

# SPECIFICATION

# MODEL: B09019-LAP-HPI-M

**PART NO:** 

VERSION: V1.00

| Approver |    | Check | Design | Customer Confirm |  |
|----------|----|-------|--------|------------------|--|
| GM       | PM | Check | Design |                  |  |
|          |    |       |        |                  |  |
|          |    |       |        |                  |  |
|          |    |       |        |                  |  |

\*Please fax the file to Zeroplus Technology after signing.

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# Content

| 1 | Software Download      | . 3 |
|---|------------------------|-----|
| 2 | Software Installation  | . 6 |
| 3 | Software Register      | 10  |
| 4 | User Interface         | 13  |
| 5 | Operating Instructions | 17  |



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# 1 Software Download

Please download the software as the following steps:

Remark: We won't have additional notice for you, when there is any modification of the module specification. If there is some unconformity caused by the module version upgrade, users should take the module software as the standard.

**STEP 1.** Visit the website of Zeroplus: <u>http://www.zeroplus.com.tw</u>.





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#### STEP 3. Click Products menu.



#### STEP 4. Click Protocol Analyzer icon.





| <b>51EI 5.</b> Ch                               | ICK <b>HPI</b> III             | the IC IN II                                      | ERFACE CO                             | olumn.                                 |  |           |
|---|--------------------------------|---|---------------------------------------|--|--|-----------|
| 😫 About ZEROPLUS - M                            | icrosoft Internet Ex           | plorer  |                                       |  |  |           |
| <u>File E</u> dit <u>V</u> iew F <u>a</u> vorit | tes <u>T</u> ools <u>H</u> elp |   |                                       |  |  | A.        |
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| Address 🕘 http://www.zer                        | oplus.com.tw/logic-analy       | zer_en/products.php#top_pr                        | otocol                                |  | 💙 🄁 G  | o Links » |
|   | AUTOMOTIVE                     | Automotive  | D <u>FLEXRAY 2.1A</u>                 | 0 <u>LIN 2.1</u>                       |  |           |
|   | PC SYSTEM                      | PC System<br>DLPC<br>DPECI<br>D <u>USB 1.1</u>    | D <u>LPC-SERIRQ</u><br>D <u>PS/2</u>  | DLPT<br>DSD2.0/SDIO                    | D <u>PCI</u><br>D <u>UART(RS-</u><br>232C/422/485) |           |
|   |                                | IC Interface  HPI  SIGNIA 5210                    | • <u>JTAG 2.0</u><br>• <u>SLE4442</u> | • <u>MCU-51 DECODE</u><br>• <u>SSI</u> | • <u>MICROWIRE</u><br>• <u>ST7669</u>              |           |
|   | DIGITAL AUDIO                  | Digital Audio<br>D <u>AC97</u><br>D <u>S/PDIF</u> | a <u>hda</u><br>a <u>st</u>           | DIIS                                   | 0 <u>PCM</u>                                       |           |
| <   | Э <sub>1</sub>                 | Basic Logic Application                           |                                       | DJK FLIP-FLOP                          | DUP DOWN COUNTER                                   | ~         |
| Ê   |                                |   |                                       |  | 🌍 Internet   |           |

**STEP 6.** Click **Software** in the Products page. When the File Download dialog box appears, you can click **Save** button to save the compressed folder.

| Cile Cala View Countries Teals Units  |                   |  |  |  |  |  |
|---|-------------------|--|--|--|--|--|
| Eine Eine Mew Lavoures Tools Telb   |                   |  |  |  |  |  |
| 🌀 Back 🔻 🌍 🕤 📓 🏠 🔎 Search 👷 Favorites 🤣 🎯 - 🌄 🎇 📲                                       |                   |  |  |  |  |  |
| Address 🍘 http://www.zeroplus.com.tw/logic-analyzer_en/products.php?pdn=78product_id=36 | So Links 🎽        |  |  |  |  |  |
| Producis<br>Best Measure And Best Quality   |                   |  |  |  |  |  |
| Products >> Products  | Home / Products / |  |  |  |  |  |
| Logic Analyzer  |                   |  |  |  |  |  |
| Protocol Analyzer Specifications Features   |                   |  |  |  |  |  |
| Accessories   |                   |  |  |  |  |  |
|   |                   |  |  |  |  |  |
|   |                   |  |  |  |  |  |
| S Inquiry <   | Software          |  |  |  |  |  |
| Specifications  | > Thternet        |  |  |  |  |  |



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2 Software Installation











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## STEP 3. Click Next.



