

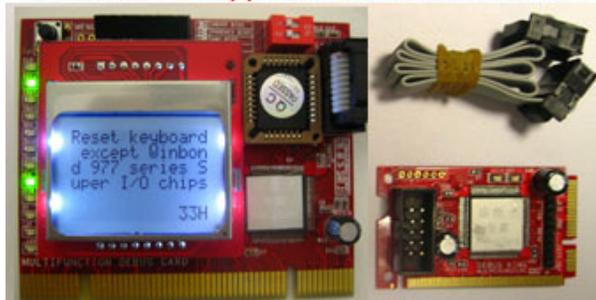
DEBUG KING (PCI) User Guide

This Debug King uses LCD display technology, and can show the error information in the LCD screen directly. This Debug King supports desktop PC' s PCI bus and notebook' s Mini-PCI / Mini-PCIe / LPC buses. With this debug King, User can be very easy to identify the motherboard problems.

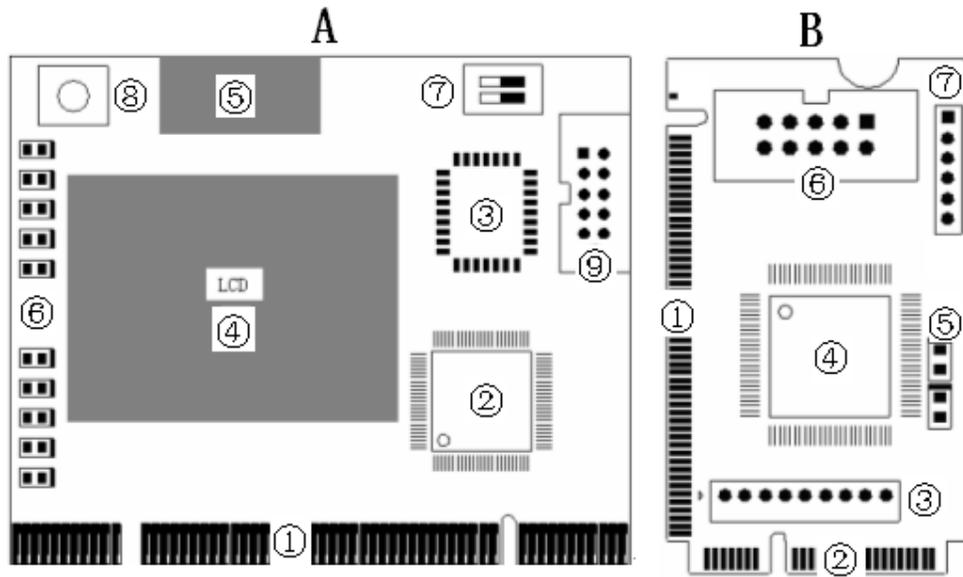
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DEBUG KING, support PCI/LPC/MiniPCI/PCIe



1: Debug King structure



A-Part is the Debug King main-board

- ① PCI interface to support desktop motherboard
- ② ASIC to deal with PCI bus signals
- ③ Memory chip to save the debug information
- ④ LCD screen to show English information
- ⑤ LCD extended connector to support dual LCD screens
- ⑥ 12 LED indicators to show PCI bus status
- ⑦ BIOS type selection jumper to select different BIOS type
- ⑧ Menu switch to show Debug King status
- ⑨ Extended interface to support notebook

B-part is the Notebook interposer

- ① Mini-PCI interface to support notebook
- ② Mini-PCIE interface to support notebook
- ③ LPC interface to support notebook
- ④ ASIC to deal with Mini-PCI/Mini-PCIE/LPC bus signals
- ⑤ LED indicators
- ⑥ Connector to connect this interposer to debug king main-board
- ⑦ Reserved for manufacture test only

2: Debug King PCI interface

PCI is a general interface, which is used in desktop. Debug King supports all motherboards, which have PCI buses.

3: Debug King LCD display

Debug King includes the English description of the debug code. When PC is booting, it will output the number to show the boot status, and Debug king will translate those numbers into English description, so user can be easy to understand the meaning. Also, in the bottom-right corner, Debug King will show the debug code as “XXH”, “XX” is the debug code, which is the same as the traditional LED debug code. “H” means the number is hexadecimal.

4: Debug King EEPROM

All debug code English 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.

5: Debug King LED indicators

Debug king has 12 LED indicators, and almost all critical PCI bus signals have been included, such as 3.3V, 3VSB, +5V, +12V, -12V, RSTJ, FRAMEJ, IRDYJ, TRDYJ, CLK, DATA and etc...

6: Debug King menu button

When user pushes this button, it will show the debug king status, and BIOS type.

