Category	Contents
Keywords	CANHub-AS4
Description	Transparent connection, multipoint connection, routing

Revision History

Version	Date	Description
V1.00	November 11, 2014	Created
V1.01	December 17, 2014	Standardized the document
V1.02	March 18, 2019	Updated the document header and footer and "Sales and Service Network" content and added the "Disclaimer" content

Contents

1. Functions

The CANHub-AS4 realizes the transparent connection of multiple CANs, and realizes multi-point connection of complex structures at the bus level; CANHub-AS4 enables the backbone network to have no branch length restrictions, and any two nodes in the network can reach the protocol distance. The device provides four communication ports, and each port has an independent CAN transceiver, which can double the number of nodes. Therefore, while providing free wiring methods, this also lifts the drive limit of the maximum number of nodes for CAN transceivers on the system bus.

Each port also provides an indicator for detecting bus activity and bus failure, which helps observe the working status of the CAN bus network.

The CANHub-AS4 can be used in CAN networks with baud rates up to 1 Mbps. All channels can work at different baud rates. CANHub-AS4 complies with CAN specification 2.0A (11-bit CAN identifier) and 2.0B (29-bit CAN identifier). Transparent, protocol-independent CAN message transmission is supported, making it suitable for a variety of applications. In addition, the product supports various different high-level CAN protocols (CANOpen, SDS, J1939, DeviceNet or other customized protocols).

The CANHub-AS4 can be configured with corresponding CAN message filters, which ensures that only the required data is transmitted to other CAN networks through the repeater. At the same time, the product also has the function of data routing, which can selectively forward CAN messages received by one channel to another channel. Therefore, the device can effectively reduce the network load. CANHub-AS4 can be configured by connecting to a PC through an asynchronous serial communication interface; it provides configuration software on Windows and is easy to use. The configuration takes effect immediately.

Figure 1.1 Product appearance

2. Features

- CAN interface with 4-channel electrical isolation

- You can configure the communication baud rate through the RS232 port: 5 Kbps-1 Mbps

- Powerful CAN message filtering function, which effectively prevents unnecessary messages from being forwarded

- You can arbitrarily set the destination port for message forwarding

- Port data throughput up to 6,000 fps

- Compliant with CAN2.0B specification and ISO/DIS 11898 specification

- All CAN channels are galvanically isolated with 2,500 VDC isolation voltage

- Has power, device status, bus activity/error indicators

- Operating voltage: 9 V-24 V AC/DC

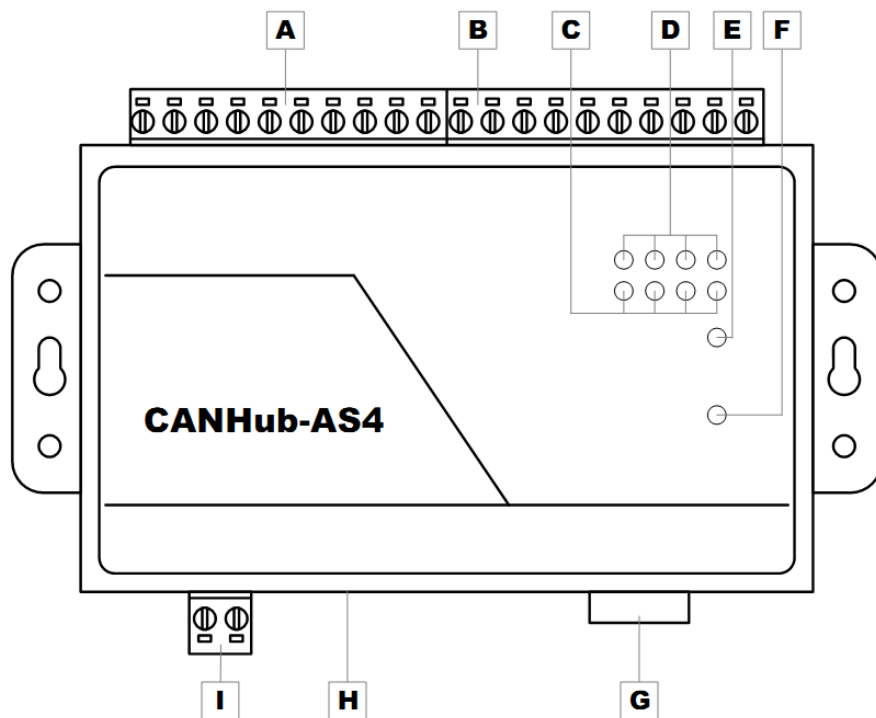- Metal shell.

