



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

# SPECIFICATION

**MODEL: B08011-LAP-AC97-M**

**PART NO:** \_\_\_\_\_

**VERSION:** V1.02

Approver		Check	Design
GM	PM		

Customer Confirm

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

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## 1 Software Download

Please install 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.

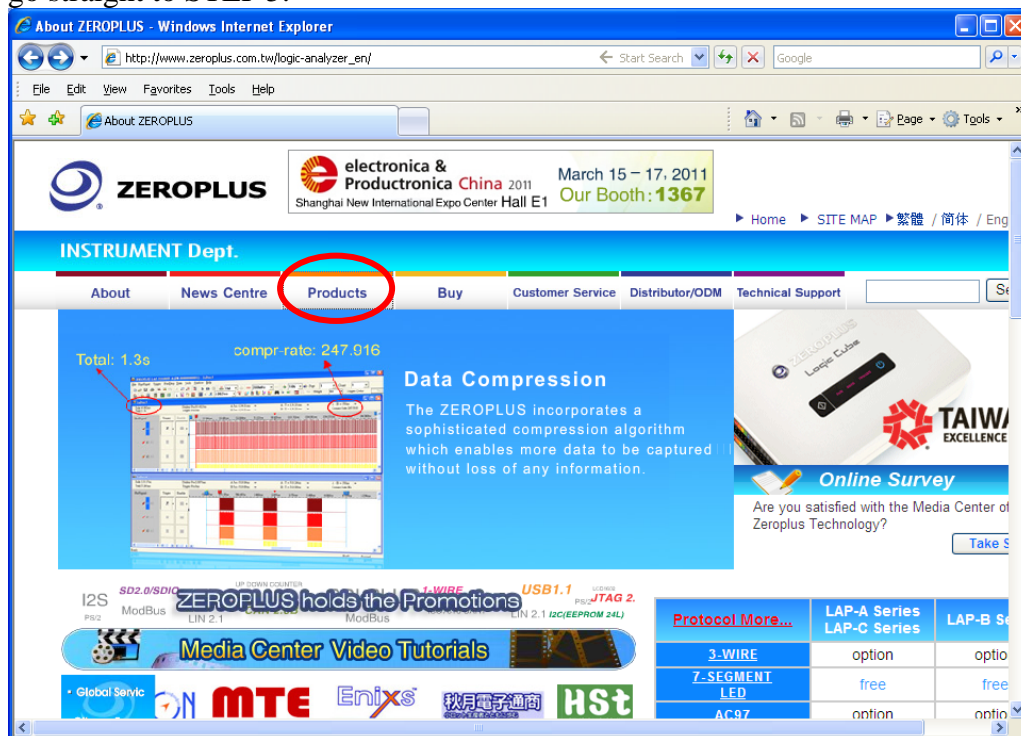
**STEP 1.** Visit the website of ZeroPlus: <http://www.zeroplus.com.tw>.

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

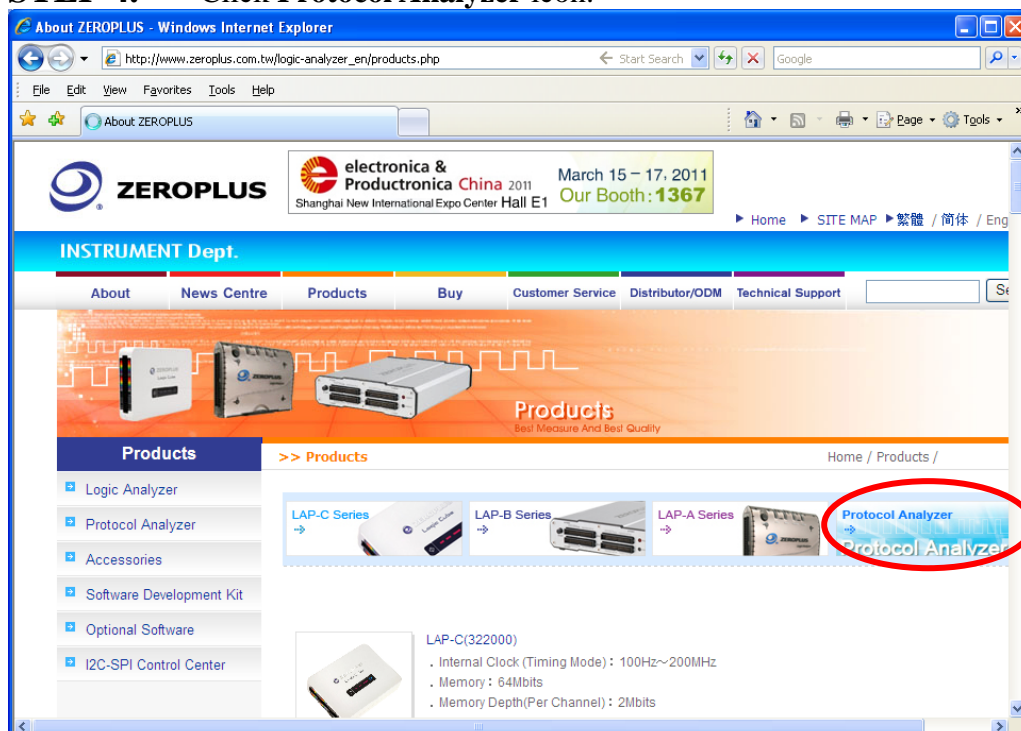




**STEP 3.** Click **Products** menu or select **Protocol Analyzer** item from its pull-down menu to go straight to STEP 5.