# **STEP 4.** Select **I accept the terms in the license agreement**, and then press **Next**.

| 🙀 Protocol Analyzer HPI - InstallShield Wizar  | rd 🔀   |
|--|--|
| License Agreement<br>Please read the following license agreement carefully.  |  |
|  |  |
| LICENSE AGREEMENT  | <u> </u>   |
| IMPORTANT-READ CAREFULLY : This LICENSE Av<br>entered into effect between ZEROPLUS Technology Co., Ltd<br>"ZEROPLUS") and Customer (Individual or Registered Comp  | GREEMENT is<br>. (hereinafter<br>anv)              |
| Whereas, ZEROPLUS owns a software product, includi<br>software as a package product for certain computer products<br>intermediary, product information, electronic file and internet<br>downloadable software. electronic file and service. known as | ng computer<br>, relevant<br>on-line<br>" ZEROPLUS |
| I accept the terms in the license agreement  | Print  |
| O I do not accept the terms in the license agreement   |  |
| InstallShield  |  |
| < <u>B</u> ack <u>N</u> ext >  | Cancel   |



#### **STEP 5.** Fill in users' information in the below dialog box and click **Next**.

| 🙀 Protocol Analyzer HPI - InstallShield Vizard   |        |
|--|--------|
| Customer Information<br>Please enter your information.   |        |
| User Name:   |        |
| sunshine   |        |
| Organization:  |        |
| soft   |        |
| Install this application for:<br><ul> <li>Anyone who uses this computer (all users)</li> <li>Only for me (sunshine)</li> </ul> InstallShield |        |
| < <u>B</u> ack <u>N</u> ext >  | Cancel |

## **STEP 6.** First, select **Complete** and then click **Next**.





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## **STEP 7.** Click **Install** to begin the installation.

| 🛃 Protocol Analyzer HPI - InstallShield Wizard 🛛 🛛 🔀  |
|---|
| Ready to Install the Program The wizard is ready to begin installation.   |
| Click Install to begin the installation.  |
| If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard. |
| InstallShield   |

# **STEP 8.** Click **Finish** to complete the installation.





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# 3 Software Register

**STEP 1.** Open the Logic Analyzer and group the unanalyzed channels into **Bus1** by pressing the **Right Key** on the mouse. HPI needs more than fourteen channels to decode signals, so it is necessary to group fifteen or more channels into a Bus.



**STEP 2.** Select **Bus1**, then press **Right Key** on the mouse to list the menu, then press **Bus Property** or **Bus** icon on the toolbar to open **Bus Property** dialog box.



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**STEP 3.** For Protocol Analyzer HPI Parameters Configuration, select Protocol Analyzer, and then choose **ZEROPLUS LA HPI MODULE V1.00.00.** Next click **Parameters Configuration** to open the **PROTOCOL ANALYZER HPI SETUP** dialog box.

| Bus Property                                       |  |  |  |  |  |
|--|--|--|--|--|--|
| General Bus Setting                                |  |  |  |  |  |
| C General Bus                                      | Color Config                           |  |  |  |  |
| Activate the Latch Function                        | A0 👻                                   |  |  |  |  |
|  | Rising Edge                            |  |  |  |  |
| - Protocol Analyzer Setting                        | ,                                      |  |  |  |  |
| Protocol Analyzer Setting                          |  |  |  |  |  |
| Protocol Analyzer                                  | Parameters Config                      |  |  |  |  |
| C ZEROPLUS LA WIEGAND MODULE V                     | /1.00.00                               |  |  |  |  |
| C ZEROPLUS LA CEC MODULE V1.00.                    | C ZEROPLUS LA CEC MODULE V1.00.00      |  |  |  |  |
| C ZEROPLUS LA HDMI CEC MODULE V                    | C ZEROPLUS LA HDMI CEC MODULE V1.00.00 |  |  |  |  |
| C ZEROPILIS LA HDMI_CEC MODULE V1.00.00            |  |  |  |  |  |
| CO ZEROPLUS LA HPI MODULE V1.00.00                 |  |  |  |  |  |
| C ZEROPLOS LA HC LIN MODULE V1.01.01               |  |  |  |  |  |
| C ZEROPLUS LA ISO7816 UART MOD                     | ULE V1.01.01                           |  |  |  |  |
| C ZEROPLUS LA MVB MODULE V1.00.                    | 00 📃                                   |  |  |  |  |
| C ZEROPLUS LA OPENTHERM2.2 MODULE V1.00.00         |  |  |  |  |  |
|  |  |  |  |  |  |
| I✓ Use the DsDp Find                               |  |  |  |  |  |
| More Protocol Analyzer: http://www.zeroplus.com.tw |  |  |  |  |  |
| ок   | Cancel Help                            |  |  |  |  |
|  |  |  |  |  |  |

