Diagnostic Card
PC Analyzer LCD
Version 6.0 PCI
User’s Guide
Model: postcard_lcd_60
For use only in a desktop model computer with PCI slot
INTRODUCTION

A Diagnostic Card is a powerful tool for technicians and administrators to troubleshoot various problems of IBM compatible PCs. It is easy to install, yet extremely powerful to use. With a Diagnostic Card in hand, you no longer have to go through tedious and time consuming process of trying to figure out what is wrong with your PC hardware. A Diagnostic Card will tell you exactly what is wrong with your PC in just seconds saving you time and money.

Our new and improved design of diagnostic card can work with almost all popular types of CPUs, Motherboards, and BIOS.

All though we try, it is not possible to update this manual every time a new motherboard is made by the manufactures. It is always advised to visit the bios manufacture website, and download the latest codes per bios revision. Or visit bioscentral.com for an online reference.

Why did we make this card? Too many people complained about "looking” up the codes in a booklet or PDF. We tried to please the masses and make a product that has all the description pre-loaded on the card. NO MORE BOOKLET! (hopefully)....

System Requirements

The Diagnostic Card itself only requires an empty PCI expansion slot. It is not necessary to install memory chips to perform analysis. “POST Codes” can be displayed through the hexadecimal display panel on the Diagnostic Card itself.

Tech Support

<table>
<thead>
<tr>
<th>Tech Support</th>
<th>1-888-359-0747</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="mailto:tech@elstonsystems.com">tech@elstonsystems.com</a></td>
<td></td>
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</table>

Diagnostic Card INDICATORS

There are two ‘Indicators’ included on this card. The light emitting diodes (LEDs) or LCD display panel that will display diagnostic information. This section discusses the following indicators that appear on the Diagnostic Card:

- POST code LCD display
- PCI bus signals LEDs
POST Code LCD Display

The POST Code LCD Display is made up a multi-line text display that not only will read out the current POST code, but a description of the error.

PCI bus signals LEDs

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>+12V</td>
<td><strong>Power Supply, +12 Volt Positive.</strong> Should be on all the time otherwise there is a short circuit.</td>
<td></td>
</tr>
<tr>
<td>-12V</td>
<td><strong>Power Supply, -12 Volt Negative.</strong> Should be on all the time otherwise there is a short circuit.</td>
<td></td>
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<tr>
<td>+5V</td>
<td><strong>Power Supply, +5 Volt Positive.</strong> Should be on all the time otherwise there is a short circuit.</td>
<td></td>
</tr>
<tr>
<td>+3.3V</td>
<td><strong>Power Supply, +3.3 Volt Positive.</strong> Should be on all the time otherwise there is a short circuit.</td>
<td></td>
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</tbody>
</table>

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<th>Signal</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLK</td>
<td><strong>Motherboard Clock Signal.</strong> Should be on when power is supplied to the motherboard even without CPU. Actually it's blinking on and off so fast, it appears to the naked eye, that it is &quot;on&quot; all the time, OR dimly lit.</td>
<td></td>
</tr>
<tr>
<td>SYS</td>
<td><strong>Motherboard System Signal.</strong> Most of the time this LED should be blinking on and off and a slow steady pace.</td>
<td></td>
</tr>
</tbody>
</table>

INSTALLING the Diagnostic Card

Installation Procedure

TO INSTALL the LCD Diagnostic Card follow these QUICK STEPS:

1) Connect the REMOTE display by attaching the white connector to the remote LCD panel. The white connector is "keyed" so it cannot be installed improperly.
2) Make sure you know WHICH BIOS you are troubleshooting. This is IMPORTANT to get the most out of this tester. What are you working on? AMI, AWARD, PHOENIX BIOS?
3) Power down the machine, install the Diagnostic Card in any available PCI expansion slot.
4) Power on the machine.
5) Select the correct BIOS while booting using the BIOS button.
6) Observe POST CODE, read the description of the problem on the LCD Post card.

Want more details on these steps? Keep reading below.
Overview of the Card Layout

Buttons:

**BIOS** = press this button once to change the BIOS modes while power is applied to the Diagnostic Card.

**S1** = press this button once to "go backward" to review the last 10 codes stored in memory.

**S2** = press this button once to "go forward" to the current code stored in memory.

No: 0 is the latest code stored in memory.
No: 1 is the second to the latest code in memory.
etc.
No: 9 is the tenth oldest code stored in memory.

The LCD card can store the last ten codes where you can cycle through and review the sequence of POST depending on if you press S1 or S2. The same buttons exist on the remote display as well. These buttons have the same function as the main board.
Power On Self-Test (POST) Codes

Most AT and 386 computers (and a few XT computers) output status codes during POST. The Diagnostic Card displays these codes during and after POST. Refer to Appendix A for a comprehensive listing of POST codes provided by BIOS manufacturers.

POST Codes

When the machine is turned on, the hexadecimal display should show the various POST codes as the system executes (unless it has a rare BIOS that does not display POST codes).

If the machine does not boot, system POST has detected a fatal fault and stopped. The number showing in the hexadecimal display on the Diagnostic Card is the number of the test in which POST failed. Refer to Appendix A for a listing of POST codes.

Troubleshooting During POST

After initial power up, Power-On Self-Test (POST) codes begin displaying on the Diagnostic Card’s hexadecimal displays (for most machines).

NOTE: A few machines use the parallel port to display POST codes instead of the Diagnostic Card.

THE POST PROCESS

The ROM built onto the motherboard of the computer runs its built-in POST (Power-On Self-Test) when you switch power on to the computer, press the reset button on the computer, or press Ctrl-Alt-Del (warm boot). POST performs a tightly interwoven initialization and testing process for each of these methods, but it typically does not test or initialize memory above 64K for warm boot. You can get an even better idea of the detailed process by studying the POST code listings in Appendix A.
Installation Detailed Steps

Step#1

Connect the REMOTE display by attaching the white connector to the remote LCD panel. The white connector is "keyed" so it cannot be installed improperly.

Connect the 12-pin jumper cable to the main board and the remote LCD board. The white connector is keyed to allow orientation accuracy. It does not matter which end goes to the main board or remote LCD board. In most cases you will want to use the remote LCD display, because when the main board is installed deep inside the computer, you will not be able to read the main screen LCD, unless you have a mirror and can stand on your head. Use the remote LCD panel to comfortably view the LCD codes and description of the demon possessed motherboard.
Installation Detailed Steps

Step#2

Make sure you know WHICH BIOS you are troubleshooting. This is IMPORTANT to get the most out of this tester. What are you working on? AMI, AWARD, PHOENIX BIOS?

Because this new LCD tester contains descriptions of what the BIOS CODEs mean, you should know which BIOS you are working with. One of the easiest ways is to put your detective hat on. you can pretend to be Dick Tracey if you like for this step. Take a look on the motherboard for the BIOS chip. 9 times out of 10, it will be printed on the BIOS chip who is the maker of the BIOS on the motherboard. In the photo below, you can see the words "Phoenix 1996" on this BIOS chip. BINGO...
Installation Detailed Steps

Step#3 and Step#4

Power down the machine, install the Diagnostic Card in any available PCI expansion slot.

Power on the machine.

We hope these two steps are self explanatory, but the most important part here is UNPLUG the computer from the wall BEFORE you insert the card into an available PCI slot. Some motherboards have an LED that is lit on the motherboard to remind you there is still power applied to the motherboard. Unplug the computer, and wait for this LED to go out. Now you are ready to install the card into the PCI slot. The PCI slot is the white slot on the motherboard. Once you have inserted the card, you may now plug in the computer to the wall socket, turn on the power supply switch in the back, and finally press the power button on the front panel of the computer.
Installation Detailed Steps

Step#5

Select the correct BIOS while booting using the BIOS button.

Hopefully, if everything goes well at this step, you should start to hear the fans on the motherboard start whirling around. Close your eyes and it starts to feel like you're riding in a convertible with the top down on a 70 degree summer day...Start to observe what is happening on the LCD display or as well on the remote LCD display if you are holding that in your hand.

If you start to see codes, then the next step here is to press the BIOS button and toggle until you see the BIOS name flash on the screen. Each time you press the BIOS button you change the mode on the LCD card. Codes are Codes in this case. If a code "02" shows up on the card, 02 will always show, but the description might be WRONG because you are in the wrong BIOS mode.

Codes displayed on the card could have three different meanings depending on which BIOS you are working on. So if you want to get the most out of your card, know which BIOS you are working on, and select the correct BIOS brand while booting.

The last BIOS name to flash on the screen is the current mode selected.
Installation Detailed Steps

Step#5 (cont - page - 2)

Select the correct BIOS while booting using the BIOS button.

Here is an IMPORTANT tip. If at this step, your power supply turns on, your hair is blowing from the fans, and the card is showing a CODE "00", well that's generally bad news. Since the BIOS codes come from the BIOS, and if they are dead or there is no power to the BIOS, then the card will show a CODE "00". That my friend is called a "show stopper".

One thing you could try at this point, is make sure all your devices are pulled from your motherboard, like modems, network cards, video cards, CPUs, memory sticks. Get the motherboard all the way down with nothing on it. The reason we suggest this is because a peripheral card can short out the motherboard causing the BIOS not to start. Our number one example of this is an old modem that has been hit by lighting. The modem will be shorted out, and since it's plugged into the PCI slot, guess what? Your motherboard won't boot or turn on either. Remove the modem removes the SHORT on the ISA or PCI slot and your motherboard 9 times out of 10 will POST.
Installation Detailed Steps

Step#6

*Observe POST CODE, read the description of the problem on the LCD Post card.*

The basic idea of how a Post Card works is that the BIOS starts up the computer from a black screen. The BIOS will start up all the hardware and finally pass the BOOT sequence or POST over to the operating system. Generally 3/4 of the CODEs that will be displayed on the card will happen before your monitor even flickers "on" for the first time.

