# AUTBUS Configuration Tool

# Operation Manual

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KYLAND

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# Contents

# 1 Introduction

AUTBUS configuration tool is used to configure AUTBUS network transmissions based on AUTBUS protocol converters and I/O connectors. AUTBUS is a new type of time-sensitive broadband industrial Internet of Technology featuring multi-nodes, high bandwidth and long-distance transmission. The AUTBUS network consists of a Management Node (MN) and multiple Terminal Nodes (TN), and MN and TN is connected via a differential pair. TN can directly communicate with MN and TN. MN is responsible for control over the entire network, including network configuration and initialization and physical layer channel scheduling and communication with the outer network.

AUTBUS adopts Orthogonal Frequency Division Multiplexing (OFDM) as the physical layer technology. During the transmission process, data streams are converted into OFDM symbols after being scrambled, coded and modulated with Quardrature Amplitude Modulation (QAM), and then composed into frames and transmitted based on different transmission modes. The receiving process is the opposite.

This manual introduces the configuration of the AUTBUS network using the configuration tool. The configuration tool is applicable for administrators that have a basic understanding of the AUTBUS network and can manually configure the AUTBUS network parameters based on actual needs. The protocol converters also support a rotary DIP switch to enable the AUTBUS network to function automatically based on the configuration of the rotary DIP switch.

# 2 How to Use

## 2.1 Connect Devices

The steps for connecting AUTBUS devices are as follows:

1 Connect AUTBUS devices with AUTBUS cables to form a bus-type or ring-type network;

2 Connect the PC on which the configuration is installed with an AUTBUS device that has an Ethernet interface (AUTBUS to Ethernet protocol converter).

3 Power on all devices.

The following figure shows an example of bus-type AUTBUS network.

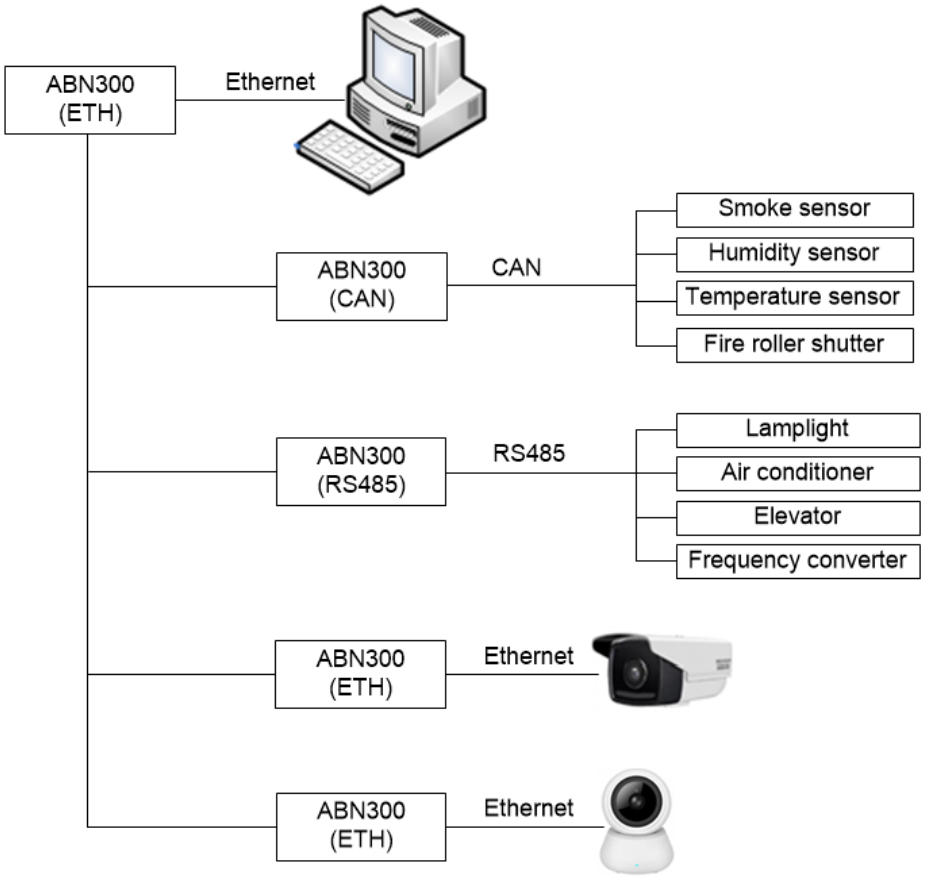


Figure 1 Bus-type AUTBUS Network

## 2.2 Access the Configuration Tool

### 2.2.1 Login

After cables are properly connected to form a network, you can access the configuration tool via the following steps:

1 Double-click the configuration tool program, such as “AUTBUS Tools v3.0.2.exe”. The login page is displayed, as shown below. Enter the default username and password “admin” or other username or password, and then click <Login>.

