5.4. Modbus TCP I/O Expansion Unit

• Introduction

Modbus is a communication protocol developed by Modicon in 1979 for linking devices with Modicon PLCs using a master/slave relationship. Different versions of Modbus today include Modbus RTU, Modbus ASCII and Modbus TCP. Where Modbus RTU and ASCII are based on serial communication like RS-232 and RS-485, and Modbus TCP is based on Ethernet communication. It's a standard, truly open and widely used in industrial automation field.

The iP-8000-MTCP series is an I/O unit with Modbus protocol. It supports most of high profile I-8K and I-87K series I/O modules. SCADA and HMI software can easily access variant I/O signals via the iP-8000-MTCP.

• Features

- **Modbus TCP on two independent LAN ports**
- **Modbus RTU/ASCII on COM ports**

- **I/O Slots for high profile I-8K and I-87K series I/O modules**
- **Auto Configuration**

The configurations of I/O modules are backed up in the EEPROM of the iP-8000-MTCP. The iP-8000-MTCP automatically checks and restores the configurations to each I/O modules during booting procedure. If one I/O module fails, the operator just needs to replace it with another one. And then check the LED indicators to know whether the auto configuration is performed correctly.

- **Firmware Programmable**

The iP-8000-MTCP is not just an I/O unit but also a programmable controller. Programmers can use the Modbus SDK to customize the firmware in C language.

• Modbus Utility

The Modbus Utility package is for Windows 98/2K/XP/7. It includes

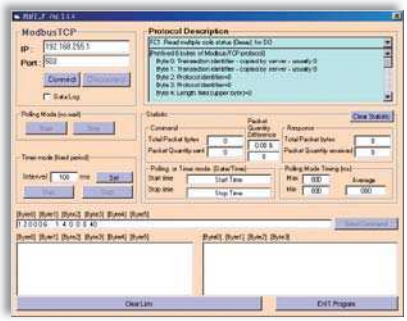
- **Modbus Utility**
  1. Configure I/O Modules and COM ports
  2. Generate Modbus register mapping table of I/O modules
  3. Online monitor
     - Control/Monitor I/O module
     - With trend line and table viewing
     - Automatically log I/O value to a .txt file

MBRTU

- Modbus RTU client (with source code in VB6) to diagnostic Modbus RTU slave devices.

MBTCP

- Modbus TCP client (with source code in VB6) to diagnostic Modbus TCP slave devices.



• Modbus SDK

We provide Modbus SDK to users. You can use it to integrate several serial devices.

	Modbus lib	nModbus dll	
Platform	MiniOS7	Windows 2k/XP/7	WinCE 5.0/6.0
Development Language	Borland C, Turbo C	C# .NET 2005/2008 VB .NET 2005/2008	
Purpose	To customize the firmware of iP-8000-MTCP	To develop a program on PC based controllers to access the iP-8000-MTCP	
Feature	Modbus RTU/ASCII: Master/Slave Modbus TCP/UDP: Master/Slave		

NEW **iP-8441-MTCP**

NEW **iP-8841-MTCP**

Highlight Information

- 2 independent Ethernet ports
- Supports Modbus TCP
- Supports Modbus RTU/ASCII
- Supports Modbus TCP to RTU Gateway
- Auto Configuration
- 4/8 I/O Slots for I-8K and I-87K Series Modules
- Operating Temperature: -25 ~ +75 °C

Introduction

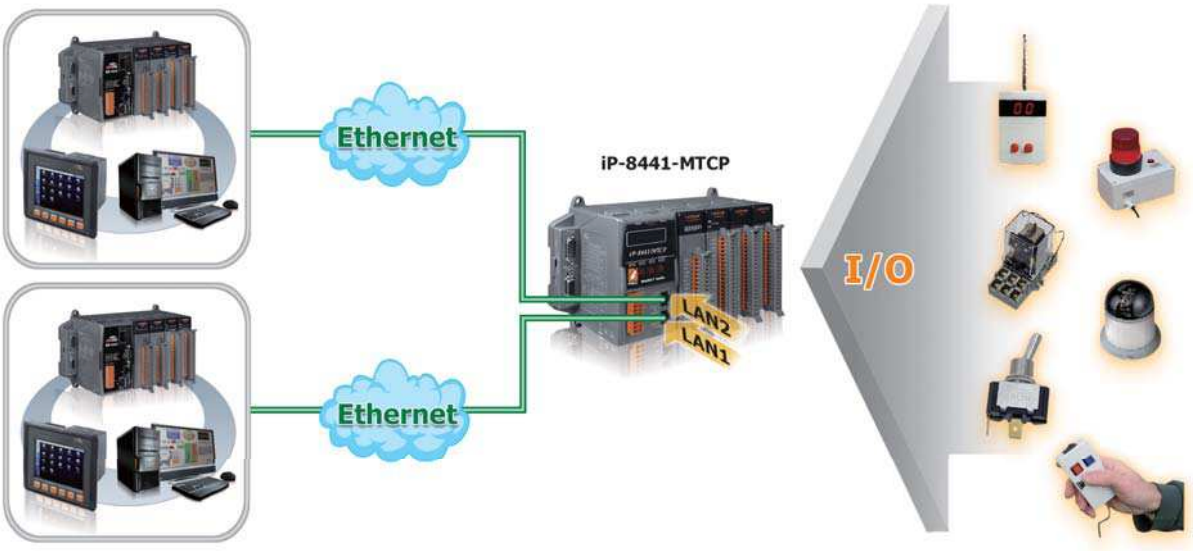
iP-8000-MTCP series is a Modbus TCP I/O expansion unit to expand I-8K and I-87K series I/O modules over the Ethernet for industrial monitoring and controlling applications. There are more than 50 I/O modules supported with the unit, including analog input/output, digital input/output, counter, frequency I/O modules.

