disappears, then the error is considered to be a recoverable position error. If, after one retry, the error condition still appears, then the error is considered to be unrecoverable and is consequently classified as a machine failure.

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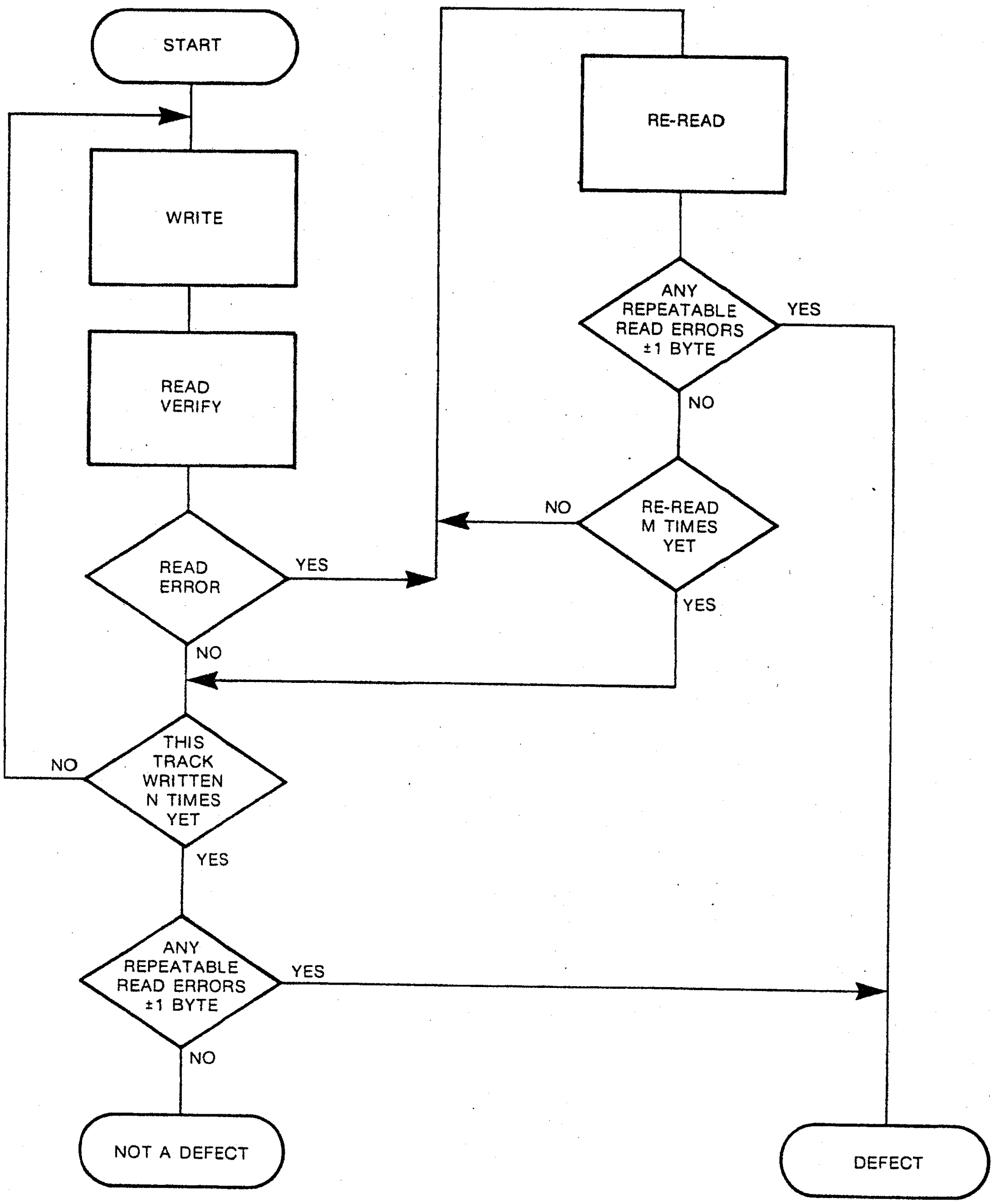