**STEP 4.** Press Register tab to type the serial key number of **HPI**. Then, press **Register**.

| ifiguration   Packet   Data Format []  |   |      |  |
|--|---|------|--|
|  |   |      |  |
|  |   |      |  |
| The HPI protocol analyzer decoding f<br>purchase its serial key to activate this | unction is an optional purchased item.Welcome to<br>function for your pecessary |      |  |
|  | anolonnoi you noococay.   |      |  |
| Enter serial key:  |   |      |  |
|  |   |      |  |
| If you ordered software or have quest  | ions about ordering software please follow the                                  |      |  |
| possible.  | es ream will respond to your enquiry as soon as                                 |      |  |
| >> By phone:   | Tel:886-2-66202225  |      |  |
| >> Applications through EMail:   | service_2@zeroplus.com.tw   |      |  |
| >> Website:  | http://www.zeroplus.com.tw  |      |  |
| Copyright(C) 1997-2009 ZEROPLUS 1  | FECHNOLOGY CO.,LTD.   |      |  |
|  |   |      |  |
|  |   |      |  |
|  |   |      |  |
|  |   |      |  |
|  |   |      |  |
|  | Register Cancel Default   | Help |  |
|  |   |      |  |

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**STEP 5.** After pressing the Register button, following dialog box will appear; it denotes that the **HPI** has been registered successfully.

| PROTOCOL ANALYZER HPI SETUP:Bus1             |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|
| Configuration Packet Data Format Register    |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Congratulation HPI deco                      | ding function has been activated!                        |  |  |  |  |  |  |
| If you have questions shout operating eafly  | the places follow the appropriate instructions below Our |  |  |  |  |  |  |
| technical support team will be happy to answ | ver any questions you have.                              |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| >> By phone:                                 | Tel:886-2-66202225                                       |  |  |  |  |  |  |
| >> Applications through EMail:               | service_2@zeroplus.com.tw                                |  |  |  |  |  |  |
| >> Website:                                  | http://www.zeroplus.com.tw                               |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  | OK Cancel Default Help                                   |  |  |  |  |  |  |



# 4 User Interface

In the configuration, please refer to below images to select options of setting HPI module.

# HPI Configuration Dialog Box

| PROTOCOL ANALYZER HPI SETU                | JP:Bus1    |  |                |  |  |
|---|------------|--|----------------|--|--|
| Configuration Packet Data Format Begister |            |  |                |  |  |
| - Protocol Analuzer Propertu              |            |  |                |  |  |
|   |            | -  |                |  |  |
| Bit Width of HPI Data:                    | 8bit       | - Heg  | ister Settings |  |  |
| Utilize the Halfword Acces                | s function | <ul> <li>The first halfword is in</li> </ul> | in High Level. |  |  |
|   |            | C The first halfword is i                    | in Low Level.  |  |  |
| Pin Assignment                            |            |  |                |  |  |
| HCS: A0 💌                                 | HCNT1: A1  | ✓ HCNT0:                                     | A2 💌           |  |  |
| HB/W: A3                                  | HDS1: A4   | ▼ HDS2:                                      | A5 💌           |  |  |
|   |            |  |                |  |  |
| HHWIL: A6 💌                               | D0-D7: A7  | ▼ ·····>                                     | B6 💌           |  |  |
|   |            |  |                |  |  |
| Protocol Analyzer Color                   |            |  |                |  |  |
| HPIC                                      | HPIA       | HPID   | READ           |  |  |
|   |            |  |                |  |  |
|   |            |  |                |  |  |
| WRITE                                     | CONTROL    | ADDRESS                                      | DATA           |  |  |
|   |            |  |                |  |  |
|   |            |  |                |  |  |
|   |            | OK Cancel                                    | Default Help   |  |  |
|   |            |  |                |  |  |

#### **Protocol Analyzer Property:**

**Bit Width of HPI Data:** The number of the HPI channel can be decided according to the options in the pull-down menu, namely, 8bit, 16bit and 32bit. When the **8bit** is selected, the **Utilize the Halfword Access function** is selected automatically, and users cannot change the selection; when the **32bit** is selected, the **Utilize the Halfword Access function** is not selected and cannot be changed either, and it can only be used in the LAP-B Series.