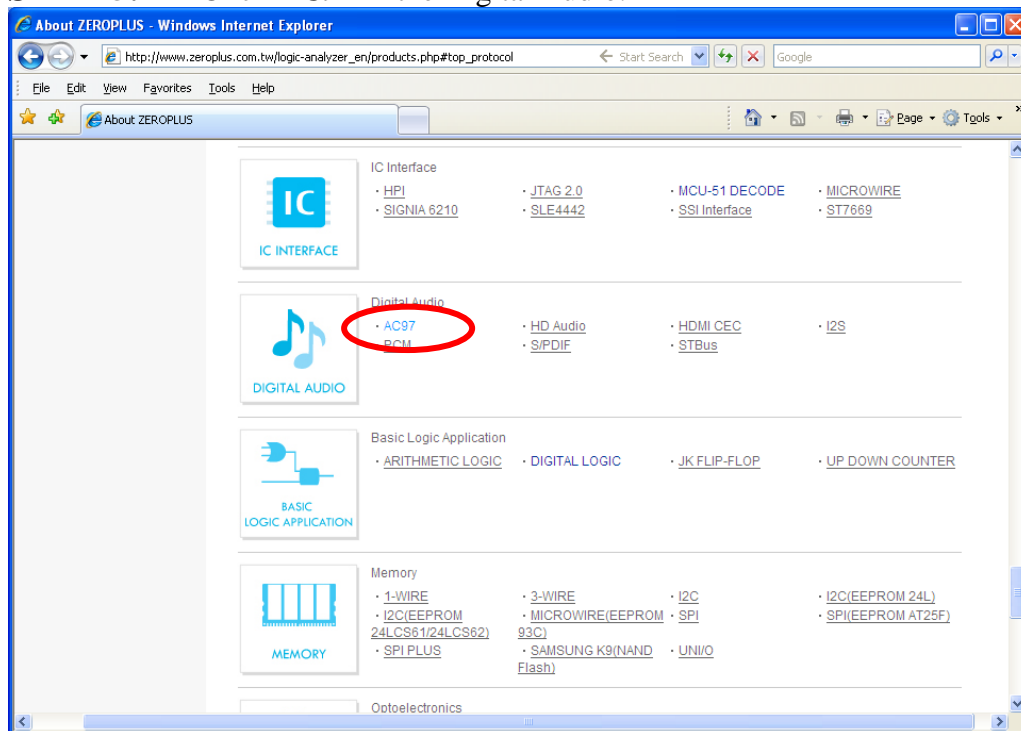


**STEP 4.** Click **Protocol Analyzer** icon.

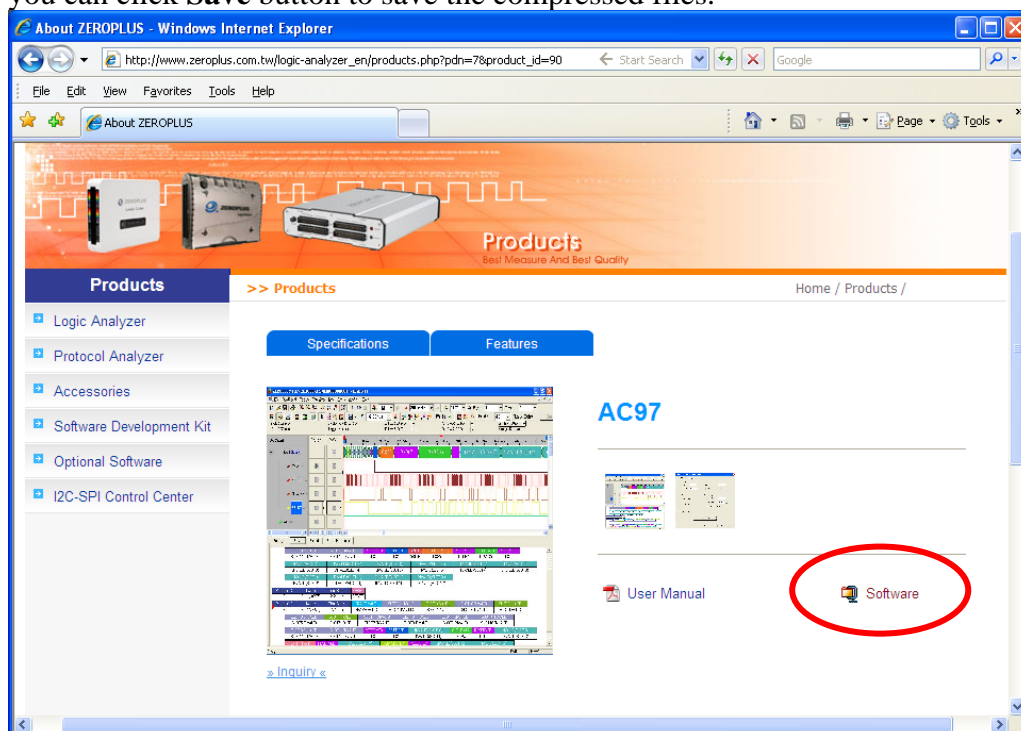




## STEP 5. Click AC97 in the Digital Audio.



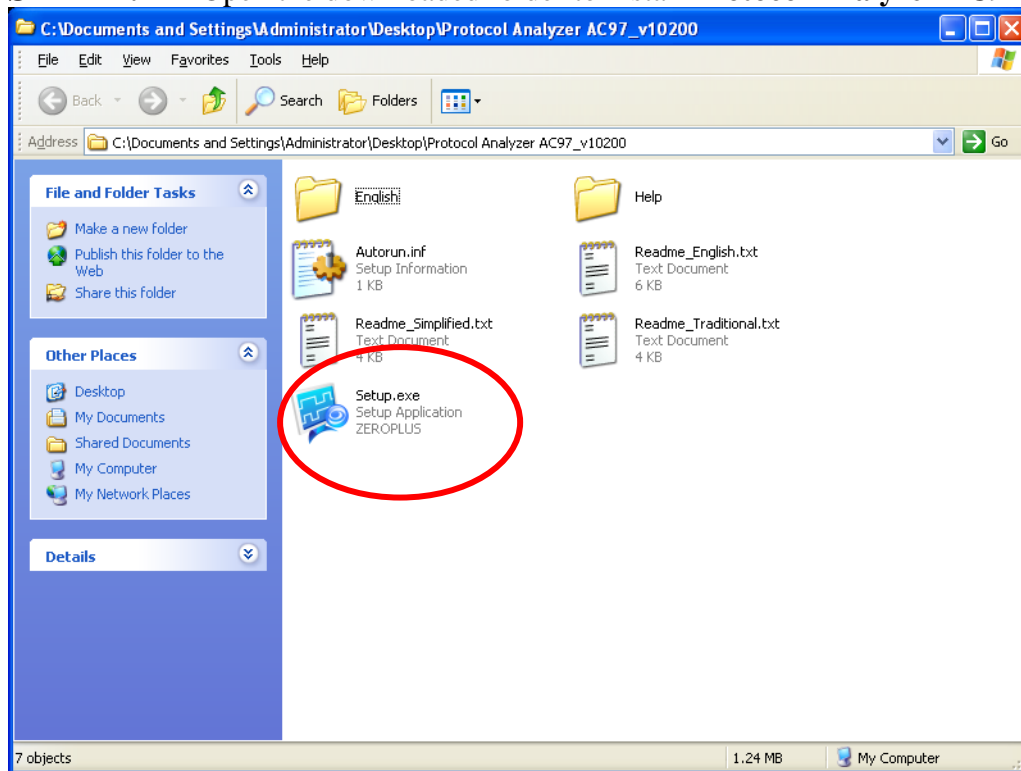
## STEP 6. Click **Software** in the Products page. When the File Download dialog box appears, you can click **Save** button to save the compressed files.



