

SHARP SERVICE MANUAL

MZ-80FD
MZ-80FDK
MZ-80FIO

PDSM880004-MZ



MZ-80FD

Floppy disk

Model MZ-80FD ✓

Extension floppy disk

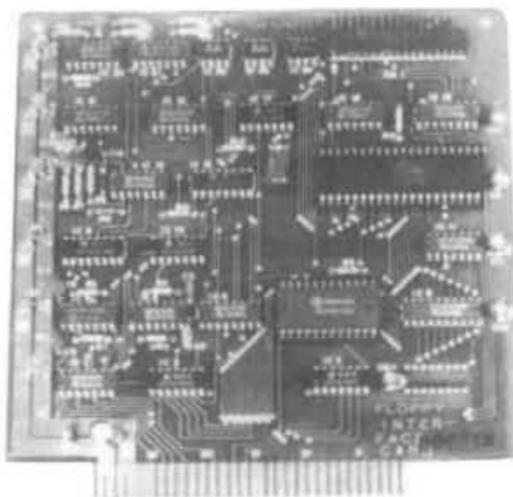
Model MZ-80FDK



MZ-80FDK

Floppy disk I/O card

Model MZ-80FIO ✓



MZ-80FIO

Features

- Microcomputer peripheral devices developed for access to newly designed software regions in Personal microcomputer System MZ-80 Series.
- 5.25-inch floppy disk of miniaturized dual drive type. In 2-drive mode, 286K byte data can be random-access processed at high speeds.
- Extension floppy disk (MZ-80FDK) may be connected in daisy chain system, thus enlarging the memory capacity up to 572K bytes.
- Precision devices composed of 2 disk drive units and switching regulator power supply. The head can be brought into contact with diskette, only when needed, to extend the life-time of diskette and head.

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MZ-80FD AND MZ-80FDK SPECIFICATIONS

■ General specifications

Item	Specification	Item	Specification
Memory capacity	143K bytes/drive (286K bytes/unit)	Rated voltage	AC 220V ±10%, 50 Hz AC 240V ±10%, 50 Hz (for U.K.)
		Power consumption	40W (at AC220V) 45W (at AC240V)
No. of tracks	70 tracks/drive	Outer dimensions	Width; 205 mm
No. of sectors	16 sectors/track		Depth; 320 mm
Operating conditions	Temperature: 5 to 25°C Relative humidity: 20 to 80%		Height; 204 mm
		Weight	6.8 kg

* Specifications subject to change without prior notice for improvement.

Accessories:	Power cord	1 pc.
	Braided wire	1 pc.
	Instruction manual	1 copy
Option:	Floppy interface card	MZ-80FIO
	Disk Basic	MZ-80FMD
	Connectin flat cable	MZ-80F15
	Extension flat cable	MZ-80F05
	Diskette	MZ-80FBD (a set of 5 pcs.)

■ Disk drive specifications

Item	Specification	Item	Specification
Memory capacity	143K bytes	DC power supply requirements	+12V DC ±5% 0.9A (TYP), 1.8A (MAX)
No. of tracks	70 tracks		+5V DC ±5% 0.7A (TYP), 1.0A (MAX)
Recording system	FM		
Medium rotational speed	300 rpm	Power consumption	12W (TYP)
Information transfer rate	125K bits/sec	Outer dimensions (bezel not included)	Width; 146 mm
Average response time	100 msec		Depth; 203.2 mm
Head load time	50 msec	Height; 82.6 mm	
Motor starting time	1 sec	Weight	1.6 kg

■ Power supply section specifications

Item	Specification
Input	AC 220V ±10%, 50 Hz AC 240V ±10%, 50 Hz (for U.K.)
Output	DC 12V DC 5V

PRECAUTIONS ON SERVICING

- The floppy disk is a precision device. Be careful not to give it an impact. Avoid servicing in a dusty place.
- Take care not to allow foreign matters to come in the machine. (For diskette as well.)
- Be sure to use the specified power supply voltage. Completely separate the power supply line from other equipments emitting noises (such as large-sized motor), or cut off noises being mixed in the power supply line with a line filter or the like.
- Do not operate or service the unit near appliances generating magnetism, otherwise malfunction and/or erasure of data and texts written in diskette may result.
- Arrange system signal cables (flat cable, etc.) as far from other devices and power supply cord as possible.
- Before transportation or moving to other place, be sure to attach the mouthpiece to the front door.

DIFFERENCES BETWEEN MZ-80FD AND MZ-80FDK

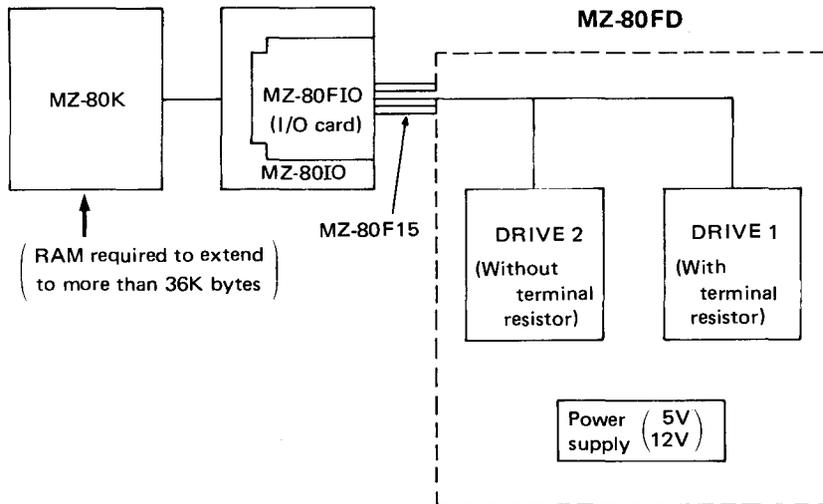
The extension floppy disk MZ-80FDK is connected between floppy disk MZ-80FD and I/O card (MZ-80F IO) to enable 4 units of disk drive (drives 1 to 4).

		MZ-80FD	MZ-80FDK
Appearance	Drive indication label	 (TLABZ0029PAZZ)  (TLABZ0033PAZZ)	 (TLABZ0034PAZZ)  (TLABZ0035PAZZ)
	Specification panel	(TSPCE0004PAZZ) (TSPCE0005PAZZ) for U.K.	(TSPCE0006PAZZ) (TSPCE0007PAZZ) for U.K.
Interior	Chassis (signal flat cable to be connected herewith)	"IN" indicated (LCHSM0090PASA)	"IN" "OUT" indicated (LCHSM0092PASA)
	Flat cable assembly (socket with flat cable connection lead)	34-pin socket: 1 pc. (DSÖCN0040PAZZ)	34-pin socket: 2 pcs. (DSÖCN0056PAZZ)
	Disk drive, PWB terminal resistor and short pin	Refer to setting of short pins and terminal resistor on page 14.	
Package	Packing case indication		"K" labels on four sides of the case (TLABE0002PAZZ)
	Braided wire	Wire length: 900 mm (DTiP-0039PAZZ)	Wire length: 500 mm (DTiP-0042PAZZ)

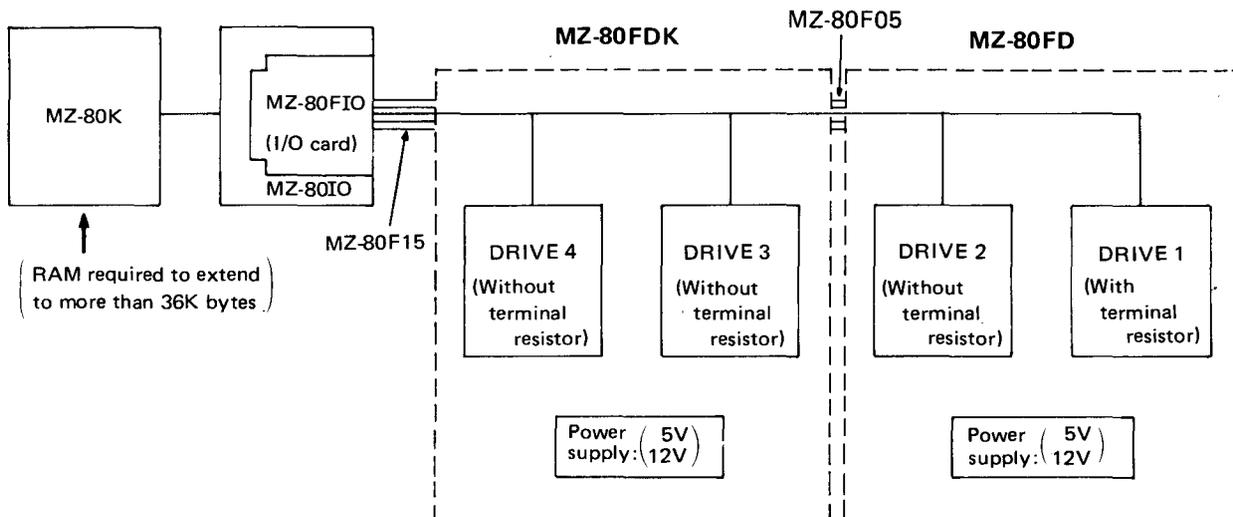
SYSTEM BLOCK DIAGRAM

Below are shown the floppy disk system block diagrams.

■ When using MZ-80FD only



■ When using both MZ-80FD and MZ-80FDK

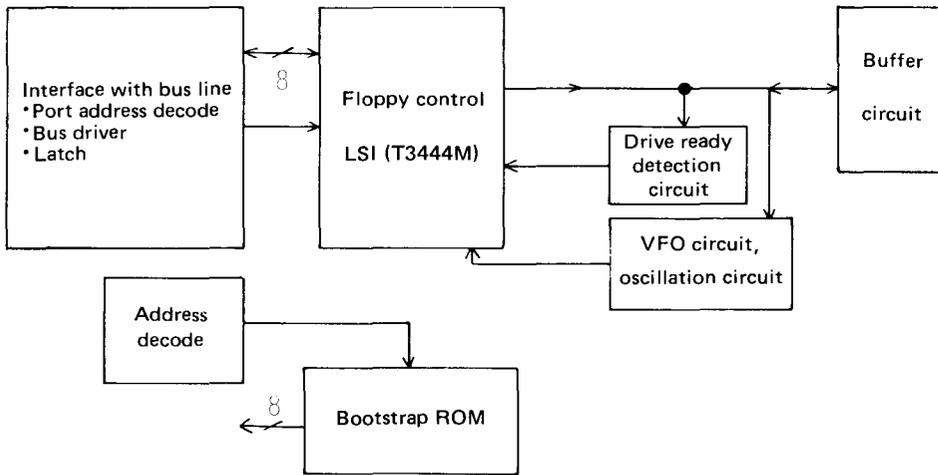


- Up to 4 units of drive can be connected, as shown above, using daisy chain.
- The signal line terminal resistor is applied only to the last drive unit of the daisy chain. (Usage of two or more terminal resistors causes damage to IC's.)
- When 4 drive units are being connected, they should be all in operating mode to ensure proper function.

* Daisy chain: Connection method to control two or more drive units. In this system, more than two connectors, each of which is coupled with each drive unit, are connected with cables.

CIRCUIT DIAGRAM OF FLOPPY DISK I/O CARD (MZ-80FIO)

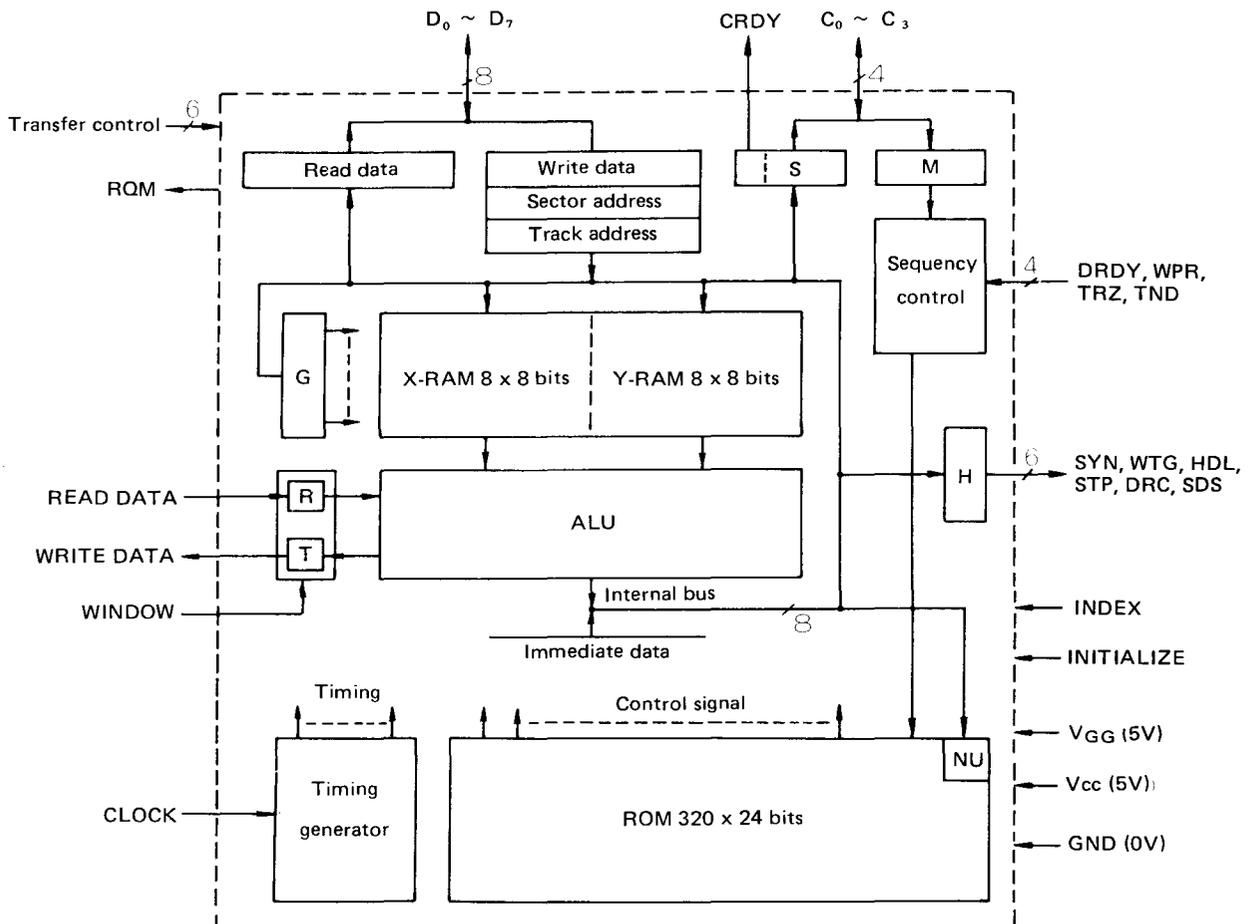
1. Block diagram



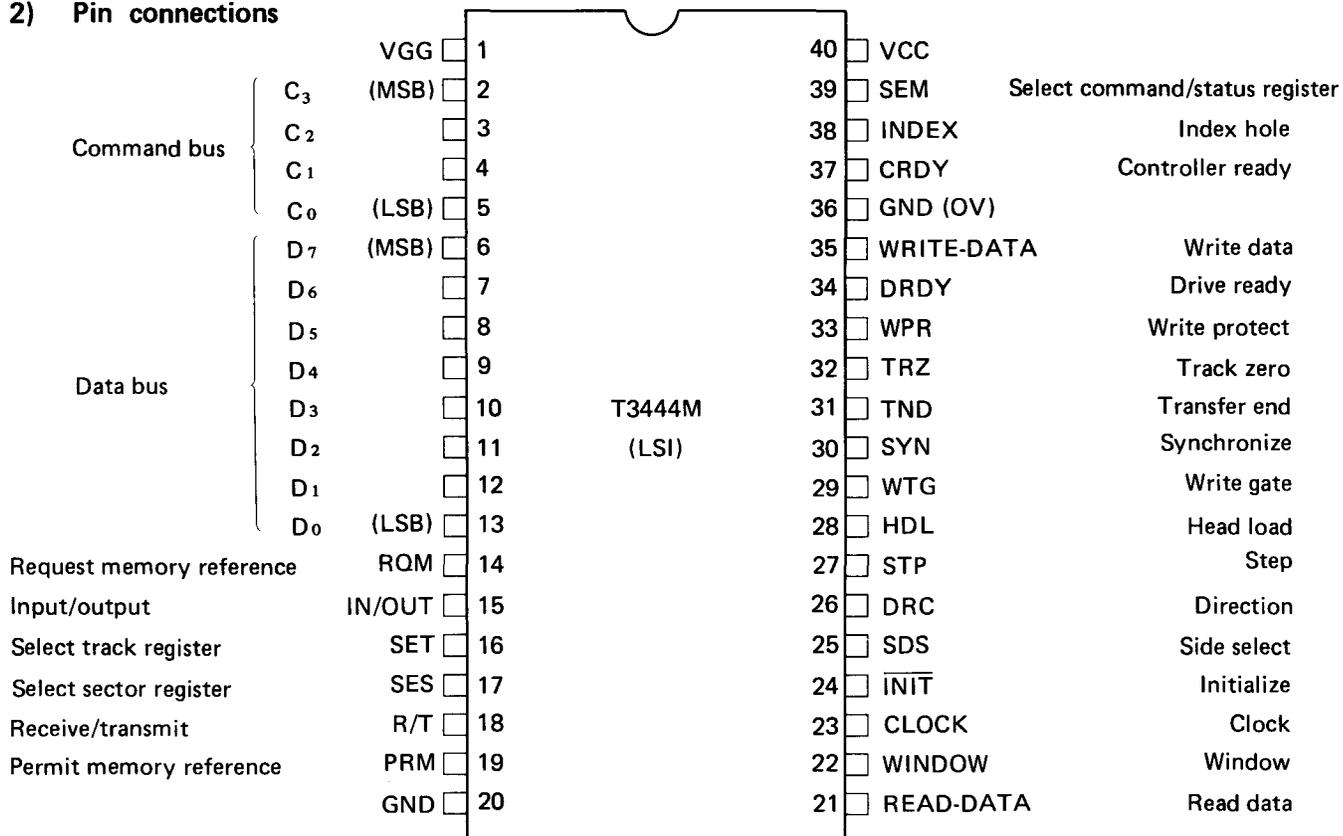
- For port addresses, \$F8, \$F9, \$FA and \$FB are used.
- For ROM addresses, \$F000 to \$F3FF are used.