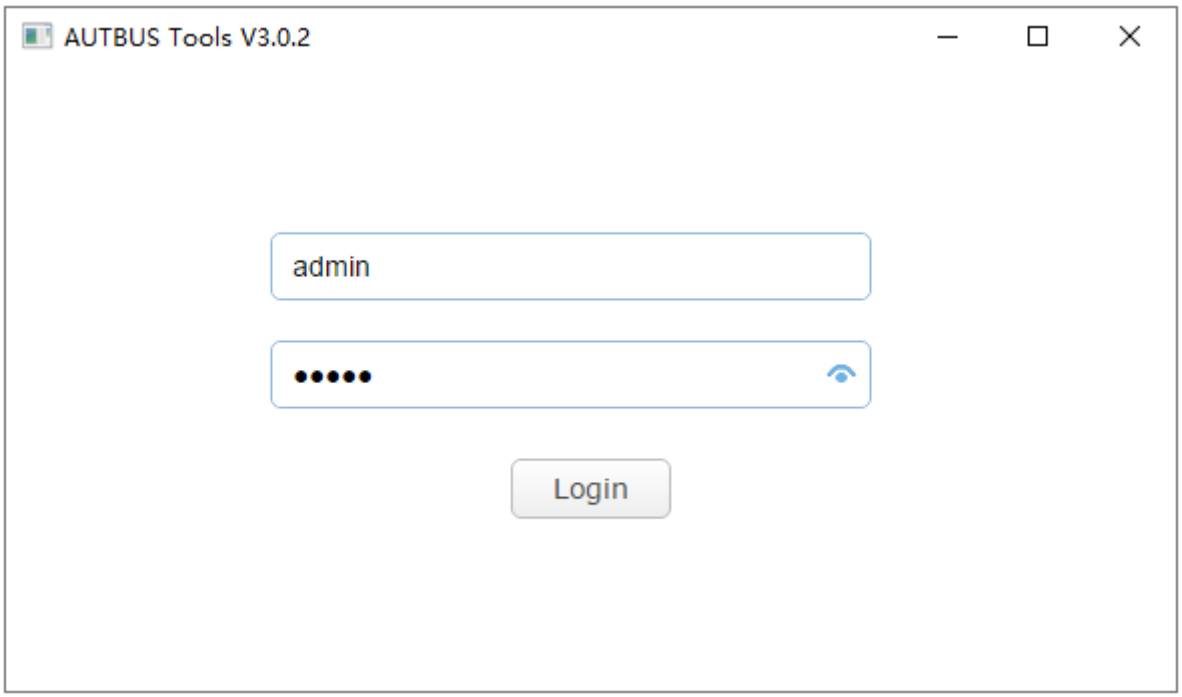


Figure 2 Login Page

2 The home page is displayed, as shown below.

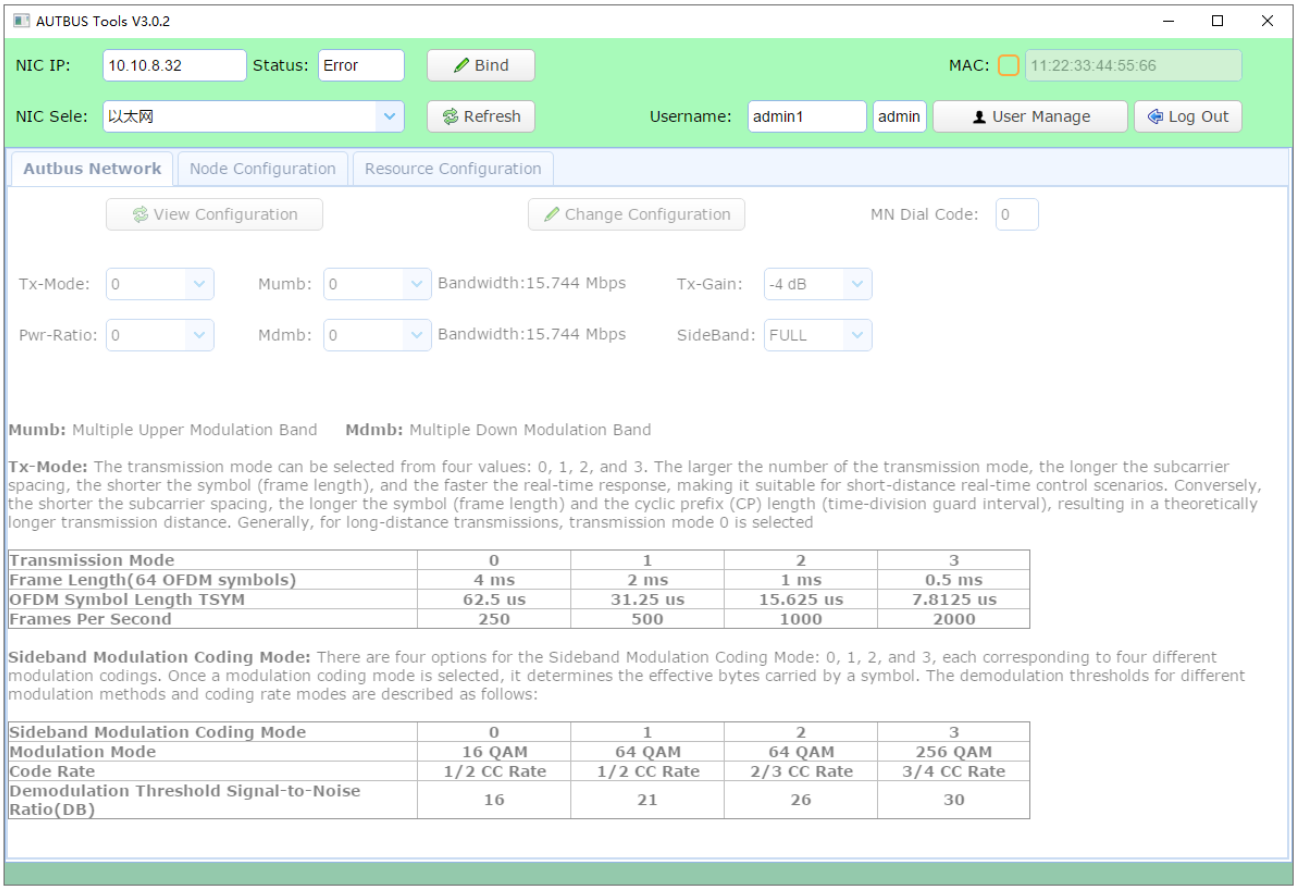


Figure 3 Home Page

3 Click the <Refresh> button.

4 Select the NIC from the “NIC Sele” dropdown list and confirm the NIC IP address to be bound.

5 Click the <Bind> button.

6 View the network status. The NIC is successfully bound if the status is “Normal”, as shown in Figure 4. If not, a prompt displaying “Failed to read configuration” is displayed. When a binding failure occurs, unbind the NIC and then rebind it. If the problem persists, check whether the device is properly connected and the selected NIC is correct.

### 2.2.2 Home Page

If the NIC is successfully bound, the main page is displayed as shown below.

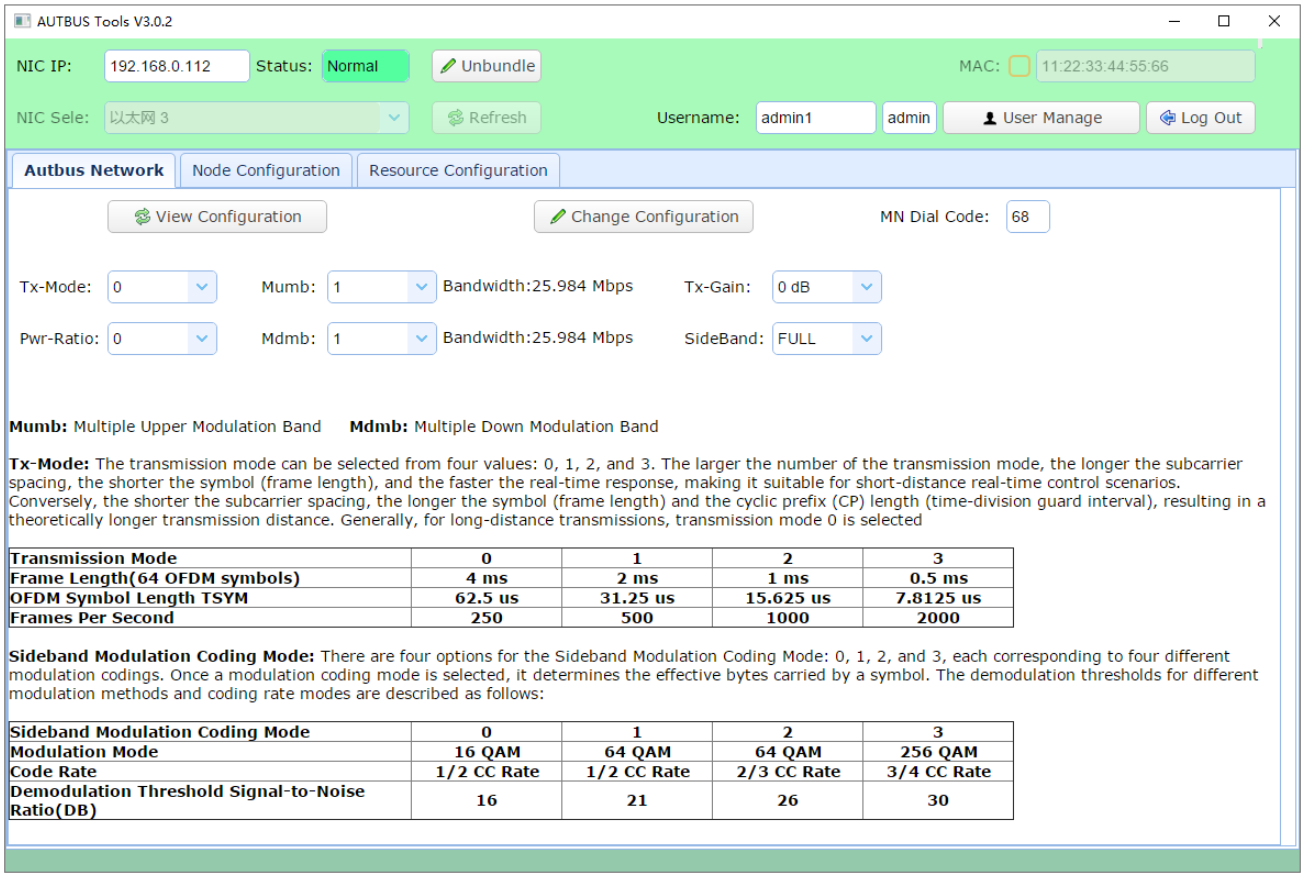


Figure 4 NIC Binding Success

**NIC IP**

Function: Display the network interface card (NIC) IP address of the PC connected to the configuration tool. With the network cable connected properly, the configuration tool will automatically obtain the NIC IP addresses.

**Status**

Display options: Normal/Error

Function: Display the communication status. After the NIC are correctly bound to the configuration tool, “Normal” is displayed. Otherwise, “Error” is displayed.

**MAC**

Configuration options: Selected/Unselected

Default configuration: Unselected

Function: The MAC address can be edited after this option is selected.

Description: The configuration tool uses this MAC address to communicate with the

AUTBUS network. It is not recommended to modify the MAC address. Otherwise, a network disconnection might occur.

**NIC Sele**

Function: Select the NIC of the connected PC.

**Bind/Unbundle**

Function: Click this button to bind or unbind the NIC.

**Refresh**

Function: Click this button to refresh the NIC list.

**Username**

Function: Display the alias name and actual username of the currently login user.

**User Manage**

Function: Click this button to open the user configuration page.

**Log Out**

Function: Click this button to log out the currently login user.

**AUTBUS Network**

Function: Configure the AUTBUS network on this tab. For details, refer to “2.4 Configure AUTBUS Network”.

Description: This tab displays AUTBUS network information saved on MN. If no MN exists in the network, this tab displays AUTBUS network information saved on the local device that is directly connected to the configuration tool. In this case, the configuration tool cannot obtain node and resource configurations in the network.

**Node Configuration**

Function: Configure AUTBUS nodes on this tab. For details, refer to “2.5 Configure Nodes”.

**Resource Configuration**

Function: Configure resource blocks allocated to the AUTBUS network on this tab. For details, refer to “2.6 Configure Resources”.

## 2.3 User Management

To prohibit illegal users' access, the configurations tool supports user management. Only one administrator account is supported, that is, the "admin" account, which can manage ordinary users. Ordinary users can only configure their own alias names and passwords.

### 2.3.1 Configure User Information

After login with the default user "admin", click <User Manage> to open the "User Manage" dialog box, as shown below.

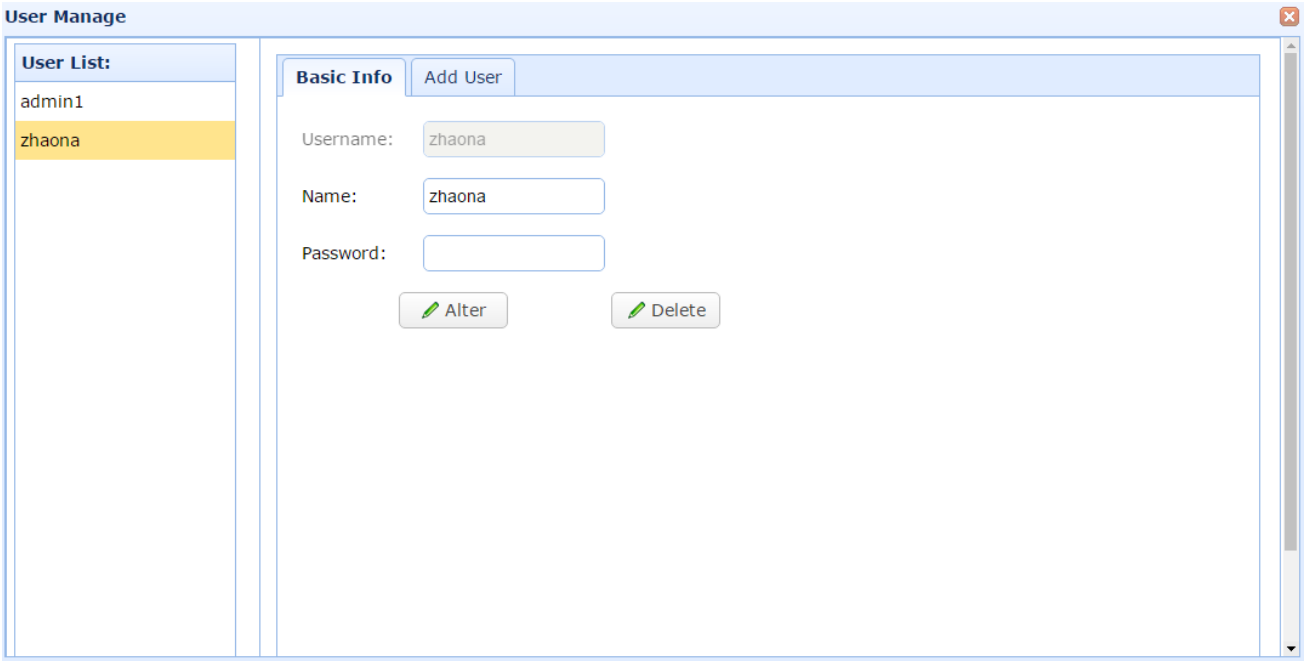


Figure 5 Change User Configuration

On the [Basic Info] tab, the login user can configure the currently login user, including the alias name and password. The "admin" user can delete an ordinary user.

