MODEL CE-1600F

- 2.5" floppy disk drive
- Since individual parts replacement is not possible with this model, when a failure is discovered after the test mention in Section 7, Test program, the unit must be replaced with new one.

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1. Specifications

Model name: CE-1600F
Product name: Floppy disk drive
Drives: One drive (one side)/unit
Recording media: 2.5" two-sided floppy disk
Recording method: GCR (4/5)
Tracks: 16 tracks/side
Capacity: 64KB (one side)
(8 sectors/track)
Power supply: 6VDC: Supplied from the unit connected.
Power consumption: 2.5W
Operating temperature: 10°C ~ 35°C
(drive operating requirement)
Humidity: 20% ~ 80% (without moisture condensation)
Physical dimensions: 96mm(W) x 122mm(D) x 39mm(H)
Weight: 470 grams
Accessories: 2.5" two-sided floppy disk (x 1), instruction book (x 1)
Option: CE-1650F
(contents of 10 2.5" two-sided floppy disks)

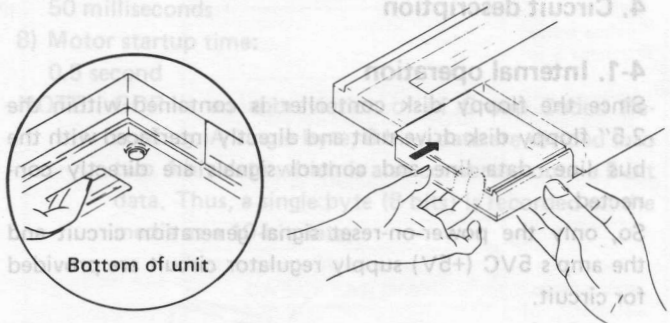
NOTE: '2.5" (63.5 mm)' indicates the diameter of the floppy disk media.

2. Cautions in installing and removing the CE-1600F

2-1. Cautions in installing the CE-1600F

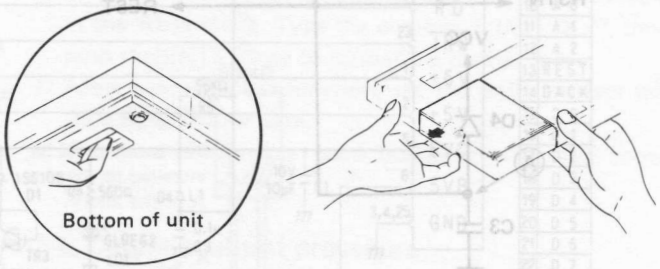
Power must be shut off to the CE-1600P before connecting the CE-1600F to the CE-1600P.

Pay special attention to hold the unit in a way as shown in the figure below with care not to touch the disk holder, in order to avoid a read/write failure because of center deviation.

