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Image not available forColour: To view this video download Flash Player PC diagnostic debug test card from Sintech Debug card expert PC diagnostic post debug card Want to know more about pc adapters, pls go to following weblink : [Home] [Profile] [shop] [contact] (C) Copyright 2006-2008, Shenzhen Sintech Electronic, Inc. Email: sale@sintech.cn; MSN: feagle_liu@hotmail.com User's Guide Diagnostic Card PC Analyzer Version 1.0 Dual Mini Card PCI-E / Mini PCI User's Guide Model: minicard_10 For use only in a laptop computer mini card PCI-E slot or mini-PCI 1 User's Guide EVOLUTION Dual Mini Card PCI Express and Mini PCI Slot In laptop machines, the Mini Card PCI Express (PCI-E) replaces the Mini PCI card standard slot design, which is a small internal card functionally identical to standard desktop computer PCI cards. Mini Card PCI-E and Mini PCI cards are used mainly to add communications functions to portable laptop computers that are built- or customized-to-order. The Mini Card PCI Express is half the size of the Mini PCI cards. This allows system designers to include one or two cards, depending on the size constraints of a particular portable computer. Our Diagnostic Card has BOTH SLOT TYPES to allow for this technology transition. INTRODUCTION This Diagnostic Card is a powerful diagnostic tool for technicians and administrators to troubleshoot various problems of IBM compatible PCs. It is easy to install, yet extremely powerful to use. With 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. The Diagnostic Card will tell you exactly what is wrong with your PC in just seconds. It saves 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. System Requirements The Diagnostic Card itself only requires an empty mini-PCI or mini-PCI-E expansion slot. The DUAL SLOT design is compatible with older Mini PCI slots as well as the new Mini Card ½ size slot lead by Dell Computers. 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 Tech Support 1-888-359-0747 Figure Diagram: 1) Mini PCI connector: for connecting the test card to notebook motherboard mini PCI slot 2) Mini Card PCI-E connector: for connecting the test card to notebook motherboard mini PCI-E slot 3) LPC header connector: for connecting the test card to 2 User's Guide notebook motherboard LPC slot 4) Main chipset: for handling the signal of mini PCI, mini PCI-E and LPC 5) Seven Segment Display: for display of PC POST codes in hexadecimal format. 6) Test port: Factory connection port, do not use. 3 User's Guide INSTALLING Diagnostic Card Installation Procedure TO INSTALL Diagnostic Card: 1) For laptop use, may require the removal of a wireless card in expansion slot of motherboard service port located on the bottom access door of most laptops. 2) Install the Diagnostic Card in the Mini Card PCI-E slot or Mini PCI slot. 3) Power on the machine. 4) Observe POST CODE from bois. NOTICE: This test card supports Mini PCI full slot, Mini Card ½ slot (PCI-E), (PCI Express), or LPC port access to the motherboard BOIS. Only one port at a time can be connected. 4 User's Guide 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 rums its built-in POST (Power-On SelfTest) 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. 5 User's Guide TIPS on USING the CARD Use this card to troubleshoot your motherboard problems. Sometimes your computer will not boot. Use this diagnostic card to see the POST (power on self test) codes that the BIOS commands the motherboard to perform. Each motherboard has a BIOS chip which is a device that initializes all hardware components on the motherboard such as CPU, memory, video card, etc. During the boot up sequence, your BIOS will also generate what is called POST80 code. Each code can be referenced in a manual supplied to help determine the problem with the motherboard. If your code is NOT LISTED in our manual, chances are you have a newer motherboard. Visit the manufacture of your BIOS and download the manual of your BIOS direct. In most cases, where the last post code is displayed on the POST card is generally the problem area. For example: If you have an Award Bios on your motherboard, and you install this card. Turn on the power to your computer. Your computer stops booting, but the POST card shows a code of "01″. This could mean you have a faulty CPU on your motherboard because the BIOS told the CPU to start, but the CPU did not respond. If a piece of hardware does not respond during a boot sequence, then the motherboard will not finish POSTing. 6 Appendix A AMI AMI Award Phoenix AMI AST Award Chips&Tech Dell Phoenix Phoenix AMI AST Award Chips & Tech Phoenix&Dell AMI AST Award Chips & Tech Phoenix&Dell AMI AST Chips & Tech Award Phoenix&Dell Error Code-00 (00)Going to give control to INT 19H boot loader. Error Code-01 (01)Processor register test about to start, and NMI to be disabled,286 reg. test about to start. (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. (01)[Beep]=none 80286 register test in –progress. Error Code - 02 (02)NMI is disabled. Power on delay starting. Power on de- lay starting.286reg. (02)Test CPU register. (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. (02)Test CPU register. (02)[Beep]=1-1-3 CMOS write/read test . (02)Verify real-mode operation(Beep)=1-1-1-3.CPU Flags test. (02)[Beep]=1-1-3 CMOS write/read test in-progress or failure. Error Code – 03 (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. (03)Test 8042 keyboard controller reset. (03)Initialize Chips; Disable NMI,PIE,AIE,UEI,SQWV, disable video, parity checking, DMA; Reset math Coprocessor; 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. (03)ROM did not checksum. (03)Disable Non-Maskable Interrupt(NMI).