

1.1 General

Toshiba T1100 is a portable personal computer which is compatible with IBM PC. Hardware of the T1100, most of IC chips are C-MOS type so that the power consumption is very little (W), and Gate Array IC chips are applied so that it is very compact and light weight (4.1 Kg, 9 lb).

The T1100 is composed of System PCB, Keyboard, LCD (Liquid Crystal Display), 3.5" FDD (Floppy Disk Drive), Battery and case. LCD can display 640 x 200 pixels in graphic mode and 2000 characters in character mode. 3.5" FDD have the capacity of 720KB.

As a power supply of the T1100, Ni-Cd battery is furnished in the System Unit and it is possible to operate the T1100 for maximum of consecutive 8 hours without rechargement. And you can drive the T1100 by AC power through the AC Adaptor in an office. Rechargement of Ni-Cd battery within the T1100 is done through the AC Adaptor too.

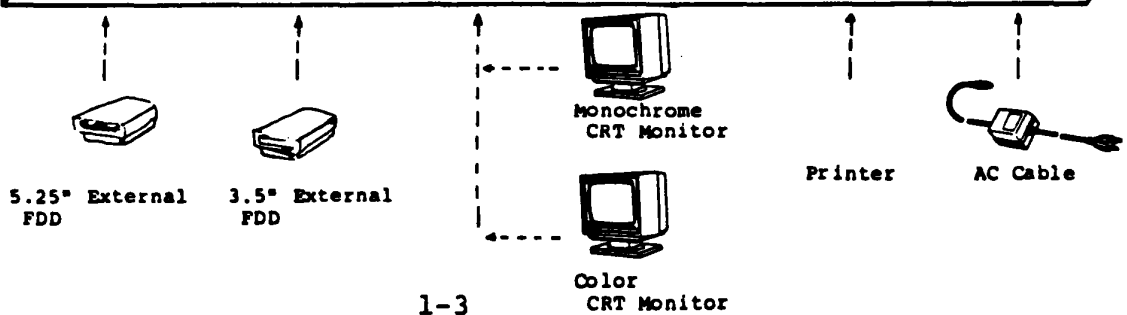
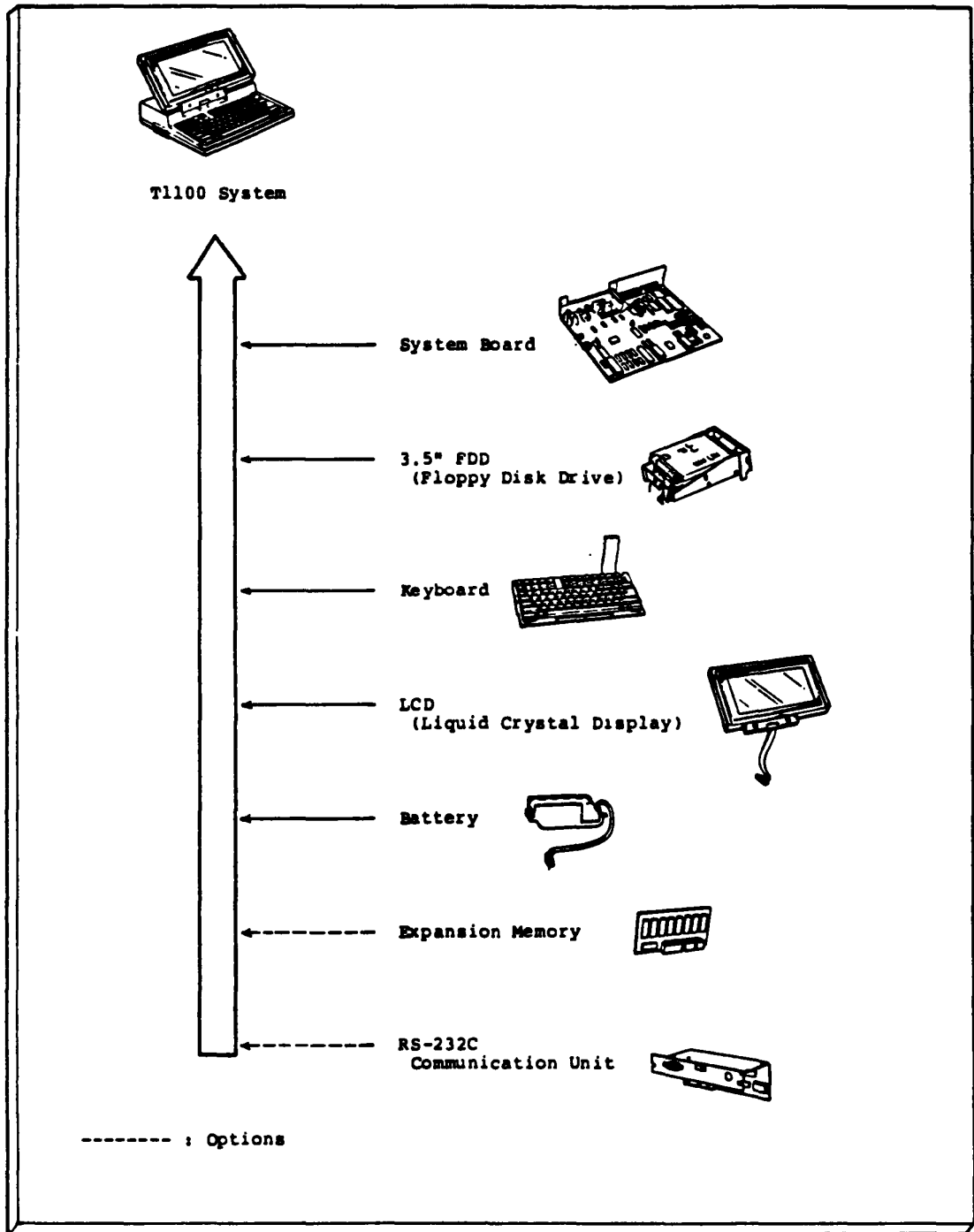
The standard memory size of the T1100 is of 256KB and it is able to extend up to 512KB with optional memory board.

Optional unit to the T1100 system are memory board (256KB) and RS-232C board are capable to be installed in the T1100 system unit. The optional external units attached to the system unit are 3.5" external FDD (storage capacity of 720KB) and 5.25" external FDD (storage capacity of 360KB) are prepared. Character type difference on the key-tops due to the Nations are applied by changing with option key-tops, and AC Adaptor is also changed with option AC Adaptor.

The T1100 has connectors for Color/Monochrome CRT Display port and printer on the back of the T1100 as well as a connector for FDD.

T1100 system

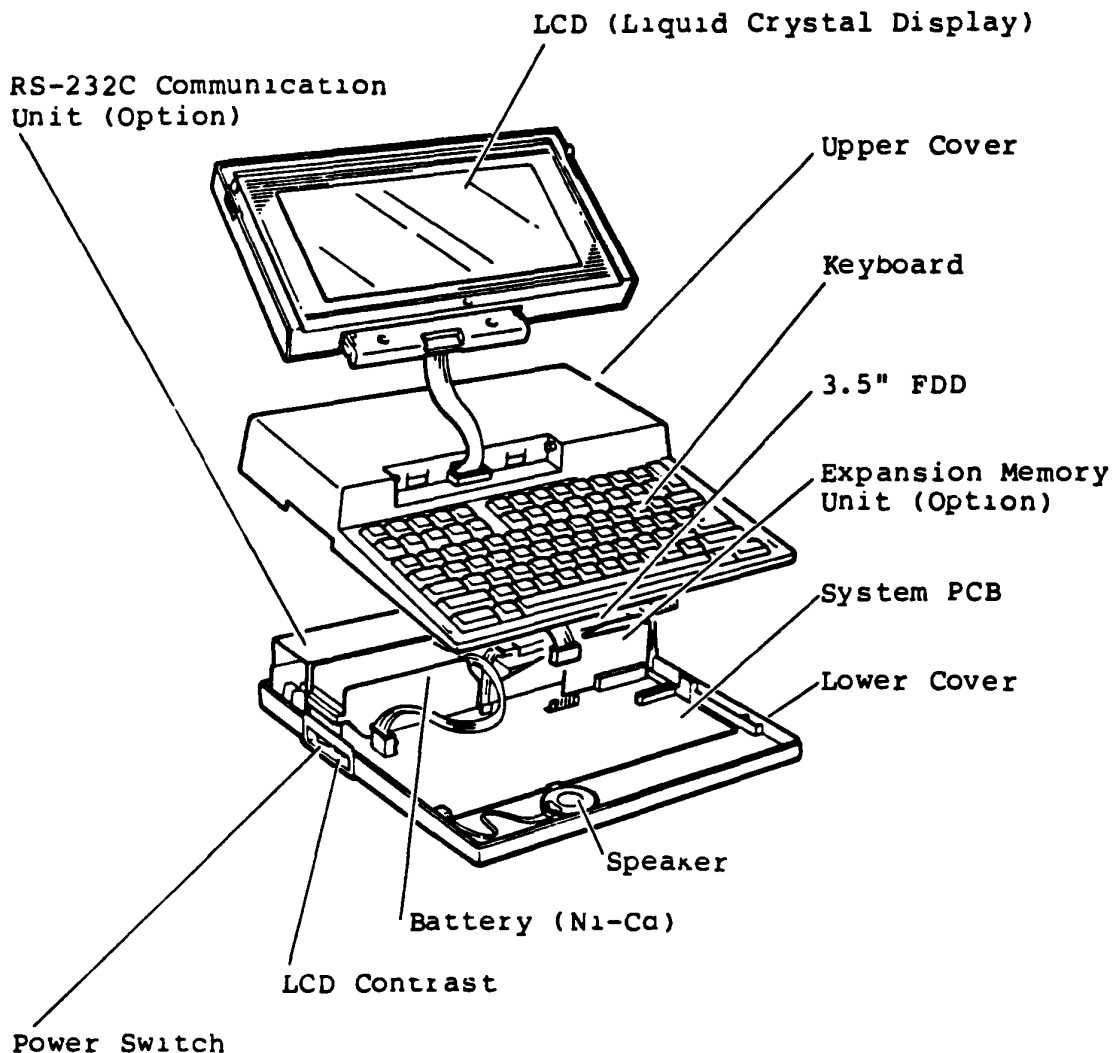
System Configuration



1.2 System Unit

The T1100 System Unit is composed of subunits. All subunits of T1100 system are built in one compact System Unit case. They are System PCB, 3.5" FDD (Floppy Disk Drive), LCD (Liquid Crystal Display), Keyboard, battery (Ni-Cd) and harnesses. In a maintenance service, the faulty subunit will be replaced with good spare subunits easily. Followings are showing locations of subunits and connectors for external cables of the T1100 System Unit.

(1) Locations of subunits



System Unit

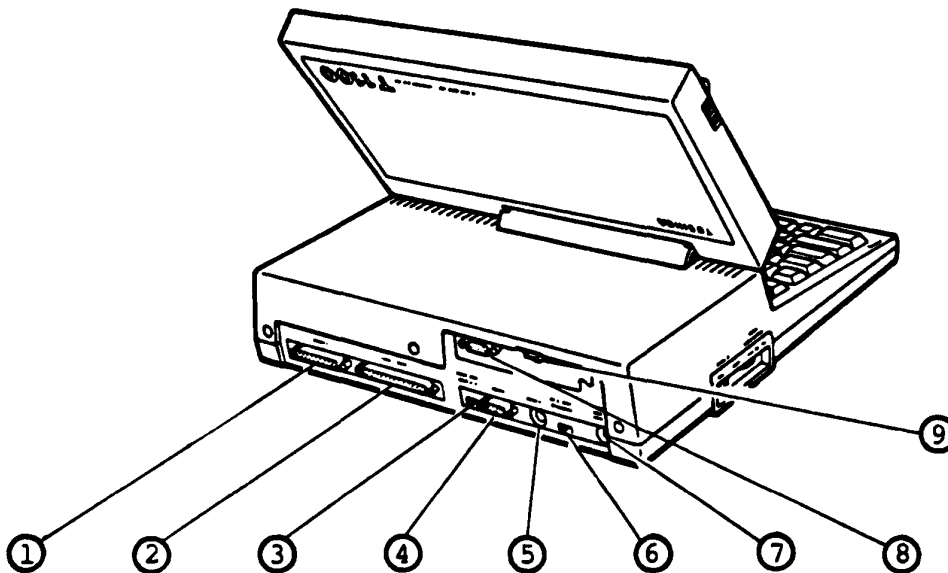
The System Unit is to contain the following subunits

System PCB
3.5" FDD (Floppy Disk Drive)
LCD (Liquid Crystal Display)
Keyboard
Battery (Ni-Cd)
Harnesses
Covers

Option AC Adaptor is used for rechargement of the Battery and/or power source to the T1100 system indoors by plug in the DC Jack on the back of the system.

AC Adaptor
Input : 220 - 240V ac, W Max.
Output : 18V dc, 600mA

(2) Locations of connectors and switches



Rear view of the T1100

1 : Printer port
2 : External FDD port
3 : Switch for selection of Internal/External FDD
4 : Color CRT Display port (RGB)
5 : Monochrome CRT Display port (composite)
6 : Switch for selection of LCD/CRT Display
7 : DC Jack
8 : RS-232C Connector (option)
9 : RS-232C ON/OFF switch

1.2.1 System PCB

System PCB is composed of processor (i80C88), RAM Memory (256KB for Main Memory, 16KB for Video RAM), ROM Memory (8KB for BIOS, 8KB for Character Generator of CRTIC), FDD Controller, CRT controller and Printer Adaptor.

As the advanced technology, this PCB introduces three "Gate Array" packages .

The System PCB houses;

- Central Processor Unit (CPU; i80C88 compatible 16-bit Processor. 4.77 MHz)
- Main Memory 256KB dynamic RAM (as standard configuration)
- PCB connector for additional Main Memory (from 256KB to 512KB)
- Boot-strap ROM (8K-Bytes EPROM i27C64 compatible) providing Basic Logic Test and Initial Program Loader
- Programmable Interrupt Controller (PIC; i82C59A compatible) Providing eight-level Interrupt Register/Priority Logic, Interrupt Mask and Vector Address
- Programmable Interval Timer (PIT; i82C53 compatible)
- Direct Memory Access Controller (DMAC; i82C37 compatible) for Floppy Disk Controller, Hard Disk controller and serial Input/Output operation.
- DIP switch (Configuration information for Software)
- Parallel 8-bit Printer Interface port (Centronics Interface)
- BUS Controller Gate Array (Bus control, Keyboard control, etc.)
- Display Controller Gate Array (LCD, RGB-CRT, Composit signal control)
- FDD/PRT Controller Gate Array (FDD, Printer control)

Continued

Configuration switches (SW-1, SW-3, SW-4)

(1) Configuration DIP SW (SW-1)



Configuration DIP Switches (SW-1)

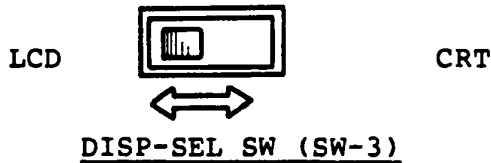
The meanings of all Configuration DIP Switch's settings are described in the following tables.

Configuration Table (SW-1)

DIP SW				FUNCTION	DESCRIPTION
1	2	3	4		
-	-	-	ON	Display Mode at power up (must be on always)	assigned 80 x 25 (B/W) only
ON	ON	ON	-	Amount of memory size of System	128KB
OFF	ON	ON	-		256KB
ON	OFF	ON	-		384KB
OFF	OFF	ON	-		512KB
ON	ON	OFF	-		not used
OFF	ON	OFF	-		not used
ON	OFF	OFF	-		not used
OFF	OFF	OFF	-		not used

(2) DISP-SELECT SW (SW-3)

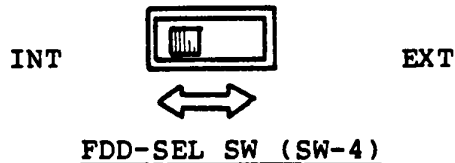
This switch selects the display unit to be used as a monitor. When you slide the switch to LCD side, only the LCD is used as the monitor, but non video signal is outputted to the RGB connector and the COMP Jack of the T1100 System Unit. If you slide the switch to CRT side, the video signal is outputted to the RGB connector and COMP Jack, but non video signal is outputted to the LCD of the T1100 System Unit.



DIP SW		FUNCTION	DESCRIPTION
DIP SW	SETTING		
SW 3	LCD	Monitor Display selection	selects LCD
	CRT		selects external CRT Display

(3) FDD-SEL SW (SW-4)

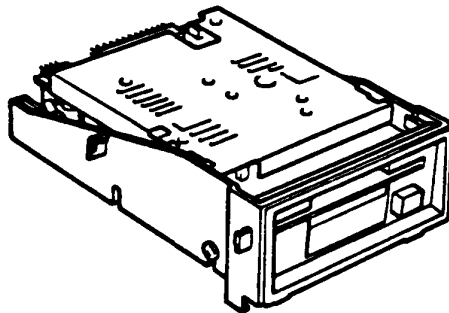
This switch assigns the FDD number (drive A, drive B) to the FDD's. When only internal FDD is used, this switch must be slid to INT side. When both of internal and external FDD's are used, FDD numbers are assigned as following table.



DIP SW		FUNCTION	DESCRIPTION
DIP SW	SETTING		
SW 4	INT	Drive Number assignment	Drive A: int.FDD Drive B: ext.FDD
	EXT		Drive A: ext.FDD Drive B: int.FDD

1.2.2 3.5" FDD (ND-354S)

The ND-354S is a high performance, high reliable, compact sized Floppy Disk Drive (FDD) for 3.5" floppy disks. The drive is able to read and write double density 3.5" floppy disk with 1M-bytes of recording capacity (unformatted) in double side, double density and 135 TPI. T1100 system uses the ND-354S as internal FDD and external unit (option).



3.5" FDD (ND-354S)

Performance Specification of ND-354S

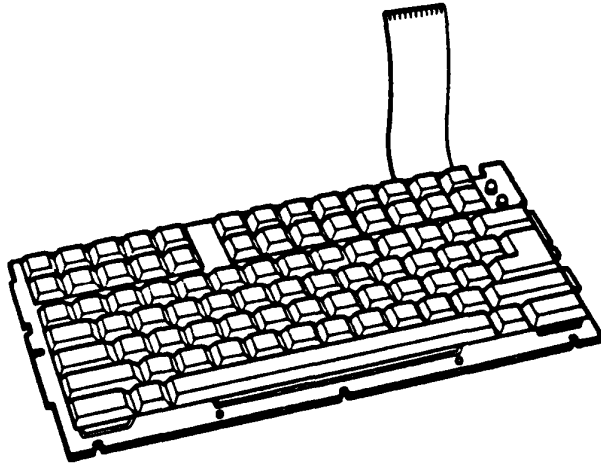
Storage Capacity Unformatted Formatted	(K-bytes)	1,000 737
Number of Heads/Drive		2
Track/Surface	(tracks)	80
Data Transfer Rate (K-bits/Second)		250
Access Time Per Track Average (Including Settling Time) Settling Time Head Load Time	(ms)	3 94 15 0 *(1)
Average Latency Time		100
Recording Density (Max.) Bit Density Track Density	(BPI) (TPI)	8,717 135
Motor Start Time		500
Rotational Speed		300
Recording Method		MFM
Recording disk		3.5" ANSI Standard disk

Note *(1) : Heads have been always loaded in operation mode.

1.2.3 Keyboard

The keyboard consists of keytops & Keyswitches (83) and matrix circuit, and it is connected to the System PCB through signal cable.

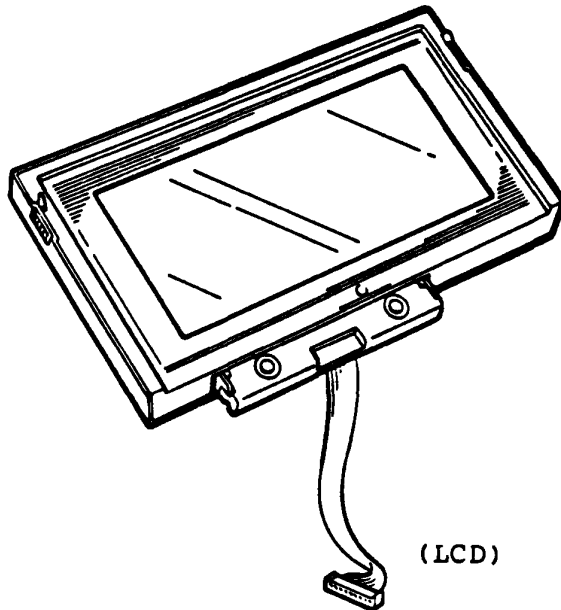
The keyboard controller (80C49) is built in on the System PCB. It is applied by changing the keytops with option keytops for character differences due to the Nations where the T1100 is used



Keyboard

1.2.4 Liquid Crystal Display (TLC-363B)

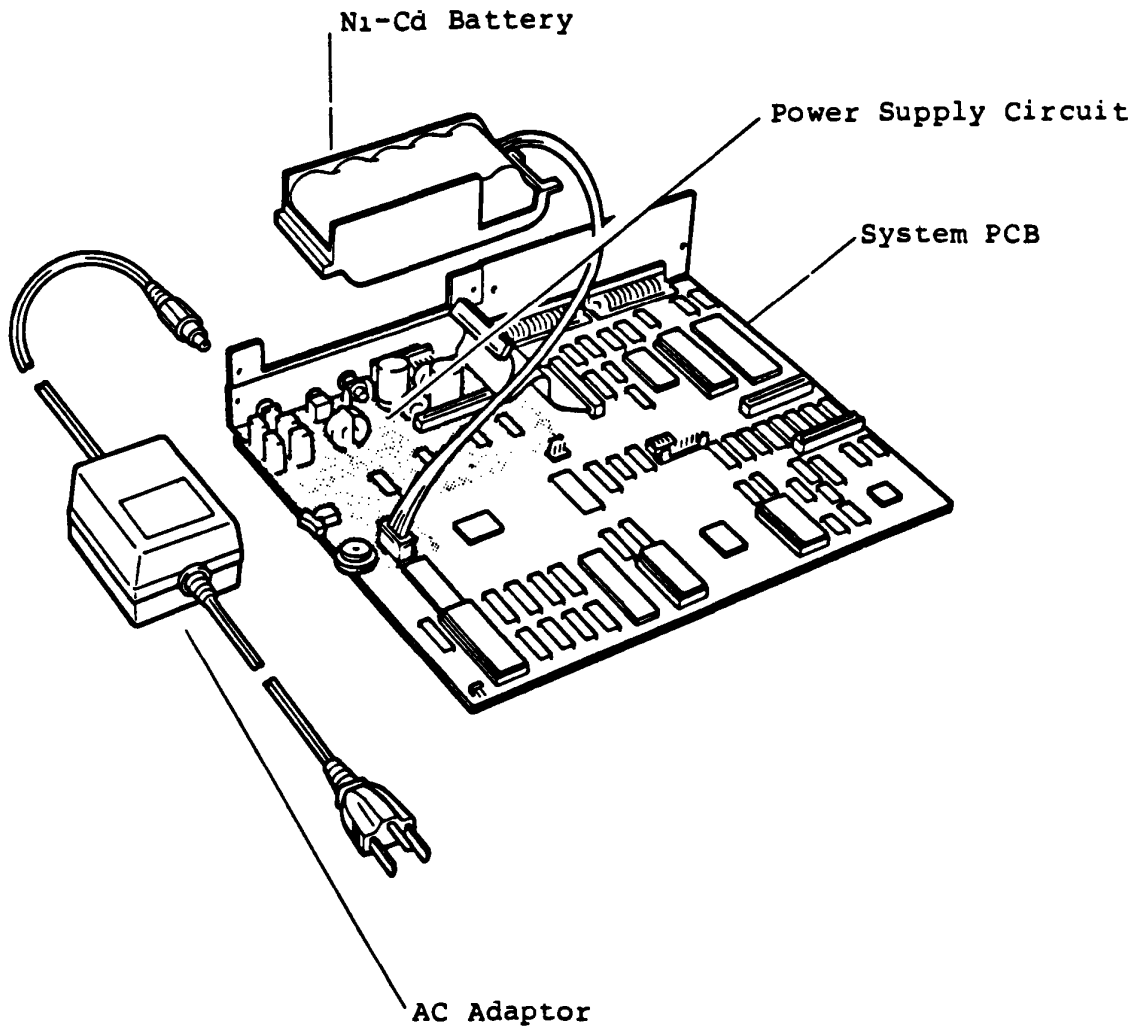
The LCD Module is flat panel 640 x 200 pixel crystal Display unit with aspect ratio of the active area of four to three. The TLC-363B can display graphic patterns, numerals, alphabets and symbols up to 2,000 characters (8 x 8 dots character).



Item	Description
Clock	1.92 MHz negative level
Supply Voltage	+5V dc $\pm 5\%$ -12V dc (-10V through -14V)
Number of Dots	640 (Horizontal) 200 (Vertical)
Number of Characters	80 x 25 (2000 characters) (8x8 dot format)
Dot Size	0.31 W x 0.45 H
Dot Pitch	0.35 (Horizontal) 0.49 (Vertical)
Power Consumption	400 mW

1.2.5 Power Supply Unit

The Power Supply Unit of the T1100 System Unit is housed on the System PCB and it furnishes DC power, +5, -5, +12 and -12 volts for all components in the T1100 System Unit. These power are supplied from the Ni-Cd battery Unit or an AC Adaptor.



Item	+12 V	+5 V	-12 V	-5 V	Unit
Rating current	300	500	30	10	milliampares
Voltage variability	none	none	+/- 2	none	volts
Ripple voltage	(*1)	100	120	50	millivolts peak to peak
Voltage fluctuation	+ 20	+/- 7	(*1)	+/- 7	percents
Manner of stabilization	(*2)	(*3)	(*3)	(*4)	-
Protection from over voltage	none	(*5)	(*6)	none	-
Protection from over current	(*7)	(*8)	(*8)	(*9)	-
Supplied to :	FDD/ RS232C	System	LCD/ RS232C	MODEM	-

Notes : (*1) undefined.

(*2) Accords to the batteries' characteristics.

(*3) Utilize the switching, pulse width modulation method.

(*4) Utilizes a series path regulator.

(*5) Detects at the +7 volts and shuts off all the DC outputs.
Recovers by switching off-on the power.

(*6) Detects at the -14.5 volts and automatically recovers by
the switching controller when the cause disappears.

(*7) Burns down a part of pattern of the printed wiring board.

(*8) Detects when about two or three times of rating current
flows, and shuts off all the DC outputs. Recovers by
switching off-on the power.

(*9) Starts the voltage drop down when about 1.5 times of rating
current flows, and automatically recovers when the cause
disappears.

1.3 Option Units

The T1100 has a variation of option units to be attached to the system. Following Units are possible to attached to the T1100 system.

- 1) Expansion Memory Unit (256KB)
- 2) RS-232C Communication Unit
- 3) 5.25" External FDD (SD-521)
- 4) 3.5" External FDD (ND-354S)
- 5) AC Adaptor
- 6) Key-top Set

1.3.1 Expansion Memory Unit

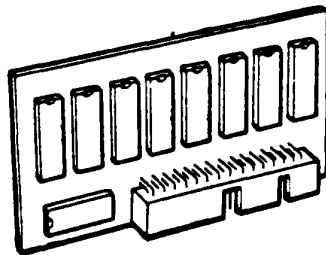
The Expansion Memory Unit is an option memory board to be installed on the System PCB. It is installed to the T1100 System Unit just by plugging in the connector on the System PCB and expands the memory size of the T1100 system till 512KB with the basic 256KB memory.

When the Expansion Memory Unit is installed, the configuration switch must be changed properly. (refer to page 1-9)

WARNING

The Memory chip is very weak to a static electricity shock.

When you handle the Expansion Memory board itself, it is recommended to protect the Expansion Memory Unit with anti static electricity materials.



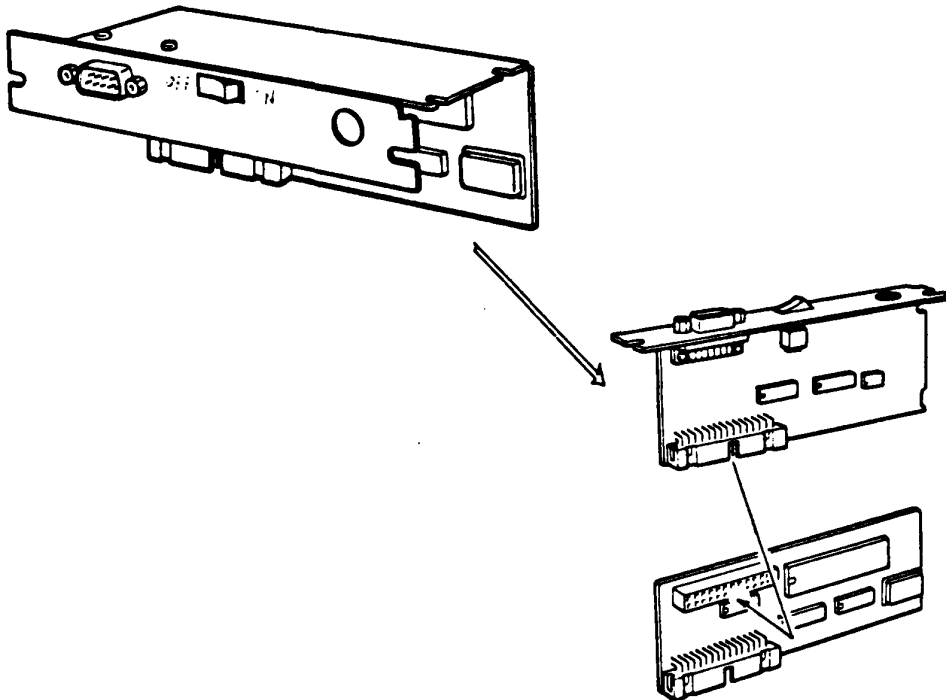
Expansion Memory Unit

1.3.2 RS-232C Communication Unit

The RS-232C Communication Unit is an option board which is able to be installed in the RS232C/Modem connector within the T1100 System Unit.

It is used for serial data transfer between T1100 and another external device at rate of 50 Baud through 9600 Baud.

The RS-232C Communication Unit is composed of two boards and introduces INS8250A IC chip to control the unit. This unit has a power switch located on the back panel of the T1100 System Unit when it is installed. It should be turned off to prevent power consumption of RS-232C Communication Unit when the RS-232C Communication Unit is not operated.



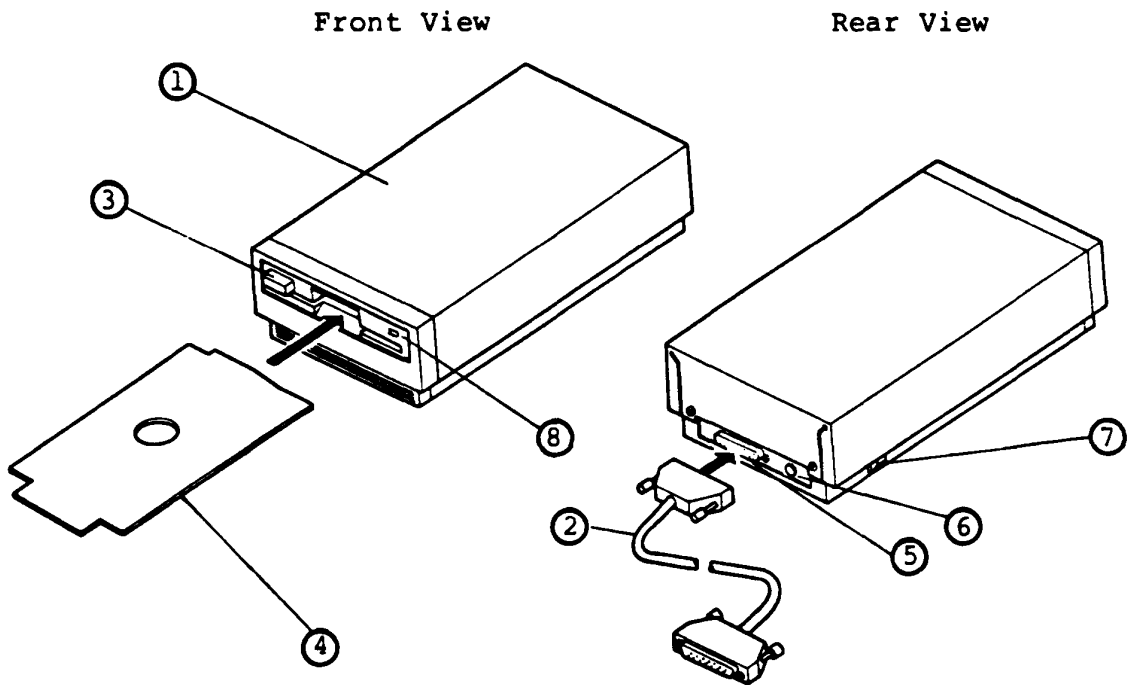
RS-232C Communication Unit

1.3.3 5.25" External FDD (SD-521)

The SD-521 is a high performance, high reliable, slim sized Floppy Disk Drive (FDD) for 5.25" floppy disks.

The drive is able to read and write double density 5.25" floppy disk with 500KB of recording capacity (unformatted) in double side, double density and 135 TPI.

T1100 system uses the SD-521 as external 5.25" FDD unit (option).



5.25" External FDD (SD-521)

Explanations on components

- ① 5.25" External FDD
5.25" External FDD (Floppy Disk Drive) is composed of Disk Drive and Control PCB.
- ② Connector Cable
This cable is a signal cable between the FDD and the T1100 System Unit. 37-pin connector of the cable is to the T1100 System Unit, and 25-pin connector is to the FDD.
- ③ Disk Eject Button
This button is used to set a disk to the FDD, and to remove a disk from the FDD. Push the button after inserting a disk while disk setting to the FDD, and push the button to eject a disk from the FDD.
- ④ Cardboard Protector
This cardboard is used for head protection against a shock during a transportation of the FDD.
- ⑤ DS-Connector
The DS-Connector is a 25-pin connector for the Connector Cable.
- ⑥ DC Jack
The DC Jack is for the AC Adaptor.
The required specification of AC Adaptor is
Input : 220-240V ac
Output : 18V dc, 600mA
* The required specification is same to the specification on AC Adaptor to the T1100 System Unit.
- ⑦ Power Switch
Push the rear portion (ON,1) of the switch to Power ON.
Push the front portion (OFF,0) of the switch to Power OFF.
- ⑧ Drive Unit Select Indicator
It is lit while the FDD is selected to use by The T1100 system. Do not eject a disk while it is lit.