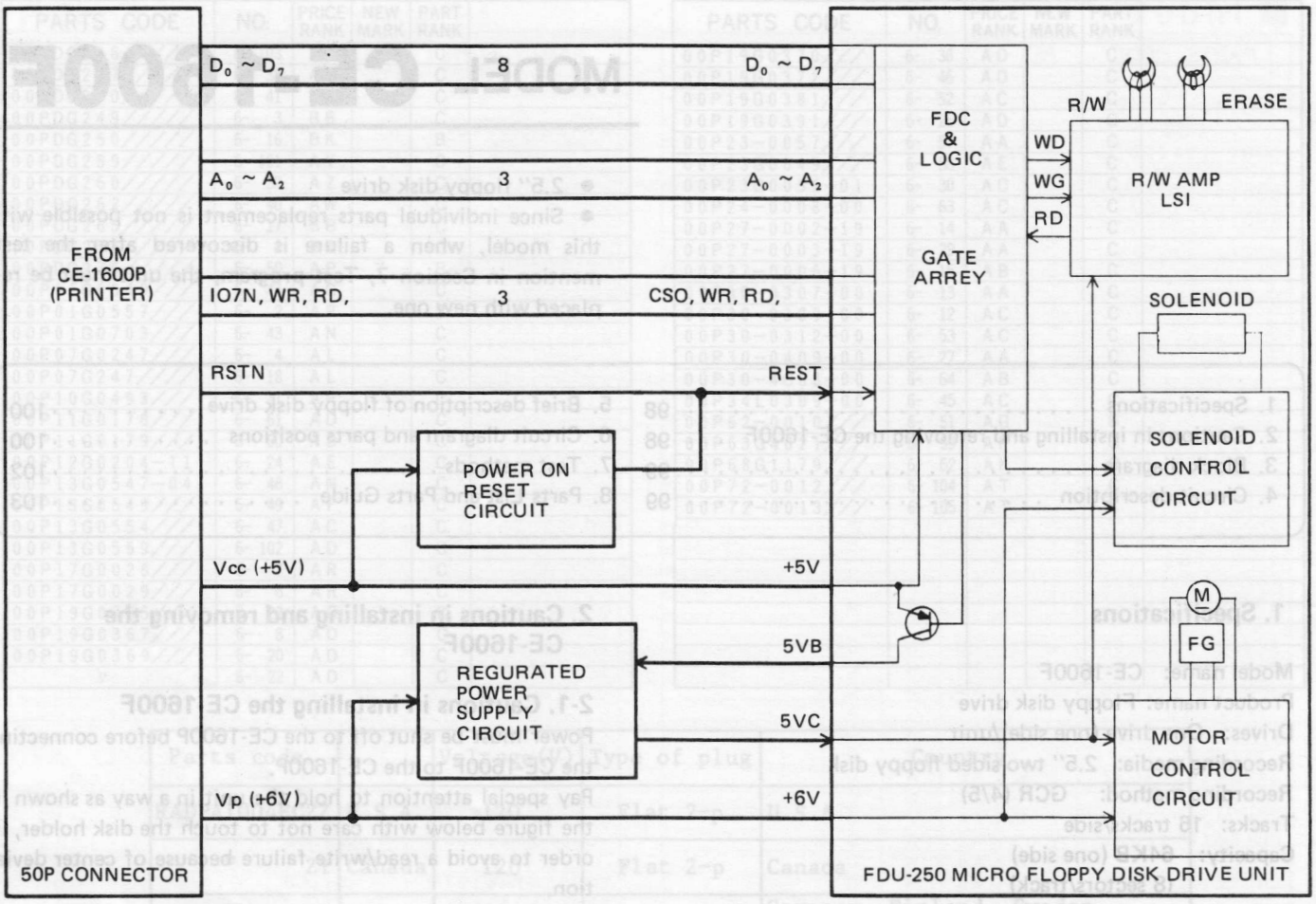


2-2. Cautions in removing the CE-1600F

Before the removal of the CE-1600F, make sure that the power is off and remove it without adding force to the disk holder (see the figure below).



3. Block diagram



4. Circuit description

4-1. Internal operation

Since the floppy disk controller is contained within the 2.5" floppy disk drive unit and directly interfaced with the bus line, data line and control signals are directly connected.

So, only the power-on-reset signal generation circuit and the amp's 5VC (+5V) supply regulator circuit are provided for circuit.

4-2. Power-on-reset signal generation circuit

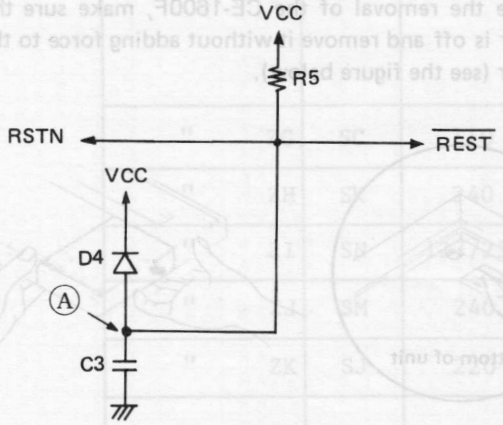


Fig. 1 Reset circuit

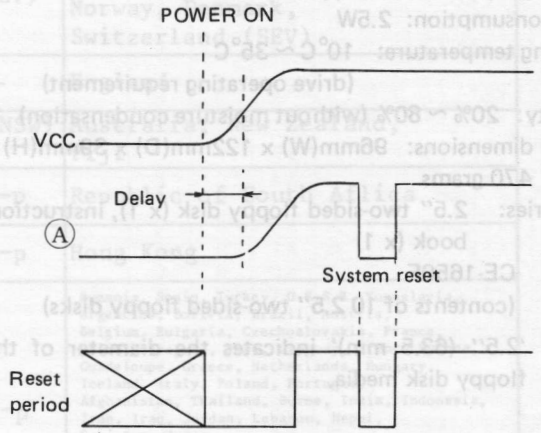


Fig. 2 Reset timings

Fig. 1 shows the reset circuit and Fig. 2 shows its timings. R5 is a charge current regulating resistor C3 which is used for pullup and delay. D4 is a diode which is used to bypass the charge in C3 to VCC line when VCC is off.

