

SPECIFICATION

MODEL: 009-LAP-I2S-M

PART NO: _____

VERSION: V1.19

Approver		Check	Design
GM	PM		

Customer Confirm

ontent

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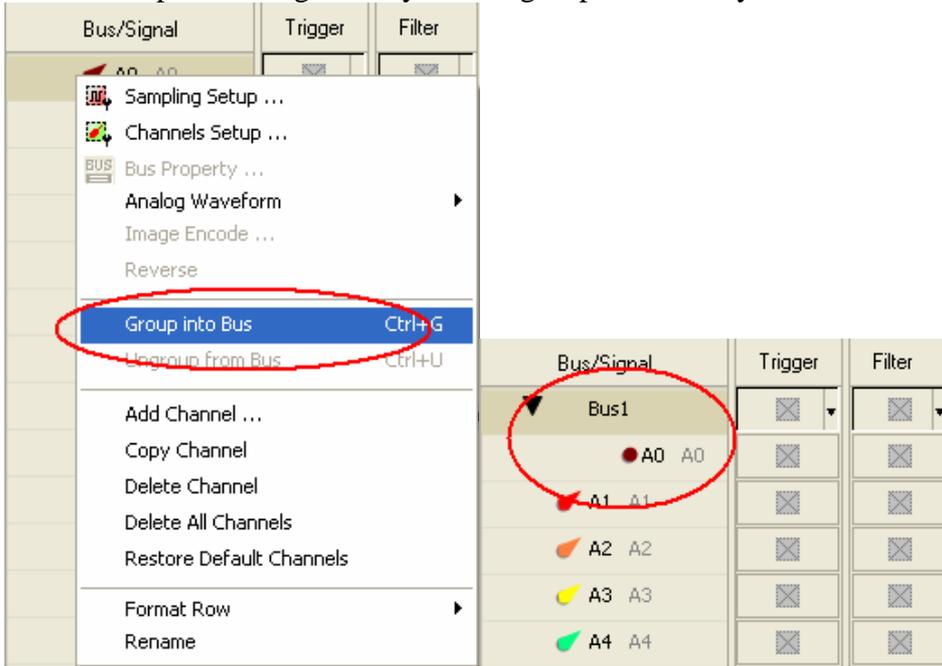
1. Software Register

Please register the software as the following steps:

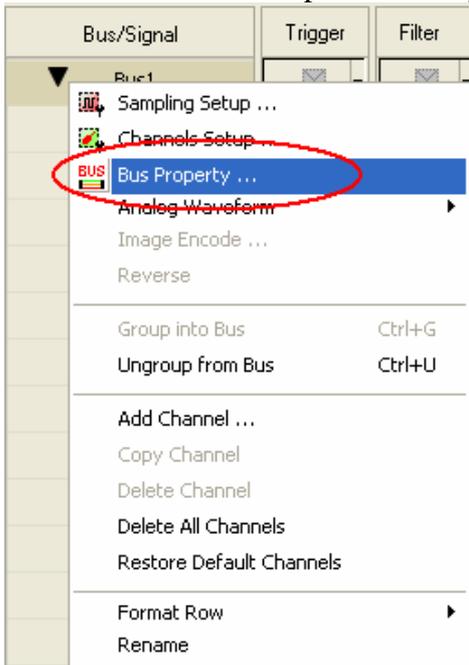
※ Remark1: The registration steps for all protocol analyzers are the same; you can complete the registration by following procedures. Following is an example on how to register the Protocol Analyzer BUS.

※ Remark2: 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.

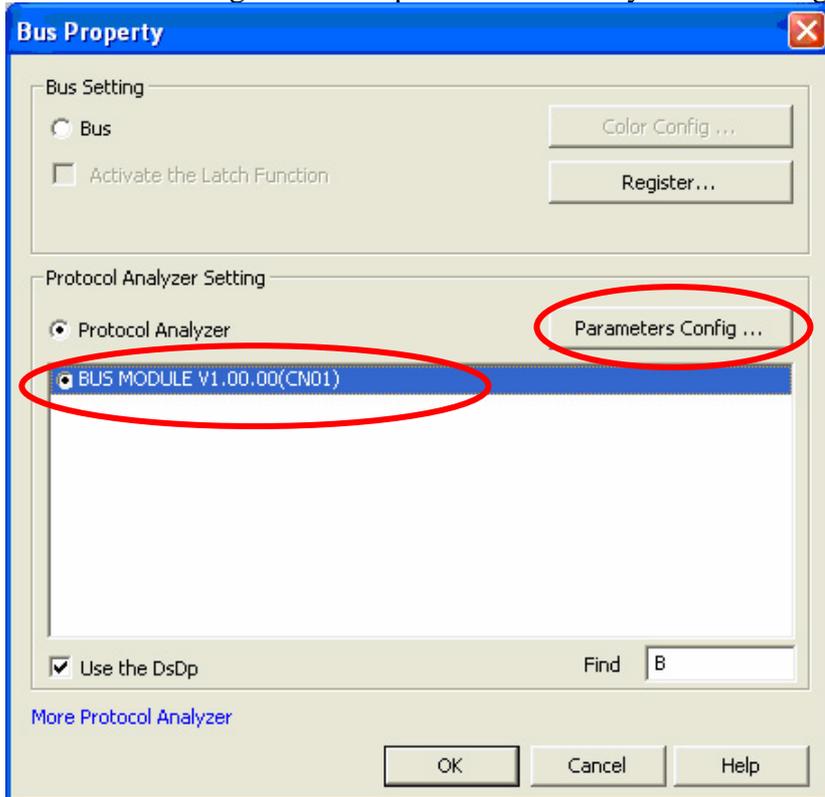
STEP 1. Open the Logic Analyzer and group the unanalyzed channels into **Bus1** by pressing the **Right Key**.



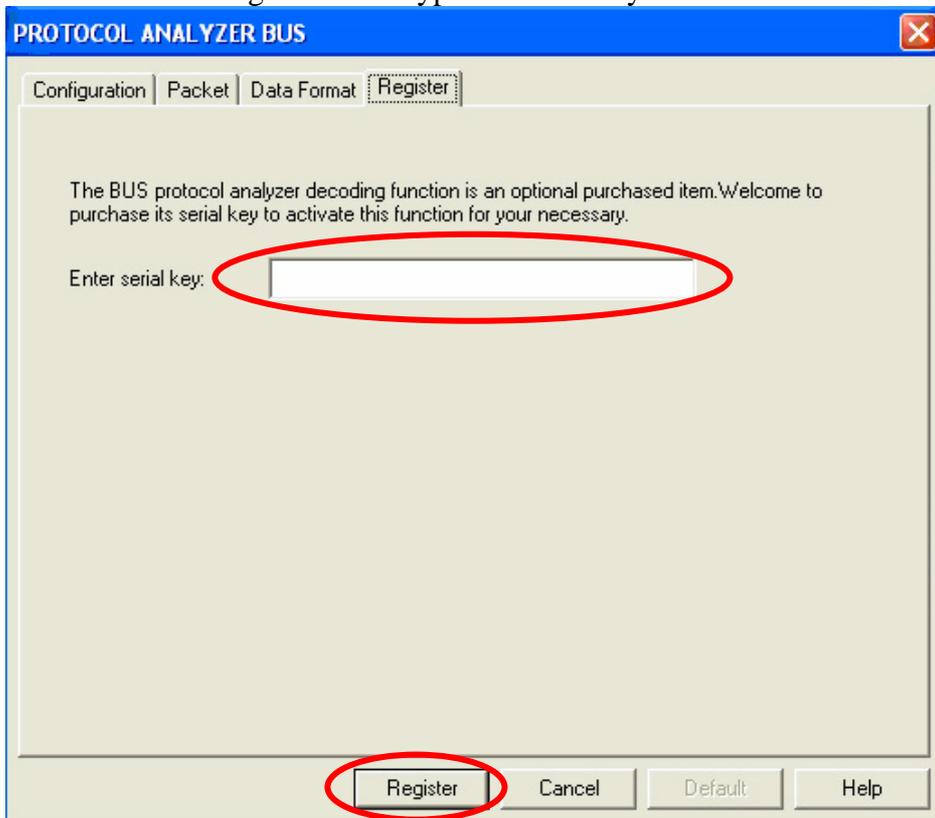
STEP 2. Select **Bus 1**, then press **Right Key** on the mouse to list the menu, then click **Bus Property** or **Bus** icon on the toolbar to open **Bus Property** dialog box.



