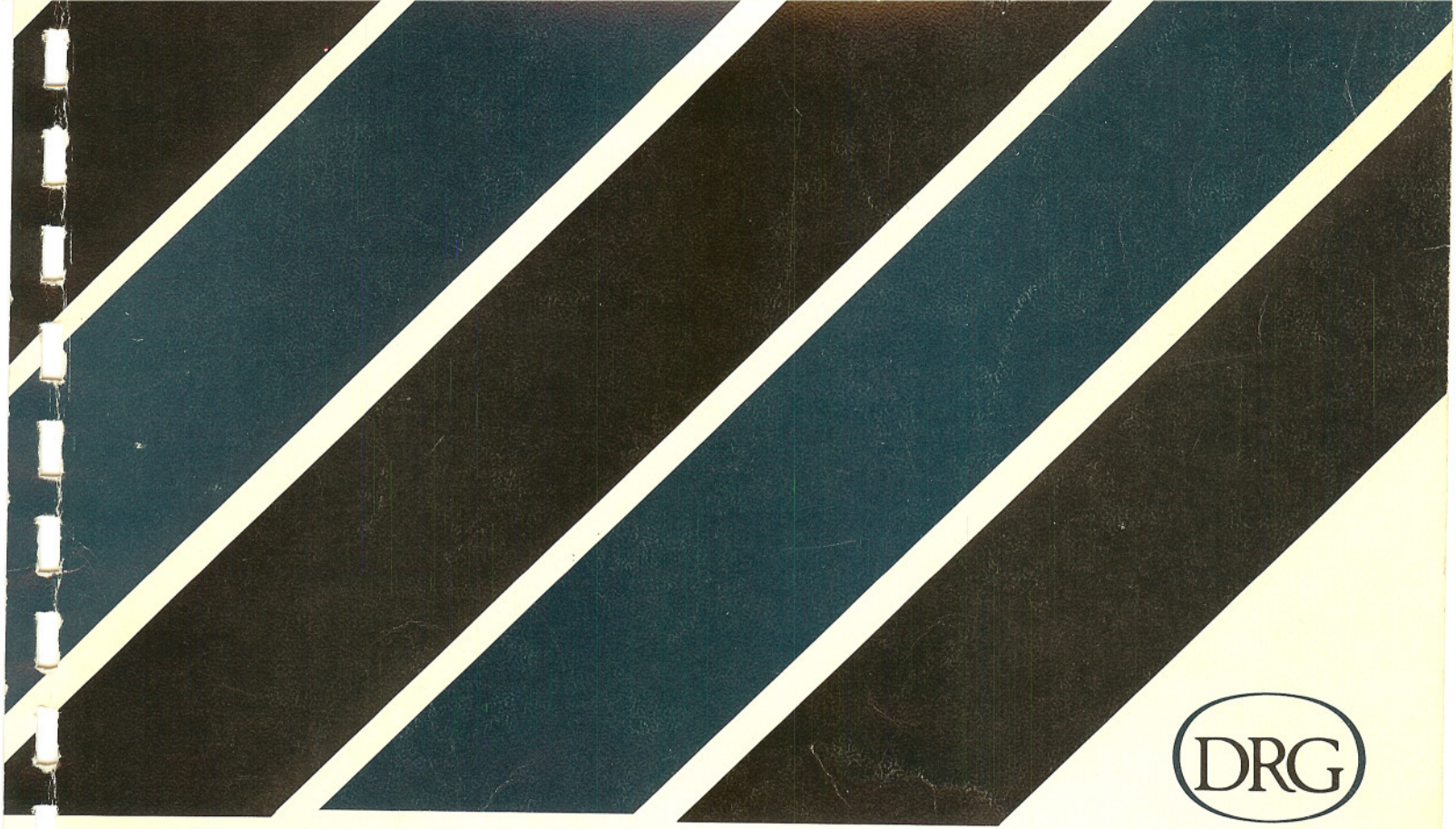
DRG Business Machines



DRG Business Machines, Lynx Crescent, Winterstoke Road,
Weston-super-Mare, BS24 9DN, Avon. Tel: Weston-super-Mare (0934) 415398 Telex: 44276

Y-E DATA

THE TWO-SIDED FLOPPY DISK DRIVE
YD-174
PRODUCT SPECIFICATION
MODEL YD174–1214

Alex Paterson (Technical Engineer)
Brent Knoll 760492 Key sunday

REV. F

REVISION

REV.	DESCRIPTION	DATE
A	ENGINEERING RELEASE	5. 30., '77
B	REVISE INTERFACE SPEC. ALL SHEETS	9. 10., '77
C	REVISE SHEET 1, 6, 14, 15, 16, 29, 30	10. 31., '77
D	REVISE SHEET 6, 9, 27, 30	11. 27., '78
E	REVISE SHEET 1, 4, 5, 9, 10, 12, 13, 30, 31, 32	2. 16., '80
F	REVISE SHEET 1, 6, 7	7.30., '80

DRWN	J. Sakai
CHK	S. Yoshikawa
APPD	J. Tatsumi
APPD	K Hiwatashi

DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS ANGLES
.xx =
.xxx =

Y-E DATA

THE TWO-SIDED FLOPPY DISK DRIVE
YD-174
PRODUCT SPECIFICATION

DWG No.	REV.
FDB-527003	F

SHEET 1 OF 32

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1.0 GENERAL

The Y-E DATA Model YD-174 Floppy Disk Drive is a low cost direct access data storoge device which utilizes a removable IBM or equivalent diskette as storage medium.

It is compatible with the following IBM Diskette Drive.
(1) Single Sided IBM 3740 and System 32 Drives.; 33FD
(2) Two-Sided IBM 3600 and 4964 Drives.; 43FD

The new model provides the storage capacity of 0.56M Bytes on the two sided single density diskette, IBM DISKETTE 2 or equivalent and 1.2M Bytes on the two sided double density diskette with write precompensation.

The YD-174 uses a two sided head carriage assembly with two proven ceramic R/W tunnel erase heads and flexured mounting arrangements which result in high reliability.

Faster access time, 3ms track to track, are accomplished by simple, precise steel belt drive with low power dissipation and minimum wear.

Standard features include
(1) No negative DC power supply.
(2) Up to 4 drives daisy chain.
(3) ISO Write protect.
(4) Program controlled door lock.
(5) Activity indicator LED on the front panel.
(6) UL recognized (File No. E59655)

The YD-174 is designed to operate in any plane and to mount 2 drives horizontally, or 3 vertically within a 19 inch RETMA Rack.

The YD-174 provides the physical and electrical interface compatible with the Shugart SA850R only except that LOW CURRENT input are required on the YD-174 interface.