**Note:**

The "admin" user cannot be deleted.

**Username**

Function: Display the username.

**Name**

Configuration range: 3~10 characters

Function: Configure the alias name of a user.

**Password**

Configuration range: 3~10 characters

Function: Configure the user's password.

### 2.3.2 Create Ordinary Users

On the [Add User] tab, the "admin" user can create ordinary users.

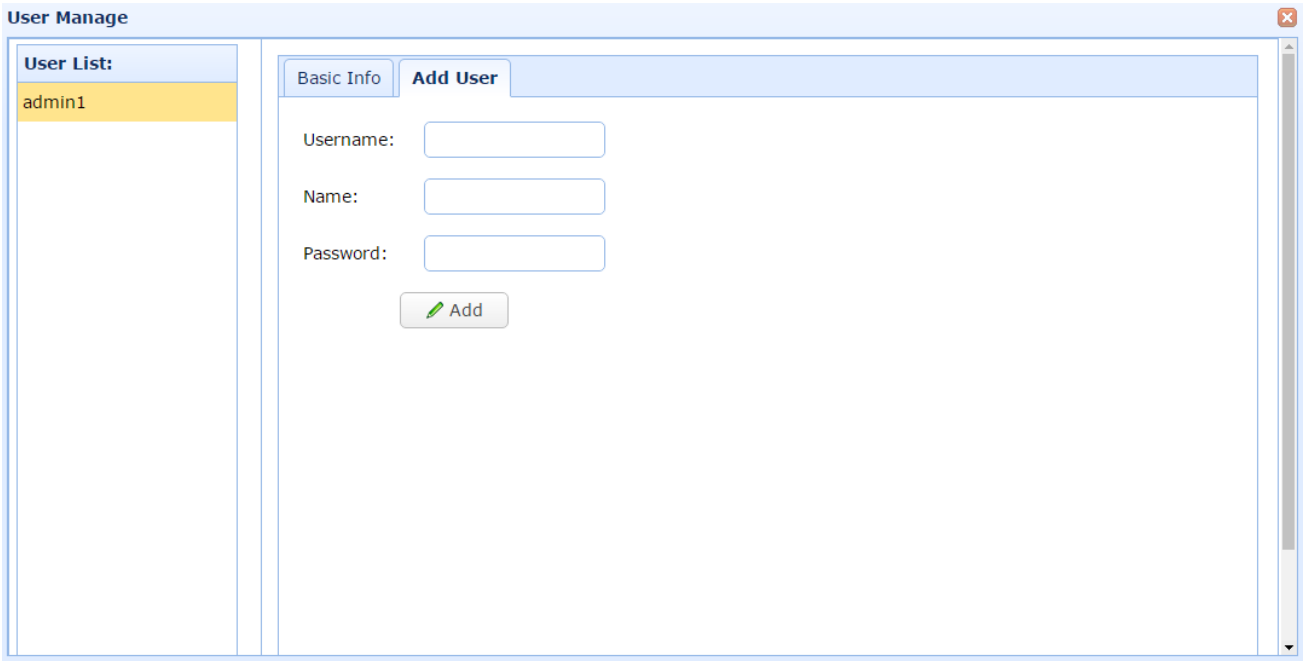


Figure 6 Create Ordinary User

**Username**

Configuration range: 3~10 characters

Function: Configure the username.

**Name**

Configuration range: 3~10 characters

Function: Configure the alias name of the user.

**Password**

Configuration range: 3~10 characters

Function: Configure the user's password.

## 2.4 Configure AUTBUS Network

### 2.4.1 Configuration via Rotary DIP Switch

There is a rotary DIP switch on the front panel of the device, which supports 16 dial codes (0~F), and the default dial code is 0. The rotary DIP switch makes the configuration of AUTBUS network parameters more conveniently. It supports two configuration modes:

- Automatic Configuration: Dial codes 0~7, except 2, adopt automatic configuration. Each dial code has been inbuilt with fixed configurations of the role, AUTBUS parameter and resources. With the DIP switch pointing to a specific dial code, the corresponding configurations are delivered and transparent data transmissions are implemented in the AUTBUS network. This mode is easy to use and can satisfy varied application requirements.
- Manual Configuration: Dial codes 8~F support manual configuration. You can customize AUTBUS work mode configurations as needed and save the configurations to the dial codes. This mode requires that the user has a deep knowledge of AUTBUS protocol.


**Note:**

- The AUTBUS configurations applied after the rotary DIP switch is set on MN can be viewed on the configuration tool.
- If the rotary DIP switch is reconfigured, the new configurations take effect only after the device is restarted.

In the AUTBUS network, you should configure one device to act as Management Node (MN). MN is the management mode in the AUTBUS network. It is responsible for Terminal Node (TN) management, resource configuration, etc. Only one MN can exist in the AUTBUS network. To configure a device to act as MN, you should configure the rotary DIP switch on this device to point to dial code 4/5/6/7/8/9/A/B/C/D/E/F. To configure a device to

act as TNs, you should configure the rotary DIP switch to point to dial code 0/1/3/F. The dial code configurations on the devices in the AUTBUS network need to match the mapping relationships as shown in the following table.

Table 1 Dial Code Mapping Relationships

| Type | TN | MN |
|---|---|---|
| Mapping 1 | 0/1 | 4~7 |
| Mapping 2 | 3 | 8~E |
| Mapping 3 | F | F |

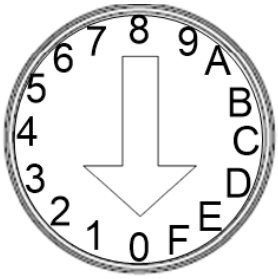


Figure 7 Dial Code Configuration

- Mode 0 and 1

When the rotary switch points to dial code 0 or 1, the device role is TN. TNs configured at mode 0 or 1 can only work with the MN configured at mode 4, 5, 6 or 7 and connected on the same bus line.

Mode 0 and 1 have been inbuilt with fixed bandwidth configurations for different types of protocol converters and the configurations cannot be modified. Other configurations, including the sideband mode, transmission mode, transmission gain, etc, are synchronized from the MN. For details about the bandwidth configurations, see the following table.

Table 2 Bandwidth Definition of Mode 0 and 1

| Converter Type | Bandwidth Definition (Mbps) | |
|---|---|---|
| | Mode 0 | Mode 1 |
| AUTBUS to RS485 | 0.75 | 1.5 |
| AUTBUS to CAN | 0.75 | 1.5 |

| | | |
|---|---|---|
| AUTBUS to Ethernet | 4.75 | 10.0 |

- Mode 2

  This mode is reserved and not supported currently.

- Mode 3

When the rotary DIP switch points to dial code 3, the device role is TN. TNs configured at mode 3 can only work with the MN configured at mode 8, 9, A, B, C, D or E and connected on the same bus line. Similar to mode 0 and 1, TNs configured at mode 3 also synchronize the sideband mode, transmission mode, transmission gain configurations, etc. from the MN. The difference is that this mode allows the user to define the bandwidth of TN. By default, the bandwidth is configured to 0 Mbps.

- Mode 4

When the rotary DIP switch points to dial code 4, the device role is MN. Mode 4 is applicable to short-distance transmission scenarios (within 100 m). This mode features high bandwidth and real-time capabilities. The AUTBUS parameter configurations are fixed and cannot be modified.

Table 3 AUTBUS Parameter Configurations of Mode 4

| **Sideband** | **TX Mode** | **Code Mode** | **Max Bandwidth** | **Power Ratio** | **Tx Gain** | **Tx Interval** |
|---|---|---|---|---|---|---|
| Full | 2 | 3 | 100 Mbps | 1 | 5 | 1 ms |

- Mode 5

When the rotary DIP switch points to dial code 5, the device role is MN. Mode 5 is applicable to long-distance transmission scenarios (within 500 m) that requires high bandwidth. This mode features better anti-interference capabilities than mode 4. The AUTBUS parameter configurations are fixed and cannot be modified.

Table 4 AUTBUS Parameter Configurations of Mode 5

| **Sideband** | **TX Mode** | **Code Mode** | **Max Bandwidth** | **Power Ratio** | **Tx Gain** | **Tx Interval** |
|---|---|---|---|---|---|---|
| Full | 1 | 3 | 100 Mbps | 1 | 5 | 2 ms |

- Mode 6

When the rotary DIP switch points to dial code 6, the device role is MN. Mode 6 is applicable to long-distance transmission scenarios (within 500 m). This mode features better anti-interference and fault-tolerant capabilities than mode 5. The AUTBUS parameter configurations are fixed and cannot be modified.