2. Explanation on LSI T3444M

1) Block diagram



2) Pin connections



3) Pin description and function

Description	Input/output	Function	Description	Input/output	Function
VGG	Power	5V	INIT	Input	Initializes, resets LSI.
C ₀ ~ C ₃	Input/output	Used to transfer command/status. 3-state output.	SDS	Output	Command signal to select either side 0 or side 1 of diskette
D ₀ ~ D ₇	Input/output	Used to transfer track/sector address as well as read/write data. 3-state output.	DRC	Output	Command signal to dictate the direction when stepping head.
RQM	Output	Signal to request transferring read/write data.	STP	Output	Step pulse.
IN/OUT	Input	Input/output designation signal to get access to tach register of command/status, track and sector.	HDL	Output	Head load.
SET	Input	Select signal to get access to track register.	WTG	Output	Write gate.
SES	Input	Select signal to get access to sector register.	SYN	Output	Command signal to indicate whether or not clock is to be synchronized with read data.
R/T	Input	Input/output designation signal to get access to read/write data register.	TND	Input	Command signal to indicate whether or not data is to be read and/or written through consecutive sectors.
PRM	Input	Select signal to get access to read/write data register.	TRZ	Input	Track zero.
GND	Power	0V	WPR	Input	Write protect.
READ DATA	Input	Read data pulse is input.	DRDY	Input	Drive ready.
WINDOW	Input	Strobing pulse when reading out read data.	WRITE DATA	Output	Write data
CLOCK	Input	Fundamental clock to cause operation.	CRDY	Output	Signal to show if controller is ready or not.
			INDEX	Input	Index hole.
			SEM	Input	Select signal to get access to command/status register.
			VCC	Power	5V

3. Function of MZ-80F IO

1) Control of 4 drive units (max.)

- 1) Starting and stopping the motor
- 2) Selecting drive unit
- 3) Loading and Unloading the read/write head
- 4) Shifting the head (control of direction, gap between and number of steps)
- 5) Generating drive ready signal
- 6) Detecting write protect and track 0
- 7) Separating read clock from drive into clock bit and data bit
- 8) Collating and retrieving disk address data
- 9) Generating and checking CRC (Cyclic Redundancy Check)
- 10) Generating sampling window pulse of read data in VFO (Variable Frequency Oscillator) circuit
- 11) Serial and parallel conversion of read/write data

*Cyclic Redundancy Check

A check carried out on read-out data to detect errors.

2) Bootstrap function

Selecting a drive for ROM (SN74S474 or equivalent), reading 14 sectors from the beginning of track 0 at the diskette being set in the drive, and finally loading the 14 sectors in RAM address \$9800.

The program loaded will be checked and jumped into \$9800. At that time, errors, if detected, will be displayed as "ER: CAN'T BOOT" in the CRT display. The set is then on monitor command wait.

(Types of errors)

- 1) Drive READY signal does not become high.
- 2) No master diskette used, or faulty master diskette.
- 3) I/O unit is not power supply on.
- 4) MZ-80F IO does not normally operate.
- 5) Signal cable is not correctly connected, or damaged cable.
- 6) RAM has not been extended. (RAM should be loaded with more than 36K bytes.)
- 7) Improper ROM or faulty circuits adjacent to ROM.
- 8) Others

Reference) ROM SN74S474 or equivalent

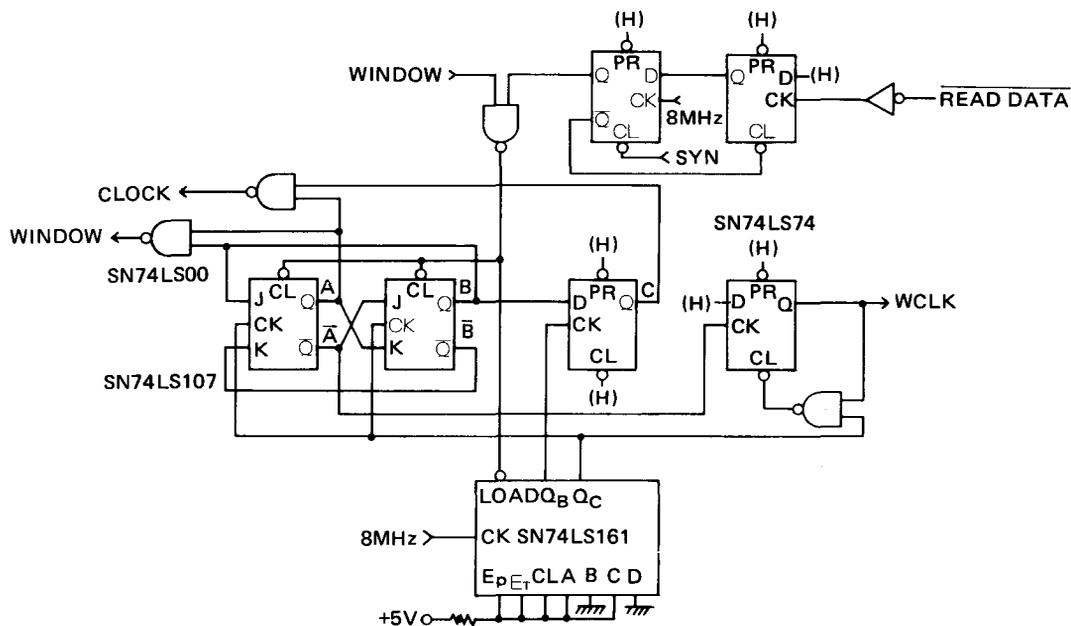
Part code	Part name	No. of bytes
RH-iX0219PAZZ	SN74S474	} 512 bytes
	μPB425C	
	82S141	
RH-iX0238PAZZ	μPB417C	} 1024 bytes
	82S181	

In applying the above ROM, jumper wire of PWB pattern is put in between pin 21 and pin 22 of ROM for short-circuit purpose in the course of production.

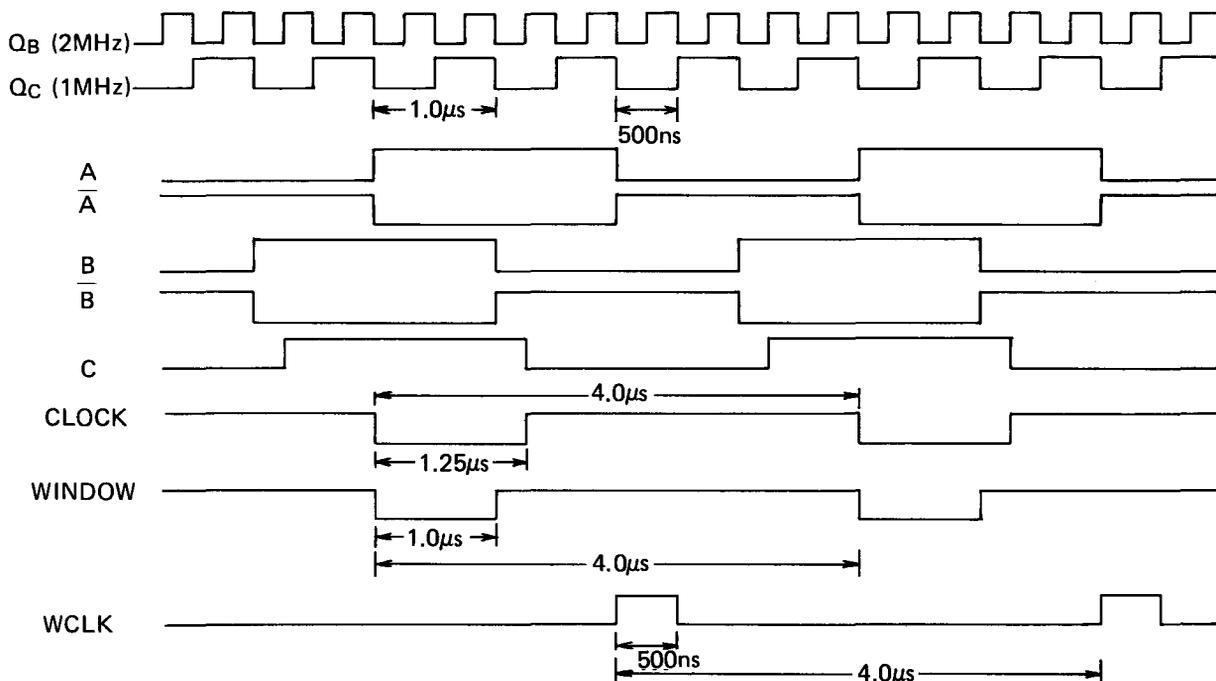
Note)

- The 512 byte ROM can be either short-circuited or not during use.
- The 1024-byte ROM in use must be short-circuited.

4. Timing chart of VFO (Variable Frequency Oscillator) circuit

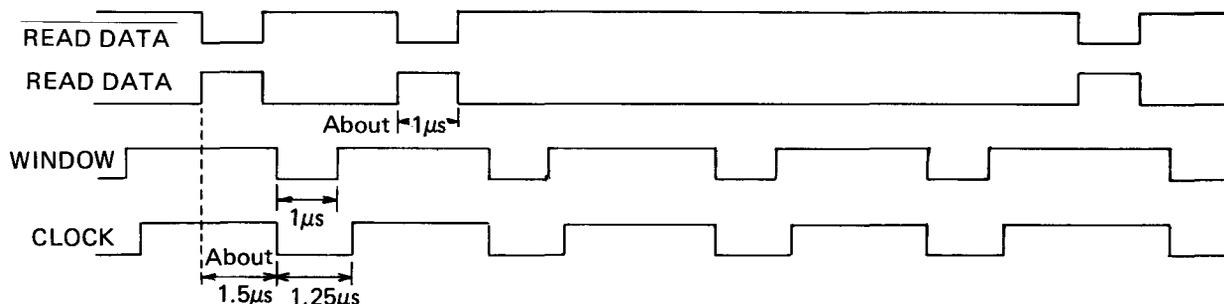


1) When synchronizing signal is high (VFO circuit is asynchronous).

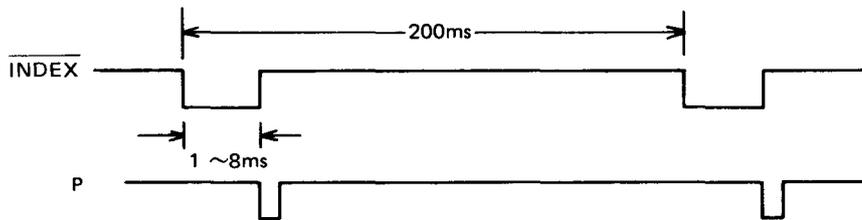
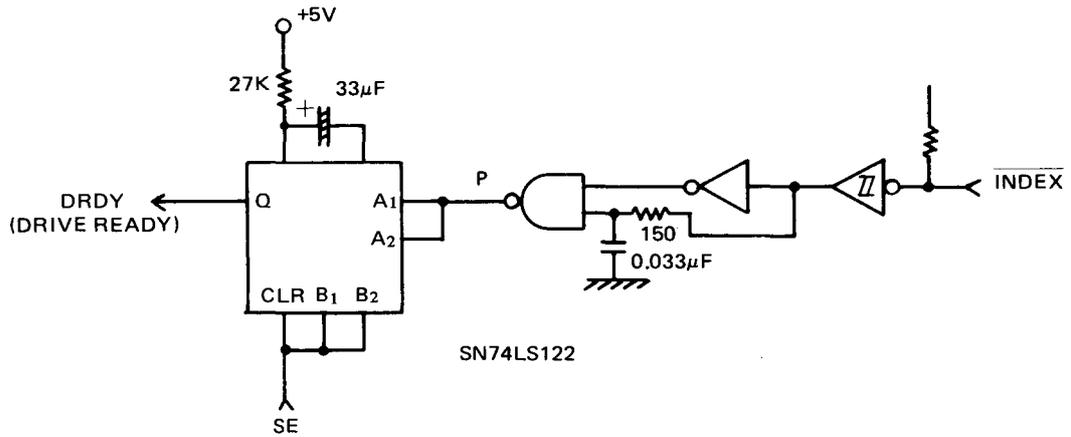


2) When synchronizing signal is low (VFO circuit is synchronous).

Read data is phase-synchronized with 8 MHz clock. The counter (SN74LS161) is initialized by means of the signal and window nand operation. Namely, timing of read data, window and clock is adjusted as follows.



5. Ready detection circuit of selected drive units



- Index signals, when continuously coming at intervals of 200ms; enable DRDY (drive ready) to be kept high.
- Conditions for drive ready.
 - a) Diskette is inserted in proper direction.
 - b) Motor runs normally (300 rpm).
 - c) Index detection circuit functions normally.
 - d) Front door is closed.
 - e) Select signals are transmitted to drive.
 - f) Specified power is supplied to drive.
 - g) Drive select signals are generated normally.
 These signals consist of SE, S1 and S0.

- When the above conditions a) thru f) have been all satisfied, index pulses are transmitted at intervals of 200ms.
- When SE signal becomes 1, the retrigger one-shot IC (SN74LS122) will be activated to cause DRDY signal by input signal.
- Floppy control LSI (T3444M) is given a command to operate. DRDY signal is then checked before an advancement to the next operation. If DRDY signal is low, error indication is displayed to interrupt the operation.

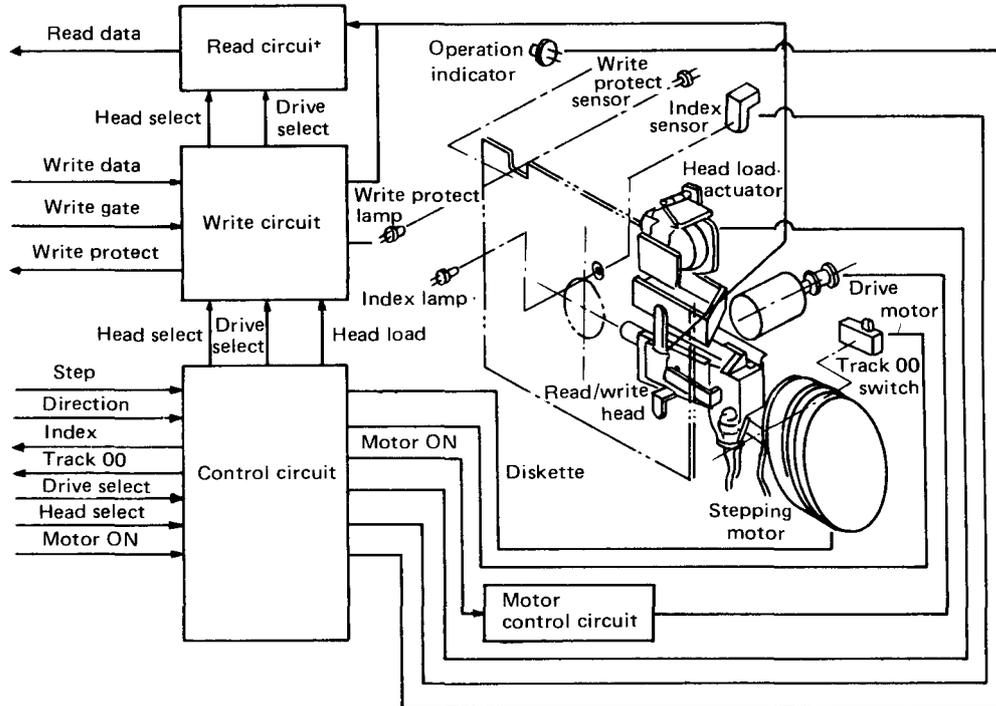
SE	S1	S0	
○	X	X	S1 and S0 invalid, non-select mode
1	○	○	Drive 1 selected
1	○	1	Drive 2 selected
1	1	○	Drive 3 selected
1	1	1	Drive 4 selected

OPERATIONAL PRINCIPLE OF FLOPPY DISK

The floppy disk is designed to rotate the so-called "diskette," a magnetic disk storage unit, to read out and write in data at high speeds by bringing the

magnetic head in direct contact with a specified track sector of 70 tracks formed in both surfaces of the diskette.

1. Fundamental block diagram



2. Mechanism explanation

This device consists mainly of the following mechanisms.

1) Read/write head

The head is attached to the arm through a leaf spring. The head can follow the motion of diskette easily.

Signals read out of the head are transmitted through FPC (Flexible Printed Cable) to the read amp. circuit.

2) Carriage assembly

2 units of read/write head are mounted on the carriage. The carriage is located with the stepping motor and lead screw.

3) Head locating mechanism

This is a high-precision, reliable head locating mechanism using stepping motor and screw-driven ball/V-groove system.

The stepping motor is of 7.5° /pulse, steel plate type.

One pulse of step signal causes a 2-step rotation by 15° , thus pushing forward the head by one track.

4) Diskette driving mechanism

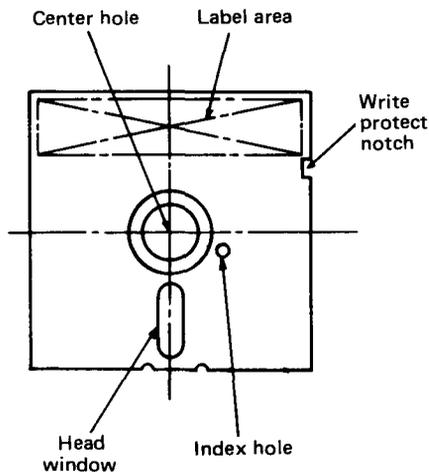
A small-sized DC motor with tachogenerator is employed. The motor rotation is transmitted through the drive belt, spindle pulley and spindle hub, thereby causing rotation of the diskette. This spindle pulley is provided with a stroboscope to check rotation interval.

5) Head load mechanism

To extend the life-time of diskette and head, the head can be brought into contact with the diskette only when in operation. This mechanism is controlled with drive select signals.

6) Write protect detection section

A luminous diode and a photo-transistor are used to detect write protect notch of the diskette and jacket. (Writing is not possible when the notch is covered with label.)



Description of diskette parts

7) Index detection section

This section consists of a luminous diode and a phototransistor. An index hole of the diskette is detected by this section to determine the starting point of a track.

8) Track 00 detection section

A carriage position is detected with a limit switch. When the carriage has reached the track 00 point, track 00 signal is emitted.

9) Control electronics section

The electric circuit to control each mechanism is composed of 2 sheets of PWB. One is to control the DC motor control circuit. The other is to control other circuits, say, detection and other functions with respect to read/write, step, head load, and other signals.

10) Diskette protect mechanism

Shutting the front door, with the diskette incompletely set in, can give damage to the diskette, thus shortening its life-time. To prevent such a drawback, this mechanism has been adopted so that the front door cannot be closed if the diskette is improperly in.

3. Interface

1) Interface signal

All lines are of TTL (transistor-transistor logic).

(1) Input signals

For input signals there are 10 kinds of input lines, all of which are valid at low levels. These signal lines are terminated at a 150-ohm integrated resistor fitted in the IC socket of drive 1. The signal voltage levels are as follows.

High level	Invalid	2.4 to 5.25V
Low level	Valid	0 to 0.4V
Input impedance		Pull-up to 5V at 150-ohm resistor

① Drive select signals (0 to 3)

The MZ-80FD has 2 drive units. By adding the MZ-80FDK, up to 4 drive units are available. These signals are used to select a desired one of the four drive units.

At low levels of drive select signal, R/W head is loaded to cause the operation indicator to light up.

Note)

Depending on which drive unit to use (Drive No.1 thru 4), it is necessary to process short pins of the control PWB. See page 14.

② Motor ON signal

The drive motor starts when the signal level becomes low. This signal level becomes high about 2 seconds after completion of all operations, if no operation is commanded next. It thus interrupts the motor, extending the service life of motor.

③ Direction select signal

The signal is given to designate the shifting direction of R/W head, when the step pulse is input.

High level - - - Out direction (to diskette outer portion)

Low level - - - IN direction (to diskette center)

④ Step signal

This signal is given to move the R/W head in the direction designated by the direction select signal. The operation is done in the course of changing from low levels to high levels.

⑤ Write data signal

This signal is used to write in data on the diskette. Each time changing high levels to low levels, the current flowing in the R/W head is reversed to write in data bit.