The reason why the reset signal is required at power on is to hold it in the standby mode so as to avoid malfunction in the floppy disk controller inside the floppy disk unit.

4-3. Regulated power supply circuit

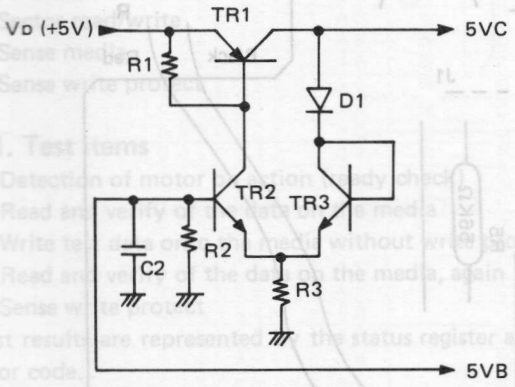


Fig. 3 Regulated power supply circuit

Fig.3 shows the regulated voltage supply circuit. In this circuit, floppy disk unit's 5VC (5V of amp) is supplied from VP (battery voltage), because 5VC can not be supplied from VCC on account of current restriction.

For the voltage of 5VC is used with a voltage difference of 0.5V minimum against VCC, the power is produced in reference to 5VB through the differentiation circuit composed of TR2 and TR3, not merely the regulator circuit. 5VB is a transistor output which is employed to turn on/off VCC with the MOTOR ON signal, and it has less voltage drop caused in the transistor, as compared with VCC. So, D1 is inserted to the output voltage feedback transistor TR3 to correct 5VC to be 0.2 to 0.3 volts higher then 5VB in appearance. (A schottky barrier diode is used for D1.)

5. Brief description of floppy disk drive

The floppy disk controller is implemented within the 2.5" floppy disk drive, and the floppy disk driving and head seeking are done by one motor. The floppy disk is driven by the belt and the head is seeked using the solenoid and cam.

The floppy disk controller and its peripheral logic are contained in a single chip gate array (2700 gates) and the read/write amplifier is also in a single chip LSI, which are directly bus connected to permit a low voltage driving.

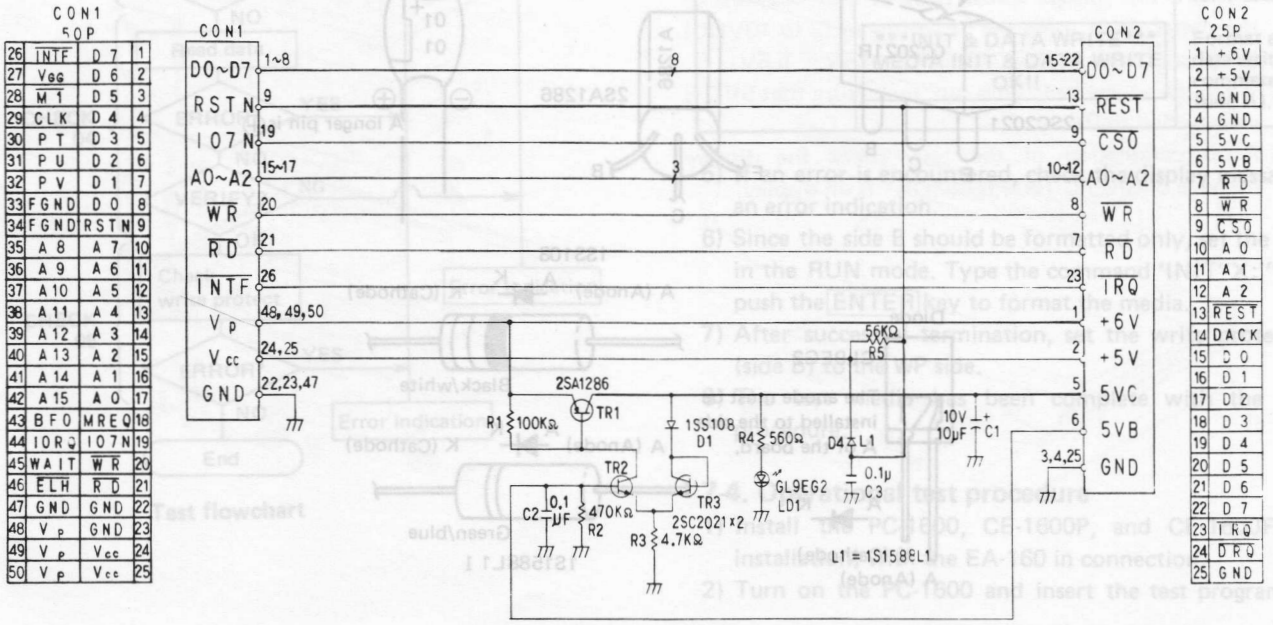
Floppy disk format and write method are unique to the floppy disk. Though the floppy disk drive is for one-sided operation, both sides of the media can be used.

