PC Notebook Diagnostic Card

User's Guide

INTRODUCTION

Notebook Diagnostic Card is a powerful diagnostic tool for technicians and administrators to troubleshoot various problems of notebook PC PII/III/ P4 by using Mini PCI Bus. It is easy to install, yet extremely powerful to use. With this 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 hardware. Notebook Diagnostic Card will indicate exactly what is wrong with your notebook in just seconds. It saves your time and money.

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

System Requirements

The Notebook Diagnostic Card itself only requires an empty Printer LPT port. It is not necessary to install memory chips to perform analysis. "POST Codes" can be displayed through the hexadecimal display panel.

Notebook Diagnostic Card INDICATORS

'Indicators' are any light emitting diodes(LED) or hexadecimal display panel is mounted on main board. This section discusses the following indicators that appear on the Notebook Diagnostic Card:

- Notebook Printer LPT port Card
- USB power cord

POST Code Display

The POST Code Display is made up of a dual, dot matrix hexadecimal read-out that displays Power On Self Test (POST) status codes.

Power On Self-Test (POST) Codes

This card can test the AMI/AWARD/PHOENIX BIOS, while it can be used in widely model of notebook. During system booting up, this card displays can show the post codes. Refer to Appendix A, it shows almost POST codes provided by BIOS manufacturers.

INSTALLING Notebook Diagnostic Card

Installation Procedure

TO INSTALL A Diagnostic Card:

1) Install the Notebook Diagnostic Card in printer (LPT) port.
2) Connect the USB power cord with USB port to the card
3) Power on the machine.

POST Codes

When the machine is turned on, the hexadecimal display should show the various POST codes (Post 80H + 84H) 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 Notebook 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 Notebook Diagnostic Card's hexadecimal displays (for most machines).

NOTE: *A few machines use the min-pci port to display POST codes instead of the Diagnostic Card.*

THE POST PROCESS

The ROM built onto the motherboard of the computer rums 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.

Error Code	Award (Edition: ELITEBIOS 4.51PG)
C0	Turn Off Chipset Cache
01	Processor Test 1
02	Processor Test 2
03	Initialize Chips
04	Test Memory Refresh Toggle
05	Blank video,Initialize keyboard
06	Reserved
07	Test CMOS Interface and Battery Status
BE	Chipset Default Initialization
C1	Memory Presence test
C5	Early Shadow
C6	Cache Presence test
08	Setup low memory
09	Early Cache Initialization
0A	Setup Interrupt Vector Table
0B	Test CMOS RAM Checksum
0C	Initialize Keyboard
0D	Initialize Video Interface
0E	Test Video Memory
0F	Test DMA Controller 0
10	Test DMA Controller 1
11	Test DMA Page Registers
12~13	Reserved
14	Test Timer Counter 2
15	Test 8259-1 Mask Bits
16	Test 8259-2 Mask Bits
17	Test Stuck 8259's interrupt bits
18	Test 8259 Interrupt Functionality
19	Test stuck NMI Bits Parity/IO check
1A	Display CPU Clock
1B-1E	Reserved
1F	Set EISA Mode
20	Enable Slot 0
21-2F	Enable Slots 1-15
30	Size Base and Extended Memory
31	Test Base and Extended Memory
32	Test EISA Extended Memory
33-3B	Reserved
3C	Setup Enabled

3D	Initialize &Install Mouse
3E	Setup Cache Controller
3F	Reserved
BF	Chipset Initialization
40	Display virus protect disable or enable
41	Initialize Floppy Drive & Controller
42	Initialize Hard Drive &Controller
43	Detect & Initialize Serial/Parallel Ports
44	Reserved
45	Detect & Initialize Math Coprocessor
46	Reserved
47	Reserved
48-4D	Reserved
4E	Manufacturing POST loop or display message
4F	Security Check
50	Write CMOS
51	Pre-boot Enable
52	Initialize Option ROMs
53	Initialize Time Value
60	Setup Virus Protect
61	Set Boot Speed
62	Setup Numlock
63	Boot Attempt
BO	Spurious
B1	Unclaimed NMI
E1-EF	Bios Setup Page
FF	BOOT UP

Error Code	AMIBIOS Edition (071596)
D0	NMI is Disabled.CPU ID saved. Init code Checksum verification starting
D1	To do DMA init ,Keyboard controller BAT test ,start memory refresh and going to 4GB flat mode
D3	To start Memory sizing
D4	To comeback to real mode . Execute OEM patch. Set stack
D5	E000 ROM enabled . Init code is copied to segment 0 and control to be transferred to segment 0.
D6	Control point is in segment 0.To check <CTRL><HOME> key and verify main BIOS Checksum. If either<CTRL><HOME>is pressed or main BIOS checksum is bad Go to check point E0 else goto check point D7
D7	To pass control point to Interface Module.
D8	Main BIOS runtime code is to be decompressed.
D9	Control to be passed to main BIOS in shadow RAM

