

orbis

**PRODUCT MANUAL
FOR
MODEL 76
DISKETTE DRIVE**

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TABLE OF CONTENTS (continued)

Section	Title	Page
1	GENERAL DESCRIPTION	
1.1	GENERAL	1-1
1.2	EQUIPMENT SPECIFICATIONS	1-3
2	OPERATION	
2.1	GENERAL	2-1
2.2	OPERATING INSTRUCTIONS	2-1
2.3	ERROR RECOVERY	2-3
2.3.1	Data Errors	2-3
2.3.2	Seek Errors	2-3
3	INSTALLATION AND CHECKOUT	
3.1	SCOPE	3-1
3.2	UNPACKING	3-1
3.3	INSTALLATION	3-1
3.4	CABLING AND CONNECTIONS	3-3
3.4.1	Input/Output Cable	3-3
3.4.2	AC Power Cable	3-3
3.4.3	DC Power Cable	3-3
3.4.4	Enhanced Interface Cable	3-3
3.5	INPUT POWER REQUIREMENTS	3-6
3.6	ENVIRONMENT	3-6
3.7	INITIAL CHECKOUT	3-6
4	THEORY OF OPERATION	
4.1	GENERAL	4-1
4.1.1	Diskette Drive Mechanism	4-1
4.1.2	Head Positioning Mechanism	4-1
4.1.3	Head Load Actuator	4-3

TABLE OF CONTENTS (continued)

Section	Title	Page
4	4.1.4 Safety and Control Electronics	4-3
	4.1.5 Read/Write Head	4-3
	4.2 INTERFACE DESCRIPTION	4-4
	4.3 SIGNAL AND DATA INTERFACE	4-6
	4.3.1 Input Lines	4-6
	4.3.2 Output Lines	4-9
	4.4 POWER INTERFACE	4-11
	4.5 MODES OF OPERATION	4-12
	4.5.1 Power Up Mode	4-12
	4.5.2 Seek Mode	4-13
	4.5.3 Write Mode	4-13
	4.5.4 Read Mode	4-14
	4.5.5 Power Down Mode	4-14
	4.6 PWB DETAILS	4-16
5	TYPICAL DIAGRAMS	
	5.1 INTRODUCTION	5-1
6	MAINTENANCE	
	6.1 GENERAL	6-1
	6.2 MAINTENANCE TOOLS AND MATERIALS	6-1
	6.3 MAINTENANCE PROCEDURES	6-2
	6.3.1 Inspect and Clean Read/Write/Erase Head	6-4
	6.4 ADJUSTMENTS, DISASSEMBLY AND ASSEMBLY	6-6
	6.4.1 Motor Drive	6-6
	6.4.2 Top Cover Removal	6-9
	6.4.3 Diskette Carrier Access	6-9
	6.4.4 Index Sensor Lamp Assembly	6-11
	6.4.5 Optional Write Enable Switch Assembly	6-11

TABLE OF CONTENTS (concluded)

Section	Title	Page
6	6.4.6 Head Load Actuator	6-11
	6.4.7 Index Sensor	6-13
	6.4.8 Spindle Assembly	6-17
	6.4.9 Diskette Carrier	6-18
	6.4.10 Stepper/Carriage	6-19
7	MAINTENANCE AIDS	
	7.1 GENERAL	7-1
	7.2 PHYSICAL DESCRIPTION (LOGIC)	7-1
8	TYPICAL PARTS LIST	
	8.1 INTRODUCTION	8-1
	8.2 PARTS LIST	8-1
9	RECOMMENDED SPARE PARTS	
	9.1 INTRODUCTION	9-1

LIST OF FIGURES

Figure	Title	Page
1-1	Model 76 Diskette Drive	1-2
2-1	Diskette Loading	2-2
3-1	Model 76 Physical Dimensions	3-2
3-2	Cable Connections	3-4
4-1	Model 76 Block Diagram	4-2
4-2	Interface Interconnect Circuit Scheme	4-5
4-3	Direction and Step Timing	4-8
4-4	Index Timing	4-8
4-5	Power Up Sequence	4-12
4-6	Read/Write Sequence	4-15
4-7	Erase Timing	4-15
4-8	PWB Connectors Detail and Address Switch Set-Up Chart	4-17
5-1	Block Diagram, Master and Slave	5-2
5-2	PWB Interface, Master and Slave	5-3
5-3	Master Logic	5-4
5-4	Slave Logic	5-6
5-5	Power and Transducers	5-7
5-6	Sector and D.S. Option	5-8
6-1	Top View of Model 76 with Top Cover Removed	6-5
6-2	Rear View of Model 76	6-7
6-3	Bottom View of Model 76	6-8
6-4	Front View of Model 76 With Carrier Open	6-10
6-5	Oscilloscope Waveforms - Index/Sector Adjustment	6-15
8-1	Assembly, Basic Model 76/77	8-2

LIST OF TABLES

Table	Title	Page
3-1	Interface Pin Assignments	3-5
8-1	Parts List	8-3
9-1	Recommended Spare Parts List	9-2

SECTION 1
GENERAL DESCRIPTION

1.1 GENERAL

The ORBIS Model 76 Diskette Drive is a small, portable, direct access, data storage device that interfaces to a host system via a control unit. (See Figure 1-1).

The Model 76 mechanism positions a read/write head to discrete positions or tracks on the spinning diskette surface. Magnetic data is written on or read from the diskette surface by the read/write head. The drive uses a single, oxide-coated mylar disk enclosed in a sealed envelope to form a diskette. The diskette and information format are fully IBM compatible. By use of other encoding techniques the capacity of each diskette may be increased to a formatted maximum data capacity of 640 Kilobytes. For more information on this subject refer to the ORBIS Model 86 Encoder.

Basically the mechanism consists of a belt-driven spindle, spindle motor, read/write head mounted on a stepping motor drive mechanism for track accessing, indexing light emitting diode and phototransistor, and a printed circuit board to provide all required internal electronic functions.

The drive components are mounted in a base-enclosure with a front panel. The front panel contains a cam-operated, bistable door mechanically linked to the disk mechanism and fully interlocked against incorrect closure and opening.

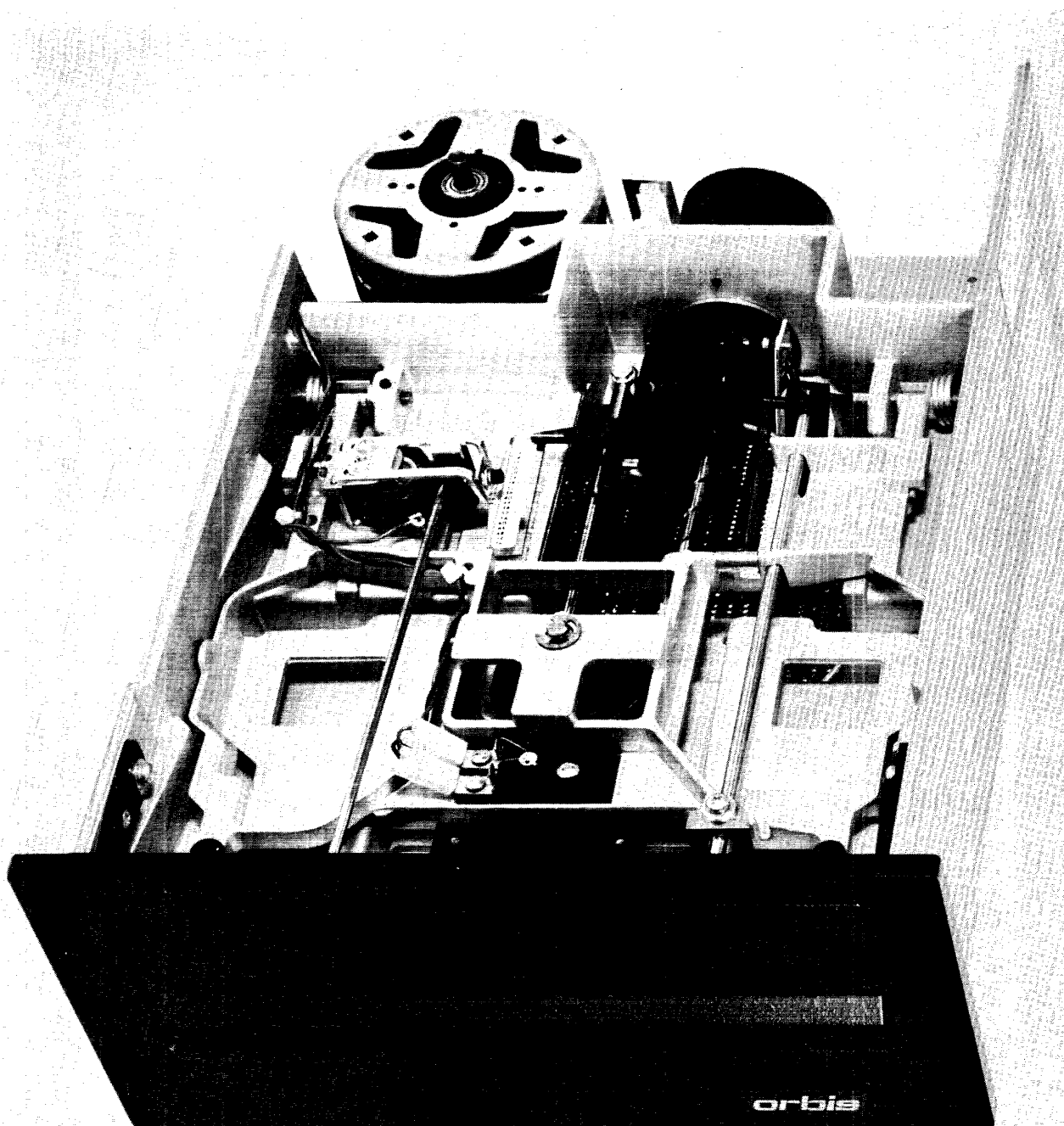


Figure 1-1. Model 76 Diskette Drive

1.2 EQUIPMENT SPECIFICATIONS

The equipment specifications for the Model 76 Diskette Drive are as follows:

1.2.1 ACCESSING TIME

Average Latency	83 mS
Access Time	6 mS track to track; 14 mS max Settle
Head Load Time	16 mS; 14 mS Settle

1.2.2 RECORDING (Single Density Operation)

Mode	Two frequency
Density (nominal)	1836 bpi (outer track) 3268 bpi (inner track)
Data Transfer Rate	250,000 Hz nominal
Sectors (soft)	IBM 3740 or equivalent
Sectors (hard)	Up to 32

1.2.3 DATA CAPACITY (Unformatted Single Density)

Bits/Track	41,664
Bytes/Track	5,208
Bits/Byte	8
Tracks/Disk	77
Bits/Disk	3,208,128

1.2.4 DISKETTE (IBM Compatible)

Disks/Cartridge	1 (8 x 8 inches including envelope)
Useable Recording Surfaces/ Disk Cartridge	1 or 2

*Step settle time is typically 10 mS.

Disk Surface Diameter	7.88 inches
Recording Diameters	Track 76 (inner) 2.0290 inches nominal; Track 00 (outer) 3.6123 inches nominal
Disk Surface Coating	Magnetic Oxide
Disk Rotational Speed	360 RPM \pm 3%

1.2.5 READ/WRITE/ERASE HEAD

Head/Unit	1
Track Width	.013 inch
Track Spacing	0.02083 inch (48 tracks per inch)
Erase to Read/Write Gap	.034 \pm 0.003 inch

1.2.6 PHYSICAL (Approx.)

Height	4.53 inches
Width	9.01 inches
Depth	14.12 inches
Weight	14 lbs.

1.2.7 ELECTRICAL

Power Supply (Supplied by User)

dc	+24 volts (\pm 10%) @ 1.2A +5 volts (\pm 5%) @ 1.0A
ac	100 Vac \pm 10% 50/60 Hz \pm 0.5 Hz 115 Vac \pm 10% 60 Hz \pm 0.5 Hz 208/230 Vac \pm 10% 60 Hz \pm 0.5 Hz 240 Vac \pm 10% 50 Hz \pm 0.5 Hz

Operating Current

Motor Start Current	0.80 max.	115V
Run Current	0.35 max.	
Motor Start Current	0.45	230V
Run Current	0.20	

SECTION 2
OPERATION

2.1 GENERAL

The Model 76 is under direct control of the interface and power supply. Therefore, no special start-up procedure is necessary.

2.2 OPERATING INSTRUCTIONS

NOTE: Verify that power and I/O cables are securely connected before operating.

Operation is fully automatic and requires no operator intervention during normal operation.

The diskette should be handled with care at all times. When not in use, the diskette should be retained in a storage envelope and stored in a vertical position in the multiple diskette container.

2.2.1 DISKETTE LOADING

1. Apply ac/dc power to unit.
2. Open drive door.
3. Carefully remove diskette from storage envelope and insert in Model 76 with index hole nearest operator and diskette label toward the door. (See Figure 2-1.)
4. Close door to engage spindle and start diskette rotation.

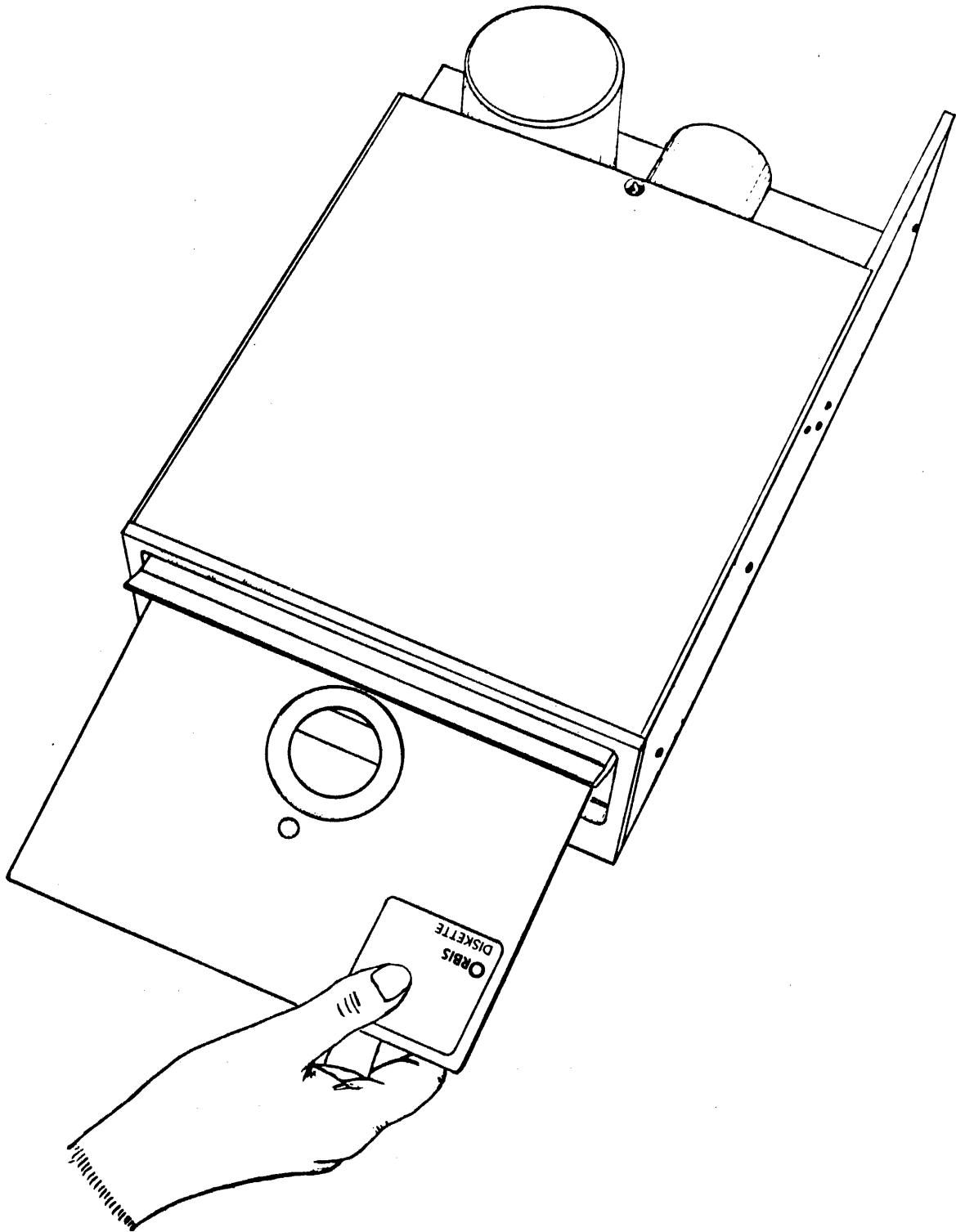


FIGURE 2-1
DISKETTE LOADING

2.3 ERROR RECOVERY

2.3.1 DATA ERRORS

To guard against degradation from imperfections in the media, no more than 4 attempts to write a record should be made when read after write errors are encountered. In the event a record cannot be successfully written with 4 attempts, it is recommended that the sector or track be labeled defective and an alternate sector or track be used. If more than 2 defective tracks are encountered, it is recommended that the diskette be replaced.

In the event of a read error up to 10 attempts should be made to recover with re-reads. If after 10 attempts the data was not recovered, step the head one track away and then re-position to recover the data.

Unloading the head when not transferring data will increase the data reliability and extend the diskette life.

2.3.2 SEEK ERRORS

Seek errors rarely occur unless the stepping rate of 6 msec is significantly exceeded. In the event of a seek error, recalibration of track location is achieved by repetitive Step and Out Direction commands until the Track 00 signal is received.

SECTION 3
INSTALLATION AND CHECKOUT

3.1 SCOPE

This section provides the information and procedures necessary to put the Model 76 into operation.

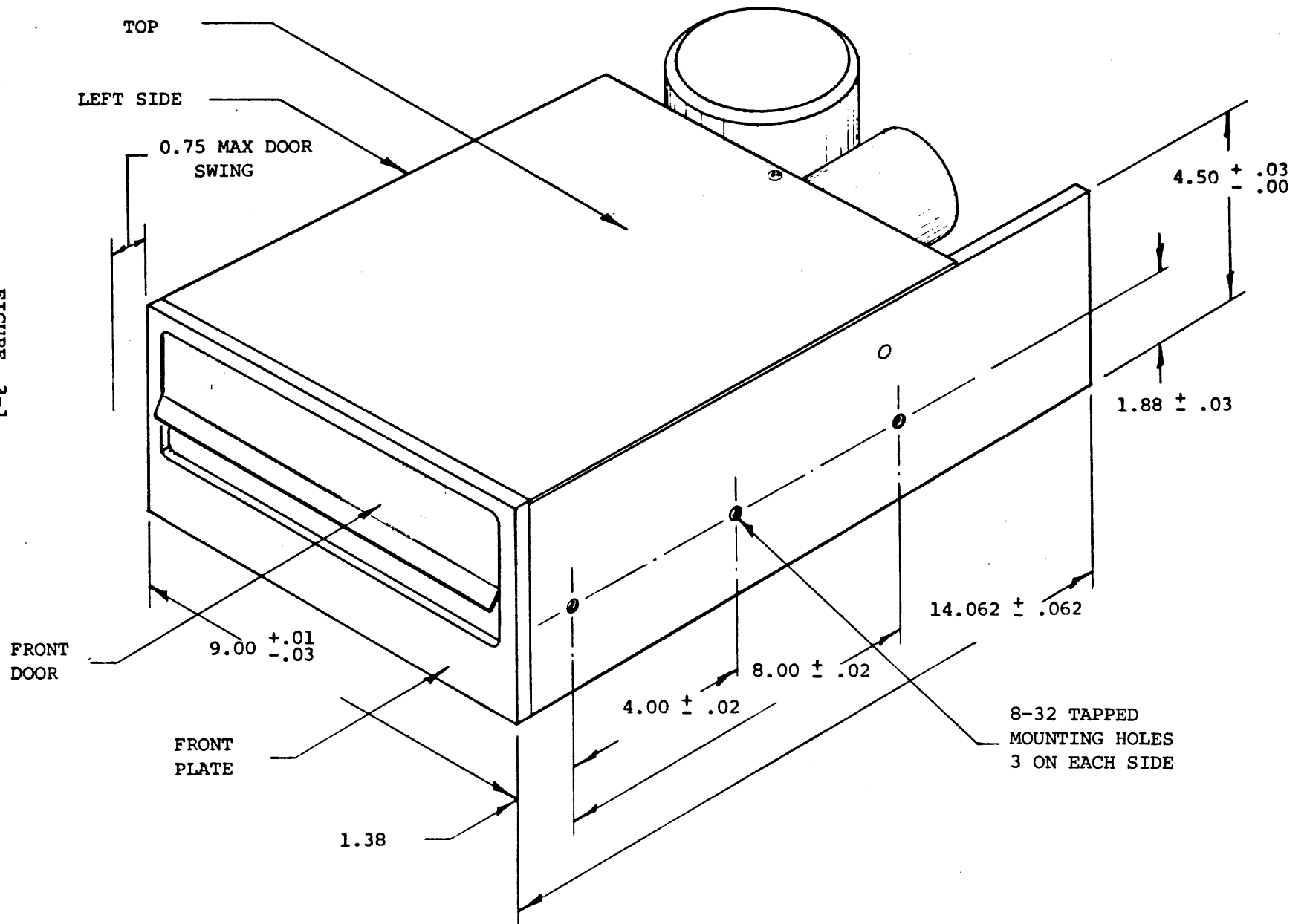
3.2 UNPACKING

During unpacking, care must be used so that all tools are non-magnetic and do not inflict damage to the unit. As the unit is unpacked, inspect it for possible shipping damage. All claims for this type of damage should be filed promptly with the transporter involved. If the claim is filed for damages, save the original packing material. Most packing material will be reuseable if reasonable care is used in packing. Unpack the Model 76 as follows:

1. Remove external packing material carefully.
2. Remove Model 76 from the container.
3. Remove internal packing materials, following instructions provided on the package.

