ICP DAS

Industrial Communication & Networking Products Catalog

Vol. ICNP 2.1.00

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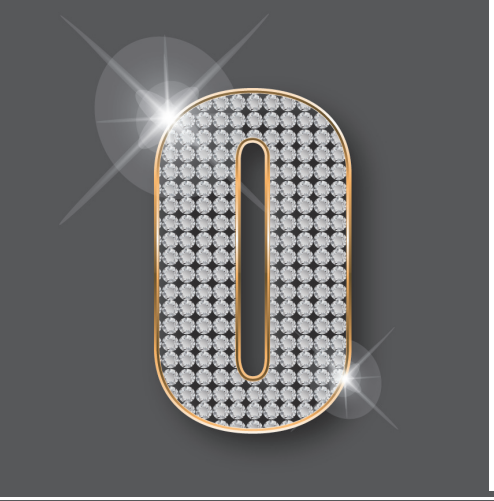

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Introduction

1-1 Industrial Communication & Networking Products

The inevitable trend toward the implementation of the Internet of Things (IoT) and Industry 4.0 currently leads global cooperation and technology development, and the future demands and business opportunities in this area are potentially unlimited.

Maximizing the extension of network is the essence of Industry 4.0 as well as the first step of building up a smart factory. ICP DAS have comprehensive selections of industrial communication and networking products to fulfill the demand of real-time communication, remote control, huge data transmission, the flexibility and the adaption of the expansion of internet infrastructure.

At ICP DAS, we are committed to leveraging our considerable experience, our highly professional R&D capabilities, and our innovative products, as well as our dedication to service, in order to work together with you to seize the unquestionable future business opportunities that will arise from the increasing adoption of both IoT and Industry 4.0.

Multi-port RS-232/422/485 Communication Cards

The VXC/VEX/PCIe-S serial card provides Universal PCI (3.3 V and 5 V) or PCI Express interface, and enables user to install additional communication ports on PC. The VXC/VEX/PCIe-S card features multiple RS-232 or RS-422/485 communication ports, offer up to 256-byte hardware FIFO for each port and support 32/64-bit Windows 7/Vista/2003/XP systems.

Chapter 2

Programmable Serial to Ethernet Device Server

Programmable Device Server (PDS) is Serial-Device to Ethernet gateway. It connects RS-232/422/485 serial devices to Ethernet that usually is the existing network in office and factory.

VxComm Driver creates virtual COM ports and maps them to physical serial ports on PDS remotely. User's serial programs only need to be changed to the virtual COM port for getting the access of serial devices allocated in the Internet or Ethernet network via the PDS.

Chapter 3

Repeater, Converter, Splitter and Hub

RS-485 is an electrical specification of a two-wire, half-duplex and multipoint serial communications channel. It is widely used in the computer automation systems, such as building automation, machine automation and factory automations etc.

ICP DAS provides total solutions on RS-485 bus, such as addressable RS-485 to RS-232/422 converter, RS-485 repeater, RS-232 to RS-485 converter, USB to RS-485 converter, RS-232/422/485 to fiber optic converter and RS-485 Hub… etc.

Chapter 4

USB to RS-232/422/485/CAN Bus Converters

Universal Serial Bus (USB) is designed to allow many peripherals to be connected by using a single standard interface socket, and to improve the plug-and-play capabilities by hot swapping.

USB ports are standard interface to external devices on many computers. By using ICP DAS USB converters, users can access industrial RS-232/422/485 serial devices and CAN bus devices through the existing USB ports easily.

Chapter 4

Fieldbus in Industrial Automation

Fieldbus is an industrial network system for real-time distributed control. It works on a network structure which typically allows daisy-chain, star, ring, branch, and tree network topologies.

ICP DAS has devoted signification resources for many years into developing Fieldbus products based on different protocols in order to provide a variety of Fieldbus solutions covering the entire scope of process and manufacturing automation, such as CAN Bus, CANopen, DeviceNet, J1939, PROFIBUS, HART, EtherCAT, Ethernet/IP, BACnet/IP, and PROFINET applications.

Chapter 5

Ethernet Switch

Ethernet is an ideal medium to transport large volumes of data, at fast speed, across great distances. A single fiber optic cable can carry multiple protocols by using Ethernet.

A well designed switch, like a hub, has to forward and receive packets from one network or device to another. ICP DAS only provides switches with industrial grade chipsets. All our switches are temperature tolerant and highly reliable to function perfectly under harsh environment.

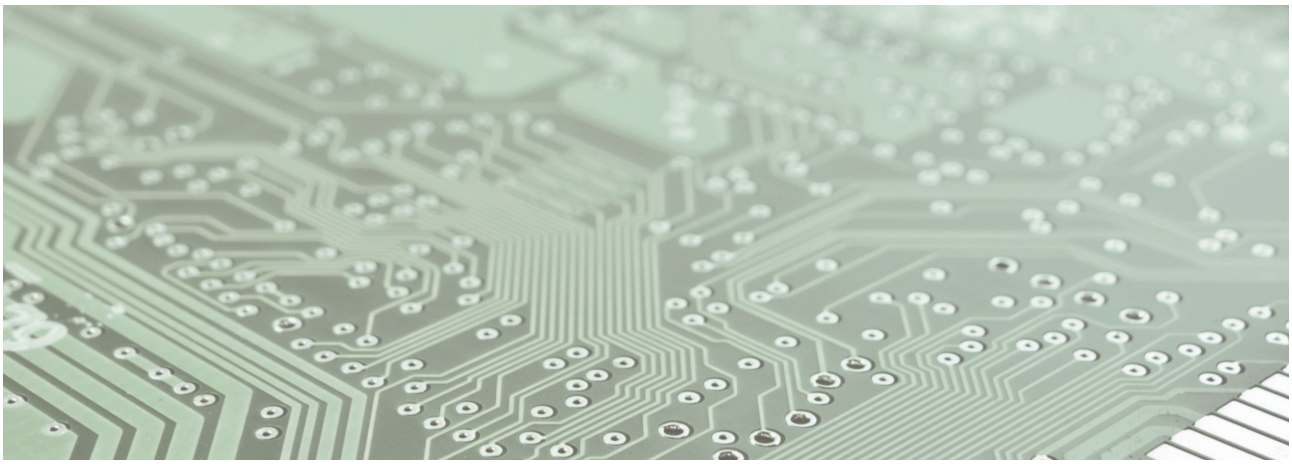
Chapter 6

Wireless Networking

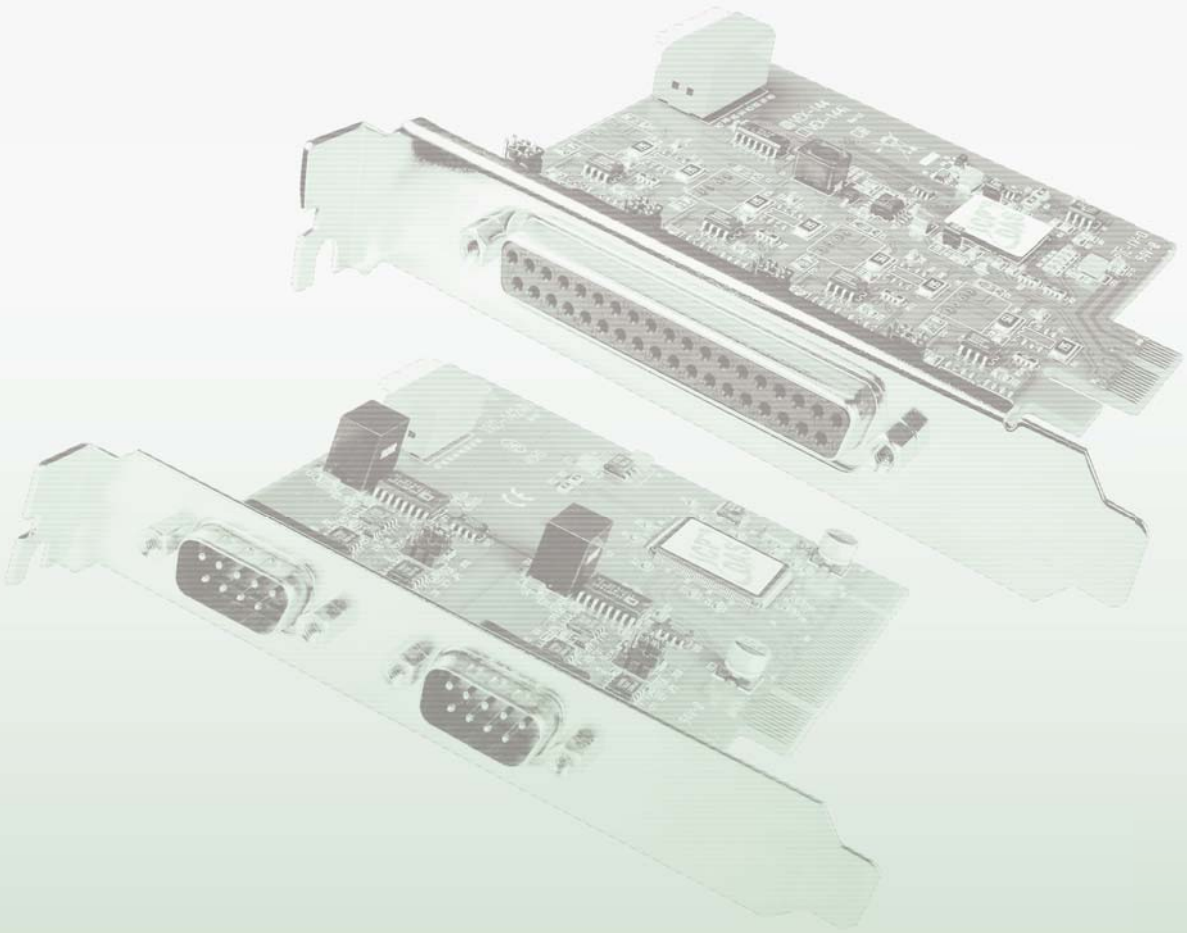
Industrial Wireless Communication creates new prospects for automation. It substantially reduces cost and time for the cable installation and maintenance. It therefore makes plant setup and reconfiguration much easier and safer.

ICP DAS provides a great variety of wireless products with modular and universal solution specially designed for industrial harsh environment.

Chapter 7



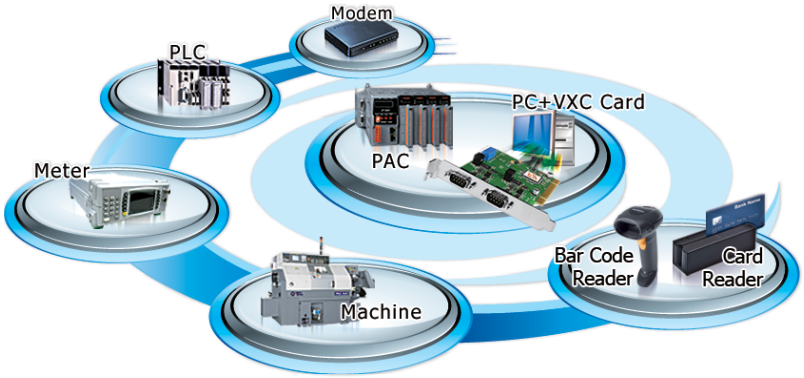
Multiport Serial Cards



2-1 Overview

Overview

The VXC/VEX/PCIe-S multiport card is the foremost choice for PC-based communication solutions, ensuring smooth communication in both time-critical applications and industrial fields. Installing a VXC/VEX/PCIe-S multiport card increases the number of serial ports available on the PC, meaning that it is much easier to integrate a PC with a large number of external devices, such as PLCs, meters, controllers, laboratory instruments, serial printers, RFID readers, bar code readers, and sensors, etc.



The PAC family from ICP DAS is a modular network-based programmable automation controller that provides the capability of adding I/O and RS-232/422/485 serial port modules. This exciting new PAC family offers a flexible, versatile and economical solution to a wide range of applications, from data acquisition, process control, testing and measurement, and motion control to energy and building management, and is an ideal alternative when replacing an existing PC-based system.

Features

COM-Selector

Most VXC/VEX cards are equipped with a COM-Selector (DIP switch) for the COM port number selection. It supports two selection modes: Auto- and Manual-mode. The Auto-mode is the default setting (DIP switch is set as 0), and the uncertain COM port number will be assigned automatically by OS. The Manual-mode of the COM-selector (DIP switch is set as 1 ~ 255) can force the card to use user-defined COM port number.

The Manual-mode of the COM-Selector provides the following advantages:

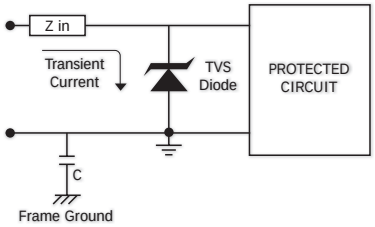
- Simplifies the COM port number selection without configuration utility.
- Specifies the COM port number directly, regardless of which PCI slot is plugged in.
- Avoids the confusion of uncertain COM port number that other PnP COM port devices use.
- Easy to replace a broken card just with the same DIP switch setting.

Easy COM Port Selection by DIP switch

ESD Protection

The VXC/VEX cards offer ESD protection technology, protecting your system from being damaged by the high potential voltages.

When the voltage is beyond the limits, the TVS diode junction avalanches providing a low impedance path for the transient current. As a result, the transient current is diverted away from the protected components and shunted through the TVS diode. The device returns to a high impedance state after the transient threat passed.



Self-Tuner

Without the help of Self-Tuner, users need to enable RS-485 transmitter before sending, and disable the transmitter after finish sending. The timing to enable and disable transmitter (direction control) is the major issue on many communication problems, and it is very difficult to debug. The built-in Self-Tuner on VXC/VEX/PCIe-S cards effectively gets rid of this direction control issue and also simplifies software programming for communication applications.

Isolation

Photo coupler is a device that uses a short optical transmission path to transfer a signal between elements of a circuit. This keeping them electrically isolated — the electrical contact along the path is broken.
It can help cutting down on ground loops, common mode voltages and block voltage spikes, provide electrical isolation, and offer significant protection from serious over-voltage conditions in one circuit affecting the other.

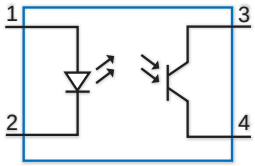


Photo Coupler Operation

Hardware FIFO up to 256 bytes

FIFO is used for buffering and flow control while data come from hardware to software. When using hardware FIFO (buffer), a little delay on software or operating system will not lose data at all. VXC/VEX/PCIe-S Cards are equipped with 128- or 256-byte hardware FIFO for each port.

2-2 PC-based Serial Communication Cards

PCI Express

Model Name	COM-Selector	RS-232	RS-422/485	Self-Tuner	Isolation (VDC)	ESD Protection	Max. Speed (bps)	FIFO Size (bytes)	Connector	Page
VEX-112	Yes	2	–	–	–	–	115.2 k	128	Male DB-9	2-2-1
VEX-112i	Yes	2	–	–	2.5 k	+/-4 kV	115.2 k	128	Male DB-9	2-2-1
VEX-142	Yes	–	2	Yes	–	–	115.2 k	128	Male DB-9	2-2-1
VEX-142i	Yes	–	2	Yes	2.5 k	+/-4 kV	115.2 k	128	Male DB-9	2-2-1
VEX-114	Yes	4	–	–	–	–	115.2 k	128	Female DB-37	2-2-1
VEX-114i	Yes	4	–	–	2.5 k	+/-4 kV	115.2 k	128	Female DB-37	2-2-1
VEX-144	Yes	–	4	Yes	–	–	115.2 k	128	Female DB-37	2-2-1
VEX-144i	Yes	–	4	Yes	2.5 k	+/-4 kV	115.2 k	128	Female DB-37	2-2-1
PCIe-S118	–	8	–	–	–	–	921.6 K	256	Female DB-62	2-2-1
PCIe-S148	–	–	8	Yes	–	–	921.6 K	256	Female DB-62	2-2-2

2-Port RS-232 Card

VEX-112, VEX-112i

- Provides two 9-wire RS-232 ports
- +/-4 kV ESD Protection and for i version
- 128-byte Hardware FIFO for Each Port
- Built-in COM-Selector DIP switch
- 2500 VDC Isolation for i version
- Baud rate: 50 ~ 115200 bps

4-Port RS-232 Card

VEX-114, VEX-114/D2, VEX-114i, VEX-114i/D2

- Provides four 9-wire RS-232 ports
- +/-4 kV ESD Protection and for i version
- 128-byte Hardware FIFO for Each Port
- Built-in COM-Selector DIP switch
- 2500 VDC Isolation for i versions
- Baud rate: 50 ~ 115200 bps

8-Port RS-232 Card

PCIe-S118, PCIe-S118/D2 *NEW*

- 256-byte Hardware FIFO for Each Port
- Automatic COM number assigned by OS
- Provides eight 8-wire RS-232 ports
- Baud rate: 2400 ~ 921600 bps

2-Port RS-422/485 Card

VEX-142, VEX-142i

- Provides two 2-wire RS-485/8-wire RS-422 ports
- Built-in COM-Selector DIP switch
- +/-4 kV ESD Protection and for i version
- Supports pull-high/-low jumpers on RS-485 port
- 128-byte Hardware FIFO for Each Port
- Baud rate: 50 ~ 115200 bps
- Automatic RS-485 Direction Control
- 2500 VDC Isolation for i version

4-Port RS-422/485 Card

VEX-144, VEX-144i

- Provides four 2-wire RS-485/8-wire RS-422 ports
- Supports pull-high/-low jumpers on RS-485 port
- Built-in COM-Selector DIP switch
- +/-4 kV ESD Protection and for i version
- 128-byte Hardware FIFO for Each Port
- Baud rate: 50 ~ 115200 bps
- 2500 VDC Isolation for i versions
- Automatic RS-485 Direction Control

8-Port RS-422/485 Card

PCIe-S148 NEW

- Provides eight 2-wire RS-485/4-wire RS-422 ports
- Supports pull-high/-low jumpers on RS-485 port
- Automatic COM number assigned by OS
- 256-byte Hardware FIFO for each port
- Baud rate: 2400 ~ 921600 bps
- Automatic RS-485 Direction Control

Universal PCI

Model Name	COM-Selector	RS-232	RS-422/485	Self-Tuner	Isolation (VDC)	ESD Protection	Max. Speed (bps)	FIFO Size (bytes)	Connector	Page
VXC-112AU	Yes	2	–	–	–	–	115.2 k	128	Male DB-9	2-2-2
VXC-112iAU	Yes	2	–	–	2.5 k	+/-4 kV	115.2 k	128	Male DB-9	2-2-2
VXC-142AU	Yes	–	2	Yes	–	–	115.2 k	128	Male DB-9	2-2-2
VXC-142iAU	Yes	–	2	Yes	2.5 k	+/-4 kV	115.2 k	128	Male DB-9	2-2-2
VXC-182iAU	Yes	1	1	Yes	2.5 k	+/-4 kV	115.2 k	128	Male DB-9	2-2-3
VXC-114U	Yes	4	–	–	–	–	115.2 k	128	Female DB-37	2-2-2
VXC-114iAU	Yes	4	–	–	2.5 k	+/-4 kV	115.2 k	128	Female DB-37	2-2-2
VXC-144U	Yes	–	4	Yes	–	–	115.2 k	128	Female DB-37	2-2-3
VXC-144iU	Yes	–	4	Yes	2.5 k	+/-4 kV	115.2 k	128	Female DB-37	2-2-3
VXC-164AU	Yes	4		Yes	–	–	115.2 k	128	Female DB-37	
VXC-118U	–	8	–	–	–	–	115.2 k	256	Female DB-62	2-2-2
VXC-148U	–	–	8	Yes	–	–	115.2 k	256	Female DB-62	2-2-3

2-Port RS-232 Card

VXC-112AU, VXC-112iAU

- Provides two 9-wire RS-232 ports
- Built-in COM-Selector DIP switch
- +/-4 kV ESD Protection for i versions
- 2500 VDC Isolation for i version
- 128-byte Hardware FIFO for Each Port
- Baud rate: 50 ~ 115200 bps

4-Port RS-232 Card

VXC-114U, VXC-114iAU, VXC-114U/D2, VXC-114iAU/D2

VXC-114U
VXC-114iAU

VXC-114U/D2
VXC-114iAU/D2

- Provides four 9-wire RS-232 ports
- Built-in COM-Selector DIP switch
- +/-4 kV ESD Protection and for i version
- 2500 VDC Isolation for i version
- 128-byte Hardware FIFO for Each Port
- Baud rate: 50 ~ 115200 bps

8-Port RS-232 Card

VXC-118U, VXC-118U/D2 NEW

VXC-118U

VXC-118U/D2

- Automatic COM number assigned by OS
- 256-byte Hardware FIFO for Each Port
- Provides eight 8-wire RS-232 ports
- Baud rate: 50 ~ 115200 bps

2-Port RS-422/485 Card

VXC-142AU, VXC-142iAU

- Provides two 2-wire RS-485/8-wire RS-422 ports
- Supports pull-high/-low jumpers on RS-485 port
- +/-4 kV ESD Protection and for i version
- 128-byte Hardware FIFO for Each Port
- Baud rate: 50 ~ 115200 bps
- Built-in COM-Selector DIP switch

1-Port RS-422/485 and 1-Port RS-232 Card

VXC-182iAU

- Provides one 2-wire RS-485/8-wire RS-422 port
- Supports pull-high/-low jumpers on RS-485 port
- Provides one 9-wire RS-232 port
- Built-in COM-Selector DIP switch
- +/-4 kV ESD Protection on RS-485 port
- 128-byte Hardware FIFO for Each Port
- Baud rate: 50 ~ 115200 bps
- Automatic RS-485 Direction Control
- 2500 VDC Isolation on RS-485 port

4-Port RS-422/485 Card

VXC-144U, VXC-144iU

- Provides four 2-wire RS-485/8-wire RS-422 ports
- Supports pull-high/-low jumpers on RS-485 port
- +/-4 kV ESD Protection and for i version
- 2500 VDC Isolation for i version
- Built-in COM-Selector DIP switch
- 128-byte Hardware FIFO for Each Port
- Baud rate: 50 ~ 115200 bps
- Automatic RS-485 Direction

8-Port RS-422/485 Card

VXC-148U *NEW*

- Provides eight 2-wire RS-485/4-wire RS-422 ports
- Supports pull-high/-low jumpers on RS-485 port
- Automatic COM number assigned by OS
- 256-byte Hardware FIFO for each port
- Baud rate: 50 ~ 115200 bps
- Automatic RS-485 Direction Control

● Ordering Information

PCI Express	Universal PCI	Ordering Information
VEX-112 CR	VXC-112AU CR	Communication Card with 2 RS-232 ports (RoHS)
VEX-112i CR	VXC-112iAU CR	Communication Card with 2 Isolated RS-232 ports (RoHS)
VEX-114 CR	VXC-114U CR	Communication Card with 4 RS-232 ports (RoHS). Includes One CA-4002 Connector
VEX-114/D2 CR	VXC-114U/D2 CR	Communication Card with 4 RS-232 ports (RoHS). Includes One CA-9-3715D Cable
VEX-114i CR	VXC-114iAU CR	Communication Card with 4 Isolated RS-232 ports (RoHS). Includes One CA-4002 Connector
VEX-114i/D2 CR	VXC-114iAU/D2 CR	Communication Card with 4 Isolated RS-232 ports (RoHS). Includes One CA-9-3715D Cable
VEX-142 CR	VXC-142AU CR	Communication Card with 2 RS-422/485 ports (RoHS)
VEX-142i CR	VXC-142iAU CR	Communication Card with 2 Isolated RS-422/485 ports (RoHS)
VEX-144 CR	VXC-144U CR	Communication Card with 4 RS-422/485 ports (RoHS). Includes One CA-4002 Connector
VEX-144i CR	VXC-144iU CR	Communication Card with 4 Isolated RS-422/485 ports (RoHS). Includes One CA-4002 Connector
	VXC-182iAU CR	Communication Card with 1 Isolated RS-422/485 port and 1 RS-232 port (RoHS)
PCIe-S118 CR	VXC-118U CR	Communication Card with 8 RS-232 ports (RoHS). Includes one CA-PC62M Connector
PCIe-S118/D2 CR	VXC-118U/D2 CR	Communication Card with 8 RS-232 ports (RoHS). Includes One CA-9-6210 Cable
PCIe-S148 CR	VXC-148U CR	Communication Card with 8 RS-422/485 ports (RoHS). Includes one CA-PC62M Connector

● Accessories

CA-0910F CR	9-Pin Female-Female D-Sub Cable 1 m
CA-0915 CR	9-Pin Male-Female D-Sub Cable, 1.5 m
CA-PC09F CR	9-Pin Female D-Sub Connector with Plastic Cover
DN-09-2F CR	I/O Connector Block with DIN-Rail Mounting and Two 9-Pin Male Header. Includes CA-0910F x 2 (9-Pin Female-Female D-Sub Cable 1 m)
CA-4002 CR	37-Pin Male D-Sub Connector with Plastic Cover
CA-9-3715D CR	Male DB-37 to 4-port Male DB-9 Cable, 1.5 M (180°)
CA-9-3705 CR	Male DB-37 to 4-port Male DB-9 Cable, 0.3 M (90°)
CA-9-6210 CR	Male DB-62 to 8-port Male DB-9 Cable, 1.0 M
CA-PC62M CR	62-pin Male D-sub connector with plastic cover

2-3 PAC-based Serial Communication Module

The PAC family of ICP DAS is a modular network-based PAC with the capability of connecting I/O either through its own dual backplane bus or alternatively through remote I/O units and remote I/O modules. This new exciting PAC family offers a flexible, versatile and economical solution to a wide range of applications from data acquisition, process control, test and measurement, motion control to energy and building management. Our PAC family includes XPAC, WinPAC, ViewPAC, LinPAC, iPAC, ViewPAC, Motion PAC and µPAC for different requirements in OS, CPU and development platform.

PAC	XP-8000-Atom	XP-8000-Atom-CE6	WP-8000	iP-8000	VP-25W1	VP-4131
Pictures						
CPU	Intel Atom Z520 (1.33 GHz)	Intel Atom Z510 (1.1 GHz)	Marvell PAX270 (520 MHz)	80186 (80 MHz)	Marvell PXA270 (520 MHz)	
OS	WES 2009	WinCE 6.0	WinCE 5.0	MiniOS7	WinCE 5.0	
LCD	-				5.7" TFT LCD with Touch Panel	10.4" TFT LCD with Touch Panel
I/O Expansion	I/O Slots, RS-232/485, Ethernet					
I/O Slot	1/3/7		4/8		3	
Software Development Tool	VS .NET 2005/2008, VC6, CB6, Delphi, BCB	VS .NET 2005/2008 ISaGRAF, InduSoft	VS .NET 2005/2008 ISaGRAF, InduSoft	C language, ISaGRAF	VS .NET 2005/2008 ISaGRAF, InduSoft	

The communication modules offer the possibility to add several serial ports into a XPAC, WinPAC, ViewPAC and iPAC . Up to 4 ports, optionally isolated, RS-232, RS-422 or RS-485 ports.

Model Name	I-8112iW	I-8114W	I-8114iW	I-8142iW	I-8144iW	I-8118W
Pictures						
Communication						
Interface	RS-232	RS-232	RS-232	RS-422/485	RS-422/485	RS-232
Port	2	4	4	2	4	8
Max. Speed (K bps)	115.2					
System						
Isolation	2500 V_{rms}	-	2500 V_{rms}	2500 V_{rms}		-
Power Consumption	1.5 W	1.25 W	1.75 W	1.5 W	1.75 W	1.7 W
Connector	Male D-Sub 9 x 2	Female D-Sub 37		Terminal Block		Female D-Sub 62
Optional Accessories	CA-0915 CA-0910F	CA-9-3705 CA-9-3715D	CA-9-3705 CA-9-3715D	-	-	CA-9-6210

Optional Accessories

CA-0910F CR

9-Pin Female-Female D-Sub cable, 1 M

CA-0915 CR

9-Pin Male-Female D-Sub cable, 1.5 M

DN-09-2F CR

I/O Connector Block with DIN-Rail Mounting and two 9-pin Male Header. Includes: 2 x CA-0910F

CA-9-3705 CR

DB-37 Male (D-Sub) to 4-port DB-9 Male (D-Sub) cable. 0.3 M (90°)

CA-9-3715D CR

DB-37 Male (D-Sub) to 4-port DB-9 Male (D-Sub) cable. 1.5 M (180°)

CA-9-6210 CR

Male DB-62 to 8-port Male DB-9 Cable, 1.0M

RS-232/422/485 Converter/Repeater

Model Name	tM-7520U	I-7520	I-7520R	I-7520A	I-7520AR	I-7551	tM-7510U	I-7510	I-7510A	I-7510AR
Pictures										
Function	Converter						Repeater			
Interface	RS-232 to RS-485			RS-232 to RS-422/485		RS-232 to RS-232	RS-485	RS-485	RS-422/485	
Isolation	3000 VDC RS-232 side	3000 VDC RS-232 side	3000 VDC RS-485 side	3000 VDC RS-232 side	3000 VDC RS-422/485 side	3000 VDC 3 ways	3000 VDC	3000 VDC		3000 VDC 3 ways
Operating Temperature	-25 °C ~ +75 °C									

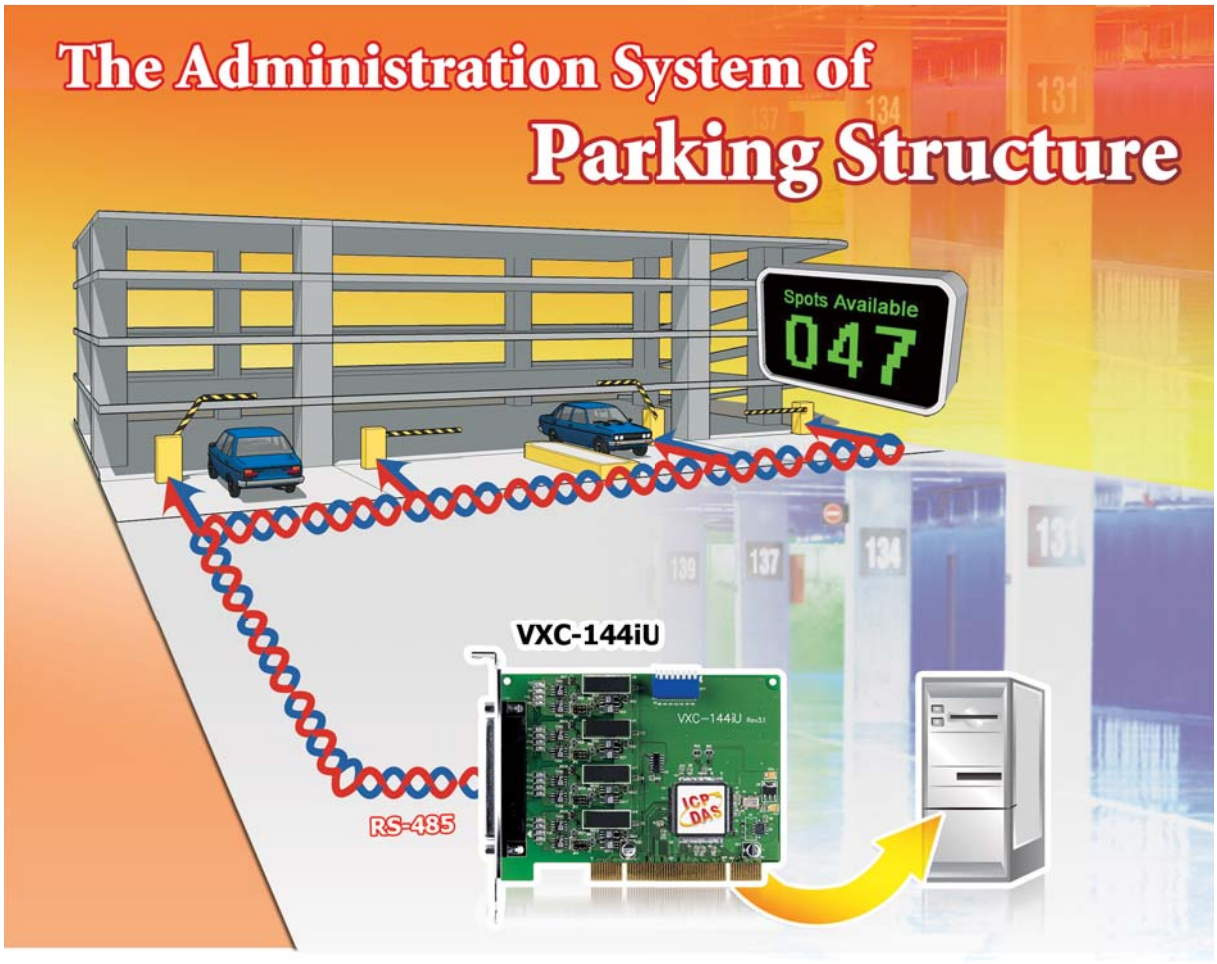
USB to RS-232/422/485 Converter

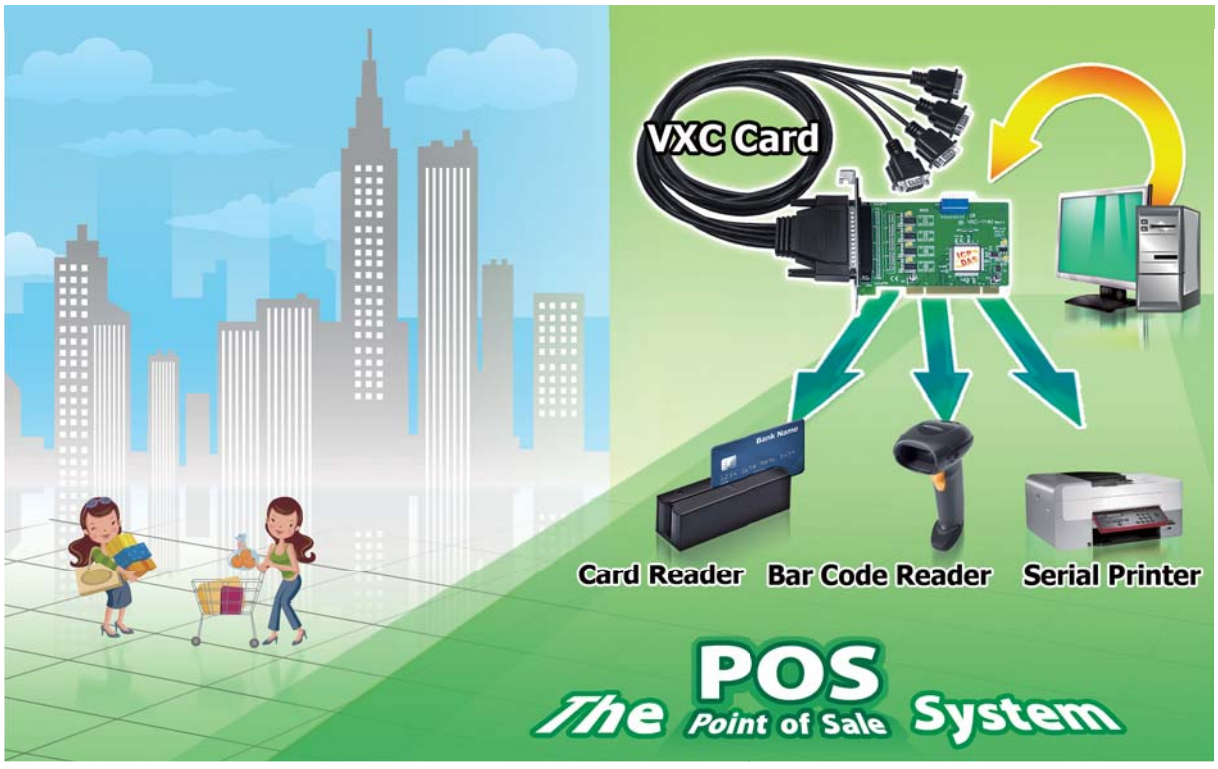
Model Name	I-7560U	USB-2514	I-7561U	tM-7561
Pictures				
Function	Converter	Converter	Converter	Converter
Interface	USB to RS-232	USB to 4-Port RS-232	USB to RS-232/422/485	USB to RS-485
Isolation	-	-	3000 VDC	3000 VDC
Operating Temperature	-25 °C ~ +75 °C			