It is designed to be used in harsh and noisy environment, so the hardware is manufactured with wide power input range (10 ~ 30 V_{DC}), isolated power input and can operate under wide temperature (-25 ~ +75°C). To simplify installation and maintenance of I/O modules, it provides many useful features, such as: auto configuration, LED indicators for fault detection, dual watchdog to keep alive, programmable power on and safe values for safety.

Modbus is a very wide known protocol in the industrial manufacturing and environment monitoring fields. Many SCADA software, HMI and PLC has built-in driver to support Modbus devices. Besides, we also provide SDK on different platforms, such as Windows XP, Window CE 5.0/6.0, Linux, MiniOS7. Therefore, it is very easy to integrate remote I/O to customer's applications.

Further more, the iP-8000-MTCP is also a c language based programmable controller that equipped a DOS-like OS (MiniOS7). Programmers can use C compilers that can create 16 bit executable file (*.exe) to customize the Modbus firmware which preinstalled in the iP-8000-MTCP. The SDK provides rich functions for Modbus communication, such as Modbus TCP master/slave, Modbus RTU master/salve, Modbus ASCII master/slave, etc.

Applications



Specifications

Models	iP-8441-MTCP	iP-8841-MTCP
System Software		
OS	MiniOS7 (DOS-like embedded operating system)	
Program Download Interface	RS-232 (COM1) or Ethernet	
Programming Language	C language	
Compilers to create.exe Files	TC++ 1.01 TC 2.01 BC++3.1 ~ 5.2x MSC 6.0 MSVC++ (before version 1.5.2)	
CPU Module		
CPU	80186 or compatible (16-bit and 80 MHz)	
SRAM	768 KB	
Flash	512 KB (100,000 erase/write cycles) with Flash protection switch	
Expansion Flash Memory	microSD socket (can support 1/2 GB microSD)	
Dual Battery Backup SRAM	512 KB; data valid up to 5 years	
EEPROM	16 KB	
NVRAM	31 bytes (battery backup, data valid up to 5 years)	
RTC (Real Time Clock)	Provide second, minute, hour, date, day of week, month, year	
64-bit Hardware Serial Number	Yes, for Software Copy Protection	
Watchdog Timers	Yes (0.8 second)	
NET ID	8-pin DIP switch to assign NET ID as 1 ~ 255	
Communication Ports		
Protocol	Modbus TCP Slave	
	Modbus RTU/ASCII Slave	
	Modbus TCP to RTU Gateway	
Ethernet	RJ-45 x 2, 10/100 Base-TX (Auto negotiating, Auto MDI/MDI-X, LED indicators)	
COM 0	Internal communication with the high profile I-87K series modules in slots	
COM 1	RS-232 (to update firmware) (RxD, TxD and GND); non-isolated	
COM 2	RS-485 (D2+, D2-; self-tuner ASIC inside); 3000 V_{DC} Isolation	
COM 3	RS-232/RS-485 (RxD, TxD, CTS, RTS and GND for RS-232, Data+ and Data- for RS-485); non-isolated	
COM 4	RS-232 (RxD, TxD, CTS, RTS, DSR, DTR, CD, RI and GND); non-isolated	
SMMI		
LED Display	Yes, 5-Digit	
Programmable LED Indicators	3	
Push Buttons	4	
Buzzer	Yes	
I/O Expansion Slots		
Slot Number	4	8
	Note: For High Profile I-8K and I-87K Modules Only	
Data Bus	8/16 bits	
Address Bus Range	2 K for each slot	
Mechanical		
Dimensions (W x L x H)	231 mm x 132 mm x 111 mm	355 mm x 132 mm x 111 mm
Installation	DIN-Rail or Wall Mounting	
Environmental		
Operating Temperature	-25 ~ +75°C	
Storage Temperature	-30 ~ +80°C	
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)	
Power		
Input Range	+10 ~ +30 V_{DC}	
Isolation	1 kV	
Redundant Power Inputs	Yes, with one power relay (1 A @ 24 V_{DC}) for alarm	
Capacity	30 W	30 W
Consumption	6.7 W	7.2 W

Ordering Information

iP-8411-MTCP	4 slots I/O Expansion Unit with Modbus TCP protocol
iP-8841-MTCP	8 slots I/O Expansion Unit with Modbus TCP protocol

Accessories

DP-660	24 V_{DC}/2.5 A, 60 W and 5 V_{DC}/0.5 A, 2.5 W Power Supply with DIN-Rail Mounting
DP-665	24 V_{DC}/2.7 A, 65 W Power Supply with DIN-Rail Mounting
I-7560 CR	USB to RS-232 Converter (RoHS)
3LMSD-2000 CR	2 GB microSD card (RoHS)