3.3 INSTALLATION

Due to the small size and light weight, the Model 76 can be installed or mounted in any convenient location or position. To reduce possible operator errors, mounting in a vertical position is recommended. The Model 76 must be installed in a location that will prevent the I/O Cable from exceeding 20 feet in length. Refer to Figure 3-1 for dimensions and mounting provisions.



MODEL 76 PHYSICAL DIMENSIONS

FIGURE 3-1

3.4 CABLING AND CONNECTIONS

3.4.1 INPUT/OUTPUT CABLE

The I/O Cable is an optional item and is supplied on order. Refer to Figure 3-2 for cable connector part number and attachment. The maximum cable length from connector to connector is 20 feet. All inputs and outputs are paired, one line for function, one for ground. Characteristic impedance should be approximately 130 ohms. The I/O Cable Connector is included in the option. The connector option consists of a self keyed connector with associated clamp. Table 3-1 provides information relative to the connector pin/signal assignments for I/O cable.

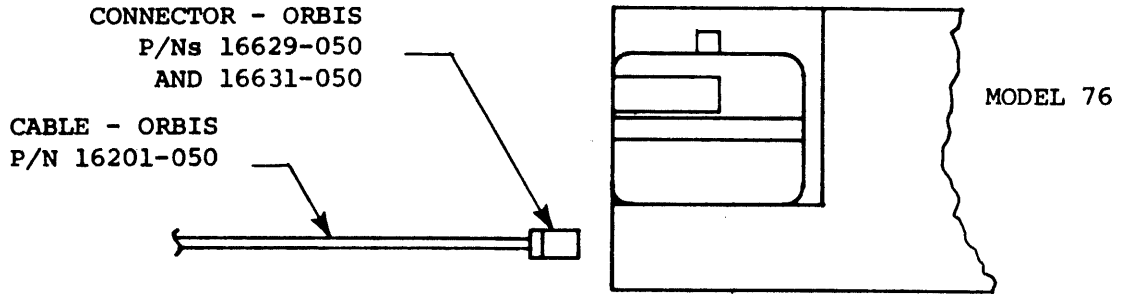
3.4.2 AC POWER CABLE

The AC Power Cable is an optional item supplied on order. All wires are stranded wire, 18 AWG minimum with the pointed-end pin connection ground. Refer to Figure 3-2 for connector part numbers and attachment. AC Power wires must be 24 AWG minimum (one line for power, one line for power return, and one line for ground) with one twist per inch.

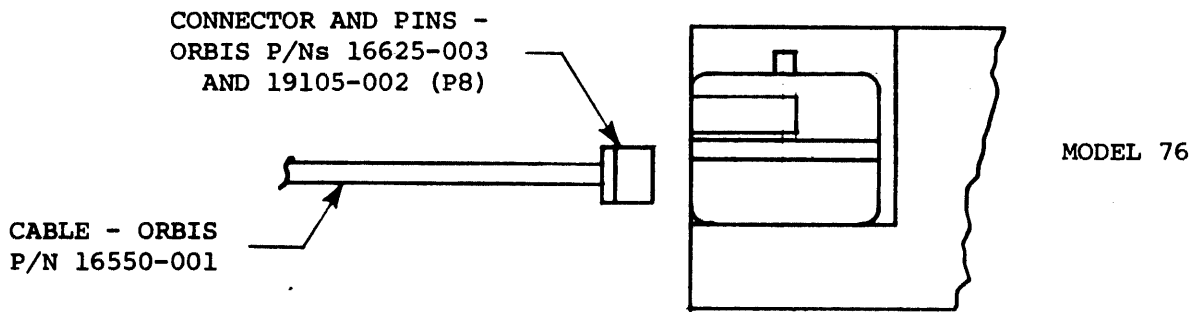
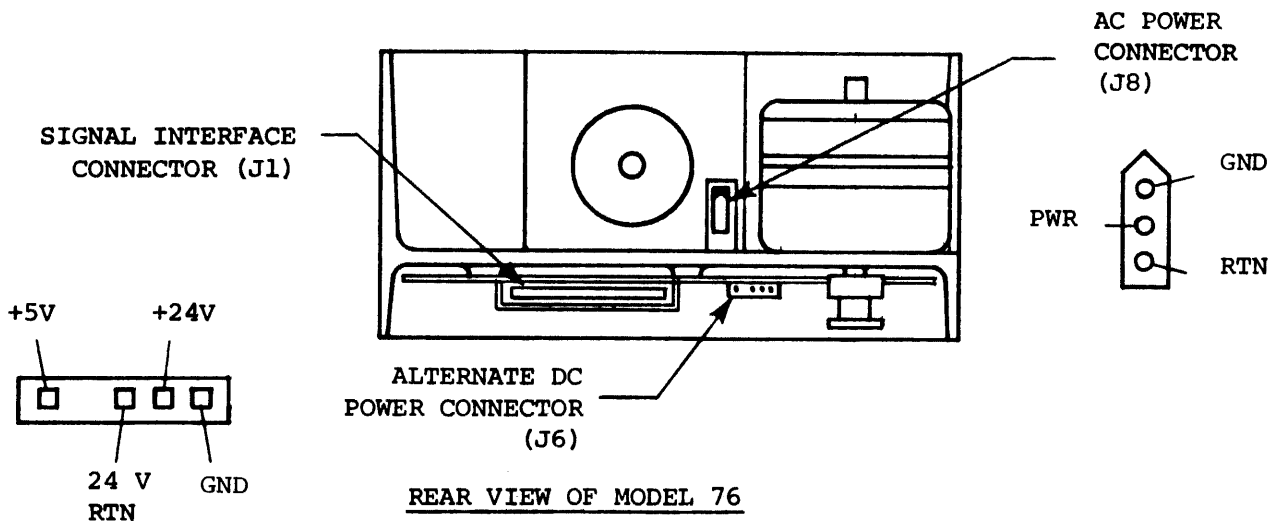
3.4.3 DC POWER CABLE (Alternate)

The dc power cable is an optional item used when for convenience or voltage drop considerations the dc lines in the input/output cable are not used.

3.4.4 ENHANCED INTERFACE CABLE



SIGNAL INTERFACE CONNECTOR



AC POWER CONNECTOR

FIGURE 3-2

CABLE CONNECTIONS

FUNCTION	DISKETTE DRIVE CONNECTOR J1
DRIVE ADDRESS A	1
RETURN	2
KEY	3
KEY	4
-READ DATA	5
RETURN	6
-READY	7
RETURN	8
-SECTOR	9
RETURN	10
-INDEX	11
RETURN	12
-WRITE DATA	13
RETURN	14
RESERVED	15
RETURN	16
-WRITE GATE	17
RETURN	18
-FILE UNSAFE	19
RETURN	20
-WRITE ENABLE (OPTION)	21
RETURN	22
-TRACK 00	23
RETURN	24
-UNSAFE RESET	25
RETURN	26
-LOW CURRENT	27
RETURN	28
-STEP	29
RETURN	30
-IN (DIRECTION)	31
RETURN	32
-LOAD HEAD	33
RETURN	34
-SEP CLOCK	35
RETURN	36
-SEP DATA	37
RETURN	38
DRIVE ADDRESS B	39
RETURN	40
+ 5 VOLTS	41
+ 5 VOLTS	42
RESERVED	43
RESERVED	44
24 VOLT RETURN	45
24 VOLT RETURN	46
24 VOLT RETURN	47
+ 24 VOLTS	48
+ 24 VOLTS	49
+ 24 VOLTS	50

TABLE 3-1
INTERFACE PIN ASSIGNMENTS

3.5 INPUT POWER REQUIREMENTS

The Model 76 requires the following input power supply.

The maximum current consumption with this input voltage is as follows:

Operating current (diskette turning, steady-state):

100/115V	0.80	max (motor start)
	0.35	max (run current)
208/230/240V	0.45	max (motor start)
	0.20	max (run current)

3.6 ENVIRONMENT

Operating and storage environments of the Model 76 are as follows:

Operational	50 to 100° F (12F°/hr maximum fluctuation)
	20 to 80% relative humidity (non-condensing)
Non-operational	-30 to +150° F
	5 to 95% relative humidity (non-condensing) Max. Wet Bulb 80°F

3.7 INITIAL CHECKOUT

This procedure should be used to determine that Model 76 is operational. The procedure assumes that unit is installed and I/O and power cables are connected.

1. Remove top cover.
2. Apply AC power to unit and visually check that spindle rotates.

3. Load the Diskette and apply a Head Load command signal to unit. Check that head load solenoid actuates. (Select proper device address.)
4. Apply Stepping and Out Direction command signals to the unit and check that the actuator steps head as commanded.
5. Remove command signals and AC power from unit and reinstall top cover.

SECTION 4
THEORY OF OPERATION

4.1 GENERAL

The ORBIS Model 76 Diskette Drive is designed as a peripheral device to be attached to or made a part of a host system. Its functional characteristics are the ability to read or write on a standard diskette upon order for track and sector positioning, and to provide output signals as to unit status.

The 76 consists of a Diskette Drive Mechanism, Head Positioning Mechanism, Head Load Actuator and Read/Write Head, Safety Control, Interface and Read/Write electronics (see Block Diagram, Figure 4-1).

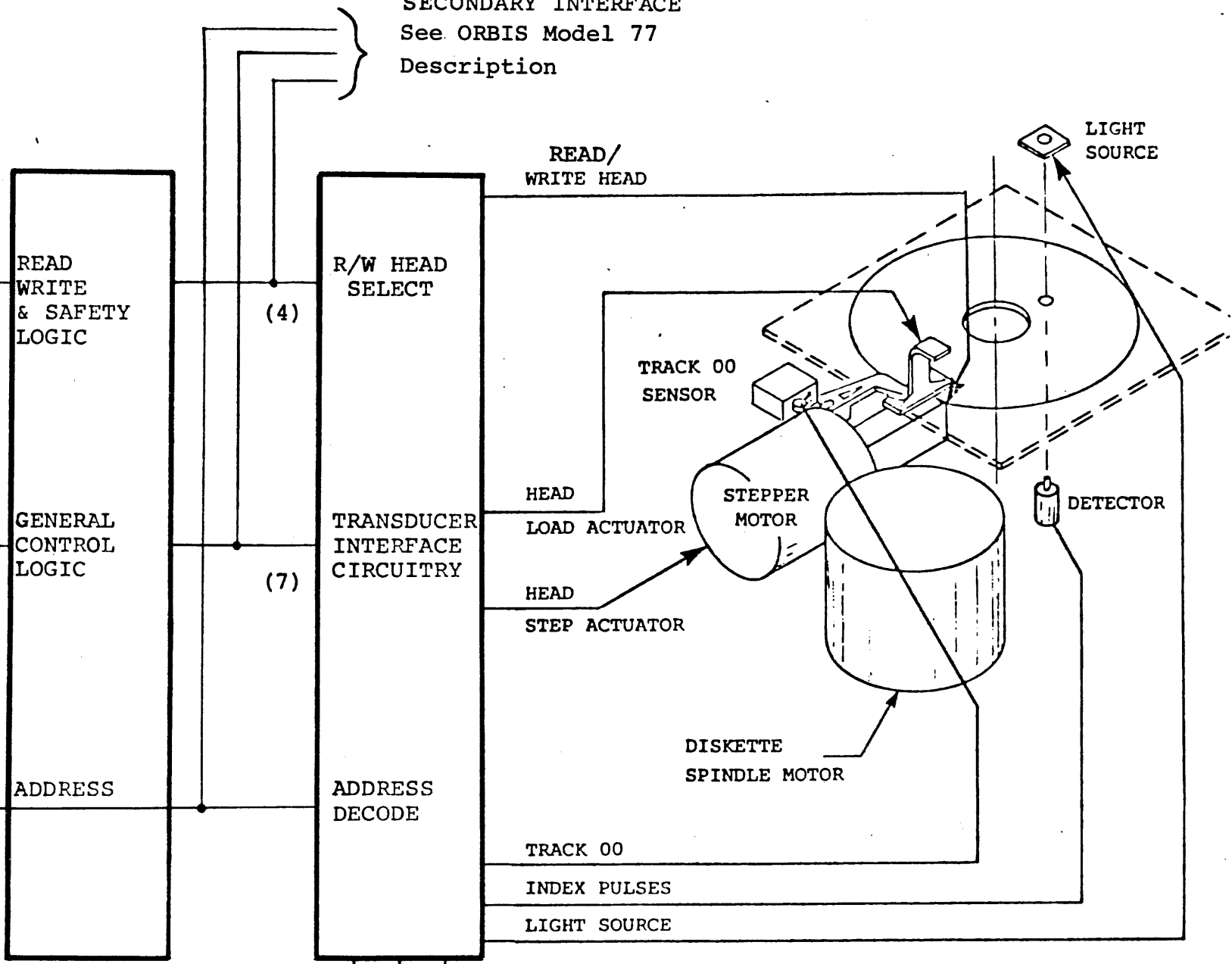
4.1.1 DISKETTE DRIVE MECHANISM

The Diskette Drive motor rotates the storage element spindle at 360 rpm through a belt drive system. A registration hub centered on the face of the spindle positions the diskette. A self-aligning clutch that moves in conjunction with the door fixes the diskette to the registration spindle.

4.1.2 HEAD POSITIONING MECHANISM

An electrical stepping motor and lead screw position the read/write head. The stepping motor rotates the lead screw clockwise or counterclockwise in increments, each increment moves the read/write head one track position. The host system provides the direction of movement and step pulses corresponding the the number of tracks to be traversed.

SECONDARY INTERFACE
 See ORBIS Model 77
 Description



4-2

PRIMARY INTERFACE

FIGURE 4-1
 MODEL 76
 BLOCK DIAGRAM

ENHANCEMENT INTERFACE

4.1.3 HEAD LOAD ACTUATOR

The read/write head is mounted on a carriage which is driven by the track traversing lead screw. The diskette is precisely held in a plane perpendicular to the read/write head by reference surfaces located on the base casting. The diskette is loaded in close proximity to the head with a load pad actuated by the head load solenoid.

4.1.4 SAFETY AND CONTROL ELECTRONICS

The standard electronics are packaged on one Printed Wiring Board. All input and output controls for reading and writing are generated or transmitted through this PWB. There are nine input signals to the 76 including Drive Address, Direction, Step, Write Gate, Write Data, File Unsafe Reset, Load Head*, and Low Current. There are eight output signals from the 76 including Ready*, Index*, Track 00, File Unsafe, Sector, Read Data, Separate Clock, and Separate Data (plus optional Write Enable).

4.1.5 READ/WRITE HEAD

The ORBIS Model 76 head comprises a single write/read gap followed by a tunnel erase structure whose function is to trim the inter track spaces and eliminate signals in those regions. Thus, normal tolerance between media and drives will not degrade the signal-to-noise ratio and diskette interchangeability is insured. The ORBIS 76 read/write head with tunnel erase is designed to insure IBM compatibility. Nevertheless, the user is not restricted to IBM format operation.

* These signals are available on J5 for Enhanced Interface Operation.

4.2 INTERFACE DESCRIPTION (76)

The signal and dc interface used by the Model 76 is of the "bus" or "daisy chain" type and allows an electrical hook-up as shown in Figure 4-2. Only one 76 is logically connected to the interface at any given time.

The maximum length of the daisy chain is twenty feet. *

The sole connector used for the interconnection is a 50-wire ribbon type. This, apart from taking minimum space, also provides the facility of requiring only one connector for each drive on the daisy chain.

Signals across the interface utilize standard TTL levels and are defined as follows:

Active	+0V	to	+0.4V
Inactive	+2.5V	to	+5.5V

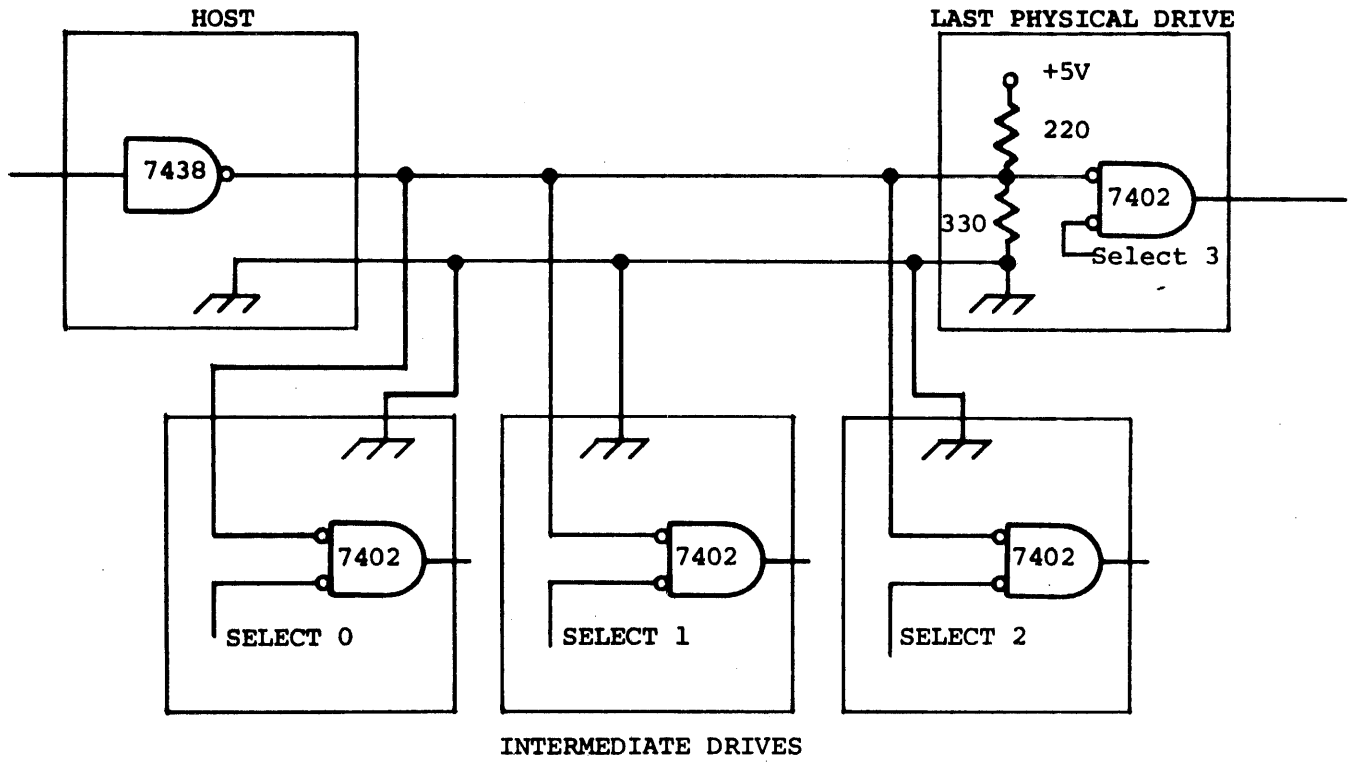
The impedance of the signal lines (130 ohms) should be terminated at the receiving end by the network shown in Figure 4-2. This is achieved in the 76 itself by means of a plug-in terminating network which is inserted only into the drive which is physically connected to the end of the primary interface.

Addressing of the drive is determined by the address switches on the electronics board. This means that a drive's physical position on the interface does not determine its logical address.

Interface lines on the daisy chain are categorized into three types: Input Signals (to the 76), Output Signals (from the 76), and dc power (to the 76).

* When daisy chaining P6 must be used to distribute DC power.

