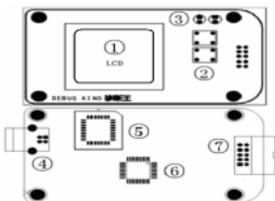


Mini PCI-E/mini PC/LPCI/ PCI (4in1) debug card USER GUIDE

DEBUG CARD (4-in-1) is composed by 3 parts: DEBUG CARD HOST,PCI debug card and 3-in-1 INTERPOSER. DEBUG CARD HOST is powered by USB port, and using LCD to display English description and Photos. Also, it supports the debug code lookup feature so that users can be easy to find the different debug code for English description. The 3-in-1 INTERPOSER supports notebook MiniPCIe, MiniPCI and LPC bus interface. DEBUG CARD HOST gets notebook debug code from 3-in-1 INTERPOSER or PCI debug card, then shows the corresponding description or Photos information based on the debug code, and also gives repair suggestion. With DEBUG CARD (4-in-1), Users don't need to remember the meaning of every debug code, and DEBUG CARD can show it to user directly. It is convenient for uses to fix their computer issues quickly.

1: The Structure of DEBUG CARD HOST



2: The USB Port of DEBUG CARD HOST

Debug card is powered by USB port. After connecting Debug card to computer's USB port, Debug card enters offline working mode.

3: The LED Indicators in DEBUG CARD HOST

There are two LED indicators in the top-right corner of Debug card. When the left LED is on, it means Debug card is in offline mode, and 3-in-1 Interposer isn't connected yet. When the right LED is on, it means Debug card is in online mode, and 3-in-1 Interposer or pci debug card has been connected.

4: The Buttons in DEBUG CARD HOST

Debug card Buttons are used to change the debug code. When in offline mode, one button is used to change the ten digits, another is used to change the lowest digit. With this, users can quickly find the English description of every debug code. When in online mode, these two buttons are used for page-up and page-down feature.

The different motherboards may use different BIOS types. Currently, the main BIOS types include: AMI, AWARD, and Phoenix. Before using debug card, users need to set the correct BIOS type first. When switching BIOS type, first, pushing the up-button, then pushing the down-button without releasing the up-bottom, the BIOS type switching information will show in the LCD screen.

When pushing the down-button first, then pushing the up-button, Debug card will show the product SN number and register code.

5: The LCD Display in DEBUG CARD HOST

Debug card uses LCD screen to show English or Photos information.

In offline mode, when pushing any of the buttons, users can read the debug code description of every debug code. In the bottom-right corner, Debug card will show the debug code as “XX”, which is the same as the traditional LED debug code number. A letter is followed up after the number to show the BIOS type. Usually, “m” means AMI BIOS, “w” means AWARD BIOS, “p” means PHOENIX BIOS, and “u” means AUTO BIOS. AUTO BIOS is Debug card’s Smart BIOS Code. Debug card uses English description for AMI/AWARD/PHOENIX BIOS, and use Photos for Auto BIOS. Please refer the appendix part to get more information about AUTO BIOS.



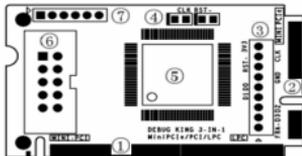
6: How to upgrade the Debug Code Description

Because motherboard technology development is so quickly, the debug code description may also be changed with the time passing. Debug card allows users to upgrade the debug code description themselves.

All debug code English and Photos description is saved into this EEPROM chip. Currently, over 1000 items are saved in this chip. When there is some version change in the description, user can be easy to upgrade the product themselves by replacing or re-writing this EEPROM chips.

When upgrading this EEPROM chip, please turn off the power and use screwdriver to take off this chip, then use programmer to program this chip with new version data. Then re-install this chip to Debug card. When new version data is available, users can download new version data from website, or they can purchase it from the sellers directly

7: The Structure of 3-in-1 INTERPOSER



- ① Mini-PCI interface to support notebook
- ② Mini-PCIe interface to support notebook
- ③ LPC interface to support notebook
- ④ LED indicators to show CLK and RESET singals
- ⑤ ASIC to deal with Mini-PCI/Mini-PCIe/LPC signals
- ⑥ Connector to connect this interposer to main-board
- ⑦ Reserved for manufacture test only

8: The Mini PCI-E Interface in 3-in-1 INTERPOSER

Mini-PCIe is used as a trend in the new notebooks. Comparing to Mini-PCI, Mini-PCIe occupies less space. The 3-in-1 Interposer uses the below pins: PIN-8, PIN-10, PIN-12, PIN-14, PIN-16,

PIN-17, and PIN-19. Those pins definitions are optional in Mini-PCIe spec, and not all notebook vendors use those pin definition, so that not all notebooks can work with this Mini PCIe interface. But Our test shows more and more notebook manufacturers are beginning to use this, such as IBM, HP, Fujitsu, Toshiba, Hasee, TCL ,Acer and etc... For the notebooks, which don't meet the above Mini-PCIe pin definition, this interface will not work and user needs to use the other interface in this 3-in-1 Interposer.