[Beep]=1-1-4 BIOS ROM checksum inprogress or failure. Error Code – 04 (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. (04)Low level keyboard communication, keyboard ID verification. (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. (04)DMA Controller failed. (04)Get the CPU type (Beep)=1-1-2-1.CPU register test. Programmable Interval Timer test failure. Error Code – 05 (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. (05)Read keyboard input port. (05)System timer bad. (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 Coprocessor; 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 Regis- ters.Get manufacturing status, reset if set(loop 1-5). (05)[Beep]=1-2-2 DMA initialization in-progress or failure. 7 Appendix A AMI AST Award Chips & Tech Phoenix&Dell AMI Award Chips & Tech ACER AMI Award Chips & Tech Phoenix&Dell AMI AST Award Chips & Tech Phoenix&Dell AMI Award Chips & Tech Error Code – 06 (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 sys- tem timer test begin. Video disabled and system timer counting OK. (06)Support chipset initialize. (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. (06)64K RAM Failed. (06)Initialize system hardware (Beep)=1-1-2-3.DMA page register write/read test in-progress or fail. Error Code – 07 (07)ROM BIOS checksum passed.CMOS shutdown regi- ster test to be done next.ROM BIOS checksum passed, Keyboard controller I/B free.Going to issue the BAT com- mand to keyboard controller.Going to issue the BAT com- mand to keyboard controller.CH-2 of 8254 initialization half way.CH-2 of 8253 test OK (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. (07)64K RAM failed data test (Base Memory) Error Code – 08 (08)Shutdown 0. (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 initiali- zation over. CH-2 delta count test OK (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. (08)Interrupt Controller bad. (08)Initialize chipset registers with POST values. [Beep]= 1-3-1 RAM refresh verification in-progress or failure. Error Code – 09 (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. (09)Verify BIOS ROM checksum, flush external cache. (09)Program the configuration register of Cyrix CPU. OEM specific cache initialization., Early Cache initialization; Cyrix CPU initialization; cache initialization. Test CMOS RAM checksum; beep; also test extended storage of parameters in the motherboard chipset;if not warm- booting;display the Test CMOS RAM checksum message, if bad, or insert key pressed, load defaults if bad. Check BIOS Checksum. (09)Unexpected interrupt is occurring. (09)Set POST flay.(Beep)=1-1-3-2. 1st 64K RAM test in-progress. Error Code – 0A (0A)CMOS initialization done(if any). Keyboard command byte code is issued. Going to write command byte data. Go- ing to write command byte data. CH-0 of timer initializa- tion over. CH-0 delta count test OK (0A)Initialize the 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 key- board; Detect type of keyboard controller(optional 8242 or 8248, with Nedadon 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 .Initialize Video controller. (0A)Timer cannot interrupt. 8 Appendix A Phoenix&Dell (0A)Initialize CPU registers. (Beep)=1-1-3-3. Perform BIOS checksum test. 1st 64K RAM chip or data line failure multi-bit. Error Code – 0B AMI CMOS status register initialize done. Keyboard controller command byte is written. Going to issue Pin-23,24 block- ing/ unblocking command. Going to issue pin23,24 block- ing/nubolcking command. Refresh started. Parity status cleared 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 Nedadon 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 RAMEnable 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 – 10 9 Appendix A AMI AST Award Compaq Chips & Tech Phoenix&Dell AMI AST Award Compaq Chips & Tech Phoenix&Dell AMI AST Award Compaq Chips & Tech Phoenix&Dell AMI AST Award Compaq Chips & Tech Phoenix&Dell ACER AMI AST Award Compaq Chips & Tech Phoenix&Dell AMI Award (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. (10)DMA controller test 0 register (10)DMA channel 1 Test. Test DMA controller 1 with AA, 55,FF,00 pattern.8237 DMA,channel 0 test. (10)PPI disabled, Program timers 0 & 1. (10)(Beeps)=19 short, IDT,GDT failure. (10)Initialize Power Management.(Beep)=1-2-1-1.Initia- lize 8254 timers. [Beep]=2-1-1 1st 64K RAM chip or data line failure-bit 0. Error Code – 11 (11)Pin23,24 of keyboard controller is blocked/unblocked. Going to check to check pressing of 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. (11)DMA controller test register 1. (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. (11)Init(blast)VDU controllers. (11)Register LDT failure. (11)Load alternate registers with POST values.(Beep)=1-2- 2. 1st 64K RAM chip or data line failure-bit 1. Error Code – 12 (12)Checking for pressing of 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. (12)DMA page registers test. (12)Call support 800-909-3424. Test 8254 timer 0 channel 0. Test DMA page registers. (12)Clear screen, turn on video. (12)Task register failure. (12)Restore CPU control word during warm boot. Jump to User Path 0.(Beep)=1-21-3.Test both 8237 DMA controllers. 1st 64K RAM chip or data line failure-bit 2. Error Code – 13 (13)DMA controller#1,#2,interrupt controller#1,#2disa- bled. 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. Check first SIMM.(13) Interrupt vectors initialized. (13)Initialize video. (13)Test 8254 timer 0 channel 1. Test keyboard controller. (13)Test timer 0. (13)LSL instruction failure. [Beep]=2-1-4 1st 64K RAM chip or data line failure-bit 3. Initialize PCI Bus Mastering devices. Error Code – 14 (14)DMA Controller. (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. (14)Memory refresh test. (14)Test 8254 timer 0 counter 2. Test timer counter 2; Test 8254 timer 0 counter 2. Test memory refresh. (14)Disable RTC interrupts. (14)LAR failure. (14)Initialize keyboard controller.