Utilize the Halfword Access function: It is used to decide whether the Protocol Analyzer HPI uses the halfword transmission. When selecting the Utilize the Halfword Access function, the options, The first halfword is in High Level and The first halfword is in Low Level, can be selected.



# HPI Register Settings Dialog Box

| Register Settings 🛛 🔀 |                   |       |               |  |  |  |
|-----------------------|-------------------|-------|---------------|--|--|--|
|                       | Register Settings |       |               |  |  |  |
|                       | HCNT1             | HCNTO | Register Type |  |  |  |
|                       | 0                 | 0     | HPIC          |  |  |  |
|                       | 0                 | 1     |               |  |  |  |
|                       | 1                 | 0     | HPIA          |  |  |  |
|                       | 1                 | 1     |               |  |  |  |
|                       | Cancel Default    |       |               |  |  |  |

**Register Settings**: It is used to set the Register Type corresponding to the values of the HCNT 1 and HCNT0, and it should be noticed that the same Registers cannot be set at the same time. There are four Registers to be selected, namely, HPIC, HPID\_AUTO, HPIA and HPID\_NONAUTO.

#### **Pin Assignment**

HCS: It is the Chip Select Control channel.

HCNT1 & HCNT0: They are the Register Select channels.

HR/W: It is the Read/Write Control channel.

HDS1 & HDS2: They are the Data Latch channels.

HHWIL: It is the Halfword Indication channel. When the **Utilize the Halfword Access function** check box is not selected, the HHWIL channel is disabled.

D0-D7: They are the Data Transmission channels. Only the D0 channel can be set, and the other channels can be increased in order. On the other hand, the number of the channels can be changed according to the selected Bit Width. Specifically, when the **8bit** is selected, the channels are from D0 to D7; when the **16bit** is selected, the channels are from D0 to D15; when the **32bit** is selected, the channels are from D0 to D31;

Protocol Analyzer Color: The protocol analyzer colors can be varied by users.



# HPI Packet Dialog Box

| PROTOCOL ANALYZE     | R HPI SETUP:Bus1     |          |                |      |
|----------------------|----------------------|----------|----------------|------|
| Configuration Packet | Data Format Register |          |                |      |
| Item                 | Color                | ltem     | Color          |      |
| F HPIC               |                      | CONTROL  |                |      |
| 🔽 HPIA               |                      | ADDRESS  |                |      |
| ✓ HPID               |                      | 🔽 DATA   |                |      |
| 🔽 READ               |                      | DESCRIBE |                |      |
| VRITE                |                      |          |                |      |
|                      |                      |          |                |      |
|                      |                      |          |                |      |
|                      |                      |          |                |      |
|                      |                      |          |                |      |
|                      |                      |          |                |      |
|                      |                      | ОК       | Cancel Default | Help |

In the packet dialog box, users can set the items to be displayed and the color of items.

# HPI Data Format Dialog Box

| PROTOCOL ANAL    | YZER HPI SE    | TUP:Bus1    |             |         |         |      |
|------------------|----------------|-------------|-------------|---------|---------|------|
| Configuration Pa | cket Data Form | at Register |             |         |         |      |
| Activate         |                |             |             |         |         |      |
| CONTROL:         | C Binary       | C Decimal   | Hexadecimal | C ASCII |         |      |
| ADDRESS:         | O Binary       | O Decimal   | Hexadecimal | C ASCII |         |      |
| DATA:            | C Binary       | C Decimal   | Hexadecimal | C ASCII |         |      |
|                  |                |             |             |         |         |      |
|                  |                |             |             |         |         |      |
|                  |                |             |             |         |         |      |
|                  |                |             |             |         |         |      |
|                  |                |             |             |         |         |      |
|                  |                |             |             |         |         |      |
|                  |                |             |             |         |         |      |
|                  |                |             |             |         |         |      |
|                  |                |             |             | Canad   | Default | Holp |
|                  |                |             |             |         |         | Help |

Users can set the Data Format of the CONTROL, ADDRESS and DATA as their requirements. When selecting the option, Activate, the data formats are decided by the settings in the Protocol Analyzer; when not selecting the option, Activate, the data formats are decided by the settings in the main program.