E0	On Board Floppy Controller (if any)is initialized. To start base 512K memory test
E1	To initialize interrupt vector table
E2	To initialize DMA and interrupt controllers
E6	To enable floppy and timer IRQ,enable internal cache
ED	Initialize floppy drive.
EE	Start looking for a diskette in drive A: and read 1st sector of the diskette
EF	Floppy read error
F0	Start searching 'MIBOOT.ROM' file in root directory
F1	'AMIBOOT.ROM' file not present in root directory.
F2	Start reading FAT table and analyze FAT to find the clusters occupied by 'AMIBOOT.ROM' file
F3	Start reading 'MIBOOT.ROM'file cluster by cluster.
F4	AMIBOOT.ROM' file not of proper size
F5	Disable internal cache
FB	Detect Flash type present.
FC	Erase Flash
FD	Program Flash
FF	Flash program successful.BIOS is going to restart
	In F000 Memory Address for a real time code
03	NMI is Disabled . To check soft reset /power-on
05	BIOS stack set . Going to disable Cache if any.
06	POST code to be uncompressed.
07	CPU init and CPU data area init to be done.
08	CMOS checksum calculation to be done next.
0B	Any initialization before keyboard BAT to be done next
0C	KB controller I/B free. To issue the BAT command to keyboard controller.
0E	Any initialization after KB controller BAT to be done next.
0F	Key board command byte to be written.
10	Going to issue Pin-23,24 blocking/unblocking command.
11	Going to check pressing of <INS>,<END> key during power-on
12	To init CMOS if "Init CMOS in every boot " is set or <END> key is pressed. Going to disable DMA and Interrupt controllers
13	Video display is disabled port-B is initialized. Chipset init about to begin
14	8254 timer test about to start
19	About to start memory refresh test
1A	Memory Refresh line is toggling .Going to check 15us ON/OFF time
23	To read 8042 input and disable Megakey Green PC feature .Make BIOS segment able to write
24	To do any setup before Int vector init

25	Interrupt vector initialization about to begin. To clear password if necessary
27	Any initialization before setting video mode to be done .
28	Going for monochrome mode and color mode setting.
2A	Different BUSes init (system,static,output devices)to start if present.(please see appendix for details of defferent BUSes).
2B	To give control for any setup required before optional video ROM check.
2C	To look for optional video ROM and give control.
2D	To give control to do any processing after video ROM returns control
2E	IF ega/vga not found then do display memory R/W test.
2F	Ega/vga not found .Display memory R/W test about to begin.
30	Display memory R/W test passed. About to look for the retrace checking.
31	Display memory R/W test or retrace checking failed. To do alternate Display memory R/W test.
32	Alternate Display memory R/W test passed. To look for the alternate display retrace checking
34	Video display checking over .Display mode to be set next.
37	Display mode set . Going to display the power on message.
38	Different BUSes init (input,IPL,general devices) to start if present.(please see Appendix for details of different BUSes)
39	Display different BUSes initialization error messages.(Please see appendix for details of different BUSes).
3A	New cursor position read and saved. To display the Hit <DEL> message.
40	To prepare the descriptor tables
42	To enter in virtual mode for memory test.
43	To enable interrupts for diagnostics mode.
44	To initialize data to check memory wrap around at 0:0
45	Data initialized. Going to check for memory wrap around at 0:0 and finding the total system memory size.
46	Memory wrap around test done. Memory size calculation over. About to go for writing patterns to test memory
47	Pattern to be tested written in extended memory. Going to write patterns in base 640K memory
48	Pattern written in base memory .Going to findout amount of memory below 1M memory.
49	Amount of memory below 1M found and verified.Going to findout amount of memory above 1M memory
4B	Amount of memory above 1M found and verified. Check for soft reset and going to clear memory below 1M for soft reset.(if power on,go to check point#4Eh)
4C	Memory below 1M cleared. (SOFT RESET) Going to clear memory above 1M
4D	Memory above 1M cleared.(SOFT RESET)Going to save the memory size.(goto check point #52h).
4E	Memory size display started. (NOT SOFT RESET)About to display the first 64k memory size.
4F	Memory size display started. This will be updated during memory test. Going for sequential and random memory test.
50	Memory testing /initialization below 1M complete. Going to adjust displayed memory size for relocation/shadow.
51	Memory size display adjusted due to relocation/shadow. Memory test above 1M to follow.
52	Memory testing/initialization above 1M complete. Going to save memory size information
53	Memory size information is saved. CPU registers are saved. Going to enter in real mode

