Commodore Disk Drive

Technical Manual

Model 8250LP

SFD-1001

These documents are for repair service information only. Part numbers are for reference only. Only parts on current dealer parts list are available. No license is given for any use by possession of these documents and may not be reproduced in any form without the written approval of Commodore Electronics Limited.

commodore COMPUTER

CONTENTS

I. GENERAL

II. CAPACITY

III. MEDIA

IV. ENVIRONMENTAL

V. RELIABILITY

VI. POWER

VII. DRIVE

VIII. INTERFACE

IX. SUGGESTED GENERAL CONTROL/DATA TIMING REQUIREMENTS

X. PHYSICAL OUTLINE

XI. PARTS LIST

I. GENERAL

Description

The JU-570 is a 1.625" High (1/2 Hight) double-sided double-density 100 TPI minifloppy diskette drive. It contains a band actuator, a DC direct drive motor, bicompliant read/write head geometry, track 0 detector index detector, write protect switch, R/W electronics and motor speed control electronics.

II. CAPACITY

	Single Density	Double Density
A. Encode Method	FM	MFM
B. Unformatted		
Bits/Diskette	4,000,000	8,000,000
Bits/Track	25,000	50,000
C. Formatted 16 Records/Track (Hard or Soft)		
Bits/Diskette	2,621,440	5,242,880
Bits/Track	16,384	32,768
Bits/Sector	1,024	2,048
D. Formatted 10 Records/Track (Hard or Soft)		
Bits/Diskette	3,276,800	6,553,600
Bits/Track	20,480	40,960
Bits/Sector	2,048	4,096
E. Formatted 18 Records/Track (Soft)		
Bits/Diskette	2,949,120	5,998,240
Bits/Track	18,432	36,864
F. Transfer Rate		
Bits/Second	125K	250K
Bytes/Second	15.625K	31.25K

III. MEDIA

Diskette

MCI recommended Minidiskette for double-sided double-density double track drive.

Tracks		
per inch	100	
per surface	78	
per disk	156	
Track Location		
track 36 radius (Side 0)	1.9166 in.	48.682 mm.
(Side 1)	1.8333 in.	46.566 mm.

IV. ENVIRONMENTAL

	Operating	Shipping	Storage
Ambient Temperature	41° to 115°F 5° to 46°C	-4° to 140°F -20° to 60°C	-4° to 122°F -20° to 50°C
Relative Humidity	20 to 80%	8 to 90%	8 to 90%
Max. Wet Bulb	80°F 29.4°C	No Condensation	
Change	15°C Change should allow 1 hour for diskette to stabilize to new environment.		

V. RELIABILITY

Error Rate - When used with MCI recommend circuits or eqiv.

Soft read errors (2 retries min.)	1 per 10^9 bits transferred
Hard read errors	1 per 10^{12} bits transferred
Seek errors	1 per 10^6 seeks
Media	
Diskette insertions	30,000
Diskette clampling (With rotated spindle)	30,000
MTBF (Mean Time between Failures)	10,000H, duty cycle 25%
PM (Preventative Maintenance)	None
MTTR (Mean Time to Repair)	30 minutes
Component Life	5 years
Media Life	3×10^6 passes per track

VI. POWER

DC Voltages

+5.00 ± 0.25 VDC @ 0.2A typical

+12.00 ± 0.60 VDC @ 1.2A max., .75A typical, 100 mV p-p ripple

BTU/Hr. (1 watt = 3.413 BTU/Hr.)

BTU Typ.	42.7
Watts Typ.	12.5

VII. DRIVE

A. Mechanical

Seek Settle Time

Track to track access time	18 ms max. Consisting of 3 ms track to track seek time and 15 ms settle time
Drive Motor Start Time	1 sec max.

R/W Head

Head load	17 ± 3 gr
Radial align./hysteresis*	70% min.
Azimuth	33' ± 18'
Modulation max.	20% max.
Spindle Speed	300 RPM ± 3%

B. Mounting

Front Loading

Diskette Vertical (Side 1 left or right)	Yes
Diskette Horizontal (Side 1 up)	Yes
Diskette Horizontal (Side 1 down)	No

Top Loading — No

C. Electrical - Readings at 21°C and nominal voltage unless otherwise specified.

1. Drive Motor

Max. stall current	900 MA
Max. running current	400 MA
Typical current	280 MA
Start time	1 sec max.

2. Stepping Motor

Stepper Motor/2 Phase (12 V)	$320\ ^{+35}_{-30}$ MA

3. Read/Write Channel

Head

Resistance/INDUCTANCE

Resistance RW1 or RW2 to CT	37 ± 30% ohms
Inductance RW at full coil	2 ± 30% mH
Resistance Erase to C.T.	8.0 ± 30% ohms
Inductance Erase	3.3 ± 30% µH

Performance

Test criteria: Head and Carriage

Rotational speed 300 rpm
Track radius at track 77
Frequency 125 kHz
Load pad pressure 17 ± 3 grams
Write current 6.3 ± 0.2 MA p-p

Average read amplitude after writing 1.3 mv p-p min.
Resolution 60% min.

VIII. INTERFACE

A. Introduction

This specification describes the requirements of the physical and electrical interface with the JU-570 Diskette Drive unit. The physical interface section specifies the mechanical requirements as well as lists recommended parts. The electrical interface defines the functional as well as timing relationships required of each I/O pin. (Fig. 1)