Specification of FDU 250

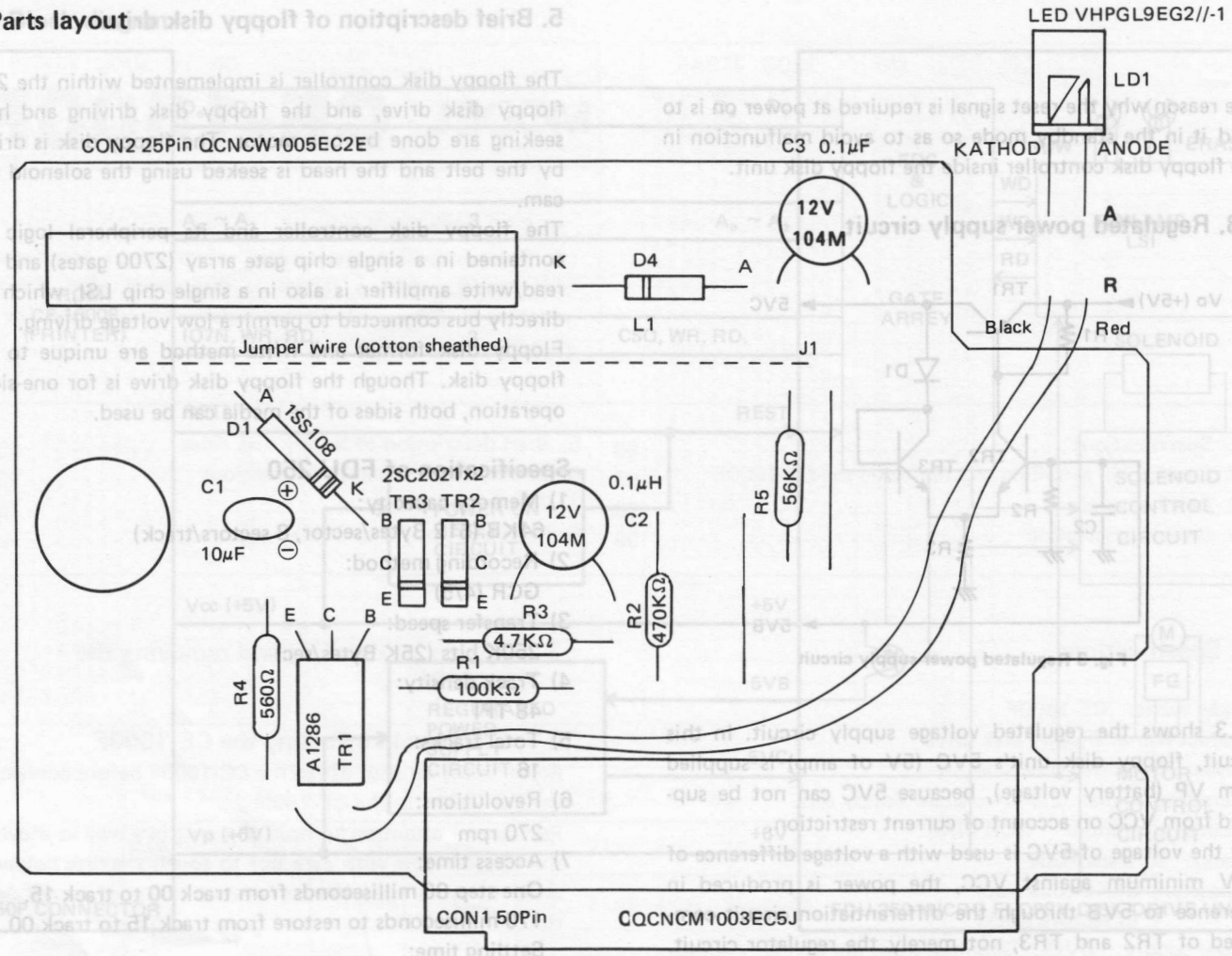
1) Memory capacity:
   64KB (512 Bytes/sector, 8 sectors/track)
2) Recording method:
   GCR (4/5)
3) Transfer speed:
   250K bits (25K Bytes/sec)
4) Track density:
   48 TPI
5) Total tracks:
   16
6) Revolutions:
   270 rpm
7) Access time:
   One step 80 milliseconds from track 00 to track 15.
   170 milliseconds to restore from track 15 to track 00.
   Settling time:
   50 milliseconds
8) Motor startup time:
   0.5 second