# HPI Register Dialog Box

| PROTOC  | COL ANALYZER HPI SETUP:B             | us1  |      |
|---------|--------------------------------------|--|------|
| Configu | ration   Packet   Data Format   Re   | gister   |      |
|         |                                      |  |      |
|         |                                      |  |      |
|         |                                      |  |      |
|         |                                      |  |      |
|         | Congratulation HPI o                 | ecoding function has been activated!                         |      |
| lfuo    | u have questions about operating s   | oftware please follow the appropriate instructions below Dur |      |
| tech    | inical support team will be happy to | answer any questions you have.                               |      |
|         |                                      |  |      |
| >> B    | ly phone:                            | Tel:886-2-66202225   |      |
| >> A    | opplications through EMail:          | service_2@zeroplus.com.tw                                    |      |
| >> V    | Vebsite:                             | http://www.zeroplus.com.tw                                   |      |
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|         |                                      |  |      |
|         |                                      |  |      |
|         |                                      |  |      |
|         |                                      |  |      |
|         |                                      | OK Cancel Default  | Help |

There is Zeroplus company information. If you have any questions about software operations, you can contact Zeroplus by Telephone or Email.



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# **5** Operating Instructions

**STEP 1.** Group the unanalyzed channels into **Bus1** by pressing the **Right Key** on the mouse. HPI needs more than fourteen channels to decode signals, so it is necessary to group fifteen or more channels into a Bus.



**STEP 2.** Select **Bus1**, then press **Right Key** on the mouse to list the menu, then press **Bus Property** or **Bus** icon on the toolbar to open **Bus Property** dialog box.



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**STEP 3.** For Protocol Analyzer HPI Parameters Configuration, select Protocol Analyzer, and then choose **ZEROPLUS LA HPI MODULE V1.00.00.** Next click **Parameters Configuration** to open the **Configuration** dialog box.

| Bus Property  |  |
|---|--|
| General Bus Setting   |  |
| C General Bus   | Color Config                                 |
| Activate the Latch Function   | A0 👻   |
|   | Rising Edge 📃                                |
| Protocol Analyzer Setting   |  |
| Protocol Analyzer   | Parameters Config                            |
| C ZEROPLUS LA WIEGAND MODULE V<br>ZEROPLUS LA CEC MODULE V1.00.<br>ZEROPLUS LA HDMI CEC MODULE V  | /1.00.00  00 /1.00.00                        |
| © ZEROPLUS LA HPI MODULE V1.00.0  | 0  |
| C ZEROPLUS LA TIC LIN MODULE VI-<br>C ZEROPLUS LA ISO7816 UART MOD<br>C ZEROPLUS LA MVB MODULE V1.00.<br>C ZEROPLUS LA OPENTHERM2.2 MOD | 01.01<br>ULE V1.01.01<br>00<br>DULE V1.00.00 |
| 🔽 Use the DsDp  | Find   |
| More Protocol Analyzer: http://www.a  | zeroplus.com.tw<br>Cancel Help               |

**STEP 4.** In the Configuration dialog box, the **Bit Width of HPI Data** can be set according to the requirements; the options are 8bit, 16bit and 32bit.

| PROTOCOL ANALYZER HPI SET                 | UP:Bus1     |    |             |                 |               |      |  |
|---|-------------|----|-------------|-----------------|---------------|------|--|
| Configuration Packet Data Format Register |             |    |             |                 |               |      |  |
| Protocol Analyzer Property                |             |    |             |                 |               |      |  |
| Bit Width of HPI Data:                    | 8bit        | •  |             | Regi            | ster Settings |      |  |
| Utilize the Halfword Acces                | ss function |    | The first   | t halfword is i | n High Level. |      |  |
|   |             |    | C The first | t halfword is i | n Low Level.  |      |  |
| Pin Assignment                            |             |    |             |                 |               |      |  |
| HCS: AO 💌                                 | HCNT1:      | A1 | •           | HCNT0:          | A2 💌          |      |  |
| HR/W: A3                                  | HDS1:       | A4 | -           | HDS2:           | A5 💌          |      |  |
| HHWIL: A6                                 | D0-D7:      | A7 | •           | >               | B6 💌          |      |  |
| Protocol Analyzer Color                   |             |    |             |                 |               |      |  |
| HPIC                                      | HPIA        |    | HPID        |                 | READ          |      |  |
|   |             |    |             |                 |               |      |  |
| WRITE                                     | CONTROL     |    | ADDR        | ESS             | DATA          |      |  |
|   |             |    |             |                 |               |      |  |
|   |             |    | эк          | Cancel          | Default       | Help |  |

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**STEP 5.** Press the Register Settings button to enter the Register Setting dialog box and set the Register Type corresponding to the values of the HCNT 1 and HCNT0.





