



孕龍科技股份有限公司
ZeroPlus Technology Co., Ltd.

SPECIFICATION

MODEL: B09019-LAP-HPI-M

PART NO: _____

VERSION: V1.01

Approver		Check	Design
GM	PM		

Customer Confirm

*Please fax the file to ZeroPlus Technology after signing.

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Content

1	Software Download.....	3
2	Software Installation	6
3	User Interface	10
4	Operating Instructions.....	12



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.

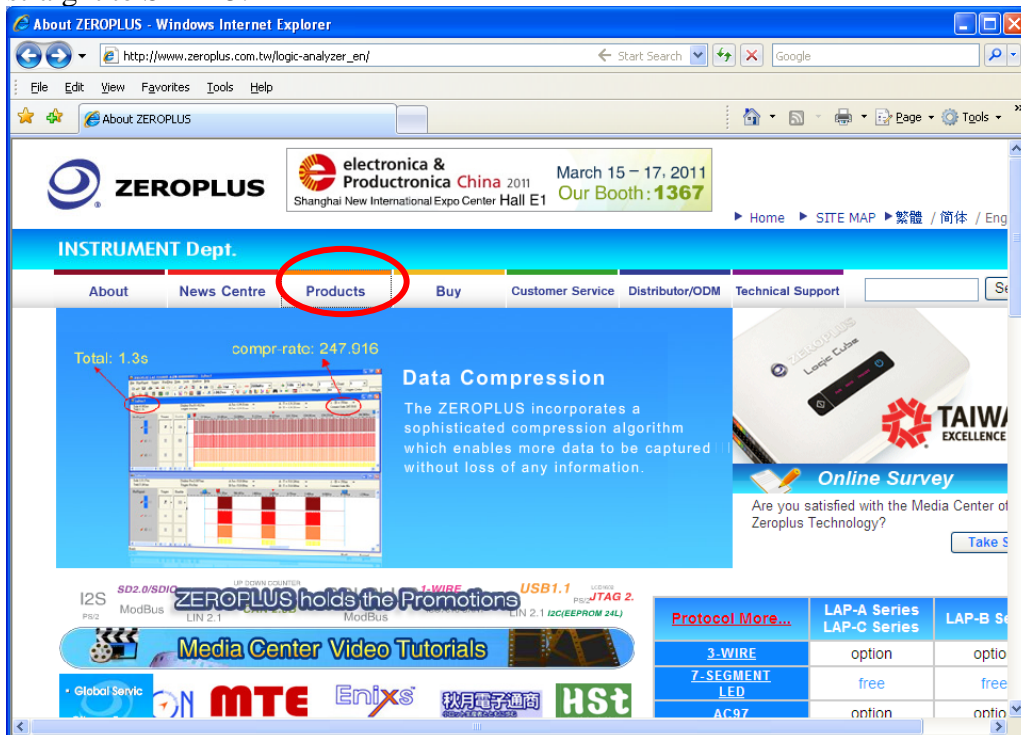
STEP 1. Visit the website of ZeroPlus: <http://www.zeroplus.com.tw>.

STEP 2. Click **English** in the Instrument Division part on the Homepage.

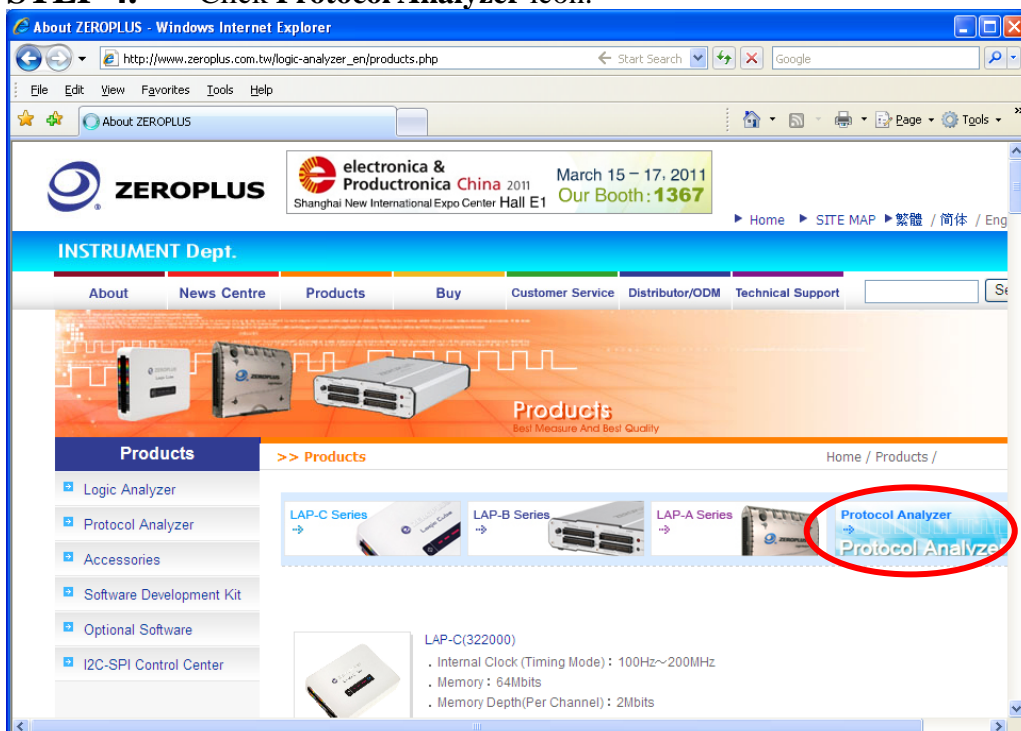




STEP 3. Click **Products** menu or select Protocol Analyzer item from its pull-down menu to go straight to STEP 5.