FIGURE 1. DEFECT DEFINITION PROCEDURE

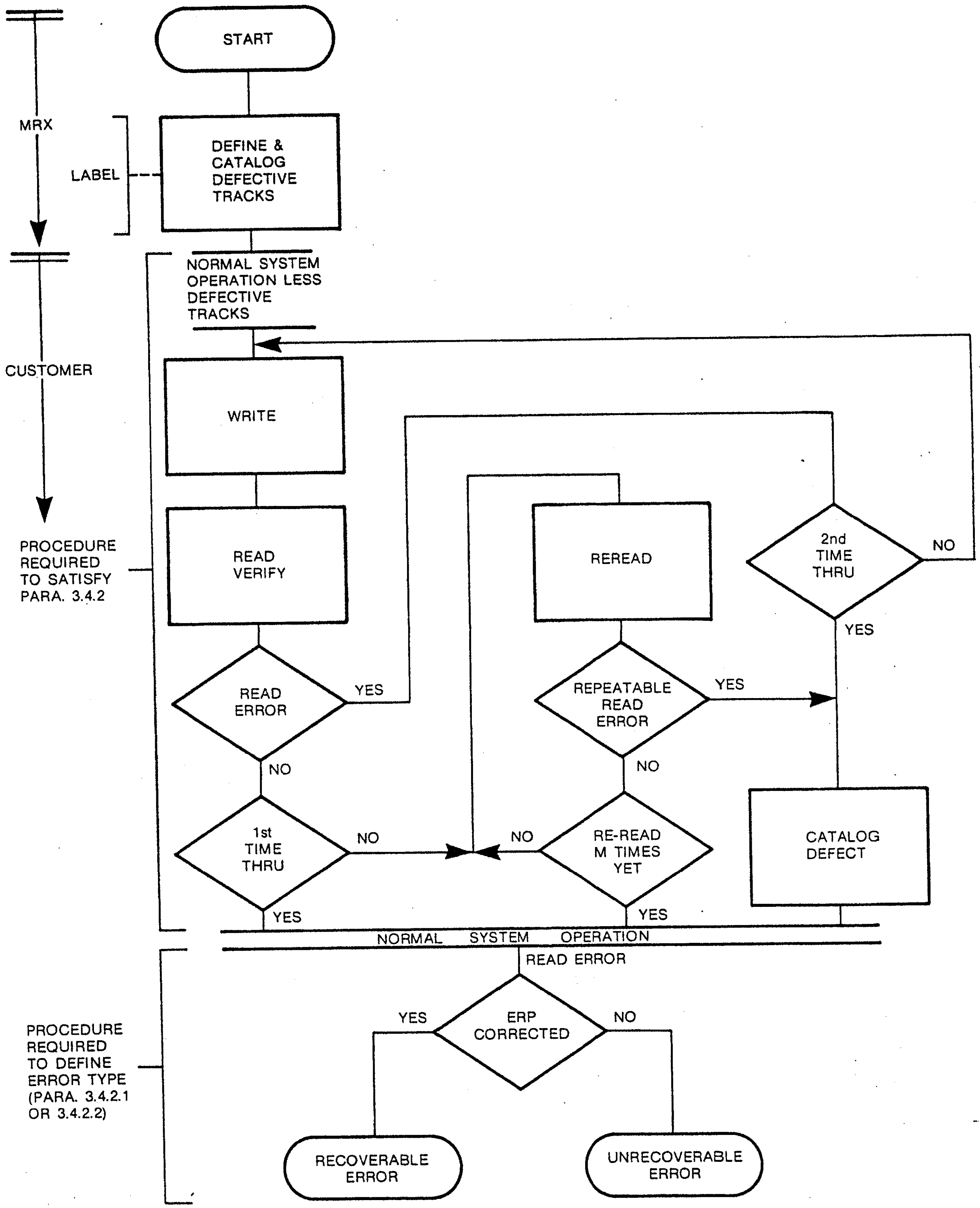

FIGURE 2. READ ERROR DEFINITION PROCEDURE

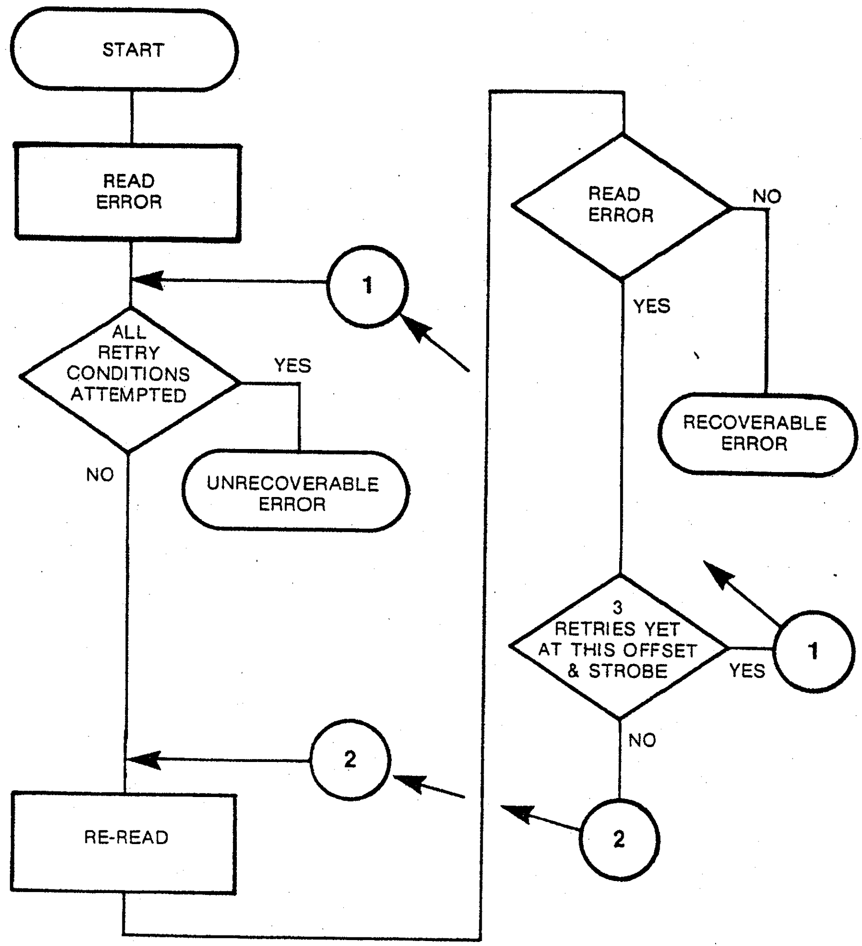

FIGURE 3. MINIMUM ERROR RECOVERY PROCEDURE (ERP)

3.5 Data Integrity

The 101 Disc Drive has several fault detection circuits to monitor conditions in the drive and to ensure that data is written on the disc safely and in the same pattern as generated by the attached controller. Data is protected by inhibiting Write Gate when a fault condition is detected.

3.6 Start/Stop Time

The time lapse required for the 101 to be in a ready state after initiating a power-up sequence is 15 seconds maximum at nominal operating voltage. Stop time is 45 seconds.

4.0 RECORDING CHARACTERISTICS

4.1 Recording Technique

Data is recorded on the discs using the Modified Frequency Modulation encoding scheme. The bit density at the innermost track is 6100 bits per inch.

4.2 VFO Data Separator/MFM Data Encoder

The VFO Data Separator/MFM Data Encoder (standardized data) for the 101 allows standardized data transfer between the drive and controller.

Standardized Write Data is encoded to MFM prior to recording on the disc. The controller generates the Write Clock signal from the 4.72 MHz PLO to strobe standardized data into the drive. Refer to Figure 12 for Write Data timing.

The VFO time separates clock from data read and transmits standardized Read Data to the controller. A Read Clock signal is generated by the VFO to strobe data into the controller.

4.3 Discs

The Memorex 101 has two discs, each containing 5.8 megabytes of data. These discs are original to Memorex and have specifically been designed for the complete family of 8-inch disc drives. Their physical size has been chosen so that their mechanical performance is optimum for the operation of these drives.

The magnetic coating and proprietary surface lubrication have been optimized for this specific device and have not simply been transferred from similar type discs such as the Memorex Data Mark and Memorex 3650. This ability to optimize the disc parameters allows the read/write signals to be optimized for high reliability. The inside diameter of the Memorex disc is 100mm (3.97 inches) and the outside diameter is 200mm (7.94 inches). The thickness of the disc is 75 mils. The highest bit density is at the inner track radius of 2.5 inches and is 6100 bits per linear inch. The radial track density is 195 tracks per inch.

The maximum number of tracks per surface is 244.

4.4 Recording Heads

There are 4 data heads in the 101. These heads are of the low mass contact start/stop type. The experience Memorex gained on its previous "Winchester" products, the Data Mark, 3650, 3644 and 601, have allowed the design of the 101 R/W slider for improved reliability. Each read/write slider is on a separate arm. The heads fly at a height of 20 microinches at the inner track radius.

An additional fixed head situated on the lowest surface of the disc array allows the reading of a pre-recorded clock track written at the byte rate of 592.8 kilobytes per second.

The disc drive is at speed in 15 seconds and the heads are at their stable flying height at this time.

4.5 DC Brushless Drive Motor

The Memorex 101 spindle drive motor is a motor which has been designed specifically for this application. It is integral with the spindle. The advantages of this DC brushless motor over AC drive motors are:

1. Much greater speed control; i.e., the uniformity of velocity when the spindle is up to speed is greater. It reduces speed variation from 2% to 0.5%. The effect of this at the bit rates used in the 101 is a saving of 3 nanoseconds in the window margin—very significant in terms of soft error rate.

2. The DC brushless motor was designed to handle the inertial mass of the 101 in its dynamic condition as opposed to the utilization of standard AC motors. The torque requirements are thus optimized and, as can be seen from the power requirements, it requires less power by a significant margin.

3. The integral motor eliminates the use of a pulley and belt.

4. The design saves an enormous amount of space. In the smallest dimension it allows much more space to separate the discs by about one inch. This is necessary because in the eight-inch disc drives, there is not the space budget nor the cost budget to carry air blowers. The additional space requirement relieved in the other two directions allows a larger volume of air flow in the HDA envelope. This improvement in volume is of the order of 4 to 1. In turn, this has a dramatic effect in reducing temperature rise inside the HDA envelope.