HOST TO MODEL 76 SIGNALS



MODEL 76 TO HOST SIGNALS

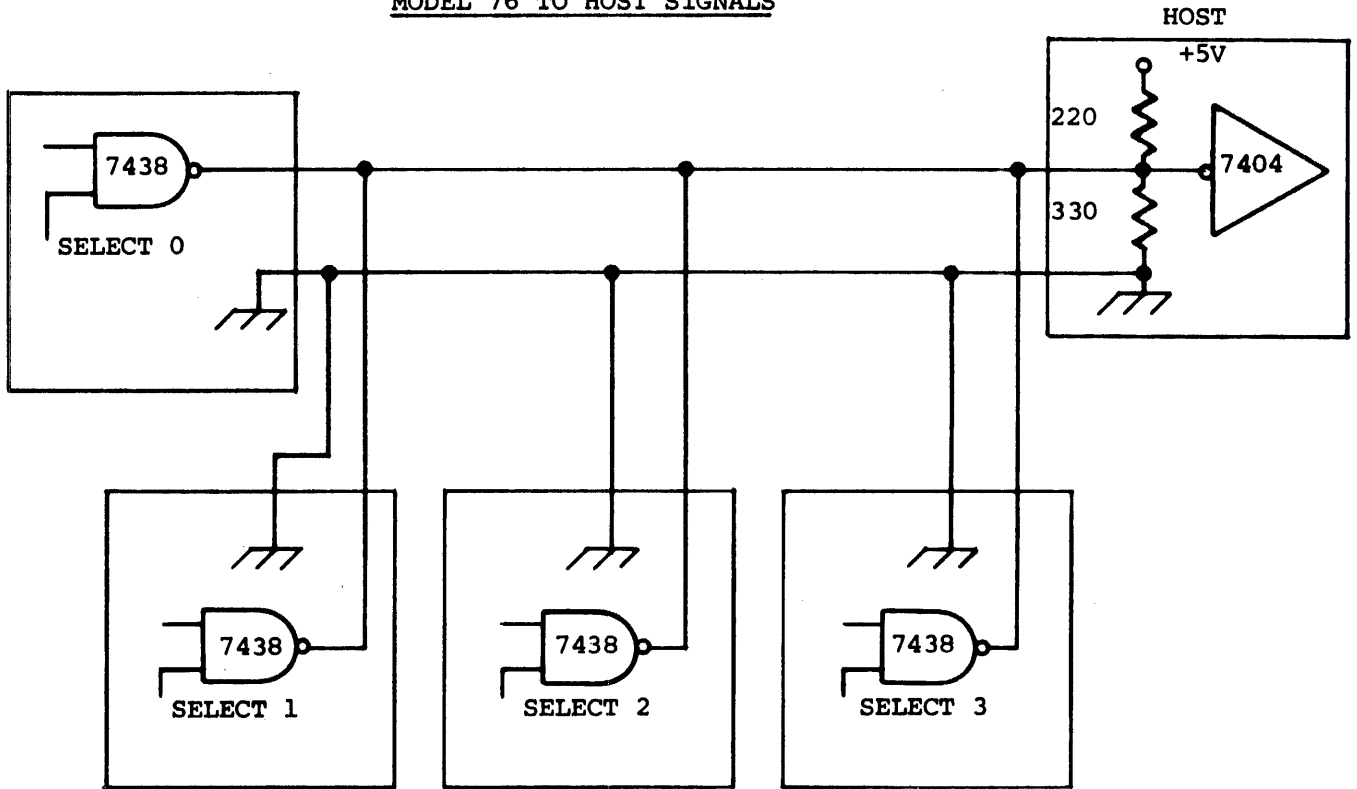


FIGURE 4-2

INTERFACE INTERCONNECT CIRCUIT SCHEME

4.3 SIGNAL AND DATA INTERFACE

4.3.1 INPUT LINES

There are nine low active TTL input lines to the 76:

(2) Drive Addresses, Direction, Step, File Unsafe Reset, Write Gate, Write Data, Low Current and Load Head.

1. Drive Address A (Pin 1), Drive Address B (Pin 39)

These interface lines define one of four drives to be selected for communication across the interface in the following manner. Non-addressed drives are not logically connected to the interface.

A Inactive, B Inactive	=	Drive 0 Selected
A Active, B Inactive	=	Drive 1 Selected
A Inactive, B Active	=	Drive 2 Selected
A Active, B Active	=	Drive 3 Selected

2. Direction (Pin 31)

This interface signal defines the direction of motion of the R/W head when the Step line is pulsed. A low active level on this line causes the Head Position Mechanism to move the Read/Write head towards the center of the disk when the Step line is pulsed. With the Direction line at an inactive level, a pulse on the Step line causes the selected Head Position Mechanism to move the Read/Write head away from the center of the disk.

3. Step (Pin 29)

A low active transition (10 μ S min.) on this line will cause the Read/Write head to be moved one track. The direction of movement is controlled by the Direction line. The state of Direction line is sampled 1 μ S after the leading edge of Step, thus allowing simultaneous transition of Direction and Step lines.

Access timing relationships must conform to Figure 4-3.

4. Load Head (Pin 33)*

A low active level on this line causes the storage element on the selected drive to be placed in close proximity to the Read/Write head for data recording or retrieval. Load Head may be activated at any time after power has been applied; however, this line must be activated at least 30 mS prior to a read* or write operation. During periods of no data transfer this line should be deactivated to provide for maximum storage element and head life.

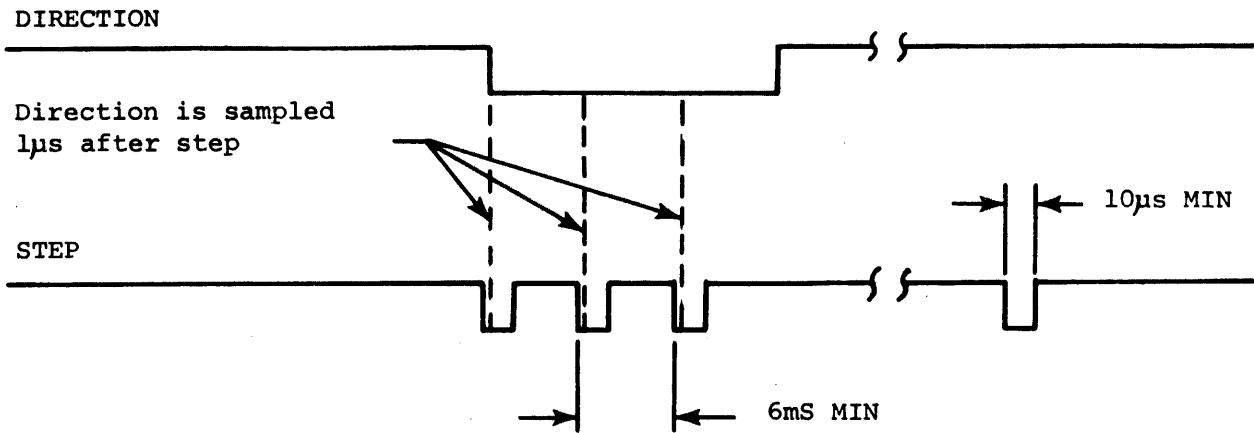
5. File Unsafe Reset (Pin 25)

A low active level (200 nS min.) on this line resets the selected File Unsafe Latch, providing the capability of a write retry operation without the need for operator intervention.

6. Write Gate (Pin 17)

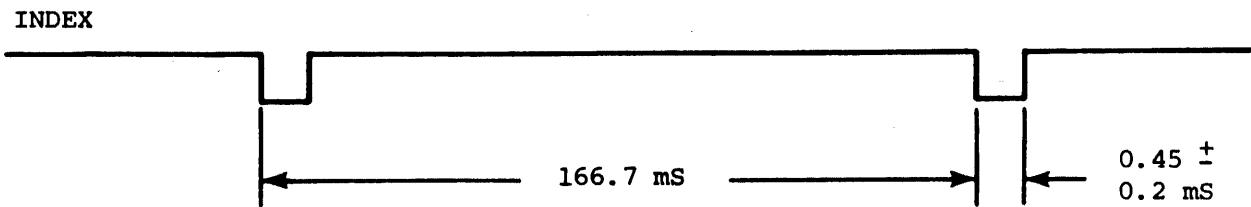
A low active level on this line enables the selected write current source, and gates in write data circuitry. Erase timing is internally generated from the write gate.

* This time may be ignored when reading since the read record continues its own built-in check. This will result in a shorter overall system latency time although transient read error rates will be quite high due to records read whilst the head is in motion.



DIRECTION AND STEP TIMING

FIGURE 4-3



INDEX TIMING

FIGURE 4-4

7. Write Data (Pin 13)

This interface line provides the data to be written on the selected diskette. Each transition to a low active level on this line causes write current through the write coils to be reversed. A 200 nS minimum pulse is required for each flux reversal to be written.

8. Low Current (Pin 27)

A low active level on this line is recommended for writing on Tracks 44 through 76 of the selected diskette. This input is used to lower the write current which consequently improves the output resolution of the inner tracks.

4.3.2 OUTPUT LINES

There are eight output lines from the 76: Index, Track 00, File Unsafe, Read Data, Ready, Sector, Separate Data, and Separate Clock.

1. Index * (Pin 11)

This interface signal is provided by the selected diskette drive once each revolution (166.7mS) to indicate the beginning of the track. This signal makes a transition to a low active level for a period of $.45 \pm .2$ mS. (Refer to Figure 4-4.)

2. Track 00 (Pin 23)

A low active level on this line indicates that the Read/Write head of the selected drive is positioned at track 00. The Track 00 signal will be active (low) after the leading edge of the last step pulse; however, read or write operations should not be initiated until after the head has moved and settled.

3. File Unsafe (Pin 19)

A low active level on this line indicates that a condition which may jeopardize data integrity on the selected drive has occurred. File Unsafe may be reset by activating the File Unsafe Reset line.
(See write Mode for list of File Unsafe Conditions.)

4. Read Data (Pin 5)

Data from the selected drive is output to the host system in the same form as write data from the host system. Each flux reversal sensed on the storage element will result in a transition to a low active level for a 200 nS period on this line.

5. Ready * (Pin 7)

A low active level on this line indicates that a diskette is loaded and rotating in the selected drive and that the front door is closed.

6. Sector * (Pin 9)

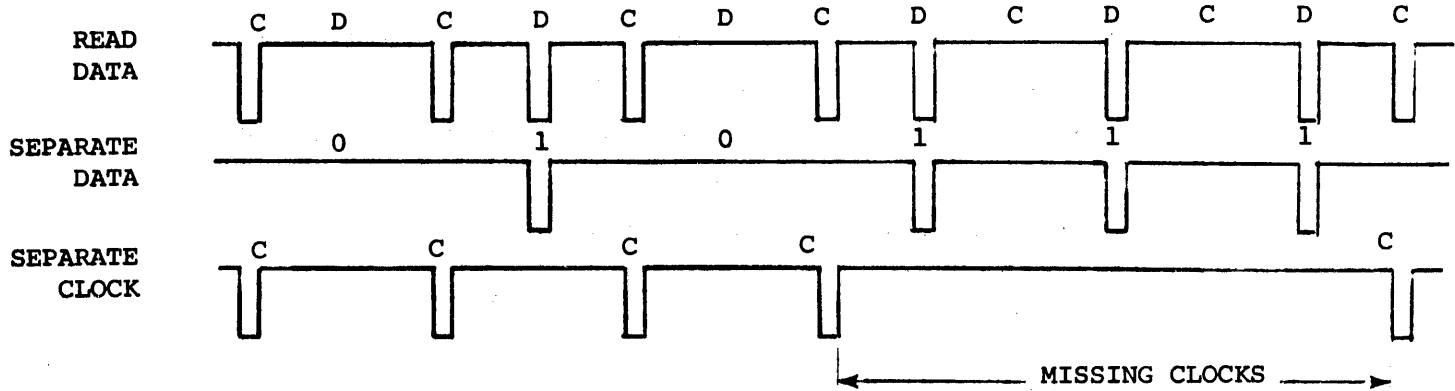
The index and sector are separated for a 33 hole media. Sector pulses are available on Pin 9 and Index on Pin 11. The Sector pulse width is 0.45 ± 0.2 mS.

7. Separate Data, Separate Clock (Pin 37, Pin 35)

This circuit splits the data read from the storage element into two categories: clock information (which appears on P1-35 of the interface cable) and "ones" data (which appears on P1-37 of the interface cable).

- * These signals are also available on J5 continuously to provide for Enhanced Interface Operation. However, in the case of Index and Sector these signals are combined at the output.

The composite read data, as read from the diskette, is decoded and separated into two output lines called Separate Data and Separate Clock, as illustrated below:



The decoder automatically detects the clock pulses from the composite data and logically connects these to the Separate Clock line.

The design of the data separation circuit of the decoder is such that it compensates for any peak shift in the data bits, and outputs the data on the Separate Data line.

Special provision has been made to detect up to three missing clocks used in IBM sync codes. This simplifies the controller design. After pre-amble detection, normally a few bytes of "0", the user's system needs only to detect the missing clocks on the Separate Clock line to sync up.

4.4 POWER INTERFACE

See Section 1.2.7.

4.5 MODES OF OPERATION

The Model 76 operates in five modes. They are:

- Power Up Mode - Sequence after power is applied.
- Seek Mode - Position read/write head to desired track.
- Write Mode - Record data onto storage element.
- Read Mode - Retrieve data from storage element.
- Power Down Mode - Sequence as power goes down.

4.5.1 POWER UP MODE (Refer to Figure 4-5)

Applying AC and DC power to the drive can be done in any sequence; however, once AC power has been applied, a two-second delay must be allowed before any Read or Write operation is attempted. This delay is for stabilization of the diskette rotational speed. When DC power is applied, a 10mS power-on reset automatically resets the electronics and inhibits inadvertant writing or erasing on the diskettes.

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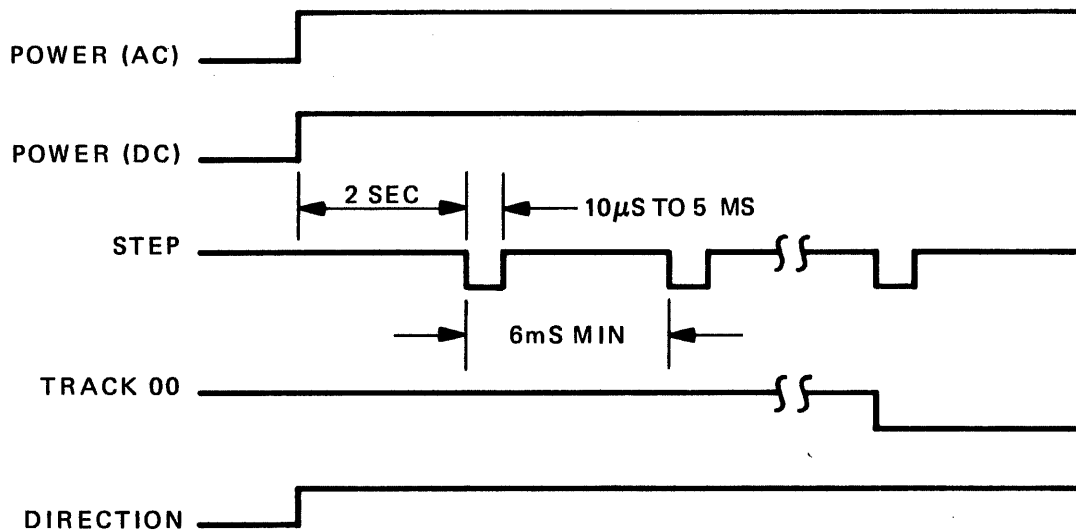


FIGURE 4-5
POWER UP SEQUENCE

Thus, the drive is ready for operation 2 seconds after application of AC power and 10 mS after application of DC power. Also, initial position of the Read/Write head with respect to data tracks is indeterminate immediately after application of DC power. In order to assure proper positioning of the Read/Write head prior to any read/write operation, a step out operation for each drive should be performed until the track 00 indicator becomes active.

4.5.2 SEEK MODE

The Seek Mode positions the Read/Write head to the desired track for recording or retrieving data. Seeking is accomplished by activating the interface Direction line appropriately and pulsing the interface Step line once for each track to be traversed. See Figure 4-3 for track seek timing. Seeking should not take place while writing. Application of a step pulse while write gate is active will cause in the following sequence:

1. Setting of File Unsafe
2. Deactivation of Write Circuitry
3. Step

4.5.3 WRITE MODE

The Write Mode records data on the storage element in the form of flux reversals. Write safety circuits are provided to ensure that hardware failure or operator interference does not cause loss of data. If write safety circuits detect an unsafe condition within the drive, a latch is set, writing is inhibited, and the host system is notified of the unsafe condition by the activation of the interface status line File Unsafe. File Unsafe conditions are defined as follows:

1. Write Gate and No Write Data
2. Write Gate and No Write Enable (where fitted)
3. Write Gate and Step
4. Write Gate and Head Not Loaded

Time delays are used to prevent setting of File Unsafe for the normal timing relationship of the above signals. In order to record data onto the storage element, certain timing relationships must be assured. These relationships are required to avoid erasure of data due to hardware failure, head position not stabilized, or improper write current (see Figure 4-6). Erase Timing is shown in Figure 4-7.

4.5.4 READ MODE

The Read Mode retrieves data previously recorded on the storage element. This is accomplished by the read winding sensing flux reversals on the diskette. The Read Mode is entered if a diskette is present and the door is closed and by deactivating the Write Gate line. In the Read Mode it is desirable but not necessary that the head has stabilized on track before reading takes place. This is not, however, a mandatory requirement as is the case in Write.

4.5.5 POWER DOWN MODE

During DC Power Down, when +5 Volts drops below $+3.7 \pm .5V$, all write circuitry is deactivated to prevent inadvertant writing or erasing on the diskette.