Performance Specification of SD-521

Storage Capacity (K-bytes)	
Unformatted	500
Formatted (9 Sectors/Track)	368.6

Number of Heads/Drive	2

Track/Surface (tracks)	40

Data Transfer Rate (K-bits/Second)	250

Access Time (ms)	
Per Track	6
Average	97
Settling Time	15
Head Load Time	50

Recording Density (Max.)	
Bit Density (BPI)	5,876
Track Density (TPI)	48

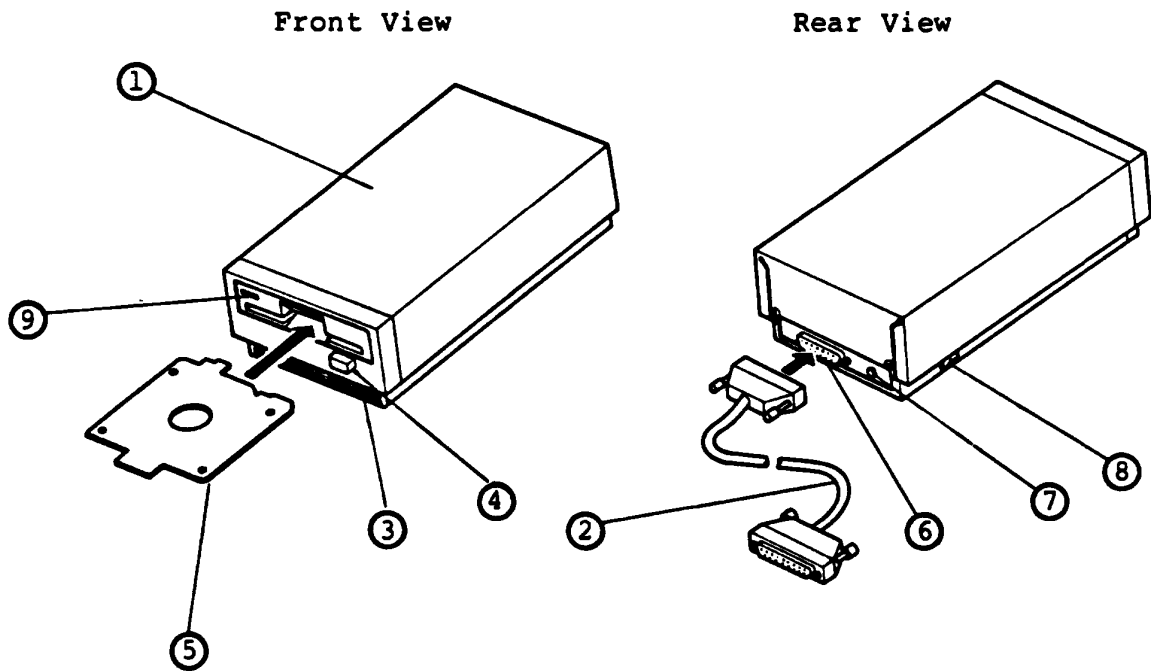
Motor Start Time (s)	0.5

Rotational Speed (RPM)	300

Recording Method	MFM

1.3.4 3.5" External FDD (ND-354S)

The ND-354S is a high performance, high reliable, slim sized Floppy Disk Drive (FDD) for 3.5" floppy disks. The drive is able to read and write double density 3.5" floppy disk with 1M-bytes of recording capacity (unformatted) in double side, double density and 135 TPI. T1100 system uses the ND-354S as internal FDD and external unit (option).



3.5" External FDD (ND-354S)

Explanations on components

- ① 3.5" External FDD
3.5" External FDD (Floppy Disk Drive) is composed of Disk Drive, Control PCB and Ni-Cd battery.
- ② Connector Cable
This cable is a signal cable between the FDD and the T1100 System Unit. 37-pin connector of the cable is to the T1100 System Unit, and 25-pin connector is to the FDD.
- ③ Low Battery Indicator
It indicates the low voltage status of the Ni-Cd battery housed in. Power charge with AC Adaptor is need to use more.
- ④ Disk Eject Button
This button is used to remove a disk from the FDD. Push the button to eject a disk from the FDD.
- ⑤ Cardboard Protector
This cardboard is used for head protection against a shock during a transportation of the FDD.
- ⑥ DS-Connector
The DS-Connector is a 25-pin connector for the Connector Cable.
- ⑦ DC Jack
The DC Jack is for the AC Adaptor.
The required specification of AC Adaptor is
Input : 220-240V ac
Output : 18V dc, 600mA
* The required specification is same to the specification on AC Adaptor to the T1100 System Unit.
- ⑧ Power Switch
Push the rear portion (ON,1) of the switch to Power ON. Push the front portion (OFF,0) of the switch to Power OFF.

- ⑨ Drive Unit Select Indicator
It is lit while the FDD is selected to use by The T1100
system. Do not eject a disk while it is lit.

Performance Specification of ND-354S

Storage Capacity (K-bytes)	
Uniformatted	1,000
Formatted	737
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Number of Heads/Drive	2
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Track/Surface (tracks)	80
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Data Transfer Rate (K-bits/Second)	250
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Access Time (ms)	
Per Track	3
Average (Including Settling Time)	94
Settling Time	15
Head Load Time	0 *(1)
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Average Latency Time (ms)	100
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Recording Density (Max.)	
Bit Density (BPI)	8,717
Track Density (IPI)	135
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Motor Start Time (ms)	500
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Rotational Speed (RPM)	300
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Recording Method	MFM
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Recording disk	3.5" ANSI Standard disk

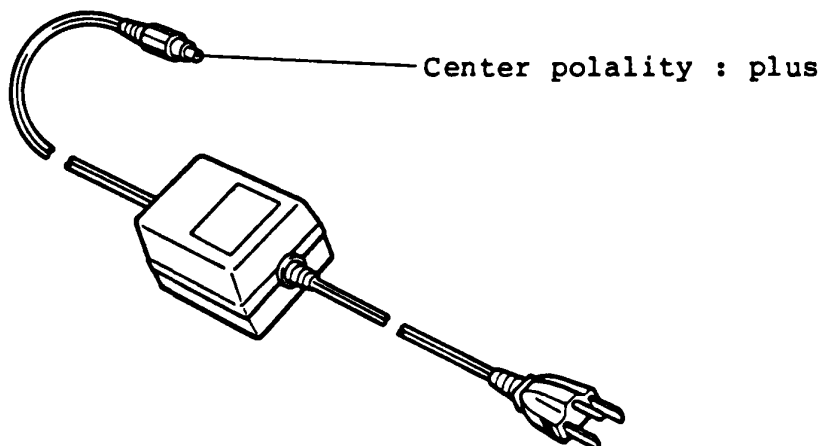
Note *(1) : Heads have been always loaded in operation mode.

1.3.5 AC Adaptor

The T1100 System Unit and 3.5" External FDD have a rechargeable Ni-Cd battery in the cabinets. These units are need to be charged after a certain running time. For the power charges or using the devices (including 5.25" External FDD) indoors, AC Adaptor are used. The required specification of AC Adaptor for the T1100 System Unit and External FDD (5.25" type and 3.5" type) are same, and are as shown below.

The required specification on AC Adaptor

Input : 220-240V ac
Output : 18V dc, 600mA
(Center polarity : +)



AC Adaptor

1.4 CRT Display Interface Connector

The T1100 system has CRT Display Interface connector on the back of T1100 System Unit.

You can connect the following types of CRT Display to the T1100 System Unit.

1) Color Display Unit

640 x 200 pixel's Color CRT Display.

It can be connected to T1100 System through D-Sub 9-pin (female) connector.

It can display such as follows by setting the display mode register.

- : 640 x 200 pixel graphic pattern or 320 x 200 pixel graphic pattern in graphic mode.

- : 80 columns x 25 lines or 40 columns x 25 lines in character mode.

2) Monochrome Display Unit

640 x 200 pixel's Monochrome CRT Display.

It can be connected to T1100 System through phone jack.

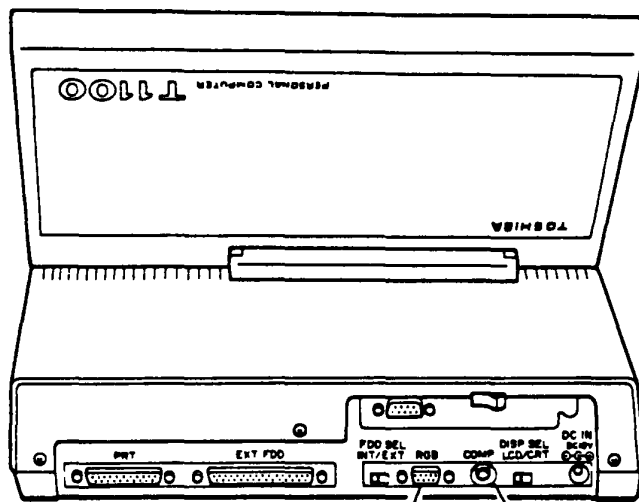
It can display such as following by setting the display mode register.

It can display 80 column x 25 line or 40 column x 25 line characters in character mode.

It connected through phone jack.

- : 640 x 200 pixel graphic pattern or 320 x 200 pixel graphic pattern in graphic mode.

- : 80 columns x 25 lines or 40 columns x 25 lines in character mode.



Color CRT Display
Connector
(9-pin D-Sub)

Monochrome CRT Display
Connector
(Phone Jack)

Specification

Signal	Description
1. Color CRT Display Interface	
Connector	9-pin D-sub
Video signal	14.3 MHz (Max) Red video : Positive level TTL compatible Green video: Positive level TTL compatibel Blue video : Positive level TTL compatible
Vertical drive	60 Hz refresh rate 200 scan lines displayed (non-interlace) Positive level, TTL compatibel
Horizontal drive	15.75 KHz scan rate 320/640 pixels displayed Positive level, TTL compatible
2. Monochrome CRT Display Interface	
Connector	Phone Jack type
Video signal	14.3 MHz (Max.) Positive level (1.5v peak to peak)
Vertical sync	60 Hz refresh rate 200 scan lines displayed (non-interlace) 524 scan lines interlaced total
Horizontal sync	15.750 KHz scan rate 320/640 pixels displayed

PART 2 TROUBLE ISOLATION PROCEDURE

This PART is a Trouble Isolation Procedures (TIP's) for the T1100 system in the First Level.

It is based on the FRU (Field Replaceable Unit) which is defined in PART 4. The target of this Trouble Isolation Procedures is to isolate the faulty unit from the system and replace it in the field.

The required tools for this trouble-shooting are as follows.

- 1). System Disk (including T&D program)
- 2). Multimeter
- 3). Screwdrivers (blade screwdriver and Phillips screwdriver)
- 4). Printer port LED

For the trouble-shooting, you are required to read the T&D operation procedure of PART 5 of this manual.

The faulty unit which is isolated according to this PART, will be repaired in the service center according to the Second Level maintenance manual (Maintenance Manual II).

You will follow the Trouble Isolation Procedures (TIP's) to isolate the failing Field Replaceable Unit (FRU) in case you met a failure on the FRU of the TOSHIBA Personal Computer System T1100.

The [ENTRY] is the isolation procedure of which TIP should be taken for the trouble.

Another TIP's are of the units which will be given by [ENTRY], or the suspected units.

Start from **ENTRY**, from next page, for any trouble shooting.

ENTRY

Fault Component (FRU) is identified already ?

1. If fault component (FRU) is identified already, or obvious problem such as unusual noise or damaged part on a component, go to the appropriate TIP (Trouble Isolation Procedure).

TIP	Page
Power Supply Unit	2-14
System PCB	2-21
FDD (3.5" Int. FDD)	2-26
Keyboard	2-36
LCD (Liquid Crystal Display)	2-41
External FDD (5.25" & 3.5")	2-58

2. If fault component (FRU) is not identified, go to **Entry-1**.

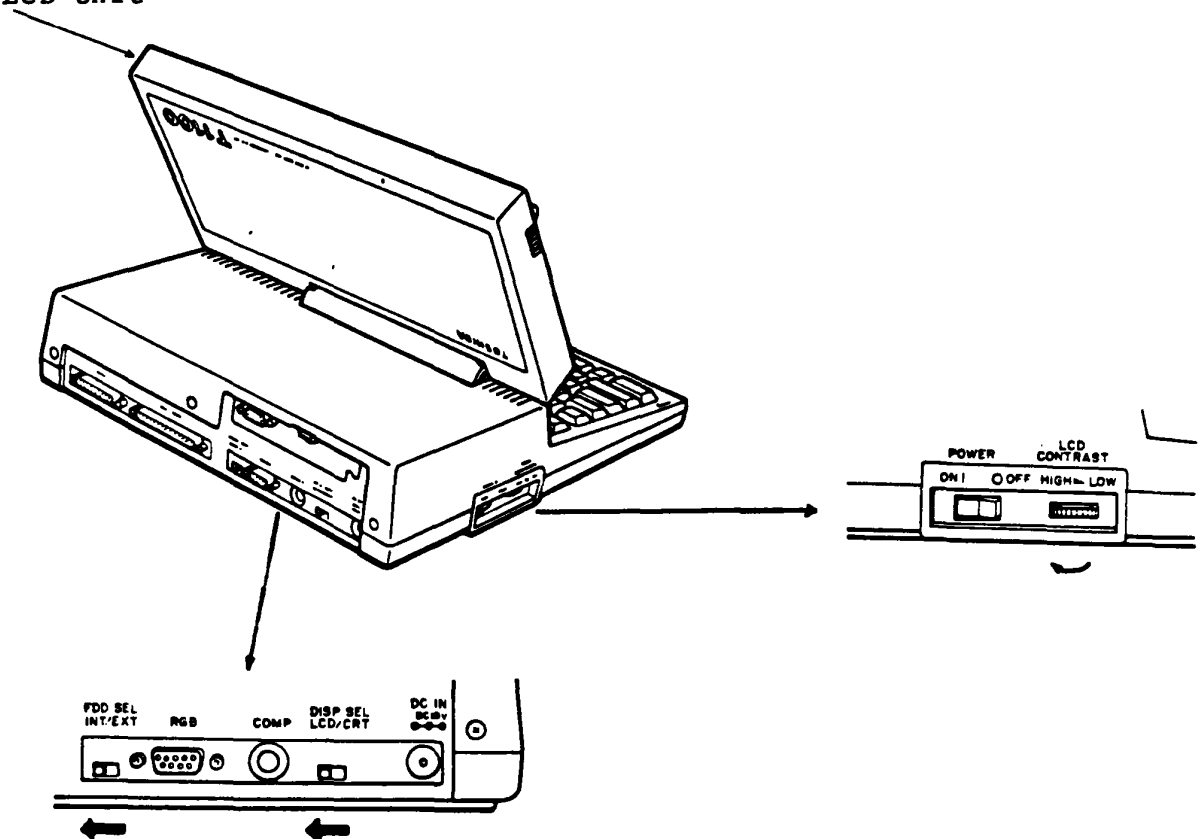
ENTRY-1

Set up the system to standard for checking.

Set up the system to standard for checking.

1. Remove all connectors connected to the T1100 System Unit.
2. Set the FDD SEL switch to INT position, and set the DISP SEL switch to LCD position.
3. Open the LCD Unit by sliding the LCD Locking TAB's on both side of the T1100 System Unit.
4. Rotate the LCD CONTRAST CONTROL fully to the direction of "High" then turn on the Power switch of the T1100 System Unit.

LCD Unit



Go to **Entry-2**.

ENTRY-2

Normal process to run the T&D programs

1. Power-On Diagnostic programs which are stored in the ROM of BIOS runs first after the power on of the T1100 System Unit. If any error occurs during this stage, error status is outputted to the printer port of the T1100 system.
2. During memory test in these Diagnostic programs the message of **MEMORY TEST XXX KB** is displayed on the LCD.
3. You can hear the beep at end of the Power-On Diagnostic.
4. The T1100 system starts to read the system disk in the Int. FDD.
5. If there is non-disk in Int. FDD the following message will be displayed on the LCD.
You need to response to the messages as following example.

**Place system disk in drive
and press any key when ready...**

Dose the above message appear?

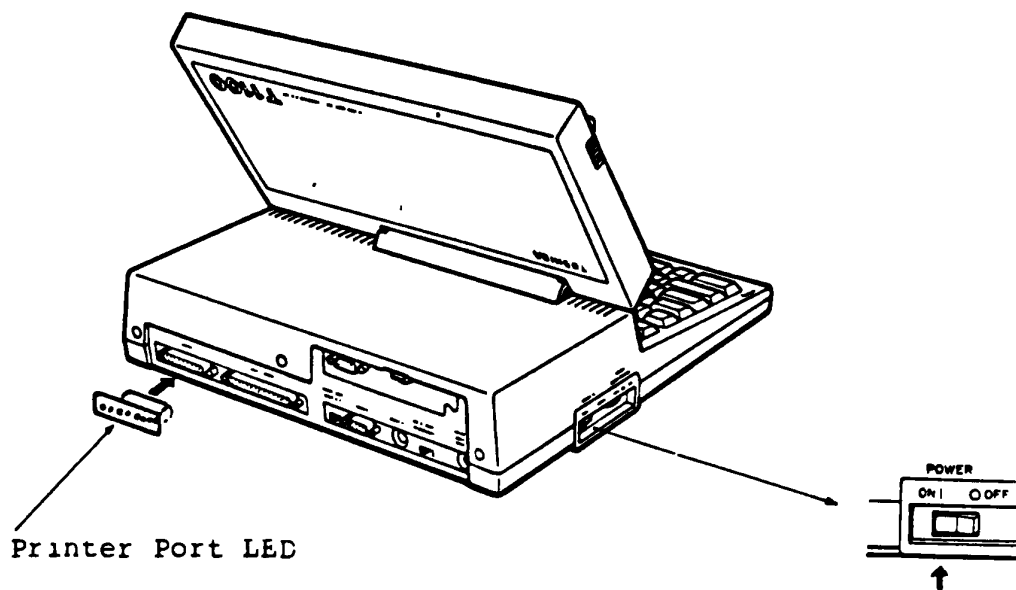
Yes: Turn off the Power switch of the T1100 system unit, and remove the Printer Port LED.
Go to **Entry-5** .

No: An error occurred in the Power-On Diagnostics.
Go to **Entry-3**

ENTRY-3

Trouble in Power-On Diagnostic

1. Turn off the Power switch of the T1100 System Unit.
2. Connect the **Printer Port LED** (Maintenance tool) to printer connector of the T1100 System Unit (rear side) as shown below.
3. Turn on the Power switch of the T1100 System Unit to run the Power-On Diagnostics.



Printer Port LED

Connection of Printer Port LED

Is any error status indicated
on the Printer Port LED?

Yes: An error occurred in the Power-On Diagnostics.
Go to **Entry-4**

No: Turn off the Power switch of the T1100 system unit, and
remove the Printer Port LED.
Go to **Power or Sytem** .

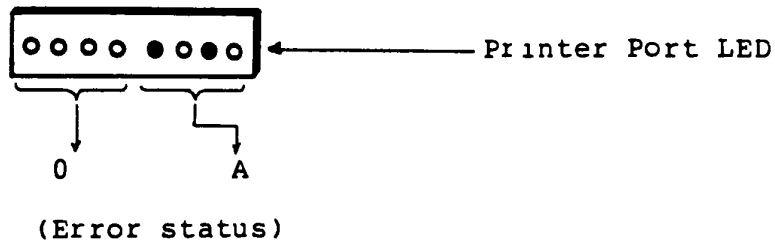
ENTRY-4

Read error status and isolate the failure component.

You may have an error condition in the Power-On Diagnostics, and the error status has been indicated on the Printer Port LED.

1. Read the error status on the Printer Port LED.
2. Isolate the failure component in accordance with the following flow chart of Power-On Diagnostics.

ex. : Error status = 0A [H]



3. In the following flow chart of the Power-On Diagnostics, sequence of the subtest executions is shown by arrow marks. In each subtest, all possible error status and information corresponding the error are described as below.

Continues to next page.

ENTRY-4

Read error status and isolate the failure component.(continued)

①	<u>Test Name</u>	③	④	⑤
②	Error / Description Status	/ Phenomenon	/ TIP	
	<u>Interrupt Controller (PIC 8259) Test</u>			
	• 08(H) / IMR could not be set or reset	/ Beep & Halt	/ System PCB	
	• 09(H) / Interrupt occurred in interrupt inhibit mode	/ Beep & Halt	/ System PCB	
	• 0A(H) / No TMR channel interrupt in specific time	/ Beep & Halt	/ System PCB	
	• 0B(H) / TMR channel interrupt occurred too fast	/ Beep & Halt	/ System PCB	
	<u>Video RAM & V/H Sync Test</u>			
	• 0C(H) / V-RAM compare error	/ Beep and Go to next	/ System PCB	

- ① Test Name : Subtest name
- ② Error Status : Error status possible to occur in the subtest
- ③ Description : Reason of the error
- ④ Phenomenon : Phenomenon when error stop occurs
- ⑤ TIP : Trouble Isolation Procedure to go

Power-On Diagnostics

<u>Test Name</u>	<u>Error Status</u>	<u>Description</u>	<u>Phenomenon</u>	<u>TIP</u>
<u>CPU Test</u>				
↓				/ Power Supply System PCB
<u>Initialize CRT Controller</u>				
↓				/ Power Supply System PCB
<u>ROM Checksum Test</u>				
↓	* AA(H)	/ Checksum Error	/ Beep & Halt	/ System PCB
<u>Timer (8253) Test & Initialize</u>				
↓	* 02(H)	/ DRAM refresh TMR is too fast	/ Beep & Halt	/ System PCB
↓	* 03(H)	/ DRAM refresh TMR is too slow	/ Beep & Halt	/ System PCB
<u>DMAC (8237) Test</u>				
↓	* 04(H)	/ Word CTR & Word Add (LSB) could not be set or reset	/ Beep & Halt	/ System PCB
↓	* 05(H)	/ Word CTR & Word Add (MSB) could not be set or reset	/ Beep & Halt	/ System PCB
<u>RAM R/W Test for First 64K-bytes</u>				
↓	* 06(H)	/ Compare error in Address: 00000 - 0FFFF(H)	/ Beep & Halt	/ System PCB
↓	* 07(H)	/ Parity error in Address: 00000 - 0FFFF(H)	/ Beep & Halt	/ System PCB
Continues to next page				

Continued

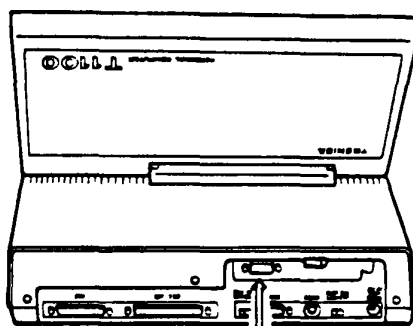
<u>Test Name</u>	<u>Error Status</u>	<u>Description</u>	<u>Phenomenon</u>	<u>TIP</u>
<u>Interrupt Controller (PIC 8259) Test</u>				
↓	* 08(H)	/ IMR could not be set or reset	/ Beep & halt	/ System PCB
	* 09(H)	/ Interrupt occurred in interrupt inhibit mode	/ Beep & Halt	/ System PCB
	* 0A(H)	/ No TMR channel interrupt in specific time	/ Beep & Halt	/ System PCB
	* 0B(H)	/ TMR channel interrupt occurred too fast	/ Beep & Halt	/ System PCB
<u>Video RAM & V/H Sync Test</u>				
↓	* 0C(H)	/ V-RAM compare error	/ Beep and Go to next	/ System PCB
	* 0D(H)	/ V/H Sync signal from CRTIC(6845) could not high level	/ Beep and Go to next	/ System PCB
	* 0E(H)	/ No level-transition (High - Low) of V/H Sync signal	/ Beep and Go to next	/ System PCB
	* 0F(H)	/ No level-transition (Low - High) of V/H Sync signal	/ Beep and Go to next	/ System PCB
<u>Determine Configuration</u>				
↓	* OPTION ROM ER (on LCD or CRT)	/ Checksum error in option ROM	/ Beep and Go to next	/ System PCB

Continues to next page

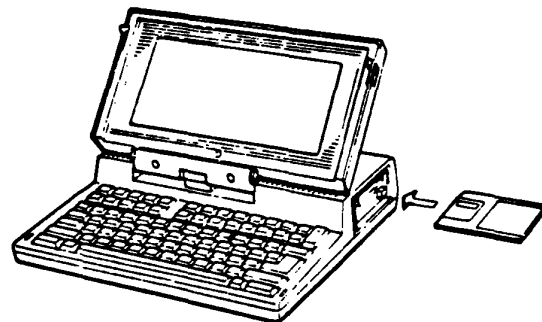
ENTRY-5

Run T&D program (RUNNING TEST) for trouble isolation.

1. Turn off the Power On switch of the System Unit.
2. Connect a printer wraparound connector to the T1100 System Unit, and connect RS-232C wraparound connector if attached. (RS-232C unit is a option).
3. Insert the system disk (including the T&D program) into the Int. FDD.
4. Turn on the Power switch of the T1100 System Unit.



Rear view



Front view

Continues to next page.

Continued

5. After the Power-On Diagnostics has been completed successfully , the following screen will be displayed.

```
Toshiba Personal Computer (R1150EN)
Copyright 1984,85 Toshiba Corporation
MS-DOS Ver 2.11
Copyright 1983,84 Microsoft Corp.

Command Ver 2.11
Current date is Tue 1-01-1980
Enter new date : 03-04-85
Current time is 0:00:27.02
Enter new time : 15:15

A)<u>testce
```

Key-in the current day and time then file name of T&D program as testce to the underlined portion. "ENTER" key should be pressed after the each of key-in message without failure.

Is the above message displayed?

Yes: Go to **Step 6.**

No: Go to **FDD.**

Continued

6. The T1100 system starts to read the T&D file then following screen will be displayed.

```
The TOSHIBA personal computer DIAGNOSTICS
version 1.00 (c) copyright TOSHIBA Corp 1985
```

```
DIAGNOSTICS MENU :
```

- 1 - DIAGNOSTIC TEST
- 4 - HEAD CLEANING
- 5 - LOG UTILITIES
- 6 - RUNNING TEST
- 8 - SYSTEM CONFIGURATION
- 9 - EXIT TO MS-DOS

```
PRESS [1]-[9] KEY
```

7. Key-in "6" and depress "ENTER" key for "RUNNING TEST".

The "RUNNING TEST" is composed of following subtests.
If an error occurs in a specific subtest, go to appropriate TIP (Trouble Isolation Procedure).

- 1). System Test - System PCB
- 2). Memory Test - System PCB
- 3). Display Test - Display Unit (LCD or CRT Display)
- 4). FDD Test - FDD
- 5). Printer Test - System PCB
- 6). RS232C Test - System PCB

POWER
(Power Supply Unit)

You have reached this TIP since the Power Supply Unit is suspected of the cause of failure.

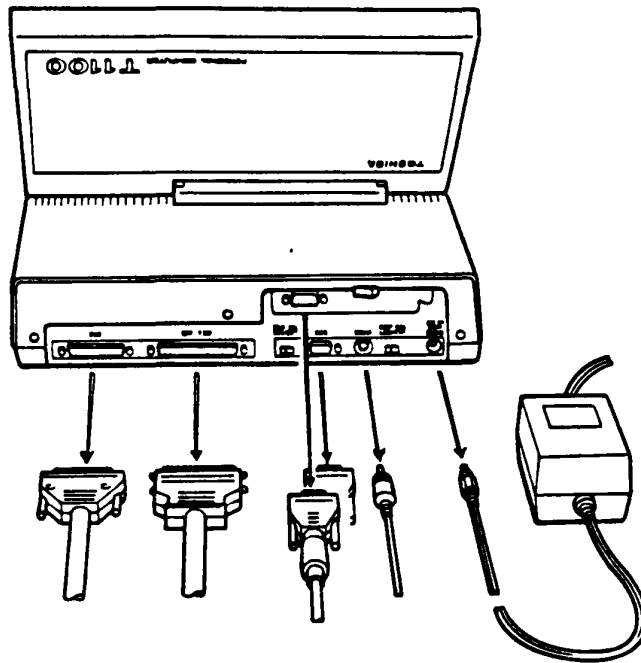
The symptom may be one of follows.

Symptom	TIP
1) No character is on the LCD	POWER-1
2) Error occurs in Power-On Diagnostics	POWER-1
3) Low Battery indicator could not be off	POWER-4

POWER-1

Remove all separated units

1. Turn off the Power switch of the System Unit.
2. Disconnect all connectors connected to the System Unit.
3. Turn on the Power switch of the System Unit then run T&D program (Running Test).
4. If the symptom disappears after the disconnection, connect the each unit one by one to isolate the faulty unit. Turn off all unit powers before the each connection for safety.



Is the faulty unit isolated.

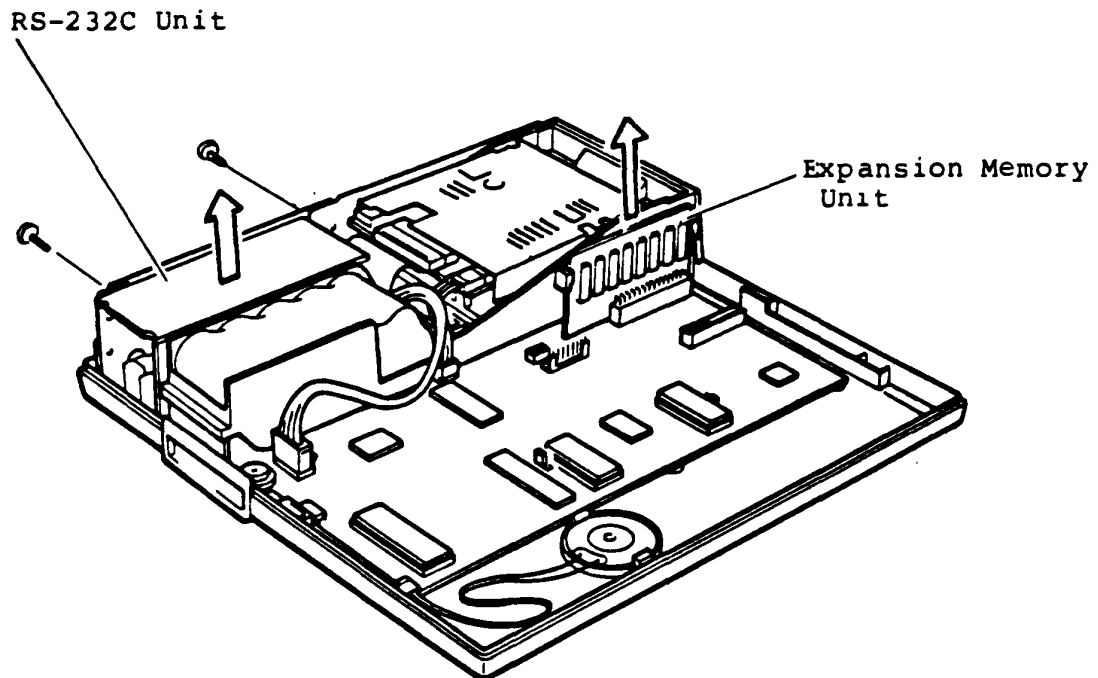
Yes: Go to the TIP of faulty unit.
(Replace the faulty unit)

No: Go to **POWER-5**.

POWER-2

Option PCB removal

1. Turn off the Power switch of the System Unit.
2. Remove all option PCB's (Expansion Memory Unit and RS-232C Unit).
3. Turn on the Power switch then run T&D program (Running Test).
4. If the symptom disappears after the removals, reinstall the each option PCB one by one to isolate the faulty PCB. Turn off the Power switch of the System Unit before the each installation for safety.



Is the faulty PCB isolated?

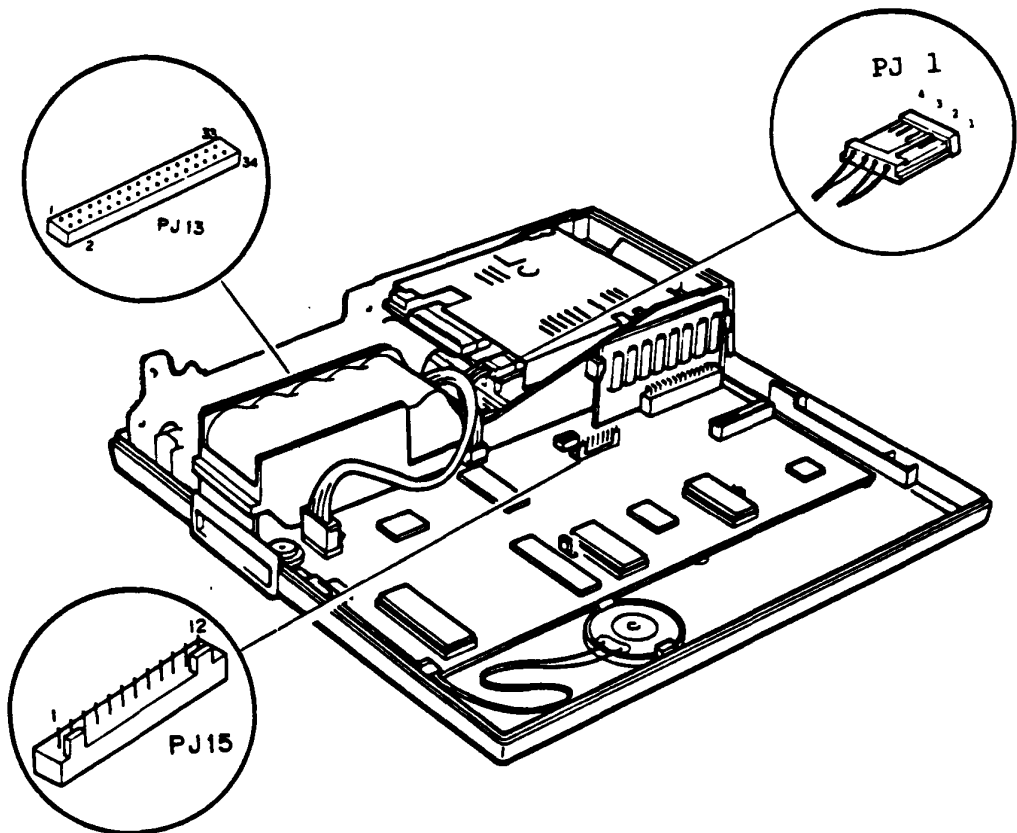
Yes: Replace the faulty PCB then run T&D program (Running Test) after the replacement.

