



Trouble shoot hardware compatibilities of diagnostic card with solution techniques for mother board repair

Umair Ahmed, Adeel Dilshad and M. Sulleman Memon

Department of Computer Science and Engineering, Quaid e Awam UEST, Nawabshah, Sindh, Pakistan.

ARTICLE INFO

Article history:

Received: 3 April 2012;

Received in revised form:

13 October 2012;

Accepted: 30 October 2012;

Keywords

Bamboo,

Moisture management,

Knitted fabrics,

Areal density and

Vapour permeability.

ABSTRACT

There are millions of computer users around world but only few people have knowledge about diagnostic card, on the other hand if someone has theoretical knowledge then don't know/understand about the language of diagnostic card. In this piece of work we have tried to resolve issues related to diagnostic card and provided much solution related to routine problems of motherboard. The objective of this research is to provide easily knowledge about the language of diagnostic card so that common user can easily knew that what type of code diagnostic card generated and can resolve the problem in motherboard at its own without consulting to hardware engineer. We have given at home simple solutions about problems related to heating issue of main chip, power supply problem, beep problem, hanging problem, red light problem and processor problem through this diagnostic card.

© 2012 Elixir All rights reserved.

Introduction

Diagnostic cards are actually main component for finding the reason of failure due to a specific cause [1, 2]. They provide information even in the absence of monitor display because it is possible that failure of system happened before the event when video remained ON. Laptop PCI is supported by different types of cards but with certain constraints and may have three ports as PCI port, USB port and Parallel connector port [3]. On the other hand ISA and PCI interface ports are available on both sides on a common desktop PC card. It is very important that knowledge or details of POST codes for the requirement of BIOS must be explained/supplied to understand the meaning or purpose of codes [4]. We have used KLP16-SD Diagnostic Card which is shown in Figure 1.

Functional Characteristics of KLP16-SD Diagnostic Card

There is no need to install software. Combining advance Technology and the user's behavioral science, humanized PC diagnostic card to be user friendly. It is easy to use. Thus it is not only applicable card technicians but also common PC users [5].

Using large-scale IC Integrated module with compact structure and testable performance, the highly quality diagnostic & stability test card can meet the high standards with more internal resources. It has more excellent anti-jamming performance and lower rate of self-failures [6].

Functional limitation of traditional PC diagnostic cards has been broken, i.e. we have created standard PCI interface and varieties of auxiliary parts that enhance the accuracy and reliability of PC diagnostic card and part of its functions depend no more on BIOS and never limits to POST contents and manners[7].

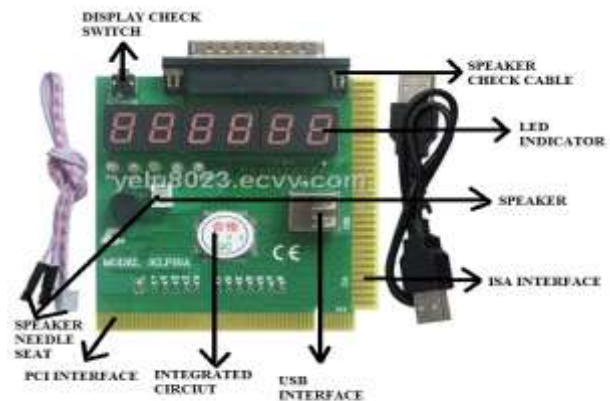


Fig. No. 1: KLP16-SD Diagnostic Card

Unlike traditional PC diagnostic cards that become useless when the system booted. KLP16-SD helps you to solve problems like system halt, blank screen, instability and keeps your computer running safely with stability [8].

It has unprecedented compatibility because KLP16-SD is compatible with all Kinds of high, middle and low classes of motherboards available in the market and it shows more accurate failure codes. There is even no exception of the Intel 9XX series that represent the mainstream of top motherboard (such as SIS671) which cannot be tested by the traditional PC diagnostic card[9].