Generally if there is a problem with a piece of hardware on the motherboard such as a memory stick, a CPU, a video card, etc, the POST card will STOP at the problem code. The stopped code on the LCD screen is generally the problem area. In the example below, CODE "60" "test expanded memory" is the memory test on the motherboard. If the memory fails at this point, this is the problem area, and will be the last code left displayed on the card.
Installation Detailed Steps

Step#6 (cont - page - 2)

Observe POST CODE, read the description of the problem on the LCD Post card.

If your motherboard is healthy and makes it all the way through POST, in this example below Phoenix has a CODE that passes the boot sequence up to the Operating System (OS). In this case, seeing a CODE "C0" on a Phoenix powered BIOS motherboard is a good thing. Because this means your motherboard and hardware is good. Hopefully by now your operating systems is trying to boot. If your OS is not booting, that is beyond what this card can diagnose. This card is not used to troubleshoot OS problems (software problems). Only hardware issues that are pre-OS boot, or during the POST. (Power On Self Test).
Installation Detailed Steps

Step#6 (cont - page - 3)

Observe POST CODE, read the description of the problem on the LCD Post card.

All though we make a valiant effort to keep the descriptions up-to-date in the LCD card, there WILL BE TIMES when you see "Unknown Code". There are two things to consider when you see this.

#1: Did you select the CORRECT BIOS? If not select the correct BIOS by pressing the BIOS button until you see your BIOS name flash up on the LCD screen. Refer to STEP#2 again in case you forgot.

#2: Yes, we have failed you. Ponder this...Do you know how many motherboard models are made each week? Think about Dell, ASUS, Gigabyte, MSI for a second. Of all the companies, there are a lot of motherboards produced weekly. BIOS manufactures can add CODES to BIOS firmware any time they want. Generally when they updated these troubleshooting codes, they also update their own POST code manuals. The idea here is that just because it says "unknown code" doesn't mean it's the end of the world, it just means you have to go back to the old ways, and download the latest BIOS manual from the BIOS maker's website, look up CODE "BA" and read what it means in the code booklet. We have provided the same reference at the end of this manual.
Appendix A

**Error Code - 00**
AMI  (00) Going to give control to INT 19H boot loader.

**Error Code - 01**
AMI  (01) Processor register test about to start, and NMI to be disabled, 286 reg. test about to start.
Award (01) Processor test 1; Processor status (1FLAGS) verification; Tests the following processor status flags carry, zero, sign, overflow. The BIOS will set each of these flags, verify they are set then turn each flag off and verify it is off.

**Error Code - 02**
AMI  (02) NMI is disabled. Power on delay starting. Power on delay starting. 286 reg.
AST  (02) Test CPU register.
Award (02) Processor test 2; Read/write/verify all CPU registers except SS, SP and BP with data pattern FF&00. Determine status of manufacturing jumper.
Chips & Tech (02) Test CPU register.
Dell (02) [Beep] = none 80286 register test in progress.
Phoenix (02) [Beep] = 1-1-3 CMOS write/read test.

**Error Code - 03**
AMI  (03) Power on delay complete. To check soft reset/power-on. Any initialization before keyboard BAT is in progress. ROM BIOS checksum (32K at F800:0) passed.
AST  (03) Test 8042 keyboard controller reset.
Award (03) Initialize Chips; Disable NMI, PIE, AIE, UEI, SQWV, disable video, parity checking, DMA; Reset math co-processor; Clear all page registers, CMOS shutdown byte; Initialize timer 0, 1 and 2 including set EISA timer to a known state; Initialize DMA controllers 0 and 1; Initialize interrupt controller 0 and 1; Initialize EISA extended registers. Calculate BIOS EPROM and sign-on message checksum; fail if not 0. Initialize EISA registers (EISA) BIOS only; Clear 8042 keyboard controller.
Chips & Tech (03) ROM did not checksum.

**Error Code - 04**
AMI  (04) Any initialization before keyboard BAT is complete. Reading keyboard SYS bit, to check soft reset/power-on. Reading keyboard SYS bit, to check soft reset/power on. Keyboard controller test with and without mouse passed. 8259 initialization OK.
AST  (04) Low level keyboard communication, keyboard ID verification.
Award (04) Test memory refresh toggle; RAM must be periodically refreshed in order to keep the memory from decaying. This function assures that the memory refresh function is working properly. Test CMOS RAM I/O port interface and verify battery power is available (bat. status = 1). Reset 8042.
Chips & Tech (04) DMA Controller failed.
Phoenix & Dell (04) Get the CPU type (Beep) = 1-1-2-1. CPU register test. Programmable Interval Timer test failure.

**Error Code - 05**
AMI  (05) Soft reset/power-on determined. Going to enable ROM, i.e. disable shadow RAM/Cache if any. Going to enable ROM, i.e. disable shadow RAM/cache if any, Chipset initialization over, DMA and interrupt controller disabled. CMOS pending interrupt disabled.
AST  (05) Read keyboard input port.
Chips & Tech (05) System timer bad.
Award (05) Keyboard controller self-test enable keyboard interface. Blank video, Initialize keyboard; Keyboard controller initialization, Initialize Chips; Disable NMI, PIE, AIE, UEI, SQ-WV, disable video, parity checking, DMA; Reset math co-processor; Clear all page registers, CMOS shutdown byte; Initialize timer 0, 1 and 2 including set EISA timer to a known state; Initialize DMA controllers 0 and 1; Initialize interrupt controller 0 and 1; Initialize EISA extended registers. Get manufacturing status, reset if set (loop 1-5).
Phoenix & Dell (05) [Beep] = 1-2-2 DMA initialization in-progress or failure.
Appendix A

Error Code – 06

AMI (06)ROM is enabled. Calculating ROM BIOS checksum, and waiting for Keyboard controller input buffer to be free. Calculating ROM BIOS checksum. Video disabled and system timer test begin. Video disabled and system timer counting OK.

AST (06)Support chipset initialize.

Award (06)Test memory refresh toggle; RAM must be periodically refreshed in-order to keep the memory from decaying. This function assures that the memory refresh function is working properly. Initialize chips.

Chips & Tech Phoenix&Dell (06)64K RAM Failed.

Error Code – 07

AMI (07)ROM BIOS checksum passed. CMOS shutdown register test to be done next. ROM BIOS checksum passed. Keyboard controller I/B free. Going to issue the BAT command to keyboard controller. Going to issue the BAT command to keyboard controller. CH-2 of 8254 initialization half way. CH-2 of 8253 test OK

Award (07)Verifies CMOS’s basis R/W functionality. Test CMOS interface and battery status. Verifies CMOS is working correctly, detects bad battery. Setup low memory; Early chip set initialization; Memory presence test; OEM chip set routines; Clear low 64K of memory; Test first 64K memory; clear lower 256K of memory, enable parity checking and test parity in lower 256K; test lower 25 If the BIOS detects error 2C, 2E, or 30 (base 512K RAM error), it displays 6K memory. Set up stack, beep. Read/write/verify CPU registers.

Chips & Tech Phoenix&Dell (07)64K RAM failed data test (Base Memory)

Error Code – 08

AMI (08)CMOS shutdown register test done. CMOS checksum calculation to be done next. BAT command to keyboard controller is issued. Going to verify the BAT command. Going to verify the BAT command. CH-2 of timer initialization over. CH-2 delta count test OK

Award (08)Setup low memory; Early chip set initialization; Memory presence test; OEM chip set routines; Clear low 64K of memory; Test first 64K memory; clear lower 256K of memory, enable parity checking and test parity in lower 256K; test lower 256K memory. Set up stack, beep. Setup interrupt vector table in lower 1K RAM area; Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL. Initialize CMOS timer.

Chips & Tech Phoenix&Dell (08)Interrupt Controller bad.

Error Code – 09

AMI (09)CMOS checksum calculation is done. CMOS diag byte written. CMOS initialize to begin. Keyboard controller BAT result verified. Keyboard command byte to be written next. (09)Keyboard command byte to be written next. CH-1 of timer initialization over. CH-1 delta count test OK

Award (09)Verify BIOS ROM checksum, flush external cache.

Chips & Tech Phoenix&Dell (09)Unexpected interrupt is occurring.

Error Code – 0A

AMI (0A)CMOS initialization done (if any). Keyboard command byte code is issued. Going to write command byte data. Going to write command byte data. CH-0 of timer initialization over. CH-0 delta count test OK

Award (0A)Initialize the first 32 interrupt vectors. Initialize first 32 interrupt vectors. Initialize INTs 33 to 120. Early Power Management initialization. Setup interrupt vector table in lower 1K RAM area; Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL. Initialize keyboard; Detect type of keyboard controller; optional 8242 or 8248, with NedaXOR gate control; Set NUM_LOCK status. Reset keyboard test keyboard controller interface to verify it returned AAH and responded to enable/disable commands, set keyboard buffer, enable keyboard and keyboard interrupts for normal use, beep, halt. Initialize Video controller.

Chips & Tech Phoenix&Dell (0A)Timer cannot interrupt.

Error Code – 0D

AMI (0D)CMOS checksum calculation is done. CMOS diag byte written. CMOS initialize to begin. Keyboard controller BAT result verified. Keyboard command byte to be written next. (0D)Keyboard command byte to be written next. CH-1 of timer initialization over. CH-1 delta count test OK

Award (0D)Verify BIOS ROM checksum, flush external cache.

Chips & Tech Phoenix&Dell (0D)Unexpected interrupt is occurring.

Error Code – 0E

AMI (0E)CMOS checksum calculation is done. CMOS diag byte written. CMOS initialize to begin. Keyboard controller BAT result verified. Keyboard command byte to be written next. (0E)Keyboard command byte to be written next. CH-1 of timer initialization over. CH-1 delta count test OK

Award (0E)Verify BIOS ROM checksum, flush external cache.

Chips & Tech Phoenix&Dell (0E)Unexpected interrupt is occurring.