NOTE: GCR is an abbreviation of of Group Coded Recording. A single byte, 8 bits, data are divided into two 4-bit data which is also converted onto a 5-bit data. Thus, a single byte (8 bits) is recorded on the media as a 10-bit data.

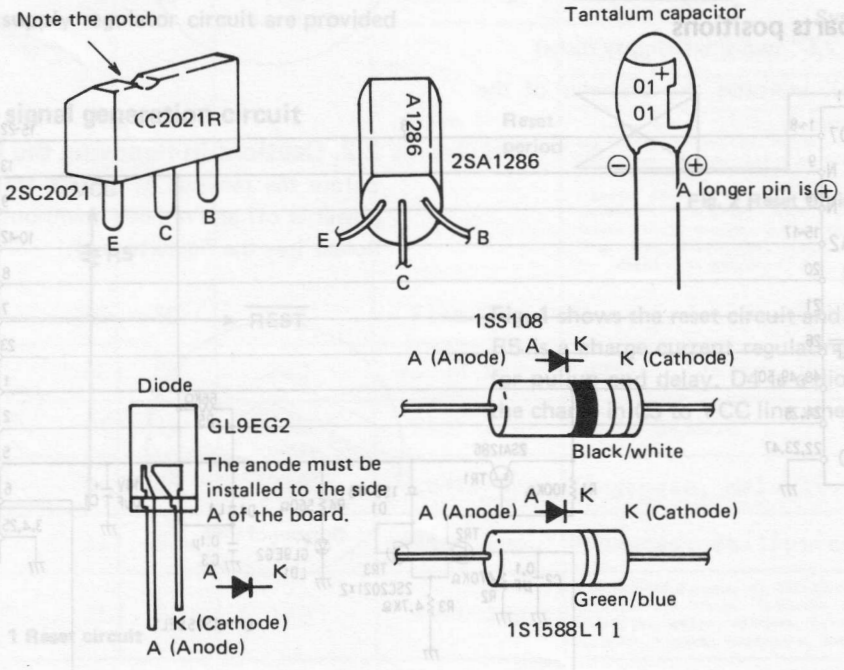
6. Circuit diagram and parts positions



Parts layout



NOTE: Slack in the jumper (J1) must be treated in the opposite direction as the 25-pin connector, because the rib is provided between the connector and J1.