Note: Please be aware that Mini-PCIe interface is supported with limitation, and some notebooks will not work with this interface.

As reference, below is part of the notebook type list, which can work with this mini-PCIe interface.

HP: V6000 series, including CT6 ...; V9000 series, including AT8, AT9...

IBM/Lenovo: CW3, CW4, LE4, LE5 ...

Hasee: 310, 320 ...

Fujitsu: PROLAND 10 series

Acer: most of the new type...

With more and more notebook manufacturers begin to support this Mini-PCIe debug card interface, just part of notebook part numbers are listed as above. And user can expand this list by their experience.

9: The Mini PCI Interface in 3-in-1 INTERPOSER

Mini PCI is a general interface, which is used in notebook. It includes 124 pins. This 3-in-1 Interposer doesn't fully use those pins, and only 101 pins are used. This interface will work with all notebooks, which are with Mini PCI slot.

10: The LPC Interface in 3-in-1 INTERPOSER

For the user, whose notebooks don't support the Mini-PCI interface and the Mini-PCIe interface, users can use the third port: LPC interface. LPC interface exists in all notebook main-boards. In this 3-in-1 Interposer, from left to right, the LPC definition is: PIN1-LFRAME#, PIN2-LAD3, PIN3-LAD2, PIN4-LAD1, PIN5-LAD0, PIN6-GND, PIN7-LRESET#, PIN8-LCLK, PIN9-3.3V

Most of IBM/Lenovo ThinkPad series notebooks reserve the LPC interface in the motherboard. For IBM X 60 notebooks, the LPC interfaces are located in the U39 slot of the main-board. The Pin definitions are as below:

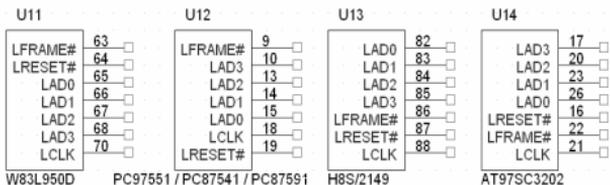
A2->LRESET# A3->LFRAME# A5->LCLK
A9->LAD3 A10->LAD2 A11->LAD1 A12->LAD0

For IBM T6 R6 notebooks, the LPC interfaces are located in the J26 slot of the main-board. The Pin definitions are as below:

A1->LCLK, A3->LFRAME# B2->LRESET#
B7->LAD3 A7->LAD2 B6->LAD1 A6->LAD0

But, usually, the notebook boards haven't LPC connectors or slots. And the users will need to connect this LPC port to the notebook by using wires. This requires that users have very good soldering sku. Below are some LPC interface chips pins definitions and user can connect the 3-in-1 Interposer to

the corresponding chip pins. For more information, please refer those chips' datasheets.

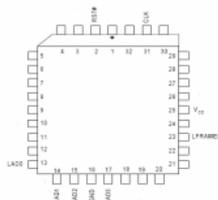


Note: This Debug-Card uses 3.3V as power supply, and you can use any 3V3 and GND signals in your notebook main-board. Please be aware that connecting the 3-in-1 Interposer to a non-3.3V power may damage the Debug-Card.

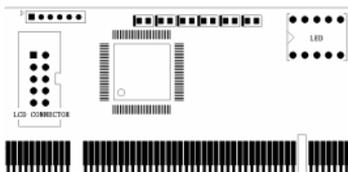
If your notebooks use LPC VBIOS, you can also connect the 3-in-1 INTERPOSER's LPC interface to your notebook's BIOS pin as below.

LPC BIOS Pin definition:

PIN2-RST#, PIN13-LAD0, PIN14-LAD1,
 PIN15-LAD2, PIN16-GND, PIN17-LAD3, PIN23-LFRAME#,
 PIN25-VCC, PIN31-CLK.



11: PCI debug 2bits LED card



2bits LED is used to show debug code number. LCD connector is used to connect DEBUG CARD HOST.

12: DEBUG CARD (4-in-1) Online Use Guide

Step 1: Leaving Debug card's USB port disconnected. And 3-in-1 Interposer will provide power to DEBUG CARD HOST. Connecting 3-in-1 Interposer to the notebook motherboard's MiniPCI, MiniPCle or LPC port.

Step 2: After turning on the power of tested notebook motherboard, DEBUG CARD enters online working mode.