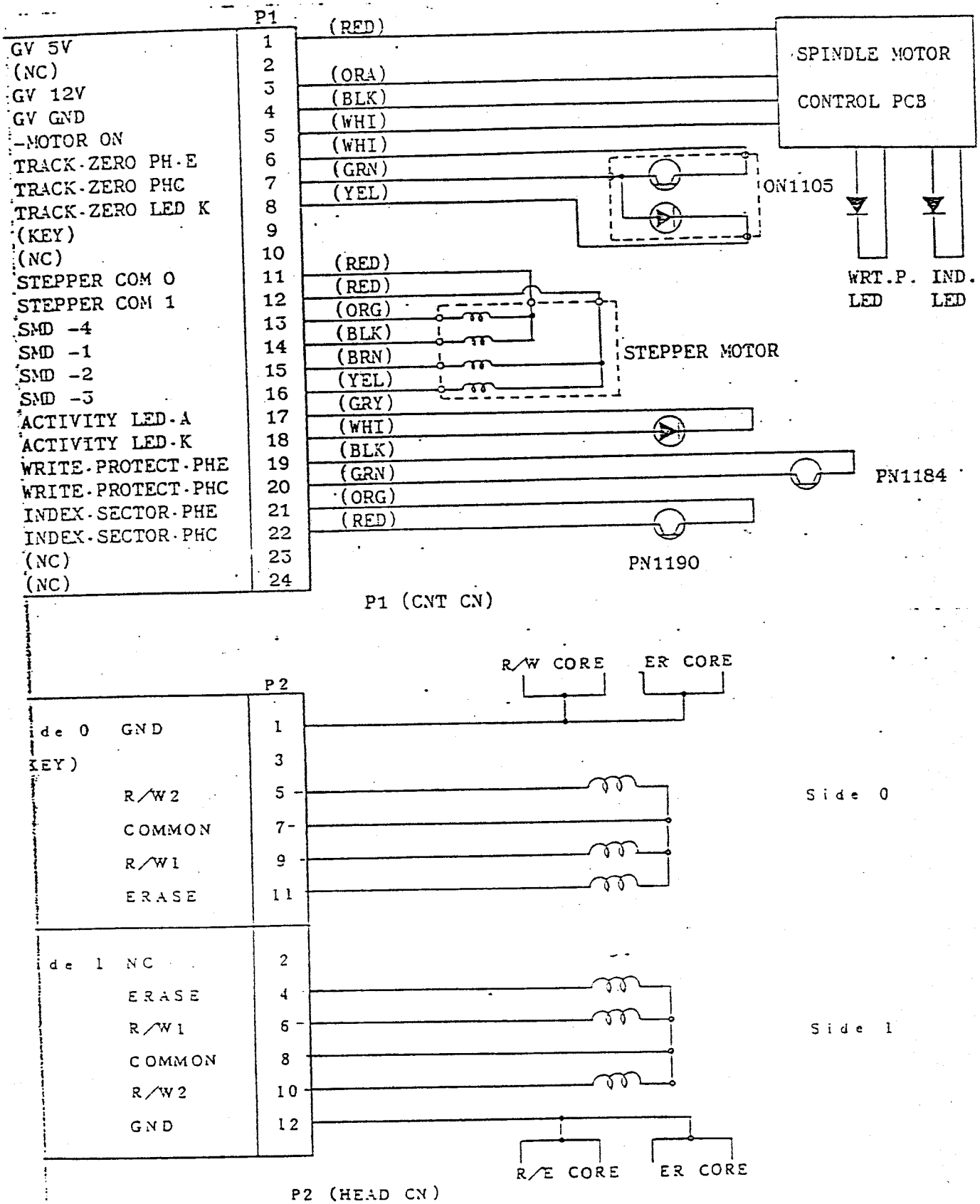
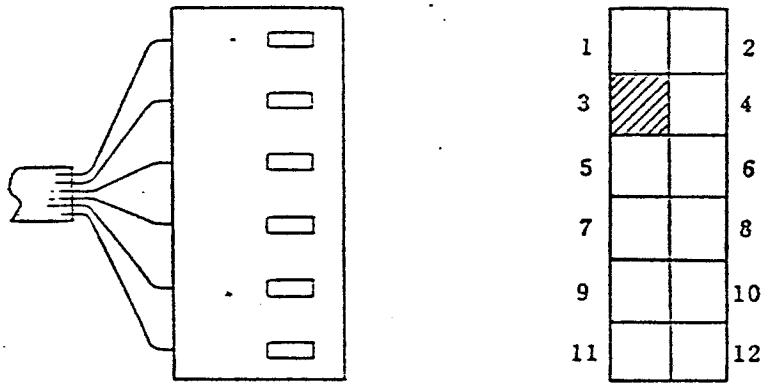


Fig. 1 The Electrical Interface Schematic

B-1. R/W Head Interface

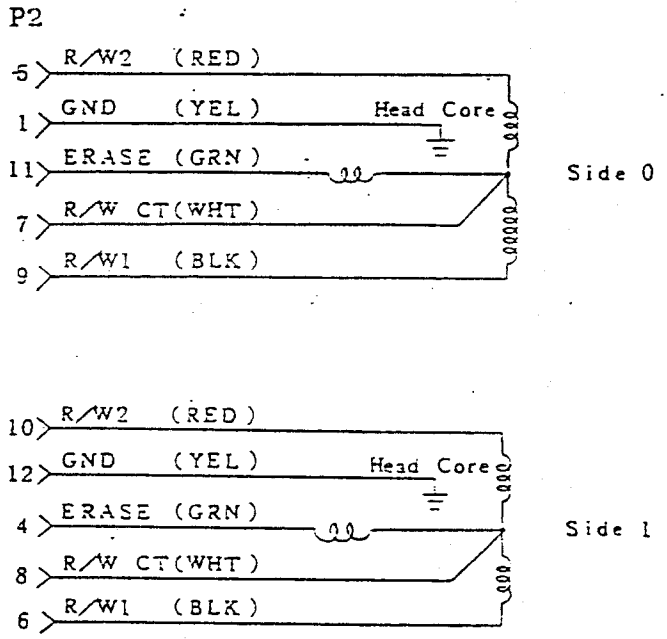
Connector P2 provides the physical interface to the magnetic head as shown in figure 2.



3: KEY

Fig. 2 P2 Connector

B-2. Schematic



B-3. Connector Requirements

Housing	Honda HKP-12F02
Contacts	Honda HKP-F303
PCB Header	Honda FFC-12TLBW1B#3

B-4. The WRITE operation utilizes both read/write coils sequentially, where each written bit is directed to alternate read/write coil, creating a change in the direction of current flow through the read/write head. The required current is 6.3 ± .2 ma peak to peak, or 3.15 ± .2 ma base to peak on all tracks. It is recommended that the write current transitions are within 0.5% from leading edge to leading edge. Proper write damping must be considered during design for write transitions. Note: The head must be loaded for proper write operation.