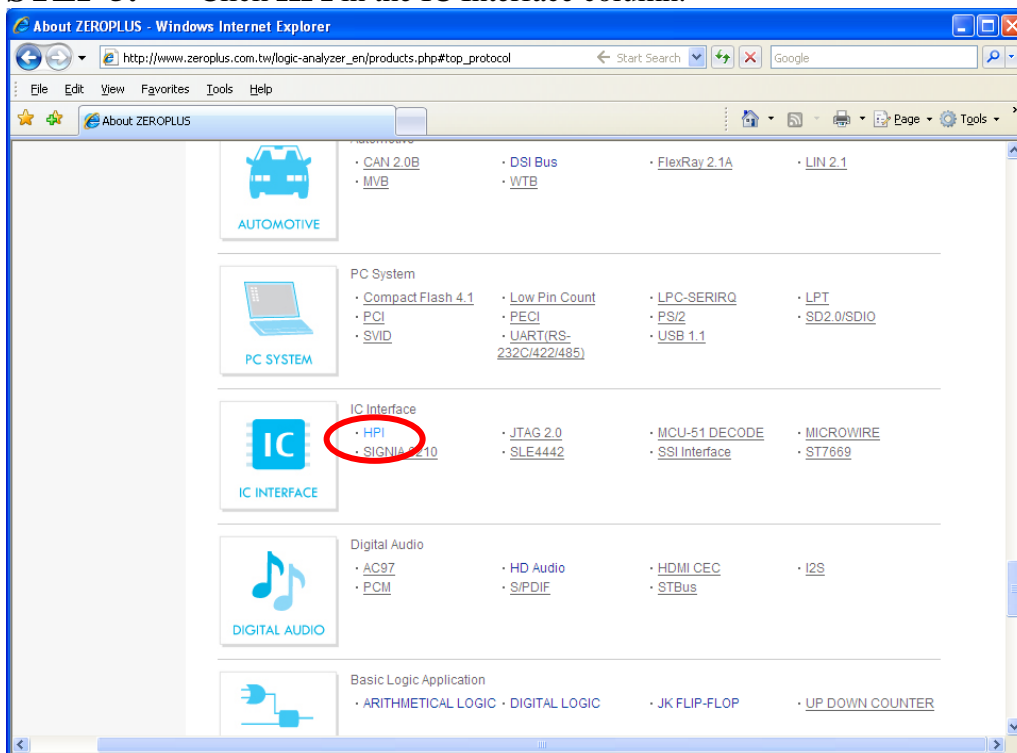


STEP 4. Click **Protocol Analyzer** icon.

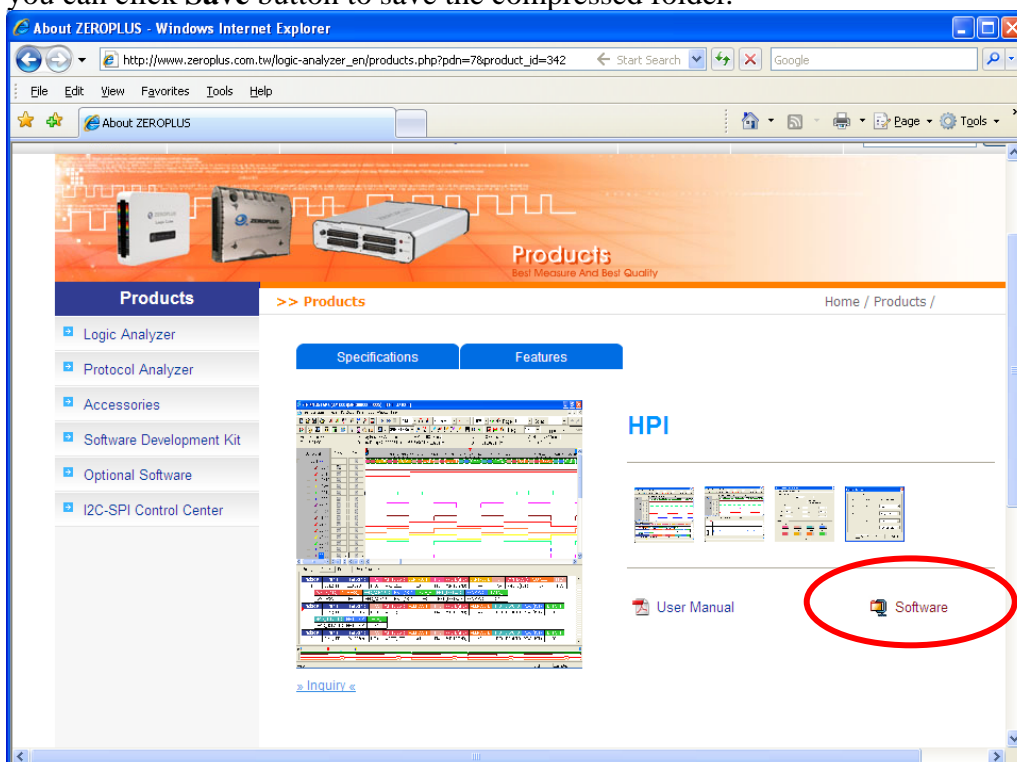




STEP 5. Click **HPI** in the IC Interface column.



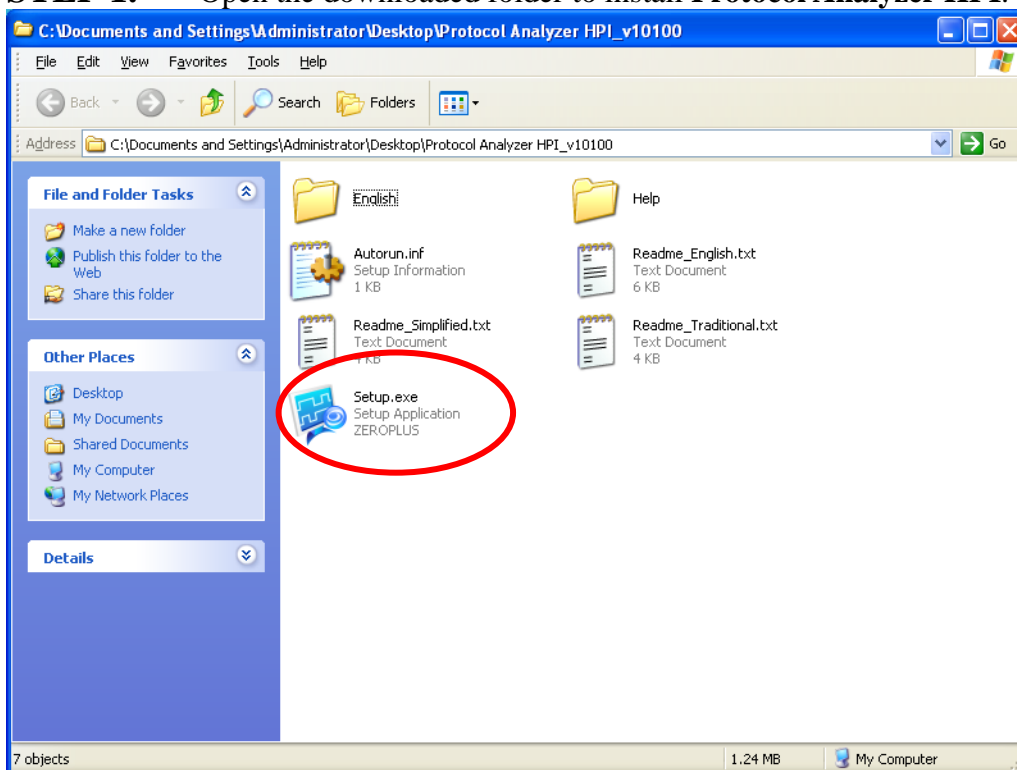
STEP 6. Click **Software** in the Products page. When the File Download dialog box appears, you can click **Save** button to save the compressed folder.



