Protoss-PE11

RS485 to Ethernet

User Manual

V 1.3

Overview of Characteristic

- ✧ **Cortex-M3 MCU with 2MB Flash and 128KB SRAM**
- ✧ **Use FreeRTOS Operation System**
- ✧ **Support TCP/UDP/MQTT/HTTP/WebSocket Protocol**
- ✧ **Support Modbus TCP to RTU, Modbus Master Function**
- ✧ **Support RS485 To 10M Ethernet Conversion, Serial Speed Up to 460800 bps**
- ✧ **Support 10M Ethernet Auto-Negotiation**

- **Support Webpage Easy Configuration or PC IOTService Tool**
- **Support Security Protocol Such As AES/DES3**
- **Support Heartbeat and Resister Packet Function**
- **Support Webpage OTA Wireless Upgrade**
- **Support Industrial Temperature: -40 to +70° C**
- **Multiple Type of Different Power Input：**
  - **Protoss-PE11-H：100～240VAC@50～60Hz**
  - **Protoss-PE11-M：9～48VDC@1A**
  - **Protoss-PE11-L： 9～24VDC@1A**
- **Size: 97.60 x 64.95 x 27.50 mm (L x W x H)， C45 rail installation**

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HISTORY

Ed. V1.0	02-10-2020	First Version
Ed. V1.1	03-18-2020	Update RS485 interface
Ed. V1.2	03-15-2021	Update Ethernet data rate 10M.
Ed. V1.3	01-12-2024	Add - L model

1. PRODUCT OVERVIEW

1.1. General Description

The Protoss-PE11 provides a RS485 interface to TCP/IP data transfer product. The Protoss-PE11 integrate TCP/IP controller, memory, 10M Ethernet transceiver, RS485 and integrates a fully developed TCP/IP network stack and FreeRTOS OS. Protoss-PE11 also includes an embedded web server used to configure device.

The Protoss-PE11 using highly integrated hardware and software platform, it has been optimized for all kinds of applications in the industrial control, smart grid, personal medical application and remote control that have lower data rates, and transmit or receive data on an infrequent basis.

1.2. Device Paremeters

Table1. Protoss-PE11 Technical Specifications

Item	Parameters
System Information	
Processor/Frequency	Cortex-M3/96MHz
Flash/SDRAM	2MB/128KB
Operating System	FreeRTOS
Ethernet Port	
Port Number	1
Interface Standard	10M Base-T
Transformer	Integrated
Network Protocol	IP，TCP，UDP，DHCP，DNS，HTTP Server/Client，ARP, AutoIP，ICMP， Telnet, NTP, Modbus TCP
Security Protocol	AES 128Bit DES3
Serial Port	
Port Number	1 RS485
Data Bits	5,6,7,8
Stop Bit	1,2
Check Bit	None, Even, Odd
Baud Rate	TTL: 600 bps~460800 bps
Flow Control	No Flow Control Software Xon/ Xoff flow control
Software	
Web Pages	Http Web Configuration Customization of HTTP Web Pages
Configuration	Web CLI XML import

	Telnet IOTService PC Software UART Fast Config
Firmware Upgrade	Webpage, IOTService Tools
Basic Parameter	
Size	97.60mm x 64.95mm x 27.50mm
Operating Temp.	-40 ~ 70°C
Storage Temp.	-40 ~ 85°C, 5 ~ 95% RH（no condensation）
Input Voltage	Protoss-PE11-H：100～240VAC@50～60Hz Protoss-PE11-M：9～48VDC@1A Protoss-PE11-L：9～24VDC@1A
Working Current	~100mA
Power	<400mW

1.3. Key Application

The Protoss-PE11 device connects serial device to Ethernet networks using the TCP/IP protocol:

- Remote equipment monitoring
- Asset tracking and telemetry
- Security Application
- Industrial sensors and controls
- Medical devices
- ATM machines
- Data collection devices
- Universal Power Supply (UPS) management units
- Telecommunications equipment
- Data display devices
- Handheld instruments
- Modems
- Time/attendance clocks and terminals

2. HARDWARE INTRODUCTION

The Protoss-PE11 unit is a complete solution for serial port device connecting to network. This powerful device supports a 10/100BASE-T Ethernet connection, a reliable and proven operating system stored in flash memory, an embedded web server, a full TCP/IP protocol stack, and standards-based (AES) encryption.