3. Parts and Functions

Figure 3.1 Components and functions of the device

Figure 3.1 shows the device appearance. Table 3.1 lists the components and functions.

Table 3.1 Function description of each component

标签	名称	说明
A	CAN 总线端口	对应 2 个端口：CAN3、CAN4
B	CAN 总线端口	对应 2 个端口：CAN1、CAN2
C	总线活跃指示灯	对应 4 个端口：CAN1、CAN2、CAN3、CAN4
D	总线错误指示灯	对应 4 个端口：CAN1、CAN2、CAN3、CAN4
E	运行指示灯	指示设备运行状态
F	电源指示灯	指示电源状态
G	RS232 通信端口	通过该端口配置 CABHub-AS4
H	DC JACK 插口	电源接口
I	AWG 14-22 插拔式接线端子	电源接口

4. Installation and Wiring

This chapter describes how to install the CANHub-AS4 device, including installing the device and system wiring. Be sure to install the device carefully by referring to the instructions. Improper installation may cause equipment malfunction, resulting in damage to the equipment.

4.1 Installation

4.1.1 Precautions

To improve system reliability and maximize device functionality, be sure to consider the following factors during installation and wiring. Environmental Conditions Do not install the device in any of the following locations.

- Places with rapid temperature changes and condensation;
- Places with ambient humidity less than 10% or greater than 90%;
- Places with corrosive or flammable gases;
- Locations with excessive dust, chloride or ironwood dust;
- Places where the device is subject to direct shock or vibration;
- Places exposed to direct sunlight;
- The device may come into contact with water, oil, and chemical agents.

Be sure to adequately enclose or protect the equipment in the following locations.

- Places with static electricity and noise;
- Places with strong electromagnetic fields;
- Locations where there may be radioactive leakage;
- Locations near power cables.

Installation in a Cabinet or Control Panel   When the device is installed in a cabinet or control panel, provide an appropriate suitable operating and maintenance environment. In a closed environment, the ambient temperature must be within the range of 0°C to 70°C. The following methods can be used to maintain a moderate temperature if necessary.

- Provide enough space for air circulation;
- Do not install the device on top of equipment that generates high heat, such as heaters, transformers or high-power resistors;
- If the ambient temperature exceeds 70°C, install a cooling fan or air conditioner.