2.0 SPECIFICATION SUMMARY

2.1 Performance Specifications

	Single Density	Double Density
Capacity		
Unformatted Per Disk	0.8M Bytes	1.6M Bytes
IBM Format Per Disk	568K Bytes	1.2M Bytes
Recording Density	3408 BPI	6816 BPI
Track Density	48 TPI	48 TPI
Number of Cylinders	77	77
Number of Tracks	154	154
Recording Method	FM	MFM with write precompensation
Rotational Speed	360 RPM	360 RPM
Transfer Rate	250K Bits/sec	500K Bits/sec
Latency (Average)	83 ms	83 ms
Access Time		
Average	91 ms	91 ms
Track to Track	3 ms	3 ms
Settling	15 ms	15 ms
Head Load Time	35 ms	35 ms
Motor Start Time	2 sec	2 sec

2.2 Installation Requirements

AC Power Requirements	100/115 VAC Installations	100/115 VAC±10% 50/60 Hz±1% 0.8A MAX. (Start up) 0.4A MAX. (Running)	
	200/230 VAC Installations	200/230 VAC±10% 50/60 Hz±1% 0.6A MAX. (Start up) 0.3A MAX. (Running)	
DC Power Requirements	+24 VDC±10%, 1.0A MAX. 0.1Vp-p ripple MAX. + 5 VDC± 5%, 1.3A MAX. 0.05Vp-p ripple MAX.		
Power Dissipations	55W (190 BTU/Hr) MAX.		
Environment		Operating	Storage
	Temperature	5°C to 43°C (41°F to 110°F)	-10°C to 45°C (14°F to 113°F)
	Relative Humidity	20 to 80% RH	8~80% RH
	Max. Wet Bulb	29°C (84°F)	No Condensation
Mechanical Dimensions	Height	114mm (4.50 in)	
	Width	217mm (8.55 in)	
	Depth	370mm (14.57 in)	
	Weight	6 Kg (13 lbs)	
Mounting	Horizontal front load, Vertical front load, Vertical top load.		

2.3 Reliability and Maintenance

Error Rate Recoverable Read Error Rate Non-Recoverable Read Error Rate Seek Error Rate	 One error per 10^9 bits read One error per 10^{12} bits read One error per 10^6 seek
MTBF	10000 power on hours
MTTR	30 minutes
Preventive Maintenance	6000 power on hours or 2 years
Design Life	15000 power on hours or 5 years
Media Life	3.5×10^6 passes/track
CE-Disk	YD-195

3.0 ELECTRICAL INTERFACE

The electrical interface of the YD-174 is devided into two categories; Signal Interface and Power Interface.
Refer to Fig. 3.1 for all interface connections.

3.1 Signal Interface

All lines in the signal interface are TTL.

3.1.1 Input lines

There are twelve (12) low active TTL input lines to YD-174. Ten (10) are standard and two (2) are user installable options. Each line has the following characteristics.
Refer to section 3.1.4, Fig. 3.2 for the interface circuits.

High level	false	2.4V to 5.25V
Low level	true	0V to 0.4V
Input Impedance		150 ohms to 5V

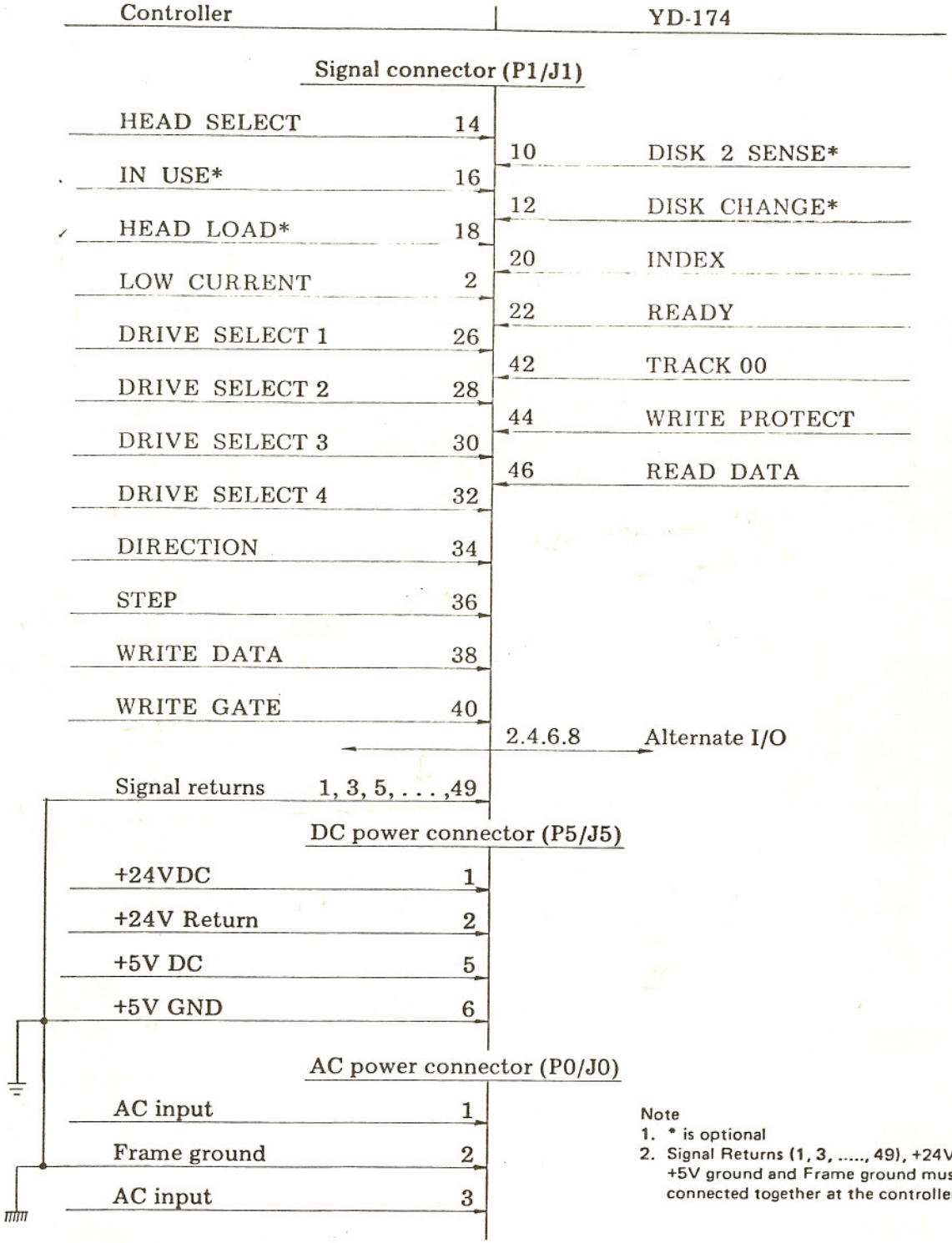
3.1.1.1 DRIVE SELECT 1—4

A low active level on this line enables the communication between the drive and it's controller.

Four separate input lines are provided so that up to four drives in daisy chain may have separate input for this control lines. Traces DS1 ~ DS4 have been provided to select which DRIVE SELECT line will activate the interface signals for unique drive
Refer to Section 4.1 and section 4.2 for additional method of selecting drives.