(Beep)=1-2-2-1.Initialize 8237 DMA controllers. [Beep]=2-2-1 1st 64K RAM chip or data line failure-bit 4. Error Code – 15 (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. (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. 10 Appendix A Compaq (15)Check battery power. Chips & Tech (15)VERW/VERR failure. Phoenix&Dell (15)[Beep]=2-2-2 1st 64K RAM chip or data line failure-bit 5. Error Code – 16 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 (16)BIOS ROM checksum.(Beep)=1-2-2-3. Initialize 8259, reset Coprocessor. [Beep]=2-2-3 1st 64K RAM chip or data line failure-bit 6. Error Code – 17 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)Cler 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. Error Code – 18 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. Error Code – 19 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 – 1A 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. 11 Appendix A 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. AMI (1E)Global equipment byte set for proper display type. Award (1E)If EISA NVM checksum is good, execute EISA initialization(EISA BIOS ONLY). Size system memory. Compaq (1E)Test keyboard controller. Phoenix&Dell (1E)[Beep]=2-4-3 1st 64K RAM chip or data line failure- bit E.Base 64K RAM test(16 bits). 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.- unication interface). Award (1F)Test system memory. Compaq (1F)Test 286 protected mode. Phoenix&Dell (1F)[Beep]=2-4-4 1st 64K RAM chip or data line failure- bit F. Error Code – 20 ACER (20)Test 128K. AMI (20)Memory refresh period 30 micro second test complete. Base 64K memory/address test started. Address line test to be done next. Video mode set completed. AST (20)Power up bus board(EISA only). Award (20)Enable slot 0;Initialize slot 0(system board).(Check memory size).8259 stuck bits test. Compaq (20)Test real and extended memory. Phoenix&Dell (20)[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 – 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 (21)[Beep]=3-1-2 slave DMA register test in-progress or failure. Error Code – 22 AMI (22)Toggle parity over. Going for sequential data R/W test on 64K memory. Power on message display OK. Award (22)Enable slots 2; Initialize slot 2.Test 8259 working. Compaq (22)Init 287 Coprocessor. Phoenix&Dell (22)[Beep]=3-1-3 master interrupt mask register test in- progress or fail. Test 8742 keyboard controller.(Beep)=1- 3-1-3 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]=3-1-4 slave interrupt mask register test in-progress or fail. Error Code – 24 ACER (24)Test keyboard controller(8042). AMI (24)Setup required before vector initialization complete. Interrupt vector initialization about to begin. Award (24)Enable slots 4;Initialize slot 4.Size extended memory. 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 8042 for turbo switch(if any). Award (25)Enable slots 5;Initialize slot 5.Test extended memory. Compaq (25)Test diskette subsystem. Phoenix&Dell (25)[Beep]=none interrupt vector loading in-progress. Error Code – 26 AMI (26)I/O port of 8042 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. 12 Appendix A Phoenix 6.0 AMI Award Compaq Phoenix&Dell ACER AMI Award Compaq Phoenix&Dell AMI Award Compaq Phoenix&Dell AMI Award Compaq Phoenix AMI Award Compaq Phoenix&Dell ACER AMI Award Compaq Dell Phoenix AMI Award Phoenix& Dell AMI Award Dell Phoenix AMI Award Compaq Phoenix (26)Enable A20 line. Verify/Load NVRAM parameters. Error Code – 27 (27)Global data initialization for turbo switch is over. Any initialization before setting video mode to be done next. (27)Enable slots 7; Initialize slot 7.Setup cache control or shadow RAM. (27)initialize parallel printer. (27)[Beep]=3-2-4 keyboard controller test in-progress or failure. Error Code – 28 (28)Test CPU. (28)initialization before setting video mode is complete. Going for monochrome mode and color setting .Check extended memory. (28)Enable slots 8;Initialize slot 8. Setup 8242. (28)Perform search for option ROMs (28)[Beep]=3-3-1 CMOS power-fail and checksum checks in-progress. Auto-size DRAM.(Beep)=1-3-3-1.Protected mode 1. Error Code – 29 (29)Monochrome mode setting is done. Going for color mode setting. (29)Enable slots 9;Initialize slot 9. (29)Test for valid system configuration. (29)[Beep]=3-3-2 CMOS configuration info validation in- progress. Initialize POST Memory Manager. Error Code – 2A (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. (2A)Enable slots A; Initialize slot A.(2A)8242 initialization. (2A)Clear screen. (2A)Clear 512K base RAM.(Beep)=1-3-3-3.Aubo-site me- mory chips. Error Code – 2B (2B)Toggle parity over. About to give control for any setup required before optional video ROM check. (2B)Enable slots B; Initialize slot B. Initialize floppy drive and controller. (2B)Check for invalid time and date. (2B)[Beep]=3-3-4 screen memory test in-progress or failure. Error Code – 2C (2C)Set up interrupt controller(8259). (2C)Processing before video ROM control is done. About to look for optional video ROM and give control. (2C)Enable slots C;Initialize slot C.Detect & initialize serial ports. (2C)Boot. (2C)[Beep]=3-4-1 screen initialization in-progress or failure. (2C)RAM failure on address xxxx.If the BIOS detects error 2C,2E,or 30(base 512K RAM error),it displays and additional word-bitmap(xxxx)indication the address line or bits that failed. For example, "2C 0002"means addressline 1 (bit one set) has failed. "2E 1020 means data bits 12 and 5 (bits 12 and 5 set) have failed in the lower 16 bits. Note that error 30 cannot occur on 386SX systems because they have a 16 rather than 32-bit bus. The BIOS also sends the bitmap to the port-80 LED display. It first display the check point code, followed by a delay, the high-order byte, another delay, and then the low-order byte of the error. It repeats this sequence continuously. Test 512 base address lines.