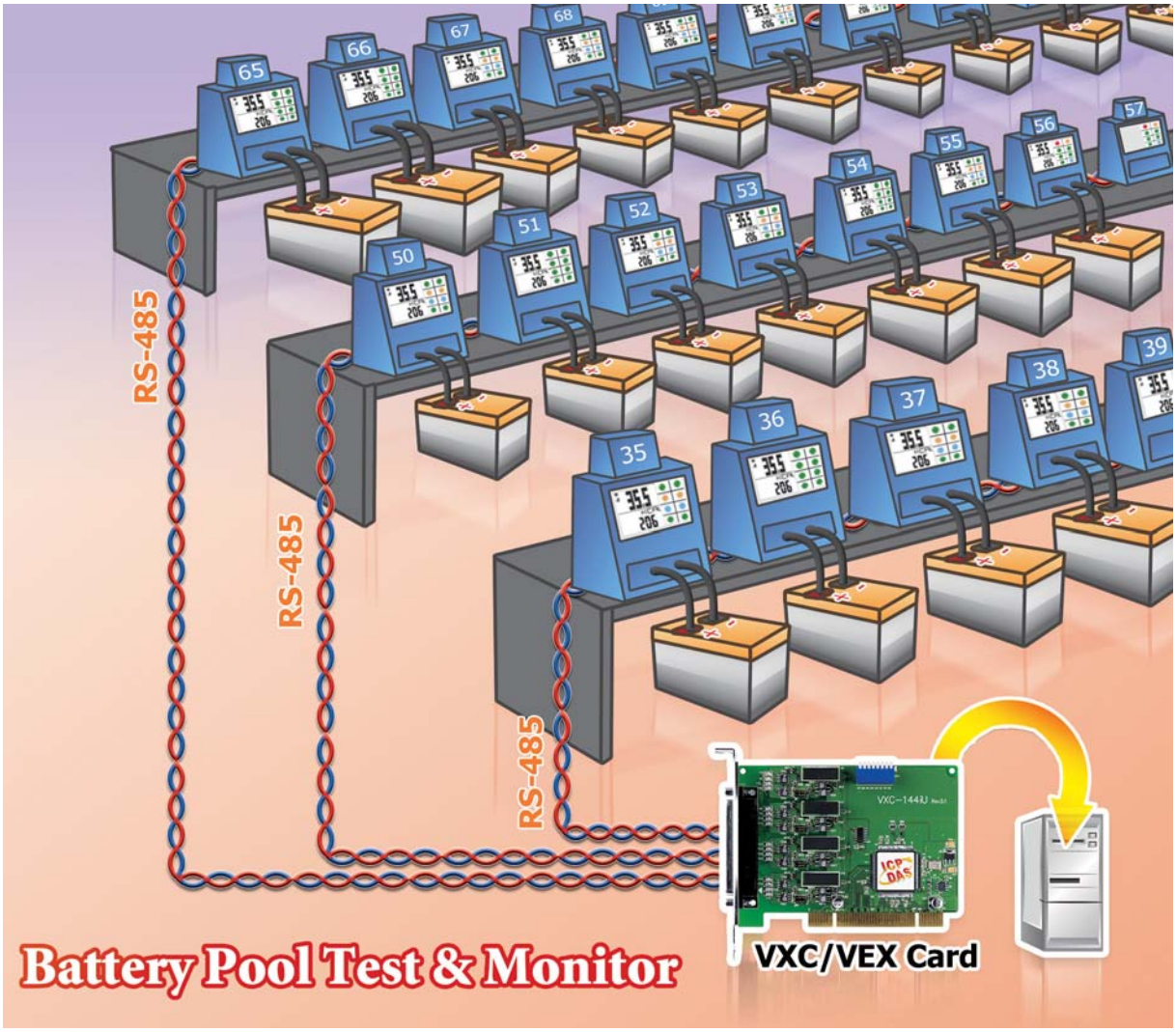
USB RS-232/485 to RS-485 Hub

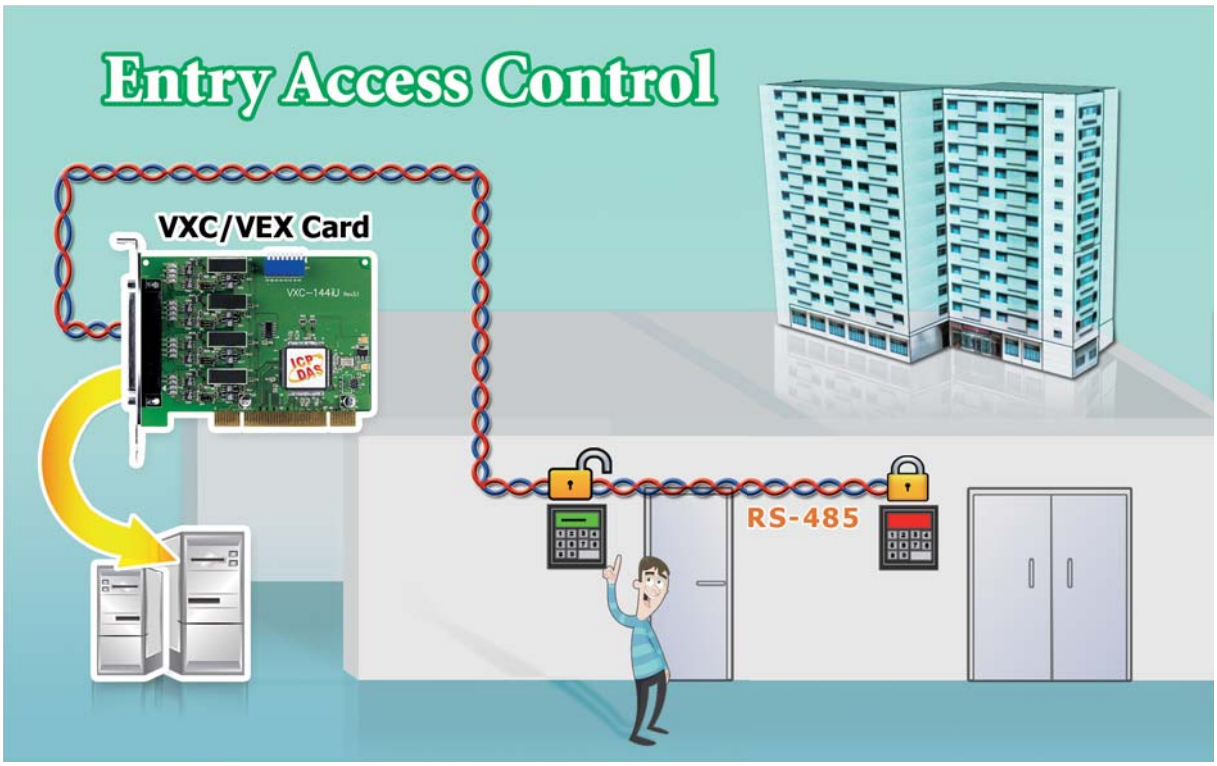
Model Name	I-7563U	I-7513	I-7520U4	I-7514U
Pictures				
Function	3-Ch Hub/Splitter	3-Ch Hub/Splitter/Repeater	4-Ch Hub/Splitter	4-Ch Hub/Splitter/Repeater
Interface	USB to 3-Ch RS-485	RS-485 to 3-Ch RS-485	RS-232 to 4-Ch RS-485	RS-485 to 4-Ch RS-485
Isolation	3000 VDC	3000 VDC 3 ways	3000 VDC RS-232 side	3000 VDC Ch1-Ch4 side
Operating Temperature	-25 °C ~ +75 °C			

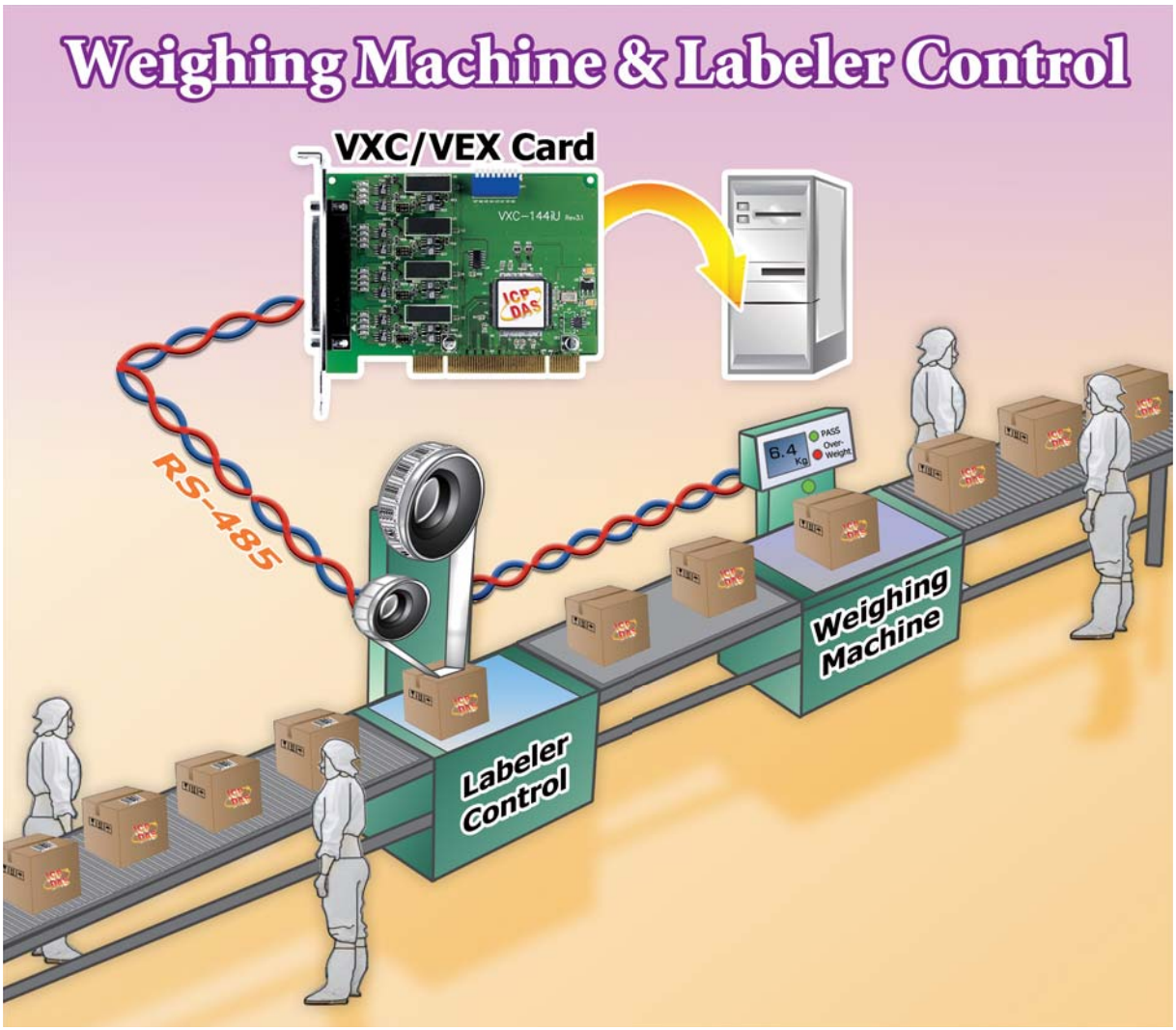
2-4 Applications






RS-485
RS-485
RS-485
VXC/VEX Card
Battery Pool Test & Monitor

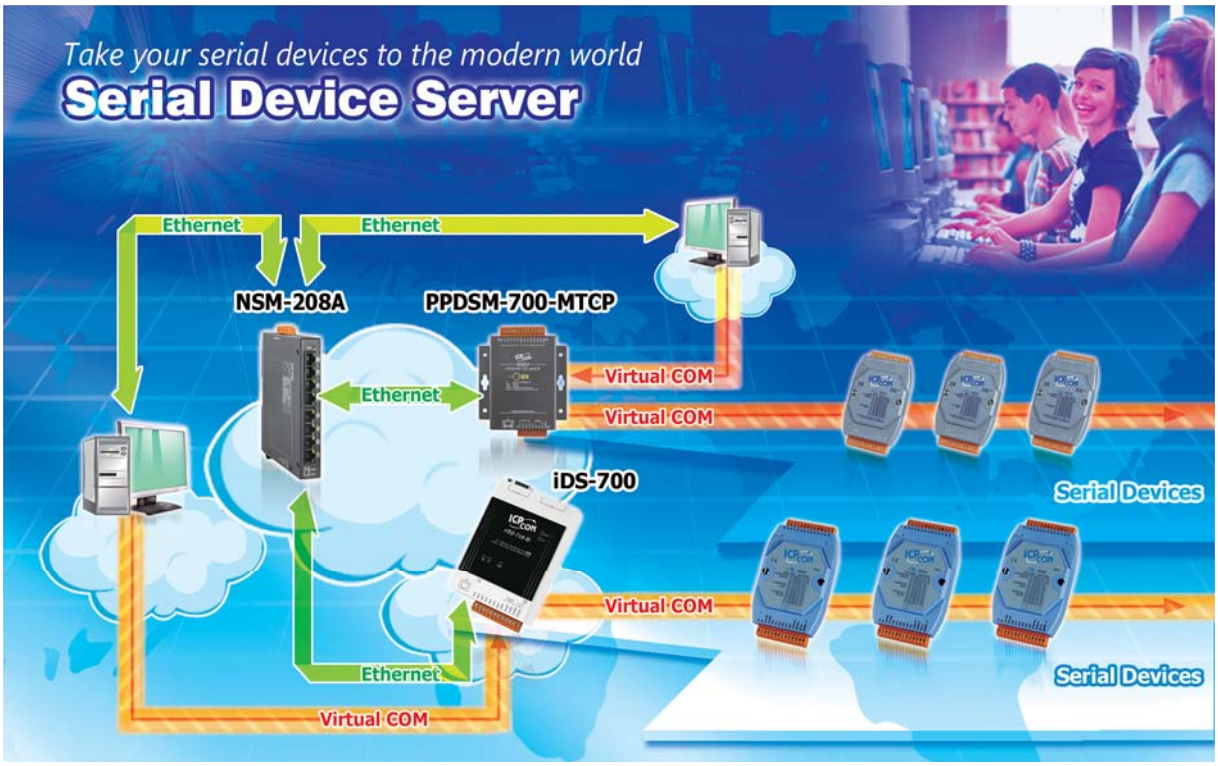

Entry Access Control
VXC/VEX Card
RS-485


Weighing Machine & Labeler Control
VXC/VEX Card
RS-485
Weighing Machine
Labeler Control


Pipeline Pressure Drop Monitor
Oil Well
Pressure Meter
VXC/VEX Card
Oil Pipeline
RS-485
Montitor Center
Pressure Meter
Oil Refinery

Serial Device Server

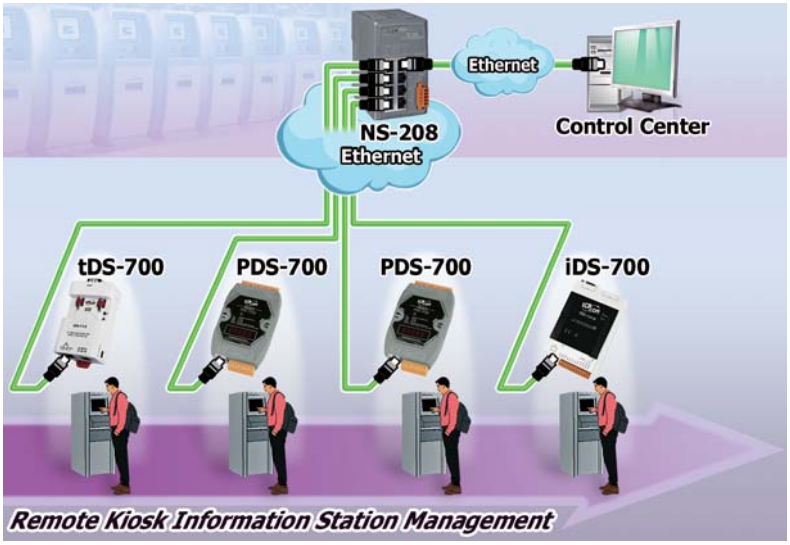
3-1 Overview



Serial Devices to Ethernet Gateway

The ICP DAS Serial Device Server is designed to bring network connectivity to your serial devices. The programmable features allow developers to quickly build custom applications that turn "dull" serial devices into "intelligent" devices right away without modifying their hardware or software configuration.

With extensive experience accumulated over many years, a great number of serial devices such as PLCs, bar code readers, RFID readers, meters and motion controllers, etc., have been widely used in various applications. As the advances in communication technologies in recent years, continue to drive optimization of data accessibility and remote operation ability, a wide variety of industries have begun to feel the urge to upgrade their latency serial communications to Ethernet network connections. The ICP DAS Serial Device Servers are your best choice for implementing this scenario in a robust, reliable and cost-effective way.



VxComm driver & utility
Where remote serial devices become part of your PC

The VxComm Driver creates virtual COM port(s) on 32-bit and 64-bit Windows XP/2003/2012/7/8 systems and maps them to the remote serial port(s) of the PDS/DS series. The user's serial client programs need to only be changed to the virtual COM port access the serial devices that are allocated on the Internet or Ethernet network via the PDS/DS series.

Easy Serial Device Networking with "transparency"

The most intuitive and easiest way to remotely control serial devices is to access those devices transparently via a network with no software modification required. The ICP DAS PDS product line offers two transparent applications:

- Socket Connections:

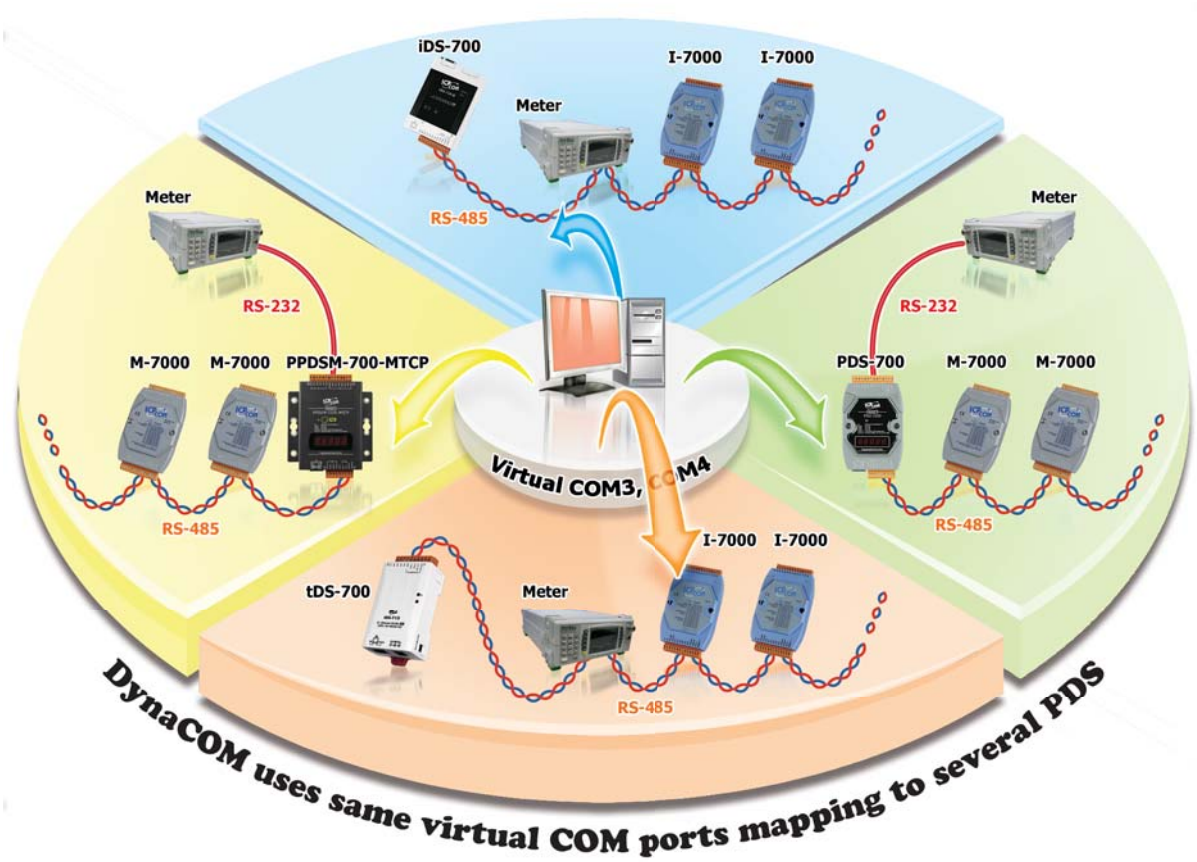
Using a TCP/IP socket connection, client programs can exchange information with specific PDS/DS serial ports and talk to serial devices directly. For example, simply create a socket connection to the TCP/IP port 10001 (default) of the PDS/DS device and you can then access Port1 of the PDS/DS remotely. This is an OS-independent method and works well on most OS (operating systems) that provide socket functions.

- Virtual COM Ports:

ICP DAS developed a specific function called "Virtual COM" that simulates PDS serial ports as fixed PC COM ports. Virtual COM ports appear to the system and applications as real ports. Once established, users can immediately enjoy the convenience that networking provides.

DynaCOM Technology

ICP DAS Virtual COM also supports an exclusive function - Dynamic Virtual COM Mapping (DynaCOM); if the system can only access limited or fixed numbers of COM Ports, specific PDS serial ports can be dynamically assigned to the corresponding COM port numbers.



Selection Guide

Comparison Table of Device Server and Modbus Gateway

Features	iDS	PPDS	PDS	DS	tDS	tGW
PoE	Yes	Yes	–	–	Yes	Yes
Programmable	–	Yes	Yes	–	–	–
Virtual COM	Yes	Yes	Yes	Yes	Yes	–
Modbus Gateway	–	Yes	–	–	–	Yes
Multi-client	Yes	Yes	Yes	Yes	–	Yes
SNMP	Yes	–	–	–	–	–
Application Mode	Virtual COM TCP Server TCP Client UDP Pair Connection RFC2217 Telnet Modem Emulator	Virtual COM TCP Server TCP Client Pair Connection Modbus TCP Slave	Virtual COM TCP Server TCP Client Pair Connection	Virtual COM TCP Server TCP Client Pair Connection	Virtual COM TCP Server TCP Client Pair Connection	Modbus TCP Master Modbus TCP Slave Modbus UDP Master Modbus UDP Slave Pair Connection
Remarks	Intelligent	Professional	Powerful	Isolation for DS-715	Cost-effective, Entry-level	Cost-effective, Entry-level

iDS Series – Intelligent Device Server

Series	Ethernet	Virtual COM	Virtual I/O	Programmable	SNMP	Casing
 iDS-700	10/100 M, PoE	Yes	–	–	Yes	Plastic
 iDS-700M						Metal
 iDS-400M	2-port 10/100 M Switch, PoE	Yes	–	–	Yes	Metal

PPDS Series – Programmable Device Server and Modbus Gateway with PoE

Series	Ethernet	Virtual COM	Virtual I/O	Programmable	Modbus	Casing
 PPDS-700-MTCP	10/100 M, PoE	Yes	Yes	Yes	Yes	Plastic
 PPDSM-700-MTCP						Metal
 PPDS-700-IP67			–		–	IP67 Waterproof Plastic

PDS Series – Programmable Device Server

Series	Ethernet	Virtual COM	Virtual I/O	Programmable	Modbus	Casing
 PDS-700	10/100 M	Yes	Yes	Yes	–	Plastic
 PDSM-700						Metal
 PDS-220Fx	100 Base-FX, Fiber		–			Plastic
 PDS-5000-MTCP	10/100 M Ethernet Switch				Yes	Plastic

DS, tDS & tGW Series – Non-Programmable Device Server and Modbus Gateway

Series	Ethernet	Virtual COM	Virtual I/O	Multi-client	Modbus	Casing	Remarks
 DS-700	10/100 M	Yes	–	Yes	–	Plastic	Isolation for DS-715
 tDS-700	10/100 M, PoE			–			Cost-effective
 tGW-700		–		Yes	Yes		

3-2 Intelligent Serial-to-Ethernet Device Servers

iDS-700 *NEW*
iDS-400 *Available soon*

Intelligent Device Servers
Remotely Monitor and Control RS-232/RS-485 Devices via an Ethernet Network

iDS-718i-D iDS-728iM-T iDS-448iM-D

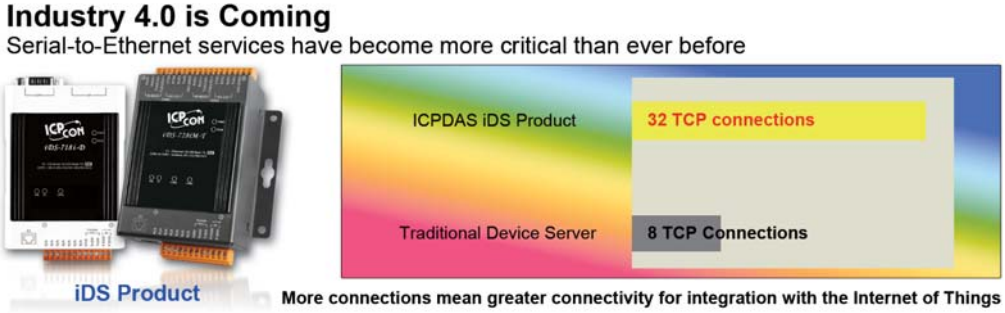
Features

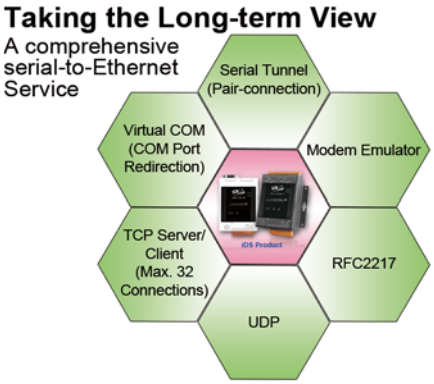
- Simple setup, factory floor devices can be connected to SCADA systems in minutes
- Serial Devices can be monitored and controlled via the Ethernet
- Supports 1/2/4-port RS-232, RS-422 and RS-485 communications
- Web-based configuration and PC Utility
- Serial ESD protection
- Provides Virtual COM (COM port redirection), TCP Server/Client (Max. 32 connections), UDP, Serial Tunnel (Pair connection), Modem Emulator, and RFC2217 application modes.
- Built-in Buzzer, RTC, and Watchdog
- Wide operating temperature range: -25 to +75°C
- Supports SNMP V1, V2c, V3, Trap and MIB-II protocols for network management
- Built-in Hardware-selectable Pull High/Low resistors and Terminal resistors for RS-422/485 ports
- Supports RS-485 Data Direction Control with Self-Tuner Technology
- Includes a Smart Ethernet Port that recognizes both straight and crossover Ethernet Cables
- Reset button for restoring the factory configuration
- RoHS Compliant

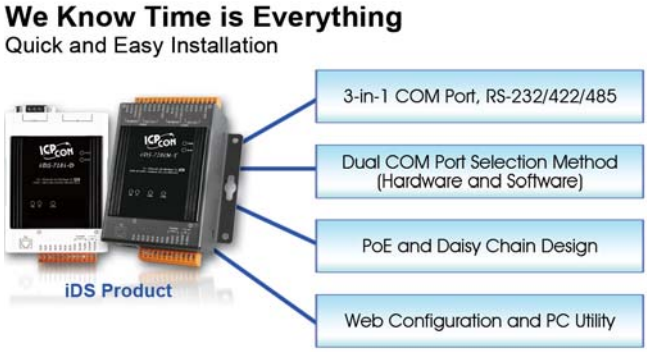
Introduction

The iDS product range is the 3rd generation of Device Servers from ICPDAS. It is designed for rugged, industrial-level applications, and provides high performance, high reliability and high capacity.

The iDS product range provides a complete Ethernet service, as well as 1-, 2-, and 4-port RS-232/RS-422/RS-485 interfaces that allow any existing serial devices to be connected to an Ethernet network.







Powerful Data Transparent Solution: Zero Data Loss

The iDS product range is equipped with an ARM-based high-performance CPU and large capacity RAM in order to accomplish the goal of "Zero Data Loss" when attempting to transfer a critical data stream. If a failure occurs on the Ethernet connection, the serial data will be queued and will be resent once the Ethernet is reconnected. Each device port provides 32 TCP connections that can be used to share the same information across the network from a single serial device.

Industrial–grade Design

The iDS product range provides a wide range of built-in features designed for easy deployment of the device into existing operating environments.

1. Dual Power Supply: DC and PoE
2. DIN-Rail Mounting
3. Serial Port Surge Protection
4. Adjustable RS-485 Terminal Resistor and Pull High/Low Resistor
5. RS-485 Direction Control via the embedded ICPDAS Self-Tuner
6. Hardware/Software-selectable RS-232, RS-422 or RS-485 Interfaces
7. Hardware Reset button and LED Indicator.
8. 64-bit Hardware Serial Number

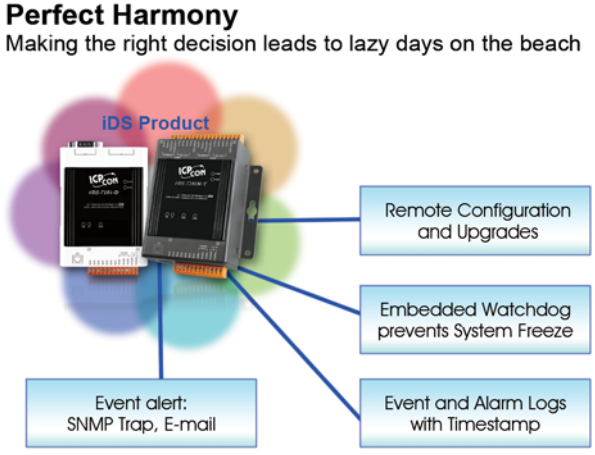
COM1	M1	M0	DIP Switch
RS-232	ON	OFF	ON 1 2 3 4 5 6 7 8
RS-422	OFF	ON	ON 1 2 3 4 5 6 7 8
RS-485	OFF	OFF	ON 1 2 3 4 5 6 7 8
Software	ON	ON	ON 1 2 3 4 5 6 7 8

Easy web-based Configuration

The built-in web server allows the iDS product to be accessed and configured using a standard web browser, such as Internet Explorer or Google Chrome. The configurations include parameters of serial ports, SNMP, the mode of Serial-To-Ethernet service. In addition, the onboard Flash memory provides the capacity for future software upgrades.