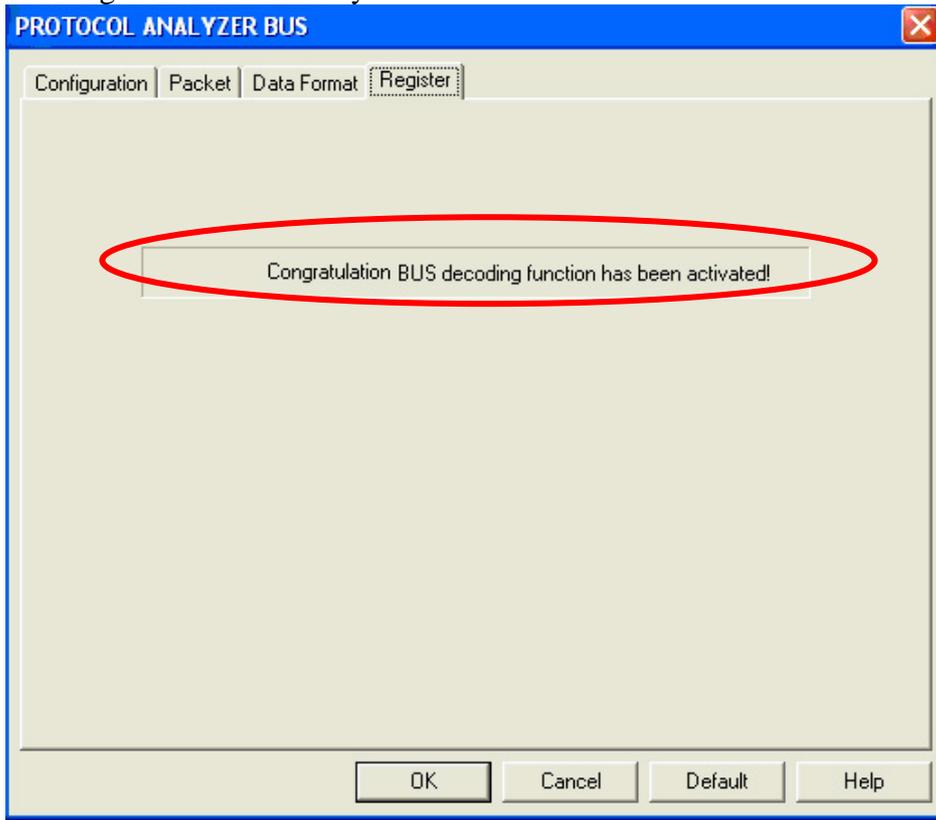
STEP 3. Select the Protocol Analyzer, and then choose **BUS MODULE V1.00.00 (CN01)**. Next click Parameters Configuration to open Protocol Analyzer Bus dialog box.



STEP 4. Click Register tab to type the serial key number of BUS. Then click Register.



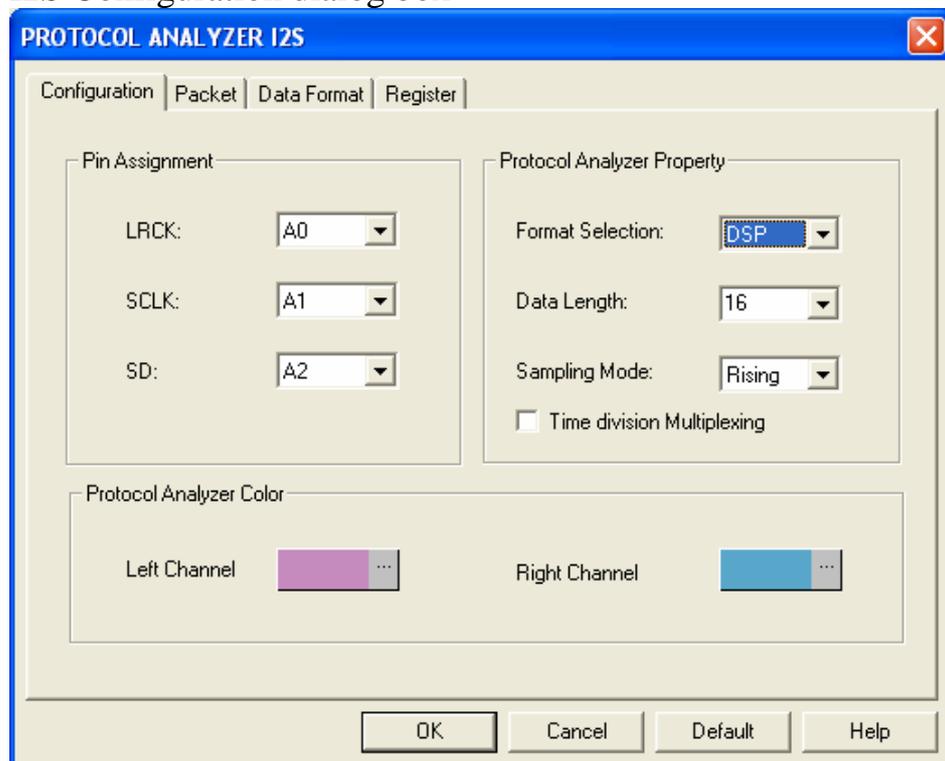
STEP 5. After clicking the Register button, following dialog box will appear; it denotes that the BUS has been registered successfully.



2. User Interface

Please refer to the below images to select options of setting I2S module.

I2S Configuration dialog box



Pin Assignment:

I2S needs three channels to decode the signals.

LRCK: It is the Select Channel for the Left Channel or Right Channel, the default is A0.

SCLK: It is the Serial Clock channel, the default is A1.

SD: It is the TDM (time-division multiplexing) Serial Data (Data Input channel and Data Output channel), the default is A2.

Protocol Analyzer Property:

Format Selection: There are four different formats; choosing the different formats will change the start point of the data decoding. The basic format is I2S; the general format is Right; the seldom format is Left; there is the DSP format and the default format is I2S.

Data Length: There are four choices, 16, 20, 24 and 32 in the pull-down menu. Users can input from 1 to 256. And the Data Length is set according to the starting point, the default is 16 bits.

Sampling Mode: There are two Modes, Rising and Falling. And the default is Rising.