7: Debug King BIOS selection jumper

The different motherboards may use different BIOS types. Currently, the main BIOS types include: AMI, AWARD, and Phoenix. Before using debug king, users need to set the correct BIOS type first. Debug King has provided a BIOS type automatic identification feature to help users to identify the BIOS types. When using this feature, user needs to set the jumper in “Auto”, and remove all memory DIMMs from motherboard, and then the debug king may show what the bios type is. Then user can set the jumper based on this auto identification result.

8: Debug King LCD extended connector

Debug king has reserved this connector for user to support two LCD display screens so that they can view the LCD from different angles.

9: Debug King notebook interposer

After connecting the notebook interposer to debug king main-board, the debug king can be used for notebook test. Please be aware that:

- 1) When using for desktop, please don't connect the notebook interposer
- 2) When using Notebook interposer, please don't connect debug king main-board's PCI interface.

10: Debug King Mini-PCIE interface in notebook interposer

Mini-PCIE is used as a trend in the new notebooks. Comparing to Mini-PCI, Mini-PCIE occupies less space. This notebook 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 notebook, which doesn' t meet the above Mini-PCIE pin definition, this interface will not work and user needs to use the other interface in this 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.

11: Debug King Mini-PCI interface in notebook interposer

Mini PCI is a general interface, which is used in notebook. It includes 124 pins. This notebook 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.

12: Debug King LPC interface in notebook interposer

For the user, whose notebooks don' t support the Mini-PCI interface and the Mini-PCIE interface, you can use the third port: LPC interface. LPC interface exists in all notebook main-boards. In the debug king notebook 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.

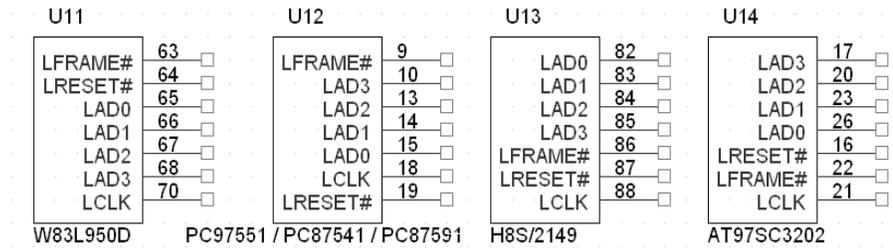
For IBM X 60 notebooks, the LPC interfaces are located in the U39 slot of the main-board. The Pin definitions are as below:

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 Five-In-One Debug-Card to the corresponding chip pins. For more information, please refer those chips' datasheets.

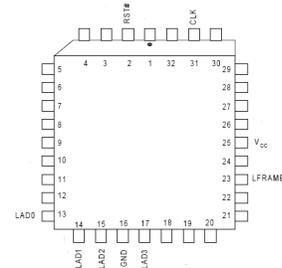


Note: This notebook interposer uses 3.3V as power supply, and you can use any 3V3 and GND signals in your notebook main-board. Please be aware that connecting the interposer to a non-3.3V power may damage the Debug-Card.

If your notebooks use LPC VBIOS, you can also connect the notebook interposer 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



13: Debug King LED Indicators in notebook interposer

The Display includes "CLK", "RST" signal status display. When the notebook is in RESET status, the "RST" indicator will be lighted on, and the "CLK" indicator will be off. When the notebook is in running status, the "RST" indicator will be off, and the "CLK" indicator will be lighted on.

14: Part of Error-Code explanation

When the notebooks are running, this Combo-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. Below is the explanation for some main error codes.

AWARD BIOS 6.0 version, The explanation when the LCD shows the below debug codes.

Code	Explanation	Note
C0	Initiate the chips	
C1, C3, C5	Memory Test	
CF	CMOS Test	
08	Super IO Test	
29	Initiate Display Card	
2D	Show system information	
52	Test all memory	
FF	Boot	

AMI BIOS 8.0 version, The explanation when the LCD shows the below debug codes.

Code	Explanation	Note
CF	Initiate the chips	
D2, D3, D4	Memory Test	
D6	BIOS error	
04	CMOS test	
2A, 2C	Initiate Display Card	
37, 3B	Show system information	
00	Boot	

PHOENIX BIOS 6.0 version, The explanation when the LCD shows the below debug codes.

Code	Explanation	Note
06, 08	Initiate the chips	
16	BIOS Test	
28, 29, 2A	Memory Test	
4A	Initiate Display Card	
50	Show system information	
F6, F7	Boot	

15: QA

Question: “RST” indicator is off, but “CLK” indicator is NOT twinkled.

Answer: This symptom shows there is no CLK signal for interposer so that the “CLK” indicator isn’ t twinkled. Usually, it may mean the motherboard can NOT support this Mini-PCIe interface. Please use Mini-PCI or LPC interface to test it.

Question: “RST” indicator is off, and “CLK” indicator is twinkled. But it shows “00”

Answer: In this case, please check the connection between notebook interposer and the Debug King main-board.