DRIVE NUMBER	DRIVE SELECT input				Traces			
	1	2	3	4	DS1	DS2	DS3	DS4
1	L	H	H	H	S	O	O	O
2	H	L	H	H	O	S	O	O
3	H	H	L	H	O	O	S	O
4	H	H	H	L	O	O	O	S

L = low level H = high level
S = short O = open



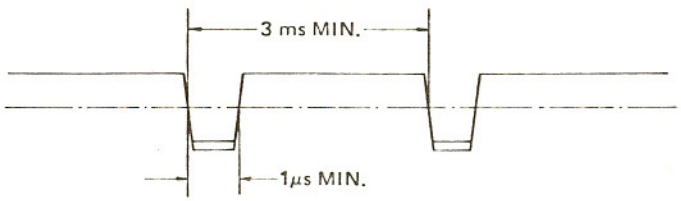
Note
1. * is optional
2. Signal Returns (1, 3, ..., 49), +24V Return, +5V ground and Frame ground must be connected together at the controller.

3.1.1.2 DIRECTION Pin 34

This interface signal defines the direction of motion of the R/W head when the STEP line is pulsed. A low 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 high level, a pulse on the STEP line causes the Head Position Mechanism to move the read/write head away from the center of the disk. The state of DIRECTION must not change while STEP is active. Any change on this line must be made at least 1 μsec before the trailing edge of the step pulse. Refer to Fig. 3.3, for these timings.

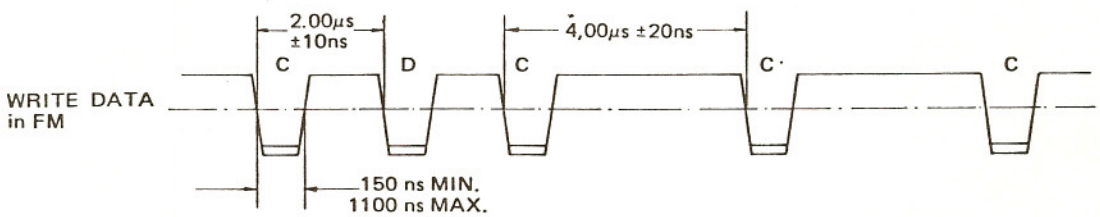
3.1.1.3 STEP Pin 36

A low active level on this line will cause the read/write head to be moved one track. The direction of movement is controlled by the DIRECTION line.



3.1.1.4 WRITE DATA Pin 38

This interface line provides the data to be written on the disk. Each transition to a low active level on this line causes write current through the write coils to be reversed.



In MFM, WRITE DATA should have the write precompensation of 250NS on tracks 44 through 76 and no write precompensation on tracks 00 through 43.

3.1.1.5 WRITE GATE Pin 40

A low active level on this line enables the write current source, and disables the stepping circuitry. A high inactive level on this line enables the read circuitry.
Deactivation of the DRIVE SELECT, and/or changing the HEAD SELECT must be delayed at least 590 μs following a write operation to asure that the track is fully tunnel erased.
Refer to Fig. 3.4 and Fig. 3.5 for these timings.

3.1.1.6 HEAD SELECT

This interface signal defines which side of a two sided diskette is used for data recording or retrieval. A high level on this line selects the R/W head on the side 0 surface of the disk. A low level on this line selects the R/W head on the side 1 surface of disk.
When switching from side 0 to side 1 and conversely, 100 μs delay is required before any read or write operation can be initiated. Refer to section 4.3 for additional method.

3.1.1.7 LOW CURRENT Pin 2

A low active level on this line is required for writing on tracks 44 trough 76.
This input is used to lower the write current by 20% which consequently improves the read output resolution of the inner tracks.

3.1.1.8 HEAD LOAD (Alternate input)

A low active level on this option input, when READY is active, causes the R/W head to be loaded against the diskette.
Refer to section 4.2 for uses and method of installation.

3.1.1.9 IN USE (Alternate input)

Refer to Section 4.6.

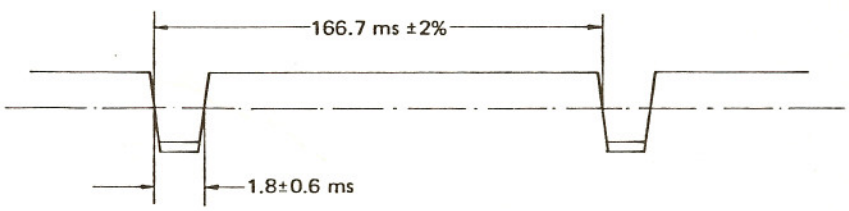
3.1.2 Output lines

There are seven (7) output lines from the YD-174: five (5) are standard and two (2) are optional. Each line has the following characteristics.
Refer to Fig. 3.2 for the interface circuits.

High level	false	MAX cutoff current 250μA
Low level	true	0 to 0.4V, MAX. sink 48mA

3.1.2.1 INDEX · Pin 20 ·

This interface signal is provided by the drive once each revolution. The leading edge of INDEX pulse indicates the beginning of the track.



3.1.2.2 READY

A low active level on this line indicated that two index holes have been sensed after properly inserting a diskette and closing the door, or that two index holes have been sensed following the application of +5V power to the drive.
Refer to section 4.4 for additional method of using the READY line.

3.1.2.3 TRACK 00

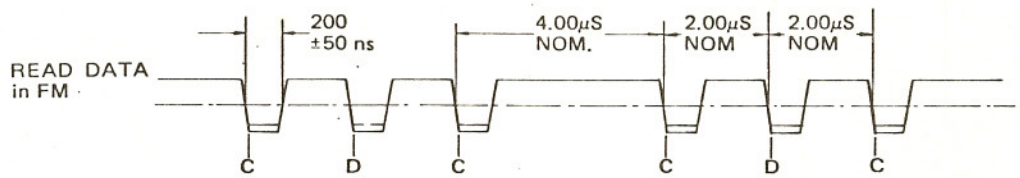
A low active level on this line indicates that the R/W head is positioned at track 00.

3.1.2.4 WRITE PROTECT

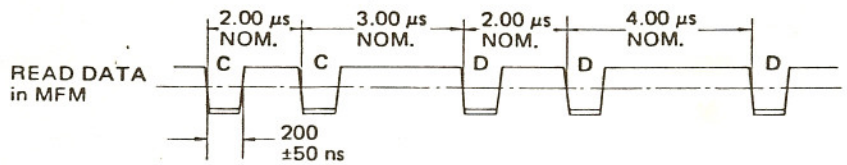
A low active level on this line indicates that diskette with ISO write protect notch is loaded.
Under normal operation, the drive will inhibit writing with a protected diskette installed in addition to notifying the interface.
Refer to section 4.7 for other method of using WRITE PROTECT.

3.1.2.5 READ DATA

Data 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 on this line.



C = LEADING EDGE OF BIT MAYBE ±400 ns FROM ITS NOMINAL POSITION.
D = LEADING EDGE OF BIT MAYBE ±200 ns FROM ITS NOMINAL POSITION.



EACH LEADING EDGE OF BIT MAYBE ±350 ns FROM ITS NOMINAL POSITION.

3.1.2.6 DISK CHANGE (Alternate output)

Refer to 4.8

3.1.2.7 DISK 2 SENSE (Alternate output)

Refer to 4.9

3.1.3 Alternate I/O pins

Eight (8) alternate I/O pins are provided for alternate control signal interface pins. Each alternate I/O pin has a pad provided for customer installable jumpers. (Pins 2, 4, 6, 8, 10, 12, 16, 18)

Two (2) optional output line and two input lines are connected through normally open traces to four interface lines (pins 10, 12, 16, 18)

3.1.4 Interface circuits

YD-174 uses the 7438 driver as a line driver and 7414 schmitt trigger inverter as a line receiver. The input of each receiver is terminated in 150 ohms to +5V.