Step 3: DEBUG CARD begins to detect the test motherboard' CLK signals. If it can't find the valid CLK signal, it will show information in the LCD screen. When Debug card fails to detect the CLK signal, please check the CLK LCD indication in 3-in-1 INTERPOSER. If the CLK LED indicator in 3-in-1 INTERPOSER doesn't flicker, it means no CLK signal is outputted to 3-in-1 INTERPOSER. Usually, when using Mini-PCle port and motherboard doesn't support this Mini-PCle port for debug,

DEBUG CARD will show this information. At this time, users need to try to use the other ports, such as MiniPCI or LPC.

Step 4: When DEBUG CARD captures the debug code successfully, it will show the corresponding English description or Photos. User can use the buttons to look at the close debug code description to get more repair information.

■ APPENDIX 1: Debug Card Self-Diagnosis

- 1) Boot to DOS
- 2) Run the command “Debug”
- 3) Input the instruction as right picture
- 4) The Debug Card will show the corresponding data.

```
C:\>debug
-> 000 11
-> 000 22
-> 000 33
-> 000 44
-> 000 55
-> 000 66
-> 000 77
-> 000 88
-> 000 99
-> 000 aa
-> 000 bb
-> 000 cc
-> 000 dd
-> 000 ee
-> 000 ff
C:\>
```

■ APPENDIX 2: Mini PCIe Interface Definition

If the Debug Card can't run in your notebook motherboard, please contact the motherboard vendor to check their Mini PCIe definition. Usually, for the motherboards, which support 3-in-1 Debug Card, the CLK LED indicator will be twinkled, and the RST LED indication will be off. For the notebooks, which don't support MiniPCIe debug card, user need to use Mini-PCI or LPC interface to test it.

19	(LCLK)	20	
17	(LRST)	18	
15	GND	16	UIM_VPP (LAD0)
13	REFCLK+	14	UIM_RESE (LAD1)
11	REFCLK-	12	UIM_CLK (LAD2)
9	GND	10	UIM_DATA (LAD3)
7	CLKREQ#	8	UIM_PWR (LFAE)
5	COEX2	6	1.5V
3	COEX1	4	GND
1	WAKE#	2	3.3V

■ APPENDIX 3: Part of Error-Code explanation

When the notebooks are running, this DEBUG CARD will show the corresponding debug code. If there is a problem in the notebook, you can judge the problem by the debug code. The debug code definition depends on the motherboards, and different motherboards may have different debug code definition.

Currently, the BIOS type mainly includes AMI, AWARD and Phoenix. The English description in the DEBUG CARD is from their official documents. Also, DEBUG CARD has a dedicated “Smart BIOS Code” (AUTO BIOS), which are based on many engineering's repair experience. “Smart BIOS Code” (AUTO BIOS) is helpful for repairer to get a rough adjudge about the issue. In DEBUG CARD, “Smart BIOS Code” (AUTO BIOS) are showed with Photos mode.

Please be aware that the debug code definition is changed with the BIOS version. For example, in AMI BIOS, the debug code definition can be very different among different BIOS versions. Because

of this, the DEBUG CARD's debug code explanation is for reference only. Below is the explanation about what LCD shows for different debug codes.

For every BIOS type, DEBUG CARD includes the description for all 256 debug codes. And totally, DEBUG KIN has over 1000 description for different debug code. Below is just a small piece of those descriptions.

AMI BIOS 8.0 version:

00 m	Passes control to OS Loader (typically INT19h)
04 m	Check CMOS diag byte to determine if battery power is OK and CMOS checksum is OK
2A m	Initialize different buses:AGP video devices and PCI/PnP devices. Check graphic
D3 m	Start memory refresh and memory sizing in Bootblock. Verify flat mode is enabled
FF m	The flash has been updated successfully. Make flash write disabled.

AWARD BIOS 6.0 version:

29 w	Initialize the APIC. Program early chipset. Measure CPU speed. Invoke video BIOS
7F w	Report errors if errors occur. Continue if no errors occur or F1 key is pressed
96 w	Build MP table. Update ESCD. Set CMOS. Load CMOS time. Build MSIRQ routing table
C1 w	Detect memory: Auto detection of DRAM size, type and ECC;Detection of L2 cache
FF w	Boot attempt (INT 19h). Check HDD or CD-ROM to boot OS

PHOENIX BIOS 6.0 version:

4A p	Initialize all video adapters in system. Check graphic card
5A p	Display prompt 'Press F2 to enter SETUP'. Check CMOS battery
80 p	Disable onboard Super I/O ports and IRQs. Check superIO or south bridge
EC p	Initialize Memory type. Check DIMM or north bridge
F7 p	Boot to Full DOS. If it can not boot, check hard disk