

ASUS Mother Board Elementary Troubleshooting Guide

REV:1.00

ASUSTek computer inc.

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1. Award PnP BIOS Postcode

Post (HEX)	Descriptions
C0	1. Turn off OEM specific cache, shadow..... 2. Initialize all the standard devices with default values Standard devices includes: <ul style="list-style-type: none">• DMA controller (8237)• Programmable Interrupt Controller (8259)• Programmable Interval Timer (8254)• RTC chip
C1	Auto detection of onboard DRAM & Cache

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C3	1. Test the first 256K DRAM 2. Expand the compressed codes into temporary DRAM area including the compressed system BIOS & Option ROMs
C5	Copy the BIOS from ROM into E000-FFFF shadow RAM so that POST will go faster
01-02	Reserved
03	Initialize EISA registers (EISA BIOS only)
04	Reserved
05	1. Keyboard Controller Self-Test 2. Enable Keyboard Interface
06	Reserved

1.Award PnP BIOS Postcode

07	Verifies CMOS's basic R/W functionality
BE	Program defaults values into chipset according to the MODBINable Chipset Default Table
09	1.Program the configuration register of Cyrix CPU according to the MODBINable Cyrix Register Table 2.OEM specific cache initialization
0A	1.Initialize the first 32 interrupt vectors with corresponding interrupt handlers Initialize INT No. from 33-120 with Dummy(Spurious) interrupt handler 2.Issue CPUID instruction to identify CPU type 3.Early Power Management initialization (OEM specific)

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0B	<ol style="list-style-type: none">1.Verify the RTC time is valid or not2.Detect bad battery3.Read CMOS data into BIOS stack area4.PnP initializations including (PnP BIOS only)<ul style="list-style-type: none">• Assign CSN to PnP ISA card• Create resource map from ESCD5.Assign IO & Memory for PCI devices (PCI BIOS only)
0C	Initialization of the BIOS data area (40:0-40:FF)
0D	<ol style="list-style-type: none">1.Program some of the chipset's value according to setup.(Early setup value program)2.Measure CPU speed for display & decide the system clock speed.3.Video initialization including Monochrome, CGA, EGA/VGA. <p>If no display device found, the speaker will beep.</p>

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0E	<ol style="list-style-type: none">1.Initialize the APIC (Multi-Processor BIOS only)2.Test video RAM (If Monochrome display device found)3.Show message including:<ul style="list-style-type: none">• Award logo, Copyright string, BIOS date code & Part No.• OEM specific sign on messages• Energy Star logo (Green BIOS only)• CPU brand, type & speed
0F	DMA channel 0 test
10	DMA channel 1 test
11	DMA page registers test
12-13	Reserved

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14	Test 8254 timer 0 counter 2
15	Test 8259 interrupt mask bits for channel 1
16	Test 8259 interrupt mask bits for channel 2
17	Reserved
19	Test 8259 functionality
1A- 1D	Reserved
1E	If EISA NVM checksum is good, execute EISA initialization(EISA BIOS only)
1F- 29	Reserved
30	Get base memory & extended memory size

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31	1. Test base memory from 256K to 640K 2. Test extended memory from 1M to the top of memory
32	1. Display the Award Plug & Play BIOS extension message (PnP BIOS only) 2. Program all onboard super I/O chips (if any) including COM ports, LPT ports, FDD port... according to setup value
33-3B	Reserved
3C	Set flag to allow users to enter CMOS setup utility
3D	1. Initialise keyboard 2. Install PS2 mouse

1.Award PnP BIOS Postcode

3E	Try to turn on level 2 cache Note: Some chipset may need to turn on the L2 cache in this stage. But usually, the cache is turn on later in Post 61h
3F-40	Reserved
BF	1.Program the rest of the chipset's value according to setup(Later setup value program) 2.If auto configuration is enabled, programmed the chipset with pre-defined values in the MODBINable Auto-Table
41	Initialize floppy disk drive controller
42	Initialize hard drive controller
43	If it is a PnP BIOS, initialize serial & parrallel ports
44	Reserved

1.Award PnP BIOS Postcode

45	Initialize math coprocessor
46-4D	Reserved
4E	If there is any error detected(such as video,KB....), show all the error messages on the screen & wait for user to press <F1> key
4F	1.If password is needed, ask for password 2.Clear the Energy Star logo (Green BIOS only)
50	Write all the CMOS values currently in the BIOS stack ares back into the CMOS
51	Reserved