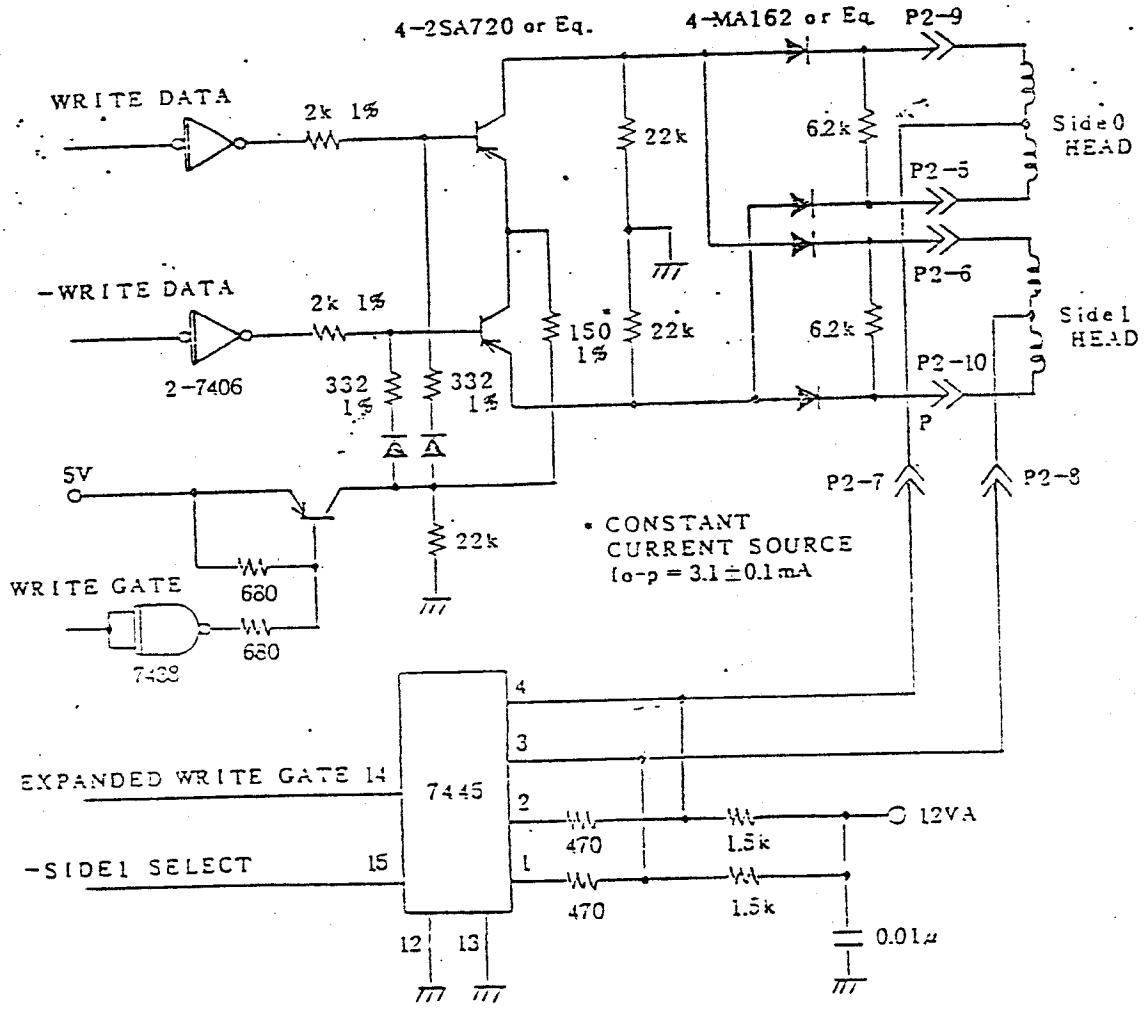


Fig. 3 A RECOMMENDED INTERFACE FOR WRITE OPERATION

B-5. The READ operation occurs when the head is loaded and data has been previously recorded on the track of interest. Using an S/A diskette the minimum differential amplitude of 1.3 mV peak-to-peak occurs on TRK 77 at a frequency of 125 kHz. A maximum signal amplitude of 20 mV occurs on TRK 00 at a frequency of 625 kHz. The customer is cautioned to use proper clamping for the read operation. A recommended interface is shown in figure 4.

