PC Analyzer

User's Guide

CONTENT

Improvement Note

As the 2 -- bit code cards diagnose the mainboard by BIOS (refer to the " SYNOPSIS" in chapter 1), the code should not been displayed in such following cases;

1. The card.is inserted on the mainboard without CPU, or CPU is not running.

2. During the RST LED is lighting (the tested mainboard is reseting);

In any cases above, the caed and LED doesn' t light or light only 1 bit; rule out the "original code". If the code is not displayed beside cases above, the card is not compatible with mainboard which is being tested. You just need a more advanced post card like PI0050.

1. SYNOPSIS

The card is named POST (Power On Self Test) card too. It could display the error code by the result of POST. then you would soon delermine the error in error code table. Especially when the PC can' t boot operating system, or blank screen. or the card and motherboard couldn' t issue an audible beep. It is a powerful diagnostic tool. Now just use it. you' ll get twice the result with half the effort .

When the power is turned on. The BIOS would have a strict test with system circuit memorizer keyboard video hard disc and floppy drive, then analyze the system configuration. Initialize the basic I/O setup that already configured. Next. Boot the operating system.

By the trait of the card, you can determine the error easily like this. During the test of pivotal parts. If the error occurs. It will halt the work and nothing appears on the screen. If the pivotal part is ok, you can have a test of the parts that unimportant, this may not halt the work even if any error occurs. And the system reports an error message at the same time. Now when the computer goes wrong. Especially the fateful error. As there is nothing appears on the screen, you can insert the card into the expansion slot. Refer to the error code table and the trouble is clear.

2. OBLIGATORY CONTENT

① The error code table is in the order of the code value that from small to big. The sequence that the code displays is decided by BIOS of the motherboard.

② Code haven't be defined is not included in the table.

③ For the different BIOS (such as AMI, Award、Phoenix), a Code has different meanings. So make sure that which kind Kind of BIOS you are testing. Or view the user' s guide, or See it on the BIOS IC on the motherboard.

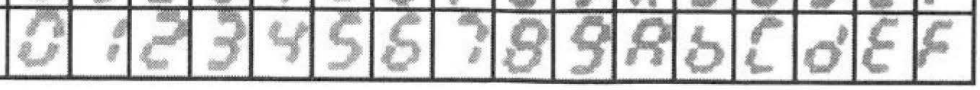
④ There is only some code displayed when you insert the card into the PCI slot on a few motherboards, but when it plugged into the ISA slot, all the code could be displayed. At present, it has be discovered that the code is displayed when you insert the card into the PCI slot of several computers which has registered trade mark, but not ISA. So you' d better try it on the other slot if the code is not displayed. In addition, on the different PCI slots of a board, some could display the code, for example, the code is displayed and goes from " 00" to " FF" when you insert the card into the PCI slot, which is near to the CPU on motherboard DELL810, but if in the other slot, the code would stopped at the port "38"

⑤ The time that reser message output needed is not always in - phase, so sometimes the code is displayed when the card in the ISA, but it is stopped at the orgination code when in the PCI.

⑥ As there are more and more kinds motherboard, and the code of BIOS POST is updated ceaselessly, so the meanings of error codes is just for reference.

⑦ According to experience: 2-bits code card is available in testing mainboard below Pii300. but not avilable in maiboard above Pii300, so it ' s better to buy 4 - bits Pi0050 card, furthermore, we haven't received any ill response from our buyer.