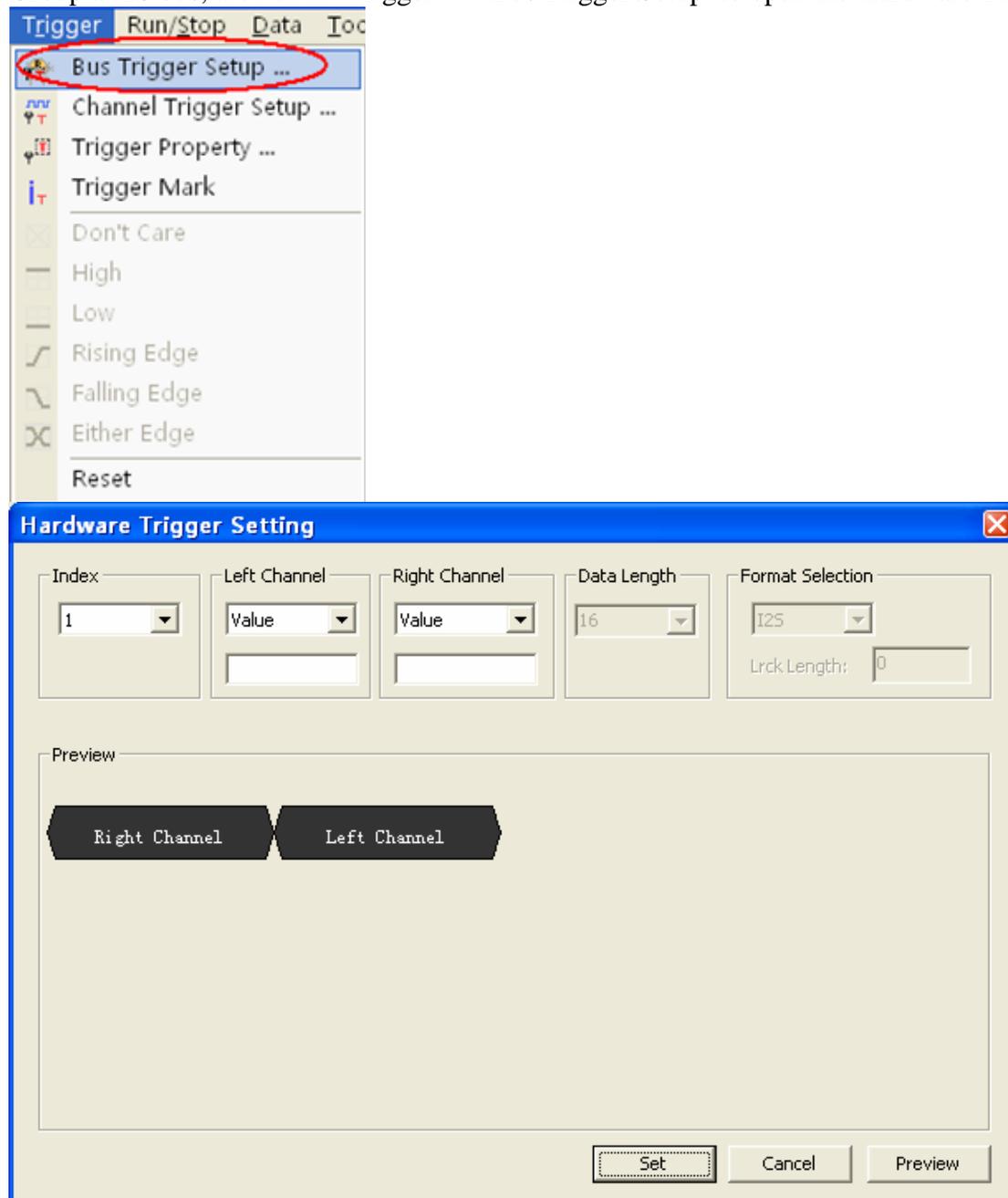
Time division Multiplexing: It only can be selected under DSP format.

Protocol Analyzer Color:

The Protocol Analyzer color can be varied by users.

Hardware Trigger Setting

Group a I2S bus, then click 'Trigger' → 'Bus Trigger Setup' to open the Hardware Trigger Setting interface.



Interface Description:

1. **Index:** It is left/right channel; 1-7 could be selected (based on 256-level being the largest). 1 means the first group of left/right channel, and the like.
2. **Left Channel:** It is the data type of each channel. Two types could be selected: Value and Don't care; it is Value by default. If Don't care is selected, 3 left channels' data would be disabled.
3. **Left Channel Data:** It is the data of left channel in Hexadecimal.
4. **Right Channel:** It is the data type of each channel. Two types could be selected: Value and Don't care; it is Value by default. If Don't care is selected, 5 right channels' data would be disabled.
5. **Right Channel Data:** It is the data of right channel in Hexadecimal.
6. **Data Length:** It is the data length of each channel. 4 options could be selected: 16, 20, 24 and 32; its unit is bit. It determines all indexes.
7. **Format Selection:** Four formats could be selected: I2S, Left, Right and DSP. It determines all indexes. If Right is selected, a dialog box of requiring LRCK length would appear because X(Don't care) shall be added in the front.
8. **Preview:** Show the current trigger setting in packet graphics; 4 rows of graphic could be showed.

9.**Set**: Set the setting to the hardware and close the interface.

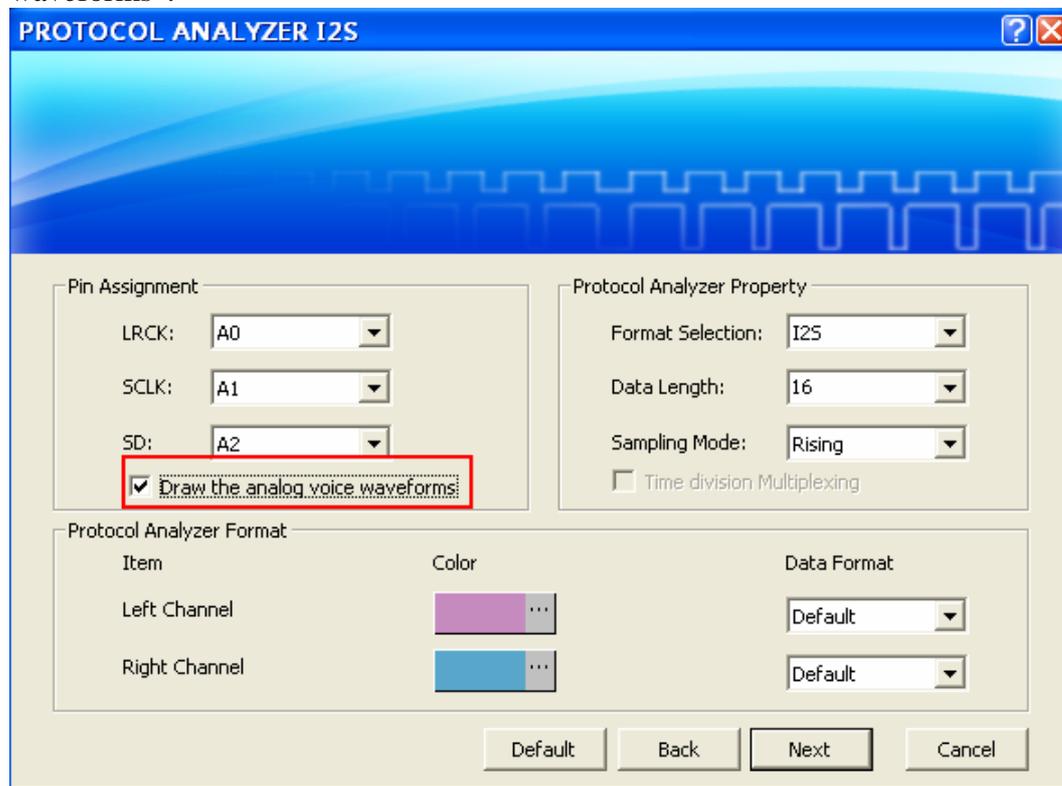
10.**Cancel**: Close the interface.