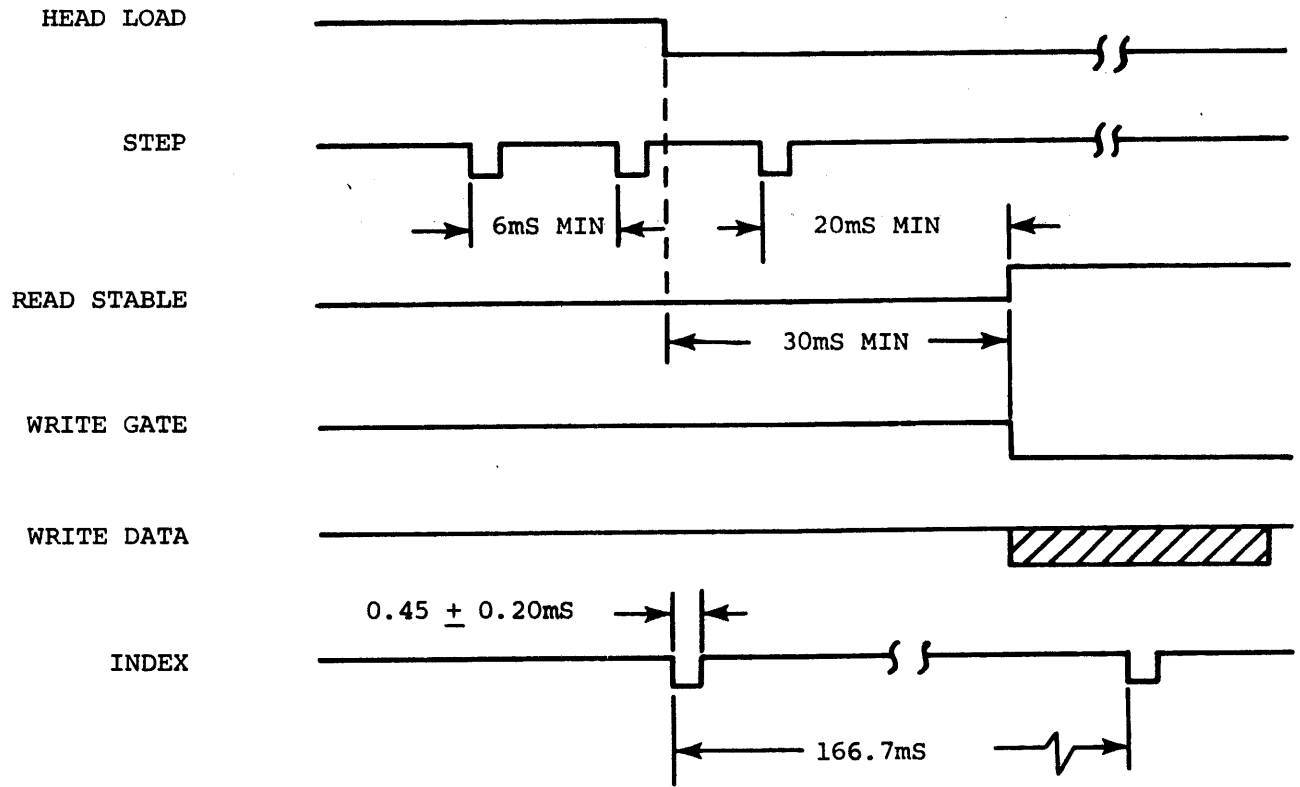


FIGURE 4-6

READ/WRITE SEQUENCE

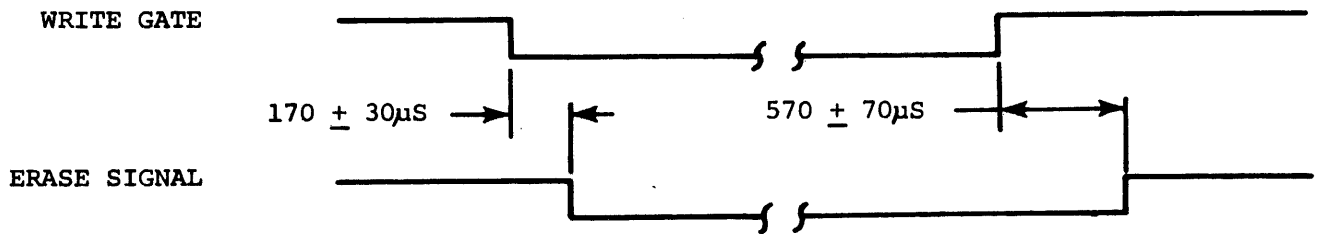
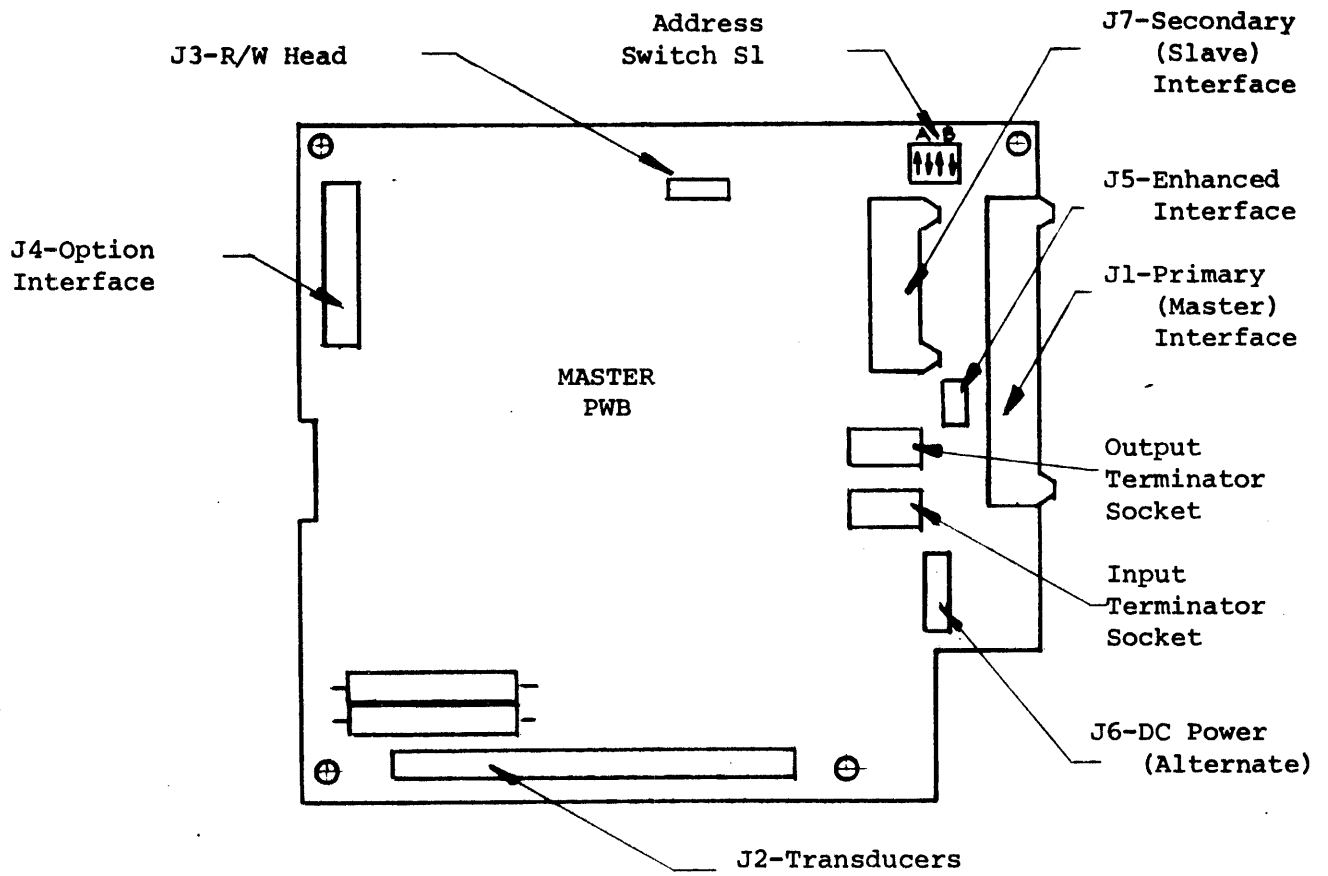


FIGURE 4-7

ERASE TIMING

4.6 PWB DETAILS

The locations of the various interface connectors and the drive address selection switch, with its setup procedure, are shown in Figure 4-8.



SWITCH S1

Address		Switch Positions	
Line A	Line B	A	B
0	0	↑ ↓	↑ ↓
0	1	↑ ↓	↓ ↑
1	0	↓ ↑	↑ ↓
1	1	↓ ↑	↓ ↑

DRIVE ADDRESS SELECTION

FIGURE 4-8

PWB CONNECTORS DETAIL AND ADDRESS SWITCH SETUP CHART

SECTION 5
TYPICAL DIAGRAMS

5.1 INTRODUCTION

This section contains detailed schematic diagrams which describe the logic circuits of the Model 76.

Since there may be detailed differences between the logic appearing in this book and that actually implemented in a given machine these diagrams should not be used for faultfinding purposes. A set of diagrams for this purpose are shipped with each machine upon request.

The terms Master and Slave only have significance when configurations involving both the Model 76 and Model 77 are considered. See Model 77 Diskette Drive information.

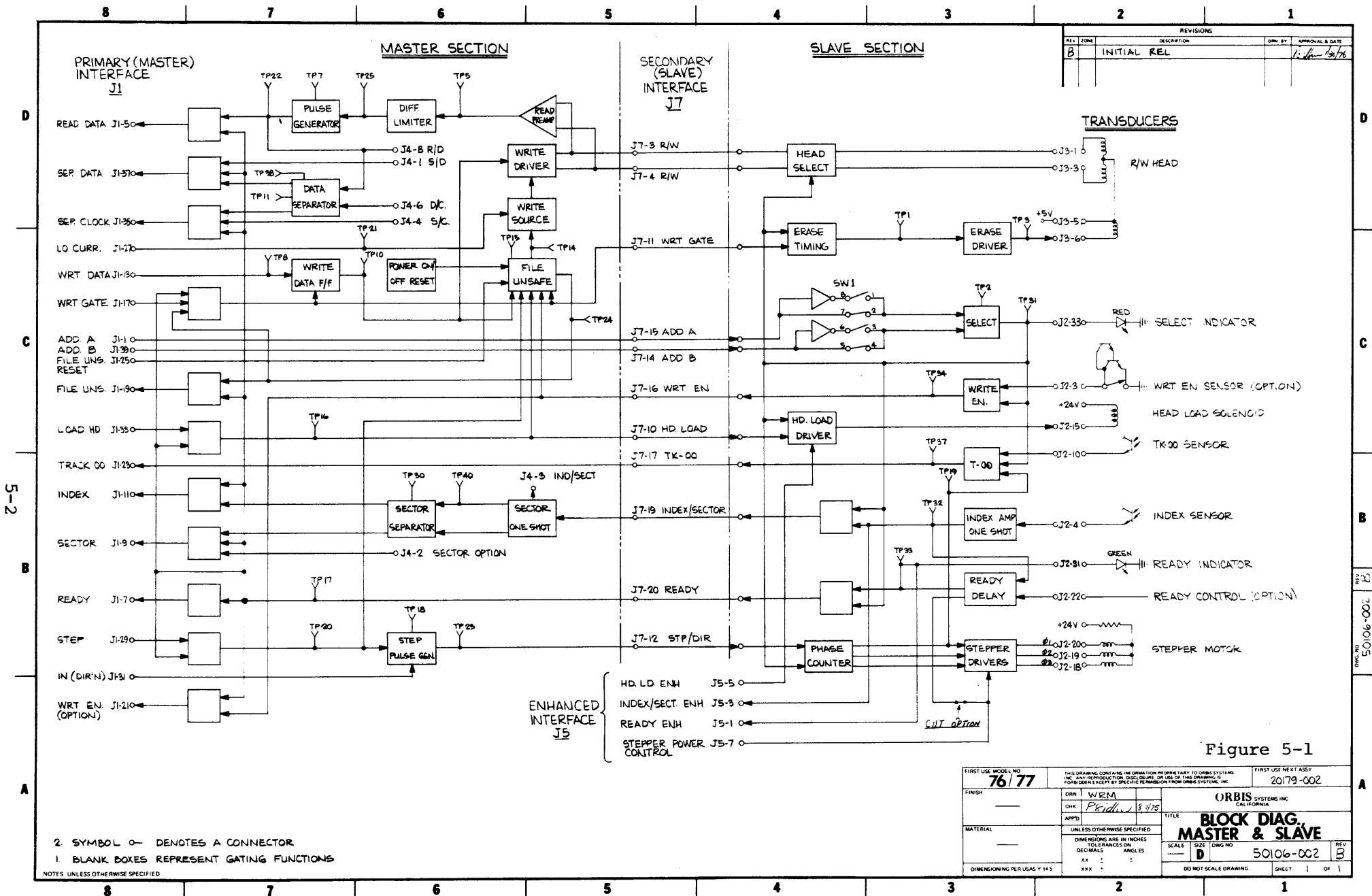


Figure 5-1

FIRST USE MODEL NO 76177	THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO ORBIS SYSTEMS INC. ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS STRICTLY FORNIDDEN EXCEPT BY SPECIFIC PERMISSION FROM ORBIS SYSTEMS INC.	FIRST USE NEXT ASSY 20179-002
DRW WRM	CHK <i>Priddy</i> 3/1/75	APPRD
MATERIAL		TITLE ORBIS SYSTEMS INC CALIFORNIA BLOCK DIAG. MASTER & SLAVE
UNLESS OTHERWISE SPECIFIED		SCALE SIZE D
DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS ANGLES		SCALE SIZE D 50106-002
DIMENSIONING PER USAS 714.5		DO NOT SCALE DRAWING
SHEET 1 OF 1		REV B

8 7 6 5 4 3 2 1

REV. ZONE		REVISIONS		DRN. BY	APPROVAL & DATE
B		INITIAL RELEASE		WPA	1/24/74

PRIMARY (MASTER) INTERFACE J1

PIN NO.	SIGNAL NAME
1	ADDRESS A (ADD A)
2	RETURN
3	KEY
4	KEY
5	READ DATA
6	RETURN
7	READY
8	RETURN
9	SECTOR
10	RETURN
11	INDEX
12	RETURN
13	WRITE DATA
14	RETURN
15	RESERVED ---
16	RETURN
17	WRITE GATE
18	RETURN
19	FILE UNSAFE
20	RETURN
21	WRITE ENABLE (OPT.)
22	RETURN
23	TRACK 00
24	RETURN
25	UNSAFE RESET
26	RETURN
27	LOW CURRENT
28	RETURN
29	STEP
30	RETURN
31	IN (DIRECTION)
32	RETURN
33	LOAD HEAD
34	RETURN
35	SEP CLK
36	RETURN
37	SEP DATA
38	RETURN
39	ADDRESS B (ADD B)
40	RETURN
41	+5 V
42	+5 V
43	RESERVED ---
44	RESERVED ---
45	24 V RET
46	24 V RET
47	24 V RET
48	+24 V
49	+24 V
50	+24 V

TRANSDUCER CONNECTOR J2

PIN NO.	SIGNAL NAME
1	WRT EN LED
2	0 V
3	WRT EN SENSOR
4	INDEX SENSOR
5	+5 V (INDEX SENSOR)
6	+5 V (TK 00 SENSOR)
7	+5 V (INDEX LAMP)
8	INDEX LAMP
9	SPARE ---
10	TK-00 SENSOR
11	TK-00 LAMP
12	SPARE ---
13	KEY
14	+24 V (HD LD SOL)
15	HD LD SOL
16	COM (STEPPER)
17	KEY
18	Φ3 (STEPPER)
19	Φ2 (STEPPER)
20	Φ1 (STEPPER)
21	SPARE ---
22	READY CONTROL (OPTION)
23	0 V
24	KEY
25	+24 V
26	0 V
27	+5 V
28	TRACK 76 SWITCH (OPTION)
29	TRACK 76 CONTROL
30	KEY
31	LED GREEN
32	READY INDICATOR
33	LED RED
34	SELECT INDICATOR

OPTION PWB INTERFACE J4 (MASTER)

PIN NO.	SIGNAL NAME
1	SEP DATA (S/D)
2	SECTOR OPTION
3	IND/SECT
4	SEP CLK (S/C)
5	KEY
6	DATA SEP CTRL (D/C)
7	0 V
8	READ DATA (R/D)
9	+24 V
10	+5 V

ENHANCED INTERFACE J5

PIN NO.	SIGNAL NAME
1	READY ENH
2	RETURN
3	INDEX/SECT ENH
4	RETURN
5	HD LD ENH
6	RETURN
7	STEPPER POWER CONTROL
8	KEY
9	SPARE ---
10	SPARE ---

ALTERNATE DC POWER CONNECTOR J6

PIN NO.	SIGNAL NAME
1	+5 V
2	KEY
3	24 V RET
4	+24 V
5	0 V

SECONDARY (SLAVE) INTERFACE J7

PIN NO.	SIGNAL NAME
1	0 V
2	+5 V (HEAD COMMON)
3	R/W 2
4	R/W 1
5	+5 V (HEAD COMMON)
6	KEY
7	SPARE ---
8	SPARE ---
9	SPARE ---
10	HEAD LOAD (HD LOAD)
11	WRITE GATE
12	STP/DIR
13	0 V
14	ADDRESS B (ADD B)
15	ADDRESS A (ADD A)
16	WRT EN
17	TRACK 00 (TK-00)
18	0 V
19	INDEX/SECTOR
20	READY

R/W HEAD CONNECTOR J3

PIN NO.	SIGNAL NAME
1	R/W 1 (WHITE/START)
2	SHIELD
3	R/W 2 (BLACK/FINISH)
4	KEY
5	COMMON (GREEN)
6	ERASE (RED)

TEST POINTS

TP NO.	FUNCTION	DWG NO.
1	ERASE TIMING	50105
2	SELECT	50103
3	ERASE DRIVER OUTPUT	50103
4	R/W HEAD COMMON	50103
5	READ PREAMP OUTPUT	50104
6	SPARE ---	---
7	READ LIMITER OUTPUT	50104
8	WRITE DATA	50104
9	WRITE GATE	50104
10	WRITE DATA F/F	50104
11	DATA SEPARATOR O/S	50104
12	SPARE ---	---
13	SPARE ---	---
14	WRITE CURRENT ENABLE	50104
15	FILE UNSAFE CONDITIONS	50104
16	LOAD HEAD	50104
17	READY	50104
18	STEP OUT PULSE	50104
19	STEP COUNTER Φ1	50103
20	STEP	50104
21	LOW CURRENT GATE	50104
22	READ DATA	50104
23	STP/DIR PULSE	50103
24	FILE UNSAFE LATCH	50104
25	READ DIFFERENTIATOR OUTPUT	50104
26	MISSING INDEX DETECTION O/S	50103
27	SPARE ---	---
28	INDEX COUNT O/S	50103
29	STEPPER POWER CONTROL	50103
30	IND/SECT	50104
31	SELECT	50103
32	INDEX/SECTOR PULSE (SLAVE)	50103
33	READY ENH	50103
34	WRITE ENABLE	50103
35	INDEX/SECTOR ENABLE	50103
36	CLOCK/DATA PHASE RESET	50104
37	TRACK 00 SENSOR	50103
38	SEP DATA ENABLE	50104
39	INDEX SENSOR	50103
40	SECTOR SEPARATOR O/S	50104
0	LOGIC 0 V	50103

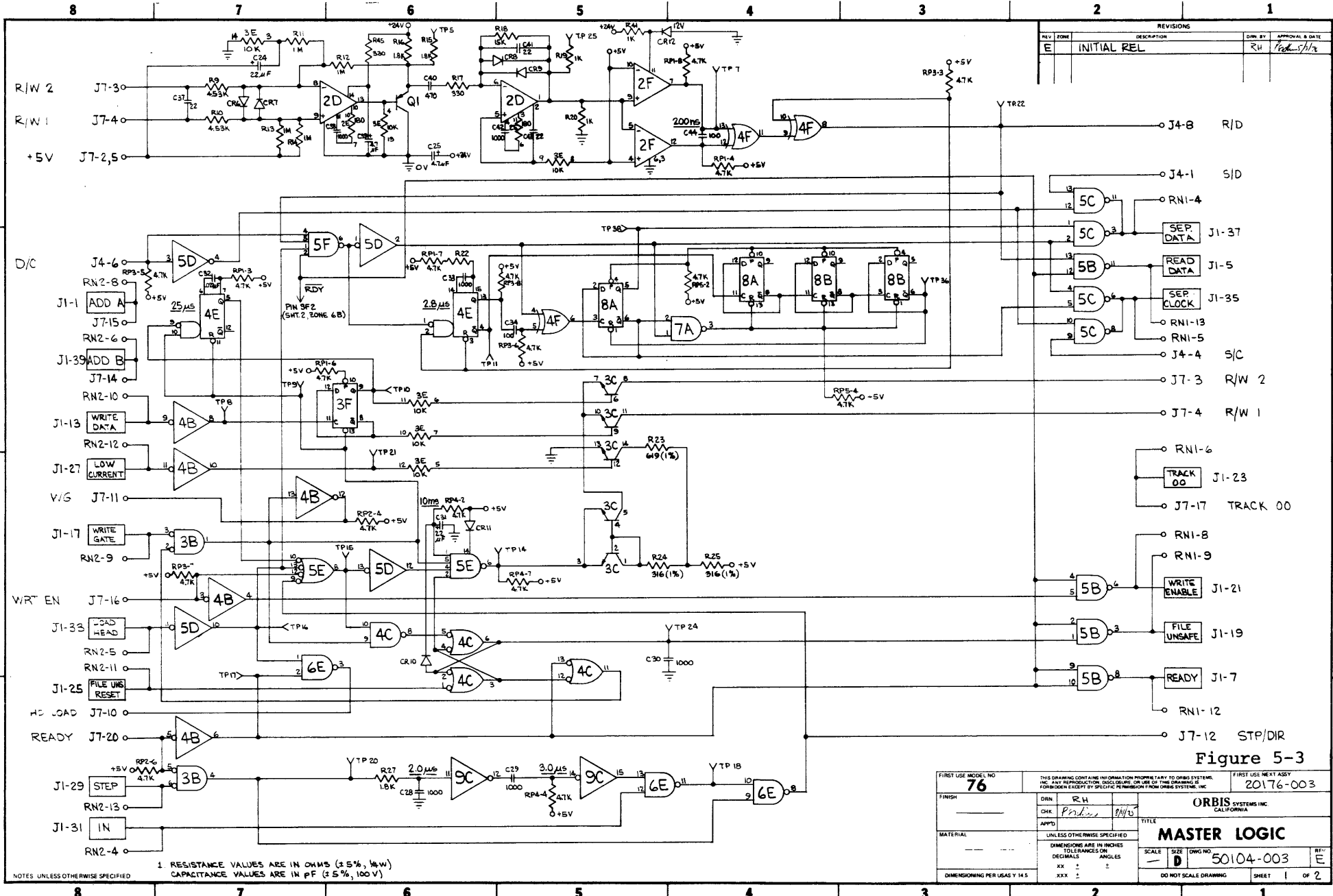
Figure 5-2

1 ALL "RETURN" LINE ARE CONNECTED TO 0 V ON THE PWB.
NOTES UNLESS OTHERWISE SPECIFIED

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FINISH	DRN MR MILLEZ B/H/75	ORBIT SYSTEMS INC. CALIFORNIA
MATERIAL	CHK	TITLE PWB INTERFACE MASTER & SLAVE
UNLESS OTHERWISE SPECIFIED	APPD	SCALE D DWG NO 50107-002 REV 3
DIMENSIONS ARE IN INCHES	TOLERANCES ON DECIMALS ANGLES	DO NOT SCALE DRAWING SHEET 1 OF 1
XX : : XXX : :		