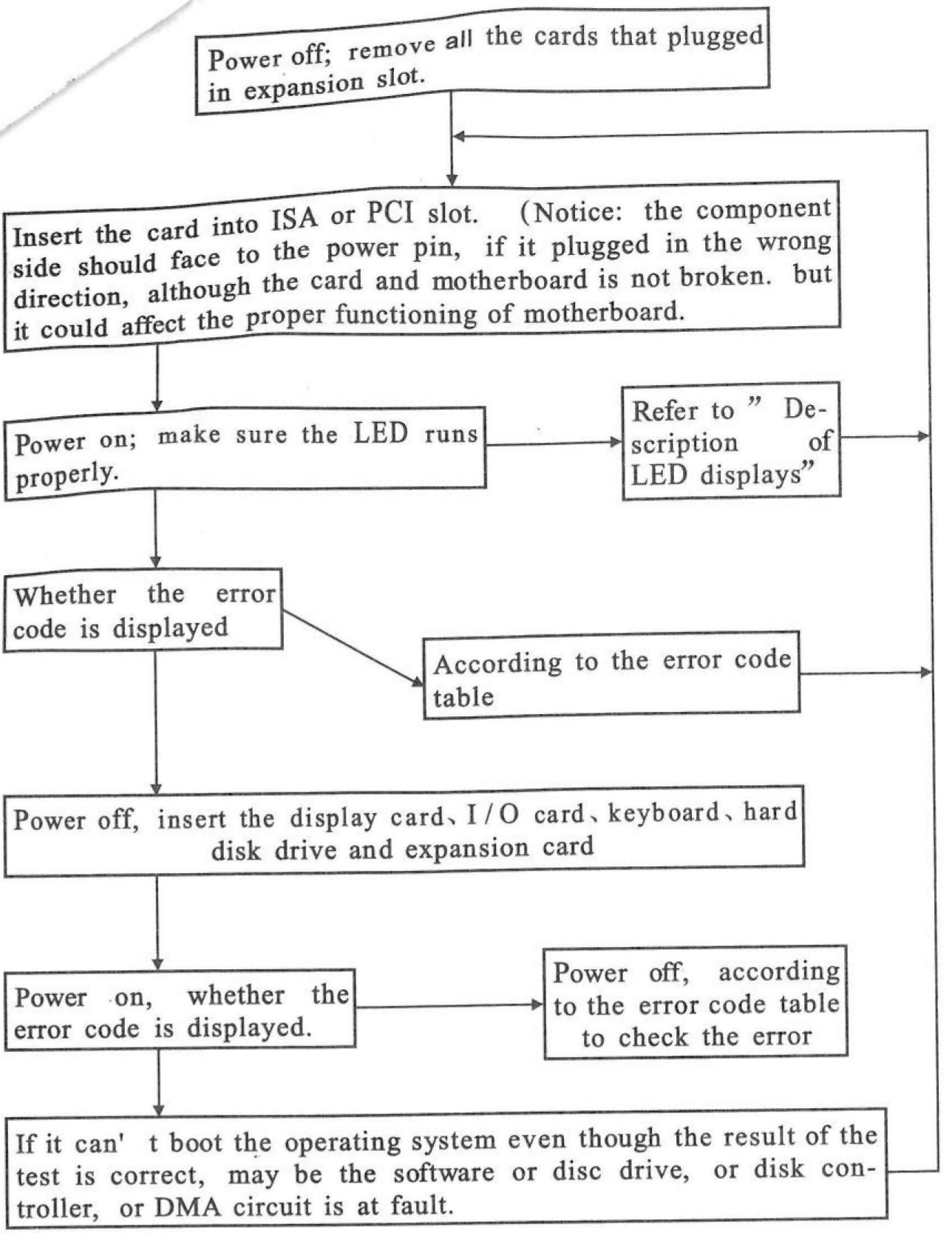
3. Hexadecimal character table

Decimalist	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hexadecimal	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
The POST card display																

4. Description of LED displays

LED	Type	Description
RUN	Bus pulse	If the LED lights , the main board has worked, no matter if the code changes.
CLK	Bus clock	Lights when the power is applied to the empty board (even without CPU), or else there is no message.
BIOS	Basic input/ output read	LED that turn on and off when the board is powered on, as CPU is reading to BIOS.
IRDY	Manager is ready	LED that turn on and off when there is a mes-sage.
OSC	osciliation	Lights when the board is powered on, or else the crystal oscillation circuit is broken, and has no OSC message.
FRAME	Frame periods	Lights all the time. Turn on and off only when there is a circular frame message.
RST	Reset	Lights only for half - second when you slide the power switch or the reset switch. If it is lit all the time, check the following: make sure that the reset pin is plugged properly, or the reset circuit is boken.
12V	Power	Lights once the board is powered on, if it is not lit, that means the short circuit occurs on motherboard, or voltage can't up to 12V.
– 12V	Power	The same as " 12V"
5V	Power	The same as " 12V"
– 5V	Power	The same as " 12V" (- 5V is output only in ISA slot.)
3V3	Power	Lights once the board is powered on, only in PCI slot there will be 3V3 output. As some motherboard's voltage can' t up to 3V. It could not light.

5. Flow chart


Power off; remove all the cards that plugged in expansion slot.
Insert the card into ISA or PCI slot. (Notice: the component side should face to the power pin, if it plugged in the wrong direction, although the card and motherboard is not broken. but it could affect the proper functioning of motherboard.
Power on; make sure the LED runs properly.
Refer to " Description of LED displays"
Whether the error code is displayed
According to the error code table
Power off, insert the display card、I/O card、keyboard、hard disk drive and expansion card
Power on, whether the error code is displayed.
Power off, according to the error code table to check the error
If it can' t boot the operating system even though the result of the test is correct, may be the software or disc drive, or disk controller, or DMA circuit is at fault.

6. Error code table

Code	Award	AMI	Phoenix4.O/ Tandy3000
00		Code copying to specific areas is done. Passing control to INT 19h boot loader next.	
01	Processor Test 1, Processor status (1FLAGS) verification. Test the following processor status flags: carry, zero, sign, overflow.		CPU is testing the register inside or failed, please change the CPU and check it.
	The BIOS sets each flag, verifies they are set, then turns each flag off and verifies it is off.		
02	Test All CPU Registers Except SS, SP, and BP with Data FF and 00		Verify Real Mode
03	Disable NMI, PIE, AIE, UEI, SQWV.	Disable NMI, PIE, AIE, UEI, SQThe NMI is disabled. Next, checking for a soft reset or a power on condition	Disable Non – Maskable Interrupt (NMI)
	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 controllers 0 and 1.		
	Initialize EISA extended registers.		
04	RAM must be periodically refreshed to keep the memory from decaying. This refresh function is working properly.		Get CPU type

Code	Award	AMI	Phoenix4.0 / Tandy3000
05	Keyboard Controller Initialization	The BIOS stack has been buitt. Next, disabling cache memory.	DMA Initialization in progress or failure
06	Reserved	Uncompressing the POST code next.	Initialized system hardware
07	Verifies CMOS is Working Correctly, Detects Bad Battery	Next, initializing the CPU and the CPU data area	Disable shadow and execute code from the ROM.
08	Early chip set initialization	The CMOS checksum calculation is	Initialize chipset with initial POST values
	Memory presence test		
	OEM chip set routines		
	Clear low 64K memory		
	Tesk first 64K memory		
09	Cyrix CPU Initialization		Set IN POST flag
	Cache Initialization		
0A	Initiailze first 120 interrupt vectors with SPURIOUS – INT – HDLR and initialize INT 00h – 1Fh according to INT – TBL.	The CMOS checksum calculation is done. Lnitializing the CMOS status register for date and time next.	Initialize CPU registers
0B	Test CMOS RAM Checksum. If Bad, or INS Key Pressed, Load Defaults	The CMOS status register is Initialized. Next. Performing any requirect initialization before the keyboard BAT command is issued	Enable CPU cache
0C	Detect Type of Keyboard Controller and	The keyboard controller input butter is free Next, issuing the BAT command to the keyboard controller.	Initialize caches to initial POST values
	Set NUM LOCK Status		
0D	Detect CPU Clock,		
	Read CMOS location 14h to find out type of video in use.		
	Detect and initialize video adapter.		