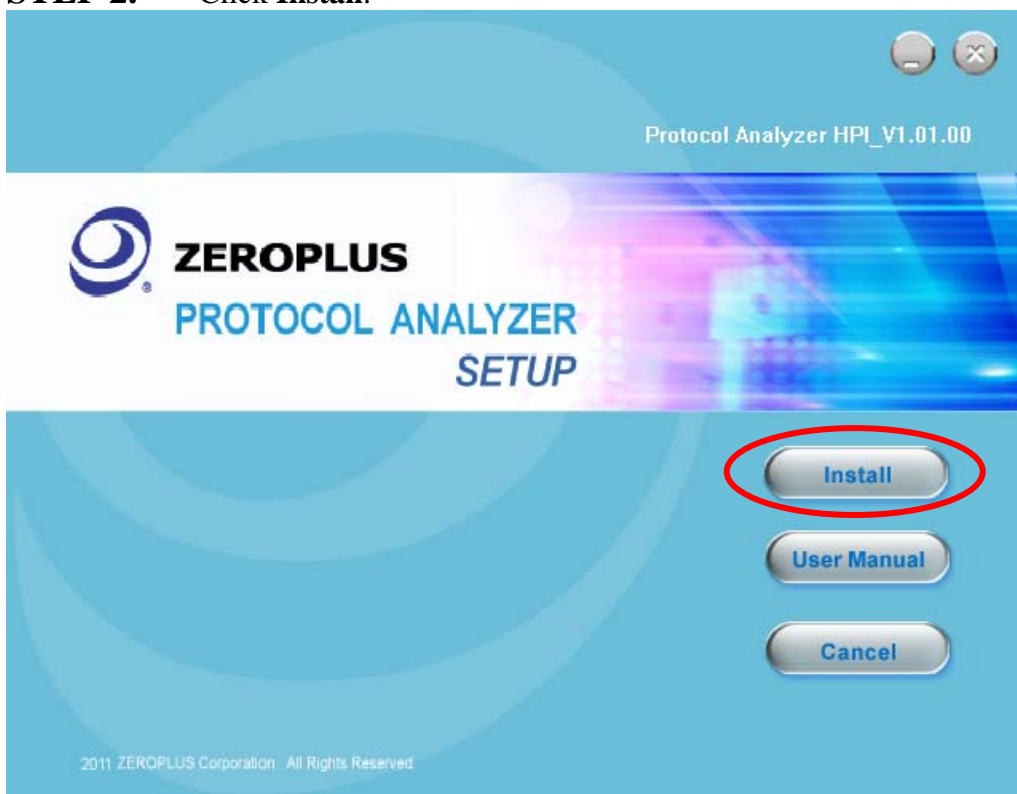


2 Software Installation

STEP 1. Open the downloaded folder to install **Protocol Analyzer HPI**.

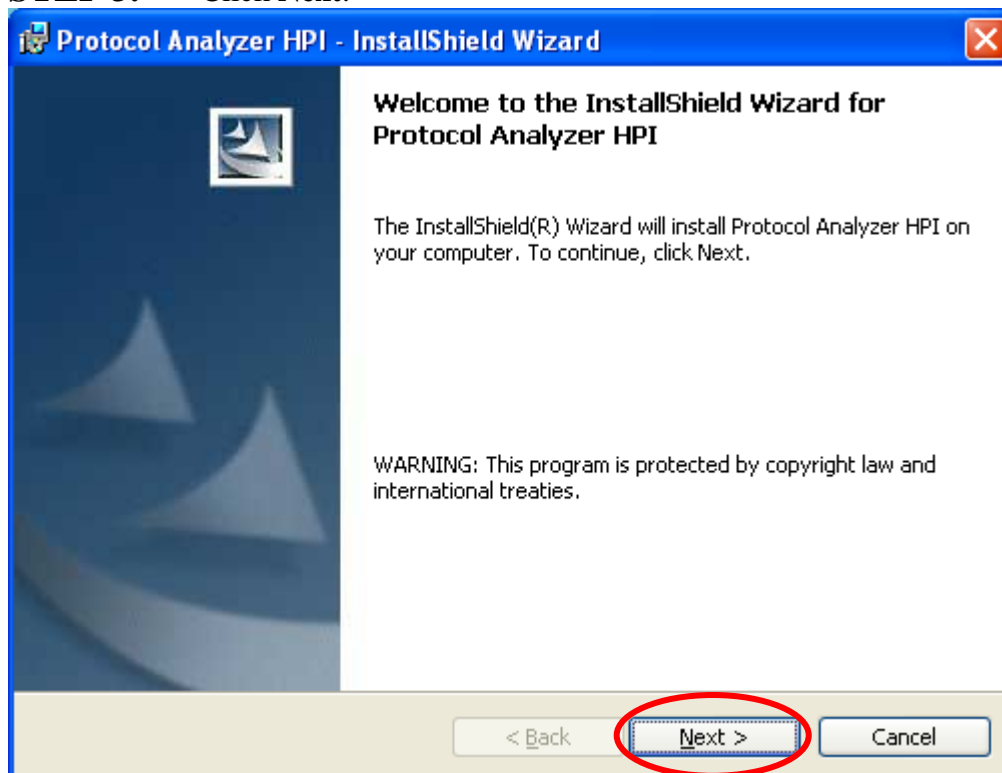


STEP 2. Click **Install**.

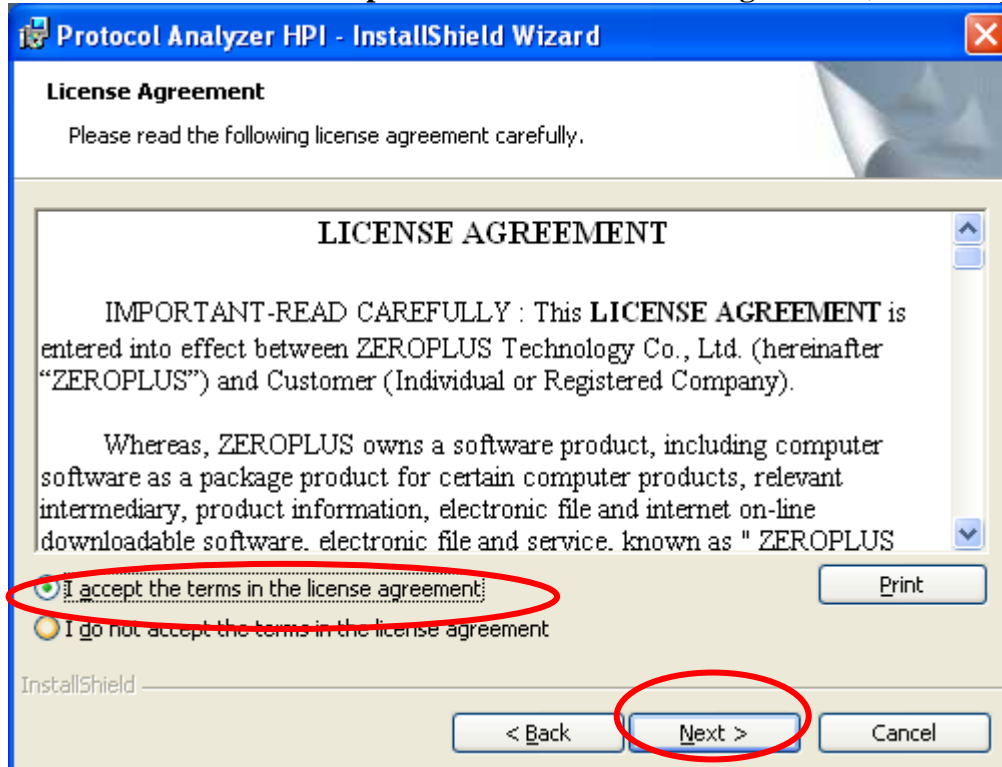




STEP 3. Click Next.