This write-in performance is available when write gate signal is at low levels.

⑥ Write gate signal

This signal being at low levels, data can be written on the diskette. At high levels, read-out or sequential operation may be made.

⑦ Side 1 select signal

This signal is given to decide which side of a double-face diskette to read or write. The R/W head of side 0 and that of side 1 are selected at high levels and low levels, respectively.

(2) Output signals

There are the following four kinds of output signal.

① Index signal

By this signal the starting position of each track can be detected. Each time the index hole of diskette is detected with the detector, the track is fed from the drive unit.

Usually, this signal level becomes low each time the hole is detected at high levels. Therefore, the leading edge of the signal indicates the beginning of a track.

② Track 00 signal

The low-level state of this signal signifies that the R/W head is located at track 00 position (the outermost track).

In any position other than track 00, the signal is at high levels.

When the R/W head is at track 00, the head is held at the position by the stopper even if another signal to step outside is given. At this time, however, the track 00 signal level becomes high. By adding still another signal to step outside, the motor phase is returned to cause track 00 signal to become low.

③ Write protect signal

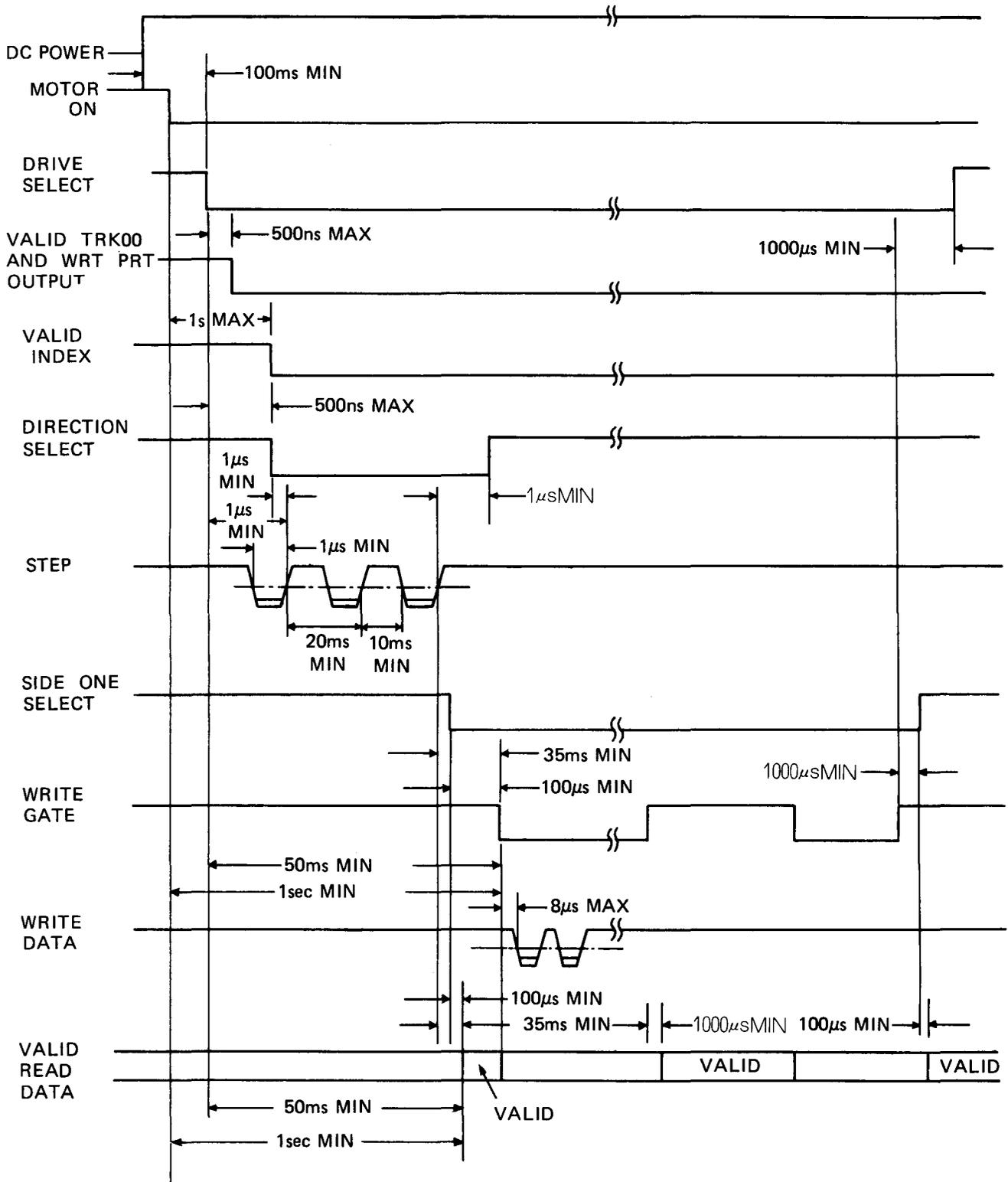
This signal is used to detect whether or not write protect for the diskette is provided. When a diskette with write protect is in, the signal level becomes low.

In usual operation, a diskette with write protect enables to protect write statement within the drive.

④ Read data signal

The signal is given to transfer data read from the diskette. Usually it is at high levels, while during detection it comes down to low levels.

3) Timing



Control and data timing

2) Power supply unit interface

Specified supply voltage of DC 5V/DC 12V is fed from the power supply unit to the J2 connector of drive control PWB.

INSPECTION AND REPLACEMENT OF DISK DRIVE MAIN PARTS

1. Removal of disk drive units

- 1) Remove 6 case set screws (3 mm) at the bottom of the set and detach the cabinet. (Screws (A) in below chart.)
- 2) Remove 4 disk drive fixing screws (LX-BZ0067PAFN) at the bottom of the set. (Screws (B) in below chart.)
- 3) Draw 2 power sockets and 2 signal cable sockets off the disk drive units. Pull the 2 disk drive units toward the front frame.
- 4) Remove 8 oval screws (LX-BZ0068PAFN) of drive support plate coupling the 2 disk drive units. (Screws (C) in Disassembled View on page 35)

2. Belt

1) Inspection

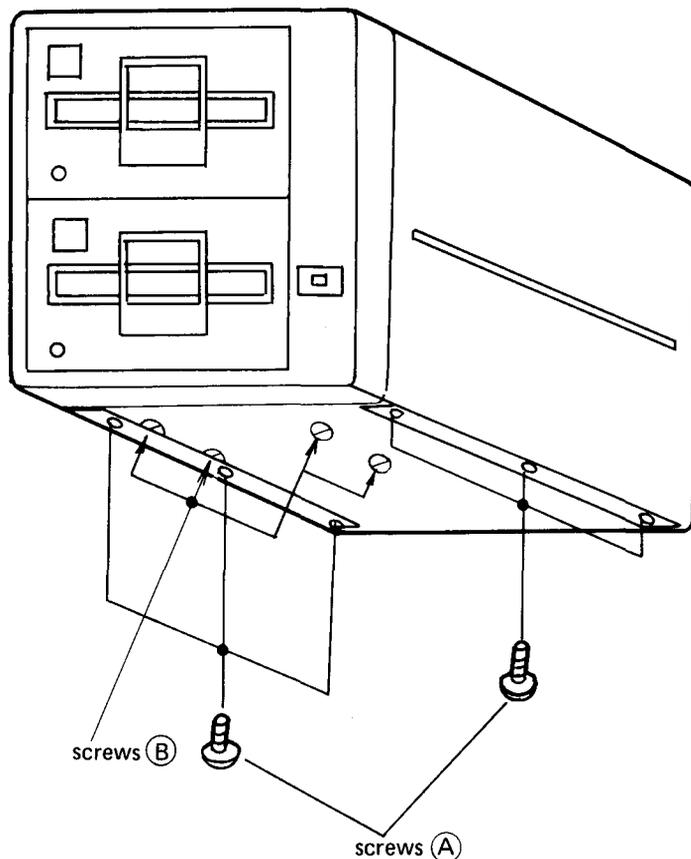
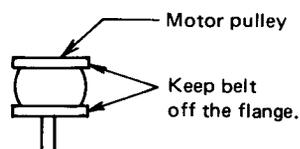
Check to see if the belt is stained with dust or dirt. Also make sure that there is no unevenness, scratch and thinned part.

2) Replacement

- 1) Take the belt off the spindle pulley while rotating the pulley gradually by hand.
- 2) For applying the belt, put the belt first on the motor pulley and then on the spindle pulley while rotating the spindle pulley.

Note)

1. In putting on and off the belt, be careful so that it be not caught by the motor pulley flange.
2. Note that there is no difference between both sides of a new belt.



3. PWB unit

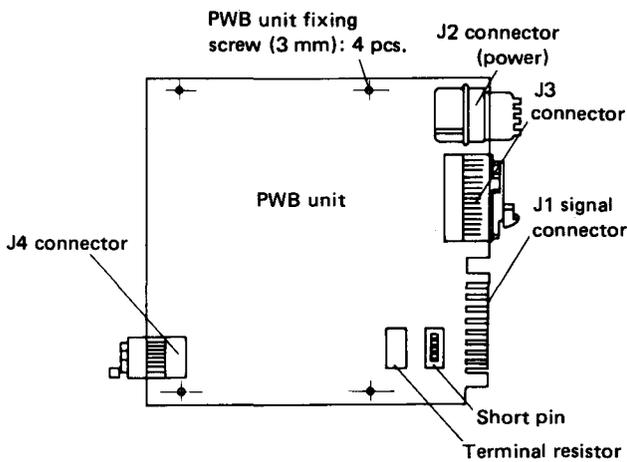
1) Replacement

- 1) Take connectors J3 and J4 off PWB.
- 2) Remove 4 PWB unit fixing screws (3 mm).
- 3) Detach PWB unit.
- 4) For reassembly, take the reverse order.

Note)

In replacing PWB unit, it is necessary to check which short pins to cut and whether or not terminal resistor is required, depending on which drive unit to use (DRIVE No.).

- Short pin: Detach the short pins from the old PWB unit and apply them to a new PWB.
- Terminal resistor: If the old PWB unit has no terminal resistor, remove terminal resistor from a new PWB.



2) Setting of short pins and terminal resistor

- Before delivery, the drive units No. 1 thru 4 are factory adjusted as tabulated below.

		Drive No.			
		MZ-80FD		MZ-80FDK	
		1	2	3	4
Short pin	HS	0	0	0	0
	DS0	SHORT	0	0	0
	DS1	0	SHORT	0	0
	DS2	0	0	SHORT	0
	MX	0	0	0	0
	DS3	0	0	0	SHORT
	HM	SHORT	SHORT	SHORT	SHORT
Terminal resistor		Provided	None	None	None

0: OPEN

HS: Head load takes place by drive select: That is, when signals of which drive is shorted among the short pins DS0, DS1, DS2 and DS3 become low, head load is caused.

DS0~3: DRIVE SELECT signals

MX: When using one drive unit, DS0 thru DS3 become invalid by shorting this pin. Select will be constantly kept.

HM: When motor ON signals become low, head load occurs.

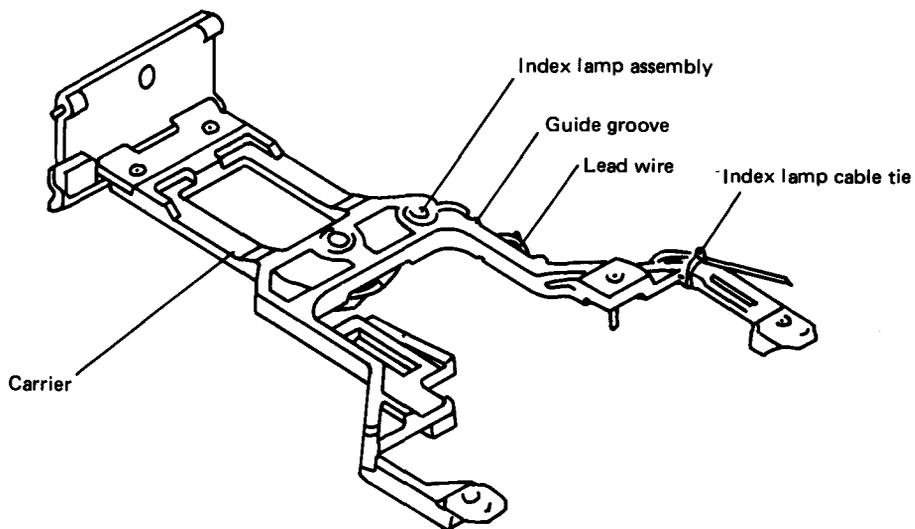
4. Index lamp assembly

1) Inspection

- ① Connect power socket to connector J2 of PWB unit. Turn power on.
- ② Make sure that there is a voltage range of DC 1 to 1.7V between B-11 (lower white lead of the 11th pin from power socket) and A-11 (black lead of the 11th pin from power socket), both belonging to connector J3.

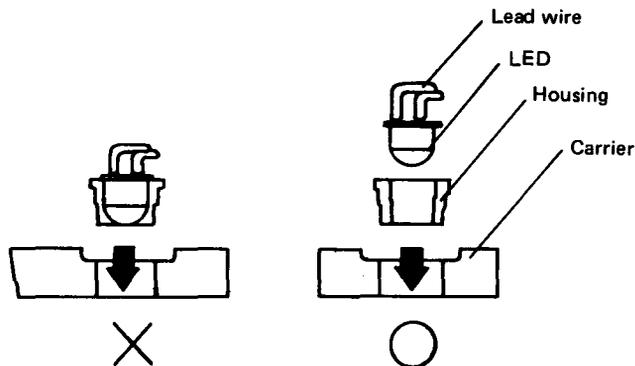
2) Replacement

- ① Remove PWB unit (refer to page 14).
- ② Disconnect 2 lead wires of index lamp assembly from the housing of connector J3.
- ③ Cut off the tie band fixing lead wires of index lamp assembly (be careful not to damage lead wires), and open the front door.
- ④ Take lead wires off the guide groove of carrier, and draw out the index lamp assembly with tweezers and fingers.
- ⑤ To attach, take the reverse order.
- ⑥ Carry out inspection, referring to description at left.



Note)

When attaching the index lamp assembly to the carrier, fit the housing and LED in at the same time.



5. Media guide L assembly (with write protect sensor lamp)

1) Inspection

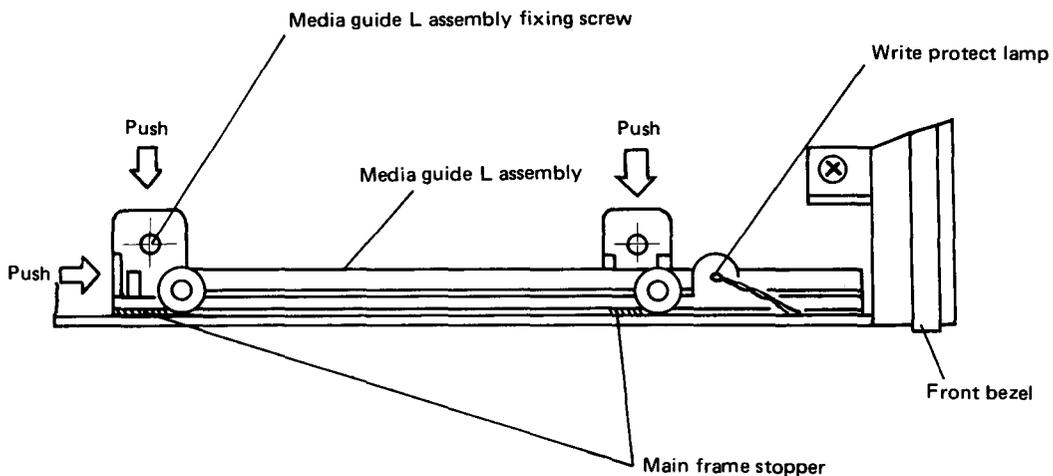
- ① Connect power socket to connector J2 of PWB unit. Turn power on.
- ② Before inserting a diskette, check the following items.
 - a) Write protect lamp
Make sure that there is a voltage range of DC 1 to 1.7V between B-13 (lower yellow lead of the 13th pin from power socket) and A-13 (black lead of the 13th pin from power socket), both belonging to connector J3.
 - b) Write protect sensor
Make sure that there is a voltage range of DC 0 to 0.5V between B-14 (orange lead below the 14th pin from power socket) and A-14 (black lead of the 14th pin from power socket), both belonging to connector J3.
- ③ Put a write protect diskette (with write protect seal being applied at the write protect notch of diskette) in place, and shut the front door. Then check the following item.
 - Write protect sensor
Make sure that there is a voltage range of DC 2.5 to 5.25V between B-14 and A-14 of connector J3.

2) Replacement

- ① Remove PWB unit (refer to page 14).
- ② Open the front door.
- ③ Detach 4 lead wires of media guide L assembly from the housing of connector J3.
- ④ Remove 2 media guide L assembly fixing screws (3 mm) and take out the assembly.
- ⑤ To attach, take the reverse order.
- ⑥ Carry out inspection, referring to description at left.

Note)

1. Attach the media guide L assembly by pushing it to main frame stopper side and front bezel side.
2. Lamp and sensor cannot be individually replaced, because they are built in the media guide L assembly.



6. Operation indicator

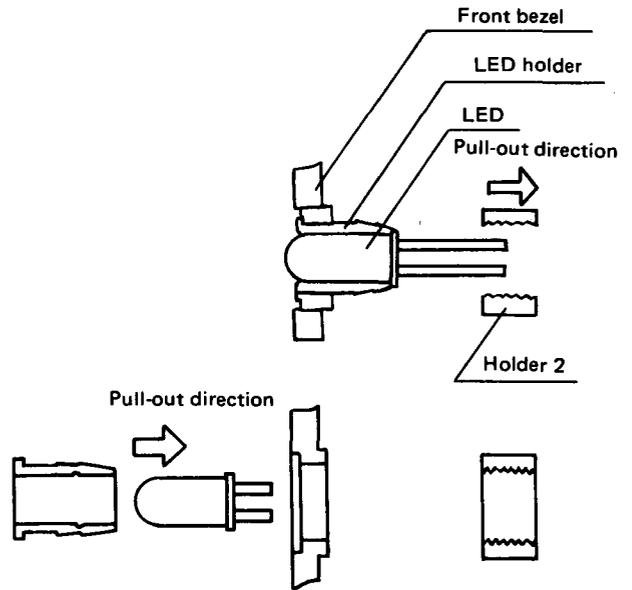
1) Inspection

- ① Connect power socket to connector J2 of PWB unit and turn power on.
- ② Let drive select 0 of interface signals be at low levels (make a short between J1-8 terminal of PWB and PWB Ground), and make short pin DSO circuit shorted. (Do not prolong this test.)

Note that the voltage range between connector J3-B10 (red lead of the 10th pin from power socket) and J 3-A10 (upper black lead of the 10th pin from power socket) will be DC 1 to 2V when the lamp is lit.

