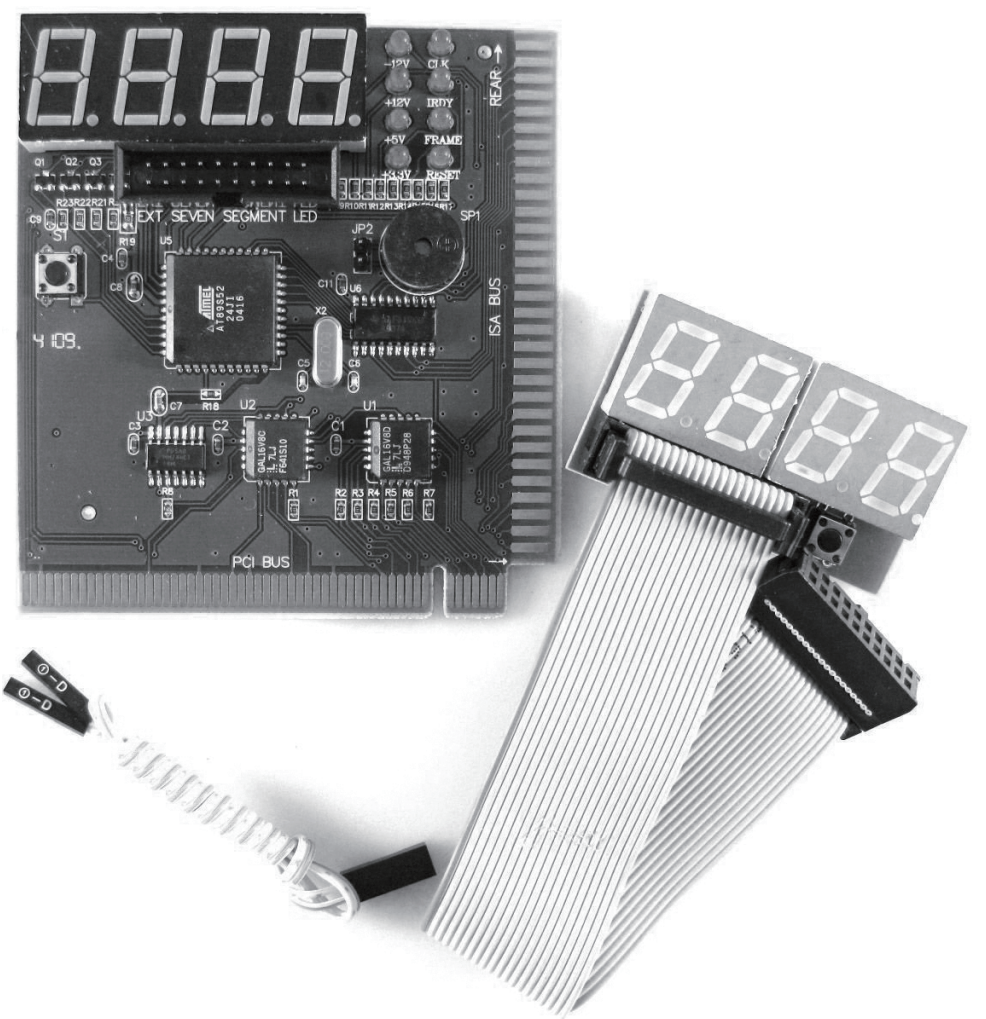
KINGWIN®

CMBA-4

PC Analyzer

User's Guide



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Improvement Note

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

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

2. When the RST LED is lit up (the tested mainboard is resetting).

In any case above, the card and LED doesn’t light up or light up briefly; rule out the “original code”. If the code is not displayed beside cases above, the card is not compatible with the mainboard which is being tested. You just need a more advanced post card like PI0050.