8 7 6 5 4 3 2 1

REV 3
50107-002



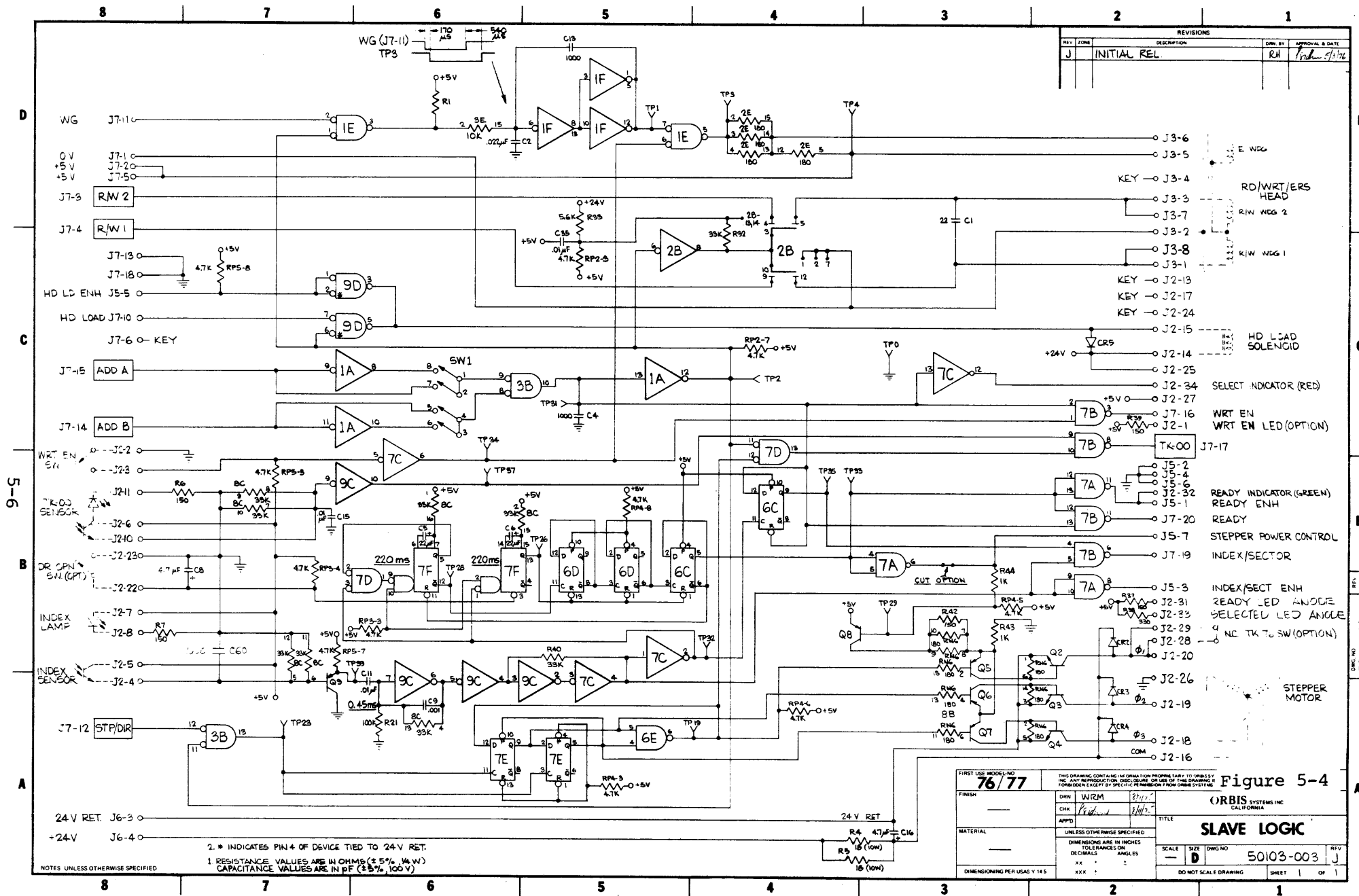
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REV	ZONE	DESCRIPTION	APP'D BY
E		INITIAL REL	RH

Figure 5-3

FIRST USE MODEL NO 76	THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO ORBIS SYSTEMS, INC. ANY REPRODUCTION, DISCLOSURE, OR USE OF THIS DRAWING IS FORBIDDEN EXCEPT BY SPECIFIC PERMISSION FROM ORBIS SYSTEMS, INC.	FIRST USE NEXT ASSY 20176-003
FINISH	DRN RH	DATE 8/1/75
MATERIAL	CHK Pro...	APP'D
UNLESS OTHERWISE SPECIFIED		TITLE MASTER LOGIC
DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS ANGLES		SCALE D
DIMENSIONING PER USAS Y 14.5		DWG NO 50104-003
		REV E
		DO NOT SCALE DRAWING
		SHEET 1 OF 2

1 RESISTANCE VALUES ARE IN OHMS (±5%, 1/4W)
CAPACITANCE VALUES ARE IN pF (±5%, 100V)

NOTES: UNLESS OTHERWISE SPECIFIED



REV. ZONE		REVISIONS		DRN BY	APPROVAL & DATE
B		INITIAL REL.		WJRM	1/26/77

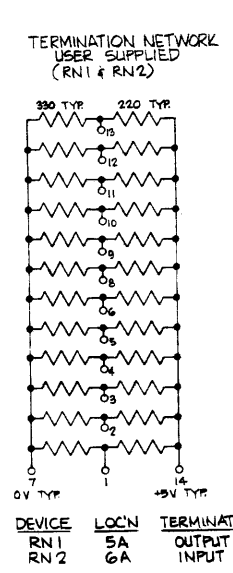
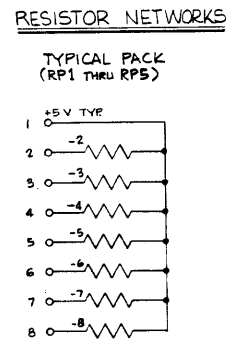
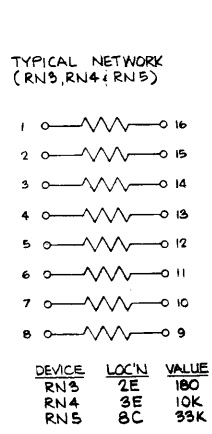
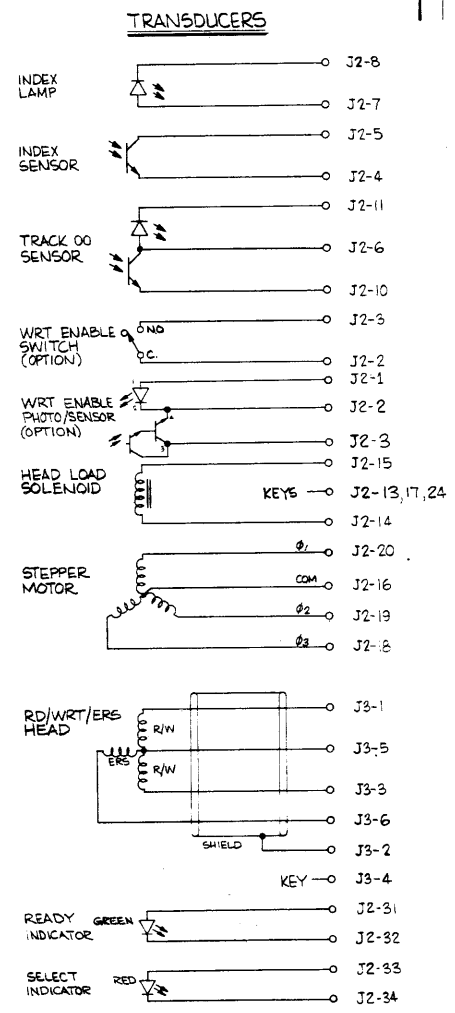
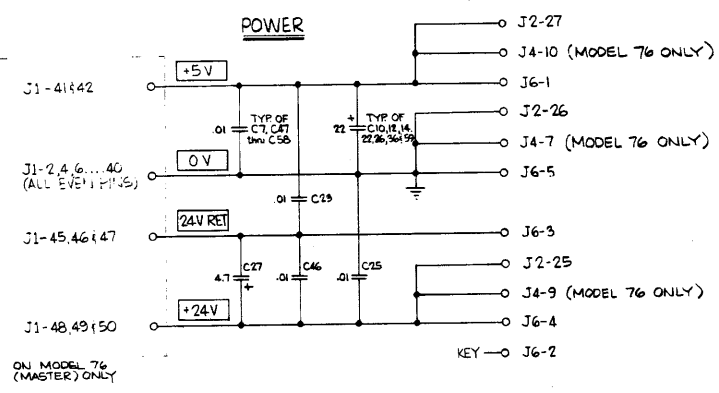


Figure 5-5

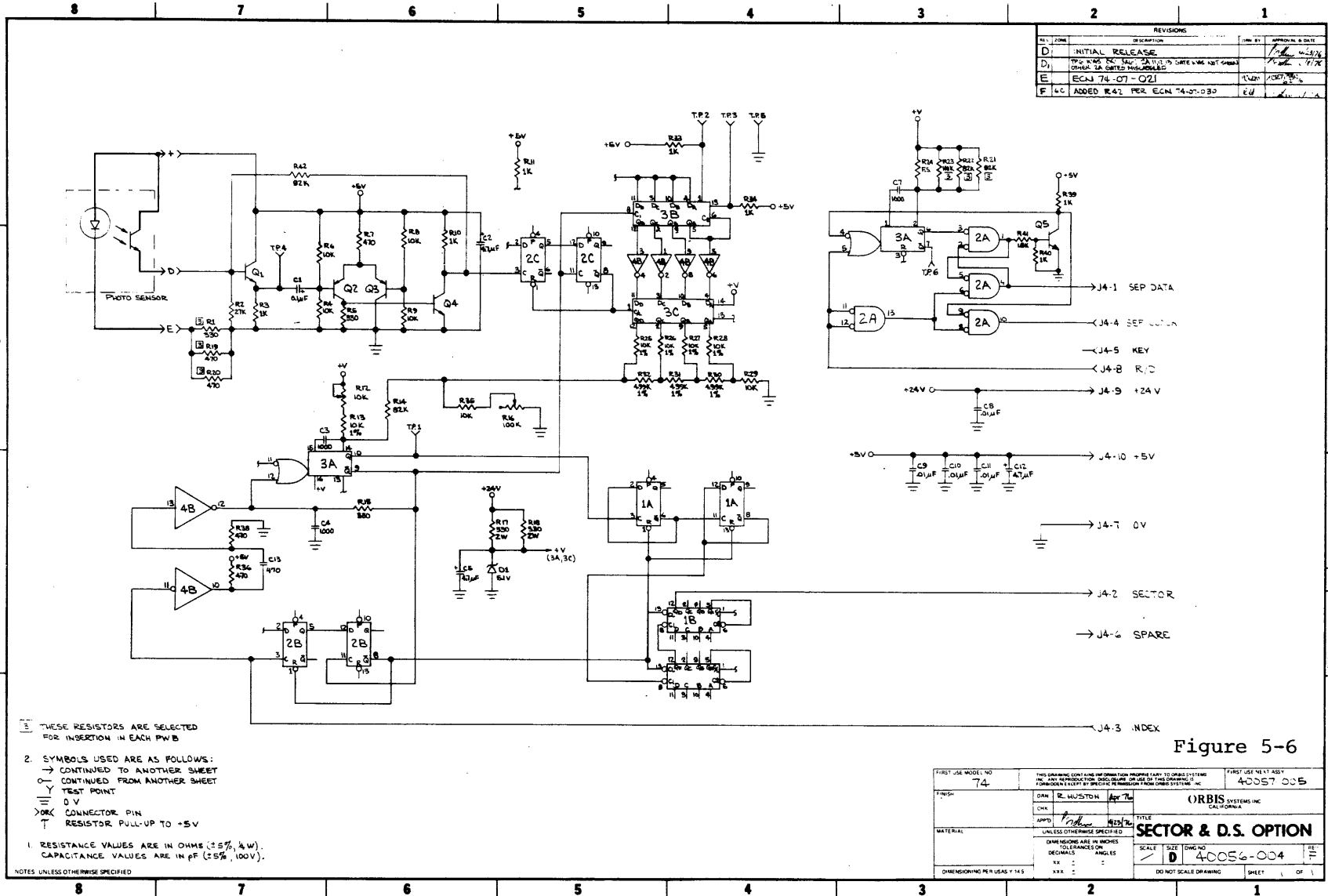
FIRST USE MODEL NO 76/77	THIS DRAWING CONTAINS THE INFORMATION PROPRIETARY TO ORBIS SYSTEMS, INC. ANY REPRODUCTION, DISSEMINATION, OR USE OF THIS DRAWING IS FORBIDDEN EXCEPT BY SPECIFIC PERMISSION FROM ORBIS SYSTEMS, INC.	FIRST USE REV'T ASSY 20176-002
DRN WJRM	CHK R. S. / 1/25	TITLE POWER & TRANSDUCERS
MATERIAL		SCALE D
DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS ANGLES XX : : XXX : :		DRW NO 50105-002
DIMENSIONING PER ASAS Y 14.5		SHEET 1 OF 1

1. RESISTANCE VALUES ARE IN OHMS ($\pm 10\%$)
CAPACITANCE VALUES ARE IN μF ($\pm 20\%$)
NOTES UNLESS OTHERWISE SPECIFIED

5-7

REV. 50105-002 B

5-8



REVISIONS		
REV. NO.	DESCRIPTION	DATE
D	INITIAL RELEASE	10/24/74
D1	TP2 WAS INC. W/ 2A1.1 IN SHRT. W/ 1K. NOT CHANG.	11/27/74
E	CHG. 74-07 - Q21	12/10/74
F	6C ADDED. R41 PER. EGN. 74-07-03D	1/21/75

1 THESE RESISTORS ARE SELECTED FOR INSERTION IN EACH PWB

2. SYMBOLS USED ARE AS FOLLOWS:
- CONTINUED TO ANOTHER SHEET
 - CONTINUED FROM ANOTHER SHEET
 - Y TEST POINT
 - D V
 - >K CONNECTOR PIN
 - T RESISTOR PULL-UP TO +5V

1. RESISTANCE VALUES ARE IN OHMS (±5%, 1/4W). CAPACITANCE VALUES ARE IN pF (±5%, 100V).

NOTES UNLESS OTHERWISE SPECIFIED

Figure 5-6

FIRST USE MODEL NO 74	THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO ORBIS SYSTEMS INC. ANY REPRODUCTION, DISSEMINATION OR USE OF THIS DRAWING IS PROHIBITED EXCEPT BY SPECIFIC PERMISSION FROM ORBIS SYSTEMS INC.	FIRST USE NEXT ASSY 40057 005
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DIMENSIONING PER LEAS 7-14.5	DO NOT SCALE DRAWING	SHEET 1 OF 1

REV. 40056-004

SECTION 6
MAINTENANCE

6.1 GENERAL

This section contains the instructions required to maintain the Diskette Drive. The information is provided in the form of routine maintenance, corrective maintenance, and troubleshooting.

6.2 MAINTENANCE TOOLS AND MATERIALS

The special tools required to maintain a Diskette Drive are listed below:

<u>TOOL</u>	<u>ORBIS PART NUMBER</u>
CE Alignment Diskette	20121-001
Key Set	13652-001
Screw Driver	13650-101
Screw Driver	13651-101
Diskette Carrier Alignment Gauge	30168-001
Track 00 Stop Alignment Gauge	30169-001
Head Load Arm Adjustment Gauge	30171-001
Armature Adjusting Gauge	30172-001

The materials used in the procedures of this section are listed below:

<u>MATERIAL</u>	<u>ORBIS PART NUMBER</u>
Gauze, Lint-free	13900-001
Head Cleaning Solution	14050-001

6.3 MAINTENANCE PROCEDURES

Under normal circumstances preventative maintenance is not required on the Drive. If severely dirty environments are encountered an occasional cleaning of the drive may be performed to assure continued reliable performance.

If a drive malfunctions it is recommended that it be inspected and cleaned as described below.

Visual inspection is the first step in any maintenance operation. Always look for corrosion, dirt, wear, binds, and loose connections. Noticing these items may save downtime later.

Inspection and maintenance operations are listed in Table 6-1 below. During normal maintenance, perform only those operations listed on the chart. Details on adjustments and service checks are found in Section 6.4. Observe all safety procedures.

Cleanliness cannot be overemphasized in maintenance of the Diskette Drive. Do not lubricate the drive except as noted in the carriage assembly procedure. Oil will allow dust and dirt to accumulate. The read/write head should be cleaned but only when signs of oxide build up are present.

The parts referenced in the various procedures are illustrated in Figures 6-1, 6-2, 6-3, and 6-4.

<u>UNIT</u>	<u>OBSERVE</u>	<u>CLEANING PROCEDURE</u>
Read/Write Head	Oxide build up and scratches	Clean Read/Write Head <u>ONLY IF NECESSARY</u>
Stepper Motor Shaft and Carriage	Inspect for nicks and burrs	Clean off all dust, dirt, and <u>excess</u> lubricant
Belt	Frayed or weakened areas	
Main Frame	Inspect for loose screws, connectors, switches, etc.	Clean Main Frame
Read/Write Head	Check for proper alignment	

TABLE 6-1

INSPECTION AND MAINTENANCE PROCEDURES

6.3.1 INSPECT AND CLEAN READ/WRITE/ERASE HEAD (Figure 6-1)

1. Remove ac power and let the motor come to a stop.
2. Remove top cover.

NOTE

Use a suitably bright and directional light during the following steps.

3. Inspect head as follows (carriage must be fully retracted to Track 00):

CAUTION

Do not smoke while inspecting. Use extreme care not to damage head.

4. Inspect face of head for reddish-brown oxide deposits. Clean head only if deposits exist (see step 5.).
5. Clean heads (only if required) as follows:

CAUTION

Do not smoke while cleaning. Do not touch the head face with fingers. Do not leave residue or lint on the head face. Trapped residual particles can result in the loss of a head and/or a scored Diskette.

- a. If oxide deposits are found, use lint-free gauze to lightly drybuff head face. Cleaning is completed if deposits are removed.
- b. Dampen (do not soak) gauze with head cleaning solution and wipe head face if oxide deposits were not removed in step a. Use dry gauze to lightly buff head face if deposits are now removed.

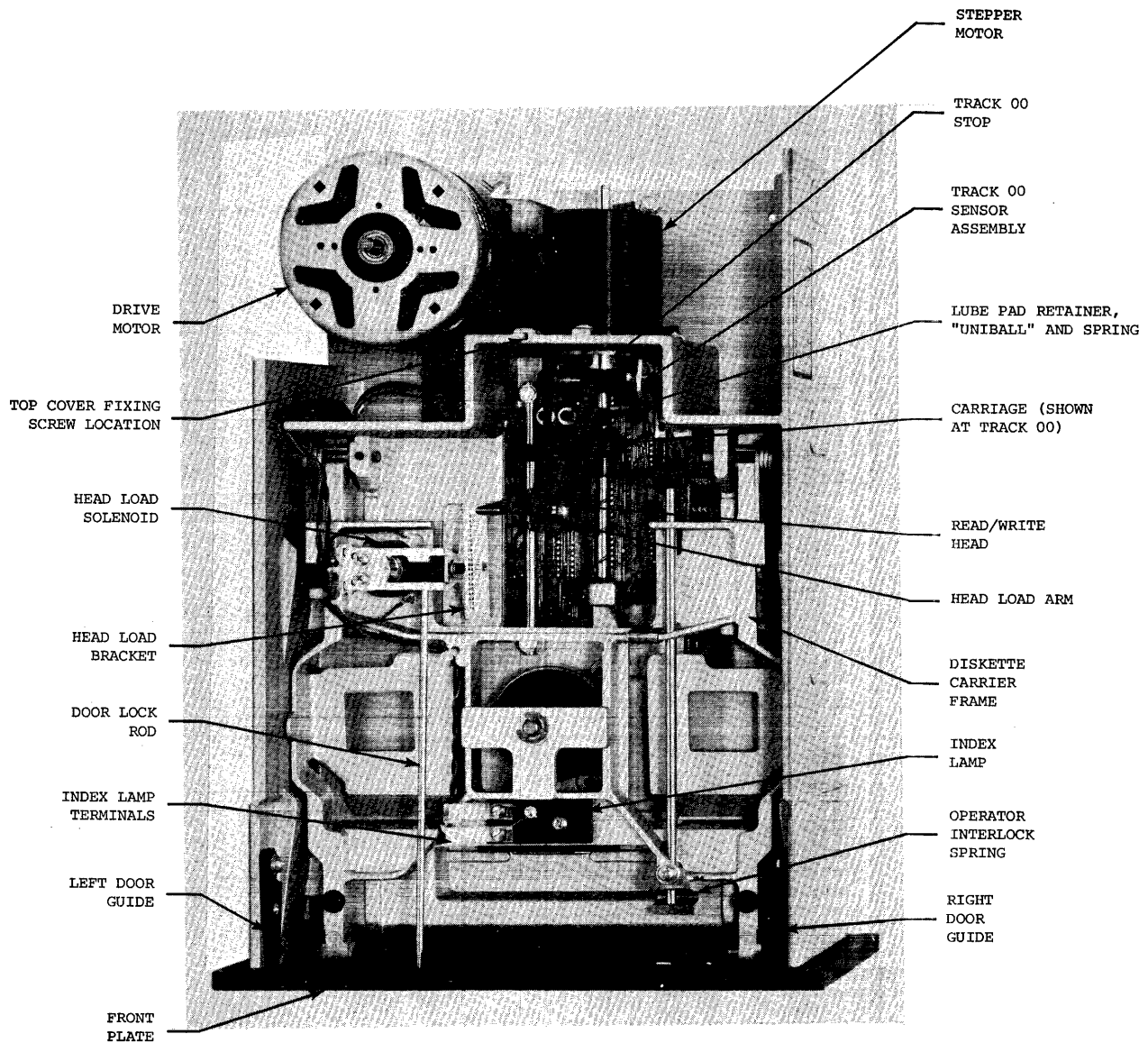


Figure 6-1. Model 76 Diskette Drive with Top Cover Removed

- c. Install a new head carriage assembly if oxide deposits still exist.