11.**Preview**: Preview the current trigger setting.

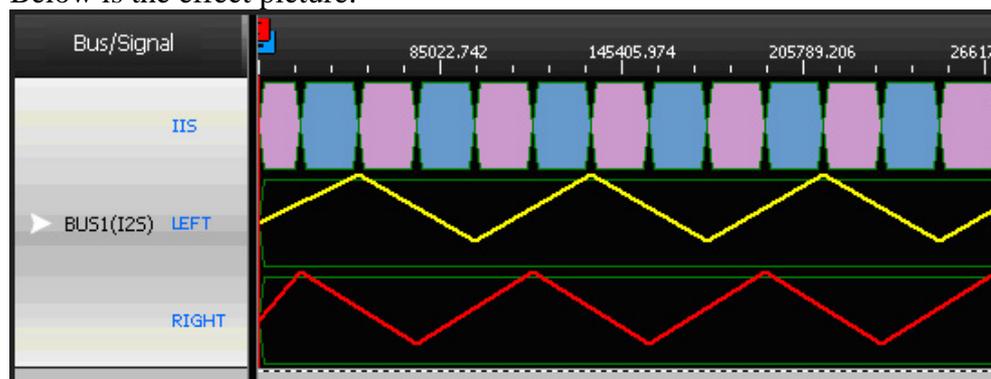
Analog Voice Waveforms Display Function

This function could display the analog waveforms of left/right channel. It only supports Smart+ main program, and for old files, bus shall be regrouped before using this function.

Add a new I2S bus in the Smart+ main program, and in its interface select “Draw the analog voice waveforms”.

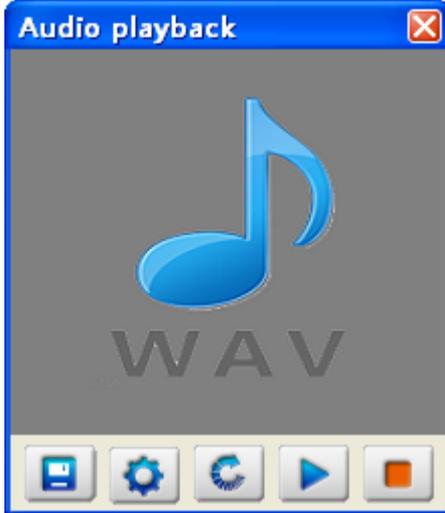


Below is the effect picture.



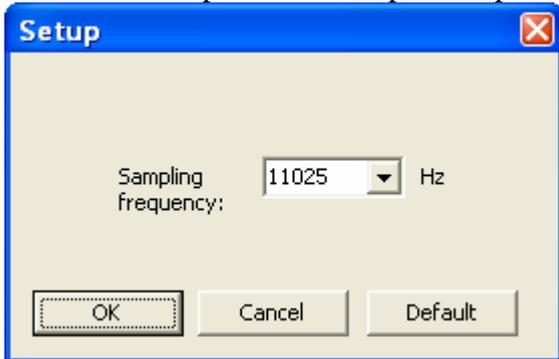
Audio Playback Function

This function could encode the decoded data to WAV audio file according to the WAV audio format. It is supported through image encode. Right click the I2S bus name and select “Image Encode” from the popup menu, then below interface will appear.



Interface Description:

1.  Save: Click it to save the file. Users could set its path, name and style.
2.  Setup: Click it to open setup dialog box.

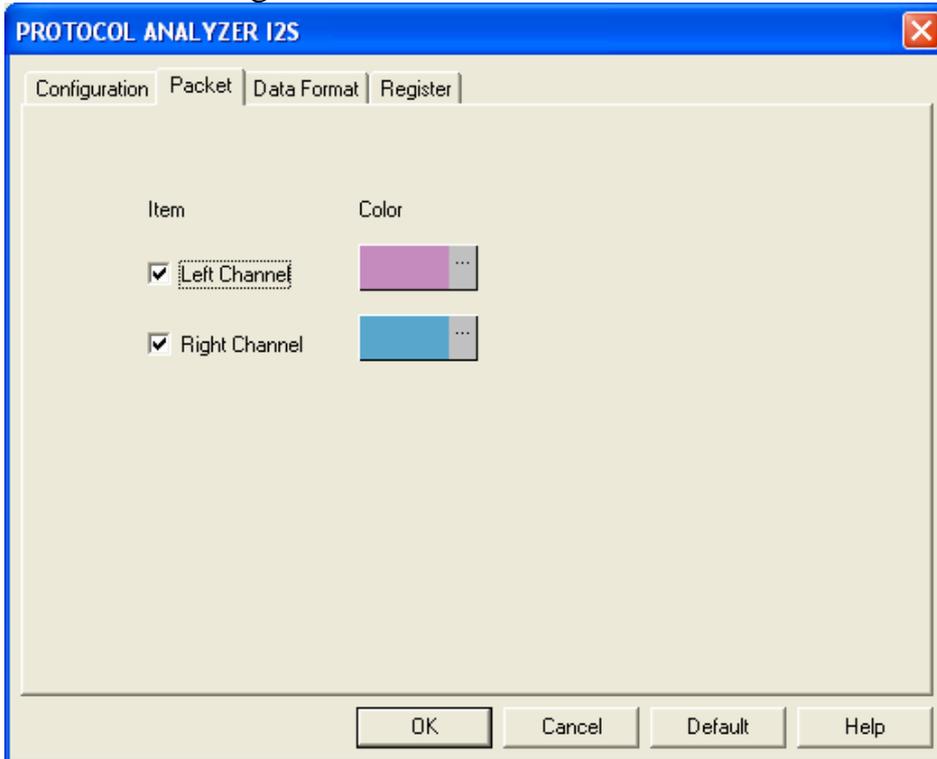


Users could set the audio’s sampling frequency in this dialog box. In the combo box there are three options: 11025, 22050 and 44100; users also could input a value between 1 and 44100 by themselves. It is 11025Hz by default.

3.  Loop: Click it to play the audio repeatedly; it is not selected by default.
4.  Play/Pause: Click Play button to play the audio, and the button would change to Pause button. If the Loop is not enabled, the audio would be played only once. Click Pause button to pause the playing, and the button would change to Play button.
5.  Stop: Click it to stop the playing.