4.1.2 Appearance and Dimensions

The dimensions of CANHub-AS4 are 115x70x25 mm. The shell has fixing holes. Figure 4.1 shows the device appearance.
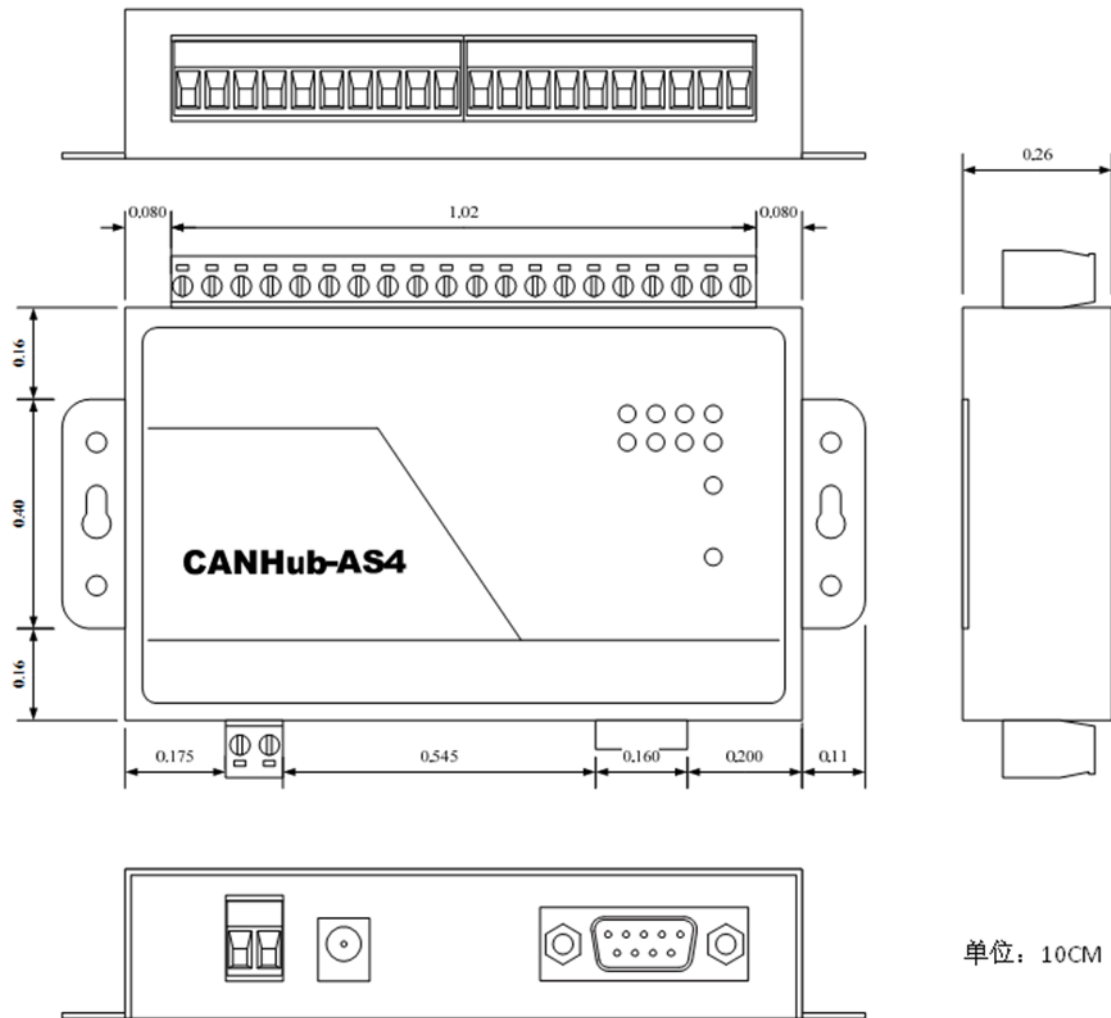

Figure 4. 1 Product dimensions

4.2 Wiring

4.2.1 Connecting the Power Cable

DC power supply   Provides 9-24 V DC/AC to keep the voltage fluctuation within the specified range.

Mains power   The rated power consumed by the CANHub-AS4 is 5 W. The device provides surge current protection. When the power is on, the inrush current is around 400 mA.

Terminal Blocks   CANHub-AS4 has two power input terminals in different structures: 2 Pin AWG 14-22 plug-in terminal block and DC JACK socket. The power cable can be connected to either terminal, but not both power terminals at the same time. AWG 14-22 plug-in terminals are M3.5 terminal screws. Use crimp terminals for wiring, or connect bare stranded wires directly to the terminals. Tighten the screws of the terminal block using a screwdriver. If the power is fully on, the "POWER" indicator remains on.

Figure 4.2 shows the power supply wiring.
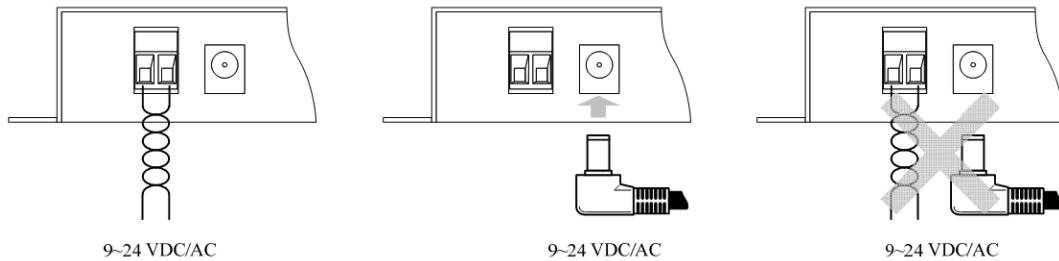

Figure 4.2 Power connector

4.2.2 Connecting to the PC over RS232

CANHub-AS4 is configured by using the RS232 interface. Figure 4.3 shows the pins of the RS232 interface on the CAHHub-AS4.

