



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

SPECIFICATION

MODEL: B11009- KEELOQ Code Hopping

PART NO: _____

VERSION: V1.00

Approver		Check	Design
GM	PM		

Customer Confirm

*Please fax the file to ZeroPlus Technology after signing.

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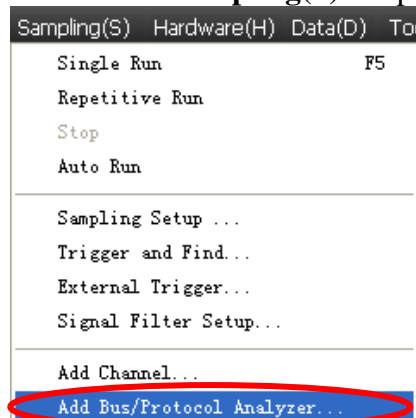
1 Software Register

Please register the software as the following steps:

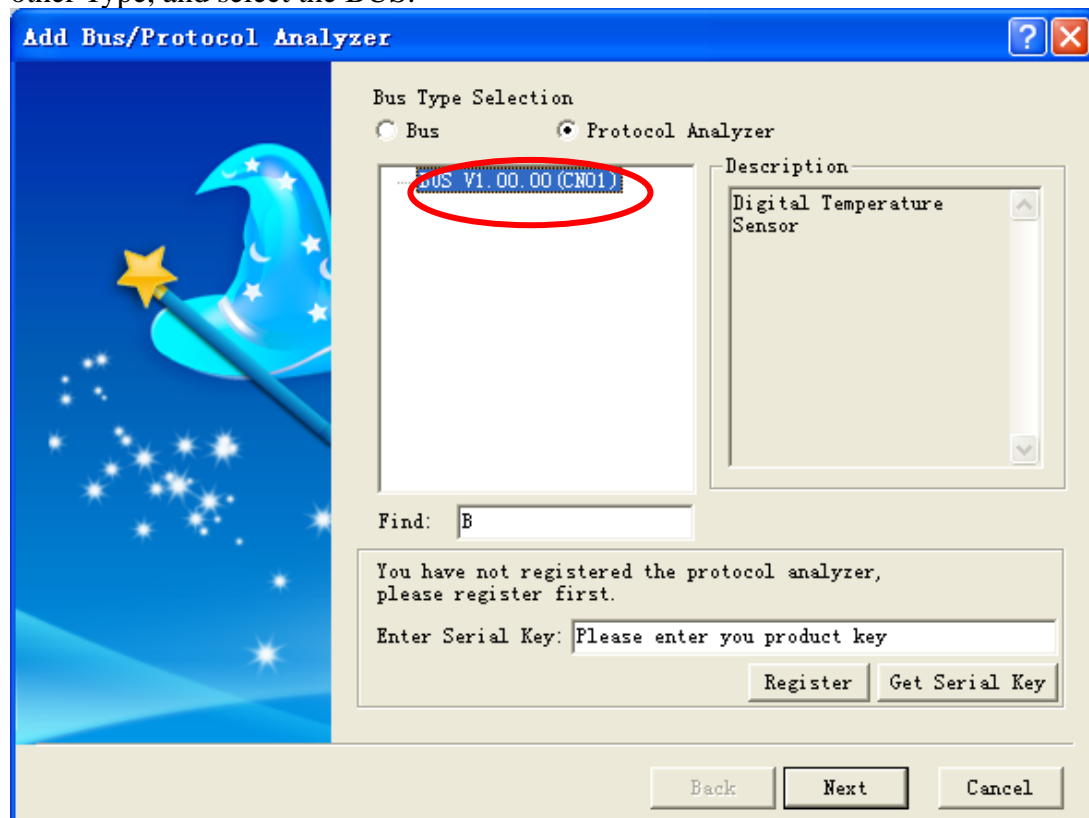
※ Remark1: The registration steps for all protocol analyzers are the same; you can complete the registration by following procedures. Following is an example on how to register the Protocol Analyzer BUS.

※ 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.

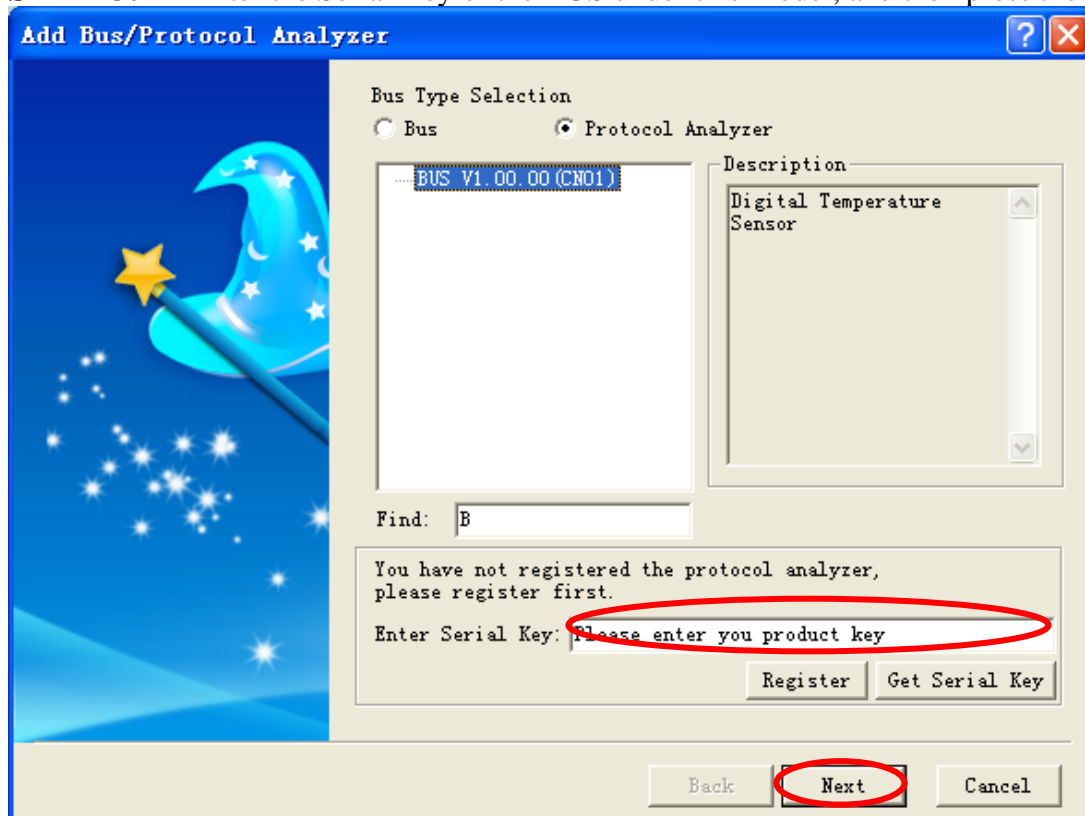
STEP 1. Open the Logic Analyzer and select the **Add Bus/Protocol Analyzer** item on the pull-down menu of the **Sampling(S)** to open the **Add Bus/Protocol Analyzer** dialog box.