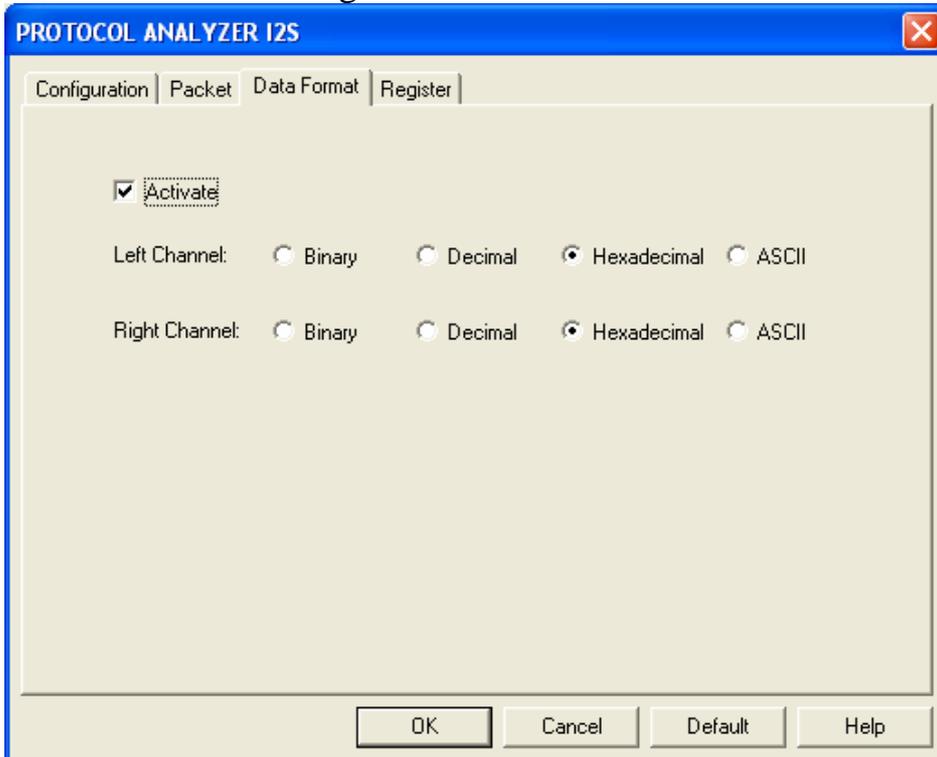
➤ Note: this function only supports audio code below 16 bits. If the selected data length exceeds 16 bits, then a prompt of “Don’t support code above 16 bits” would appear after “Image Encode” is clicked.

I2S Packet dialog box



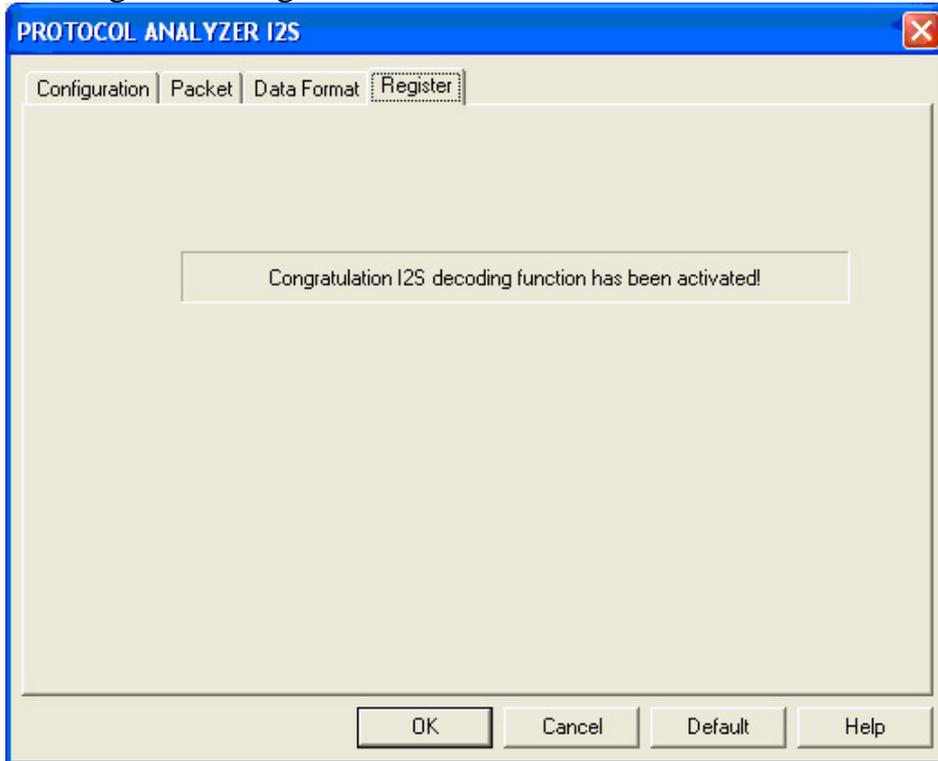
In the Packet part, users can set the items and colors as users' requirements.

I2S Data Format dialog box



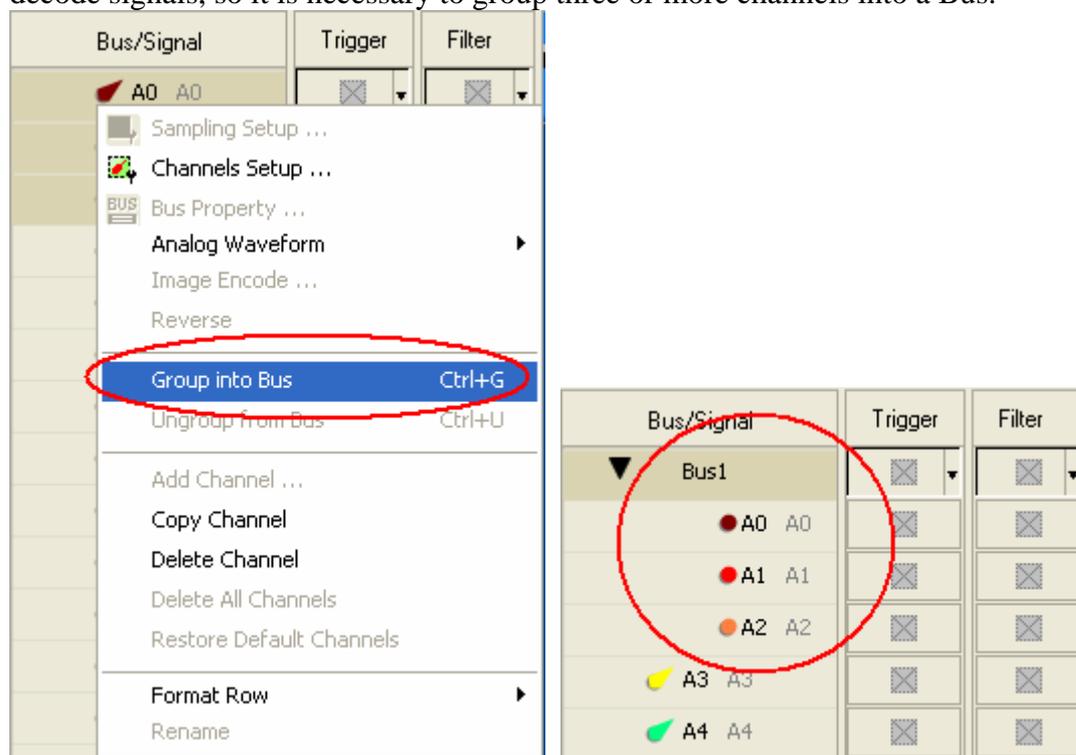
Users can set the data format of the Left Channel and Right Channel as their requirements. When selecting the option, Activate, the data format is decided by the settings in the Protocol Analyzer; when not selecting the option, Activate, the data format is decided by the settings in the main program.