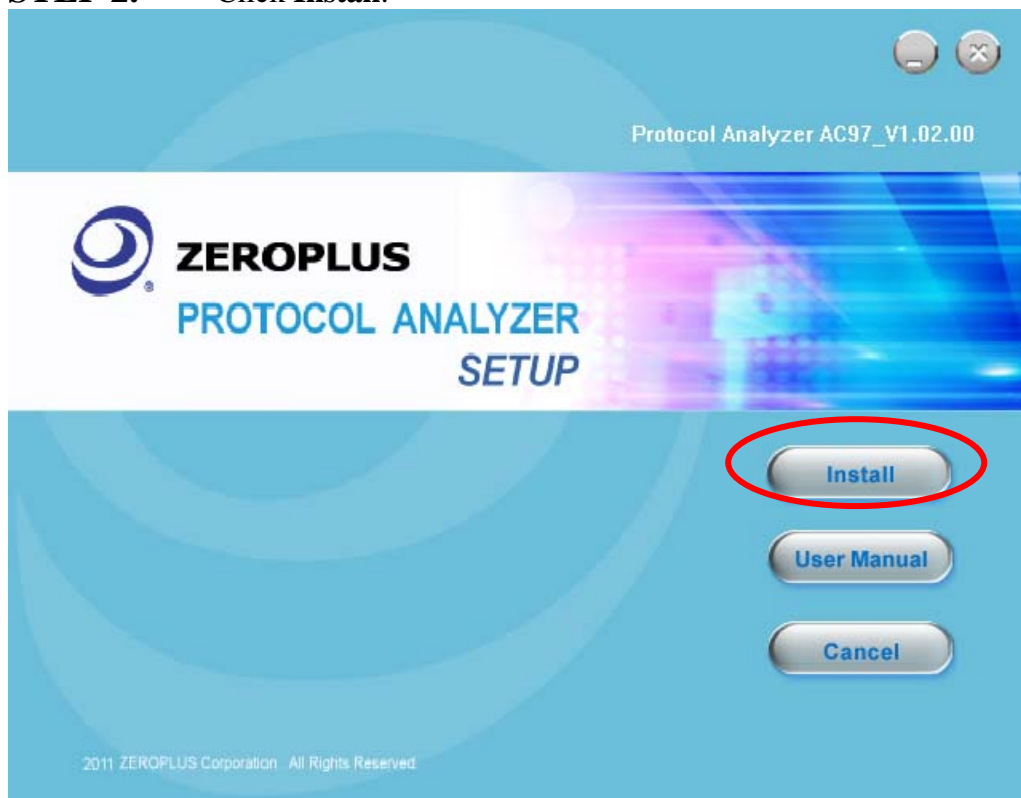


## 2 Software Installation

**STEP 1.** Open the downloaded folder to install **Protocol Analyzer AC97**.



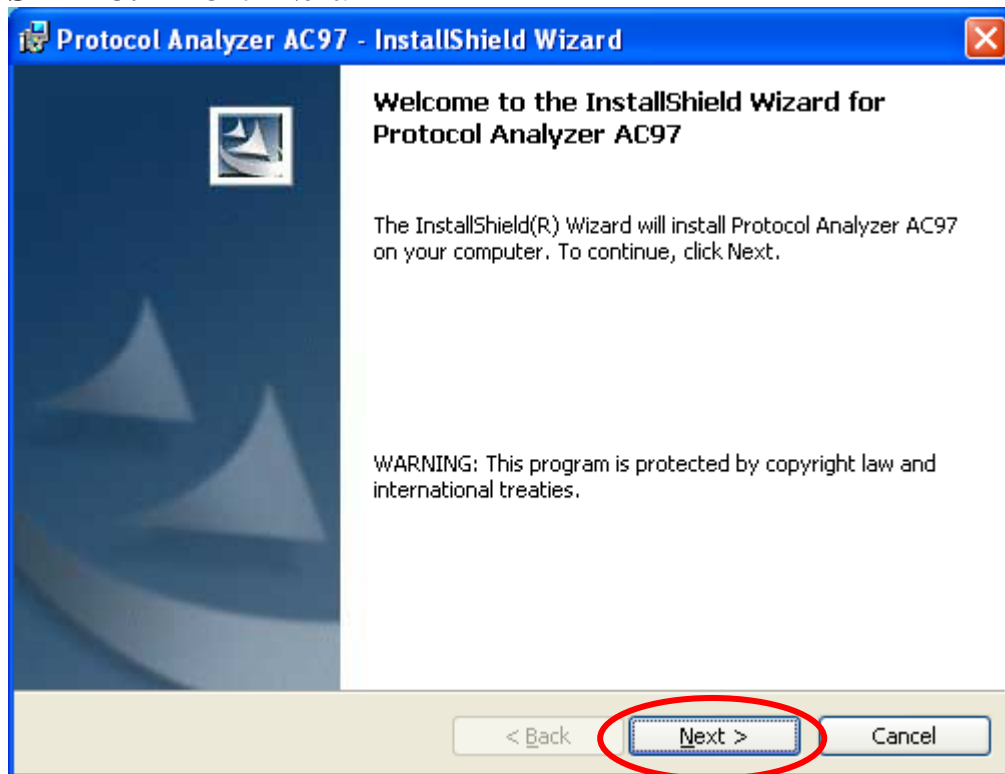
**STEP 2.** Click **Install**.



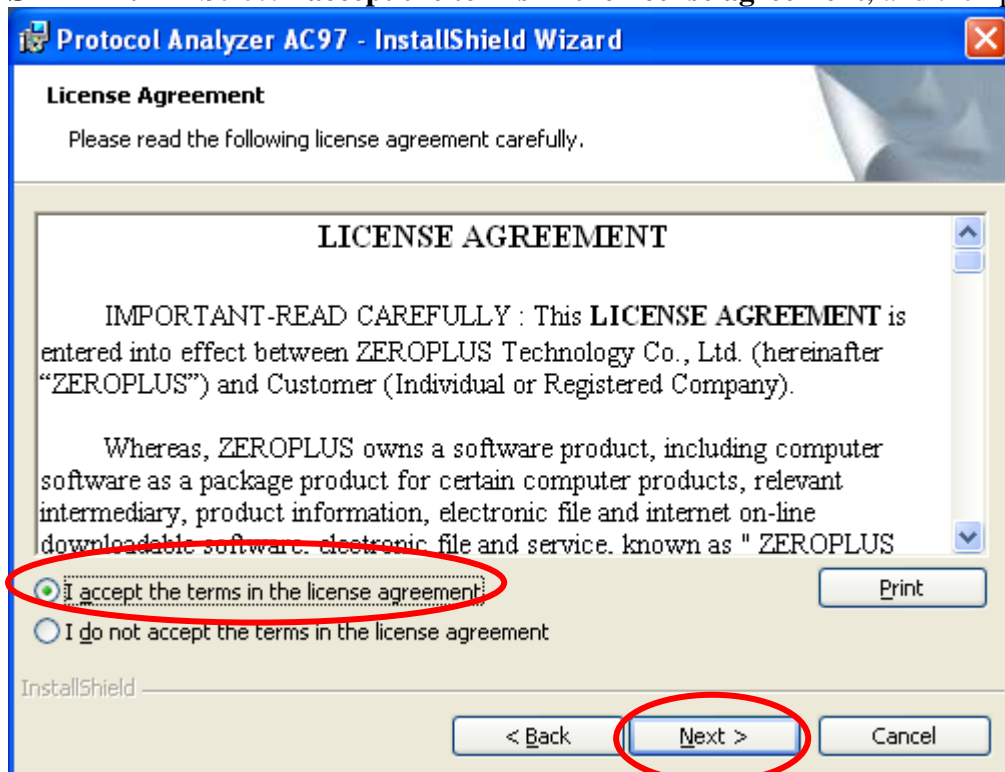




**STEP 3.** Click Next.



**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 AC97 - InstallShield Wizard". It has a blue header bar with a close button (X) in the top right corner. The main area is titled "Customer Information" and contains the text "Please enter your information." Below this, there are two text input fields: "User Name:" with "Microsoft" entered, and "Organization:" with "User" entered. Below these fields, there is a section titled "Install this application for:" with two radio button options: "Anyone who uses this computer (all users)" (which is selected) and "Only for me (Microsoft)". At the bottom of the dialog, there are three buttons: "< Back", "Next >" (which is circled in red), and "Cancel". The "InstallShield" logo is visible in the bottom left corner.