CONTENT

1.SYNOPSIS

The card is named POST (Power On Self Test) card too. It could display error code by the result of POST. Then you would soon determine the error in code table. Especially when the PC can't boot operating system, 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 the result twice 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 it would analyze the system configuration, initializing 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. If the error occurs during the test of pivotal parts, it will halt the work and nothing appears on the screen. If the pivotal parts is OK, you can test the parts that's 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, and 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 that hasn't been defined is not included in table.
③ For the different BIOS (such as AMI, Award, Phoenix), a code has different meanings. Refer to the user's guide, or see it on the BIOS IC on the motherboard.
④ There is only some codes displayed when you insert the card into the PCI slot on a few motherboards, but when it is plugged into the ISA slot, all the codes will be displayed. At present, it has been discovered that 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 can display the code, for example, the code is displayed and goes from "00" to "FF" when you insert the card into the PCL slot, which is near the CPU on motherboard DELL810, but if in the other slot, the code would stop at the port "38".
⑤ The time that reset message output needed is not always in –phase, so sometimes the code is displayed when in the card in the ISA , but it is stopped at the original code when in the PCI.
⑥ As there are more and more kinds motherboards, and the code of BIOS POST is updated ceaselessly, so the meanings of error codes are just for reference.

⑦ According to experience: 2-bits code card is available in testing mainboard below Pil300, but not available in mainboard above Pil300, so it's better to buy 4-bits Pi0050 card. Furthermore, we haven't received any undesirable feedback from our buyer.

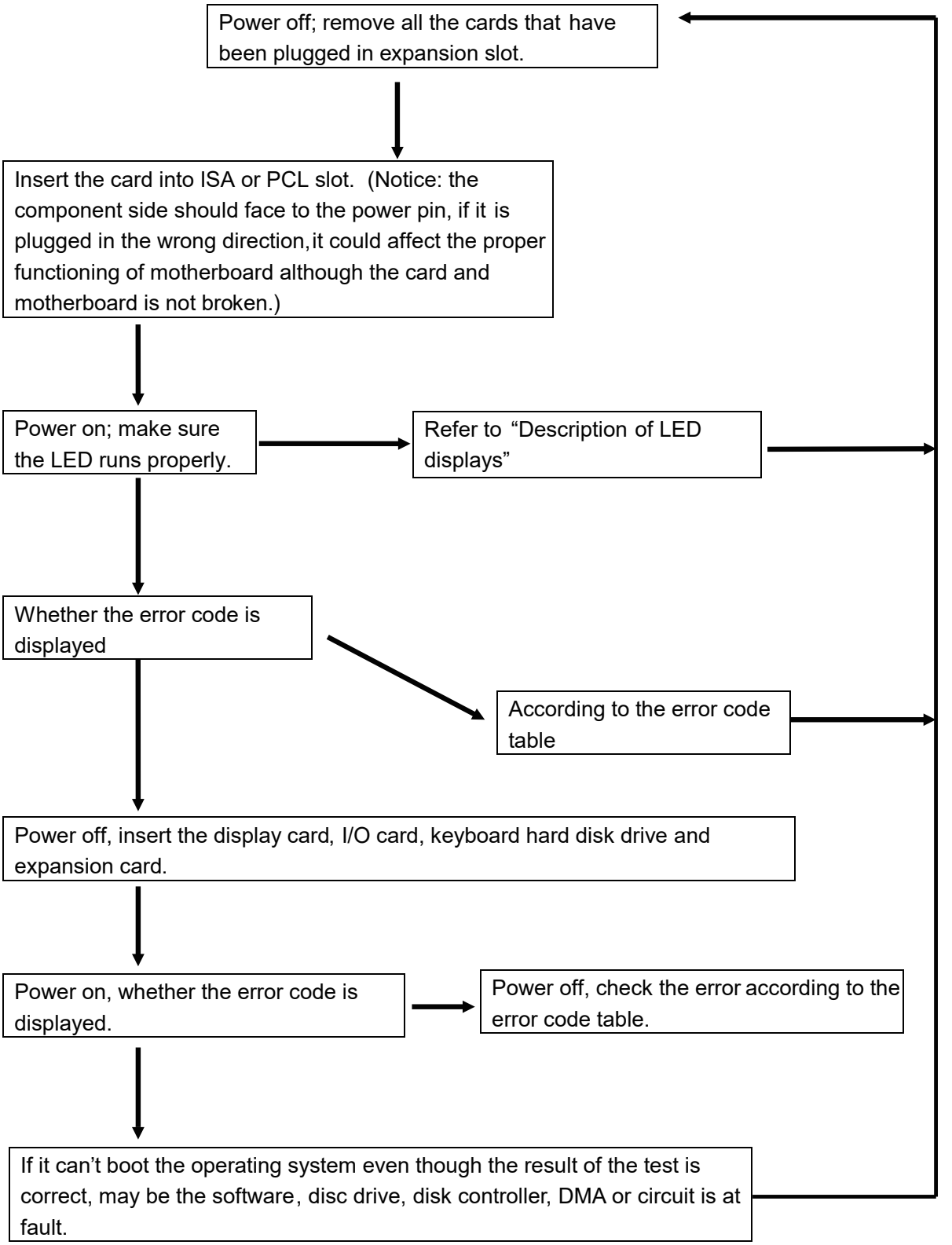
3. Hexadecimal character table.