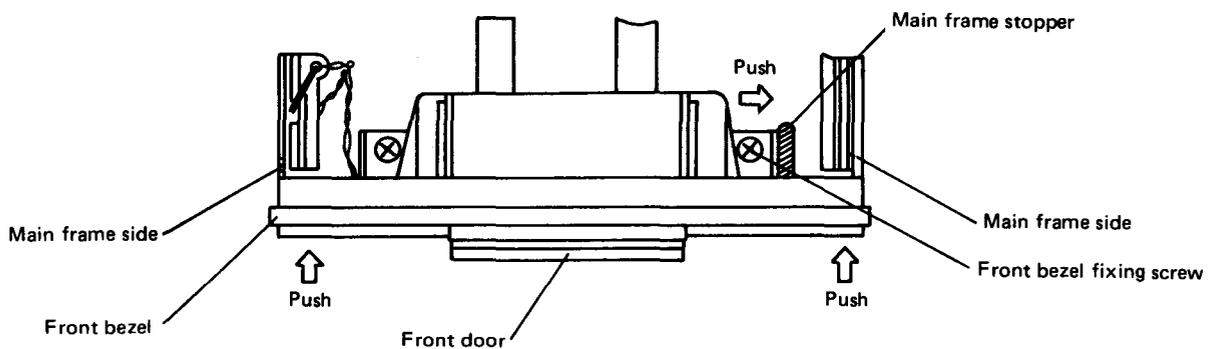
2) Replacement

- ① Remove PWB unit (refer to page 14).
- ② Detach 2 lead wires of operation indicator from the housing of connector J3, and take lead wires out of the wire holder.
- ③ Open the front door.
- ④ Remove 2 front bezel fixing screws (3 mm) and the front bezel itself by pulling it forward.
- ⑤ Draw out the holder 2 with tweezers in the arrow direction. Take out LED holder. (See the sketch at right.)
- ⑥ Draw LED out of the LED holder. To assemble, take the reverse order.
- ⑦ Carry out inspection, referring to the above instruction.



Note:

1. Attach the front bezel assembly, by pushing it to main frame side and main frame stopper. (See the sketch below.)
2. Do not pull up the carrier with fingers, otherwise excessive force is applied to the head arm.



7. Drive motor assembly (DC motor and motor control PWB unit)

1) Inspection

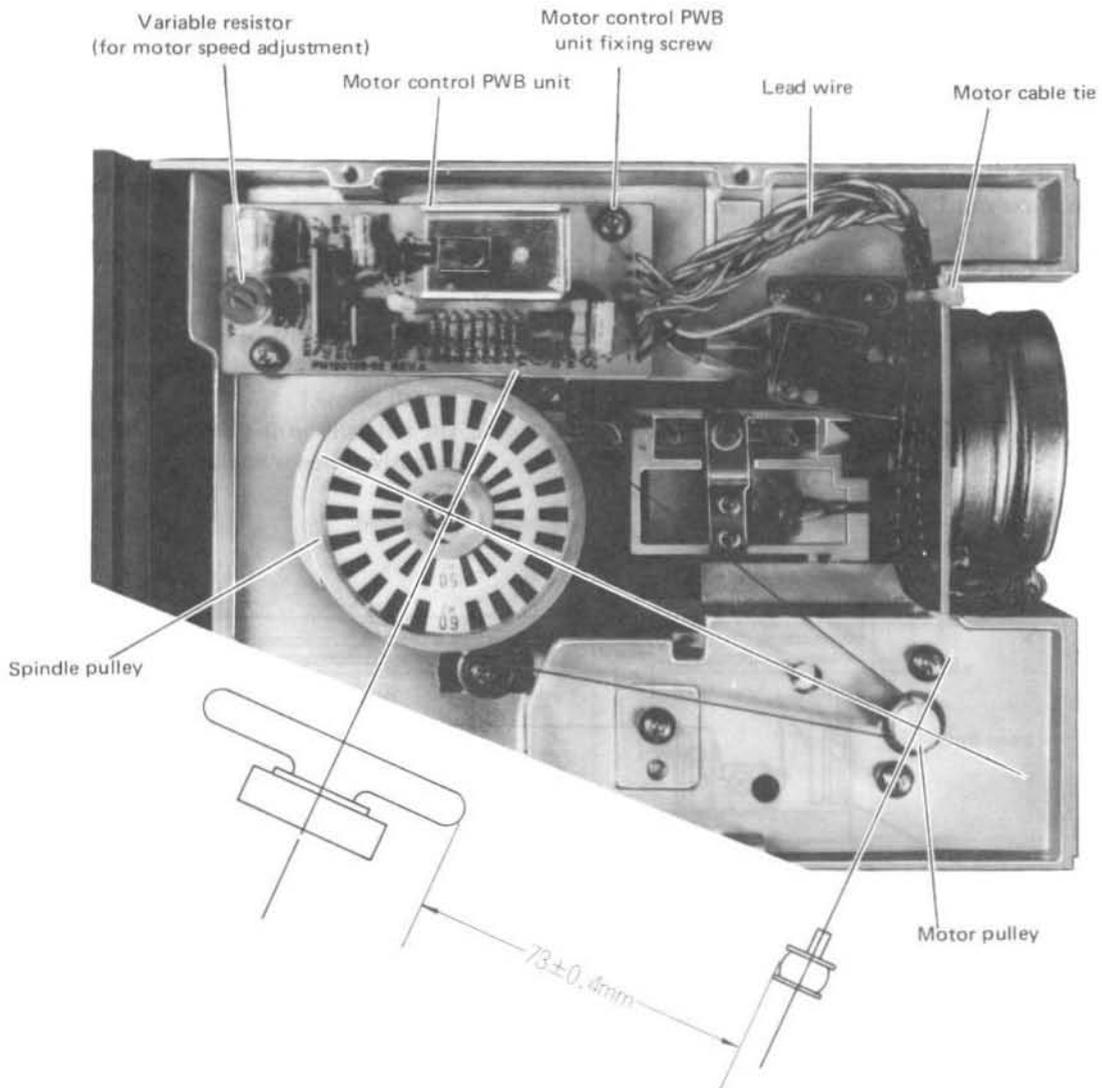
- ① Connect power socket to connector J2 of PWB unit. Turn power on.
- ② Led interface motor ON signals be at low levels (make a short between J1-16 terminal of PWB unit and PWB Ground) and run the motor. (Do not prolong this test.)
- ③ Put a diskette in place and close the front door.
- ④ Carry on head load.
- ⑤ Make sure that the stroboplate attached on the spindle pulley appears to be stationary.

Note)

The shifting rate of stroboplate is allowed to be up to 1.5 pcs./sec.

2) Replacement

- ① Remove PWB unit. (Refer to page 14.)
- ② Put off the belt. (Refer to page 13.)
- ③ Cut off the tie band for fixing lead wires of motor and motor control PWB unit. Be careful not to damage lead wires.
- ④ Remove 3 lead wires—coming from the motor control PWB unit to connector J3—from the housing of connector J3.
- ⑤ Remove 2 motor control PWB unit fixing screws (3 mm) and 2 DC motor fixing screws (3 mm). Detach the DC motor and motor control PWB unit from the main frame.
- ⑥ For assembly, take the reverse order.
- ⑦ Carry out inspection, referring to description at left.



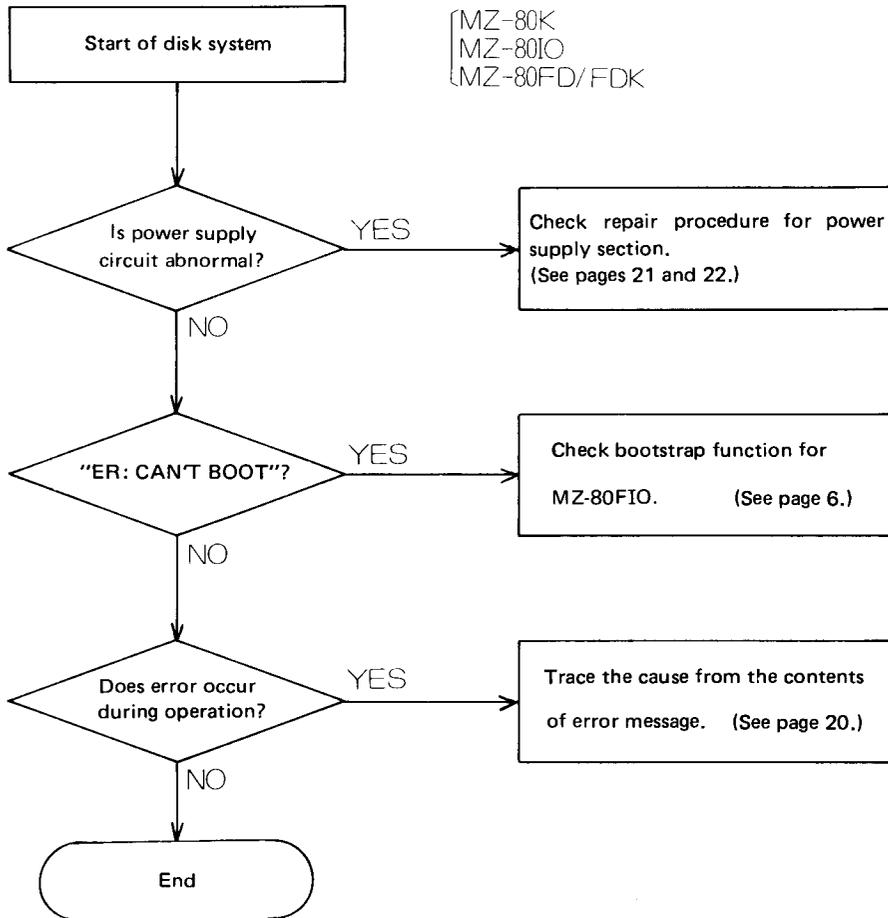
Note)

In mounting the DC motor, the distance between spindle pulley and motor pulley should be kept to be $73 \pm 0.4 \text{ mm}$ as shown above.

3) Adjustment

- ① After the completion of the above check items, adjust the variable resistor of motor control PWB unit so that the stroboplate appears to be completely stationary.

REPAIR PROCEDURES



- Check by replacing several sheets of diskette to see if errors occur due to faulty diskette (data deterioration caused by foreign matters, deformation, wear-out, damage, magnetism, etc.).
- Troubles in disk system often cause error messages. Trace the cause from the contents of error message.
- Replace suspected parts in the disk system with normal ones. Check again the trouble section.

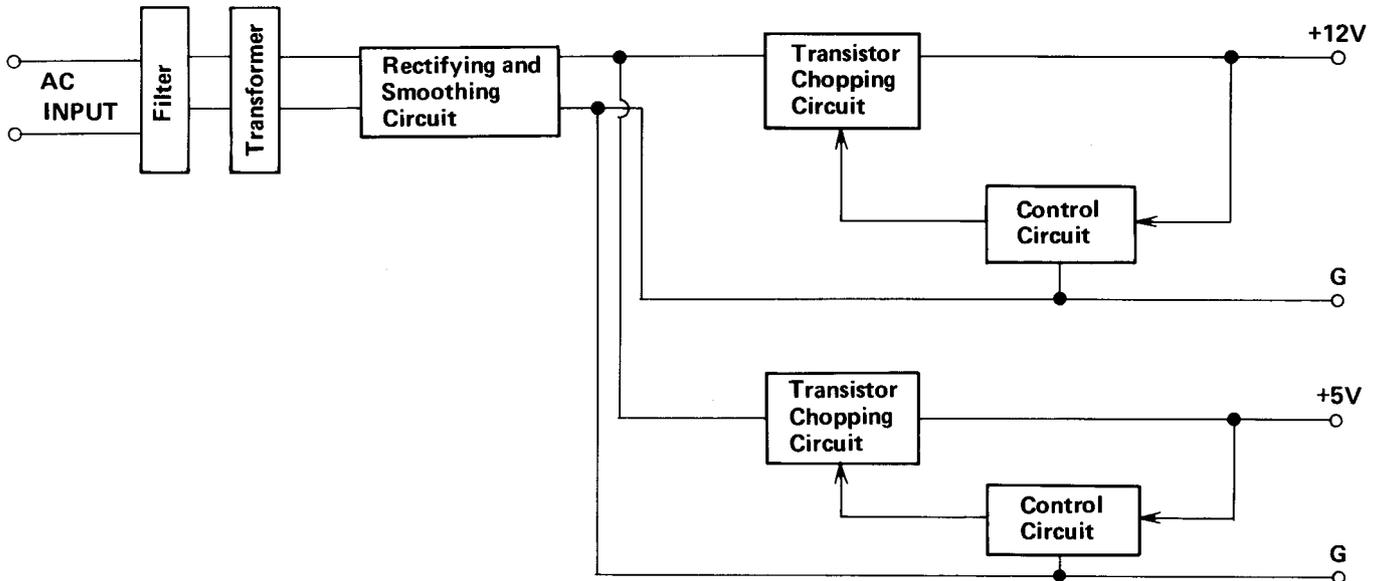
1) Personal computer	MZ-80K
2) Interface unit	MZ-80IO
3) I/O card	MZ-80FIO
4) Diskette	MZ-80FMD, MZ-80FBD
5) Flat cable	MZ-80F15, MZ-80F05
6) Disk drive	
- The signal circuits of floppy disk and I/O card operate at TTL levels of 0V, +5V. Connect any system other than micro-computer peripheral devices for MZ-80 series to see if signal levels are out of the range of 0 to +5V (max. +5.25V).

■ Error chart for disk system

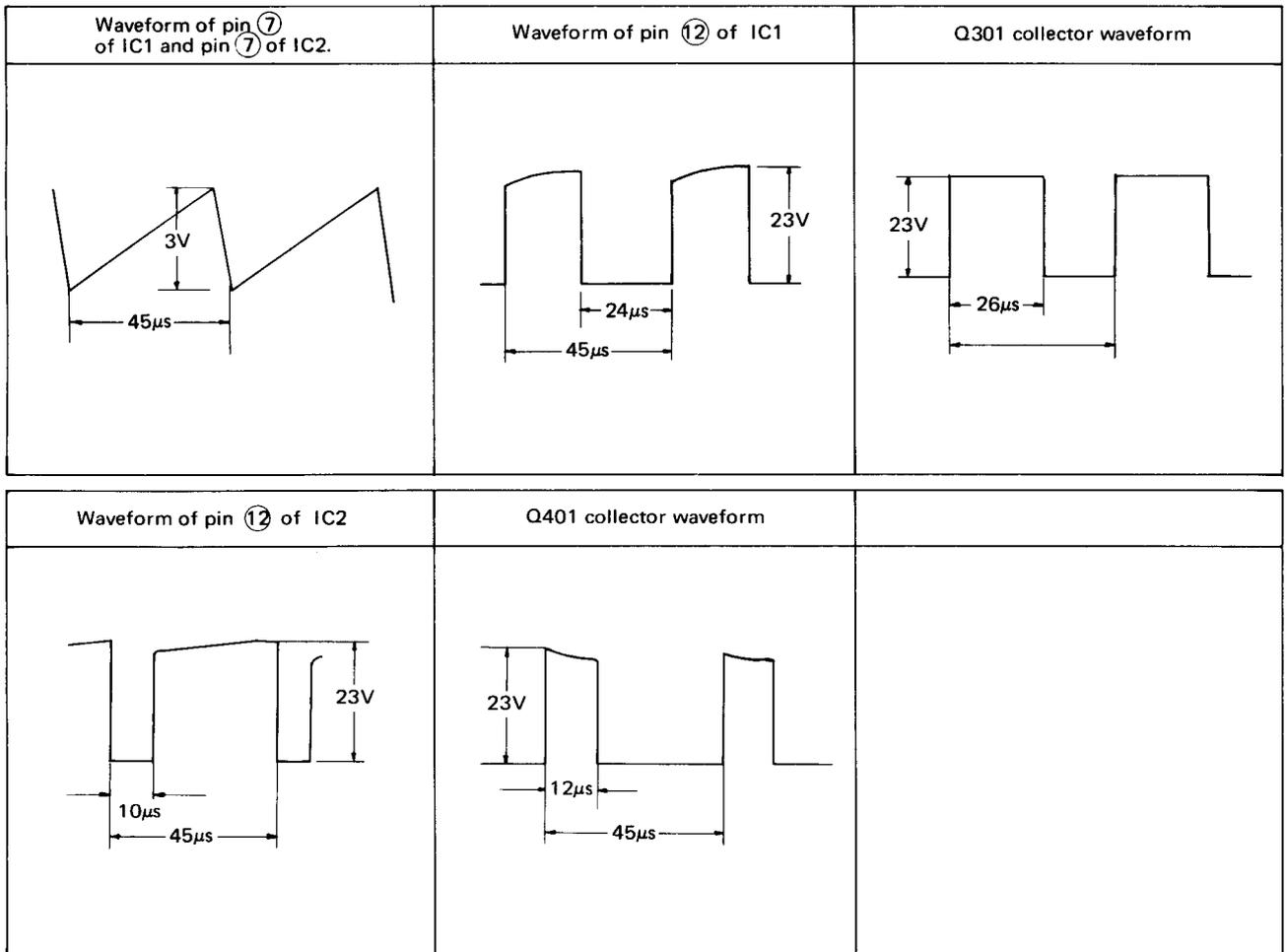
Error code [Error message]	Contents	Check item and corrective action
50 [NO READY]	1) Drive fails to be ready. <input type="checkbox"/> Diskette is wrongly inserted. <input type="checkbox"/> Motor does not normally run. <input type="checkbox"/> Index detection circuit is improper. <input type="checkbox"/> Flat cable is improperly fit in or broken. <input type="checkbox"/> No select signal comes at drive. <input type="checkbox"/> Drive unit door (front door) is not closed. <input type="checkbox"/> Diskette is faulty. <input type="checkbox"/> Write operation is attempted in write protect state.	<input type="checkbox"/> Fit diskette in correctly. <input type="checkbox"/> Check belt and/or drive motor assembly. <input type="checkbox"/> Check index lamp, drive PWB, index sensor. <input type="checkbox"/> Check flat cable. <input type="checkbox"/> Check floppy disk I/O card. <input type="checkbox"/> Close front door. <input type="checkbox"/> Replace diskette.
	2) Floppy disk I/O card is faulty. <input type="checkbox"/> Oscillation circuit is interrupted. <input type="checkbox"/> VFO circuit is abnormal. <input type="checkbox"/> LSI (T3444M) CRDY signal is not given. <input type="checkbox"/> LSI is not released. <input type="checkbox"/> Pattern is broken or bridged. <input type="checkbox"/> Conductive foreign matters are sticking to IC, etc. <input type="checkbox"/> PWB and connector are in inadequate contact.	<input type="checkbox"/> Check IC13. <input type="checkbox"/> Check IC15 and IC16. (See page 7). <input type="checkbox"/> No CLOCK signal comes at LSI. <input type="checkbox"/> Replace LSI. <input type="checkbox"/> Check pattern. <input type="checkbox"/> Check IC.
	3) Interface unit is faulty.	<input type="checkbox"/> Refer to Service Manual for MZ-80 IO.
54 [UNFORMAT]	1) Drive <input type="checkbox"/> Head position is not aligned. (off-track state) <input type="checkbox"/> Head and amp. circuit are defective.	<input type="checkbox"/> Replace drive unit. <input type="checkbox"/> Replace drive unit and/or drive PWB unit.
	2) Diskette <input type="checkbox"/> Diskette not formatted is in use. <input type="checkbox"/> CRC error in ID field. <input type="checkbox"/> ID field is broken down.	<input type="checkbox"/> Initialize again, or replace diskette
	3) Floppy disk I/O card is faulty. <input type="checkbox"/> LSI (T3444M) is improper. <input type="checkbox"/> VFO circuit is defective.	<input type="checkbox"/> Replace LSI. <input type="checkbox"/> Check IC15 and IC16. (See page 7.)
41 [DISK DATA ERROR]	1) Drive <input type="checkbox"/> SEEK error <input type="checkbox"/> Head shift is improper.	<input type="checkbox"/> Check drive unit and diskette Replace, if required. <input type="checkbox"/> Replace drive unit.
	2) Diskette <input type="checkbox"/> CRC error in data field. <input type="checkbox"/> Data field is broken down. <input type="checkbox"/> ID field is defective. <input type="checkbox"/> Data mark detection error.	<input type="checkbox"/> Initialize again, or replace diskette.
	3) Floppy disk I/O card is faulty. <input type="checkbox"/> Pattern is broken or bridged. <input type="checkbox"/> Conductive foreign matters entered.	<input type="checkbox"/> Check pattern. <input type="checkbox"/> Check for foreign matters.