Through Ethernet cable connect router with Protoss-PE11 serial server for data transfer, which makes the data transformation very simple.

Figure 1. Protoss-PE11 Appearance

2.1. Protoss-PE11 Pins Definition

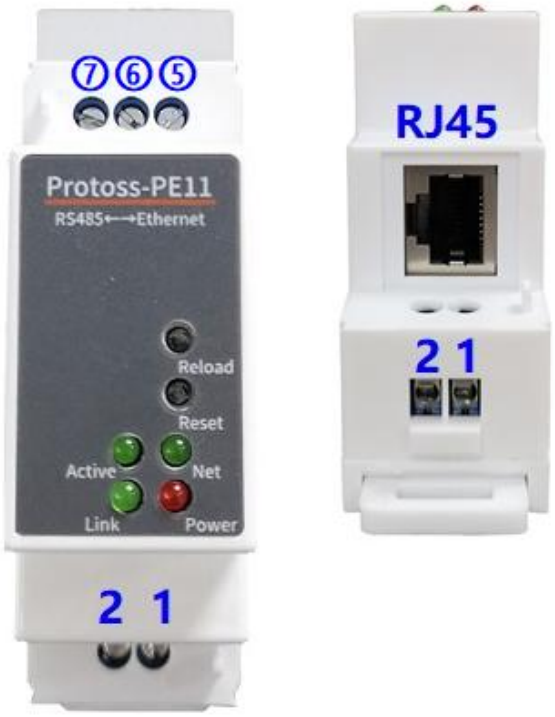

Figure 2. Protoss-PE11 Interface

Table2. Protoss-PE11-H Interface Definition

Pin	Description	Net Name	Signal Type	Comment
1	AC Power Input	L	Power	100～240VAC Input
2	AC Power Input	N	Power	
5		RS485_B-	IO	RS485 B-
6	Signal GND	GND	Power	Used for RS485 GND, usually leave it unconnected
7		RS485_A+	IO	RS485 A+
RJ45	Ethernet	RJ45	I/O	
Reload	Restore to factory setting button	Reload	I	Press down for more than 3 seconds and loose to restore factory setting.
Reset	Reset button	Reset	I	Hardware reset button
Net	Network status LED	Net	O	On: Ethernet connection is OK Off: No Ethernet connection
Active	UART Data Transfer	Active	O	Off: No data transfer 0.3s Off -> 0.9s On: UART TX Output 0.3s Off -> 0.3s On: UART RX Receive On: UART bidirection.
Power	Power LED	Power	O	On: Power input OK Off: Power input NG.
Link	Server connection LED	Link	O	On: netp Socket connection OK. Off: no netp Socket connection.

Table3. Protoss-PE11-M Interface Definition

Pin	Description	Net Name	Signal Type	Comment
1	DC Power Input	VCC+	Power	9～48VDC@1A Input
2	DC Power Input	GND-	Power	
5		RS485_B-	IO	RS485 B-
6	Signal GND	GND	Power	Used for RS485 GND, usually leave it unconnected
7		RS485_A+	IO	RS485 A+
RJ45	Ethernet	RJ45	I/O	
Reload	Restore to factory setting button	Reload	I	Press down for more than 3 seconds and loose to restore factory setting.
Reset	Reset button	Reset	I	Hardware reset button
Net	Network status LED	Net	O	On: Ethernet connection is OK Off: No Ethernet connection
Active	UART Data Transfer	Active	O	Off: No data transfer 0.3s Off -> 0.9s On: UART TX Output 0.3s Off -> 0.3s On: UART RX Receive On: UART bidirection.
Power	Power LED	Power	O	On: Power input OK Off: Power input NG.
Link	Server connection LED	Link	O	On: netp Socket connection OK. Off: no netp Socket connection.