I2S Register dialog box

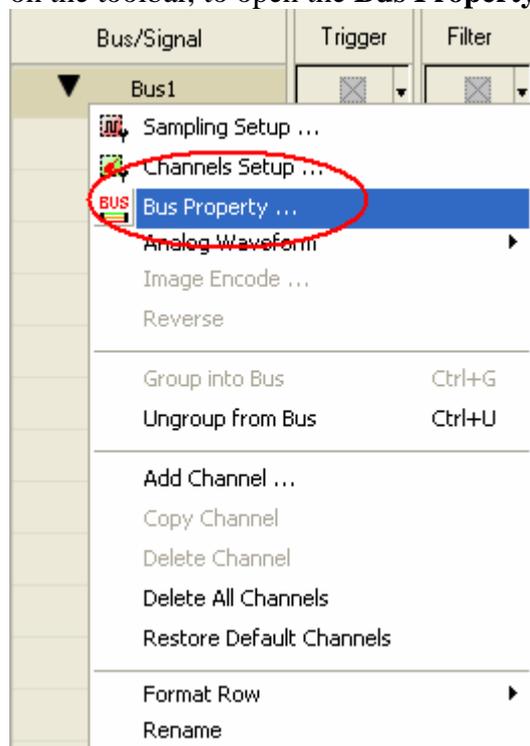


3. Operating Instructions

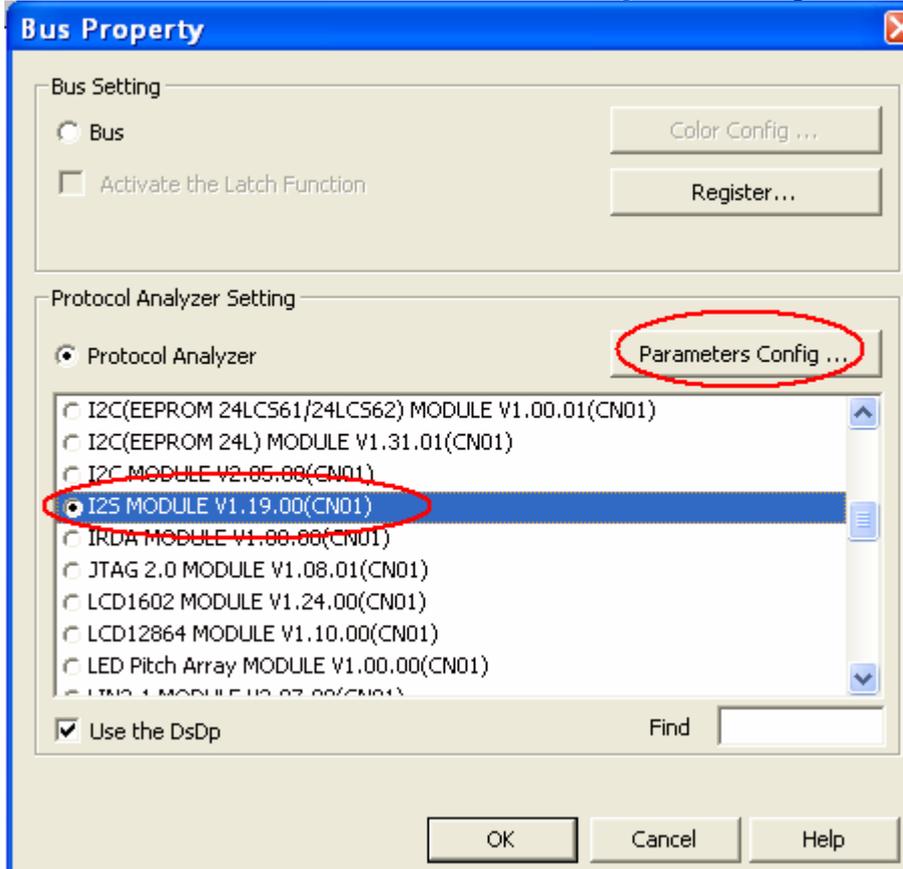
STEP 1. Group A0-A2 into **Bus1** by pressing the **Right Key** on the mouse. I2S needs three channels to decode signals, so it is necessary to group three or more channels into a Bus.



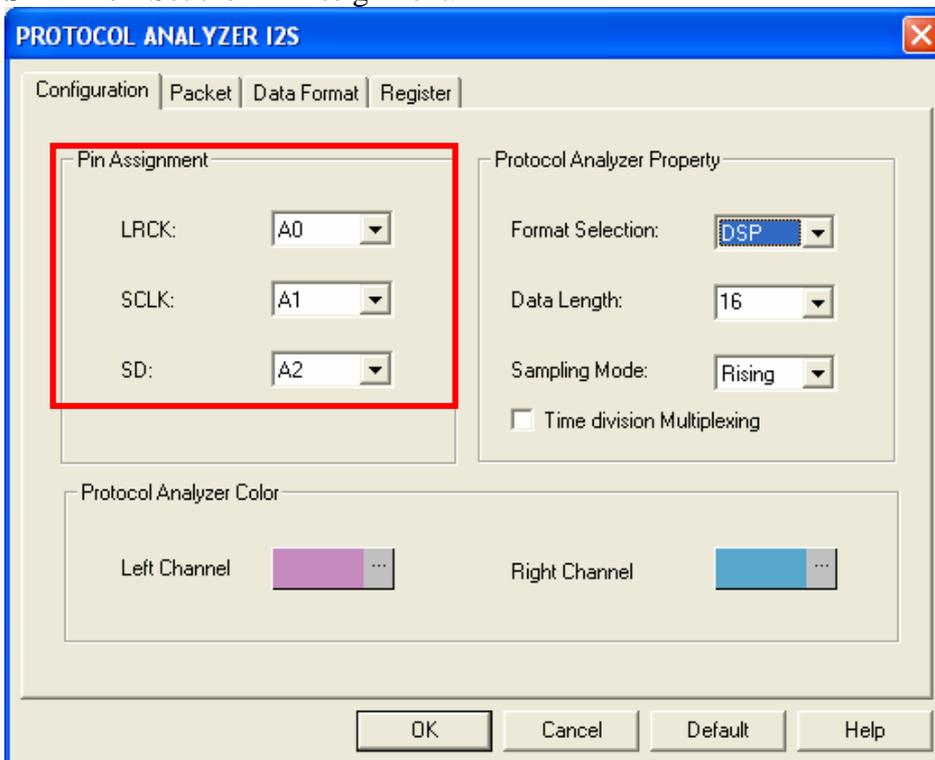
STEP 2. Select **Bus1**, press right key and select **Bus Property** from the popup menu, or click the **Bus** icon on the toolbar, to open the **Bus Property** dialog box.