Error Code – 0F

AMI (0F)CMOS checksum calculation is done. CMOS diag byte written. CMOS initialize to begin. Keyboard controller BAT result verified. Keyboard command byte to be written next. (0F)Keyboard command byte to be written next. CH-1 of timer initialization over. CH-1 delta count test OK

Award (0F)Verify BIOS ROM checksum, flush external cache.

Chips & Tech Phoenix&Dell (0F)Unexpected interrupt is occurring.
64K RAM chip or data line failure multi-bit.

**Error Code – 0B**

**AMI**


**Award**

(0B) Verify the RTC time is valid or not. Detect bad battery. Read CMOS data into BIOS stack area. Perform PnP initializations. Assign I/O & Memory for PCI devices (PCI BIOS Only). Test CMOS RAM checksum; beep; also test extended storage of parameters in the motherboard chipset; if not warm-booting,display the Test CMOS RAM check-sum message, if bad, or insert key pressed,load defaults if bad. Initialize video interface; Detect CPU clock; Read CMOS location 14b to find out type of video in use; Detect and initialize video adapter. 8254 timer,channel 0 test.

**Chips & Tech**

(0B) CPU protected mode.

**Phoenix&Dell**

(0B) Enable CPU Cable-Check CPU Jumpers. [Beep]=1-3-4 1st 64K RAM odd/even logic failure.

**Error Code – 0C**

**AMI**

(0C) KB controller I/B free. Going to issue the BAT command to keyboard controller. Pin-3,24 of keyboard controller is blocked/unblocked. NOP command of key-board controller to be issued next. NOP command of key-board controller to be issued next. System timer started. Refresh & system timer OK.

**Award**

(0C) Initialization of the BIOS data area(40:00-40:FF). Initialize keyboard; Detect type of keyboard controller (optional 8242 or 8248, with Neddon XOR gate control); Set NUM_LOCK status. Reset keyboard test keyboard controller interface to verify it returned AAH and responded to enable/disable commands, set keyboard buffer, enable keyboard and keyboard interrupts for normal use,beep,halt.8254 timer,channel 1 test.

**Chips & Tech**

(0C) DMA register failure.

**Phoenix&Dell**

(0C) Initialize cache to initial POST value. Test DMA page registers. [Beep]=1-4-1 1st 64K RAM address line failure.

**Error Code – 0D**

**AMI**

(0D) BAT command to keyboard controller is issued. Going to verify the BAT command. NOP command processing is done, CMOS shutdown register test to be done next. CMOS shutdown register test to be done next. Refresh link toggling passed. Refresh link toggling passed.

**AST**

(0D) (Beeps)=13 short, 8254 timer register.

**Chips & Tech**

(0D) (Beeps)=14 short. Refresh failure.

**Award**

(0D) Program some of the chipset’s value. Measure CPU speed for display. Video initialization including MDA, CGA,EGA/VGA. Initialize video interface; Detect CPU clock; Read CMOS location 14b to find out type of video in use; Detect and initialize video adapter. OEM specific-Initialize motherboard special chipset as required by OEM; initialize cache controller early, when cache is separate from chipset. 8254 timer,channel 2 test.

**Phoenix&Dell**

(0D) [Beep]=1-4-2 1st 64K RAM parity test in progress or failure.

**Error Code – 0E**

**AST**

(0E)(Beeps)=14 short, ASIC registers.

**AMI**

(0E) Keyboard controller BAT result verified. Any initia-lization after KB controller BAT to be next. CMOS shutdown register R/W test passed. Going to calculate CMOS checksum, and update DIAG. Goint to calculate CMOS checksum, and update DIAG Byte. Refresh period ON/OFF 50% OK.

**Award**

(0E) Initialize the APIC(Multi-Processor BIOS only). Test video RAM (If Monochrome display device found). Show startup screen message. Test video memory; Test video memory, write sign-on message to screen. Setup shadow RAM-Enable shadow according to setup. Test COMS Shutdown byte.

**Chips & Tech**

(0E) (Beeps)=14 short, Keyboard controller failure.

**Phoenix**

(0E) Initialize I/O.(Beep)1-1-4-3. Test 8254 timers.

**Error Code – 0F**

**AMI**

(0F) initialization after KB controller BAT done. Keyboard command byte to be written next. CMOS checksum calculation is done. DIAG byte written. CMOS Init. To begin(If “INIT CMOS IN EVERY BOOT IS SET”),CMOS initialization to begin(If “INIT CMOS IN EVERY BOOT IS SET”).

**AST**

(0F)(Beeps)=15 short, CMOS RAM shutdown.

**Award**

(0F) DMA channel 0 Test. Test DMA controller 0; BIOS checksum test, keyboard detect and initialization.Test Extended CMOS.

**Chips & Tech**

(0F)(Beeps)=15 short. Protected mode failure.

**Phoenix**

(0F) Initialize the local IDE.

**Error Code – A0**

**AMI**

(10) KB controller command byte is written. Going to issue pin-23,24 blocking/unblocking command. CMOS initia-lization done(if any). CMOS status
register about to Init for Date and Time. CMOS status register about to Init for Date and Time. Refresh on and about to start 64K base memory test. Confirmed refresh ON & about to start 64K memory.

AST (10)DMA controller test 0 register
Award (10)DMA channel 1 Test. Test DMA controller 1 with AA, 55,FF,00 pattern.8237 DMA,channel 0 test.
Compaq (10)PPI disabled, Program timers 0 & 1.
Chips & Tech (10)Register about to Init for Date and Time. Refresh on and about to start 64K base memory test. Confirmed refresh ON & about to start 64K memory.
Phoenix&Dell (10)DMA controller test register 1.

Error Code – 11
AMI (11)Pin23,24 of keyboard controller is blocked/unblocked. Going to check to check pressing of <INS> key during power-on. CMOS status register initialized. Going to disable DMA and Interrupt controllers. Going to disable DMA and Interrupt controllers. Address line test passed. Address line test passed.
AST (11)DMA controller test register 1.
Award (11)DMA page register test. Test DMA page registers, use I/O ports to test address circuits. POST enables user reboot here. Test DMA page registers. FATAL DISPLAY ER- RORS.8237 DMA, channel 1 test.
Compaq (11)DMA controller test register 1.
Chips & Tech (11)Register LDT failure.
Phoenix&Dell (11)DMA page register test. Test DMA page registers, use I/O ports to test address circuits. POST enables user reboot here. Test DMA page registers. FATAL DISPLAY ER- RORS.8237 DMA, channel 1 test.

Error Code – 12
AMI (12)Checking for pressing of <INS> key during power-on done. Going to disable DMA and Interrupt controllers. DMA controller #1, #2, interrupt controller #1, #2 disabled. About to disable Video display and Init port-B. About to disable video display and Init port-B. 64K base memory test passed. 64K base memory test passed.
AST (12)DMA page registers test.
Award (12)Call support 800-909-3424. Test 8254 timer 0 channel 0. Test DMA page registers.
Compaq (12)DMA page registers test.
Chips & Tech (12)Task register failure.
Phoenix&Dell (12)Clear screen, turn on video.

Error Code – 13
AMI (13)DMA controller #1, #2, interrupt controller #1, #2 disabled. About to disable Video display and initialize port-B. Chipset initialize/auto memory detection about to begin. Replace first memory SIMM. (13)Chipset initialize/auto memory detection about to begin. Replace first memory SIMM. (13)Chipset initialize/auto memory detection about to begin. Replace first memory SIMM.
AST (13)Initialize video.
Award (13)Test 8254 timer 0 channel 1. Test keyboard controller.
Compaq (13)Test timer 0.
Chips & Tech (13)Register LDT failure.
Phoenix&Dell [Beep]=2-1-4 1st 64K RAM chip or data line failure-bit 3. Initialize PCI Bus Mastering devices.

Error Code – 14
ACER (14)DMA Controller.
AMI (14)Chipset initialization/auto memory detection over. To un-compress the POST code if compressed BIOS. 8254 timer test about to start. 8254 timer test about to start. 8042 keyboard controller test OK.
AST (14)Memory refresh test.
Award (14)Test 8254 timer 0 counter 2. Test timer counter 2; Test 8254 timer 0 counter 2. Test memory refresh.
Compaq (14)Disable RTC interrupts.
Chips & Tech (14)LAR failure.

Error Code – 15
AMI (15)POST code is un-compressed. 8254 timer about to start. CH-2 timer test halfway. 8254 CH-2 timer test to be complete. 8254 CH-2 timer test to be completed. Interrupt vectors initialized. CMOS read/write test OK.
Award (15)test 8259 interrupt mask bits for channel 1. Test 8259-1 mask bits; Verify 8259 channel 1 masked interrupt by alternate turning off and on the interrupt line. Test 1st 64K of system memory.
Compaq (15)Check battery power.
Chips & Tech (15)VERW/VERR failure.
Appendix A

Phoenix&Dell  (15) [Beep]=2-2-2 1st 64K RAM chip or data line failure-bit 5.

AMI  
(16) CH-2 timer test over.8254 CH-1 timer test to be complete. CMOS checksum/battery check OK
Award  
(16) Test 8259-2 mask bits; Verify 8259 channel 2 masked interrupt by alternate turning off and on the interrupt line. Setup Interrupt vectors.
Compaq  
(16) Battery power was lost.
Chips & Tech  
(16) Keyboard controller gate A20 failure.
Phoenix&Dell  

AMI  
(17) CH-1 timer test over.8254 CH-0 timer test to be completed. Monochrome mode set.
Award  
(17) Test struck 8259’s interrupt bits; Turn off interrupt then verify no interrupt mask register is on. Setup video I/O operations.
Compaq  
(17) Clear CMOS-DIAG
Phoenix&Dell  
(17) Initialize cache before memory auto-size.[Beep]=2-2-4 1st 64K RAM chip or data line failure-bit 7.