POWER SUPPLY SECTION

Block Diagram of Power Supply Section

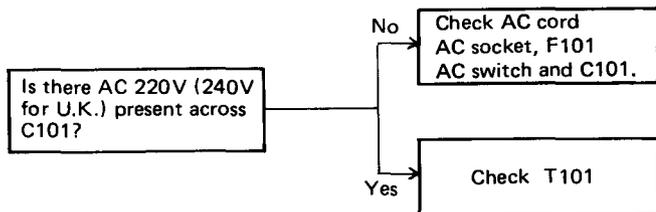


Waveform of Each Part

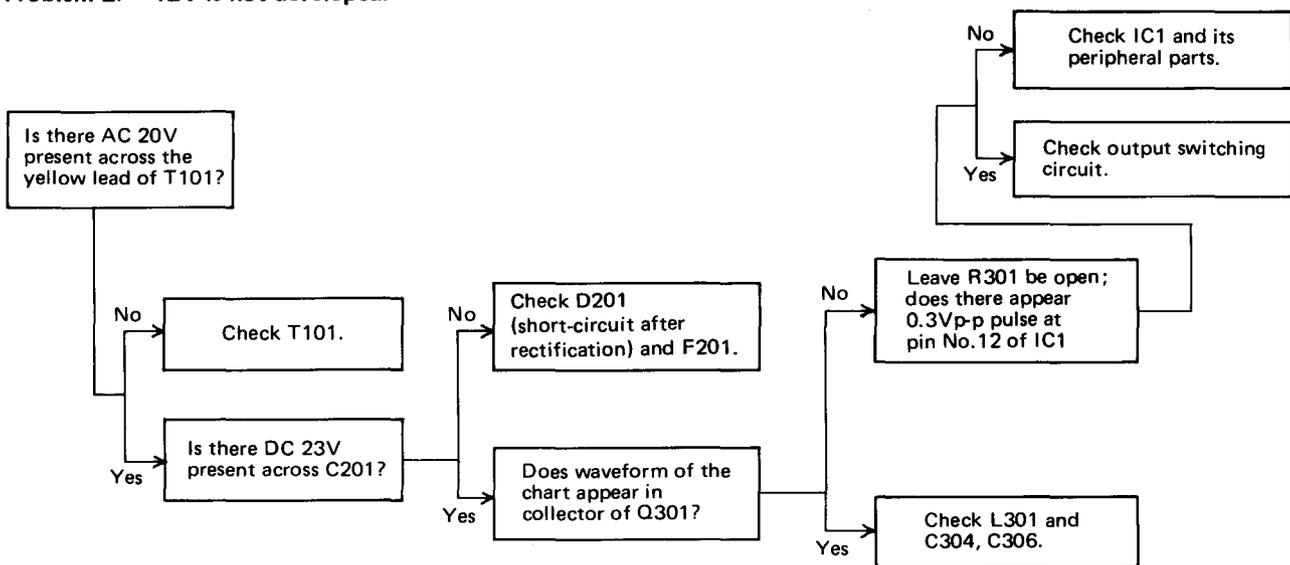


■ Trouble Shooting Chart

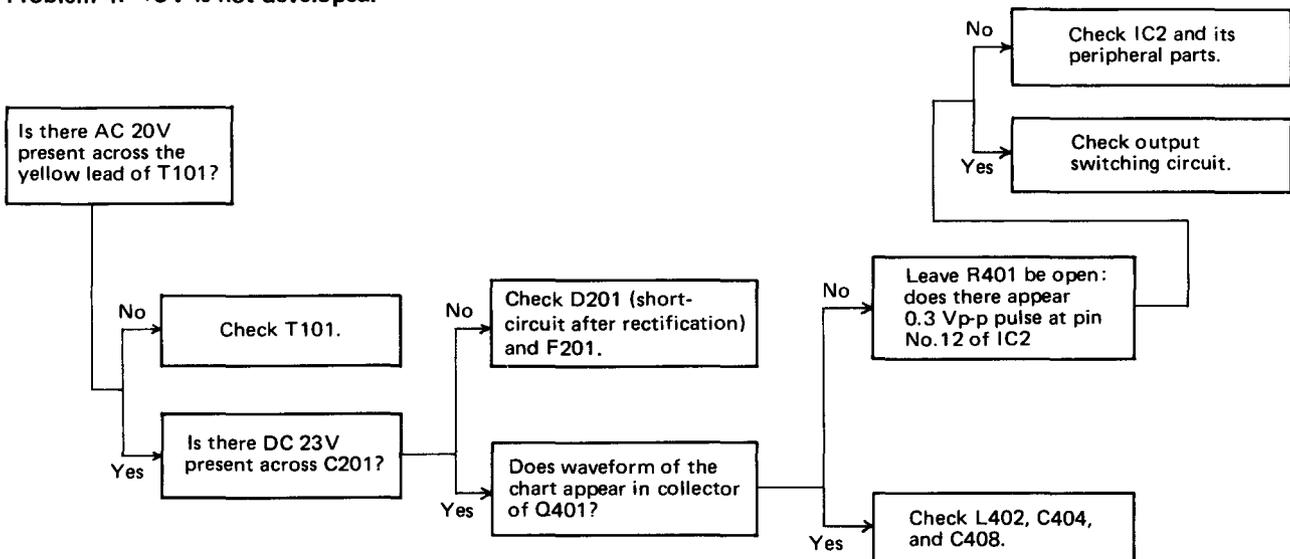
Problem 1: No voltage appears at any output terminal.



Problem 2: +12V is not developed.



Problem 4: +5V is not developed.

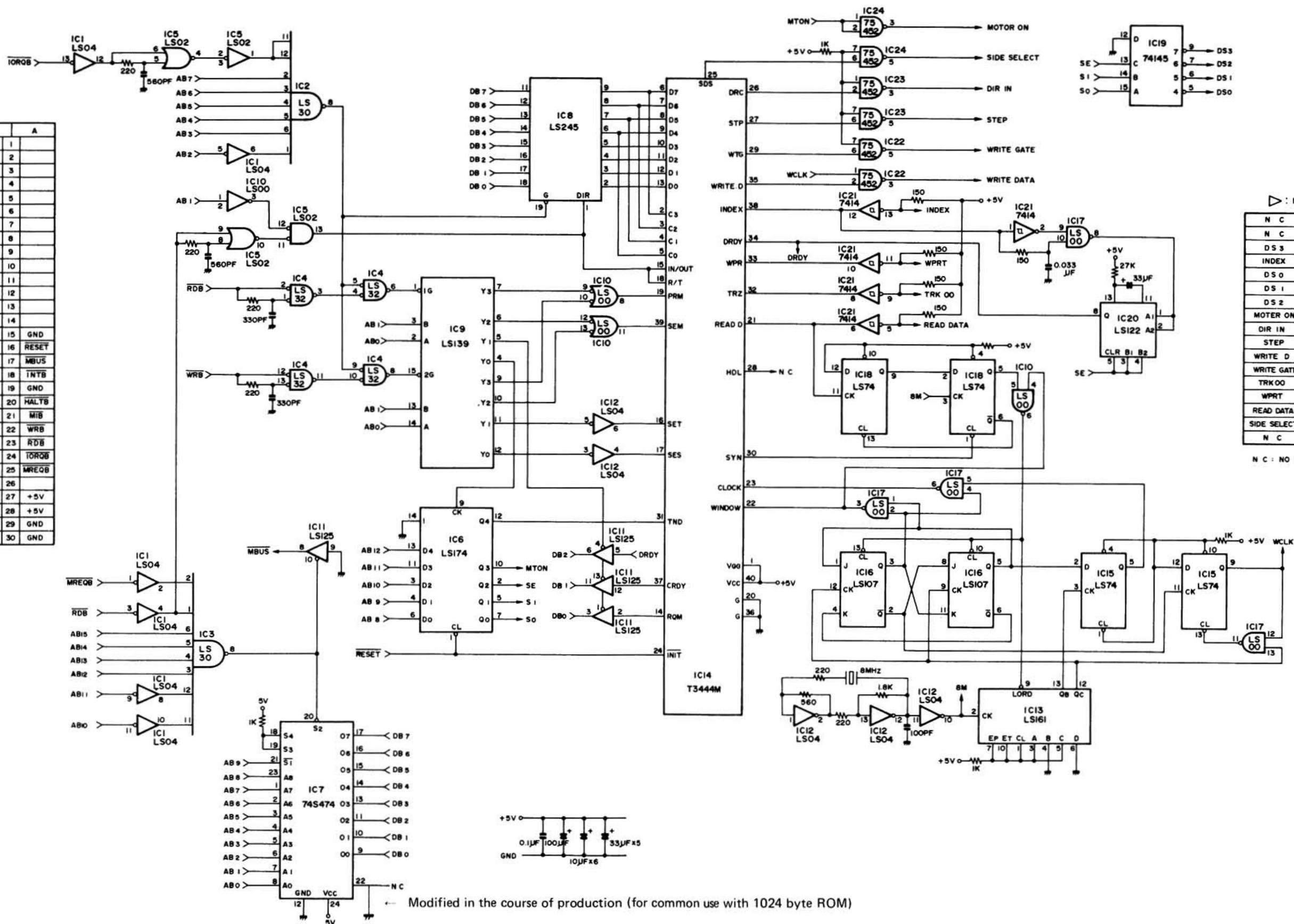


CIRCUIT DIAGRAM AND PRINTED WIRING BOARD

Note) The circuit diagram and printed wiring board subject to change without prior notice.

■ Floppy disk I/O card (MZ-80FIO) circuit

B	A
DB 7	1
DB 6	2
DB 5	3
DB 4	4
DB 3	5
DB 2	6
DB 1	7
DB 0	8
GND	9
AB15	10
AB14	11
AB13	12
AB12	13
AB11	14
AB10	15
AB 9	16
AB 8	17
AB 7	18
AB 6	19
AB 5	20
AB 4	21
AB 3	22
AB 2	23
AB 1	24
AB 0	25
	26
+5V	27
+5V	28
GND	29
GND	30



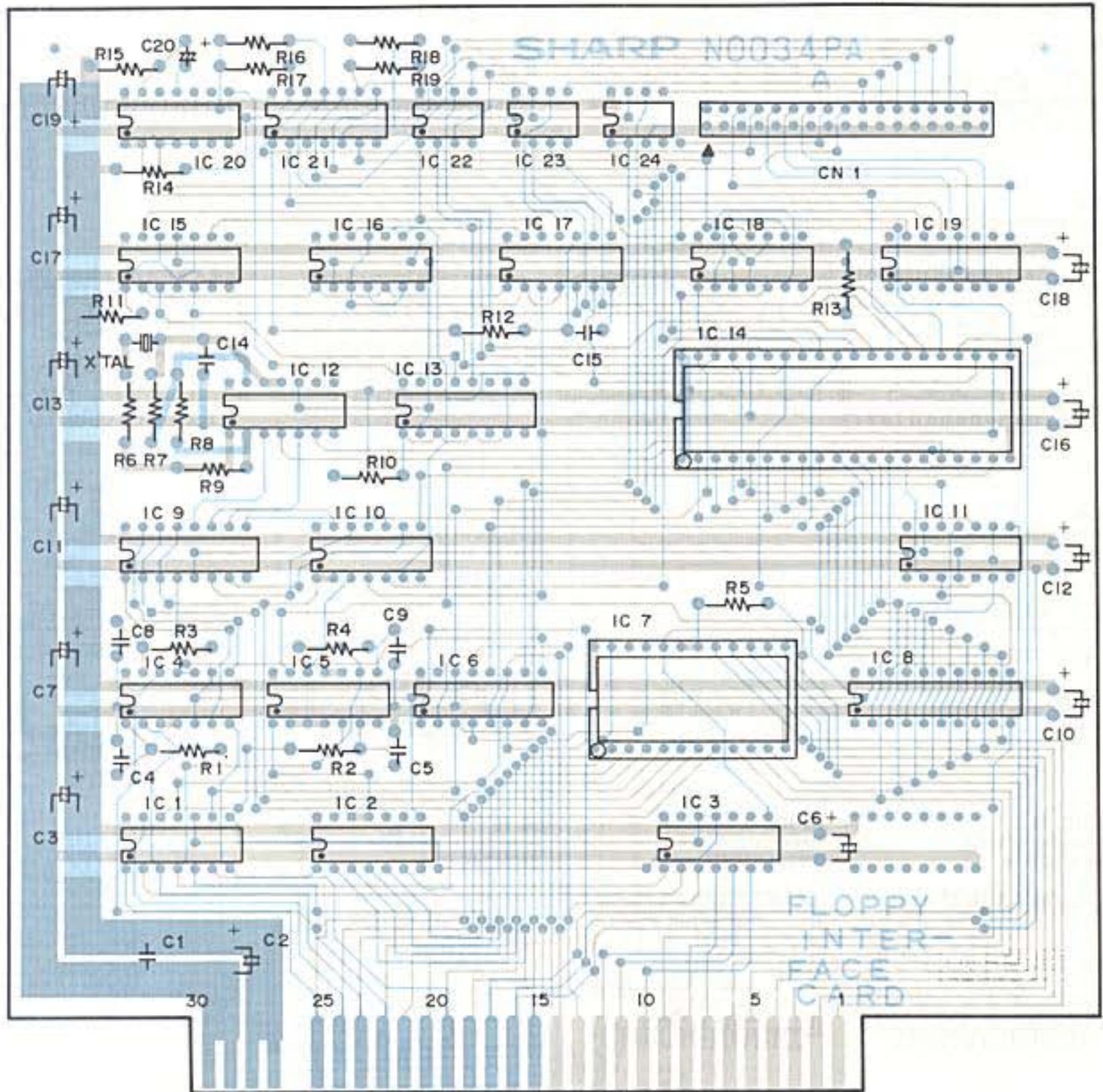
▷ : 1 PIN MARK

N C	2	1	G
N C	4	3	G
DS 3	6	5	G
INDEX	8	7	G
DS 0	10	9	G
DS 1	12	11	G
DS 2	14	13	G
MOTOR ON	16	15	G
DIR IN	18	17	G
STEP	20	19	G
WRITE D	22	21	G
WRITE GATE	24	23	G
TRK OO	26	25	G
WPRT	28	27	G
READ DATA	30	29	G
SIDE SELECT	32	31	G
N C	34	33	G

N C : NO CONNECT

← Modified in the course of production (for common use with 1024 byte ROM)

■ Printed Wiring Board (Floppy disk I/O Card Section)



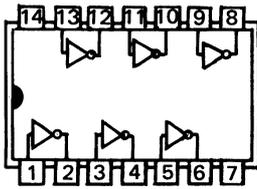
Perspective View

- Parts-fitted face
- Opposite side

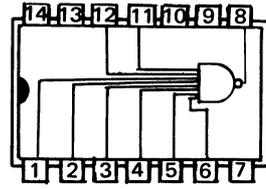
Note) Pin 12 and pin 22 of IC7 (ROM) are short-circuited with jumper wire or PWB pattern in the course of production.

■ IC Pin Assignments (Top View)

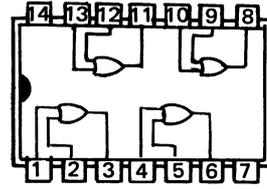
IC 1, 12
RH-iX0074PAZZ
SN74LS04N



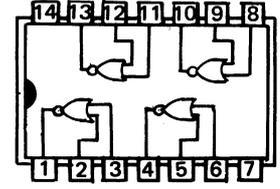
IC 2, 3
RH-iX0077PAZZ
SN74LS30N



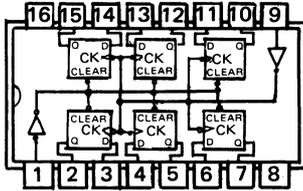
IC 4
RH-iX0078PAZZ
SN74LS32N



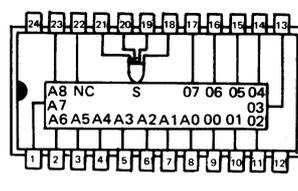
IC 5
RH-iX0071PAZZ
SN74LS02N



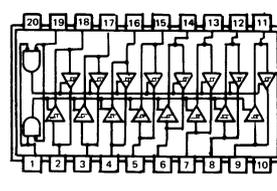
IC 6
RH-iX0215PAZZ
SN74LS174N



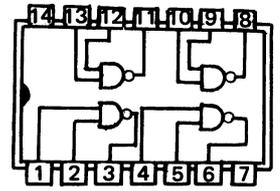
IC 7
RH-iX0219PAZZ
ROM SN74S474N



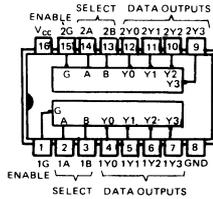
IC 8
RH-iX0124PAZZ
SN74LS245N



IC 10, 17
RH-iX0070PAZZ
SN74LS00N



IC 9
RH-iX0081PAZZ
SN74LS139N

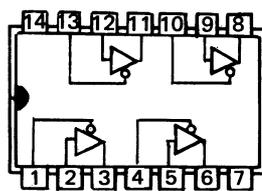


FUNCTION TABLE

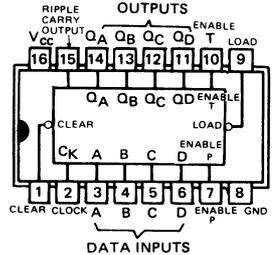
INPUTS			OUTPUTS			
ENABLE	SELECT		Y0	Y1	Y2	Y3
H	X	X	H	H	H	H
L	L	L	L	H	H	H
L	L	H	L	H	L	H
L	H	L	H	L	H	L
L	H	H	H	H	L	L