4.6 Five-Phase Stepper Motor

Memorex has chosen to use a 5-phase permanent magnet stepper motor in the 101 product. This motor was chosen over 4-phase motors for its higher torque throughout the operating frequencies and its higher start/stop stepping rate. The step angle on the 5-phase motor is 0.72 degrees.

4.7 Stepper Electronics

To allow faster access time a ramping circuit is incorporated into the 101 Drive electronics. Without the ramping circuit, step pulses to the stepper drive circuitry would be limited to start/stop rate of the stepper motor. For the 5-phase stepper this is 1.3 kHz. By ramping the step pulses, the electronics can move the stepper motor at frequencies up to 5 kHz for long seeks.

A constant current switching power source was designed for improved stepper performance at reduced power consumption. Stepper Motor Drive current is automatically reduced after head carriage settling, thus allowing additional power savings during periods not requiring head carriage repositioning.

5.0 101 SPECIFICATION SUMMARY

5.1 Standard Specification Summary

Data Retrieval Time	
Average Rotational Latency	10.12 Milliseconds
Track to Track Access	19.0 Milliseconds
Average Access	70.0 Milliseconds
Maximum Access	120.0 Milliseconds
Data Transfer Rate	592.8 Kilobytes/Second
Error Rates	
Recoverable Read Errors	1 in 10^{10} Bits
Recoverable Position Errors	1 in 10^{6}
Recording Characteristics	
Recording Surfaces	4
Moving Data Heads per Surface	1
Usable Tracks per Surface	244
Tracks Spacing (Center-Center)	5.2 mils (195 TPI)
Bit Density	
Innermost Track	6100 Bits/Inch
Encoding Technique	MFM
Coating Material	Oriented Magnetic Oxide
Rotational Speed	2964 RPM ± 0.5%
Capacity (Unformatted)	
Track Capacity	12,000 Bytes
Cylinder Capacity	48,000 Bytes
Disc Capacity (Moving Head-Maximum)	11,712,000 Bytes
Physical Characteristics	
Width	8.55 in.
Depth	14.05 in.
Height (W/O Power Supply)	4.38 in.
Weight (W/O Power Supply)	10 lbs.
Mounting Axis	Horizontal Vertical
Start/Stop Time (At Nominal Operating Voltages)	15 Seconds (Maximum)

DC Power

Voltage	Tolerance	Peak	Nominal
+24V	+5, -10%	6.0A	3.0A
+5V	±5%	2.5A	2.5A
-5V	±5%	0.25A	0.25A
or Jumper Option			
-7V to -16V		0.30A	0.30A

Power Dissipation	89.3W (Quiescent) 164W - Peak

Environmental

Operating*	
Temperature	10° C to 43° C (+50° F to +110° F)
Relative Humidity	10% to 90%
Temperature Variation	6° C/Hour (10° F/Hour), No condensation
Elevation	Sea Level to 1,981 m (6,500 ft) above Sea Level. Equivalent to density altitude of -457 m(-1,500 ft.) to +3,779 m (+12,400 ft.)
Wet Bulb Temperature (Maximum)	27° C (80° F)
Humidity Variation (Maximum)	20%/Hour
Non-Operating	
Temperature (Shipping)	-40° C to 60° C (-40° F to +140° F)
Relative Humidity	10% to 90%
Temperature Variation	Below that which can cause condensation
Elevation	Sea Level to 3,658 m (12,000 ft) above Sea Level
Wet Bulb Temperature (Maximum)	27° C (80° F)
Humidity Variation (Maximum)	Below that which can cause condensation

*After pre-soak within the following environmental conditions for a minimum period allowing for unit stabilization.

Shock and Vibration

Shipping/Storage	
Vibration	1.0 g @ 10 to 100 CPS
Shock	5.0 g for 5 Milliseconds

6.0 ELECTRICAL INTERFACE

6.1 Power Input

The power input is achieved through a six-pin AMP connector, No. 1-380999-0. The mating connection is AMP No. 1-480270-0. The top side view of the power connector is as follows:

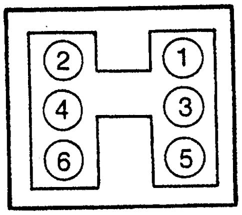

FIGURE 4. CONNECTOR C

Only DC power is needed for the Model 101. See interface list for connector pinouts.

WARNING

Voltage returns must be connected to a common point at the power supply.

6.2 Power Requirements

The power requirements of the Model 101 are DC voltages which include +24V, +5V, and -5V. There is no requirement for AC voltage within the drive. Total nominal power consumption is less than 100W. The individual power tolerances and consumption is shown in the following table:

Voltage	Tolerance	Current Peak	Current Nominal
+24V	+5, -10%	6.0A	3.0A
+ 5V	±5%	2.5A	2.5A
- 5V	±5%	0.25A	0.25A
or			
-7V to -16V (Jumper Option)		0.30A	0.30A

NOTE

Voltage returns must be connected to a common point at the power supply.

6.3 Signal Interface

Signal interface to and from the drive is accomplished through edge connectors A and B.

6.3.1 Connector A

Connector A is a 50-pin edge connector and is used for control and read/write signals when a single drive is connected to the host computer or for daisy-chaining control signals when up to four drives are connected to the host computer. The interfacing connector to the PC board edge connector is the AMP. No. 1-583717-1. See interface list for connector pinouts.

6.3.2 Connector B

Connector B is a 20-pin edge connector and is used for radially connecting read/write signals to the host computer when more than one drive (four maximum) is used (Figure 7). The interfacing connector to the PC board edge connector is the AMP No. 583717-1. See interface list for connector pinouts.

6.4 Driver/Receiver Lines, Control Signals

All control signals use single-ended (ground return) negative true logic:

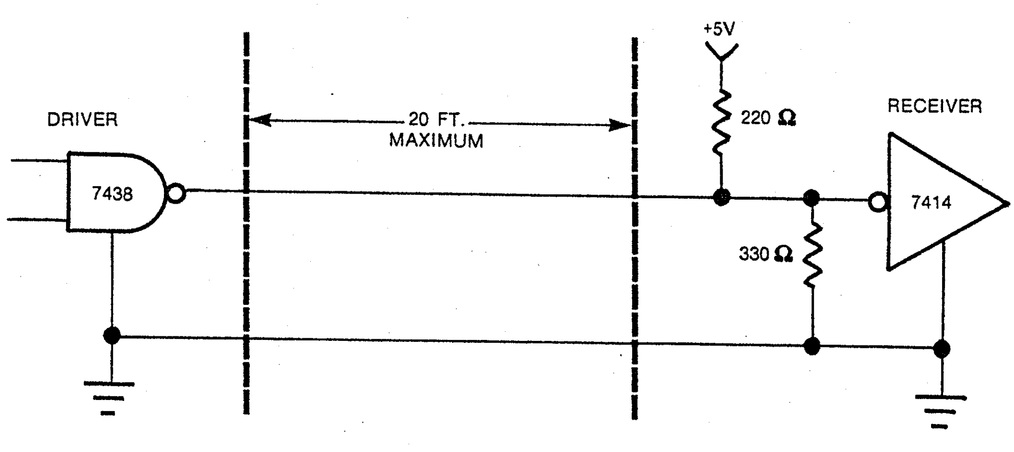

FIGURE 5. CONTROL SIGNAL INTERCONNECT

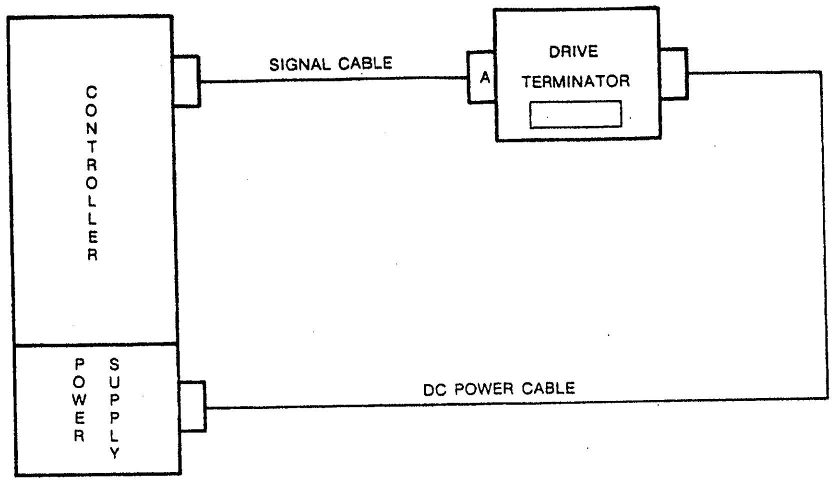

FIGURE 6. SINGLE DRIVE INTERFACE

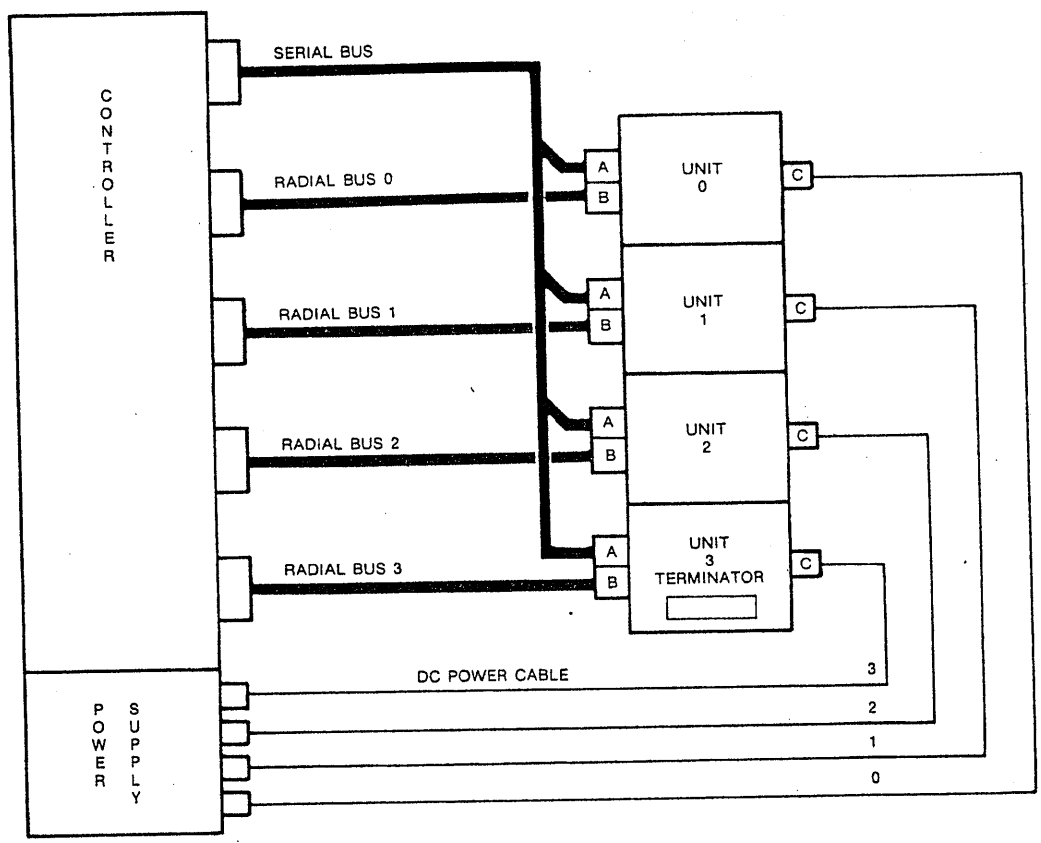

FIGURE 7. MULTIDRIVE INTERFACE

6.5 Driver/Receiver Lines, Data Signals

All data signals and high speed clocks use differential pair line drivers/receivers. The intelligence on these lines is positive true logic (i.e., when the + side of the line is more positive than the - side of the line, a positive logic "1" or positive going pulse appears on the + line:

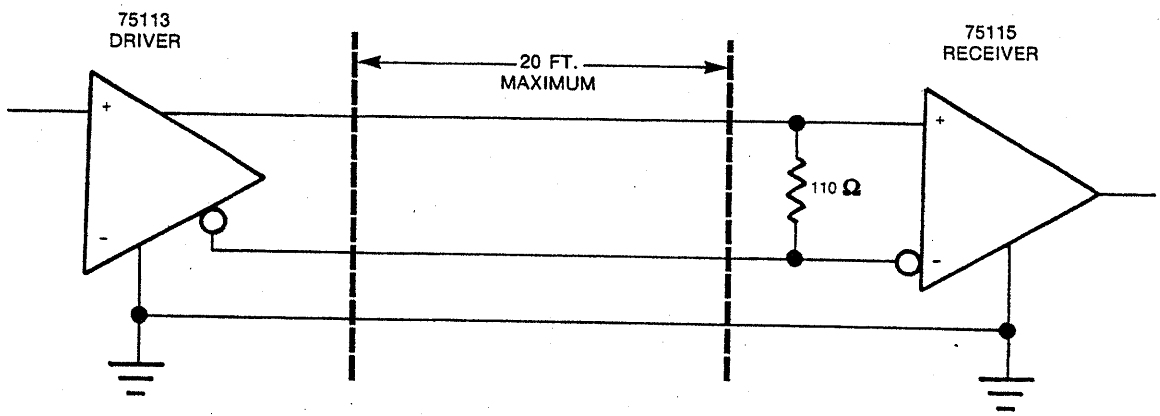

FIGURE 8. DATA DRIVER/RECEIVER INTERCONNECT

6.6 Signal Description

6.6.1 Drive Ready

When this signal goes true (low level) in a selected drive, it indicates that the spindle motor is up to speed with the PLO synchronized to the disc speed.

6.6.2 Drive Select (4 lines)

One (only) of four lines while at a logic true (low level) will activate a selected drive; while the select line is false (high level) all input/output interface lines to that drive are deselected. DRIVE SELECT 4 line may be jumper optioned for SEEK COMPLETE on Connector A.

6.6.3 Head Select 0, 1

Two lines provide for selection of one of four read/write heads. Heads are selected with logical true (low level) signals.