ACER  
(18) Timer initialize.
AMI  
(18) CH-0 timer test over. About to start memory refresh. Color mode set.
AST  
(18) Testing Video memory.
Award  
(18) Test 8259 interrupt functionality; Force an interrupt and verify the interrupt occurred. Test video memory.
Dell  
(18) [Beep]=2-3-1 1st 64K RAM chip or data line failure-bit 8
Compaq  
(18) Test base memory(first 128K)
Chips & Tech  
(18) Shutdown during memory test.
Phoenix&Dell  
(18) 8254 timer initialization.[Beep]=1-2-3-1. Test 8259 interrupt controllers registers.[Beep]=2-3-1 1st 64K RAM chip or data line failure-bit 8.

AMI  
(19) 82 timer test over. Memory refresh test to be done next. About to look for optional video ROM at segment C000 and give control to the optional video ROM if present.
Award  
(19) Test 8259 functionality. Test stuck NON-Maskable Interrupt bits(Parity/I/O check):Verify NMI can be cleared. 8259 Interrupt controller, channel 1 mask bits test.
Compaq  
(19) Clear and initialize base memory.
Phoenix&Dell  
(19) Check memory.[Beep]=2-3-2 1st 64K RAM chip or data line failure-bit 9.

Error Code – 18

AMI  
(1A) Memory refresh line is toggling. Going to check 15 micro second ON/OFF time. Return from optional video ROM. Optional video ROM control OK
Award  
(1A) Display CPU clock.8259 Interrupt controller, channel 2 mask bits test.
Compaq  
(1A) Initialize and test VDU adapters.
Chips & Tech  
(1A) Copyright checksum errors.
Phoenix&Dell  
(1A) 8237 DMA controller initialization.[Beep]=1-2-3-3. Verify refresh is occurring.[Beep]=2-3-3 1st 64K RAM chip or data line failure-bit A.

Error Code – 1B

AMI  
(1B) Memory refresh period 30 micro second test complete. Base 64K memory test about to start. Shadow RAM enable/disable completed. Display memory read/write test OK.
Award  
(1B) Test CMOS battery status. Test the system ROM.
Chips & Tech  
(1B) Shutdown during memory sizing.
Phoenix&Dell  
(1B) [Beep]=2-4-1 1st 64K RAM chip or data line failure-bit B.

Error Code – 1C

ACER  
(1C) Memory refresh.
AMI  
(1C) Display memory read/write test for main display type as set in the CMOS setup program over. Display memory read/write test for alternate display OK.
Award  
(1C) Test CMOS RAM checksum. Test CMOS.
Chips & Tech  
(1C) Chip-Set initialization.
Phoenix&Dell  
(1C) [Beep]=2-4-1 1st 64K RAM chip or data line failure-bit C. Reset Programmable Interrupt Controller.[Beep]=1-2-4-1. Base 64K address test.

Error Code – 1D

AMI  
(1D) Display memory read/write test for alternate display type complete if main display memory read/write test returns error. Video retrace check OK. Set configuration from CMOS.
Compaq  
(1D) Test DMA controller and page registers.
Phoenix&Dell  
(1D) [Beep]=2-4-2 1st 64K RAM chip or data line failure-bit D

Error Code – 1E

ACER  
(1E) Select memory type.
Appendix A

**Error Code - 1F**

AMI
1F)Video mode set call for mono/color begins. Mode set call for mono/color OK. Set EISA mode; If EISA non-volatile memory checksum is good, execute EISA initialization. If not, execute ISA test an clear EISA mode flag. Test EISA configuration memory integrity(checksum & comm.-unic interface).

Award
1F)Test system memory.

Compaq
1F)Test keyboard controller.

Phoenix&Dell
[Beep]=2-4-3 1st 64K RAM chip or data line failure- bit E. Base 64K RAM test(16 bits).

**Error Code - 20**

AMI
20)Video mode set call for mono/color begins. Mode set call for mono/color OK. Set EISA mode; If EISA non-volatile memory checksum is good, execute EISA initialization. If not, execute ISA test an clear EISA mode flag. Test EISA configuration memory integrity(checksum & comm.-unic interface).

Award
20)Test system memory.

Compaq
20)Test 286 protected mode.

Phoenix&Dell
[Beep]=2-4-4 1st 64K RAM chip or data line failure- bit F.

**Error Code - 21**

AMI
21)Address line test passed. Going to do toggle parity. (21) ROM type 27256 verified. Video display OK.

Award
21)Enable slots 1 through 15;Initialize slot 1. Test stuck NMI bits (parity I/O check).

Compaq
21)Init time of day.

Phoenix&Dell
[Beep]=3-1-1 master DMA register test in-progress or failure. Test DRAM refresh.(Beep)=1-3-1-1. Upper 16 of 32 bit test failed.

**Error Code - 22**

AMI
22)Enable slots 2; Initialize slot 2. Test 8259 working.

Award
22)Init 287 Coprocessor.

Compaq
22)Toggel parity over. Going for sequential data R/W test on 64K memory. Power on message display OK.

Phoenix&Dell
[Beep]=3-1-2 slave DMA register test in-progress or failure.

**Error Code - 23**

AMI
23)Base 64K sequential data R/W test passed. Going to SET BIOS stack and to do any setup before Interrupt vector Init. Any setup before interrupt vector Init about to start. Power on message displayed.

Award
23)Enable slots 3;Initialize slot 3. Test protected mode.

Compaq
23)Test keyboard and interface.

Phoenix&Dell
[Beep]=3-1-2 slave interrupt mask register test in-progress or fail.

**Error Code - 24**

AMI
24)Test keyboard controller(8042).

Award
24)Setup required before vector initialization complete. Interrupt vector initialization about to begin.

Compaq
24)Reset A20 ads set default CPU speed.

Phoenix
24)Set ES segment to register to 4 GB.(beep)=1-3-2-1. Verify CMOS/Configure CMOS.

**Error Code - 25**

AMI
25)Interrupt vector initialization done. Going to read Input port of 9042 for turbo switch(if any). Going to read I/O port of 9042 for turbo switch(if any).

Award
25)Enable slots 5;Initialize slot 5. Test extended memory.

Compaq
25)Test diskette subsystem.

Phoenix&Dell

**Error Code - 26**

AMI
26)I/O port of 9042 is read. Going to initialize global data for turbo switch. Going to initialize global data for turbo switch.

Award
26)Enable slots 6;Initialize slot 6. Test protected mode exceptions.

Compaq
26)Test fixed disk subsystem.

Phoenix 6.0
26)Enable A20 line. Verify/Load NVRAM parameters.

**Error Code - 27**

AMI
27)Global data initialization for turbo switch is over. Any initialization before setting video mode to be done next.
Appendix A

| Award          | (27)Enable slots 7; Initialize slot 7. Setup cache control or shadow RAM. |
|               | (27)Initialize parallel printer. |
| Phoenix&Dell  | (27)[Beep]=3-2-4 keyboard controller test in-progress or failure. |
| ACER          | (28)Test CPU. |
| AMI           | (28)Initialization before setting video mode is complete. Going for monochrome mode and color setting. Check extended memory. |
| Award         | (28)Enable slots 8; Initialize slot 8. Setup 8242. |
| Compaq        | (28)Perform search for option ROMs. |
| Phoenix&Dell  | (28)[Beep]=3-3-1 CMOS power-fail and checksum checks in-progress. Auto-size DRAM. [Beep]=1-3-3-1. Protected mode 1. |
| AMI           | (29)Monochrome mode setting is done. Going for color mode setting. |
| Award         | (29)Enable slots 9; Initialize slot 9. |
| Compaq        | (29)Test for valid system configuration. |
| Phoenix&Dell  | (29)[Beep]=3-3-2 CMOS configuration info validation in-progress. Initialize POST Memory Manager. |
| AMI           | (2A)Monochrome Color mode setting is done. About to go for toggle parity before optional ROM test. About to go for toggle parity before optional ROM Check. |
| Award         | (2A)Enable slots A; Initialize slot A. (2A) 8242 initialization. |
| Compaq        | (2A)Clear screen. |
| Phoenix       | (2A)Clear 512K base RAM. (Beep)=1-3-3-3. Auto-site memory chips. |
| AMI           | Error Code = 2B |
| Award         | (2B)Enable slots B; Initialize slot B. Initialize floppy drive and controller. |
| Compaq        | (2B)Check for invalid time and date. |
| Phoenix&Dell  | (2B)[Beep]=3-3-4 screen memory test in-progress or failure. |
| ACER          | (2C)Set up interrupt controller(8259). |
| AMI           | (2C)Processing before video ROM control is done. About to look for optional video ROM and give control. |
| Award         | (2C)Enable slots C; Initialize slot C. Detect & initialize serial ports. |
| Compaq        | (2C)Boot. |
| Phoenix       | (2C)[Beep]=3-4-1 screen initialization in-progress or failure. |
| AMI           | Error Code = 2D |
| Award         | (2D)Optional video ROM control is done. About to give control to do any processing after video ROM returns control. |
| Phoenix&Dell  | (2D)[Beep]=3-4-2 screen retrace tests in-progress or failure. |
| AMI           | Error Code = 2E |
| Award         | (2E)Return from processing after the video ROM control. If EGA/VGA not found then do display memory R/W test. |
| Dell          | (2E)[Beep]=3-4-3 search for video ROM in-progress. |
| Phoenix       | (2E) See Error code "2C". Test 512K base memory. (Beep)= 1-3-4-3. Exit 1st protected mode test. [Beep]=none search for video ROM in-progress. |
| AMI           | Error Code = 2F |
| Award         | (2F)EGA/VGA not found. Display memory R/W test about to begin. |
| Compaq        | (2F)Enable slots F; Initialize slot F. Detect & initialize 80x87 Co-Processor. |
| Phoenix       | (2F)Enable cache before system BIOS shadow. |
| ACER          | (30)Set up Temp. interrupt. |
| AMI           | (30)Display memory R/W test passed. About to look for the retrace checking. Virtual mode memory test about to begin. |
| AST           | (30)Interrupt controller#1. |
| Award         | (30)Get base memory & extended memory size. Size base And extended memory... |

Error Code = 28

Error Code = 29

Error Code = 2A

Error Code = 2C

Error Code = 2D

Error Code = 2E

Error Code = 2F

Error Code = 30
from 256K to 640K and extended memory above 1MB.