H = high level, L = low level, X = irrelevant

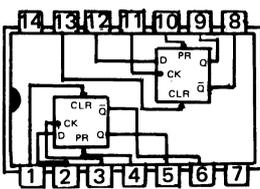
IC 11
RH-iX0141PAZZ
SN74LS125N



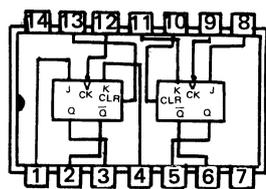
IC 13
RH-iX0216PAZZ
SN74LS161N



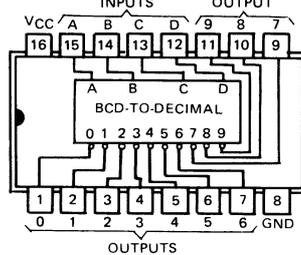
IC 15, 18
RH-iX0079PAZZ
SN74LS74N



IC 16
RH-iX0127PAZZ
SN74LS107N



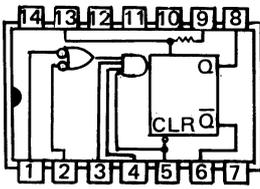
IC 19
RH-iX0217PAZZ
SN74145



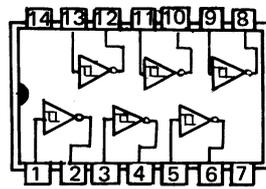
NO.	INPUTS				OUTPUTS										
	D	C	B	A	0	1	2	3	4	5	6	7	8	9	
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H
1	L	L	L	H	L	H	L	H	H	H	H	H	H	H	H
2	L	L	H	L	H	L	H	L	H	H	H	H	H	H	H
3	L	L	H	H	L	H	L	H	L	H	H	H	H	H	H
4	L	H	L	L	H	H	L	H	L	H	H	H	H	H	H
5	L	H	L	H	L	H	L	H	L	H	H	H	H	H	H
6	L	H	H	L	H	L	H	L	H	L	H	H	H	H	H
7	L	H	H	H	L	H	L	H	L	L	H	H	H	H	H
8	H	L	L	L	H	H	H	H	H	H	L	H	H	H	H
9	H	L	L	H	H	H	H	H	H	H	L	L	H	H	H
INVALID	H	L	H	L	H	H	H	H	H	H	H	H	H	H	H
	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H
	H	H	L	L	H	H	H	H	H	H	H	H	H	H	H
	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H
	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H
	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H

H = high level, L = low level

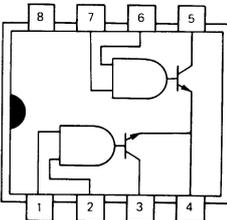
IC 20
RH-iX0214PAZZ
SN74LS122N



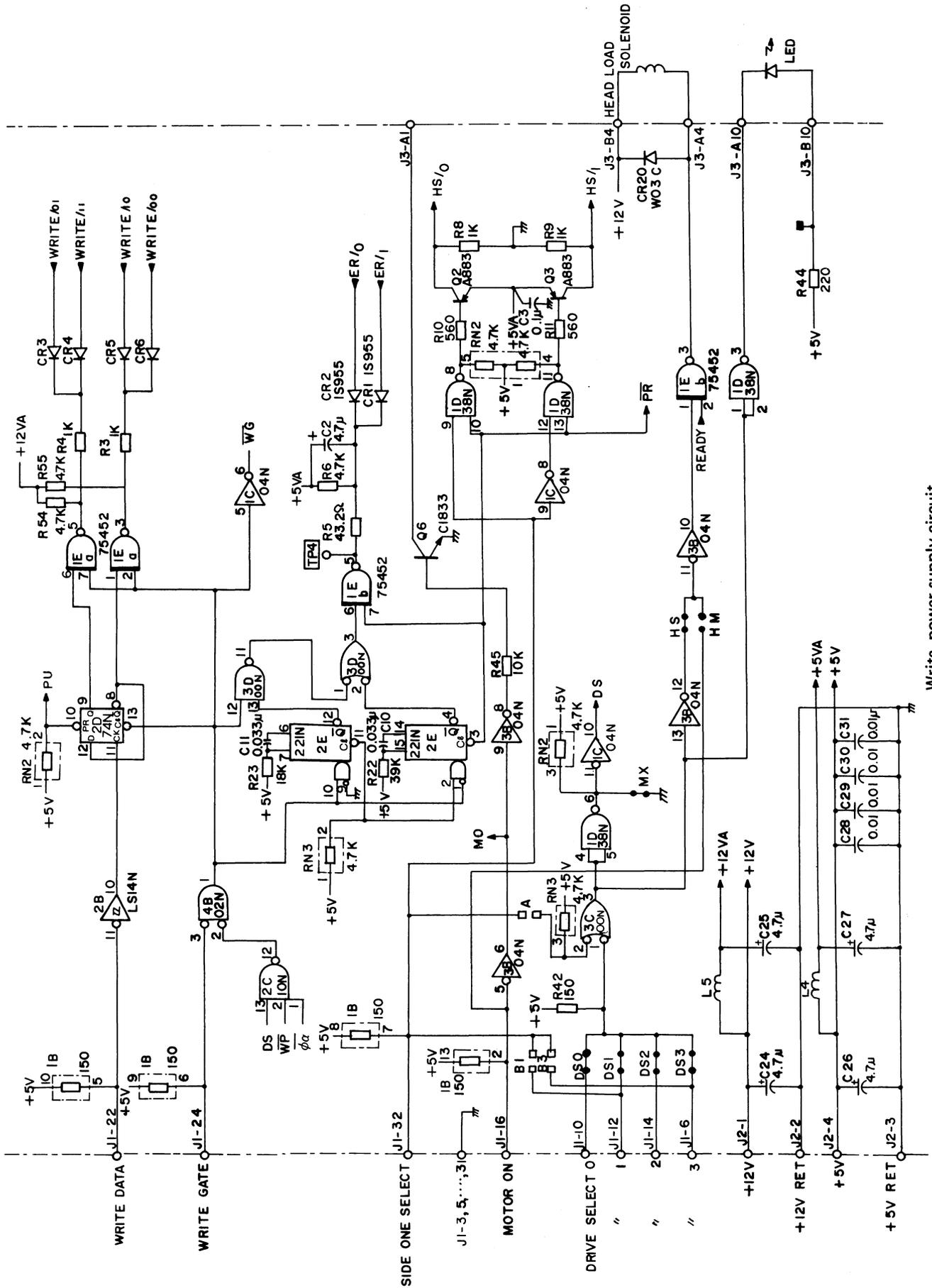
IC 21
RH-iX0131PAZZ
SN7414N



IC 22 ~ 24
RH-iX0220PAZZ
SN75452BP

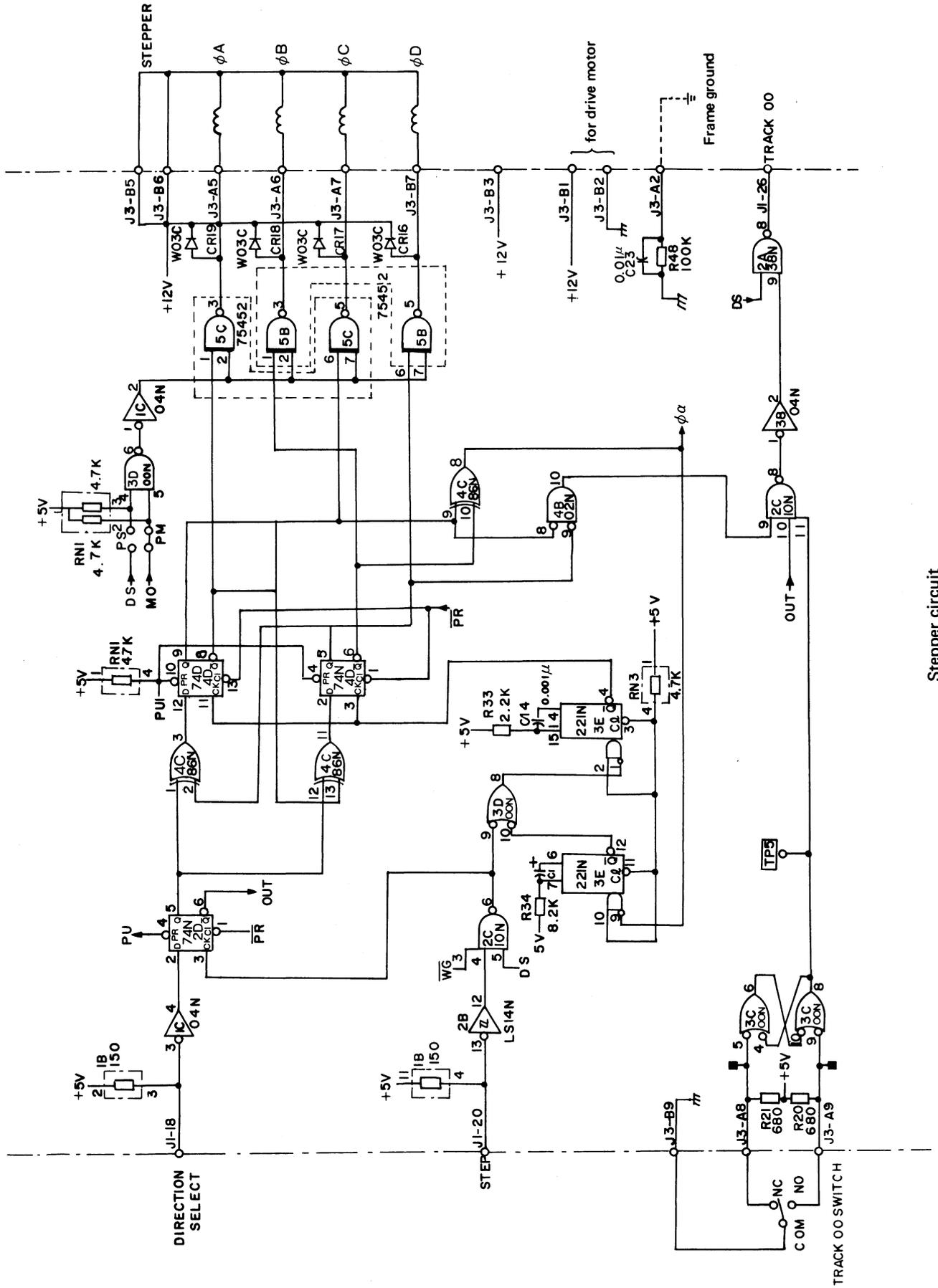


■ Disk drive PWB circuit (1)



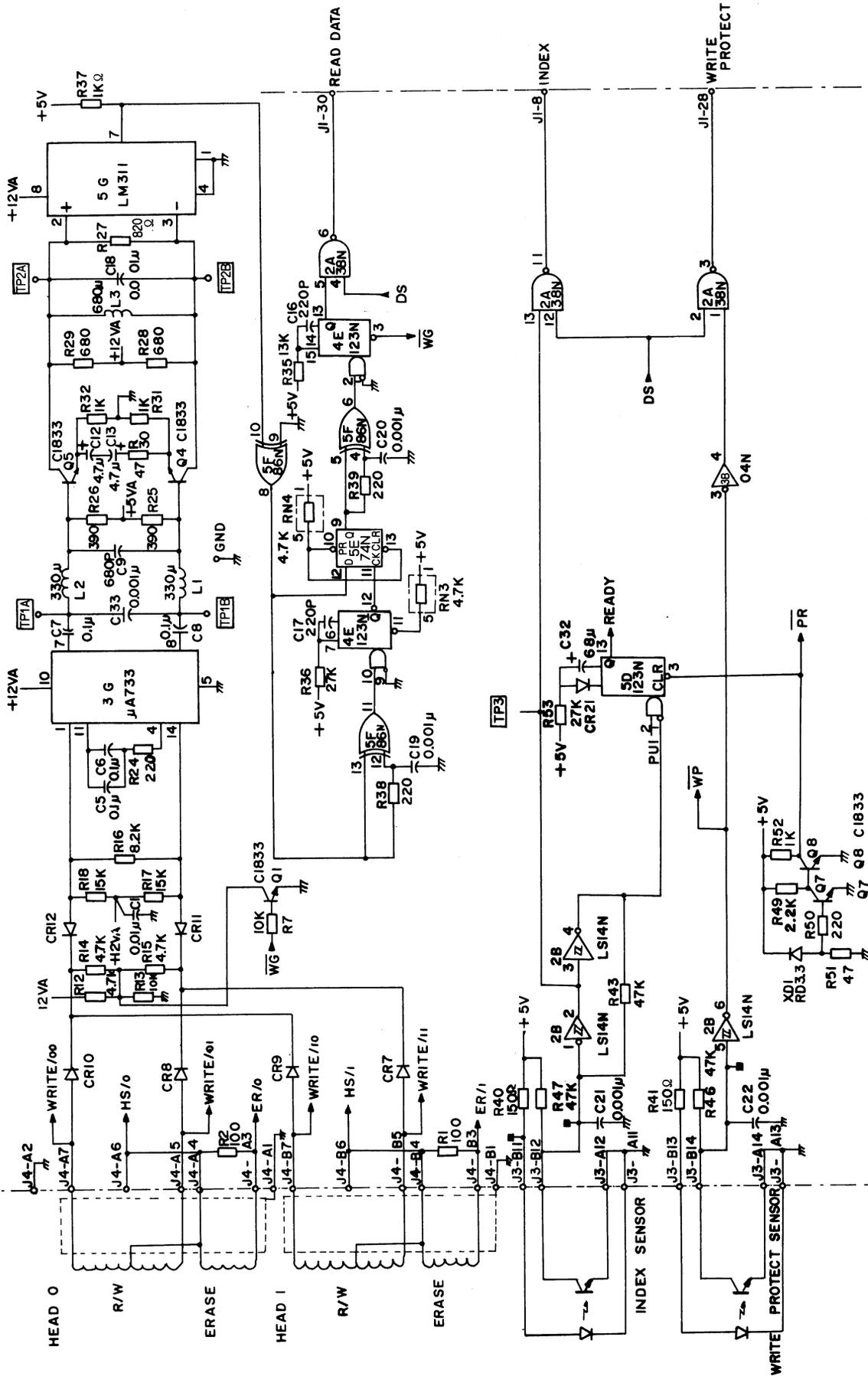
Write, power supply circuit

■ Disk drive PWB circuit (2)

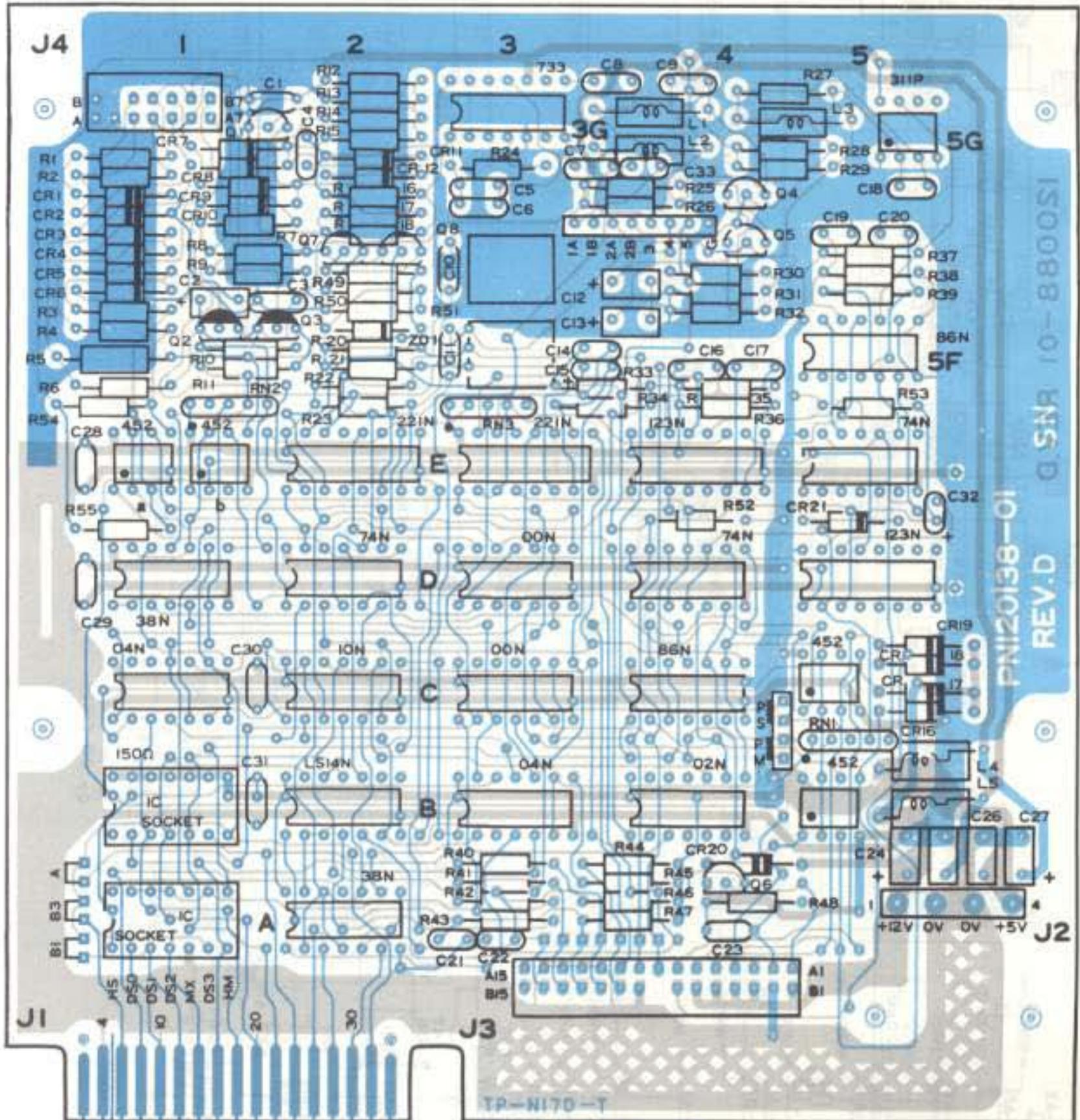


Stepper circuit

■ Disk drive PWB circuit (3)



Read, index circuit



Perspective View

- Parts-fitted face
- Opposite side

■ Disk drive PWB, arrangement of test pins/connector pins

J1. Interface codes

Code	Pin No.		Code
RETURN	1	2	RESERVED
RETURN	3	4	RESERVED
RETURN	5	6	DRIVE SELECT 3
RETURN	7	8	IN DEX
RETURN	9	10	DRIVE SELECT 0
RETURN	11	12	DRIVE SELECT 1
RETURN	13	14	DRIVE SELECT 2
RETURN	15	16	MOTOR ON
RETURN	17	18	DIRECTION SELECT
RETURN	19	20	STEP
RETURN	21	22	WRITE DATA
RETURN	23	24	WRITE GATE
RETURN	25	26	TRACK 00
RETURN	27	28	WRITE PROTECT
RETURN	29	30	READ DATA
RETURN	31	32	SIDE ONE SELECT
RETURN	33	34	RESERVED
PWB back side (solder-fitted side)		PWB front side (parts fitted side)	

J2. Power supply

Pin No.	Code
1	+12V DC
2	+12V RETURN
3	+5V RETURN
4	+5V DC

J3 Transducer

Wire color	Code	Pin No.		Code	Wire color
Blue	MOTOR ON	A1	B1	+12V (DRIVE MOTOR)	Red
Brown	FLAME GROUND	A2	B2	+12V RETURN (DRIVE MOTOR)	Black
		A3	B3		
Green	HEAD LOAD	A4	B4	HEAD LOAD +12VDC	White
Black	STEPPER ϕ A	A5	B5	+12V (STEPPER)	Red
Yellow	STEPPER ϕ B	A6	B6	+12V (STEPPER)	Red
Brown	STEPPER ϕ C	A7	B7	STEPPER ϕ D	Orange
Yellow	TRACK00 SWITCH (NORMAL CLOSE)	A8	B8	Key	
Green	TRACK00 SWITCH (NORMAL OPEN)	A9	B9	TRACK 00 SWITCH RETURN	White
Black	IN USE LED RETURN	A10	B10	+IN USE LED	Red
Black	INDEX LED RETURN	A11	B11	+INDEX LED	White
Black	INDEX PTX RETURN	A12	B12	+INDEX PTX	Blue
Black	W/P LED RETURN	A13	B13	+W/P LED	Yellow
Black	W/P PTX RETURN	A14	B14	+W/P PTX	Orange
		A15	B15		