No: Go to **POWER-6**.

POWER-3

Voltage check

1. Turn off the Power switch of the System Unit.
2. Remove the System Unit Cover. (Refer to PART 3)
3. Remove all option Units from the System Unit.
4. Turn on the Power switch of the System Unit.
5. Check all output voltage of +5V, -12V, +12V and -5V dc at the following connector pins.



continues to next page.

POWER-3

Voltage check (continued)

6. The voltages should be in tolerance as following table.

Voltage Tolerances

Connector	Pin		Voltage		
	+Lead	-Lead	Normal Vdc	Min Vdc	Max Vdc
PJ15	11	GND	+ 5	+ 4.7	+ 5.3
PJ15	12		-12	-10.0	-14.0
PJ1	4		+12	+11.5	+14.5
PJ13	32		- 5	- 4.7	- 5.3

Are the voltages in tolerance?

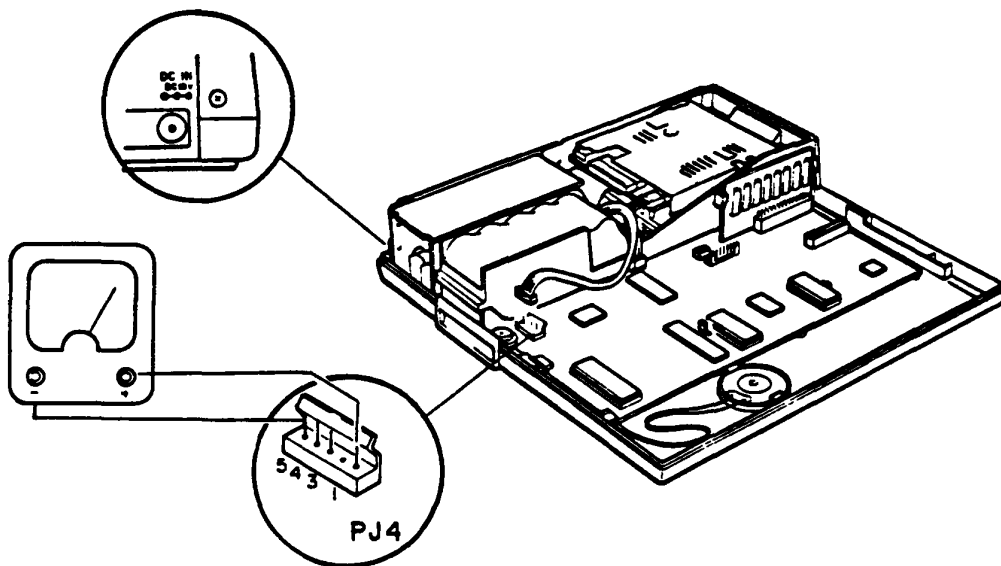
Yes: The Power Supply is good.

No: Go to **POWER-4**.

POWER-4

Input voltage check

1. Turn off the Power switch of the System Unit.
2. Disconnect the Battery connector PJ4 of the System Unit.
3. Plug in the jack of AC adaptor to the System Unit and AC plug of the AC adaptor to a wall outlet.
4. Check the input voltage at the pin 1 and pin 5.



Voltage Tolerance

Connector	Pin		Voltage		
	+Lead	-Lead	Normal Vdc	Min Vdc	Max Vdc
PJ4	1	5	+20	+18	+22

Is the voltage in tolerance.

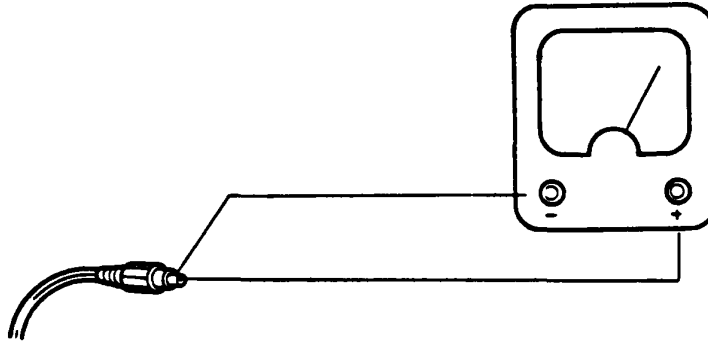
Yes: Power regulator of the System PCB is faulty.
Replace the System PCB.

No: Go to **POWER-5**.

POWER-5

AC adaptor output voltage check

1. Turn off the Power switch of the System Unit.
2. Disconnect the AC adaptor from the System Unit.
3. Plug in the jack of AC adaptor to the System Unit and AC plug of the AC adaptor to a wall outlet.
4. Check the AC adaptor output voltage at the pin 1 and pin 2 of PJ8.



AC Adaptor Jack

Voltage Tolerances

Connector	Pin		Voltage		
	+Lead	-Lead	Normal Vdc	Min Vdc	Max Vdc
AC Adaptor Jack	1	2	+20	+18	+22

Is the voltage in tolerance.

Yes: The Power Supply circuit of the System PCB is faulty.
Replace the System PCB.

No: The AC adaptor is faulty.
Replace the AC adaptor.

SYSTEM PCB

You have reached this TIP since the System PCB is suspected of the cause of failure.

The symptom may be one of follows.

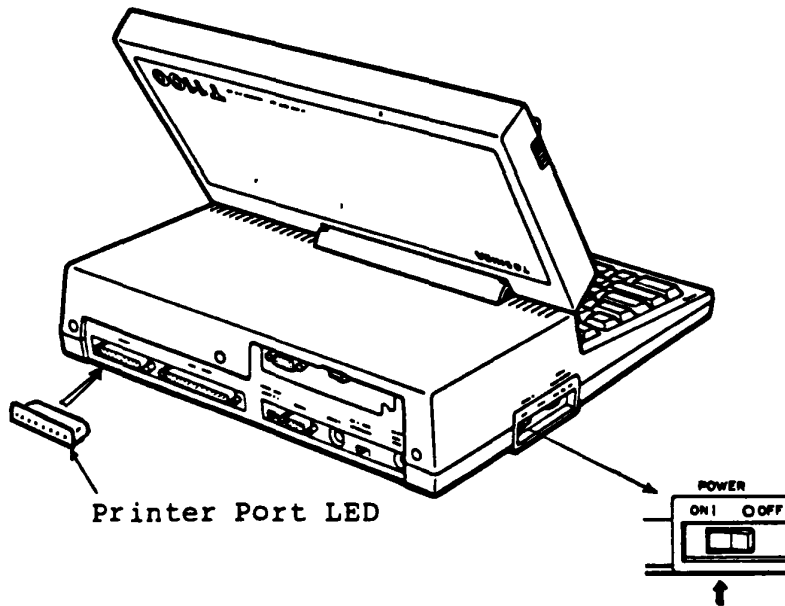
- 1) The Power-On Diagnostics could not run at all.
No error status is indicated on the Printer LED.
- 2) An error status has been indicated on the Printer LED during the Power-On Diagnostics.

Go to **SYSTEM-1** for the trouble shooting of above symptoms.

SYSTEM PCB-1

Remove all separated units

1. Turn off the Power switch of all units of the system.
2. Disconnect all connectors connected to the System Unit except Printer Port LED.
3. Connect the Printer Port LED to the printer connector of the System Unit.
4. Turn on the Power switch of the System Unit.
5. Check whether the symptom disappears or not.



Does the symptom disappear?

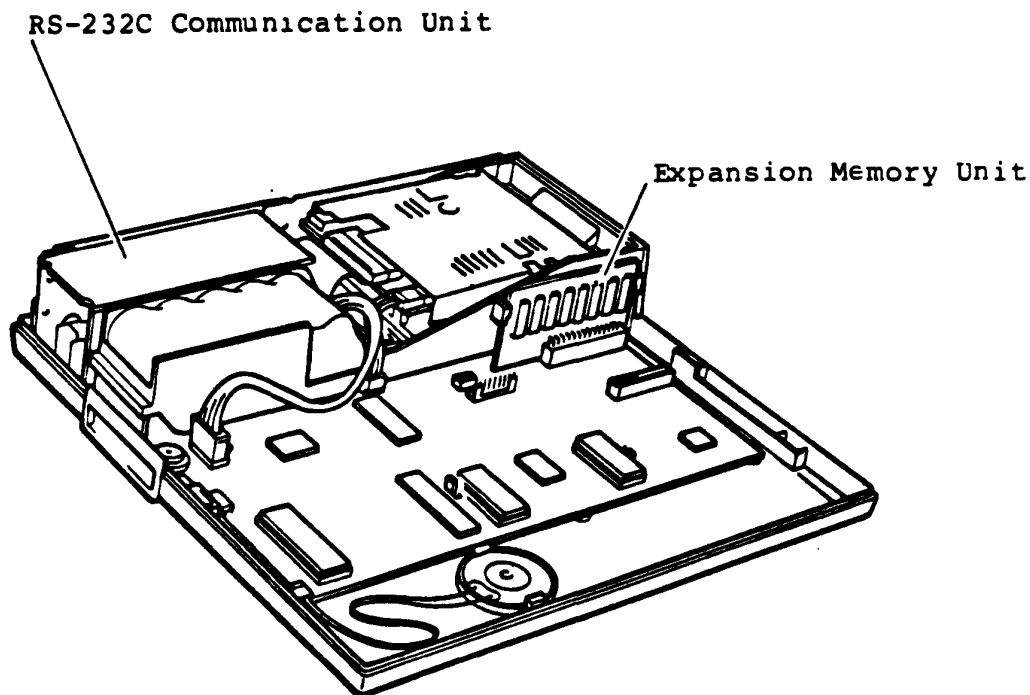
Yes: Failure is the one of separated units.
Connect each separated unit one by one to the System Unit and run Power-On Diagnostics for the failure unit isolation.
Turn off the Power switch of all units before making disconnection and connection of each connector.

No: Go to **SYSTEM PCB-2.**

SYSTEM PCB-2

Remove all option PCB(s)

1. Turn off the Power switch of the System Unit.
2. Remove all option PCB(s) (Expansion Memory Unit and RS-232C Communication Unit).
3. Turn on the Power switch of the System Unit then check the error status on the Printer LED.



Does the symptom disappear?

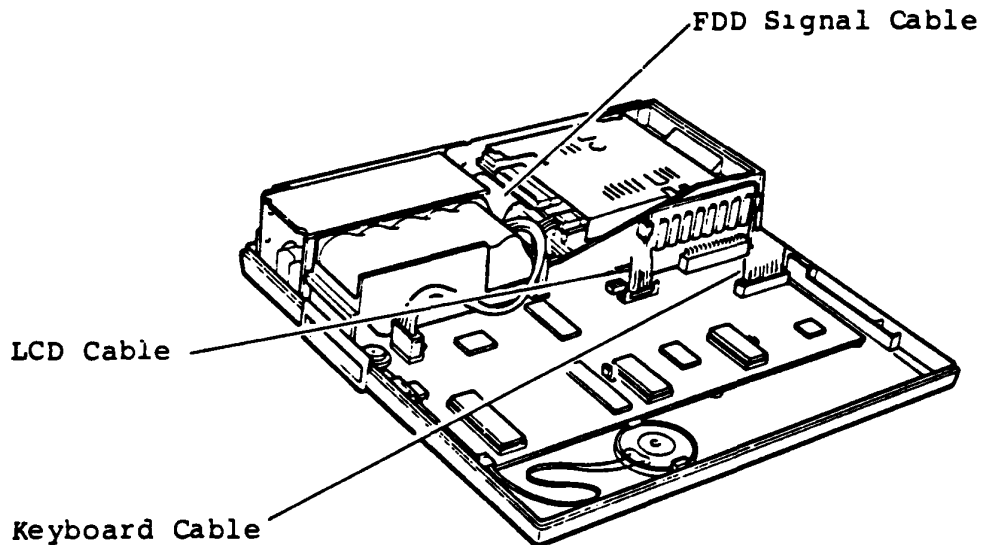
Yes: Failure is the one of option PCB(s).
Reinstall each option PCB one by one to the System Unit and run Power-On Diagnostics for the failure PCB isolation.
Turn off the Power switch of the System Unit before making removal and reinstallation of each option PCB.

No: Go to **SYSTEM PCB-3**.

SYSTEM PCB-3

Disconnect all signal cables

1. Turn off the Power switch of the System Unit.
2. Disconnect all signal cable connectors of Int. FDD, LCD, Keyboard.
3. Turn on the Power switch of the System Unit then check the error status on the Printer LED.



Does the symptom disappear?

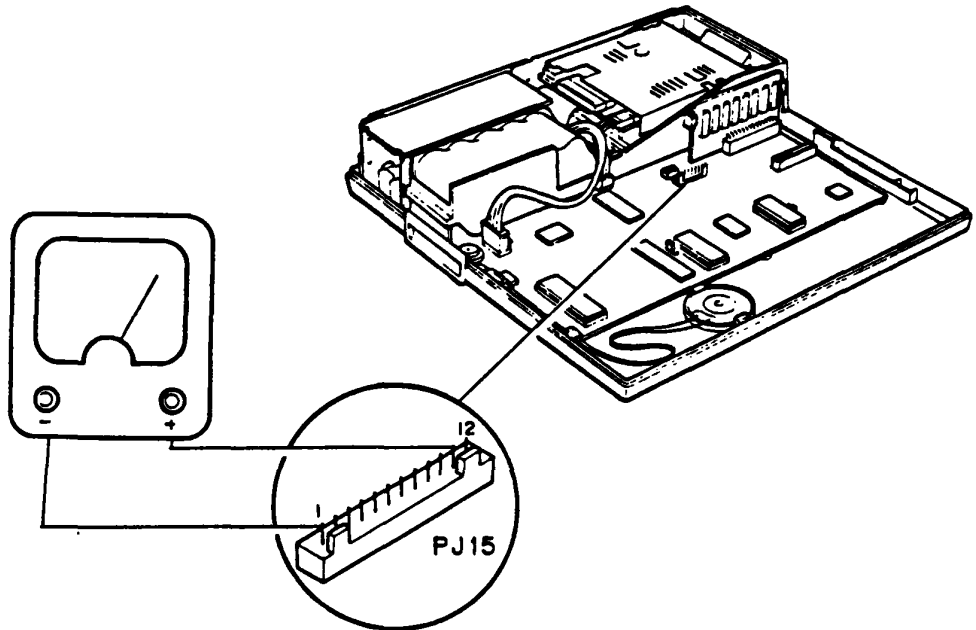
Yes: Failure is one of Int. FDD, LCD or Keyboard.
Connect each unit of them one by one to the System Unit and run Power-On Diagnostics for failure unit.
Turn off the Power switch of the System Unit before each disconnection and connection of unit.

No: Go to **SYSTEM PCB-4.**

SYSTEM PCB-4

Check the +5V

1. Turn on the Power switch of the System Unit.
2. Check the voltages of +5V at the Pin 11 of PJ15 of the System PCB.



Voltage Tolerance

Connector	Pin		Voltage		
	+Lead	-Lead	Normal Vdc	Min Vdc	Max Vdc
PJ15	11	1	+ 5	+ 4.7	+ 5.3

Is the voltage in tolerance?

Yes: System PCB is Faulty.
 Replace the System PCB.
 Restore the system then run T&D program for verification.

No: Go to **POWER**.

**FDD
(3.5" Internal Floppy Disk Drive)**

You have reached this TIP since FDD is suspected of the cause of the failure.

For the trouble shooting, you will need one good spair 3.5" Int. FDD for the replacement.

Before the trouble-shooting, confirm that FDD SEL switch of the T1100 System Unit is set to INT position.

FDD-1

1. Turn off the Power switch of the System Unit.
2. Insert the system disk to the Int. FDD.
3. Turn on the Power switch of the System Unit.
4. A short time after the power on (15 seconds for 256KB memory or 30 seconds for 512KB memory), the "In use LED" of FDD on the Keyboard and the FDD panel are lit in a short time.
5. The following messages will appear on the LCD.

```
Toshiba Personal Computer (R1150EN)
Copyright 1984,85 Toshiba Corporation

MS-DOS Ver 2.11
Copyright 1983,84 Microsoft Corp.

Command Ver 2.11
Current date is Tue 1-01-1980
Enter new date : 03-04-85
Current time is 0:00:27.02
Enter new time : 15:15

A><u>testce
```

Key-in the current **day** and **time** then file name of T&D program as **testce** to the underlined portion. "ENTER" key should be pressed after the each of key-in message without failure.

Is the above message displayed?

Yes: Go to **FDD-2**.

No: Go to **Step 6**.

FDD-1

6. Confirm that one of following screen appears on the LED.

①

Place system disk in drive
Press any key when ready

②

Non-system disk or disk error
Replace and press any key when ready

Does one of above screens appear on the LCD?

Yes: If the screen was ①
1) No disk is in the FDD.
2) FDD is suspected.

If the screen was ②
1) The disk in the FDD is not system disk.
2) The system disk is damaged.
3) FDD is suspected.

No: Go to **SYSTEM PCB.**

FDD-2

1. After the T&D program loading, following Diagnostic Menu will appears on the LCD.
2. Depress "1" then "ENTER" keys to display the Diagnostic Test Menu.

The TOSHIBA personal computer DIAGNOSTICS
version 1.00 (c) copyright TOSHIBA Corp 1985

DIAGNOSTICS MENU :

- 1 - DIAGNOSTIC TEST
- 4 - HEAD CLEANING
- 5 - LOG UTILITIES
- 6 - RUNNING TEST
- 8 - SYSTEM CONFIGURATION
- 9 - EXIT TO MS-DOS

PRESS [1]-[9] KEY

Is the above message displayed?

Yes: Go to **Step 3**.

No: You may use a damaged disk. Prepare the other T&D system disk then repeat the operation to verify. If the replacement led you here again, go to **FDD-5**.

FDD-2

(continued)

3. Confirm that following Diagnostic Test Menu will appears on the LCD.
4. Depress "5" then "ENTER" keys to select the Floppy Disk Test.

The TOSHIBA personal computer DIAGNOSTICS
version 1.00 (c) copyright TOSHIBA Corp 1985

DIAGNOSTIC TEST MENU :

- 1 - SYSTEM TEST
- 2 - MEMORY TEST
- 3 - KEYBOARD TEST
- 4 - DISPLAY TEST
- 5 - FLOPPY DISK TEST
- 6 - PRINTER TEST
- 7 - ASYNC TEST
- 99 - EXIT TO DIAGNOSTICS MENU

Select display type (1:LCD/2:COLOR CRT/3:MONO CRT) ?

PRESS [1]-[9] KEY 4

Is the above message displayed?

Yes: Go to **FDD-3**.

No: You may use a damaged disk. Prepare the other T&D system disk then repeat the operation to verify.
If the replacement led you here again, go to **FDD-5**.

FDD-3

Floppy Disk Test Menu

1. Confirm that the Floppy Disk Test Menu is displayed as shown below.
2. Execute each sub-test in accordance with T&D operation procedures in PART 5.

```
FLOPPY DISK                XXXXXXXX

SUB-TEST : XX
PASS COUNT: XXXX      ERROR COUNT: XXXX
WRITE DATA: XX      READ DATA : XX
ADDRESS  : XXXXX     STATUS   : XXX
.
SUB-TEST MENU :

*1 - Sequential read
*2 - Sequential read/write
*3 - Random address/data
*4 - Write specified address
*5 - Read specified address
99 - Exit to DIAGNOSTIC TEST MENU

* = 1:FDD1 2:FDD2 0:FDD1&2

SELECT SUB-TEST NUMBER ?
```

Is any error message displayed?

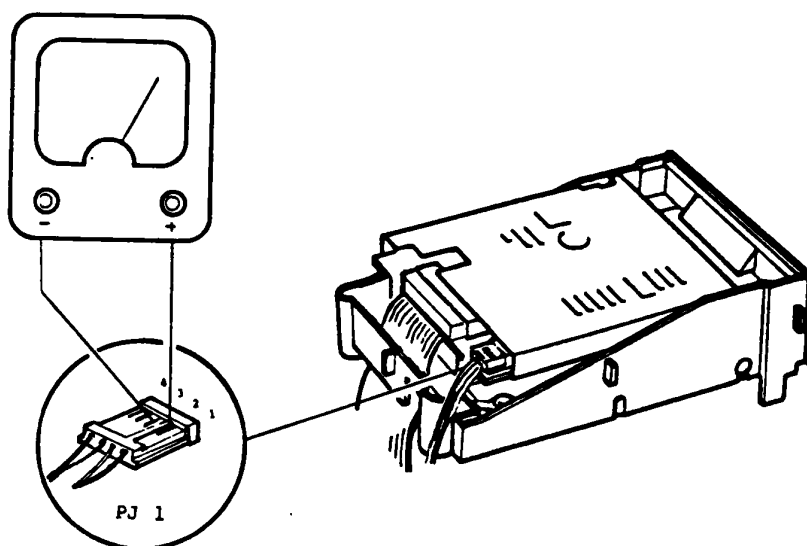
Yes: Go to **FDD-4**.

No: FDD is good. Another Unit may be suspected.

FDD-4

Voltage check

1. Turn off the Power switch of the System Unit.
2. Remove the Upper Cover of the System Unit. (Refer to PART 3)
3. Turn on the Power switch of the System Unit then check the voltages for the Int. FDD at the connector PJ1 on the Int. FDD Unit with a multimeter.



Voltage Tolerances

Connector	Pin		Voltage		
	+Lead	-Lead	Normal Vdc	Min Vdc	Max Vdc
PJ1	1	2, 3	+ 5	+ 4.7	+ 5.3
	4		+12	+11.5	+14.5

Are the voltages within the tolerance.

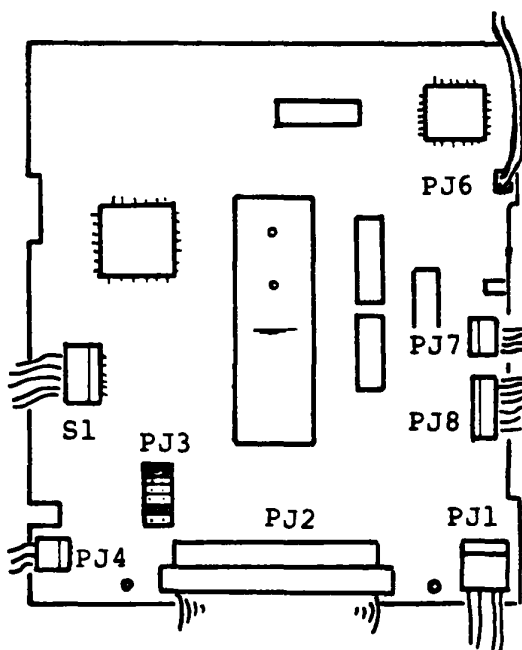
Yes: Go to **FDD-5**.

No: Power Supply is suspected.
Go to **POWER**.

FDD-5

Check the connectors

1. All connectors of the suspected fdd is connected properly and securely?



Are the connectors free of damage
and installed properly?

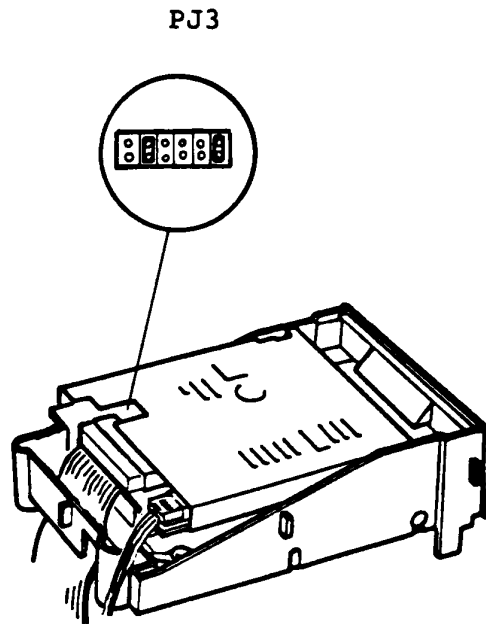
Yes: Go to **FDD-6**.

No: Repair the damaged connector or mount the connector properly then repeat the T&D operation to verify.

FDD-6

Check the Jumper Straps

1. Check the Jumper Strap settings on the FDD Unit PCB.
The Jumper Strap settings must be as shown below.



Are straps set properly?

Yes: Go to **FDD-7**.

No: Set the Jumper Straps properly.

FDD-7

Replace the FDD

1. Replace the FDD with good spare FDD and plug in all connectors which has been disconnected.
(refer to PART 3)
2. Set the Jumper Straps properly.
3. Run the T&D program to verify.

Does the failure remain?

Yes: System PCB is suspected. Replace the System PCB then repeat the T&D operation to verify.

No: Suspected FDD is faulty.

KEYBOARD

You have reached this TIP since Keyboard is suspected of the cause of the failure.

The symptom may be one of follows.

1. Character(s) are lost or changed incorrectly during key-in operation.
2. Excessive character(s) are transferred from the Keyboard to the System Unit.

Go to "KEYBOARD-1" for the symptom 1 and 2 of the above.

KEYBOARD-1

T&D Operation

1. Turn off the Power switch of the System Unit.
2. Insert the T&D program disk to the Int. FDD Unit of the System Unit.
3. Turn on the Power switch of the System Unit.
4. Execute the T&D program of keyboard in accordance with the T&D operation procedure of "PART 5".

KEYBOARD TEST IN PROGRESS 301000				
□□	□□□□□□□□□□□□□□	□	□	
□□	□ □□□□□□□□□□□□□□	□□□□		
□□	□ □□□□□□□□□□□□□□	□□□□		
□□	□□□□□□□□□□□□□□	□	□□□	
□□	□	□	□	□ □
IF TEST OK, PRESS [DEL] THEN [ENTER] KEY				

Does all key-in operation function correctly.

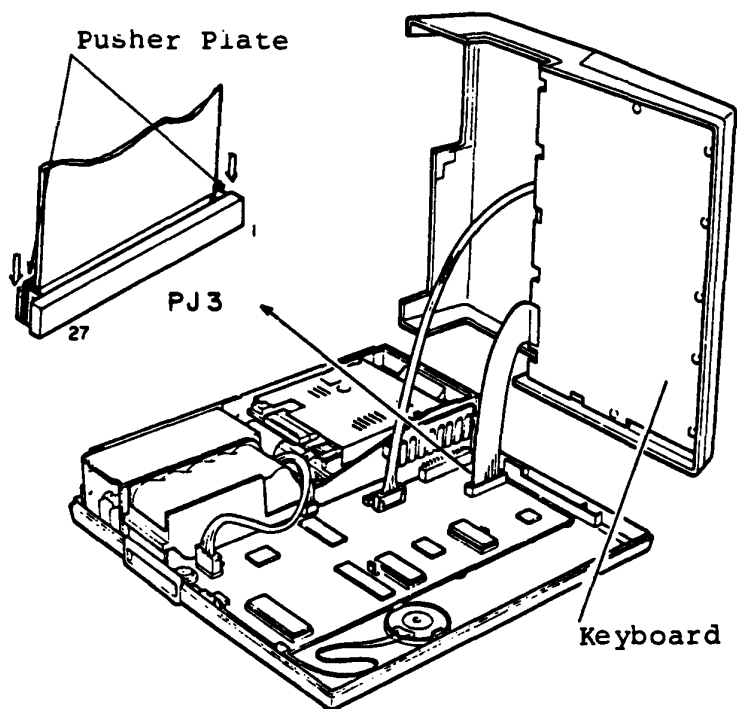
Yes: Another unit is suspected.

No: Go to **KEYBOARD-2**.

KEYBOARD-2

Keyboard connector check

1. Turn off the Power switch of the System Unit.
2. Remove the Upper Cover of the System Unit, but Keyboard cable. (refer to PART 3)
3. Check the Keyboard cable and connectors for damage or connection.
Keyboard cable is connected to the connector on the System PCB with a pusher plate. If the pusher plate is not set securely or the disconnection of signal line will occur.



Is there any damage on the Keyboard cable or disconnection with the connector?
correctly.

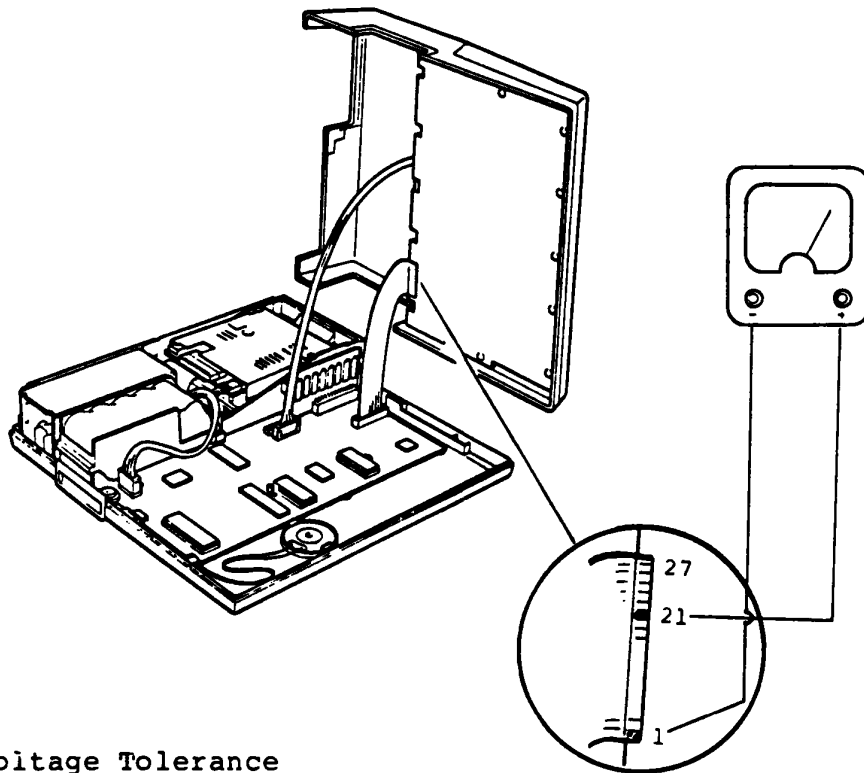
Yes: Correct the damaged one or the connection.

No: Go to **KEYBOARD-3**.

KEYBOARD-3

Voltage Check

1. Turn off the Power switch of the System Unit.
2. Check the power voltage at the keyboard connector on the Keyboard PCB for the appropriate voltage with a multimeter.



Voltage Tolerance

Connector	Pin		Voltage		
	+Lead	-Lead	Normal Vdc	Min Vdc	Max Vdc
	21	1	+ 5	+ 4.7	+ 5.3

Is the voltage within the tolerance.

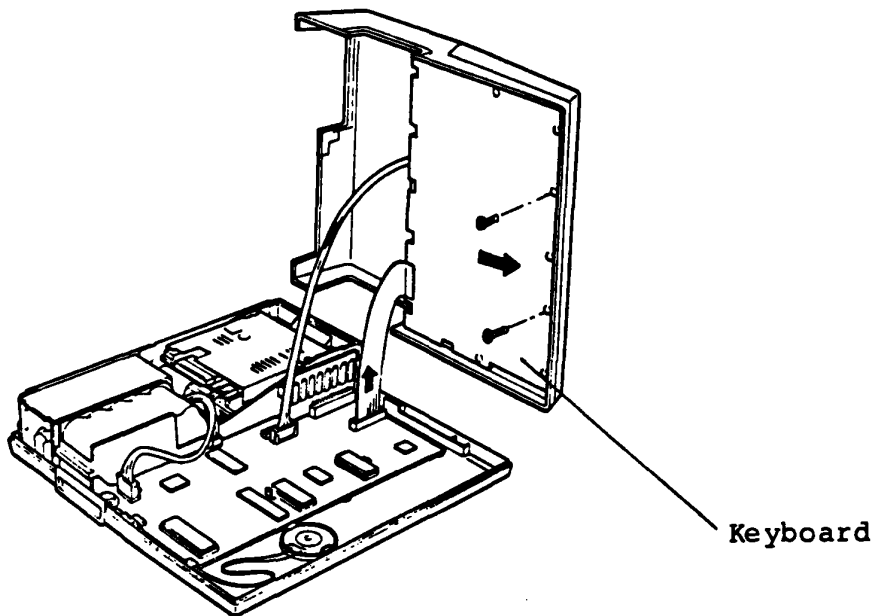
Yes: Go to **KEYBOARD-4**.

No: Go to **SYSTEM PCB**.

KEYBOARD-4

Keyboard replacement

1. Turn off the Power switch of the System Unit.
2. Unplug the Keyboard cable from the connector on the System Unit.
3. Replace the Keyboard and Keyboard Cable with good spare ones.
4. Turn on the Power switch of the System Unit.
5. Run the T&D program of Keyboard for verification.



Does the symptom disappear?

Yes: The Keyboard is failure.

No: Another unit should be suspected.