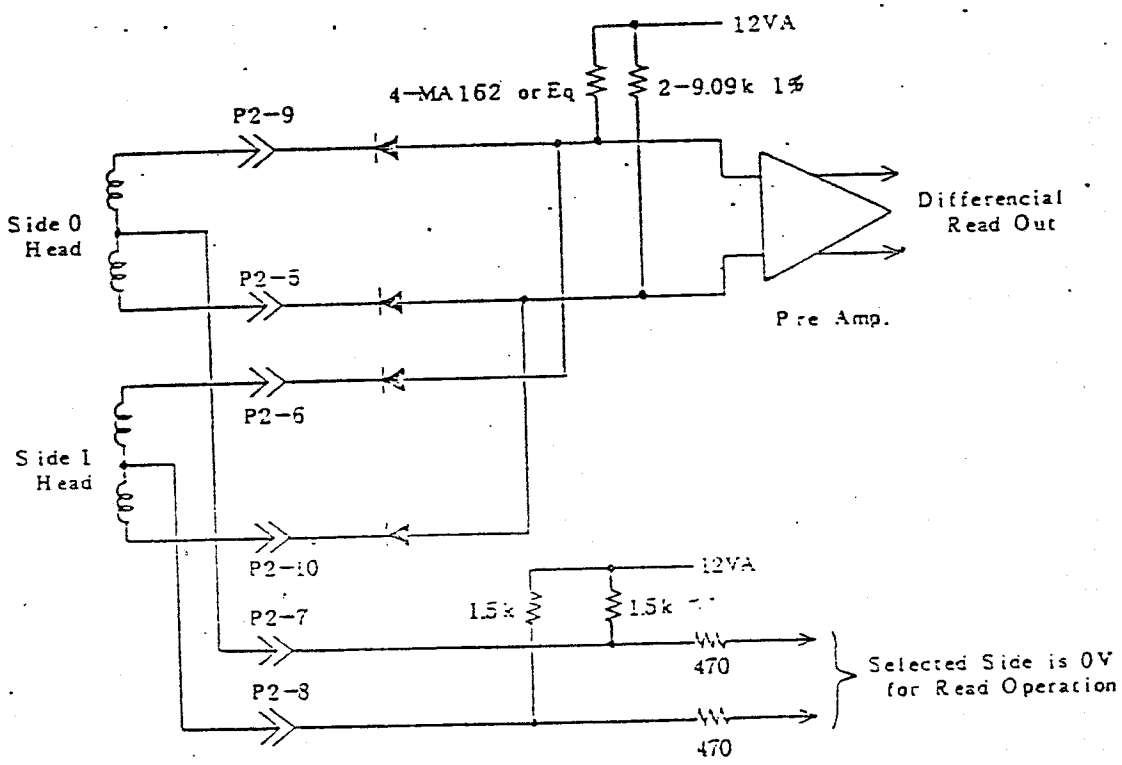


Fig. 4 A RECOMMENDED INTERFACE FOR READ OPERATION

NOTE: Figure 3 and 4 interface circuits are valid only when used in connection with each other.

B-6. The ERASE COIL requires a DC current of 40 ma ± 4 ma energized during any write operation. Both erase current and write current should be started and ended simultaneously.
A recommended interface for the erase coil is shown in figure 5.

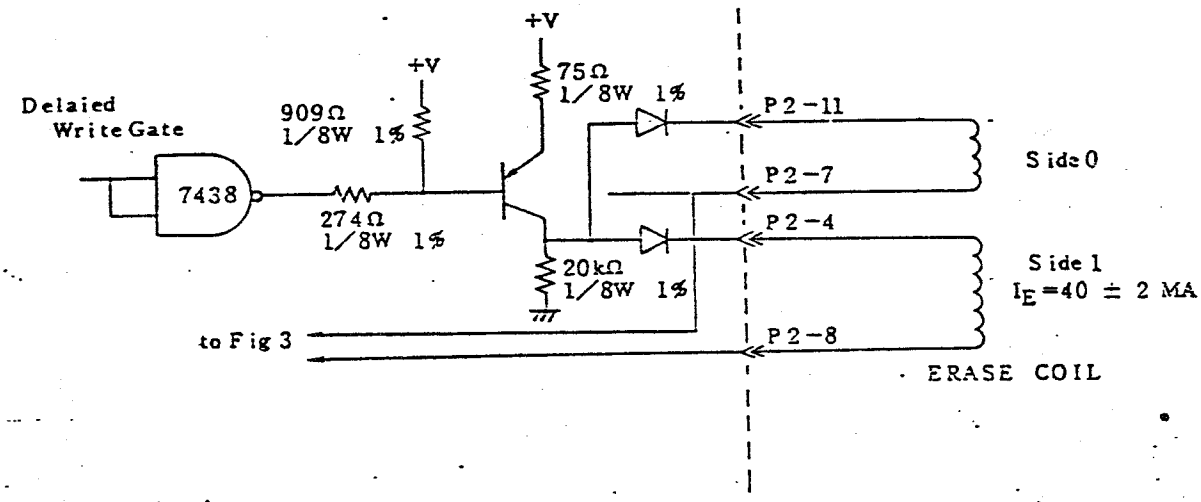


Fig.5 A RECOMMENDED INTERFACE FOR EARSE COIL

C-1. Stepping Motor, Drive Motor, Write Protect, Track 00 and ACTIVE LED Interface

Connector P1 provides the physical interface to stepper, drive motor, write protect, Track 00, and Index.