7. Test methods

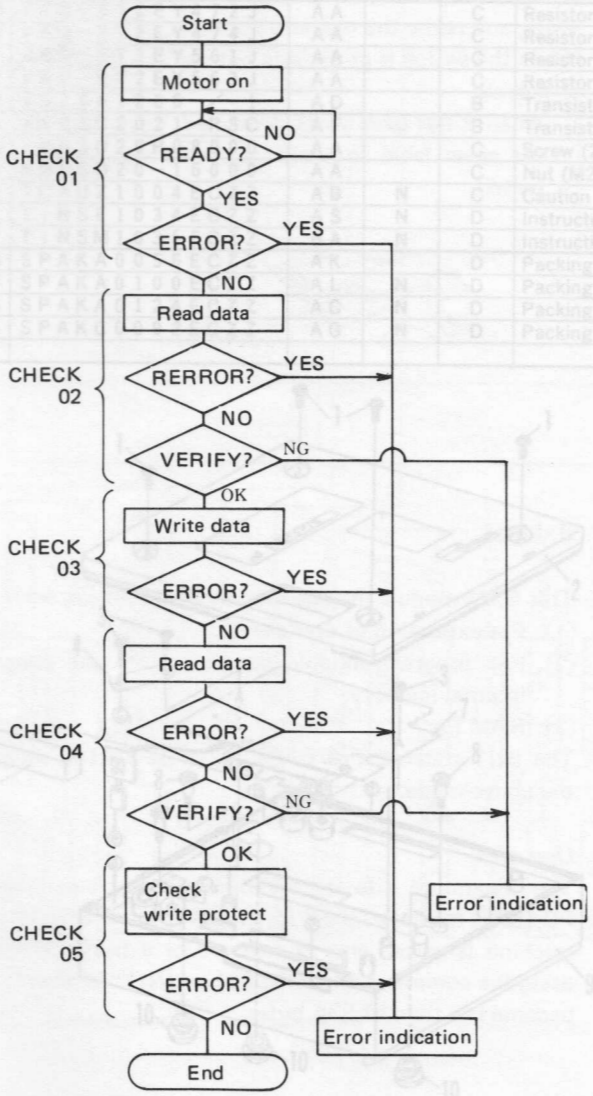
As the 2.5" floppy disk drive used in the CE-1600F incorporates the floppy disk controller within the drive unit, it operates as an external memory unit of the I/O space as seen from the PC-1600.
The following five test items are tested.

1) Motor on/off
2) Head seek
3) Sector read/write
4) Sense media
5) Sense write protect

7-1. Test items

1) Detection of motor on action (ready check)
2) Read and verify of the data on the media
3) Write test data onto the media without write protect
4) Read and verify of the data on the media, again
5) Sense write protect

Test results are represented by the status register and IOCS error code.



Test flowchart

7-2. Items required

1) PC-1600
2) CE-1600P
3) CE-1600F
4) EA-160
5) Test program stored media (UKOGC3018CSZZ)
6) Test media which has been prepared by the data write program.
7) Printout paper

7-3. Preparing test media

The test media required for the test can be prepared in the following way:

1) Install the PC-1600, CE-1600P, and CE-1600F (test installation) with the EA-160 in connection.
2) Turn on the PC-1600 and insert the test program contained media.
3) Type the command 'LOAD"X:WMEDIA"' and push the ENTER key.
4) When the prompt symbol appears, remove the test program stored disk and ensure that the machine is in the RUN mode. Next, type the command 'R.(RUN)', then push the ENTER key.

Step	Display message	Note
RUN ENTER	***INIT & DATA WRITE*** SET BLANK MEDIA & HIT [ENTER] KEY!!	Set the blank media (CE-1650F).
Set the side A of a blank disk (CE-1650F).		
ENTER	Set diskette for X: MEDIA INTIALIZE NOW!!	The green access lamp of the CE-1600F comes active for 5 seconds.
ENTER	***INIT & DATA WRITE*** MEDIA INITIALIZE NOW	The green LED comes active for 20 seconds.
	INIT & DATA WRITE WRITE DATA NOW!!	The green LED comes active for 3 seconds.
	INIT & DATA WRITE DATA READ NOW!!	The green LED comes active for 7 seconds.
	INIT & DATA WRITE MEDIA INIT & DATA WRITE OK!!	Format and data write are completed (side A).

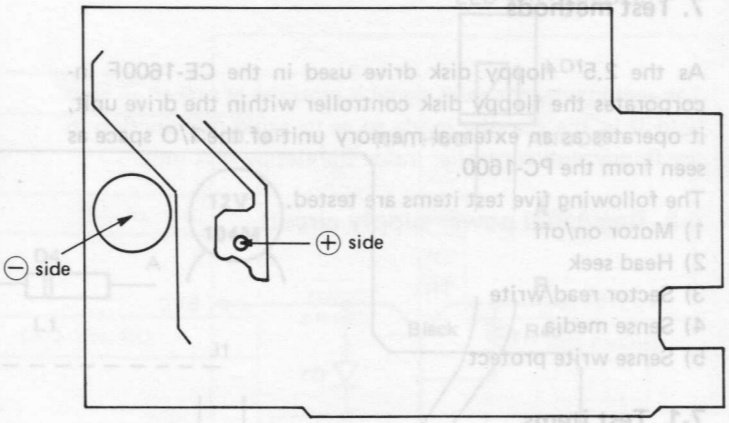
5) If an error is encountered, check the display message for an error indication.
6) Since the side B should be formatted only, set the media in the RUN mode. Type the command 'INIT"X:"', then push the ENTER key to format the media.
7) After successful termination, set the write protect tab (side B) to the WP side.
8) The test media has been complete with the above procedure.

