5 Troubleshooting

5.1 Introduction

When computer power is turned on, the system BIOS runs a series of internal checks on the hardware. These internal checks comprise the **POST (Power-On Self-Test.** POST allows the computer to detect problems as early as the power-on stage. The error messages and system beeps of POST can alert you to the problems of your computer.

If an error is detected during these tests, you will either hear system beep/s or see an error message displayed on the screen. If the error occurs before the display is initialized, the system beeps to report error.

If error is **fatal** (non-correctable), the system halts after reporting the fatal error. If error is **non-fatal** (correctable), the process continues after reporting the non-fatal error.

WARNING:

Only experienced technicians should attempt the procedures described in this chapter.

5.2 Error Messages

Within POST, there are two kinds of messages:

Error messages — failure in hardware, software, or firmware

Informational messages — require no action

Message	Possible Cause	Solution
Diskette Drive failure	The B: drive failed or is missing.	Check the B: drive.
Diskette drive A failure	The A: drive has either failed or is missing.	Check the A: drive.
Diskette drive reset failed	The diskette controller has failed.	Check the diskette connector. If still failed, replace the system board.
Diskette read failure — strike F1 to retry boot	The diskette is either unformatted or defective.	Replace the diskette with a bootable diskette and retry. Check the Phoenix SETUP too.
Errors found; incorrect configuration information memory size miscompare	POST reports the size of base or expansion memory does not agree with configuration information.	Rerun Phoenix SETUP and enter correct memory size.
Gate A20 failure	The 8042 is not accepting commands. Cannot leave or enter protected mode.	Replace the system board.
Fixed disk configuration error	The specified configuration is not supported.	Run Phoenix SETUP and correct the fixed disk configuration.
Fixed Disk Drive failure	Bad fixed disk.	Retry boot. If that doesn't work, preformat fixed disk or replace the fixed disk.
Fixed disk read failure — strike F1 to retry boot	The fixed disk is defective.	Retry boot. If that doesn't work, replace the fixed disk.
No boot device available — press F1 to retry boot	Either diskette drive A; the fixed disk, or the diskette itself is defective	Retry boot. If problem persists, replace the diskette or the fixed disk.
No boot sector on fixed disk — press F1 to retry boot	The C: drive is not formatted or is not bootable.	Format the C: drive, make it bootable.
Not a boot diskette — strike F1 to retry boot.	The diskette in drive A: is not formatted as a bootable diskette.	Replace the diskette with a bootable diskette and retry boot.

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Message	Possible Cause	Solution
No timer tick interrupt	The timer chip has failed.	Turn the power off, then back on again. If the problem persists, replace the system board.
Option ROM checksum failure	The peripheral card contains a defective ROM.	Replace the peripheral card.
BIOS ROM checksum failure	The ROM BIOS contains an invalid value.	Turn system off, then on again. If problem persists, change ROMs.
Shutdown failure	The keyboard controller or its associated logic has failed.	Check the keyboard controller.
Time and date not set — run Phoenix SETUP program	Clock not set.	Run SETUP.
Timer 2 failure	Timer chip failed.	Turn the power off, then back on again. If the problem persists, replace the system board.
Timer or interrupt controller	Either the timer chip or the interrupt controller is defective.	Replace the system board.
Timer interrupt did not occur	Either the timer chip or the interrupt controller is defective.	Replace the system board.
F2 to enter ROM-based SETUP	Invalid configuration information must be changed.	SETUP must be executed.
Invalid configuration information — please run SETUP	Display controller is configured incorrectly.	
Memory size is incorrect.		
Wrong number of diskette drives.	Run SETUP.	
Keyboard clock line failure	Either the keyboard or the keyboard cable connection is defective.	Ensure proper connections of the keyboard and its cable.
Keyboard data line failure	The keyboard controller firmware has failed.	Check the keyboard cable. If problem persists, change system board.
Keyboard controller failure	The keyboard controller firmware has failed.	Check the keyboard controller.

Message	Possible Cause	Solution
Keyboard stuck key failure	A key(s) is jammed.	Press the key(s) again.
Memory failure at hex-value, read hex-value, expecting hex-value	Circuitry associated with the memory chips has failed.	Turn the power off, then back on again. If the problem persists, replace the system board.
Unexpected interrupt in protected mode	Hardware interrupt or NMI occurred while in protected mode.	Replace the system board.
Real time clock failure	The RTC or battery failed.	Replace the RTC or battery on the system board.
Keyboard is locked — unlock keyboard.	Locked keyboard.	Unlock keyboard.