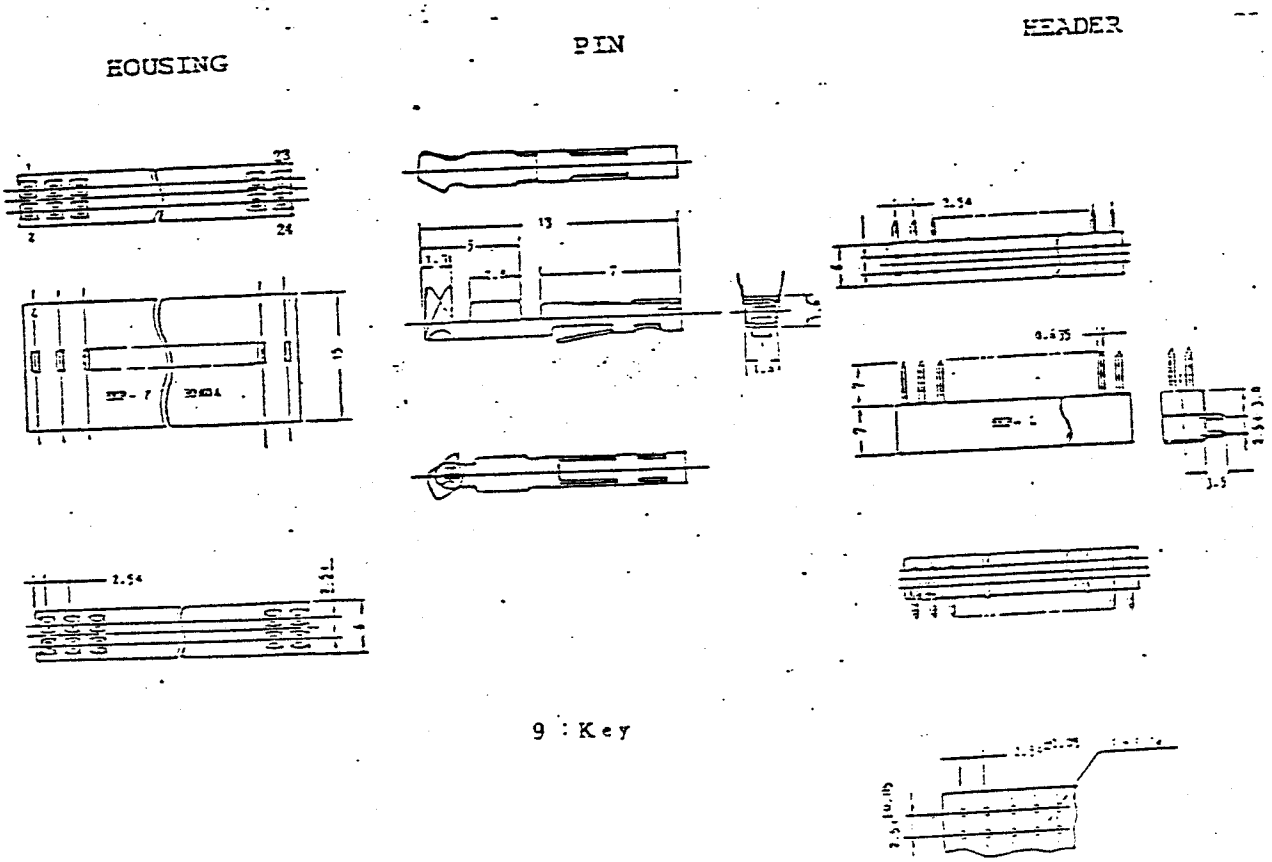


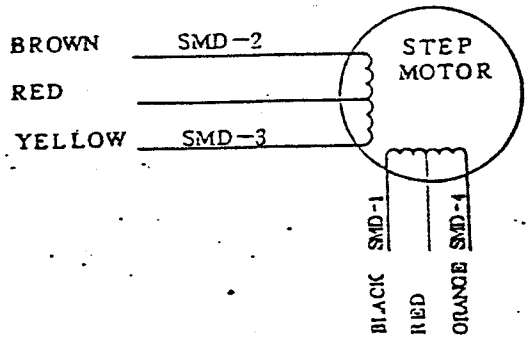
Fig.6

Connector Requirements

Housing	Honda	HKP-24F02	
Contacts	Honda	HKP-F40JR	
PCB header	Honda	HKP-10M2L	FFC-24TLBW1B #9

C-2. Step Motor Input Requirement

The motor is a bifilar wound, four phase stepper which generates a 1.8° step with single phase stepping.

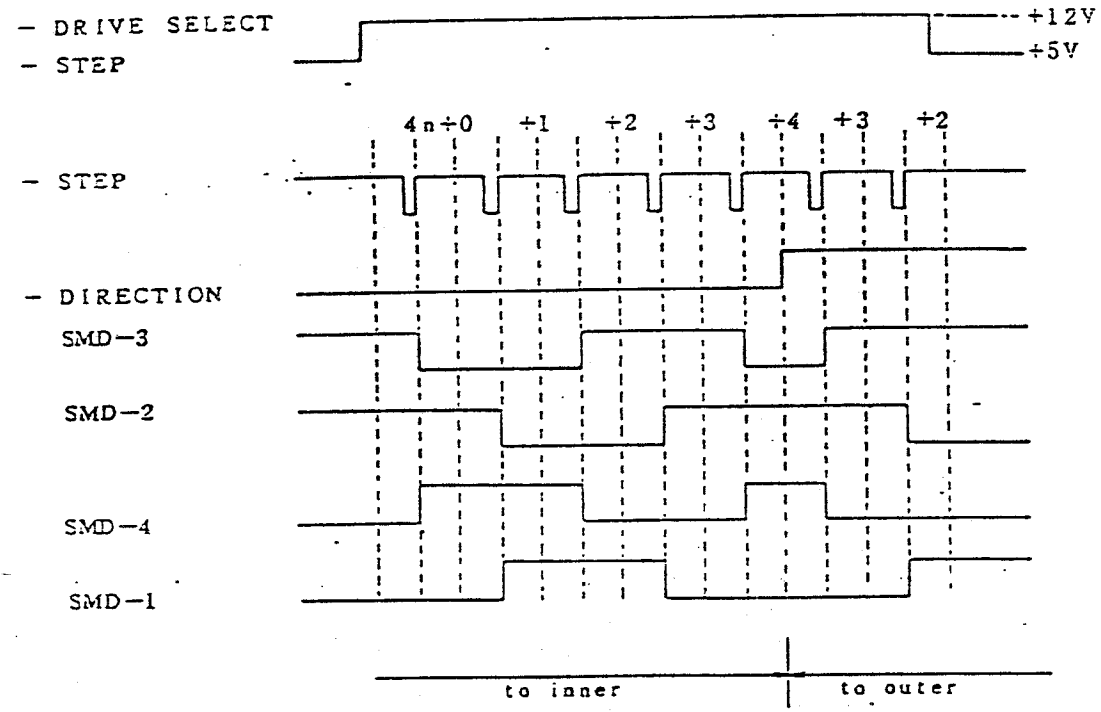


To Energize : Both red center taps go to +12V DC and go to +5V DC for unselected drive. For selected drive an appropriate two phases are connected to ground.

PHASE TABLE/TWO PHASE DRIVE

TRK POSITION	SMD-3 (YELLOW)	SMD-2 (BROWN)	SMD-4 (ORANGE)	SMD-1 (BLACK)
4 x n +0	LOW	HIGH	HIGH	LOW
4 x n +1	LOW	LOW	HIGH	HIGH
4 x n +2	HIGH	LOW	LOW	HIGH
4 x n +3	HIGH	HIGH	LOW	LOW

C-3. Stepper Timing Driven in Two Phases



C-4. Stepper Voltage

When no step command or no selected drive, +12V supplied to stepper is switched to +5V to avoid power consumption.

D. Motor On

This input, when activated to a logical zero level (open collector with 1 K ohm pull up) will turn on the drive motor allowing reading or writing on the drive. A 1 sec delay after activating this line must be allowed before reading or writing. In general when the drive is not selected, the motor should be off to extend motor and diskette life and decrease power consumption. System timing must be analyzed to determine optimum delay between deselection of drive(s) and turning off motor(s).

Shown below is one of examples for motor control PCB which should resides on customer's PCB.