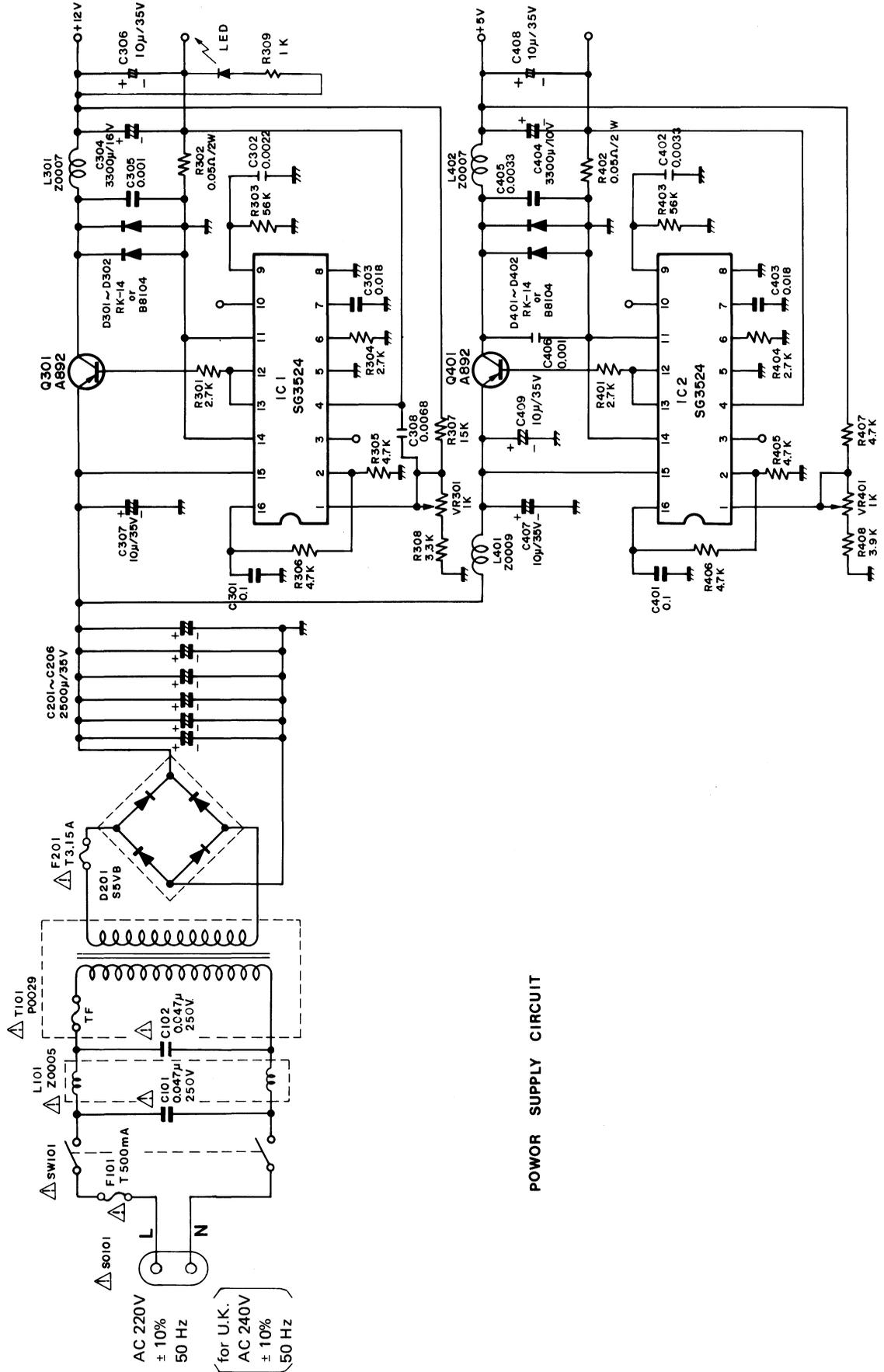
J4 Head

Wire color	Code	Pin No.		Code	Wire color
	SHIELD (HEAD 0)	A1	B1	SHIELD (HEAD 1)	
		A2	B2	KEY	
Red	ERASE (HEAD 0)	A3	B3	ERASE (HEAD 1)	Red
Green	W/R ERASE RETURN (HEAD 0)	A4	B4	W/R ERASE RETURN (HEAD 1)	Green
Black	W/R (HEAD 0)	A5	B5	W/R (HEAD 1)	Black
		A6	B6		
White	W/R (HEAD 0)	A7	B7	W/R (HEAD 1)	White

Test points

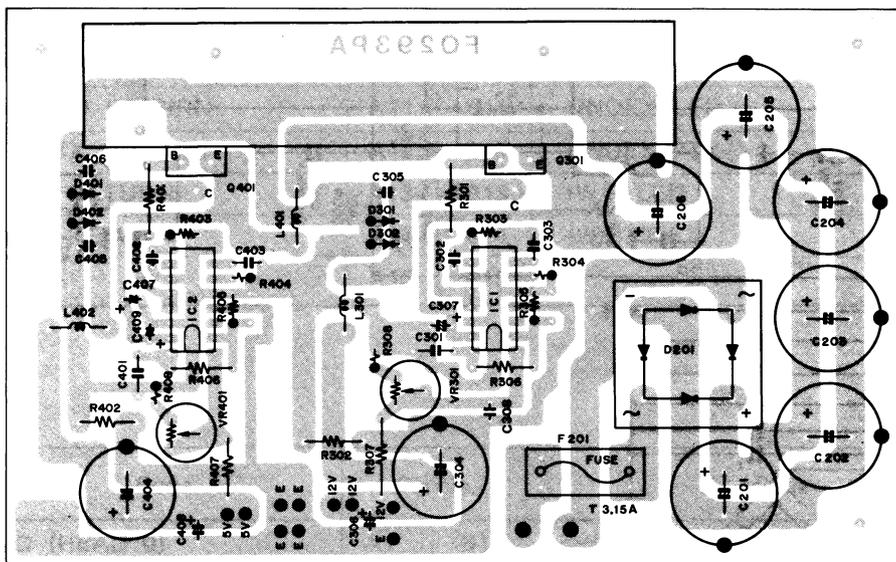
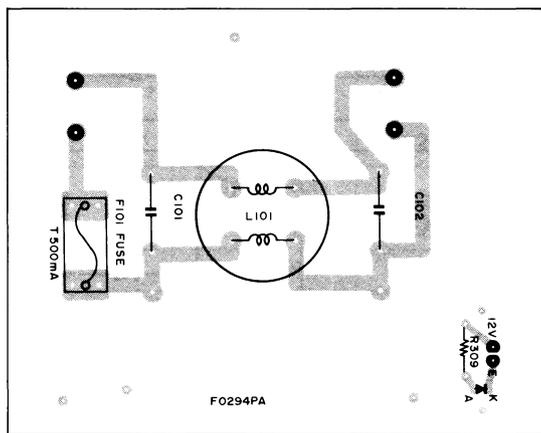
Pin No.	Code
1A	PRE AMP 1A
1B	PRE AMP 1B
2A	PRE AMP 2A
2B	PRE AMP 2B
3	INDEX
4	ERASE
5	TRACK 00
G	GROUND

Power Supply Circuit

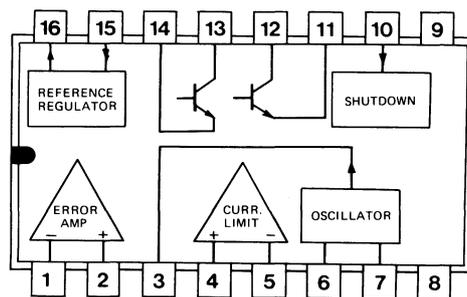
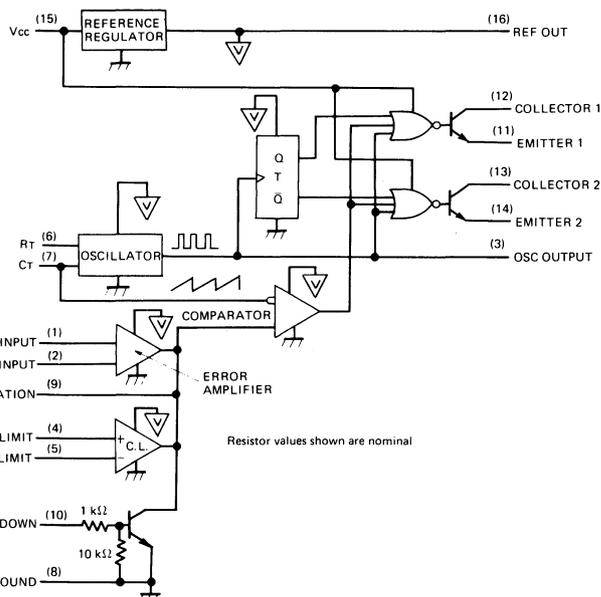


POWER SUPPLY CIRCUIT

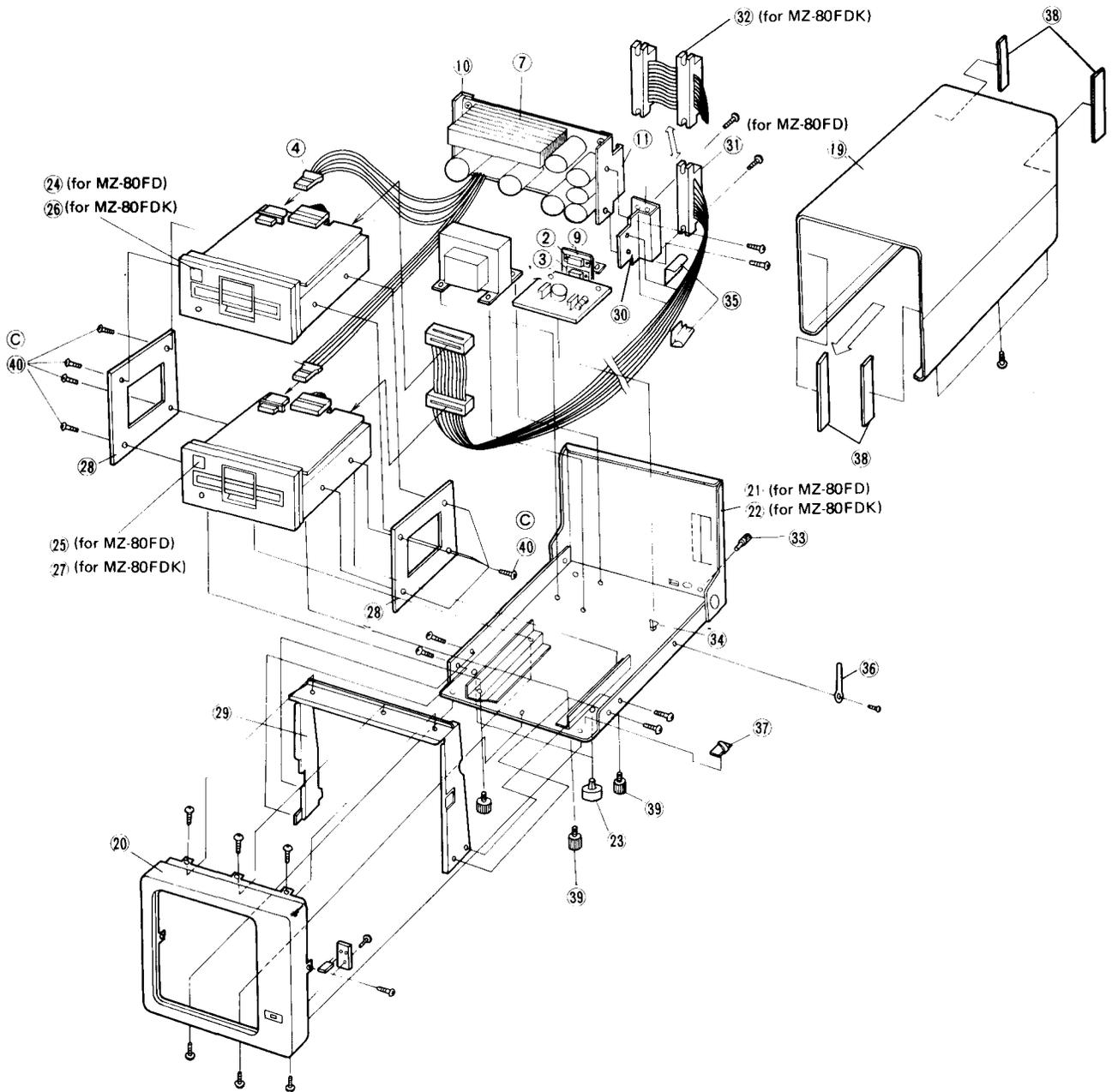
Printed Wiring Board (Power Supply Section)