Table 5 AUTBUS Parameter Configurations of Mode 6

| Sideband | TX Mode | Code Mode | Max Bandwidth | Power Ratio | Tx Gain | Tx Interval |
|---|---|---|---|---|---|---|
| Full | 1 | 2 | 62 Mbps | 1 | 5 | 2 ms |

- Mode 7

When the rotary DIP switch points to dial code 7, the device role is MN. Mode 7 is applicable to environments where there are many interference sources. This mode features better anti-interference capabilities than mode 6 while supporting transmission over long distances (within 500 m). The AUTBUS parameter configurations are fixed and cannot be modified.

Table 6 AUTBUS Parameter Configurations of Mode 7

| Sideband | TX Mode | Code Mode | Max Bandwidth | Power Ratio | Tx Gain | Tx Interval |
|---|---|---|---|---|---|---|
| Full | 0 | 0 | 31 Mbps | 1 | 5 | 4 ms |

- Mode 8~E

When the rotary DIP switch points to dial codes 8 to E, the device role is MN. Modes 8 to E have been inbuilt with default AUTBUS parameter configurations. You can use the defaults or redefine them as needed and save the defined configurations to the dial code. Modes 8 to E allow the user to define the bandwidth of TN.

Table 7 AUTBUS Parameter Configurations of Mode 8~E

| Sideband | TX Mode | Code Mode | Max Bandwidth | Power Ratio | Tx Gain | Tx Interval |
|---|---|---|---|---|---|---|
| Full | 0 | 0 | 31 Mbps | 0 | 0 | 4 ms |

- Mode F

When the rotary DIP switch points to dial code F, the rotary DIP switch of all devices must point to F; otherwise, communication is not possible. Mode F is the full self-definition mode, without AUTBUS parameters configured, and the device role is TN by default. You need to configure the device role, AUTBUS parameter and resources and save the configurations to dial code F through the AUTBUS configuration tool (upper computer) or console terminal.

### 2.4.2 Configuration via Configuration Tool

When the rotary DIP switch points to dial codes 8 to F, you can define AUTBUS parameters via the configuration tool based on actual needs. After configurations, you need to click <Change Configuration> to save the configurations and then restart the devices to enable new configurations to take effect.

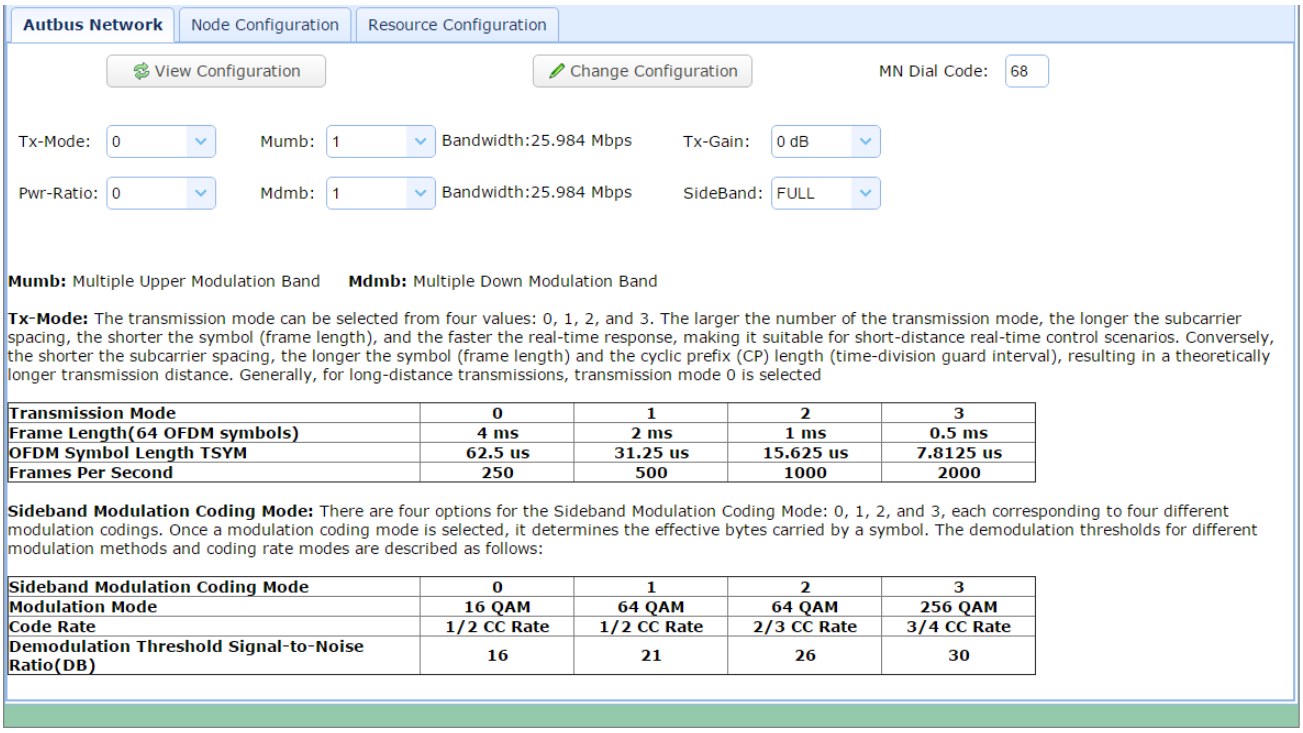


Figure 8 Configure AUTBUS Network Work Mode

**View Configuration**

Function: Click this button to refresh AUTBUS network configuration information.

**Change Configuration**

Function: Click this button to save configurations. AUTBUS network configuration modifications take effect only after the device is rebooted.

**MN Dial Code**

Function: Display the dial code of the configured rotary DIP switch on MN.

Description: If no MN exists in the network connected to the configuration tool, this element displays the dial code of the local device that is directly connected to the configuration tool. In this case, the configuration cannot obtain the node and resource configurations in the network. When the dial code that the DIP switch points to is changed, you need restart the device and refresh the [AUTBUS Network] tab by clicking <View Configuration>.

**Tx Mode**

Configuration range: 0~3

Default: 0

Function: Configure the transmission mode.

Description: Transmission mode determines the number of frames transmitted per second and the time needed for transmitting each frame and each OFDM symbol. The larger the value of transmission mode, the longer the subcarrier spacing, the shorter the symbol (frame length) and the faster the real-time response, making it suitable for short-distance real-time control scenarios. Conversely, the shorter the subcarrier spacing, the longer the symbol (frame length) and the cyclic prefix (CP) length (time-division guard interval), resulting in a theoretically longer transmission distance. Generally, for long-distance transmission scenarios, transmission mode 0 is selected.

Detailed descriptions of each transmission mode are shown in the following table.

Take Transmission Mode 0 as an example. When the number of cyclic frames is 1, the transmission interval is 4 ms. When the number of cyclic frames is 2, the transmission interval is 8 ms. For information about how to configure the number of cyclic frames, see the “Interval” parameter in “2.6 Configure Resources”.

Table 8 Descriptions of Transmission Mode

| Transmission Mode | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Frame Length (64 OFDM symbols) | 4 ms | 2 ms | 1 ms | 0.5 ms |
| OFDM Symbol Length (TSYM) | 62.5 us | 31.25 us | 15.625 us | 7.8125 us |
| Frames per Second | 250 | 500 | 1000 | 2000 |

**Pwr-Ratio**

Configuration range: 0~3

Default configuration: 0

Function: Configure the power ratio of lower sideband modulation coding mode to upper sideband modulation coding mode when full sideband mode is used. The larger the value of power ratio, the higher the power proportion for the upper sideband and the lower the proportion for the lower sideband. User can adjust the power ratio accordingly based the actual channel quality.

**Mumb/Mdmb**

Configuration range: 0~3

Default configuration: 0

Function: Configure the Multiple Upper Modulation Band (MUMB) and Multiple Down Modulation Band (MDMB) mode.

Description: The modulation band mode determines the effective bytes carried by a symbol. The modulation mode is QAM.

- 16 QAM: each symbol is represented by 4 bits;
- 64 QAM: each symbol is represented by 6 bits;
- 256 QAM: each symbol is represented by 8 bits;

CC (Code Rate) indicates the ratio of useful bits to the totally transmitted bits. The lower the code rate, the larger the number of redundant bits added by the physical layer.

Signal-to-Noise Ratio (SNR) indicates the ratio of useful signals to noise signals. “Demodulation Threshold Signal-to-Noise Ratio” specifies the lower limit of signal-to-noise ratio for received signals. When SNR is lower than the threshold, the received signals might

be disturbed by noises and results in demodulation errors. Generally, a larger threshold indicates that the system has better anti-interference performance, but it affects system complexity and power consumption.

Descriptions of Modulation Modes, Code Rates and Demodulation Threshold Signal-to-Noise Ratio corresponding to the four sideband modulation coding modes are shown in the following table.

Table 9 Descriptions of Upper/Lower Sideband Modulation Coding Mode

| **Sideband Modulation Coding Mode** | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| **Modulation Mode** | 16 QAM | 64 QAM | 64 QAM | 256 QAM |
| **Code Rate** | 1/2 CC Rate | 1/2 CC Rate | 2/3 CC Rate | 3/4 CC Rate |
| **Demodulation Threshold Signal-to-Noise Ratio (DB)** | 16 | 21 | 26 | 30 |

**Tx-Gain**

Configuration range: -4~13 dB

Default configuration: 0

Function: Set the gain for transmitted signals.

Description: The greater the value of transmission gain, the greater the signal strength. Signals might degrade as they travel over long distances. In such circumstances, it is recommended to set a greater value of transmission gain to increase the signal strength.

**Sideband**

Configuration options: FULL/HALF

Default configuration: Full

Function: Select the sideband mode.

Description: In half sideband mode, only the lower sideband is transmitted. Therefore, the bandwidth used is only half that in full sideband mode.

The bandwidth definition corresponding to customized AUTBUS parameter definitions

are shown in the following table.