| RUTUCUL ANALYZER HPT SETU   | JP:Dust  |            |                 |              |      |  |
|---|----------|------------|-----------------|--------------|------|--|
| Configuration Packet Data Format  | Register |            |                 |              |      |  |
| Protocol Analyzer Property  |          |            |                 |              |      |  |
| Bit Width of HPI Data: Bbit  Register Settings                                |          |            |                 |              |      |  |
| Itilize the Halfword Access function     The first halfword is in High Level. |          |            |                 |              |      |  |
|   |          | C The firs | t halfword is i | n Low Level. |      |  |
| Pin Assignment  |          |            |                 |              |      |  |
| HCS: A0 💌   | HCNT1:   | A1 🔻       | HCNT0:          | A2 🔻         |      |  |
| HR/W: A3  | HDS1:    | A4 💌       | HDS2:           | A5 💌         |      |  |
| HHWIL: A6 💌   | D0-D7:   | A7 💌       | >               | B6 💌         |      |  |
| Protocol Analyzer Color   |          |            |                 |              |      |  |
| HPIC  | HPIA     | HPID       |                 | READ         |      |  |
|   |          |            |                 |              |      |  |
| WRITE   | CONTROL  | ADDR       | ESS             | DATA         |      |  |
|   |          |            |                 |              |      |  |
|   |          |            |                 |              |      |  |
|   |          | ОК         | Cancel          | Default      | Help |  |



# **STEP 7.** Set the channels in the **Pin Assignment**. The number of the channels is different according the selected Bit Width of HPI Data.

| PR  | OTOCOL ANALYZ                                  | ER HPI SET   | UP:Bus1    |    |      |        |         | ×    |
|-----|--|--------------|------------|----|------|--------|---------|------|
| []] | onfiguration Packe                             | t Data Forma | t Register |    |      |        |         |      |
|     | Protocol Analyzer F                            | roperty      |            |    |      |        |         |      |
|     | Bit Width of HPI Data: 8bit  Register Settings |              |            |    |      |        |         |      |
|     | Utilize the Halfword Access function           |              |            |    |      |        |         |      |
|     | – Pin Assignment                               |              |            |    |      |        |         |      |
|     | HCS: AC  | ) 🔻          | HCNT1:     | A1 | -    | HCNT0: | A2 💌    | 1    |
|     | HBAW: AS                                       | 3 💌          | HDS1:      | A4 | •    | HDS2:  | A5 💌    | [    |
|     | HHWIL: A                                       | 5 💌          | D0-D7:     | A7 | •    | >      | B6 💌    |      |
|     | – Protocol Analyzer (                          | Color        |            |    |      |        |         |      |
|     | HPIC   |              | HPIA       |    | HPID | I      | READ    |      |
|     |  |              |            |    |      |        |         |      |
|     | WRIT   | E            | CONTROL    |    | ADDR | ESS    | DATA    |      |
|     |  |              |            |    |      |        |         |      |
| _   |  |              |            |    | ĸ    | Cancel | Default | Help |

# **STEP 8.** Set the Protocol Analyzer Color.

| PROTOCOL ANALYZER HPI SET   | JP:Bus1       |                         |                 |  |  |  |  |
|---|---------------|-------------------------|-----------------|--|--|--|--|
| Configuration Packet Data Format  | Register      |                         | ,               |  |  |  |  |
| Protocol Analyzer Property  |               |                         |                 |  |  |  |  |
| Bit Width of HPI Data:  | 8bit ·        | - Reg                   | jister Settings |  |  |  |  |
| Utilize the Halfword Access function     The first halfword is in High Level. |               |                         |                 |  |  |  |  |
|   | 50 TM 1051071 | C The first halfword is | in Low Level.   |  |  |  |  |
| Pin Assignment  |               |                         |                 |  |  |  |  |
| HCS: A0 💌   | HCNT1: A1     | HCNT0:                  | A2 💌            |  |  |  |  |
| HR/W: A3 💌  | HDS1: A4      | ✓ HDS2:                 | A5 💌            |  |  |  |  |
| HHWIL: A6 💌   | D0-D7: A7     | ▼ ·····>                | B6 💌            |  |  |  |  |
| Protocol Analyzer Color   |               |                         |                 |  |  |  |  |
| HPIC  | HPIA          | HPID                    | READ            |  |  |  |  |
|   |               |                         |                 |  |  |  |  |
| WRITE   | CONTROL       | ADDRESS                 | DATA            |  |  |  |  |
|   |               |                         |                 |  |  |  |  |
|   |               |                         |                 |  |  |  |  |
|   |               | OK Cancel               | DefaultHelp     |  |  |  |  |



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**STEP 9.** Following pictures show the completion of the protocol analyzer decoding and packet list. The trigger condition is set as Either Edge; the memory depth is 128K; the sampling frequency is 200MHz (the sampling frequency should be more than 4 times higher than the signal to be tested).