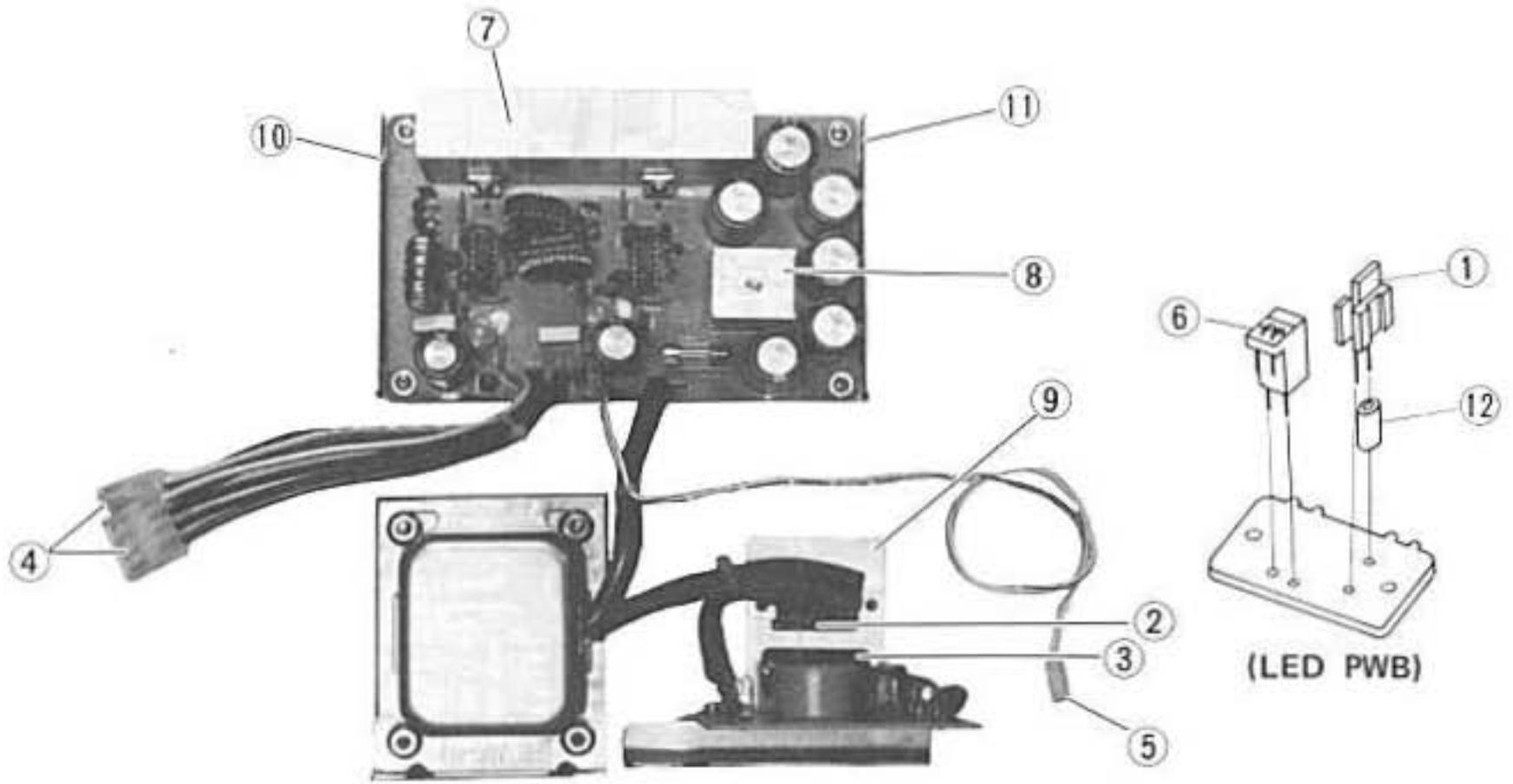
IC 1, 2 RH-iX0151PAZZ SG3524



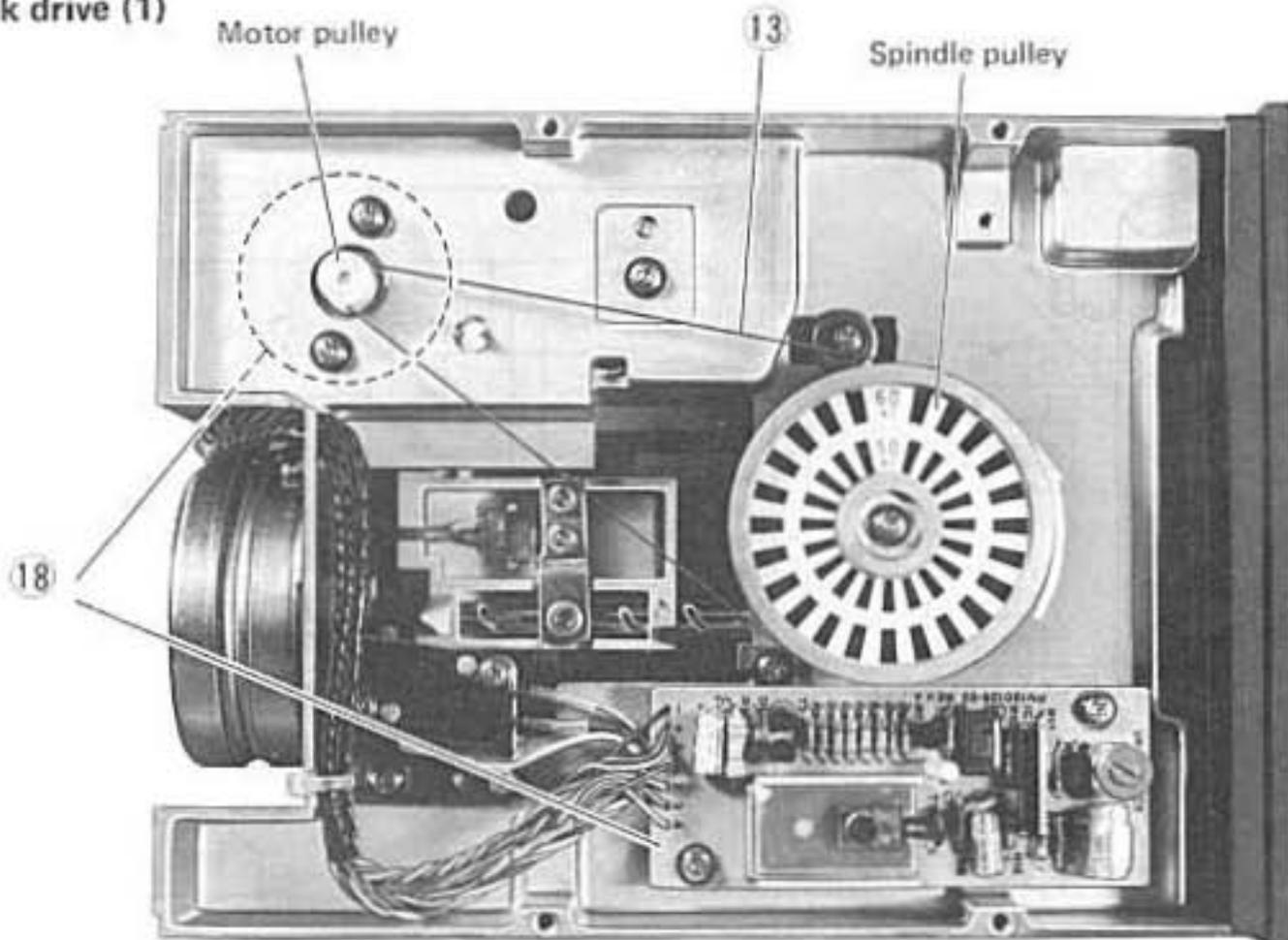
DISASSEMBLED VIEWS



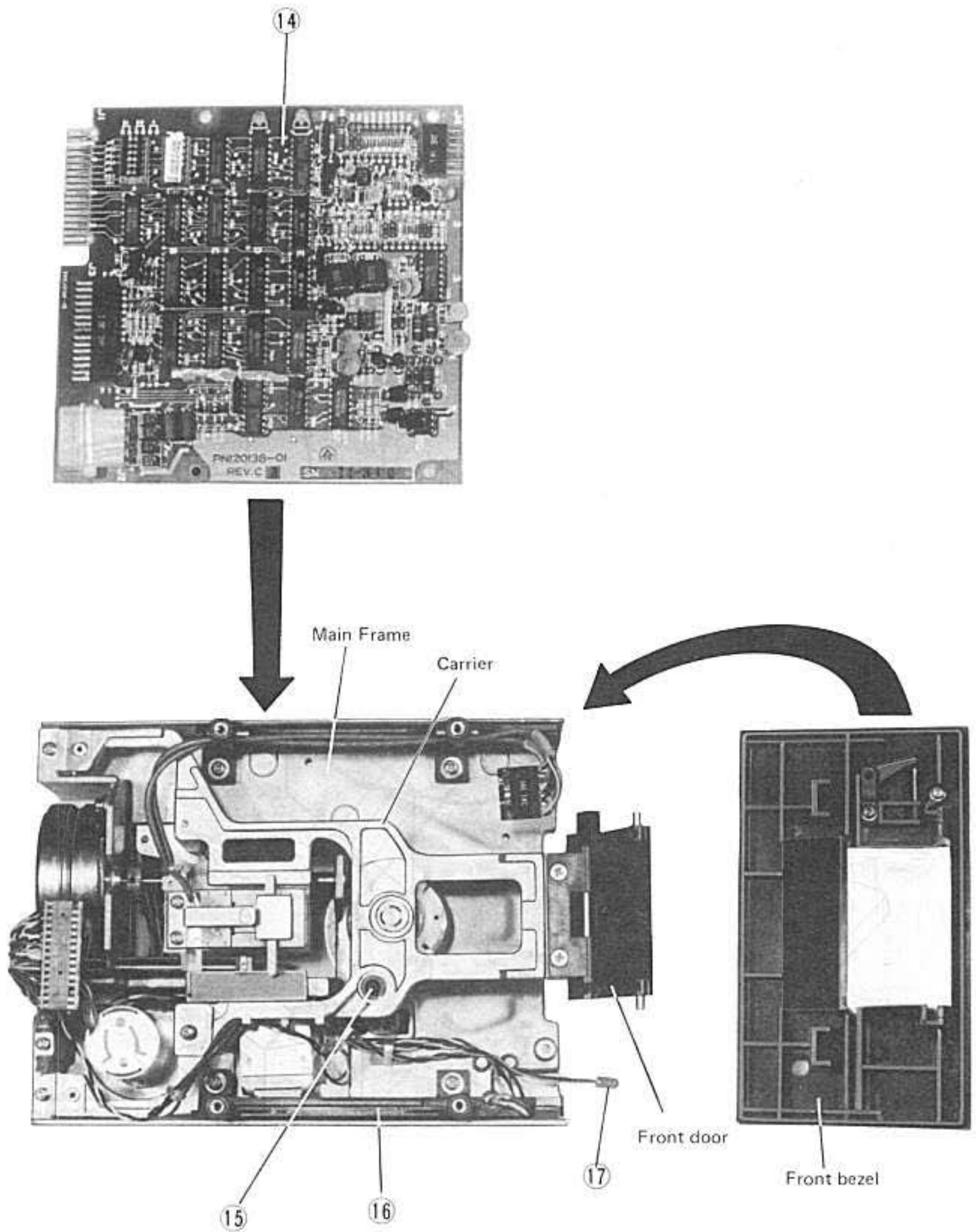
■ Power Supply



■ Disk drive (1)

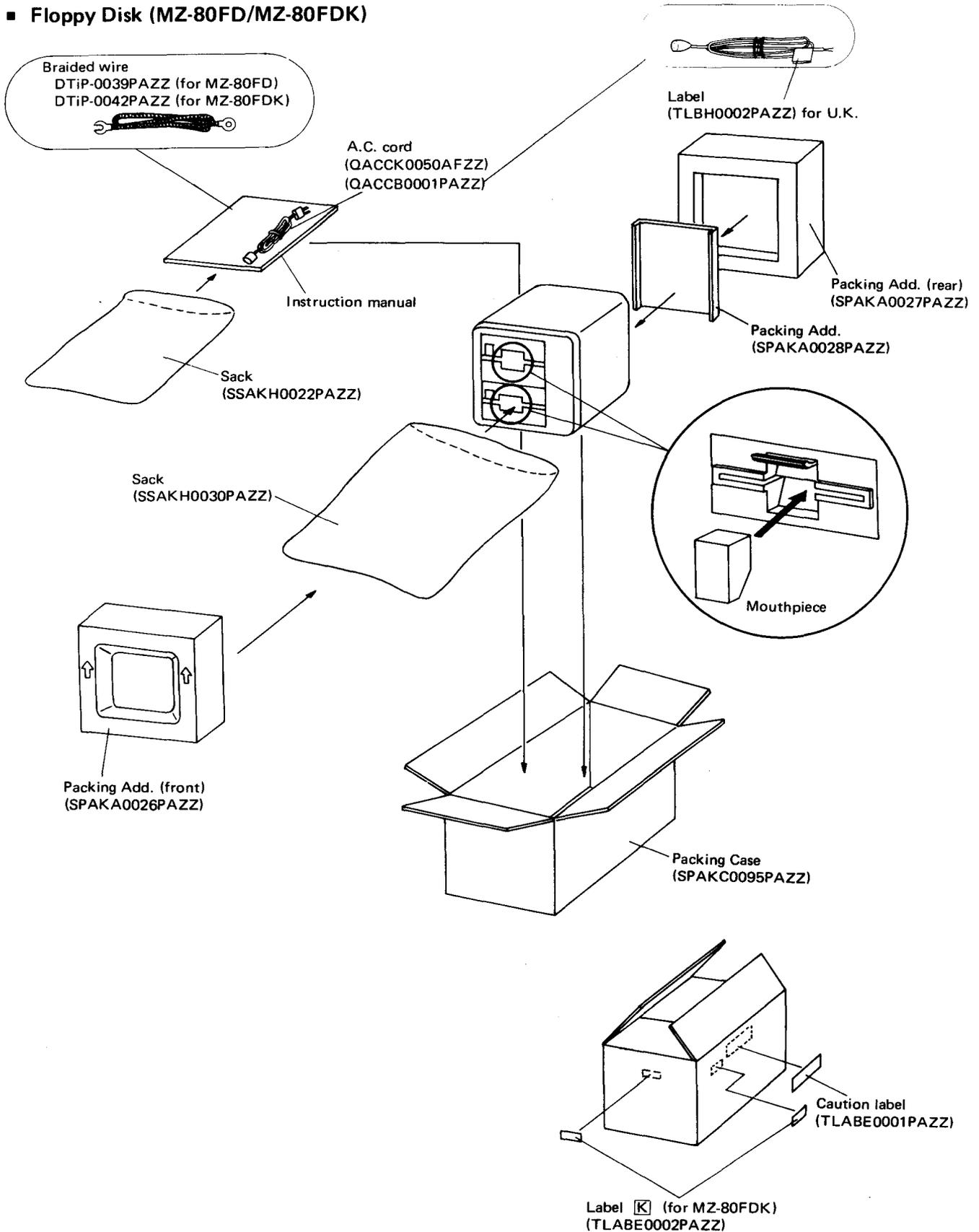


■ Disk drive (2)

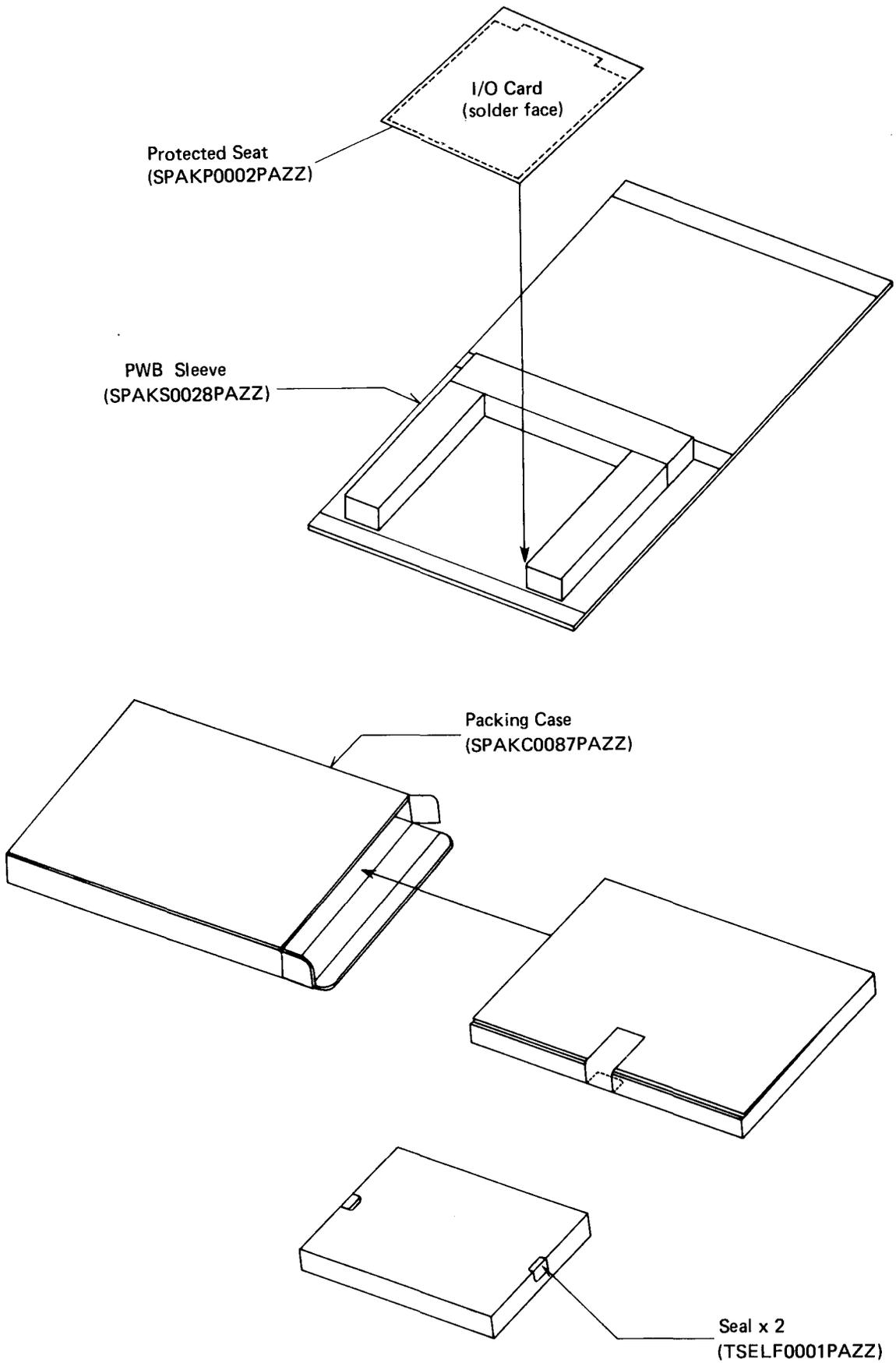


PACKING METHOD

■ Floppy Disk (MZ-80FD/MZ-80FDK)



■ Floppy disk I/O card (MZ-80FIO)



PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE	
18	95AF130246-01	Drive Motor Ass'y (with Motor Control PWB)	BY	IC8	RH-ix0124PAZZ	SN74LS245N	AT	
				IC9	RH-ix0081PAZZ	SN74LS139N	AL	
				IC10 } IC17 }	RH-ix0070PAZZ	SN74LS00N	AE	
				IC11	RH-ix0141PAZZ	SN74LS125N	AK	
19	GCABA8121PASA	Cabinet	BF	IC13	RH-ix0216PAZZ	SN74LS161N	AN	
20	GWAKP0005PASA	Front Frame	AR	IC14	RH-ix0213PAZZ	LSI T3444M	BS	
21	LCHSM0090PASA	Chassis (for MZ-80FD)	BH	IC15 } IC18 }	RH-ix0079PAZZ	SN74LS74N	AG	
22	LCHSM0092PASA	Chassis (for MZ-80FDK)	BH					
23	GLEGR0001PAZZ	Foot	AB	IC16	RH-ix0127PAZZ	SN74LS107N	AG	
24	TLABZ0029PAZZ	Drive Number Label DRIVE 1 (for MZ-80FD)	AB	IC19	RH-ix0217PAZZ	SN74145	AM	
25	TLABZ0033PAZZ	Drive Number Label DRIVE 2 (for MZ-80FD)	AB	IC20	RH-ix0214PAZZ	SN74LS122N	AH	
26	TLABZ0034PAZZ	Drive Number Label DRIVE 3 (for MZ-80FDK)	AB	IC21	RH-ix0131PAZZ	SN7414N	AM	
27	TLABZ0035PAZZ	Drive Number Label DRIVE 4 (for MZ-80FDK)	AB	IC22 } IC24 }	RH-ix0220PAZZ	SN75452BP	AK	
28	LANGF0017PAZZ	Drive Fixing Angle	AE	RESISTORS				
29	LANGF0023PAZZ	Front Frame Fixing Angle	AM	R1 } R4 }	VRD-SC2EF221J	220 ohm	1/4W	
30	LANGK0269PAZZ	Flat Cable Ass'y Fixing Angle	AE	R6 } R8 }				
31	DSÖCN0040PAZZ	Flat Cable Ass'y (for MZ-80FD)	BP	R5 } R10 }				
32	DSÖCN0046PAZZ	Flat Cable Ass'y (for MZ-80FDK)	BU	R11 } R13 }	VRD-SC2EF102J	1K ohm	1/4W	
33	QTANN0002PAZZ	Ground Terminal	AH	R14 }				
	DTiP-0039PAZZ	Braided Wire (for MZ-80FD)	AS	R7	VRD-SC2EF182J	1.8R ohm	1/4W	
	DTiP-0042PAZZ	Braided Wire (for MZ-80FDK)	AS	R9	VRD-SC2EF561J	560 ohm	1/4W	
34	LHLDF0015PAZZ	Filter PWB Fixing Holder	AC	R12 } R16 }	VRD-SC2EF151J	150 ohm	1/4W	
35	LHLDW0006PAZZ	Flat Cable Fixer	AD	R15	VRD-SC2EF273J	27K ohm	1/4W	
36	LHLDW9003CEZZ	Cord Fixer, HW-146	AA					
37	LBNDCC0003PAZZ	Wire Band	AB	CAPACITORS				
38	PCUSG0005PAZZ	Cushion 5 x 100 x t1.0	AA	C1	VCTYPU1BD104Z	0.1 MFD	12V Ceramic	AB
▲	QACCK0050AFZZ	A.C. Cord	AQ	C2	VCEAAU1CW107Y	100 MFD	16V Aluminum	AB
▲	QACCB0001PAZZ	A.C. Cord (for U.K.)	AQ	C3 } 7 }				
39	LX-BZ0067PAFN	Screw for Disk Drive	AG	11 } 13 }	VCSACU1AE106K	10 MFD	10V Tantalum	AE
40	LX-BZ0068PAFN	Screw for Disk Drive Fixing Angle	AH	17 } 19 }				
	TiNSE0007PAZZ	Instruction Manual	AR	C4 } C8 }	VCCSPR1H6331J	330PF	50V Ceramic	AA
▲	TSPCE0004PAZZ	Specification Panel (for MZ-80FD)	AE	C5 } C9 }	VCCSPR1H6561J	560PF	50V Ceramic	AA
▲	TSPCE0005PAZZ	Specification Panel (for MZ-80FD) for U.K.	AE	C6 } C10 }				
▲	TSPCE0006PAZZ	Specification Panel (for MZ-80FDK)	AE	C12 } C16 }	VCSACU1AE336K	33 MFD	10V Tantalum	AF
▲	TSPCE0007PAZZ	Specification Panel (for MZ-80FDK) for U.K.	AE	C18 } C20 }				
▲	TLABH0002PAZZ	Label for A.C. Cord (for U.K.)	AC	C14	VCCCPR1H3101J	100PF	50V Ceramic	AA
	TLABE0001PAZZ	Caution Label	AB	C15	VQYKU1HM333K	0.033MFD	50V Film	AB
	TLABE0002PAZZ	Label [K] (for MZ-80FDK)	AB	MISCELLANEOUS				
MODEL MZ-80FIO					XTAL	RCRSA0009PAZZ	Crystal Oscillator 8 MHz	AP
*** I/O CARD UNIT SECTION ***					CN1	OPLGZ0049PAZZ	34-Pin Connector	AR
INTEGRATED CIRCUIT						QSÖCZ0010PAZZ	24-Pin IC Socket	AM
IC1 } IC12 }	RH-ix0074PAZZ	SN74LS04N	AE		QSÖCZ0012PAZZ	40-Pin IC Socket	AR	
IC2 } IC3 }	RH-ix0077PAZZ	SN74LS30N	AE					
IC4	RH-ix0078PAZZ	SN74LS32N	AF					
IC5	RH-ix0071PAZZ	SN74LS02N	AE					
IC6	RH-ix0215PAZZ	SN74LS174N	AL					
IC7	RH-ix0219PAZZ	ROM SN74S474N (or RH-ix0238PAZZ μ PB417C)	BD					

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