Refer to Fig. 3.2 for the recommended interface circuits of the controller.

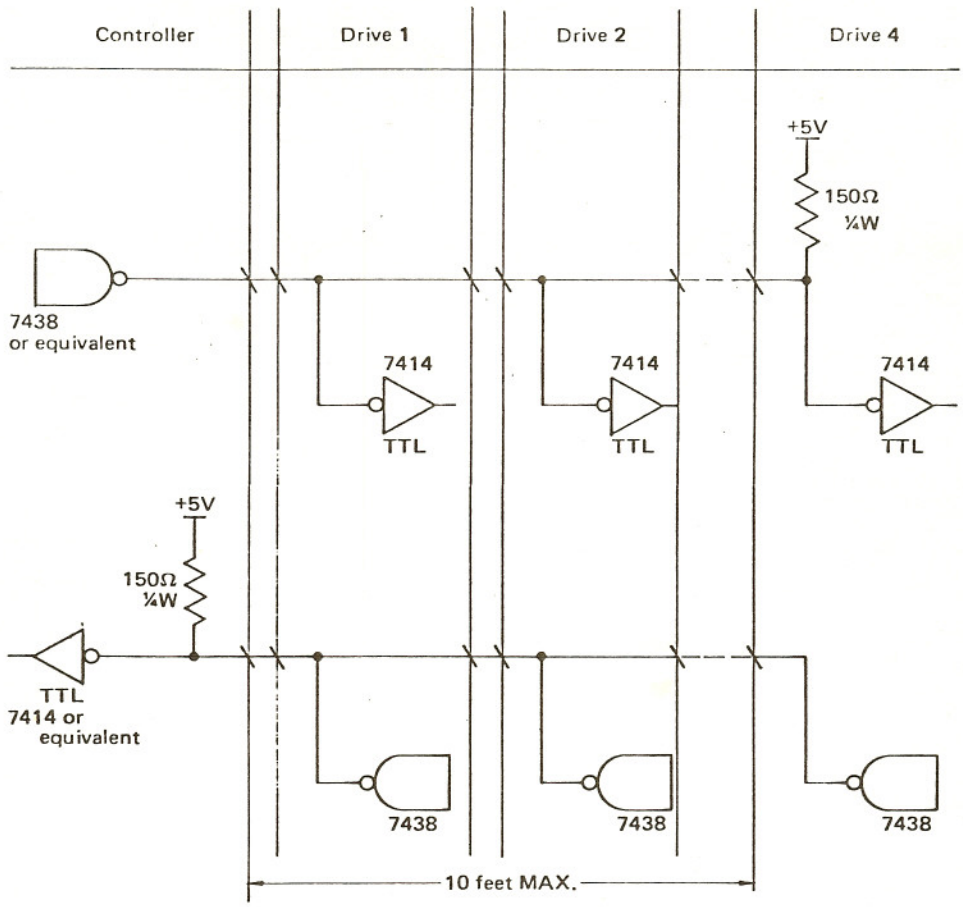


Fig. 3.2 Signal interface circuits

3.1.5 Timing

3.1.5.1 Track access timing

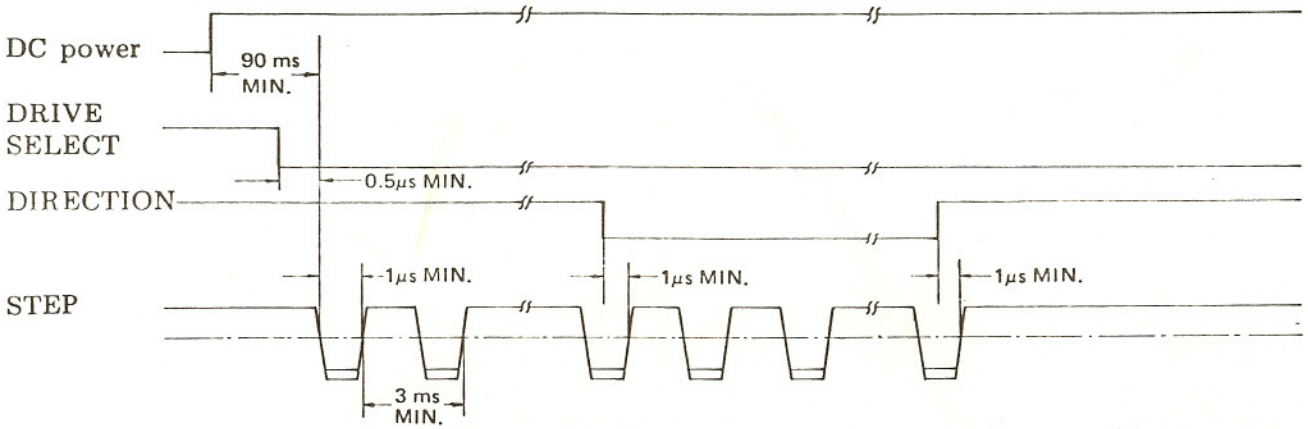


Fig. 3.3 Track access timing

3.1.5.2 Read timing

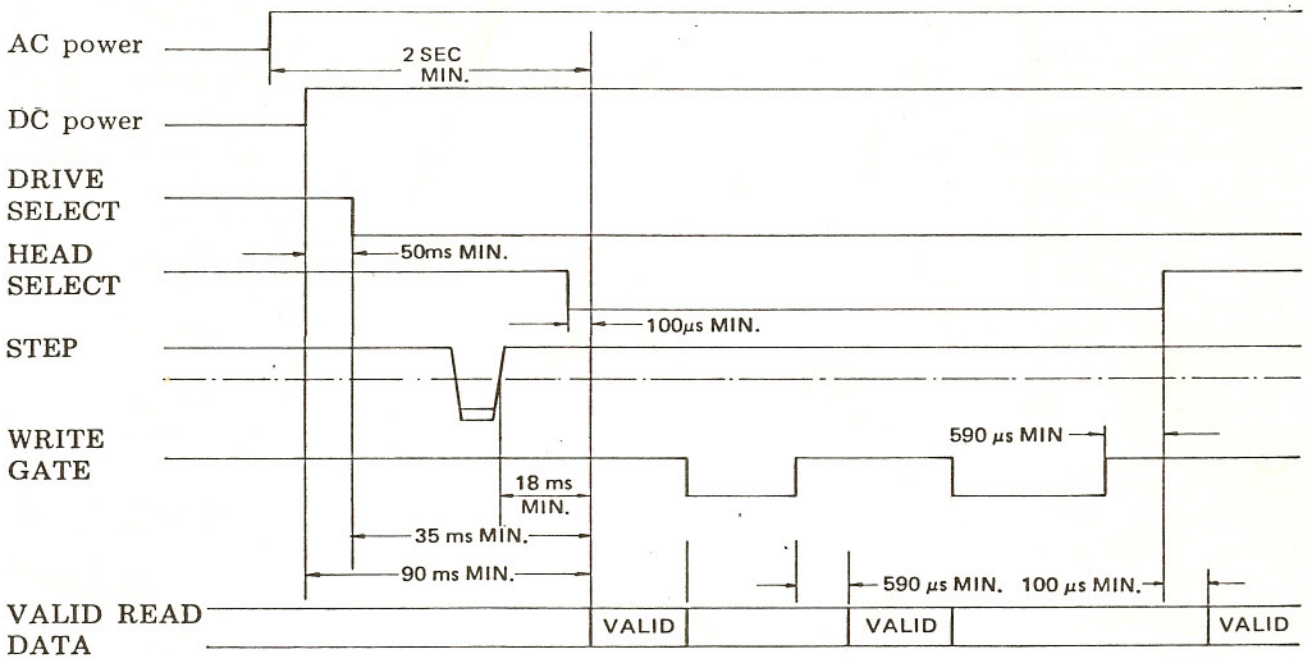


Fig. 3.4 Read Timing

3.1.5.3 Write Timing

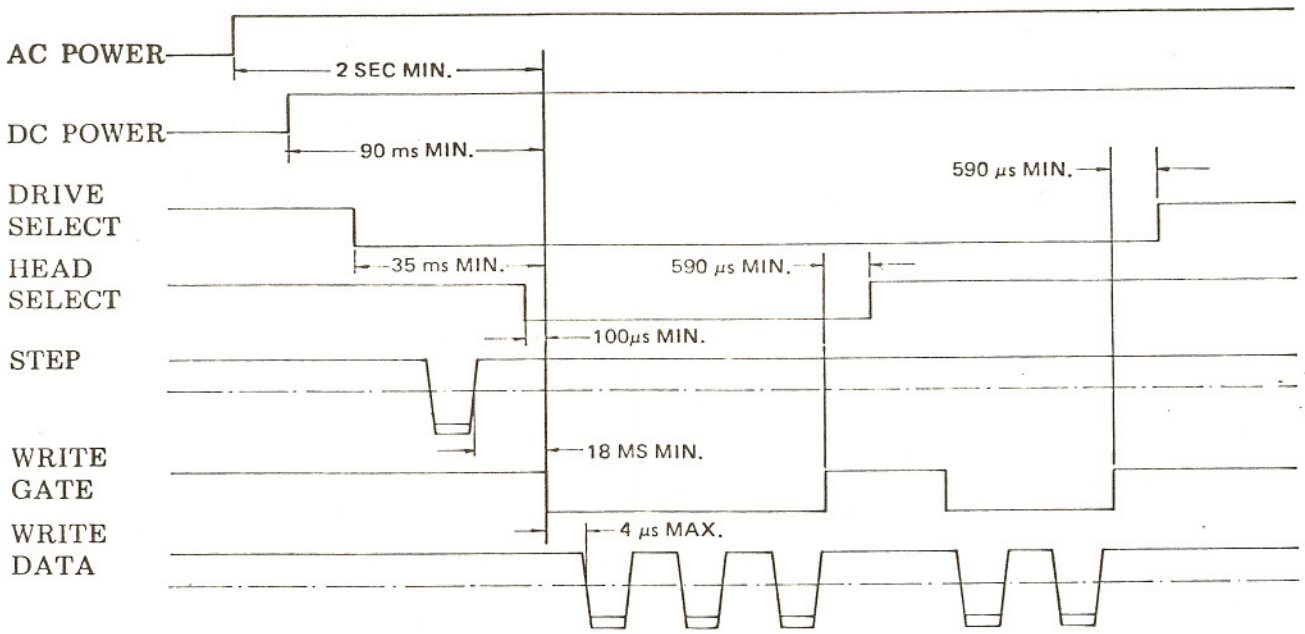


Fig. 3.5 Write timing

3.2 Power interface

3.2.1 DC power requirement

DC power Voltage	Ripple Voltage		DC supply current (A)			
			1 drive	2 drives	3 drives	4 drives
+24V±10%	0.1V (p-p)	TYP.	0.7	0.8	0.9	1.0
	MAX.	MAX.	1.0	1.2	1.4	1.6
+5V±5%	0.05V (p-p)	TYP.	0.9	1.6	2.3	3.0
	MAX.	MAX.	1.3	2.2	3.1	4.0

Note
1. DC power voltage is specified at DC power connector (J5) on PWB.
2. DC supply current is when the drives are normally installed without customer options.
3. If either of the following customer installable options are chosen, the current for +5V is same as above table but the current for +24V line is multiple of the MAX. +24V current times the number of drives.

3.2.2 AC power requirement

Refer to section 2.2.

Note: DC power voltage is specified at DC power connector (J5) on PWB.

4.0 CUSTOMER INSTALLABLE OPTIONS

YD-174 can be modified by the user to function differently than method as outlined in section 3. These modifications can be implemented by adding or deleting traces and by use of the Alternate I/O pins. Table 4.2 shows the trace option with condition of the trace as it is shipped from the factory.