54	Shutdown successful, CPU in real mode. Going to disable gate A20 line and disable parity /NMI.
57	A20 address line ,parity/NMI disable successful. Going to adjust memory size depending on relocation/shadow.
58	Memory size adjusted for relocation/shadow. Going to clear Hit<DEL> message.
59	Hit<DEL> message cleared. <WAIT…> message displayed. About to start DMA and interrupt controller test
60	DMA page register test passed. To do DMA# 1 base register test
62	DMA# 1 base register test passed. To do DMA#2 base register test.
65	DMA#2 base register test passed. To program DMA unit 1 and 2
66	DMA unit 1 and 2 programming over. To initialize 8259 interrupt controller.
7F	Extended NMI sources enabling is in progress.
80	Keyboard test started . clearing output buffer,checking for stuck key ,to issue keyboard reset command.
81	Keyboard reset error/stuck key found. To issue keyboard controller interface test command
82	Keyboard controller interface test over. To write command byte and init circular buffer
83	Command byte written , Global data init done . To check for lock-key.
84	Lock-key checking over. To check for memory size mismatch with CMOS
85	Memory size check done. To display soft error and check for password or bypass setup.
86	Password checked. About to do programming before setup.
87	Programming before setup complete . To uncompress SETUP code and execute CMOS setup.
88	Returned from CMOS setup program and screen is cleared.About to do programming after setup
89	Programming after setup complete . Going to display power on screen message.
8B	First screen message displayed. <WAIT…> message displayed . PS/2 Mouse check and extended BIOS data area allocation to be done.
8C	Setup options programming after CMOS setup about to start .
8D	Going for hard disk controller reset.
8F	Hard disk controller reset done. Floppy setup to be done next.
91	Floppy setup complete . Hard disk setup to be done next.
95	Init of different BUSes optional ROMs from C800 to start.(please see Appendix-I for details fo different BUSes).
96	Going to do any init before C800 optional ROM control
97	Any init before C800 optional ROM control is over. Optional ROM check and control will be done next.
98	Optional ROM control is done. About to give control to do any required processing after optional ROM returns control and enable external cache
99	Any initialization required after optional ROM test over. Going to setup timer data area and printer base address.
9A	Return after setting timer and printer base address.Going to set the RS-232 base address
9B	Returned after RS-232 base address . Going to do any initialization before Coprocessor test
9C	Required initialized. Before Coprocessor is over. Going to initialize the coprocessor next.
9D	Coprocessor initialized. Going to do any initialization after Coprocessor test.
9E	Initialization after coprocessor test is complete . Going to check extd keyboard, keyboard ID and num-lock
9F	Keyboard ID command to be issued.
A2	Going to display any soft errors.

A3   Software error display complete. Going to set keyboard typemate rate.

A4   Keyboard typematic rate set . To program memory wait states.

A5   Going to enable parity/NMI

A7   NMI and parity enabled. Going to do any initialization required before giving control to optional ROM   at E000.

A8   Initialization before E000 ROM control over. E000 ROM to get control next

A9   Returned form E000 ROM control. Going to do any initialization required after E000 optional ROM control

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

AB   To build MP table if needed.

AC   To uncompress DMI data and execute DMI post init.

B0   System configuration is displayed

B1   Going to copy any code to specific area.

00   Copying of code to specific area done Going to give control to INT-19 boot loader

Testing Point

2A   Different BUSes init (system,static,output devices)to start if present.

38   Different BUSes init(Input ,IPL,general devices) to start if present.

39   Display different BUSes initialization error messages.

	Error Code	PhoenixBios 4.0 release 6.0
1-1-1-3	02	Verify Real Mode
1-1-2-1	04	Get CPU type
1-1-2-3	06	Initialize system hardware
1-1-3-1	08	Initalize chipset registers with initial POST values
1-1-3-2	09	Set in Post flag
1-1-3-3	0A	Initialize CPU registers
1-1-4-1	0C	Initialize cache to initial POST values
1-1-4-3	0E	Initialize I/O
1-2-1-1	10	Initialize Power Management
1-2-1-2	11	Load alternate registers with initial POST values
1-2-1-3	12	Jump to UserPatch0
1-2-2-1	14	Initialize keyboard controller
1-2-2-3	16	BIOS ROM checksum
1-2-3-1	18	8254 timer initialization
1-2-3-3	1A	8237 DMA controller initialization
1-2-4-1	1C	Reset Programmable Interrupt Controller