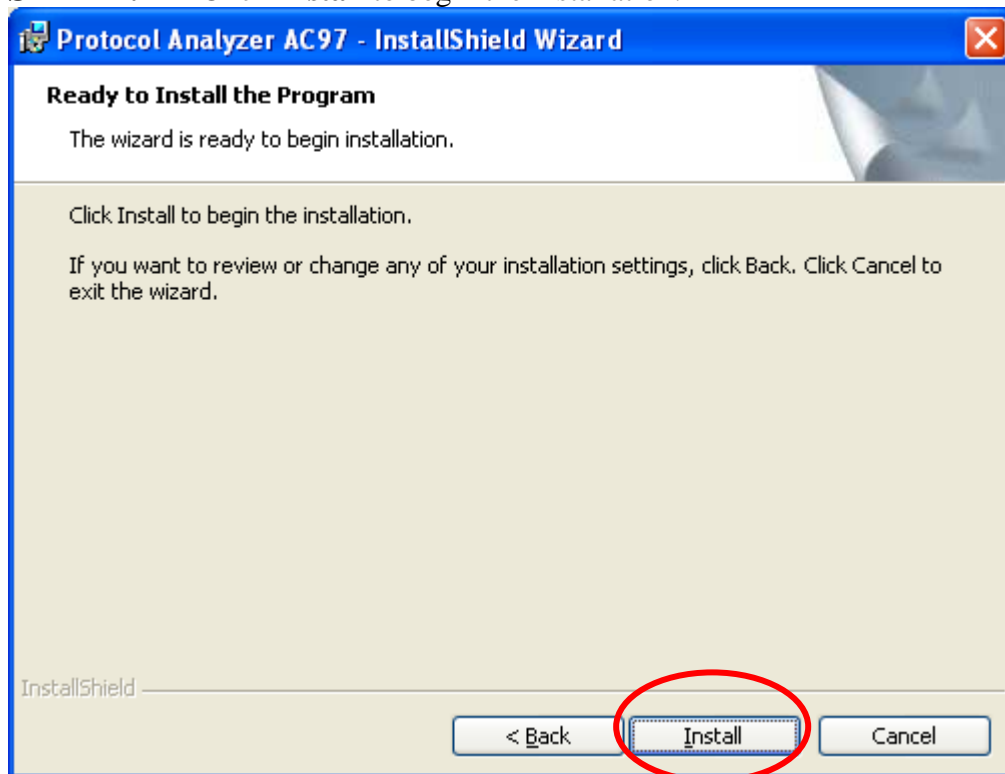
**STEP 6.** Select **Complete** and then click **Next**.

The dialog box is titled "Protocol Analyzer AC97 - InstallShield Wizard". It has a blue header bar with a close button (X) in the top right corner. The main area is titled "Setup Type" and contains the text "Choose the setup type that best suits your needs." Below this, there is a section titled "Please select a setup type." with two radio button options: "Complete" (which is selected) and "Custom". Each option has a small icon to its left. The "Complete" option has the text "All program features will be installed. (Requires the most disk space.)" next to it. The "Custom" option has the text "Choose which program features you want installed and where they will be installed. Recommended for advanced users." next to it. At the bottom of the dialog, there are three buttons: "< Back", "Next >" (which is circled in red), and "Cancel". The "InstallShield" logo is visible in the bottom left corner.

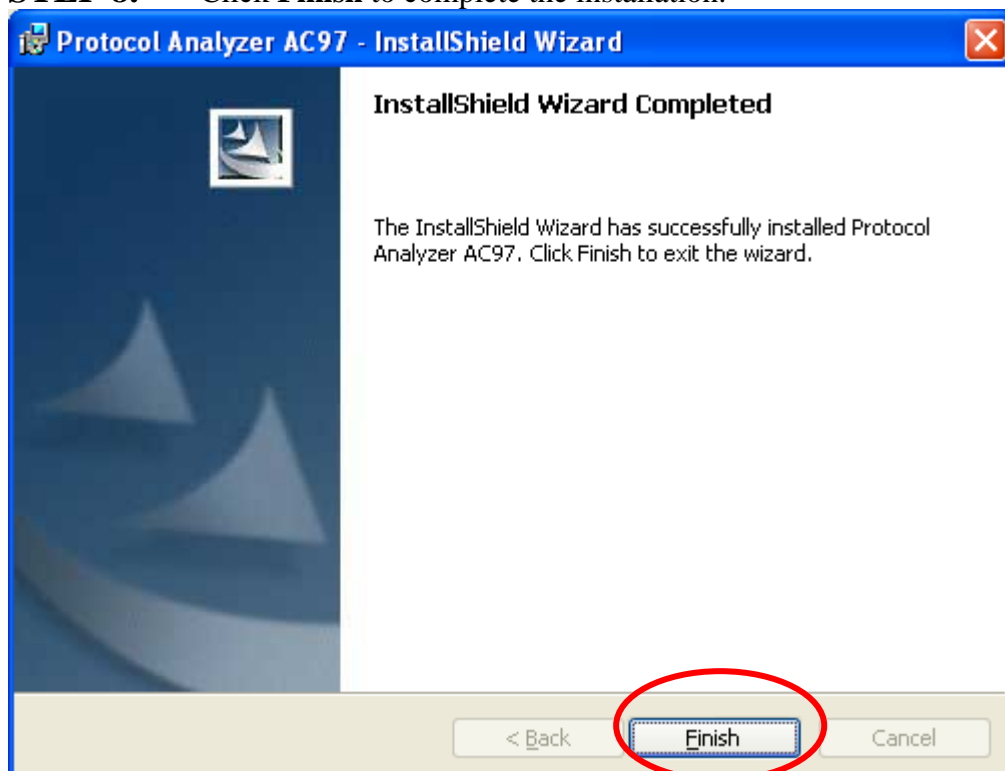




**STEP 7.** Click **Install** to begin the installation.



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





### 3 User Interface

In the configuration dialog box, please refer to the below images to select options of setting **AC97 Module**.

AC97 Configuration Dialog Box

**Pin Assignment:**

**SYNC:** It is the Synchronous Signal channel, and the default is A0.

**BITCLK:** It is the Clock Signal channel, and the default is A1.

**SDI/SDO:** It is the Data Transmission channel, and the default is A2.

**RESET:** It is the Reset channel, and the default is A3.

**Protocol Analyzer Property:**

**Decoding I/O:** Set the Decoding Mode to SDI or SDO.

**PCM Bit Width:** Set the Bit Width to 16, 18 or 20.

**Sampling Mode:** Set the Mode to Rising or Falling.

**Double Rate Audio:** When it is enabled, the PCM L, PCM R and PCM C can be decoded.



### Protocol Analyzer Format:

Press the **Settings** button to open the Protocol Analyzer Format dialog box. The Color of each Item can be varied as the users' requirements. The Items (Codec ID, CMD Address, Status Address, Reserved, CMD Data, Status Data, IO CTRL, PCM L Front, PCM R Front, PCM Center, PCM L Surr, PCM LFE, Line 2 ADC, Hset ADC, PCM Right, Line 1 ADC, PCM L, PCM Left, PCM R, Line 1 DAC, PCM C, PCM R Surr, Hset DAC, PCM MIC and IO Status) can be set as Binary, Decimal, Hexadecimal, ASCII or Default. And the Data Format of these Items (Codec ID, CMD Address, Status Address, Reserved, CMD Data, Status Data, IO CTRL, PCM L Front, PCM R Front, PCM Center, PCM L Surr, PCM LFE, Line 2 ADC, Hset ADC, PCM Right, Line 1 ADC, PCM L, PCM Left, PCM R, Line 1 DAC, PCM C, PCM R Surr, Hset DAC, PCM MIC and IO Status) 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 (Codec ID, CMD Address, Status Address, Reserved, CMD Data, Status Data, IO CTRL, PCM L Front, PCM R Front, PCM Center, PCM L Surr, PCM LFE, Line 2 ADC, Hset ADC, PCM Right, Line 1 ADC, PCM L, PCM Left, PCM R, Line 1 DAC, PCM C, PCM R Surr, Hset DAC, PCM MIC and IO Status) is the Default.