Code	Award	AMI	Phoenix4 .0 / Tandy3000
0E	Test Video Memory, write sign - on message to screen. Setup shadow RAM ? Enable shadew according to setup.	The keyboard controller BAT command result has been verified. Next, performing any necessary Initialization after the keyboaed controller BAT command test	Initialize I / O component
0F	Test DMA Cont . 0; BIOS Checksum Test Keyboard Detect and Initialization.	The initialization after the keyboard controller BAT command test is done. The keyboard command byte is written next.	Initialize the local bus IDE
10	Test DMA Controiler 1	Test DMA The keyboard controller command byte is written. Next, issuing the Pin 23 and 24 Blocking and unblocking command	Initialize Power Management
11	Test DMA Page Registers	Next, checking if <End> or <Ins> keys were pressed during power on. Initializing CMOS RAM if the Initialize CMOS RAM in every boot AMIBIOS POST option was set in AMIBCP or the <End> key was pressed.	Load alternate registers with initial POST values
12	Reserved	Next , disabling DMA controllers 1 and 2 and interrupt controllers 1 and 2	Restore CPU control word during warm boot
13	Reserved	The video display has been disabled. Port B has been initialized. Next, initializing the chipset	Initialize PCI Bus Mastering devices
14	Test 8254 Timer 0 Counter 2	The 8254 timer test will begin next.	Initialize keyboard controller
15	Verify 8259 Channel 1 Interrupts by Turning Off and On the interrupt Lines		
16	Verify 8259 Channel 2 Interrupts by Turning Off and On the Interrupt Lines		BIOS ROM checksum

Code	Award	AMI	Phoenix4.0/ Tandy3000
17	Turn Off Interrupts Then Verify No Interrupt Mask Register is On		Initialize cache before memory Auto size
18	Force an Interrupt and Verify the Interrupt Occurred		8254 timer initialization
19	Test Stuck NMI Bits; Verify NMI Can Be Cleared		The 8254 timer test is over. Starting the memory refresh test next
1A	Display CPU clock	The memory refresh line is toggling. Checking the 15 second on/off time next	8237 DMA controller initialization
1B	reserved		
1C	Reserved		Reset Programmable Interrupt Controller
1D	Reserved		
1E	Reserved		
1F	If EISA non-volatile memory checksum is good, execute EISA initialization		
	If not, execute ISA tests an clear.		
	EISA mode flag		
	Test EISA configuration memory		
	Integrity (checksum & communication interface).		
20	Initialize Slot O (System Board)		Test DRAM refresh
21	Initialize Slot 1		

Code	Award	AMI	Phoenix4.0/ Tandy3000
22	Initialize Slot 2		Test 8742 Keyboard Con-Trolier
23	Initialize Slot 3	Reading the 8042 input port and disabling the MEGAKEY Green PC feature next. Making the BIOS code segment writable and performing any necessary configuration before initializing the interrupt vectors	
24	Initialize Slot 4	The configuration required before interrupt vector initialization has completed. Interrupt vector initialization is about to begin	Set ES segment register to 4 GB
25	Initialize Slot 5	Interrupt vector initlalization is done. Clearing the password if the POST DIAG awitch is on.	
26	1. test the exceptional situation of protected mode, check the memory of cpu and mainboard. 2. no fateful trouble, VGA displayed normally. If non-fateful trouble occurred, then display error message in VGA otherwise boot operating system, and code "26" is OK code, no any other codes to display	1. read/write input、output port of 8042 keyboard; ready for revolve mode, continue to get ready for initialization of all data, check the 8042 chips on mainboard. 2. refere to the left.	1. enable A20 adress line, check the A20 pins of memory controlling chips, and check circuit, correlated to pins. in memory slot, may be A20 pin and memory pins are not in contact, or memory A20 pins bad. 2. refere to the left
27	Initialize Slot 7	Any initialization before setting video mode will be done next	
28	Initialize Slot 8	Initialization before setting the video mode is complete. Configuring the monochrome mode and color mode settings next	Auto size DRAM

Code	Award	AMI	Phoenix4.0/ Tandy3000
29	Initialize Slot 9		Initialize POST Memory Manager
2A	Initialize Slot 10	Initializing the different bus system, static, and output devices, if present	Clear 512 KB base RAM
2B	Initialize Slot 11	Passing control to the video ROM to perform any required configuration before the video ROM test.	
2C	Initialize Slot 12	All necessary processing before passing control to the video ROM is done. Looking for the video ROM next and passing control to it.	RAM failure on address line xxxx *
2D	Initialize Slot 13	The video ROM has returned control to BIOS POST Performing any required processing after the video ROM had control	
2E	Initialize Slot 14	Completed pest - video ROM test processing. If the EGA/VGA controller is not found, performing the display merery Read/write test next	RAM failure on data bits Xxxx * of low byte of memory bus
2F	Initialize Slot 15	The EGA/VGA controller was not found. The display memory reed/write test is about to begin	Enable cache before system BIOS shadow
30	Size Base Memory From 256K to 640K and Extended Memory Above 1MB	The display memory read/write test passed. Look for retrace checking next	
31	Test Base Memory From 256K to 640K and Extended Memory Above 1MB	The display memory read/write test or retrace checking failed. Performing the alternate display memory read/write test next	
32	If EISA Mode, Test EISA Memory Found in Slots Initialization	The alternate display memory read/write test passed. Looking for alternate display retrace checking next.	Test CPU Bus – clock frequency
33	Reserved		Initialize Phoen'x Dispatch manager