1.Award PnP BIOS Postcode

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- 1.Initialize all ISA ROMs
- 2.Later PCI initializations(PCI BIOS only)
 - assign IRQ to PCI devices
 - initialize all PCI ROMs
- 3.PnP initializations (PnP BIOS only)
 - assign IO, Memory, IRQ & DMA to PnP ISA devices
 - initialize all PnP ISA ROMs
- 4.Program shadow RAM according to setup settings
- 5.Program parity according to setup setting
- 6.Power Management initialization
 - Enable/Disable global PM
 - APM interface initializtion

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53	<ol style="list-style-type: none">1.If it is not a PnP BIOS, initialize serial & parallel ports2.Initialize time value in BIOS data area by translate the RTC time value into a timer tick value
54-5F	Reserved
60	Setup virus protection (Boot sector protection) functionality according to setup setting
61	<ol style="list-style-type: none">1.Try to turn on level 2 cache Note:If L2 cache is already turned on in post 3D, this part will be skipped2.Set the boot up speed according to setup setting3.Last chance for chipset initialization4.Last chance for Power Management initialization (Green BIOS only)5.Show the system configuration table

1.Award PnP BIOS Postcode

62	1.Setup daylight saving according to setup valus 2.Program the NUM lock, typmatic rate & typmatic speed according to setup setting
63	1.If there is any changes in the hardware configuration, update the ESCD information (PnP BIOS only) 2.Clear memory that have been used 3.Boot system via INT 19h
FF	System booting. This means that the BIOS already pass the control right to the operating system

Unexpected Errors:

POST (HEX)	Descriptions
B0	If interrupt occurs in protected mode
B1	Unclaimed NMI occurs

2.How to repair

- 00 (1) POWER,PWROK,RESET,CLK,REQ#,A20M# ,M/IO# signal error
- (2)HA,HD,AD,SA signal error
- (3)insert PCI card cause 00.remove card ok: PCI bus GNT open
- (4)address FFFFF8,9,A,B,4,5,6,7: PCI bus AD16 open
- (5)address FFFFF1,2,3,4,5: PCI bus C/BE0# open
- (6)IOR#&IOW# LED error :IOR#&IOW# short
- (7)address FFFFF1 :BIOS's MEMR# signal open
- (8)address FFFFF0,1,2,3 always replay :PCI bus DEVSEL# and GNT short
- (9)address correct but DATA always FF:BIOS's MEMRCS# open
- (10)00 hang up :high bit address open or short
- (11)address incorrect : check all HA,AD,SA,ADS# signal open or short
- (12)DEBUG card can not show address: PCI bus REQ2# open
- (13)NEMR# LED light off:check Power,CLK,reset,MEMR#,HA,AD,M/IO#,
D/C#,BE0~BE3
- (14)address FFFFE0 SA4 error:check SA4,AD4,HA4 signal

2.How to repair

- (15)data Eb SD2 error: check SD2,AD2,HD2 signal open or short
- (16)address FFFFF0,1,2,3 hang up:check AD,HOLD,HOLDA,NA#,
- BOFF signal open or short

2.How to repair

- C0 (1)HD signal open or short
- (2)HA signal open or short
- (3)RTCRD#Open
- (4)Voltage error
- (5)BIOS bad
- (6)371 bad

- C1 (1)MA,MD,CAS,RAS,WE#,CLK signal Open or Short
- (2)BIOS BAD
- (3)MADV#,CLKRUN#,MWE#,AHOLD,KEN# ,NA# Open or Short
- (4)VCCLK,STPCLK frequency error
- (5)M16# AND IO16# Short
- (6)DIMM or SIMM SOCKET not clean or bad
- (7)CPU overdrive or jumper setting error

2.How to repair

- **C3** (1)BIOS BAD
- (2)Chipset

- **C5** (1)HA Short or Open
- (2)MA Short or Open
- (3)BIOS BAD

- **05** (1)CLK
- (2)XIOW,XIOR,KBCS,SA2,BRSTDRV,IRQ1,KBINIT signal open or short
- (3)XD0~XD7 open or short
- (4)K/B BIOS bad
- (5)I/O CHIP(if K/B function inside)bad

- **07** (1)XD Open

2.How to repair

- (2)RTCWR,RTCRD,RTCALE,IRQ8
- (3)check 32.768khz
- (4)clear CMOS
- (5)Dallas bad

- **0A** (1)BIOS bad
- (2)check interrupt circuit

- **0B** (1)PCLKS,PCLKPIIX
- (2)AD signal
- (3)14.318 MHZ
- (4)PIIXINIT,TRDY#,RADY
- (5) PCI bus C/BE0 and AD8 short
- (6)check all CLK signal
- (7)371 or battery bad