Table 5-1. Error Messages

5.3 Run-Time Messages

Run time messages are displayed if an error occurs after the boot procedure is complete. The table below lists these errors with corresponding solutions.

Message	Cause	Solution
I/O card parity interrupt at address. Press the S key to shut off NMI, the R key to reboot, or any other key to continue	The peripheral card has failed.	Type (S)hut off NMI.
This will only temporarily allow users to continue. Users must replace the peripheral card.		
Memory parity interest at address. Press the S key to shut off NMI, the R key to reboot, or any other key to continue	A memory chip(s) has failed	Type (S)hut off NMI.
This will only temporarily allow users to continue. Users must replace the memory chip(s).		
Unexpected hardware interrupt interrupt at address.		
Press the R key to reboot or any other key to continue	Hardware problem.	
Not displayed if the extended interrupt handler is not enabled.	Check the hardware.	
Unexpected software interrupt interrupt at address. Press the R key to reboot or any other key to continue	Error(s) in the software program. Not displayed if the extended interrupt handler is not enabled.	Turn the machine off and then on again. If that doesn't work, check the program.
Memory parity NMI	Memory card failed	Replace the card.
Bus lock NMI	A device has driven the —BURST signal line for more than 7.8 microseconds, causing the DMA Controller to generate a bus time-out.	Test the system board and all installed devices for proper operation. Replace if necessary.
Fail safe timer NMI	Applications software package failed.	Check the program being run.
IOCHK NMI	An adapter card has driven the —IOCHK signal line high.	Check all adapter cards for proper operation. Replace if necessary.

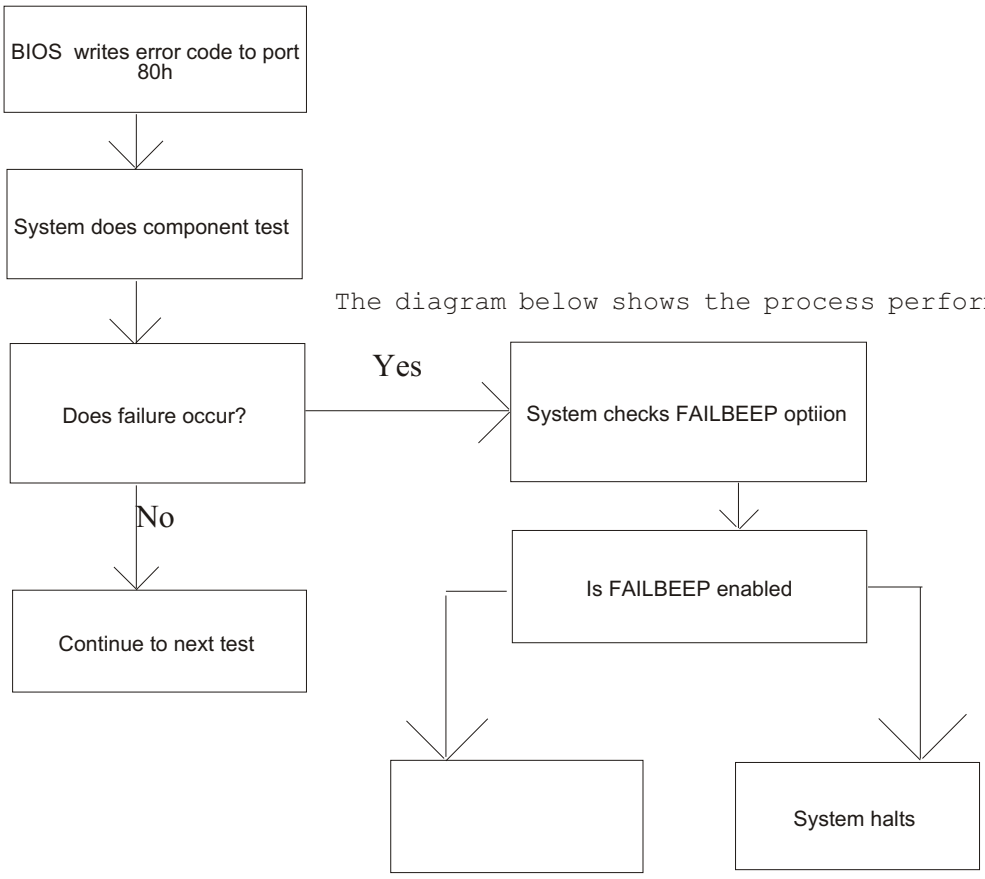
Software NMI	A systems software routine has generated an NMI to halt processing.	Check all programs operating in the system.