#### Protocol Analyzer Decoding

| 🎼 ZEROPLUS LAP-C (3  | 32128) (S/N:000                  | 0000-0000) - [HPI.al                           | c]                          |                          |                                 |  |  |
|--|----------------------------------|--|-----------------------------|--------------------------|---------------------------------|--|--|
| 媥 <u>F</u> ile B <u>u</u> s/Signal T <u>r</u> :  | igger Run/ <u>S</u> top <u>I</u> | <u>Data T</u> ools <u>W</u> indow <u>H</u> elp |                             |                          | -<br>-<br>-                     |  |  |
| 🗅 💪 🔚 🎒 🔍 🖲  | ũ, 🎬 🐺 🖓 🖓                       | 🛙 🔟 🕨 🕨 🚺 128k                                 | < ▼ ♦iia iii 200MHz         | - m m 10% - ·            | 🖕 🎝 Page 🚺 🔻 Cor                |  |  |
| ۵ 🕟 📾 📖  | S 🛛 🖉                            | ) 🛗 📓 - 105.896001                             |                             | 🖬 💱 🕅 14 🖓 🕅             | 👫 🏘 Height 20 🗸                 |  |  |
| Trigger Delay 5ns  | ;                                |  |                             |                          |                                 |  |  |
| Scale: 105.006005ns  | Display Pos:                     | :436.759732us 🛛 A Pos:377                      | . 205us 💌 🔺 A = 1           | T = 377.209026us 💌       | A - B = 437.549026us 💌          |  |  |
| Total:655.36us Display Range:434.134581us ~ 439.384882usus   + B - T = 60.34us   + Compr-Rate:No |                                  |  |                             |                          |                                 |  |  |
| Bus/Signal Tri   | igger Filter                     | 434.659611435.1846414                          | 35. 709671436. 234702436. 7 | 59732437.284762437.80979 | 2438. 334822438. 859852439. 🚽 📤 |  |  |
| - Busi OPI   |                                  | HPID_AUTO                                      | READ(1ST)                   | HPIC READ(1ST)           | CONTROL_H : 0X48                |  |  |
| HCS /  | xi                               |  |                             | 379. 705us               |                                 |  |  |
| нсит 1   |                                  | 1.325us  | 1.325us                     | 1.325us                  | 1.33us                          |  |  |
| 🥖 нсито 📑  |                                  | 2.65us   | 2.6                         | 5us                      | 2.655us                         |  |  |
| - / HR/W   |                                  | 1.325us  | 1.325us                     | 2.                       | 655us                           |  |  |
| 🧹 HDS1 🔡   |                                  | 2.645  | õus                         | 1.33us                   | 2.655us                         |  |  |
| / HDS2   |                                  | 3.975  | ius                         |                          | 3. 98us                         |  |  |
| - HHWIL  |                                  | 1.325us  | 1.325us                     | 1.325us                  | 1.33us                          |  |  |
| 🖋 DO Añ  |                                  | 2.65us   | 2.6                         | 5us                      | 2.655us                         |  |  |
| 🖌 D1 BC 🔤  |                                  | 1.325us  | 1.325us                     | 1.325us                  | 1.325us                         |  |  |
| 💋 🖉 🖉  |                                  | 2.6  | 5us                         | 2                        | . 655us                         |  |  |
| 🥢 🥖 D3 B2  |                                  | 5. 295   | õus                         |                          | 5. 31us                         |  |  |
| 🧭 D4 B3  |                                  |  | 10. 6us                     |                          |                                 |  |  |
| 🖌 D5 B4  |                                  |  |                             | 21.195us                 |                                 |  |  |
| 🖌 D6 B5  |                                  | 1.325us  | 1.325us                     | 1.325us                  | 1.325us 🗸 🗸                     |  |  |
| <  |                                  | <  |                             |                          | <u>&gt;</u>                     |  |  |
| Ready  |                                  |  |                             |                          | End! DEMO                       |  |  |