LCD

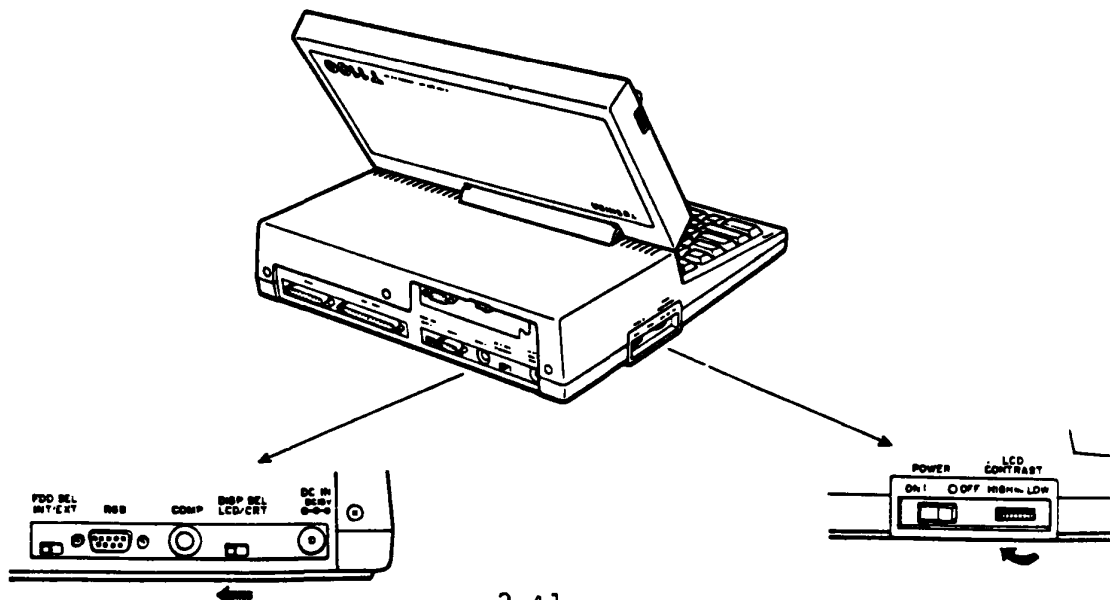
You have reached this TIP since LCD is suspected of the cause of the failure.

Before to enter the troubleshoot, confirm that the system is fully charged, and LCD CONTRAST is fully rotated to the direction to HIGH.

The symptom may be one of the follows.

1. Neither of character and graph appear on the LCD while the system is running. - Go to **LCD-1**
2. Upper half or lower half of the LCD is unable to display a character or graph. - Go to **LCD-3**
3. Extra dots or missing dots appear on a certain column. - Go to **LCD-5**
4. Extra dot(s) or missing dot(s) appear on a certain character. - Go to **LCD-6**

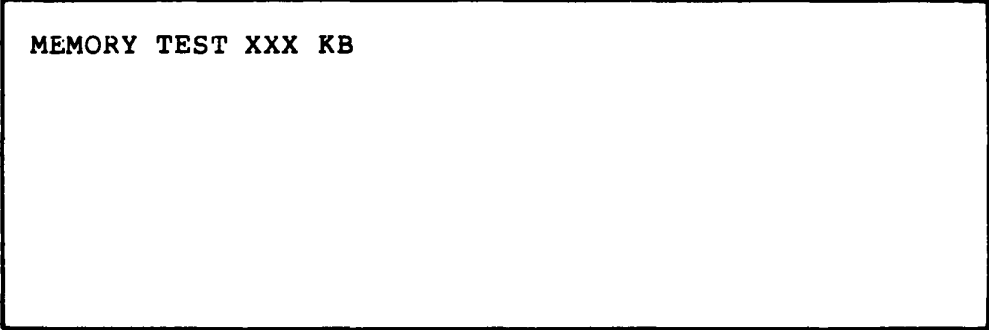
For the checking of above symptoms, run the T&D program of LCD according to the **LCD-7** to **LCD-16** if necessary.



LCD-1

Screen check at the start up time

1. Turn the LCD CONTRAST CONTROL to the direction to HIGH.
2. Turn on the Power switch of the System Unit.
Screen of the LCD will be dark for a moment.
3. After a while (6 or 7 seconds), the message of **MEMORY TEST
XXX KB** will be displayed.



MEMORY TEST XXX KB

Dose the above message appear?

Yes: Go to **LCD-7.**

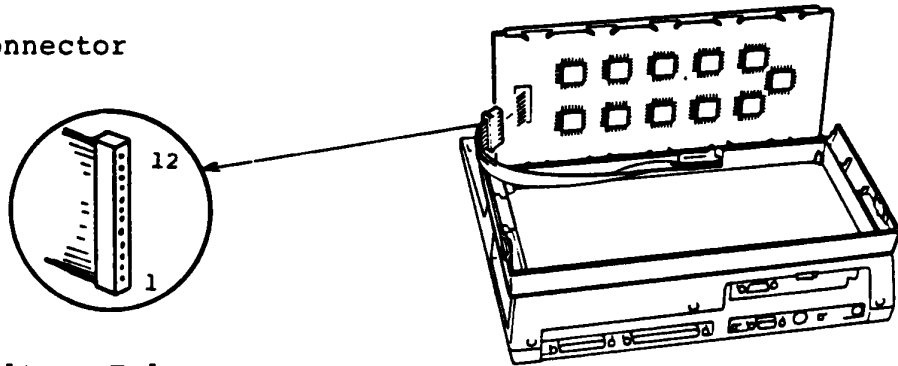
No: Go to **LCD-2.**

LCD-2

Mon of character is displayed on the LCD

1. Turn off the Power switch of the System Unit.
2. Disassemble the LCD Unit. (refer to PART 3).
3. Check the voltages at the LCD connector with a multimeter.
The -12V dc is varried according to the turning of LCD CONTRAST CONTROL.
When you turn the LCD CONTRAST CONTROL fully to **HIGH**, it becomes to be -14V dc.

LCD connector



Voltage Tolerances

Pin		Voltage		
+Lead	-Lead	Normal Vdc	Min Vdc	Max Vdc
11	GND	+ 5	+ 4.7	+ 5.3
12		-12	-10.0	-14.0
4		+ 2.5	+ 2.2	+ 2.8
4		+ 0.05	+ 0.04	+ 0.06
4		+		
32		+ 2.5	+ 2.2	+ 2.8

Are the voltages in tolerance?

Yes: Go to **LCD-3**.

No: Replace the LCD cable.
If it leads you here again, replace the System PCB.

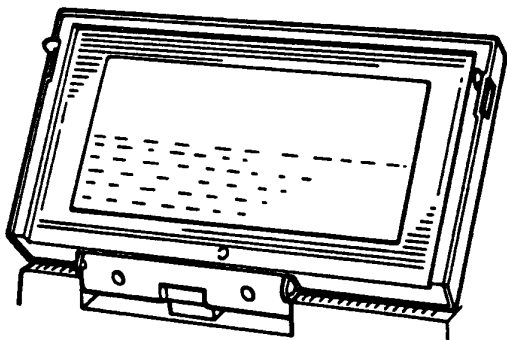
LCD-3

Upper/Lower half screen is not displayed ?

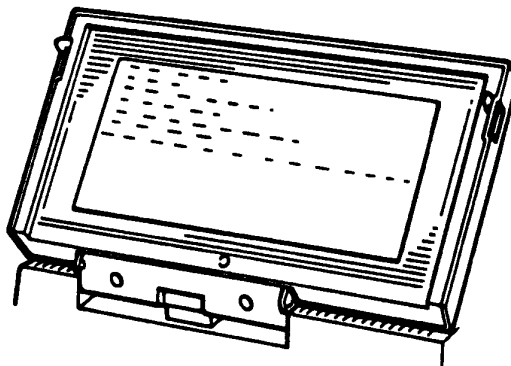
Check for no displaying screen on upper or lower half of the LCD.

1. Turn on the Power switch of the System Unit.
2. Turn LCD CONTRAST CONTROL fully to **HIGH**.
3. Check the LCD screen for whether a half of LCD screen is unable to display as following figure.

(A)



(B)



Does above symptom appear?

Yes: Go to **LCD-4**.

No: Go to **LCD-5**.

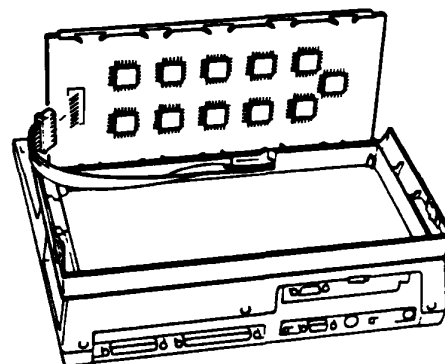
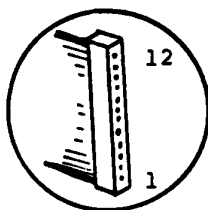
LCD-4

Voltage check

You have reached this TIP since a half of the LCD screen is unable to display character or graph.

1. Turn off the Power switch of the System Unit.
2. Disassemble the LCD unit. (refer to PART 3)
3. Turn on the Power switch of the System Unit then check the voltages at LCD connector on the LCD board.

LCD connector



Voltage Tolerances

Symptom	Pin		Voltage	
	+Lead	-Lead		
(A)	09	01	+4.2V to +5.0V	Depends on a volume of displayed characters on the upper half of LCD.
	08			
(B)	07			
	06			

Are the voltages in tolerance?

Yes: LCD is faulty, replace the LCD.

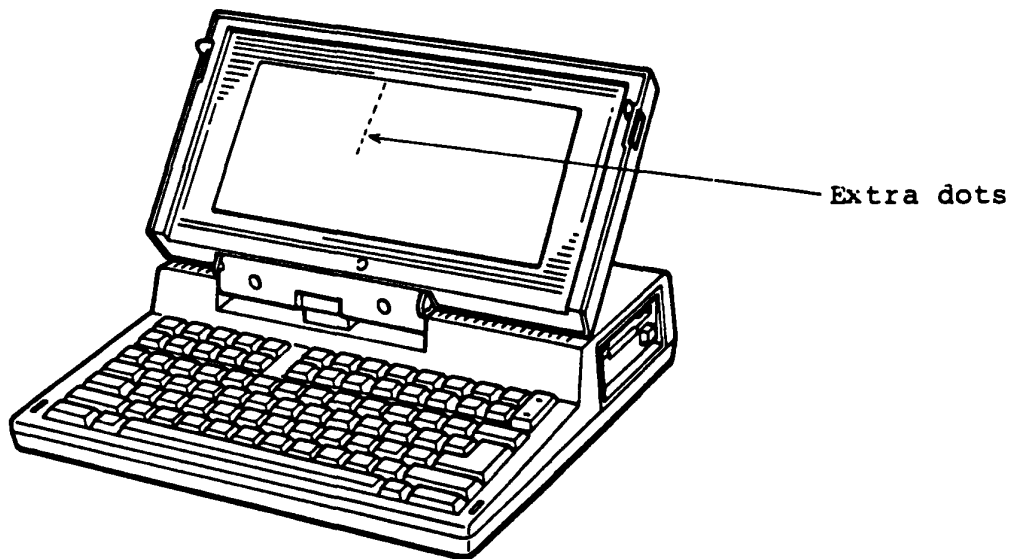
No: Replace the LCD cable.
If it leads you here again, replace the System PCB.

LCD-5

Extra dots or missing dots on a certain column ?

Check for extra dots and missing dots on a certain column.

1. Turn on the Power switch of the System Unit.
2. Turn the LCD CONTRAST CONTROL fully to **HIGH**.
3. Check the extra dots and missing dots on a certain column.



Are there any extra or missing dots?

Yes: Replace the LCD. (refer to PART 3)

No: Go to **LCD-6** .

LCD-6

Extra dot(s) or missing dot(s) on a certain character?

Check for extra dot(s) and missing dot(s) on a displayed character by running T&D program according to the LCD-7 through LCD-16.

1. Turn on the Power switch of the System Unit.
2. Turn the LCD CONTRAST CONTROL fully to **HIGH**.
3. Check the extra dot(s) and missing dot(s) on a certain character by running the T&D program for LCD according to LCD-7 through LCD-16.

Is there any extra or missing dot?

Yes: Replace the System PCB. (refer to PART 3)

No: Go to **LCD-7** for running Display Test Program.

LCD-7

T&D running

1. Turn off the Power switch of the System Unit.
2. Insert the system disk to the Int. FDD.
3. Turn on the Power switch of the System Unit and load the T&D program.
After the loading, following screen will appear on the LCD.

The TOSHIBA personal computer DIAGNOSTICS
version 1.00 (c) copyright TOSHIBA Corp 1985

DIAGNOSTICS MENU :

- 1 - DIAGNOSTIC TEST
- 4 - HEAD CLEANING
- 5 - LOG UTILITIES
- 6 - RUNNING TEST
- 8 - SYSTEM CONFIGURATION
- 9 - EXIT TO MS-DOS

PRESS [1]-[9] KEY

Does the above screen appear?

Yes: Go to LCD-8.

No: System PCB is faulty.
Replace the System PCB, then check it again.

LCD-8

Diagnostic Test Menu

1. Press 1 then **ENTER** keys for selecting Diagnostic Test Menu. The Diagnostic Test Menu will be displayed as follows after the key-in.

The TOSHIBA personal computer DIAGNOSTICS
version 1.00 (c) copyright TOSHIBA Corp 1985

DIAGNOSTIC TEST MENU :

- 1 - SYSTEM TEST
- 2 - MEMORY TEST
- 3 - KEYBOARD TEST
- 4 - DISPLAY TEST
- 5 - FLOPPY DISK TEST
- 6 - PRINTER TEST
- 7 - ASYNC TEST
- 99 - EXIT TO DIAGNOSTICS MENU

Select display type (1:LCD/2:COLOR CRT/3:MONO CRT) ?

PRESS [1]-[9] KEY 4

Does the above screen appear?

Yes: Go to **LCD-9**.

No: System PCB is faulty.
Replace the System PCB, then check it again.

LCD-9

Sub-test Menu

1. Press **4** then **ENTER** keys for selecting the Display Test. The Display Sub-test Menu will be displayed as follows.

```
DISPLAY TEST                                XXXXXXXX

SUB-TEST  :  XX
PASS COUNT:  XXXX      ERROR COUNT:  XXXX
WRITE DATA:  XX      READ DATA  :  XX
ADDRESS   :  XXXXX    STATUS      :  XXX

SUB-TEST MENU :

01 - VRAM read/write
02 - Character attributes
03 - Character set
04 - 80 * 25 Character display
05 - Graphics display (color set 0/1)
06 - 640 * 200 Graphics display
07 - Display page
08 - "H" Pattern display
09 - Exit to DIAGNOSTIC TEST MENU

SELECT SUB-TEST NUMBER  ?
TEST LOOP (1:YES/2:NO) ?
ERROR STOP (1:YES/2:NO) ?
```

Is the above message displayed?

Yes: Run the Sub-tests (01 - 08) of the Display Test.
Go to **LCD-10** for running sub-tests.

No: System Unit is suspected.
Go to the **ENTRY**.

LCD-10

(01) VRAM read/write

1. Press **01** then **ENTER** keys on the Display Test Menu.
The following message will appear on the screen for very short time, then it returns to the Display Test Menu.

```
DISPLAY TEST                                XXXXXXXX  
  
SUB-TEST   : XX  
PASS COUNT: XXXX      ERROR COUNT: XXXX  
WRITE DATA: XX      READ DATA  : XX  
ADDRESS    : XXXXX   STATUS      : XXX
```

Does the error message appear?

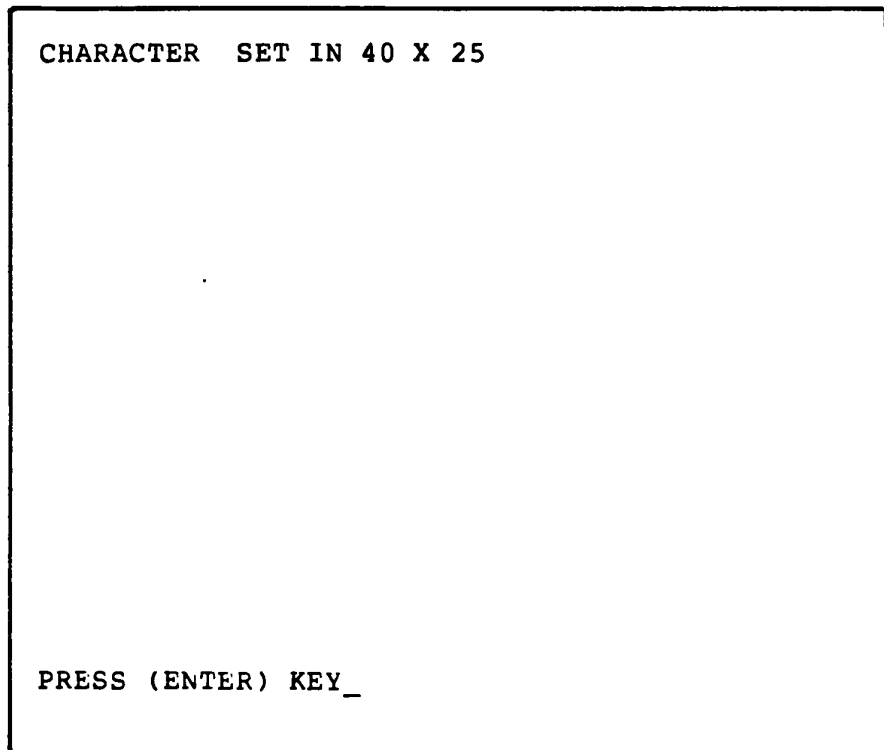
Yes: System PCB is faulty.
Replace the System PCB. (refer to PART 3)

No: Go to **LCD-11**.

LCD-12

(03) Character set

1. Press **03** then **ENTER** keys on the Display Test Menu, then the following pattern will appear on the screen.
2. Press **ENTER** key to return to the Display Test Menu.



Is the above pattern displayed correctly?

Yes: Go to **LCD-13**.

No: System PCB is faulty.
Replace the System PCB, then check it again.

LCD-13

(04) 80 X 25 Character display

1. Press **04** then **ENTER** keys on the Display Test Menu.
The following pattern will appear on the screen.
2. Press **ENTER** key to return to the Display Test Menu.

80 X 25 CHARACTER DISPLAY

```
012345678901234567890123456789 345678901234567890123456789
!"#$%&'()*+,-./0123456789:;<= UVWXYZ[^\]^_`abcdefghijklmnop
!"#$%&'()*+,-./0123456789:;<= JWXYZ[^\]^_`abcdefghijklmnop
!"#$%&'()*+,-./0123456789:;<=> VWXYZ[^\]^_`abcdefghijklmnopq
!"#$%&'()*+,-./0123456789:;<=>? XYZ[^\]^_`abcdefghijklmnopqrs
!"#$%&'()*+,-./0123456789:;<=>?@A YZ[^\]^_`abcdefghijklmnoprst
!"#$%&'()*+,-./0123456789:;<=>?@AB Z[^\]^_`abcdefghijklmnoprstu
!"#$%&'()*+,-./0123456789:;<=>?@ABCL [^\]^_`abcdefghijklmnoprstuv
!"#$%&'()*+,-./0123456789:;<=>?@ABCDE [^\]^_`abcdefghijklmnopstuvw
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFL ^_`abcdefghijklmnopstuvwxy
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGH ^_`abcdefghijklmnopstuvwxy
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHI. ^_`abcdefghijklmnopstuvwxyz
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK ^_`abcdefghijklmnopstuvwxyz{
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKL ^_`abcdefghijklmnopstuvwxyz{|
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLM ^_`abcdefghijklmnopstuvwxyz{|}
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN ^_`abcdefghijklmnopstuvwxyz{|}-
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO ^_`abcdefghijklmnopstuvwxyz{|}-
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOP ^_`abcdefghijklmnopstuvwxyz{|}-
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPG ^_`abcdefghijklmnopstuvwxyz{|}-
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQ ^_`abcdefghijklmnopstuvwxyz{|}-
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQ ^_`abcdefghijklmnopstuvwxyz{|}-
```

PRESS (ENTER) KEY_

Is the above pattern displayed correctly?

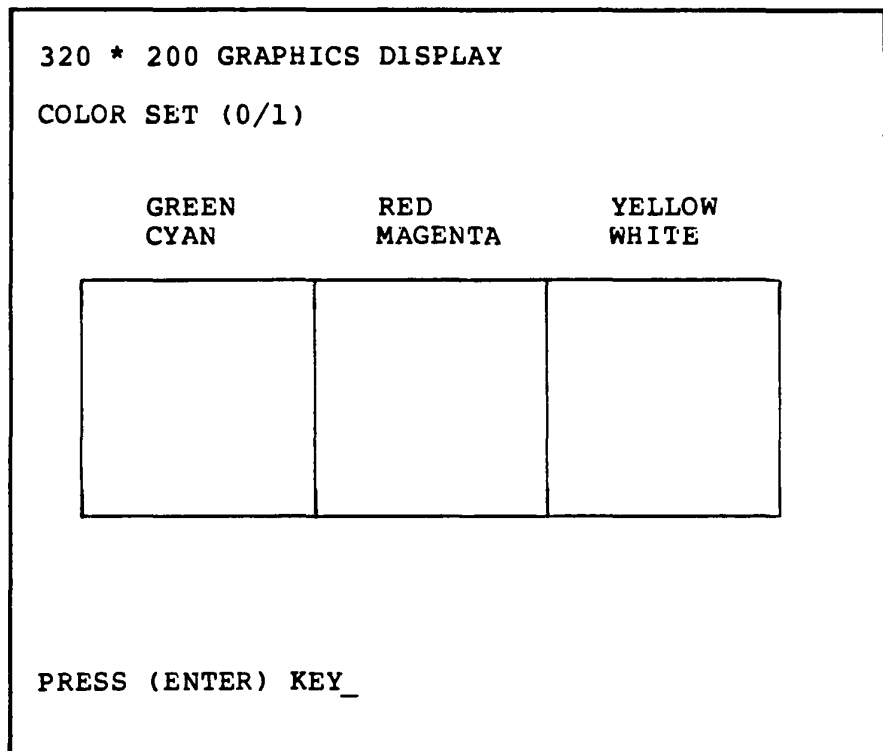
Yes: Go to **LCD-14**.

No: System PCB is faulty.
Replace the System PCB, then check it again.

LCD-14

(05) Graphics display (color set 0/1)

1. Press **05** then **ENTER** keys on the Display Test Menu.
The following pattern will appear on the screen.
2. Press **ENTER** key to return to the Display Test Menu.



Is the above pattern displayed correctly?

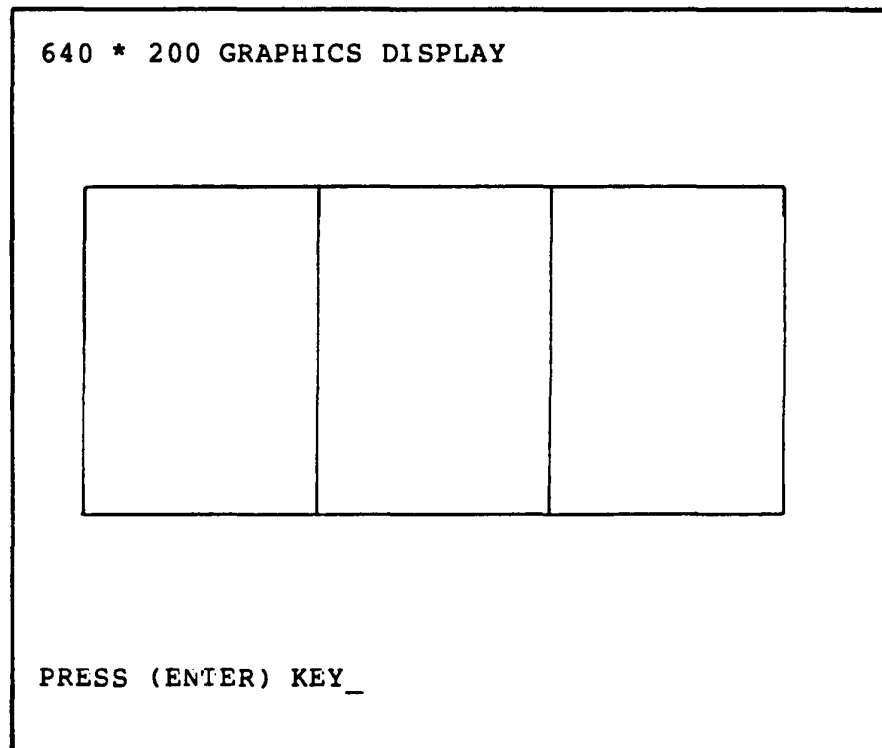
Yes: Go to **LCD-15**.

No: System PCB is faulty.
Replace the System PCB, then check it again.

LCD-15

(06) 640 * 200 Graphics display

1. Press **06** then **ENTER** keys on the Display Test Menu.
The following pattern will appear on the screen.
2. Press **ENTER** key to return to the Display Test Menu.



Is the above pattern displayed correctly?

Yes: Go to **LCD-16**.

No: System PCB is faulty.
Replace the System PCB, then check it again.

**Ext. FDD
(5.25" & 3.5" External Floppy Disk Drive)**

You have reached this TIP since Ext. FDD (External FDD) is suspected of the cause of the failure.
For the trouble shooting, you will need one good spair 5.25" Ext. FDD or 3.5" Ext. FDD for the replacement.

External FDD is composed of following components.
You will isolate the faulty component from them in this TIP.

External FDD components (5.25" type & 3.5" type)

- * FDD assembly
- * FDD PCB (FDD5C1 for 5.25" type, FDD3C1 for 3.5" type)
- * Ni-Cd Battery Unit
- * AC Adaptor (common to 5.25", 3.5" type Ext. FDD's and T1100 System Unit)
- * Ext. FDD Cable (common to 5.25", 3.5" type Ext. FDD's)

You need to prepare the following tools for this TIP.

Tools

- * multimeter
- * MS-DOS Disk (including T&D program file)
- * Work Disk (5.25" or 3.5", formatted)
- * Spair Ext. FDD Unit and Ext. FDD Cable
- * Cleaning Disk (5.25" or 3.5")
- * Screwdriver ((phillips screwdriver)

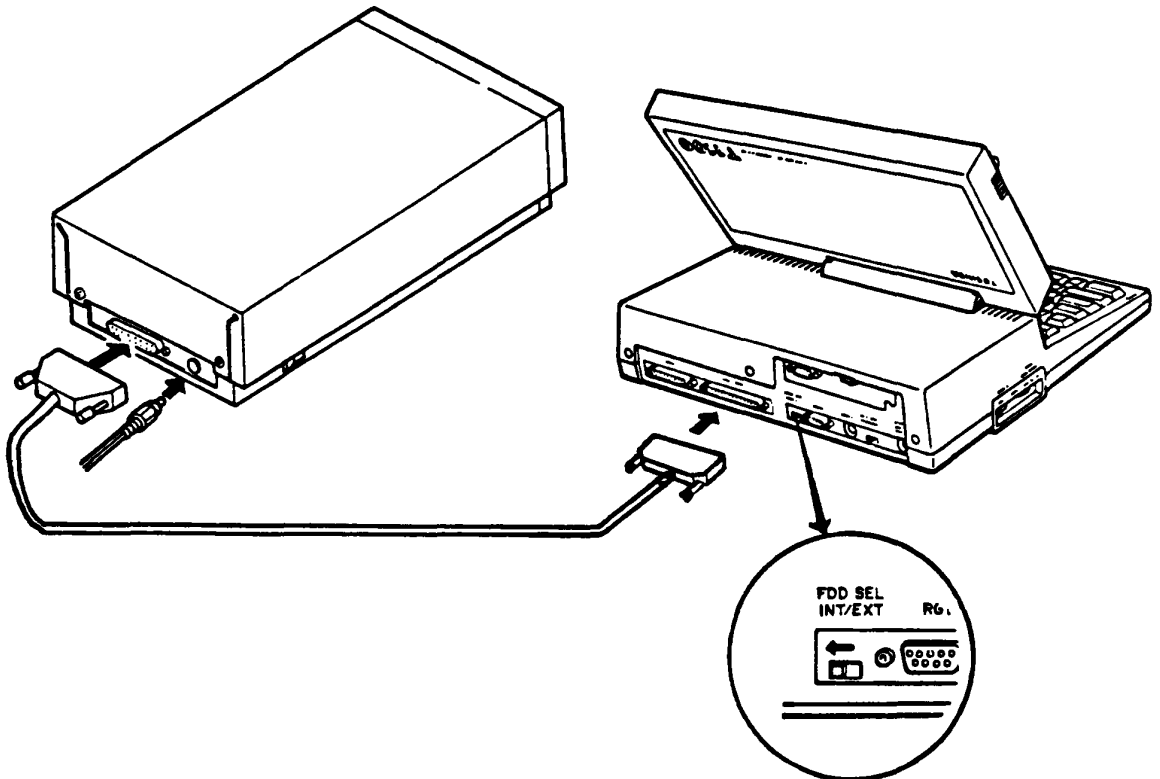
You can apply this TIP to both of 5.25" type and 3.5" type External FDD.

Start from **Ext. FDD-1** for any trouble-shooting of Ext. FDD.

Ext. FDD-1

Set up for the FDD test

1. Connect the Ext. FDD cable to the T1100 System and the Ext. FDD.
2. Connect the AC adaptor to the Ext. FDD, and plug in AC plug of the AC adaptor to a wall-outlet.
3. Set the FDD SEL switch of the T1100 System to INT. position.
4. Insert the MS-DOS disk (including T&D program file) to the Int. FDD of the T1100 System.
5. Turn on the power switches of the T1100 System & the Ext. FDD then run the FDD test program according to the operation procedure of T&D (PART 5: TEST & DIAGNOSTICS).



Go to **Ext. FDD-2.**

Ext. FDD-2

FDD test menu

1. Proceed the T&D program to FDD test menu (FDD test menu is as follow).
2. Insert the good work disk (error free) into the Ext. FDD.
3. Run all subtests of the FDD test program according to the T&D program operation procedure. (refer to PART5: TEST & DIAGNOSTICS)
Following figure is an example screen of FDD Test program.

```
FLOPPY DISK                521000

SUB-TEST : 21
PASS COUNT: 0000      ERROR COUNT: 0000
WRITE DATA: 00      READ DATA : 00
ADDRESS : 00000      STATUS : 000

SUB-TEST MENU :

*1 - Sequential read
*2 - Sequential read/write
*3 - Random address/data
*4 - Write specified address
*5 - Read specified address
99 - Exit to DIAGNOSTIC TEST MENU

** 1:FDD1 2:FDD2 0:FDD1&2

SELECT SUB-TEST NUMBER ? 21
TEST LOOP (1:YES/2:NO) ? 1
ERROR STOP (1:YES/2:NO) ? 1
```

Does any error message appear?

Yes: Clean the Read/Write head of the Ext. FDD with cleaning disk. For head cleaning, insert a cleaning disk to the Ext. FDD then select "HEAD CLEANING" on a DIAGNOSTIC MENU of T&D program. (refer to PART 5: TEST & DIAGNOSTICS)

If it leads you here again, go to **Ext. FDD-3** .

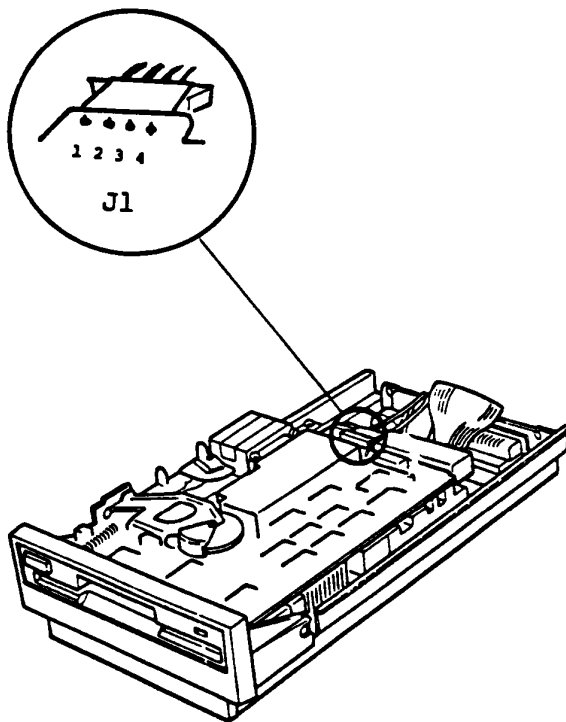
No: The Ext. FDD is good.

Ext. FDD-3

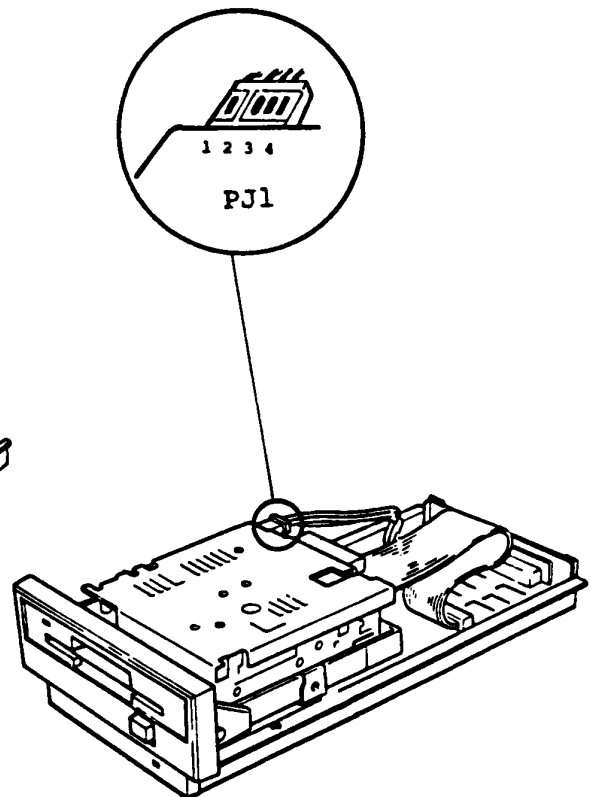
Voltage check

Check the voltages of the Ext. FDD as following.

1. Turn off the Power switches of the T1100 System Unit and Ext. FDD.
2. Open the upper cover of the Ext. FDD. (Refer to PART 3: REPLACEMENT/ADJUSTMENT)
3. Turn on the Power switch of the Ext. FDD then check the voltages for the FDD assembly by a multimeter. (All check points are shown in the Tables on next page.)