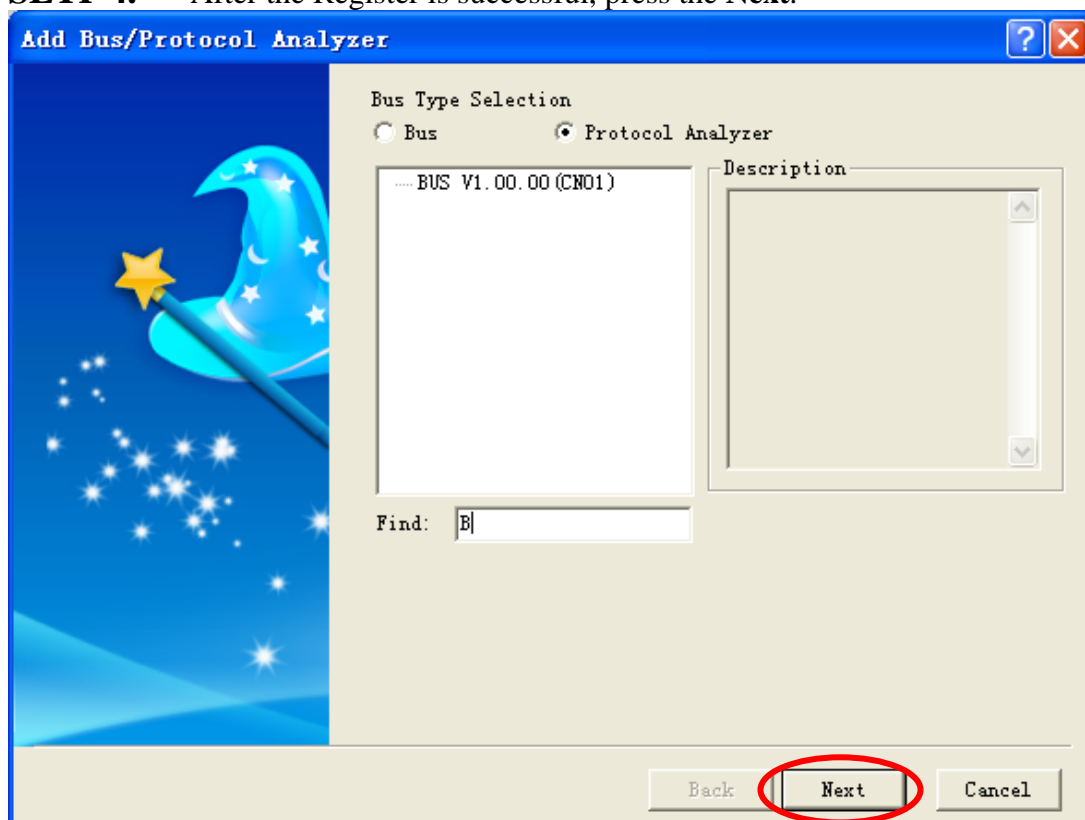
STEP 2. Select Protocol Analyzer item in the Add Bus/Protocol Analyzer dialog box, expand the other Type, and select the BUS.



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

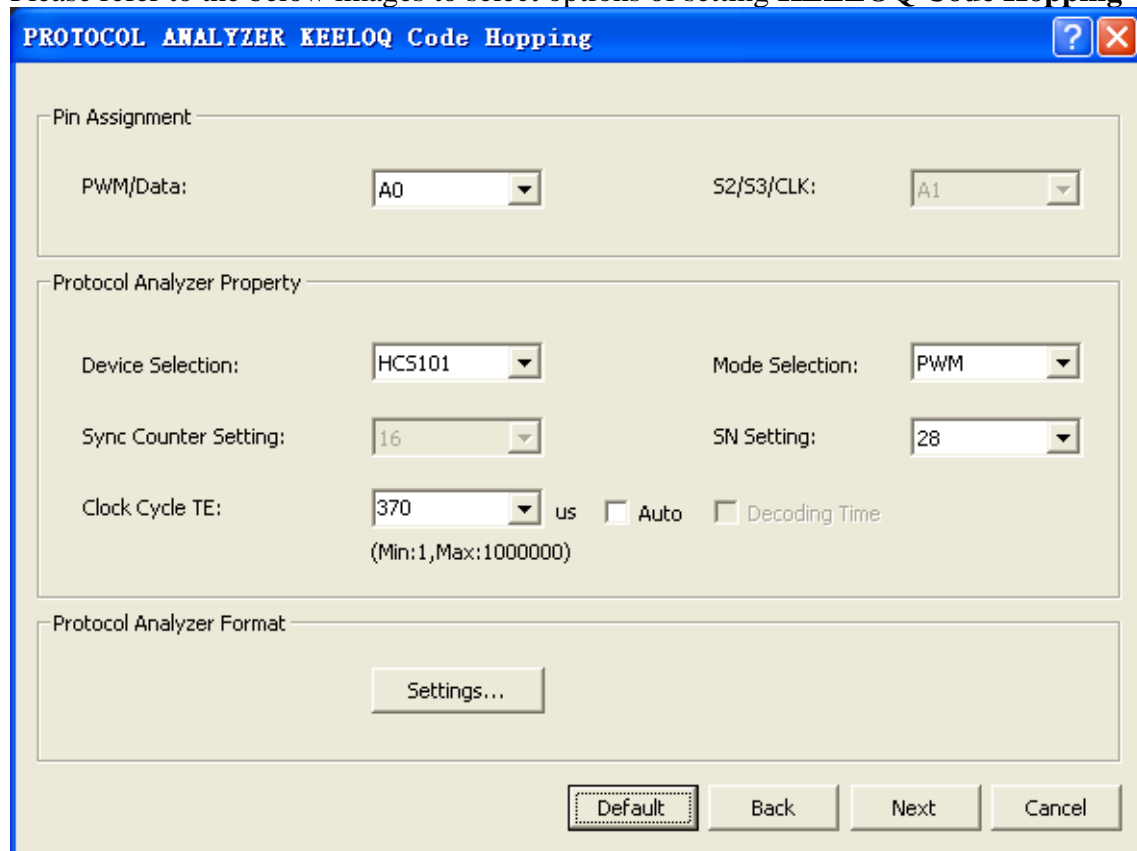


SETP 4. After the Register is successful, press the **Next**.



2 User Interface

Please refer to the below images to select options of setting **KEELOQ Code Hopping**



Pin Assignment: When selecting the PWM, VPWM, MANCH, PPM or Seed mode, it only needs one channel to decode signals; but if selecting the Sync or Writer mode, it needs two channels to decode and the S2/S3/CLK is activated; so the decoded Channel is related with the Mode Selection.

Protocol Analyzer Property:

Device Selection:

There are 12 kinds of Device Selection that are HCS10, HCS200, HCS201, HCS300, HCS301, HCS320, HCS360, HCS361, HCS362, HCS365, HCS370, HCS500.

Clock Cycle TE: When selecting the PWM, VPWM, MANCH, PPM or Seed mode(Single Channel), user needs to set the Clock Cycle TE. The TE Range is 1~1000000us, user can input and select the 100, 200, 370 or 400 from pull-down menu; the default is 370.

Decoding Time: It only can be activated in the HCS362 device. After selecting, the CRC can't be decoded, but the Time can be decoded.

Mode Selection and Other Settings Explanation: Different device can have the different selected mode (10 items in all).