#### Packet List

| 🖟 ZEROPLUS LAP-C (32128) (S/N: 000000-0000) - [HPI. alc]   |                                       |  |                              |  |  |  |  |  |
|--|---------------------------------------|--|------------------------------|--|--|--|--|--|
| <u> F</u> ile B <u>u</u> s/Signal T <u>r</u> igger   | Run/Stop Dat                          | ta <u>T</u> ools <u>W</u> indow <u>H</u> elp |                              |  | _ 8 ×  |  |  |  |
| D 🛱 🖪 🎒 🔍 👯  | ii), ۲۰۰ 📲                            |  | K ▼ 📲 🎇 200MHz               | 🔻 🗤 🔤 10% 💌 🖓                                | - 🐝 Page 🚺 🔻 Co  |  |  |  |
|  | ► <u>53</u> 800 €                     |  |                              | 2 +2 A A A A                                 | 808 Height 20  |  |  |  |
|  |                                       |  | Bar Bar Bar B                | ан Ван   <b>ВМС</b> (м. 1931   ]  <u>(0)</u> | increase increase in the second secon |  |  |  |
| Trigger Delay 5ns  |                                       |  |                              | 077 00000                                    | D 107 510000   |  |  |  |
| Scale:1105.005005ns Display Fos:435.1595/32us A Fos:377.2050s   ♥ A = T = 377.209025ns   ♥ A = B = 437.5490250s   ♥<br>Total:655.36ns Display Range:434.134581ns <sup>™</sup> 439.344862nsns   ♥ B = T = 60.34ns   ♥ Compy=Rate:No |                                       |  |                              |  |  |  |  |  |
|  | · · · · · · · · · · · · · · · · · · · |  |                              | - 00.0103   0                                |  |  |  |  |
| Bus/Signal Trigger   | Filter 🛃                              | 434.659611435.1846414                        | 35. 709671436. 234702436. 75 | 9732437.284762437.809792                     | 438. 334822438. 859852439. 🕱 🔷   |  |  |  |
| - Busi (HPI)   |                                       | HPID_AUTO                                    | READ (1 ST)                  | HPIC READ(1ST)                               | CONTROL_H : 0X48   |  |  |  |
| 🖌 🖌 HCS 🕴 🗙  |                                       |  |                              | 379. 705us                                   |  |  |  |  |
| 🥖 HCNT1 🔣  |                                       | 1.325us                                      | 1.325us                      | 1.325us                                      | 1.33us   |  |  |  |
| 🖌 hcnto  |                                       | 2.65us                                       | 2.65                         | ius  | 2.655us  |  |  |  |
| - / HR/W   |                                       | 1.325us                                      | 1.325us                      | 2.6  | 55us   |  |  |  |
| 🖌 HDS1   |                                       | 2.64   | 5us                          | 1.33us                                       | 2.655us  |  |  |  |
|  |                                       | 3.97   | 5us                          |  | 3.98us   |  |  |  |
|  |                                       | 1.325us                                      | 1.325us                      | 1.325us                                      | 1.33us   |  |  |  |
| JO AT  |                                       | 2.65us                                       | 2.65                         | ius  | 2.655us  |  |  |  |
| 🖌 🖌 D1 BC  |                                       | 1.325us                                      | 1.325us                      | 1.325us                                      | 1.325us  |  |  |  |
| 🖌 🖉 D2 B1  |                                       | 2.6  | 5us                          | 2.0  | 655us  |  |  |  |
| - <b>D3</b> B2   |                                       | 5. 29  | 5us                          |  | 5. 31us 🗸 🗸  |  |  |  |
|  |                                       |  |                              |  | >  |  |  |  |
| × Setting Refresh Export.  | Synch Par                             | ameter                                       |                              |  |  |  |  |  |
| Packet # Name 1  | TimeStamp                             | HPID_AUTO READ(2ND                           | ))                           |  | <b>_</b>   |  |  |  |
| 1 Bus1(HPI)  | -65.525us                             | HPID_AUTO READ(2ND                           | ))                           |  |  |  |  |  |
| Packet # Name *  | TimeStamp                             | HPID_NONAUTO WRIT                            | E(2ND)                       |  |  |  |  |  |
| 2 Bus1(HPI)  | 224.83us                              | HPID_NONAUTO WRIT                            | E(2ND)                       |  |  |  |  |  |
| Packet # Name 1  | TimeStamp                             | HPIA READ(2ND)                               |                              |  |  |  |  |  |
| 3 Bus1(HPI)  | 239.41us                              | HPIA READ(2ND)                               |                              |  |  |  |  |  |
| Packet # Name  | TimeStamp                             | HPID_NONAUTO READ                            | (2ND)                        |  |  |  |  |  |
| 4 Busi(HPI)  | 242.000us<br>TimoStomo                |  |                              |  |  |  |  |  |
|  | rinestamp                             | HEAD(2ND)                                    |                              |  | ·  |  |  |  |
| Ready  |                                       |  |                              | I  | ind! DEMO  |  |  |  |

# 21/21

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