The dialog box titled "Protocol Analyzer Format" contains two columns of settings. Each row represents an item with a color selection box and a data format dropdown menu. The items are listed as follows:

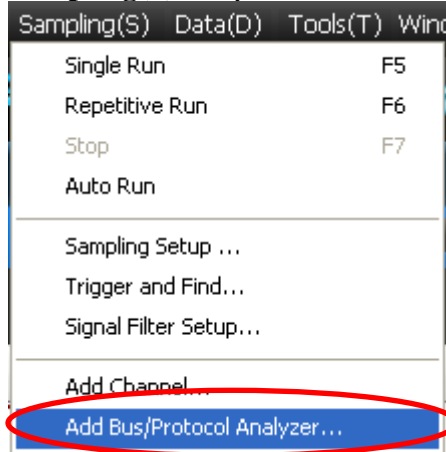
Item	Color	Data Format
Reset	[Pink]	Default
Slot Valid	[Green]	Default
Codec ID	[Blue]	Default
Write	[Red]	Default
PCM L Front	[Pink]	Default
PCM Center	[Light Green]	Default
PCM LFE	[Orange]	Default
IO CTRL	[Purple]	Default
PCM Right	[Blue]	Default
Line 2 ADC	[Pink]	Default
PCM L	[Purple]	Default
Frame Invalid	[Blue]	Default
Reserved	[Magenta]	Default
Read	[Blue]	Default
Data	[Green]	Default
Line 1 DAC	[Orange]	Default
PCM R Surr	[Yellow]	Default
Hset DAC	[Light Green]	Default
PCM Left	[Pink]	Default
PCM MIC	[Cyan]	Default
IO Status	[Teal]	Default
PCM C	[Light Green]	Default

At the bottom of the dialog box are three buttons: OK, Cancel, and Default.

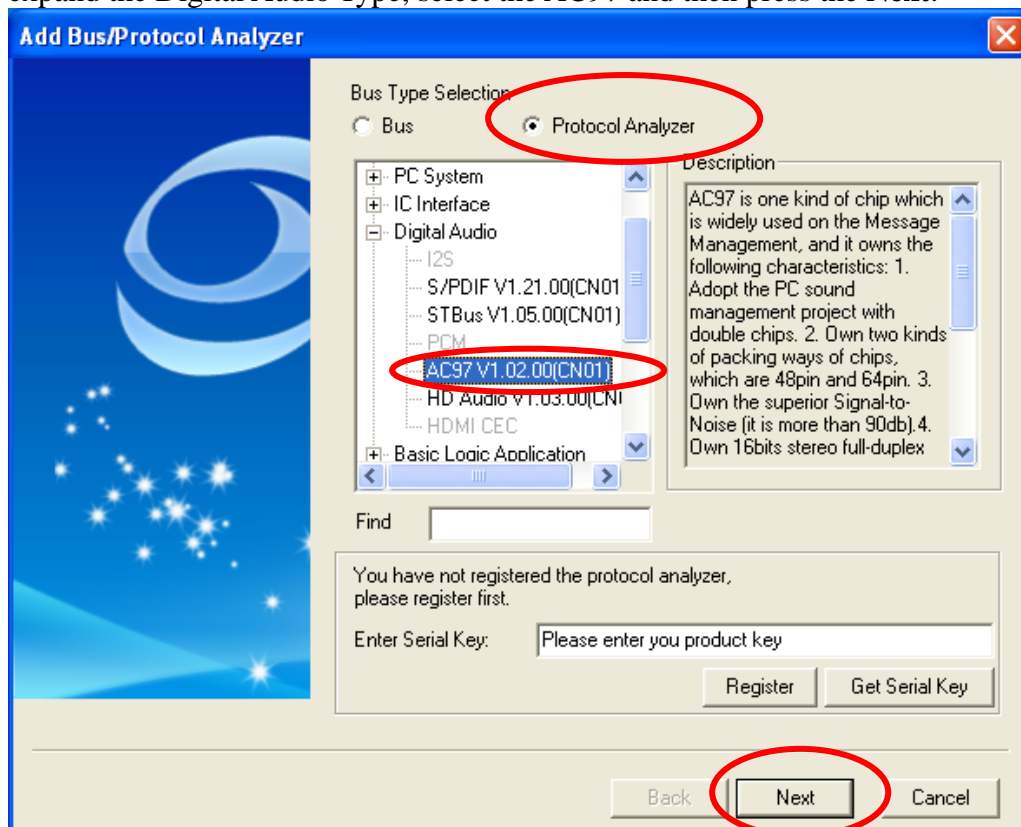


## 4 Operating Instructions

**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.

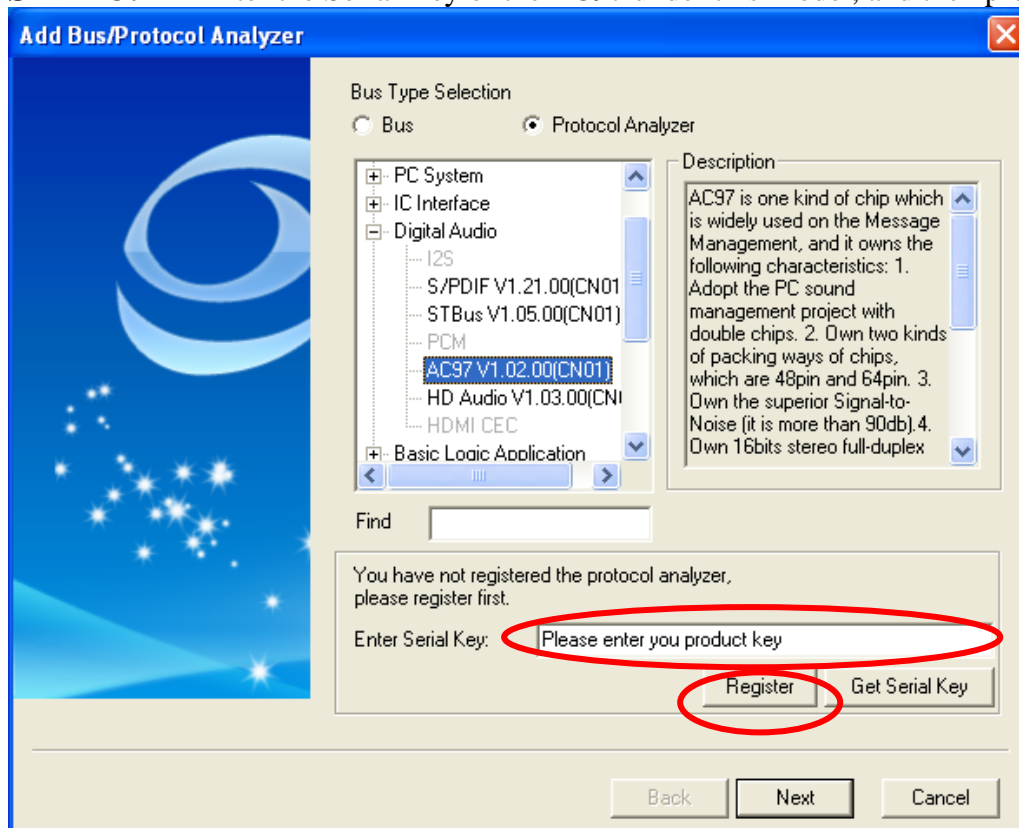


**STEP 2.** Select the Protocol Analyzer item in the Add Bus/Protocol Analyzer dialog box, expand the Digital Audio Type, select the AC97 and then press the **Next**.

