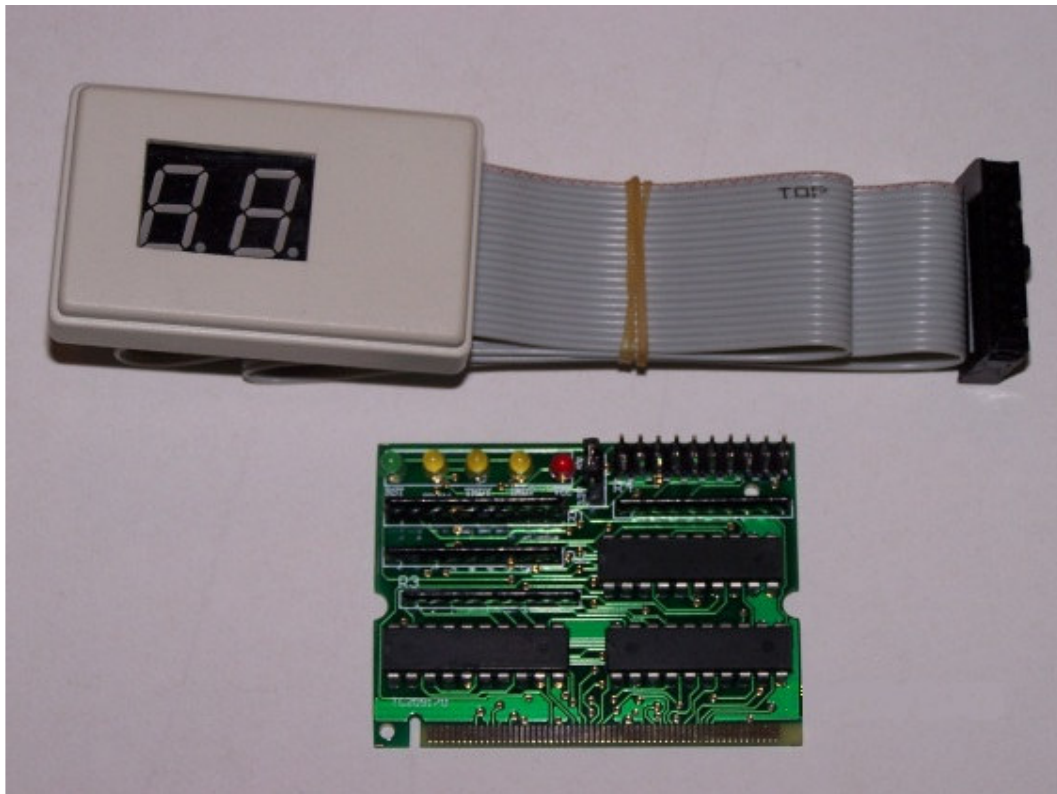


PC Laptop / Notebook Diagnostic Card

From:

DARKWIRE.com.au



INTRODUCTION

The Notebook Diagnostic Card is a powerful diagnostic tool for technicians and administrators to troubleshoot various problems with notebook PC's PII/III/P4 using the 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.

The Notebook Diagnostic Card will indicate exactly what is wrong with your notebook in just seconds. It saves you time and money. Our new and improved design of Diagnostic Card works with almost all popular types of Laptop/Notebook CPUs, Motherboards, and BIOS's **.

System Requirements

The Notebook Diagnostic Card itself only requires an empty Mini PCI slot. It is not necessary to install memory chips to perform analysis. "POST Codes" are displayed on the hexadecimal display panel.

Tech Support

Email - Support@DarkWire.com.au

Notebook Diagnostic Card INDICATORS

'Indicators' are light emitting diodes (LED's) and the hexadecimal display panel mounted on a ribbon cable. This section discusses the following indicators that appear on the Notebook Diagnostic Card:

- Notebook Mini PCI Bus Card
- Post Code display

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's, which are widely used in many models of notebook. During system booting up, this card displays the post codes. Appendix A lists POST codes provided by the above BIOS manufacturers.

PCI Signal Definition:

RST – Reset. After power on or reset, this indicator should be on for an half second and then turned off.

FRAME - PCI Bus Frame. Should be on under normal circumstances and flashes when a PCI Frame Signal is detected.

TRDY - Device Ready. Flashes when an TRDY signal is detected

IRDY - Device Ready. Flashes when an IRDY signal is detected.

VCC - Motherboard Clock Signal. Should be on when power is supplied to the motherboard even without CPU.

INSTALLING Notebook Diagnostic Card

Installation Procedure

- 1) Install the Notebook Diagnostic Card in a spare Mini PCI slot.
- 2) Connect the display by ribbon cable
- 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 parallel port to display POST codes instead of the Diagnostic Card.

Jumper Setting

This card is suitable for both 3.3V/5V rating voltage. The default setting is 5V.

Please check your Mini PCI slot voltage rating.

NOTE: If the voltage is 5V, don't change the jumper to 3.3V or damage to the card will result.

For the 3.3V Mini PCI slot, please set the jumper to 3.3V, and remove the socketed resistor array on the board.

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.

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
B0 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 'AMIBOOT.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 'AMIBOOT.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 BUS' init (system, static, output devices)to start if present.(please see appendix for details of different BUS').
- 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 BUS' init (input, IPL, general devices) to start if present. (please see Appendix for details of different BUS')
- 39 Display different BUS' initialization error messages. (Please see appendix for details of different BUS').
- 3A New cursor position read and saved. To display the Hit 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 message.
- 59 Hit 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 BUS's optional ROMs from C800 to start.(please see Appendix for details fo different BUS's).
- 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 BUS' init (system, static, output devices) to start if present.
- 38 Different BUS' init (Input, IPL, general devices) to start if present.
- 39 Display different BUS' initialization error messages.

****NOTE****

** This Card, while widely compatible with many different Motherboards and BIOS's, may not work in all Motherboards or with all BIOS's under all conditions. This card is specifically designed to work with AMI/Phoenix/Award BIOS's but some Motherboards output the POST codes via the parallel port, others just do not provide enough information for the Card to display or output the codes via a proprietary interface that is not read or interpreted by the Card.

While any incompatibilities are unlikely to occur, please understand that it is a possibility, given the 1000's of different Motherboards and BIOS's in circulation and must therefore be accepted when purchasing the Card. Under no circumstances shall the manufacturer or their agents or distributors be held liable in any way for damages, including lost profits, lost savings, or other incidental or consequential damages arising out of the use of, or inability to use, the Notebook Diagnostic POST Card. Please note however that a Card that does not work at all on any Motherboard should be returned for testing and will be replaced if found to be faulty.