2.How to repair

- 0C (1)INTR signal open

- 0D (1)BIOS BAD
- (2)INTR#,IRDY#,TRDY#,DEVSEL#,STOP#,NMI
- (3)AD signal
- (4)BOFF# Open or Short
- (5)+12V Open

- 0E (1) A20GATE signal error
- (2)check INIT,INTR
- (3)clear CMOS

- 0F (1)HD63,IERR# short

2.How to repair

- 18 (1)D/C# Open or Short
- (2)HITM# Open or Short
- (3)NMI# Open or Short
- (4)INTR,LOCK open or short

- 31 (1)KBCS#,IRQ1 Short

- 41 (1)BIOS BAD
- (2) SA0~SA16 Open
- (3)MEMR#,MEMW#
- (4)BIOS's signal must be careful

- 4E (1)TRDY#,DEVSEL# short

- 52 (1)PCIRST open

2.How to repair

- **61** (1)TAG RAM or SRAM bad
- (2)NA#,BS16 open or short
- (3)Chipset

- **C1->0D->C1** (1)K/B BIOS BAD
- **C1->05->C1** (2)KBRST# Short

- **Protected mode** (1)KBDRST#,A20M
- (2)INIT,PEN short
- (3)A20 GATE#

- **Function Test** (1)DALLAS BAD
- (2)32.768

2.How to repair

- **Speed error** (1)CACHE BAD
- (2)CPU CLK
- (3)CLOCK Chip

- **ESCD error** (1)BIOS BAD
- (2)BIOS's signal error

- **NO SCSI** (1)EADS,GNT# ,HITM,AD signal Open or Short
- (2)SCSI CLK

- **Sound Bad** (1)Update BIOS
- (2)SD Open or Short

2.How to repair

- **Com Port**
 - (1)GD75232 open
 - (2)Com Port to GD75232 to I/O Chip Open or Short
 - (3)IRQ3,IRQ4 Open or Short
 - (4)Chipset BAD
 - (5)voltage :+12V,-12V,+5V,-5V,GND error

- **Printer Port**
 - (1)Printer Port to I/O Chip Open or Short
 - (2)IRQ7
 - (3)I/O Chip BAD
 - (4)array resistance bad

- **K/B error**
 - (1)XD0~XD7 ,IRQ1,CLK open or short
 - (2)K/B BIOS or K/B JACK bad
 - (3)FUSE,L(inductor),array resistance

2.How to repair

- **Floppy** (1)24Mhz
- (2)SA,SD,IOR#,IOW#,PHOLD#,PHOLDA#,TC,DRQ2,DACK2#,IRQ6
- (3)check ISA to I/O chip signal
- (4)check 371 chip to ISA signal
- (5)CMOS and JUMPER cannot disable

- **IDE** (1)DD signal
- (2)IORDY,IOW#,IOR#IRQ14,15 Open or Short
- (3)cache bad
- (4)IDE connector