HCS101: It only supports the PWM, the SN Settings is activated, and the Sync Counter Setting is disable.

HCS200: It supports the PWM/Sync/Writer, the SN Setting and the Sync Counter Setting are disable. It doesn't support the Seed.

HCS201: It supports the PWM/Sync/Writer, the SN Setting and the Sync Counter Setting are disable.

When the Seed is decoded in Button Status=1111, the PWM/Sync mode may be appear.

HCS300/301: It supports the PWM/Sync/Writer, the SN Setting and the Sync Counter Setting are disable.

When the Seed is decoded in Button Status=1111, the PWM/Sync mode may be appear.

HCS320: It supports the PWM/Sync/Writer, the SN Setting and the Sync Counter Setting are disable. It doesn't support the Seed.

HCS360: It supports the PWM/MANCH/Writer/PWM Seed/MANCH Seed, the SN Setting and the Sync Counter Setting are disable. The Seed in HCS360 Device can be set as mode selection, it doesn't decided by the Button Status; the PWM/MANCH mode may be appear.

HCS361: It supports the PWM(TXWAK=0)/PWM(TXWAK=1)/VPWM/Writer/PWM(TXWAK=0) Seed/PWM(TXWAK=1) Seed/VPWM Seed, SN Setting is activated and Sync Counter Setting is disable. Seed in HCS361 Device can be set as mode selection, it doesn't decided by the Button Status; the PWM/VPWM mode may be appear.

HCS362: It supports the PWM/MANCH/Sync/Writer, SN Setting is activated, Sync Counter Setting is disable. When the Seed is decoded in Button Status=1111, the PWM/MANCH mode may be appear.

HCS365/370: It supports the PWM/MANCH/VPWM/PPM, the SN Setting and Sync Counter Setting are disable. When the Seed is decoded in Button Status=1111, the PWM/MANCH/VPWM/PPM mode may be appear.

HCS500: It only supports the PWM, the SN Setting and Sync Counter Setting are disable. It doesn't support the Seed decoding.

Sync Counter Setting: User can set to 16 or 20, the default is 16.

SN Setting: User can set to 28 or 32, the default is 28.

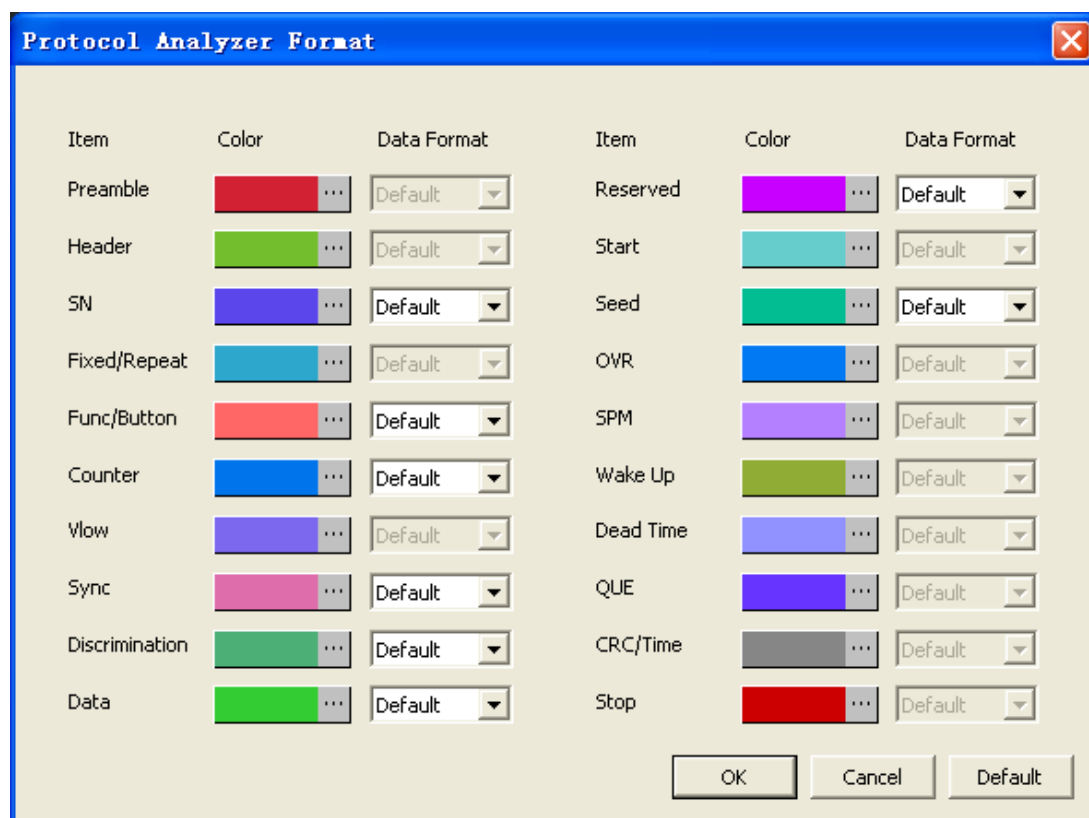
Auto: The Clock Cycle TE is the min unit of time in decoding, when selecting the Auto, the Clock Cycle TE can be calculated automatically.

Calculation Methods:

1. For searching the PWM/Data line, the most before and the last segments of the Ds and Dp are ignored.
2. Then find the 100 segments level, if not, find the existed, and then find out the min Tmin.(But it is not less than 1us).
3. Then find out the 1~1.5Tmin segment to accumulate as N, the Time is T, and Automatic Value =T/N. If the N is 0, Automatic Value =1.

Protocol Analyzer Format:

The Color of each Item can be varied as the users' requirements. The Items (SN, Func/Button, Counter, Sync, Discrimination, Data, Reserved, Seed) can be set as Binary,Decimal, Hexadecimal, ASCII or Default. And the Data Format of these Items in the Waveform DisplayArea 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 is the Default.



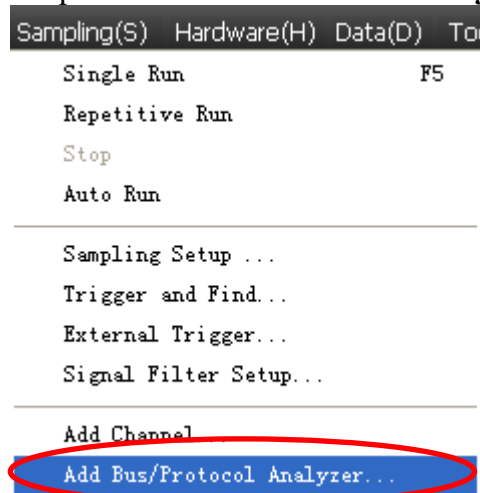
The dialog box titled "Protocol Analyzer Format" contains two columns of settings. Each row includes an "Item", a "Color" selection (represented by a colored square and a three-dot menu), and a "Data Format" dropdown menu. The items and their default colors are as follows:

Item	Color	Data Format
Preamble	Red	Default
Header	Green	Default
SN	Blue	Default
Fixed/Repeat	Cyan	Default
Func/Button	Red	Default
Counter	Blue	Default
Vlow	Purple	Default
Sync	Pink	Default
Discrimination	Green	Default
Data	Green	Default
Reserved	Magenta	Default
Start	Cyan	Default
Seed	Teal	Default
OWR	Blue	Default
SPM	Purple	Default
Wake Up	Olive	Default
Dead Time	Purple	Default
QUE	Purple	Default
CRC/Time	Grey	Default
Stop	Red	Default