IT-friendly Management

All devices in the iDS product range support the SNMP protocol, which is a popular method within the IT industry for monitoring a device over the Ethernet. The iDS device can be configured to send SNMP-Trap alerts to the SNMP manager if user-defined errors or events are encountered. For example, alerts can be triggered by a warm/cold start events, or a password change, etc. An email alert and web-based event log page is also provided.

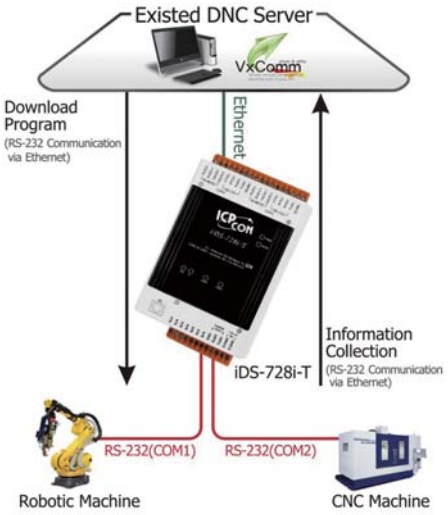


Application

Factory Automation Application

Typically, a DNC Server is used to manage or communicate with remotely distributed CNC Machines. In the past two decades, the interface used for data transfer has been either via floppy disk or via serial port transmission. However, an Ethernet network can offer a far more rapid rate of data transmission, allowing greater communication efficiency between the DNC server and the CNC machine, as well as the ability to perform real-time information monitoring.

Generally speaking, in larger factory environments, the installed DNC Servers and CNC machines are frequently exchanging significant amounts of data, meaning that challenging conditions may be encountered when attempting to perform data transfer via an Ethernet network, such as:
1. Electronic noise or power surges that cause severe damage to the device and potential interruption to communication.
2. The processing of large amounts of data can cause the device server to become unreliable and unstable.



The ICPDAS iDS-700 series of devices are equipped with the complete Serial-To-Ethernet service, which, together with the Industrial-grade Design, can be used to overcome these issues.

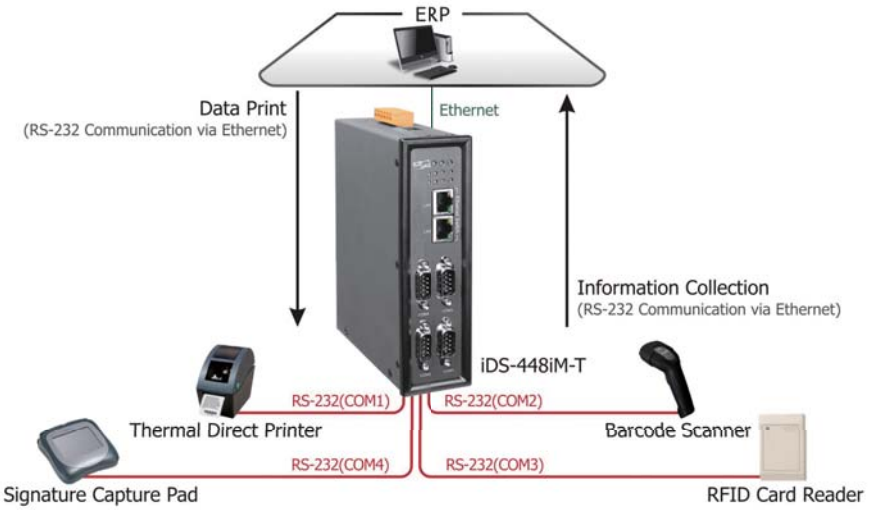
By integrating an iDS-728i-T module into this scenario via an Ethernet connection to the existing DNC server, and then connecting the remote machines via the RS-232 COM ports, communication reliability could be ensured and data transfer could be performed at much higher levels.

Stock Management Application

In a normal stock management situation, a large number of workstations are connected to external devices such as barcode scanners, printers and card readers, etc. Using the information collected from the workstations, the data in the ERP system can be quickly organized and then used to precisely predict both the demands and the requirements from the supply chain so as to maintain both at a reasonable or prescribed level.

The smartest choice for this situation is to use an iDS product rather than a PC as it is more compact in size, has a lower power consumption, and is more stable, reliable and convenient to operate. These devices also provide full Ethernet services such as Virtual COM technology and SNMP Trapping for monitoring purposes, as well as the ability to perform online maintenance tasks such as setup or firmware upgrades.

By integrating an iDS-448iM-D module into the scenario illustrated below, an Ethernet connection can be established to the existing ERP host system, and then the remote peripheral devices (barcode scanners, printers and card readers, etc.) can be connected via the RS-232 COM ports on the iDS module, thereby ensuring reliable communication and more convenient data collection.



Connecting Remote Serial Devices

The ICPDAS range of iDS-700 device servers can be used to create a pair-connection application (as well as serial-bridge or serial-tunnel applications), which can then be used to route data over a TCP/IP connection between serial devices. This can be useful when connecting a mainframe computer, server or other serial devices that do not themselves have Ethernet capability, thereby eliminating the limitation on cable length inherent in the majority of legacy serial communication devices.

In the example illustrated below, an iDS-718i-D module is connected to both the DNP Host (via the RS-232 COM port) and the DNP3 device (via the RS-485 COM port), meaning that both devices are able to communicate via the Ethernet, making communication much more efficient and reliable.

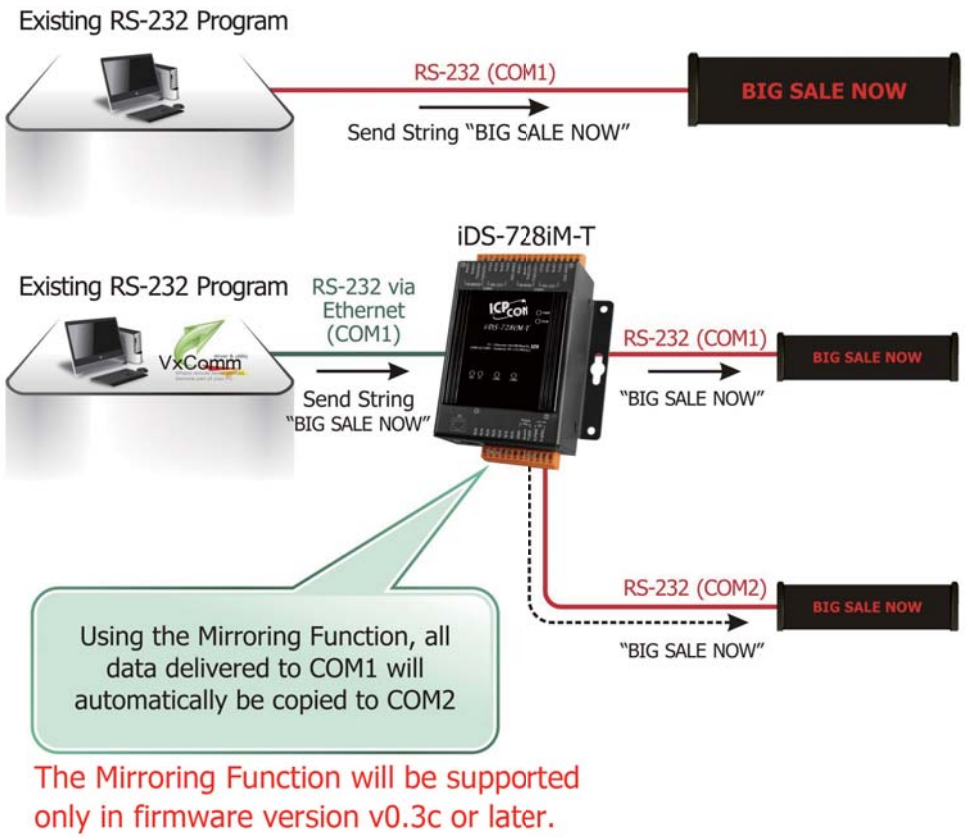
Multiple-Broadcasting System

Nowadays, many supermarkets or shopping malls use an LED display board to present the latest promotional messages, and will modify the content of the message using software on a remote PC.

As the business grows, additional LED displays may become necessary in order to present these promotional messages in other locations. Conventionally, the source code would need to be modified in order to create a new function to transmit the messages to the additional sites.

However, by utilizing the "Mirroring" function provided by iDS products, data can be automatically transmitted to the additional locations without the need for any additional software tasks.

In the scenario illustrated below, by integrating an iDS-728iM-T, the message sent from the Host PC can be simultaneously transmitted to multiple devices, thereby providing more effective communication to multiple locations with minimal effort.



The Mirroring Function will be supported only in firmware version v0.3c or later.

Data Monitoring and Redundant Communication

Generally speaking, an RS-232 device is only designed for one-to-one communication. Sometimes, however, when attempting to monitor data being transmitted between RS-232 devices, such as between a PLC and a meter using an alternative approach, difficulties may be encountered that cause frustration, meaning that the task is impossible unless the communication method or control structure is changed.

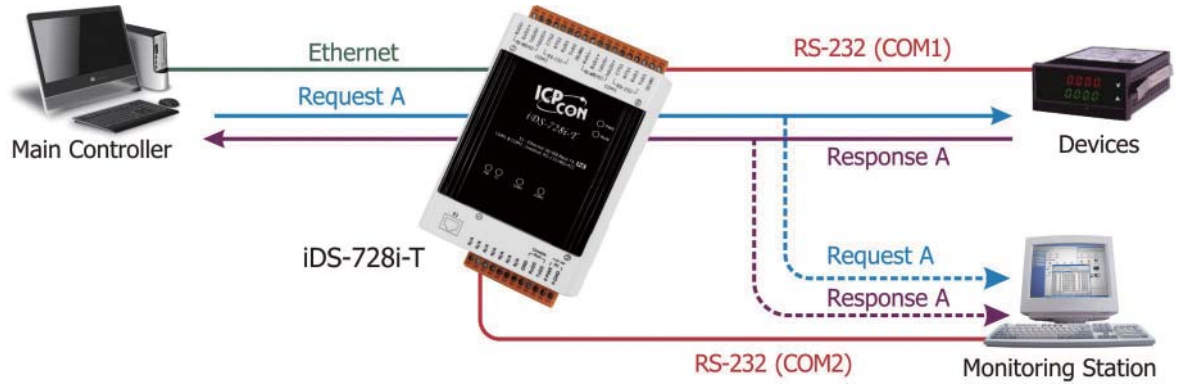
In fact, the majority of control structures in the automation field are implemented using traditional RS-232 communications. However, with the concept of IOT (Internet of Things) becoming increasingly commonplace, more and more companies and governments are faced with the need to share information with either the stakeholders or the general public, so the data being transmitted between RS-232 devices must also be shared with not only one authorized station, but also with potentially two or more stations, some of which may possibly only exist on the IT cloud.

The problem faced by many organizations is how to connect these serial control systems to the Ethernet while still retaining the original structure. The solution is the iDS range of products from ICPDAS. These products include an innovative function called "Mirroring Function", which provides the following capabilities:

1. Monitoring the TCP-to-Serial Data Transfer Process through the Serial Port.

It is often useful to be able to monitor the requests and responses between the Host PC and the PLC. By integrating an iDS module from ICPDAS, requests from the TCP connection on the Host PC, or responses from the RS-232 connection on the remote device will be automatically shared via the specified port on the iDS module.

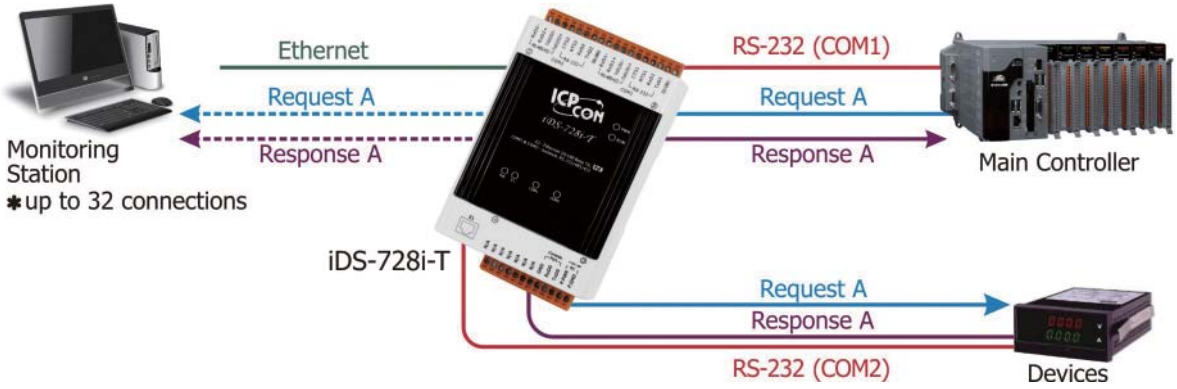
In the scenario illustrated below, an iDS-728i-T is used to share the requests and responses between the Host PC and a remote device with a remote monitoring station, thereby providing a more efficient method of examining communications between multiple devices with minimal effort.



2. Monitoring the Serial-to-Serial Data Transfer Process through the TCP Port.

The majority of industrial control systems are based on either a PLC or a PAC device, where RS-232 communication is common. By integrating an iDS module, it is easy for the remote monitoring system to receive information from multiple devices via the existing serial communication network.

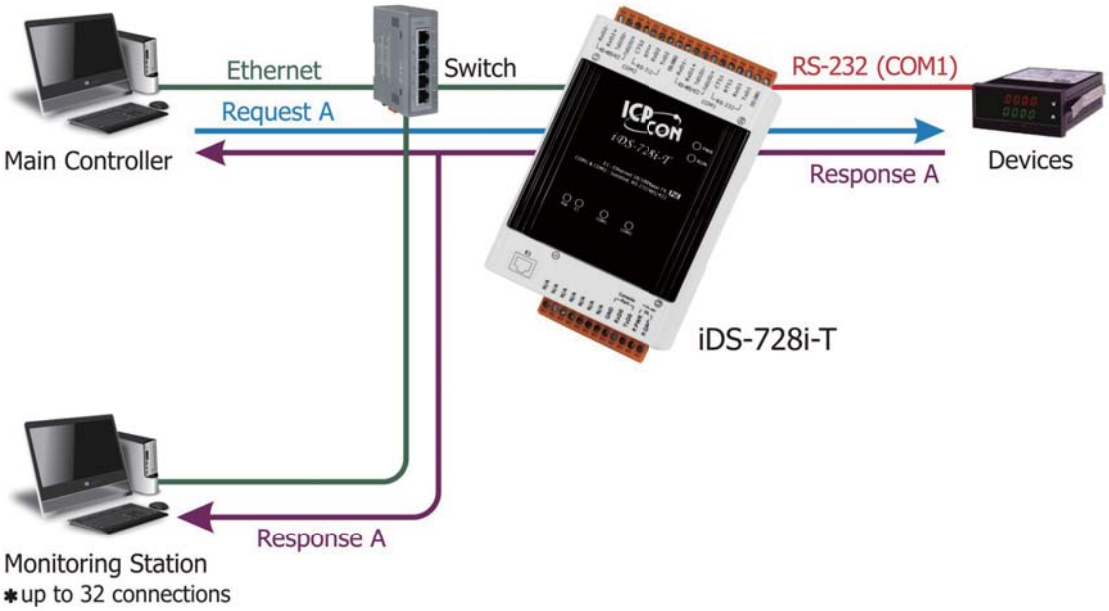
For example, in the scenario illustrated below, an iDS-728i-T is used to monitor the requests and responses between a remote monitoring station and several remote devices, thereby providing a more efficient method of controlling communications between multiple devices with minimal effort.



3. Redundant TCP Communication with Response Broadcast

Integrating an iDS product that can be used to transfer response data from remote equipment is one of the most cost-effective solutions to building a simple redundant monitoring station. Using this approach, it is possible to ensure that critical information transmitted from remote devices will not only be sent to the main control station, but also to any other redundant stations.

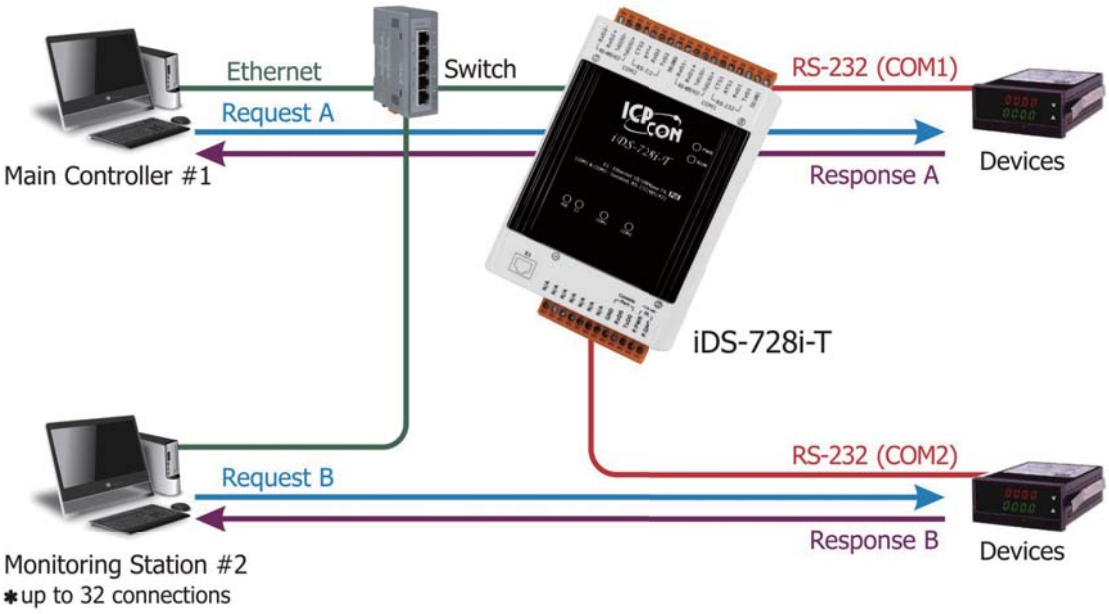
For example, in the scenario illustrated below, an iDS-728i-T is combined with an Ethernet switch to monitor requests and responses between a remote device (via RS-232) and the main controller (via the Ethernet), while simultaneously forwarding the data to an additional (redundant) monitoring station, thereby ensuring that no critical data is lost and providing a more efficient method of controlling communications between multiple devices with minimal effort.



4. Redundant TCP Communication with Multiple Hosts

The solution to the problem of enabling a serial device to serve more than two controllers is using iDS product. By utilizing the capacity for high speed computing together with a substantial amount of RAM as a FIFO, iDS products allow up to 32 TCP connections to be used to read from and write to the same serial devices.

In the scenario illustrated below, an iDS-728i-T is combined with an Ethernet switch to control requests and responses between multiple remote devices (via RS-232 and RS-485) and multiple controllers (via the Ethernet), thereby providing a more efficient method of controlling communications between multiple devices with minimal effort.

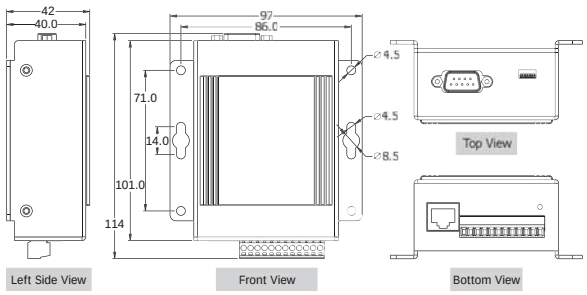


Specifications

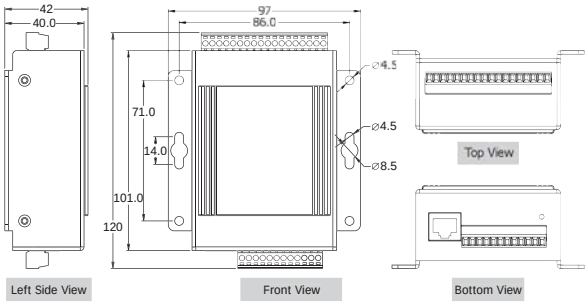
Models	iDS-718i-D	iDS-728i-T	iDS-718iM-D	iDS-728iM-T	iDS-448iM-D
CPU Module					
CPU	32-bit RISC, 720 MHz				
RAM	256 MB DDR3				
Flash	256 MB				
Peripheral	microSD, RTC, 64-bit Serial Number, Watchdog, Buzzer				
Communication Interface					
COM1	5-wire RS-232/422/485 (Isolated)				8-wire RS-232/422/485 (Isolated)
COM2	–	5-wire RS-232/422/485 (Isolated)	–	5-wire RS-232/422/485 (Isolated)	8-wire RS-232/422/485 (Isolated)
COM3	–	–	–	–	8-wire RS-232/422/485 (Isolated)
COM4	–	–	–	–	8-wire RS-232/422/485 (Isolated)
Ethernet	10/100 Base-TX, RJ-45 port (Auto-negotiating, Auto MDI/MDI-X, LED indicators), PoE (IEEE 802.3af, Class 1)				2-port 10/100 Base-TX Ethernet Switch with LAN Bypass, RJ-45 port (Auto-negotiating, Auto MDI/MDI-X, LED indicators), PoE (IEEE 802.3af, Class 1)
COM Port Signals					
3-wire RS-232	RxD, TxD and GND				
5-wire RS-232	RxD, TxD, CTS, RTS and GND				
8-wire RS-232	RxD, TxD, CTS, RTS ,DCD, DSR ,DTR, and GND				
RS-422/485	TxD+, TxD-, RxD+, RxD- and GND/Data+, Data- and GND				
RS-485	Data+, Data- and Iso.GND				
COM Port Formats					
Data Bits	5, 6, 7, 8				
Parity	None, Even, Odd, Mark, Space				
Stop Bits	1, 1.5, 2				
Baud Rate	921.6 kbps Max.				
Flow Control	RTS/CTS, XON/XOFF				
Pull High/Low Resistor	Switch-selectable (1 kΩ for RS-422/485, Non-Resistor for RS-232)				
Power					
ESD Protection	Yes (with Frame Ground)				
Protection	Power input reverse polarity protection				
Required Supply Voltage	+12 V_{DC} ~ +48 V_{DC} (non-regulated) or PoE (IEEE 802.3af, Class 1)				
Power Consumption	3.5 W				
Software					
Protocols	ICMP, IPv4, TCP, UDP, DHCP, BOOTP, Telnet, SSH, FTP, SFTP, DNS, SNMP V1/V2c/V3, HTTP, SMTP, ARP				
Configuration Method	Web, Serial Console, Telnet/SSH Console, eSearch Utility for Windows				
Virtual COM for Windows	Windows XP/2003/2008/7/8 x86/x64, 2012 x64, XP Embedded				
Virtual COM for Linux	Linux kernel 2.4.x, 2.6.x, 3.x				
SNMP Standards	RFC1213 MIB-II, RFC1317				
Application Modes	Virtual COM, TCP Server, TCP Client, UDP, Pair Connection, RFC2217, Terminal, Reverse Telnet, TCP Modem				
Mechanical					
Dimensions (W x H x D)	76 mm x 114 mm x 42 mm (97 mm x 114 mm x 42 mm for "M" versions)		76 mm x 120 mm x 42 mm (97 mm x 120 mm x 42 mm for "M" versions)		129 mm x 166 mm x 47 mm
Installation	DIN-Rail				
Casing	Plastic (Metal for "M" versions)				
Environment					
Operating Temperature	-25 °C ~ +75 °C				
Storage Temperature	-40 °C ~ +80 °C				
Humidity	5 ~ 90% RH, non-condensing				

Dimensions (Units: mm)

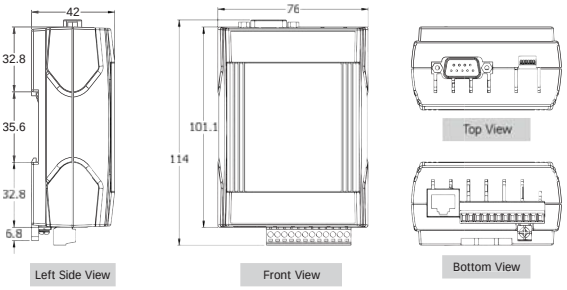
iDS-718iM-D



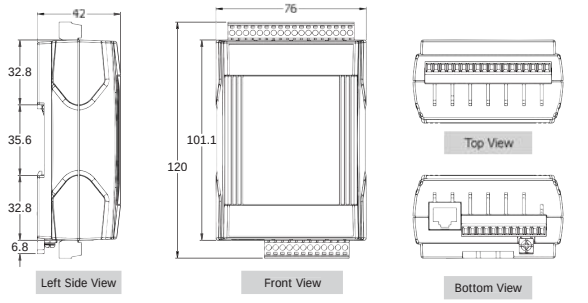
iDS-728iM-T



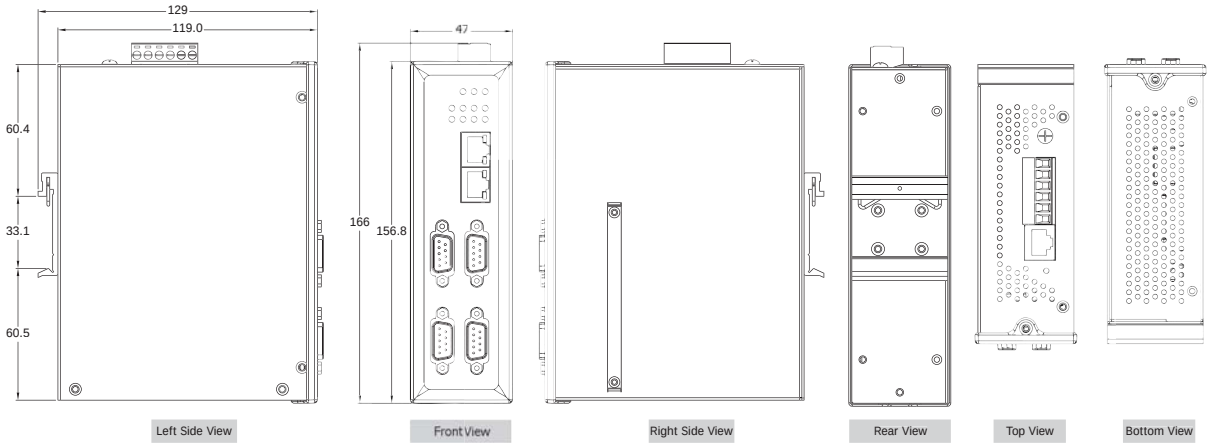
iDS-718i-D



iDS-728i-T



iDS-448iM-D



Ordering Information

iDS-718i-D CR	Intelligent Device Server with 1 RS-232/422/485 (Isolated, RoHS, DB9)
iDS-718iM-D CR	Intelligent Device Server with 1 RS-232/422/485 (Isolated, Metal Case, RoHS, DB9)
iDS-728i-T CR	Intelligent Device Server with 2 RS-232/422/485 (RoHS, Terminal block)
iDS-728iM-T CR	Intelligent Device Server with 2 RS-232/422/485 (Metal Case, RoHS, Terminal block)
iDS-448iM-D CR	Intelligent Device Server with 4 RS-232/422/485 (Metal Case, RoHS, DB9)

Accessories

GPSU06U-6 CR	24 VDC/0.25 A, 6 W Power Supply
MDR-20-24 CR	24 VDC/1 A, 24 W Power Supply with DIN-R
DIN-KA52F-48 CR	48V/0.52A, 25 W Power Supply with DIN-Rail Mounting (RoHS, for NS-205PSE)
CA-0903	9-Pin Female D-Sub and RS-232 Connector Cable, 30 cm Cable
CA-0910	9-Pin Female D-Sub and 3-wire RS-232 Cable, 1 m Cable
NS-205 CR	Unmanaged 5-port Industrial Ethernet Switch (RoHS)
NS-205PSE CR	Unmanaged Ethernet Switch with 4 PoE Ports and 1 RJ-45 Uplink (RoHS)

3-3 Palm-size Programmable Serial-to-Ethernet Device Server

PDS-720(D)

PPDS-720(D)-MTCP

Programmable Device Server with 1 RS-232 port and 1 RS-485 port

PPDS-720D-MTCP PDS-720

PDS-782-25/D6

PDS-782D-25/D6

Programmable Device Server with 7 RS-232 ports and 1 RS-485 port

PDS(M)-700(D) Series

PPDS(M)-700(D)-MTCP Series

Programmable Device Server with RS-232 and RS-485 ports

PPDS-700D-MTCP series PDSM-700D series

Features

Powerful software functions

- Incorporates serial devices in an Ethernet network
- Application Modes: Virtual COM, TCP Server, TCP Client
- Virtual COM for 32/64-bit Windows XP/2003/2012/7/8
- Supports Modbus TCP to RTU/ASCII Gateway (for MTCP versions)
- Programmable with lib and sample programs
- Built-in high performance MiniOS7 from ICP DAS
- Supports Virtual I/O technology (for models with DIO)
- Supports IP filter (Accessible IP) for security control
- Supports multi-client and data sharing function

Robust hardware features

- Built-in watchdog timer suitable for use in harsh environments
- Built-in Self-Tuner on RS-485 Ports (automatic direction control)
- Supports +/- 4 kV ESD protection on serial ports
- Power reverse polarity protection and low power consumption
- 10/100 Base-TX Ethernet, RJ-45 Port (Auto-negotiating, auto MDI/MDI-X, LED indicator)
- Supports PoE (Power over Ethernet, for PPDS versions)
- Built-in 7-Segment 5-digit LED display (for D versions)
- Supports D/I, latched D/I and counter functions (for models with DIO)
- Palm-size form factor with multiple serial ports
- Industrial DIN-Rail mounting

Introduction

The PDS-700/PPDS-700-MTCP series is a family of Programmable Device Servers, also known as "Serial-to-Ethernet gateway", that are designed for linking RS-232/422/485 devices to an Ethernet network. The user-friendly VxComm Driver/Utility allows users to easily turn the built-in COM ports of the PDS-700/PPDS-700-MTCP series into standard COM ports on a PC. By virtue of its protocol independence, a small-core OS and high flexibility, the PDS-700/PPDS-700-MTCP series is able to meet the demands of every network-enabled application.

The PDS-700/PPDS-700-MTCP series includes a powerful and reliable Xserver programming structure that allows you to quickly and easily build your robust Ethernet applications. The built-in, high-performance MiniOS7 boots the PDS-700/PPDS-700-MTCP up in just one second and gives you fastest responses.

These modules also provide advanced features as follows:

Programmable Enhanced "Device Servers"

The programmable features of the PDS series of products makes it possible to effectively implement exclusive protocols and exclusive communication mechanisms for complex PDS-based applications. This provides the following advantages:

• Effective network transmission:
Place your customized software on the PDS to directly perform processes locally. The effective data and information can be periodically sent back to the PC based on a schedule that can be planned in advance and the devices will work independently on-site, even when not connected to a network. Therefore, the design of system can be much more flexible. This also reduces the need to rely on the network, which is an inevitable factor for conventional DS (Device Server) as it has to keep on "talking" to the PC via the network to ensure the status maintains transparency.

• Previous development efforts can be duplicated:
Along with serial devices, you can place your customized or value-added software on the PDS to implement an intelligent Ethernet controller. This controller can then be used in applications for future projects, dramatically reducing programming requirements. In addition, your value-added software is embedded in the PDS, so if a computer system undergoes hardware replacement or upgrade, incompatibility issues don't need to be considered, which therefore reduces system maintenance work.

Virtual I/O Highly Integrates On-Site Messages

I/O acquisition is very important when performing on-site integration. The RS-485 port of PDS is able to be connected to I/O devices, like I-7000/M-7000 series, to offer abundant I/O functions for various purposes. For easier on-site integration, some PDS models also provide Digital I/O, which is also supported by the ICP DAS DCON utility, EZ Data Logger or other DCON client programs.

"Virtual I/O" is an extension of "Virtual COM" technology that simulates the PDS's digital I/Os control as a virtual COM port (Port I/O) application on the PC. You are now able to access the PDS's digital I/Os using the DCON protocol through the virtual COM port.

In addition, the DCON utility and EZ Data Logger also support control of the PDS's digital I/Os through the use of "Virtual I/O" technology, so you can monitor PDS's digital I/Os and complete the I/Os application in a convenient way.

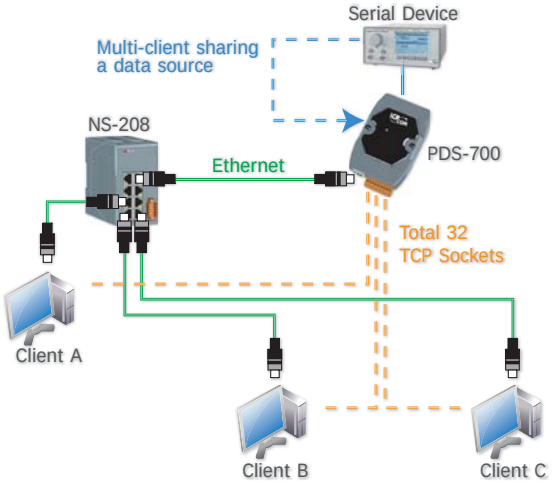
Data Sharing with Multiple Clients

M0: Transparent Mode (Multi-echo)

In transparent mode, the PDS sends data from a serial device to each client that is connected to the same serial port of the PDS. Thus, each connected client has a copy of the same data from the serial device.