- **0KB** (1)CLK,HD,HA,ADSC# signal open or short

- **Memory size error** (1)MA signal short or open

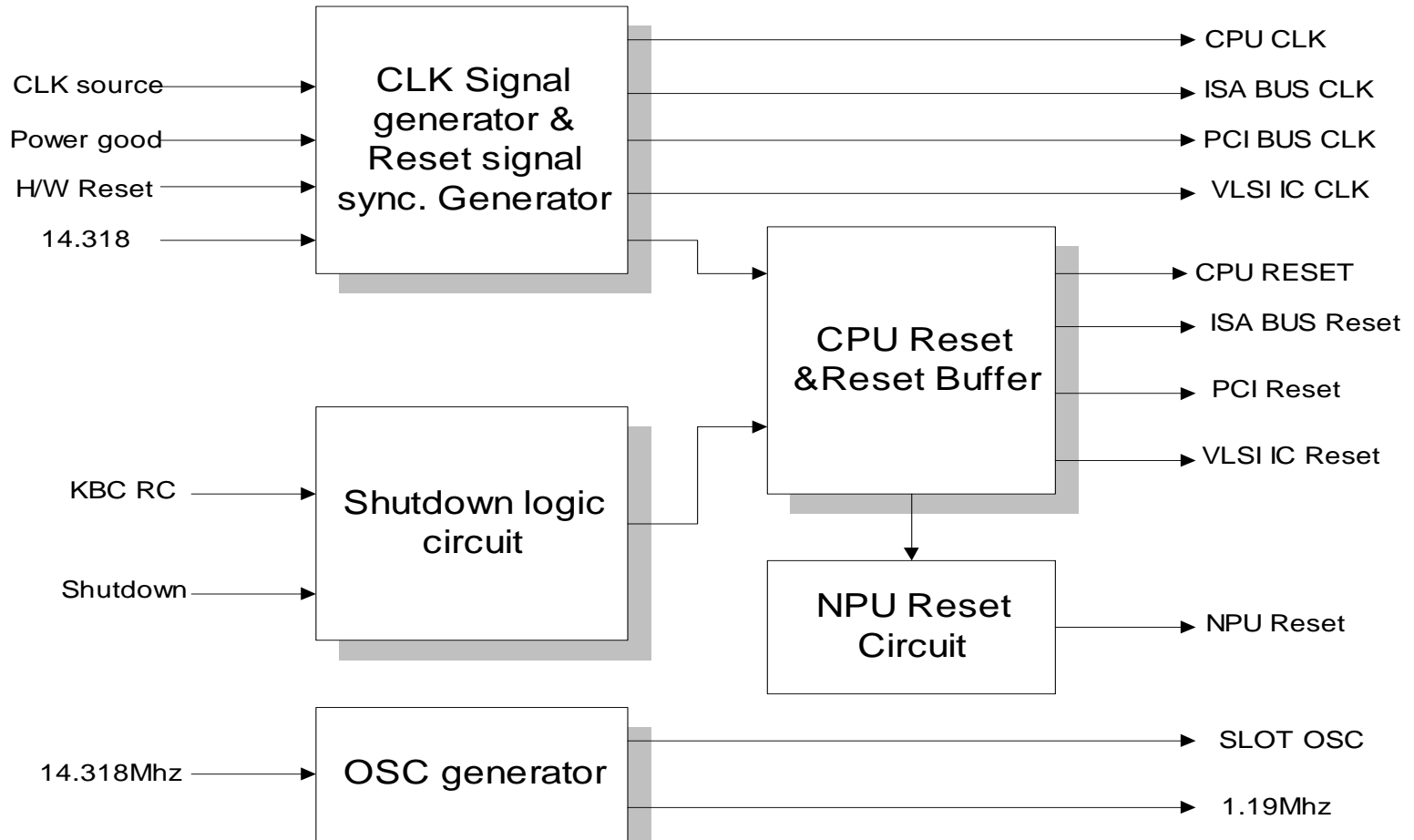
2.How to repair

- Remark :The above simple troubleshooting guideline is for engineer reference. If above information can not cover all problem , please follows the below methods comply with oscilloscope to measure all signal on either chipset or slot step by step.

- a.power (All chipset & slot & IC must have correct voltage in order to work properly.)
- b.Clock (After power is stable ,then frequency divider will output those required frequency for chipset & slot.)
- c.Command signal (After power and frequency are stable and reset signals are all inactive , CPU and chipset will issue command signal and transfer address and data bus into correct path ,like ADS#,M/IO#,W/R#,D/C#)
- d.Address & Data line

3. RESET , CLK Description

Reset , CLK 相關電路剖析



3. RESET , CLK Description

- **1.Power Good =>This signal is provided by power supply . When power is turn on power good signal will change from low to high when power is stable.**
- **2.Hardware Reset =>connect to the reset switch of computer's panel.**
- **3.Keyboard Controller RC =>If system want to switch from protect mode to real mode , it can write command to KBD controller and issue low pulse from RC pin to reset CPU.**
- **4.Shutdown =>CPU issues a shutdown code and reset itself by shutdown circuit .**

3.RESET , CLK Description

- **5.CPU CLK =>Provide CPU the working frequency.**
- **6.ISA BUS CLK =>Provide working frequency for ISA bus slot and related ISA logic circuit .**
- **7.PCI BUS CLK =>Provide working frequency for PCI Bus slot and related PCI logic circuit.**
- **8.VLSI IC CLK =>Provide chipset for the system synchronization purpose .**
- **9.SLOT OSC =>Provide 14.318MHZ frequency for ISA card use ,like VGA card.**

3.RESET , CLK Description

- **10.1.19Mhz =>Provide 8254 (interval timer) reference frequency.This frequency is generated from OSC divide 12.**
- **11.CPU Reset =>Reset CPU to work from the beginning .The source of reset CPU come form 4 reset signal .**
- **12.ISA Reset =>Provide ISA card and related ISA logic circuit reset signal .The input source of ISA reset is from Power Good and hardware reset signal .**
- **13.PCI Reset =>Provide PCI card and related logic circuit reset signal .The input source of PCI reset is from Power Good and hardware reset signal .**
- **14.VLSI IC Reset =>Provide VLSI IC reset signal, the input resource of Power Good is from Power Good and H/W reset signal.**

3.RESET , CLK Description

- **15.NPU Reset =>Reset NPU. The input sources have:**
 - **a.Power Good and H/W reset signal.**
 - **b.CPU issue NPU reset command.**