Table4. Protoss-PE11-L Interface Definition

Pin	Description	Net Name	Signal Type	Comment
1	DC Power Input	VCC+	Power	9～24VDC@1A Input
2	DC Power Input	GND-	Power	
5		RS485_B-	IO	RS485 B-
6	Signal GND	GND	Power	Used for RS485 GND, usually leave it unconnected
7		RS485_A+	IO	RS485 A+
RJ45	Ethernet	RJ45	I/O	
Reload	Restore to factory setting button	Reload	I	Press down for more than 3 seconds and loose to restore factory setting.
Reset	Reset button	Reset	I	Hardware reset button
Net	Network status LED	Net	O	On: Ethernet connection is OK Off: No Ethernet connection
Active	UART Data Transfer	Active	O	Off: No data transfer 0.3s Off -> 0.9s On: UART TX Output 0.3s Off -> 0.3s On: UART RX Receive On: UART bidirection.
Power	Power LED	Power	O	On: Power input OK Off: Power input NG.
Link	Server connection LED	Link	O	On: netp Socket connection OK. Off: no netp Socket connection.

<Notes>

I — Input; O — Output; I/O: Digital I/O; Power—Power Supply

2.2. RS485 Interface

RS485 use two wire links, A(DATA+), B(DATA-). Connect A(+) to A(+), B(-) to B(-) for communication. Suggest to connect GND together when interference is very severe.

The RS485 interface support maximum 32 RS485 device. The cable maximum length is 1200 meters. Need to add 120Ohm terminal resistor for over 300 meters.

2.3. RJ45 Interface

Ethernet port is 10M adaptive, support AUTO MDI/MDIX which means it support direct connecting to PC with Ethernet cable.

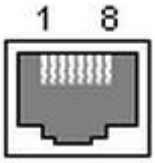

Figure 3. RJ45 Pin Defination

Table5. RJ45 Interface

Pin Number	Name	Description
1	TX+	Transfer Data+
2	TX-	Transfer Data-
3	RX+	Receive Data+
4	PHY-VCC	Transformer Tap Voltage
5	PHY-VCC	Transformer Tap Voltage
6	RX-	Receive Data-
7	N.C.	None Connect
8	N.C.	None Connect

2.4. Mechanical Size

The dimensions of Protoss-PE11 are defined as following picture (mm):


64.95mm
27.50mm
97.60mm
Protoss-PE11
RS485←→Ethernet
Reload
Reset
Active
Net
Link
Power