5.25" type



3.5" type

Continues to next page.

Ext. FDD-3

Voltage check (continued)

Voltage Tolerances

5.25" type

Connector	Pin		Voltage		
	+Lead	-Lead	Normal Vdc	Min Vdc	Max Vdc
J1	1	2,3	+12	+11.5	+14.5
	4		5	+ 4.5	+ 5.3

3.5" type

Connector	Pin		Voltage		
	+Lead	-Lead	Normal Vdc	Min Vdc	Max Vdc
PJ1	1	2,3	+ 5	+ 4.7	+ 5.3
	4		+12	+11.5	+14.5

Are the voltages within the tolerance.

Yes: Go to **Ext. FDD-5**

No: Go to **Ext. FDD-4.**

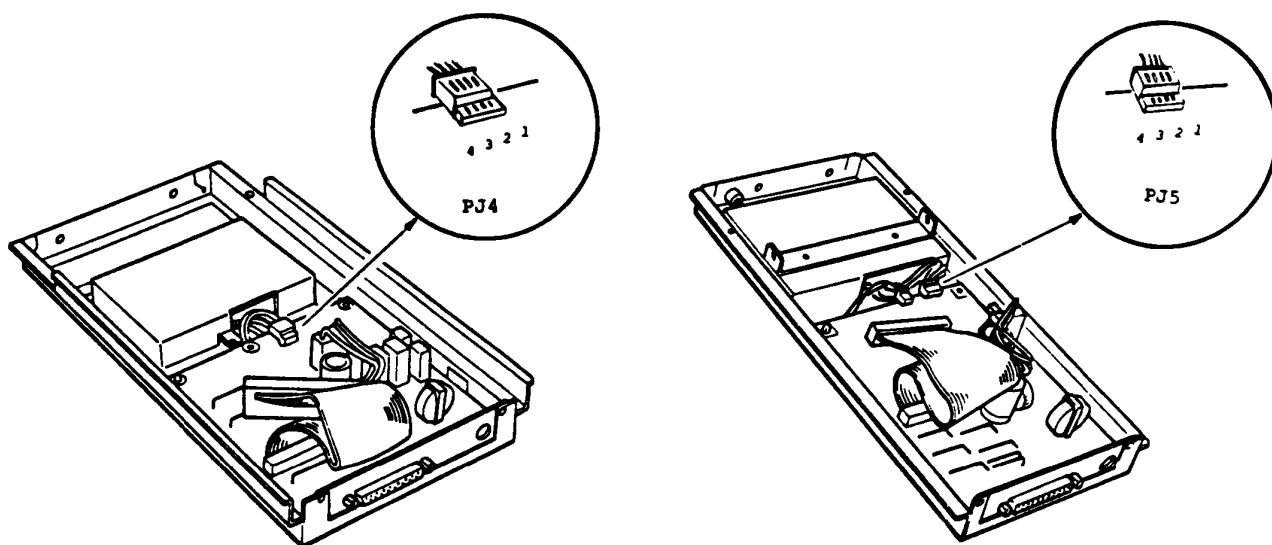
Ext. FDD-4

Voltage check

If the voltages to FDD assembly are not in tolerance, one of the AC adaptor, FDD PCB or Ni-Cd battery is suspected. Check all of them by a multimeter as follows.

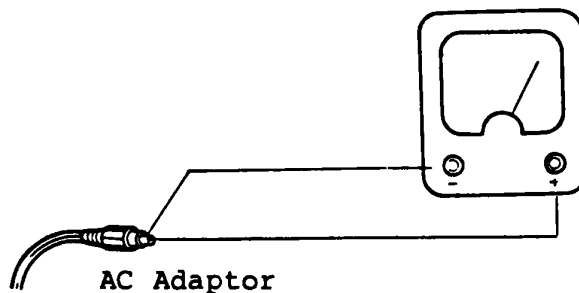
Note: Ni-Cd batter must be charged at least for an hour before the check.

1. Turn off the Power switch of the Ext. FDD then pull out the DC plug of the AC adaptor from the Ext. FDD.
2. Check the voltage at the battery connector on the FDD PCB. (All check points are shown in the tables on next page.)
3. Check the output voltage of the AC adaptor at DC plug.



5.25" type

3.5" type



Continues to next page.

Ext. FDD-4

Voltage check (continued)

Voltage Tolerances

Output of Ni-Cd Battery (5.25" type)

Connector	Pin		Voltage
	+Lead	-Lead	
PJ4	1,2	3,4	More than 12 Vdc

Output of Ni-Cd Battery (3.5" type)

Connector	Pin		Voltage
	+Lead	-Lead	
PJ5	1,2	3,4	More than 12 Vdc

Output of AC adaptor

Pin		Voltage		
+Lead	-lead	Normal Vdc	Min Vdc	Max Vdc
Inner Contact	Outer Contact	+20	+18	+22

If output voltage of Ni-Cd battery is out of tolerance:
 ==> Change the battery.

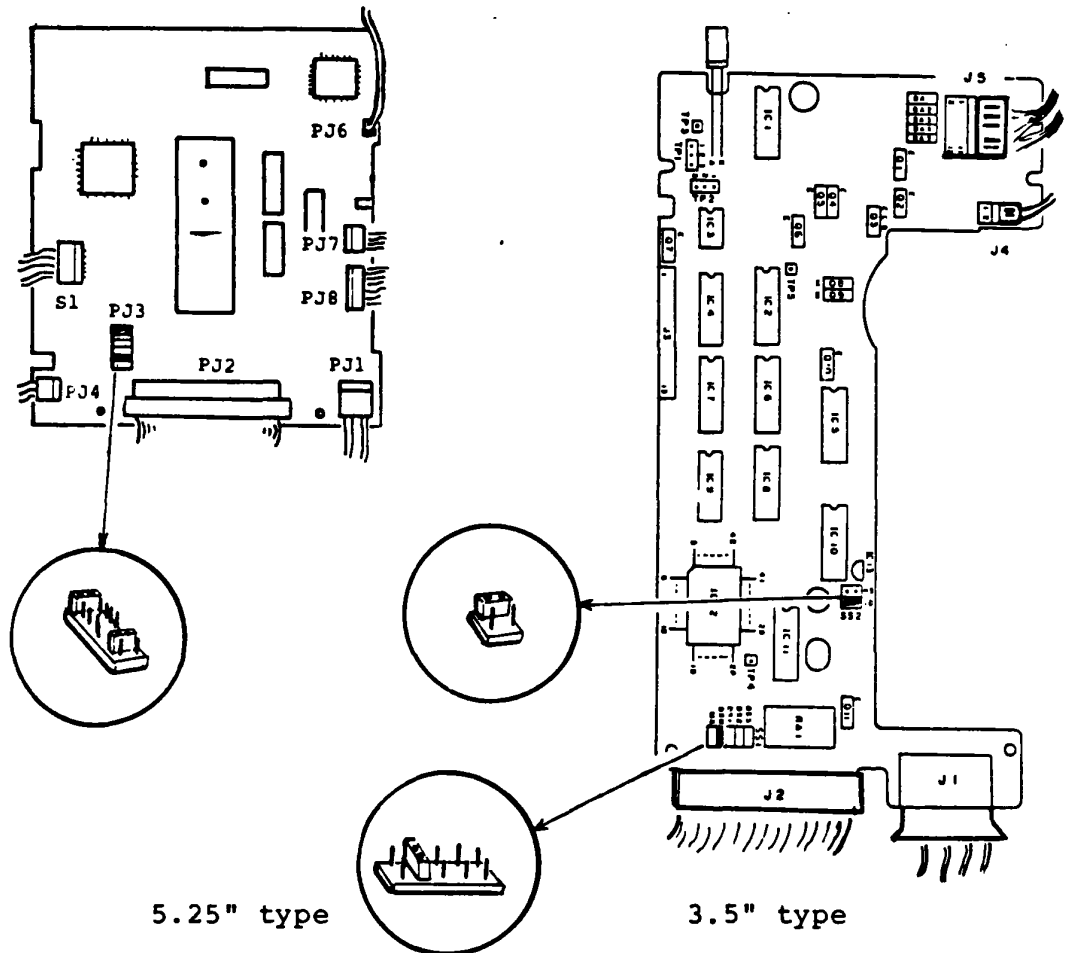
If output voltage of AC adaptor is out of tolerance:
 ==> Change the AC adaptor.

If both output voltages of the battery & the AC adaptor are in the tolerance:
 ==> Change the FDD PCB.

Ext. FDD-5

Connector & jumper strap check

1. Check all connectors of the suspected FDD assembly whether they are connected properly and securely.
2. Check the jumper strap settings on the FDD assembly PCB.



Are the connectors and jumper straps set properly?

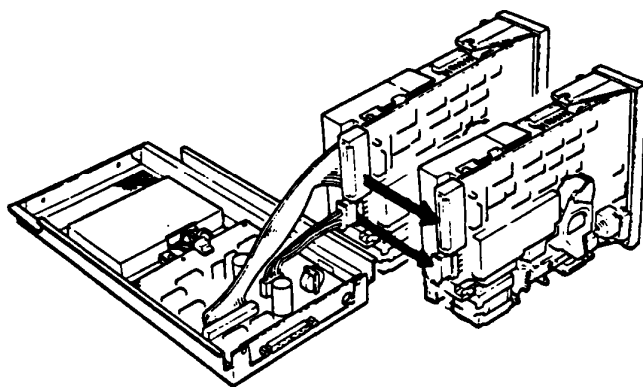
Yes: Go to **Ext. FDD-6**.

No: Set the connector or the jumper strap properly then repeat to run FDD test program to verify.
If it leads you here again, go to **Ext. FDD-6**.

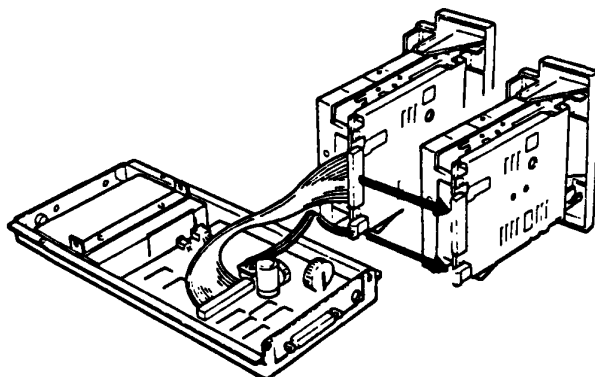
Ext. FDD-6

FDD change

1. Turn off the power switches of the Ext. FDD & the T1100 System Unit.
2. Change the FDD assembly with a good one for checking.
3. Run FDD test program for the Ext. FDD.
If an error occurs again, the FDD PCB (FFD5C1 for 5.25" type, FFD3C1 for 3.5" type) or Ext. FDD cable are suspected.



5.25" type



3.5" type

Does any error occurs?

Yes: Go to **Ext. FDD-7.**

No: The FDD assembly is faulty.
Change the FDD assembly with spair one.

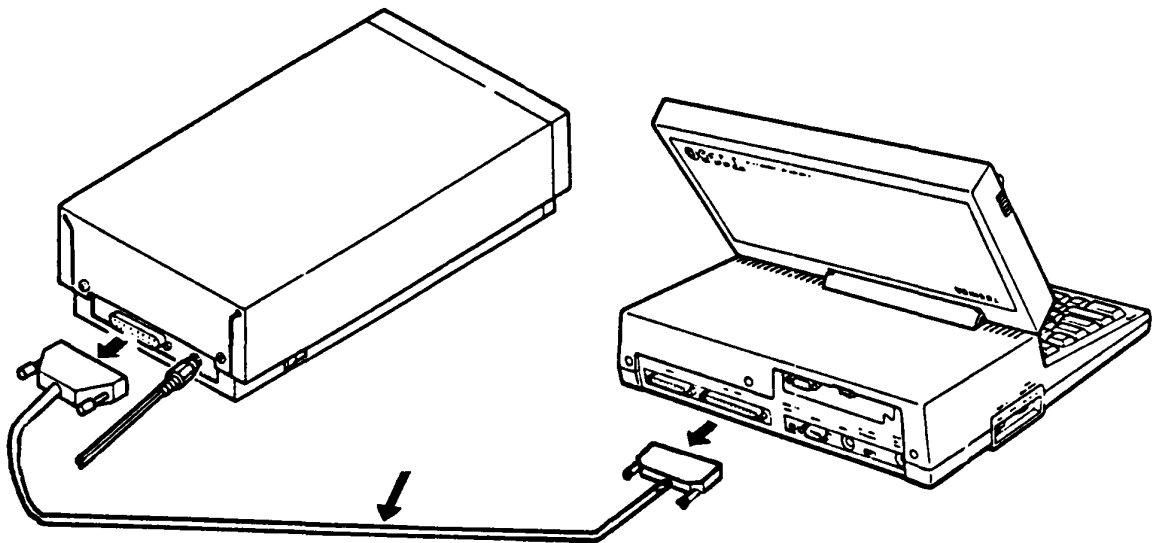
Ext. FDD-7

FDD cable change

The FDD PCB and EXT. FDD cable are still suspected. In this entry, you will isolate the faulty component from them.

1. Turn off the power switches of the Ext. FDD & the T1100 System Unit.
2. Change the Ext. FDD cable with good one for checking.
3. Turn on the power switches of the Ext. FDD and the T1100 System Unit then run the FDD test program for Ext. FDD.

External FDD Unit
(5.25" type/3.5" type)



Does any error occurs?

Yes: Go to **Ext. FDD-8**.

No: The Ext. FDD cable is faulty.
Change the Ext. FDD cable with spair one.

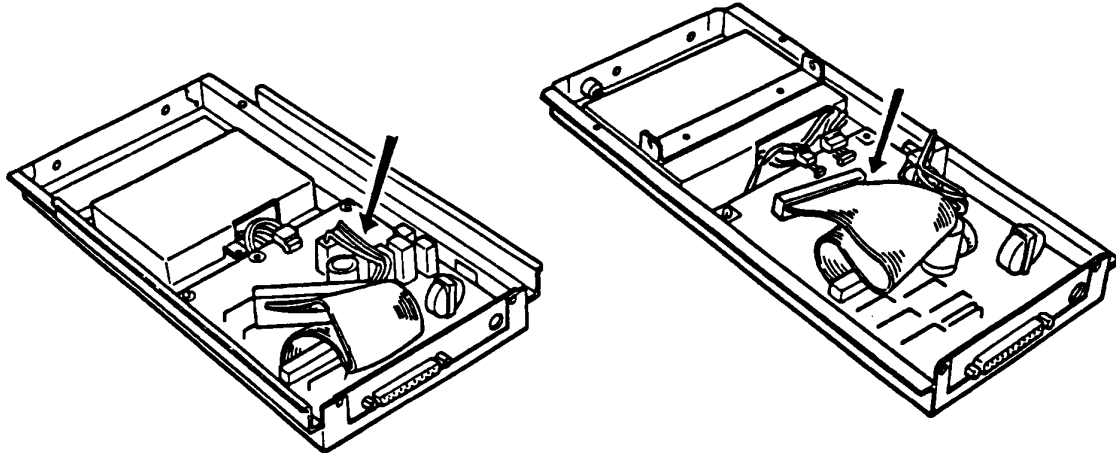
Ext. FDD-8

FDD PCB change

The FDD PCB is suspected.

Change the FDD PCB (FFD5C1 for 5.25" type, FFD3C1 for 3.5" type) referring to PART 3: REPLACEMENT/ADJUSTMENT.

1. Turn off the power switches of the Ext. FDD and the T1100 System Unit.
2. Replace the Ext. FDD PCB then run FDD test program for the Ext. FDD.



5.25" type

3.5" type

Does any error occurs?

Yes: Ext. FDD UNIT is good.

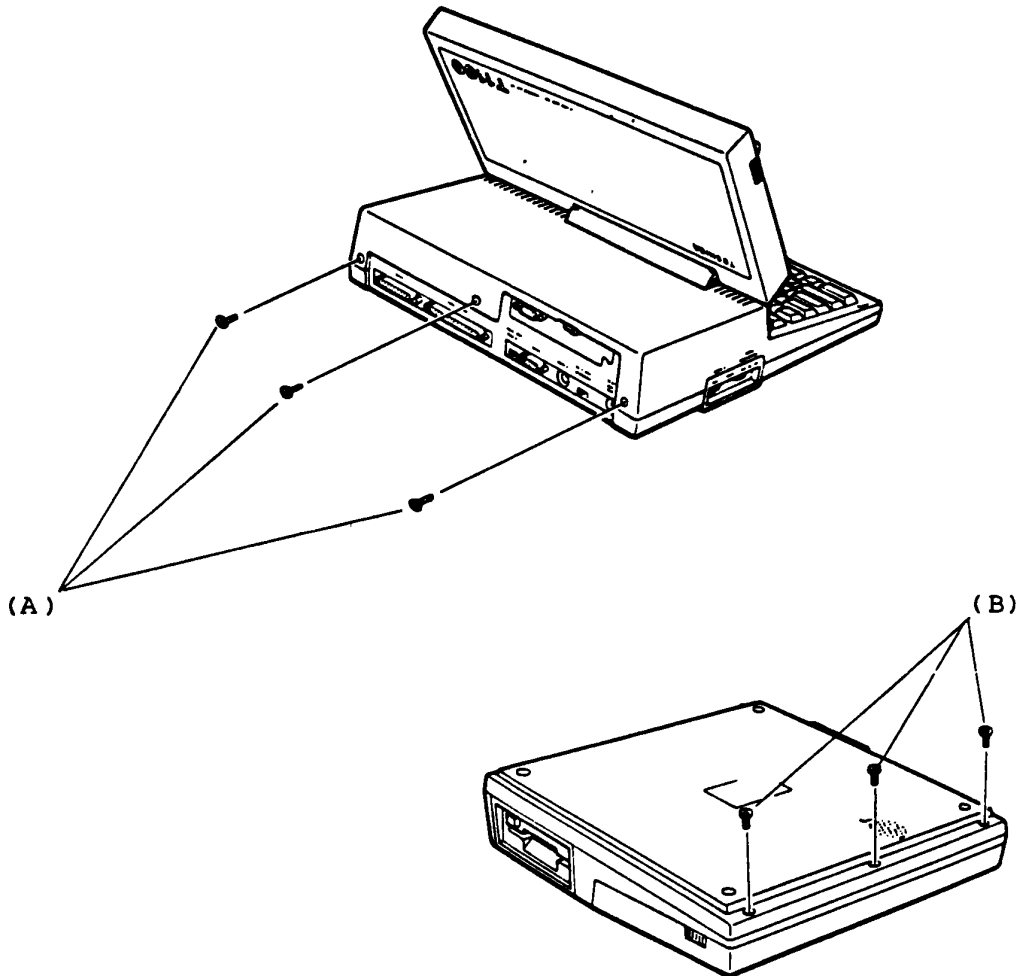
The System board of the T1100 System Unit is suspected.
Go to the TIP of **System PCB**.

No: The FDD PCB of the Ext. FDD is faulty.
Change the FDD PCB.

3.1 UPPER COVER REMOVAL/REPLACEMENT

REMOVAL

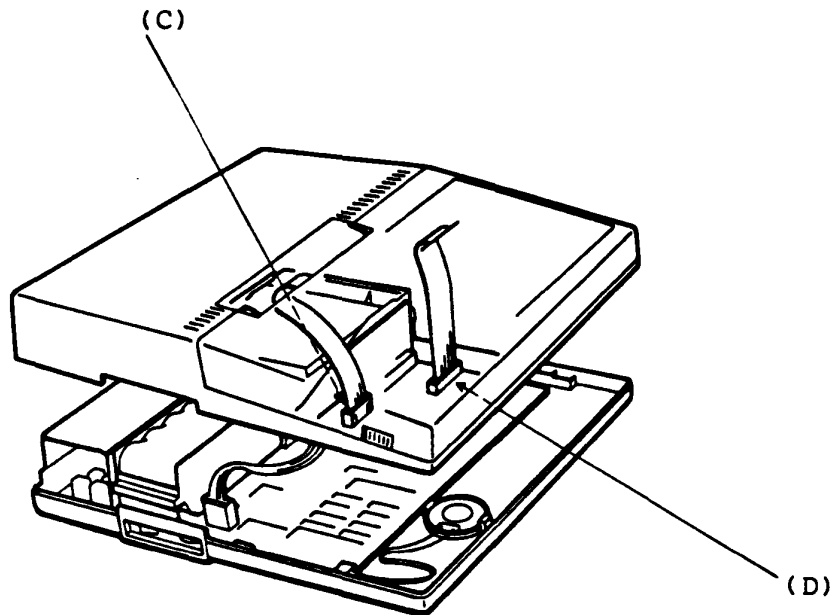
1. Turn off the Power switch of the System Unit then remove all connectors on the rear panel of the T1100 System Unit.
2. Remove three mounting screws (A) on the rear panel of the T1100 System Unit.
3. Turn the T1100 System Unit upside down then remove three mounting screws (B) on the Lower Cover.



Continues to next page

3.1 UPPER COVER REMOVAL/REPLACEMENT (continued)

4. Turn the T1100 System Unit to normal position then lift up the Upper Cover for 2 inches by holding the both sides of the Upper Cover.
 - * The LCD cable and the keyboard cable are still connected to the System PCB.
5. Unplug the LCD connector (C) and keyboard connector (D) to separate the upper cover from the lower cover. The upper part and lower part of the T1100 System Unit have been separated.



REPLACEMENT

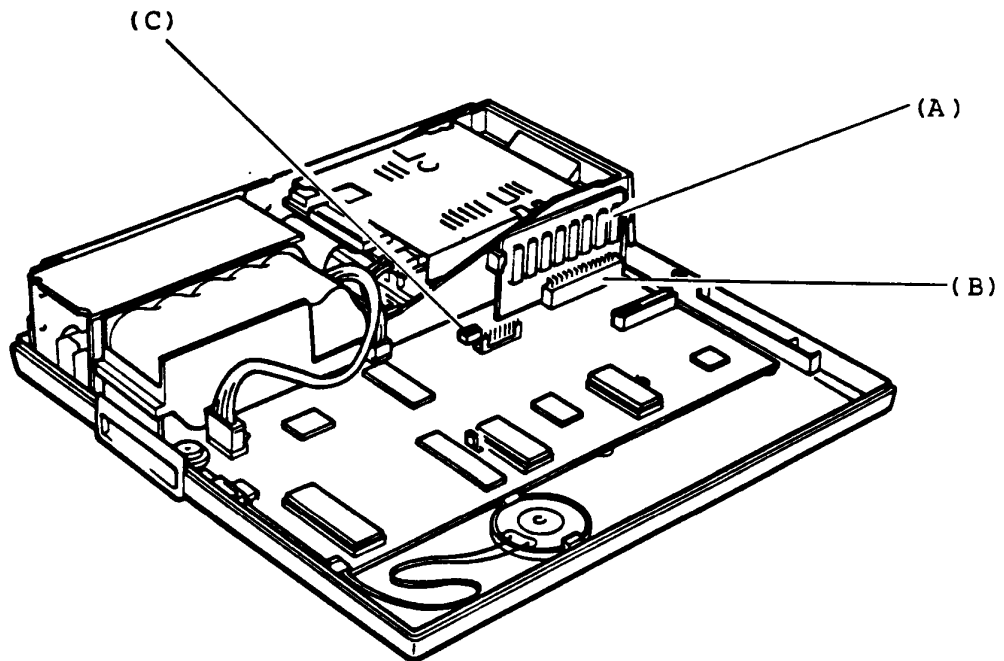
Have a reverse procedure.

The keyboard cable (flat cable) is fixed to the key board connector with pressure plate. For the connection of the keyboard connector, depress the pressure plate securely.

3.2 EXPANSION MEMORY UNIT REMOVAL/REPLACEMENT (Option)

REMOVAL

1. Open the Upper Cover of the T1100 System Unit according to the procedure of **UPPER COVER REMOVAL/REPLACEMENT**. (refer to **page 3-2**)
2. Unplug the Expansion Memory Unit (A) from the connector (B) on the System PCB.
3. If the memory size of the T1100 system is changed, you must change the setting of configuration DIP switch (C).



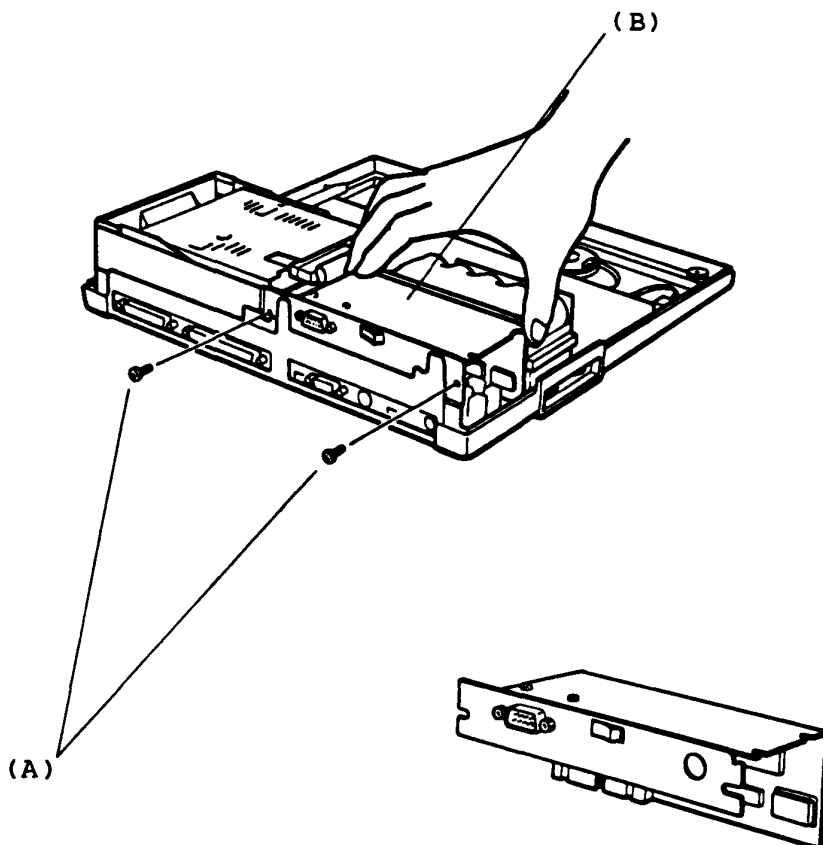
REPLACEMENT

Have a reverse procedure.

3.3 RS-232C COMMUNICATION UNIT REMOVAL/REPLACEMENT (Option)

REMOVAL

1. Open the Upper Cover of the T1100 System Unit according to the procedure of **UPPER COVER REMOVAL/REPLACEMENT**. (refer to page 3-2)
2. Remove two mounting screws (A) of the RS-232C Communication Unit (B) from the rear panel of the T1100 System Unit.
3. Unplug the RS-232C Communication Unit from the System PCB.



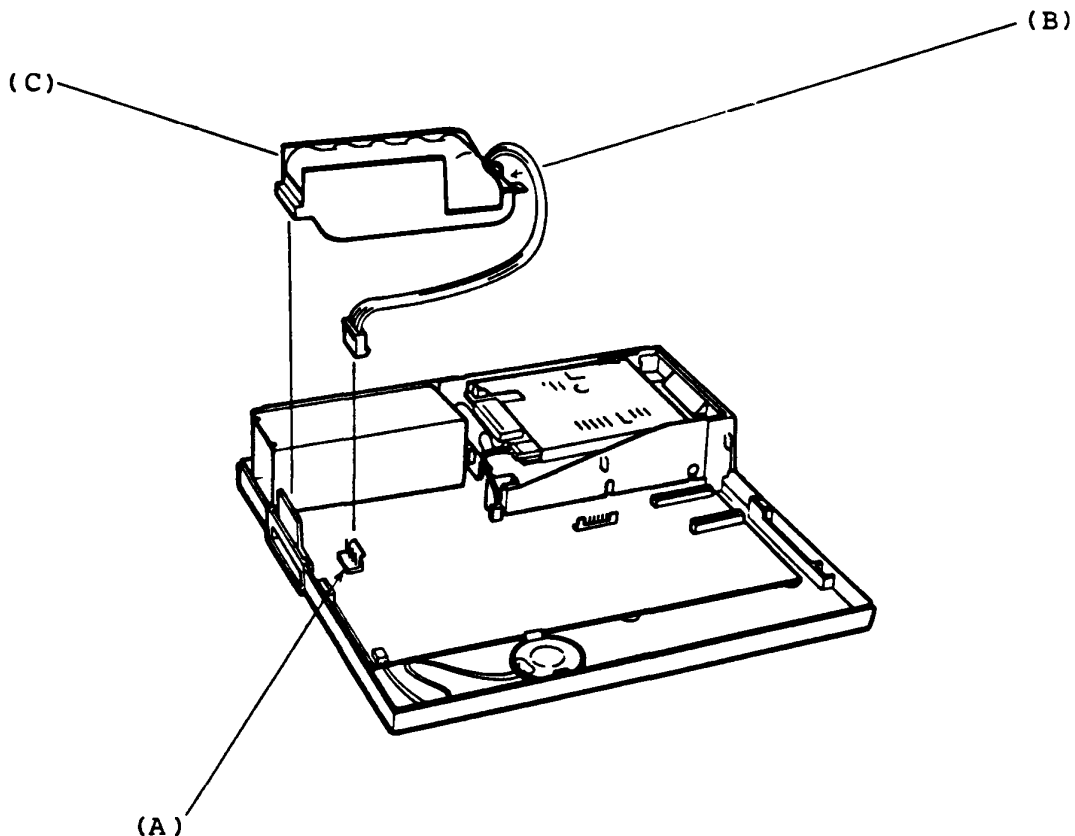
REPLACEMENT

Have a reverse procedure.

3.4 BATTERY UNIT REMOVAL/REPLACEMENT

REMOVAL

1. Open the Upper Cover of the T1100 System Unit according to the procedure of **UPPER COVER REMOVAL/REPLACEMENT**. (refer to **page 3-2**)
2. Unplug the battery connector (A) from the System PCB.
3. Pushing the battery locking lever (B) to battery side, lift up the battery unit (C) to remove.



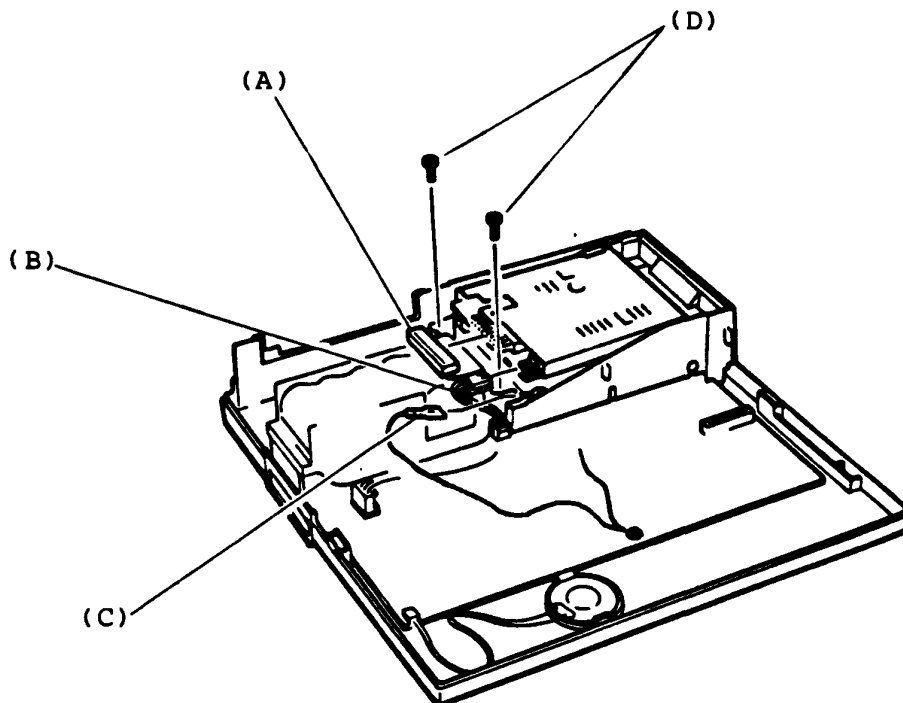
REPLACEMENT

Have a reverse procedure.

3.5 3.5" INTERNAL FDD REMOVAL/REPLACEMENT

REMOVAL

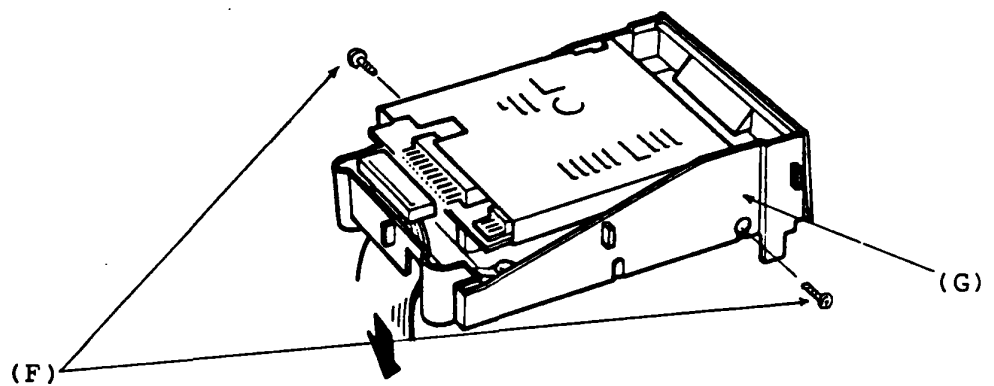
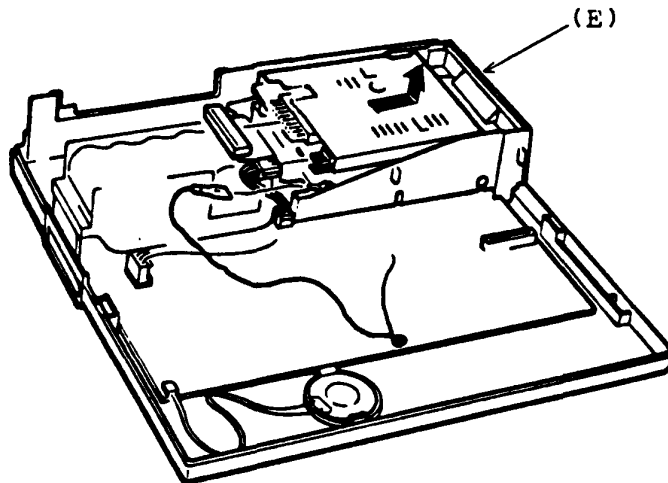
1. Open the Upper Cover of the T1100 System Unit according to the procedure of **UPPER COVER REMOVAL/REPLACEMENT**. (refer to page 3-2)
2. Remove the Expansion Memory Unit according to the procedure of **EXPANSION MEMORY UNIT REMOVAL/REPLACEMENT**. (refer to page 3-4)
3. Remove the Battery Unit according to the procedure of **BATTERY UNIT REMOVAL/REPLACEMENT**. (refer to page 3-6)
4. Remove all connectors from the FDD Unit: signal cable connector (A), power connector (B) and ground line connector (C).
5. Remove two FDD mounting screws (D).