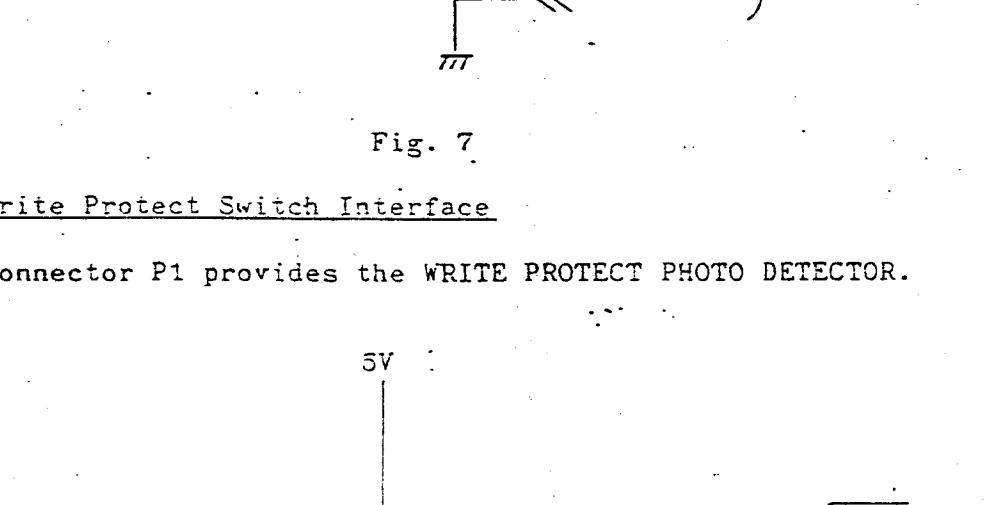


Fig. 7

E. Write Protect Switch Interface

Connector P1 provides the WRITE PROTECT PHOTO DETECTOR.

Fig. 8

This interface signal is provided by the drive to give the user an indication when a write protected diskette is installed.

This signal is a normally opened switch contact when the diskette is not protected and closed when it is protected. Writing on the diskette is inhibited on the drive when the diskette is write protected.

F. TRACK 00

The drive need the TRACK 00 signal to obstruct BUMP NOISE in recal motion USER should prepare the logic circuits that make stepper stop to outer direction after TRACK 00 signal is active low.

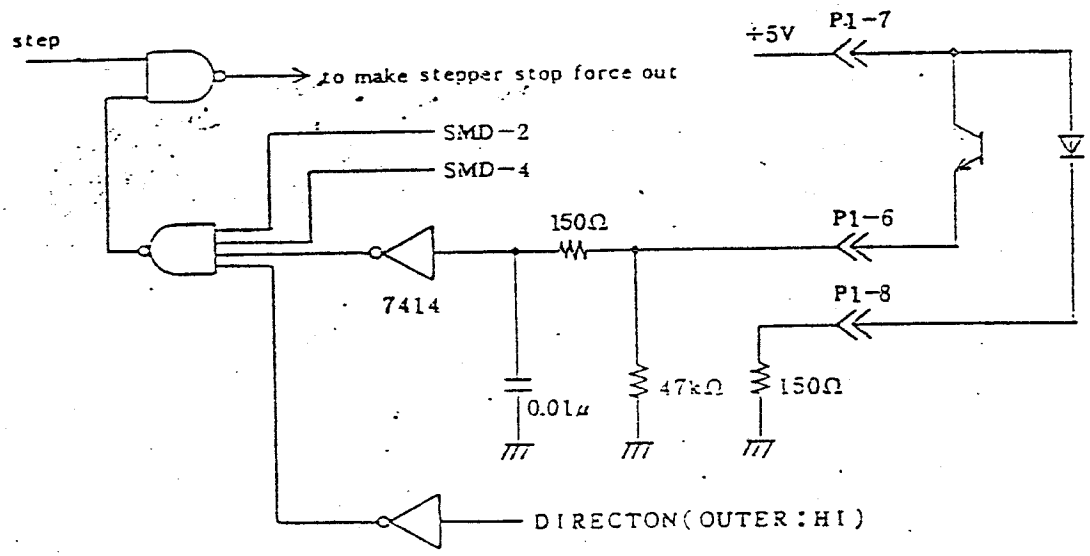


Fig. 9

G. ACTIVE LED

Drive have the interface of the active led on the face plate. Recomended interface is shown in Fig. 10.

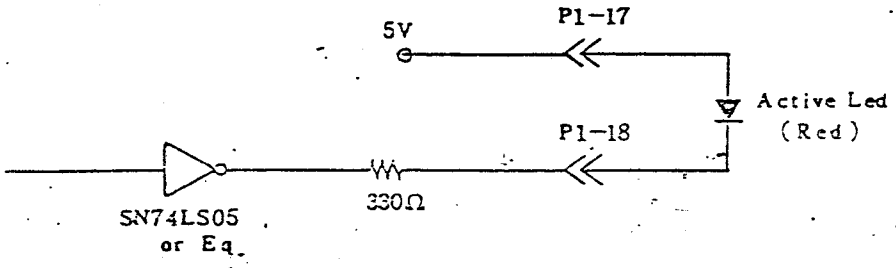


Fig. 10

H. Frame Ground

The drive frame must be grounded. If drive is incorporated into a battery powered portable system, then D.C. ground is recommended. If system's input power is line voltage, then the third wire SAFETY GROUND is recommended. AMP P/N 61761-2 AC or DC power input ground and mating connector AMP P/N 60972-1.

I. Power Interface

Diskette Storage Drive requires DC power for operation. The two required voltages are as follows:

(1) +5.00 ± 0.25 VDC @ 0.2A typical

(2) +12.0 ± 0.6 VDC @ 1.2A max., .75A typical, 100 mv max allowable p-p ripple

Motor start surge (see below)

The 12V current is composed of two components; diskette drive motor current and read/write stepper functions. Also the diskette drive motor is energized and deenergized by the "Motor On" or "Drive Select" interface line.

Each of these functions has the following contributions to the +12V current requirements.

(A) Read/Write function and stepper motor (drive "standby" current)
+5V current is 1.0A typical 0.3A max.

(B) Diskette drive motor start
+12V current is 1.0A typical, 1.2A max. for 1 sec max.