Table 5-2. Run-time Messages

5.4 Beep Codes

In some cases, POST errors cannot be reported on the screen. When an error occurs before the screen is initialized or when the system is set to loop on the system board tests, then the screen cannot display the error message. Beep codes are used to identify a POST error that occurs when the screen is not available.

For example, a beep code of 2-1-4 (a burst of 2 beeps, a single beep, and a burst of 4 beeps) indicates a failure of bit 3 in the first 64k of RAM. The value for the diagnostic port, port 80h, is written at the beginning of the test. Therefore, if the test fails, the user can determine where the problem occurred by reading the last value written to port 80h.



The diagram below shows the process performed by the system if an error occurs and the screen is unavailable.

5.4.1 Using Beep Codes

The table below shows the errors for which beep codes and screen messages are used:

System Board Failure			
Error Type	Fatal	Non-Fatal	Off-board Failure
Looping on system board tests (MANLOOP set to True)	Beep and halt	Beep and halt	Not applicable
Normal power on (MANLOOP set to False)	Beep and halt	Screen message and prompt “Press F1 to continue”	Screen message and prompt to “Press F1 to continue”

Table 5-3.

The following tables list the fatal and non-fatal system board errors separately. Note that no beep code is sounded if a test is aborted while in progress. The contents of port 80h can be read to identify the area of future.

Fatal System Board Errors

Beep Code	Contents Port 80h	Description
none	01h	CPU register test in progress
1-1-3	02h	CMOS write/read failure
1-1-4	03h	ROM BIOS checksum failure
1-2-1	04h	Programmable interval timer failure
1-2-2	05h	DMA initialization failure
1-2-3	06h	DMA page register
1-3-1	08h	RAM refresh verification
none	09h	First 64K RAM test in progress
1-3-3	0Ah	First 64K RAM chip or data line failure, multi-bit
1-3-4	0BH	First 64K RAM odd/even logic failure
1-4-1	0CH	Address line failure first 64K RAM
1-4-2	0DH	Parity failure first 64K RAM
1-4-3	0EH	Fail-safe timer failure
1-4-4	0FH	Software NMI port failure
2-1-1	10h	Bit 0 first 64K RAM failure

2-1-2	11h	Bit 1 first 64K RAM failure
2-1-3	12h	Bit 2 first 64K RAM failure
2-1-4	13h	Bit 3 first 64K RAM failure
2-2-1	14h	Bit 4 first 64K RAM failure
2-2-2	15h	Bit 5 first 64K RAM failure
2-2-3	16h	Bit 6 first 64K RAM failure
2-2-4	17h	Bit 7 first 64K RAM failure
2-3-1	18h	Bit 8 first 64K RAM failure
2-3-2	19h	Bit 9 first 64K RAM failure
2-3-3	1Ah	Bit 10 first 64K RAM failure
2-3-4	1Bh	Bit 11 first 64K RAM failure
2-4-1	1Ch	Bit 12 first 64K RAM failure
2-4-2	1Dh	Bit 13 first 64K RAM failure
2-4-3	1Eh	Bit 14 first 64K RAM failure
2-4-4	1Fh	Bit 15 first 64K RAM failure
3-1-1	20h	Slave DMA register failure
3-1-2	21h	Master DMA register failure
3-1-3	22h	Master interrupt mask register failure
3-1-4	23h	Slave interrupt mask register failure
none	25h	Interrupt vector loading in progress
3-2-4	27h	Keyboard controller test failure
none	28h	CMOS RAM power failure and checksum calculation in progress
none	29h	CMOS RAM configuration validation in progress
3-3-4	2Bh	Screen memory test failure
3-4-1	2Ch	Screen initialization failure
3-4-2	2Dh	Screen retrace test failure
none	2Eh	Search for video ROM in progress
none	30h	Screen running with video ROM
none	31h	Monochrome monitor operable
none	32h	Color monitor (40 column) operable
none	33h	Color monitor (80 column) operable

Non-Fatal System Board Errors

A failure in add-on boards or memory is reported on the monitor. These error messages help isolate the failed subsystem.