Code	Award	AMI	Phoenix4.0/ Tandy3000
34	Reserved	Video display checking is over. Setting the display mode next.	
35	Reserved		
36	Reserved		Warm start and shut down
37	Reserved	The display mode is set. Displaying the power on message next	
38	Reserved	Initializing the bus input, IPL, general devices next, if present	Shadow system BIOS ROM
39	Reserved	Displaying bus initialization error messages.	
3A	Reserved	The new cursor position has been read and saved. Displaying the Hit <DEL> message next	Auto size cache
3B	Reserved	The Hit <DEL> message is displayed. The protected mode memory test is about to start.	
3C	Setup Enabled		Advanced configuration of chipset registers
3D	Detect if Mouse is Present, Initialize Mouse, Install Interrupt Vectors		Load alternate registers with CMOS values
3E	Initialize Cache Controller		
3F	Reserved		
40	Display Virus Protest Disable or Enable	Preparing the descriptor tables next	
41	Initialize Floppy Disk Drive Controller and Any Drives		Initialize extended memory for RomPilot
42	Initialize Hard Drive Controller and Any Drives	The descriptor tables are prepared. Enteling protected mode for the memory test next	Initialize interrupt vectors
43	Detect and Initialize Serial & Parallel Ports and Game Port	Entered protected mode. Enabling interrupts for diagnostics mode next.	

Code	Award	AMI	Phoenix4.0/ Tandy3000
44	Reserved	Interrupts enabled if the diagnostics switch is on. Initializing data to check memory wraparound at 0:0 next.	
45	Detect and Initialize Math Coprocessor	Data initialized. Checking for memory wraparound at 0: 0 and finding the total system memory size next	POST device initialization
46	Reserved	The memory wraparound test is done. Memory size calculation has been done. Writing patterns to test memory next	Check ROM copyright notice
47	Reserved	The memory pattern has been written to extended memory. Writing patterns to the base 640 KB memory next.	Initialize 120 support
48	Reserved	Patterns written in base memory. Determining the amount of memory below 1 MB next.	Check video configuration against CMOS
49	Reserved	The amount of memory below 1 MB has been found and verified. Determining the amount of memory above 1 MB memory next.	initialize PCI bus and devices
4A	Reserved		Initialize all video adapters in system
4B	Reserved	The amount of memory above 1 MB has been found and verified. Checking for a soft reset and clearing the memory below 1 MB for the soft reset next. If this is a power on situation, going to checkpoint 4Eh next.	QuletBoot start (optional)
4C	Reserved	The memory below 1 MB has been cleared via a soft reset. Clearing the memory above 1 MB next.	Shadow video BIOS ROM
4D	Reserved	The memory above 1 MB has been cleared via a soft reset. Saving the memory size next. Going to checkpoint 52h next	

Code	Award	AMI	Phoenix4.0 / Tandy3000
4E	Reboot if Manufacturing Mode; If not, Display Messages and Enter Setup	The memory tesl started, but not as the result of a soft reset. Displaying the first 64 KB memory size next.	Display BIOS copyright notice
4F	Ask Password Security (Optional)	The memory size display has started. The display is updated during the memory test. Performing the sequential and random memory test next	Initialize Multi-Boot
50	Write All CMOS Values Back to RAM and Clear	The memory below 1 MB has been tested and initialized. Adjusting the displayed memory size fot relocation and shadowing next	Display CPU type and speed
51	Enable Parity Checker. Enable NMI, Enable Cache Before Boot	The memory size display was adjusted for relocation and shadowing. Testing the memory above 1 MB next.	Initialize EISA board
52	Initialize Option ROMs from C8000h to EFFFFh or if FSCAN Enabled to F7FFFh	The memory above 1 MB has been tested and initialized. Saving the memory size information next.	Test keyboard
53	Initialize Time Value in 40h: BIOS Area	The memory size information and the CPU registers are saved. Entering real mode next.	
54		Shutdown was successful. The CPU is in real mode. Disabling the Gate A20 line, parity, and the NMI next	Set key click if enabled
56			Enable USB devices
57		The A20 address line, parity. and the NMI are disabled. Adjusling the memory size depending on relocatlon and shadowing next.	
58		The memory size was adjusted for relocation and shadowing. Clearing the Hit <DEL> message next	Test for unexpected Interrupts

Code	Award	AMI	Phoenix4.0/ Tandy3000
59		The Hit <DEL> message is cleared. The <WAIT...> message is displayed. Starting the DMA and interrupt controller test next,	Initialize POST display service
5A			Display prompt Press F2 to enter SET-UP'
5B			Disable CPU cache
5C			Test RAM between 512 and 640 kB
60	Setup virus protection (boot sector protection) functionality according to setup setting.	The DMA page register test passed. Performing the DMA Controller 1 base register test next.	Test extended memory
61	Try to turn on level 2 cache (if L2 cache already turned on in post 3D, this part will be skipped)		
	Sat the boot up speed according to setup setting		
	Last chance for chipset initialization		
	Last chance for power management initialization (Green BIOS Only)		
	Show the system configuration table		
62	Setup NUM Lock Status According to Setup values	The DMA controller 1 base register test passed. Performing the DMA controller 2 base register test next	Test extended memory address lines
	Program the NUM lock. typematic rate & typematic speed according to setup setting		

Code	Award	AMI	Phoenix4.0/ Tandy3000
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		
64			Jump to UserPatch1
65		The DMA controller 2 base register test passed Programming DMA controllers 1 and 2 next	
66		Completed programming DMA controllers 1 and 2 Initializing the 8259 interrupt controller next.	Configure advanced cache registers
67		Completed 8259 interrupt controller initialization	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
6F			

Code	Award	AMI	Phoenix4.0/ Tandy3000
70			Display error message
71			
72			Check for configuration errors
76			Check for keyboard errors
7C			Set up hardware interrupt vectors
7D			Initialize Intelligent System Monitoring
7E			Initialize coprocessor if present
7F		Extended NMI source enabling is in progress.	
80		The keyboard test has started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command next	Disable onboard Super I/O ports and IRQs
81		A keyboard reset error or stuck key was found. Issuing the keyboard controller interface test command next	Late POST device initialization
82		The keyboard controller interface test completed. Wirting the command byte and initializing the circular buffer next.	Detect and install external RS232 ports
83		The command byte was written and global data initialization has completed. Checking for a locked key next	Configure non – MCD IDE controllers
84		Locked key checking is over. Checking for a memory size mismatch with CMOS RAM data next	Detect and install external parallel ports
85		The memory size check is done. Displaying a soft error and checking for a password or bypassing WINBIOS Setup next.	Initialize PC – compatible PnP ISA devices
86		The password was checked. Performing any required programming before WINBIOS Setup next	Re – initialize onboard I/O ports.