M1: Slave Mode (Single-echo)

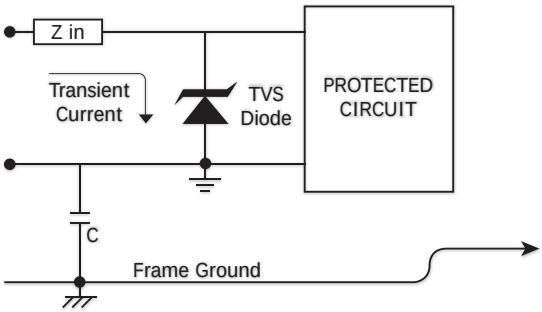
In slave mode, the PDS only sends data from a serial device to the client that requires the service. If there are no requirements from the client, then data will not be sent to the client. The PDS services each client individually when sharing data from the serial device, but the clients do not have a copy of the same data.

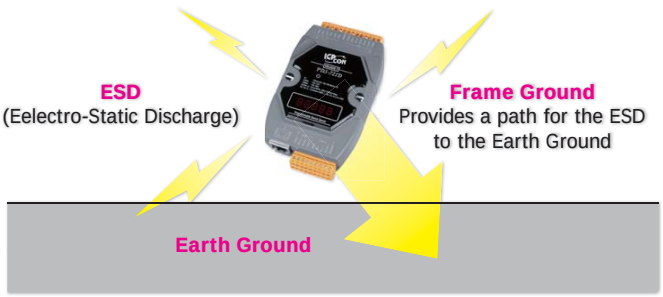


ESD Protection and Frame Ground

The PDS series offers TVS diode ESD protection technology with a frame ground design that protects your system from being damaged by high potential voltages.

Under normal operating conditions, the TVS diode presents high impedance (appears as an open circuit) to the protected component. If the voltage exceeds the limitation, the TVS diode avalanches, providing a low impedance path for the transient current. As a result, the transient current is diverted away from the protected components and shunted through the TVS diode. The device returns to a high impedance state after the transient threat has passed.





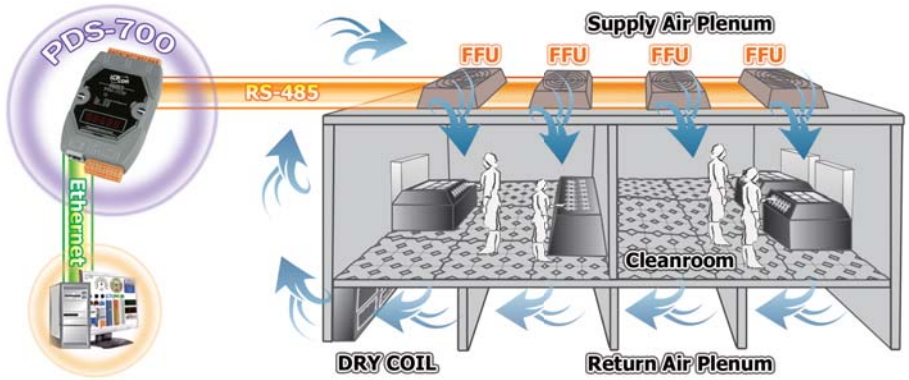
Self-Tuner Inside

Without the presence of Self-Tuner, users need to enable the RS-485 transmitter before transmitting, and disable the transmitter after the transmission is complete. The time required to enable and disable the transmitter (direction control) is the major source of many communication issues, and it is very difficult to debug. The built-in Self-Tuner in the PDS effectively removes this direction control issue and also simplifies the software/firmware programming required for communication applications.

PoE

The PPDS-700-MTCP series features true IEEE 802.3af compliant (classification, Class 1) Power over Ethernet (PoE) using a standard category 5 Ethernet cable to receive power from a PoE switch like the NS-205PSE. The PPDS-700-MTCP also works as a Modbus/TCP to RTU/ASCII gateway that supports most SCADA/HMI communications based on the Modbus/TCP protocol.

Applications



Selection Guide

Model Name	RS-232	RS-485	RS-422/ RS-485	DI/ DO	Ethernet	COM1	COM2	COM3	COM4	COM5	COM6	COM7	COM8
PDS-720(D) PPDS-720(D)-MTCP	1	1	–	–	10/100 M	5-wire RS-232	2-wire RS-485	–	–	–	–	–	–
PDS(M)-721(D) PPDS(M)-721(D)-MTCP	1	1	–	6/7	10/100 M	5-wire RS-232	2-wire RS-485	–	–	–	–	–	–
PDS(M)-732(D) PPDS(M)-732(D)-MTCP	2	1	–	4/4	10/100 M	5-wire RS-232	2-wire RS-485	5-wire RS-232	–	–	–	–	–
PDS(M)-734(D) PPDS(M)-734(D)-MTCP	1	1	1	4/4	10/100 M	5-wire RS-232	2-wire RS-485	RS-422/ RS-485	–	–	–	–	–
PDS(M)-742(D) PPDS(M)-742(D)-MTCP	3	1	–	–	10/100 M	5-wire RS-232	2-wire RS-485	5-wire RS-232	9-wire RS-232	–	–	–	–
PDS(M)-743(D) PPDS(M)-743(D)-MTCP	3	1	–	4/4	10/100 M	5-wire RS-232	2-wire RS-485	3-wire RS-232	3-wire RS-232	–	–	–	–
PDS(M)-752(D) PPDS(M)-752(D)-MTCP	4	1	–	–	10/100 M	5-wire RS-232	2-wire RS-485	5-wire RS-232	5-wire RS-232	5-wire RS-232	–	–	–
PDS(M)-755(D) PPDS(M)-755(D)-MTCP	1	4	–	–	10/100 M	5-wire RS-232	2-wire RS-485	2-wire RS-485	2-wire RS-485	2-wire RS-485	–	–	–
PDS(M)-762(D) PPDS(M)-762(D)-MTCP	5	1	–	1/2	10/100 M	5-wire RS-232	2-wire RS-485	3-wire RS-232	3-wire RS-232	3-wire RS-232	3-wire RS-232	–	–
PDS(M)-782(D) PPDS(M)-782(D)-MTCP	7	1	–	–	10/100 M	5-wire RS-232	2-wire RS-485	3-wire RS-232	3-wire RS-232	3-wire RS-232	3-wire RS-232	3-wire RS-232	3-wire RS-232
PDS-782(D)-25/D6	7	1	–	–	10/100 M	5-wire RS-232	2-wire RS-485	3-wire RS-232	3-wire RS-232	3-wire RS-232	3-wire RS-232	3-wire RS-232	3-wire RS-232

Note:
1. The D version modules have a built-in 7-Seg. LED Display.
2. The M version modules use metal case.
3. The PPDS-700-MTCP series modules support PoE (Power over Ethernet) and Modbus Gateway.

System Specifications

CPU		
CPU		80186, 80 MHz or compatible
SRAM		512 KB
Flash Memory		Flash ROM: 512 KB; Erase unit is one sector (64 KB); 100,000 erase/write cycles
EEPROM		16 KB; Data retention: 40 years; 1,000,000 erase/write cycles
Built-in Watchdog Timer		Yes
Communication Interface		
Ethernet		10/100 Base-TX, RJ-45 port (Auto-negotiating, auto MDI/MDI-X, LED indicator)
PoE		IEEE 802.3af (PPDS(M)-700(D)-MTCP series only)
COM Port Formats		
Data Bit	COM1 and COM2	7, 8
	COM3 ~ COM8	5, 6, 7, 8
Parity		None, Even, Odd, Mark, Space
Stop Bit	COM1 ~ COM8	1, 2
Baud Rate		115200 bps max.
LED Indicators		
5-digit 7 Segment		Yes (D versions only)
System		Red
PoE		Green (PPDS(M)-700(D)-MTCP series only)
Power		
Protection		Power Reverse Polarity Protection
Required Supply Voltage	PDS(M)-700(D) Series	+10 V_{DC} ~ +30 V_{DC} (non-regulated)
	PPDS(M)-700(D)-MTCP Series	PoE or +12 V_{DC} ~ +48 V_{DC} (non-regulated)
Power Consumption	D versions (LED display)	2.9 W
	Others	2.2 W
Mechanical		
Dimensions (W x H x D)	M versions (Metal case)	88 mm x 123 mm x 28 mm
	Others (Plastic)	72 mm x 123 mm x 35 mm
Installation		DIN-Rail or Wall mounting
Environment		
Operating Temperature		-25 °C ~ +75 °C
Storage Temperature		-40 °C ~ +80 °C
Humidity		5 ~ 90% RH, non-condensing

I/O Specifications

Digital Output		
Output Type		Open Collector (Sink/NPN)
Load Voltage		30 V_{DC}, max.
Load Current		100 mA, max.
Isolated Voltage		Non-isolated
Digital Input		
Input Type		Source (Dry Type), Common Ground
Off Voltage Level		+1 V max.
On Voltage Level		+3.5 ~ +30 V
Isolated Voltage		Non-isolated
Counters	Max. Count	16-bit (65535)
	Max. Input Frequency	100 Hz
	Min. Pulse Width	5 ms

Ordering Information

Models							RS-232 RS-485 RS-422/485	DI/DO	Includes Cable
	PDS	M	- 7 ☐ ☐	D		CR			
P	PDS	M	- 7 ☐ ☐	D	- MTCP	CR			
PoE	Programmable Device Server	Metal		LED Display	Modbus/TCP	RoHS			
P D S - 7 2 0 D						CR	1 RS-232 1 RS-485	–	1 CA-0910
P P D S - 7 2 0 D -MTCP						CR			
PDS M -721 D						CR	1 RS-232 1 RS-485	6/7	1 CA-0910
PPDS M -721 D -MTCP						CR			
PDS M -732 D						CR	2 RS-232 1 RS-485	4/4	1 CA-0910
PPDS M -732 D -MTCP						CR			
PDS M -734 D						CR	1 RS-232 1 RS-485 1 RS-422/485	4/4	1 CA-0910
PPDS M -734 D -MTCP						CR			
PDS M -742 D						CR	3 RS-232 1 RS-485	–	1 CA-0910
PPDS M -742 D -MTCP						CR			
PDS M -743 D						CR	3 RS-232 1 RS-485	4/4	1 CA-0910
PPDS M -743 D -MTCP						CR			
PDS M -752 D						CR	4 RS-232 1 RS-485	–	1 CA-0910
PPDS M -752 D -MTCP						CR			
PDS M -755 D						CR	1 RS-232 4 RS-485	–	1 CA-0910
PPDS M -755 D -MTCP						CR			
PDS M -762 D						CR	5 RS-232 1 RS-485	1/2	1 CA-0910
PPDS M -762 D -MTCP						CR			
PDS M -782 D						CR	7 RS-232 1 RS-485	–	1 CA-0910
PPDS M -782 D -MTCP						CR			
P D S - 7 8 2 D -25/D6						CR	7 RS-232 1 RS-485	–	1 CA-0910 1 CA-9-2505D

Note:
1. PPDS(M)-700(D)-MTCP supports PoE and Modbus Gateway.
2. D versions support 7-segment 5-digit LED display.
3. M versions is equipped with metal case.

Accessories

GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
MDR-20-24	24 VDC/1 A, 24 W Power Supply with DIN-Rail Mounting
DIN-KA52F-48	48 VDC/0.52 A, 25 W Power Supply with DIN-Rail Mounting
CA-0903	9-Pin Female D-Sub and RS-232 Connector Cable, 30 cm Cable
CA-0910	9-Pin Female D-Sub and 3-wire RS-232 Cable, 1 m Cable
CA-9-2505D	DB-25 Male (D-Sub) to 6-port DB-9 Male (D-Sub) Cable
NS-205 CR	Unmanaged 5-port Industrial Ethernet Switch (RoHS)
NS-205PSE CR	Unmanaged Ethernet Switch with 4 PoE Ports and 1 RJ-45 Uplink (RoHS)
DN-09-2	I/O Connector Block with DIN-Rail Mounting and Two 9-Pin Male Headers. Includes CA-0915 x 2 (9-Pin Male-Female D-Sub Cable 1.5 m)
DN-09-2F	I/O Connector Block with DIN-Rail Mounting and Two 9-Pin Male Headers. Includes CA-0910F x 2 (9-Pin Female-Female D-Sub Cable 1.0 m)

3-4 Palm-size Serial-to-Ethernet Device Server

DS-712

Serial-to-Ethernet Device Server with 1 RS-232 port

DS-715

Serial-to-Ethernet Device Server with 1 RS-422/RS-485 port

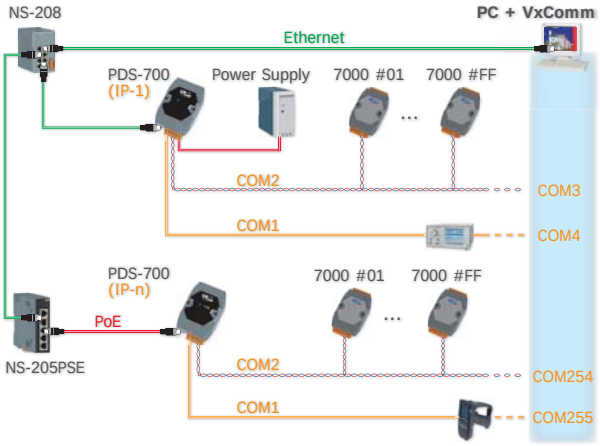
Features

- Incorporate Serial Devices in an Ethernet network
- Application Modes: Virtual COM, TCP Server, TCP Client
- Virtual COM for 32/64-bit Windows XP/2003/2012/7/8
- Watchdog Timer suitable for use in harsh environments
- 10/100 Base-TX, RJ-45 Port (Auto-negotiating, auto MDI/MDI-X, LED indicator)
- Built-in High Performance MiniOS7 from ICP DAS
- High Performance Device Server
- Power Reverse Polarity Protection
- RoHS Compliant & no Halogen
- Serial Port +/-4 kV ESD Protection Circuit
- Low power consumption
- Palm-Size with DIN-Rail Mounting
- Male DB-9 Connector

Introduction

The DS-700 is a series of Serial-to-Ethernet Device Servers that are designed for linking RS-232/422/485 devices to an Ethernet network. By using the VxComm Driver/Utility, the built-in COM port of the DS-700 series can be virtualized to a standard PC COM port in Windows. By virtue of its protocol independence, a small size and flexibility, the DS-700 series meets the demands of virtually any network-enabled application.

The DS-712 is equipped with a male DB-9 connector and supports a 5-wire RS-232 port, while the DS-715 is equipped with a removable terminal block connector and supports a 4-wire RS-422 port or a 2-wire RS-485 port with 2000 V_{rms} isolation.



Applications

- Factory, Building and Home Automation

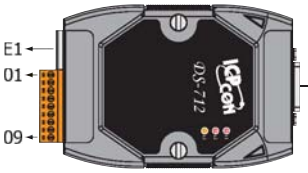
System Specifications

Models		DS-712	DS-715
CPU			
CPU		80186, 80 MHz or compatible	
Built-in Watchdog Timer		Yes	
Communication Interface			
COM1	Non-isolated	RS-232 (TxD, RxD, RTS, CTS, GND)	–
	Isolated (2000 V_{rms})	–	RS-422 (TxD+, TxD-, RxD+, RxD-); RS-485 (D2+, D2-)
Ethernet		10/100 Base-TX, RJ-45 port (Auto-negotiating, auto MDI/MDI-X, LED indicator)	
COM Port Formats			
Data Bit		7, 8	
Parity		None, Even, Odd, Mark, Space	
Stop Bit		1, 2	
Baud Rate		115200 bps max.	

Models	DS-712	DS-715
LED Indicators		
L1	Run (Red)	
L2	Link/Act (Red)	
L3	10/100M (Orange)	
Power		
Protection	Power Reverse Polarity Protection	
Required Supply Voltage	+12 VDC ~ +48 VDC (non-regulated)	
Power Consumption	2.0 W	
Mechanical		
Dimensions (W x H x D)	72 mm x 118 mm x 35 mm	72 mm x 124 mm x 35 mm
Installation	DIN-Rail or Wall mounting	
Environment		
Operating Temperature	-25 °C ~ +75 °C	
Storage Temperature	-40 °C ~ +80 °C	
Humidity	5 ~ 90% RH, non-condensing	

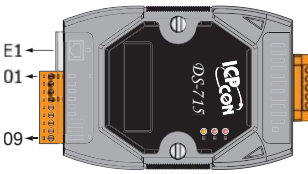
Pin Assignments

Terminal No.	Pin Assignment
E1	
01	N/A
02	N/A
03	N/A
04	N/A
05	INIT*
06	N/A
07	N/A
08	(R)+Vs
09	(B)GND



COM1: (RS-232)

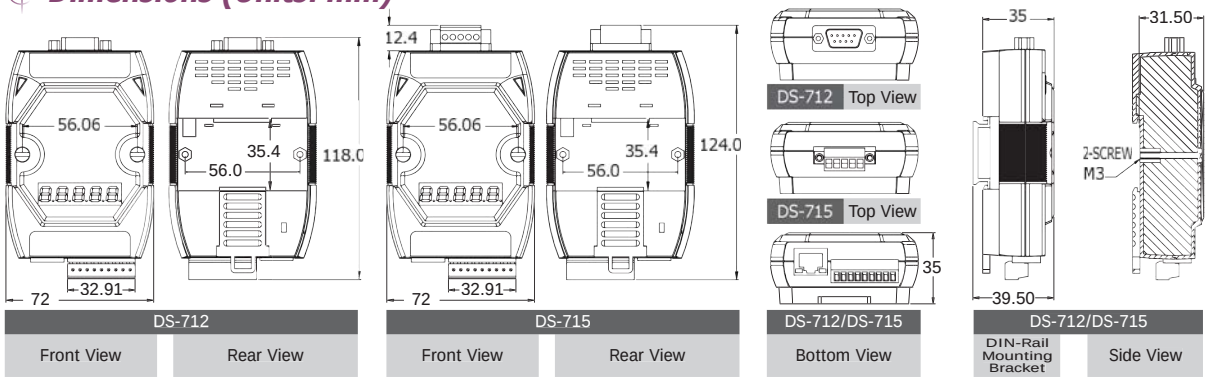
Pin Assignment	Terminal No.		Pin Assignment
GND	05	09	--
--	04	08	CTS
TxD	03	07	RTS
RxD	02	06	--
--	01		



COM1 (RS-422/485)

- F.G.
- Tx+/D+
- Tx-/D-
- Rx+
- Rx-

Dimensions (Units: mm)



DS-712: Front View | Rear View

DS-715: Front View | Rear View

DS-712/DS-715: Bottom View

DS-712/DS-715: DIN-Rail Mounting Bracket | Side View

Ordering Information

DS-712 CR	Device Server with 1 RS-232 port (RoHS)
DS-715 CR	Device Server with 1 Isolated RS-422/RS-485 port (RoHS)

Accessories

GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
MDR-20-24	24 VDC/1 A, 24 W Power Supply with DIN-Rail Mounting
DIN-KA52F-48	48 VDC/0.52 A, 25 W Power Supply with DIN-Rail Mounting
CA-0915	9-Pin Male-Female D-Sub Cable, 1.5 m Cable
NS-205 CR	Unmanaged 5-port Industrial Ethernet Switch (RoHS)
NS-205PSE CR	Unmanaged Ethernet Switch with 4 PoE Ports and 1 RJ-45 Uplink (RoHS)
DN-09-2F	I/O Connector Block with DIN-Rail Mounting and Two 9-Pin Male Headers. Includes CA-0910F x 2 (9-Pin Female-Female D-Sub Cable 1.0 m)

3-5 IP67 Programmable Serial-to-Ethernet Device Server

PPDS-741-IP67 *Available soon*

PPDS-742-IP67 *NEW*

PPDS-743-IP67 *Available soon*

Programmable Device Server with 4 RS-232 or RS-485 ports, PoE and IP67 Casing

Features

- Incorporate Serial Devices in an Ethernet network
- Virtual COM for 32-bit and 64-bit Windows XP/2012/7/8
- Watchdog Timer suitable for use in harsh environments
- 10/100 Base-TX, RJ-45 Port (Auto-negotiating, auto MDI/MDI-X, LED indicator)
- Built-in High Performance MiniOS7 from ICP DAS
- Self-Tuner ASIC Controller on the RS-485 Port
- Powerful Programmable Device Server
- Rugged RJ-45 Connector for anti-vibration and shock
- Plastic Casing with IP67 Waterproof
- Power Reverse Polarity Protection
- RoHS Compliant & no Halogen
- Serial Port +/-4 kV ESD Protection Circuit
- Low power consumption
- Supports PoE (IEEE 802.3af, Class 1)
- ODM Service is available

Introduction

The PPDS-700-IP67 series is a family of Programmable Device Servers, also known as "Serial-to-Ethernet gateway", that are designed for linking RS-232/422/485 devices to an Ethernet network. The user-friendly VxComm Driver/Utility allows users to easily turn the built-in COM ports of the PPDS-700-IP67 series into standard COM ports on a PC. By virtue of its protocol independence, a small-core OS and high flexibility, the PPDS-700-IP67 series is able to meet the demands of every network-enabled application.

The PPDS-700-IP67 series includes a powerful and reliable Xserver programming structure that allows you to design your robust Ethernet applications in one day. The built-in, high-performance MiniOS7 boots the PPDS-700-IP67 up in just one second and gives you fastest responses.

The PPDS-700-IP67 is a special design for the toughest applications. It can be directly mounted to any machine or convenient flat surface. The rugged packaging and IP67 connectors are rated to protect against water, oil, dust, vibration, and much more.

The PPDS-700-IP67 supports PoE (Power over Ethernet) function that allows power and data to be carried over a single Ethernet cable, so a device can operate solely from the power it receives through the data cable. This innovation allows greater flexibility in office design, higher efficiency in systems design, and faster turnaround time in set-up and implementation. When there is no PoE switch on site, the PPDS-700-IP67 accepts power input from a +12 V_{DC} ~ +48 V_{DC} adapter.

When using PoE devices such as the PPDS-700-MTCP, PPDS-700-IP67 and PET-7000 (Ethernet I/O module with PoE), you can select the ICP DAS "PoE" switch – "NS-205PSE" – as the power source. The NS-205PSE automatically detects whether the connected devices are PoE devices or not. This mechanism ensures that the NS-205PSE will work with both PoE and non-PoE devices simultaneously.

As a power source for PoE devices, the NS-205PSE requires a power input ranging from +46 V_{DC} ~ +55 V_{DC}.

Applications

- Factory Automation
- Transportation Automation
- Chemical Industry Automation
- Marine Automation

System Specifications

Models	PPDS-741-IP67	PPDS-742-IP67	PPDS-743-IP67
CPU			
CPU	80186, 80 MHz or compatible		
SDRAM	512 KB		
Flash Memory	Flash ROM: 512 KB; Erase unit is one sector (64 KB); 100,000 erase/write cycles		
EEPROM	16 KB; Data retention: 40 years; 1,000,000 erase/write cycles		
Watchdog Timer	Yes		
Communication Interface			
COM1	5-wire RS-232		
COM2	Isolated 2-wire RS-485		
COM3	Isolated 2-wire RS-485	5-wire RS-232	5-wire RS-232
COM4	Isolated 2-wire RS-485	Isolated 2-wire RS-485	5-wire RS-232
Ethernet	10/100 Base-TX, RJ-45 port (Auto-negotiating, Auto MDI/MDI-X, LED indicators), PoE (IEEE 802.3af, Class 1)		
COM Port Formats			
Data Bit	5, 6, 7, 8		
Parity	None, Even, Odd, Mark, Space		
Stop Bit	1, 2		
Baud Rate	115200 kbps (max.)		
LED Indicators			
System	Red: Sys		
Ethernet	Green: Link/Act (E1), Orange: 10/100M (E1)		
COM1 ~ COM4	Green: RxD, Orange: TxD		
Power			
Protection	Power input reverse polarity protection		
Required Supply Voltage	+12 V_{DC} ~ +48 V_{DC} (non-regulated) or PoE (IEEE 802.3af, Class 1)		
Power Consumption	2.2 W		
Mechanical			
Casing	Plastic casing with IP67 waterproof protection		
Dimensions (W x H x D)	85 mm x 76 mm x 137 mm		
Installation	Wall mounting		
Environment			
Operating Temperature	-10 °C ~ +60 °C		
Storage Temperature	-10 °C ~ +60 °C		
Humidity	100% RH for operating temperature -10 °C ~ +60 °C		
Note: 5-wire RS-232: TxD, RxD, CTS, RTS, GND Isolated 2-wire RS-485: DATA+, DATA-, GND; Self-Tuner Inside; 2500 V_{rms} Isolation			

Ordering Information

PPDS-741-IP67 CR	Programmable Device Server with 1 RS-232 port, 3 RS-485 ports, PoE and IP67 Casing (RoHS)
PPDS-742-IP67 CR	Programmable Device Server with 2 RS-232 ports, 2 RS-485 ports, PoE and IP67 Casing (RoHS)
PPDS-743-IP67 CR	Programmable Device Server with 3 RS-232 ports, 1 RS-485 port, PoE and IP67 Casing (RoHS)

Accessories

GPSU06U-6

24 V_{DC}/0.25 A, 6 W Power Supply

MDR-20-24

24 V_{DC}/1 A, 24 W Power Supply with DIN-Rail Mounting

DIN-KA52F-48

48 V_{DC}/0.52 A, 25 W Power Supply with DIN-Rail Mounting

NS-205 CR

Unmanaged 5-port Industrial Ethernet Switch (RoHS)

NS-205PSE CR

Unmanaged Ethernet Switch with 4 PoE Ports and 1 RJ-45 Uplink (RoHS)

3-6 Programmable Serial-to-Fiber Device Server

PDS-220Fx

Programmable Device Server with 1 RS-232, 1 RS-422/485 and 1 Fiber ports

PDS-220FT

PDS-220FC
PDS-220FCS
PDS-220FCS-60

Features

- Adds optical fiber connectivity to serial devices
- Virtual COM for 32-bit and 64-bit Windows XP/2012/7/8
- Watchdog Timer suitable for use in harsh environments
- Serial Port +/-4 kV ESD Protection Circuit
- 100 Base-FX (SC/ST connector)
- Low power consumption
- "Virtual COM" extends PC COM ports
- Powerful Programmable Device Server
- Power Reverse Polarity Protection
- Self-tuner ASIC Controller on the RS-485 port
- Built-in high performance MiniOS7 from ICP DAS
- ODM Service is available

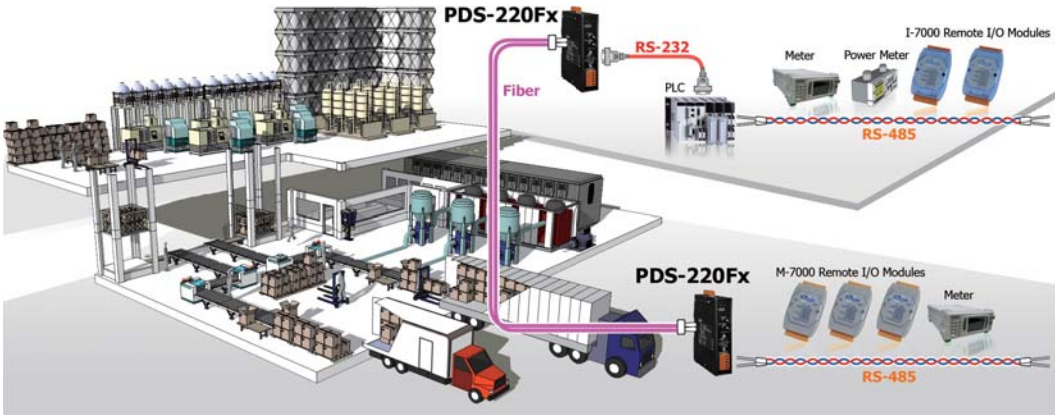
Introduction

The PDS-220Fx series is a family of Programmable Device Servers, also known as "Serial-to-Fiber gateway", that are designed for adding optical fiber connectivity to RS-232/422/485 devices.

The fiber-optic communications permits transmission over longer distances than other forms of communications because of the signals travel along them with less loss and no crosstalk. It has following important features:

- **Immunity to electromagnetic interference (EMI) — Motors, relays, welders and other industrial equipment generate a tremendous amount of electrical noise that can cause major problems with copper cabling.**
- **High electrical resistance, making it safe to use near high voltage equipment or between areas with different earth potentials.**
- **No sparks — important in flammable or explosive gas environments.**
- **Not electromagnetically radiating, and difficult to tap without disrupting the signal — important in high-security environments.**

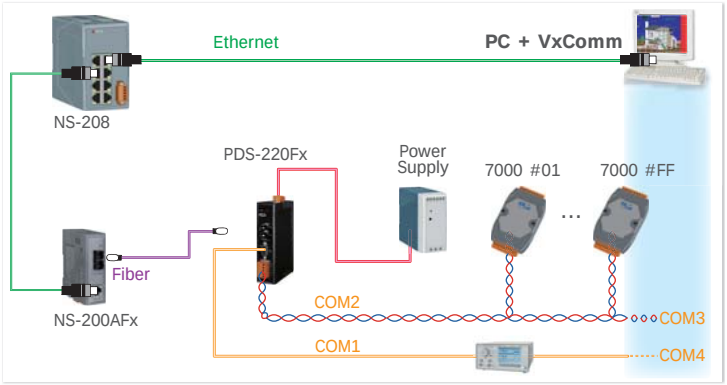
Because of these reasons, optical fibers have largely replaced copper wire communications in core networks in the developed world.



The user-friendly VxComm Driver/Utility allows users to easily turn the built-in COM ports of the PDS-220Fx series into standard COM ports on a PC. By virtue of its protocol independence, a small-core OS and high flexibility, the PDS-220Fx series is able to meet the demands of every network-enabled application.
The PDS-220Fx series includes a powerful and reliable Xserver programming structure that allows you to design your robust Ethernet applications in one day. The built-in, high-performance MiniOS7 boots the PDS-220Fx up in just one second and gives you fastest responses.
The PDS-220Fx is equipped with 1 RS-232 port and 1 RS-422/485 port. The removable onboard terminal block connector is designed for easy and robust wiring in industrial situations.

Applications

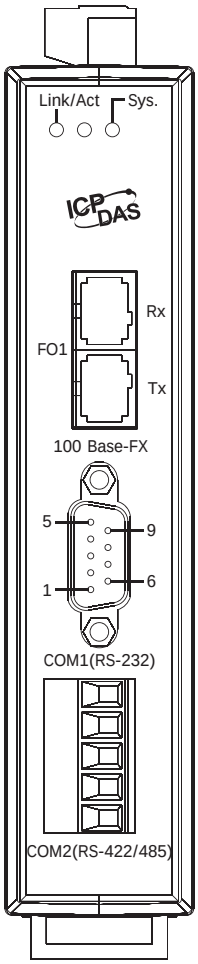
- Factory Automation
- Building Automation
- Home Automation



System Specifications

Models		PDS-220FT	PDS-220FC	PDS-220FCS	PDS-220FCS-60
CPU					
CPU		80186, 80 MHz or compatible			
SRAM		512 KB			
Flash		512 KB; Erase unit is one sector (64 KB); 100,000 erase/write cycles			
EEPROM		16 KB; Data retention: 40 years; 1,000,000 erase/write cycles			
Peripheral		Watchdog Timer, Init Pin			
Communication Interface					
COM1		Male DB-9, 5-wire RS-232 (RxD, TxD, CTS, RTS, GND); Note: +/- 4 kV ESD Protection			
COM2		Removable Terminal Block 2-wire RS-485 (D+, D-, GND) with Self-Tuner ASIC or 4-wire RS-422 (TxD+, TxD-, RxD+, RxD-, GND) Note: +/- 4 kV ESD Protection			
Fiber Port		100 Base-FX, ST connector 	100 Base-FX, SC connector 		
Mode	Fiber Cables	Multi-mode: 50/125, 62.5/125 or 100/140 µm		Single-mode: 8.3/125, 8.7/125, 9/125 or 10/125 µm	
	Wavelength	1300 or 1310 nm			
	Min. TX Output	-20 dBm		-15 dBm	-5 dBm
	Max. TX Output	-14 dBm		-8 dBm	-0 dBm
	Max. RX Sensitivity	-32 dBm		-34 dBm	-35 dBm
	Min. RX Overload	-8 dBm		-5 dBm	
	Budget	12 dBm		19 dBm	30 dBm
Distance		2 km, (62.5/125 µm recommended) for full duplex		**30 km**, (9/125 µm recommended) for full duplex	**60 km**, (9/125 µm recommended) for full duplex
COM Port (16C550 or compatible UART)					
Data Bit		7, 8			
Parity		None, Even, Odd, Mark, Space			
Stop Bit		1, 2			
Baud Rate		115200 bps max.			
LED Indicators					
Link/Act		Green			
System		Red			
Power					
Power Input		+12 V_{DC} ~ +48 V_{DC} (non-regulated)			
Power Consumption		0.14 A @ 24 V_{DC}			
Protection		Power Reverse Polarity Protection, EMS Protection (Frame GND)			
Mechanical					
Dimensions (W x L x H)		31 mm x 121 mm x 157 mm	31 mm x 123 mm x 157 mm		
Installation		DIN-Rail mounting			
Environment					
Operating Temperature		-25 °C ~ +75 °C			
Storage Temperature		-30 °C ~ +85 °C			
Humidity		10 ~ 90% RH, non-condensing			

Pin Assignments

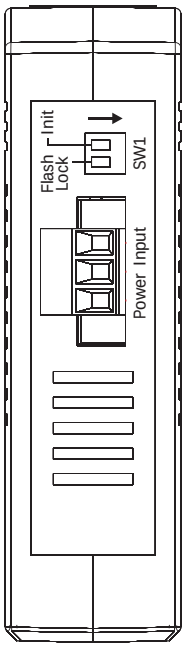


Pin Assignment	Terminal No.		Pin Assignment
GND	05	09	--
--	04	08	CTS
TxD	03	07	RTS
RxD	02	06	--
--	01		

COM1: Male DB-9 Connector

Terminal No.	Pin Assignment
01	TxD+/D+
02	TxD-/D-
03	RxD+
04	RxD-
05	GND

COM2: Removable Terminal Block



Terminal No.	Pin Assignment
03	PWR
02	P.GND
01	F.G.