6.4 ADJUSTMENTS, DISASSEMBLY AND ASSEMBLY

CAUTION

Ensure the ac and dc power has been disconnected before attempting any service procedure.

6.4.1 MOTOR DRIVE (Figures 6-1, 6-2, and 6-3)

1. Drive motor assembly: Removal and installation
 - a. Remove ac connector from mounting bracket.
 - b. Remove screw holding grounding lug to main frame.
 - c. Remove belt from drive and motor pulleys.
 - d. Remove fasteners holding the motor to the base casting and remove motor.
 - e. Reverse the procedure for installation.

NOTE

Insure ground lead is re-installed correctly.

2. Motor drive pulley
 - a. Loosen set screw and remove pulley.
 - b. Reverse procedure for installation.

NOTE

When installing a new pulley, the drive pulley must be aligned with the spindle pulley so that the belt tracks correctly.

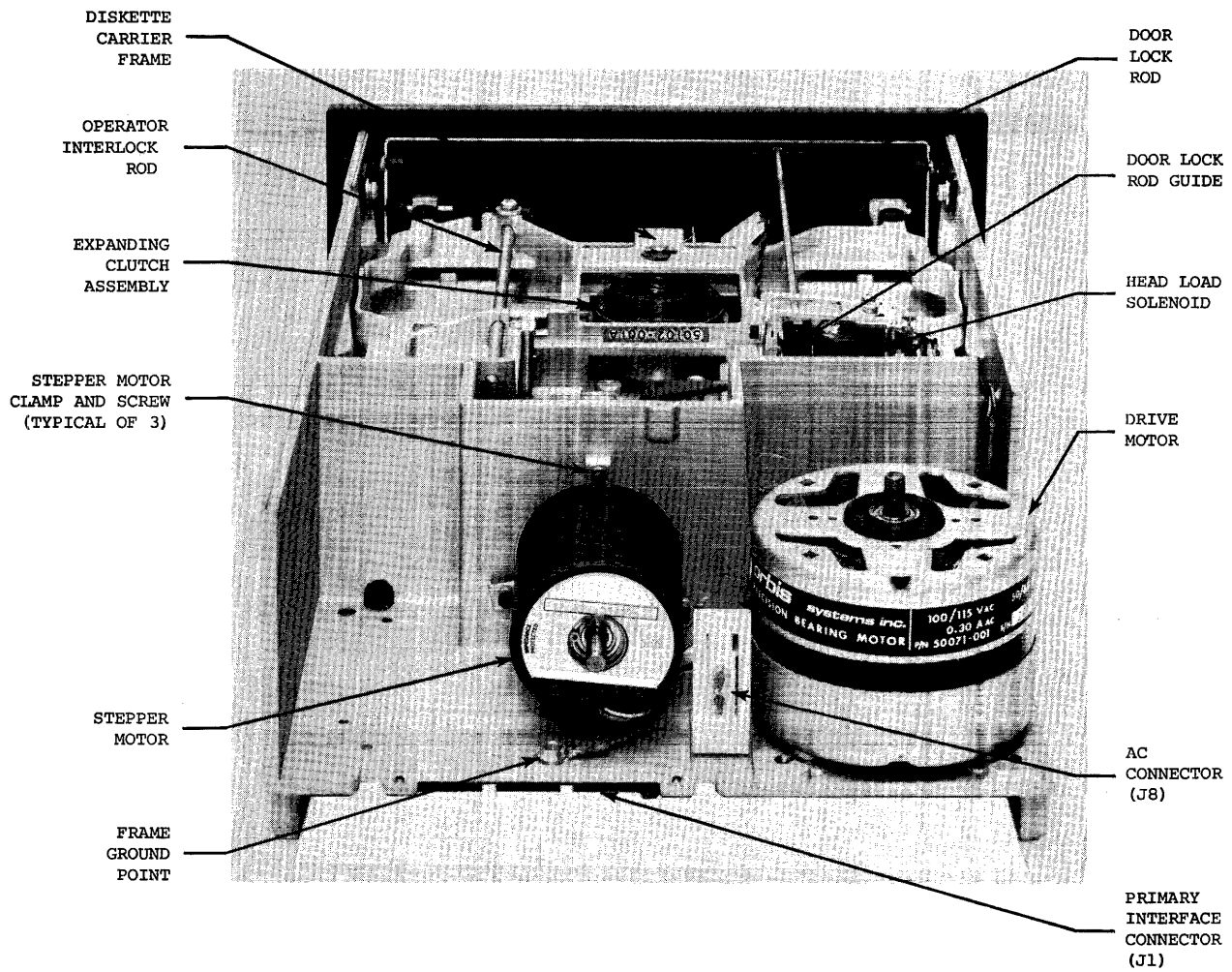


Figure 6-2. Rear View of Model 76 Diskette Drive

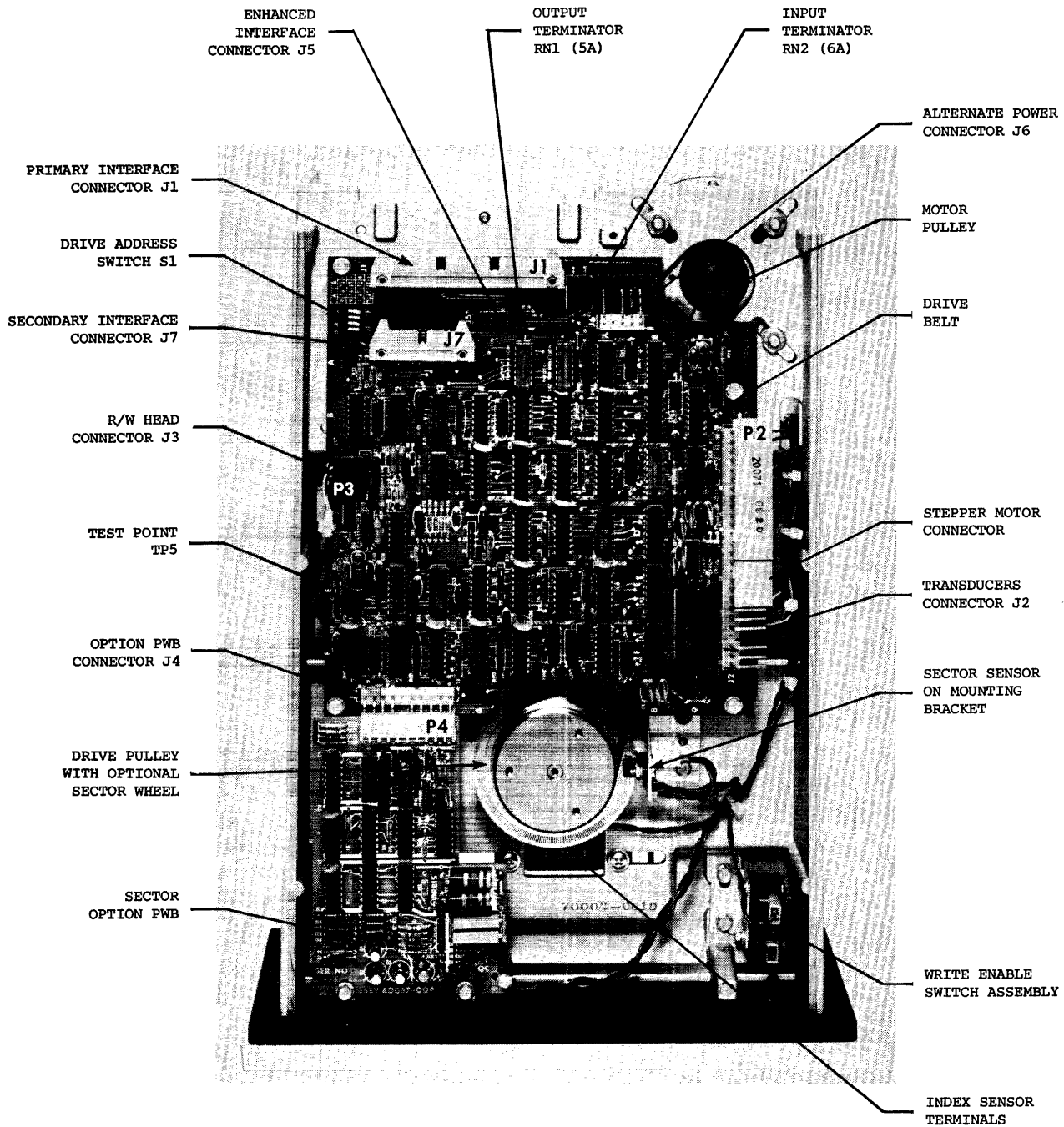


Figure 6-3. Bottom View of Model 76 Diskette Drive

6.4.2 TOP COVER REMOVAL (Figure 6-1)

1. Retract screw on rear of cover sufficiently to allow the cover to be slid rearward to unlatch it from the front plate.
2. Pull cover forward to remove.
3. Reverse procedure for installation.

6.4.3 DISKETTE CARRIER ACCESS (Figures 6-1 and 6-4)

1. Remove top cover (see Section 6.4.2) and open front door.
2. Remove 2 screws holding front plate to main frame. Remove front plate.
3. Position head to approximate center of head load bail (to prevent load arm tab from slipping off end of bail). Move Operator Interlock away from front door.
4. Swing carrier up by carefully closing front door and unlatching it from door guides.

CAUTION

Carrier is spring loaded. Use extreme care when opening carrier.

5. Reverse procedure to close carrier. Ensure that both torsion springs on the carrier pivots are correctly positioned and that the plastic rollers are mounted to the pins on the sides of the door.

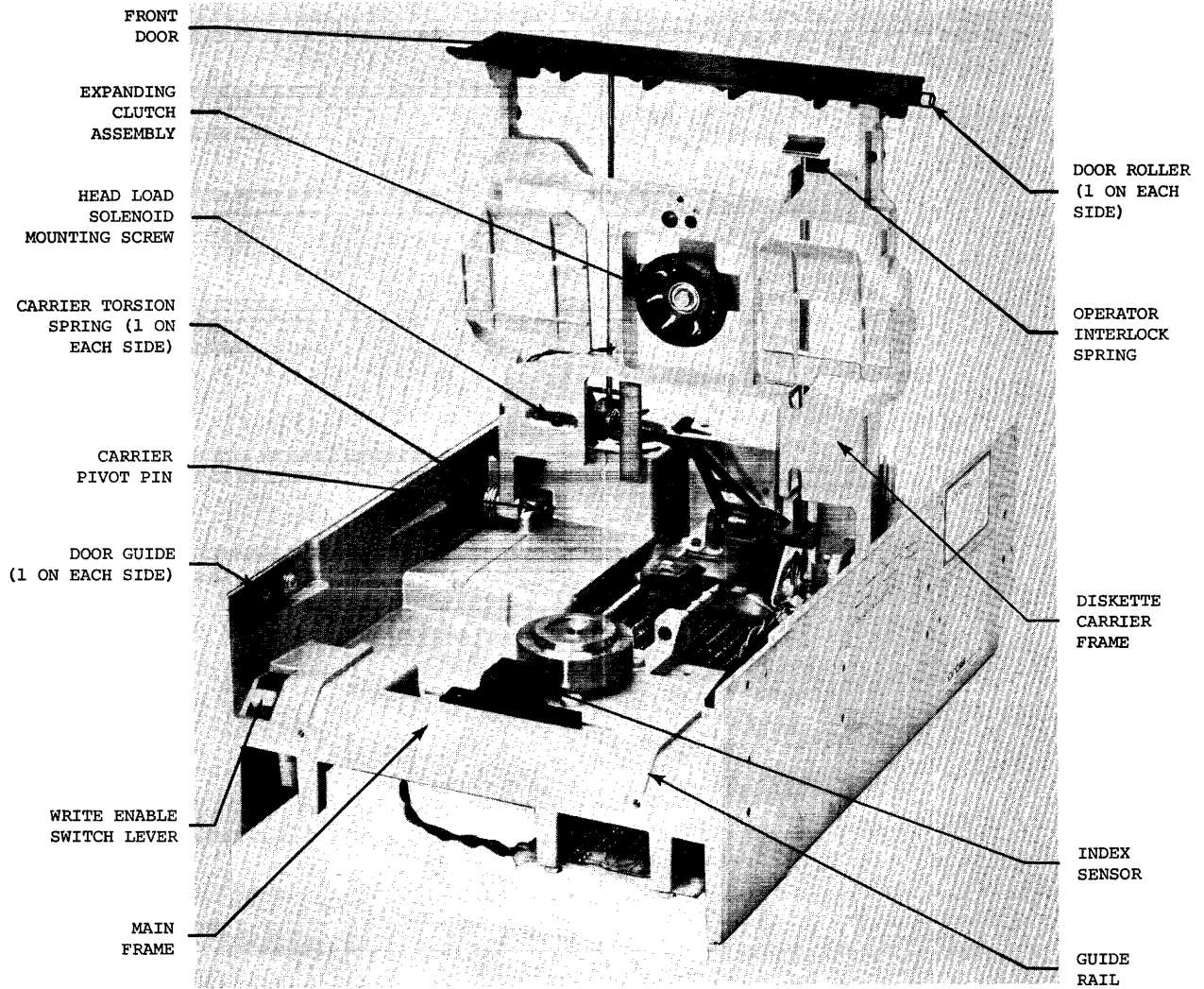


Figure 6-4. Front View of Model 76 Diskette Drive with Carrier Open

6.4.4 INDEX SENSOR LAMP ASSEMBLY: REMOVAL AND INSTALLATION
(Figure 6-1)

1. Remove top cover (see Section 6.4.2).
2. Disconnect the wires to the LED terminals (quick disconnects).
3. Remove the screw holding the assembly to the diskette carrier.
4. Reverse the procedure for installation.
5. Check index timing and readjust if necessary (see Section 6.4.7, procedure 2).

6.4.5 OPTIONAL WRITE ENABLE SWITCH ASSEMBLY
(Figure 6-3)

1. Disconnect wires from PWB connector J2 (quick disconnects).
2. Remove the two screws holding the switch bracket and remove the assembly.
3. Reverse the procedure for installation. Adjust switch bracket in and out to correctly position switch lever.

6.4.6 HEAD LOAD ACTUATOR (Figures 6-1 and 6-4)

1. Head Load actuator: Removal and installation
 - a. Remove top cover (see Section 6.4.2).
 - b. Disconnect the wires to the solenoid terminals (solder joints).

- c. Swing up the diskette carrier assembly (see Section 6.4.3).
- d. Remove screw holding the actuator to the diskette carrier.

CAUTION

Restrain the head load arm to prevent its impact with the head.

- 2. Head Load actuator physical adjustment
 - a. Remove top cover (see Section 6.4.2).
 - b. Step carriage to Track 00.
 - c. Adjust the armature to pole clearance of the solenoid using the Armature Adjusting Gauge.
 - d. With power off set the height of the door lock bar guide so that the tab on the head load arm misses the bar by $.010 \pm .005$ ".
 - e. Energize solenoid coil either using tester or manually by grounding pin 15 on connector J2.
 - f. Loosen bail screw on Head Load Bail.
 - g. Using the Head Load Arm Adjustment Gauge adjust bail so that Head Load Arm just touches the gauge. Tighten screw until just snug. Insure that the load arm is over bail when carriage is at Track 00.
 - h. Step carriage to Track 76 and check that arm still just touches the gauge. (This will result in the correct Head Load Bail to Head Load Arm clearance.) Insure that load arm is over bail when carriage is at Track 76.

- i. Tighten Head Load Bail screw.
 - j. Insure that the door opens freely when the solenoid is not actuated.
 - k. Replace top cover.
3. Head Load and Settle Timing
- a. Connect oscilloscope Channel A to trigger negative on J2-15 or Head Load (black or grey wire on solenoid).
 - b. Connect oscilloscope Channel B to TP5 on the PWB.
 - c. Position head on Track 00 and load a scratch diskette.
 - d. Place unit on its side with the head load solenoid down.
 - e. Load the head. Data envelope should become stable to 90% amplitude 30 milliseconds from leading edge of Head Load signal.
 - f. If this is not met, continue the procedure.
 - g. Bend the back stop on the solenoid slightly away from frame.
 - h. Repeat Steps e and g until e is met.

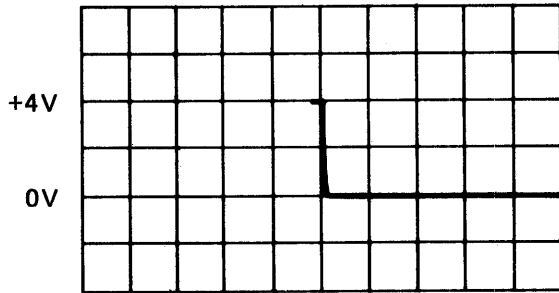
6.4.7 INDEX SENSOR (Figures 6-3 and 6-4)

- 1. Index Sensor assembly: Removal and installation
 - a. Remove bottom cover (option).
 - b. Disconnect wires from the terminals (quick disconnects).

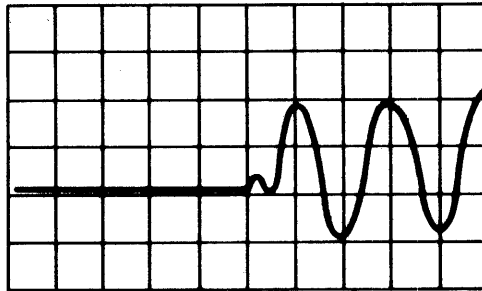
- c. Swing up diskette carrier assembly (see Section 6.4.3).
- d. Remove two screws and remove assembly from baseplate.
(Shims may be used under assembly body.)
- e. Reverse procedure for installation, maintaining same shims.

2. Index/Sector adjustment

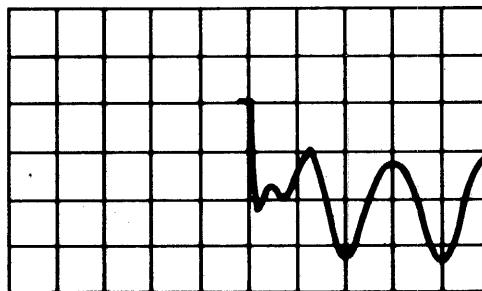
- a. Insert CE diskette and step the carriage to Track 48.
- b. Connect channel A to TP-32 and trigger negative (a.c.)
- c. Connect channel B to TP5 (read date, a.c.)
- d. Adjust trigger level to obtain waveform as in Figure 6-5.
- e. Adjust index sensor to cause data to be coincident with leading edge of Index pulse ($\pm 5 \mu\text{S}$).
Sensor is adjusted by slightly loosening both screws and moving sensor from the bottom or top with a screw driver blade.
- f. Open and close the front door several times.
Ensure that the adjust made in e. above repeats within $\pm 25 \mu\text{S}$.
- g. Step carriage in to Track 76 and out to Track 00.
Data should be within $\pm 25 \mu\text{S}$ of leading edge of Index pulse as measured at track 48. If not, readjust index sensor.
- h. Insert sectorized diskette and verify 33 pulses at TP32 (index sensor pulse width $0.45 \pm 0.2 \text{ mS}$ at 10% points). This step is optional.



CHANNEL A ONLY
VERT. SENS.: 2V/DIV.
ADJUST TRIGGER (A.C.)
TP.32



CHANNEL B ONLY
VERT. SENS.: 1V/DIV.(A.C.)
TP.5



DISPLAY (A + B)
VERT. SENS.: 1V/DIV.

TIME SCALE: 5 μ S/DIV.

FIGURE 6-5

OSCILLOSCOPE WAVEFORMS -
INDEX/SECTOR ADJUSTMENT

3. Sector Assembly (option): Removal and adjustment

- a. Remove bottom cover (option)

CAUTION

Ensure that sensor does not damage sector wheel on disassembly or assembly.

- b. Remove two screws holding sector sensor bracket and carefully remove assembly.
- c. Remove two screws holding sector PWB to main frame and remove PWB and sector sensor assembly.
- d. To reinstall, reverse the procedure.
- e. To install a sector option proceed as follows:

- i. Remove drive belt and close front door.