Code	Award	AMI	Phoenix4.0/ Tandy3000
87		The programming before WINBIOS Setup has completed Uncompressing the WINBIOS Setup code and executing the AMIBIOS Setup or WINBfOS Setup utility next	Configure Motherboard Configurable Devices (optional)
88		Returned from WINBIOS Setup end cleared the screen. Performing any necessary programming after WINBIOS Setup next	Initialize BIOS Data Area
89		The programming after WINBIOS Setup has completed. Displaying the power on screen message next	Enable Non – Maskable Interrupts (NMIs)
8A			Initialize Extended BIOS Data Area
8B		The first screen message has been displayed. The <WAIT. . .> message is displayed. Performing the PS/2 mouse check and extended BIOS data area allocation check next	Test and initialize PS/2 mouse
8C		Programming the WINBIOS Setup options next	Initialize floppy controller
8D		The WINBIOS Setup options are programmed. Resetting the hard disk controller next	
8E		The hard disk controller has been reset. Configuring the floppy drive controller next	
8F			Determine number of ATA drives (optional)
90			Initialize hard - disk controllers
91		The floppy drive controller has been configured. Configuring the hard disk drive controller next.	Initialize local – bus hard – disk controllers
92			Jump to UserPatch2
93			Build MPTABLE for multi – processor boards

Code	Award	AMI	Phoenix4.0/ Tandy3000
95		Initializing bus adaptor ROMs from C8000h through D8000	hInstall CD ROM for boot
96		Initializing before passing control to the adaptor ROM at C800	Clear huge ES segment register
97		Initialization before the C800 adaptor ROM gains control has completed. The adaptor ROM check is next.	Fix up Multi Processor table
98		The adaptor ROM had control and has now returned control to BIOS POST. Performing any required processing after the option ROM returned controlA	Search for option ROMs. One long, two short beeps on checksum failure
99		Any initialization required after the option ROM test has completed. Configuring the timer data area and printer base address next.	Check for SMART Drive (optional)
9A		Set the timer and printer base addresses. Setting the RS – 232 base address next.	Shadow option ROMs
9B		Returned after setting the RS – 232 base address. Performing any required initialization before the Coprocessor test next.	
9C		Required initialization before the Coprocessor test is over. Initializing the Coprocessor next	Set up Power Management
9D		Coprocessor initialized. Performing any required initialization after the Coprocessor test next.	Initialize security engine (optional)
9E		Initialization after the Coprocessor test is complete. Checking the extended keyboard, keyboard ID, and Num Lock key next. Issuing the keyboard ID command next	Enable hardware interrupts
9F			Determine number of ATA and SCSI drives
A0			Set time of day

Code	Award	AMI	Phoenix4.0/ Tandy3000
A1			Check key lock
A2		Displaying any soft error next	
A3		The soft error display has completed. Setting the keyboard typematic rate next.	
A4		The keyboard typematic rate is set. Programming the memory wait states next	Initialize typematic rate
A5		Memory wait state programming is over. Clearing the screen and enabling parity and the NMI next	
A7		NMI and parity enabled. Performing any initialization required before passing control to the adaptor ROM at E000 next.	
A8		Initialization before passing control to the adaptor ROM at E000h completed. Passing control to the adaptor ROM at E000h next	Erase F2 prompt
A9		Returned from adaptor ROM at E000h control. Performing any initialization required after the E000 option ROM had control next	
AA		Initialization after E000 option ROM control has completed. Displaying the system configuration next	Scan for F2 key stroke
AB		Uncompressing the DMI data and executing DMI POST initialization next	
AC			Enter SETUP
AE			Clear boot flag
B0	If Interrupts Occurs in Protected Mode	The system configuration is displayed.	Check for errors

Code	Award	AMI	Phoenix4.0/ Tandy3000
B1	If Unmasked NMI Occurs, Display Press F1 to Disable NMI, F2 Reboot	Copying any code to specific areas.	Inform RomPilot about the end of POST.
B2			POST done – prepare to boot operating system
B3			
B4			1 One short beep before boot
B5			Terminate Quiet-Boot (optional
B6			Check password (optional)
B7			Initialize ACPI BIOS
B8			
B9			Prepare Boot
BA			Initialize SMBIOS
BB			Initialize PnP Option ROMs
BC			Clear parity checkers
BD			Display MultiBoot menu
BE	Program chipset registers with power on BIOS defaults		Clear screen (optional)
BF	Program the rest of the chipset' s value according to setup (later setup value program)		Check virus and backup reminders
	If auto configuration is enabled, programmed the chipset with predefined values in the MODBINable Auto Table		

Code	Award	AMI	Phoenix4.0/ Tandy3000
C0	Turn off OEM specific cache, shadow Initialize standard devices with default values: DMA controller (8237); Programmable Interrupt Controller (8259); Programmable Interval Timer (8254); RTC chip.		Try to boot with INT 19
C1	OEM Specific – Test to Size On – Board Memory		Initialize POST Error Manager (PEM)
C2			Initialize error logging
C3	Test the first 256K DRAM Expand the compressed codes into temporary DRAM area including the compressed system BIOS & Option ROMs.		Initialize error display function
C4			Initialize system error handler
C5	OEM Specific – Early Shadow Enable for Fast Boot		PnPnd dual CMOS (optional)
C6	External Cache Size Detection		Initialize note dock (optional)
C7			Initialize note dock late
C8			Force check (optional)
C9			Extended checksum (optional)
CA			Redirect Int 15h to enable remote keyboard