(Beep)= 1-3-4-1 Activate interleave(if possible).[Beep]3-4-1 screen initialization in-progress or failure. Error Code – 2D (2D)Optional video ROM control is done. About to give control to do any processing after video ROM returns control. (2D)Enable slots D; Initialize slot D. Detect & initialize parallel ports. Test timer 2. (2D)[Beep]=3-4-2 screen retrace tests in-progress or failure. Error Code – 2E (2E)Return from processing after the video ROM control. If EGA/VGA not found then do display memory R/W test. (2E)Enable slots E; Initialize slot E. Initialize hard drive & controller. (2E)[Beep]=3-4-3 search for video ROM in-progress. (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. Error Code – 2F (2F)EGA/VGA not found. Display memory R/W test about to begin. (2F)Enable slots F; Initialize slot F. Detect & initialize 80x87 Co-Processor. (2F)Write to DIAG byte. (2F)Enable cache before system BIOS shadow. Error Code – 30 13 Appendix A ACER AMI AST Award Compaq Dell Phoenix AMI AST Award Compaq Phoenix&Dell AMI AST Award Compaq Dell Phoenix AMI AST Award Compaq Phoenix&Dell ACER AMI Compaq Phoenix&Dell AMI Compaq Phoenix&Dell AMI Compaq Phoenix&Dell AMI Compaq Phoenix&Dell ACER AMI (30)Set up Temp. interrupt. (30)display memory R/W test passed. About to look for the retrace checking. Virtual mode memory test about to begin. (30)Interrupt controller#1. (30)Get base memory & extended memory size. Size base And extended memory from 256K to 640K and extended memory above 1MB. (30)Clear 1st 128K bytes of RAM. (30)[beep]=none screen believed running w/video ROM. (30)see Error Code "2C".Unexpected shutdown.[Beep]=no- ne screen believed operable. [Beep]=none screen believed running w/video ROM. Error Code – 31 (31)Display memory R/W test or retrace checking failed. About to do alternate Display memory R/W test. Virtual mode memory test started. (31)Interrupt controller#2. (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. (31)Load interrupt vectors 70-77. (31)[Beep]=none monochromatic screen believed operable. Error Code – 32 (32)Alternate display memory R/W test passed. About to look for the alternate display retrace checking. Processor executing in virtual mode. (32)Interrupt controllers for stuck interrupt. (32)Display the Award Plug & Play BIOS extension message(PnP BIOS only).Test EISA extended memory; If EISA mode flag is set then test EISA memory found in slots initialization, This test is skipped in ISA mode and can be skipped with ESC key in EISA mode. (32)Load interrupt vectors 00-1F. (32)[Beep]=none 40-column color screen believed operable. (32)Test CPU bus-clock frequency.(Beep)=1-4-1-3.Deter- mine system board memory size. [Beep]=none 40-column color screen believed operable. Error Code – 33 (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. (33)Non-maskable interrupt for stuck interrupt(EISA,P486, P386) (33)Call Tech Support 727-532-4151. (33)Initialize Memory SIZE and RESETWD. (33)[Beep]=none 80-column color screen believed operable. Initialize dispatch Manager. Error Code – 34 (34)Set up BIOS interrupt vector. (34)Verification of display adapter done. Display mode to be set next. Memory address line test in progress. (34)Verify CMOS checksum. (34)[Beep]=4-2-1 timer tick interrupt test in progress or failure. Relocate memory option. Error Code – 35 (35)Display mode set complete. BIOS ROM data area about to be checked. Memory below 1MB calculated. (35)CMOS checksum not valid. (35)[Beep]=4-2-2 shutdown test in progress or failure. Error Code – 36 (36)BIOS ROM data area check over. Going to set cursor for power on message. Memory above 1MB calculated. (36)Check battery power. (36)[Beep]=4-2-3 gate A20 failure. Warm start shut down. Configure EMS memory option. Error Code – 37 (37)Cursor setting for power on message id complete. Going to display the power on message. Memory test about to start. (37)Check for game adapters. (37)[Beep]=1-4-2-4 unexpected interrupt in protected mode. Reinitialize the motherboard chipset. Error Code – 38 (38)CMOS RAM. (38)Power on message display complete. Going to read new cursor position. 14 Appendix A 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 Phoenix (38)Shadow system BIOS ROM.(Beep)=1-4-3-1.Configure wait state option. Error Code – 39 AMI (39)New cursor position read and saved. Going go display the Hitmessage. Memory above 1MB initialized. Compaq (39)Check for parallel ports. Phoenix (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 massage. 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 RA M. Error Code – 3B AMI (3b)Hitormessage 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 3.07 (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 ME- MORY 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 bables.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. 15 Appendix A Award Compaq ACER AMI Award Compaq Phoenix ACER AMI Award Compaq Phoenix ACER AMI Phoenix AMI Phoenix AMI Phoenix ACER AMI Phoenix AMI AMI Award Phoenix About to start DMA controller test. (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). (43)Reset parity checks. Error Code – 44 (44)Video BIOS ROM initialize. (44)Interrupts enabled(if post switch is on). Going to initialize data to check memory wrap around at 0:0. (44) Going to initialize data to check memory re-map at 0:0. (44)Start verify cycle if 128K RAM test. (44)Initialize BIOS interrupts.