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





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

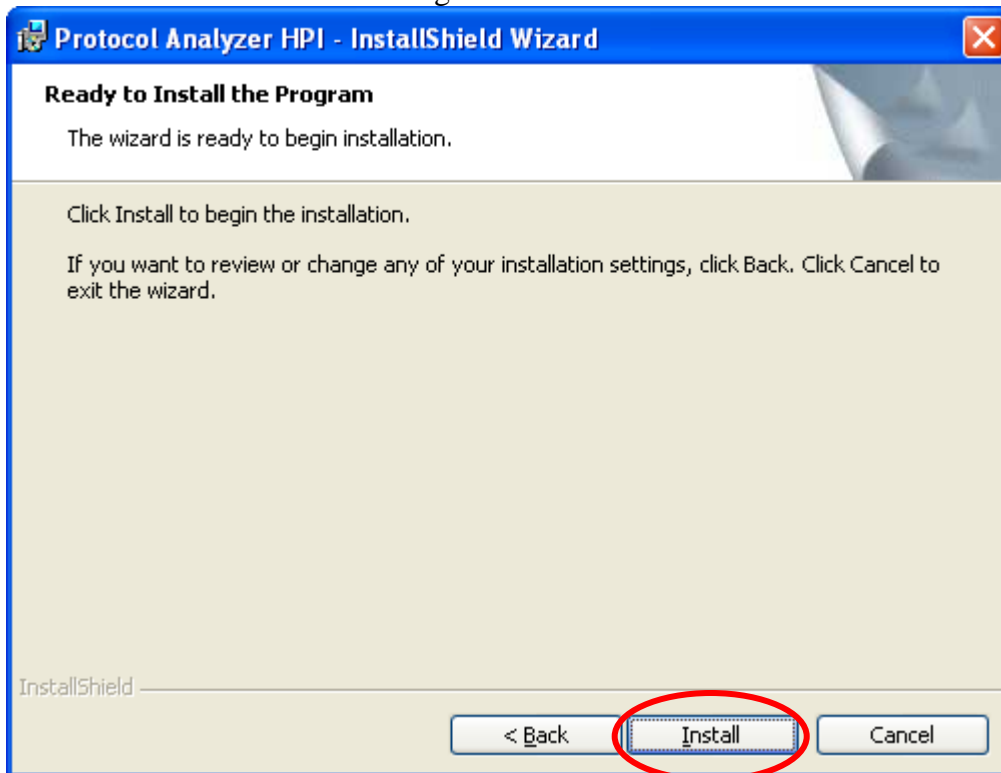
The dialog box is titled "Protocol Analyzer HPI - InstallShield Wizard". It contains a section "Customer Information" with the instruction "Please enter your information." Below this are two text input fields: "User Name:" with "Microsoft" entered, and "Organization:" with "User" entered. There are two radio button options: "Anyone who uses this computer (all users)" (selected) and "Only for me (Microsoft)". At the bottom, there are three buttons: "< Back", "Next >" (circled in red), and "Cancel".

STEP 6. Select **Complete** and then click **Next**.

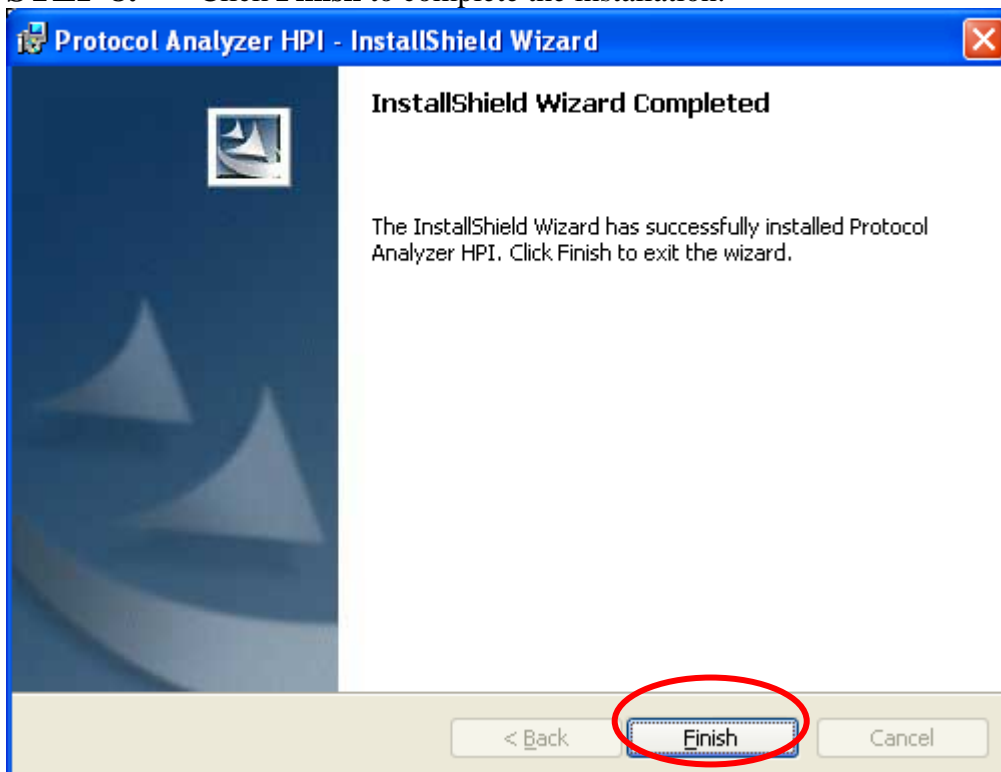
The dialog box is titled "Protocol Analyzer HPI - InstallShield Wizard". It contains a section "Setup Type" with the instruction "Choose the setup type that best suits your needs." Below this is the text "Please select a setup type." There are two radio button options: "Complete" (selected) and "Custom". The "Complete" option has a description: "All program features will be installed. (Requires the most disk space.)". The "Custom" option has a description: "Choose which program features you want installed and where they will be installed. Recommended for advanced users." At the bottom, there are three buttons: "< Back", "Next >" (circled in red), and "Cancel".



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



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





3 User Interface

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

HPI Configuration Dialog Box

Pin Assignment	Value
HCS:	A0
HCNT1:	A1
HCNT0:	A2
HR/W:	A3
HDS1:	A4
HDS2:	A5
HHWIL:	A6
D0:	A7
:	:
D15:	B6

Protocol Analyzer Property		
Bit Width of HPI Data: 16bit		
<input checked="" type="checkbox"/> The first halfword is: High		
Register Settings		
HCNT1	HCNT0	Register Type
0	0	HPIC
0	1	HPID-AUTO
1	0	HPIA
1	1	HPID-NONAUTO

Protocol Analyzer Format

Settings...