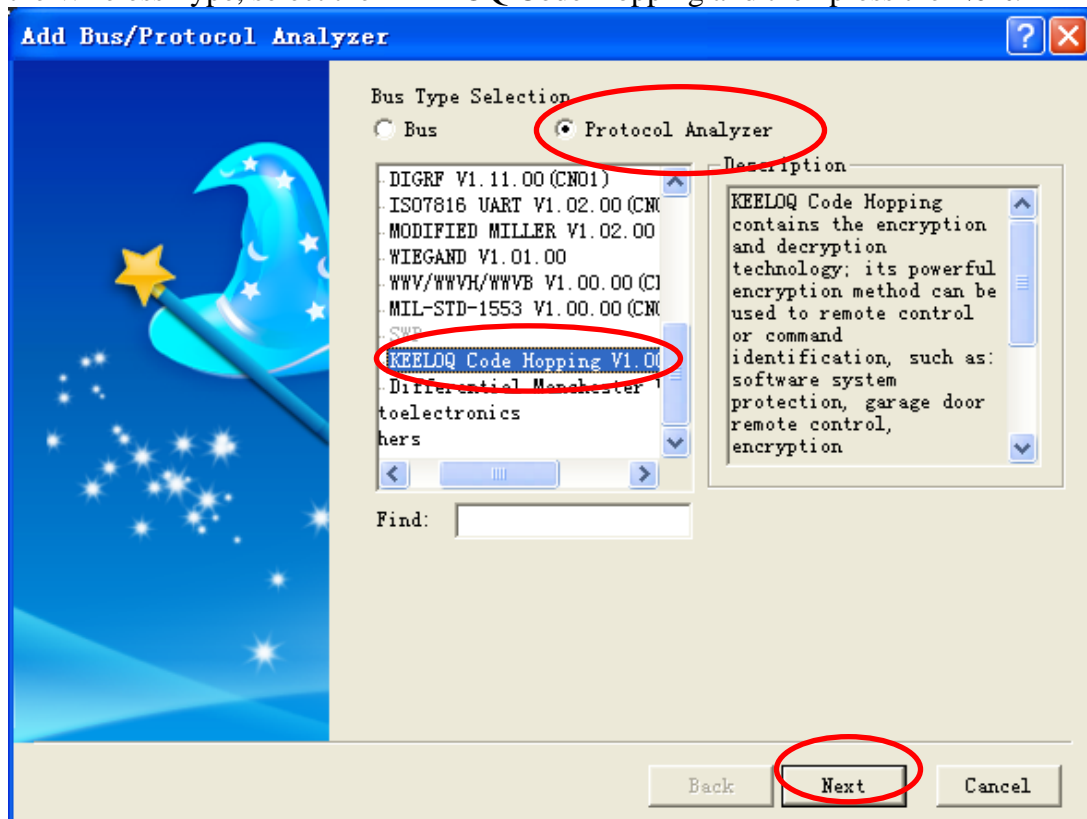
At the bottom right of the dialog are three buttons: "OK", "Cancel", and "Default".

3 Operating Instructions

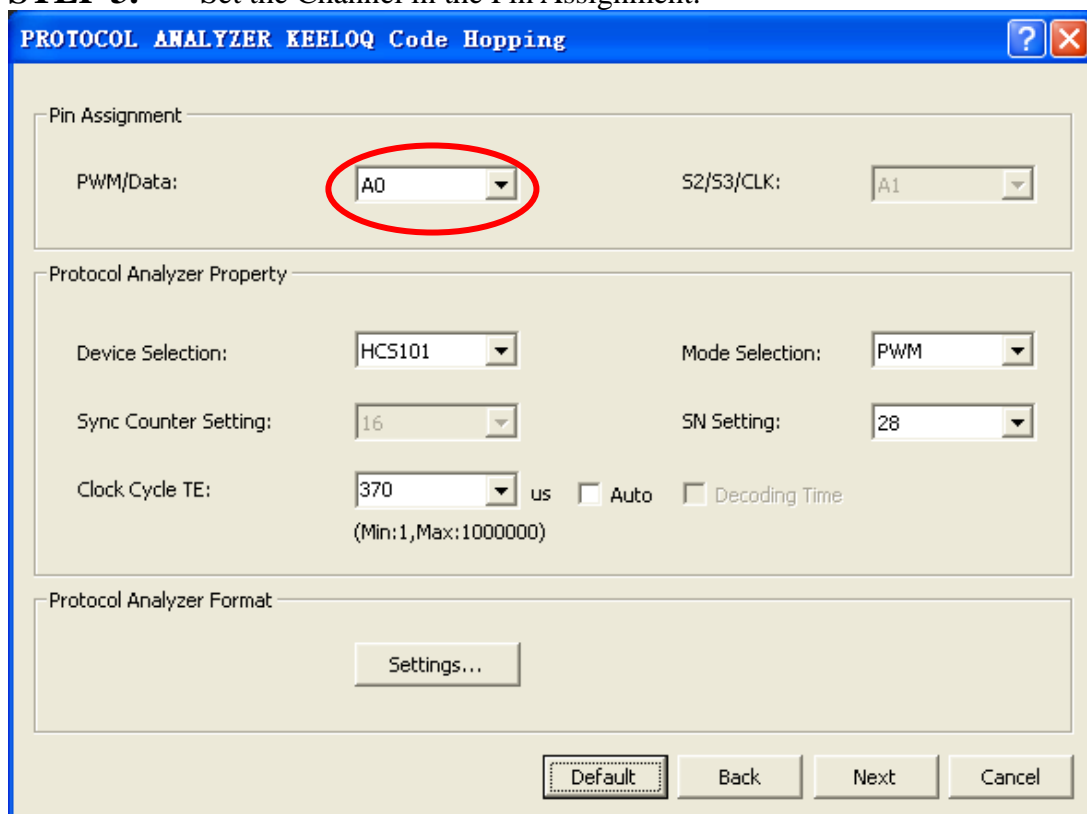
STEP 1. Select the **Add Bus/Protocol Analyzer** item on the pull-down menu of the **Sampling(S)** to open the **Add Bus/Protocol Analyzer** dialog box.