The random initial codes which mislead the diagnoses, are thoroughly eliminated. Kingnostic card no more depends on RESET signal of test computer. It can prevent impulse loss and correct failure automatically, even if the RESET logic of the test computer is abnormal. It will not influence the testing functions of kingnostics cards and new generation diagnostic cards [10].



Fig No.2: Heat on Main Chip



Fig No.3: Soldering the Capacitor



Fig No.4: Heat on Shorts



Fig No.5: Remove Main Chip



Fig No.6: Removing Legs of Capacitor



Fig No.7: Remove Shorts



Fig No.8: Heat on ICS Chip



Fig No.9: Heat on SMSC Chip



Fig No.10: Heat on BIOS Chip



Fig No.11: Removing ICS Chip



Fig No.12: Remove SMSC Chip



Fig No.13: Remove BIOS Chip

Table No.1: Collection of common codes generated by different Diagnostic Cards with different purpose [13-20]

CODE	PURPOSE
(00)	Going to give control to Int 19 th boot loader.
(10)	Processor register test about to start, and NMI to be disabled, 286 reg.test about to start.
(02)	NMI is Disabled. Power on delay starting. Power on delay Starting 286 reg.
(03)	Power on delay complete. To check soft reset/power-on. Any initialization before keyboard BAT is in progress. ROM checksum (32k at F800:0) passed.
(04)	Any initialization before keyboard BAT is complete. Reading keyboard SYS bit, to check soft reset/power On. Keyboard controller test without mouse passed. 8259 Initialization OK.
(05)	Soft reset/power-on determined Going to enable ROM. I-e disable shadow RAM/Cache if any. Chipset initialization over, DMA and interrupt controller disable. CMOS pending interrupt disabled.
(06)	ROM is enabled. Calculating ROM BIOS checksum, and Waiting for keyboard controller input buffer to be free. Calculating ROM BIOS Checksum. Video disabled and system timer test begin. Video disabled and system timer counting OK.
(07)	ROM BIOS checksum passed. CMOS shutdown register test to done next. ROM BIOS checksum passed, keyboard controller I/B free keyboard controller. CH-2 of 8254 initialization half way test.
(12)	Checking of pressing of <INS> key during power-on done. Going to disable DMA and interrupt controller. DMA controller#1,#2,interrupt controller#1,#2 disabled About to disable video display and Init port-B about to disable video display and Init port-B 64K base memory test passed 64K base memory test passed 64K base memory test passed.
(13)	DMA controller#1, #2, Interuppt controller#1, #2 disabled. About to disabled video display and initialized port-B Replace first memory simm.
(14)	Chipset initialization/auto memory detection over. To uncompress the post code if compressed BIOS. 8254 timer test about start. 8254 timer test about to start. 8042 keyboard controller test OK.
(15)	POST code is un-compressed 8254 timer about to start. CH-2 Timer test halfway 8254 CH-2 Timer test to be completed. 8254 CH_2 Timer test to be completed interrupt vector initialized CMOS read/write test OK.
(16)	CH-2 timer test over.8254 CH-1 timer test to be complete CMOS checksum/Battery check OK.
(17)	CH-1 timer test over. 8254 CH-0 timer test to be Completed. Monochrome mode set.
(18)	CH-0 timer test over. About to start memory refresh.colour Mode set.
(19)	82 timer test over. Memory refresh test to be done next. About to look for optional video ROM at segment C000 and given control to the optional video ROM if present.
(08)	CMOS shutdown register test done. CMOS checksum Calculation to be done next. BAT command to keyboard controller is issued. Going to verify the BAT command. CH-2 of timer initialization over. CH-2 delta count test OK.
(09)	CMOS checksum calculation is done, CMOS diag byte Written CMOS initialize to begin. Keyboard controller BAT result Controller BAT result verified keyboard command byte to be written command next.
(0A)	CMOS initialization done (if any). Keyboard command byte code is issued. Going to write command byte data. Going to write command byte data. CH-0 of timer initialization over. CH-0 delta count test OK.
(0B)	CMOS status register initialize done. Keyboard controller command byte is written. Going to issue Pin -23, 24 blocking/unblocking command. Going to issue Pin -23, 24 blocking/unblocking command. Refresh started. Parity status cleared.
(0C)	KB controller I/B free. Going to issue the BAT command to keyboard controller.
(0D)	BAT command to keyboard controller is issued. Going to verify the BAT command. NOP command processing is done Refresh link toggling passed.
(10)	KB controller command byte is written. Going to issue pin-23, 24 blocking/unblocking commands. CMOS initialization done (if any). CMOS status register about of init for date and time.
(11)	Pin23, 24 of keyboard controller is blocked/unblocked. Going to Check to check pressing of <INS> key during power-on. CMOS status register initialized going to disable DMA and interrupt controller.
(1A)	Memory refresh line is toggling. Going to check 15 micro second ON/OFF time return from optional video ROM control OK.
(1B)	Memory refresh line period 30 micro second test complete. Base 64K Memory test about to start. Shadow RAM enable/disable completed. Display memory read/write test OK.