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	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

4.Description of LED displays

LED	Type	Description
RUN	Bus pulse	If the LED lights, the mainboard 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 turns on and off when the board is powered on, as CPU is reading to BIOS.
IRDY	Manager is ready	LED that turns on and off when there is a message.
OSC	oscillation	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 one half second when you slide the power switch or the reset switch. If it is lit all the time, please check the following: make sure that the reset pin is plugged properly, or the reset circuit is broken.
12V	Power	Lights once the board is powered on. If it is not lit, which means the short circuit occurs on motherboard, or the voltage can not 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 PCL slot there will be 3V3 output. As some motherboards' voltage can't up to 3V, it could not light.

5. Flow chart


Power off; remove all the cards that have been plugged in expansion slot.
Insert the card into ISA or PCL slot. (Notice: the component side should face to the power pin, if it is plugged in the wrong direction,it could affect the proper functioning of motherboard although the card and motherboard is not broken.)
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, check the error according to the error code table.
If it can’t boot the operating system even though the result of the test is correct, may be the software, disc drive, disk controller, DMA or 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. The BIOS sets each flag, verifies that they are set. Then turns each flag off and verifies whether it is off.		CPU is testing the register inside or failed, please change the CPU and check it.
02	Test All CPU Registers Except SS, SP and BP with Data FF and 00.		Verify Real Mode
03	Disable NMI , PIE, AIE, UEI and SQWV. Disable video, parity checking, DMA. Reset math coprocessor. Clear all page registers, CMOS, shutdown byte. Initialize timer 0, 1, and 2, including setting EISA timer to a known state. Initialize DMA controllers 0 and 1. Initialize interrupt controllers 0 and 1. Initialize EISA extended registers.	Disable NMI, PIE, AIE UEI and SQ. The NMI is disabled. Next, check for a soft reset or a power on condition.	Disable Non-Maskable Interrupt(NMI)
04	RAM must be periodically refreshed to keep the memory from decaying. This refresh function is working properly.		Get CPU type

Code	Award	AMI	Phonenix4.0/ Tandy3000
05	Keyboard Controller Initialization	The BIOS stack has been built. Next disable cache memory.	DMA Initialization in progress or failure
06	Reserved	Then uncompress the POST code .	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 Memory presence test OEM chip set routines Clear low 64k memory Test first 64k memory Cyrix CPU Initialization Cache Initialization	The CMOS checksum calculation	Initialize chipset with initial POST values
09	Cyrix CPU Initialization Cache Initialization		Set IN POST flag
0A	Initialize first 120 interrupt vectors with SPURIOUS-INT-HDLR and initialize INT 00h-1Fh according to INT-TBL	The CMOS checksum calculation is done. Initializing 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, perform any required initialization before the keyboard BAT command is issued.	Enable CPU cache
0C	Detect the type of keyboard controller and Set NUM LOCK Status	The keyboard controller input butter is free. Next, issue the BAT command to the keyboard controller.	Initialize caches to initial POST values
0D	Detect CPU Clock Read CMOS location 14h to find out the type of video in use. Detect and initialize video adapter		