Beep codes 4-2-1 through 4-4-3 and above are only reported through the speaker and sent to the diagnostic port if the manufacturing loop option switch MANLOOP is set to TRUE and the manufacturing jumper indicator is on in POST. Otherwise, these errors are reported via the screen. Phoenix sets the MANLOOP to TRUE when building the production BIOS if requested by the system designer.

The table below lists the beep codes and error codes that are written to Port 80h for nonfatal system board errors.

Beep Codes	Contents Port 80h	Description
4-2-1	34h	Timer tick interrupt test in progress or failure
4-2-2	35h	Shutdown test in progress or failure
4-2-3	36h	Gate A20 failure
4-2-4	37h	Unexpected interrupt in protected mode
4-3-1	38h	RAM test in progress or address failure > FFFFh
4-3-3	3Ah	Interval timer channel 2 test or failure
4-3-4	3Bh	Time-of-day clock test or failure
4-4-1	3Ch	Serial port test or failure
4-4-2	3Dh	Parallel port test or failure
4-4-3	3Eh	Math coprocessor test or failure

5.4.2 Fault Isolation Charts

Chart A

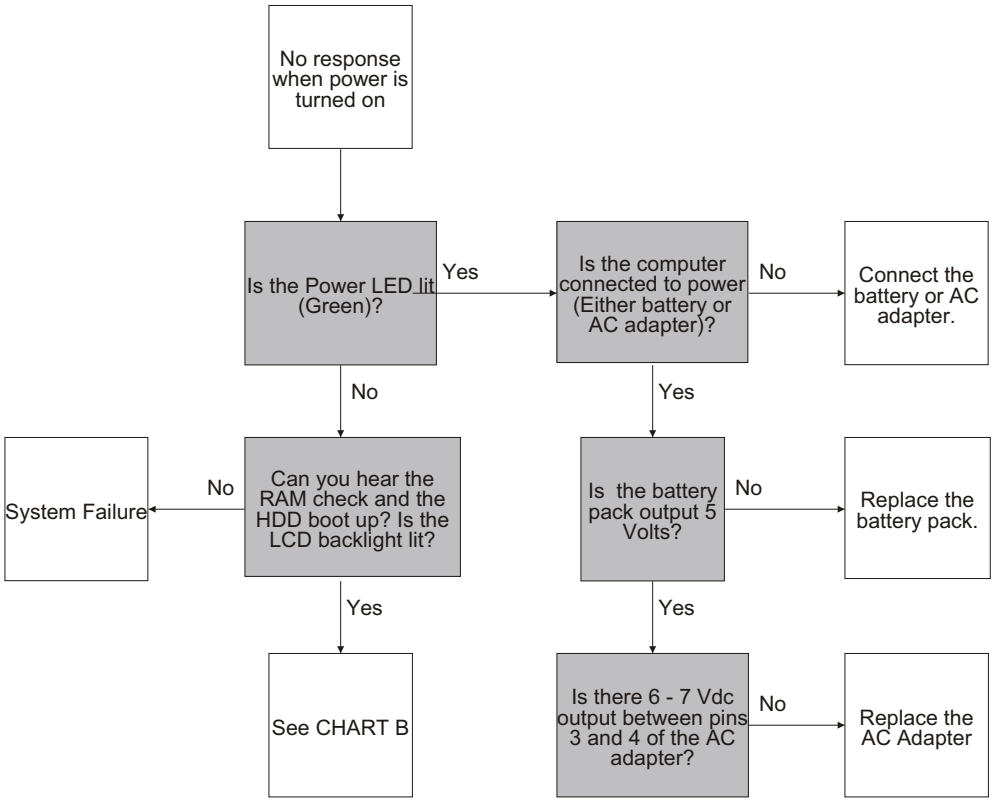


Chart B

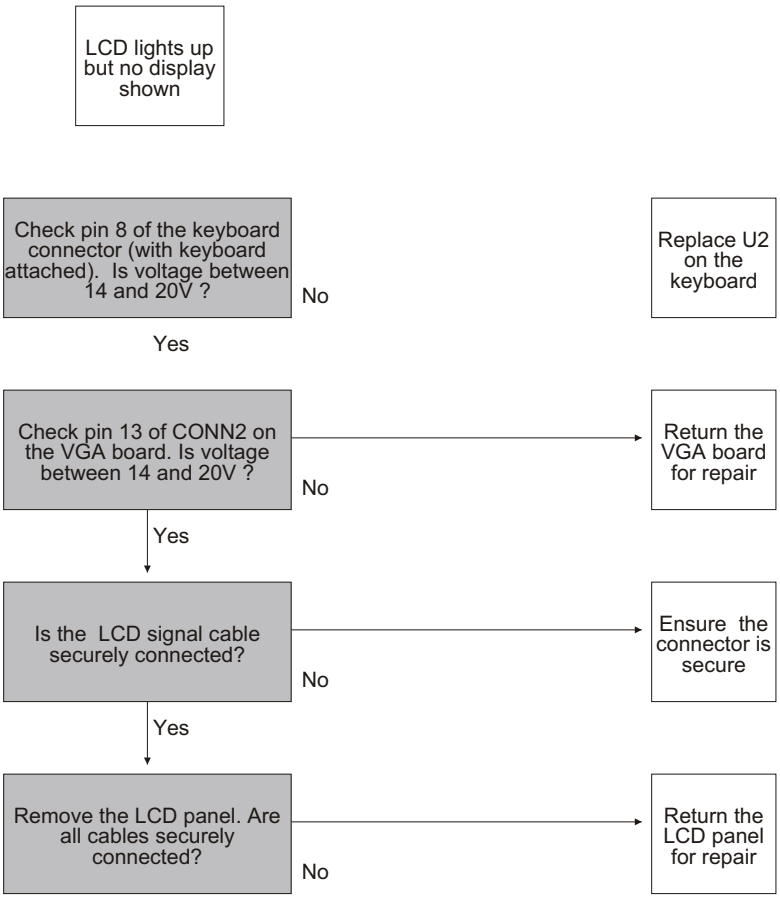

LCD lights up but no display shown
Check pin 8 of the keyboard connector (with keyboard attached). Is voltage between 14 and 20V ?
No
Replace U2 on the keyboard
Yes
Check pin 13 of CONN2 on the VGA board. Is voltage between 14 and 20V ?
No
Return the VGA board for repair
Yes
Is the LCD signal cable securely connected?
No
Ensure the connector is secure
Yes
Remove the LCD panel. Are all cables securely connected?
No
Return the LCD panel for repair