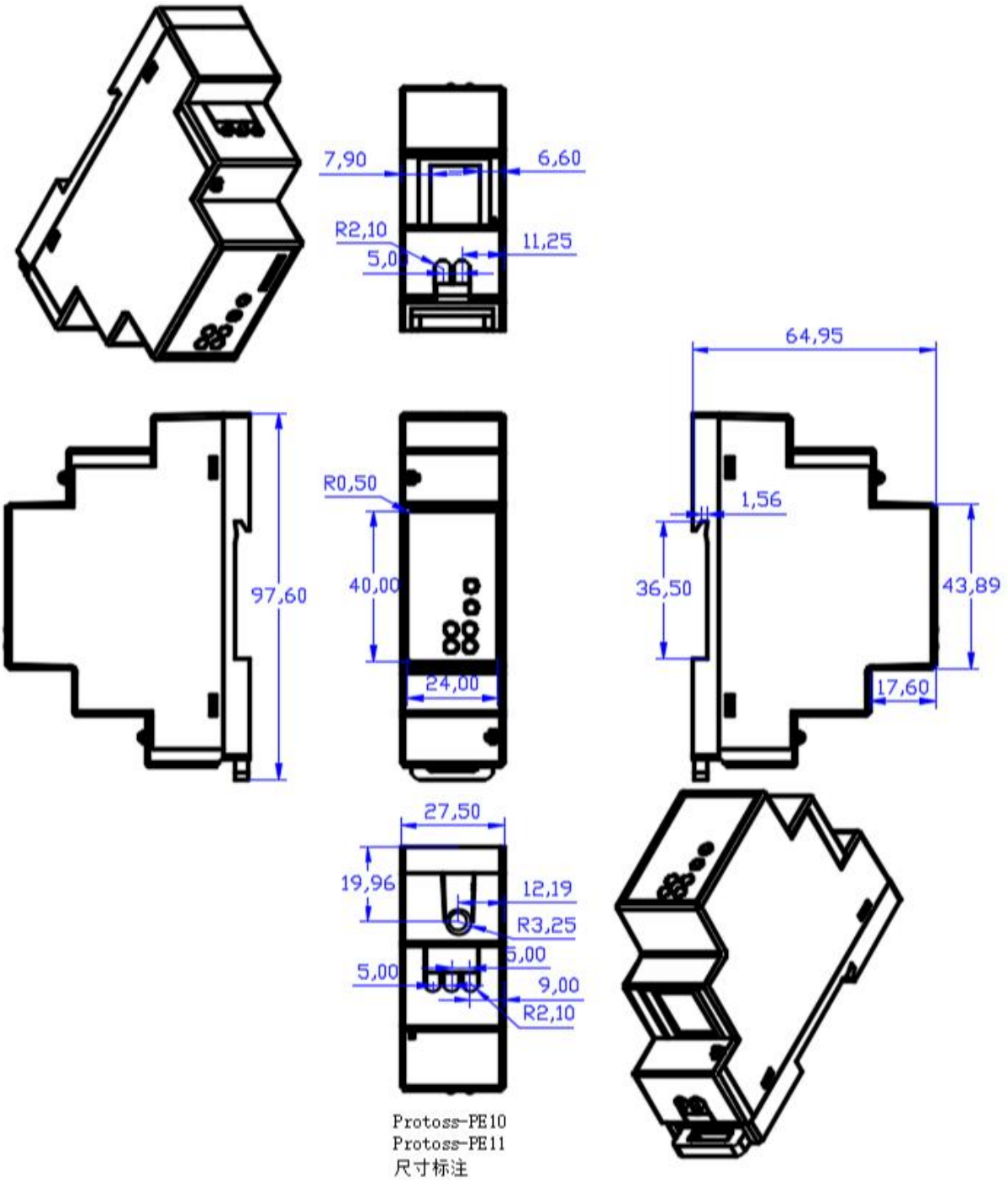

Figure 4. Protoss-PE11 Mechanical Dimension

2.5. Product Installation

Figure 5. Product Installation

2.6. Order Information

Base on customer detailed requirement, Protoss-PE11 provide different configuration version, Details as below:

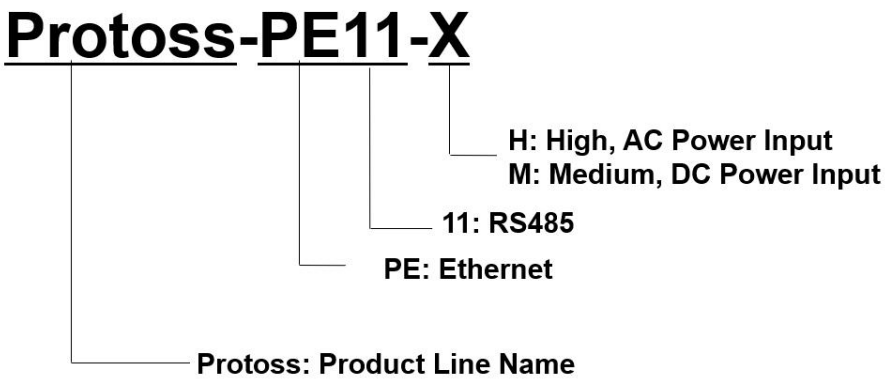

Figure 6. Protoss-PE11 Product Order Information

3. FUNCTION DESCRIPTION

Refer to “IOT_Device_Series_Software_Funtion” document for more detailed function.

APPENDIX A: CONTACT INFORMATION

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