- ii. Remove two set screws and remove pulley from spindle shaft (be careful of spring-loaded pulley).

CAUTION

Sector wheel is very fragile and may be easily damaged. Handle with extreme care.

- iii. Install new pulley containing sector wheel. Position pulley so that outer edge is flush with end of spindle shaft and lock down two set screws (one behind the other). Door may now be opened.
- iv. Mount the sector PWB by connecting it to the connector on the main PWB and then affixing it to the main frame with two screws, lock washers and flat washers.

- v. Very carefully slide the sector sensor assembly into place with the sensor slot straddling the sector wheel. Ensure that the wheel clears the sensor in all rotational positions.
- vi. Install the two screws, lock washers and flat washers and tighten down the sensor bracket.
- vii. Replace cable clamp.

6.4.8 SPINDLE ASSEMBLY (Figures 6-3 and 6-4)

1. Remove top cover (see Section 6.4.2).
2. Swing up diskette carrier (see Section 6.4.3). and turn drive to vertical position (side up, door forward).
3. Remove the two set screws holding the spindle pulley (one behind the other).

CAUTION

The spring-loaded pulley may fly out when the set screws are removed.

4. Carefully withdraw spindle hub from opposite side of baseplate. Retain the shim washers which are on the spindle shaft.
5. Reverse the procedure for installation. Use shim washers to obtain the same dimension as the old spindle. The distance from the hub face, on which the disk sits, to the bottom of the shim washer stack should be identical to the unit previously removed.

6.4.9 DISKETTE CARRIER

1. Diskette carrier removal (Figures 6-1 and 6-4)
 - a. Remove the top cover (see Section 6.4.2)
 - b. Unsolder leads from the head load solenoid and remove connectors from index lamp assembly. Remove cable ties from cables on the carrier.
 - c. Loosen set screws from diskette carrier pins (2 on early models, 1 on late models).
 - d. Swing diskette carrier up (Section 6.4.3).
 - e. Loosen set screw and push motor-side pivot pin slightly outward.
 - f. Remove diskette carrier assembly being very careful not to let head load arm snap down on head face.
 - g. To install a new carrier reverse the procedure. Be sure that the motor-side pivot pin is pushing smartly against the carrier but not to the extent of binding it up.
2. Diskette carrier adjustment
 - a. Insert the Diskette Carrier Alignment Gauge between bottom surface of carrier and left guide rail on main frame 1" behind front door.
 - b. Loosen left door guide on main frame and adjust downward until carrier just squeezes the gauge. Tighten the door guide screws.

- c. Repeat a. and b. on right side.
- d. Recheck both sides with the gauge and readjust if necessary.

6.4.10 STEPPER/CARRIAGE (Figures 6-1, 6-2, 6-3 and 6-4)

1. Stepper/carriage assembly: Removal and installation
 - a. Remove bottom cover (option).
 - b. Disconnect the connectors from the PWB and remove the PWB.
 - c. Remove top cover (see Section 6.4.2)
 - d. Extract stepper cable from cable tie nearest the stepper motor.
 - e. Remove head cable clamp
 - f. Remove two screws on the carriage and carefully remove lube pad retainer, stylus spring and stylus ball.

CAUTION

Be very careful with the stylus ball. It is very small and easy to lose.

- g. Loosen three stepper motor clamp screws and rotate clamps away from motor body.
- h. Pull the motor back far enough to allow the shaft to clear the carriage bearings. Carefully remove the carriage assembly.

- i. To install a carriage/stepper motor assembly reverse the procedure. Add one drop of light machine oil to the lube pad upon reassembly. A small amount of non-silicone grease will hold the stylus ball in place on the stylus spring during reassembly. Torque stylus spring hold down screws (2) to 70-75 oz-in.
 - j. Adjust head track 00 alignment (see next paragraph).
 - k. Adjust track 00 stop (see next paragraph).
 - l. Adjust track 00 sensor (see 6.4.10, Paragraph 5).
 - m. Adjust index (see 6.4.7, Paragraph 2).
2. Head Track 00 alignment

NOTE

Head track 00 alignment should be checked prior to adjusting index/sector, track 00 or track 00 stop.

- a. Load CE Alignment Diskette.

NOTE

Alignment diskette should be at room conditions for at least twenty minutes before alignment.

- b. Slightly loosen three stepper motor clamp screw.
- c. Loosen track 00 stop and slide it back.
- d. Power up the drive. Step drive until phase 1 is energized.

- e. Monitor the analog data signal on TP5 of the PWB and load the head.
 - f. Turn motor until track 00 signal is sensed.
 - g. Step drive to track 48 and adjust motor for maximum signal. Tighten three stepper motor hold down screws.
 - h. After a track 00 alignment has been performed the track 00 sensor alignment must be checked and reset if necessary and reset track 00 stop.
3. Track 00 stop adjustment
- a. Remove top cover (see Section 6.4.2).
 - b. Step carriage to track 00 (verify that Track 00 signal is active).
 - c. Loosen screw on track 00 stop.
 - d. Place the Track 00 Stop Alignment Gauge between the stop and the back of the carriage.
 - e. Slide the stop forward against the carriage and tighten the stop screw. Remove the gauge.
 - f. Re-install the top cover.
4. Track 00 sensor assembly: Removal and installation
- a. Remove top cover (see Section 6.4.2).
 - b. Manually rotate stepper shaft and move carriage to track 76.

- c. Remove screw holding bracket to base casting and remove cable connector from PWB.
 - d. Lift detector/cable sub-assembly from drive.
 - e. Remove 2 screws holding detector to bracket.
 - f. Reverse the procedure for installation.
5. Tracks 00 sensor adjustment
- a. Remove top cover (see Section 6.4.2).
 - b. Loosen (do not remove) the mounting screw for sensor bracket. Insert the CE Alignment Diskette.
 - c. Power up, close door, and step carriage to track 76. Ensure that the above 76 stop does not interfere with the carriage at track 76. This may be checked by stepping in one track (no read signal should be evident).
 - d. Step carriage to track 00, then to track 02.
 - e. Slide the track 00 sensor bracket toward stepper motor until the sensor signal goes true at TP-37.
 - f. Gently slide the track 00 switch away from the stepper motor until the track 00 signal goes false.
 - g. Tighten the screw which holds the track 00 sensor bracket to base.
 - h. Ensure that the signal transition takes place between tracks 01 and 02 on Step In.
 - i. Re-install the top cover.

SECTION 7
MAINTENANCE AIDS

7.1 GENERAL

This section contains generalized information on the logic circuits used in the unit.

7.2 PHYSICAL DESCRIPTION (LOGIC)

The logic consists of two styles of circuits: discrete component and integrated circuits (IC). Discrete component circuits contain individually identifiable resistors, capacitors, transistors, etc.

All components are mounted on one side of the printed wiring board. The board is 7 x 8 inches and contains both ICs and discrete components. Alpha-numerical designators are marked on the component side of the board to identify all discrete components. Alpha-numeric coordinate designators are used to identify the integrated circuits (ICs). Test points on the board are located on 5-pin connector strips (except TP-0) and are plainly marked.

SECTION 8
TYPICAL PARTS LIST

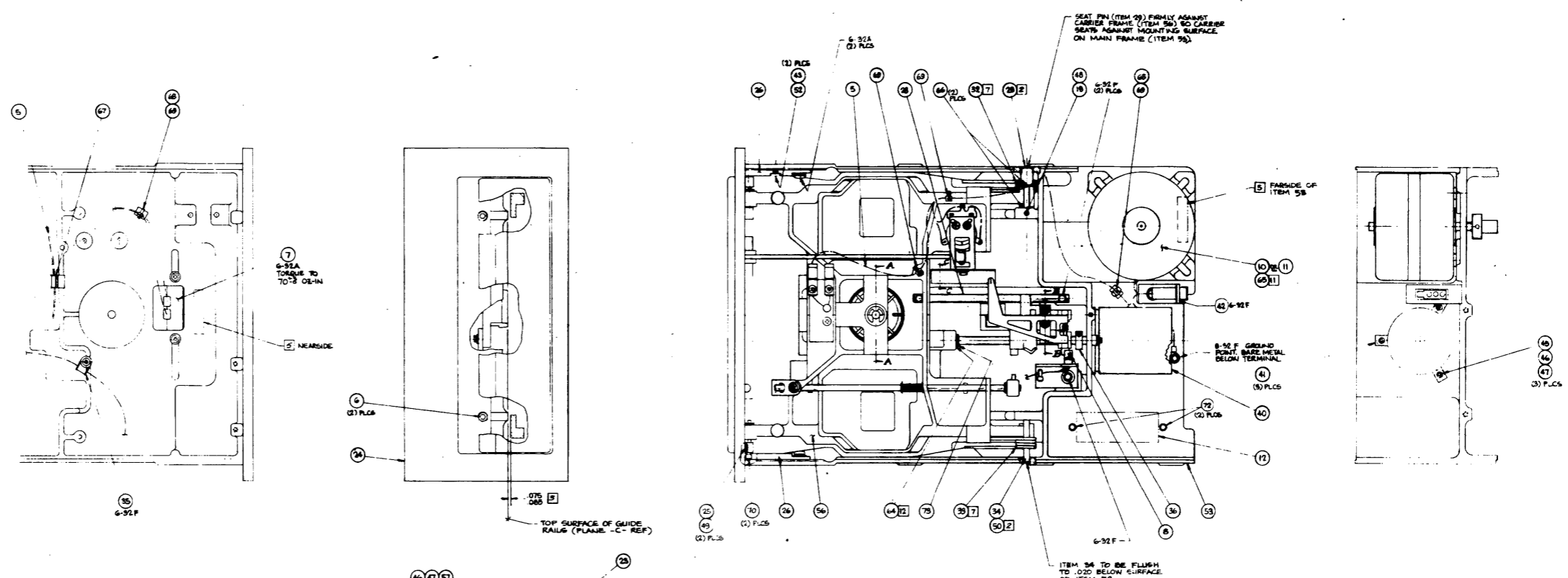
8.1 INTRODUCTION

This section contains a typical parts list for the Model 76 Diskette Drive. Changes to the drive will be made from time to time to improve reliability or to simplify assembly or disassembly. The parts list is intended to be typical of a large number of drives, but not necessarily all. When ordering parts for a specific drive be sure to include the full serial number (eg. 05-2900).

The parts list consists of the basic assembly (less PWB and top cover) and its constituent subassemblies. When a subassembly is referred to in the parts list the designation SPL (separate parts list) indicates that later pages will illustrate a breakdown of that subassembly. The basic assembly drawing is shown as Figure 8-1.

8.2 PARTS LIST

The typical parts list is shown on the following pages.



- 12 Before installing stepper motor, thoroughly clean bore in casting and apply grease, item 64, to entire inside surface of bore and OD of shaft end. Remove excess after installation of motor.
- 11 Shim between motor and frame to make belt track true on Pulleys, if required.
- 10 Apply a light film of grease (item 64) to OD of hub shaft before assembling into bearings.
- 9 To aid in assembly, apply a light coating of grease (item 64) to socket of item 21 before installing ball (item 20).
- 8 Install two (2) set screws (item 19). Item 18 to be flush with end of shaft.
- 7 Torsion springs (items 32 and 33) to rest in recesses on floor of casting.
6. Reference mechanical adjustment specification #20088-002.
- 5 Rubber stamp "ASSY" followed by ORBIS part number and latest rev. letter approximately where shown.
- 4 Adjust diskette load pad to noted dimension with power on head load relay and front door closed. Check at tracks 00 and 76.
- 3 Adjust items 26 (2 places) to provide noted clearance between diskette guide rails and carrier when front door is fully closed.
- 2 Apply item 50 to OD of items 29 and 34.

NOTES: UNLESS OTHERWISE SPECIFIED

FIGURE 8-1

76 77	ORBIS
ASSEMBLY, BASIC MODEL 76/77	70009-XXX A

ORBIS SYSTEMS INC.

PL & BI NO.
20179-XXX

REV D PL SHEET 2 OF 4

BI SHEET 2 OF 3

PARTS LIST & BUILD INTENT

Assembly, Final - Model 76

ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
	001	002	003	004		BUY QTY	NEXT REL		
1	1	-	-	-	-001			Assy., Final - Model 76	Low V 60 Hz
2	-	1	-	-	-002			Assy., Final - Model 76	Low V 50 Hz
3	-	-	1	-	-003			Assy., Final - Model 76	High V 60 Hz
4	-	-	-	1	-004			Assy., Final - Model 76	High V 50 Hz
5	1	1	1	1	20032-001			Belt Drive	
6	1	1	1	1	30076-001			Nameplate	
7	1	1	1	1	40059-003			Cover, Top	
8	REFERENCE				20197-001			Option List, Model 76	
9	REFERENCE							List, Spare Parts	
10									
11	1	1	1	1	20176-003	SPL		Assy., PWB - Model 76	
12	1	1	1	1	13005-304			Screw, Button Head	6-32 x 1/4
13	1	1	1	1	20123-001			Label, Config. & FCN Record	
14	1	1	1	1	30158-001			Scale, Track Position	Mount on diskette load arm
15									
16	1	-	-	-	70009-001	SPL		Assy., Basic - Model 76/77	Low V, 60 Hz
17	-	1	-	-	70009-002	SPL		Assy., Basic - Model 76/77	Low V, 50 Hz
18	-	-	1	-	70009-003	SPL		Assy., Basic - Model 76/77	High V, 60 Hz
19	-	-	-	1	70009-004	SPL		Assy., Basic - Model 76/77	High V, 50 Hz
20									
21	1	1	1	1	18417-001			Resistor network, 14 pin - dual term.	Bag & tag
22	REFERENCE				20191-001			Product Specification, Model 76/77	
23	REFERENCE				20202-001			Test Req'mt. Specification, M76/77	
24									
25									

8-5

FINAL

20179-XXX

ORBIS SYSTEMS INC.

PL & BI NO.
20176-003

REV **J** PL SHEET
2 OF **7**

BI SHEET
3 OF **32**

PARTS LIST & BUILD INTENT ASSEMBLY, PWB - MODEL 76

ITEM NO.	QUANTITY REQD.				PART NO.	BATCH 05		DESCRIPTION	REMARKS
						BUY QTY	NEXT REL		
1	1				50090-003H			Master PWB	
2	REF				50103-003			Slave Logic	
3	REF				50104-003			Master Logic	
4	REF				50105-002			Power and Transducers	
5	REF				50106-002			Block Diagram, Master/Slave	
6	2				17200-000			IC Gate SN7400N	4C, 6E
7	2				17200-002			IC Gate S7402N	3B, 7D
8	4				17200-004			IC Gate SN7407N	1A, 4B, 7C, 5D
9	2				17200-020			IC Gate SN7420N	5E, 5F
10	5				17200-038			IC Gate SN7438N	5B, 5C, 6B, 7B, 7A
11	6				17200-074			IC, F/F SN7474N	8A, 8B, 6C, 6D, 7E, 3F
12	1				17200-086			IC EX OR SN7486N	4F
13	3				17200-123			IC, O/S SN74123N	9B, 7F, 4E
14	REF				20222-XXX			IC Burn-in Specification	Requirement
15	2				17207-463			IC, Peripheral Driver SN75463P	1E, 9D
16	2				17240-007			IC, Gate CMOS CD4007AE	2B, 1F
17	1				17240-049			IC, Gate CMOS CD4049AE	9C
18	1				17202-001			IC Amplifier uA739C	2D
19	1				17204-002			IC Comparator LM319N	2F
20	1				17230-086			IC Xtors CA3086	3C
21	3				19410-001			Transistor NPN Power TIP31	Q2, 3, 4
22	6				19409-001			Transistor PNP NS3906	Q1, 5, 6, 7, 8, 9
23	6				16903-001			Diode, Logic	CR11, 6, 7, 8, 9, 10
24	4				16907-001			Diode, High Current Switching	CR2, 3, 4, 5
25	REF				50107-002			PWB Interface, Master & Slave	

9-8

PWB

20176-003

PARTS LIST & BUILD INTENT ASSEMBLY, PWB - MODEL 76

ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
						BUY QTY	NEXT REL		
26	1				18408-333			Resistor, Network 8R 33K	8C
27	1				18408-103			Resistor Network 8R 10K	3E
28	2				18408-181			Resistor Network 8R 180 ohm	2E, 8D
29	5				18409-472			Resistor Pack 7R 4.7K	RPI to 5
30									
31	1				18400-104			Resistor, 5% 1/2w 100K	R21
32	2				18400-333			↑ 33K	R32, 40
33	1				18400-153			15K	R18
34	1				18400-562			5.6K	R33
35	3				18400-182			1.8K	R15, 16, 27
36	5				18400-102			1.0K	R19, 20, 41, 43, 44
37	4				18400-331			↓ 330 ohm	R17, 29, 38, 45
38	5				18400-151			Resistor, 5% 1/2w 150 ohm	R6, 7, 37, 39, 42
39									
40	2				18400-F.S.			Resistor, 5% 1/2w F.S.	R22, 1
41	1				18400-123			Resistor, 5% 1/2w 12K	R28
42	1				16910-120			Diode, Zener 12V	CR12
43									
44	4				18416-100			Resistor, 1% 1/2w 1M	R11-14
45	2				18413-453			Resistor, 1% 1/2w 4.53K	R9, 10
46	1				18412-619			Resistor, 1% 1/2w 619 ohm	R23
47	2				18412-316			Resistor, 1% 1/2w 316 ohm	R24, 25
48									
49	A/R				19700-002			Sleeving	
50	2				18406-180			Resistor, 5% 10w 18 ohm	R4, 5

8-7

PWB

PARTS LIST & BUILD INTENT

ASSEMBLY, PWB - MODEL 76

ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
						BUY QTY	NEXT REL		
51	4				16308-220			Capacitor, Mica 5% 22PF	C41,43,1,37
52	2				16308-101			Capacitor, Mica 5% 100PF	C34,44
53	1				16308-471			Capacitor, Mica 5% 470PF	C40
54	10				16308-102			Capacitor, Mica 5% 0.001uF	C4,9,13,28,29,30,33,38,42,60
55									
56	15				16304-103			Capacitor, Ceramic +80-20% 0.01uF	C47-58,7,15,35
57									
58	2				16302-223			Capacitor, Radial 0.022uF	C2,32
59	1				16302-103			Capacitor, Radial 0.01uF	C11
60	2				16310-105			Capacitor, Tantalum 10% 1.0uF	C20,21
61	5				16310-475			Capacitor, Tantalum 10% 4.7uF	C16,27,39,8,25
62	11				16310-226			Capacitor, Tantalum 10% 22uF	C59,5,6,10,12,14,22,24,26,31,36
63									
64	A/R				19602-001			Wire, 30 AWG	
65	1				16632-018			Wafer, 156 Center, 18 Pin	J2
66	2				16632-008			Wafer, 156 Center, 8 Pin	J2
67	1				16633-006			Wafer, 100 Center, 6 Pin	J3
68	3				16643-005			Wafer, 156 Center, 5 Pin	J4,J6
69	10				16634-005			Wafer, 100 Center, 5 Pin	J5,T.P.
70	1				16634-001			Wafer, 100 Center, 1 Pin	TP-0
71	2				19402-001			Pad, Transistor	
72	1				16629-050			Header, 50 Pin	J1
73	1				16629-020			Header, 20 Pin	J7
74	1				18805-004			Switch, 4-Position	S1
75	2				16644-014			Socket, 14 Pin DIP PWB	5A,6A

8-8

PWB

ORBIS SYSTEMS INC.

PL & BI NO. 70009-XXX	REV E	PL SHEET 2 OF 5
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BI SHEET 6 OF 32

PARTS LIST & BUILD INTENT Assy., Basic Model 76/77

ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
	001	002	003	004		BUY QTY	NEXT REL		
1	1	-	-	-	-001			Assy., Basic Model 76/77	Low V, 60 Hz
2	-	1	-	-	-002			Assy., Basic Model 76/77	Low V, 50 Hz
3	-	-	1	-	-003			Assy., Basic Model 76/77	High V, 60 Hz
4	-	-	-	1	-004			Assy., Basic Model 76/77	High V, 50 Hz
5	1	1	1	1	20071-002	SPL		Assy., Signal Harness	
6	2	2	2	2	13005-304			Screw, Hex Socket, Button Head	6-32 x 1/4
7	1	1	1	1	30086-001			Assy., Index Sensor	
8	1	1	1	1	20199-001	SPL		Assy., Track 00 Sensor	
9									
10	1	-	1	-	20219-060	SPL		Assy., Spindle Drive Motor	60 Hz
11	-	1	-	1	20219-050	SPL		Assy., Spindle Drive Motor	50 Hz
12	-	-	1	1	40099-001	SPL		Assy., Kit - High Voltage	
13	1	1	1	1	40110-001			Hub, Drive	
14	2	2	2	2	10200-002			Bearing, Ball, Flanged	
15	A/R	A/R	A/R	A/R	13950-002			Shim, Bearing	
16	A/R	A/R	A/R	A/R	13950-003			Shim, Bearing	
17	1	1	1	1	20106-002			Spring, Helical Compression	
18	1	1	1	1	30056-001			Pulley, Drive	
19	4	4	4	4	13100-304			Set Screw	
20	1	1	1	1	10204-002			Ball	
21	1	1	1	1	30069-002			Spring, Stylus	
22	1	1	1	1	30084-001			Pad, Lube	
23	1	1	1	1	30085-002			Retainer, Pad - Lube	
24	1	1	1	1	40042-001			Plate, Front	
25	2	2	2	2	30080-001			Stop, Door Closed	

6-8

BASIC

70009-XXX

ORBIS SYSTEMS INC.