A 16 pin programmable shunt is provided for seven most commonly used trace cut options. All these traces are usually shorted from the factory. See Table 4.1

Trace	Function — Normally shorted	Function — open
A	(DS) = DS	(DS) = DS * HL
B	(DS) = DS	(DS) = DS, (HL) = HL
X	(HL) = DS	(HL) = DS * HL
Z	(IN USE) = DS	(IN USE) = HL + IN USE
HL	Stepper Power = DS	Stepper Power = always active
R	READY for multiplex mode	READY for radial mode
I	INDEX for multiplex mode	INDEX for radial mode

Note DS = DRIVE SELECT, HL = HEAD LOAD
* = AND logic function, + = OR logic function
( ) means the drive internal logic.

Table 4.1 Programmable shunt feature

Trase designator	Description	Shipped from factory	
		Open	Short
DS1 ~ DS4	Drive address select pins (up to 4 drives)	DS2, DS3 DS4 are unplugged	DS1 is plugged
A, B, X	Radial HEAD LOAD		plugged
Z	IN USE from DRIVE SELECT		"
HL	Stepper power from HEAD LOAD	Stepper always on	"
R	READY alternate output pad		"
I	INDEX "		plugged
C	Alternate input HEAD LOAD	unplugged	
D	" IN USE	"	
DC	Alternate input DISK CHANGE	"	
2S	" DISK 2 SENSE	"	
DS	Stepper power from DRIVE SELECT	"	
Y	IN USE from HEAD LOAD	"	
DL	Door lock latch	unplugged	
RR	Radial READY		short
RI	Radial INDEX		"
WP	Inhibit write when WRITE PROTECT		short
NP	Allow " "	pad	
D1, D2, D4, DDS	Drive address, select pins (up to 8 drives)	pad	
B1 ~ B4	Two, double sided drive select	pad	
S1 ~ S3	Head select option	S1, S3 is pad	S2 is short
2, 4, 6, 8, 10, 12, 16, 18	Alternate I/O pins	pad	

Table 4.2 Customer trace options

4.1 Drive select option, one to eight drives.

Normally, Up to four drives can be operated in a daisy chain system.