1-3-1-1	20	Test DRAM refresh
1-3-1-3	22	Test 8742 Keyboard controller
1-3-2-1	24	Set ES segment to register to 4GB
1-3-3-1	28	Autosize DRAM
1-3-4-1	2C	Test 512 base address lines
1-3-4-3	2E	Test 512K base memory
1-4-1-3	32	Test CPU bus-clock frequency
1-4-2-1	34	CMOS RAM read/write failure (this commonly indicates a problem on the ISA bus such as a card not seated correctly)
1-4-2-4	37	Reinitialize the chipset
1-4-3-1	38	Shadow system BIOS ROM
1-4-3-2	39	Reinitialize the cache
1-4-3-3	3A	Autosize cache
1-4-4-1	3C	Configure advanced chipset registers
	3D	Load alternate registers with CMOS values
	42	Initialize interrupt vectors
	45	POST device initialization
2-1-2-3	46	Check ROM copyright notice
	48	Check Video configuration against COMS
	49	Initialize PCI bus and devices
	4A	Initialize all Video adapters in system
	4B	QuietBoot start (optional)
	4C	Shadow video BIOS ROM
	4E	Display Bios copyritht notice
	50	Display CPU type and speed
	51	Initialize EISA board
	52	Test keyboard
	54	Set key click if enabled
2-2-3-1	58	Test for unexpected interrupts
	59	Initialize POST display service

5A	Display prompt press F2 to enter Setup?
5B	Disable cpu cache
5C	Test RAM between 512 and 640KB
60	Test extended memory
62	Test extend memory address lines
64	Jump to Userpath 1
66	Configure advanced cache registers
67	Initialize Multi Processor APIC
68	Enable external and CPU caches
69	Setup System Management Mode (SMM) area
6A	Display external L2 cache size
6B	Load custom defaults (optional)
6C	Display shadow-area message
6E	Display possible high address for UMB recovery
70	Display error messages
72	Check for configuration errors
76	Check for keyboard errors
7C	Set up hardware interrupt vectors
7E	Initialize coprocessor if present
80	Disable onboard super I/O ports and IRQs
81	Late Post device initialization
82	Detect and install external RS232 ports
83	Configure non-MCD IDE controllers
84	Detect and install external parallel ports
85	Initialize PC-compatible PnP ISA devices
86	Re-initialize onboard I/O ports
87	Configure Motheboard Configurable Devices(optional)
88	Initialize BIOS Data Area
89	Enable Non-Maskable interrupts (NMIs)

8A	Initialize BIOS Data Area
8B	Test and initialize PS/2 mouse
8C	Initialize floppy controller
8F	Determine number of ATA drives (optional)
90	Initialize hard-disk controllers
91	Initialize local-bus hard-disk controllers
92	Jump userpath2
93	Build MPTABLE multi-processor boards
95	Install CD ROM for boot
96	Clear huge ES segment register
97	Fixup Multi Processor table
98	Search for option ROMs.one long,two short beeps on checksum failure
99	Check for SMART Drive (optional)
9A	Shadow option ROMs
9C	Set up Power Management
9D	Initialize security engine (optional)
9E	Enable hardware interrupts
9F	Determine number of ATA and SCSI drives
A0	Set time of day
A2	Check key lock
A4	Initialize typematic rate
A8	Erase F2 prompt
AA	Scan for F2 key stroke
AC	Enter SETUP
AE	Clear boot flag
B0	Check for errors
B2	POST done-prepare to boot operating system
B4	1 one short beep before boot
B5	Terminate QuiteBoot(optional)

B6	Check password(optional)
B9	Prepare Boot
BA	Initialize DMI parameters
BB	Initialize Pnp Option ROMs
BC	Clear parity checkers
BD	Display Multiboot menu
BE	Clear screen (optional)
BF	Check virus and backup reminders
C0	Try to boot with INT 19
C1	Initialize POST Error Manager(PEM)
C2	Initialize error logging
C3	Initialize error display function
C4	Initialize system error handler
C5	PnPnd dual CMOS (optional)
C6	Initialize notebook docking(optional)
C7	Initialize notebook docking late
C8	Force check (optional)
C9	Extended checksum(optional)
D2	Unknown interrupt
E0	Initialize the chipset
E1	Initialize the bridge
E2	Initialize the CPU
E3	Initialize system timer
E4	Initialize system I/O
E5	Check force recovery boot
E6	Checksum BIOS ROM
E7	Go to BIOS
E8	Set Huge Segment
E9	Initialize Multi Precessor
EA	Initialize OEM special code
EB	Initialize PIC and DMA
EC	Initialize memory type
ED	Initialize memory size
EE	Shadow boot block
F0	System memory test

F1	Initialize Run Time Clock
F2	Initialize Video
F3	Initialize system management modes
F4	Output one beep before boot
F5	Boot to mini dos
F6	Clear Huge Segment
F7	Boot to full dos

Not finding your codes? You can contact your motherboard's manufacturer or searching the internet, (E.G. http://www.bioscentral.com)

F1   Initialize Run Time Clock

F2   Initialize Video

F3   Initialize system management modes