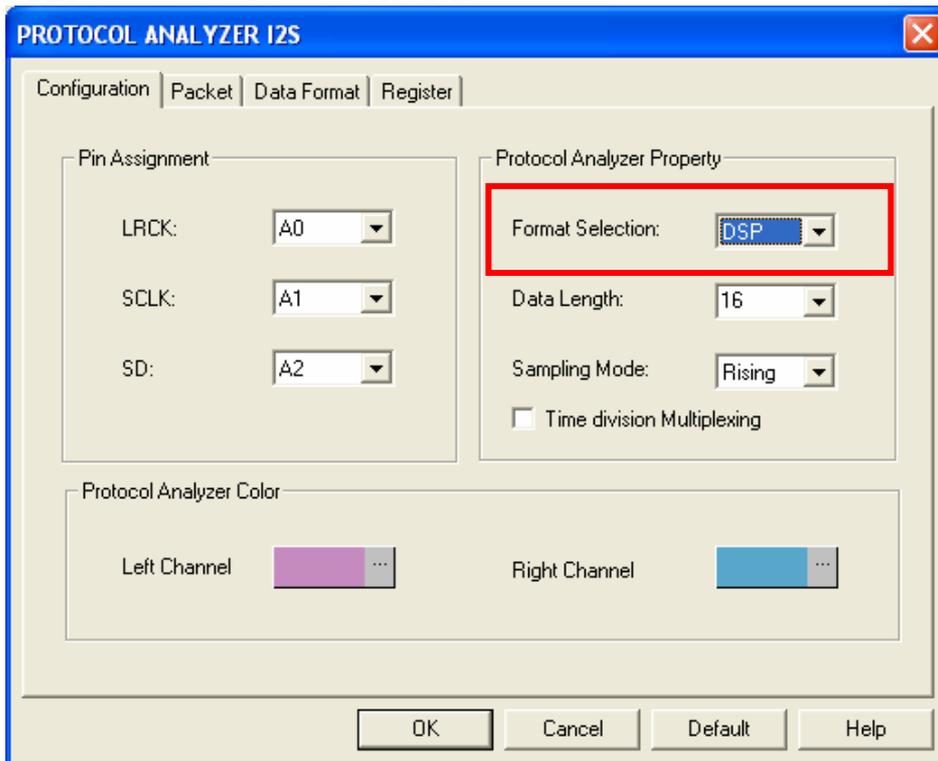
STEP 3. Protocol Analyzer Setting. Click the Protocol Analyzer and select **I2S MODULE V1.19.00(CN01)**, then click **Parameters Configuration** to open the **Configuration** dialog box.



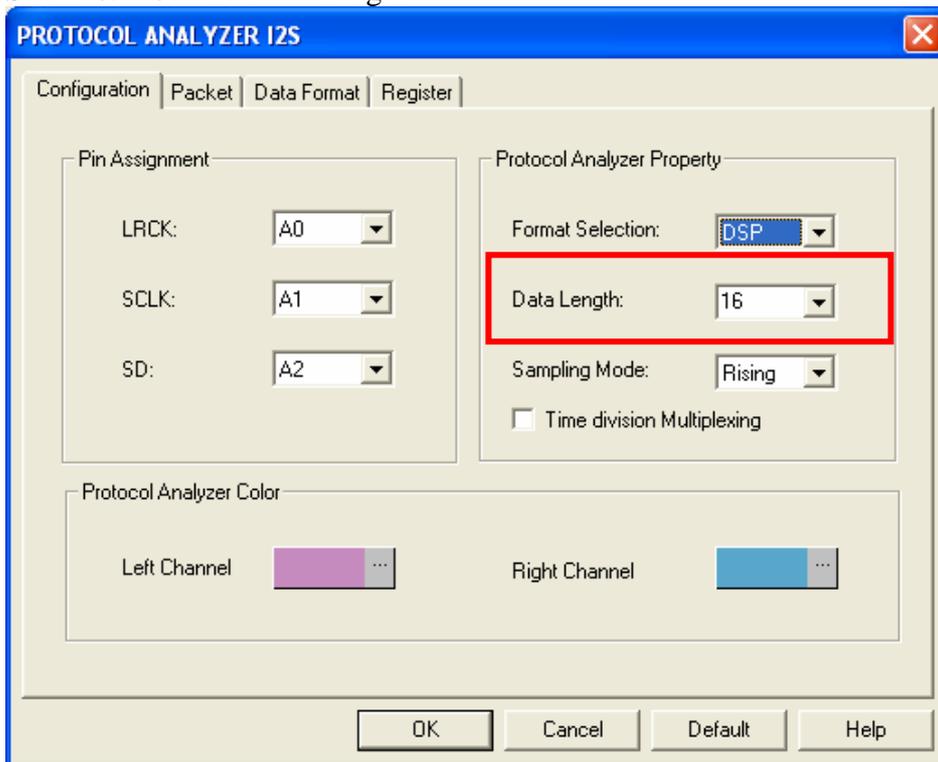
STEP 4. Set the Pin Assignment.



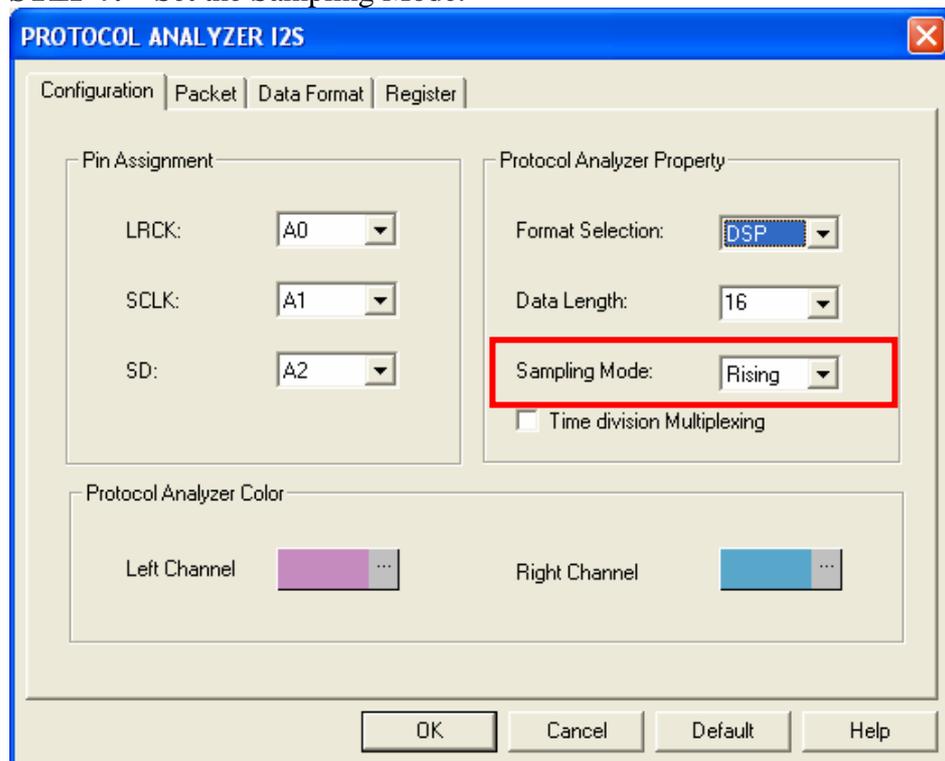
STEP 5. Set the Format Selection.