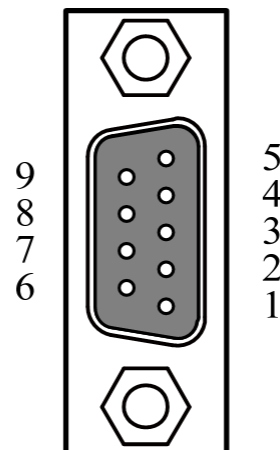| 引脚	信号	描述
1	N.C.	
2	TXD	发送数据
3	RXD	接收数据
4	N.C.	
5	GND	信号地
6	N.C.	
7	N.C.	
8	N.C.	
9	N.C.	

Figure 4.3 DB9

This port uses a DB-9 female connector. Before configuration, use one RS232 extension cable (supplied) to connect CANHub-AS4 to the PC. Communication is impossible if a crossover cable is used.

4.2.3 Connecting the Network

CANHub-AS4 provides four CAN channels. All channels are equivalent and can be used to connect a CAN network or a device with a CAN interface. The four channels are respectively drawn out by two 10 Pin AWG 14-22 plug-in terminals. Figure 4.4 and Table 4.1 show the pin definitions of the terminal blocks.
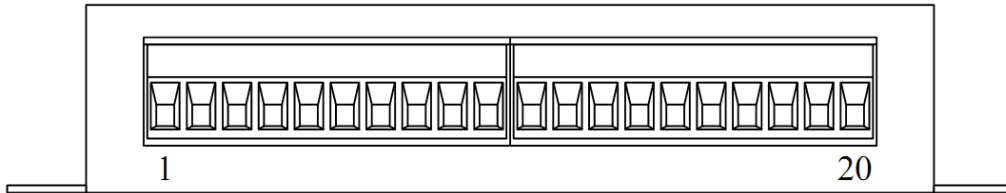

Figure 4.4 Terminals

Table 4.1 Description of wiring terminals

Pin	Port	Name	Function
1	CAN1	CAN_L	CAN_L signal cable
2		R−	Short-circuit with R+ to enable the 120-ohm termination resistor
3		FG	Shielded ground
4		R+	Short-circuit with R- to enable the 120-ohm termination resistor
5		CAN_H	CAN_H signal cable
6	CAN2	CAN_L	CAN_L signal cable
7		R−	Short-circuit with R+ to enable the 120-ohm termination resistor
8		FG	Shielded ground
9		R+	Short-circuit with R- to enable the 120-ohm termination resistor
10		CAN_H	CAN_H signal cable
11	CAN3	CAN_L	CAN_L signal cable
12		R−	Short-circuit with R+ to enable the 120-ohm termination resistor
13		FG	Shielded ground

14		R＋	Short-circuit with R- to enable the 120-ohm termination resistor
15		CAN_H	CAN_H signal cable
16		CAN_L	CAN_L signal cable
17		R－	Short-circuit with R+ to enable the 120-ohm termination resistor
18	CAN4	FG	Shielded ground
19		R＋	Short-circuit with R- to enable the 120-ohm termination resistor
20		CAN_H	CAN_H signal cable

When the CANHub-AS4 device is connected to the CAN bus, CAN_L is connected to CAN_L, and CAN_H is connected to CAN_H. According to the ISO 11898 specification, to reduce the signal reflection on the CAN bus and enhance the communication reliability, the two endpoints of the bus usually require a termination matching resistor. The terminal matching resistance is determined by the characteristic impedance of the transmission cable. For example, if the characteristic impedance of the twisted pair is 120 ohm, the two terminals on the bus should also be connected to a 120-ohm terminal resistance. The CANHub-AS4 converter itself contains terminating resistors. When CANHub-AS4 is at the end of the bus, short the "R-" and "R+" pins to enable the terminating resistor.

4.2.4 LED Indicators

There are 10 LED indicators on the top panel of the CANHub-AS4. After the CAN bus is connected, when the system has no data transmission, the network active status indicator and the network error indicator should be off; when the system has data transmission, all the network active status indicators flash. Table 4.2 describes the functions.

Table 4.2 Indicator description

LED 名称	颜色	显示	意义
POWER	绿色	点亮	电源已接通。
		熄灭	没有接通电源，或者电源线存在问题。
System	绿色	闪烁频率 0.5Hz	系统工作正常。
		熄灭	系统没有工作。
		无规律地闪烁	电源功率不足或电源干扰严重。
Active	绿色	点亮	对应端口的总线处于活动状态，连续有数据通过时闪烁。
		熄灭	对应端口的总线处于非活动状态。
Fault	红色	点亮	对应端口的总线发生错误。
		熄灭	对应端口的总线没有发生错误。

5. Function Configuration

This chapter describes how to access various configuration, monitoring, and management functions of CANHub-AS4. Before connecting to the CAN, configure the CANHub-AS4 to meet the actual application requirements. The device configuration includes CAN baud rate, message routing, and message filtering. Connect CANHub-AS4 to the PC by using an RS232 cable. The configuration is performed by a dedicated configuration program running on the PC without any hardware jumper or switch configuration. The configuration takes effect immediately after it is complete.