Default Back Next Cancel

Pin Assignment:

HCS: It is the Chip Select channel.

HCNT1-0: It is the Register Select channel.

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

HDS1-2: It is the Data Latch channel.

HHWIL: It is the Halfword Indication channel. When the Option, **The first halfword is**, is disabled, the channel is disabled.

D0-D15: They are the Data Transmission channels, but only the channel, D0, can be set, and the other channels are increased gradually. At the same time, when the different Bit Widths of HPI Data are selected, the Channel Length will be changed accordingly.

Protocol Analyzer Property:

Bit Width of HPI Data: Set the Bit Width (or the number of the Data channel) to 8bit or 16bit.

The first halfword is: When the Option is selected, it is necessary to set the Level of the first halfword to High or Low in the behind column; when the Option is disabled, the column is disabled.

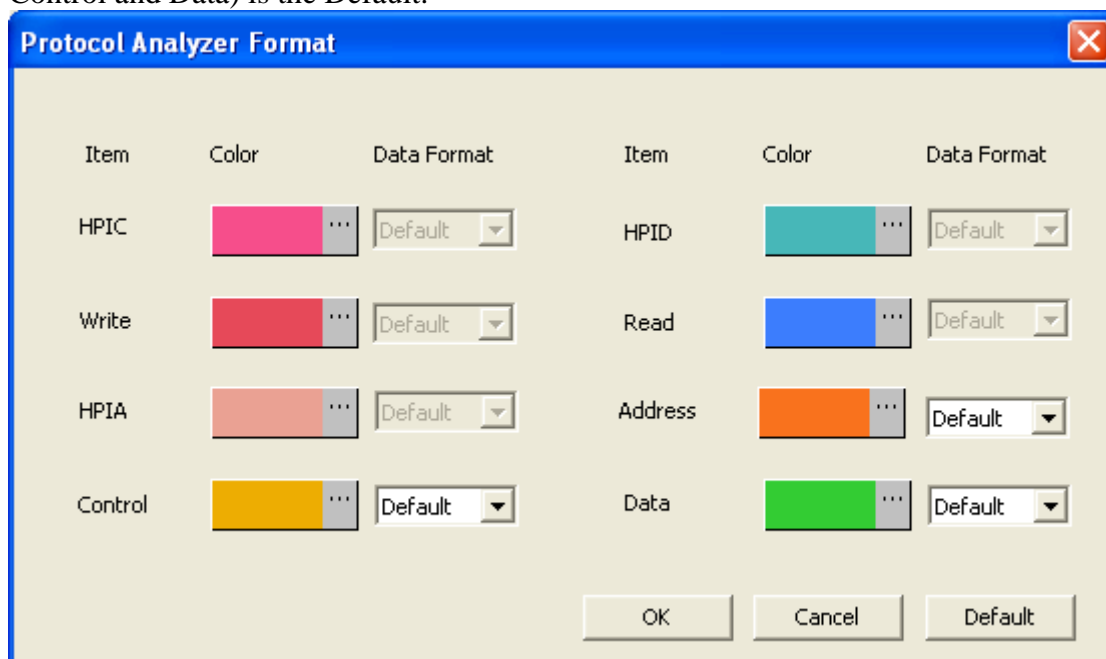
Register Settings: Set the Types of the Register according to the values of the HCNT[1:0]. Notice that the Type of the set Register should not be the same.

Protocol Analyzer Format:

Press the **Settings** to open the Protocol Analyzer Format dialog box. The Color of each Item can be varied as the users' requirements. The Items (Address, Control and Data) can be set as Binary,



Decimal, Hexadecimal, ASCII or Default. And the Data Format of these Items (Address, Control and Data) in the Waveform Display Area and Packet List is controlled by the Protocol Analyzer. The default Data Format is controlled by the main program and the Data Format of these items (Address, Control and Data) is the Default.



The dialog box titled "Protocol Analyzer Format" contains two columns of settings. Each column has three rows of items, each with a color selection box and a "Data Format" dropdown menu set to "Default".

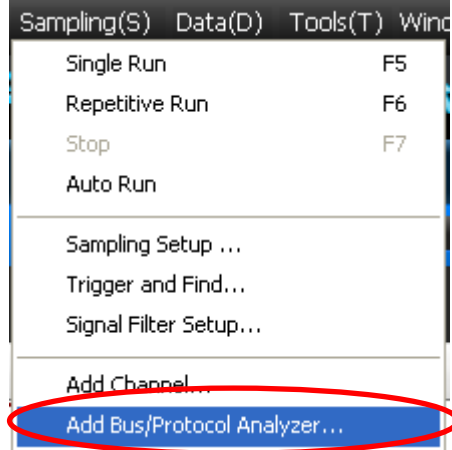
Item	Color	Data Format	Item	Color	Data Format
HPIC	[Pink]	Default	HPID	[Teal]	Default
Write	[Red]	Default	Read	[Blue]	Default
HPIA	[Light Red]	Default	Address	[Orange]	Default
Control	[Yellow]	Default	Data	[Green]	Default

At the bottom right are three buttons: "OK", "Cancel", and "Default".