Code	Award	AMI	Phoenix4.0/ Tandy3000
CB			Redirect Int 13h to Memory Technologies Devices such as ROM, RAM, PCMCIA, and serial disk
CC			Redirect Int 10h to enable remote serial video
CD			Re-map I/O and memory for PCMCIA
CE			Initialize digitizer and display message
D0		The NMI is disabled. Power on delay is starting. Next, the initialization code checksum will be verified.	
D1		Initializing the DMA controller, performing the keyboard controller BAT test, starting memory refresh, and entering 4 GB flat mode next.	
D2			Unknown interrupt
D3		Starting memory sizing next	
D4		Returning to real mode. Executing any OEM patches and setting the stack next.	
D5		Passing control to the uncompressed code in shadow RAM at E000:0000h. The initialization code is copied to segment 0 and control will be transferred to segment 0	

Code	Award	AMI	Phoenix4.0/ Tandy3000
D6		Control is in segment 0 Next, checking if <Ctrl> <Home> was pressed and verifying the system BIOS checksum. If either <Ctrl> <Home> was pressed or the system BIOS checksum is bad, next will go to checkpoint code E0h. Otherwise, going to checkpoint code D7h.	
E0		The onboard floppy controller if available is initialized. Next, beginning the base 512 KB memory test	Initialize the chipset
E1	E1 Setup - Page E1	Initializing the interrupt vector table next	Initialize the bridge
E2	E2 Setup - Page E2	Initializing the DMA and Interrupt controllers next.	Initialize the CPU
E3	E3 Setup - Page E3		Initialize system timer
E4	E4 Setup - Page E4		Initialize system I/O
E5	E5 Setup - Page E5		Check force recovery boot
E6	E6 Setup - Page E6	Enabling the floppy drive controller and Timer IRQs. Enabling internal cache memory.	Checksum BIOS ROM
E7	E7 Setup - Page E7		Go to BIOS
E8	E8 Setup - Page E8		Set Huge Segment
E9	E9 Setup - Page E9		Initialize Multi Processor
EA	EA Setup - Page EA		Initialize OEM special code
EB	EB Setup - Page EB		Initialize PIC and DMA

Code	Award	AMI	Phoenix4.0/ Tandy3000
EC	EC Setup - Page EC		Initialize Memory type
ED	ED Setup - Page ED	Initializing the floppy drive.	Initialize Memory size
EE	EE Setup - Page EE	Looking for a floppy diskette in drive A: Reading the first sector of the diskette	Shadow Boot Block
EF	EF Setup - Page EF	A read error occurred while reading the floppy drive in drive A:	System memory test
F0		Next, searching for the AMIBOOT.ROM file in the root directory.	Initialize interrupt vectors
F1		The AMIBOOT.ROM file is not in the root directory	Initialize Run Time Clock
F2		Next, reading and analyzing the floppy diskette FAT to find the clusters occupied by the AMIBOOT.ROM file	Initialize video
F3		Next, reading the AMIBOOT.ROM file, cluster by cluster.	Initialize System Management Manager
F4		The AMIBOOT.ROM file is not the correct size	Output one beep
F5		Next, disabling internal cache memory.	Clear Huge Segment
F6			Boot to Mini DOS
F7			Boot to Full DOS
FB		Next, detecting the type of flash ROM.	
FC		Next, erasing the flash ROM.	
FD		Next, programming the flash ROM	
FF	Int 19 Boot Attempt	Flash ROM programming was successful. Next, restarting the system BIOS.	

7. Description of beep code

(1)AMI BIOS beep codes(fatal error)

1 beep	DRAM Refresh Failure. Try reseating the memory first. If the error still occurs, replace the memory with known good chips.
2 beeps	Parity Error in First 64K RAM. Try reseating the memory first. If the error still occurs, replace the memory with known good chips.
3 beeps	Base 64K RAM Failure. Try reseating the memory first. If the error still occurs, replace the memory with known good chips.
4 beeps	System timer failure
5 beeps	Process failure
6 beeps	Keyboard Controller 8042 – Gate A20 Error. try reseating the keyboard controller chip. If the error still occurs, replace the keyboard chip. If the error persists, check parts of the system relating to the keyboard, e.g. try another keyboard, check to see if the system has a keyboard fuse
7 beeps	Processor. Virtual Mode Exception Interrupt Error
8 beeps	Display Memory Read/Write Test Failure (Non – fatal) . Replace the video card or the memory on the video card.
9 beeps	ROM BIOS Checksum (32KB at F800: 0) Failed. It is not likely that this error can be corrected by reseating the chips. . Consult the motherboard supplier or an AMI product distributor for replacement part(s).
10 beeps	CMOS Shutdown Register Read/Write Error
11 beeps	Cache memory error

(2)AMI BIOS beep codes(Non – fatal errof)

2 short	POST Failure – One or more of the hardware tests has failed
1 long 2 short	An error was encountered in the video BIOS ROM, or a horizontal retrace failure has been encountered
1 long 3 short	Conventional/Extended memory failure
1 long 8 short	Display/Retrace test failed

(3)Award BIOS beep codes

1 short	No error during POST
2 short	Any Non – fatal error, enter CMOS SETUP to reset
1 long 1 short	RAM or motherboard error

1 long 2 short	Video Error, Cannot Initialize Screen to Display Any information
1 long 3 short	Keyboard Controller error
1 long 9 short	Flash RAM /EPROM (which on the motherboard) error. (BIOS error)
Long beep	Memory bank is not plugged well, or broken.