7-4. Operational test procedure

1) Install the PC-1600, CE-1600P, and CE-1600F (test installation) with the EA-160 in connection.
2) Turn on the PC-1600 and insert the test program con-

tained media.

3) Type the command 'LOAD"X:CE-1600F"' and push the [ENTER] key.
4) When the prompt symbol appears, remove the test program stored disk and turn off the PC-1600.
5) Disconnect the test installation CE-1600F from the CE-1600P.
6) Connect the CE-1600F to be tested with the CE-1600P.
7) Turn on the PC-1600.
8) Type the command 'R.(RUN)', then push the [ENTER] key.
9) When the prompt is issued for setting of the media, insert the test media with the side A face up.
10) Push the [ENTER] key. If other key is pushed, the test resumes from 8).
11) After continuous test of test items, 1 thru 4, "OK" is displayed when the test has been successful. If not successful, the error is indicated on the display and the printer.
12) After successful ending of test items, 1 thru 4, remove the test media and set the side B of the media whose write protect tab is set to WP.
13) Push the [ENTER] key now to check the function of the write protect switch. If it has been successful, the description is printed and the test terminates.
14) During this write protect test period, measure the +5VC check point of the interface board with the dc voltmeter to check that it is within a range of 4.5VDC to 5.5VDC (5V±0.5V).



5VC voltage test location (pattern side)

7-5. Write protect test

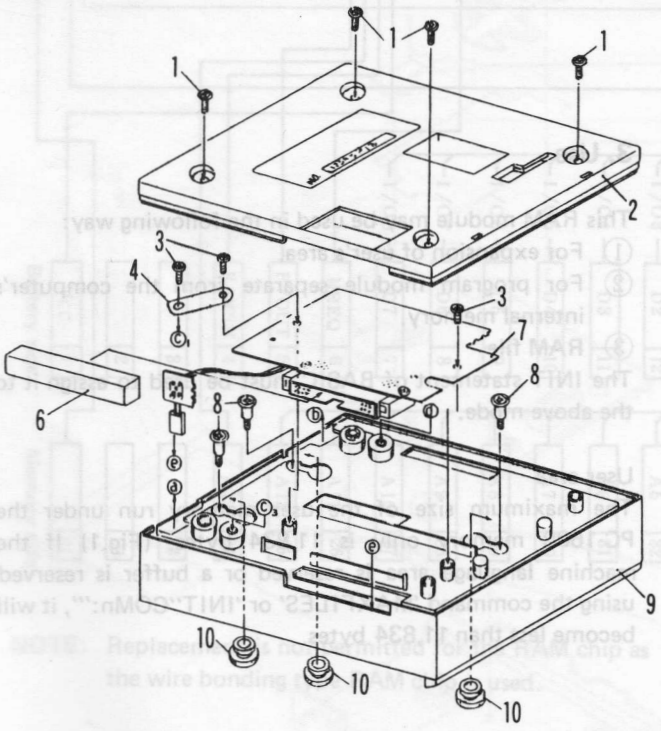
This test is conducted to check proper functioning of the write protect of the floppy disk drive.