Chart C

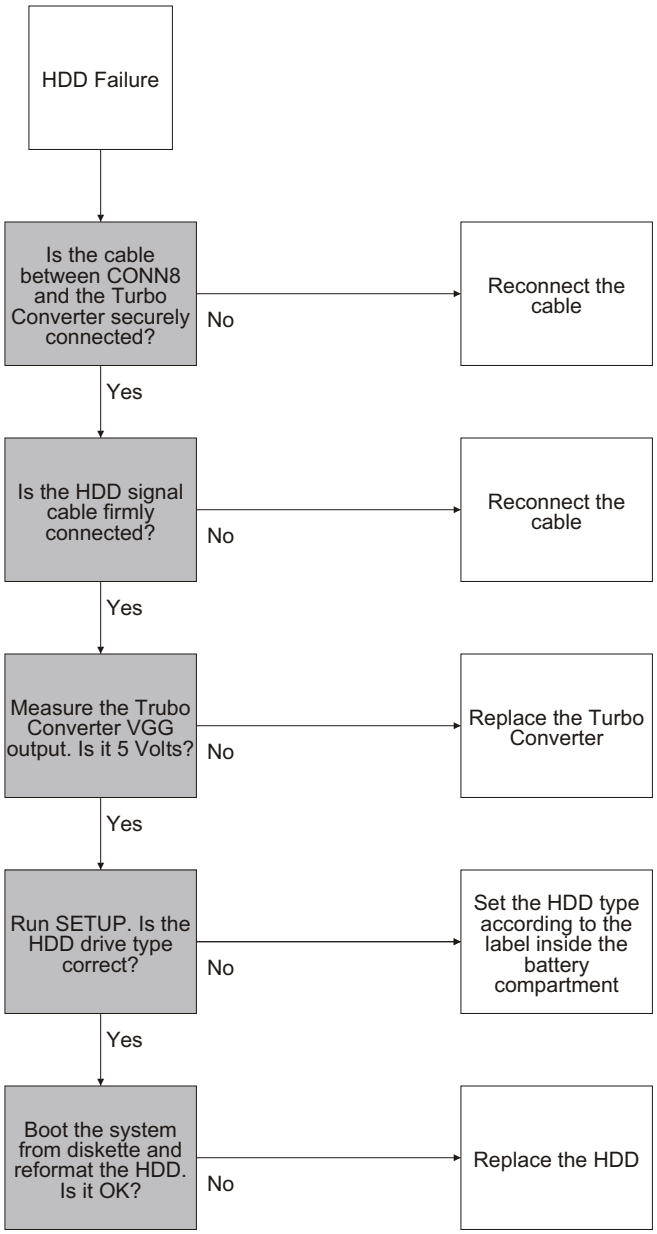

HDD Failure
Is the cable between CONN8 and the Turbo Converter securely connected?
No
Reconnect the cable
Yes
Is the HDD signal cable firmly connected?
No
Reconnect the cable
Yes
Measure the Trubo Converter VGG output. Is it 5 Volts?
No
Replace the Turbo Converter
Yes
Run SETUP. Is the HDD drive type correct?
No
Set the HDD type according to the label inside the battery compartment
Yes
Boot the system from diskette and reformat the HDD. Is it OK?
No
Replace the HDD