Code	Award	AMI	Phoenix4.0/ Tandy3000
0E	Test Video Memory, and write a sign-on message to screen Setup shadow RAM. Enable shadow according to setup.	The keyboard controller BAT command result has been verified. Next, perform any necessary initialization after the keyboard controller BAT command test.	Initialize 1/0 component
0F	Test DMA Cont0; BIOS Checksum Test Keyboard Detection 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 Controller1	Test DMA. The keyboard controller commend byte is written. Next, issue the Pin 23 and 24 blocking and unblocking command.	Initialize Power Management
11	Test DMA Page Registers	Next, check if < End > or < Ins > keys were pressed during power on. Initialization 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, disable 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, initialize the chipset.	Initialize PCL 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		8524 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. Check the 15 microseconds 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, then 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 controller
23	Initialize Slot 3	Read the 8042 input port and disable the MEGAKEY Green PC feature. Next make the BIOS code segment writable and perform any necessary configuration before initializing the interrupt vectors.	
24	Initialize Slot 4	The configuration is required before the interrupt of vector initialization has completed. Interrupting vector initialization is about to begin.	Set ES segment register to 4 GB
25	Initialize Slot 5	Interrupt vector initialization is done. Clear the password if the POST DIAG switch 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 troubles occurred, then display error messages in VGA otherwise boot operating system, and code “26” is OK code, no any other codes to display.		1. Enable A20 address line, check the A20 pins of memory controlling chips, and check circuit, correlated to pins. In memory slot, may be A20pin and memory pins are not in contact, or memory A20 pins are bad. 2 .Refer to the left.
27	Initialize Slot7	Any initialization before seething video mode will be done next.	
28	Initialize Slot 8	Initialization before setting the video mode is complete.	Auto size DRAM

Code	Award	AMI	Phoenix4.0/ Tandy3000
29	Initialize Slot 9		Initialize POST Memory Manager
2A	Initialize Slot 10	Initialize the different bus system, static, and output devices, if present	Clear 512 KB base RAM
2B	Initialize Slot11	Passing control to the video ROM to perform any required configuration before the video POM test.	
2C	Initialize Slot 12	All necessary processes before passing control to the video ROM are done. Next, look for the video ROM and pass control to it.	RAM failure on address line××××*
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 memory Read/ write test next.	RAM failure on data bits ××××* of memory bus
2F	Initialize Slot 15	The EGA/VGA controller was not found. The display memory read / 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 test6 passed. Look for retrace checking next.	
31	Size Base Memory From 256k to 640k and Extend Memory Above 1MB	The display memory read /write test or retrace checking failed. Next, perform the alternate display memory read/write test.	
32	If EISA Mode, Test EISA Memory Found in slots Initialization	The alternate display memory read/write test passed. Next, look for alternate display retrace checking.	Test CPU Bus-clock frequency
33	Reserved		Initialize Phoenix Dispatch manager

Code	Award	AMI	Phoenix4.0/ Tandy3000
34	Reserved	Video display checking is over. Set the display mode next.	
35	Reserved		
36	Reserved		Warm start and shut down
37	Reserved	The display mode is set. Display the power on message next.	
38	Reserved	Initialize the bus input, IPL, general devices next, if present.	Shadow system BLOS ROM
39	Reserved	Display bus initialization error messages.	
3A	Reserved	The new cursor position has been read and saved. Display the Hit (DEL) message next.	Auto size cache
3B	Reserved	The new (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 Floppy Disk Drive Controller and Any Drives		
3F	Reserved		
40	Display virus Protest Disable or Enable	Preparing the4 descriptor tables next.	
41	Initialize Hard Floppy Disk Drive Controller and Any Drives		Initialize extended memory for Rompilot
42	Initialize Hard Disk Controller and Any Drives	The descriptor tables are prepared Enteling protected mode for the memory test next.	Disk Drive Controller and Any Drives interrupt vectors
43	Detect and initialize Serial & Parallel	Enter Protected mode. Enable interrupts for diagnostics mode next.	