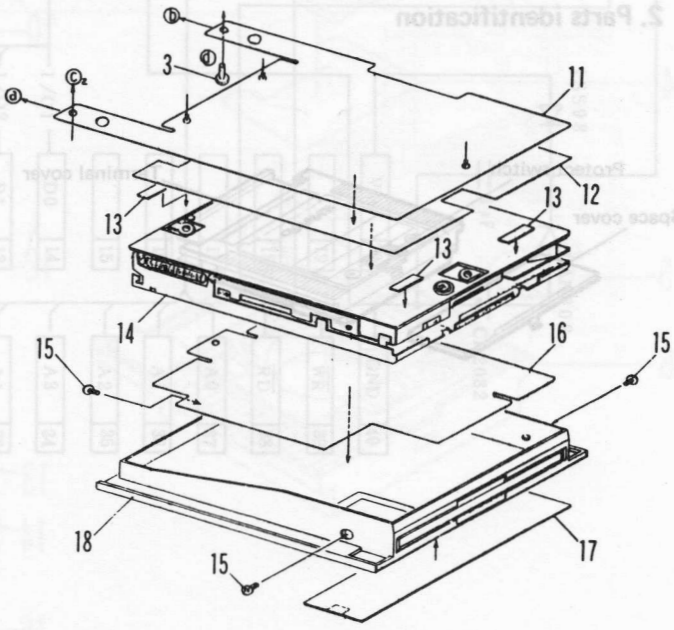
- Test description
  - Check class 05 (CHECK 05)
    Insertion of the media is checked after the motor has turned on and functioning of the write protect is checked. That is, it checks that it is the media that write protected.
- Check items
  1) During the test (while the access LED is active), measure the voltage across pads at two locations of the pattern side using the dc voltmeter (6 to 10VDC) to ensure that it is 5VDC±0.5VDC (4.5V ~ 5.5V).
  2) When the access lamp goes out, make sure that 5VC is now turned to 0V.
  3) After completion of the test, check the display message on the PC-1600 that "OK" is on display.

8 PARTS LIST & GUIDE

1 Exteriors

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	XUBSM26P08000	AA	N	C	Screw (2.6×8)
2	DUNTG1051ECZZ	AP	N	D	Bottom cabinet unit
3	XUBSD26P06000	AA		C	Screw (2.6×6)
4	QEARP1002ECZZ	AA	N	C	Earth plate
6	PCAPH1002ECZZ	AB	N	C	Connector cap
7	DUNTK1052ECZZ	BC	N	E	Interface PWB unit (This includes №101~116)
8	LX-BZ1009ECZZ	AB	N	C	Screw
9	GCABB1006ECZZ	AK	N	D	Top cabinet
10	PGUMM1006ECZZ	AB	N	C	Rubber
11	PSLDC1005ECZZ	AE	N	C	Shield plate A
12	PSHEP1008ECZZ	AB	N	C	Insulator sheet B
13	PTPEZ1003ECZZ	AB	N	C	Shield plate fixing tape
14	DUNT-1041ECZZ	BZ	N	E	2.5inch FD unit
15	LX-BZ1008ECZZ	AA	N	C	Screw
16	PSLDC1006ECZZ	AD	N	C	Shield plate B
17	HDECA1008ECZZ	AC	N	D	Dec. panel
18	GCOVH1001ECZZ	AH	N	D	Cover
101	QCNCM1003EC5J	AP	N	C	Connector (50pin)
102	QCNCW1005EC2E	AF	N	C	Connector (25pin)
103	VCTYPU1NX104M	AB		C	Capacitor (12WV 0.10μF)
104	VCSATU1AE106M	AD		C	Capacitor (10WV 10μF)
105	VHDDS1588L2-1	AB		B	Diode (DS1588L2)
106	VHD1SS108//-1	AB		B	Diode (1SS108)
107	VHPGL9EG2//-1	AB	N	B	Photo transistor (GL9EG2)
108	VRD-ST2EY104J	AA		C	Resistor (1/4W 100KΩ ±5%)
109	VRD-ST2EY472J	AA		C	Resistor (1/4W 4.7KΩ ±5%)
110	VRD-ST2EY474J	AA		C	Resistor (1/4W 470KΩ ±5%)
111	VRD-ST2EY561J	AA		C	Resistor (1/4W 560Ω ±5%)
112	VRD-ST2EY563J	AA		C	Resistor (1/4W 56KΩ ±5%)
113	VS2SA1286-/-1	AD		B	Transistor (2SA1286)
114	VS2SC2021-RSC	AF		B	Transistor (2SC2021-RSC)
115	XBBSD20P08000	AA		C	Screw (2×8)
116	XNESD20-16000	AA		C	Nut (M2)
201	TCAUZ1004ECZZ	AB	N	C	Caution card
202	TiNSE1034ECZZ	AS	N	D	Instruction book (USA only)
	TiNSM1035ECZZ	BA	N	D	Instruction book (E,F,G,S,I)
203	SPAKA0056ECZZ	AK		D	Packing cushion
204	SPAKA0100ECZZ	AL	N	D	Packing cushion for set
205	SPAKA0124ECZZ	AC	N	D	Packing cushion for media
206	SPAKC0092ECZZ	AG	N	D	Packing case





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