Continues to next page

3.5 3.5" INTERNAL FDD REMOVAL/REPLACEMENT (continued)

6. Slide the FDD Unit (E) to the right side a little then lift up the FDD Unit to remove.
7. Remove two mounting screws (F) on the both sides of the FDD case (G) to remove the FDD Assembly from the case.



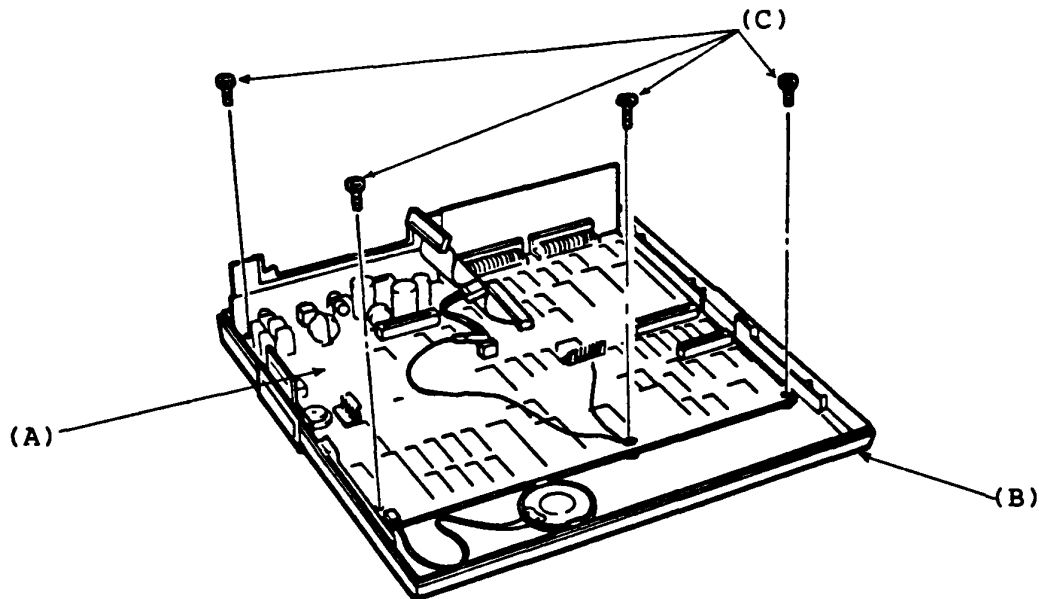
REPLACEMENT

Have a reverse procedure.

3.6 SYSTEM PCB REMOVAL/REPLACEMENT

REMOVAL

1. Open the Upper Cover of the T1100 System Unit according to the procedure of **UPPER COVER REMOVAL/REPLACEMENT**. (refer to page 3-2)
2. Remove the Expansion Memory Unit according to the procedure of **EXPANSION MEMORY UNIT REMOVAL/REPLACEMENT**. (refer to page 3-4)
3. Remove the Battery Unit according to the procedure of **BATTERY UNIT REMOVAL/REPLACEMENT**. (refer to page 3-6)
4. Remove the RS-232C Communication Unit according to the procedure of **RS-232C COMMUNICATION UNIT REMOVAL/REPLACEMENT**. (refer to page 3-5)
5. The System PCB (A) is mounted to the Lower Cover (B) of the T1100 System Unit with four mounting screws (C).
6. Lift up the System PCB to remove.



REPLACEMENT

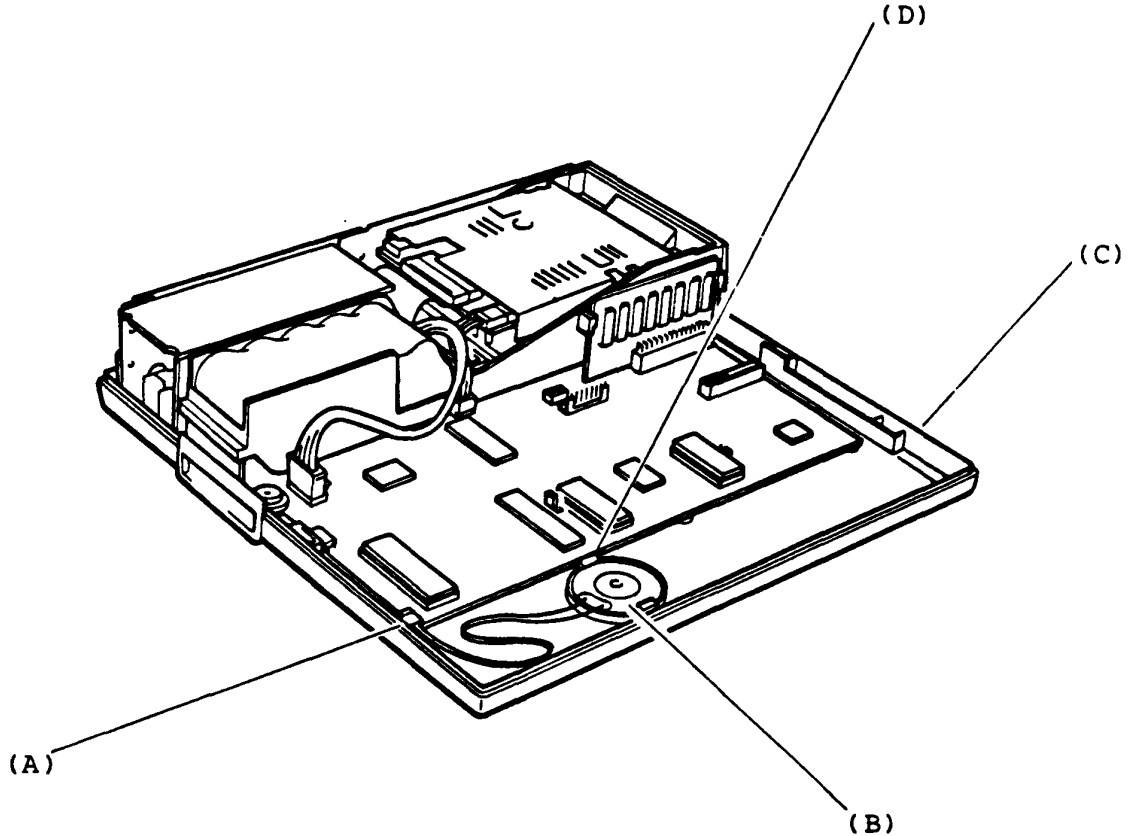
Have a reverse procedure.

You need to set the DIP switch of new System PCB properly after replacement. (Refer to page 1-9 "Configuration DIP Switch")

3.7 SPEAKER REMOVAL/REPLACEMENT

REMOVAL

1. Open the Upper Cover of the T1100 System Unit according to the procedure of **UPPER COVER REMOVAL/REPLACEMENT**. (refer to page 3-2)
2. Unplug the speaker connector (A) from the System PCB.
3. The speaker (B) is mounted to the lower cover (C) with a locking lever (D). Push the locking lever so that the speaker is free to move then pull out the speaker from the lower cover.



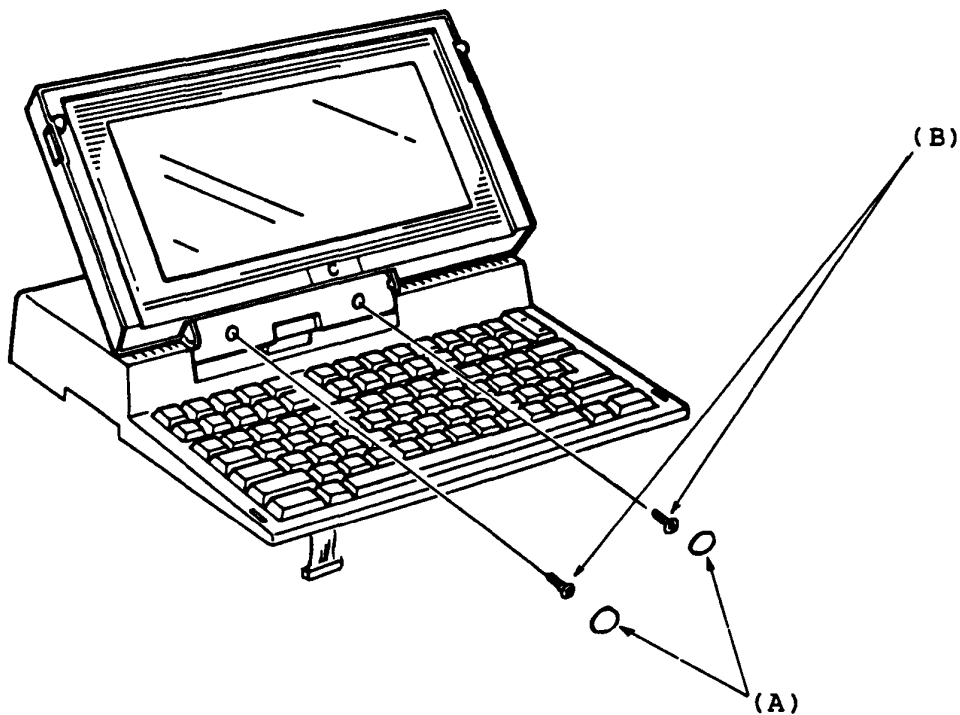
REPLACEMENT

Have a reverse procedure.

3.8 LCD UNIT REMOVAL/REPLACEMENT

REMOVAL

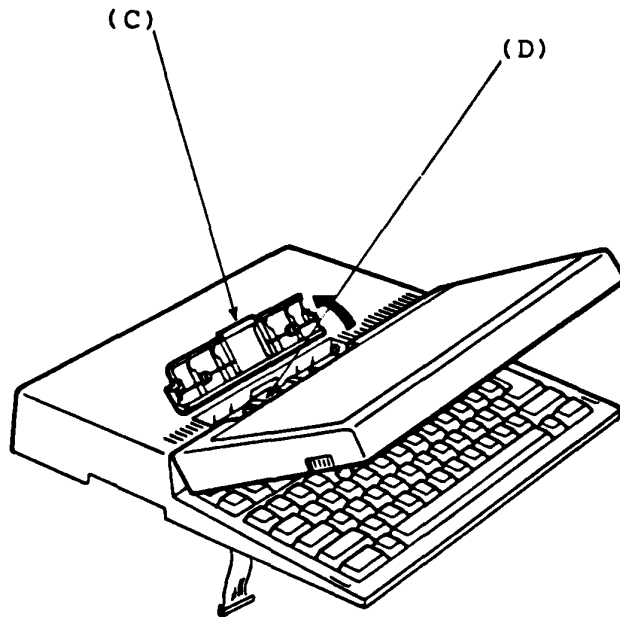
1. Open the Upper Cover of the T1100 System Unit according to the procedure of **UPPER COVER REMOVAL/REPLACEMENT**. (refer to page 3-2)
2. Open the LCD Unit by sliding the LCD Lock TAB's to the front side.
3. Peel the two seals (A) on the LCD hinge then remove two mounting screws (B).



Continues to next page.

3.8 LCD UNIT REMOVAL/REPLACEMENT (continued)

4. Lower the LCD Unit to access the back side of the LCD hinge, and open the hinge cover (C) then separate the LCD Unit from the Upper Cover of the T1100 System Unit.
5. Pull out the LCD cable (D) from the hole of the Upper Cover of the T1100 System Unit.



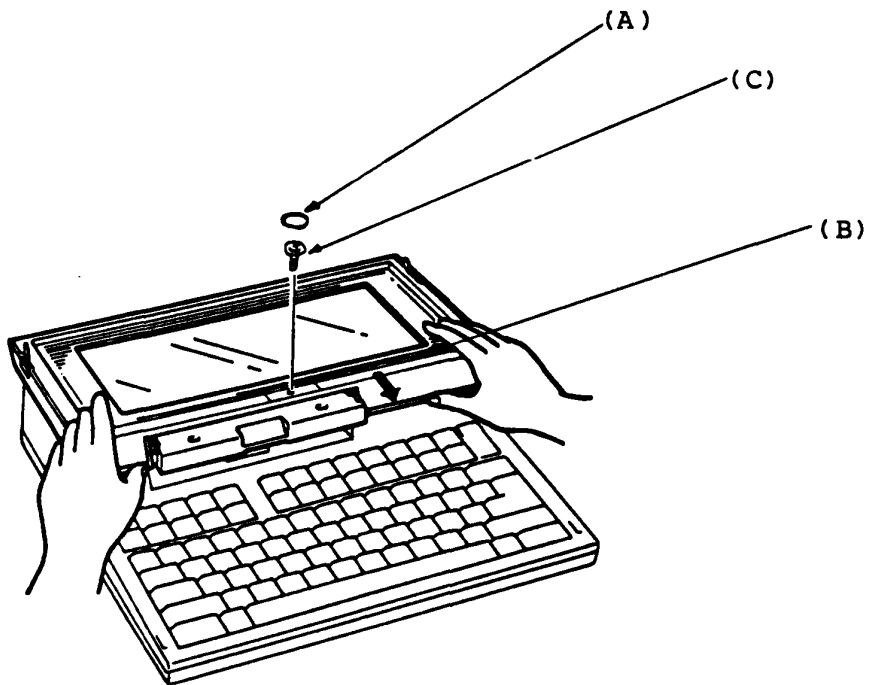
REPLACEMENT

Have a reverse procedure.

3.9 LCD BOARD REMOVAL/REPLACEMENT

REMOVAL

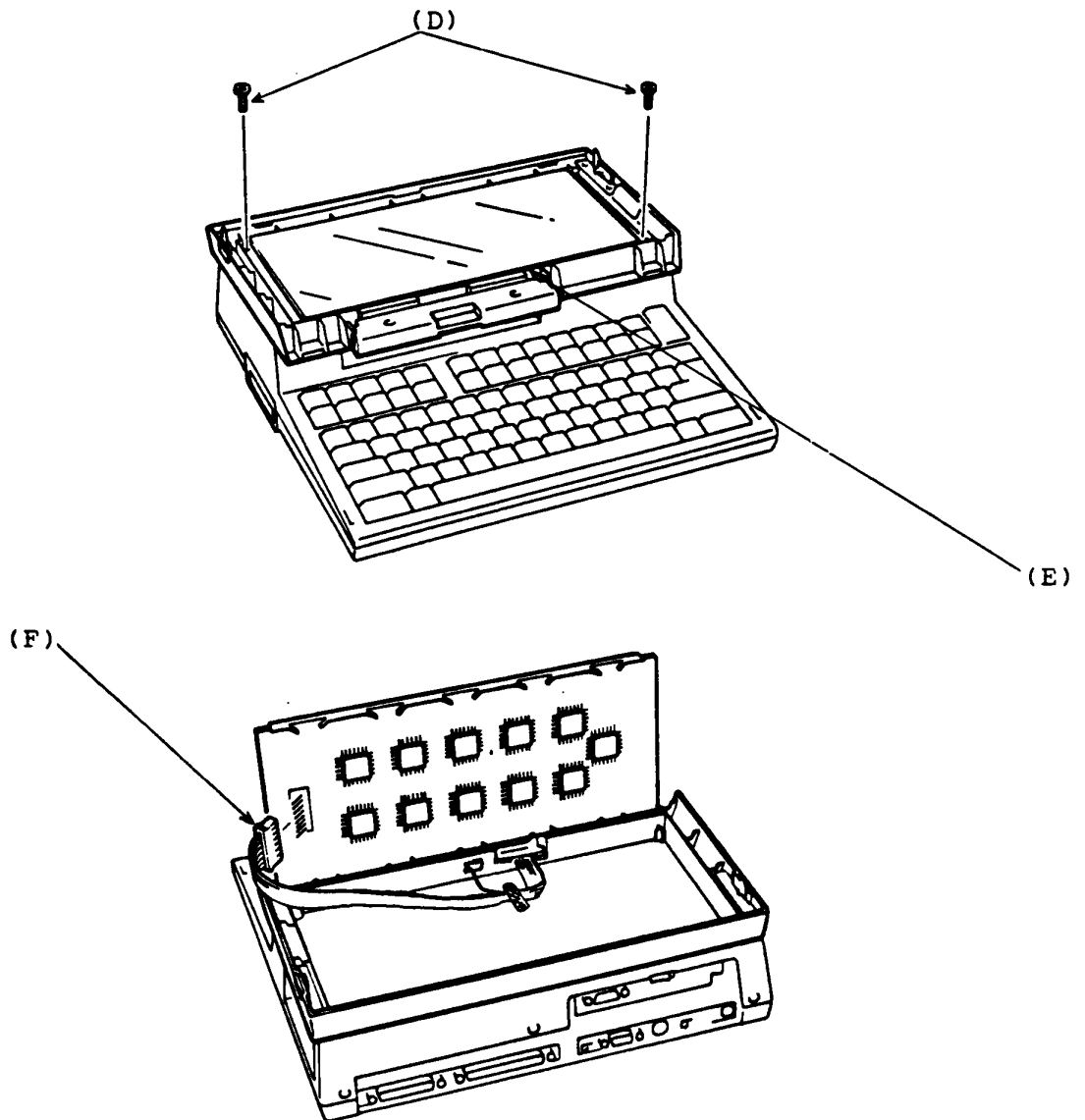
1. Turn off the Power Switch of the T1100 System Unit.
2. Open the LCD Unit by sliding the LCD Lock TAB's to the front side.
3. Peel the seal (A) on the LCD front panel (B) and remove the flat head screw (C).
4. Slide the LCD front panel to the front side until the click then lift up the LCD front panel to remove.



Continues to next page.

3.9 LCD BOARD REMOVAL/REPLACEMENT (continued)

5. Remove two mounting screws (D) on the LCD board (E) then lift up the LCD board to remove.
6. Unplug the LCD cable connector (F) from the back of the LCD board.



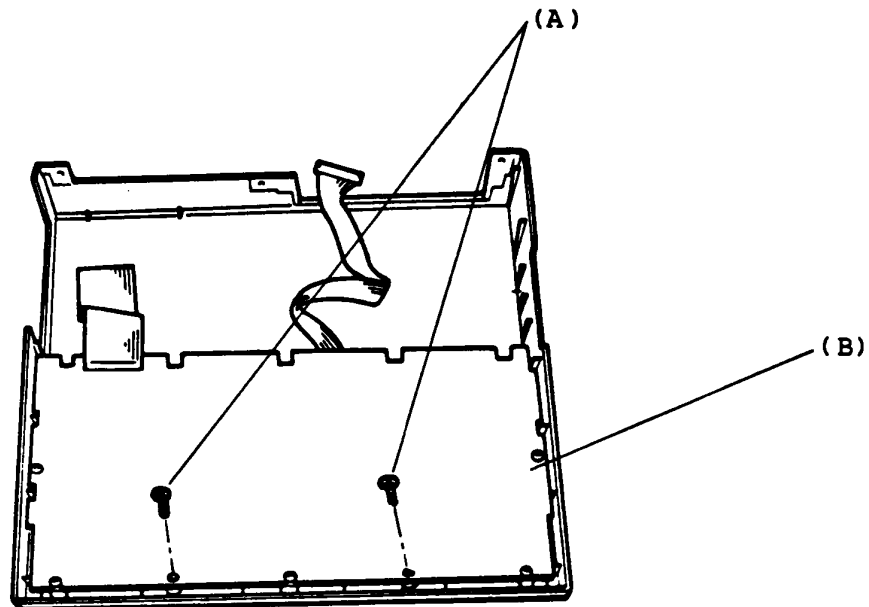
REPLACEMENT

Have a reverse procedure.

3.10 KEYBOARD REMOVAL/REPLACEMENT

REMOVAL

1. Open the Upper Cover of the T1100 System Unit according to the procedure of **UPPER COVER REMOVAL/REPLACEMENT**. (refer to **page 3-2**)
2. Turn the upper module of the T1100 system Unit upside down.
3. The Keyboard Unit is mounted on the Upper Cover with two mounting screws (A). Remove the two mounting screws then pull the Keyboard (B) to the front side to remove.



REPLACEMENT

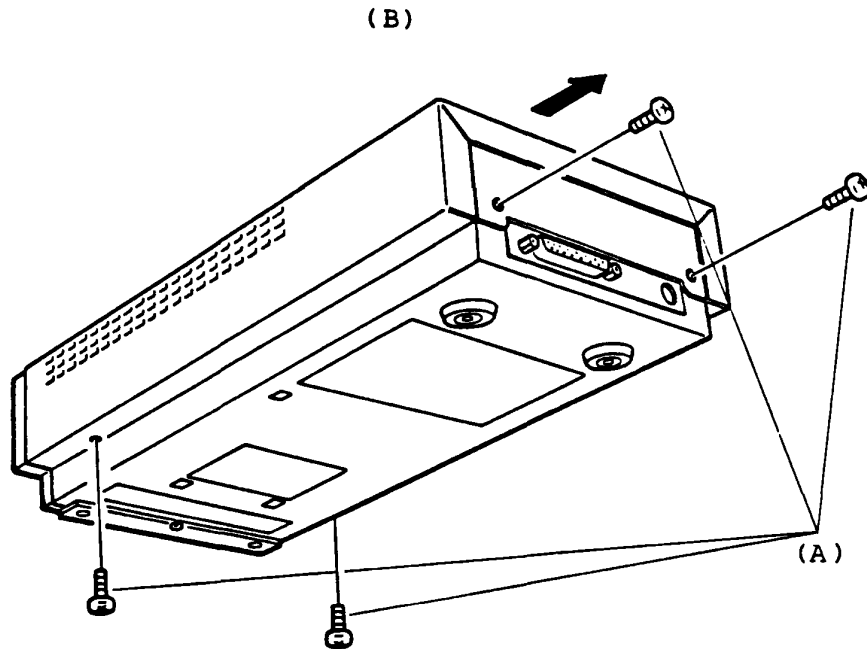
Have a reverse procedure.

3.11 5.25" EXTERNAL FDD DISASSEMBLE/ASSEMBLE

Upper Cover Removal/Replacement

REMOVAL

1. Turn off the Power switch of the Ext. FDD (External FDD) and the System Unit then remove the Ext. FDD cable from the rear of the Ext. FDD Unit.
2. Remove four mounting screws (A) from the Ext. FDD.
3. Slide the upper cover (B) backward to remove.



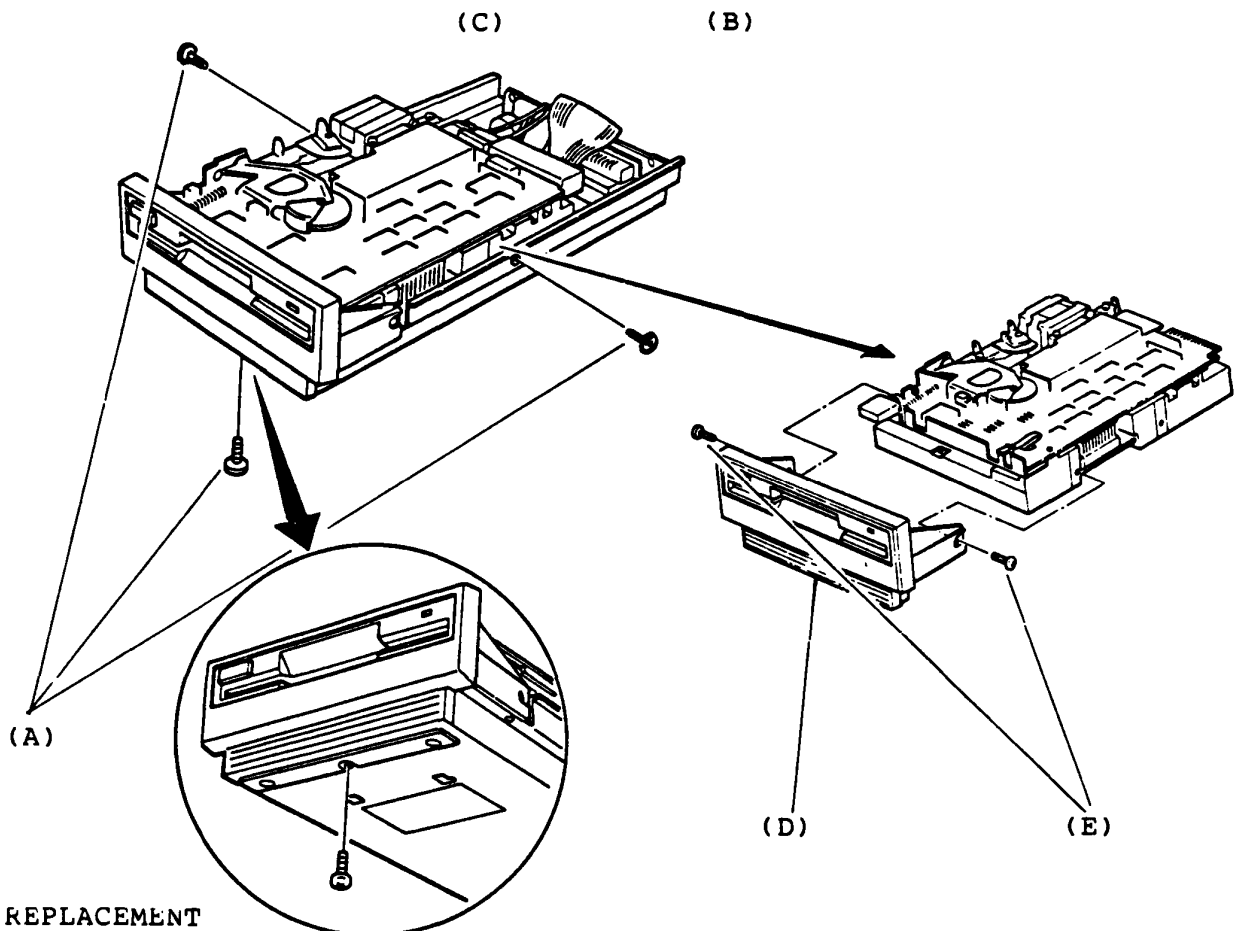
REPLACEMENT

Have a reverse procedure.

FDD Assembly (& Front Panel) Removal/Replacement

REMOVAL

1. Remove three mounting screws (A) of the FDD assembly.
2. Disconnect the signal cable connector J2 (B) and power cable connector J1 (C) on the FDD assembly.
3. Slide the FDD assembly forward to remove.
4. The FDD assembly has a front panel (D) which is mounted to the FDD assembly by two mounting screws (E). Remove the two mounting screws (E) to remove the front panel if need.



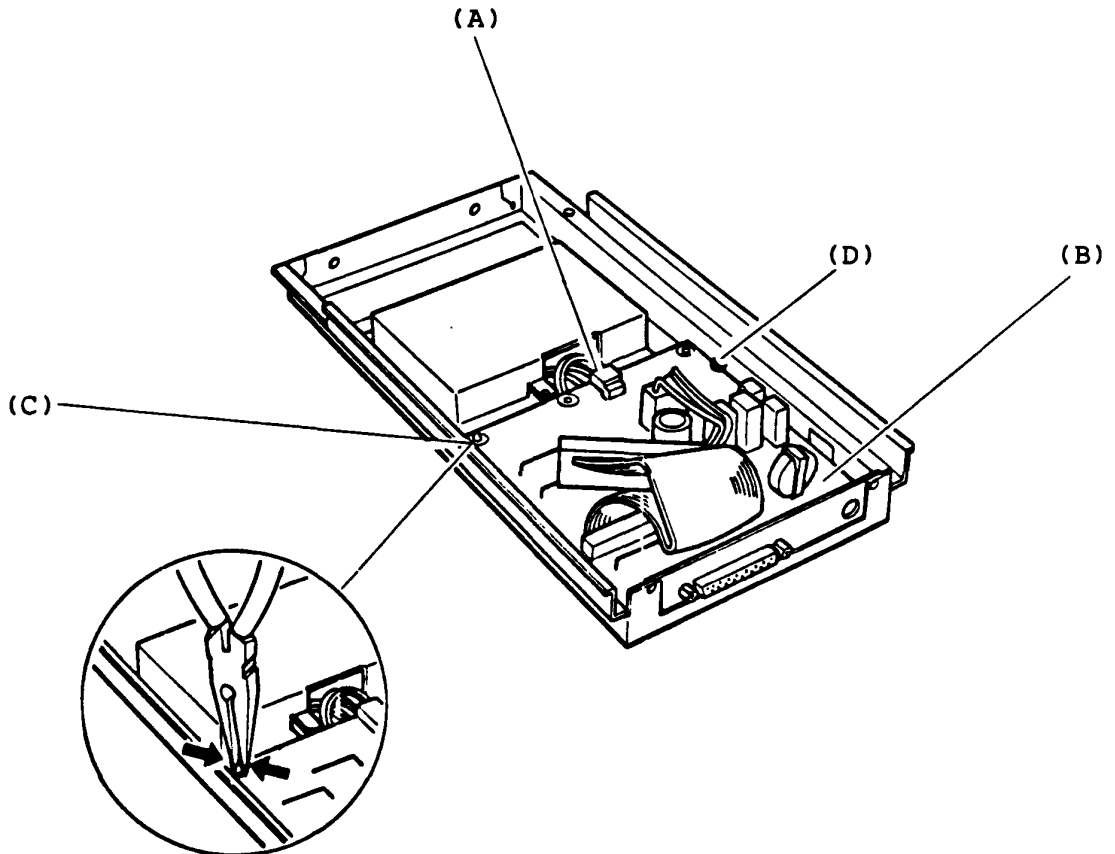
REPLACEMENT

Have a reverse procedure.

FDD PCB (FFD5C1) REMOVAL/REPLACEMENT

REMOVAL

1. Disconnect the battery connector PJ4 (A) on the FDD PCB.
2. The FDD PCB (B) is mounted on the lower cover with a nylon latch (C) and a slot (D).
Nip head of the nylon latch on the PCB by a longnose plier to be free then lift the PCB up by getting it out of the slit.



REPLACEMENT

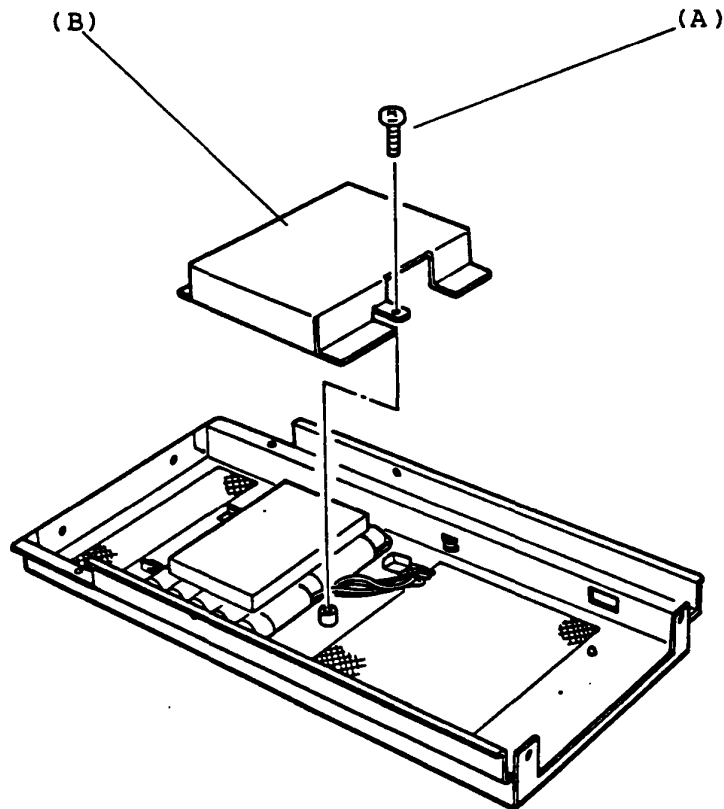
Have a reverse procedure.

Battery Removal/Replacement

REMOVAL

The battery stock room is there under the FDD assembly.. Before removing the battery, you have to remove the FDD assembly and disconnect the battery connector PJ4 on the FDD PCB.

1. Remove the battery cover mounting screw (A).
2. Slide the battery cover (B) backward one inch to unhook then lift up the battery cover. You can access the battery.