Code	Award	AMI	Phoenix4.0/ Tandy3000
44	Reserved	Interrupts have been enabled(If the diagnostics switch is on, then Initialize date to check memory wraparound at 0:0)	
45	Detect and initialize Math Coprocessor	Date initialized. Check for memory wraparound at 0:0 and finding the total system memory size.	POST device initialization
46	Reserved	The memory wraparound text is done, Memory size has been calculated, which will be written into the patterns to test memory.	Check ROM copyright notice
47	Reserved	The memory pattern has been written to extended memory. Write patterns to the base 640KB memory next.	Initialize 120 support
48	Reserved	Patterns written in base memory. Determine the amount of above 1MB next.	Check video configuration against CMOS
49	Reserved	The amount of memory below 1MB has been found and verified. Determine the amount of memory above 1 MB next.	Initialize PCI bus and devices
4A	Reserved		Initialize all video adapters in system
4B	Reserved	The amount of memory above 1MB has been found verified. Check for a soft reset and clear the memory below 1MB for the soft reset. If this is a checkpoint situation, then go to checkpoint 4Eh.	QuletBoot start (optional)
4C	Reserved	The memory below 1MB has been cleared via a soft reset. Clear the memory above 1 MB next.	Shadow video BIOS ROM
4D	Reserved	The memory above 1 MB has been cleared via a soft reset. Save the memory size next. Then going to checkpoint 52h.	

Code	Award	AMI	Phoenix4.0/ Tandy3000
4E	Reboot if Manufactruring Mode, if not Display Messages and Enter Setup	The memory test started. but not as the result of a soft reset. Display the first 64KB 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. Perform the sequential and random memory test next.	Initialize Multiboot
50	Write all CMOS Values back to RAM and clear	The memory below 1MB has been tested and initialized. Adjust the displayed memory size for relocation and shadowing next.	Display CPU type and speed
51	Enable parity checker. Enable NMI and enable cache before boot	The memory size display was adjusted for relocation and shadowing next.	Initialize EISA board
52	Initialize Option ROMs from C8000h to EFFFFh or if FSCAN Enabled to F 7FFFh	The memory above 1MB has been tested and initialized. Save 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. Enter real mode next.	
54		Shutdown was successful. The CPU is in real mode. Disable 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. Depending on relocation and shadowing, adjust the memory size next.	
58		The memory size was adjusted for relocation and shadowing. Clear 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. Next start the DMA and interrupt controller test.	Initialize POST display service
5A			Display prompt F2 to enter SETUP
5B			Disable CPU cache
5C			Test RAM between 512KB and 640KB
60	Setup virus protection (boot sector protection) functionality according to setup setting	The DMA page register test is passed. Perform 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)		
	Set to boot up speed according to setup setting		
	Last chance for chipset initialization		
	Last chance for power management initialization (Green BIOS Only)		
	Show the system for power configuration table		
62	Setup NUM Lock Status According to Setup Values	The DMA controller 1 base register test is passed. Perform the DMA controller 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, please update the ESCD information (PnP BIOS only)		
	Clear memory that have been used		
	Boot system via INT 19h		
64			Jump to User Patch1
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 initialization.	Configure advanced cache registers
67		Completed 8259 interrupt controller initialization.	Initialize Multi Processor APIC
68			Enable external and CPU cache
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. Clear the output buffer and check for stuck keys. Issue the keyboard reset command next.	Disable onboard super I/O ports and IRQs
81		A keyboard reset error or stuck key was found. Issue the keyboard controller interface test command next.	Late POST install external RS232 ports
82		The keyboard controller interface test is completed. Write the command byte and initialize the circular buffer next.	Detect and install external RS232 ports
83		The command byte was written and global data initialization has been completed. Check for a locked key next.	Configure non-MCD IDE controllers
84		Checking for locked key is over. Then check for a memory size mismatch with CMOS RAM data.	Detect and install external parallel ports
85		The memory size check is done. Display a soft error and check for a password or bypass WINBIOS Setup next.	Initialize PC-compatible PnP ISA devices
86		The password was checked. Perform any required programming before WINBIOS setup next.	Re – initialize onboard I/O ports