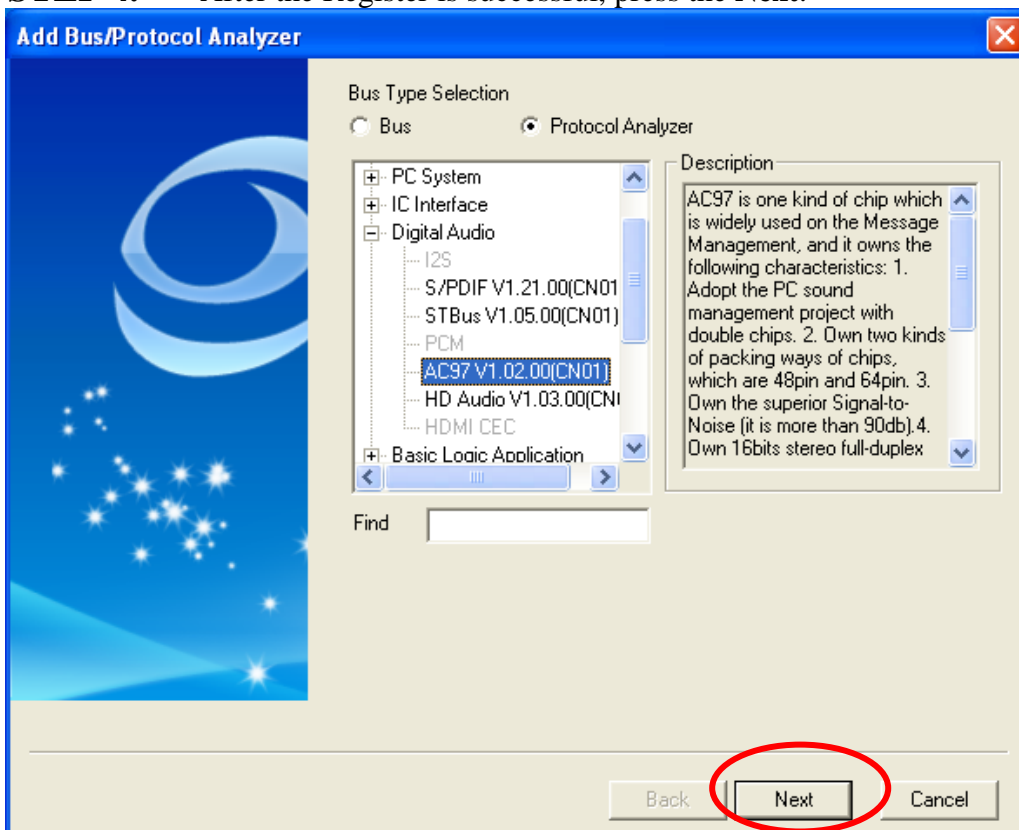




**STEP 3.** Enter the Serial Key of the AC97 under this Model, and then press the **Register**.



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





**STEP 5.** Open the PROTOCOL ANALYZER AC97 dialog box and set the channels for SYNC, SDI/SDO, BITCLK and RESET.

PROTOCOL ANALYZER AC97

Pin Assignment

SYNC: A0 SDI/SDO: A2

BITCLK: A1 ☐ RESET: A3

Protocol Analyzer Format

Settings...

Protocol Analyzer Property

Decoding I/O: SDO Sampling Mode: Rising

PCM Bit Width: 16 ☐ Double Rate Audio

Default Back Next Cancel

**STEP 6.** Set Decoding I/O to SDO or SDI.

PROTOCOL ANALYZER AC97

Pin Assignment

SYNC: A0 SDI/SDO: A2

BITCLK: A1 ☐ RESET: A3

Protocol Analyzer Format

Settings...

Protocol Analyzer Property

Decoding I/O: SDO Sampling Mode: Rising

PCM Bit Width: 16 ☐ Double Rate Audio

Default Back Next Cancel



**STEP 7.** Set the **PCM Bit Width** to 16, 18 or 20.

The screenshot shows the 'PROTOCOL ANALYZER AC97' window. It has a blue header with a waveform graphic. Below the header, there are three main sections: 'Pin Assignment', 'Protocol Analyzer Format', and 'Protocol Analyzer Property'. In the 'Pin Assignment' section, 'SYNC' is set to A0, 'SDI/SDO' is set to A2, 'BITCLK' is set to A1, and there is an unchecked 'RESET' checkbox with A3 as an option. The 'Protocol Analyzer Format' section has a 'Settings...' button. The 'Protocol Analyzer Property' section contains 'Decoding I/O' set to SDO, 'Sampling Mode' set to Rising, 'PCM Bit Width' set to 16 (highlighted with a red box), and an unchecked 'Double Rate Audio' checkbox. At the bottom are 'Default', 'Back', 'Next', and 'Cancel' buttons.

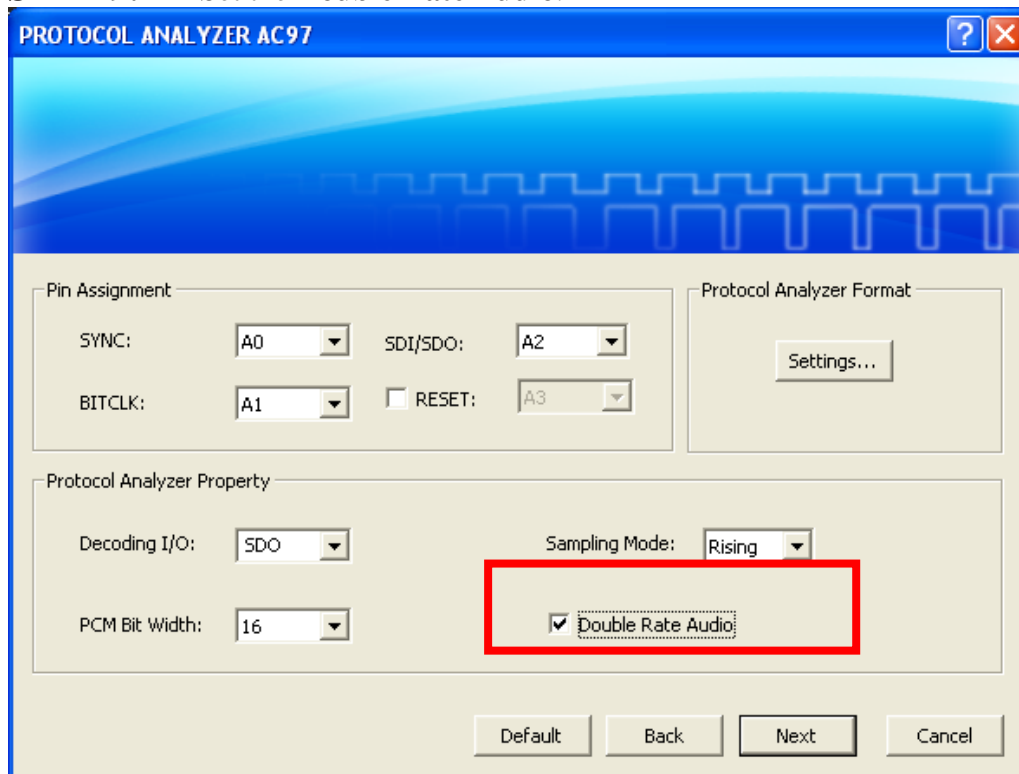
**STEP 8.** Set the **Sampling Mode** to Rising or Falling.