This option allows up to eight drives to be multiplexed together. Four DRIVE SELECT lines are to be used for addressing the drive. DRIVE SELECT 1 is used as DRIVE SELECT enable. DRIVE SELECT 2 (binary 1), DRIVE SELECT 3 (binary 2), and DRIVE SELECT 4 (binary 4) are the address lines. The logical drive assignment is accomplished by properly jumpering the Traces D1, D2, D4, where D1 (binary 1), D2 (binary 2) and D4 (binary 4)

1. Add a 74L85, 4 bit comparator in IC location.
2. Jumper trace DDS, unplug trace DS1 ~ DS4.
3. Jumper properly traces D1, D2 and D4.

DRIVE NUMBER	DRIVE SELECT input				Traces		
	1	2	3	4	D1	D2	D4
0	L	H	H	H	0	0	0
1	L	L	H	H	1	0	0
2	L	H	L	H	0	1	0
3	L	L	L	H	1	1	0
4	L	H	H	L	0	0	1
5	L	L	H	L	1	0	1
6	L	H	L	L	0	1	1
7	L	L	L	L	1	1	1

L = low level, H = high level

4.2 Head load options

Normally, when a drive is selected, its head is loaded and the stepper power is energized.

Option 1. Allows a drive to be selected, without loading head or enabling stepper. The advantage of this option would be that the output signals could be monitored while head is unloaded, thereby extending the media life.

Option 2. Allows a drive to be selected and stepper to be enable without loading head. An example of this option is that initial recalibration at power on could be performed at not READY condition.

Option 3. (Radial READY) allows a drive to be head loaded, without selecting drive or enabling stepper. The advantage of this option is that the head could be kept loaded on all drives thereby eliminating the head load time at the disk copy operation.

Refer to Table 4.3.

Logic	Normal	Option 1	Option 2	Option 3
DRIVE SELECT (DS)	(DS) = DS	(DS) = DS	(DS) = DS	(DS) = DS*HL
HEAD LOAD (HL)	(HL) = DS*R	(HL) = HL*DS*R	(HL) = HL*R	(HL = HL*R
Stepper power (SP)	(SP) = (HL) = DS*R	(SP) = (HL) = HL*DS*R	(SP) = (DS) = DS	(SP) = (DS) = DS*HL
Installation		Unplug X plug C	Unplug B Unplug HL plug DS plug C	Unplug A Unplug HL plug DS plug C

R = READY, ( ) means drive interval logic, * = AND logic function

Table 4.3 Drive select/headload option

4.3 HEAD SELECT OPTIONS

Normally, a head is selected from the interface line in a daisy chain system of up to four drives.

4.3.1 Head select from DIRECTION line.

This option allows both HEAD SELECT and DIRECTION to be multiplexed on the same DIRECTION line.

1. Cut trace S2, and jumper the trace S1.

4.3.2 Head select up to two double sided drives.

This option is to use the existing DRIVE SELECT lines to adress up to two double sided drives

1. Cut trace S2, and jumper the trace S3.

DRIVE NUMBER	HEAD SELECT	DRIVE SELECT input				Traces
		1	2	3	4	
1	0	L	H	H	H	plug DS1
1	1	H	L	H	H	Jumper 2B
2	0	H	H	L	H	plug DS3
2	1	H	H	H	L	Jumper 4B

L: low level, H: high level

4.4 Radial READY options

Normally, the READY line from a drive is only available to the interface when it is selected. This option enables the user to moniter the READY line of each drive on the interface all the times.

1. Cut Trace RR
2. Unplug Trace R and jumper the pad R to one of the Alternate I/O pins.

4.5 Radial INDEX options

Normally, the INDEX line from a drive is only available to the interface when it is selected. This option enables the user to monitor the INDEX line of each drive on the interface all the times.

1. Cut trace RI
2. Unplug trace I and jumper the pad I to one of the Alternate I/O pins

4.6. IN USE options

Normally, the activity LED will be turned on, when DRIVE SELECT become active. The door lock will be activated when DRIVE SELECT and READY is active.

4.6.1 IN USE LED

This optional input, when activated to a Low level, will turn on the activity LED. For uses and method, refer to Table below

Logic	Option 1	Option 2	Option 3
IN USE	(IN USE) = IN USE + DS	(IN USE) = IN USE + HL	(IN USE) = (IN USE)
Installation	Plug D	Plug D Unplug Z Plug Y	Plug D Unplug Z Plug Y

+ = OR logic function

4.6.2 Door lock latch option

With this option, installed door lock actuator may be latched without maintaining tne active status of IN USE input throughout the door lock interval, because the IN USE input may be strobed by DRIVE SELECT.

1. Plug trace D
2. Plug trace DL

4.7 Write Protect option

With this option installed, a Write Protected diskette will not inhibit writing but it will be reported to the controller.

1. Cut trace WP and jumper trace NP

4.8 Disk change (Alternate Output)

A low active level on this option line indicates that the READY signal has gone false (door opened) after DRIVE SELECT went false. The disk change circuit is reset false on the true to false transition of DRIVE SELECT provided that the drive is READY. See Fig. 4.1