Power Input: Removable Terminal Block

Ordering Information

PDS-220FT CR	Programmable Device Server with 1 RS-232, 1 RS-422/485 and 1 Multi-mode ST Fiber Port (RoHS)
PDS-220FC CR	Programmable Device Server with 1 RS-232, 1 RS-422/485 and 1 Multi-mode SC Fiber Port (RoHS)
PDS-220FCS CR	Programmable Device Server with 1 RS-232, 1 RS-422/485 and 1 Single-mode SC Fiber Port (RoHS)
PDS-220FCS-60 CR	Programmable Device Server with 1 RS-232, 1 RS-422/485 and 1 Single-mode SC Fiber Port (RoHS)

Accessories

GPSU06U-6

24 VDC/0.25 A, 6 W Power Supply

MDR-20-24

24 VDC/1 A, 24 W Power Supply with DIN-Rail Mounting

DIN-KA52F-48

48 VDC/0.52 A, 25 W Power Supply with DIN-Rail Mounting

CA-0903

9-Pin Female D-Sub and RS-232 Connector Cable, 30 cm Cable

CA-0910

9-Pin Female D-Sub and 3-wire RS-232 Cable, 1 m Cable

NS-200AFT-T CR

Industrial 10/100 Base-T to 100 Base-FX Media Converter; 1 Multi-mode ST connector (RoHS)

NS-200AFC-T CR

Industrial 10/100 Base-T to 100 Base-FX Media Converter; 1 Multi-mode SC connector (RoHS)

NS-200AFCS-T CR

Industrial 10/100 Base-T to 100 Base-FX Media Converter; 1 Single-mode SC connector (RoHS)

NS-200AFCS-60T CR

Industrial 10/100 Base-T to 100 Base-FX Media Converter; 1 (40 km) Single-mode SC connector (RoHS)

NS-205 CR

Unmanaged 5-port Industrial Ethernet Switch (RoHS)

3-7 Tiny Serial-to-Ethernet Device Server & Modbus Gateway

tDS-700 Series

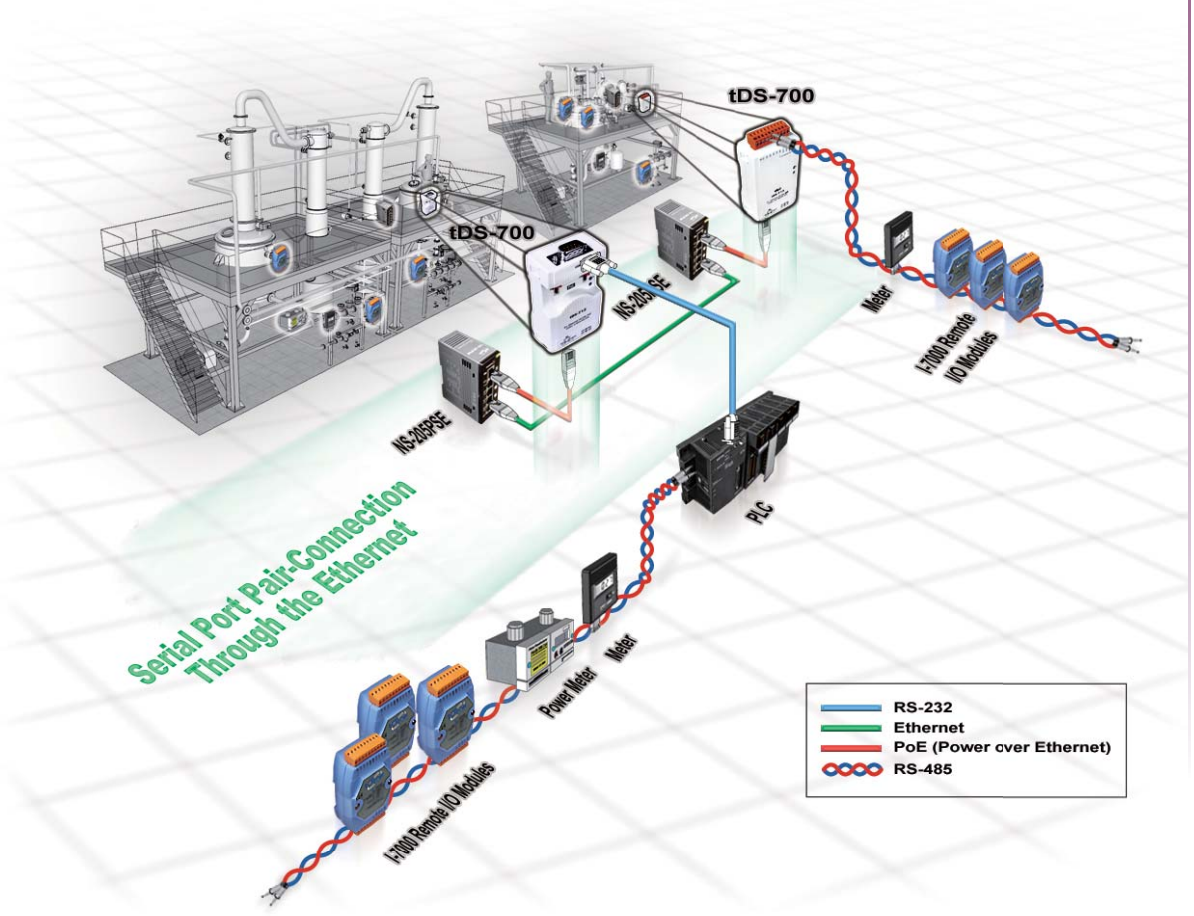
Tiny Serial-to-Ethernet Device Server

Features

- Incorporates any RS-232/422/485 serial device in Ethernet
- Application Modes: Virtual COM, TCP Server, TCP Client
- Virtual COM for 32/64-bit Windows XP/2003/2012/7/8
- Data Packing Modes: Length, Delimiter, timeout, Char-timeout.
- Supports pair-connection (serial-bridge, serial-tunnel) applications
- Supports UDP responder for device discovery (UDP Search)
- Static IP or DHCP network configuration
- Easy firmware update via the Ethernet (BOOTP, TFTP)
- Tiny Web server for serial and network configuration (HTTP)
- Contains a 32-bit MCU that efficiently handles network traffic
- 10/100 Base-TX Ethernet, RJ-45 x 1 (Auto-negotiating, auto MDI/MDIX, LED Indicators)
- Redundant power inputs: PoE and DC jack
- Allows automatic RS-485 direction control
- Male DB-9 or terminal block connector for easy wiring
- Tiny form-factor and low power consumption
- RoHS compliant & no Halogen
- Cost-effective device servers

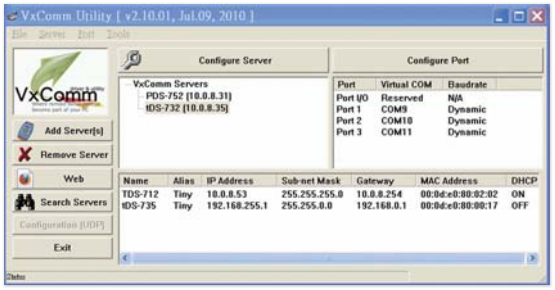
Introduction

The tDS-700 is a series of Serial-to-Ethernet device servers designed to add Ethernet and Internet connectivity to any RS-232 and RS-422/485 device, and to eliminate the cable length limitation of legacy serial communication. By using the VxComm Driver/Utility, the built-in COM port of the tDS-700 series can be virtualized to a standard PC COM port in Windows. Therefore, users can transparently access or monitor serial devices over the Internet/Ethernet without software modification.



The VxComm Driver/Utility supports the most popular operating system in the world, including 32-bit and 64-bit Windows 7/Vista/2008/2003/XP. The virtual COM works transparently and is protocol independent, enabling perfect integration with your current central computer. The utility provides an easy configuration interface that can be used to quickly create and map virtual COM ports to one or several tDS-700 modules. In addition, the utility contains a built-in terminal program, so users can send/receive command/data via the terminal program for easy testing.

The tDS-700 device servers can be used to create a pair-connection application (as well as serial-bridge or serial-tunnel), and can then route data over TCP/IP between two serial devices, which is useful when connecting mainframe computers, servers or other serial devices that do not themselves have Ethernet capability. By virtue of its protocol independence and flexibility, the tDS-700 meets the demands of virtually any network-enabled application.



DHCP minimizes configuration errors caused by manual IP address configuration, such as address conflicts caused by the assignment of an IP address to more than one computer or device at the same time. The tDS-700 supports the DHCP client function, which allows the tDS-700 to easily obtain the necessary TCP/IP configuration information from a DHCP server. The tDS-700 also contains a UDP responder that transmits its IP address information in response to a UDP search from the VxComm Utility, making local management more efficient.

The tDS-700 features a powerful 32-bit MCU to enable efficient handling of network traffic. It also has a built-in web server that provides an intuitive web management interface to allow users to modify the settings of the module, including DHCP/Static IP, gateway/mask and serial ports.

Based on an amazing tiny form-factor, the tDS-700 achieves the maximum space savings that allows it to be easily installed anywhere, even directly attached to a serial device or embedded into a machine.

The tDS-700 series also contains a built-in CPU watchdog, which automatically resets the CPU if the built-in firmware is operating abnormally, or if there is no communication between the tDS-700 and the host for a predefined period of time (system timeout). This is an important feature that ensures the tDS-700 operates continuously, even in harsh environments.

Comparison Table	tDS-700 Series	PDS-700 Series
Ethernet	10/100 M, PoE	10/100 M
Programmable	–	Yes
Virtual COM	Yes	Yes
Virtual I/O	–	Yes
DHCP	Yes	Yes
Web Configuration	Yes	Yes
UDP Search	Yes	Yes
Multi-client	–	Yes
Remarks	Cost-effective	–

The tDS-700 offers true IEEE 802.3af-compliant (classification, Class 1) Power over Ethernet (PoE) functionality using a standard category 5 Ethernet cable to receive power from a PoE switch such as the NS-205PSE. If there is no PoE switch on site, the tDS-700 will also accept power input from a DC adapter. The tDS-700 is designed for ultra-low power consumption, reducing hidden costs from increasing fuel and electricity prices, especially when you have a huge amount of device servers installed. Reducing the amount of electricity consumed by choosing energy-efficient equipment can have a positive impact on maintaining a green environment.

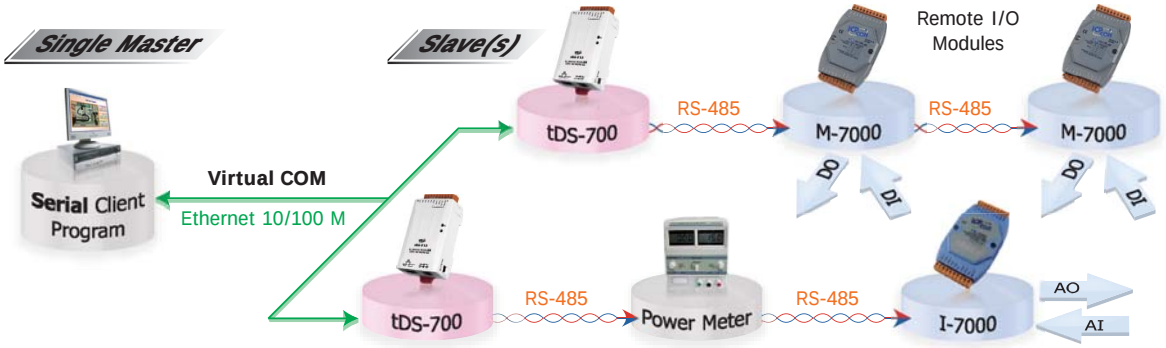
The tDS-712 is equipped with a male DB-9 connector, while other models are equipped with a removable terminal block connector to allow easy wiring, and also supports automatic RS-485 direction control when sending and receiving data.

The tDS-700 has the same basic Serial-to-Ethernet gateway and virtual COM functions as the PDS-700 series, as shown in the above comparison table. Note: For multiple TCP connections on the same serial port, use PDS-700 instead.

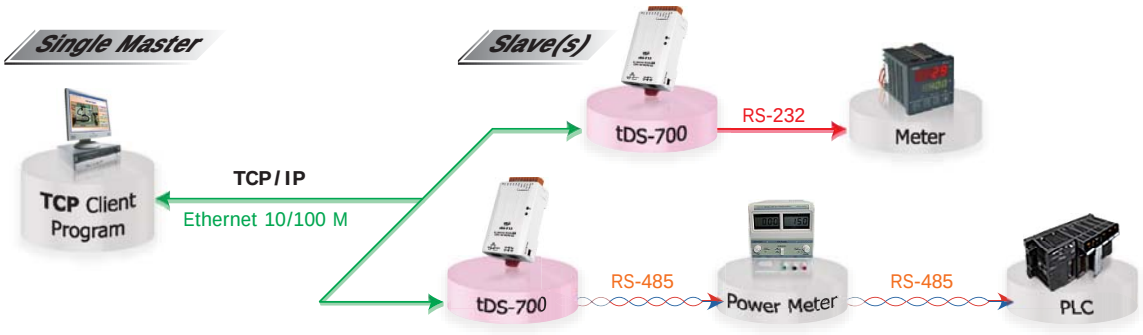
Applications

- Factory Automation
- Building Automation
- Home Automation
- Remote Diagnosis and Management

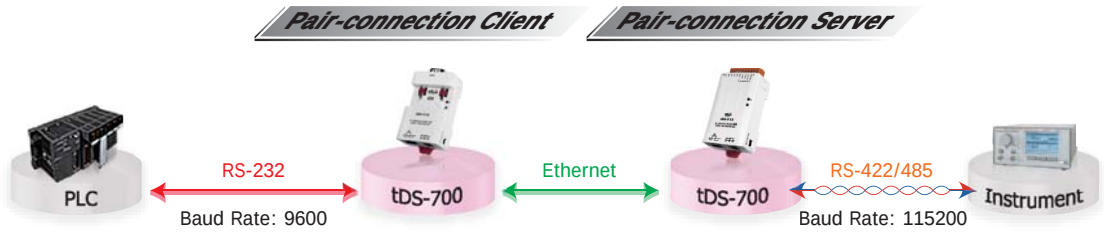
1. Access serial device via Virtual COM ports



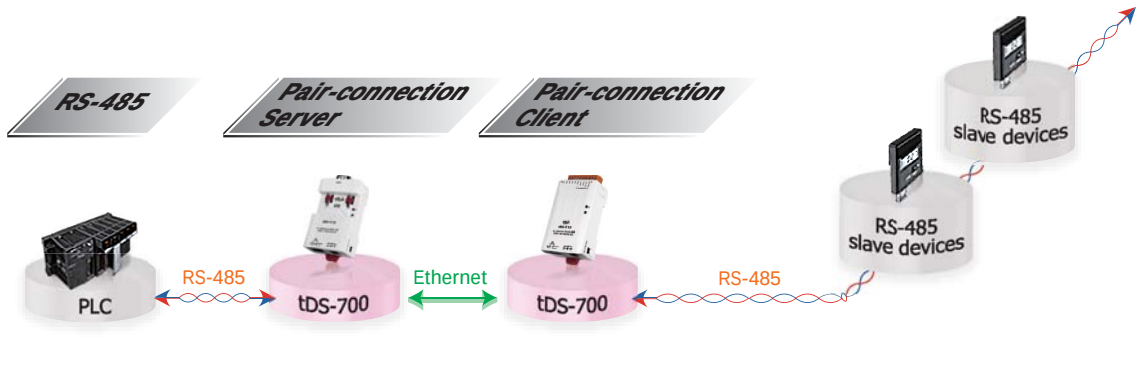
2. Access serial device via TCP/IP socket connection



3. Serial converter application through pair-connection



4. Virtual RS-485 bus application through pair-connection



tGW-700 Series

Tiny Modbus/TCP to RTU/ASCII Gateway

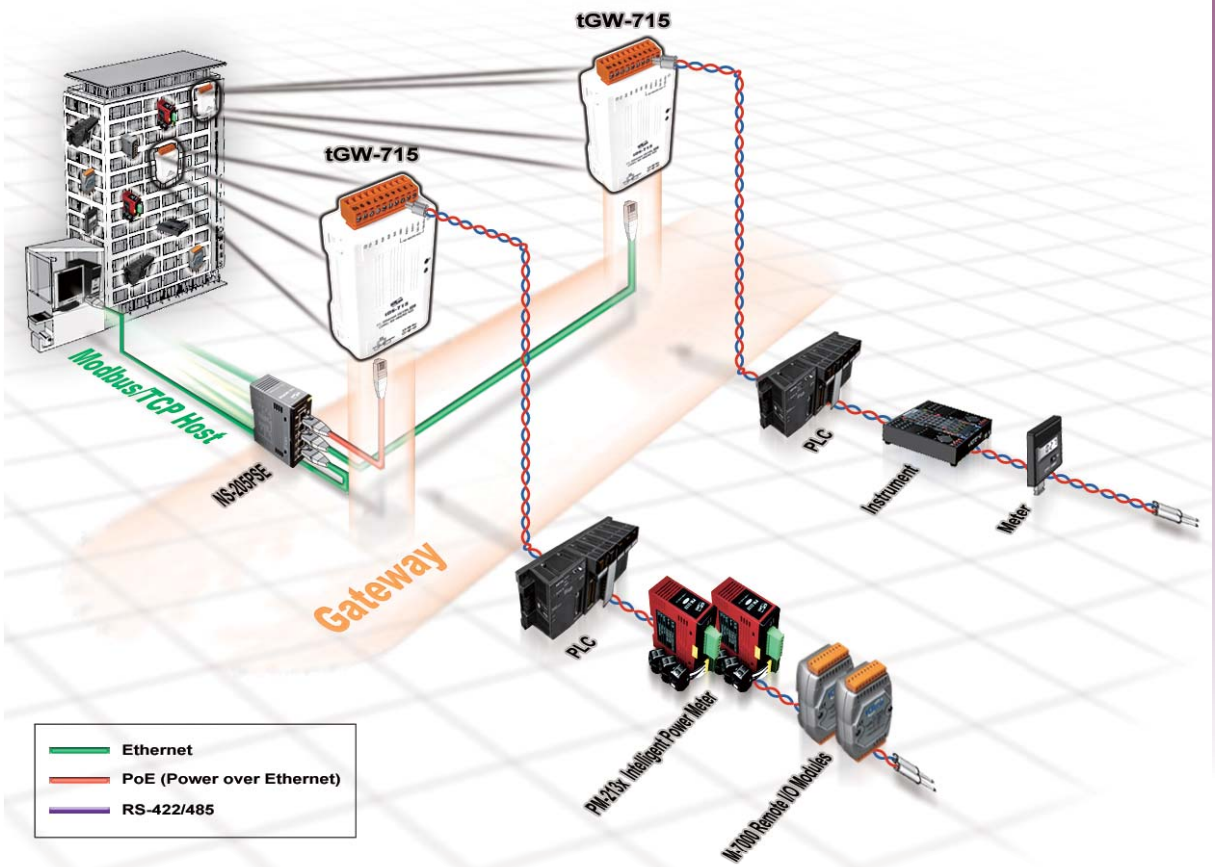
tGW-712 tGW-700 series

Features

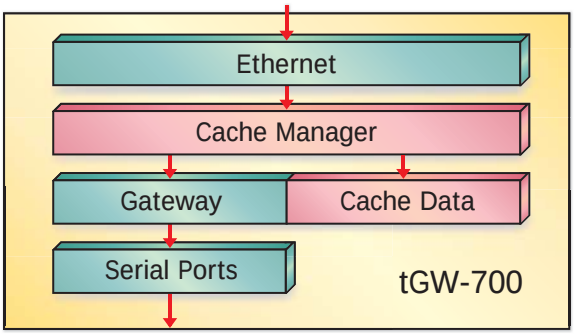
- Supports Modbus TCP/UDP master and slave
- Supports Modbus RTU/ASCII master and slave
- Max. TCP connections (masters) per serial port: 32 (tGW-71x), 16 (tGW-72x) or 10 (tGW-73x)
- Read-cache ensures faster Modbus TCP/UDP response
- Supports UDP responder for device discovery (UDP Search)
- Static IP or DHCP network configuration
- Easy firmware update via the Ethernet (BOOTP, TFTP)
- Tiny Web server for serial and network configuration (HTTP)
- 10/100 Base-TX Ethernet, RJ-45 x 1 (Auto-negotiating, auto MDI/MDIX, LED Indicators)
- Redundant power inputs: PoE and DC jack
- Allows automatic RS-485 direction control
- Male DB-9 or terminal block connector for easy wiring
- Tiny form-factor and low power consumption
- RoHS compliant & no Halogen
- Cost-effective Modbus Gateway

Introduction

Modbus has become a de facto standard industrial communication protocol, and is now the most commonly available means of connecting industrial electronic devices. Modbus allows for communication between many devices connected to the same RS-485 network, for example, a system that measures temperature and humidity and communicates the results to a computer. Modbus is often used to connect a supervisory computer with a remote terminal unit (RTU) in supervisory control and data acquisition (SCADA) systems.

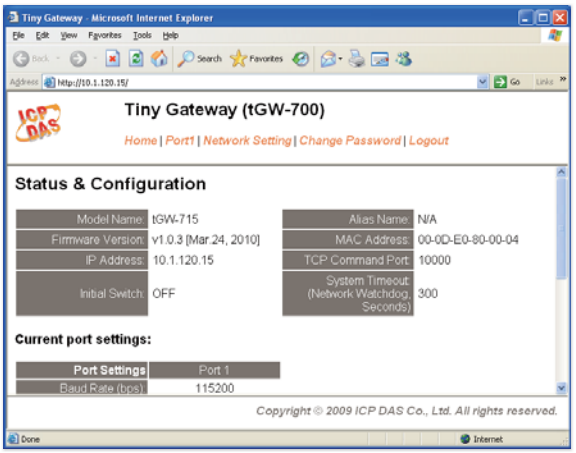


The tGW-700 module is a Modbus gateway that enables a Modbus TCP/UDP host to communicate with serial Modbus RTU/ASCII devices through an Ethernet network, and eliminates the cable length limitation of legacy serial communication devices. The module can be used to create a pair-connection application (as well as serial-bridge or serial-tunnel application), and can then route data over TCP/IP between two serial Modbus RTU/ASCII devices, which is useful when connecting mainframe computers, servers or other serial devices that use Modbus RTU/ASCII protocols and do not themselves have Ethernet capability.



The maximum number of TCP connections for each serial port is up to 32 for tGW-71x, 16 for tGW-72x and 10 for tGW-73x. This allows multiple masters accessing slave devices on the same serial port. The new read-cache function is used to store previous requests and responses in the memory buffer of the tGW-700 module. When other HMI/SCADA master controllers send the same requests to the same RTU slave device, the cached response is returned immediately. This feature dramatically reduces the loading on the serial port communication, ensures faster TCP responses, and improves the stability of the entire system.

The tGW-700 module supports the DHCP client function, which allows it to easily obtain the necessary TCP/IP configuration information from a DHCP server, and minimizes configuration errors caused by manual setting. The module also contains a UDP responder that transmits its IP address information in response to a UDP search from the eSearch utility, making local management more efficient.



The tGW-700 module features a powerful 32-bit MCU to enable efficient handling of network traffic, and also has a built-in web server that provides an intuitive web management interface that allows users to modify the configuration of the module, including the DHCP/Static IP, the gateway/mask settings and the serial port settings.

The module contains a dual watchdog, including a CPU watchdog (for hardware functions) and a host watchdog (for software functions). The CPU watchdog automatically resets the CPU if the built-in firmware is operating abnormally, while the host watchdog automatically resets the CPU if there is no communication between the module and the host (PC or PLC) for a predefined period of time (system timeout). The dual watchdog is an important feature that ensures the module operates continuously, even in harsh environments.

The tGW-700 module offers true IEEE 802.3af-compliant (classification, Class 1) Power over Ethernet (PoE) functionality using a standard category 5 Ethernet cable to receive power from a PoE switch such as the NS-205PSE. If there is no PoE switch on site, the module will also accept power input from a DC adapter. The tGW-700 module is designed for ultra-low power consumption, reducing hidden costs from increasing fuel and electricity prices, especially when you have a large number of modules installed. Reducing the amount of electricity consumed by choosing energyefficient equipment can have a positive impact on maintaining a green environment.

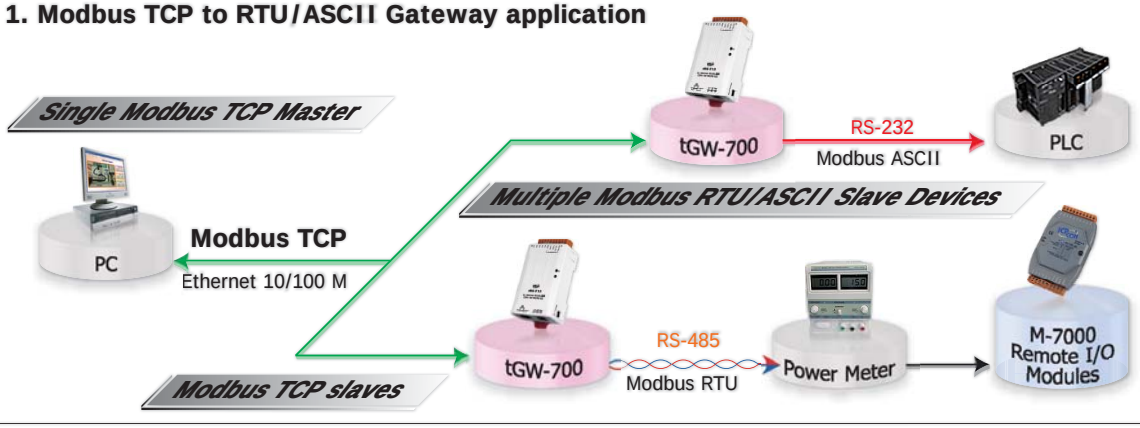
Based on an amazing tiny form-factor, the tGW-700 achieves maximum space savings that allows it to be easily installed anywhere, even directly embedded into a machine. It also supports automatic RS-485 direction control when sending and receiving data, thereby improving the stability of the RS-485 communication.

Comparison Table	Ethernet	Programmable	Virtual COM	Virtual I/O	DHCP	Web Configuration	UDP Search	Modbus Gateway	Multi-client
tGW-700 Series	10/100 M, PoE	–	–	–	Yes	Yes	Yes	Yes	Yes
PPDS-700-MTCP Series	10/100 M, PoE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

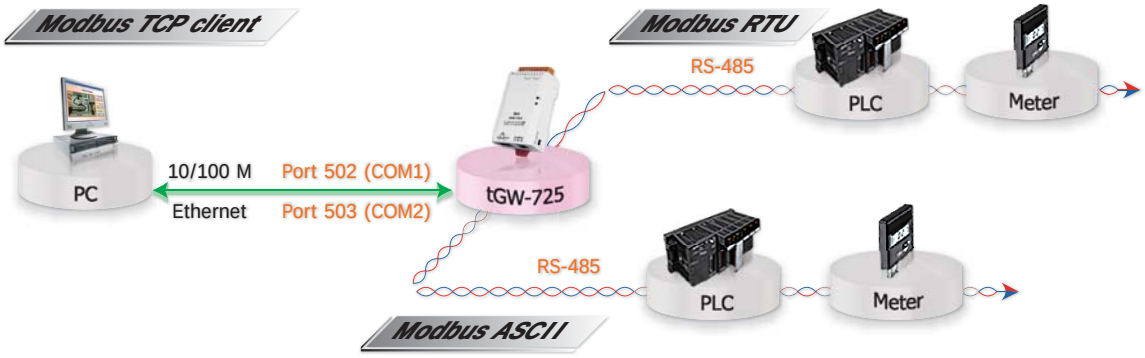
Applications

- Factory Automation
- Building Automation
- Home Automation
- Remote Diagnosis and Management

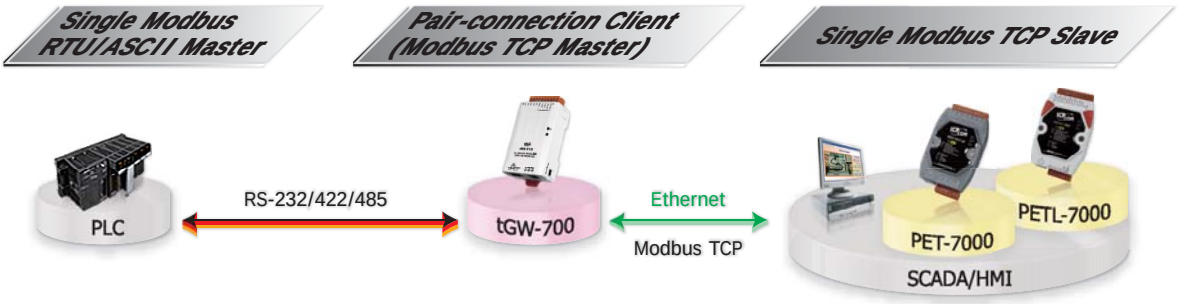
1. Modbus TCP to RTU/ASCII Gateway application



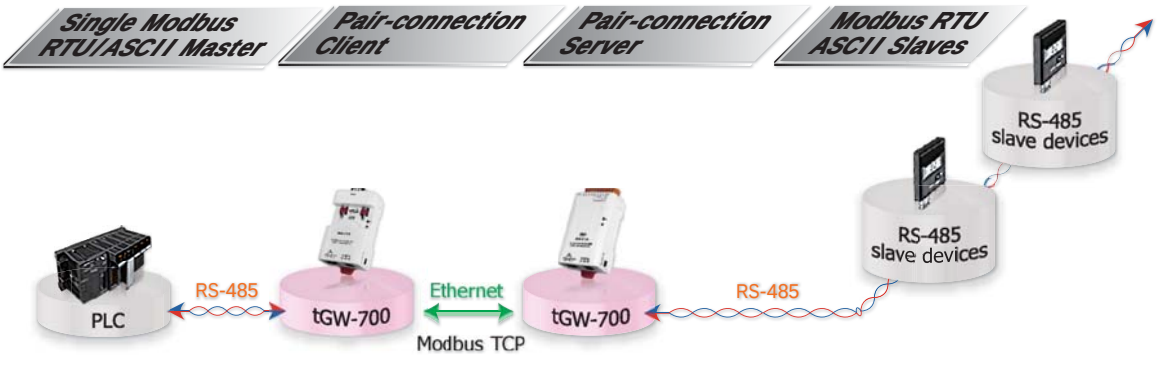
2. Modbus TCP to RTU/ASCII Gateway application (dual-port)



3. Modbus RTU/ASCII to TCP Gateway application (like pair-connection)



4. Virtual RS-485 bus application through pair-connection



tSH-700 Series NEW

Tiny Serial Port Sharer

tSH-700 series

Features

- Supports baud rate conversion application
- Supports two masters sharing one slave port
- Read-cache ensures faster response
- Redundant power inputs: PoE and DC jack
- Tiny form-factor and low power consumption
- Supports Modbus RTU/ASCII protocol conversion
- Raw data mode for most query-response protocols
- Built-in web server for easy configuration (HTTP)
- Allows automatic RS-485 direction control

Introduction

Following the success of the original tGW-700/tDS-700 modules, ICP DAS has continued to develop new functions for these products in order to provide increased support for a greater number of applications. The tGW-700 modules are Modbus TCP-to-Serial gateway, while the tSH-700 modules are Serial Port Sharers working as Serial-to-Serial converters. The tSH-700 module provides a number of functions, including "Baud Rate Conversion", "Modbus RTU/ASCII Conversion" and "Two Masters Share One Slave". The built-in web server provides easy configuration interface, and no console commands are required.