(Beep)=2-1-2-1. Verify video configuration. Error Code – 45 (45)Set up BIOS RAM . (45)Data initialized. Going to check for memory wrap around at 0:0 and the total system memory size. (45)Detect & Initialize math CoProcessor; Initialize math CoProcessor. (45)Check for parity errors. (45)POST device initialization. Error Code – 46 (46)Test controller and cache memory. (46) Memory wrap around test done. Memory size calculation over, writing patterns to test memory. (46)display the setup message(to press Ctrl-Alt-Esc to enter setup), and enable setup. (46)No RAM errors. (46)Check ROM copying notice.(Beep)=2-1-2-3. Initialize video system. Error Code – 47 (47)Pattern to be tested written in extended memory,640K memory. (47)Set system speed for boot. (47)Got a RAM error. (47)Initialize manager for PCI Options ROMs.(Beep)=2-1- 2-4. Error Code – 48 (48)Memory test. (48)Patterns written in base memory. Going to find out amount of memory below 1M memory. (48)Check Video configuration against CMOS.(Beep)=2- 1-3-1. Test for unexpected interrupts. Error Code – 49 (49)Memory below 1M found and verified. Going to find out amount of memory above 1M memory. (49)Initialize PCI bus and devices.(Beep)=2-1-3-2. Error Code – 4A (4A)Amount of memory above 1M found and verified. Going for BIOS ROM data area check. (4A)Initialize all video adapters in system.(Beep)=2-1-3-3. Start 2nd protected mode test. Error Code – 4B (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 and to clear memory below 1M for soft reset. (4B)Quiet-Boot start(optional). Error Code – 4C (4C)#3 shutdown. (4C)Memory below 1M cleared.(SOFT RESET)Going to clear memory above 1M. (4C)Shadow video BIOS ROM.(Beep)=2-1-4-1.Perform LDT instructions test. Error Code – 4D (4D)Memory above 1M cleared. (SOFT RESET)Going to save the memory size. (GOTO check point#52h) Error Code – 4E (4E)Memory test started.(NO SOFT RESET)About to display the first 64K memory test. (4E)If there is any error, show all the error messages on the screen & wait for user to press.Manufacturing POST loop or display messages; Reboot if manufacturing POST loop pin is set. Otherwise display any messages and enter setup. (4E)Display copying notice.(Beep)=2-1-4-3. Perform TR instruction test. Error Code – 4F 16 Appendix A AMI Award ACER AMI AST Award Compaq Chips & Tech Phoenix AMI AST Award Compaq Chips & Tech Phoenix AMI Award Compaq Chips & Tech Phoenix AMI Award Compaq Chips & Tech ACER AMI Compaq Chips & Tech Phoenix AMI Compaq Chips & Tech AMI Compaq Chips & Tech Phoenix AMI Compaq Chips & Tech (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. (4F)If password is needed, ask for password. Clear the Energy Star logo(Green BIOS only).Security check; Ask password security. Error Code – 50 (50)#2 shutdown. (50)Memory testing/initialization below 1M complete. Going to adjust displayed memory size for relocation /shadow. DMA page register test complete. (50)Protected mode. (50)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. (50)Check for dual freq in CMOS. (50)Hardware initialize. (50)Display CPU type and speed.(Beep)=2-2-1-1.(50)Per- form LSL instruction test.[Beep]=none Custom chip set or custom platform. Error Code – 51 (51)Memory size display adjusted due to relocation/shadow. Memory test above 1M to follow. DMA unit-1 base register test about to start. (51)Protected mode. (51)Pre-boot enable; Enable parity checker; Enable NMI, Enable cache before boot. (51)Check CMOS VDU configuration. (51)Timer Initialize (51)Initialize EISA board. Error Code – 52 (52)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. (52)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. (52)Start VDU search. (52)DMA controller initialize. (52)Test keyboard.(Beep)=2-2-1-3.(52)Perform LAR instruction test. Error Code – 53 (53)Memory size information is saved. CPU registers are saved. Going to enter in real mode. DMA CH-2 base register test OK. (53)If it is not a PnP BIOS, initialize serial & parallel ports. Initialize time value in BIOS data area. Initialize time value; Initialize time value in 40h BIOS data area. (53)Vector to VDU option ROMs. (53)Initialize interrupt controller. Error Code – 54 (54)#7 shutdown. (54)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. (54)Initialize primary display adapter. (54)Chip-Set Initialize. (54)Set key click if enabled.(Beep)=2-2-2-1.(54)Perform VERR instruction test. Error Code – 55 (55)Registers restored. Going to disable gate A20 address line. F/F latch for both units checked. (55)Check PCI video Card-or replace video card. (55)Initialize secondary display adapter. (55)EMS configuration Setup. Error Code – 56 (56)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. (56)No display adapters installed. (56) Protected mode. (56)Enable keyboard.(Beep)=2-2-2-3.Unexpected exception. Error Code – 57 (57)A20 address line disable successful. BIOS ROM data area check halfway. BIOS ROM data area check to be com- plete.8259 initialization over. (57)Init primary VDU mode. (57)Memory size. Error Code – 58 17 Appendix A ACER AMI Compaq Chips & Tech Phoenix AMI Compaq Chips & Tech Phoenix AMI Compaq Chips & Tech Phoenix AMI Compaq Chips & Tech Phoenix ACER AMI Compaq Chips & Tech Phoenix AMI Compaq Chips & Tech AMI Compaq Chips & Tech Phoenix AMI Compaq Chips & Tech ACER AMI AST Award Compaq Chips & Tech Phoenix AMI AST Award Compaq Chips & Tech AMI AST Award Compaq (58)#6 shutdown. (58)Memory size adjusted for relocation/shadow. Going to clear Hit message. BIOS ROM data area check over. Going to clear Hit message.8259 mask register check OK. (58)Start of VDU test (for each adapter). (58)Memory interleave configure. (58)Test for unexpected interrupts.(Beep)=2-3-3-.