6.6.4 Index

Provided by the selected drive once each revolution (20.24 msec). The signal goes to a logic true (low level) for a period of 1.7 μsec in a selected drive.

6.6.5 Sector/Byte Clock

The drive allows 12,000 bytes per track. An internal jumper option allows either a Sector Mark or Byte Clock to be outputted. In either case, the output signal goes true (low level) for 0.84 µs (SECTOR MARK).

When SECTOR MARK is used, a jumper option allows user selectable Byte Counts/Sector up to a maximum of 4,096 Bytes/Sector.

6.6.6 Track 0

This line goes to logical true (low level) in the selected drive, when the R/W heads are positioned over TRACK 0.

6.6.7 Direction

A logical true (low level) signal on this line causes head motion "in" (toward the spindle) and a logical false (high level) signal causes head motion "out" (away from the spindle) when step pulses are applied to the selected drive.

6.6.8 Step

A transition of logical false (high level) to logical true (low level) signal causes the selected drive head to step one track in accordance with the direction defined by the DIRECTION Signal. There are three unique step modes that are defined as follows.

6.6.8.1 Controlled Step Mode

Controlled Step Mode is automatically selected by the drive when the incoming step transition rate is $\leq$1 kHz. In this mode, the controller issues step pulses and the drive responds in real time to each pulse.

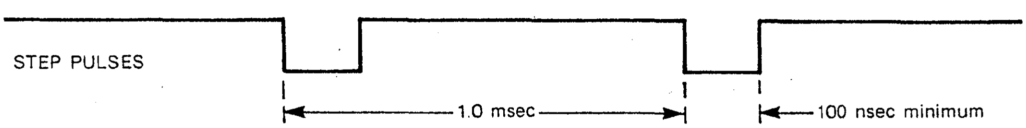

FIGURE 9. CONTROLLED STEP MODE TIMING DIAGRAM

6.6.8.2 Ramped Step Mode

Ramped Step Mode is automatically selected by the drive when the incoming step rate is >1 kHz and <4.5 kHz. When using this mode it is recommended that SEEK COMPLETE be used.

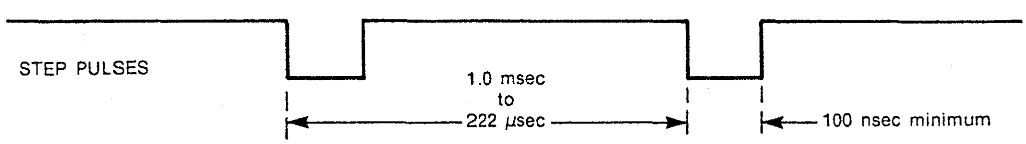

FIGURE 10. RAMPED STEP MODE TIMING DIAGRAM

6.6.8.3 Slave Step Mode

Slave Step Mode is automatically selected by the drive when the incoming step transition rate is ≤12 kHz. When using this mode, the maximum speed of the step pulses may be 3.0 MHz with the lower limit set at 12 kHz. These limits ensure accumulation of the complete step count before completion of the first slaved step. Stepping may not occur less than 100 nsec after a change in DIRECTION. In the SLAVE STEP MODE, the drive may be deselected 100 nsec after the last step pulse is sent. Step rates between 4.5 kHz and 12 kHz should be avoided.

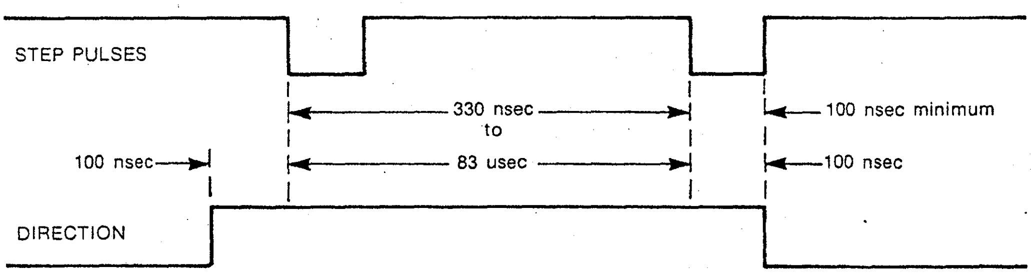

FIGURE 11. SLAVE STEP MODE TIMING DIAGRAM

6.6.9 Seek Complete

A logical true (low level) on this line indicates that the selected R/W head has arrived at the desired track. Since SEEK COMPLETE does not include head settling time, the user should wait 20 msec before performing a read or write operation. SEEK COMPLETE is always available on Connector B and may be jumper optioned for use with Connector A (in place of DRIVE SELECT 4).

6.6.10 Write Gate

When this line is logical "1" (low level), it enables write data to be written on the disc. The leading edge of the Write Gate must be used to ensure write timing accuracy.

6.6.11 Write Data

WRITE DATA is sent to the drive from controller over differential lines in NRZ format using positive true logic. The incoming WRITE DATA is clocked into the drive on the negative transition of the WRITE CLOCK.

6.6.12 Write Clock

WRITE CLOCK is sent to the drive over differential lines using positive true logic. WRITE CLOCK should be derived from PLO clock. WRITE CLOCK must be present at the interface for one byte prior to WRITE GATE true.

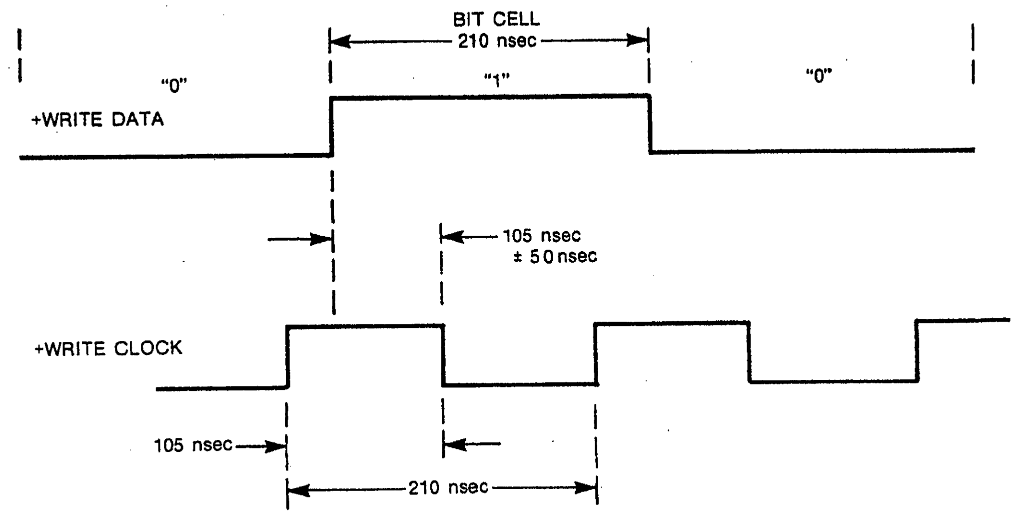

FIGURE 12. WRITE DATA TIMING DIAGRAM

6.6.13 Write Fault

This line goes to logical "1" (low level) when a write fault is detected and inhibits further writing on the disc until the fault is cleared. The WRITE FAULT conditions detected are:

- WRITE GATE active (low level) when DRIVE READY is false (high level)
- WRITE GATE and READ GATE are both active (low level)
- WRITE GATE active when SEEK COMPLETE false

6.6.14 Fault Clear

FAULT CLEAR provides for resetting of latched fault conditions within the drive. The leading edge of the pulse, logical false (high level) to logical true (low level), transition provides the reset. The minimum pulse width should be 100 nsec.