(4) Phoenix BIOS beep codes

Beep Code	Description / What to Check
1 – 1 – 1 – 3	Verify Real Mode
1 – 1 – 2 – 1	Get CPU type.
1 – 1 – 2 – 3	Initialize system hardware.
1 – 1 – 3 – 1	Initialize chipset registers with initial POST values.
1 – 1 – 3 – 2	Set in POST flag.
1 – 1 – 3 – 3	Initialize CPU registers.
1 – 1 – 4 – 1	Initialize cache to mitial POST values.
1 – 1 – 4 – 3	Initialize I/O.
1 – 2 – 1 – 1	Initialize Power Management.
1 – 2 – 1 – 2	Load alternate registers with initial POST values.
1 – 2 – 1 – 3	Jump to User Patch0
1 – 2 – 2 – 1	Initialize keyboard controlier.
1 – 2 – 2 – 3	BIOS ROM checksum.
1 – 2 – 3 – 1	8254 timer initialization.
1 – 2 – 3 – 3	8237 DMA controller initialization.
1 – 2 – 4 – 1	Reset Programmable Interrupt Controller.
1 – 3 – 1 – 1	Test DRAM refresh.
1 – 3 – 1 – 3	Test 8742 Keyboard Controller.
1 – 3 – 2 – 1	Set ES segment to register to 4 GB.
1 – 3 – 3 – 1	28 Autosize DRAM.
1 – 3 – 3 – 3	Clear 512K base RAM.
1 – 3 – 4 – 1	Test 512K base address lines.
1 – 3 – 4 – 3	Test 512K base memory.
1 – 4 – 1 – 3	Test CPU bus - clock frequency.
1 – 4 – 2 – 4	Reinitialize the chipset.
1 – 4 – 3 – 1	Shadow system BIOS ROM.
1 – 4 – 3 – 2	Reinitialize the cache.
1 – 4 – 3 – 3	Autosize cache.
1 – 4 – 4 – 1	Configure advanced chipset registers.
1 – 4 – 4 – 2	Load alternate registers with CMOS values

2 – 1 – 1 – 1	Set Initial CPU speed.
2 – 1 – 1 – 3	Initialize interrupt vectors.
2 – 1 – 2 – 1	Initialize BIOS interrupts.
2 – 1 – 2 – 3	Check ROM copyright notice.
2 – 1 – 2 – 4	Initialize manager for PCI Options ROMs.
2 – 1 – 3 – 1	Check video configuration against CMOS.
2 – 1 – 3 – 2	Initialize PCI bus and devices.
2 – 1 – 3 – 3	Initialize all video adapters in system.
2 – 1 – 4 – 1	Shadow video BIOS ROM.
2 – 1 – 4 – 3	Display copyright notice.
2 – 2 – 1 – 1	Display CPU type and speed.
2 – 2 – 1 – 3	Test keyboard.
2 – 2 – 2 – 1	Set key click if enabled.
2 – 2 – 2 – 3	56 Enable keyboard.
2 – 2 – 3 – 1	Test for unexpected interupts.
2 – 2 – 3 – 3	Display prompt " Press F2 to enter SETUP".
2 – 2 – 4 – 1	Test RAM between 512 and 640k.
2 – 3 – 1 – 1	Test expanded memory
2 – 3 – 1 – 3	Test extended memory address lines.
2 – 3 – 2 – 1	Jump to User Patch1.
2 – 3 – 2 – 3	Configure advanced cache registers.
2 – 3 – 3 – 1	Enable external and CPU caches.
2 – 3 – 3 – 3	Display extemal cache size.
2 – 3 – 4 – 1	Display shadow message.
2 – 3 – 4 – 3	Display non - disposable segments.
2 – 4 – 1 – 1	Display error messages.
2 – 4 – 1 – 3	Check for configuration errors.
2 – 4 – 2 – 1	Test real - time clock.
2 – 4 – 2 – 3	Check for keyboard errors
2 – 4 – 4 – 1	Set up hardware interrupts vectors.
2 – 4 – 4 – 3	Test coprocessor ot present.
3 – 1 – 1 – 1	Disable onboard I / O ports.
3 – 1 – 1 – 3	Detect and install external Rs232 ports.
3 – 1 – 2 – 1	Detect and install external parallel ports.
3 – 1 – 2 – 3	Re - Initialize onboard I/O ports.
3 – 1 – 3 – 1	Initialize BIOS Data Area.
3 – 1 – 3 – 3	Initialize Extended BIOS Data Area.
3 – 1 – 4 – 1	Initialize floppy controller.

3 – 2 – 1 – 1	Initialize hard – disk controller.
3 – 2 – 1 – 2	Initialize local – bus hard – disk controller.
3 – 2 – 1 – 3	Jump to UserPatch2.
3 – 2 – 2 – 1	Disable A20 address line.
3 – 2 – 2 – 3	Clear huge ES segment register.
3 – 2 – 3 – 1	Search for option ROMs.

(5)IBM BIOS beep codes

Beep Code	Description
No Beeps	No Power, Loose Card, or Short.
1 Short Beep	Normal POST, computer is ok.
2 Short Beep	POST error, review screen for error code.
Continuous Beep	No Power, Loose Card, or Short.
Repeating Short Beep	No Power, Loose Card, or Short.
One Long and one Short Beep	Motherboard issue.
One Long and Two short Beeps	Video (Mono/CGA Display Circuitry) issue.
One Long and Three Short Beeps.	Video (EGA) Display Circuitry.
Three Long Beeps	Keyboard / Keyboard card error.
One Beep, Blank or Incorrect Display	Video Display Circuitry.

8. Corrective Action

(1) . If I forget the password, what can I do?