**Error Code – 31**

AMI (31) Display memory R/W test or retrace checking failed. About to do alternate Display memory R/W test. Virtual mode memory test started.

Award (31) Test base and extended memory; Test base memory from 256K to 640K and extended memory above 1MB using various patterns. Detect & initialize optional ROMs.

Compaq (31) Load interrupt vectors 70-77.

Phoenix&Dell (31)[Beep]=none monochromatic screen believed operable.

**Error Code – 32**

AMI (32) Alternate display memory R/W test passed. About to look for the alternate display retrace checking. Processor executing in virtual mode.

Award (32) Test base and extended memory above 1MB using various patterns. Detect & initialize optional ROMs.

Compaq (32) Load interrupt vectors 00-1F;

Phoenix (32) Load interrupt vectors 00-1F;

Dell (32)[Beep]=none 40-column color screen believed operable.

**Error Code – 33**

AMI (33) Video display checking over. Verification of display type with switch setting and actual card to begin. Verification of display type with switch setting and Actual Card to begin. Memory address line test in progress.

Award (33) Call Tech Support 727-532-4151.

Compaq (33) Initialize Memory SIZE and RESETWD.

Phoenix&Dell (33)[Beep]=none 80-column color screen believed operable. Initialize dispatch Manager.

**Error Code – 34**

AMI (34) Set up BIOS interrupt vector.

Compaq (34) Verifcation of display adapter done. Display mode to be set next. Memory address line test in progress.

Phoenix&Dell (34)[Beep]=4-2-1 timer tick interrupt test in progress or failure. Relocate memory option.

**Error Code – 35**

AMI (35) Display mode set complete. BIOS ROM data area about to be checked. Memory below 1MB calculated.

Compaq (35) CMOS checksum not valid.

Phoenix&Dell (35)[Beep]=4-2-2 shutdown test in progress or failure.

**Error Code – 36**

AMI (36) BIOS ROM data area check over. Going to set cursor for power on message. Memory above 1MB calculated.

Compaq (36) Check battery power.


**Error Code – 37**

AMI (37) Cursor setting for power on message id complete. Going to display the power on message. Memory test about to start.

Compaq (37) Check for game adapters.

Phoenix&Dell (37)[Beep]=1-4-2-4-2 unexpected interrupt in protected mode. Reinitialize the motherboard chipset.

**Error Code – 38**

ACER (38) CMOS RAM.

AMI (38) Power on message display complete. Going to read new cursor position. Memory below 1MB initialized.

Compaq (38) Check for serial ports.

Phoenix&Dell (38)[Beep]=4-3-1 RAM test in progress or failure above address 0FFFFh

**Error Code – 39**

AMI (39) New cursor position read and saved. Going go display the Hit<DEL> message.
Appendix A

Compaq
(39) Check for parallel ports.
(39) Reinitialize the cache. (Beep) = 1-4-3-1

**Error Code – 3A**

AMI
(3A) Check memory, first 64K, one long beep. Reference string display is over. Going to display the Hit<ESC> message. Memory size display initiated. This will be updated when the BIOS goes through the memory.

Award
(3A) Check memory.

Compaq
(3A) Initialize Port. And comm. timeouts.

Phoenix&Dell
(3A)[Beep]=4-3-3 Interval timer channel 2 test in progress or failure.

Phoenix
(3A) Auto-size cache. (Beep)=1-4-3-3. Retest 64K base RAM.

**Error Code – 3B**

AMI
(3B) Hit<DEL> or <ESC> message displayed. Virtual mode memory test about to start. About to start below 1MB memory test.

Compaq
(3B) Flush keyboard buffer.

Phoenix&Dell
(3B)[Beep]=4-3-4 Time-Of-Day clock test in progress or failure.

**Error Code – 3C**

ACER
(3C) Memory size.

AMI
(3C) Memory test below 1MB completed and about to start above 1MB test.

Award
(3C) Set flag to allow users to enter CMOS setup utility. Setup enabled.

Phoenix
(3C) Configure advanced chipset registers. (Beep)=1-4-4-1. Determine relative CPU speed.

Phoenix&Dell
(3C)[Beep]=4-4-2 Serial port test in progress or failure.

**Error Code – 3D**

AMI
(3D) Memory test above 1MB completed.

Award
(3D) Initialize keyboard. Install PS/2 mouse. Initialize & install mouse; Detect if mouse is present, initialize mouse, install interrupt vectors.

Phoenix
(3D) Load alternate registers with CMOS values, (Beep)=1-4-4-2

Phoenix&Dell
(3D)[Beep]=4-4-2 Parallel port test in progress or failure.

**Error Code – 3E**

AMI
(3E) About to go to real mode (shutdown).

Award
(3E) Try to turn on level 2 cache.

Phoenix
(3E) Get switches/jumper status from 8742.

Phoenix&Dell
(3E)[Beep]=4-4-3 Math CoProcessor test in progress or failure.

**Error Code – 3F**

AMI
(3F) Shutdown successful and Processor in real mode.

Award
(3F) Enable shadow RAM per CMOS RAM setup or if MEMORY TYPE is SYS in the EISA configuration.

Dell
(3F) Cache memory failure.

**Error Code – 40**

ACER
(40) Shutdown#1.

AMI
(40) Preparation for virtual mode test started. Going to verify from video memory. CACHE memory on and about to disable A20 address line.

AST
(40) CMOS RAM backup battery.

Award
(40) Display virus protest disable or enable.

Compaq
(40) Save RESET WD value.

Phoenix
(40) Set initial CPU speed. (Beep)=2-1-1-1.

**Error Code – 41**

AMI
(41) Returned after verifying from display memory. Going to prepare the descriptor tables. A20 address line disabled successful.

AST
(41) CMOS RAM checksum.

Award
(41) Initialize floppy disk drive controller.

Compaq
(41) Check RAM refresh.

**Error Code – 42**

AMI
(42) Descriptor tables prepared. Going to enter in virtual mode for memory test. 486 internal cache turned on. About to start DMA controller test.

AST
(42) Setup CMOS RAM.

Award
(42) Initialize hard drive & controller; Initialize hard drive controller and any drives.

Compaq
(42) Start write cycle of 128K RAM test.

Phoenix
(42) Initialize interrupt vectors. (Beep)=2-1-1-3.

**Error Code – 43**

AMI
(43) Entered in the virtual mode. Going to enable interrupts for diagnostics mode. About to start DMA controller test.

Award
(43) If it is a PnP BIOS, initialize serial & parallel ports. Detect & initialize serial/parallel ports; Initialize any serial and parallel ports (also game port).

Compaq
(43) Reset parity checks.

**Error Code – 44**

ACER
(44) Video BIOS ROM initialize.

AMI
(44) Interrupts enabled (if post switch is on). Going to initialize data to check
Appendix A

memory wrap around at 0:0.
Award (44) Going to initialize data to check memory re-map at 0:0.
Compaq (44) Start verify cycle if 128K RAM test.
Phoenix (44) Initialize BIOS interrupts.(Beep)=2-1-2-1. Verify video configuration.

Error Code – 45

ACER (45) Set up BIOS RAM.
AMI (45) Data initialized. Going to check for memory wrap around at 0:0 and the total system memory size.
Award (45) Detect & Initialize math CoProcessor; Initialize math CoProcessor.
Compaq (45) Check for parity errors.
Phoenix (45) POST device initialization.

Error Code – 46

ACER (46) Test controller and cache memory.
AMI (46) Memory wrap around test done. Memory size calculation over, writing patterns to test memory.
Award (46) Display the setup message(to press Ctrl-Alt-Esc to enter setup), and enable setup.
Compaq (46) No RAM errors.
Phoenix (46) Check ROM copying notice.(Beep)=2-1-2-1-3.

Error Code – 47

Phoenix (46) POST device initialization.

Error Code – 48

AMI (47) Pattern to be tested written in extended memory, 640K memory.
Award (47) Set system speed for boot.
Compaq (47) Got a RAM error.
Phoenix (47) Initialize manager for PCI Options ROMs.(Beep)=2-1-2-4.

Error Code – 49

AMI (48) Memory test.
Phoenix (48) Check Video configuration against CMOS.(Beep)=2-1-3-1. Test for unexpected interrupts.

Error Code – 4C

Phoenix (48) Quiet-Boot start(optional).

Error Code – 4D

AMI (49) Memory below 1M found and verified. Going to find out amount of memory above 1M memory.
Phoenix (49) Initialize PCI bus and devices.(Beep)=2-1-3-2.

Error Code – 4A

AMI (4A) Amount of memory above 1M found and verified. Going for BIOS ROM data area check.
Phoenix (4A) Initialize all video adapters in system.(Beep)=2-1-3-3. Start 2nd protected mode test.

Error Code – 4B

AMI (4B) Amount of memory above 1M found and verified. Check for soft reset and going to clear memory below 1M for reset.(If power on, go to check point#4Eh). BIOS ROM data area check over. Going to check<ESC> and to clear memory below 1M for soft reset.
Phoenix (4B) Quiet-Boot start(optional).

Error Code – 4C

Phoenix (4C) Shadow video BIOS ROM.(Beep)=2-1-4-1. Perform LDT instructions test.

Error Code – 4E

AMI (4D) Memory above 1M cleared. (SOFT RESET) Going to save the memory size.(GOTO check point#52h)

Error Code – 4E

AMI (4E) Memory test started.(NO SOFT RESET) About to display the first 64K memory test.

Award (4E) If there is any error, show all the error messages on the screen & wait for user to press<F1>. Manufacturing POST loop or display messages; Reboot if manufacturing POST loop pin is set. Otherwise display any messages and enter setup.