6.6.15 PLO CLock

PLO CLOCK is sent by the selected drive over differential lines using positive true logic. When READ GATE is not active, the clock is derived from a dedicated clock track on the disc and will occur 96,000 times per revolution. When READ GATE is active, the PLO CLOCK is derived from the data. When WRITE GATE is active, the PLO CLOCK should be used as a WRITE CLOCK.

6.6.16 Read Gate

READ GATE is activated when the READ GATE line goes to a logical "1" (low level); the line is activated over a known segment of data (all 0's) so that synchronization of the internal PLO CLOCK to the READ DATA is achieved (within eight data bytes or 13.5 μsec).

6.6.17 Read Data

Data is sent by the selected drive over differential lines in NRZ format using positive true logic. The READ DATA will contain valid data 13.5 μs after READ GATE is activated (sync time). READ DATA is clocked out of the drive on the leading edge of the READ/WRITE CLOCK (PLO CLOCK) derived within the drive.

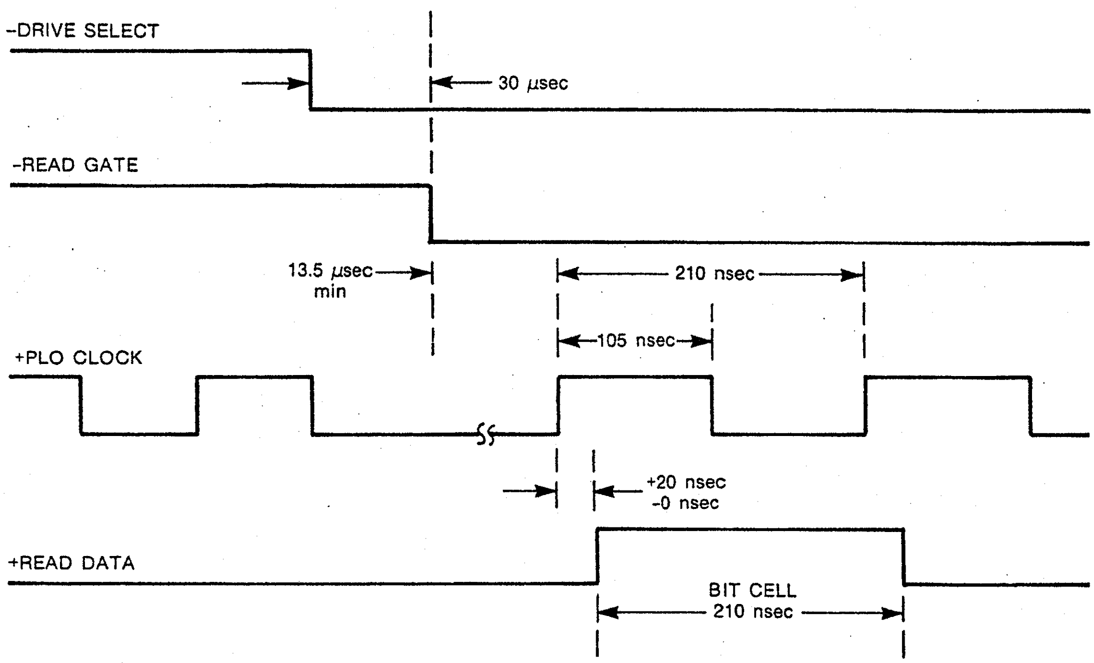

FIGURE 13. READ DATA TIMING

SIGNAL NAME	SIGNAL PIN NO.	SIGNAL RET. PIN NO.	INT TYPE
HEAD SEL. 0	2	1	SINGLE ENDED
HEAD SEL. 1	4	3	SINGLE ENDED
SPARE	6	5	
SPARE	8	7	
INDEX	10	9	SINGLE ENDED
DRV. RDY	12	11	SINGLE ENDED
SECTOR/BYTE CLK	14	13	SINGLE ENDED
DRV. SEL. 1	16	15	SINGLE ENDED
DRV. SEL. 2	18	17	SINGLE ENDED
DRV. SEL. 3	20	19	SINGLE ENDED
DRV. SEL. 4/SEEK COMP	22	21	SINGLE ENDED
DIRECTION	24	23	SINGLE ENDED
STEP	26	25	SINGLE ENDED
FAULT CLEAR	28	27	SINGLE ENDED
WRITE GATE	30	29	SINGLE ENDED
TRK 0	32	31	SINGLE ENDED
WRT. FAULT	34	33	SINGLE ENDED
READ GATE	36	35	SINGLE ENDED
GND	38	37	SINGLE ENDED
WRITE DATA	40 (-)	39 (+)	DIFF. PAIR
GND	41		DIFF. PAIR
WRITE CLK	42 (-)	43 (+)	DIFF. PAIR
GND	44		DIFF. PAIR
PLO CLK	46 (-)	45 (+)	DIFF. PAIR
GND	47		DIFF. PAIR
READ DATA	48 (+)	49 (-)	DIFF. PAIR
GND	50		DIFF. PAIR

FIGURE 14: MODEL 101 INTERFACE LIST (CONNECTOR A)

SIGNAL NAME	SIGNAL PIN NO.	SIGNAL RET. PIN NO.	INT TYPE
INDEX	1	2	SINGLE ENDED
READY	3	4	SINGLE ENDED
SECTOR/BYTE CLK	5	6	SINGLE ENDED
SEEK COMPLETE	7	8	SINGLE ENDED
WRITE DATA	10 (-)	9 (+)	DIFF. PAIR
GND	11		
WRITE CLK	12 (-)	13 (+)	
GND	14		
PLO CLK	16 (-)	15 (+)	
GND	17		
READ DATA	18 (+)	19 (-)	
GND	20		

FIGURE 15. MODEL 101 INTERFACE LIST (CONNECTOR B)

POWER SOURCE	POWER PIN NO.	POWER RETURN PIN NO.	
+24V	1	2	SEPARATE RETURNS
-5V OR -7 TO -16V	4	3	
+5V	5	6	

FIGURE 16. MODEL 101 INTERFACE LIST (CONNECTOR C)