Adopting excellent control algorithm to page down the codes, which is easier in KLP16-SD than the traditional diagnostic cards. Kingnostic cards greatly decrease the rate of inappropriate operation that lead to a low accuracy in test.

All the indicator lamps (such as CLK, IRDY and FRAME) are 100% correct. They will be ON only there are signals and OFF when there are no signals, while the traditional ones will

be ON once they have signals. For example take the CLK indicator, it makes the users see clearly even single 10ns impulse. It will not be ON when there is CLK signal impulse, no matter the current signal stay at HIGH or LOW level, which will not mislead the user. Therefore no pulse loss and no useless pulses [11].

The kingnostics card are even more advanced than the new generation PC diagnostic cards. They extremely eliminated wrong codes, redundant codes and will not miss any needed codes. The users can check all the failure codes by check switch. They are really the most accurate all around the word [12].

It eliminated the fault that stops test at halfway, which makes test more efficient and reliable.

It is supported by 80h, 84h and 300h ports.

Codes Generated by Diagnostic card and their Purpose

In normal conditions different diagnostic cards produce different codes. Normally codes generated by cards. For example code '01' may have one purpose of meaning in one category of card but on the other hand '01' in other type may have other purpose of meaning. In same way purpose generated by '01' code in one card by code '01' may relate to code '06' in another card.

Following in Table No.1, we have given some codes in Hex by those been generated by card used by us in laboratory. The same codes have different meanings in different cards. Few of those can be found over [13-20]. The purpose of presenting these codes here is that user can easily diagnose the issue and problem of motherboard and resolve it at its own without wondering to the hardware technician.

Hardware Problems and their Solution

In this section we are presenting some problems commonly occurred while working on PC and have suggested solutions to those issues. Solutions are based on practical work conducted at laboratory.

Problem: Main IC Heat (Heat On Main Chip)

Solution: Change main IC is too much difficult because at certain conditions chips of one board didn't match to another mother board and as result motherboard didn't give display. Remove the Shorts and Remove Main Chip. We propose one solution of main chip that change main chip, than system will give display and also its working will be good in BIOS but didn't goes to windows and become hang because some shorts didn't match.

Problem: Red Light (Heat on ICS chip) Red light is given because processor became damage and processor also didn't get heat.

Solution: One solution is to change the ICS chip and then system will be ok. For that first remove shorts of ICS chip then Remove ICS chip.

Problem: System Hanging

Solution: Change 16v transistor. For that remove Legs of capacitor from back.

Problem: System Didn't Start (Power Problem)

Solution: Heat on SMSC chip. Change the SMSC Chip and system became Ok, for that remove the shorts of SMSC chip

Problem: Beep (Heat on shorts)

Solution: Change the RAM chip and shorts, for this remove shorts first.