REPLACEMENT

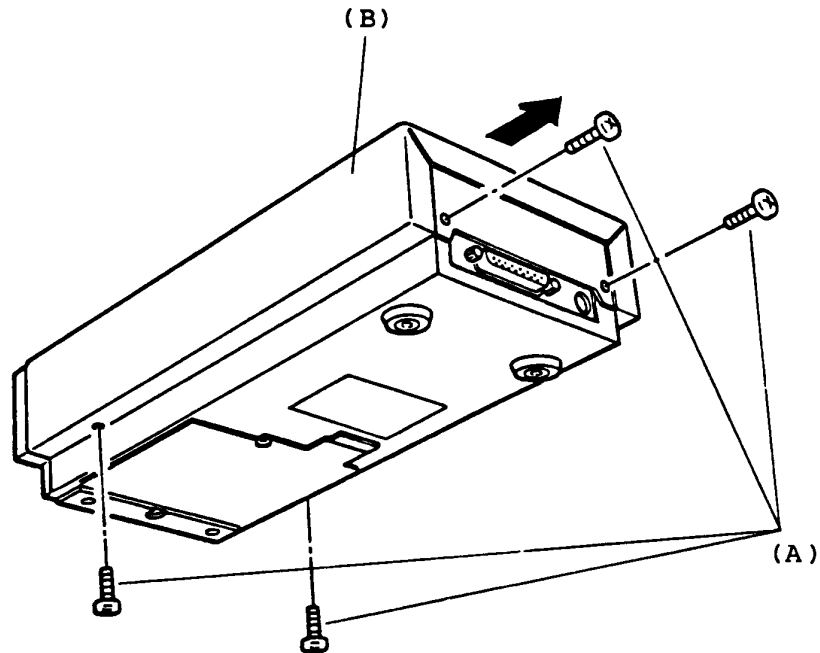
Have a reverse procedure.

3.12 3.5" EXTERNAL FDD DISASSEMBLE/ASSEMBLE

Upper Cover Removal/Replacement

REMOVAL

1. Turn off the Power switch of the EXT. FDD (External FDD) and the System Unit then remove Ext. FDD cable from the rear of the Ext. FDD Unit.
2. Remove four mounting screws (A) from the Ext. FDD.
3. Slide the upper cover (B) backward to remove.



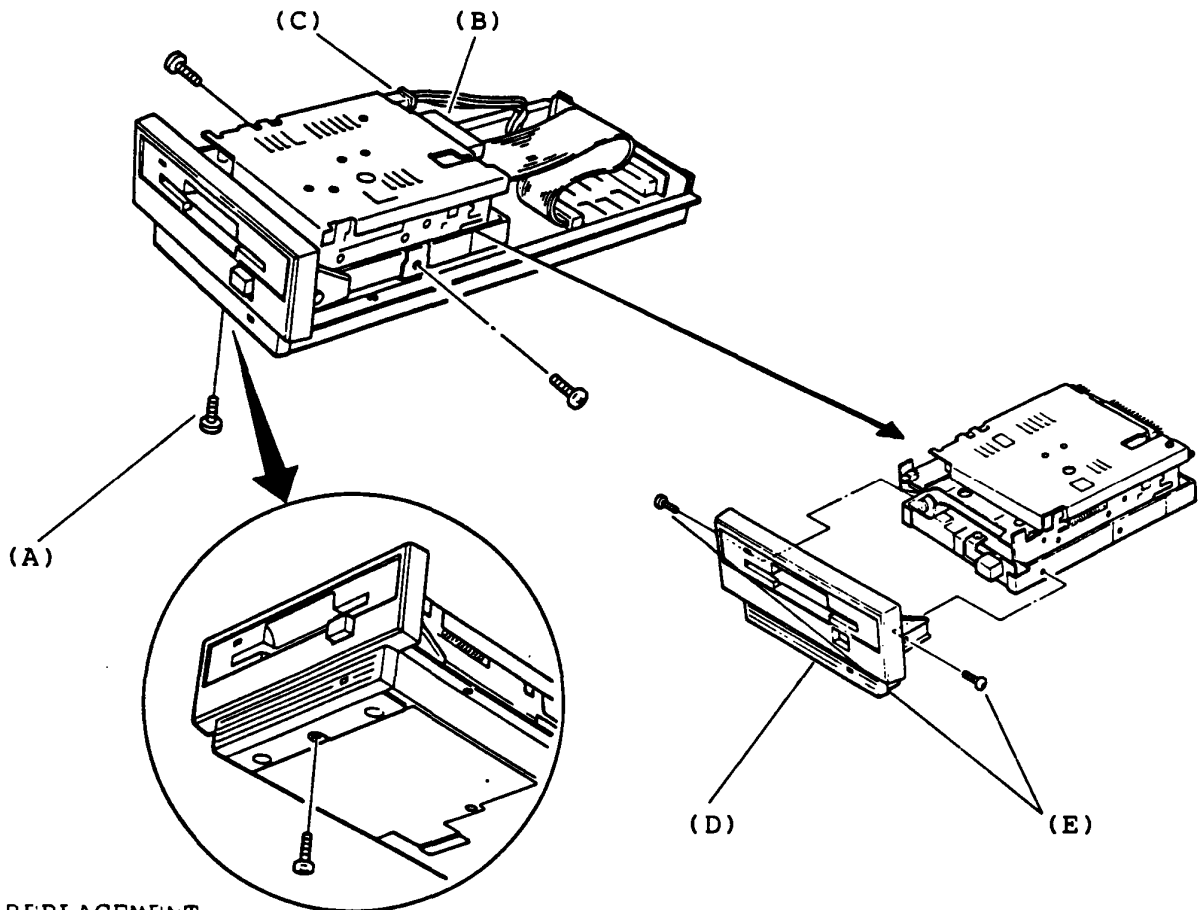
REPLACEMENT

Have a reverse procedure.

FDD Assembly (& Front Panel) Removal/Replacement

REMOVAL

1. Remove three mounting screws (A) of the FDD assembly.
2. Disconnect the signal cable connector PJ2 (B) and power cable connector PJ1 (C) on the FDD assembly.
3. Slide the FDD assembly forward to remove.
4. The FDD assembly has a front panel (D) which is mounted to the FDD assembly by two mounting screws (E). Remove the two mounting screws to remove the front panel if need.



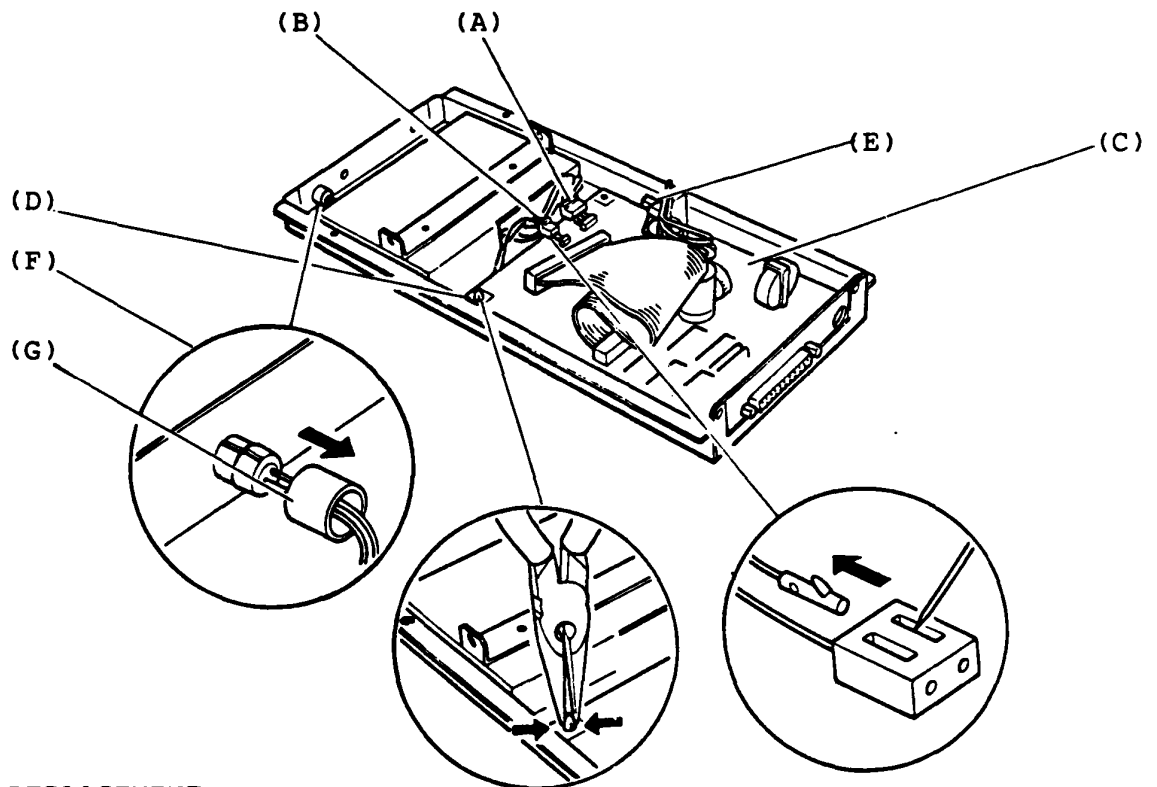
REPLACEMENT

Have a reverse procedure.

FDD PCB (FFD3C1) & LED assembly Removal/Replacement

REMOVAL

1. Disconnect the battery connector PJ5 (A) and Low Battery LED connector PJ4 (B) on the FDD PCB (C).
2. The FDD PCB is mounted on the lower cover with a nylon latch (D) and a slot (E).
Nip head of the nylon latch on the PCB by a longnose plier to be free then lift the PCB up by getting it out of the slit.
3. If you need to remove the Low Battery LED assembly (F), pull out the LED collar (G) to dismount the LED from the lower cover.
4. Pick at pins of Low Battery LED connector (PJ4) by a picker then remove the LED cables from the connector so that you can pass the LED cables through the lower cover hole..



REPLACEMENT

Have a reverse procedure.

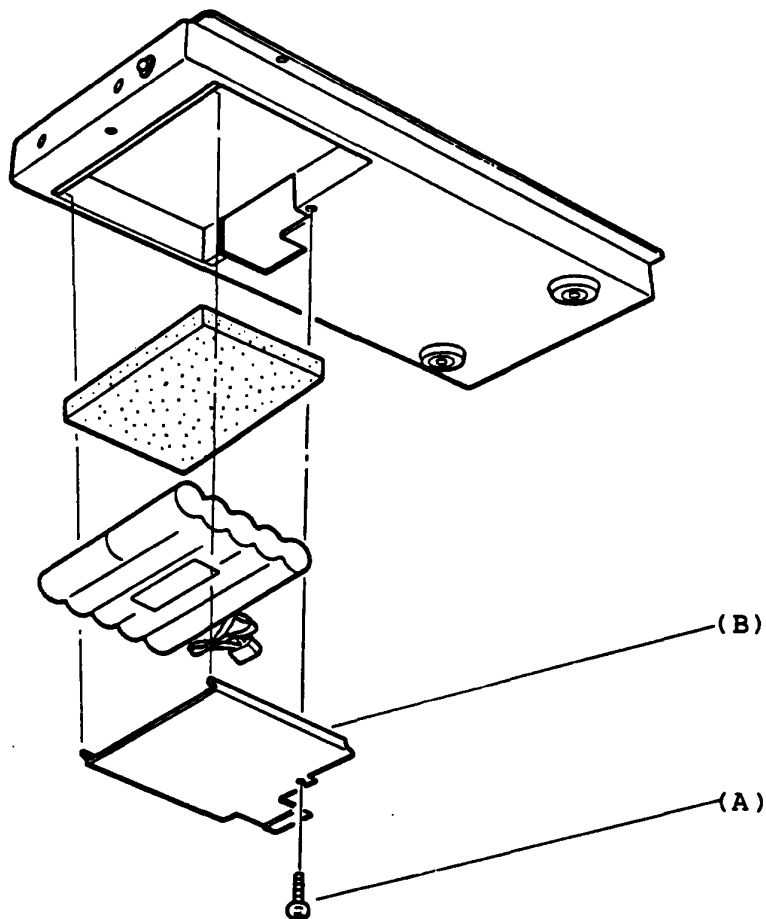
Battery Removal/Replacement

REMOVAL

The opening to the battery stock room is there outside of the lower cover.

Before removing the battery, you have to disconnect the battery connector PJ5 on the FDD PCB.

1. Remove the battery cover mounting screw (A).
2. Slide the battery cover (B) backward a little then pull down the battery cover. You can access the battery.

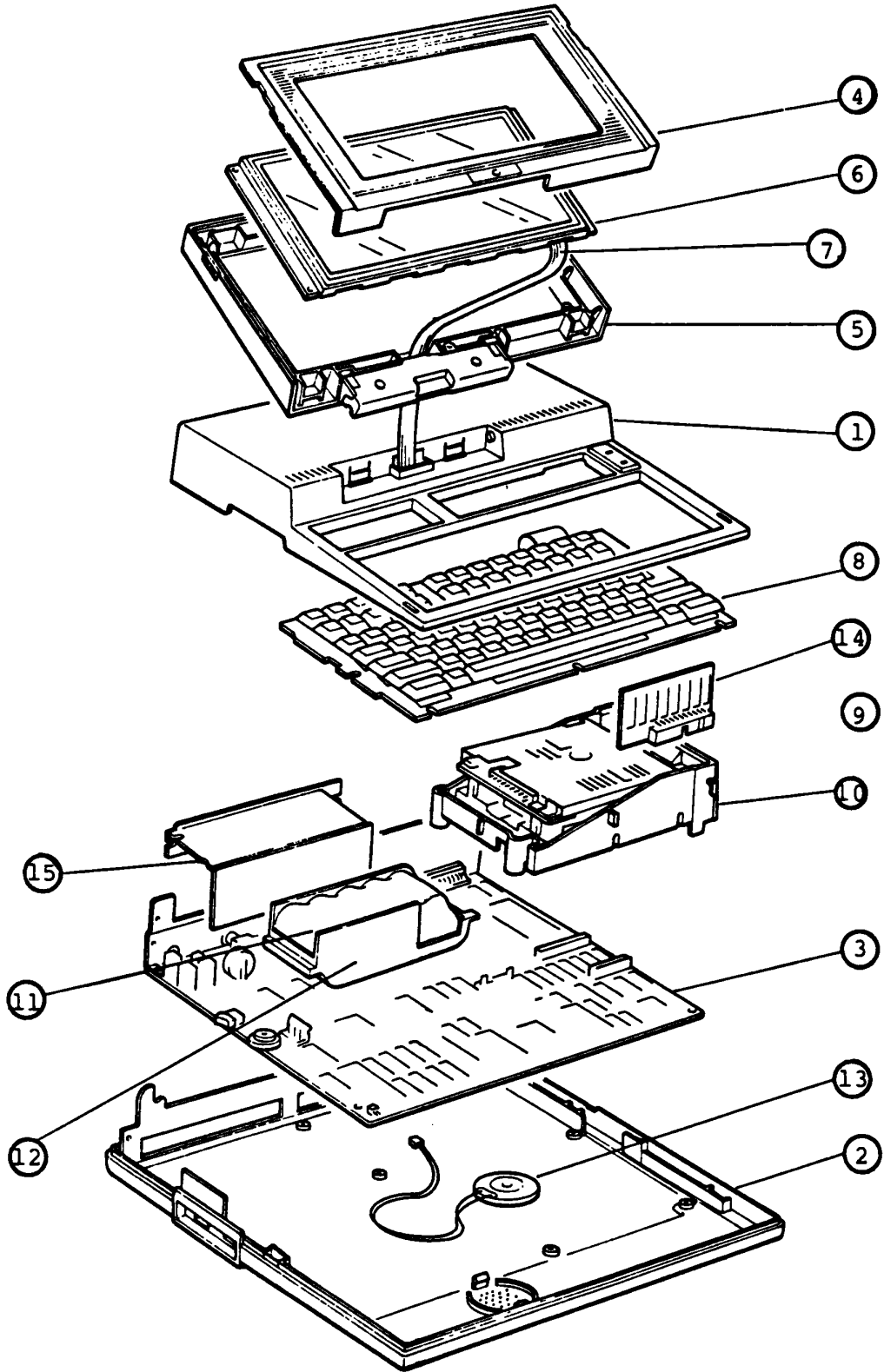


REPLACEMENT

Have a reverse procedure.

4.1 System Unit

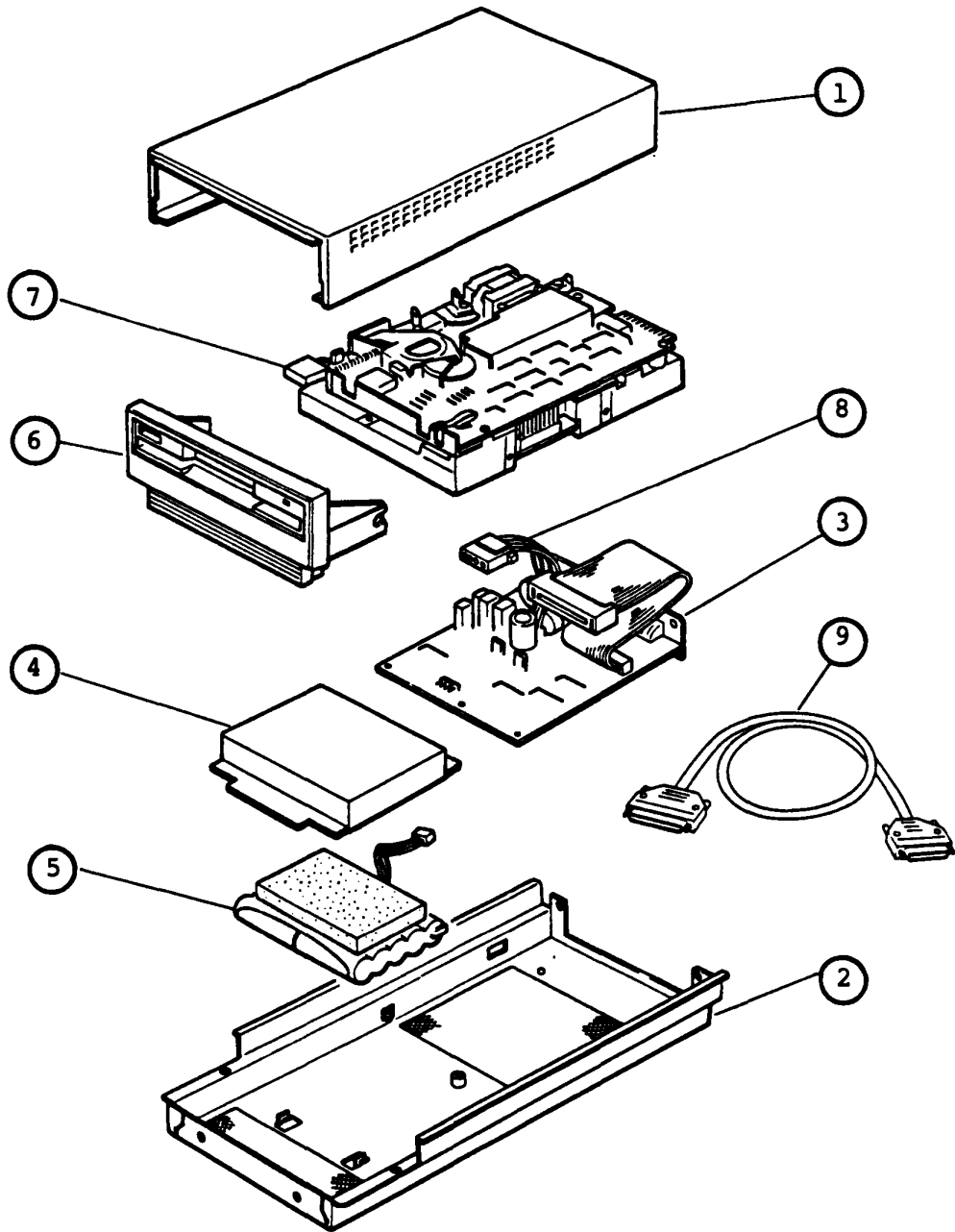
INDEX No.	PART NUMBER	DESCRIPTION	NOTE
1	47U100163P1	Upper Cover	
2	47U100164P1	Lower Cover	
3	34T778836G01	System PCB	
4	47T108086P1	LCD Front Cover	
5	47M137714G1	LCD Rear Cover	
6	VF0014P01	LCD	
7	VL0034P32	LCD Cable	
8	UE0165P01	Keyboard	
9	FDD4421A0J0	3.5" Internal FDD	
10	47T108085P1	FDD case	
11	XZ0064P01	Battery	
12	47P127002P1	Battery Case	
13	39K156042G1	Speaker	
14	34M741266G01	Expansion Memory (256KB)	Option
15	34M741256G01 34M741261G01	RS-232C Communication Unit	Option



T1100 System Unit

4.2 5.25" External FDD

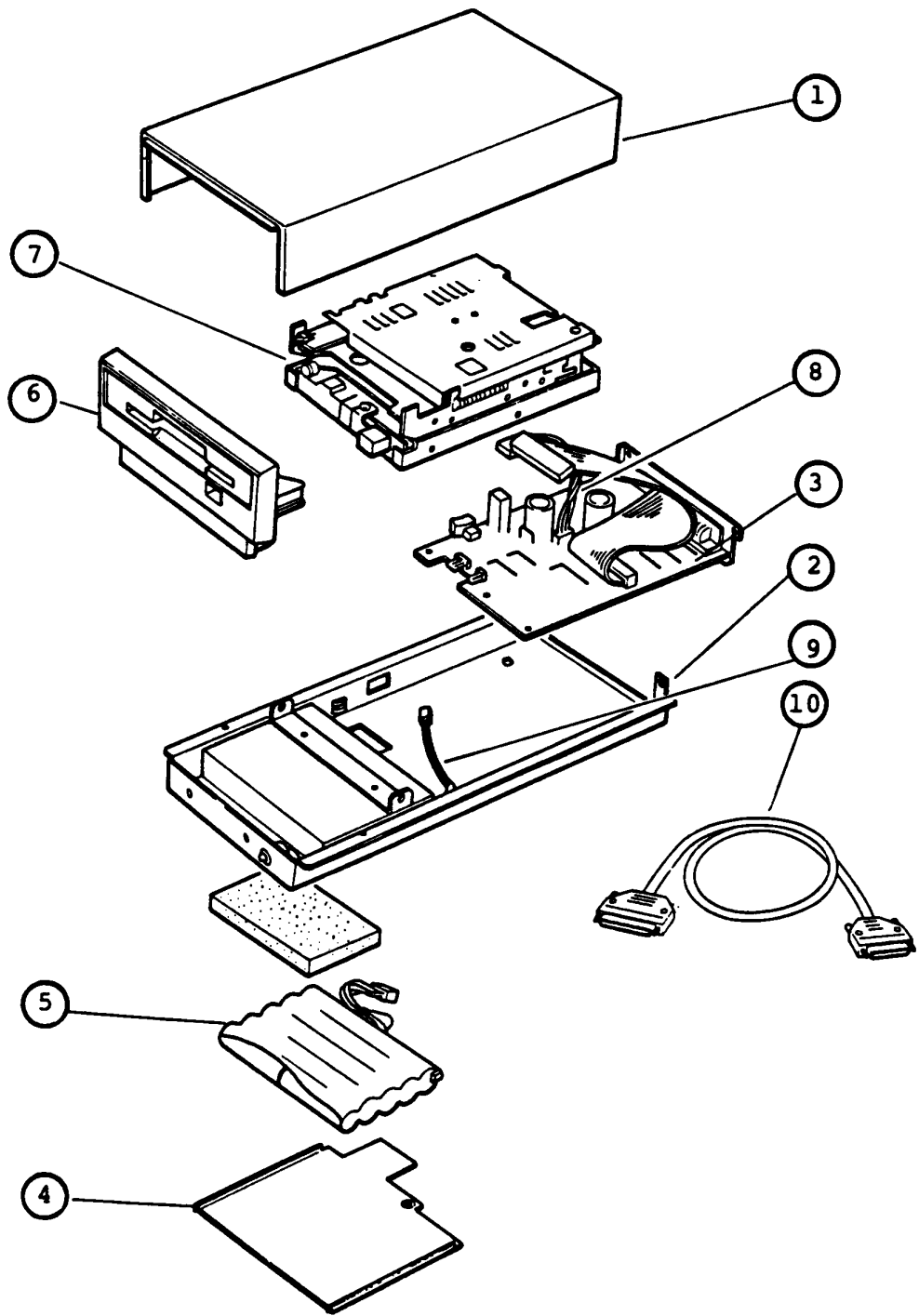
INDEX No.	PART NUMBER	DESCRIPTION	NOTE
1	47P127086P1	Upper Cover	
2	47P127085P1	Lower Cover	
3	34P710241G01	PCB	
4	47M137924P1	Battery Cover	
5	XZ0067P01	Battery	
6	47P127089P1	Front Panel	
7	ZA0162P01	5.25 inch FDD	
8	UL0034P23	FDD PS Cable	
9	UL0046P13DD004	Cable	



5.25" External FDD

4.3 3.5" External FDD

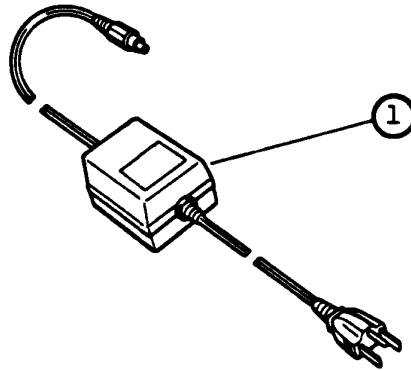
INDEX No.	PART NUMBER	DESCRIPTION	NOTE
1	47P127088P1	Upper Cover	
2	47P127087P1	Lower Cover	
3	34P710266G01	PCB	
4	47M137853P1	Battery Cover	
5	XZ0067P01	Battery	
6	47P127090P1	Front Panel	
7	FDD4421J0Z1	3.5 inch FDD	
8	UL0034P24	FDD PS Cable	
9	UL0034P22	LED Cable	
10	UL0046P13DD004	Cable	



3.5" External FDD

4.4 AC Adaptor

INDEX No.	PART NUMBER	DESCRIPTION	NOTE
1		AC Adaptor	



AC Adaptor

T1100 SPECIAL TOOL LIST

INDEX No.	PART NUMBER	DESCRIPTION	NOTE
1	39K154439G1	Printer Wraparound Conn.	
2		CCM Wraparound Conn.	
3	34M741071G01	Printer Port LED	FXBBMT
4	UE0047P603	Keytop Puller	
5	XG0025P03	Alignment Disk	
6	ATS0021A001	FDD Exerciser	220VAC
7	TSF456-2000	Silicon Oil	TOSHIBA SILICON CO.
8	XG0024P01	Cleaning Disk Kit	
9	49K153033P1	Cover Assy Positioning Pins	
10	49K153034P01	Opener Assy Positioning Pins	
11	49P126201G1	Steel Belt Strecher	

5.1 INTRODUCTION

5.1.1 General

The purpose of this T1100 test program system is to check the functions of the hardware of all modules supported in the T1100 system.

This T1100 test program system is structured under the MS-DOS, and consists of 11 programs covering all of the hardware modules supported in T1100 Personal Computer system as described in STRUCTURE section.

The **CE Diagnostic Test Program** is provided as a file in the MS-DOS System Disk. You have to run the MS-DOS before you load the Diagnostic Test.

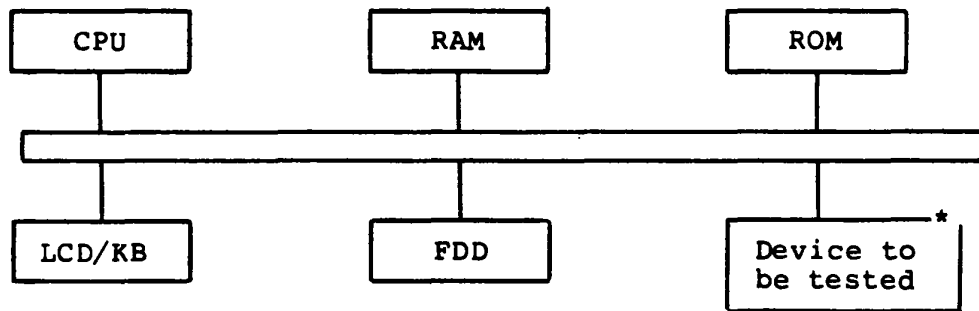
The service engineer utilize these programs to isolate the trouble selecting the appropriate program by the operation procedure described in OPERATION section.

In addition, the operation procedure of the **User Diagnostic Test Program** is also described in OPERATION section as a reference, because it is probable to deal with this diagnostic in your service activities.

This diagnostic is prepared to perform the quick function check in the field by the customer so that the procedure is rather simplified from the CE Diagnostic Disk.

5.1.2 Components Required

The following devices are required to execute the test program system.



Where:

CPU : Central Processer Unit
RAM : Random Access Memory ; 128KB
ROM : Read Only Memory; 8KB
LCD : Liquid Crystal Display
KB : Keyboard
FDD : Floppy Disk Device

*

Devices to be tested

RAM : Random Access Memory
ROM : Read Only Memory
KB : Keyboard
CRT : Display Device
LCD : Liquid Crystal Display
FDD : Floppy Disk Device

PRT : Printer or Printer Wraparound Connector(Part
No.39K154439G1)

RS232C : RS-232C Unit + CCM Wraparound
Connector(Part No.39K154406G1)

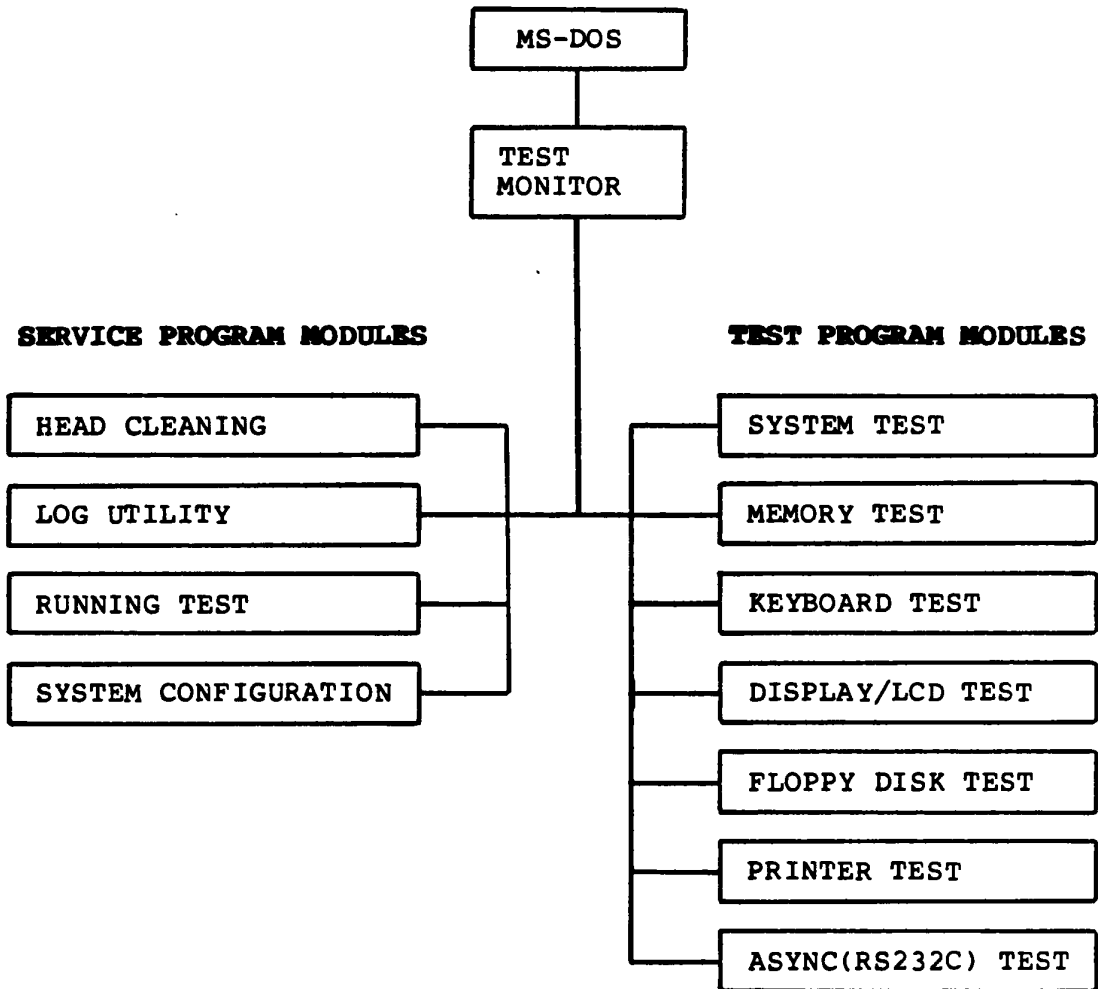
5.1.3 Structure

The T1100 test program system is composed of 11 program modules executed under the Test Monitor.

The 11 program modules can be divided to two groups, the Service Program modules (Head cleaning, Log utility, Running test, and System configuration) and the Test Program modules (all other modules). Those are shown in the figure on next page.

Each of the Test Program modules contains some number of subtest programs which are shown in the Appendix A: Test Program List.

TEST PROGRAM STRUCTURE



5.2 OPERATION

This section describes how to operate the T1100 test program system such as **CE DIAGNOSTIC** and **USER DIAGNOSTIC**. These Diagnostic Test Program systems are provided as files in the MS-DOS System Disk. You have to run the MS-DOS before you load the Diagnostic Test Program.

5.2.1 CE DIAGNOSTIC

(1) Test program loading

Insert the MS-DOS disk to the internal disk drive, then turn on the power of the T1100 system. The MS-DOS will be loaded after **Power On Diagnostic** execution. The execution time of Power On Diagnostic depends on the size of memory of T1100 system (about 15 seconds for 256KB). During the MS-DOS loading, following messages will appear on the screen.

```
Toshiba Personal Computer (R1150EN)
Copyright 1984,85 Toshiba Corporation
MS-DOS Ver 2.11
Copyright 1983,84 Microsoft Corp.
Command Ver 2.11
Current date is Tue 1-01-1980
Enter new date : 03-04-85
Current time is 0:00:27.02
Enter new time : 15:15

A><u>testce
```

Key-in current date and current time then file name of **CE Diagnostic** as **testce** to load the diagnostic program. The underlined portions on the above screen are for the input messages. After the above steps, the test program loading is complete.

(2)Task selection

The following screen (Diagnostic Menu) will be displayed after the test program loading.

The TOSHIBA personal computer DIAGNOSTICS
version 1.00 (c) copyright TOSHIBA Corp 1985

DIAGNOSTICS MENU :

- 1 - DIAGNOSTIC TEST
- 4 - HEAD CLEANING
- 5 - LOG UTILITIES
- 6 - RUNNING TEST
- 8 - SYSTEM CONFIGURATION
- 9 - EXIT TO MS-DOS

PRESS [1]-[9] KEY

Key-in the task number. (Input the task number, and then press the "ENTER" key without fail.)