Code	Award	AMI	Phoenix4.0/ Tandy3000
87		The programming before WIN-BOIS Setup has been completed. Uncompress the WIMBOIS setup code and execute the AMIBIOS setup or WINBFOS setup utility next.	Configure Motherboard Configurable Devices (Optionai)
88		Return from WINBOIS setup end clear the screen. Perform any necessary programming after WINBIOS setup next.	Initialize BIOS Data Area
89		The programming after WINBIOS setup has been completed. Display setup 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. Perform the PS/BIOS mouse check and extend BIOS date area allocation check next.	Test and initialize PS/2 mouse
8C		Program the WINBIOS setup options next.	Initialize floppy controller
8D		The WINBIOS setup options are programmed. Reset the hard disk controller next.	
8E		The hard disk controller has been reset. Configure the floppy drive controller next.	
8F			Determine the number of ATA drives (0ptional)
90			Initialize hard disk controllers
91		The floppy drive controller has been configured. Configure 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		Initialize bus adaptor ROMs from C8000.	Install CD ROM for boot
96		Initialize before passing control to the adaptor ROM at C800.	Clear huge ES segment register
97		Initialization before the C800 adaptor ROM gaining control has completed. Next check the adaptor ROM.	Fix up multi processor TABLE
98		The adaptor ROM had control and returned control to BIOS POST. performing any required process after the option ROM returned control A.	Search for option ROMs One long two short beeps on deck sum failure
99		Any initialization required after the option ROM test has been completed. Configure the timer data area printer base address next.	Check for SMART drive (optional)
9A		Set the timer and printer base addresses. Set the RS-223 base address next.	Shadow option ROMs
9B		Return after setting the RS 232 base address. Perform any required initialization before the Coprocessor test next.	
9C		Require initialization before the Coprocessor test is over. Initialize the Coprocessor next.	Set up power Management
9D		Coprocessor initialized. Perform any required initialization after the Coprocessor test next.	Initialize security engine (optional)
9E		Initialization after the Coprocessor test is completed. Next check the extended Num Lock key, and issue the keyboard ID command.	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		Display any soft error next.	
A3		The soft error display has been completed. Set the keyboard typematic rate next.	
A4		The keyboard typematic rate is set. Program the memory into waiting states next.	Initialize typematic rate
A5		Memory wait state programming is over. Next clear the screen and enable parity and the NMI.	
A7		NMI and parity enabled. Perform any initialization requirement before passing control to the adaptor ROM at E000 next.	
A8		Initialization before passing control to the adaptor. Passing control to the adaptor ROM at E000h next.	Erase F2 prompt
A9		Return from adaptor ROM at E000h control. Perform any initialization requirement after the E000 option ROM had control next.	
AA		Initialization after E000 option ROM control has been completed. Displaying the system configuration next	Scan for F2 key stroke
AB		Uncompressing the DIM data and executing DIM POST initialization next.	
AC			Enter SETUP
AE			Clear boot flag
BO	If interrupts occur in protected Mode	The system configuration is displayed.	Check for error