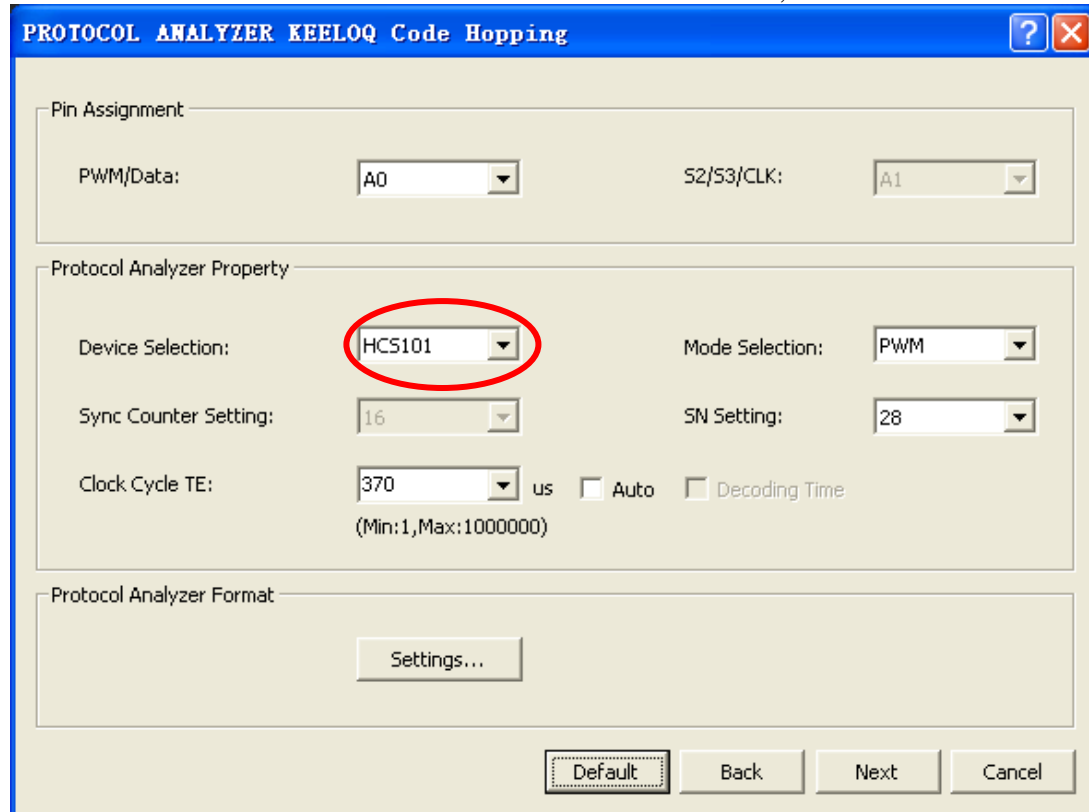
STEP 2. Select the Protocol Analyzer item in the Add Bus/Protocol Analyzer dialog box, expand the Wireless Type, select the KEELOQ Code Hopping and then press the **Next**.



STEP 3. Set the Channel in the Pin Assignment.

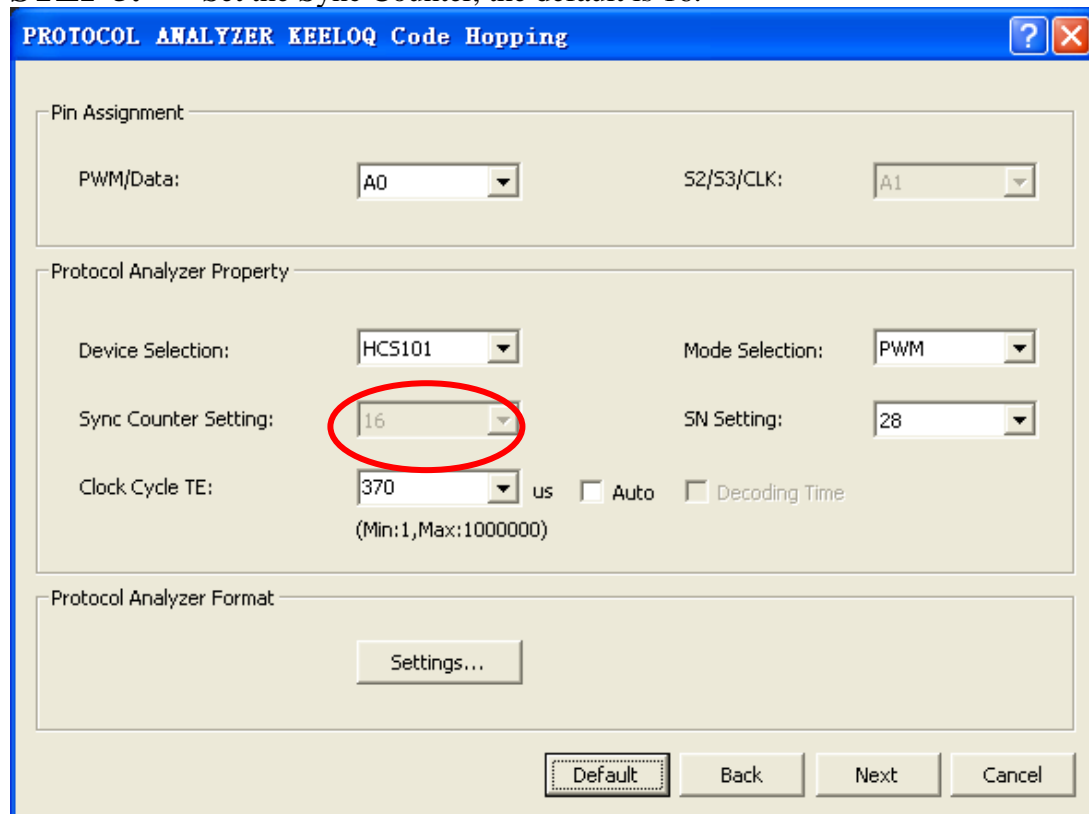


STEP 4. Set the Device Selection in HCS101~HCS500, the default is HCS101.



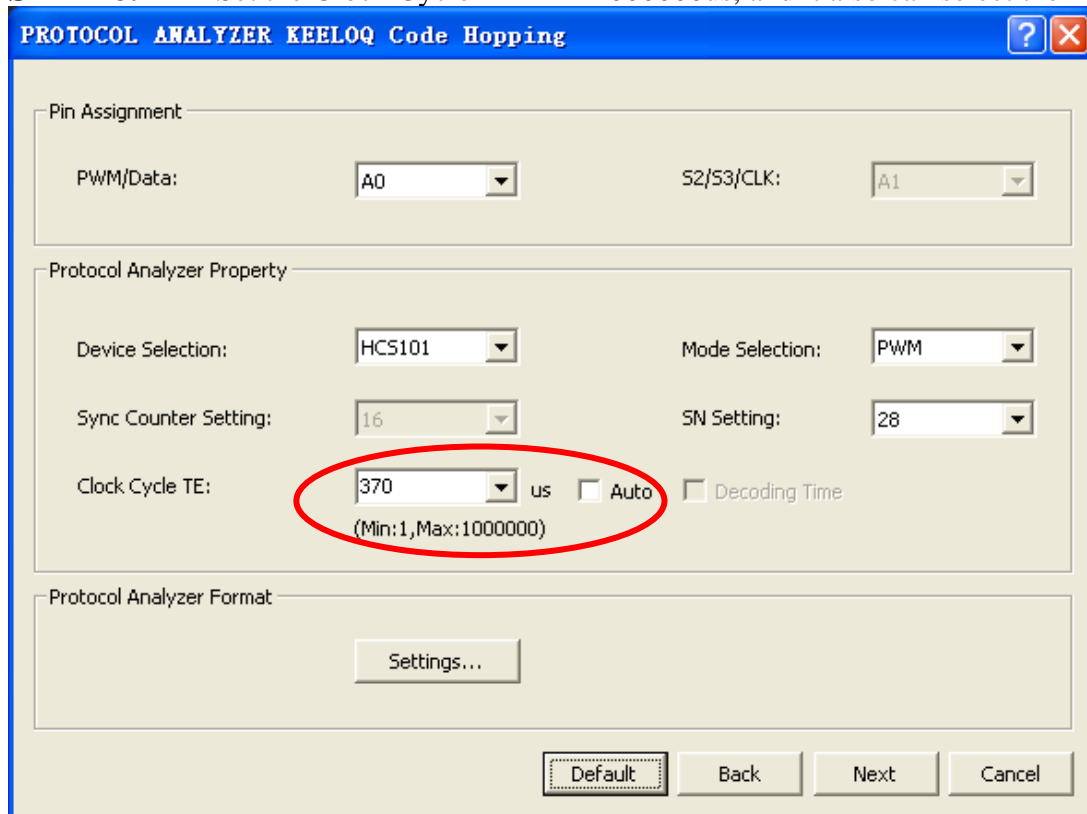
The screenshot shows the 'PROTOCOL ANALYZER KEELOQ Code Hopping' dialog box. It has a blue title bar with a question mark and a close button. The dialog is divided into three main sections: 'Pin Assignment', 'Protocol Analyzer Property', and 'Protocol Analyzer Format'. In the 'Pin Assignment' section, 'PWM/Data:' is set to 'A0' and 'S2/S3/CLK:' is set to 'A1'. In the 'Protocol Analyzer Property' section, 'Device Selection:' is set to 'HCS101' (highlighted with a red circle), 'Mode Selection:' is set to 'PWM', 'Sync Counter Setting:' is set to '16', 'SN Setting:' is set to '28', and 'Clock Cycle TE:' is set to '370' us. There are also checkboxes for 'Auto' and 'Decoding Time'. In the 'Protocol Analyzer Format' section, there is a 'Settings...' button. At the bottom, there are buttons for 'Default', 'Back', 'Next', and 'Cancel'.