(58) Perform A20 gate test. Error Code – 59 (59)Hit message cleared. message displayed. About to start DMA and interrupt controller test. Master 8259 mask register OK, about to start slave. (59)Check existence of adapter. (59)Exiting protected mode. (59)Initialize POST display service. Error Code – 5A (5A)About to check timer and keyboard interrupt level. (5A)Blank display, check VDU registers. (5A)Board memory size. (5A)Keyboard ready test. Display prompt "press F2 to enter SETUP".(Beep)=2-23-3 Error Code – 5B (5B)Timer interrupt OK. (5B)Start screen memory test. (5B)Shadow RAM relocated. (5B)Display CPU cache. Error Code – 5C (5C)About to test keyboard and I/O.` (5C)About to test keyboard interrupt. (5C)End of test of adapter, clear memory. (5C)EMS configure. (5C)Test RAM between 512 and 640K.(Beep)=2-2-4-1. Determine if AT or KT keyboard type. Error Code – 5D (5D)ERROR! Timer/keyboard interrupt not in proper level. (5D)Error detected on an adapter. (5D)Wait state configuration is set-up. Error Code – 5E (5E)8259 interrupt controller error. (5E)test the next adapter. (5E)1st 64K RAM re-test. (5E)Enter third protected mode test. Error Code – 5F (5F)8259 interrupt controller test OK. (5F)All adapters successfully tested. (5F)Shadow RAM. Error Code – 60 (60)Set up BIOS interrupt. (60)DMA page register test passed. About to go for DMA #1,verify from display memory. (60)RAM size. (60)Setup virus protection(Boot sector protection). (60)Start of memory test. (60)CMOS RAM. (60)Test expanded memory.(Beep)=2-3-1-1.(60)Base memory test. Error Code – 61 (61)Display memory verification over. About to go for DMA #1 base register test. (61)RAM test. (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. (61)Enter protected mode. (61)Video. Error Code – 62 (62)DMA#1 base register test passed. About to go for DMA #2 base register test. (62)Shadow RAM. (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. (62)Start memory sizing. 18 Appendix A Phoenix AMI AST Award Compaq Chips & Tech ACER AMI AST Compaq Chips & Tech Phoenix AMI AST Compaq Chips & Tech AMI AST Compaq Chips & Tech Compaq AMI AST Compaq Chips & Tech Phoenix ACER Compaq Chips & Tech Phoenix Compaq Chips & Tech Phoenix Compaq Chips & Tech Phoenix ACER Compaq Chips & Tech Phoenix Compaq Chips & Tech Compaq Chips & Tech Phoenix Compaq (62)Test extended memory address lines.(Beep)=2-3-1-3. Base memory address test. Error Code – 63 (63)DMA #2 base register test passed. About to go for BIOS ROM data area check. (63)Cache memory. (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. (63)Get CMOS size. (63)Protected mode interrupt. Error Code – 64 (64)Start test real time clock. (64)BIOS ROM data area check halfway. BIOS ROM data area check to be complete. (64)Copy BIOS to shadow RAM. (64)Start test of real memory. (64)Address line A20. (64)Jump to User Patch 1.(Beep)=2-3-2-1.Shadow memory test. Error Code – 65 (65)DMA #2 base register test passed. About to program DMA unit 1 and 2. (65)Copy video BIOS to shadow RAM. (65)Start test of extended memory. (65)Memory address lines. Error Code – 66 (66)DMA unit 1 and 2 programming over. About to initialize 8259 interrupt controller. (66)8254 timer channel #2. (66)Save size of real and extended memory. (66)Memory Test. (66)Configure advanced cache registers.(Beep)=2-3-2-3. Extended memory test. Error Code – 67 (67)8259 initialization over. About To start keyboard test. (67)Memory initialize. (67)Update 128K-Option installed CMOS bit. (67)Extended memory. (67)Initialize Multi Processor APIC. Error Code – 68 (68)Test floppy disk. (68)Prepare to return to real mode. (68)Timer interrupt. (68)Enable external and CPU caches.(Beep)=2-3-3-1. Ex- tended address test. Error Code – 69 (69)Back in real mode-test successful. (69)Real Time clock. (69)Setup System Management Mode(SMM) area. Error Code – 6A (6A)Back in real mode-error during test. (6A) Keyboard controller. (6A) Display external cache size.(Beep)=2-3-3-3.Determine memory test. Error Code – 6B (6B)Display error messages. (6B)Test Math chip. (6B)Load custom defaults(optional). Error Code – 6C (6C)Test hard disk drive. (6C)End of memory test. (6C)Test serial port(RS232). (6C)Display shadow message.(Beep)=2-3-4-1.Display error messages. Error Code – 6D (6D)Initialize KB OK display string. (6D)Test parallel ports. Error Code – 6E (6E)Determine size to test. (6E)Dual card. (6E)Display possible high address for UMB recovery. Display non-disposable segments.(Beep)=2-3-4-3.Configure ROM/RAM BIOS. Error Code – 6F (6F)Start of MEMORY TEST. 19 Appendix A Chips & Tech (6F)Test floppy drive controller. Error Code – 70 (70)About to test parallel port. (70)start of keyboard test. (70)Display XXXXX KB OK. (70)Test hard drive controller. (70)Display error messages.(Beep)=2-4-1-1.System time test. Error Code – 71 AMI (71)Keyboard controller BAT test over. Compaq (71)Test each RAM segment. Chips & Tech (71)Key-lock. 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. Error Code – 76 AMI (76)Hard disk setup about to start. Compaq (76)Prepare to enter protected mode. Phoenix (76)Check for keyboard errors. (Beep)=2-4-2-3.Initialize hardware interrupt vectors. Error Code – 77 AMI (77)Hard disk setup over. Compaq (77)Test software exceptions. 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 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 ACER AMI Compaq Chips & Tech Phoenix 20 Appendix A Compaq Phoenix AMI Compaq Phoenix AMI Compaq Phoenix AMI Compaq Phoenix ACER AMI Compaq Phoenix AMI Phoenix AMI Compaq Phoenix AMI Compaq Phoenix ACER AMI Compaq Phoenix AMI Compaq Phoenix AMI Compaq Phoenix AMI Compaq Phoenix ACER AMI Compaq Phoenix AMI issue keyboard reset command. About to give control to optional ROM in segment C800 to DE00. (80)Start of 8042 test. (80)Disable onboard Super I/O ports and IRQs.