Use "CANHub-AS4 Configurator" under Windows to configure the device. The software is included on the CD-ROM delivered with the product. The configuration program can save the last successfully set parameters of the device. Before configuring the device, connect the device to the PC by using the RS232 communication cable. The following describes the main configuration parameters in detail with reference to the configuration software.

5.1   Basic Information

The first tab is Basic Information. General settings include CANHub-AS4 communication ports and some basic information about the device. Download all user-modified configurations to the device, or obtain the current configuration and modify the device information on this interface, as shown in Figure 5.1.

Figure 5.1 Basic Information tab

Connecting the Port

Select the port where the program communicates with CANHub-AS4. The drop-down list in the combo box lists the serial communication ports available in the system.

Get All

Read configuration from CANHub-AS4 (including configuration of other tabs).

Set All

Write all configurations (including those of other tabs) to the CANHub-AS4 device.

5.2　Baud Rate

The second tab is the baud rate settings. Select the baud rate of the corresponding port in this tab, as shown in Figure 5.2. If you select "Custom" in the list below, enter your calculated baud rate in the edit box on the right. Calculate the baud rate for non-standard values. It is recommended to use dedicated computing software, or contact technical support or sales engineers.

Figure 5. 2 Baud Rate Settings tab

5.3   Routing

CANHub-AS4 provides the simple message routing function, which can selectively forward CAN messages received on one channel to another channel. These operations are performed on the Routing tab page. As shown in Figure 5.3, select the corresponding channel to forward the message to this channel.
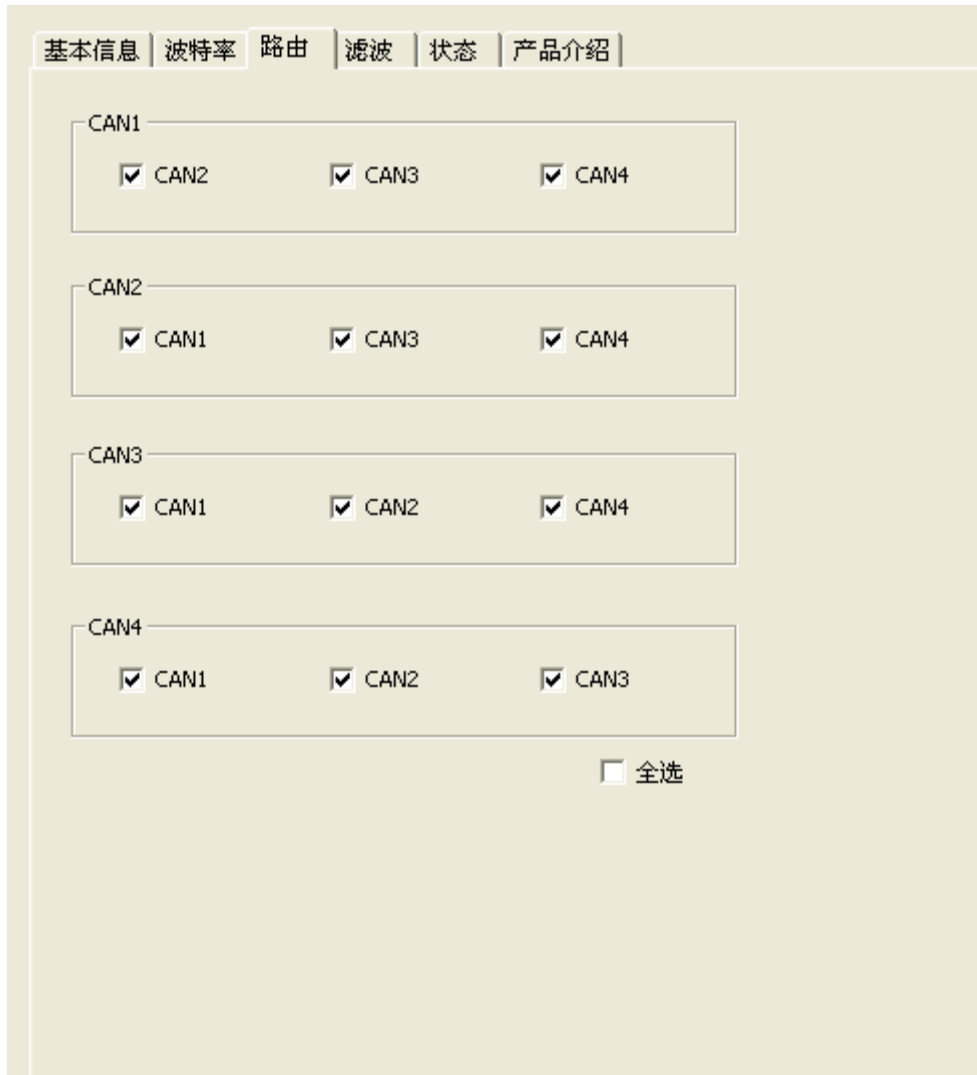
Figure 5.3 Routing tab