Error Code – 4F

AMI (4F) Memory size display started. This will be updated during memory test. Going for sequential and random memory test. Processor in real mode after shutdown.
Award (4F) If password is needed, ask for password. Clear the Energy Star logo(Green BIOS only). Security check; Ask password security.

Error Code – 50


Error Code – 4F

AMI (50) Memory testing/initialization below 1M complete. Going to adjust displayed memory size for relocation /shadow. DMA page register test complete.
Appendix A

<table>
<thead>
<tr>
<th>Company</th>
<th>Code</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>AST</td>
<td>50</td>
<td>Protected mode.</td>
</tr>
<tr>
<td>Award</td>
<td>50</td>
<td>Write all the CMOS values currently in the BIOS stack areas back into the CMOS. Write CMOS; Write all CMOS values back to RAM and clear screen.</td>
</tr>
<tr>
<td>Compaq</td>
<td>50</td>
<td>Check for dual freq in CMOS.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>50</td>
<td>Hardware initialize.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>50</td>
<td>Display CPU type and speed.(Beep)=2-2-1-1.(50)Per- form LSL instruction test.[Beep]=none Custom chip set or custom platform.</td>
</tr>
<tr>
<td>AMI</td>
<td>51</td>
<td>Memory size display adjusted due to relocation/shadow. Memory test above 1M to follow. DMA unit-1 base register test about to start.</td>
</tr>
<tr>
<td>AST</td>
<td>51</td>
<td>Protected mode.</td>
</tr>
<tr>
<td>Award</td>
<td>51</td>
<td>Pre-boot enable; Enable parity checker; Enable NMI, Enable cache before boot.</td>
</tr>
<tr>
<td>Compaq</td>
<td>51</td>
<td>Check CMOS VDU configuration.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>51</td>
<td>Timer Initialize</td>
</tr>
<tr>
<td>Phoenix</td>
<td>51</td>
<td>Initialize EISA board.</td>
</tr>
<tr>
<td>AMI</td>
<td>52</td>
<td>Memory testing-initialization below 1M complete. Going to save memory size information. Going to prepare to go back to real mode. DMA unit-1 channel OK, about to begin CH-2.</td>
</tr>
<tr>
<td>Award</td>
<td>52</td>
<td>Initialize all ISA ROMs. Later PCI initializations(PCI BIOS only), PnP initializations(PnP BIOS only), Program shadow RAM according to setup settings. Program parity according to setup setting. Power Management initialization. Initialize option ROMs; initialize any option ROMs present from C8000h to EFFFFh.</td>
</tr>
<tr>
<td>Compaq</td>
<td>52</td>
<td>Start VDU search.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>52</td>
<td>DMA controller initialize.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>52</td>
<td>Test keyboard.(Beep)=2-2-1-3.(52)Perform LAR instruction test.</td>
</tr>
<tr>
<td>AMI</td>
<td>53</td>
<td>Memory size information is saved. CPU registers are saved. Going to enter in real mode. DMA CH-2 base register test OK.</td>
</tr>
<tr>
<td>Award</td>
<td>53</td>
<td>If it is not a PnP BIOS, initialize serial &amp; parallel ports. Initialize time value in BIOS data area. Initialize time value; Initialize time value in 40h BIOS data area.</td>
</tr>
<tr>
<td>Compaq</td>
<td>53</td>
<td>Vector to VDU option ROMs.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>53</td>
<td>Initialize interrupt controller.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>53</td>
<td>Set keyboard if enabled.(Beep)=2-2-2-1.(53)Perform VERR instruction test.</td>
</tr>
<tr>
<td>AMI</td>
<td>54</td>
<td>#7 shutdown.</td>
</tr>
<tr>
<td>Compaq</td>
<td>54</td>
<td>Shutdown successful, CPU in real mode. Going to re- store registers saved during preparation for shutdown. About to check F/F latch for unit-1 and unit-2.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>54</td>
<td>Initialize primary display adapter.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>54</td>
<td>Chip-Set Initialize.</td>
</tr>
<tr>
<td>AMI</td>
<td>55</td>
<td>Registers restored. Going to disable gate A20 address line. F/F latch for both units checked.</td>
</tr>
<tr>
<td>Award</td>
<td>55</td>
<td>Check PCI video Card-or replace video card.</td>
</tr>
<tr>
<td>Compaq</td>
<td>55</td>
<td>Initialize secondary display adapter.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>55</td>
<td>EMS configuration Setup.</td>
</tr>
<tr>
<td>AMI</td>
<td>56</td>
<td>A20 address line disable successful. BIOS ROM data area about to be checked. DMA unit 1 and 2 programming over and about to initialize 8259 interrupt controller.</td>
</tr>
<tr>
<td>Compaq</td>
<td>56</td>
<td>No display adapters installed.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>56</td>
<td>Protected mode.</td>
</tr>
<tr>
<td>AMI</td>
<td>57</td>
<td>A20 address line disable successful. BIOS ROM data area check halfway. BIOS ROM data area check to be complete.8259 initialization over.</td>
</tr>
<tr>
<td>Compaq</td>
<td>57</td>
<td>Init primary VDU mode.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>57</td>
<td>Memory size.</td>
</tr>
<tr>
<td>ACER</td>
<td>58</td>
<td>#6 shutdown.</td>
</tr>
<tr>
<td>AMI</td>
<td>58</td>
<td>Memory size adjusted for relocation/shadow. Going to clear Hit&lt;DEL&gt; message. BIOS ROM data area check over. Going to clear Hit&lt;ESC&gt; message.8259 mask register check OK.</td>
</tr>
<tr>
<td>Compaq</td>
<td>58</td>
<td>Start of VDU test (for each adapter).</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>58</td>
<td>Memory interleave configure.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>58</td>
<td>Test for unexpected interrupts.(Beep)=2-3-3.(58)Perform A20 gate test.</td>
</tr>
<tr>
<td>AMI</td>
<td>59</td>
<td>Hit&lt;ESC&gt; message cleared.&lt;Wait..&gt; message displayed. About to start DMA</td>
</tr>
</tbody>
</table>
and interrupt controller test. Master 8259 mask register OK, about to start slave.

**Error Code – 5A**

AMI (5A) About to check timer and keyboard interrupt level.
Compaq (5A) Blank display, check VDU registers.
Chips & Tech (5A) Board memory size.
Phoenix (5A) Keyboard ready test. Display prompt “press F2 to enter SETUP”. (Beep)=2-2-3-3

**Error Code – 5B**

AMI (5B) Timer interrupt OK.
Compaq (5B) Start screen memory test.
Chips & Tech (5B) Shadow RAM relocated.
Phoenix (5B) Display CPU cache.

**Error Code – 5C**

ACER (5C) About to test keyboard and I/O.
AMI (5C) About to test keyboard interrupt.
Compaq (5C) End of test of adapter, clear memory.
Chips & Tech (5C) EMS configure.
Phoenix (5C) Test RAM between 512 and 640K. (Beep)=2-2-4-1. Determine if AT or KT keyboard type.

**Error Code – 5D**

AMI (5D) ERROR! Timer/keyboard interrupt not in proper level.
Compaq (5D) Error detected on an adapter.
Chips & Tech (5D) Wait state configuration is set-up.

**Error Code – 5E**

AMI (5E) 8259 interrupt controller error.
Compaq (5E) Test the next adapter.
Chips & Tech (5E) 1st 64K RAM re-test.
Phoenix (5E) Enter third protected mode test.

**Error Code – 5F**

AMI (5F) 8259 interrupt controller test OK.
Compaq (5F) All adapters successfully tested.
Chips & Tech (5F) Shadow RAM.

**Error Code – 60**

ACER (60) Set up BIOS interrupt.
AMI (60) DMA page register test passed. About to go for DMA #1, verify from display memory.
AST Award (60) Setup virus protection (Boot sector protection).
Compaq (60) Start of memory test.
Chips & Tech (60) CMOS RAM.
Phoenix (60) Test expanded memory. (Beep)=2-3-1-1. (60) Base memory test.

**Error Code – 61**

AMI (61) Display memory verification over. About to go for DMA #1 base register test.
AST (61) RAM test.
Award (61) Try to turn on level 2 cache. Set the boot up speed according to setup setting. Last chance for chipset initialization. Last chance for power management initialization. Show the system configuration table.
Compaq (61) Enter protected mode.
Chips & Tech (61) Video.

**Error Code – 62**

AMI (62) DMA #1 base register test passed. About to go for DMA #2 base register test.
AST (62) Shadow RAM.
Award (62) Setup daylight saving according to setup values. Program the NUM lock, type rate & type speed according to setup setting. Setup NUM_LOCK; Setup NUM_LOCK status according to setup.
Compaq (62) Start memory sizing.
Phoenix (62) Test extended memory address lines. (Beep)=2-3-1-3. Base memory address test.

**Error Code – 63**

AMI (63) DMA #2 base register test passed. About to go for BIOS ROM data area check.
AST (63) Cache memory.
Award (63) If there is any changes in the hardware configuration, update the ESCD information (PnP BIOS only. Clear memory that have been used. Boot system via INT 19h.)
Compaq (63) Get CMOS size.
Chips & Tech (63) Protected mode interrupt.
### Appendix A

<table>
<thead>
<tr>
<th>Error Code – 64</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACER</strong></td>
</tr>
<tr>
<td><strong>AMI</strong></td>
</tr>
<tr>
<td><strong>AST</strong></td>
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<tr>
<td><strong>Compaq</strong></td>
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<tr>
<td><strong>Chips &amp; Tech</strong></td>
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<tr>
<td><strong>Phoenix</strong></td>
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<tr>
<th>Error Code – 65</th>
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<tbody>
<tr>
<td><strong>AMI</strong></td>
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<td><strong>AST</strong></td>
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<td><strong>AMI</strong></td>
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<tr>
<td><strong>Compaq</strong></td>
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<td><strong>AMI</strong></td>
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<td><strong>Phoenix</strong></td>
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<tr>
<td><strong>AMI</strong></td>
</tr>
<tr>
<td><strong>Compaq</strong></td>
</tr>
<tr>
<td><strong>Chips &amp; Tech</strong></td>
</tr>
</tbody>
</table>
Appendix A

Error Code – 72
AMI (72)Keyboard interface test over, mouse interface test started.
Compaq (72)High order address test.
Chips & Tech (72)Pointing divide.
Phoenix (72)Check for configuration errors.(Beep)=2-4-1-3.(72) Real time clock test.