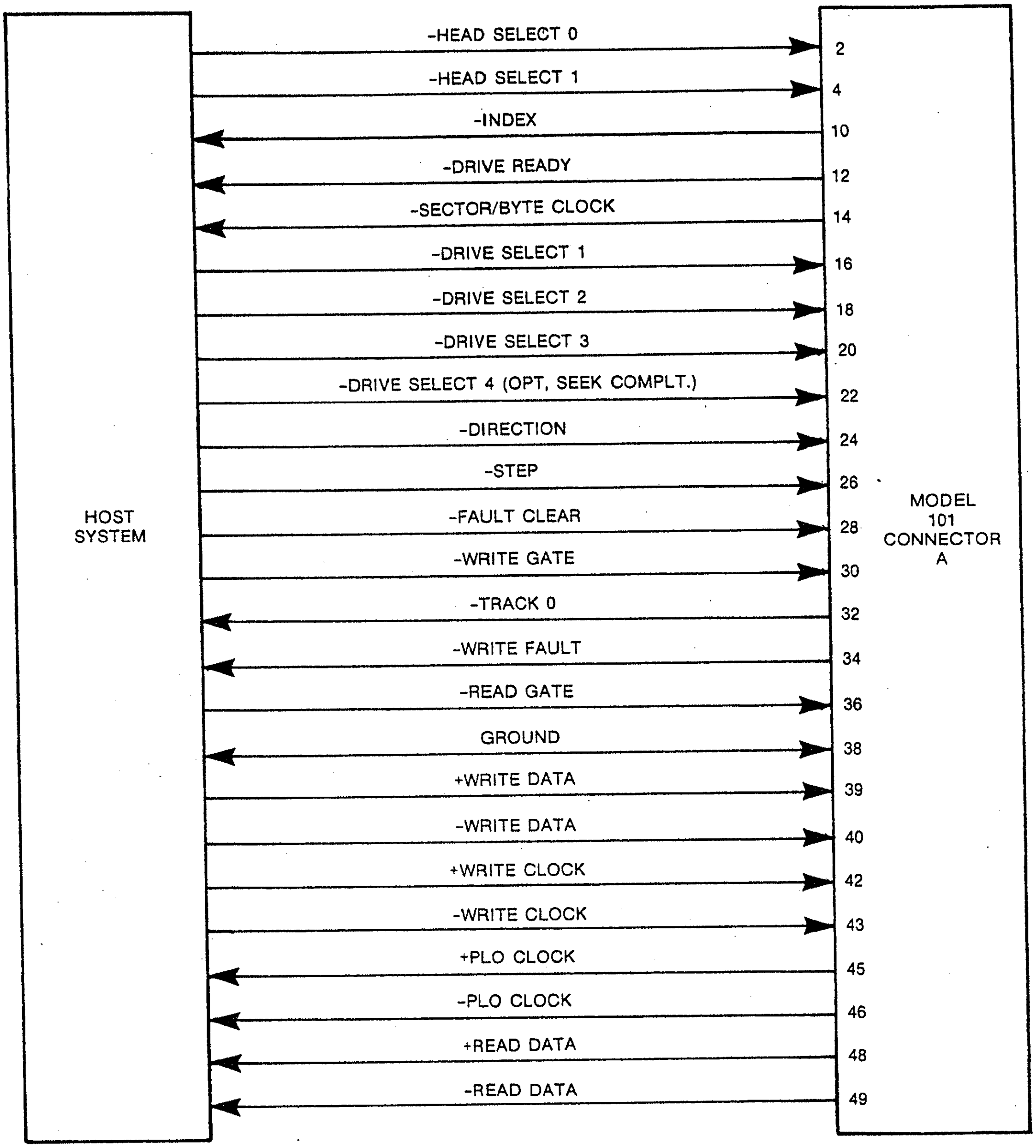

FIGURE 17. MODEL 101 SIGNAL INTERFACE (CONNECTOR A)

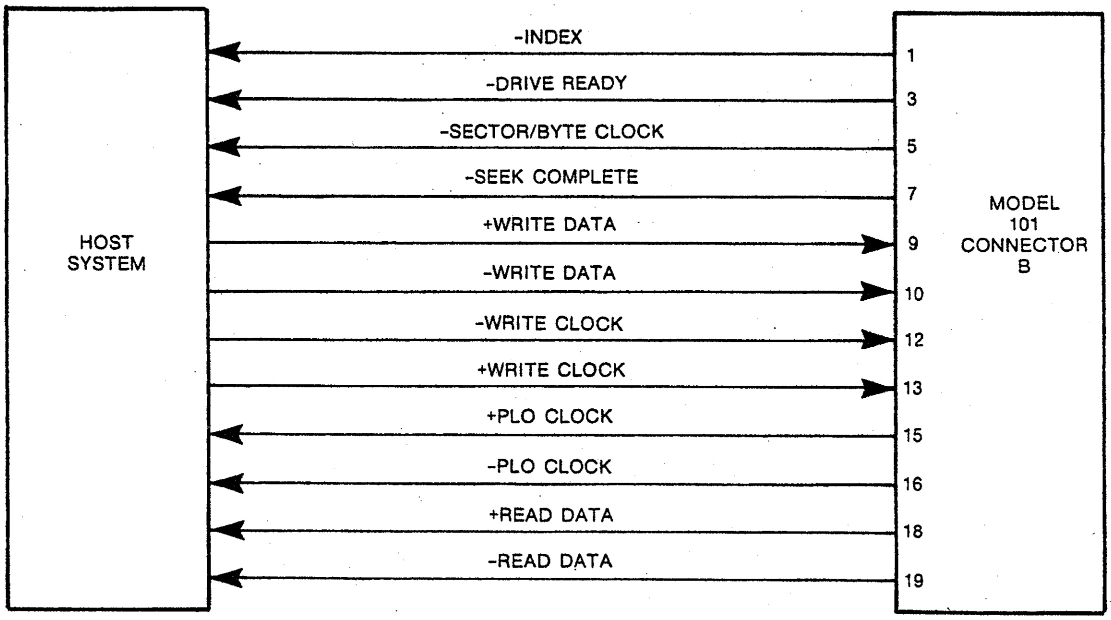

FIGURE 18. MODEL 101 SIGNAL INTERFACE (CONNECTOR B)

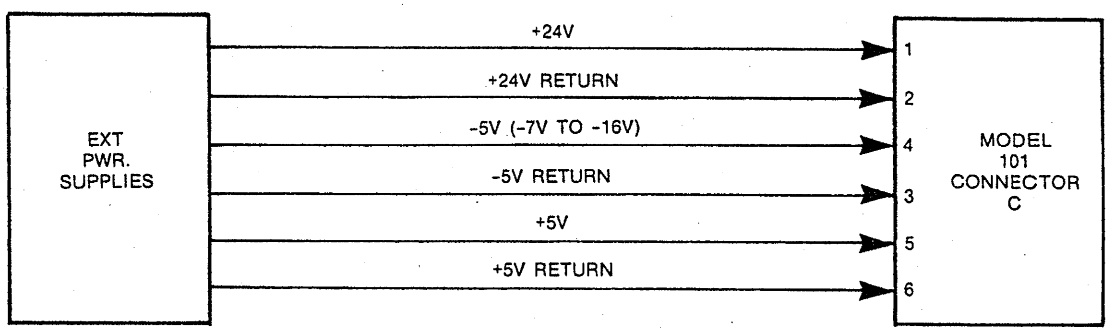

FIGURE 19. POWER INTERFACE (CONNECTOR C)