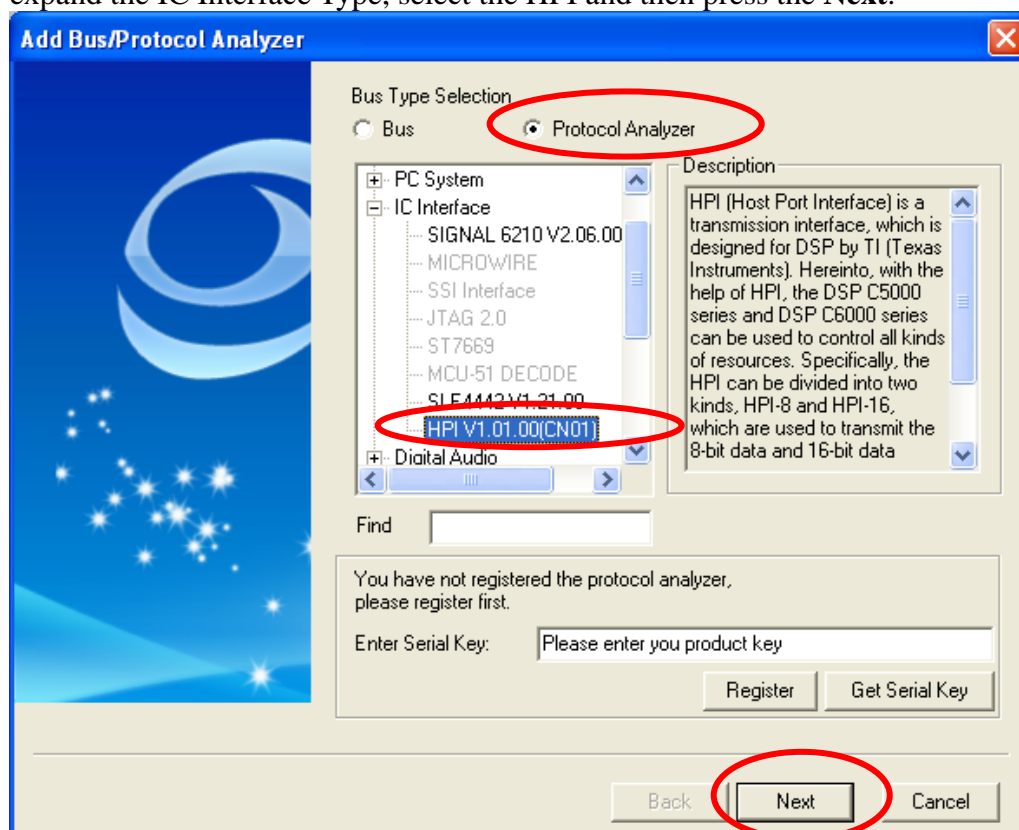


4 Operating Instructions

STEP 1. Select the **Add Bus/Protocol Analyzer** item on the pull-down menu of the **Sampling(S)** to open the **Add Bus/Protocol Analyzer** dialog box.

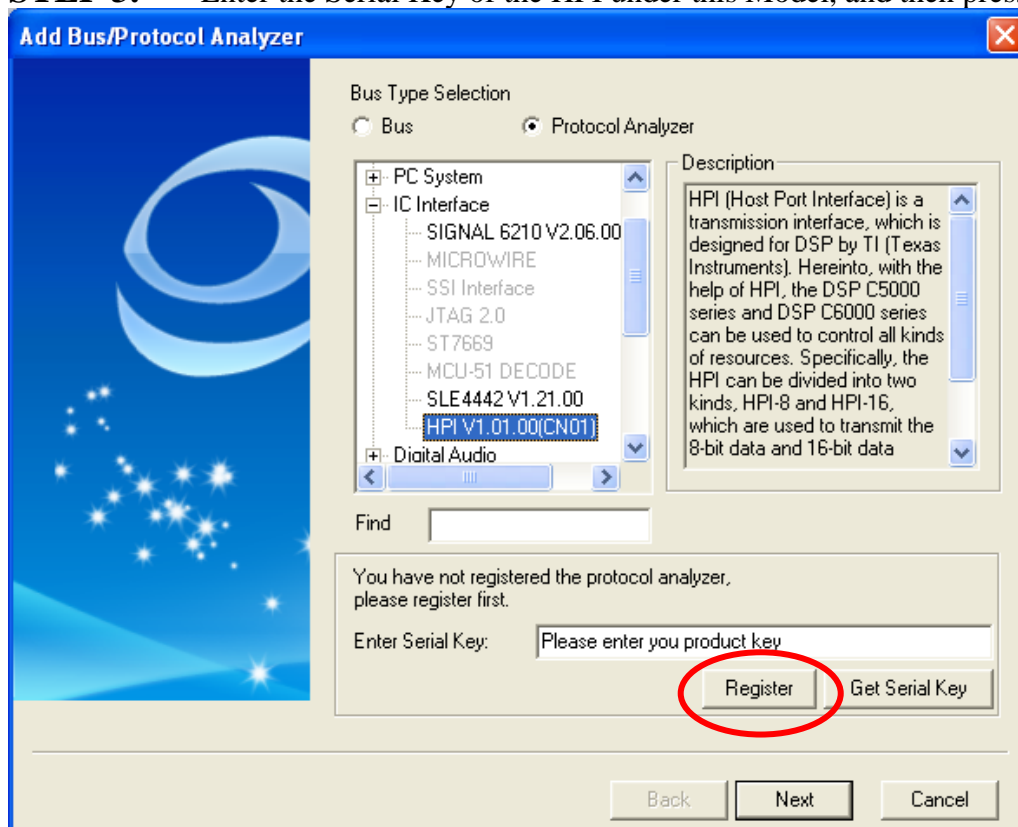


STEP 2. Select the Protocol Analyzer item in the Add Bus/Protocol Analyzer dialog box, expand the IC Interface Type, select the HPI and then press the **Next**.

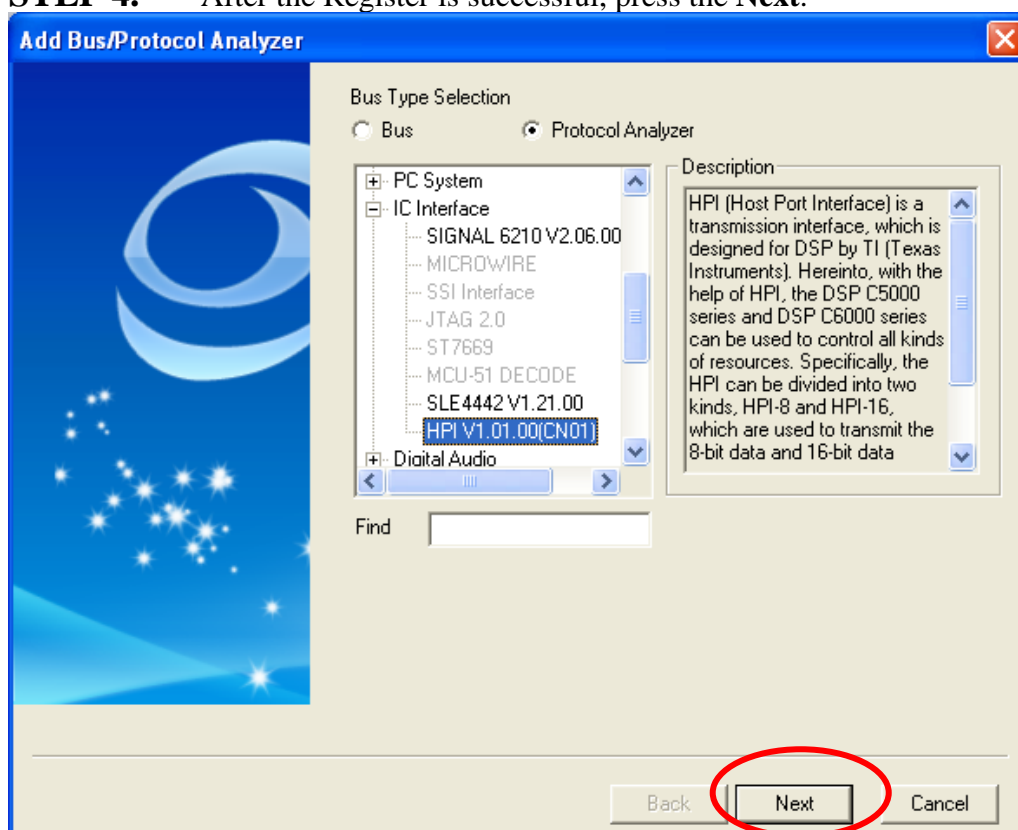




STEP 3. Enter the Serial Key of the HPI under this Model, and then press the **Register**.