- 1 : Go to step (4): Diagnostic Test Menu (includes pressing "ENTER" key only)
- 4 : Head cleaning of FDD
- 5 : Display of error logs
- 6 : Running test
- 8 : System configuration
- 9 : Returns to MS-DOS

(3) Display of system configuration

The following system configuration will be displayed on the CRT after pressing "8" and "ENTER" at task selection.

SYSTEM CONFIGURATION :

- * - 512KB MEMORY
- * - 1 FLOPPY DISK DRIVE(S)
- * - ASYNC ADAPTER

PRESS [ENTER] KEY

Memory size and number of disks are shown on the screen. Confirm your system configuration and press the "ENTER" key if it is "OK". If it is "NG", turn off the power, and then check the configuration switch (See next page). Repeat the operation from step (1) after correcting them.

Configuration DIP SW (SW-1)

Configuration Table (SW-1)

DIP SW				FUNCTION	DESCRIPTION
1	2	3	4		
-	-	-	ON	Display Mode at power up (must be on always)	assigned 80 x 25 (B/W) only
ON	ON	ON	-	Amount of memory size of System	128KB
OFF	ON	ON	-		256KB
ON	OFF	ON	-		384KB
OFF	OFF	ON	-		512KB
ON	ON	OFF	-		not used
OFF	ON	OFF	-		not used
ON	OFF	OFF	-		not used
OFF	OFF	OFF	-		not used

(4) Test selection

The following screen appears after pressing "1" and "ENTER" at task selection.

The TOSHIBA personal computer DIAGNOSTICS
version 1.00 (c) copyright TOSHIBA Corp 1985

DIAGNOSTIC TEST MENU :

- 1 - SYSTEM TEST
- 2 - MEMORY TEST
- 3 - KEYBOARD TEST
- 4 - DISPLAY TEST
- 5 - FLOPPY DISK TEST
- 6 - PRINTER TEST
- 7 - ASYNC TEST
- 99 - EXIT TO DIAGNOSTICS MENU

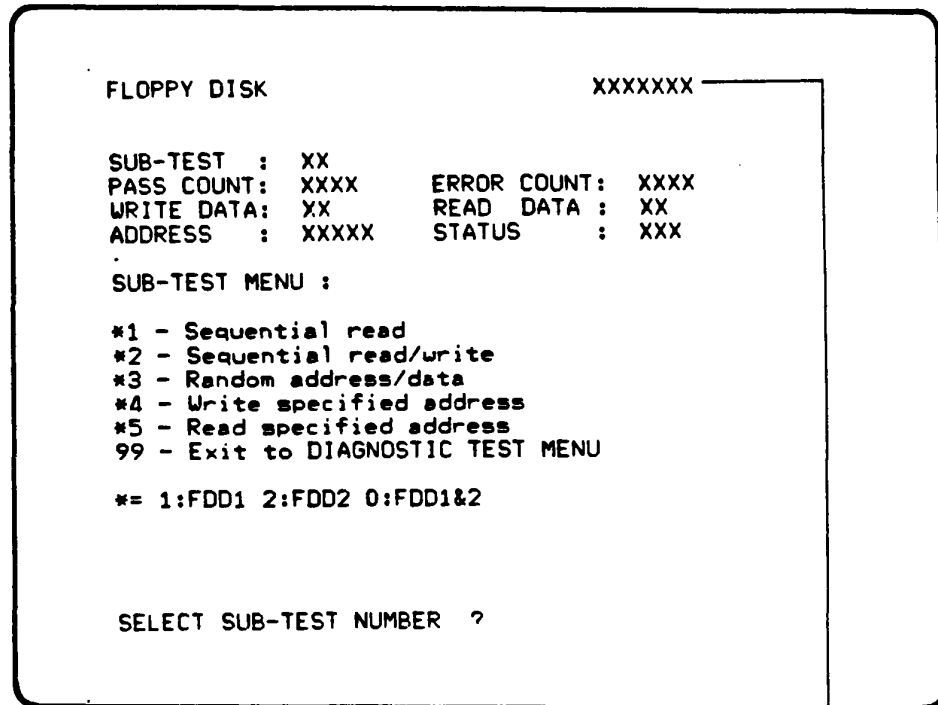
PRESS [1]-[9] KEY

Key-in the test number. (Input the test number, and then press the "ENTER" key without fail.)

- (NOTE)
- 1 : System test
 - 2 : Memory test
 - 3 : Keyboard test
 - 4 : Display/LCD test
 - 5 : FDD test
 - 6 : Printer test
 - 7 : ASYNC/RS232C wraparound test
 - 99 : Returns to step (2); Diagnostic Menu for the task selection.

(5) Subtest and test mode selection

The subtest menu screen(The following sample is for FDD) will be displayed after selecting any test(1-7) at test selection, so input 2 digit subtest number.
(Refer to Appendix A: Test Program List)



where,

TSSDSS



Status (Refer to Appendix C)
Device number
Subtest number (Refer to Appendix A)
Test number (Refer to Appendix A)

Note 1 : Subtest number

Select the number from the menu screen and make the input with 2 digits. The input number "99" will make the control return to step (4): Diagnostic Test Menu.

Note 2 : Test mode selection

The test program execution mode can be specified as follows after the test ends or when an error occurs.

TEST LOOP (1:YES/2:NO) ?

- 1 : Each time the test cycle ends, it increments the pass counter by one and repeats the test cycle.
- 2 : At the end of test cycle, it terminates the test execution and exits to the subtest selection menu.

ERROR STOP (1:YES/2:NO) ?

- 1 : When an error occurs, it displays the error status at column 7(Refer to Appendix C) and stops the execution of test program temporarily. The operation guide displays on the right side of the screen as follows.

((HALT OPERATION))

- 1 : Test End
- 2 : Continue
- 3 : Retry

- "1" key-in : It terminates the test program execution and exits to the subtest selection menu.
- "2" key-in : It goes to the next test step.
- "3" key-in : It retries the error detected test step.

- 2 : When an error occurs, it displays the error status, then it increments the error counter by one and goes to the next test step.

Note : The Running test will neglect the "TEST LOOP (N)", and "ERROR STOP (Y)" and will not stop the test execution.

(6) Termination

When it is needed to terminate the test program execution, press the "CTRL" + "BREAK" keys. It makes a return to the step (2) for the task selection.

5.2.2 USER DIAGNOSTIC

(1) Test program loading

Insert the MS-DOS disk to the internal disk drive, then turn on the power of the T1100 system. The MS-DOS will be loaded after **Power On Diagnostic** execution. The execution time of Power On Diagnostic depends on the size of memory of T1100 system (about 15 seconds for 256KB). During the MS-DOS loading, following messages will appear on the screen.

```
Toshiba Personal Computer (R1150EN)
Copyright 1984,85 Toshiba Corporation
MS-DOS Ver 2.11
Copyright 1983,84 Microsoft Corp.

Command Ver 2.11
Current date is Tue 1-01-1980
Enter new date : 03-04-85
Current time is 0:00:27.02
Enter new time : 15:15

A>test
```

Key-in current date and current time then file name of **USER Diagnostic** as **test** to load the diagnostic program . The underlined portions on the above screen are for the input messages. After the above steps, the test program loading is complete.

(2)Task selection

The following screen (Diagnostic Menu) will be displayed after the test program loading.

```
The TOSHIBA personal computer DIAGNOSTICS
version 1.00 (c) copyright TOSHIBA Corp 1985

DIAGNOSTICS MENU :

1 - DIAGNOSTIC TEST
8 - SYSTEM CONFIGURATION
9 - EXIT TO MS-DOS

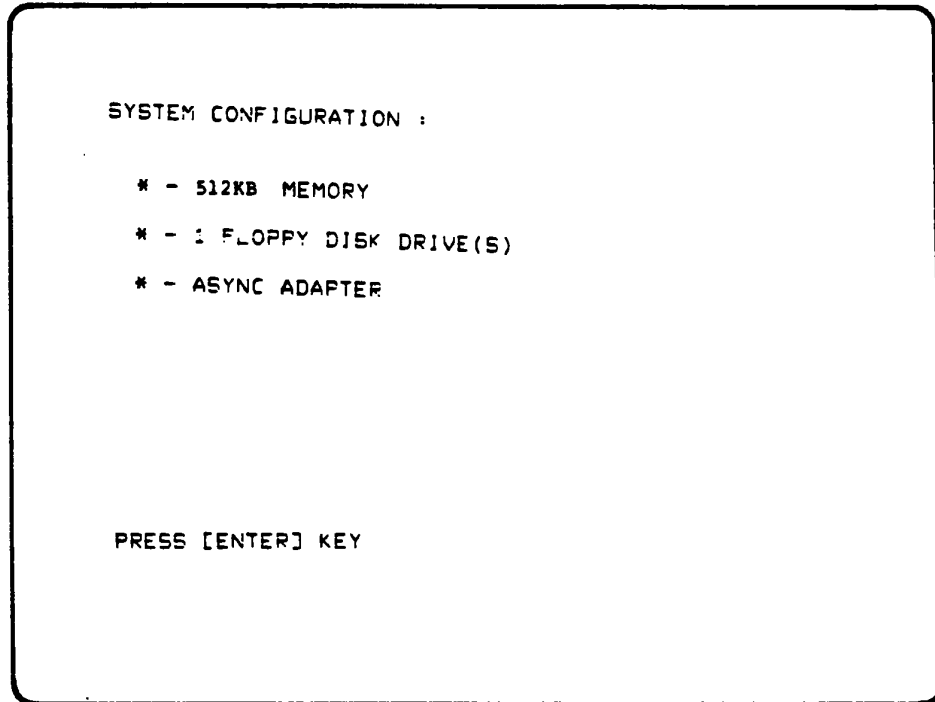
PRESS [1]-[9] KEY 1
```

Key-in the task number. (Input the task number, and then press the "ENTER" key without fail.)

- 1 : User test (includes pressing "ENTER" key only)
- 8 : System configuration
- 9 : Returns to MS-DOS

(3) Display of system configuration

The following system configuration will be displayed on the CRT after pressing "8" and "ENTER" at task selection.



Memory size and number of disks are shown on the screen. Confirm your system configuration and press the "ENTER" key if it is "OK". If it is "NG", turn off the power, and then check the configuration switch (See next page). Repeat the operation from step (1) after correcting them.

Configuration DIP SW (SW-1)

Configuration Table (SW-1)

DIP SW				FUNCTION	DESCRIPTION
1	2	3	4		
-	-	-	ON	Display Mode at power up (must be on always)	assigned 80 x 25 (B/W) only
ON	ON	ON	-	Amount of memory size of System	128KB
OFF	ON	ON	-		256KB
ON	OFF	ON	-		384KB
OFF	OFF	ON	-		512KB
ON	ON	OFF	-		not used
OFF	ON	OFF	-		not used
ON	OFF	OFF	-		not used
OFF	OFF	OFF	-		not used

(4) Test program execution

The User Test executes the test program in the mode of "TEST LOOP = N" and "ERROR STOP = Y".

If an error occurs during the test running, it will make an immediate stop of the execution. At this time, the "ENTER" key will make an exit to the task selection menu.

The test program starts with the following messages from the system.

Do you want to test printer (1:YES/2:NO) ?

1 : It executes the printer test.

2 : It does not.

Select display type (1:LCD/2:COLOR CRT/3:MONO CRT) ?

1 : It selects LCD.

2 : It selects color CRT display.

3 : It select monochrome CRT display.

The User Test executes the following tests in sequence.

<u>Test name</u>	<u>Subtest number</u>
System	: 01
Memory	: 02
Display	: 01 - 06
FDD	: *3 (*:Automatically select 0 or 1)
Printer	: 02 (It will be done if specified)

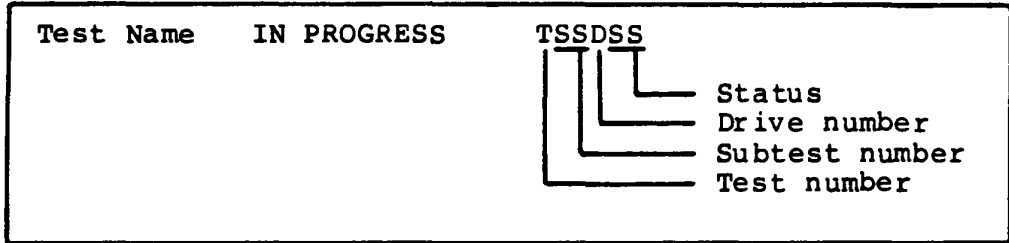
Refer to Appendix A, Test Program List, for summary of the subtests or Subtest description in each program module for the details.

Output Message for floppy disk exchange

Before the FDD test execution, the following message will be displayed so insert the work floppy disk and then press "ENTER" key.

Mount work disk(s) on drive(s), then press (ENTER) key,
Warning : the contents of disk(s) will be destroyed.

(5) Screen during the test running



(6) Test End

It returns to step (2): Diagnostic Menu for the task selection Menu after the test ends.

5.3 SYSTEM TEST

Summary of the System Test

This program performs the checksum test of the ROM on the Systems PCB.

Subtest and test mode selection

After pressing "1" and "ENTER" at test selection, the following screen appears for subtest and test mode selection.

```
SYSTEM TEST                                XXXXXXXX

SUB-TEST : XX
PASS COUNT: XXXX      ERROR COUNT: XXXX
WRITE DATA: XX      READ DATA : XX
ADDRESS : XXXXX      STATUS : XXX

SUB-TEST MENU :

01 - ROM checksum
99 - Exit to DIAGNOSTIC TEST MENU

SELECT SUB-TEST NUMBER ?
```

Select desired subtest by pressing 2 digit subtest number from SUBTEST MENU shown above and "ENTER". Then select the test mode by pressing "1:YES" or "2:NO" and "ENTER" for TEST LOOP and ERROR STOP question respectively.

The selected subtest starts and test information such as SUBTEST No., PASS COUNT, ERROR COUNT, WRITE DATA, READ DATA, ADDRESS, and STATUS are displayed and updated during execution as shown above.

5.4 MEMORY TEST

Summary of the Memory Test

This test performs the memory read/write test with constant data (Five patterns) and address pattern data and also memory refresh test for RAM.

Subtest and test mode selection

After pressing "2" and "ENTER" at test selection, the following screen appears for subtest and test mode selection.

```
MEMORY TEST                                XXXXXXXX

SUB-TEST : XX
PASS COUNT: XXXX      ERROR COUNT: XXXX
WRITE DATA: XX      READ DATA : XX
ADDRESS : XXXXX      STATUS : XXX

SUB-TEST MENU :

01 - RAM constant data
02 - RAM address pattern data
03 - RAM refresh
99 - Exit to DIAGNOSTIC TEST MENU

SELECT SUB-TEST NUMBER ?
```

Select desired subtest by pressing 2 digit subtest number from SUBTEST MENU shown above and "ENTER". Then select the test mode by pressing "1:YES" or "2:NO" and "ENTER" for TEST LOOP and ERROR STOP question respectively.

The selected subtest starts and test information such as SUBTEST No., PASS COUNT, ERROR COUNT, WRITE DATA, READ DATA, ADDRESS, and STATUS are displayed and updated during execution as shown above.

Refer the following page for subtest description.
Refer to the APPENDIX C for error status code.

Subtest description

Subtest 01 Constant data read/write test

It makes a read/write test to the Memory. It writes the constant data to the Memory, then reads and compares it with the original data. The constant data uses "FFH", "AAH", "55H", "01H" and "00H".

Subtest 02 Address pattern data read/write test

It writes the address pattern data which is generated by XORing upper byte of address field with lower byte of address field, then reads and compares them with the original data.

Subtest 03 Memory refresh test

It writes the constant data in 256 byte length to the Memory, then reads and compares it with the original data. The constant data uses "AAH" and "55H". A certain interval time will be forced between the write and the read operation.

5.5 KEYBOARD TEST

Summary of the Keyboard Test

This test performs the function test of keyboard by pressing all the keys according to the keyboard pattern on the screen.

Subtest and test mode selection

After pressing "3" and "ENTER" at test selection, the following screen appears for subtest and test mode selection.

```
KEYBOARD TEST                                XXXXXXXX

SUB-TEST : XX
PASS COUNT: XXXX      ERROR COUNT: XXXX
WRITE DATA: XX      READ DATA : XX
ADDRESS : XXXXX      STATUS : XXX

SUB-TEST MENU :

01 - Pressed key display
99 - Exit to DIAGNOSTIC TEST MENU

SELECT SUB-TEST NUMBER ?
```

Select desired subtest by pressing 2 digit subtest number from SUBTEST MENU shown above and "ENTER". Then select the test mode by pressing "1:YES" or "2:NO" and "ENTER" for TEST LOOP and ERROR STOP question respectively.

The selected subtest starts and test information such as SUBTEST No., PASS COUNT, ERROR COUNT, WRITE DATA, READ DATA, ADDRESS, and STATUS are displayed and updated during execution as shown above.

Refer the following page for subtest description.
Refer to the APPENDIX C for error status code.

Subtest description

Keyboard layout is drawn on the CRT, and when a certain key is pressed, the character "*" will be displayed at the corresponding location of the CRT.

If the same key is pressed again, it becomes to be the original state so that it is able to confirm the self-repeat function.

5.6 LCD/DISPLAY TEST

Summary of the LCD/Display Test

This test performs the test of VIDEO RAM read/write, attribute character, character mode display, graphic mode display, and screen page for CRT display/LCD and its controller function.

Subtest and test mode selection

After pressing "4" and "ENTER" at test selection, the system asks the display type being tested. The prompt message will appear on the same test menu screen.

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DIAGNOSTIC TEST MENU :

- 1 - SYSTEM TEST
- 2 - MEMORY TEST
- 3 - KEYBOARD TEST
- 4 - DISPLAY TEST
- 5 - FLOPPY DISK TEST
- 6 - PRINTER TEST
- 7 - ASYNC TEST
- 99 - EXIT TO DIAGNOSTICS MENU

Select display type (1:LCD/2:COLOR CRT/3:MONO CRT) ?

PRESS [1]-[9] KEY 4

Key-in the number corresponding to the display type being tested.

After the display type selection, the following menu appears for subtest and test mode selection.

```
DISPLAY TEST                                XXXXXXXX

SUB-TEST : XX
PASS COUNT: XXXX      ERROR COUNT: XXXX
WRITE DATA: XX      READ DATA : XX
ADDRESS : XXXXX      STATUS : XXX

SUB-TEST MENU :

01 - VRAM read/write
02 - Character attributes
03 - Character set
04 - 80 * 25 Character display
05 - Graphics display (color set 0/1) or 320 * 200 BW
06 - 640 * 200 Graphics display
07 - Display page
08 - "H" Pattern display
99 - Exit to DIAGNOSTIC TEST MENU

SELECT SUB-TEST NUMBER ?
```

Select desired subtest by pressing 2 digit subtest number from SUBTEST MENU shown above and "ENTER". Then select the test mode by pressing "1:YES" or "2:NO" and "ENTER" for TEST LOOP and ERROR STOP question respectively.

The selected subtest starts and test information such as SUBTEST No., PASS COUNT, ERROR COUNT, WRITE DATA, READ DATA, ADDRESS, and STATUS are displayed and updated during execution as shown above.

Refer the following page for subtest description.
Refer to the APPENDIX C for error status code.

Subtest description

Subtest 01 Read/write test of video RAM

In the display-off mode, it writes the constant data of "FFH", "AAH", "55H", "00H" to the video RAM, then it reads and compares them with the original data.

Subtest 02 Character attribute display test

Normal Display
Intensified Display
Reverse Display
Blinking Display

* Note : If it is color display unit, it checks back color, forward color, border color about each of seven colors of blue, green cyan, red magenta, yellow and white.

Subtest 03 Display of character set

Subtest 04 Display of 80 x 25 characters

Subtest 05 Display in 320 x 200 graphic mode (color set 0)

Three colors of green, red, and yellow

Display in 320 x 200 graphic mode (color set 1)

Three colors of Cyan, magenta, and white

Subtest 06 Display in 640 x 200 graphic mode

Black & white

Subtest 07 Screen Page test

It displays the contents of VIDEO RAM to the CRT in 40 x 25 mode. VIDEO RAM contains a capacity of 8 screen pages and each screen page is displayed as all "0", all "1" and all "7" respectively.

Subtest 08 "H" Pattern display test

5.7 FLOPPY DISK TEST

Summary of the FLOPPY DISK Test

This test performs the read/write test with sequential address, random address, and specified address for FDD and its controller functions.

Subtest and test mode selection

After pressing "5" and "ENTER" at test selection, the following screen appears for subtest and test mode selection.

```
FLOPPY DISK                                XXXXXXXX

SUB-TEST : XX
PASS COUNT: XXXX      ERROR COUNT: XXXX
WRITE DATA: XX      READ DATA : XX
ADDRESS : XXXXX      STATUS : XXX

SUB-TEST MENU :

*1 - Sequential read
*2 - Sequential read/write
*3 - Random address/data
*4 - Write specified address
*5 - Read specified address
99 - Exit to DIAGNOSTIC TEST MENU

*= 1:FDD1 2:FDD2 0:FDD1&2

SELECT SUB-TEST NUMBER ?
```

Select desired subtest by pressing 2 digit subtest number from SUBTEST MENU shown above and "ENTER". Then select the test mode by pressing "1:YES" or "2:NO" and "ENTER" for TEST LOOP and ERROR STOP question respectively.

The selected subtest starts and test information such as SUBTEST No., PASS COUNT, ERROR COUNT, WRITE DATA, READ DATA, ADDRESS, and STATUS are displayed and updated during execution as shown above.

Refer the following subtest description.
Refer to the APPENDIX C for error status code.

Subtest description

Subtest 01 Sequential read test

It performs the CRC check carrying out the sequential read operation to all the tracks 0 thru 39.

Subtest 02 Sequential read/write test

It performs the data comparison check carrying out the sequential read/write operation to the tracks 1 thru 39. (The data pattern, "B5ADAD", is repeated.)

Subtest 03 Random address/data read/write

It writes random data at random address to the tracks 1-39, then reads and compares them with the original data.

Subtest 04 Specified address write test

It writes the data specified to the address specified. The specification of data and address can be made by the input from the keyboard.

Subtest 05 Specified address read test

It reads the data from the address (track no. and head no.) specified by the keyboard.

5.8 PRINTER TEST

Summary of the Printer Test

This test performs the test of ripple pattern, functions(6 print modes), and wraparound for printer and its controller.

Subtest and test mode selection

After pressing "6" and "ENTER" at test selection, the following screen appears for subtest and test mode selection.

```
PRINTER TEST                                XXXXXXXX

SUB-TEST  : XX
PASS COUNT: XXXX      ERROR COUNT: XXXX
WRITE DATA: XX      READ DATA : XX
ADDRESS   : XXXXX    STATUS      : XXX

SUB-TEST MENU :

01 - Ripple pattern
02 - Function
03 - Wrap around
99 - Exit to DIAGNOSTIC TEST MENU

SELECT SUB-TEST NUMBER ?
```

Select desired subtest by pressing 2 digit subtest number from SUBTEST MENU shown above and "ENTER". Then select the test mode by pressing "1:YES" or "2:NO" and "ENTER" for TEST LOOP and ERROR STOP question respectively.

The selected subtest starts and test information such as SUBTEST No., PASS COUNT, ERROR COUNT, WRITE DATA, READ DATA, ADDRESS, and STATUS are displayed and updated during execution as shown above.

Refer the following page for subtest description.
Refer to the APPENDIX C for error status code.

Subtest description

Subtest 01 Ripple pattern test

It prints characters of coded = "20H" - "7EH" on a line rotating the line pattern by one character to the down lines.

Subtest 02 Function test

Normal Print
Double Width Print
Compressed Print
Emphasized Print
Double Strike Print
All Characters Print

Subtest 03 Wraparound test

It checks the data, control, and status lines with the Printer Wraparound Connector(Part No.).

5.9 ASYNC(RS232C) TEST

Summary of the ASYNC(RS232C) Test

This test performs the data transmission(Send/Receive) with the CCM Wraparound Connector(Part No.39K154406G1).

Subtest and test mode selection

After pressing "7" and "ENTER" at test selection, the following screen appears for subtest and test mode selection.

```
ASYNC TEST                               XXXXXXXX

SUB-TEST : XX
PASS COUNT: XXXX      ERROR COUNT: XXXX
WRITE DATA: XX      READ DATA : XX
ADDRESS : XXXXX      STATUS : XXX

SUB-TEST MENU :

01 - Wrap around (channel-1)
99 - Exit to DIAGNOSTIC TEST MENU

SELECT SUB-TEST NUMBER ?
```

Select desired subtest by pressing 2 digit subtest number from SUBTEST MENU shown above and "ENTER". Then select the test mode by pressing "1:YES" or "2:NO" and "ENTER" for TEST LOOP and ERROR STOP question respectively.

The selected subtest starts and test information such as SUBTEST No., PASS COUNT, ERROR COUNT, WRITE DATA, READ DATA, ADDRESS, and STATUS are displayed and updated during execution as shown above.

Refer the following page for subtest description.
Refer to the APPENDIX C for error status code.

Subtest description

The setting of communications mode is assumed as follows ;

Async, 9600 BPS, 8 data bits + parity (even), 1
stop bit, data = 20H - 7EH codes.

One communications channel is provided on the Asynchronous Communications Interface and another additional channel is available as an optional unit.

Subtest 01 Performs above test for channel 1. The CCM Wrap-around Connector should be attached on RS232C interface connector.

Subtest 02 Performs above test for channel 2 if additional channel is installed. The CCM Wraparound Connector should be attached on RS232C interface connector.

5.10 HEAD CLEANING

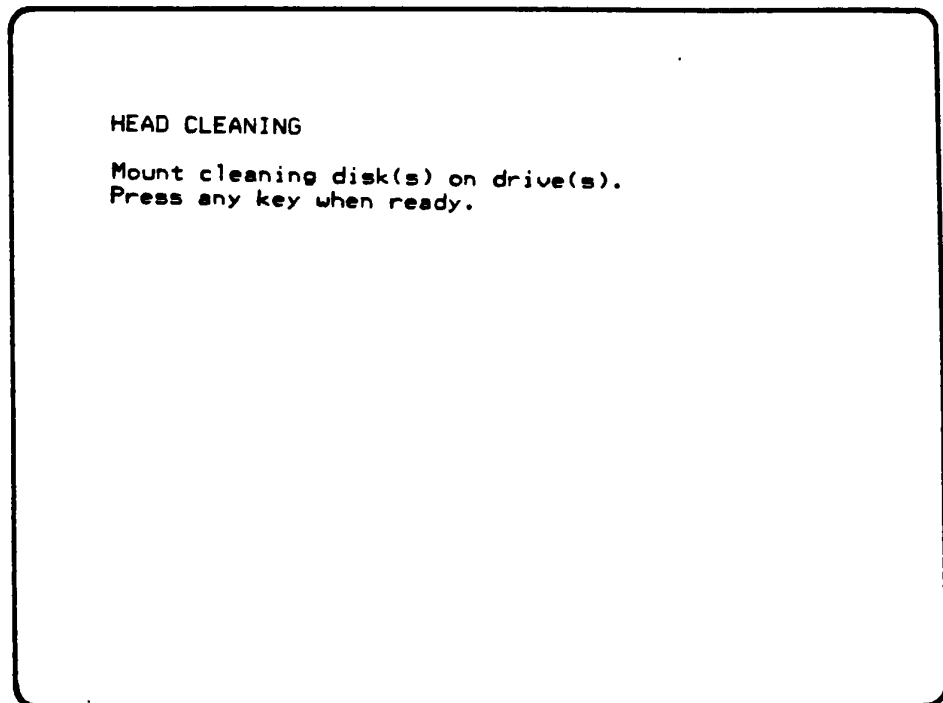
Summary of the program

It executes the head load, seek and read operation for the purpose of head cleaning.

The Cleaning Disk Kit(Part No. XG0024P01) is required to perform the cleaning properly.

Program execution

After pressing "4" and "ENTER" at task selection, the following screen appears before test execution.



Follow the above message for the preparation then press "ENTER".

5.11 LOG UTILITY

Summary of the program

The error information which is detected while testing is logged in the memory or the test floppy disk. The logged error information is able to be displayed on the CRT or be printed out through the printer.

Program execution

The error information logged in the Memory or the floppy disk is displayed as shown below by key-in "5" during the task selecting operation.

Error Display

Number of error log entrys

003 ERRORS							
<u>CNT</u>	<u>TEST</u>	<u>N</u>	<u>PASS</u>	<u>STS</u>	<u>ADDR</u>	<u>WD</u>	<u>RD</u>
001	FDD	11	0000	110	24015		
002	FDD	11	0001	110	30108		
003	FDD	13	0003	110	23106		

Test name Error status Write data
Subtest No. FDD address Read data
Error count PASS count

The following functional keys are available for the error display screen.

- "1" key : One page is scrolled upwards.
- "2" key : One page is scrolled downwards.
- "3" key : It returns to task selection.
- "4" key : All error logs in RAM are erased.

- "5" key : The error logs are printed out through the printer.
- "6" key : The error logs in floppy disk are displayed on the CRT.
- "7" key : The error logs in RAM are written to floppy disk.

Note : When the error retrying was made successfully, the "R" character is added at the head of error status.
In this case, the error count is not updated.

5.12 RUNNING TEST

Summary of the program

The Running Test makes a sequential and continuous execution of the test programs specified by the test list of system parameter with taking no man's intervention. Under the execution of Running Test, it displays the test name and subtest number being currently executed.

Program execution

Prior to the execution of Running test, the screen shows the following messages asking of execution or non-execution of printer and ASYNC wraparound test, and display selection .

(1) Printer wraparound test (1:YES/2:NO)?

1 : It executes the printer wraparound test.

2 : It does not.

(2) Async wraparound test (1:YES/2:NO)?

1 : It executes the async wraparound test.

2 : It does not.

(3) Select display type (1:LCD/2:COLOR CRT/3:MONO CRT)?

1 : It selects LCD.

2 : It selects color CRT display.

3 : It selects monochrome CRT display .

The Running Test executes the following test programs

<u>Test name to be tested</u>	<u>Subtest number in sequential execution</u>
1. System	: 01
2. Memory	: 01, 02, 03
3. Display	: 01 - 07
4. FDD	: *2 (*:Automatically select 0 or 1)
5. Printer	: 03 (Printer Wraparound Connector Part No.39K154439G1 is required.)
6. RS232C	: 01 (CCM Wraparound Connector Part No.39K154406G1 is required.)

Refer to Appendix A, Test Program List, for summary of the subtests or Subtest description in each program module for the details.

5.13 SYSTEM CONFIGURATION

Summary of the program

It displays your system's configuration such as Memory size, Number of FDD(s), and Async.

APPENDIX A : TEST PROGRAM LIST

TEST No.	TEST NAME	SUBTEST No.	TEST ITEM
1	SYSTEM	01	ROM Checksum
2	MEMORY	01 02 03	Constant Data R/W test Address Pattern R/W test Memory Refresh Test
3	KEYBOARD	01	
4	DISPLAY/ LCD	01 02 03 04 05 06 07	Video RAM R/W Test Character Attribute display Character Set display 80 x 25 display 320 x 200 Graphic display 640 x 200 Graphic display Screen Page Test
5	FDD	*1 *2 *3 *4 *5	Sequential Read Test Sequential R/W Test Random Address/Data R/W Test Specified Address Write Test Specified Address Read Test
6	PRINTER	01 02 03	Ripple Pattern Test Function Test Wraparound Test (It needs wraparound connector.)
7	ASYNC/ (RS232C)	01 02	Wraparound Test (It needs wraparound connector.)

APPENDIX B : AVERAGE EXECUTION TIME

TEST NO.	TEST NAME	SUBTEST NO.	EXECUTION TIME
1	SYSTEM	01	1 Second
2	MEMORY (256 KB)	01 02 03	70 Seconds 20 Seconds 40 Seconds
3	KEYBOARD	01	
4	LCD/ DISPLAY	01 02 03 04 05 06 07	1 Second
5	FDD	01 02 03 04 05	55 Seconds 195 Seconds 38 Seconds 1 Second 1 Second
6	PRINTER	01 02 03	93 Seconds 8 Seconds 1 Second
7	ASYNC/ (RS232C)	01 02	1 Second 1 Second

APPENDIX C : ERROR STATUS CODE LIST

DEVICE NAME	ERROR CODE	STATUS
SYSTEM	01	ROM Checksum Error
MEMORY	01 FF	Parity Error Compare Error
FDD	01 02 03 04 08 09 10 20 40 80 FF	Bad Command Address Mark Not Found Write Protected Record Not Found DMA Overrun Error DMA Boundary Error CRC Error FDC Error Seek Error Time Out Error Compare Error
PRINTER	01 08 10 20 40 80 FF	Time Out Fault Select Line Out of Paper Acknowledge Line Busy Line Compare Error
ASYNC/ (RS232C)	01 02 04 08 10 20 40 80 88	DSR Off Time Out CTS Off Time Out RX Empty Time Out TX Buffer Full Time Out Parity Error Framing Error Overrun Error Line Status Error Modem Status Error

APPENDIX D : WRAPAROUND CONNECTOR

1. Wraparound connector for printer

(1) - STROBE	→	- ACKNOWLEDGE	(10)
(9) + DATA BIT 7	→	+ P. END	(12)
(14) - AUTO FEED	→	- ERROR	(15)
(16) - INITIALIZE PRINTER	→	+ SELECT	(13)
(17) - SELECT INPUT	→	+ BUSY	(11)

2. Wraparound connector for RS232C

(3) SERIAL OUTPUT	→	SERIAL INPUT	(2)
(7) REQUEST TO SEND	↘	CLEAR TO SEND	(8)
		SIGNAL DETECT	(1)
(4) DATA TERMINAL READY	↘	DATA SET READY	(6)
		RING INDICATE	(9)