- **Baud Rate Conversion:**

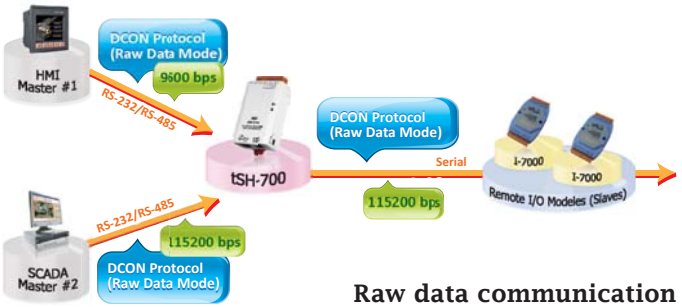
This function allows a single master device to communicate with slave devices using different baud rates and data formats. Most query-response protocols (half-duplex), e.g. DCON, are supported in the raw data mode. Full-duplex communication should also work when the data size is smaller than the built-in 512 bytes buffer on each serial port.

- **Modbus RTU/ASCII Conversion:**

This function allows a single Modbus RTU/ASCII master device to communicate with Modbus RTU/ASCII slave devices using different protocols, baud rates and data formats.

- **Two Masters Share One Slave:**

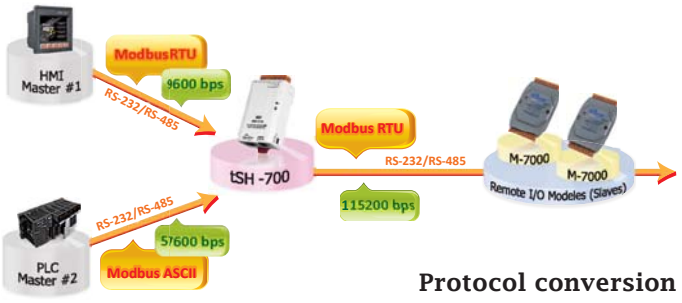
This function allows two master devices connected to different serial ports to share slave devices. The queries from the masters are queued in the tSH-700 module and then processed one-by-one. Modbus mode can be used to convert the Modbus RTU/ASCII protocols, while raw data mode can be used for DCON or other query-response protocols. Different baud rates and data formats can also be used on the different serial ports.



Raw data communication

- **Read-Cache Function:**

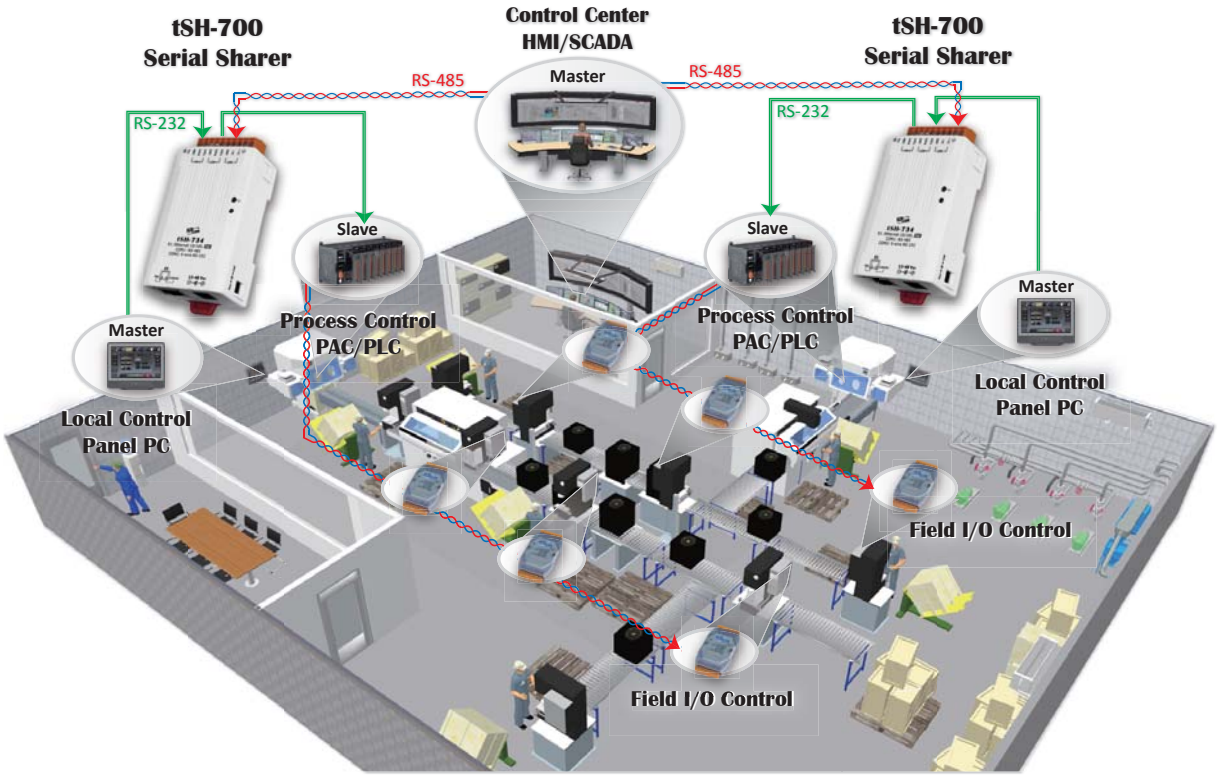
The built-in read-cache function is used to store previous requests and responses of the Modbus messages in the memory buffer of the tSH-700 module. When other HMI/SCADA master controllers requiring the same information from the same salve RTU device, the cached response is returned immediately. This feature dramatically reduces the loading on the slave serial port communication, ensures faster responses to the master, and improves the stability of the entire system.



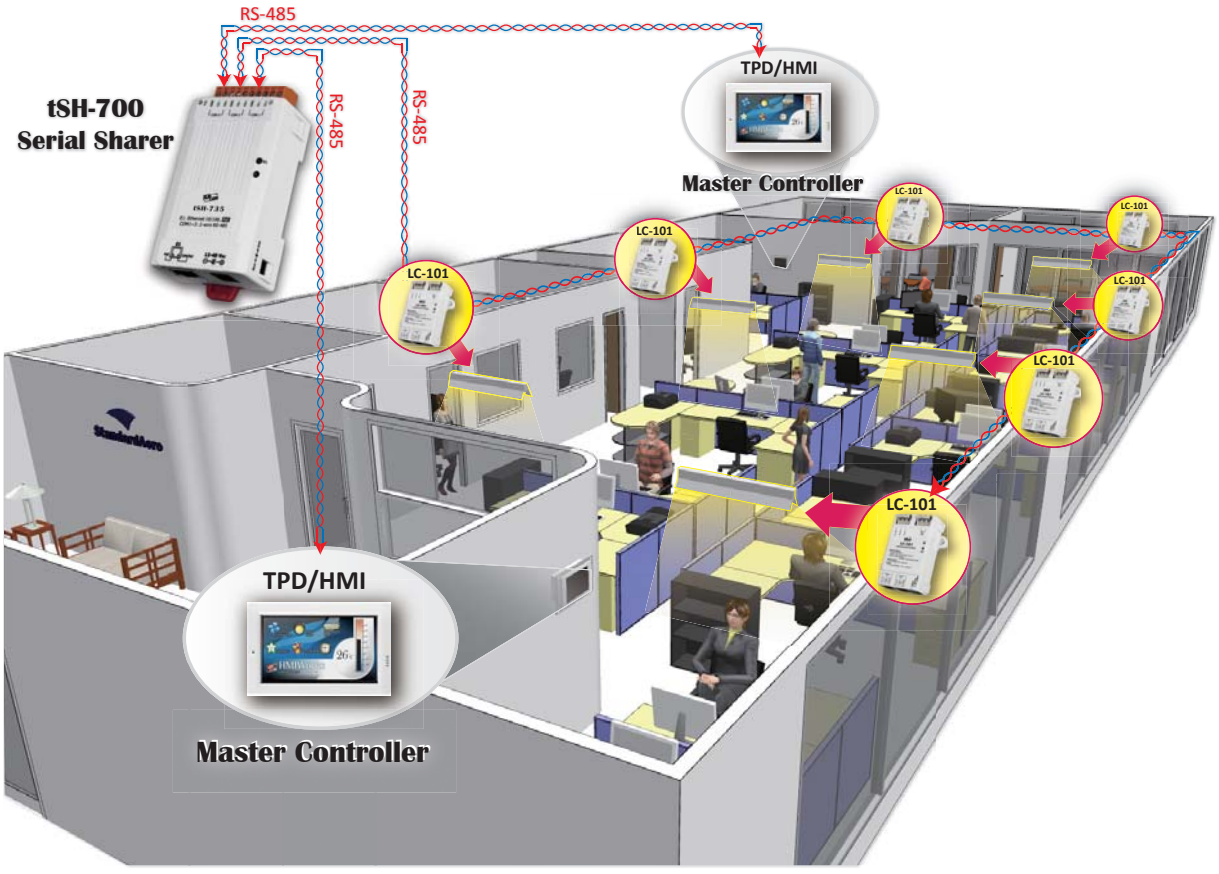
Protocol conversion

Applications

Accessing a Process Controller from Local Panel and Control Center



Control Office Lightings from Two HMI Devices (Masters) in Different Places

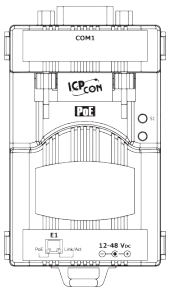


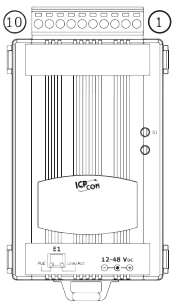
System Specifications

Models	tDS-712 tGW-712	tDS-722 tGW-722 tSH-722	tDS-732 tGW-732 tSH-732	tDS-715 tGW-715	tDS-725 tGW-725 tSH-725	tDS-735 tGW-735 tSH-735	tDS-718 tGW-718	tDS-724 tGW-724 tSH-724	tDS-734 tGW-734 tSH-734	tDS-715i tGW-715i
System										
CPU	32-bit MCU									
Communication Interface										
Ethernet	10/100 Base-TX, 8-pin RJ-45 x 1, (Auto-negotiating, Auto-MDI/MDIX, LED indicator) PoE (IEEE 802.3af, Class 1)									
COM1	5-wire RS-232	5-wire RS-232	3-wire RS-232	2-wire RS-485 4-wire RS-422	2-wire RS-485	2-wire RS-485	3-wire RS-232 2-wire RS-485 4-wire RS-422	2-wire RS-485	2-wire RS-485	2-wire RS-485 4-wire RS-422
COM2	–	5-wire RS-232	3-wire RS-232	–	2-wire RS-485	2-wire RS-485	–	5-wire RS-232	3-wire RS-232	–
COM3	–	–	3-wire RS-232	–	–	2-wire RS-485	–	–	3-wire RS-232	–
Self-Tuner	–			Yes, automatic RS-485 direction control						
Isolation	–									**2500 VDC**
COM Port Capability (16C550 or compatible UART)										
Baud Rate	115200 bps Max.									
Data Bit	5, 6, 7, 8									
Parity	None, Odd, Even, Mark, Space									
Stop Bit	1, 2									
Power										
Power Input	IEEE 802.3af, Class 1 for PoE; +12 ~ 48 VDC for DC Jack									
Power Consumption	0.07 A @ 24 VDC									
Connector	Male DB-9 x 1 for tXX-712 series; Removable Terminal Block (10-pin) for others.									
Mechanical										
Dimensions (W x H x D)	52 mm x 95 mm x 27 mm (tDS/tGW-712: 52 mm x 90 mm x 27 mm)									
Installation	DIN-Rail mounting									
Environment										
Operating Temperature	-25 °C ~ +75 °C									
Storage Temperature	-30 °C ~ +80 °C									
Humidity	10 ~ 90% RH, non-condensing									

2-wire RS-485: DATA+, DATA-, GND (Non-isolated) 4-wire RS-422: TxD+, TxD-, RxD+, RxD-, GND (Non-isolated)	3-wire RS-232: RxD, TxD, GND (Non-isolated) 5-wire RS-232: RxD, TxD, CTS, RTS, GND (Non-isolated)

Pin Assignments





tDS-712/tGW-712		
COM1 (Male DB-9)	09	N/A
	08	CTS1
	07	RTS1
	06	N/A
	05	GND
	04	N/A
	03	TxD1
	02	RxD1
	01	N/A

tDS-722/tGW-722/tSH-722		
	10	F.G.
COM2	09	CTS2
	08	RTS2
	07	RxD2
	06	TxD2
COM1	05	GND
	04	CTS1
	03	RTS1
	02	RxD1
	01	TxD1

tDS-732/tGW-732/tSH-732		
	10	F.G.
	09	GND
COM3	08	RxD3
	07	TxD3
	06	GND
COM2	05	RxD2
	04	TxD2
	03	GND
COM1	02	RxD1
	01	TxD1

tDS-735/tGW-735/tSH-735		
	10	F.G.
	09	GND
COM3	08	D3-
	07	D3+
	06	GND
COM2	05	D2-
	04	D2+
	03	GND
COM1	02	D1-
	01	D1+

tDS-718/tGW-718		
	10	F.G.
	09	N/A
RS-232	08	GND
	07	RxD1
	06	TxD1
	05	GND
RS-485/ RS-422	04	RxD1-
	03	RxD1+
	02	TxD1-/D1-
	01	TxD1+/D1+

tDS-715(i)/tGW-715(i)		
	10	F.G.
	09	N/A
	08	N/A
	07	N/A
	06	N/A
	05	GND
RS-485/ RS-422	04	RxD1-
	03	RxD1+
	02	TxD1-/D1-
	01	TxD1+/D1+

tDS-725/tGW-725/tSH-725		
	10	F.G.
	09	N/A
	08	N/A
	07	N/A
	06	GND
COM2	05	D2-
	04	D2+
	03	GND
COM1	02	D1-
	01	D1+

tDS-724/tGW-724/tSH-724		
	10	F.G.
	09	N/A
	08	CTS2
	07	RTS2
COM2	06	GND
	05	RxD2
	04	TxD2
	03	GND
COM1	02	D1-
	01	D1+

tDS-734/tGW-734/tSH-734		
	10	F.G.
	09	GND
COM3	08	RxD3
	07	TxD3
	06	GND
COM2	05	RxD2
	04	TxD2
	03	GND
COM1	02	D1-
	01	D1+

Ordering Information

Serial Device Server: Includes one CA-002 cable.	
tDS-712 CR	Tiny Device Server with PoE and 1 RS-232 Port (RoHS)
tDS-722 CR	Tiny Device Server with PoE and 2 RS-232 Ports (RoHS)
tDS-732 CR	Tiny Device Server with PoE and 3 RS-232 Ports (RoHS)
tDS-715 CR	Tiny Device Server with PoE and 1 RS-422/485 Port (RoHS)
tDS-725 CR	Tiny Device Server with PoE and 2 RS-485 Ports (RoHS)
tDS-735 CR	Tiny Device Server with PoE and 3 RS-485 Ports (RoHS)
tDS-718 CR	Tiny Device Server with PoE and 1 RS-232/422/485 Port (RoHS)
tDS-724 CR	Tiny Device Server with PoE, 1 RS-485 and 1 RS-232 Ports (RoHS)
tDS-734 CR	Tiny Device Server with PoE, 1 RS-485 and 2 RS-232 Ports (RoHS)
tDS-715i CR NEW	Tiny Device Server with PoE and 1 Isolated RS-422/485 Port (RoHS)
Modbus/TCP to RTU/ASCII Gateway: Includes one CA-002 cable.	
tGW-712 CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1 RS-232 Port (RoHS)
tGW-722 CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 2 RS-232 Ports (RoHS)
tGW-732 CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 3 RS-232 Ports (RoHS)
tGW-715 CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1 RS-422/485 (RoHS)
tGW-725 CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 2 RS-485 Ports (RoHS)
tGW-735 CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 3 RS-485 Ports (RoHS)
tGW-718 CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1 RS-232/422/485 Port (RoHS)
tGW-724 CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE, 1 RS-485 and 1 RS-232 Ports (RoHS)
tGW-734 CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE, 1 RS-485 and 2 RS-232 Ports (RoHS)
tGW-715i CR NEW	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1 Isolated RS-422/485 Port (RoHS)
Serial Port Sharer: Includes one CA-002 cable.	
tSH-722 CR NEW	Tiny Serial Port Sharer with PoE and 2 RS-232 Ports (RoHS)
tSH-732 CR NEW	Tiny Serial Port Sharer with PoE and 3 RS-232 Ports (RoHS)
tSH-725 CR NEW	Tiny Serial Port Sharer with PoE and 2 RS-485 Ports (RoHS)
tSH-735 CR NEW	Tiny Serial Port Sharer with PoE and 3 RS-485 Ports (RoHS)
tSH-724 CR NEW	Tiny Serial Port Sharer with PoE, 1 RS-485 and 1 RS-232 Ports (RoHS)
tSH-734 CR NEW	Tiny Serial Port Sharer with PoE, 1 RS-485 and 2 RS-232 Ports (RoHS)

Accessories

CA-002
DC connector to 2-wire power cable, 0.3 M

CA-0915
Male DB-9 to Female DB-9 Cable, 1.5 m

CA-0910F
Female DB-9 to Female DB-9 Cable, 1.0 m

CA-0910N
DB-9 Female-Female 3-wire Null Modem Cable, 1M

CA-PC09F
DB-9 Female Connector with Plastic Cover

FRA05-S12-SU CR
12V/0.58A (max.) Power Supply (RoHS, for tDS/ tGW-700)

DIN-KA52F CR
24V/1.04A, 25 W Power Supply with DIN-Rail Mounting (RoHS, for NS-205 and NS-205PSE-24V)

DIN-KA52F-48 CR
48V/0.52A, 25 W Power Supply with DIN-Rail Mounting (RoHS, for NS-205PSE)

NS-205PSE CR
Unmanaged Ethernet Switch with 4 PoE Ports and 1 RJ-45 Uplink (RoHS)

NS-205PSE-24V CR
Unmanaged 5-port 10/100 Mbps PoE (PSE) Ethernet Switch; 24 VDC Input (RoHS)

3-8 Programmable Serial Device Server with LAN Switch

PDS-5105D-MTCP

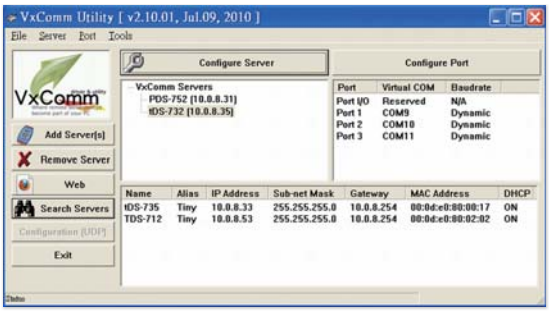
Programmable Device Server with 10 RS-485 Ports, 2-port LAN Switch and LED Display

Features

- Integrates any RS-485 serial device in an Ethernet Network
- Virtual COM extends the PC COM ports
- Virtual COM supports 32-bit and 64-bit Windows XP/2003/7/8
- Provides 10 RS-485 ports with Self-Tuner (Auto-direction control)
- +/- 2 kV ESD protection on serial ports
- RoHS compliant & no halogen
- 2-port 10/100 Base-TX Ethernet Switch with LAN Bypass
- Powerful programmable device server
- Watchdog timer suitable for use in harsh environments
- Power reverse polarity protection
- Built-in high performance MiniOS7 from ICP DAS
- ODM service is available
- Low power consumption

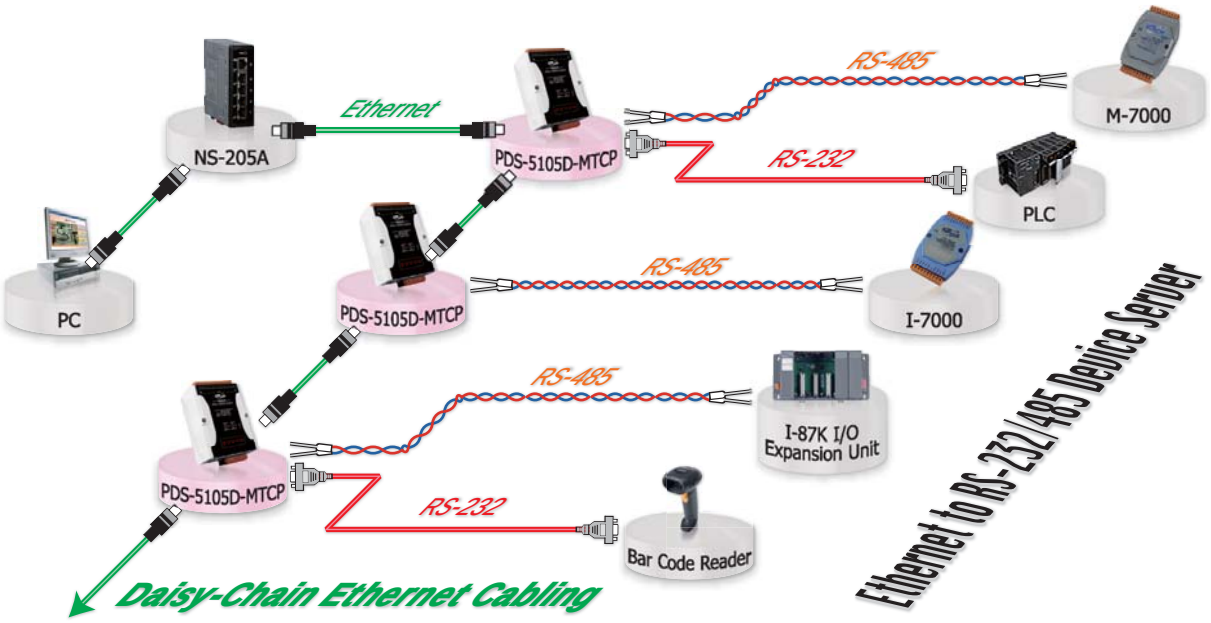
Introduction

The PDS-5105D-MTCP is a Programmable Device Server, also known as a "Serial-to-Ethernet gateway" that is designed to allow Ethernet connectivity to be added to RS-232/485 devices.



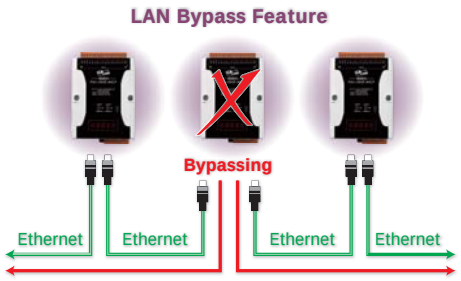
The user-friendly VxComm Driver/Utility allows users to easily turn the built-in COM ports of the PDS-5105D-MTCP series into standard COM ports on a PC. By virtue of its protocol independence, specialized OS and high flexibility, the PDS-5105D-MTCP series is able to meet the demands of any network-enabled application.

The PDS-5105D-MTCP series includes a powerful and reliable Xserver programming structure that allows you to quickly develop custom robust Ethernet applications. The built-in, high-performance MiniOS7 boots the PDS-5105D-MTCP up in just one second and gives you the fastest response.



2-port Ethernet Switch with LAN Bypass

The PDS-5105D-MTCP is equipped with a 2-port 10/100Base-Tx Ethernet switch that simplifies network wiring by cascading Ethernet devices. Furthermore, the module features a LAN Bypass function allowing network traffic to be continued between two network segments (Ethernet port1 and port2). In cases where the module is offline due to of software, hardware or power failure, the LAN Bypass function will be automatically activated, and the essential communications on the network can continue operating without interruption.



Applications

- Factory Automation
- Building Automation
- Home Automation

System Specifications

System	
CPU	80186 or compatible (16-bit and 80 MHz)
SRAM	512 KB
Flash Memory	512 KB; Erase unit is one sector (64 KB); 100,000 erase/write cycles
EEPROM	16 KB
Watchdog Timers	Yes (0.8 seconds)
Communication Ports	
Ethernet	2-port 10/100 Base-TX Ethernet Switch with LAN Bypass, RJ-45 x 2 (Auto-negotiating, Auto-MDI/MDIX, LED indicator)
COM1	RS-232 (TxD, RxD, GND)/RS-485 (D1+, D1-), Self-Tuner ASIC inside, non-isolated
COM2 ~ 10	RS-485 (Dx+, Dx-), Self-Tuner ASIC inside, non-isolated
COM Port Formats	
Baud Rate	115200 bps Max. @ 10 Ports, half-duplex, 80% loading
Data Bit	7, 8: for COM1 and COM2 5, 6, 7, 8: for COM3 ~ COM10
Parity	None, Odd, Even, Mark, Space
Stop Bit	1, 2: for COM1 ~ COM10
LED Indicators	
5-Digit 7 Segment	Yes
System	Red
Power	
Protection	Power Reverse Polarity Protection
Frame GND	Yes (for EMS Protection)
Input Range	+12 ~+48 VDC (non-regulated)
Power Consumption	4.8 W
Mechanical	
Dimension (W x H x D)	91 mm x 123 mm x 52 mm
Installation	DIN-Rail mounting
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +85 °C
Humidity	5 ~ 95% RH, non-condensing

Ordering Information

PDS-5105D-MTCP CR	Programmable Device Server with 10 RS-485 Ports, 2-port LAN Switch and LED Display. (RoHS)

Accessories

GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
MDR-20-24	24 VDC/1 A, 24 W Power Supply with DIN-Rail Mounting
CA-0903	9-Pin Female D-sub and RS-232 connector cable, 30 cm Cable
CA-0910	9-Pin Female D-sub and 3-wire RS-232 cable, 1 M Cable
NS-205 CR	Unmanaged 5-port Industrial Ethernet Switch (RoHS)
DIN-KA52F-48	48 VDC/0.52 A, 25 W Power Supply with DIN-Rail Mounting

3-9 Modbus Data Concentrator, MDC-700 series

MDC-711

Modbus data concentrator with 1x Ethernet and 1 x RS-232, 1 x RS-485

MDC-714

Modbus data concentrator with 1x Ethernet and 1 x RS-232, 4 x RS-485

MDC-711 MDC-714

Features

- Modbus Data Concentrator
- Great Capability of Shared Memory
- Config.CSV to Ease Hard Work of Editing a lot of Definition
- Web Sever to Ease the Operating and Show Clear Information

Introduction

MDC-700 series is a Modbus Data Concentrator that has ability to perform up to 200 Modbus/RTU commands to read/write from/to Modbus slave devices via RS-232/485 and allows up to 8 Modbus/TCP masters to get the polled data via the Ethernet.

MDC-700 series provide a built-in web server to ease the configuring and provide clear information for the performed results of each Modbus/RTU command on the RS-232/485.

Modbus Data Concentrator

The MDC performs the pre-defined Modbus/RTU commands to read/write data from/to the Modbus/RTU slave devices via the RS-232/485. It mirrors the data of the slave devices to its own shared memory. And it accepts up to 8 Modbus/TCP masters to directly read/write data form/to the shared memory instead of polling each Modbus/RTU slave device one by one.

This way not only makes the data on the RS-232/485 sharable to multiple Modbus/TCP master but also shorten the time to read/write data from/to multiple Modbus/RTU slave devices.

Great Capability of Shared Memory

The MDC can perform up to 200 polling definitions. And the internal shared memory has four tables to store the polled AI, AO, DI and DO data. Each table can store up to 4000 registers.

Config.csv

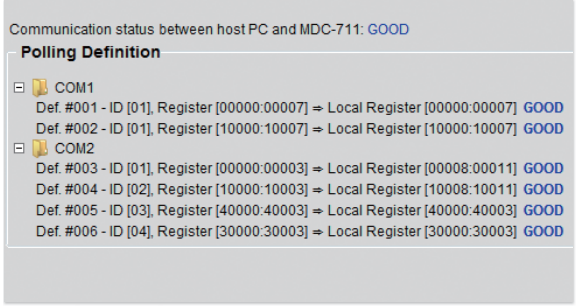
	A	B	C	D	E	F	G	H	I
1	#	TCPPort	ModbusID						
2	*	502	1						
3	#	ModuleInfo							
4	*	this is my data concentrator							
5	#	ComPortNo	BaudRate	DataBit	Parity	StopBit	TimeOut	PollDelay	Mode
6	*	1	115200	8	0	1	50	20	Master
7	*	2	115200	8	0	1	50	20	Master
8	*	3	9600	8	0	1	100	20	Master
9	*	4	9600	8	0	1	100	20	Master
10	*	5	9600	8	0	1	100	20	Master
11	#	UseComPort	SlaveModbusID	FunctionCo	RegStartAddr	RegCount			
12	*	2	1	1	0	4			
13	*	2	2	2	0	4			
14	*	2	3	3	0	4			
15	*	2	4	4	0	4			
16	*	2	4	4	4	8			

Config.CSV to Ease Hard Work of Editing a lot of Definition

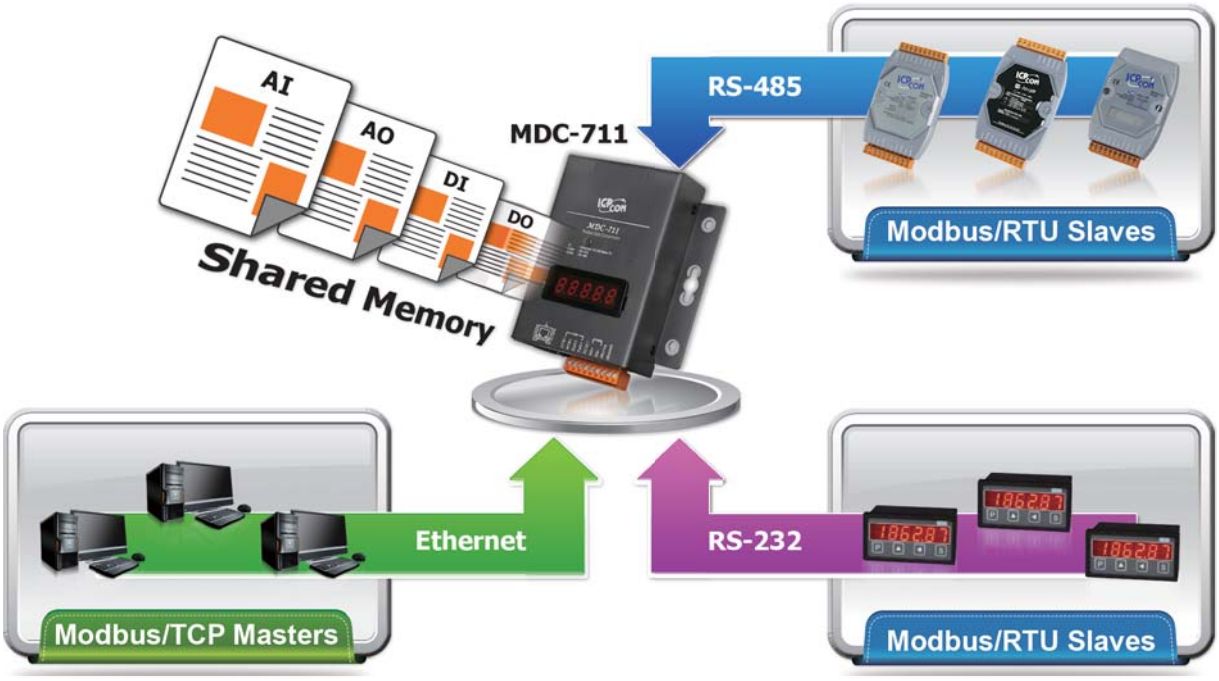
The Modbus polling definition is defined in a Config.CSV file. Editing/checking a lot of polling definitions is a hard work and may have chance to make a mistake. A CSV format file can ease the work by using Excel. Furthermore, the built-in web server allows users import/export the Config.CSV via a simple mouse-click action.

Web Sever to Ease the Operating and Show Clear Information

The IP address, configuration file, Config.CSV can be simply configured via the Web server. And the performed results of all Modbus polling definition are shown on the web page. It is very easy to debug which Modbus/RTU device has communication problem. And the MDC firmware will skip the abnormal Modbus polling definition for a while to smoothly perform the whole polling without distribution.



Applications



System Specifications

Models	MDC-711	MDC-714
Ethernet		
Port	x1, 10/100 Base-TX	
Protocol	Modbus/TCP Slave	
Max. connection	8	
COM port		
RS-232	x1, (TXD, RXD, RTS, CTS, GND)	
RS-485	x1, (Data+, Data-)	x4, (Data+, Data-)
Baudrate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	
Data Format	N81, E81, O81	
Protocol	Modbus/RTU Master	
Max. Node	32 nodes for each RS-485 port	
Polling Definition	200 definitions for all RS-232/485 ports	
Shared Memory	4000 registers for each of AI, AO, DI and DO data	
System		
5-Digit 7 Segment LED Display	Yes, to display IP address	
System LED Indicator	Yes, to display hear beat	
Mechanical		
Dimension (W x H x D)	102 mm x 101 mm x 28 mm	102 mm x 125 mm x 28 mm
Installation	Wall Mount	
Power		
Required Supply Voltage	+10 VDC ~ +30 VDC (non-regulated)	
Power Consumption	2.5 W	
Environment		
Operating Temperature	-25 °C ~ +75 °C	
Storage Temperature	-40 °C ~ +80 °C	
Humidity	5 ~ 95% RH, non-condensing	

Ordering Information

MDC-711 CR	Modbus data concentrator with 1x Ethernet and 1 x RS-232, 1 x RS-485 (RoHS)
MDC-714 CR	Modbus data concentrator with 1x Ethernet and 1 x RS-232, 4 x RS-485 (RoHS)

3-10 Programmable Modbus to Ethernet Gateway

µPAC-7186EX(D)-MTCP

Modbus/RTU to Modbus/TCP Gateway

µPAC-7186EX-MTCP µPAC-7186EXD-MTCP

Features

- Incorporate Serial Devices in an Ethernet network
- "Virtual COM" extends PC COM ports
- 10/100 Base-TX (Auto-negotiating, auto MDI/MDI-X, LED indicator)
- Self-Tuner ASIC Controller on the RS-485 Port
- 5-digit LED Display (for versions with a display)
- Built-in High Performance MiniOS7 from ICP DAS
- Supports Modbus/TCP and Modbus/RTU
- Virtual COM for 32-bit and 64-bit Windows XP/2003/Vista/7
- Programmable Internet/Ethernet Controller
- Watchdog Timer suitable for use in harsh environments
- Power Reverse Polarity Protection Circuit
- RS-485 Port ESD Protection Circuit
- RoHS Compliant & no Halogen
- Low power consumption

Introduction

The Modbus communications protocol has become the de facto industry standard, and is now the most commonly available means of connecting industrial electronic devices.