STEP 5. Set the Sync Counter, the default is 16.



The screenshot shows the same 'PROTOCOL ANALYZER KEELOQ Code Hopping' dialog box as in Step 4. In this step, the 'Sync Counter Setting:' dropdown is highlighted with a red circle and set to '16'. All other settings remain the same as in Step 4.

STEP 6. Set the Clock Cycle TE in 1~1000000us, and it also can select the Auto.



PROTOCOL ANALYZER KEELOQ Code Hopping

Pin Assignment

PWM/Data: A0 S2/S3/CLK: A1

Protocol Analyzer Property

Device Selection: HCS101 Mode Selection: PWM

Sync Counter Setting: 16 SN Setting: 28

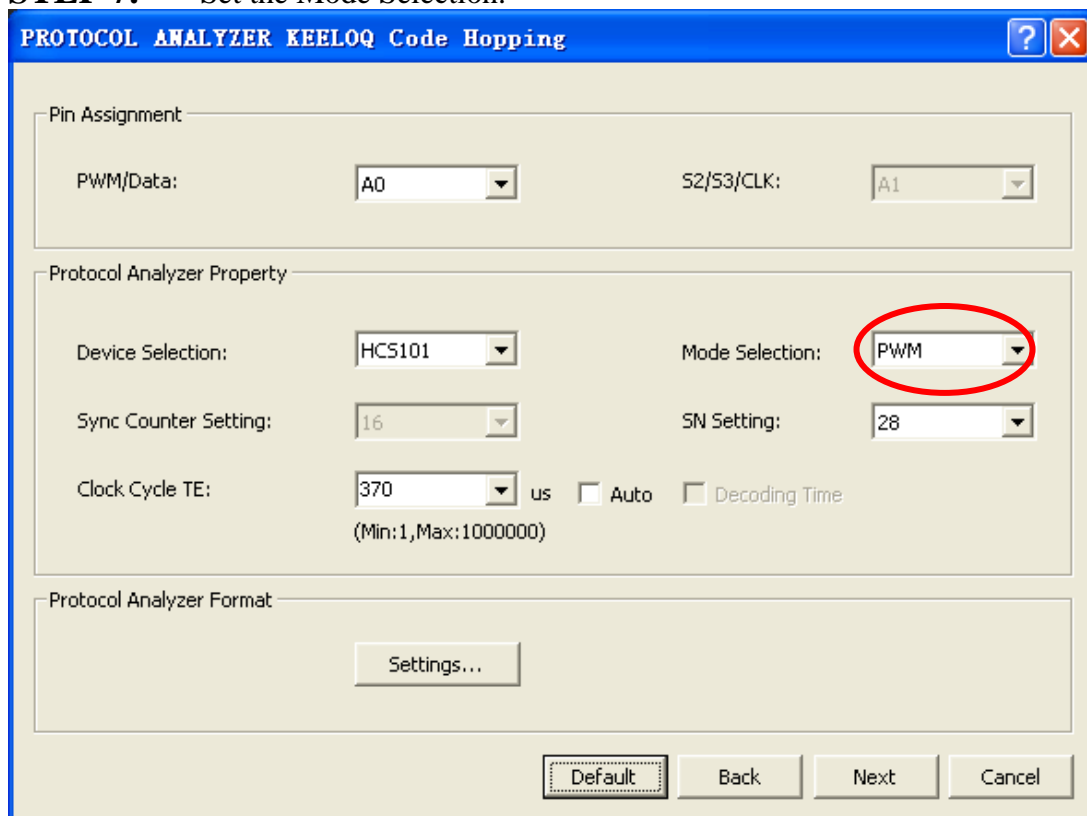
Clock Cycle TE: 370 us ☐ Auto ☐ Decoding Time
(Min:1,Max:1000000)

Protocol Analyzer Format

Settings...

Default Back Next Cancel

STEP 7. Set the Mode Selection.