5.4   Filtering

CANHub-AS4 has a powerful message filter. The filter has 1,024 cells, which can hold 1,024 standard identifiers or 512 extended identifiers or a mixture of both types. In the "Filter" tab, the filter types are divided into: Standard Frame Identifier, Standard Frame Group Identifier, Extended Frame Identifier and Extended Frame Group Identifier. The group identifier refers to a group of continuous identifiers. As shown in Figure 5.4, click the corresponding button on the configuration program interface, the details of the corresponding filter can be displayed in the following list box, and the content of the filter can be modified.

Figure 5. 4 Filtering tab

1. Select "Enable" to modify the filter content.

2. Click the "Add" button to add one (two) identifiers to the filter list. What is added varies depending on the type of the current identifier. Two standard frame identifiers are always added at a time.

3. In the case of standard frame identifiers or standard frame group identifiers, each filter will have a radio button under the "Sequence Number" column. Select the radio box to enable the filter.

4. Click the Channel column of the newly added filter. In the displayed drop-down list, select the port corresponding to the filter.

5. Click the ID or Start ID or End ID column of the newly added filter. Enter the filter identifier in the displayed edit box. For example, 128. Note: The standard frame identifier range is 0-2047, while the extended frame identifier range is 0-536870911.

6. Click on an empty space in the filter list box to add a filter.

7. Repeat the preceding steps to add more filters.

5.5 Status Functions

Monitor the status of each channel of CANHub-AS4 in real time by using the configuration program. As shown in Figure 5.5, click the button under the "Status" tab. The software interface displays the working conditions of each channel of the device. Table 5.1 lists the meaning of each parameter.

Figure 5. 5 Status tab

Table 5. 1 State parameter description

Name	Function
RBS	Receive buffer status: Receive available information
DOS	Data overflow state: Because the data previously transmitted to the CAN controller has not been read out, and the receive buffer has not been released in time, the subsequent information is lost.
TBS	Send buffer status: no message to send
TCS	Send end status: All sent requests are processed successfully.
RS	Receive status: The CAN controller is receiving data.
TS	Sending status: The CAN controller is sending data.
ES	Error status: The count value of the transmit and receive error counters, or one of them, has

	reached the threshold set in the error warning limit register.
BS	Bus status: The CAN controller is currently disabled because the transmit error counter has reached its threshold 255.
RXERR	Current value of the Rx error counter.
TXERR	Current value of the Tx error counter.

6. Inspection and Maintenance

The main electrical components in CANHub-As4 are semiconductor components. Despite their long service life, ageing may also be accelerated under inappropriate conditions. Periodic inspections should be carried out to ensure that the required conditions are maintained. It is recommended to check the device at least once every 6 months to a year. Under unfavorable environmental conditions, more frequent inspections should be carried out. For any problem, please feel free to contact Guangzhou ZLG Electronics Co., Ltd.

7. Disclaimer

Based on the principle of providing better service for users, Guangzhou ZLG Electronics Co., Ltd. ("ZLG Electronics") will try to present detailed and accurate product information in this manual. However, due to the effectiveness of this manual within a particular period of time, ZLG Electronics does not guarantee the applicability of this document at any time. ZLG Electronics shall reserve the right to update this manual without prior notice. To get the latest version, please visit the official website of ZLG Electronics regularly or contact ZLG Electronics. Thank you!

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