Table 10 Bandwidth Definition Corresponding to AUTBUS Parameter Definition

| No. | Transmission Mode | Coding Mode | Bandwidth (Mbps) | |
|---|---|---|---|---|
| | | | Full Sideband | Half Sideband |
| 1 | 0 | 3 | 100 | 50 |
| 2 | 0 | 2 | 62 | 31 |
| 3 | 0 | 1 | 51 | 25.5 |
| 4 | 0 | 0 | 31 | 15.5 |
| 5 | 1 | 3 | 100 | 50 |
| 6 | 1 | 1 | 50 | 25 |
| 7 | 1 | 0 | 30 | 15.5 |
| 8 | 2 | 3 | 100 | 50 |
| 9 | 2 | 2 | 60 | 30 |
| 10 | 3 | 3 | 96 | 48 |

**Role**

Configuration options: MN/TN

Function: Configure the device role.

**Note:**

For the AUTBUS work mode where the value of “Tx Mode” is 2 and the value of both “Mumb” and “Mdmb” is 3, it is recommended that the total length of the bus line is within 100 m. For other modes, the total length of the bus line should be within 500 m.

## 2.5 Configure Nodes

The [Node Configuration] tab displays configurations of effective nodes on the AUTBUS network. Nodes can also be configured on this tab.

### 2.5.1 View Node Configurations

After completing AUTBUS parameter configurations of the AUTBUS network, click the [Node Configuration] tab. This tab displays all nodes that have come online. If any device fails to come online, check whether the device is properly connected and whether the device is restarted after a program update.

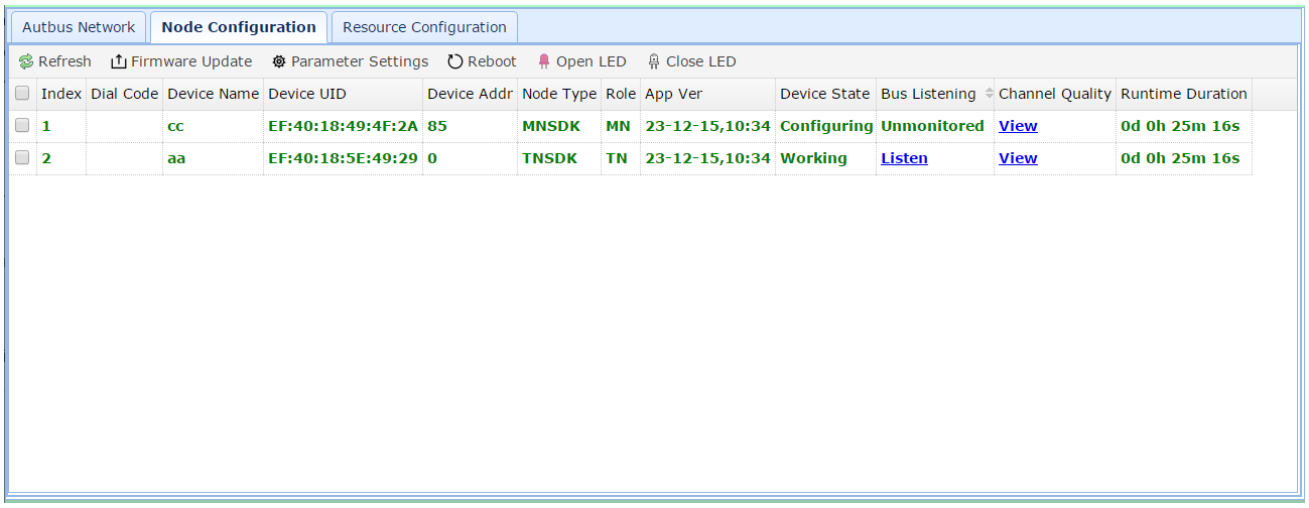


Figure 9 Node Configuration

**Refresh**

Function: Click this button to refresh the [Node Configuration] tab.

**Firmware Update**

Function: Click this button to enter the firmware update page. For details, see “2.5.2 Update Firmware”.

**Parameter Settings**

Function: Select a device and then click this button to enter the parameter setting page of this device. For details, see “2.5.3 Set Device Parameters”.

**Reboot**

Function: Select a device and click this button, then the device will be rebooted.

**Open LED**

Function: Click this button to light the LED. The LED will lose its fault reporting functionality.

**Close LED**

Function: Click this button to restore the fault reporting functionality of the LED.

**Index**

Function: Display the node indexes.

**Dial Code**

Function: Display the dial code of the rotary DIP switch on the device.

**Device Name**

Function: Display the device name, which can be configured through the [Parameter Settings] option.

**Device UID**

Function: Display the device UID.

Description: Device UID identifies a device. Each device has a unique UID.

**Device Addr**

Function: Display the device address, which can be configured through the [Parameter Settings] option.

**Node Type**

Display options: MNSDK/TNSDK

Function: Display the device type.

**Role**

Display options: MN/TN

Function: Display the device role.

**App Ver**

Function: Display the firmware version of the device.

**Device State**

Display options: Working/Configuring

Function: Display the device status.

- “Working” indicates that the device is working properly.
- “Configuring” indicates that the device is the one connecting to the upper computer.

**Node ID**

Function: Display the node ID.

**Bus Listening**

Display options: Listen/Unmonitored

Function: Display whether bus listening is enabled on the device. The bus listening feature can be configured through the [Parameter Settings] option. When this feature is enabled, “Listening” is displayed. Click <Listening> to enter the bus listening statistics page. For details, see “2.5.5 Configure Bus Listening”.

**Lostcnt**

Function: Display the number of times that the node has gone offline.

**Traffic Statistics**

Function: Click <View> in the “Traffic Statistics” column to view traffic statistics. For details, see “2.5.6 View Traffic Statistics”.

**Channel Quality**

Function: Click <View> in the “Channel Quality” column to view channel quality. For details, see “2.5.7 View Channel Quality”.

**Runtime Duration**

Function: Display the elapsed time since the device boots up.


**Note:**

Right click any place in the table head to select more options of node information to be displayed.

### 2.5.2 Update Firmware

On the [Node Configuration] tab, select a device and then click <Firmware Update> to update the firmware of the device.

As shown in the following figure, click <Select Firmware>, select the firmware file to be upgraded, and then click <upgrade>. When the progress bar reaches 100%, wait one minute and then restart the device. During the upgrade process, to terminate the upgrade, click

<stop>.

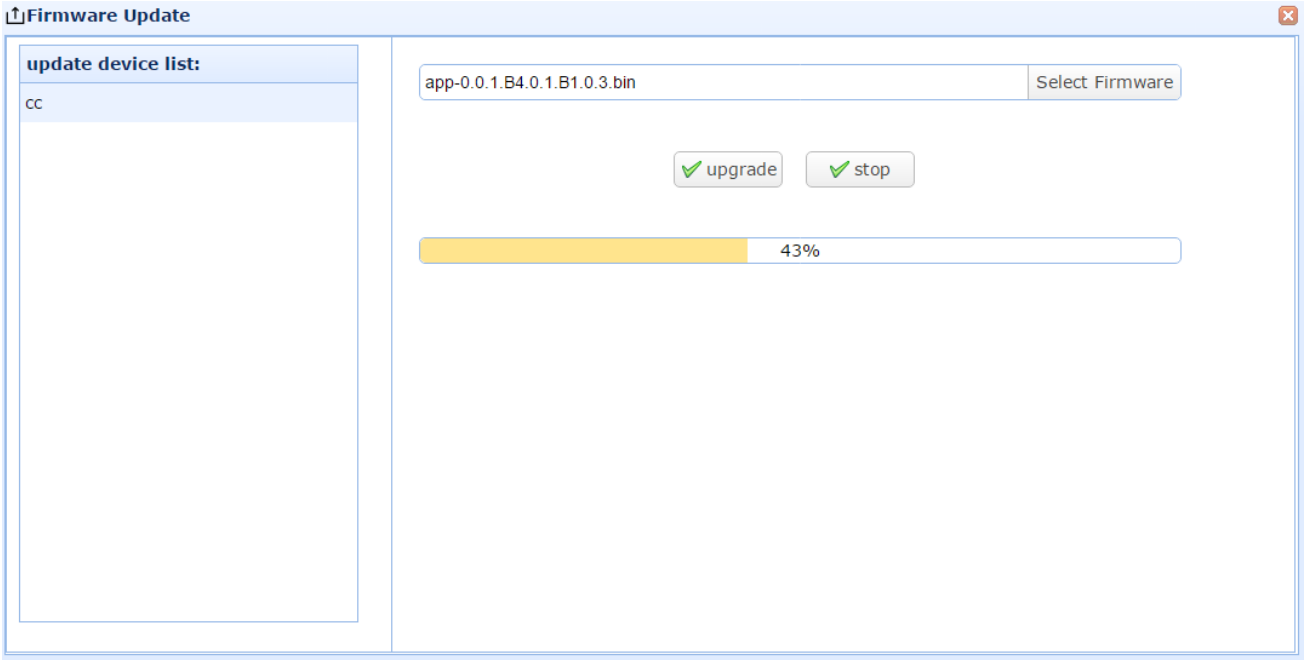


Figure 10 Update Firmware

**Warning:**

The firmware file is a binary file named with suffix ".bin". When update is complete, restart the device and then the new version takes effect.

### 2.5.3 Set Device Parameters

On the [Node Configuration] tab, select a device and click <Parameter Settings> to enter the device parameter setting page.

On the [Basic Info] tab, configure the device name, device address and bus listening feature.