This screenshot is similar to the previous one, showing the 'PROTOCOL ANALYZER AC97' window. In this step, the 'Sampling Mode' dropdown menu in the 'Protocol Analyzer Property' section is highlighted with a red box and set to 'Rising'. The 'PCM Bit Width' remains set to 16. All other settings and the window layout are identical to the previous screenshot.

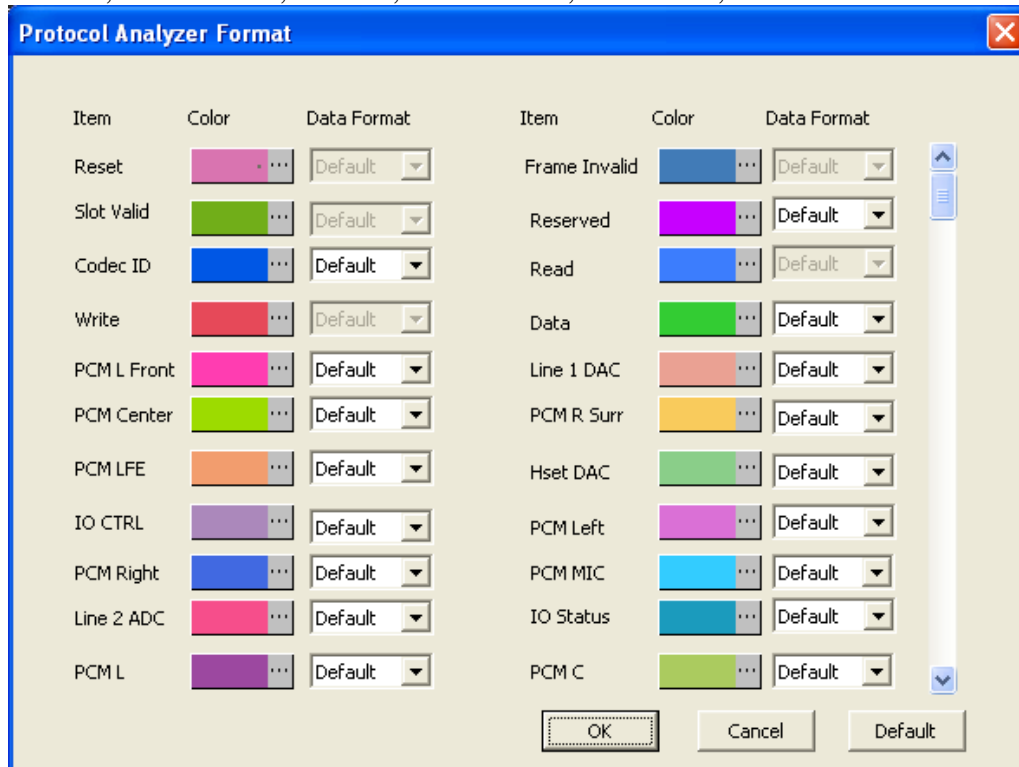




## STEP 9. Set the Double Rate Audio.

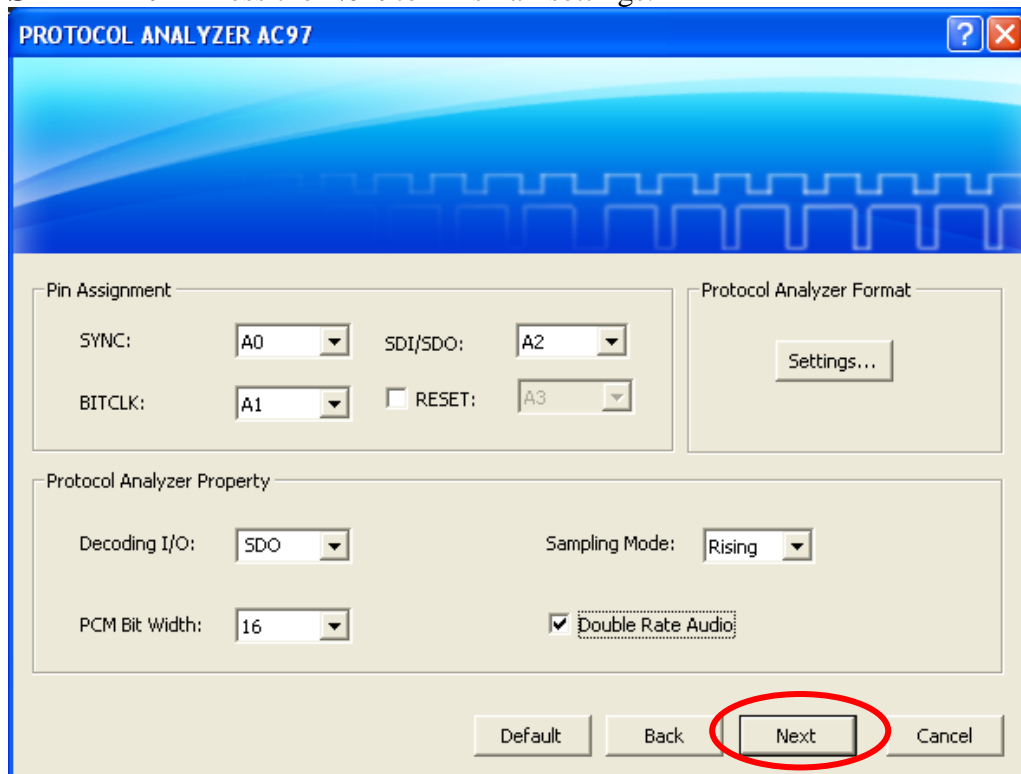


**STEP 10.** Press the **Settings** button to open the Protocol Analyzer Format dialog box, and then set the Color of each Item and the Data Format of the Items (Codec ID, CMD Address, Status Address, Reserved, CMD Data, Status Data, IO CTRL, PCM L Front, PCM R Front, PCM Center, PCM L Surr, PCM LFE, Line 2 ADC, Hset ADC, PCM Right, Line 1 ADC, PCM L, PCM Left, PCM R, Line 1 DAC, PCM C, PCM R Surr, Hset DAC, PCM MIC and IO Status).