PROTOCOL ANALYZER KEELOQ Code Hopping

Pin Assignment

PWM/Data: A0 S2/S3/CLK: A1

Protocol Analyzer Property

Device Selection: HCS101 Mode Selection: PWM

Sync Counter Setting: 16 SN Setting: 28

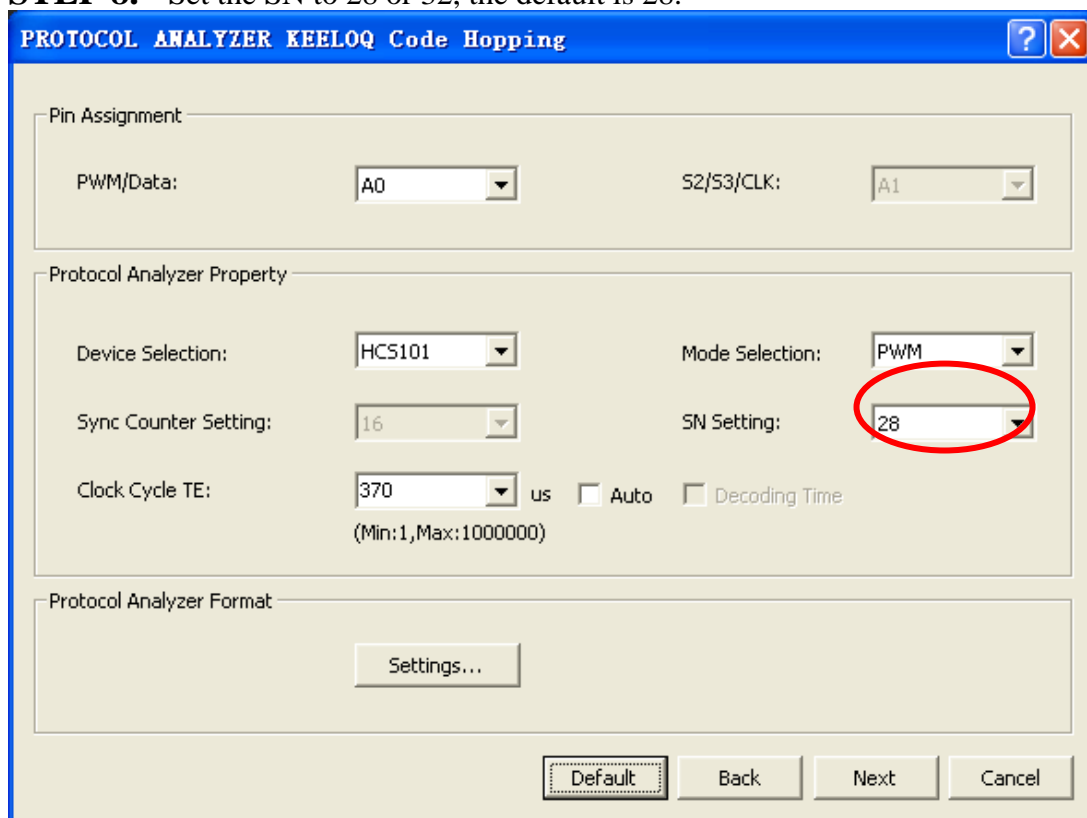
Clock Cycle TE: 370 us ☐ Auto ☐ Decoding Time
(Min:1,Max:1000000)

Protocol Analyzer Format

Settings...

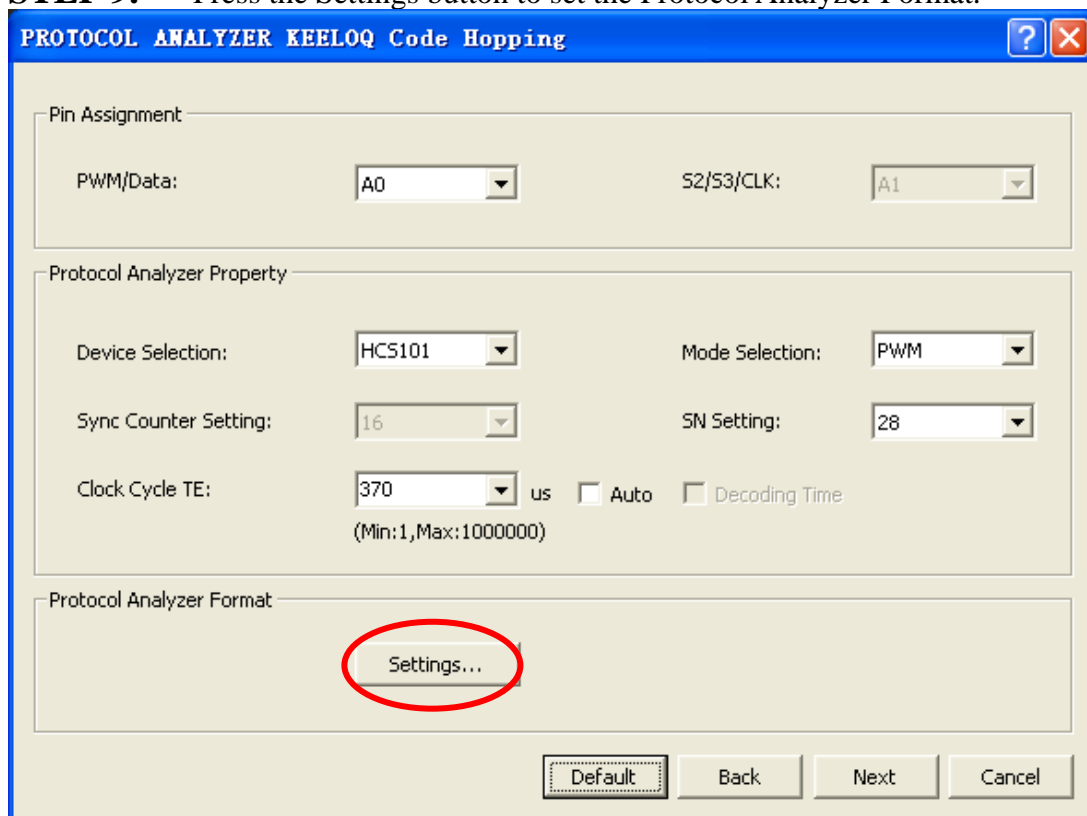
Default Back Next Cancel

STEP 8. Set the SN to 28 or 32, the default is 28.



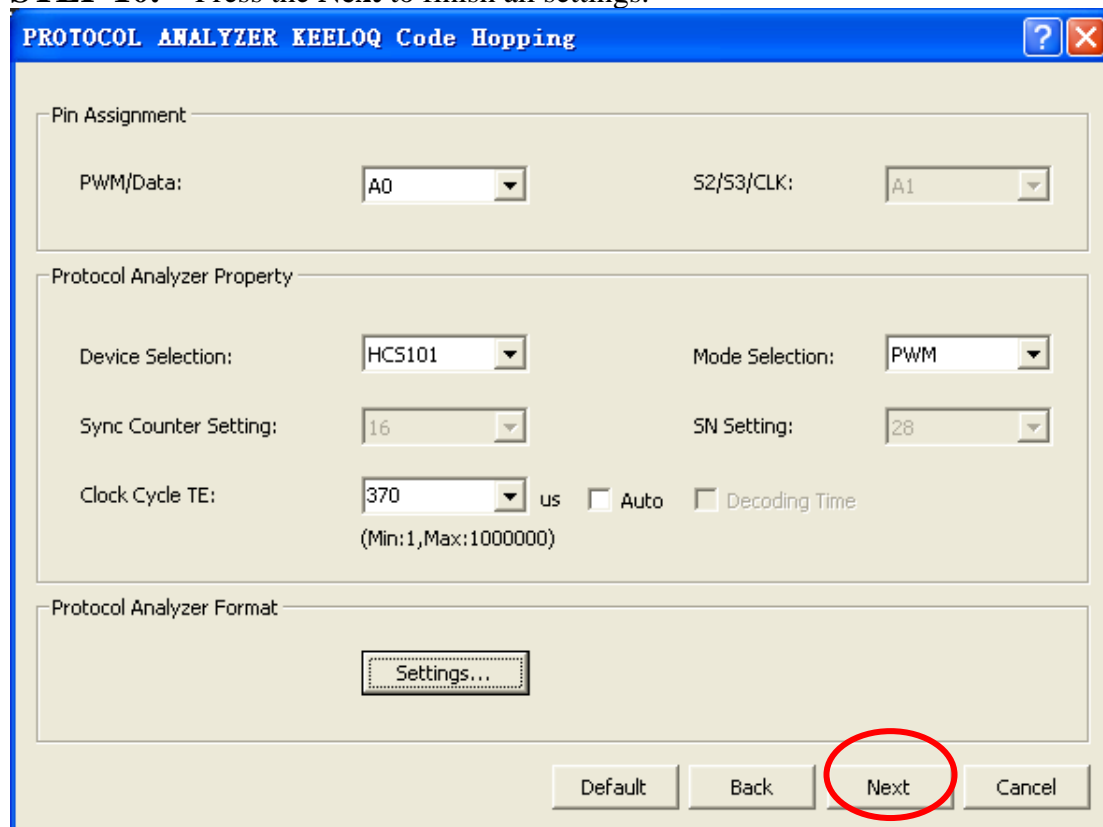
The screenshot shows the 'PROTOCOL ANALYZER KEELOQ Code Hopping' dialog box. It has a blue title bar with a question mark and a close button. The dialog is divided into three main sections: 'Pin Assignment', 'Protocol Analyzer Property', and 'Protocol Analyzer Format'. In the 'Pin Assignment' section, 'PWM/Data:' is set to 'A0' and 'S2/S3/CLK:' is set to 'A1'. The 'Protocol Analyzer Property' section contains several settings: 'Device Selection:' is 'HCS101', 'Mode Selection:' is 'PWM', 'Sync Counter Setting:' is '16', 'SN Setting:' is '28' (highlighted with a red circle), 'Clock Cycle TE:' is '370' us, and there are checkboxes for 'Auto' and 'Decoding Time'. The 'Protocol Analyzer Format' section has a 'Settings...' button. At the bottom, there are buttons for 'Default', 'Back', 'Next', and 'Cancel'.