If you forget your password, don't worry! The following will help you:

① . Omnipotent password

For the BIOS from different manufacturer, their password is different too. Both omnipotent password and password users set are able to unlock the computer. Try the abbreviation of manufacturer or the character string which formed by the first letter of each word. May be it is the omnipotent password, for example:

I. AMI password

AMI	AMI	Bios310	AMI! SW	KILLCMOS
A. M. I	589589	SMOSPWD	AMISETUP	ami. kez
BIOS	ammii	AMI SW	ami?	AMI. KEY
AMI SW	amipswd	amidecod	amiami	
PASSWORD	LKWPETER	BIOSPASS	AMIPSWD	

II. Award passwod

PASSWORD	HLT	biostar	?award	djonet
AWARD SW	ALFAROME	j09F	1EAAh	g6PJ
AWARD?SW	256256	j256	admin	HELGA – S
AWARE PW	589721	LKWPETER	ally	HLT

III. others

Phoenix BIOS: phoenix	Megastar: star
Biostar Biostar: Q54arwms	Micron: sldkj754xyzall
Compag: compag	Micronies: dn 04rie
CTX International: CTX_123	Packard Bell: bell9
Dell: Dell	Shuttle: spacve
Digital Equipment: komprie	Siements Nixdorf: SKY FOX
HP Vectra: hewlpack	Tinys: tiny
IBM: IBM MBIUO sertafu	TMC: BIGO

② . Discharge by software

CMOS ROM can be discharged by software way. Then help you to solve the password problem. Follow these method, use the prompt " DE-BUG", all things to be easy.

I. clear Award password

C: \> DEBUG

– o 70 34↙ or – o 70 11↙

– o 71 34↙ – o 71 ff↙

– q↙ – q↙

II. clear AMI BIOS password

C: \> DEBUG

– o 70 16↙ or – o 70 10↙

– o 71 16↙ – o 71 0↙

– q↙ – q↙

Note: the setup of CMOS BIOS will be erased during the discharge, so the computer is able to running until you reset it. If it is COMPAQ computer, you'd better get a floppy disk which store CMOS program first, then do the discharge, or else it is easy to discharge but hard to recover.

③ . hardware jumper discharge to CMOS BIOS

All the computers could discharge to CMOS BIOS by switch or jumper, and clear any prompt (system booting prompt, CMOS setup prompt, key lock prompt) . There are examples for the particularity of CMOS of some Original packaging computer:

The discharge of COMPAQ and AST is finished by close/open the switch, but except the state power off, follow these steps:

a. when the external power is turned off, push SW1 and SW1 – 2 to

" on ".

b. external power is turned on, restart the computer.

c. after 1 to 5 minutes. turn off the computer

d. push SW1 and SW1 - 2 to "off"

e. turn on the computer. enter CMOS setup to reset if.

Most of motherboard discharge to CMOS by jumper, and for the different board, the pin is different. During the discharge, read the user's guide of motherboard first, if the state of CMOS discharge jumper pin is not included in it, to check that whether there are sighs on the motherboard, such as " Exit Batter", " Clean CMOS", "CMOS ROM Reset". If you find these sign, connect the pin of switch, or else, remove the battery.

④ . get helps from youur dealer

If the problem is not solved still, please get in touch with you dealer.

(2)How to enter CMOS SETUP?

BIOS	Key	Screen instruction
AMI	<Del> or <ESC>	Displayed
Award	<Del> or <Ctrl> + <Alt> + <ESC>	Displayed
MR	<Del> or <Ctrl> + <Alt> + <ESC>	NONE
Quadtel	<F2>	Displayed
COMPAQ	Press <F10> when the cursor displayed on top right screen	NONE
AST	<Del> + <Alt> + <S>	NONE
Phoenix	<Del> + <Alt> + <S>	NONE
Hewlett Packard(HP)	<F2>	NONE

9. If the code is not included in the book, what can I do?

As the mainboard manufacturer defines the code. Some codes haven't been defined, so you can get in touch with you dealer and find them. Also if you have the new code meaning, you can write them down in the following table:

CODE	Description	BIOS type (√)		
		Award	AMI	Phoenix

10. Answers of frequently - asked questions

NOTE: 1. Don't against the rules in motherboard quality guaranty during repair the board.

2. Troubleshooting only when the power off.

Error	description	solutions
Memory Bank	Memory bank is bad	Replace it and try again
	Pin of memory bank is dirty	Clean it with student eraser and try again.
	It is not match the other bank	Insert the right memory bank.
	Plugged in the wrobng direction	Insert it property
Memory slot or extended slot	The slot is dirty or something in it	Clean it
	Metallic spring stice in the slot is out of shape or ruptured.	Refit it ' s shape or replace it
	Metallic spring stice in the slot is rusty or mouldy	Wash with the pure alcoho. Inserts it and pull it out frequently after it is dry.
CPU	CPU is bad	Replace it . (Touch it to check if it does not generate heat or overheated)
	The jumper setup or CMOS setup of CPU is error.	Check the setup of working voltage and frequency of CPU
	CPU pin is dirty	Clear the dirty things, insert and pull out it frequently.
	CPU is not plugged well.	Check the CPU pin
Error of POST card or it plugged by error	The pin is dirty	Clean it with student eraser. Insert the card and pull it out many times.
	The POST card is plugged in wrong slot	Distinguish carefully between ISA slot and PCI slot
	It is plugged in the wrong direction.	Make sure the component Side should face to the power pin
	The POST card is bad	Get in touch form you dealer. (P678@163.net)
Power on, the code is stopped	The motherboard is not running	Check the power and CPU jumper.
	There is no code export to the bus slot in which the POST card insert	Try the other slot. (See " Obligatory content")
POST tails midway	Motherboard error	According to error codes
	The motherboard send the error code to ideo display	Connect the video display. According to the message on the screen to check the error, then try again.

Introduce of run LEDS

ıly by some units and a few mainboard slot message, it could runs normaıly, and it has a low error percentum. If the card is plugged into the bad slot, the code stop changing, or the other LEDs is not light, but the run LED is quite possible to run normally. You can solve the following problems by the result of "if the run LED has lighted, the mainboard has ever ran":

1. The code of the card is bad.
2. The card is not fit for the mainboard which you using.
3. PCI slot or ISA slot is bad.
4. The card is plugged incorrectly or pins of card are dirty, or pins in slot rusted.
5. The mainboard stops working.
6. The mainboard is working on programs which is out of relation to codes.