(Beep)=3-1- 1-1.Detect floppy controller. Error Code – 81 (81)Keyboard reset error/stuck key found. About to issue keyboard controller interface test command. Optional ROM control over. (81)Do 8042 self-test. (81)late POST device initialization. Error Code – 82 (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. (82)Check result received. (82)Detect and install external RS232 ports.(Beep)=3-1- 1-3.Test floppy drives. Error Code – 83 (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. (83)Error result. (83)Configure non-MCD IDE controllers. Error Code – 84 (84)Keyboard initialize. (84)Lock-key checking over. About to check for memory size mismatch with CMOS. CoProcessor detection over. 80287 check/test OK. (84)OK 8042,Init mode=5D. (84)Detect and install external parallels ports.(Beep)=3-1-2-1.Fixed disk test. Error Code – 85 (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. (85)Initialize PC-compatible PnP ISA devices. Error Code – 86 (86)Password checked. About to do programming before setup. About to give control to system ROM at segment E000. (86)Start keyboard test, reset keyboard. (86)Re-initialize onboard I/O ports.(Beep)=3-1-2-3.(86)Per form external ROM scan. Error Code – 87 (87)Programming before setup complete. Going to uncompress SETUP code and execute CMOS setup. System ROM E000:0 check over. (87)Got acknowledge, read result. (87)Configure Motherboard Configuration Devices(option- al) Error Code – 88 (88)System #1 initialize. (88)Returned from CMOS setup program and screen is cleared. About to do programming after setup. (88)Got result, check it (88)Initialize BIOS Data Area.(Beep)=3-1-3-1.Test key- lock/keyboard type. Error Code – 89 (89)Programming after setup complete. Going to display power on screen message. (89)Test for stuck keys. (89)Enable Non-Maskable Interrupts (NMIs) Error Code – 8A (8A)First screen message displayed. About to display message. (8A)Key seems to be stuck. (8A)Initialize Extended BIOS Data Area.(Beep)=3-1-3-3. wait for F1 test. Error Code – 8B (8B)First screen message displayed message displayed. About to do Main and Video BIOS shadow. (8B)Test keyboard interface. (8B)Test and initialize PS/2 mouse. Error Code – 8C (8C)System #2 initialize. (8C)Main and video BIOS shadow successful. Setup options programming after CMOS setup about to start. (8C)Got result, check it. (8C)Initialize floppy controller. (Beep)=3-1-4-1.Final system initialization. Error Code – 8D (8D)Setup options are programmed, mouse check and Init to be done next. Going 21 Appendix A Compaq AMI Phoenix AMI Phoenix AMI Phoenix ACER AMI Compaq Chips & Tech Phoenix AMI Compaq Chips & Tech Phoenix AMI Compaq Phoenix ACER AMI Compaq Chips & Tech Phoenix AMI Compaq Chips & Tech Phoenix AMI Compaq Chips & Tech Phoenix AMI Chips & Tech Phoenix ACER AMI Chips & Tech Phoenix AMI Phoenix AMI for hard disk, floppy reset. (8D)End of test, no errors. Error Code – 8E (8E)Mouse check and initialization complete. Going for hard disk controller reset. About to go For floppy check. (8E)Interrupt 19 boot loader. Error Code – 8F (8F)Hard disk controller reset done. Floppy setup to be done nest. (8F)Determine number of ATA drives(optional) Error Code – 90 (90)Invoke interrupt 19 to boot loader. (90)Floppy setup is over. Test for hard disk presence to be done. (90)Start of CMOS test . (90)Set-up RAM. (90)Initialize hard-disk controller.(Beep)=3-2-1-1 Error Code – 91 (91)Floppy setup complete. Hard disk setup to be done next. (91)CMOS seems to be OK. (91)CPU speed. (91)Initialize local-bus hard-disk controller.(Beep)=3-2-1-2 Error Code – 92 (92)Hard disk setup complete. About to go for BIOS ROM data area check. (92)Error on CMOS read/write test. (92)Configuration check. (92)Jump to User Patch 2.(Beep)= 3-2-1-3 Error Code – 93 (93)BIOS ROM data area check halfway. BIOS ROM data area check to be completed. (93)Start of DMA controller test. (93)Build MPTABLE for multi processor boards. Error Code – 94 (94)#5 shutdown. (94)Hard disk setup complete. Going to set base and extended memory size. BIOS ROM data area check over. (94)Page registers seem OK. (94)POD Bootstrap. (94)Disable A20 address line.(Beep)=3-2-2-1 Error Code – 95 (95)Memory size adjusted due to mouse support, hard disk type-47.Going to verify from display memory. (95)DMA controller OK. (95)Reset ICS. (95)Install CD ROM for boot. Error Code – 96 (96)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. (96)8237 DMA Initialization complete. (96)BIOS PEAK. (96)Clear huge ES segment register.(Beep)=3-2-2-3. Error Code – 97 (97)Any Init before C800 optional ROM control is over. Optional ROM check & control will be done next. (97)VGA power. (97)Fix-up Multi Processor table. Error Code – 98 (98)#A shutdown. (98)Optional ROM control is done. About to give control to do any required processing after optional ROM returns control. (98)Adapters POS. (98)Search for option ROMs. One long, two short beeps on checksum failure. (Beep)=3-2-3-1. Error Code – 99 (99)Any initialization required after optional ROM test over. Going to setup timer data area and printer base address. (99)Check for SMART Drive(optional). Error Code – 9A (9A)Return after setting timer and printer base address. Going to set the RS-232 22 Appendix A Phoenix AMI ACER AMI Phoenix AMI AMI Phoenix AMI Phoenix AMI Compaq Phoenix AMI Compaq AMI Compaq Phoenix AMI Compaq AMI Compaq Phoenix AMI Compaq AMI Compaq AMI AMI Compaq Phoenix AMI Compaq AMI Compaq Phoenix AMI Compaq AMI Compaq Phoenix Phoenix Phoenix Compaq AMI base address. (9A)Shadow option ROMS.(Beep)=3-2-3-3. Error Code – 9B (9B)Returned after RS-232 base address. Going to de any initialization before CoProcessor test. Error Code – 9C (9C)#B shutdown. (9C)Required initialization before co-Processor is over. Going to initialize the CoProcessor next. (9C)Set up Power Management.