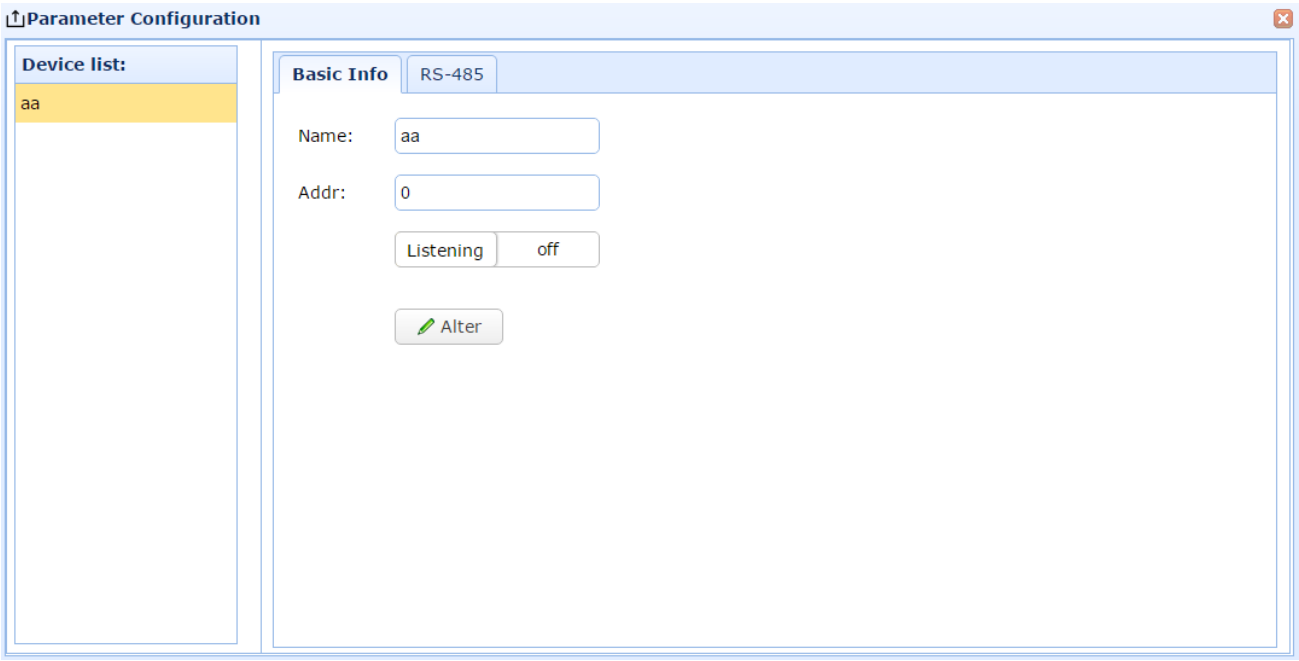


Figure 11 Basic Parameter Setting

**Name**

Configuration range: 2~28 characters

Function: Configure the device name.

Description: Device name is mandatory. It can contain Chinese characters, English characters and numbers, but not special characters.

**Addr**

Configuration range: 0~27

Function: Configure the device address information.

**Bus Listening**

Configuration options: Listening On/Off

Default configuration: Listening Off

Function: Whether to enable bus listening on the device.

For AUTBUS to RS485 converters, configure RS485 port parameters on the [RS-485] tab.

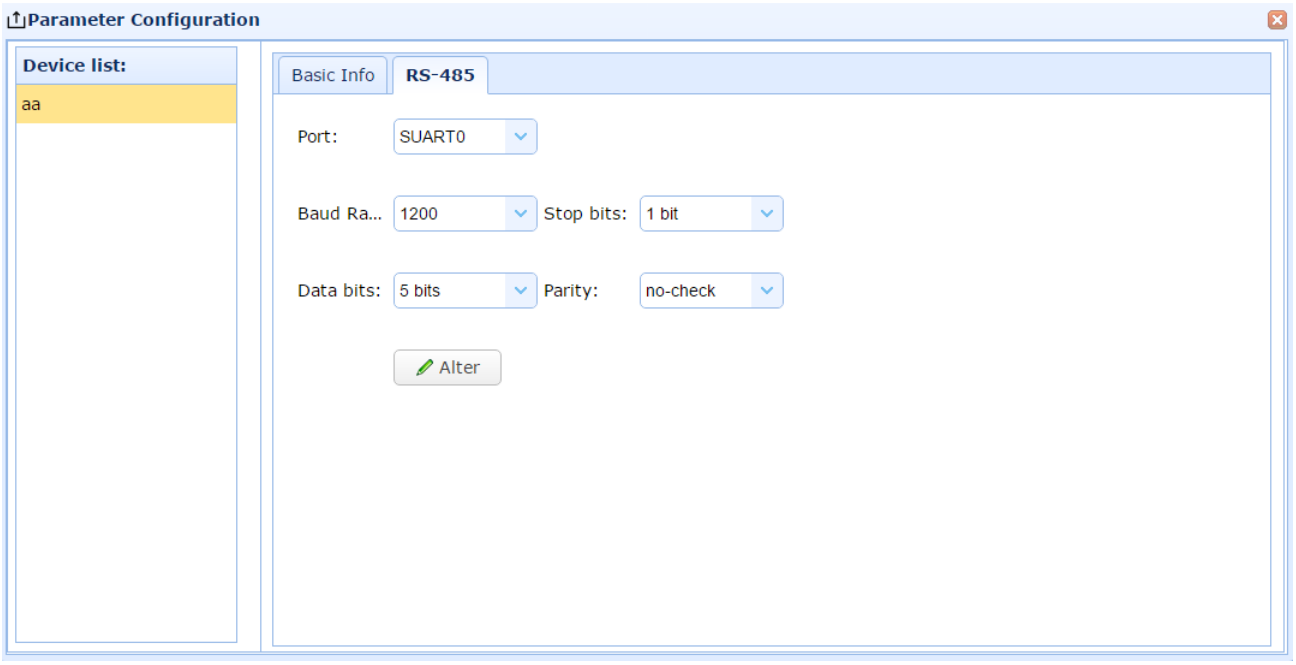


Figure 12 RS485 Parameter Setting

**Port**

Configuration options: SUART0/SUART1/SUART2

Function: Select the RS485 port to be configured.

Description: “SUART0” should be selected here.

**Baud Rate**

Configuration options: 1200/2400/4800/9600/19200/38400/56000/115200/128000/230400/256000

Default configuration: 115200

Function: Configure the baud rate of the RS485 port, that is, the number of bits transmitted per second.

Description: Baud rate is the most important parameter in RS485 communication. It determines the amount of data transmitted per second. The higher the baud rate, the faster the transmission speed and the more the power consumption. The transmitting end and the receiving end should have the same baud rate configured.

**Stop Bits**

Configuration options: 1 bit/1.5 bits/2 bits

Default configuration: 1 bit

Function: Configure the stop bit of the RS485 port.

Description: Stop bit marks the end of a data transmission. Generally, the stop bit of RS485 transmission is 1 bit. You can adjust it as needed. The transmitting end and the receiving end should have the same number of stop bits configured.

**Data Bits**

Configuration options: 5 bits/6 bits/7 bits/8 bits

Default configuration: 8 bits

Function: Configure the data bits of the RS485 port.

Description: Data bits specify the number of bits used in each data byte. The transmitting end and the receiving end should have the same number of data bits configured.

**Parity**

Configuration option: No-check/Odd/Even

Default configuration: No-check

Function: Select the parity mode.

Description: Parity is used to check data integrity. Besides the transmitted data bits, one parity bit is transmitted to make sure the transmitted data bits meet the specified requirement. The transmitting end and the receiving end should have the same parity mode configured.

- No-check: No parity check is performed on transmitted data bits.
- Odd: The number of “1” bits in the binary string including the nine data bits and one parity bits must be odd.
- Even: The number of “1” bits in the binary string including the nine data bits and one parity bits must be even.

### 2.5.4 Reboot

On the [Node Configuration] tab, select a device and click <Reboot>. Then the device will be rebooted.


**Warning:**

If the device acting as MN is rebooted, all nodes in the network will be rebooted.

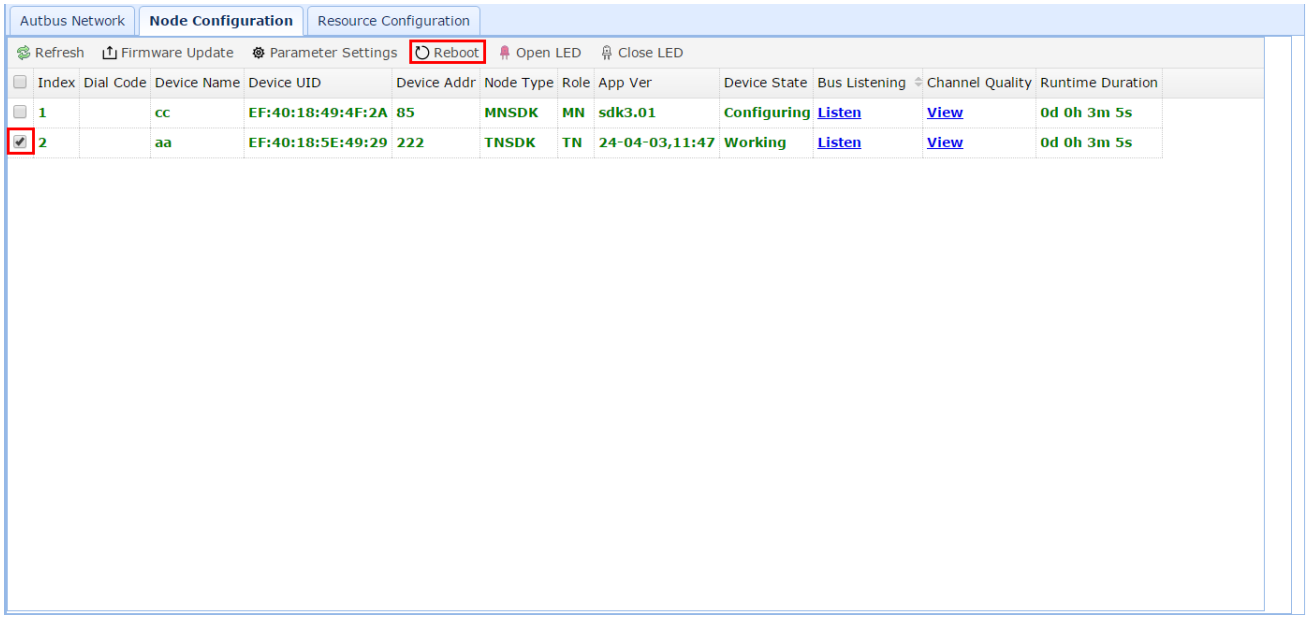


Figure 13 Reboot Device

### 2.5.5 Configure Bus Listening

On the [Node Configuration] tab, click <Listen> in the “Bus Listening” column of a device to enter the bus listening statistics page.