Error Code – 73
AMI (73)Global data initialization for keyboard/mouse over.
Compaq (73)Exit memory test.

Error Code – 74
ACER (74)About to test serial port.
AMI (74)Display 'SETUP' prompt and about to start floppy setup.
Compaq (74)Parity error on bus after memory test, system halted.
Phoenix (74)Test real-time clock.(Beep)=2-4-2-1. Test for stuck keys.

Error Code – 75
AMI (75)Floppy setup over.
Compaq (75)Start of protected mode test.
AMI (75)Hard disk setup about to start.
Compaq (75)Prepare to enter protected mode.
Phoenix (75)Check for keyboard errors. (Beep)=2-4-2-1. Initialize hardware interrupt vectors.

Error Code – 76
AMI (76)Hard disk setup over.
Compaq (76)Start of protected mode test.
AMI (76)Test software exceptions.

Error Code – 77
AMI (77)Test software exceptions.
Compaq (77)Exit cache controller test.

Error Code – 78
ACER (78)Set real time.
Compaq (78)Prepare to return to real mode.
Phoenix (78)Detect and test CoProcessor.

Error Code – 79
AMI (79)About to initialize timer data area.
Compaq (79)Back in real mode-No error.

Error Code – 7A
AMI (7A)Timer data initialized and about to verify CMOS battery power.
Compaq (7A)Back in real mode-error.
Phoenix (7A)Determine/Init COM channels.

Error Code – 7B
AMI (7B)CMOS battery verification over.
Compaq (7B)Exit protected mode.

Error Code – 7C
ACER (7C)scan option. RAMs.
Compaq (7C)High order address test failure.
Phoenix (7C)Set up hardware interrupts vectors.(Beep)=2-4-4-1. Determine LPT channels.

Error Code – 7D
AMI (7D)About to analyze POST results. About to analyze diagnostic test results for memory.
Compaq (7D)Enter cache controller test.

Error Code – 7E
AMI (7E)CMOS memory size updated.
Compaq (7E)Exit cache controller test.
Phoenix (7E)Test CoProcessor if present.(Beep)=2-4-4-3. Initialize BIOS data area.

Error Code – 7F
AMI (7F)Look for <DEL>key and get into CMOS setup if found. About to check optional ROM C000:0.
Compaq (7F)Copy System ROM to high RAM.

Error Code – 80
ACER (80)Determine math CoProcessor is present.
AMI (80)Keyboard test started, clearing output buffer, checking for stuck key. About to issue keyboard reset command. About to give control to optional ROM in segment C800 to DE00.
Compaq (80)Start of 8042 test.
Phoenix (80)Disable onboard Super I/O ports and IRQs.(Beep)=3-1- 1-1. Detect floppy controller.

Error Code – 81
AMI (81)Keyboard reset error/stuck key found. About to issue keyboard controller interface test command. Optional ROM control over.
Compaq (81)Do 8042 self-test.
Phoenix (81)late POST device initialization.

Error Code – 82
AMI (82)Keyboard controller interface test over. About to write command byte and Init
circular buffer. Check for printer ports and put the addresses in global data area.

Error Code – 83

AMI (83) Command byte written, global data Init done. About to check for lock-key. Check for RS232 ports and put the addresses in global data area.

Error Code – 84

AMI (84) Lock-key checking over. About to check for memory size mismatch with CMOS. CoProcessor detection over. 80287 check/test OK.

Error Code – 85

AMI (85) Memory size check done. About to display soft error and check for password or bypass setup. About to display soft error message. If no video replace Video card.

Error Code – 86

AMI (86) Password checked. About to do programming before setup. About to give control to system ROM at segment E000.

Error Code – 87

AMI (87) Programming before setup complete. Going to uncompress SETUP code and execute CMOS setup. System ROM E000:0 check over.

Error Code – 88

AMI (88) System #1 initialize.

Error Code – 89

AMI (89) Programming after setup complete. Going to display power on screen message.

Error Code – 8A

AMI (8A) First screen message displayed. About to display <WAIT…>message.

Error Code – 8B

AMI (8B) First screen message displayed <WAIT…>message displayed. About to do Main and Video BIOS shadow.

Error Code – 8C

AMI (8C) System #2 initialize.

Error Code – 8D

AMI (8D) Setup options are programmed, mouse check and Init to be done next. Going for hard disk, floppy reset.

Error Code – 8E

AMI (8E) Mouse check and initialization complete. Going for hard disk controller reset. About to go For floppy check.

Error Code – 8F

AMI (8F) Hard disk controller reset done. Floppy setup to be done nest.

Error Code – 90

AMI (90) Floppy setup is over. Test for hard disk presence to be done.

Compaq (90) Start of CMOS test.
<table>
<thead>
<tr>
<th>Chips &amp; Tech</th>
<th>Set-up RAM.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoenix</td>
<td>Initialize hard-disk controller.(Beep)=3-2-1-1</td>
</tr>
<tr>
<td>AMI</td>
<td>Floppy setup complete. Hard disk setup to be done next.</td>
</tr>
<tr>
<td>Compaq</td>
<td>CMOS seems to be OK.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>CPU speed.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>Initialize local-bus hard-disk controller.(Beep)=3-2-1-2</td>
</tr>
<tr>
<td>AMI</td>
<td>Hard disk setup complete. About to go for BIOS ROM data area check.</td>
</tr>
<tr>
<td>Compaq</td>
<td>Error on CMOS read/write test.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>Configuration check.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>Jump to User Patch 2.(Beep)= 3-2-1-3</td>
</tr>
<tr>
<td>AMI</td>
<td>BIOS ROM data area check halfway. BIOS ROM data area check to be completed.</td>
</tr>
<tr>
<td>Compaq</td>
<td>Start of DMA controller test.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>Install CD ROM for boot.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>Memory size adjusted due to mouse support, hard disk type-47.Going to verify from display memory.</td>
</tr>
<tr>
<td>AMI</td>
<td>DMA controller OK.</td>
</tr>
<tr>
<td>Compaq</td>
<td>Reset ICS.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>Install CD ROM for boot.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>Memory size adjusted due to mouse support, hard disk type-47.Going to do any Init before C800 optical ROM control. Returned after verifying from display memory.</td>
</tr>
<tr>
<td>AMI</td>
<td>$257$ DMA Initialization complete.</td>
</tr>
<tr>
<td>Compaq</td>
<td>BIOS PEAK.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>Clear huge ES segment register.(Beep)=3-2-2-3.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>Any Init before C800 optional ROM control is over. Optional ROM check &amp; control will be done next.</td>
</tr>
<tr>
<td>AMI</td>
<td>VGA power.</td>
</tr>
<tr>
<td>Chips &amp; Tech</td>
<td>Fix-up Multi Processor table.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>Check for SMART Drive(optional).</td>
</tr>
<tr>
<td>AMI</td>
<td>Any initialization required after optional ROM test over. Going to setup timer data area and printer base address.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>Check for SMART Drive(optional).</td>
</tr>
<tr>
<td>AMI</td>
<td>Return after setting timer and printer base address. Going to set the RS-232 base address.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>Shadow option ROMS.(Beep)=3-2-3-3.</td>
</tr>
<tr>
<td>AMI</td>
<td>Returned after RS-232 base address. Going to do any initialization before Co-Processor test.</td>
</tr>
<tr>
<td>AMI</td>
<td>Required initialization before Co-Processor is over. Going to initialize the CoProcessor next.</td>
</tr>
<tr>
<td>Phoenix</td>
<td>Set up Power Management.(Beep)=3-2-4-1.</td>
</tr>
<tr>
<td>AMI</td>
<td>CoProcessor initialized. Going to do any initialization after CoProcessor test.</td>
</tr>
<tr>
<td>AMI</td>
<td>Initialization after CoProcessor test is complete. Going to check expander</td>
</tr>
</tbody>
</table>
Appendix A

Phoenix
keyboard, keyboard ID and number-lock.

AMI
(9E)Enable hardware interrupts. (Beep)=3-2-4-3.

Error Code – 9F

AMI
(9F)Extended keyboard check is done, ID flag set. num-lock on/off. Keyboard ID command to be issued.

Phoenix
(9F)Determine number at ATA and SCSI drives.

Error Code – A0

AMI
(A0)Keyboard ID command issued. Keyboard ID flag to be reset.

Compaq
(A0)Start of diskette tests.

Phoenix
(A0)Set time of day. (Beep)=3-3-1-1

Error Code – A1

AMI
(A1)Keyboard ID flag reset. Cache memory test to follow.

Compaq
(A1)FDC reset active (3F8H bit 2)

Error Code – A2

AMI
(A2)Cache memory test over. Going to display any soft errors.

Compaq
(A2)FDC reset inactive (3F8H bit 2)

Phoenix
(A2)Check key lock. (Beep)=3-3-1-3

Error Code – A3

AMI
(A3)Soft error display complete. Going to set the keyboard type matric rate.

Compaq
(A3)FDC motoron.

Error Code – A4

AMI
(A4)Keyboard type matric rate set. Going to program memory wait states.

Compaq
(A4)FDC time-out error.

Phoenix
(A4)Initialize Type matric rate.

Error Code – A5

AMI
(A5)Memory wait states programming over. Going to clear the screen and enable parity/NMI.

Compaq
(A5)FDC failed reset.