STEP 9. Press the Settings button to set the Protocol Analyzer Format.



This screenshot is identical to the previous one, showing the 'PROTOCOL ANALYZER KEELOQ Code Hopping' dialog box. In this step, the 'Settings...' button in the 'Protocol Analyzer Format' section is highlighted with a red circle, indicating the next action to be taken.

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



PROTOCOL ANALYZER KEELOQ Code Hopping

Pin Assignment

PWM/Data: A0 S2/S3/CLK: A1

Protocol Analyzer Property

Device Selection: HCS101 Mode Selection: PWM

Sync Counter Setting: 16 SN Setting: 28

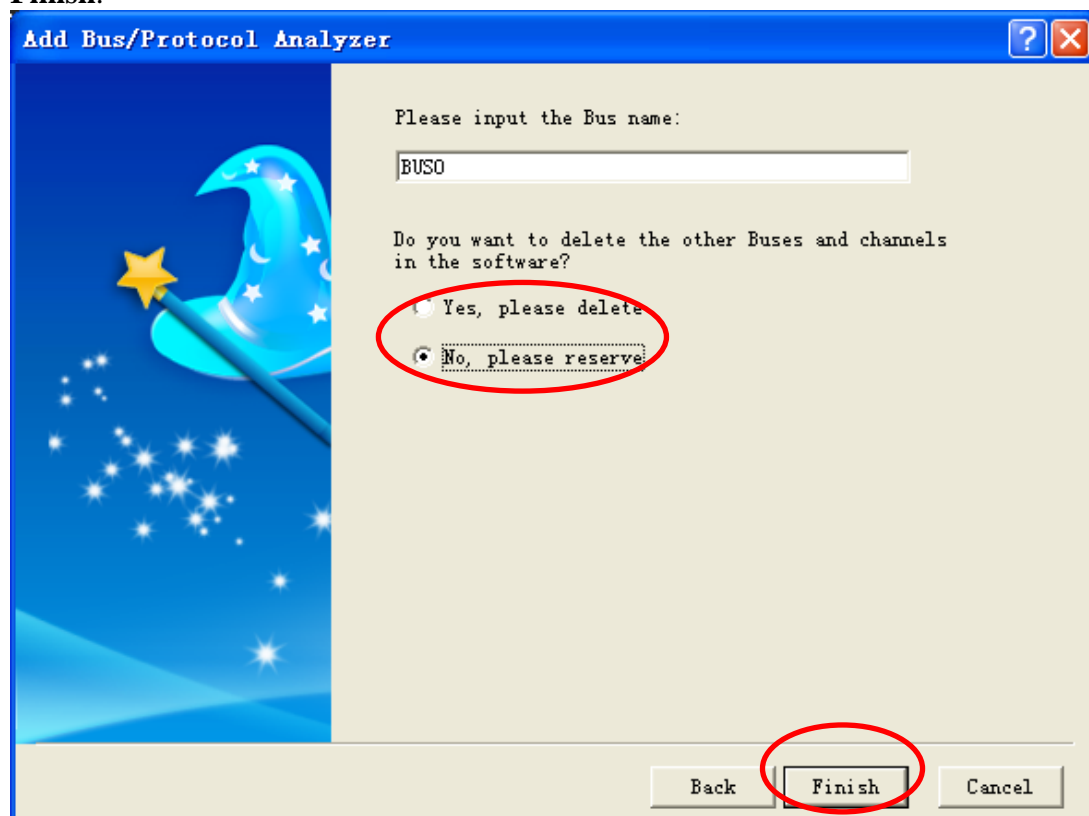
Clock Cycle TE: 370 us ☐ Auto ☐ Decoding Time
(Min:1,Max:1000000)

Protocol Analyzer Format

Settings...

Default Back **Next** 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:

BUS0

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

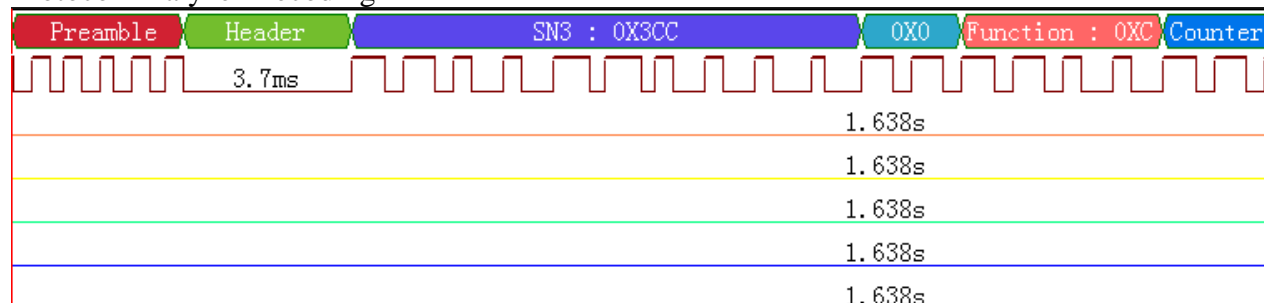
☐ Yes, please delete

☒ **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 Either Edge; the Memory depth is 16K; the Sampling frequency is 10KHz (the sampling frequency should be more than four times higher than the signal to be tested).

Protocol Analyzer Decoding



Packet List

Packet List												
Packet #	Name	TimeStamp	Preamble	Header	SN3	Fixed2	Function	Counter	SN1 28	Function	Vlow	
1	BUS1(KEELOQ Code Hopping)	3.7ms	Preamble	Header	3CC	0	C	0004	F383930	0	1	
Fixed1												
1												
2	BUS1(KEELOQ Code Hopping)	155.3ms	Preamble	Header	3CC	0	C	0004	F383930	0	0	
Fixed1												
0												