Chart D

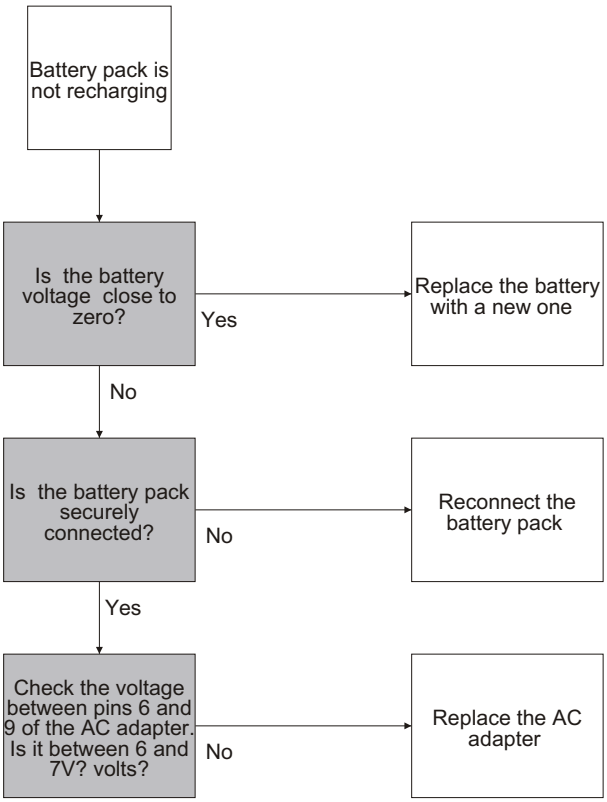
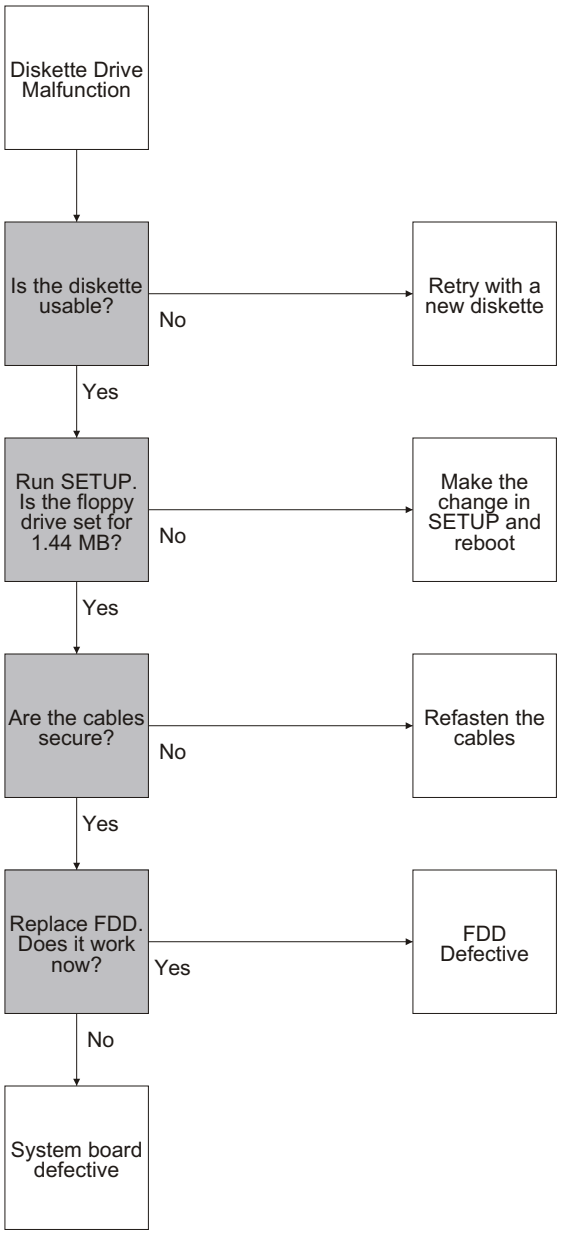
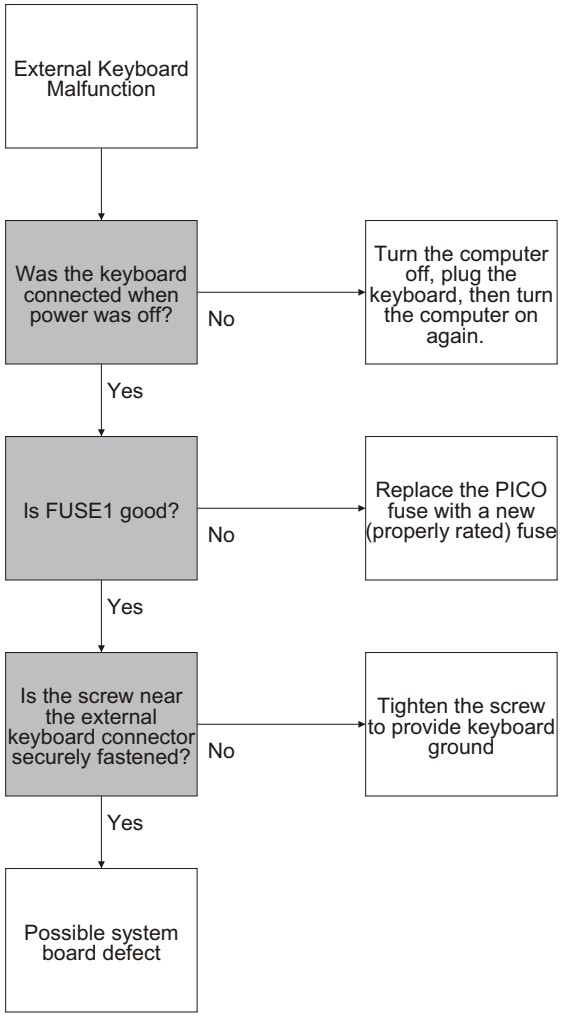

Battery pack is not recharging
Is the battery voltage close to zero?
Yes
Replace the battery with a new one
No
Is the battery pack securely connected?
No
Reconnect the battery pack
Yes
Check the voltage between pins 6 and 9 of the AC adapter. Is it between 6 and 7V? volts?
No
Replace the AC adapter

Chart E


Diskette Drive Malfunction
Is the diskette usable?
No
Retry with a new diskette
Yes
Run SETUP. Is the floppy drive set for 1.44 MB?
No
Make the change in SETUP and reboot
Yes
Are the cables secure?
No
Refasten the cables
Yes
Replace FDD. Does it work now?
Yes
FDD Defective
No
System board defective

Expansion Keyboard



Expansion Box