1. Plug DC

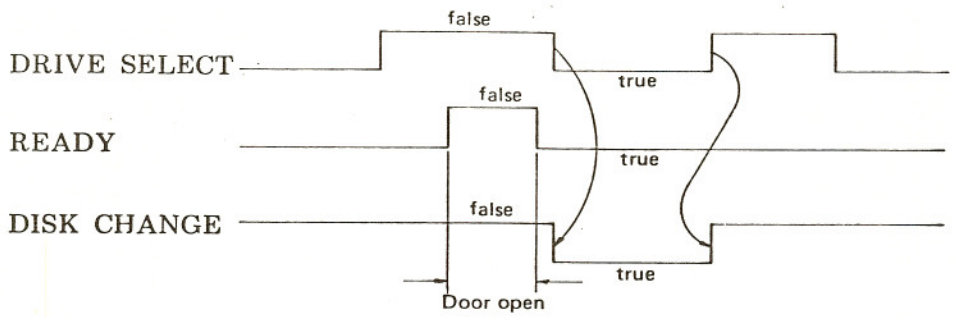


Fig. 4.1 IN USE timing

4.9 DISK 2 SENSE

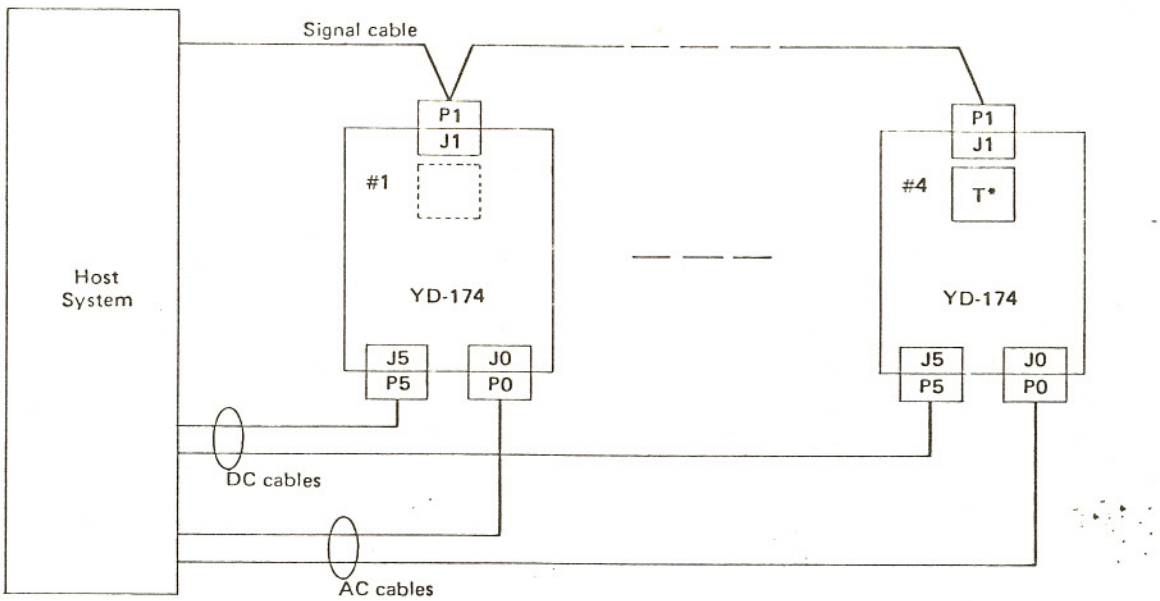
A low level on this line indicates that a two-sided diskette is rotating, and A HIGH level on this line indicates that single-sided diskette is rotating.

1. Plug trace 2S

5.0 PHYSICAL INTERFACE

The interface between YD-174 and the host system is via three (3) connectors: Signal (P1/J1), DC power (P5/J5) AC power (P0/J0).

Refer to Fig. 4.1 for interface connection.



*T : Terminators

Fig. 5.1 Interface connection

5.1 Connectors and cables

5.1.1 Signal connectors and cables (P1/J1)

5.1.1.1 Connector J1

Connection to J1 is through a 50 pin PWB edge card connector. The dimension for this connector are shown in Fig. 5.2

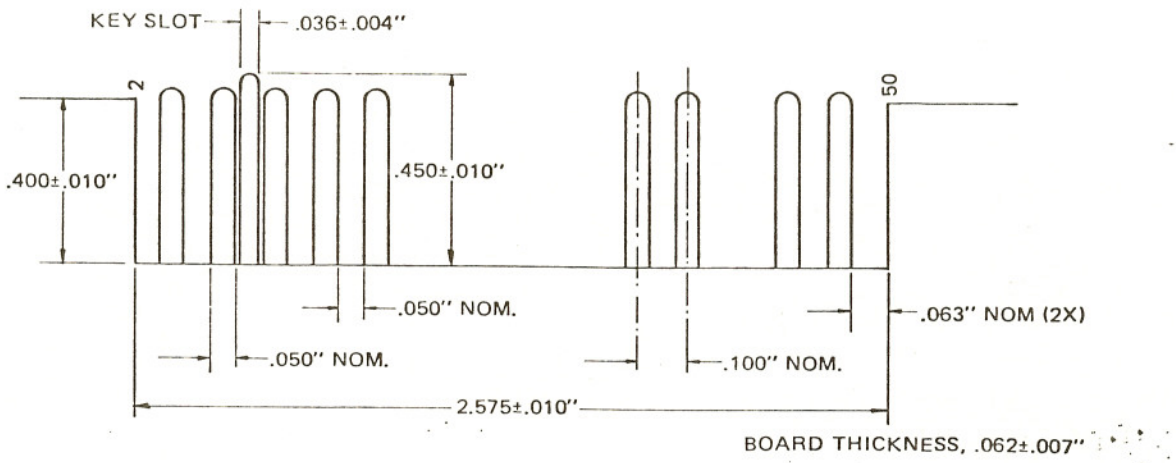


Fig. 5.2 J1 Connector Dimensions (component side)

5.1.1.2 Connector P1 for a flat cable

Parts		3M P/N
Connector		3415-0001
Polarizing key		3439-0000
Crimp tool	Press	3440
	Locator plate	3443-11
	Platen	3442-1
Flatcable (10 feet MAX.)		3365/50

5.1.1.3 Connector P1 for a twisted pair

Parts	Crimp type	Solder type	
	AMP P/N	AMP P/N	VIKING P/N
Housing	1-583717-1	1-583717-1	3VH25/1JN-5
Contact	583616-5	583854-3	—
Plarizing Key	583274-1	583274-1	091-0071-000
Crimp tool	90268-1	—	—
Extractor tool	91073-1	91073-1	—
Twist pair (20 feet MAX.)	AWG 26	AWG 26	AWG 26

5.1.2 DC power connector and cable (P5/J5)

Parts	P5 (cable side)	J5 (Drive side)
	AMP P/N	AMP P/N
Housing	1-480270-0	1-380999-0
Contact (6 pins)	60619-1	—
Crimp tool	90124-2	—
Extractor tool	1-305183-2	—
Cable (10 feet MAX)	AWG 18 to 16	—

5.1.3 AC power connector and cable (P0/J0)

Parts	P0 (cable side)	J0 (Drive side)
	AMP P/N	AMP P/N
Housing	1-480700-0	1-480701-0
Contact (3 pins)	350550-1	350705-1 and 350669-1
Crimp tool	90296-1	90296-1
Extractor tool	458994-1	458994-1
Cable (20 feet MAX)	AWG 18 to 16	AWG 18 to 16

5.2 Connector pin assignments

5.2.1 Signal connector pin assignments

See Table 5.1

Signal return Pin No.	Signal Pin No.	SIGNAL NAME	
		STANDARD	OPTION
1	2	LOW CURRENT	
1, 3, 5, 7	2, 4, 6, 8	Alternate I/O	
9	10	Alternate I/O	TWO SIDED
11	12	Alternate I/O	DISK CHANGE
13	14	SIDE SELECT	Alternate I/O
15	16	Alternate I/O	IN USE
17	18	Alternate I/O	HEAD LOAD
19	20	INDEX	
21	22	READY	
23	24	RESERVED	
25	26	DRIVE SELECT 1	
27	28	DRIVE SELECT 2	
29	30	DRIVE SELECT 3	
31	32	DRIVE SELECT 4	
33	34	DIRECTION	
35	36	STEP	
37	38	WRITE DATA	
39	40	WRITE GATE	
41	42	TRACK 00	
43	44	WRITE PROTECT	
45	46	READ DATA	
47	48	reserved	
49	50	reserved	

TABLE 5. Signal connector pin assignments

5.2.2 DC Connector Pin Assignment

Pin No.	Signal Name
1	+24 V DC
2	+24 V RETURN
3	reserved
4	reserved
5	+5 V DC
6	+5 V GND

5.2.3 AC Connector Pin Assignment

Pin No.	Signal Name
1	AC INPUT
2	FRAME GROUND
3	AC INPUT

5.3 Terminators

The terminators consist of two DIP resistor modules which may be plugged into DIP sockets on the PWB of the last drive in a daisy chain. Refer to Fig. 5.1.