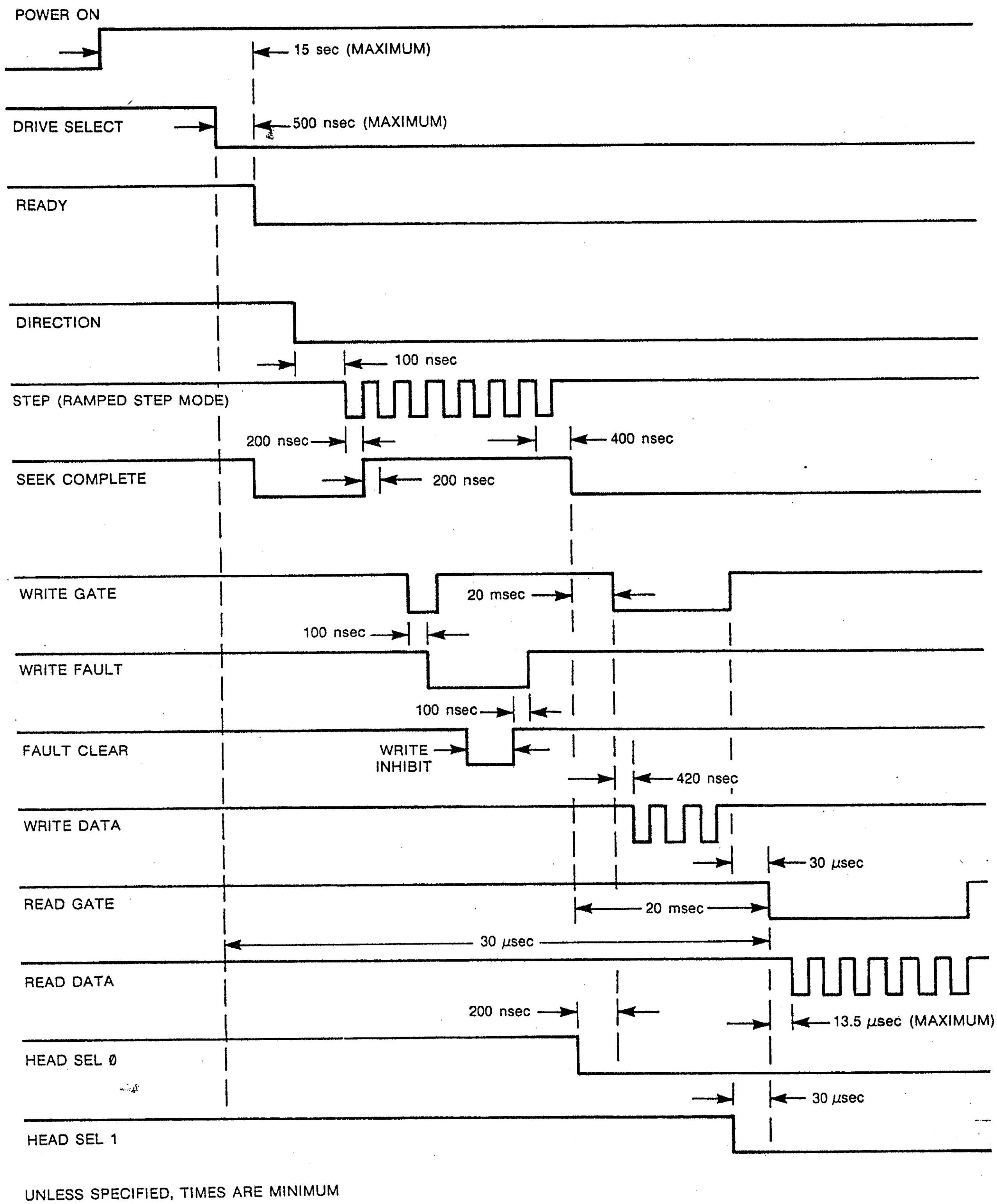

FIGURE 20. GENERAL INTERFACE TIMING DIAGRAM

7.0 RELIABILITY AND SERVICE GOALS

7.1 Mean Time Between Failures

The Mean Time Between Failures (MTBF) is estimated to be 8000 hours and is defined as:

$$\text{MTBF} = \frac{\text{Operating Hours}}{\text{Unscheduled Incidents}}$$

The 101 Disc Drive is not equipped with a usage meter. Therefore, total operating hours must be measured by the OEM customer. The Operating Hours, in the above equation, mean the average Power-on hours per month less any maintenance time. Failures such as power supply, controller, I/O cables, or operator errors should not be counted as Unscheduled Incidents.

MTBF shall be determined using the Unscheduled Incidents reports from all the field installations, for a period of at least one year, beginning after the first year the field shipments have begun.

The Head Disc Assembly, containing the disc stack, read/write heads, drive motor, actuator motor, filter, spindle and actuator, is a sealed unit to be treated as a component with respect to maintenance. The Head Disc Assembly is not to be opened in the field but returned to an appropriate repair facility if repairs are necessary. The assembly is to be replaced as a component in the unit if failure necessitates.

7.2 Mean Time to Repair

The Mean Time to Repair (MTTR) is estimated as 0.5 man hour per incident. MTTR is defined as the average time for trained service personnel to diagnose and repair a failure in the drive using a Field Diagnostic Unit as the primary fault isolation aid.

7.3 Preventive Maintenance

The 101 Disc Drive requires no preventive maintenance. One of the major factors contributing to this is the sealed Head Disc Assembly which is a replaceable component.

7.4 Service Life

The 101 Disc Drive provides an estimated useful life of 5 years or 35,000 hours, whichever occurs first, before factory overhaul or replacement is required. Repair is permitted during the product lifetime.

8.0 POWER

8.1 Power Supply Requirements

	DC Supply Voltages			
	Logic & Analog	Analog		Spindle & Step Motors
Load Voltage (Nom.)	+5	-5.0	-7 to -16	+24
Load Current (Max.)	2.5A	.25A	.30A	6A
Line and Load Regulation (50-100% Load Change/±10% Line Change/10-55° C)	±5%	±5%	—	=5% -10%
Ripple and Noise	50 mV p-p	25 mV p-p	2V @ 8.5V p-p	2V p-p
Transient Response Recovery Time* (±50% Load Change)	2 ms	2 ms	—	2 ms
Overvoltage Limit (Max.)	+6.2V	-6.3V	-18V	+30V

* Recovery time is defined as the time elapsed from the initial excursion of the output voltage beyond the transient recovery band until it returns and stays within this band. Transient recovery band is defined as equal to the line and load regulation band and is centered about the average of the steady-state values that exist immediately before and after load changes.

8.2 Grounding

8.2.1 DC Grounding

When signal cables have a shield ground (twisted-pair of twinax), the shield shall be connected to DC ground at both ends of the cable.

DC common is isolated from frame ground in the drive. DC ground to frame ground should be provided with a single-point ground in the controller.

Signal grounds within the I/O cables are attached to DC common in the units at both ends of the cable.

9.0 SAFETY STANDARDS REQUIREMENT

The 101 Disc Drive (60 Hz) shall be UL Recognized and CSA Certified as electronic data processing equipment.

Complete UL listing or CSA certification will depend on the OEM usage of the equipment. Items such as air flow, mounting electrical connections, etc. will be reviewed by UL/CSA prior to final acceptance by that organization.

COMMENTS FORM

101 OEM Disc Storage Drive Product Specification—101.80-00

Please send us your comments; they will help us produce better publications. For our reference, please include publication number, revision level, and page number. When applicable, reference specific paragraph numbers. Possible areas to comment on: accuracy, clarity, organization, audience suitability, and illustrations.

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