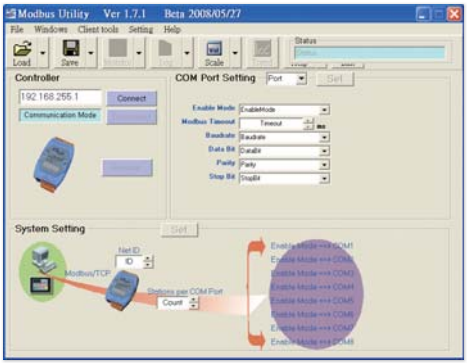
Modbus allows for communication between many devices connected to the same network, for example a system that measures temperature and humidity and communicates the results to a computer. Modbus is often used to connect a supervisory computer with a remote terminal unit (RTU) in supervisory control and data acquisition (SCADA) systems.

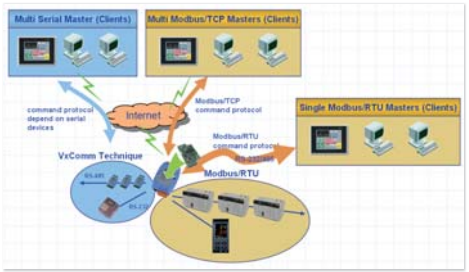
The µPAC-7186EX(D)-MTCP uses a default firmware to become a single Modbus/TCP to multiple Modbus/RTU converter. You can simply use the Modbus Utility to configure the device and then set the connection between the SCADA or HMI software and the µPAC-7186EX(D)-MTCP.

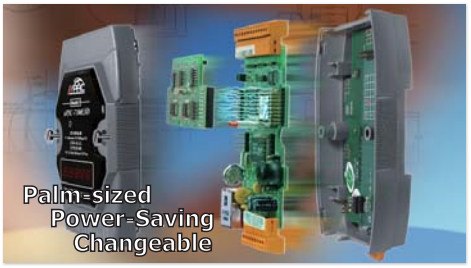
The µPAC-7186EX(D)-MTCP can also link to legacy serial devices that don't support Modbus/RTU. To use this function, you need to install the VxComm driver on the host PCs and create virtual COM ports for the remote serial ports on the µPAC-7186EX(D)-MTCP. You can then directly access the remote serial devices via the virtual COM ports.

Using the Modbus SDK, users can develop their own custom Modbus firmware, allowing extra functions and integration of serial devices. In this way, the µPAC-7186EX(D)-MTCP becomes a powerful controller.

The µPAC-7186EX(D)-MTCP contains a built-in operating system, the MiniOS7, which offers a stable and high performance environment that is similar to DOS. The MiniOS7 can boot up the µPAC-7186EX(D)-MTCP within just one second, with the added benefit of no virus problems and a small footprint. Furthermore, the µPAC-7186EX(D)-MTCP is designed for low power consumption, maintenance elimination (no hard disk and no fan) with a robust case.



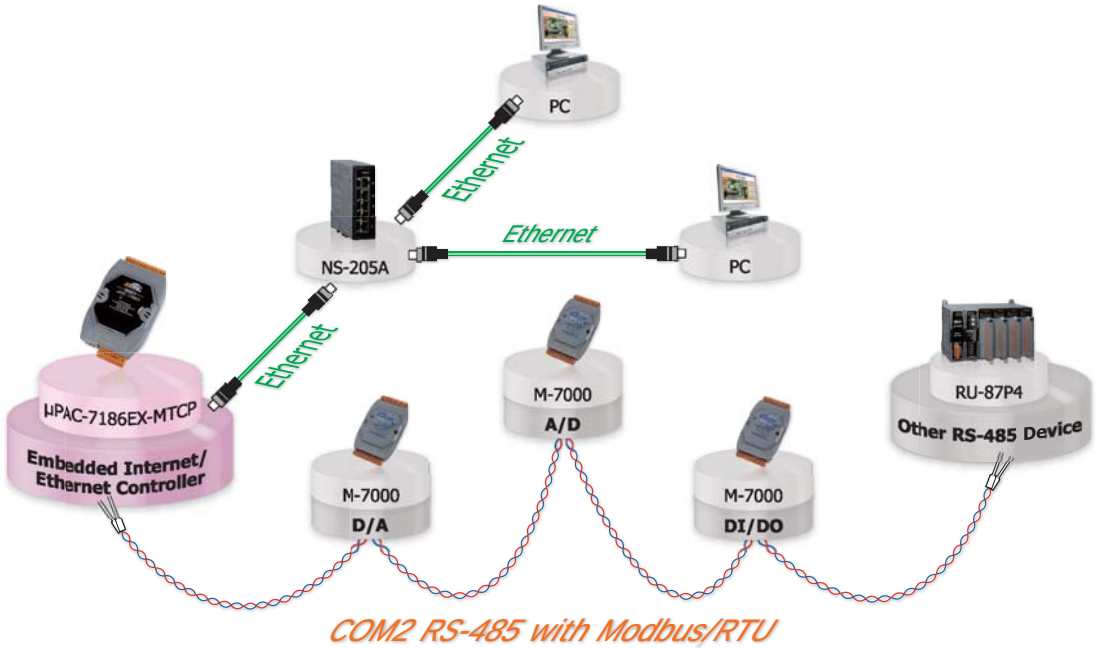




I/O Expansion Bus and Expansion Board

The µPAC-7186EX(D)-MTCP supports a single I/O expansion bus for plugging with a X-board. ICP DAS provides many optional X-boards for the µPAC-7186EX(D)-MTCP, which offers various I/O functions, such as D/I, D/O, A/D, D/A, Timer/Counter, UART, flash memory, battery backup SRAM and AsicKey... etc.

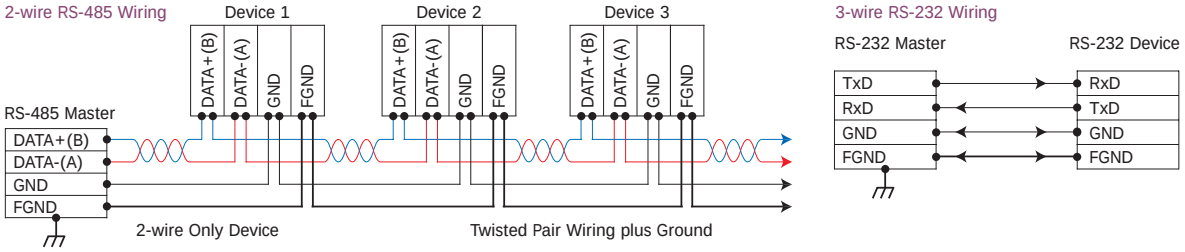
Applications



System Specifications

Models	µPAC-7186EX-MTCP	µPAC-7186EXD-MTCP
CPU		
CPU	80186, 80 MHz or compatible	
SRAM	512 KB	
Flash Memory	512 KB	
EEPROM	16 KB	
NVRAM	31 Bytes (battery backup, data valid for up to 10 years)	
RTC (Real Time Clock)	Yes	
Hardware Serial Number	Yes (64-bit)	
Built-in Watchdog Timer	Yes	
Communication Interface		
COM1	RS-232 (TxD, RxD, RTS, CTS, GND)	
COM2	RS-485 (D2+, D2-, GND)	
Ethernet	10/100 Base-TX, RJ-45 port (Auto-negotiating, auto MDI/MDI-X, LED indicators)	
COM Port Formats		
Speed	115200 bps max.	
Data Bit	7, 8	
Parity	None, Even, Odd	
Stop Bit	1	
LED Indicators		
5-Digit 7 Segment	–	Yes
System	Yes	
Power		
ESD Protection	Yes (with Frame Ground)	
Protection	Power Reverse Polarity Protection	
Required Supply Voltage	+10 V_{DC} ~ +30 V_{DC} (non-regulated)	
Power Consumption	1.5 W	2.5 W
Mechanical		
Dimension (W x H x D)	72 mm x 123 mm x 35 mm	
Installation	DIN-Rail or Wall mounting	
Environment		
Operating Temperature	-25 °C ~ +75 °C	
Storage Temperature	-40 °C ~ +80 °C	
Humidity	5 ~ 95% RH, non-condensing	

Wiring



Pin Assignments

μPAC-7186EX(D)-MTCP

Terminal No.		Pin Assignment
E1		Link/Act 10/100M
COM1	01	CTS1
	02	RTS1
	03	RxD1
	04	TxD1
	05	INIT*
COM2	06	D2+
	07	D2-
	08	(R)+Vs
	09	(B)GND

I/O Expansion Bus

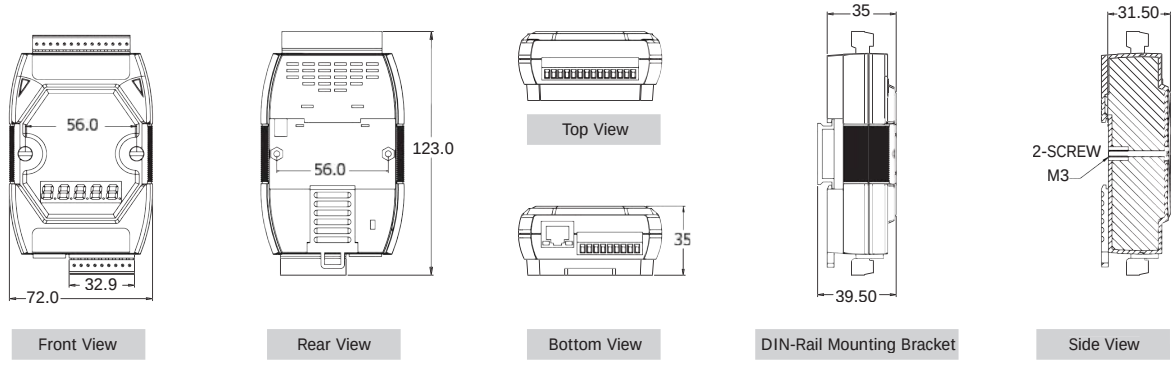
J1			
GND	01	02	GND
CLKOUTA	03	04	ARDY
INTO	05	06	INT1
VCC	07	08	RESET
GND	09	10	RESET\
TO0	11	12	TO1
TI0	13	14	TI1
SCLK	15	16	DIO9
DIO4	17	18	DIO14
VCC	19	20	VCC

CON20A JDIP20P

J2			
MA0	01	02	AD0
MA1	03	04	AD1
MA2	05	06	AD2
MA3	07	08	AD3
MA4	09	10	AD4
MA5	11	12	AD5
MA6	13	14	AD6
MA7	15	16	AD7
INT4	17	18	WRITE\
CS\	19	20	READ\

CON20A JDIP20P

Dimensions (Units: mm)



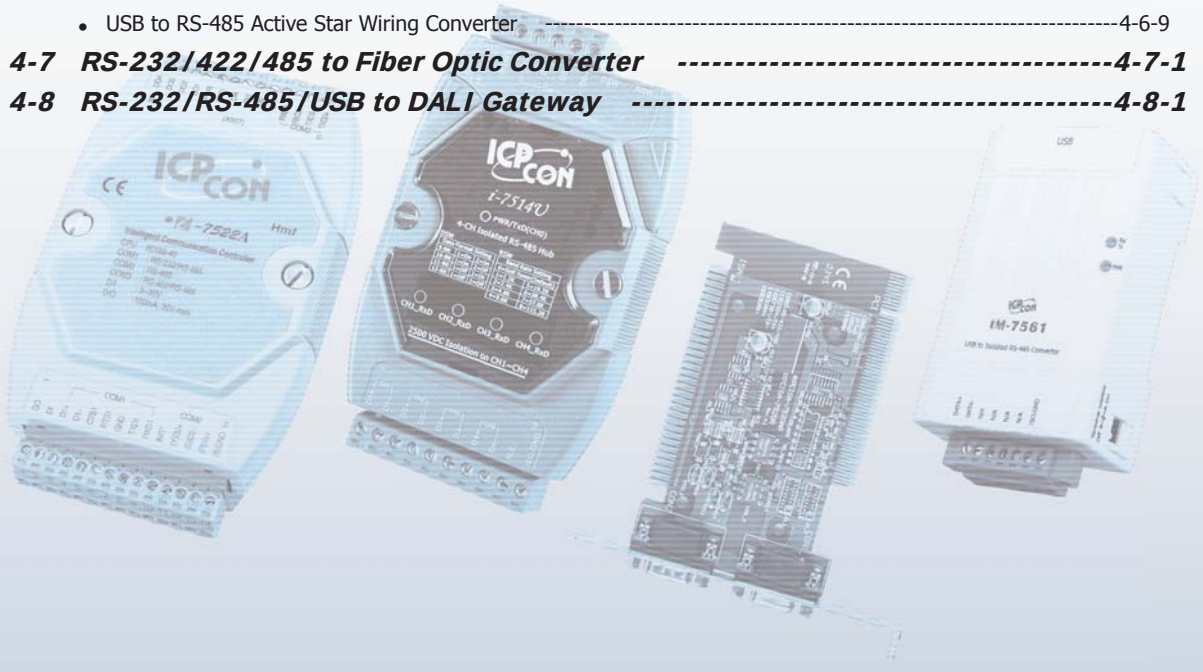
Ordering Information

μPAC-7186EX-MTCP CR	μPAC-7186EX with Default Modbus/TCP Firmware (RoHS)
μPAC-7186EXD-MTCP CR	μPAC-7186EXD with Default Modbus/TCP Firmware (RoHS)

Accessories

GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
MDR-20-24	24 VDC/1 A, 24 W Power Supply with DIN-Rail Mounting
CA-0903	9-Pin Female D-Sub and RS-232 Connector Cable, 30 cm Cable
CA-0910	9-Pin Female D-Sub and 3-wire RS-232 Cable, 1 m Cable
NS-205 CR	Unmanaged 5-port Industrial Ethernet Switch (RoHS)

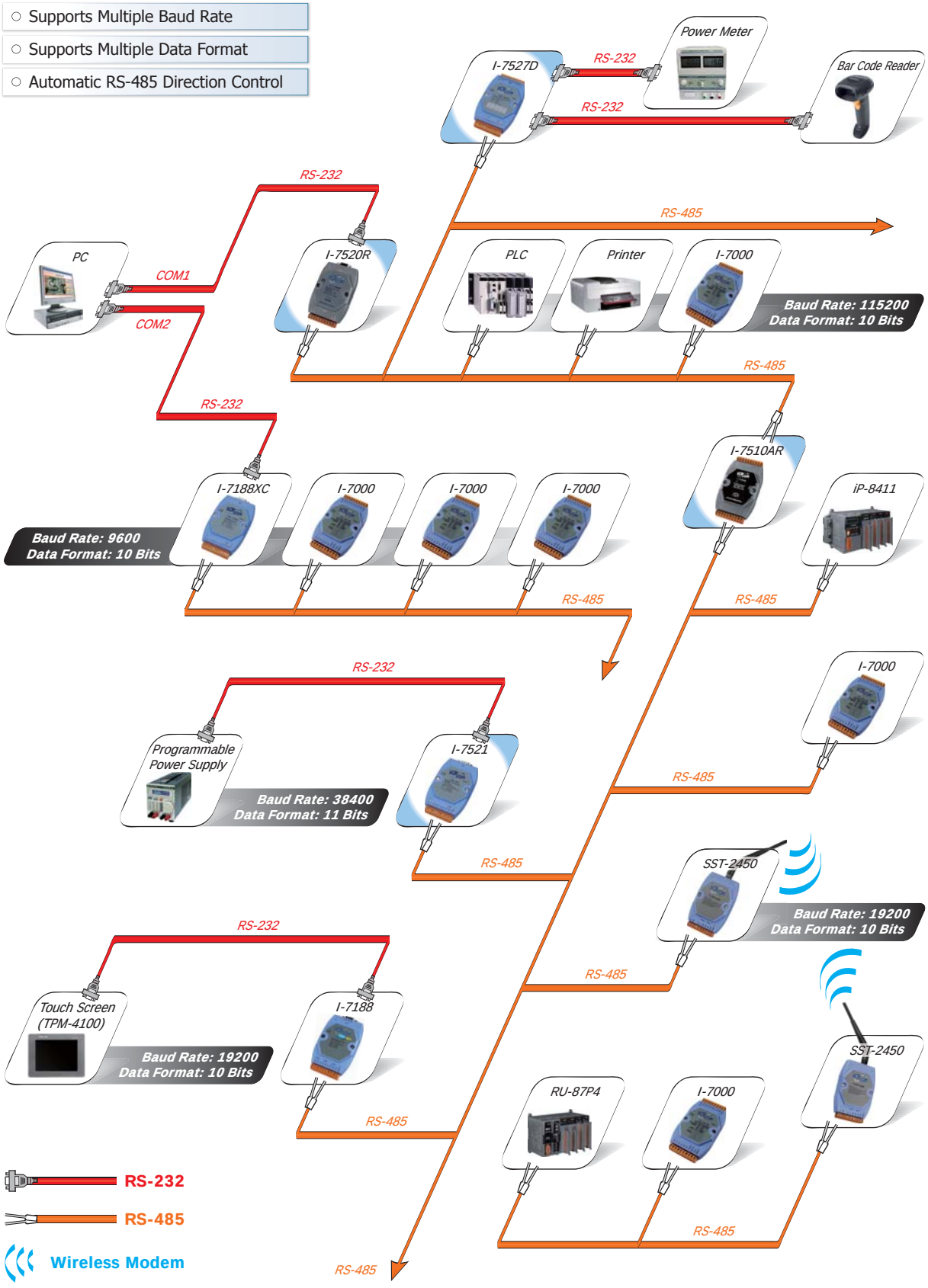
Converters, Repeaters, Hubs and Splitter



4-1 RS-485 Network Configuration

ICP DAS Self-Tuner ASIC Features

- Supports Multiple Baud Rate
- Supports Multiple Data Format
- Automatic RS-485 Direction Control



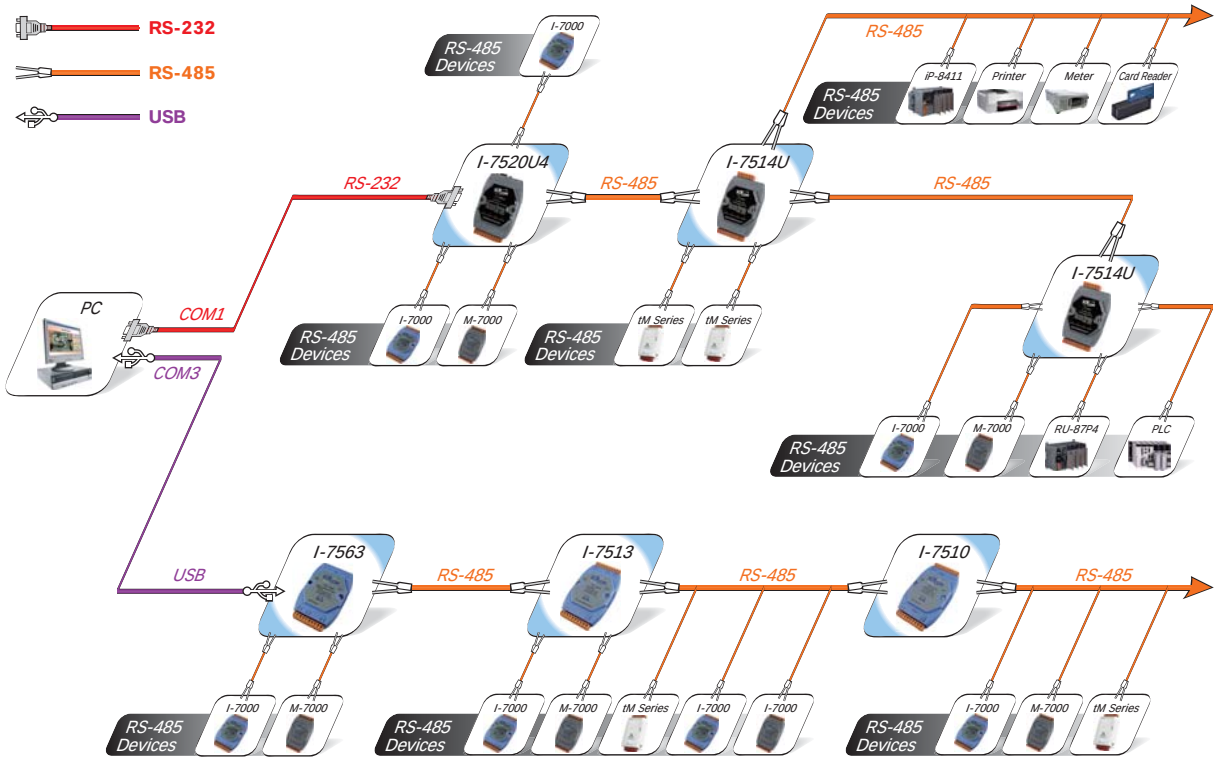
Bus Type

Star Type

High Quality Isolated RS-485 Repeater/Hub/Splitter

The maximum effective distance of RS-485 without repeater is 1200 meters (4000 feet) at baud rates up to 9.6 kbps and up to 32 (256) nodes can be connected. With the professional design, the repeater I-7510 solves the problem of signal weakening and extends the maximum effective distance by 1200 m and connects 32 (256) nodes more. And it has optical isolation design for lightning and surge protection. If the RS-485 topology is too complex to make the communication well, a RS-485 hub or splitter is recommended.

I-7520U4 and I-7514U are multichannel RS-485 repeater/hub/splitter. Each channel is independent and has optical isolation, short circuit and open circuit protection. Thus when one channel fails, it will not affect another channel of the hub. These features make it perfect to star type or mixed type topology in complex and large scale RS-485 network.



4-2 RS-422/485 Repeaters

tM-7510U

Isolated RS-485 Repeater

Features

- 2-way 3000 VDC Isolation Protection
- ESD Protection for RS-485 Data Line
- Power Input, +10 ~ +30 VDC
- Low power consumption
- Long-cable application
- Power and data flow indicator for troubleshooting
- Easy-to-use rotary switch for baud rate setting, 1200 ~ 115200 bps
- Operating Temperatures, -25 °C ~ +75 °C
- Tiny packaging fits on your DIN-Rail Mounting

Introduction

The tM-7510U repeater simply amplifies, or boosts, existing RS-485 signal to enable them to cover longer distances. It extends the communication distance by 4000 ft. (1200 m) or increases the maximum number of bus nodes. The module provides 3000 VDC of isolation allowing you to separate and protect critical segments of the system from the rest of the RS-485 network.

The tM-7510U provides 2 modes of baud rate setting, one is Self-Tuner mode and the other is Fixed baud rate mode. The Self-Tuner mode can support multiple baud rate and multiple data format. The Self-Tuner design is exactly the same as I-7510 series. The Fixed baud rate mode offers a better quality for data transmission over long or lossy lines or electrically noisy environments.

Baud rate 1200 ~ 115200 bps

Comparison Table of Repeater

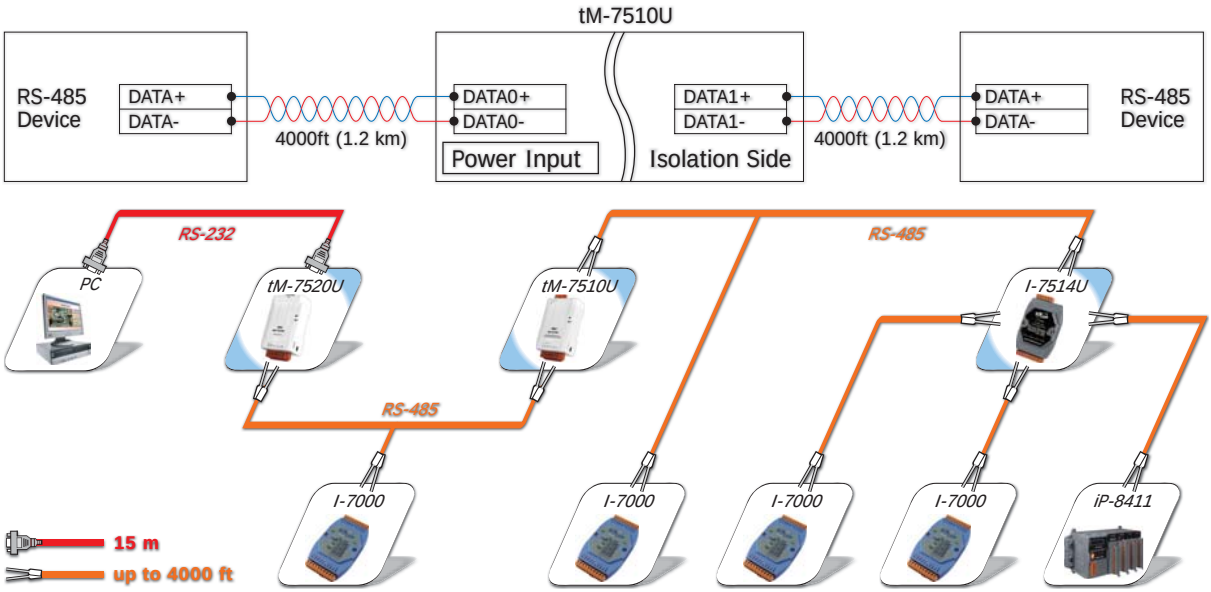
Mode name	tM-7510U	I-7510
RS-485 Direction Control	Fixed baud rate setting and Automatic RS-485 Direction Control (Self-Tuner, default)	Automatic RS-485 Direction Control (Self-Tuner)
Baud rate	300 ~ 115200 bps for Self-Tuner 1200 ~ 115200 bps for Fixed baud rate setting	300 ~ 115200 bps
Dimensions (W x H x D)	52 mm x 95 mm x 27 mm	72 mm x 122 mm x 35 mm
Remarks	Entry-level Long-cable application	Entry-level

System Specifications

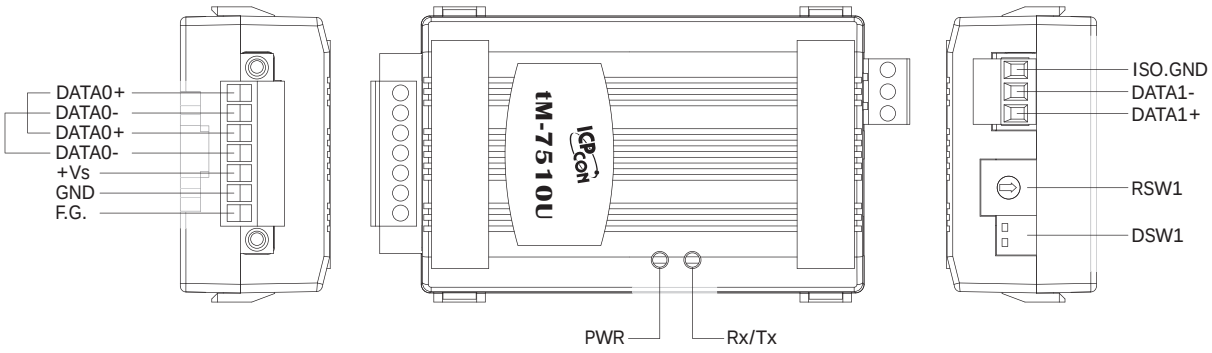
Interface		
Serial Interface	RS-485	Data+, Data-
Transmission Distance		Max. 1,200 m at 9.6 kbps; Max. 400 m at 115.2 kbps (Belden 9841 2P twisted-pair cable, if different cables are used, the transmission distance may change)
3000 VDC Isolated Voltage		2-way Isolation
Connector		Removable 7-Pin Terminal Block x 1; Removable 3-Pin Terminal Block x 1
LED Indicators		
Power/Communication		Yes
Power		
Input Voltage Range		+10 VDC ~ +30 VDC (Non-isolated)
Power Consumption		0.6 W
Environment		
Operating Temperature		-25 °C ~ +75 °C
Storage Temperature		-30 °C ~ +75 °C
Humidity		10 ~ 90% RH, non-condensing

Applications

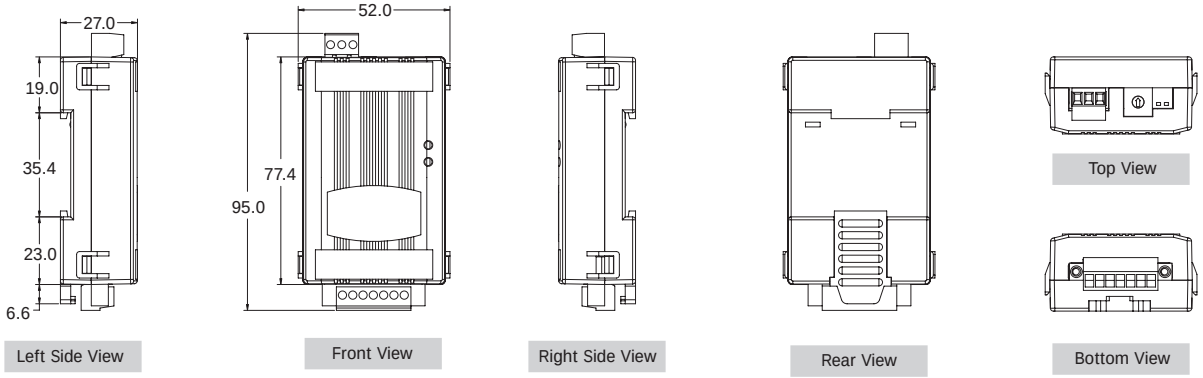
RS-485 to RS-485 Repeater (Only for half duplex application)



Pin Assignments



Dimensions (Units: mm)



Ordering Information

tM-7510U CR	Isolated RS-485 Repeater (RoHS)

Accessories

GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
DIN-KA52F	24 VDC/1.04 A, 25 W Power Supply with DIN-Rail Mounting

I-7510

Isolated RS-485 Repeater

I-7510A

Isolated RS-422/485 Repeater/Converter

I-7510AR

Three Way Isolated RS-422/485 Repeater/Converter

Features

- Automatic RS-485 Direction Control
- 3-way 3000 V_{DC} Isolation Protection for I-7510AR
- Transmission Speed of up to 115200 bps
- Operating Temperatures, -25 °C ~ +75 °C
- 2-way 3000 V_{DC} Isolation Protection for I-7510/I-7510A
- ESD Protection for RS-485 Data Line
- Power Input, +10 ~ +30 V_{DC}
- DIN-Rail Mounting

Introduction

The I-7510/I-7510A provides 2-way optical isolation between one piece of RS-422/RS-485 equipment and the rest of the system. It can also be used as a repeater to extend the transmission of an existing network. Additionally, an RS-485 system can be expanded beyond the 256 node limitation imposed by the standard. It can also be used to convert a four-wire RS-422 signal into a 2-wire RS-485 signal, and vice versa.

The I-7510AR is exactly the same as the I-7510A, except for the isolation side. The isolation side of the I-7510A is located in the input interface circuit, but the isolation side of the I-7510AR is located in the input and output interface circuit. In other words the I-7510AR is 3-way isolation repeater module.