To collect bus listening statistics of a device, you need enable the bus listening feature on the device’s parameter setting page.

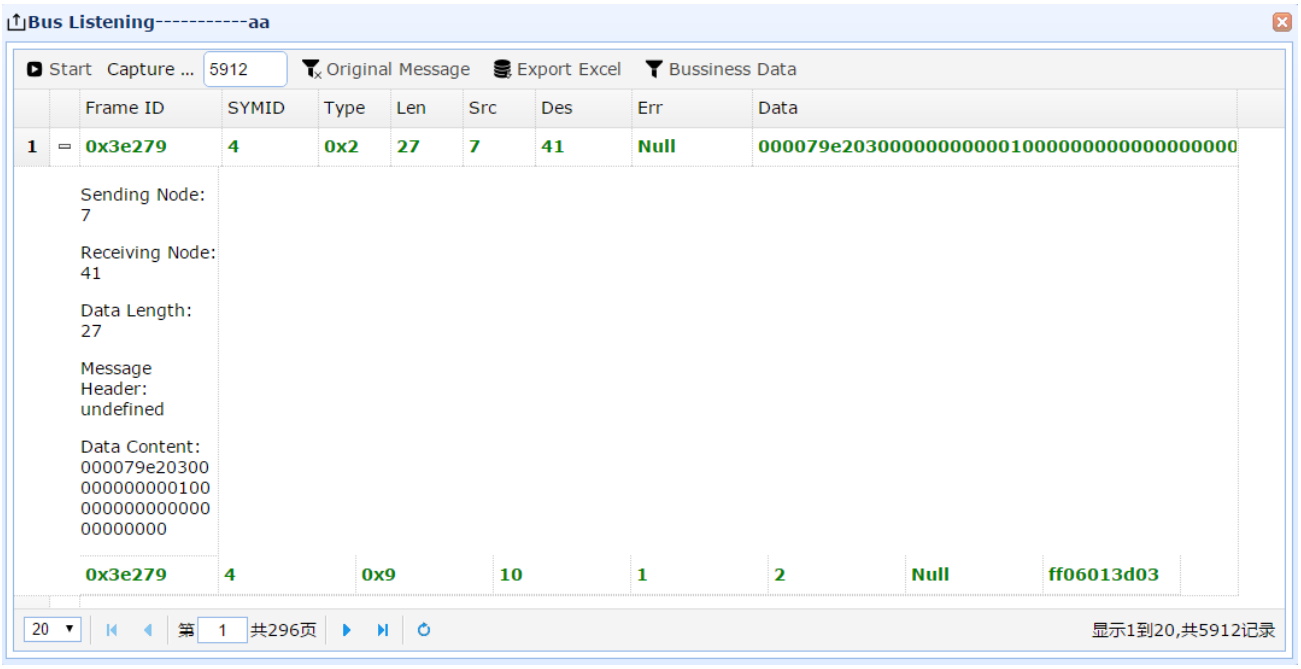


Figure 14 Configure Bus Listening

**Start/Stop**

Function: Click <Start> to start listening on the device and <Stop> to stop listening.

**Capture…**

Function: Display the number of captured packets after listening is started.

**Original Message**

Function: With this option selected, the page displays the original packets in the captured packets.

**Business Data**

Function: With this option selected, the page displays the service packets in the captured packets.

**Export Excel**

Function: Click this option to export the captured packet statistics to an EXCEL file, which will be saved in the directory of the configuration tool.

### 2.5.6 View Traffic Statistics

On the [Node Configuration] tab, click <View> in the “Traffic Statistics” column of a device to enter the traffic statistics display page.

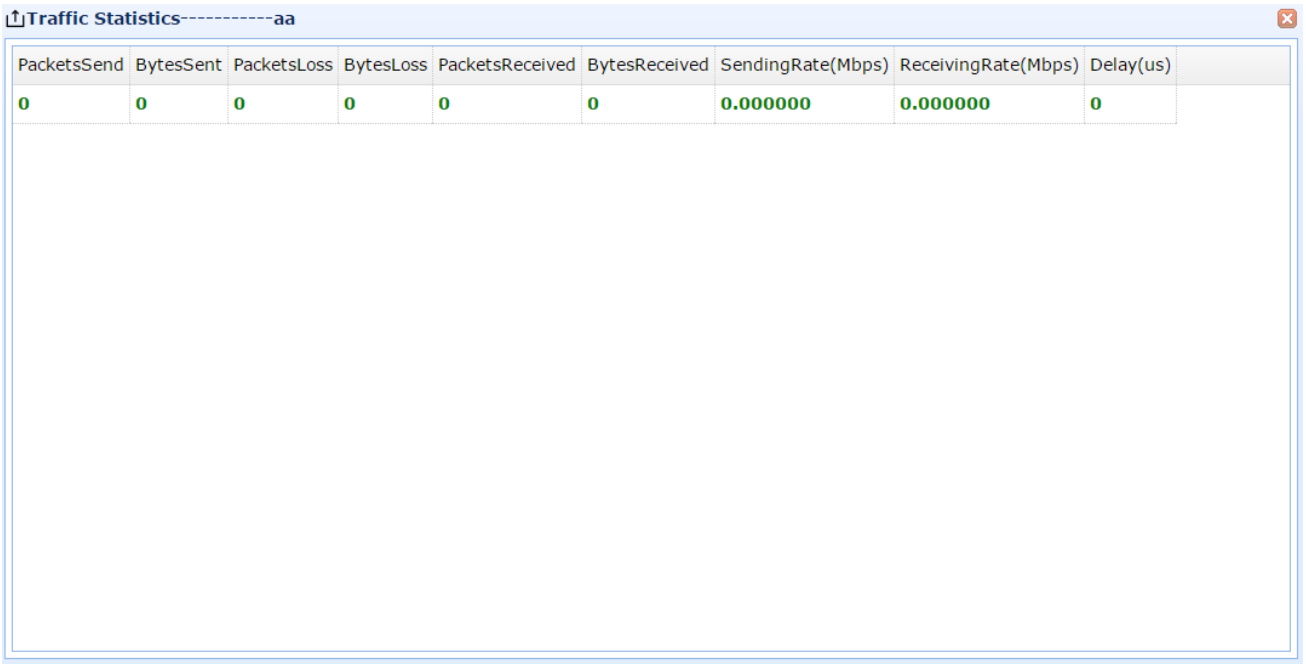


Figure 15 View Traffic Statistics

This page displays the device's traffic statistics, including the data sent, received, discarded as well as sending rate and delay, etc.

### 2.5.7 View Channel Quality

On the [Node Configuration] tab, click <View> in the "Channel Quality" column of a device to enter the channel quality display page.

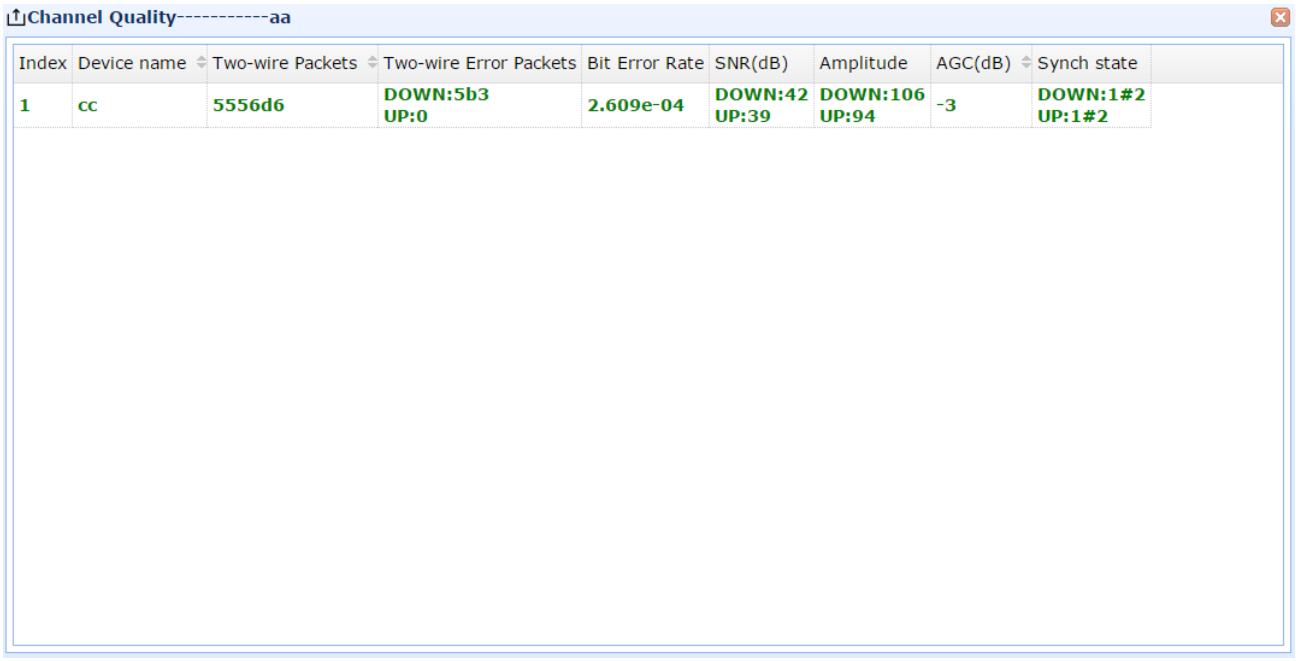


Figure 16 View Channel Quality

This page displays the number of two-wire packets, two-wire error packets, bit error rate, etc., on the device. Fewer error packets and slower error packet growth rate indicate better channel quality. Channel quality is optimal when SNR is above 30 dB.