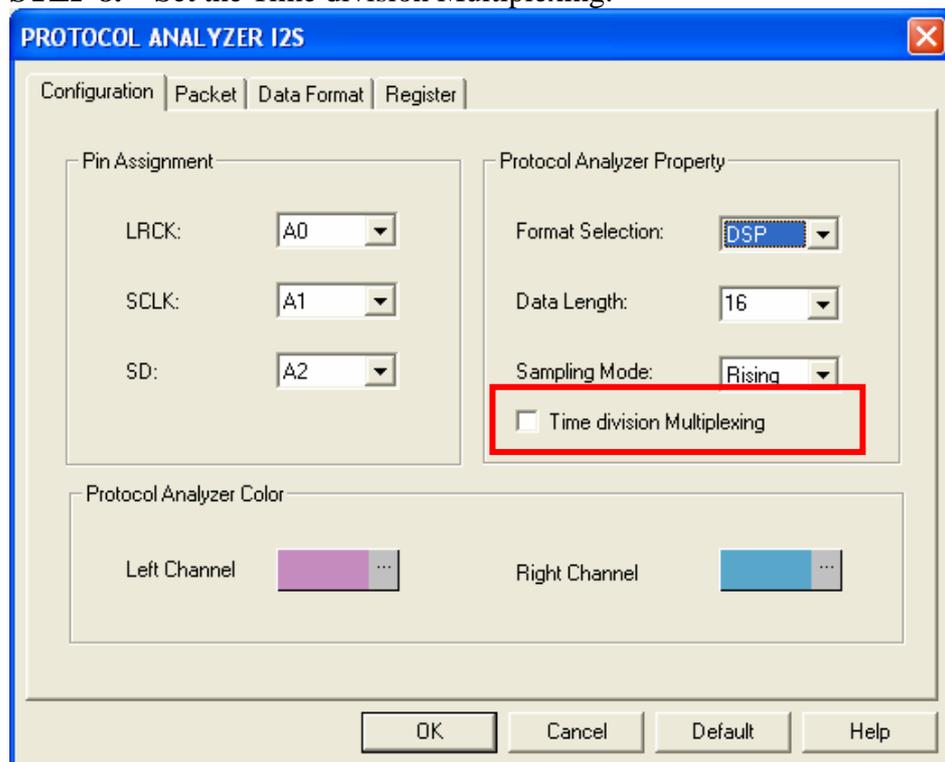
STEP 6. Set the Data Length.



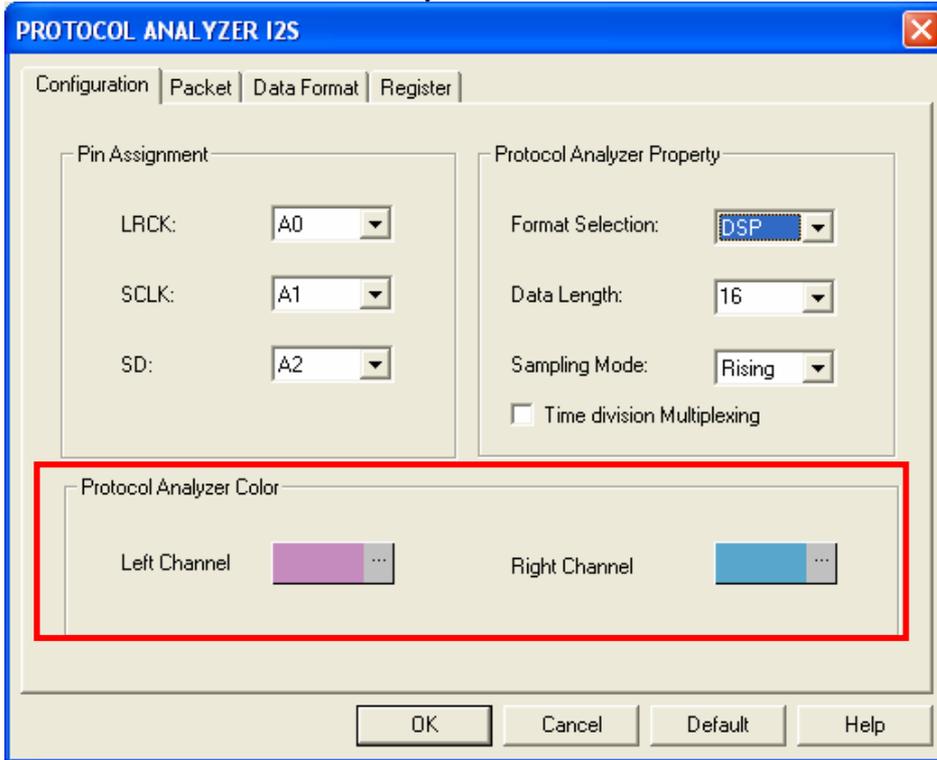
STEP 7. Set the Sampling Mode.



STEP 8. Set the Time division Multiplexing.

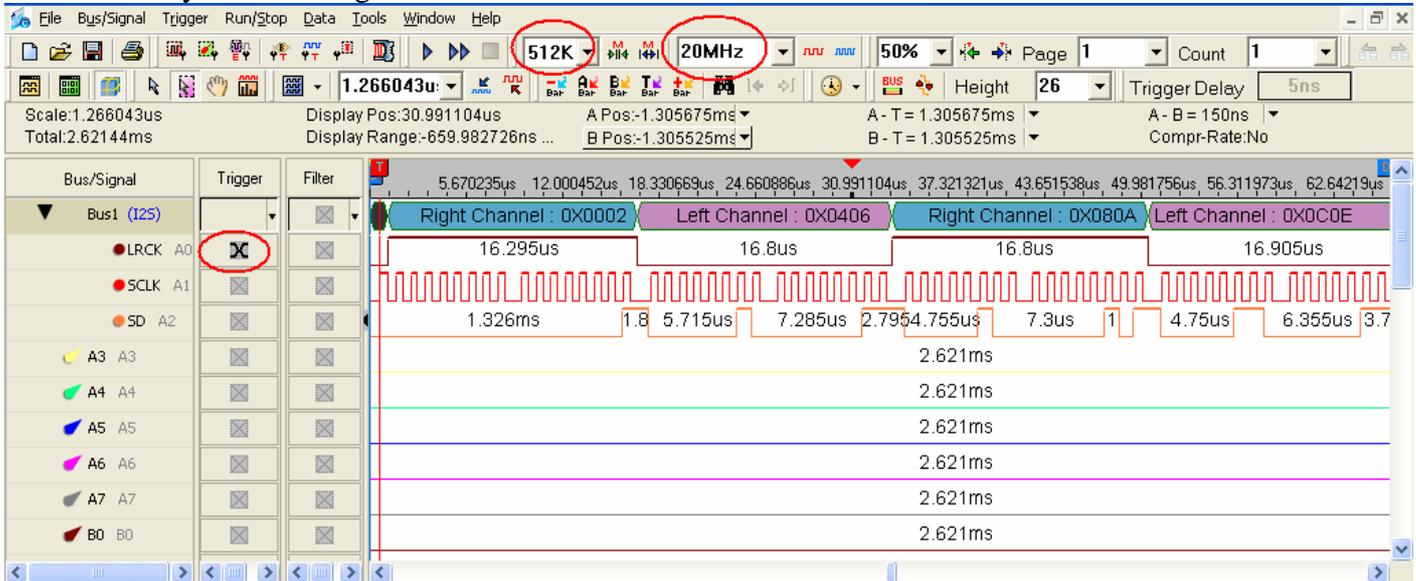


STEP 9. Set the Protocol Analyzer Color.



STEP 10. 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 512K; the sampling frequency is 20MHz (the sampling frequency should be more than four times higher than the signal to be tested).

Protocol Analyzer Decoding



Packet List