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

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 compresses system BIOS 8 Option ROMs.		Initialize system 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 (optional0
CA			Redirect Int 15h to enable remote keyboard

Code	Award	AMI	Phoenix4.0/ Tandy3000
CB			Redirect Int 13h to memory technology devices, such as ROM ram PCMCI 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 delay is starting. Next, the initialization code checksum will be verified.	
D1		Initialize the DMA controller. Perform the keyboard controller BAT test, and start memory 4GB fist mode next.	
D2			Unknown interrupt
D3		Start memory sizing next.	
D4		Return to real mode, execute any OEM patches and set the stack next.	
D5		Pass control to the uncompressed code in shadow RAM at E000:000h. The initialization code is copied to segment 0 and control will be transferred to segment 0.	

Code	Award	AMI	Phoenix4.0/ Tandy300
D6		Control is in segment 0. Next check if <Ctrl> and <home> was pressed and verify the system BOIS checksum. If either <Ctrl> and <home> was pressed or the system bois checksum is wrong. next go to checkpoint code Eoh. Otherwise, go to checkpoint code D7h.	
E0		If the onboard floppy controller is initialized availably, then begin the base 512KB memory test.	Initialize the chipset
E1	E1 Setup-Page E1	Initialize the interrupt vector table.	Initialize bridge
E2	E1 Setup-Page E2	Initialize the DMA and interrupt controllers.	Initialize the CPU
E3	E1 Setup-Page E3		Initialize system timer
E4	E1 Setup-Page E4		Initialize system I/O
E5	E1 Setup-Page E5		Check force recovery boot
E6	E1 Setup-Page E6		Checksum BIOS ROM
E7	E1 Setup-Page E7		Go to BIOS
E8	E1 Setup-Page E8		Set Huge segment
E9	E1 Setup-Page E9		Initialize Multi processor
EA	E1 Setup-Page EA		Initialize OEM special code
EB	E1 Setup-Page EB		Initialize PIC and DMA

Code	Award	AMI	Phoenix4.0/ Tandy300
EC	EC Setup-Page EC		Initialize Memory type
ED	EC Setup-Page ED	Initialize the floppy drive	Initialize Memory size
EE	EC Setup-Page EE	Look for a floppy diskette in drive A; reading the first sector of the diskette.	Shadow memory Block
EF	EC Setup-Page EF	A read error occurred while reading the floppy drive in drive A.	System memory test
F0		Search for the AMIBOOT.ROM fine in the root directory.	Initialize interrupt vectors
F1		The AMIBOOT.ROM file is not in the root directory.	Initialize Run Time Clock
F2		Read and analyze the floppy diskette FAT to find the clusters occupied by the AMINOOT.ROM file.	Initialize video
F3		Read the AMIBOOT.ROM file cluster.	Initialize System Manegememt manager
F4		The AMINOOT.ROM file is not the correct size.	Output one beep
F5		Disable internal cache memory.	Clear Huge segment
F6			Boot to Mini DOS
F7			Boot to Full DOS
FB		Detect the type of flash ROM	
FC		Erase the flash ROM	
FD		Program the flash ROM	
FF	Int 19 Boot Attempt	Flash ROM programming was successful. Then restart 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 chips. 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(32k 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 error)

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 of 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 motherboard0 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 with initial POST values
1-1-4-1	Initialize cache to initial 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 controller
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 4GB
1-3-3-1	28 Autosize DRAM
1-3-3-3	Clear 512k base RAM
1-3-4-3	Test 512K base address ;lines
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 interrupt
2-1-2-3	Check ROM copyright notice
2-1-2-4	Initialize manage for PCI Options ROMs
2-1-3-1	Check video configuration against CMOS
2-1-3-2	Initialize PCL 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 enable
2-2-2-3	56 Enable keyboard
2-2-3-1	Test for unexpected interrupts
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 extended memory
2-3-1-3	Test extended memory address lines
2-3-2-1	Jump to User Path1
2-3-2-3	Configure advanced cache registers
2-3-3-1	Enable external and CPU caches
2-3-3-3	Display external cache size
2-3-4-1	Display shadow message
2-4-1-3	Check for keyboard errors
2-4-2-1	Set up hardware interrupts vectors
2-4-4-3	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 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	Reinitialize 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 User Patch2
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 forgot 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 are able to unlock the computer. Try the abbreviation of manufacture or the character string which formed by the first letter of each word.. May be is the omnipotent password, for example:

I. AMI password

AMI	AMI	Bios310	AMI SW	KILLCMOS
A.M.L	589589	SMOSPWD	AMISETUP	Ami. kew
BIOS	ammii	AMI SW	ami?	AMI.KEY
AMI SW	amipswd	Amidecod	amiami	
PASSWORD	LKWPETER	BIOSPASS	AMIPSWD	

II. Award password

PASSWORD	HLT	biostar	?award	djonet
AWARD SW	ALFAROME	Jo9F	1EAAh	G6pJ
AWARD ? SW	256256	J256	admin	HELGA-S
AWARD SW	589721	LKWPETER	ally	HLT

III. Others

Phoenix BIOS Phoenix	Megastar : star
Biostar Biostar:Q54arwms	Micron: sjdkj 754xyzall
Compag : compag	Micronies : dn 04rie
CTX international:CTX-123	Packard Bell: bell9
Dell:Dell	Siemets Nixdort:SKY FOX
HP Vectra;hewipack	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, and all things will be easy.

Ⅰ. Clear Award password

C:\>DEBUQ

-0 70 34↙ or -0 70 11↙

-0 71 34↙ -0 71 ff↙

-q↙ -q↙

Ⅱ. Clear AMI BIOS password

C:\>DEBUG

-0 70 16↙or -0 70 10↙

-071 16↙ -0 71 0↙

-q↙ -q↙

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

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 your 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 go against the rules in motherboard quality guaranty during repairing the board.
2. Troubleshooting only when the power off.

Error0	description	solutions
Memory Bank	Memory bank is bad	Replace 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 wronng 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 shape or ruptured	Refit it's shape or replace it
	Metallic spring stice in the slot is rusty or mouldy	Wash with the pure alcohol 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 jumper, insert and pull out it frequency of CPU
	CPU pin is dirty	Clean it with a small brush, insert the card and pull it out many times
	CPU is not plugged in wrong slot	Check the CPU pin

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 clears any prompt) / There are examples for the particularity of CMOS of some original packaging computers:

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

a. When the external power is turned off, push SW1-2 to "on".
b. External power is turned on restart the computer.
c. Turn off the computer after 1 to 5 minutes.
d. Push SW1 and SW1-2to "off".
e. Turn on the computer, and enter CMOS setup to reset it.

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, and if the state of CMOS discharge jumper pin is not included in it, 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 help from your 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 display on top right screen	NONE
AST	(Del)+(Alt)+(S)	NONE
Phoenix	(Del)+(Alt)+(S)	NONE
Hewlett Packard(HP)	(F2)	NONE

Error of POST card or it plugged by error	The pin is dirty	Clean it with small br, insert tz the card and pull it out many times
	The POST card id plugged in wrong slot	Distinguish carefully between ISA slot and PCL 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 from your dealer,
Power on, the code is stopped	The POST card is bad	Check the power and CPU jumper
	The is no code export to the bus slot in which the POST card insert	Try the other slot. (see “Obligatory content”)
POST tails minaway	Motherboard error	According to error codes
	The motherboard send the error code to video display	Connect the video display. According to the message on the screen to check the error, then try again.

Introduce of run LEDS

Only by some units and a few mainboard slot message, it could runs normally, and it has a low error percentage. If the card is plugged into the bad slot, the code stop changing , or the other LEDs are not on, 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 are 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 are rusted.
5. The mainboard stops working.
6. The mainboard is working on programs which is out of relation to codes.