STEP 4. After the Register is successful, press the **Next**.





STEP 5. Open the PROTOCOL ANALYZER HPI dialog box and set the **Pin Assignment**.

PROTOCOL ANALYZER HPI

Pin Assignment

HCS: A0
HCNT1: A1
HCNT0: A2
HR/W: A3
HD51: A4
HD52: A5
HHWIL: A6
D0: A7
:
D15: B6

Protocol Analyzer Property

Bit Width of HPI Data: 16bit
☒ The first halfword is: High

Register Settings

HCNT1	HCNT0	Register Type
0	0	HPIC
0	1	HPID-AUTO
1	0	HPIA
1	1	HPID-NONAUTO

Protocol Analyzer Format

Settings...

Default Back Next Cancel

STEP 6. Set the **Bit Width of HPI Data** to 8bit or 16bit.

PROTOCOL ANALYZER HPI

Pin Assignment

HCS: A0
HCNT1: A1
HCNT0: A2
HR/W: A3
HD51: A4
HD52: A5
HHWIL: A6
D0: A7
:
D15: B6

Protocol Analyzer Property

Bit Width of HPI Data: 16bit
☒ The first halfword is: High

Register Settings

HCNT1	HCNT0	Register Type
0	0	HPIC
0	1	HPID-AUTO
1	0	HPIA
1	1	HPID-NONAUTO

Protocol Analyzer Format

Settings...

Default Back Next Cancel



STEP 7. Set the **The first halfword is** to High or Low.

The screenshot shows the 'PROTOCOL ANALYZER HPI' dialog box. On the left is the 'Pin Assignment' section with dropdowns for HCS (A0), HCNT1 (A1), HCNT0 (A2), HR/W (A3), HD51 (A4), HD52 (A5), HHWIL (A6), D0 (A7), and D15 (B6). On the right is the 'Protocol Analyzer Property' section. It includes a 'Bit Width of HPI Data' dropdown set to '16bit'. Below it, the checkbox 'The first halfword is:' is checked, and the dropdown is set to 'High'. This section is highlighted with a red rectangle. Further down is the 'Register Settings' table, and at the bottom is the 'Protocol Analyzer Format' section with a 'Settings...' button. At the very bottom are 'Default', 'Back', 'Next', and 'Cancel' buttons.

HCNT1	HCNT0	Register Type
0	0	HPIC
0	1	HPID-AUTO
1	0	HPIA
1	1	HPID-NONAUTO

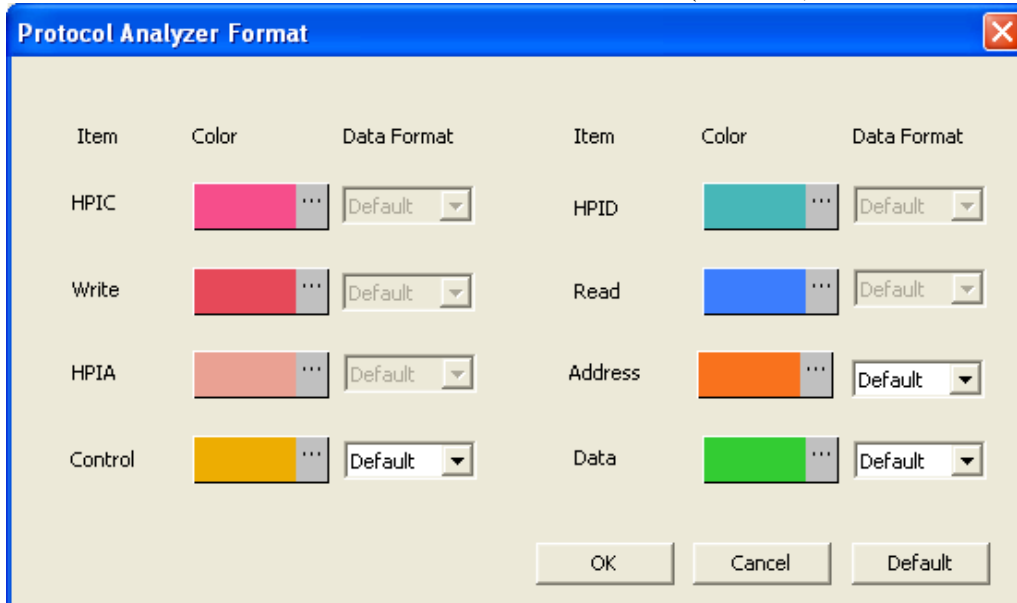
STEP 8. Set the Types (four types in total) of the Register.

This screenshot is identical to the one in Step 7, showing the 'PROTOCOL ANALYZER HPI' dialog box. In this step, the 'Register Settings' table is highlighted with a red rectangle. The table lists four register types based on the combinations of HCNT1 and HCNT0 bits.

HCNT1	HCNT0	Register Type
0	0	HPIC
0	1	HPID-AUTO
1	0	HPIA
1	1	HPID-NONAUTO



STEP 9. Press the **Settings** button to open the Protocol Analyzer Format dialog box and set the Color of each Item and the Data Format of the Items (Address, Control and Data).