Error Code – A6

AMI
(A6)Screen cleared. Going to enable parity and NMI.

Compaq
(A6)FDC passed reset.

Error Code – A7

AMI
(A7)NMI and parity enabled. Going to do any Initialization required before giving control to optional ROM at E000.

Error Code – A8

AMI
(A8)Initialization before E000 ROM control over. E000 ROM to get control next.

Compaq
(A8)Start of determine drive type.

Phoenix
(A8)Erase F2 prompt. (Beep)=3-3-3-1

Error Code – A9

AMI
(A9)Returned from E000 ROM control. Going to do any init required after E000 optional ROM control.

Compaq
(A9)Seek operation initiated.

Error Code – AA

AMI
(AA)Initialization after E000 optional ROM control is over. Going to display the system configuration.

Compaq
(AA)Waiting for FDC status.

Phoenix
(AA)Scan for F2 key stroke. (Beep)=3-3-3-3

Error Code – AB-AF

Phoenix
(AC)Enter SETUP. (Beep)=3-3-4-1

Phoenix
(AE)Clear in-POST flag. (Beep)=3-3-4-3. Clear Boot flag.

Compaq
(AF)diskette tests complete.

Error Code – B0

AMI
(B0)System configuration is displayed. Going to un-compress SETUP code for hot-key setup.

Award
(B0)Spurious interrupt occurred in protect mode. Check mismatch memory.

Compaq
(B0)Start of fixed drive tests.

Phoenix
(B0)Check for errors. (Beep)=3-4-1-1. Unknown interrupt occurred.

Error Code – B1

AMI
(B1)un-compressing of SETUP code is complete. Going to copy any code to specific area.

Award
(B1)If unmasked NMI occurs, Press F1 to disable NMI, F2 to boot.

Compaq
(B1)Combo board not found, exit.

Error Code – B2-B5

Compaq
(B2)Combo controller failed, exit.

Phoenix
(B2)POST done-prepare to boot operating system. (Beep)=3-4-1-3

Compaq
(B3)Testing drive 1.

Compaq
(B4)Testing drive 2.

Phoenix
(B4)One short beep before boot. (Beep)=3-4-3-1

Compaq
(B5)Drive error(error condition).
Appendix A

Phoenix (B5) Terminate Quiet-Boot (optional)

Error Code – B6

Compaq (B6) Drive failed (failed to respond).
Phoenix (B6) Check password (optional). (Beep) = 3-4-2-3

Error Code – B7-BD

Compaq (B7) CMOS RAM invalid or no fixed drives, exit.
Compaq (B8) Fixed drive tests complete.
Phoenix (B8) Clear global descriptor table. (Beep) = 3-4-3-4
Compaq (B9) Attempt to boot diskette.
Phoenix (B9) Prepare boot.
Compaq (BA) Attempt to boot fixed drive.
Phoenix (BA) Initialize DMI parameters.
Compaq (BB) Boot attempt failed (diskette or fixed).
Phoenix (BB) Initialize PnP option ROMs.
Compaq (BC) Boot record read, jump to boot record.
Phoenix (BC) Clear parity checkers. (Beep) = 3-4-4-1
Compaq (BD) Drive error, retry booting.
Phoenix (BD) Display Multi-Boot menu.

Error Code – BE

Award (BE) Program defaults values into chipset. (BE) Chipset default initialization;
Program chipset registers with power on BIOS defaults.
Compaq (BE) Weitck CoProcessor test.
Phoenix (BE) Clear screen (optional). (Beep) = 3-4-4-3

Error Code – BF

Award (BF) Program the rest of the chipset
Award (BF) Chipset initialization; Program chipset registers with setup values.
Phoenix (BF) Check virus and backup reminders. (Beep) = 3-4-4-4

Error Code – C0

Award (C0) Turn off chipset cache; OEM Specific-cache control.
Chips & Tech (C0) System board memory failure.
Phoenix (C0) Try to boot with INT 19. (Beep) = 4-1-1-1

Error Code – C1, C2, C3, C4

Award (C1) Memory presence test; OEM specific test to size on-board memory. Bad SIMM.
Chips & Tech (C1) I/O channel activated.
Phoenix (C1) Initialize POST Error Manager (PEM).
AMI (C2) NMI is Disable. Power on delay start on.
Phoenix (C2) Initialize error logging.
AMI (C3) Check memory (Cache, Video or first 64K)
Award (C3) DRAM Select page, Check BIOS setting and first SIMM, Possible address line failure.
Phoenix (C3) Initialize error display function.
Award (C4) CMOS conflicts, check video switch, BIOS (Chipset) on the video not initializing.
Phoenix (C4) Initialize system error handler.

Error Code – C5

AMI (C5) Power on delay complete. Going to enable ROM i.c. disable Cache if any.
Award (C5) Early shadow; OEM Specific-Early shadow enable for fast boot.
Phoenix (C5) PnP and dual CMOS (optional)

Error Code – C6

AMI (C6) Calculating ROM BIOS checksum.
Award (C6) Cache presence test; External cache size detection. (Check Memory first 64K, Check CPU jumper Setting). Also, Check Video memory
Phoenix (C6) Initialize notebook docking (optional).

Error Code – C7

AMI (C7) ROM BIOS checksum passed. CMOS shutdown register test to be done next.
Award (C7) Shadow video/system BIOS after memory pass.
Phoenix (C7) Initialize notebook docking late.

Error Code – C8, C9

AMI (C8) CMOS Shutdown register test done. CMOS checksum calculation to be done next.
Award (C8) CMOS Shutdown, time delay.
Phoenix (C8) Force check (optional)
Phoenix (C9) Extended checksum (optional)

Error Code – CA, CB, CC

AMI (CA) CMOS checksum calculation is done; CMOS Drag byte written. CMOS status register about to initializing for Date and Time.
Award (CA) Micronics cache initialization.
AMI (CB) CMOS status register Init done. Any initialization before keyboard BAT to be
Appendix A

**Error Code – CD-CF**
- Award (CC) NMI handler shutdown.
- AMI (CD) BAT command to keyboard controller is to be issued.
- AMI (CE) Keyboard controller BAT result verified. Any initialization after KB controller.
- AMI (CF) Initialization after KB controller BAT done. Keyboard command byte to be written next.

**Error Code – D0-DC**
- Compaq (D0) Entry to clear memory routine.
- Phoenix (D0) Interrupt handler error. (Beep) = 4-2-1-1
- AMI (D1) Keyboard controller command byte is written. Going to check pressing of <INS> key during power-on.
- Compaq (D1) Ready to go to protected mode.
- AMI (D2) Checking for pressing of <INS> during power-on. Going to disable DMA and Interrupt controllers.
- Compaq (D2) Ready to clear extended memory.
- Phoenix (D2) Unknown interrupt error. (Beep) = 4-2-1-3
- AMI (D3) DMA controller #1.#2, interrupt controller #1.#2 disable. Video display is disable and port-B is initialized. Chipset initialize/auto memory detection about to begin.
- Compaq (D3) Ready to reset back to real mode.
- AMI (D4) Chipset initialization/auto memory detection about to begin. Check SIMM for mismatch.
- Compaq (D4) Back in real mode-ready to clear real mode.
- Phoenix (D4) Pending interrupt error. (Beep) = 4-2-2-1
- AMI (D5) RUNTIME code is un-compressed.
- Phoenix (D6) Initialize ROM error. (Beep) = 4-2-2-3, Shutdown error. (Beep) = 4-2-3-1. (DA) Extended Block Move, (Beep) = 4-2-3-3. (DC) Shutdown error. (Beep) = 4-2-4-1
- AMI (DD) Transfer control to un-compressed code in shadow ram at F000:FFF0.
- Compaq (E0) Ready to replace E000 ROM.
- Phoenix (E0) Initialize the chipset.

**Error Code – E1,E2**
- Compaq (E1) Completed E000 ROM replacement.
- Phoenix (E1) Initialize the bridge.
- Compaq (E2) Ready to replace EGA ROM.
- Phoenix (E2) Initialize the motherboard chipset, and CPU. (Beep) = 4-3-1-3

**Error Code – E3**
- Compaq (E3) Completed EGA ROM replacement.
- Phoenix (E3) Initialize refresh counter and system timer. (Beep) = 4-3-1-4

**Error Code – E4-EC**
- Phoenix (E4) Check for forced Flash or initialize system I/O. (Beep) = 4-3-2. (E5) Check HW status of ROM or check force recovery boot. (Beep) = 4-3-2-2. (E6) BIOS ROM is OK. (Beep) = 4-3-2-3. (E7) Do a complete RAM Test or go to BIOS. (Beep) = 4-3-2-4. (E8) Do OEM initialization or set huge segment. (Beep) = 4-3-3-1. (E9) Initialize interrupt controller or initialize multi processor. (Beep) = 4-3-3-2. (E1) Read in bootstrap code or initialize OEM special code. (Beep) = 4-3-3-3. (E2) Initialize all vectors or initialize PIC and DMA. (Beep) = 4-3-3-4. (EC) Boot the Flash program or initialize memory type. (Beep) = 4-3-4-1. (ED) Initialize the boot device or initialize memory size. (Beep) = 4-3-4-2

**Error Code – EE**
- Award (EE) Unexpect Processor exception.
- Phoenix (EE) Boot code was read OK or shadow boot block. (Beep) = 4-3-4-3

**Error Code – F0-F7**
- Phoenix (F0) Initialize interrupt vectors. (F1) Initialize Run Time Clock. (F2) Initialize video.
- Phoenix (F3) Initialize System Management Mode. (F4) Output one beep before DOS. (F5) Boot to Mini DOS. (F6) Clear Huge Segment. (F7) Boot to Full DOS

**Error Code – FF**
- Award (FF) System booting. This means that the BIOS already passed control to the operation system. If no error flags such as memory size are set, boot via INT 19-load system from drive A, then C; display error message if correct boot device not found. Boot system.