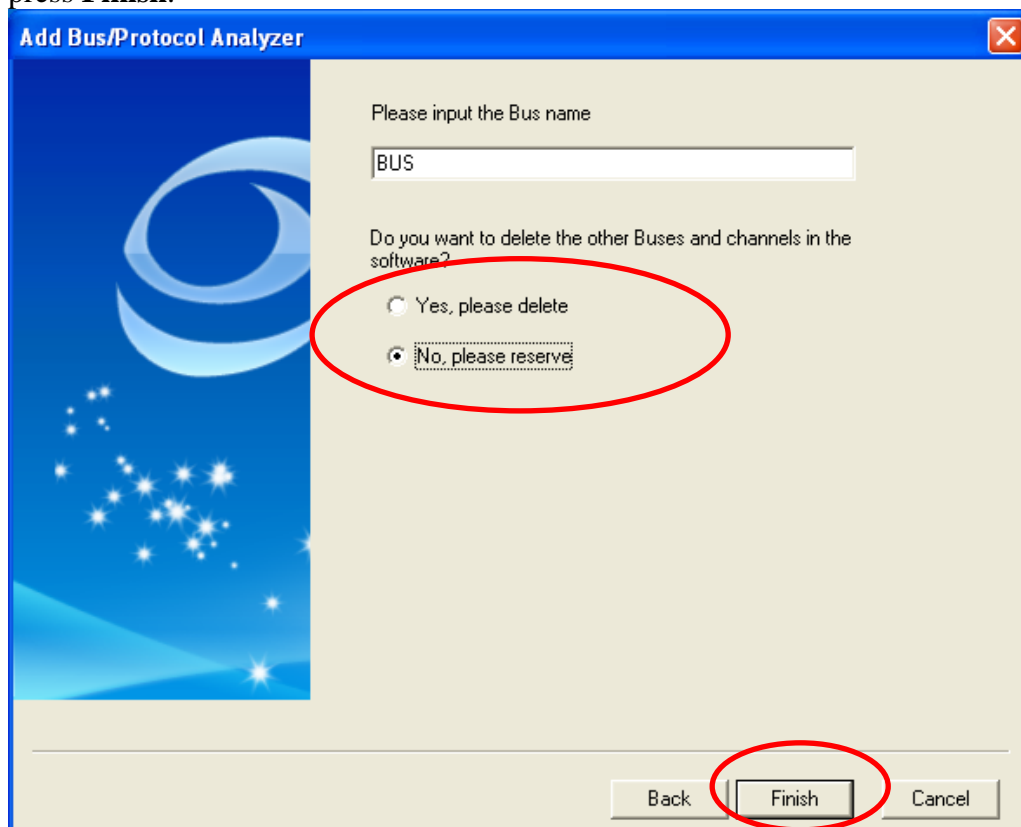




**STEP 11.** Press the **Next** to finish all settings.



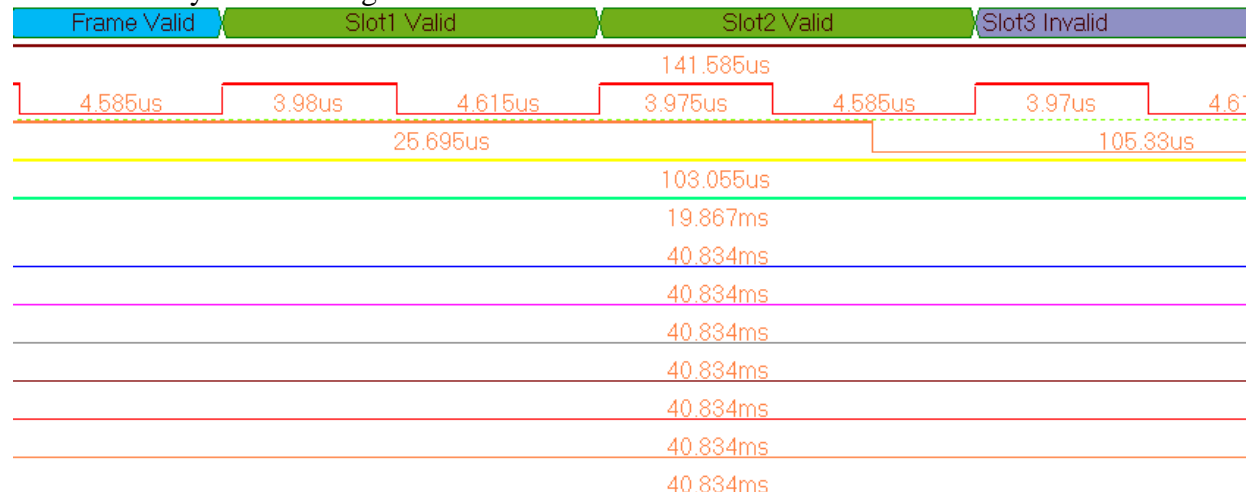
**STEP 12.** Please enter the Bus Name, select **Yes, please delete** or **No, please reserve** and then press **Finish**.





**STEP 13.** Following pictures show the completion of the protocol analyzer decoding and the packet list. The trigger condition is set as Either Edge; the memory depth is 32K; the sampling frequency is 100MHz (the sampling frequency should be more than eight times higher than the signal to be tested).

### Protocol Analyzer Decoding



### Packet List

Navigator   Packet List   Statistics   Memory Analyzer									
Setting... Refresh Export... Synch. Parameter...									
Packet #	Name	TimeStamp	Frame Valid	Slot X Valid	Slot X Valid	Slot X Invalid	Slot X Invalid	Slot X Invalid	
1	Bus1(AC97)	0.01328ms	Frame Valid	Slot1 Valid	Slot2 Valid	Slot3 Invalid	Slot4 Invalid	Slot5 Invalid	
	Slot X Invalid	Slot X Invalid	Slot X Invalid	Slot X Invalid	Slot X Invalid	Slot X Invalid	Slot X Invalid	Slot X Invalid	Reserved
	Slot6 Invalid	Slot7 Invalid	Slot8 Invalid	Slot9 Invalid	Slot10 Invalid	Slot11 Invalid	Slot12 Invalid		0
	Codec Id	Write	CMD Address	Reserved	CMD Data	Reserved	Invalid(Slot X)	Invalid(Slot X)	Invalid(Slot X)
	1	Write	26	0F7	96D6	1	Invalid(Slot3)	Invalid(Slot4)	Invalid(Slot5)
	Invalid(Slot X)	Invalid(Slot X)	Invalid(Slot X)	Invalid(Slot X)	Invalid(Slot X)	Invalid(Slot X)	Invalid(Slot X)	Invalid(Slot X)	
	Invalid(Slot6)	Invalid(Slot7)	Invalid(Slot8)	Invalid(Slot9)	Invalid(Slot10)	Invalid(Slot11)	Invalid(Slot12)		
Packet #	Name	TimeStamp	Reset						
2	Bus1(AC97)	2.21448ms	Reset						
Packet #	Name	TimeStamp	Frame Valid	Slot X Invalid	Slot X Valid	Slot X Invalid	Slot X Valid	Slot X Invalid	
3	Bus1(AC97)	2.74236ms	Frame Valid	Slot1 Invalid	Slot2 Valid	Slot3 Invalid	Slot4 Valid	Slot5 Invalid	
	Slot X Valid	Slot X Invalid	Slot X Invalid	Slot X Invalid	Slot X Invalid	Slot X Invalid	Slot X Invalid	Slot X Invalid	Reserved
	Slot6 Valid	Slot7 Invalid	Slot8 Invalid	Slot9 Invalid	Slot10 Invalid	Slot11 Invalid	Slot12 Invalid		0
	Codec Id	Invalid(Slot X)	CMD Data	Reserved	Invalid(Slot X)	PCM R Front	Reserved	Invalid(Slot X)	PCM Center