## 2.6 Configure Resources

AUTBUS resources must be configured so that nodes on the network can communicate with each other. The AUTBUS configuration tool provides dynamic and static configuration methods. To use the dynamic configuration method, you need to enable the dynamic bandwidth allocation function. When it is disabled, you can manually configure resources.

### 2.6.1 View Resource Configurations

For manual configuration, multiple resource blocks can be allocated. You can view and modify resource block configurations on the [Resource Configuration] tab, as shown in the following figure.

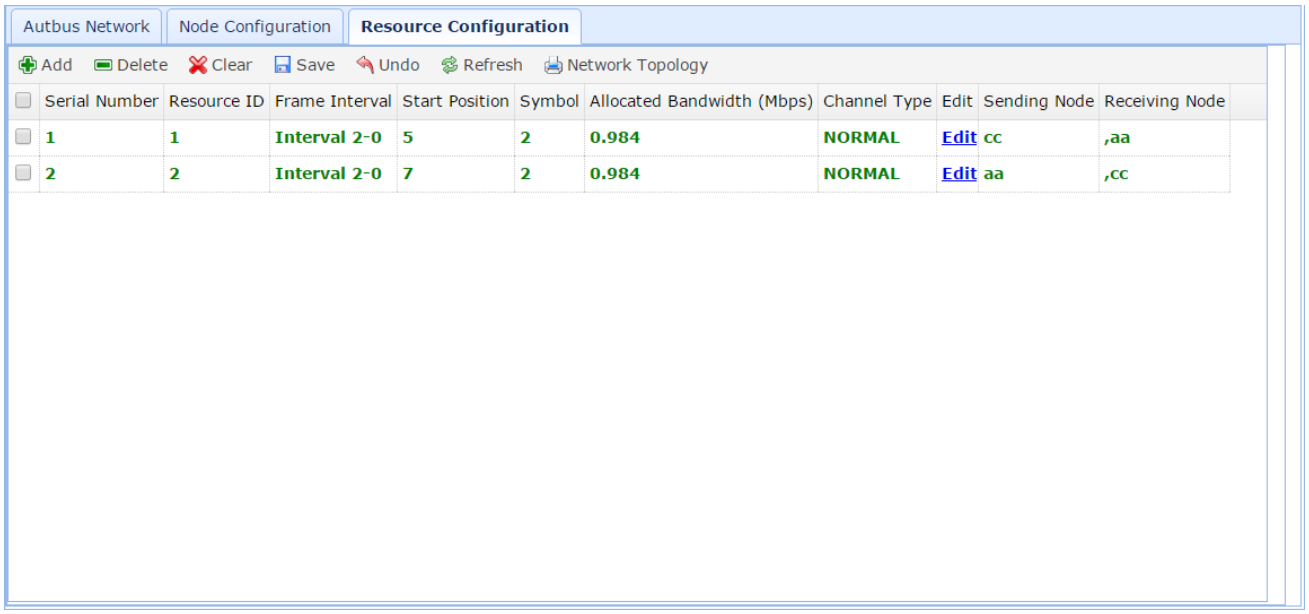


Figure 17 View Resource Configurations

**Add**

Function: Click this button to enter the resource block creation page.

**Delete**

Function: Select one or more resource blocks and then click this button to delete the resource block configuration.

**Warning:**

When deleting resource blocks, you need to delete those with larger symbol numbers first. Otherwise, the deletion might result in a communication failure.

**Clear**

Function: Click this button to delete the configuration of all resource blocks.

**Save**

Function: After modifying resource block configurations, such as resource block creation,

deletion and corresponding cancellation operations, etc, you need to click <Save> and then reboot the devices. Otherwise, the previously mentioned modifications do not take effect.

**Undo**

Function: After modifying resource block configurations, such as resource block creation, deletion, etc, you can click the <Undo> button to cancel the operation if the operation is not saved yet.

**Refresh**

Function: Click this button to refresh the current page.

**Network Topology**

Function: Click this button to enter the page displaying the topology graph of the AUTBUS network.

To modify the configuration of a specific resource block, click <Edit> in the “Edit” column.

### 2.6.2 Create Resources

On the [Resource Configuration] tab, click <Add> to enter the resource configuration page.

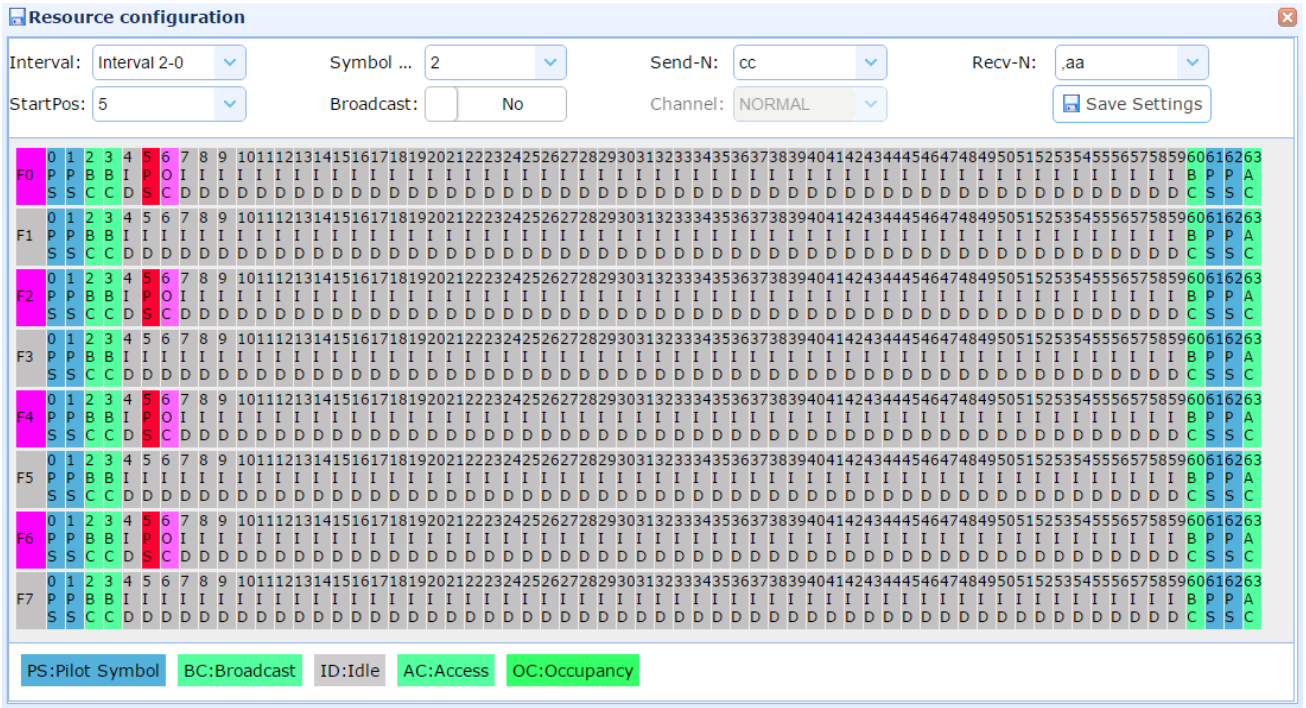


Figure 18 Create Resource Blocks

**Interval**

Configuration options: Interval 1-0/Interval 2-0/Interval 2-1/Interval 4-0/Interval 4-1/Interval 4-2/Interval 4-3/Interval 8-0/Interval 8-1/Interval 8-2/Interval 8-3/Interval 8-4/Interval 8-5/Interval 8-6/Interval 8-7

Default configuration: Interval 1-0

Function: Configure the number of cyclic frames, that is, the transmission interval.

Description: “Interval 2-0” indicates the first case when the number of cyclic frames is 2. Likewise, “Interval 8-3” indicates the fourth case when the number of cyclic frames is 8.

**StartPos**

Configuration range: 4~59

Function: Set the start symbol number of the resource block.

Description: Symbols numbered 0 to 3 and 60 to 30 are occupied by the system. You can allocate the symbols numbered 4 to 59.

**Symbol…**

Configuration range: 2~57

Function: Configure the number of symbols in a resource block.

Description: Each resource block should have at least two symbols. For example, “5” indicates that the resource block has five symbols.

**Broadcast**

Configuration options: Yes/No

Default configuration: No

Function: Whether to enable broadcasting.

Description: When broadcasting is enabled, all nodes on the AUTBUS network are specified as receiving nodes. In this case, “Recv-N” does not need to be configured.

**Send-N**

Configuration options: All nodes

Function: Select the device which sends data in this resource block. Each resource block can be configured with only one sender.

**Recv-N**

Configuration options: All nodes

Function: Select the device which receives data in this resource block. Each resource block can be configured with multiple receivers.

**Channel**

Configuration options: NORMAL (mandatory)

Function: Display the channel type.