(C) Diskette drive motor running
+12V current is .28A typical, 0.9A max. (motor stalled)

IX. SUGGESTED GENERAL CONTROL/DATA TIMING REQUIREMENTS

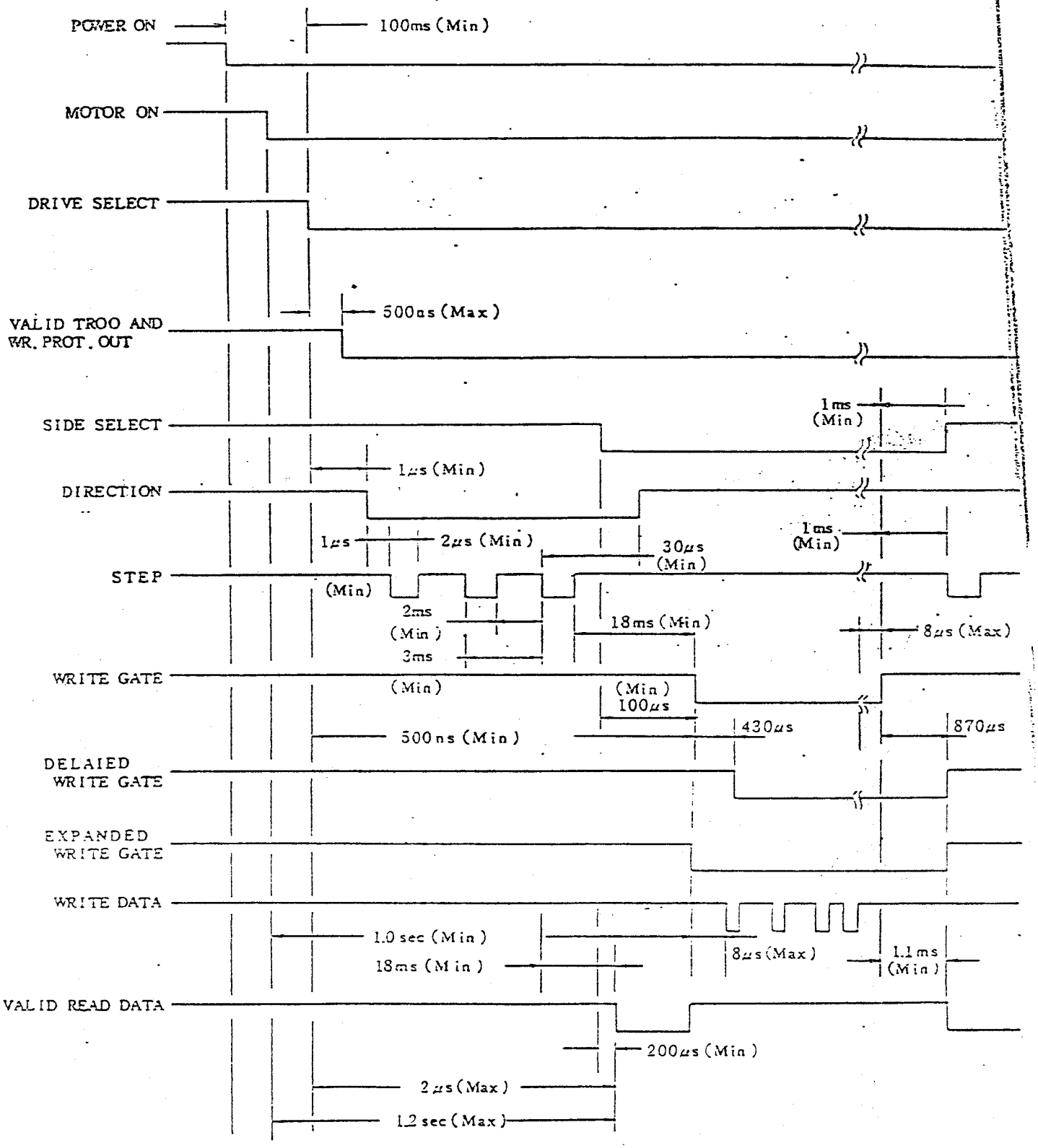


Fig. 11
(All signals are shown as low active)