(Beep)=3-2-4-1. Error Code – 9D (9D)CoProcessor initialized. Going to do any initialization after CoProcessor test. Error Code – 9E (9E)Initialization after CoProcessor test is complete. Going to check expander keyboard, keyboard ID and number-lock. (9E)Enable hardware interrupts.(Beep)=3-2-4-3. Error Code – 9F (9F)Extended keyboard check is done, ID flag set. num-lock on/off. Keyboard ID command to be issued. (9F)Determine number at ATA and SCSI drives. Error Code – A0 (A0)Keyboard ID command issued. Keyboard ID flag to be reset. (A0)Start of diskette tests. (A0)Set time of day .(Beep)=3-3-1-1 Error Code – A1 (A1)Keyboard ID flag reset. Cache memory test to follow. (A1)FDC reset active (3F8H bit 2) Error Code – A2 (A2)Cache memory test over. Going to display any soft errors. (A2)FDC reset inactive(3F8H bit 2) (A2)Check key lock.(Beep)=3-3-1-3 Error Code – A3 (A3)Soft error display complete. Going to set the keyboard type matric rate. (A3)FDC motoron. Error Code – A4 (A4)Keyboard type matric rate set. Going to program memory wait states. (A4)FDC time-out error. (A4)Initialize Type matric rate. Error Code – A5 (A5)Memory wait states programming over. Going to clear the screen and enable parity/NMI. (A5)FDC failed reset. Error Code – A6 (A6)Screen cleared. Going to enable parity and NMI. (A6)FDC passed reset. Error Code – A7 (A7)NMI and parity enabled. Going to do any Initialization required before giving control to optional ROM at E000. Error Code – A8 (A8)Initialization before E000 ROM control over. E000 ROM to get control next. (A8)Start of determine drive type. (A8)Erase F2 prompt.(Beep)3-3-3-1 Error Code – A9 (A9)Returned from E000 ROM control. Going to do any init required after E000 optional ROM control. (A9)Seek operation initiated. Error Code – AA (AA)Initialization after E000 optional ROM control is over. Going to display the system configuration. (AA)Waiting for FDC status. (AA)Scan for F2 key stroke.(Beep)=3-3-3-3 Error Code – AB-AF (AC)Enter SETUP.(Beep)=3-3-4-1 (AE)Clear in-POST flag.(Beep)=3-3-4-3.Clear Boot fag. (AF)diskette tests complete. Error Code – B0 (B0)System configuration is displayed. Going to un-com- press SETUP code for hot-key setup. 23 Appendix A Award Compaq Phoenix (B0)Spurious interrupt occurred in protect mode. Check mismatch memory. (B0)Start of fixed drive tests. (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). 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)PnPnd 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 24 Appendix A Phoenix AMI Award Phoenix AMI Award Phoenix Phoenix AMI Award AMI Award AMI AMI AMI Compaq Phoenix AMI Compaq AMI Compaq Phoenix AMI Compaq AMI Compaq Phoenix AMI Compaq Phoenix AMI Compaq Phoenix Compaq Phoenix Compaq Phoenix Compaq Phoenix Phoenix Award (C6)Initialize notebook docking (optional). Error Code – C7 (C7)ROM BIOS checksum passed. CMOS shutdown register test to be done next. (C7)Shadow video/system BIOS after memory pass. (C7)Initialize notebook docking late. Error Code – C8,C9 (C8)CMOS Shutdown register test done. CMOS checksum calculation to be

done next. (C8)CMOS Shutdown, time delay. (C8)Force check(optional) (C9)Extended checksum(optional) Error Code – CA,CB,CC (CA)CMOS checksum calculation is done, CMOS Drag byte written. CMOS status register about to initializing for Date and Time. (CA)Micronics cache initialization. (CB)CMOS status register Init done. Any initialization before keyboard BAT to be done next. (CC)NMI handler shutdown. Error Code – CD-CF (CD)BAT command to keyboard controller is to be issued. (CE)Keyboard controller BAT result verified. Any initialization after KB controller. (CF)Initialization after KB controller BAT done. Keyboard command byte to be written next. Error Code – D0-DC (D0)Entry to clear memory routine. (D0)Interrupt handler error.(Beep)=4-2-1-1 (D1)Keyboard controller command byte is written. Going to check pressing of key during power-on. (D1)Ready to go to protected mode. (D2)Checking for pressing of key during power-on done. Going to disable DMA and Interrupt controllers. (D2)Ready to clear extended memory. (D2)Unknown interrupt error.(Beep)=4-2-1-3 (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. (D3)Ready to reset back to real mode. (D4)Chipset Initialization/auto memory detection about to begin. Check SIMM for mismatch. (D4)Back in real mode-ready to clear real mode. (D4)Pending interrupt error.(Beep)=4-2-2-1 (D5)RUNTIME code is un-compressed. (D6)Initialize option 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 10 error(Beep)=4-2-41 (DD)Transfer control to un-compressed code in shadow ram at F000:FFF0. (E0)Ready to replace E000 ROM. (E0)Initialize the chipset. Error Code – E1,E2 (E1)Completed E000 ROM replacement. (E1)Initialize the bridge. (E2)Ready to replace EGA ROM. (E2)Initialize the motherboard chipset, and CPU.(Beep)=4-3 -1-3 Error Code – E3 (E3)Completed EGA ROM replacement. (E3)Initialize refresh counter and system timer(Beep)=4-3- 1 –4 Error Code – E4-EC (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)=4-3-24. (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. (EA)Read in bootstrap code or initialize OEM special code. (Beep)=4-3 -3-3. (EB) 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 (EE)Unexpected Processor exception. 25 Appendix A Phoenix Phoenix Phoenix Award (EE)Boot code was read OK or shadow boot block.(Beep)= 4-3-4-3 Error Code – F0-F7 (F0)Initialize interrupt vectors.(F1)Initialize Run Time Clock. (F2) Initialize video. (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 (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 19load system from drive A, then C; display error message if correct boot device not found. Boot system. 26

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