6.0 MOUNTING

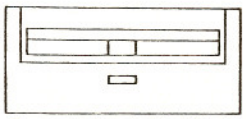
6.1 Drive mechanical dimensions

For the demension of the YD-174, refer to Fig. 6.1.

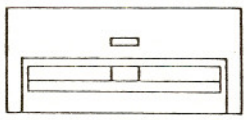
6.2 Mounting recommendations.

The YD-174 is designed so that it may be mounted in any plane (horizontal front door, vertical front load, vertical top load).

Note: When mounting in horizontal front load, install YD-174 so that the button on the front bezel is under the front door.



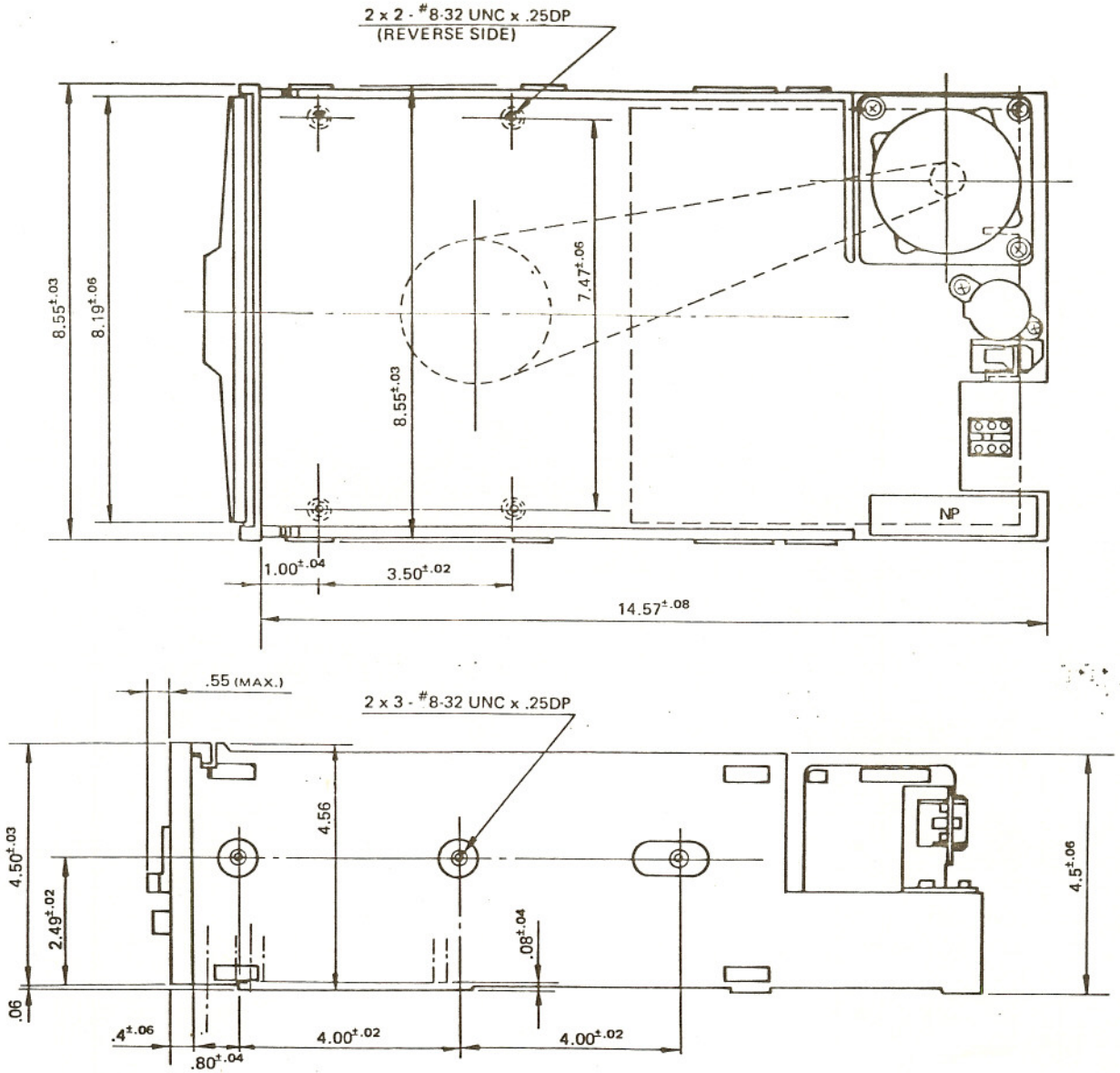
Properly installed
(PWB down)



Improperly installed
(PWB up)

6.3 Front bezel assembly

Two (2) size of front bezel are available (Refer to Fig. 6.1)
Standard color of front bezel, button and front door are recommended on Fig. 6.1.



[Standard Color]

Parts	Color Code (MUNSELL)	Color Code (MUNSELL)
Front Bezel	IVORY (6Y8.5/0.5, 7LST)	BLACK (N1.5, 7LST)
Front Door	GRAY (5Y4.5/1 , 7LST)	BLACK (N1.5, 7LST)
Push Button	GRAY (5Y4.5/1 , 7LST)	BLACK (N1.5, 7LST)

Fig. 6.1 Dimensions

7.0 IBM COMPATIBILITY

The Model YD-174 is designed to employ an IBM or equivalent diskette as recording media.

The following physical and electrical characteristics deemed necessary to be IBM compatible are employed in the Model YD-174.

7.1 Track Positioning

The Diskette Drive will position the R/W head on the center line of track 40 whose relative locations are specified in IBM's Drawing GA21-9190-3 and GA21-9275-0 within ±0.04 mm (±0.0016 of an inch). The track 40 track positioning accuracy may be checked by CE Disk YD-195.

7.2 Read/Write/Erase Head

The geometry and configuration of Read/Write/Erase head employed in the diskette drive is equivalent to the IBM head.

7.3 Read output level

The read output level measured by the following procedure shall be satisfied the table below.

(1) Data is written on the standard media with YD-174.
(2) The read output level from the standard media above is checked between Test point TP1A and TP1B with the same drive.

TA1A and TP1B are output of the head preamplifier.

Track	Output (all "1")	Resolution=$\frac{\text{all "1" output}}{\text{all "0" output}} \times 100$
76	100 mV p-p MIN.	40% MIN.

7.4 Write Current

IBM compatibility requires a 20% reduction in write current on tracks 44 through 76.

7.5 Index Positioning

The diskette drive Index Sensor adjustment allows the precise positioning of the Index Sensor with relation to the R/W head gap.

The positional difference of the Model YD-174 shall be within ±500μs, which may be checked by CE Disk YD-195.

7.6 Time Margins in FM

The Time Margins measured by the following test procedure shall be equal to or greater than 0.6 μs.

(1) Write random data pattern or worst case pattern (E5) on the all tracks or the innermost track of the Standard media with YD-174.
(2) Read data from the standard media above by using the one shot data separator with the same drive.
(3) Decrease the pulse width of data window and check the minimum pulse width of data window (TL), just before the Data error is occurred.
(4) Increase the pulse width of data window and check the maximum pulse width of data window (TH), just before the Data error is occurred.
(5) Calculate the Time Margins by the formula below.
Time Margins = TL — TH (μs)