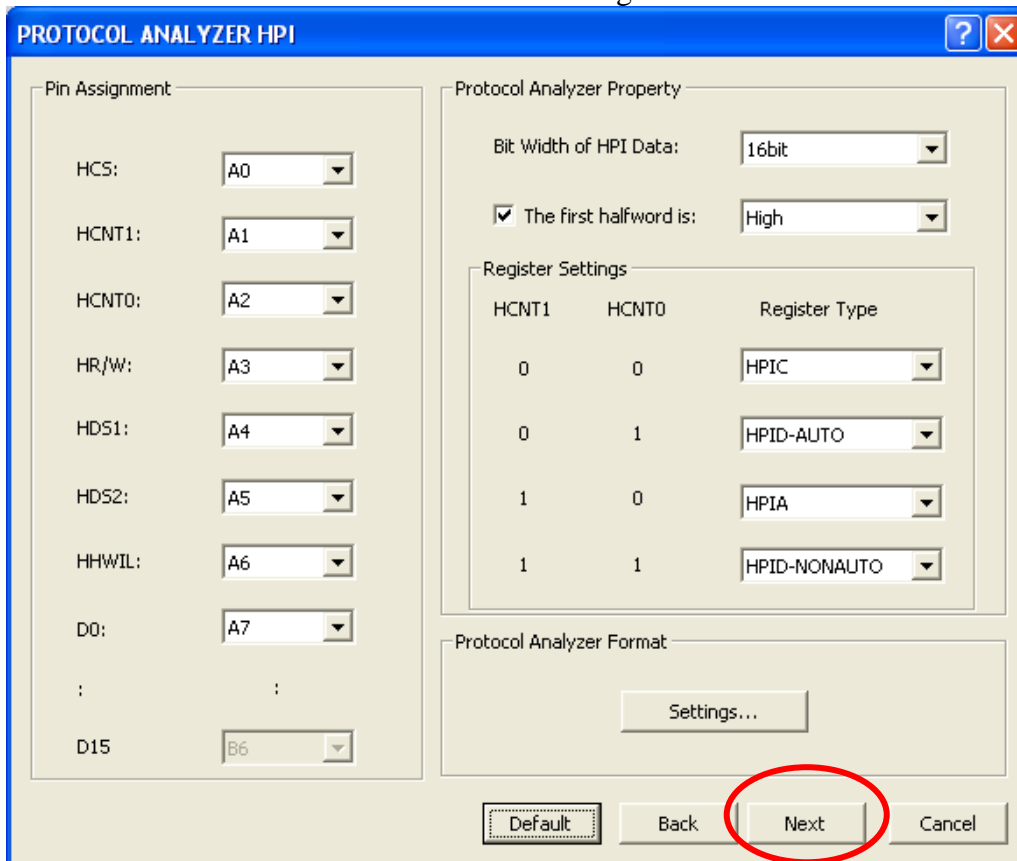


The Protocol Analyzer Format dialog box contains two columns of settings. Each row has an 'Item' label, a 'Color' selection (a colored square with a small '...' button), and a 'Data Format' dropdown menu. The items and their default settings are:

Item	Color	Data Format
HPIC	Pink	Default
HPID	Teal	Default
Write	Red	Default
Read	Blue	Default
HPIA	Light Red	Default
Address	Orange	Default
Control	Yellow	Default
Data	Green	Default

At the bottom are three buttons: 'OK', 'Cancel', and 'Default'.

STEP 10. Press the **Next** to finish all settings.



The PROTOCOL ANALYZER HPI dialog box is divided into two main sections: 'Pin Assignment' and 'Protocol Analyzer Property'.

Pin Assignment: A list of pins with dropdown menus for their assignments:

Pin	Assignment
HCS:	A0
HCNT1:	A1
HCNT0:	A2
HR/W:	A3
HD51:	A4
HD52:	A5
HHWIL:	A6
D0:	A7
:	:
D15:	B6

Protocol Analyzer Property:

- Bit Width of HPI Data: 16bit
- ☒ The first halfword is: High
- Register Settings:**

HCNT1	HCNT0	Register Type
0	0	HPIC
0	1	HPID-AUTO
1	0	HPIA
1	1	HPID-NONAUTO

At the bottom, there is a 'Settings...' button and a row of four buttons: 'Default', 'Back', 'Next' (circled in red), and 'Cancel'.



STEP 11. Please enter the Bus Name, select **Yes, please delete** or **No, please reserve** and then press **Finish**.

Add Bus/Protocol Analyzer

Please input the Bus name

BUS

Do you want to delete the other Buses and channels in the software?

☐ Yes, please delete

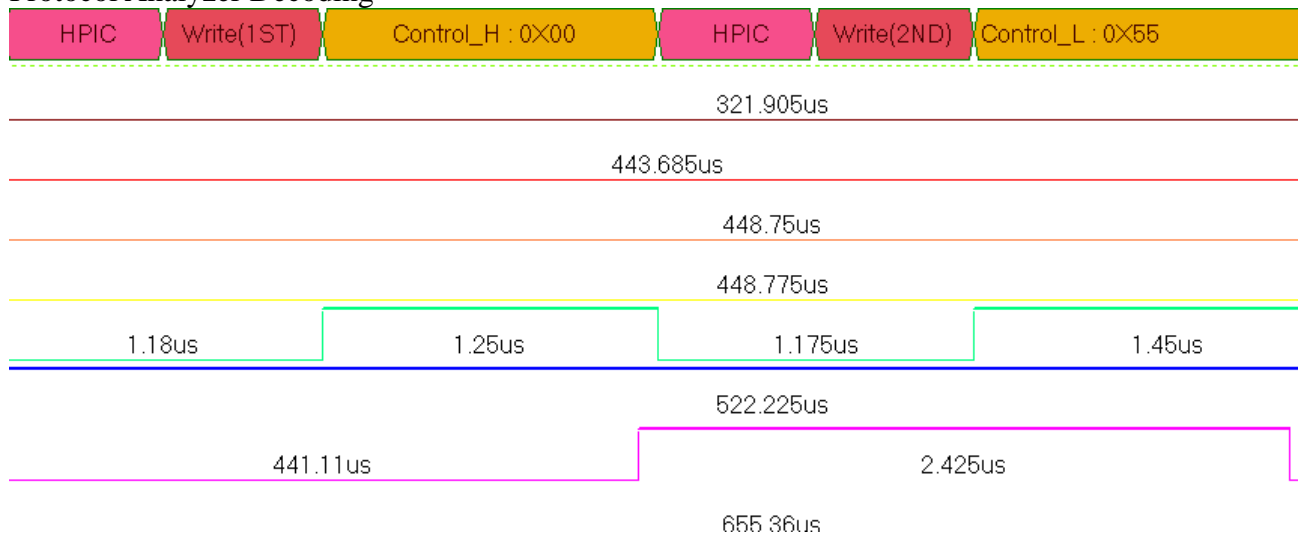
☒ No, please reserve

Back Finish Cancel



STEP 12. 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



Packet List

Packet #	Name	TimeStamp	HPIC	Write(1ST)	Control_H	HPIC	Write(2ND)	Control_L	HPIA	Write(1ST)	Address_H	HPIA
1	Bus1(HPI)	0.37322ms	HPIC	Write(1ST)	00	HPIC	Write(2ND)	55	HPIA	Write(1ST)	AA	HPIA
	Write(2ND)	Address_L	HPID-NONAUTO	Read(1ST)	Data_H	HPID-NONAUTO	Read(2ND)	Data_L				
	Write(2ND)	FF	HPID-NONAUTO	Read(1ST)	54	HPID-NONAUTO	Read(2ND)	A9				
2	Bus1(HPI)	0.38837ms	HPIA	Write(1ST)	FE	HPIA	Write(2ND)	53	HPID-NONAUTO	Read(1ST)	A8	
	HPID-NONAUTO	Read(2ND)	Data_L									
	HPID-NONAUTO	Read(2ND)	FD									
3	Bus1(HPI)	0.39847ms	HPIA	Write(1ST)	52	HPIA	Write(2ND)	A7	HPID-NONAUTO	Read(1ST)	FC	
	HPID-NONAUTO	Read(2ND)	Data_L									
	HPID-NONAUTO	Read(2ND)	51									
4	Bus1(HPI)	0.40858ms	HPIC	Write(1ST)	A6	HPIC	Write(2ND)	FB	HPIA	Write(1ST)	50	HPIA
	Write(2ND)	Address_L	HPID-AUTO	Read(1ST)	Data_H	HPID-AUTO	Read(2ND)	Data_L	HPID-AUTO	Read(1ST)	Data_H	
	Write(2ND)	A5	HPID-AUTO	Read(1ST)	FA	HPID-AUTO	Read(2ND)	4F	HPID-AUTO	Read(1ST)	A4	