Problem: BIOS IC become heat (Heat on BIOS chip)

Solution: Changed BIOS Chip. Remove Shorts of BIOS Chip first and then remove BIOS chip. We got one experience that when we remove BIOS IC than system was working without it. (Please don't change the BIOPS setting i.e. master, slave boot order.)

Figures from Figure No.2 to Figure No.13 shows the work conducted at laboratory for discussed issues and their proposed solutions.

Conclusion:

In this piece of work we have given practical solutions of some common motherboard issues as main IC heat, system hanging, power problem, beep problem, Bios IC Heating etc. and have diagnosed those issues with diagnostic card by giving certain meaning to the codes produced by card. In future we are tending to fix some other problems of PC hardware so that daily routine problems can be resolved at home rather visiting to hardware engineer.

Acknowledgment

Authors are thankful to Department of Computer Systems Engineering and administration of Quaid e Awam UEST, Nawabshah, PAKISTAN to provide the lab facilities to conduct this piece of research.

References

- [1] Dorf, Richard C.; Svoboda, James A. (2001). Introduction to Electric Circuits (5th ed.). New York: John Wiley and Sons, Inc. ISBN 0-471-38689-8.
- [2] http://en.wikipedia.org/wiki/POST_card
- [3] Baker, R. J. (2010). CMOS: Circuit Design, Layout, and Simulation, Third Edition. Wiley-IEEE. ISBN 978-0-470-88132-3. <http://CMOSedu.com/>
- [4] Hodges, D.A., Jackson H.G., and Saleh, R. (2003). Analysis and Design of Digital Integrated Circuits. McGraw-Hill. ISBN 0-07-228365-3.
- [5] Veendrick, H.J.M. (2011). Bits on Chips. pp. 253. ISBN 978-1-616-27947-9. http://openlibrary.org/works/OL15759799W/Bits_on_Chips/
- [6] "Time To Check BIOS." Smart Computing. April 1999. Volume 7, Issue 4.
- [7] Sacco, Anibal; Alfredo Ortéga. "Persistent BIOS Infection". Exploiting Stuff. <http://exploiting.wordpress.com/2009/03/23/cansecwest-was-great-here-the-presentation-slides/>. Retrieved 2010-02-06.
- [8] Fisher, Dennis. "Researchers unveil persistent BIOS attack methods". Threat Post. http://threatpost.com/en_us/blogs/researchers-unveil-persistent-bios-attack-methods-031909. Retrieved 2010-02-06.
- [9] Giuliani, Marco. "Mebromi: the first BIOS rootkit in the wild". blog. <http://blog.webroot.com/2011/09/13/mebromi-the-first-bios-rootkit-in-the-wild/>. Retrieved 2011-09-19.
- [10] Yuan, Liang. "Trojan.Mebromi". Threat Response. http://www.symantec.com/security_response/writeup.jsp?docid=2011-090609-4557-99. Retrieved 2011-09-19.
- [11] Smart Computing Article - What Is The BIOS? - Computing Basics July 1994 • Vol.5 Issue 7
- [12] Scott Mueller, Upgrading and repairing PCs 15th edition, Que Publishing, 2003 ISBN 0789729741, pages 109-110
- [13] <http://www.click-a.com/PCI+LPT.pdf>
- [14] http://en.wikipedia.org/wiki/POST_card
- [15] http://www.elstonsystems.com/dl/manual_postcard_32.pdf
- [16] <http://www.trinitech.biz/manuals/PCSENT-PCI.pdf>
- [17] <http://gipson.utl.ru/files/diagnosticcard%20manual.PDF>
- [18] <http://mrbios.com/techsupport/award/postcodes.htm>
- [19] <http://www.immt.pwr.wroc.pl/faq/msg00050.html>
- [20] http://www.biosupgrades.com/products/postcards/POSTcard_mini.pdf