PL & BI NO. 70009-XXX	REV C1	PL SHEET 3 OF 5
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BI SHEET 7 OF 30

PARTS LIST & BUILD INTENT

Assy., Basic - Model 76/77

ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
	001	002	003	004		BUY QTY	NEXT REL		
26	2	2	2	2	30105-005			Guide, Door	
27									
28	1	1	1	1	30097-001			Rod, Guide	
29	1	1	1	1	30078-002			Pin, Pivot - Diskette Position Frame	
30									
31									
32	1	1	1	1	13251-003			Spring, Torsion	Right Hand
33	1	1	1	1	13251-002			Spring, Torsion	Left Hand
34	1	1	1	1	12402-628			Pin, Grooved	
35	2	2	2	2	10950-001			Clamp, Cable	
36	1	1	1	1	10951-002			Clamp, Split - .250 Dia. Shaft	Tk. 00 Stop
37									
38									
39									
40	1	1	1	1	40000-500			Motor, Stepper	
41	3	3	3	3	10952-001			Clamp, Synchro Mounting	
42	1	1	1	1	30066-002			Bracket, AC Mounting	
43	2	2	2	2	13000-303			Screw, Mach., Pan Hd., Phillips	6-32 x 3/16
44									
45	3	3	3	3	13006-206			Screw, Cap, Hex Socket Hd.	4-40 x 3/8
46	5	5	5	5	13800-003			Washer, Flat	#4
47	5	5	5	5	13803-003			Washer, Split Lock	#4
48	A/RA/R	A/RA/R	A/RA/R	A/RA/R	10101-003			Adhesive, Loctite	#242
49	A/RA/R	A/RA/R	A/RA/R	A/RA/R	10102-002			Adhesive, Contact	Pliobond
50	A/RA/R	A/RA/R	A/RA/R	A/RA/R	12002-001			Lubricant, Spray	Slix-it 6% Silicone

01-8

BASIC

70009-XXX

ORBIS SYSTEMS INC.

PL & BI NO. 70009-XXX	REV C1	PL SHEET 1 OF 5
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PARTS LIST & BUILD INTENT	Assembly, Basic - Model 76/77	BI SHEET 8 OF 9
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ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
	001	002	003	004		BUY QTY	NEXT REL		
51	AS	REQUIRED			12001-001			Oil Lubricating	
52	AS	REQUIRED			10101-005			Adhesive, Loctite	Loctite 290
53	1	1	1	1	70005-001			Main Frame Machining (Die Cast)	
54		REFERENCE			70004-001			Casting, Main Frame	
55	1	1	1	1	40114-001	SPL		Assy., Carriage	
56	1	1	1	1	50102-001	SPL		Assy., Diskette Carrier	
57	2	2	2	2	13006-208			Screw, Cap Hex Soc. Hd.	4-40 x 1/2
58		REFERENCE			11375-001			Felt - Rabbit Hair	
59	AS	REQUIRED			30216-001			Shim, Stylus Spring	
60	1	1	1	1	30215-001			Label, High Voltage Caution	
61									
62									
63									
64	AS	REQUIRED			12003-001			Lubricant, Magnalube G	
65	AS	REQUIRED			30112-001			Shim, Drive Motor	
66	2	2	2	2	13801-009			Washer, Nylon	.031 thk.
67	1	1	1	1	10953-001			Clip, Cable	
68	2	2	2	2	13550-003			Tie Base	
69	AS	REQUIRED			13600-003			Tie, Wire Bundle - Nylon	
70	2	2	2	2	30153-001			Roller, Door	
71		REFERENCE			40075-001			Plate, Front - Die Cast	
72	2	2	2	2	13011-406			Screw, Thread Forming	Hex Hd.
73	1	1	1	1	14000-009			O-Ring	
74		REFERENCE			50071-001			Assy., Motor - Precision Bearing	Ref. 20120-001

BASIC

70009-XXX

II-8

PARTS LIST & BUILD INTENT	Assy., Spindle Drive Motor	BI SHEET 11 OF 32
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8-14

ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
	050	060				BUY QTY	NEXT REL		
1	1	-			-050			Assy., Spindle Drive Motor	50 Hz
2	-	1			-060			Assy., Spindle Drive Motor	60 Hz
3	1	1			16626-003			Connector, Plug	Molex
4	1	1			19104-001			Terminal	Molex (2-wire)
5	2	2			19104-002			Terminal	Molex
6	1	-			30214-500			Pulley, Motor - .312 Dia Shaft	50 Hz
7	-	1			30214-600			Pulley, Motor - .312 Dia Shaft	60 Hz
8									
9	1	1			20120-002			Motor, Ball Bearing	
10	1	1			13100-304			Set Screw	6-32 x 1/4
11	A/RA/R				10101-003			Adhesive, Loctite	
12	A/RA/R				12003-001			Lubricant, Magnalube G	Apply to shaft O.D.
13	A/RA/R				19600-518			Wire, Hookup	Green #18 AWG
14	1	1			19103-003			Terminal, Ring Tongue	
15	1	1			10955-001			Strain Relief, Cable	
16	1	1			19103-002			Terminal, Ring Tongue	
17	1	1			13011-306			Screw, Hex Hd. - Self Thd'g	6-32 x 3/8

PARTS LIST & BUILD INTENT					Assembly, Carriage			REMARKS	
ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05			DESCRIPTION
	001					BUY QTY	NEXT REL		
1	1				-001			Assy., Carriage	
2	1				50076-001	—		Carriage, Machining	
3	1				40043-003	—		Arm, Head Load	
4	1				30075-002	—		Pad, Head Load	
5	REF				11375-001	—		Felt, Rabbit Hair	
6	1				30042-001	—		Pin, Head Load	
7	1				13251-004	—		Spring, Torsion	
8	2				12750-003	—		Ring, Retaining	
9									
10	1				13000-204	—		Screw, Pan Hd. #4-40 x 1/4	Use torq wrench
11	1				13803-003	—		Washer, Split Lock #4	
12									
13									
14	2				13006-110	—		Screw, Cap, Hex Soc Hd #2-56 x 5/8	Use torq wrench
15	2				13803-002	—		Washer, Split Lock #2	
16	2				13804-001	—		Washer, Flat Rd. SST	
17	A/B				10102-001	—		Adhesive, Contact	
18									
19	1				20163-001	—		Head, Read/Write - Ferrite	
20	REF				20089-001	—		Spec., Head Test	
21	1				30192-001	—		Spring, Carriage, Anti-Roll	
22	REF				50075-001	—		Carriage, Molded	
23									
24	A/B				11300-001	—		Ink, Marking	White
25	REF				140102-001			Fixture, Head Alignment	

8-16

ORBIS SYSTEMS INC.

PL & BI NO. 50102-001	REV A	PL SHEET 2 OF 4
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BI SHEET 14 OF 32

PARTS LIST & BUILD INTENT Assy., Diskette Carrier

ITEM NO.	QUANTITY REQD			PART NO.	BATCH 05		DESCRIPTION	REMARKS
	001				BUY QTY	NEXT REL		
1	1			-001			Assy., Diskette Carrier	
2	1			50026-005	-		Carrier, Machining	
3	REF			50051-002	-		Frame, Carrier - Die Cast	
4	1			20181-001	-		Assy., Clutch - Expanding	
5								
6								
7	A/R			13301-007	-		Washer, Nylon	
8	1			30026-001	-		Arm, Diskette Load	
9	1			30208-001	-	-	Bracket, Diskette Load - Locking	
10	1			30025-002	-		Pad, Diskette Load	
11								
12								
13	1			30061-003	-		Pin, Clutch	
14	1			12750-002	-		Ring, Retaining	
15	1			13250-007	-		Spring, Compression	
16								
17								
18	1			40041-002	-		Door, Front	
19								
20	2			10700-001	-		Bumper, Headed	
21	1			12751-005	-		Ring, Grip	
22	1			13950-003	-		Shim, Bearing	
23	1			18300-002	-		Relay, Head Load	
24	2			13700-125	-		Tubing, Polyurethane	Cut pcs. .44" long
25	1			13009-001	-		Screw, 82° Flathead St./Stl.	6-32 x 3/8

CARRIER

50102-001

8-17

PARTS LIST & BUILD INTENT

Assembly, Diskette Carrier

ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
	001					BUY QTY	NEXT REL		
26	A/B				10101-003	—		Adhesive, Loctite	Loctite 242
27	A/B				10102-002	—		Adhesive, Contact	Pliobond
28	A/B				10101-006	—		Adhesive, Loctite	Loctite 601
29	A/B				12003-001	—		Lubricant, Magnalube G	
30	2				30094-002	—		Pad, Front Door	
31	A/B				13801-003	—		Washer, Nylon	
32	1				13006-203	—		Screw, Hex Socket Cap	4-40 x 3/16
33	1				13800-003	—		Washer, Flat	#4
34	1				13803-003	—		Washer, Split Lock	#4
35									
36	1				30207-001	—		Spring, Operator Interlock	
37	1				30161-002	—		Shaft, Door Interlock	
38	REF				40078-001	—		Door, Front - Die Cast	
39	1				30163-002	—		Block, Actuator - Door Int'lk	
40	1				30213-001	—		Spring, Compr. - Oper. Int'lk.	
41									
42	1				13100-304	—		Set Screw	#6 - 32 x 1/2
43	1				30209-001	—		Guide, Door Lock Bar	
44	1				30210-001	—		Bar, Door Lock	
45	1				30211-001	500		Hinge Clip, Door Lock Bar	
46	1				14000-008	—		O-Ring	
47	1				30100-001	—		Assy., Lamp - Index	
48	1				12750-001	—		Ring, Retaining	Oper. Int'lk

81-8

CARRIER

50102-001

ORBIS SYSTEMS INC.

PL & BI NO. 20197-001	REV B	PL SHEET 2 OF 2
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PARTS LIST & BUILD INTENT

Option List - Model 76

BI SHEET 17 OF 32

ITEM NO.	QUANTITY RECD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
	001					BUY QTY	NEXT REL		
1					-001			Option List - Model 76	
2									
3									
4									
5	1				40047-001			Bezel, Front - Oversized	
6									
7									
8	1				20081-XXX	SPL		Assy., Cable - Signal Interface	For 1 Drive, x ft. long
9	1				20090-001	SPL		Assy., Cable - AC Power	1 Per Drive
10	1				30012-001	SPL		Assy., Write Enable Switch	
11	1				40070-001	SPL		Assy., 32 Sect.	Master only
12									
13	1				20110-001	SPL		AC Power Connector Kit	
14	2				13125-014			Chassis Slide	
15	1				20195-00n	SPL		Assy., Signal Cable - Master	Master Drives (n>2)
16	1				20200-00n	SPL		Assy., DC Power Cable	For n Drives
17	1				20201-001	SPL		Assy., Enhanced Interface Cable	1 per Drive
18	1				20193-001	SPL		Assy., Kit - DC Power Connector	Ref. J6
19	1				20204-001	SPL		Assy., Option PWB - Blank	
20	1				20231-001			Assy., Optical Write Enable Option	
21	1				20232-XXX			Assy., Drive Status Indicator Option	

8-20

OPTION LIST

20197-001

PARTS LIST & BUILD INTENT

Assy., 32 Sector & Std. 2F Data Separator

ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
	001					BUY QTY	NEXT REL		
1	1				-001			Assy., 32 Sect. & Std. 2F D.S.	
2	1				40057-005	SPL		Assy., PWB - Sector & D.S.	
3	1				30056-002			Pulley, Drive	
4	1				40054-001			Wheel, Sector	
5	1				30091-001			Ring, Mounting - Sector Wheel	
6									
7									
8									
9									
10									
11	3				13005-306			Screw, Button Head - Socket Cap	6-32 x 3/8
12	2				13100-304			Set Screw	6-32 x 1/4
13	4				13000-306			Screw, Phillips Pan Head	6-32 x 3/8
14	4				13800-004			Washer, Flat	#6
15	4				13803-004			Washer, Lock - Split	#6
16	1				13600-003			Tie, Wire Bundle - Nylon	Tyrap
17									
18	A/R				10101-003			Adhesive, Loctite	Loctite #242
19									
20									
21									
22	REF				30111-001			Tool, Sector Wheel Align	
23	REF				20103-001			Test Spec., Sector/D.S. Option	

ASSY., SECTOR

40070-001

8-24

ORBIS SYSTEMS INC.

PL & BI NO. 40057-005 REV J PL SHEET 2 OF 4

PARTS LIST & BUILD INTENT ASSY., PWB - SECTOR & D.S. BI SHEET 22 OF 32

ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
	Q05					BUY QTY	NEXT REL		
1					-005			Assy., PWB - Sector & D.S.	
2	REF				40056-004			Schematic, Option Board I	
3									
4	1				40058-004 F			PC Board	
5									
6	4				17200-177			IC Counter, 74177	1B,1C,3B,3C
7	3				17200-074			IC F-F, 7474	1A,2B,2C
8	1				17200-002			IC Gate, 7402	2A
9	1				17203-001			IC OS, 9602	3A
10	1				17200-005			IC Gate, 7405	4B
11									
12	3				19400-001			Transistor, NPN 2N2222A	Q1,Q4,Q5
13	2				19405-001			Transistor, PNP 2N2907A	Q2,Q3
14	1				19402-001			Pad, Transistor	
15	1				16910-051			Diode, Zener 5.1V	D1
16									
17	1				18400-273			Resistor, 1/2w 5%, 27K	R2
18	7				18400-102			Resistor, 1/2w 5%, 1K	R3,10,11,33,34,39,40
19	5				18400-103			Resistor, 1/2w 5%, 10K	R4,6,8,9,35
20	3				18400-331			Resistor, 1/2w 5%, 330 ohm	R5,15,1
21	5				18400-471			Resistor, 1/2w 5%, 470 ohm	R7,36,38,19,20
22	1				18400-F.S.			Resistor, 1/2w 5%, F.S.	R24
23	1				18400-104			Resistor, 1/2w 5%, 100K	R23
24	REF				18400-752			Resistor, 1/2w 5%, 7.5K	R24
25	REF				18400-822			Resistor, 1/2w 5%, 8.2K	R24

SECTOR PWB

40057-005

8-25

ORBIS SYSTEMS INC.

PL & BI NO. 40057-005	REV J	PL SHEET 3 OF 4
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PARTS LIST & BUILD INTENT ASSY., PWB - SECTOR & D.S.

BI SHEET 23 OF 32

ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
	005					BUY QTY	NEXT REL		
26	3				13600-003			Tie, Wire Bundle - Nylon	Tyrap
27	6				18414-100			Resistor, 1/8w 1%, 10K	R13,25,26,27,28,29
28	3				18400-823			Resistor, 1/4w 5%, 82K	R14,22,21
29	3				18413-499			Resistor, 1/8w 1%, 4.99K	R30,31,32
30	1				18400-182			Resistor, 1/4w 5%, 1.8K	R41
31	2				18420-331			Resistor, 2w 5%, 330 ohm	R17,18
32									
33	1				18418-104			Trimpot, 100K	R16
34	1				18418-103			Trimpot, 10K	R12
35	A/R				19600-124			Wire, Hook up	24 AWG Brown
36	1				16303-104			Capacitor, Tant 10%, .1uf	C1
37	1				16308-471			Capacitor, Mica 5%, 470pf	C13
38	3				16308-102			Capacitor, Mica 5%, .001uf	C3,4,7
39	4				16304-103			Capacitor, Bypass +80-20% .01uf	C9,10,11,8
40	3				16303-475			Capacitor, Tant 10%, 4.7uf	C5,12,2
41	A/R				13701-002			Tubing, Heat Shrink	
42	1				16638-010			Connector, Molex, 10 Pin	P4 (09-52-3101)
43	1				16634-005			Test Point Strip, 5 Pin	TP- 1-5
44	1				16634-001			Test Point Single	TP6
45	1				30083-001			Bkt. Mtg. Sector Sensor	
46	1				18500-001			Sensor Photon Interrupt	LED/Xtor
47	2				13000-206			Screw, Phillips Pan Hd.	4-40 x 3/8
48	2				12300-003			Nut, Hex	4-40
49	2				13803-003			Washer, Lock Split	#4
50	A/R				19601-024			Wire, Twisted Pair	24 AWG

SECTOR PWB

40057-005

ORBIS SYSTEMS INC.

PL & BI NO. 20232-XXX	REV A	PL SHEET 2 OF 3
		BI SHEET 32 OF 32

PARTS LIST & BUILD INTENT					ASSY., DRIVE STATUS INDICATOR OPTION			REMARKS	
ITEM NO.	QUANTITY REQD				PART NO.	BATCH 05		DESCRIPTION	REMARKS
	001	002	003			BUY QTY	NEXT REL		
1	1	-	-		-001			Assy., Drive Status Indicator Opt.	Std. Front Plate (Blk)
2	-	1	-		-002			Assy., Drive Status Indicator Opt.	Oversize Bezel (Blk)
3	-	-	1		-003			Assy., Drive Status Indicator Opt.	Varisystems (20205-)
4									
5	1	-	-		40118-001			Front Plate, Status Indic. Option	Black
6	-	1	-		40119-001			Oversize Front Bezel, Status Ind. Opt	Black
7	-	-	1		40115-001			Bezel, Front - Oversize (Varisystems)	Black
8									
9	1	1	1		17500-001			LED Indicator	Red (Selected)
10	1	1	-		17500-002			LED Indicator	Green (Ready)
11	2	2	1		17501-001			Mounting Clip, LED Indicator	
12	A/R	A/R	A/R		19601-024			Wire, Twisted Pair	#24
13	4	4	2		19106-002			Terminal, .045" Sq.	Molex
14	1	1	1		16627-005			Connector, .156" Centers	
15	3	3	1		13600-003			Tie, Wire Bundle	Tyrap
16	1	1	1		13550-001			Tie Base	
17	A/R	A/R	A/R		13701-002			Tubing, Heat Shrink	
18									
19	1	1	1		16630-001			Polarizing Key	

8-35

SECTION 9
RECOMMENDED SPARE PARTS

9.1 INTRODUCTION

This section contains a list of parts which are recommended as spares. The list has been prepared for the user who has a small number of drives and prefers to maintain the drives to a low level. Where a large number of drives is involved ORBIS marketing personnel are available for assistance in choosing the appropriate quantity of each part.

Under normal circumstances it is recommended that the small quantity user merely maintains a spare PWB, and all other maintenance is effected through the factory repair/refurbish facility.

PART NUMBER	PART DESCRIPTION	RECOMMENDED QTY. PER DRIVE	NEXT ASSEMBLY PART NUMBER
30100-001	Assy, Index Lamp	1	50102-001
30086-001	Assy, Index Sensor	1	70009-XXX
20219-050/ -060	Assy, Spindle Drive Motor	1	70009-XXX
40114-001	Assy, Carriage	1	70009-XXX
20176-XXX	Assy, PWB	1	20179-XXX
10200-002	Bearing, Ball - Flanged	2	70009-XXX
10204-002	Ball, Stylus	2	70009-XXX
10952-001	Clamp, Synchro Mtg.	3	70009-XXX
13009-001	Screw, 80 ^o Flt. Hd. - St/Stl	1	50102-001
20106-002	Spring, Compression	1	70009-XXX
13250-007	Spring, Compression	1	50102-001
13950-002	Shim, Bearing	2	70009-XXX
13950-003	Shim, Bearing	2	70009-XXX
18300-001	Relay, Head Load	1	50102-001
20032-001	Belt, Drive	1	20179-XXX
20106-002	Spring, Helical Compr.	1	70009-XXX
20181-001	Assy, Clutch	1	50102-001
30025-002	Pad, Diskette Load	1	50102-001
30036-003	Hub, Drive	1	70009-XXX
30069-002	Spring, Stylus	1	70009-XXX
30084-001	Pad, Lube	1	70009-XXX
30097-001	Rod, Guide	1	70009-XXX
30105-005	Guide, Door	2	70009-XXX
30153-001	Roller, Door	2	50102-001
40000-500	Motor, Stepper	1	70009-XXX

TABLE 9-1

RECOMMENDED SPARE PARTS LIST

orbis

orbis systems inc.

14251 Franklin Ave., Tustin, California 92680

TELEX 68-5657