X. PHYSICAL OUTLINE

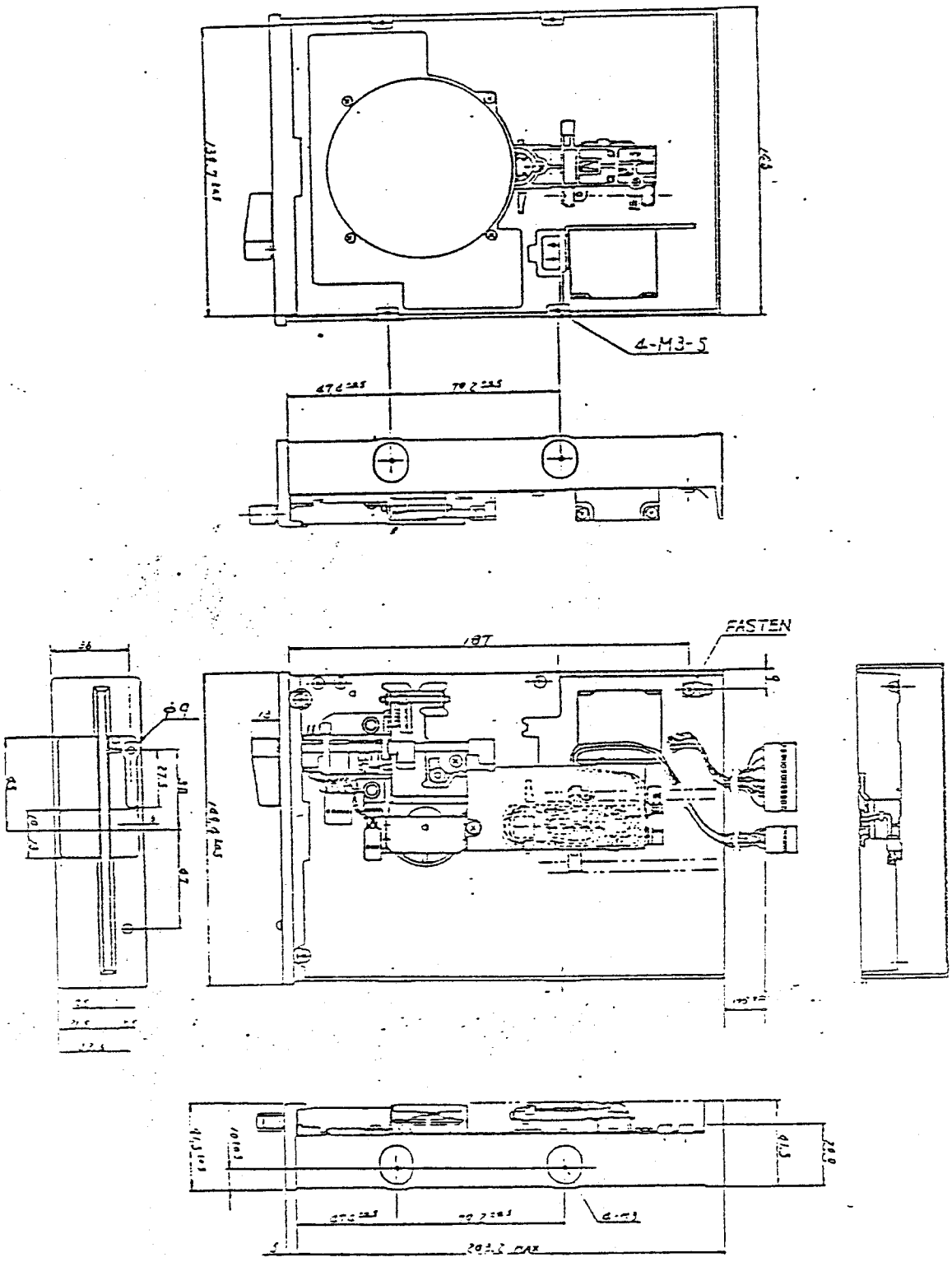
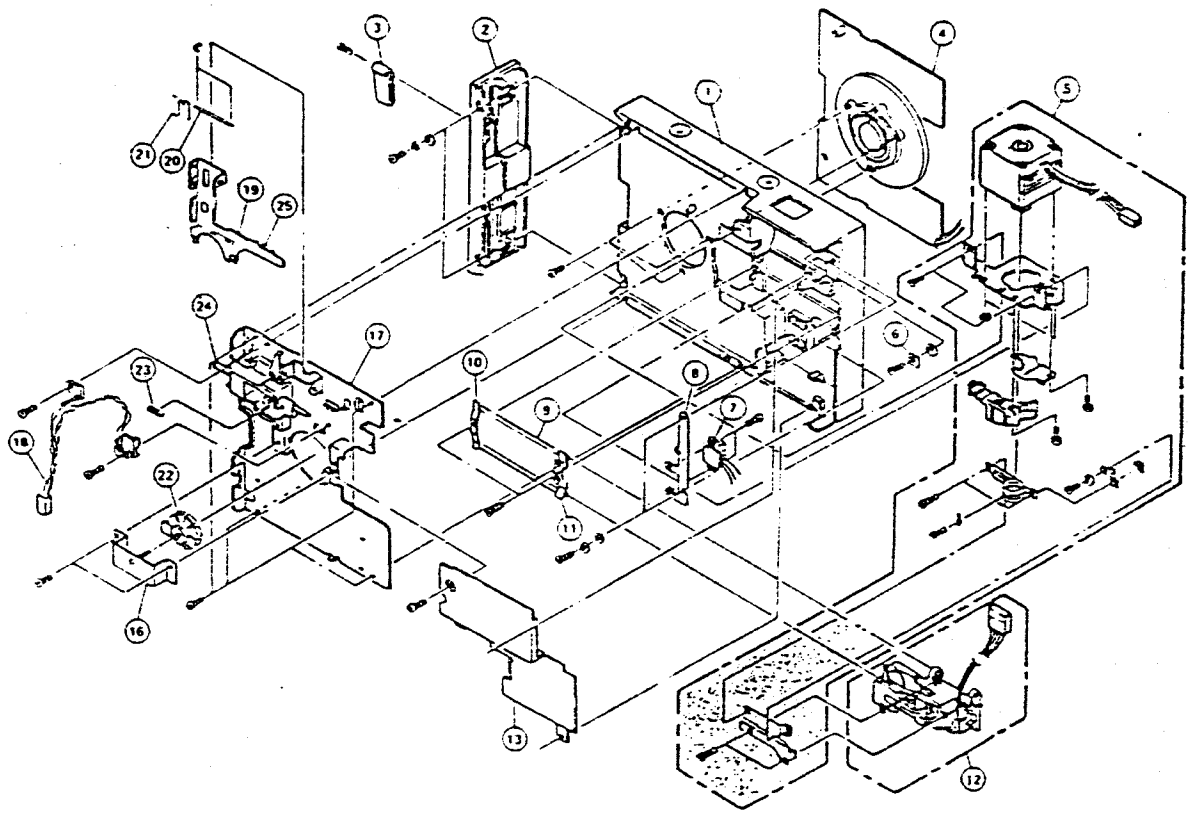


Fig. 12

XI. PARTS LIST

REF. NO.	MANUFACTURE PART NUMBER	DESCRIPTION	Q'TY
1.	YJF3L01141B1	BASE	1
2.	YJF5W00150B2	FRONT PANEL	1
3.	333D46817670	HANDLE	1
4.	YJFMD00170B4	DC MOTOR	1
5.	YJF3101010A3	STEPPING MOTOR ASS'Y	1
6.	YJ617612	FASTEN TAB	1
7.	YJUF56TRK-2S	DETECTOR	1
8.	YJF2T00601B4	BRACKET	1
9.	YJF2E00590B4	GUIDE ROD	2
10.	333D46331360	CLAMP GUIDE ROD	1
11.	YJF2E00580B4	CLAMP GUIDE ROD (2)	1
12.	YJUF56HCA-2	R/W HEAD ASS'Y	1
13.	YJF2H00681B3	SHIELD PLATE	1
16.	YJF2E00631B4	GUIDE SHAFT ASS'Y	1
17.	YJF2E00560B1	CARTRIDGE GUIDE	1
18.	YJUF56WP-2S	DETECTOR ASS'Y	1
19.	333D36331610	LIFTER	1
20.	333D46624810	LIFTER SHAFT	1
21.	333D46625021	LIFTER SPRING	1
22.	YJF3100160A4	COLLET ASS'Y	1
23.	333D46624770	LOCK SPRING	1
24.	YJF3100461A3	CLAMP CAM ASS'Y	1
25.	333D46817500	PAD	1


1
2
3
4
5
6
7
8
9
10
11
12
13
16
17
18
19
20
21
22
23
24
25