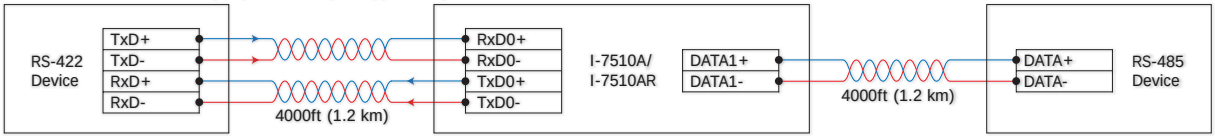
System Specifications

Models		I-7510	I-7510A	I-7510AR
Interface				
Serial Interface	RS-422	–	TxD+, TxD-, RxD+, RxD- The RS-422 and RS-485 cannot be used simultaneously	
	RS-485	Data+, Data-		
Transmission Distance		Max. 1,200 m at 9.6 kbps; Max. 400 m at 115.2 kbps (Belden 9841 2P twisted-pair cable, if different cables are used, the transmission distance may change)		
Self-Tuner Asic Inside		Yes		
Speed		300 ~ 115200 bps		
ESD Protection		Yes		
3000 V_{DC} Isolated Voltage		2-way Isolation		3-way Isolation
Connector		Removable 10-Pin Terminal Block x 2		
LED Indicators				
Power/Communication		Yes		
Power				
Input Voltage Range		+10 V_{DC} ~ +30 V_{DC} (Non-isolated)		
Power Consumption		2.16 W		
Mechanical				
Casing		Plastic		
Dimensions (W x H x D)		72 mm x 122 mm x 35 mm		
Installation		DIN-Rail Mounting		
Environment				
Operating Temperature		-25 °C ~ +75 °C		
Storage Temperature		-30 °C ~ +75 °C		
Humidity		10 ~ 90% RH, non-condensing		

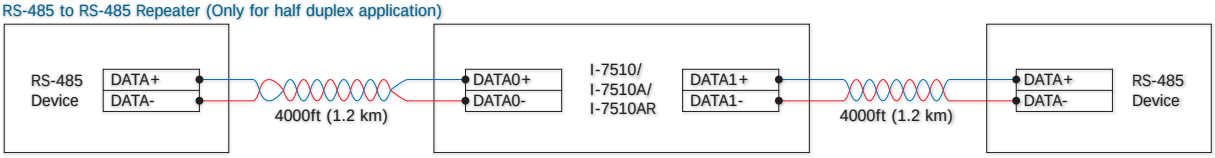
Applications

Applications for RS-422/485

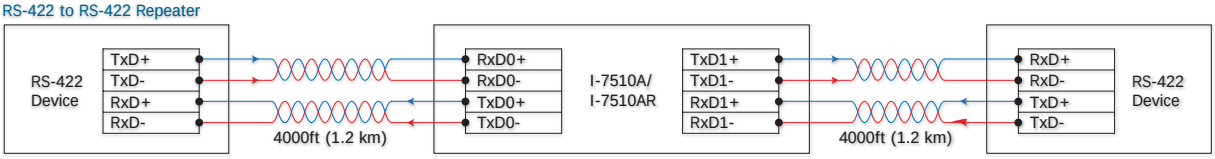
RS-422 to RS-485 Converter (Only for half duplex application)



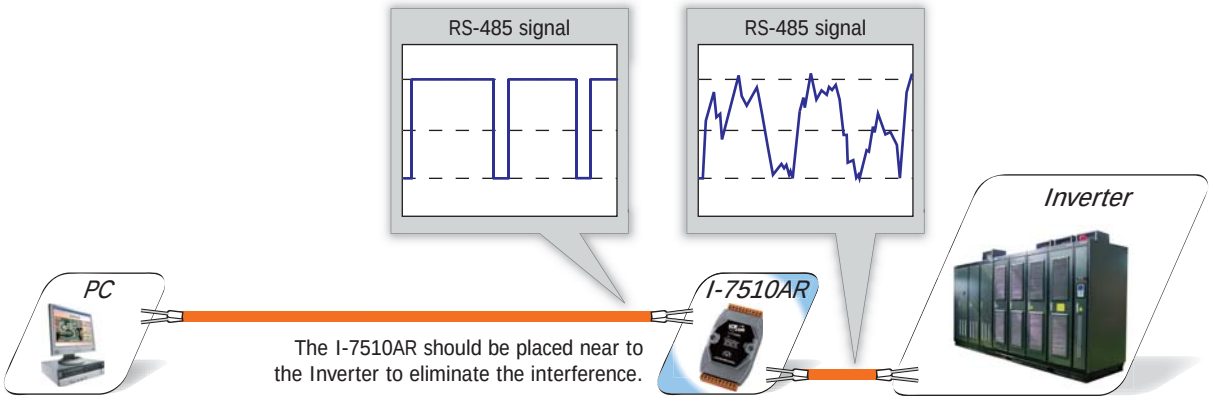
RS-485 to RS-485 Repeater (Only for half duplex application)



RS-422 to RS-422 Repeater



Application for 3-way isolation



Pin Assignments

I-7510

Terminal No.	Pin Assignment	Terminal No.	Pin Assignment
01	DATA+	20	DATA1+
02	DATA-	19	DATA1-
03	--	18	--
04	--	17	--
05	--	16	--
06	--	15	--
07	--	14	--
08	--	13	--
09	(R)+Vs	12	--
10	(B)GND	11	--

I-7510A / I-7510AR

Terminal No.		Pin Assignment	Pin Assignment
RS-485	01	DATA0+	DATA0+
	02	DATA0-	DATA0-
	03	--	--
RS-422	04	RxD0+	TxD0+
	05	RxD0-	TxD0-
	06	TxD0+	RxD0+
	07	TxD0-	RxD0-
	08	--	--
	09	(R)+Vs	(R)+Vs
	10	(B)GND	(B)GND

I-7510A/7510AR

Terminal No.		Pin Assignment
RS-485	20	DATA1+
	19	DATA1-
	18	--
RS-422	17	TxD1+
	16	TxD1-
	15	RxD1+
	14	RxD1-
	13	--
	12	--
	11	--

Ordering Information

I-7510 CR	Isolated RS-485 Repeater (RoHS)
I-7510A CR	Isolated RS-422/485 Repeater/Converter (RoHS)
I-7510AR CR	Three Way Isolated RS-422/485 Repeater/Converter (RoHS)

Accessories

GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
DIN-KA52F	24 VDC/1.04 A, 25 W Power Supply with DIN-Rail Mounting

4-3 RS-485 Repeater/Hub/Splitter

I-7514U

Isolated 4 Channels RS-485 Repeater/Hub/Splitter

Features

- RS-485 Splitter
- True RS-485 Star Wiring Hub
- Power and data flow indicator for troubleshooting
- Easy-to-use rotary switch for fixed baud rate setting, 1200 ~ 115200 bps
- Independent RS-485 driver for each channel
- Automatic RS-485 Direction Control
- 120 Ω termination resistor for each channel
- Operating Temperatures, -25 °C ~ +75 °C
- DIN-Rail Mounting

Introduction

RS-485 Active Hub

The I-7514U is a 4-ch RS-485 active star wiring hub, it has 4 independent RS-485 output channels and one RS-485 input channel. Each output channel is equipped with an individual driver. The data from a master to the input channel will simultaneously be forwarded to all the four output channels.

Splitter

Data coming from the master input will be transmitted to all four RS-485 slave channels. But data coming from the slave channels will be returned to the master input only. Thus reduces the possibility of interference between each RS-485 slave loop and makes the RS-485 networks more robust and reliable.

Baud Rate Setting

The I-7514U provides 2 modes of baud rate setting, one is Self-Tuner mode and the other is fixed baud rate mode. The Self-Tuner mode can support multiple baud rate and multiple data format. The Self-Tuner design is exactly the same as I-7513 and I-7510 series. The Fixed baud rate mode offers a better quality for data transmission over long or lossy lines or electrically noisy environments.

RS-485 Short-Circuit

The Short-circuit protection can automatically shut off the breakdown channel, this kind of design can suffice to protect the communication system. When a connected RS-485 equipment breaks down, the breakdown channel will be isolated to ensure that other equipments work normally.

Termination resistors

In some critical environments, you may need to add termination resistors to prevent the reflection of serial signals. The I-7514U includes a jumper-selectable 120 Ω termination resistor for each channel (Default disable).

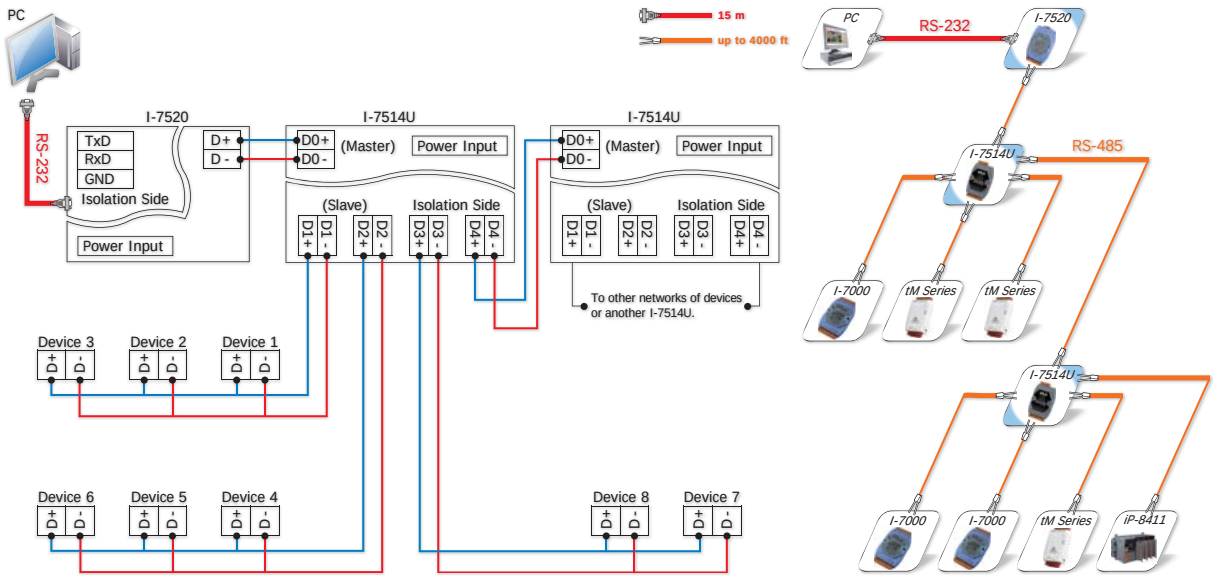
LED Indicators

The I-7514U has 6 LED to indicate the power status and network traffic. The TxD/RxD LED will flash when the unit is being sent out or received data.

System Specifications

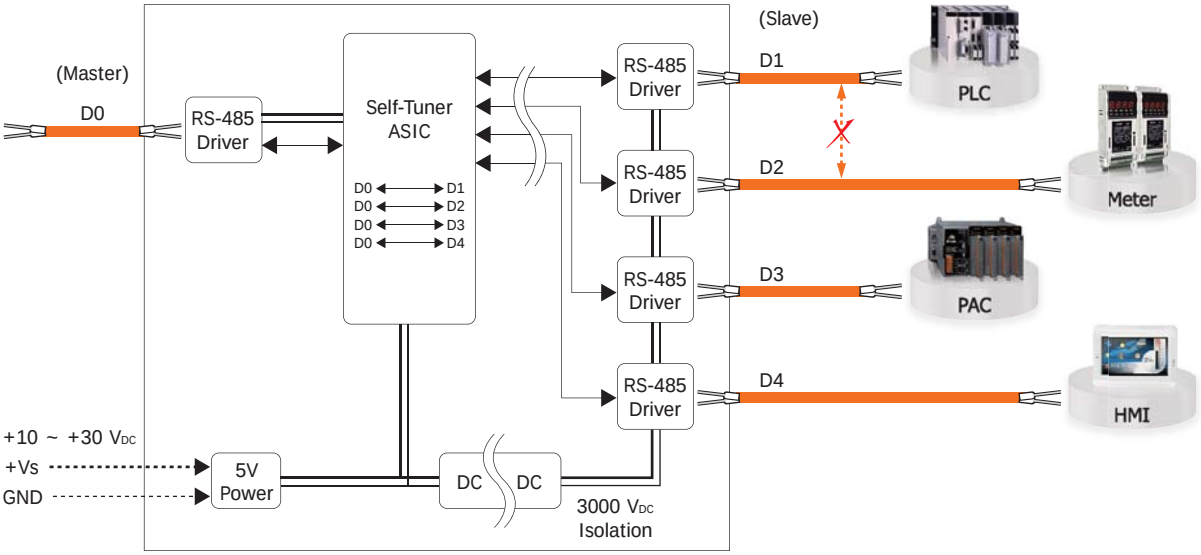
Interface	
Input (Master)	1 RS-485 Channel: Data+, Data-
Output (Slave)	4 RS-485 Channels: Data+, Data-
Transmission Distance	Max. 1,200 m at 9.6 kbps; Max. 400 m at 115.2 kbps (Belden 9841 2P twisted-pair cable, if different cables are used, the transmission distance may change)
Self-Tuner Asic Inside	Yes
Speed	300 ~ 115200 bps via Self-Tuner mode; 1200 ~ 115200 bps via Fixed Baud Rate mode
ESD Protection	Yes
3000 V_{DC} Isolation on CH1 ~ CH4	2-way Isolation
Connector	Removable 10-Pin Terminal Block x 1; Removable 6-Pin Terminal Block x 1
LED Indicators	
Power/Communication	Yes
Power	
Input Voltage Range	+10 V_{DC} ~ +30 V_{DC} (Non-isolated)
Power Consumption	1.2 W
Mechanical	
Casing	Plastic
Dimensions (W x H x D)	72 mm x 122 mm x 35 mm
Installation	DIN-Rail Mounting
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +75 °C
Humidity	10 ~ 90% RH, non-condensing

Applications

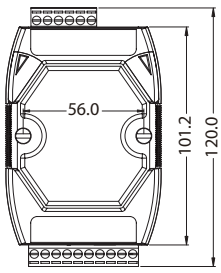


RS-485 Splitter

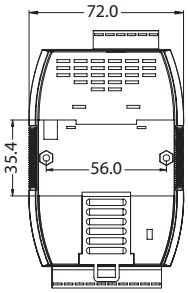
The following block diagram shows how I-7514U was designed as independent channel. Data coming from the master input will be transmitted to all four RS-485 slave channels. But data coming from the slave channels will be returned to the master input only. Thus reduces the possibility of interference between each RS-485 slave loop and makes the RS-485 networks more robust and reliable.



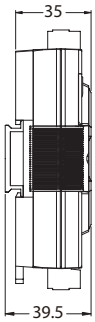
Dimensions (Units: mm)



Front View



Rear View



DIN-Rail Mounting Bracket

Ordering Information

I-7514U-G CR	Isolated 4 Channels RS-485 Active Hub (Gray Cover) (RoHS)

Accessories

GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
DIN-KA52F	24 VDC/1.04 A, 25 W Power Supply with DIN-Rail Mounting

4-4 RS-232/RS-422/485 Converters

tM-7520U

Isolated RS-232 to RS-485 Converter

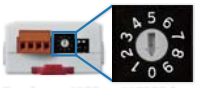
Features

- 2-way 3000 V_{DC} Isolation Protection
- ESD Protection for RS-485 Data Line
- Power Input, +10 ~ +30 V_{DC}
- Low power consumption
- Long-cable application
- Power and data flow indicator for troubleshooting
- Easy-to-use rotary switch for baud rate setting, 1200 ~ 115200 bps
- Operating Temperatures, -25 °C ~ +75 °C
- Tiny packaging fits on your DIN-Rail Mounting

Introduction

Most industrial computer systems provide standard RS-232 serial ports with limited transmission speed, range, and networking capabilities. The RS-485 standards overcome these limitations by using differential voltage lines for data and control signals. The tM-7520U transparently converts RS-232 signals into isolated RS-485 signal with no need to change any hardware or software. This lets you easily build an industrial grade, long-distance communication system using standard PC hardware. The module provides 3000 V_{DC} of optical isolation allowing you to separate and protect critical segments of the system from the rest of the RS-485 network.

The tM-7520U provides 2 modes of baud rate setting, one is Self-Tuner mode and the other is Fixed baud rate mode. The Self-Tuner mode can support multiple baud rate and multiple data format. The Self-Tuner design is exactly the same as I-7520 series. The Fixed baud rate mode offers a better quality for data transmission over long or lossy lines or electrically noisy environments.



Baud rate 1200 ~ 115200 bps

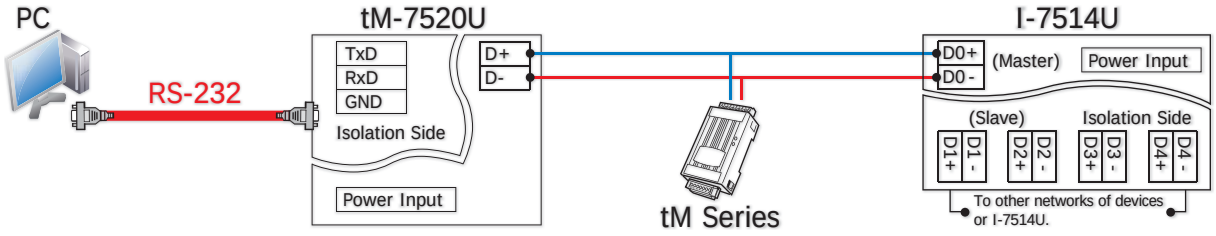
Comparison Table of Repeater

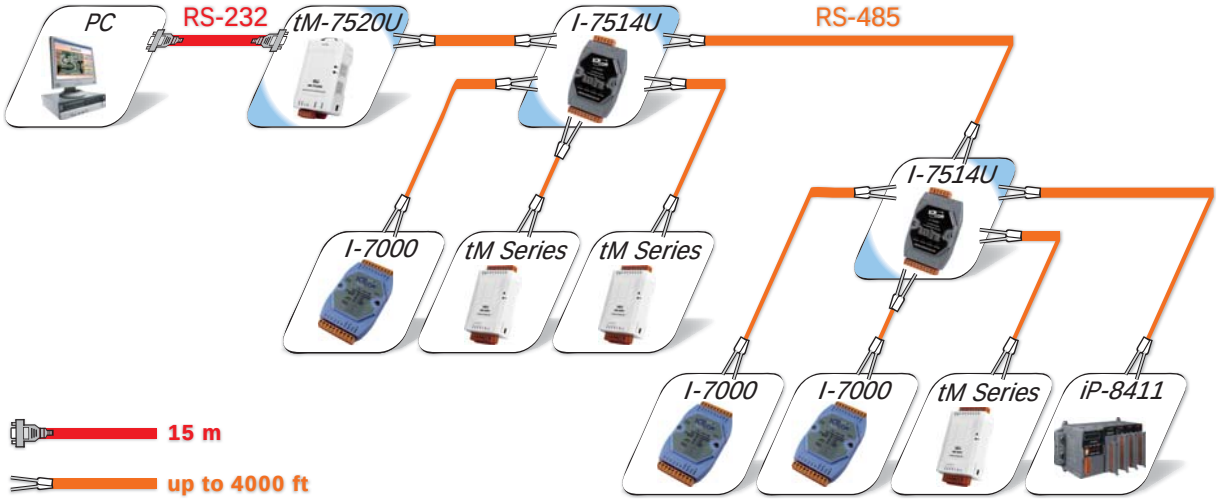
Mode name	tM-7520U	I-7520
RS-485 Direction Control	Fixed baud rate setting and Automatic RS-485 Direction Control (Self-Tuner, default)	Automatic RS-485 Direction Control (Self-Tuner)
Baud rate	300 ~ 115200 bps for Self-Tuner 1200 ~ 115200 bps for Fixed baud rate setting	300 ~ 115200 bps
Dimensions (W x H x D)	52 mm x 92 mm x 27 mm	72 mm x 118 mm x 35 mm
Remarks	Entry-level Long-cable application	Entry-level

System Specifications

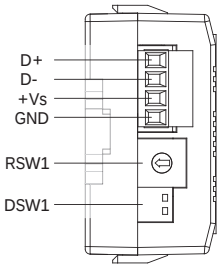
Interface	
Input	RS-232: TxD, RxD and GND
Output	RS-485: Data+, Data-
Transmission Distance	Max. 1,200 m at 9.6 kbps; Max. 400 m at 115.2 kbps (Belden 9841 2P twisted-pair cable, if different cables are used, the transmission distance may change)
3000 V_{DC} Isolated Protection	Yes
Connector	Removable 4-Pin Terminal Block x 1; 9-Pin Female D-Sub x 1
LED Indicators	
Power/TxD/RxD	Yes
Power	
Input Voltage Range	+10 V_{DC} ~ +30 V_{DC} (Non-isolated)
Power Consumption	0.5 W
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +75 °C
Humidity	10 ~ 90% RH, non-condensing

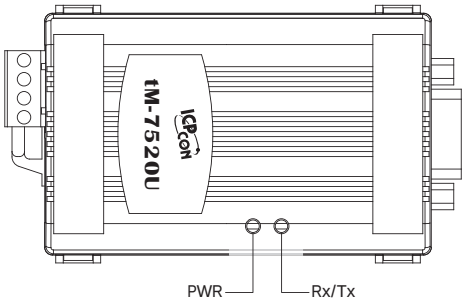
Applications





Pin Assignments

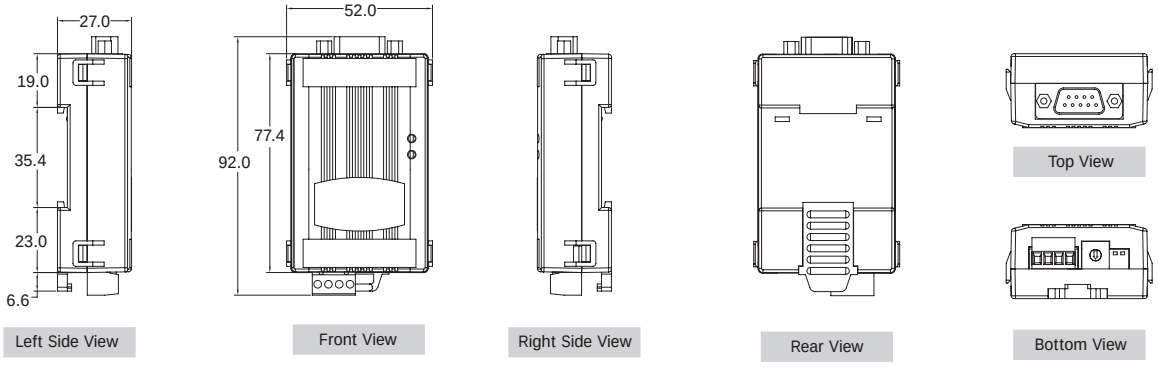




Pin Assignment	Terminal No.		Pin Assignment
--	01	06	--
TxD	02	07	--
RxD	03	08	--
--	04	09	--
GND	05		

RS-232: Female DB-9 Connector

Dimensions (Units: mm)



Ordering Information

tM-7520U CR	Isolated RS-232 to RS-485 Converter (RoHS)
tM-7520U-CA CR	tM-7520U CR with CA-0915 cable x 1 (RoHS)

Accessories

GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
DIN-KA52F	24 VDC/1.04 A, 25 W Power Supply with DIN-Rail Mounting
tM-7510U CR	Isolated RS-485 Repeater (RoHS)
CA-0915	9-Pin Male-Female D-Sub Cable, 1.5 m

I-7520U4

Isolated RS-232 to 4 Channels RS-485 Active Star Wiring Hub

Features

- True RS-485 Star Wiring Hub
- Power and data flow indicator for troubleshooting
- Easy-to-use rotary switch for fixed baud rate setting, 1200 ~ 115200 bps
- Power Input, +10 ~ +30 V_{DC}
- Independent RS-485 driver for each channel
- Automatic RS-485 Direction Control
- 120 Ω termination resistor for each channel
- Operating Temperatures, -25 °C ~ +75 °C
- DIN-Rail Mounting

Introduction

RS-485 Active Hub

The I-7520U4 is isolated RS-232 to 4-ch RS-485 active star wiring hub, it has 4 independent RS-485 output channels and one RS-232 input channel. Each output channel is equipped with an individual driver. The data from a master to the input channel will simultaneously be forwarded to all the four output channels.

Baud Rate Setting

The I-7520U4 provides 2 modes of baud rate setting, one is Self-Tuner mode and the other is fixed baud rate mode. The Self-Tuner mode can support multiple baud rate and multiple data format. The Self-Tuner design is exactly the same as I-7520 series. The Fixed baud rate mode offers a better quality for data transmission over long or lossy lines or electrically noisy environments.

RS-485 Short-Circuit

The Short-circuit protection can automatically shut off the breakdown channel, this kind of design can suffice to protect the communication system. When a connected RS-485 equipment breaks down, the breakdown channel will be isolated to ensure that other equipments work normally.

Termination resistors

In some critical environments, you may need to add termination resistors to prevent the reflection of serial signals. The I-7520U4 includes a jumper-selectable 120Ω termination resistor for each channel (Default disable).

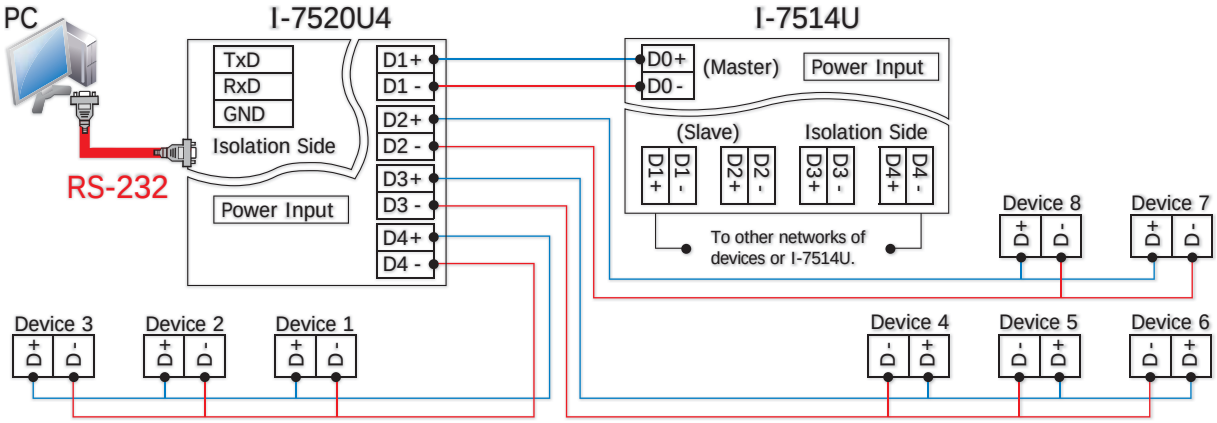
LED Indicators

The I-7520U4 has 6 LED to indicate the power status and network traffic. The TxD/RxD LED will flash when the unit is being sent out or received data.

System Specifications

Interface	
Input	1 RS-232 Channel: TxD, RxD and GND
Output	4 RS-485 Channels: Data+, Data-
Transmission Distance	Max. 1,200 m at 9.6 kbps; Max. 400 m at 115.2 kbps (Belden 9841 2P twisted-pair cable, if different cables are used, the transmission distance may change)
Self-Tuner Asic Inside	Yes
Speed	300 ~ 115200 bps via Self-Tuner mode; 1200 ~ 115200 bps via Fixed Baud Rate mode
ESD Protection	Yes
3000 V_{DC} Three Way Isolated Protection	Yes
Connector	Removable 10-Pin Terminal Block x 1; 9-Pin Female D-Sub x 1
LED Indicators	
Power/Communication	Yes
Power	
Input Voltage Range	+10 V_{DC} ~ +30 V_{DC} (Non-isolated)
Power Consumption	1.2 W
Mechanical	
Casing	Plastic
Dimensions (W x H x D)	72 mm x 118 mm x 35 mm
Installation	DIN-Rail Mounting
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +75 °C
Humidity	10 ~ 90% RH, non-condensing

Applications



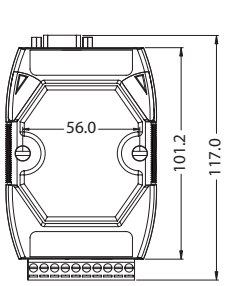
Pin Assignments

Terminal No.		Pin Assignment
RS-485	01	D1+
	02	D1-
	03	D2+
	04	D2-
	05	D3+
	06	D3-
	07	D4+
	08	D4-
	09	(R)+Vs
	10	(B)GND

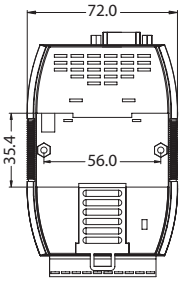
Pin Assignment	Terminal No.	Pin Assignment
--	01	--
TxD	02	--
RxD	03	--
--	04	--
GND	05	--
	06	
	07	
	08	
	09	

RS-232: Female DB-9 Connector

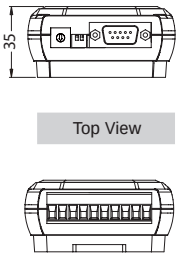
Dimensions (Units: mm)



Front View

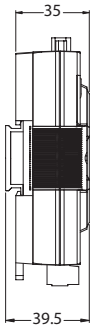


Rear View

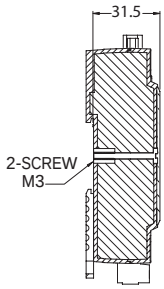


Top View

Bottom View



DIN-Rail Mounting Bracket



Side View

Ordering Information

I-7520U4-G CR	Isolated RS-232 to 4 Channels RS-485 Active Hub (Gray Cover) (RoHS)
I-7520U4-CA-G CR	I-7520U4-G CR with CA-0915 cable x 1

Accessories

GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
DIN-KA52F	24 VDC/1.04 A, 25 W Power Supply with DIN-Rail Mounting
I-7510 CR	Isolated RS-485 Repeater (RoHS)
CA-0915	9-Pin Male-Female D-Sub Cable, 1.5 m

PCISA-7520R

Isolated RS-232 to RS-485 Converter Card

PCISA-7520AR

Isolated RS-232 to RS-422/485 Converter Card

PCISA-7520AR

Features

- No External Power Supply required
- No Driver installation required
- 3000 VDC Isolation Protection
- Auto Switching Baud Rate, 300 ~ 115200 bps
- Transmission Speed of up to 115200 bps
- Can be used in an ISA Bus, a PCI Bus or any system with an RS-232 Interface

Introduction

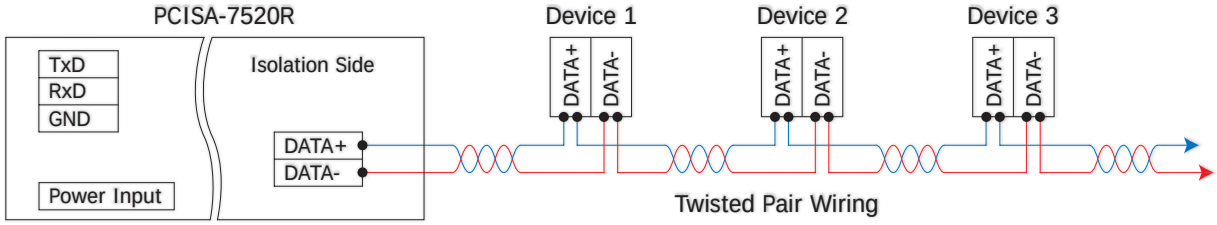
The PCISA-7520 series card provides RS-232 to RS-485 (or RS-422) converter function that is exactly the same as I-7520 series. It is designed for easy installation, powered from the PCI or ISA Interface but without PCI and ISA functions. The PCISA-7520 series is equipped with one RS-232 serial port and one RS-485 serial port. The RS-232 port is designed to communicate with the local Host PC, the RS-485 is designed to communicate with the remote IO module.

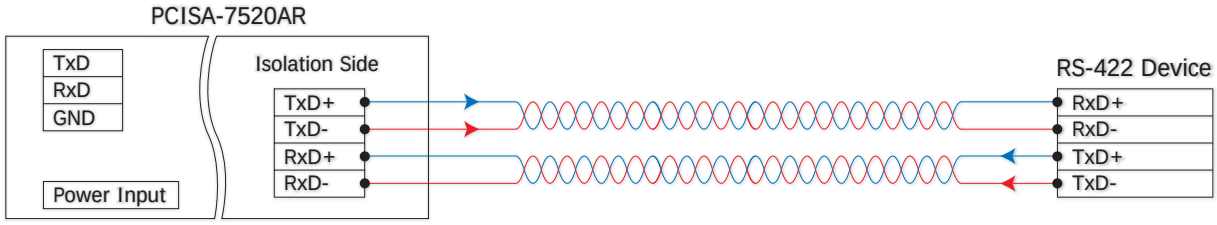
For adding more serial ports to a PC, please refer to VXC/VEX series card in chapter 2.

System Specifications

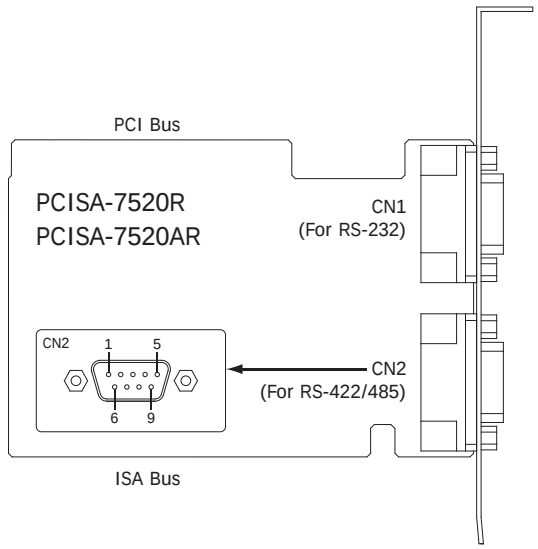
Models		PCISA-7520R	PCISA-7520AR
Interface			
Serial Interface	RS-232	TxD, RxD, GND	
	RS-422	–	TxD+, TxD-, RxD+, RxD- The RS-422 and RS-485 cannot be used simultaneously
	RS-485	Data+, Data-	
Transmission Distance		Max. 1,200 m at 9.6 kbps; Max. 400 m at 115.2 kbps (Belden 9841 2P twisted-pair cable, if different cables are used, the transmission distance may change)	
Self-Tuner Asic Inside		Yes	
Speed		300 ~ 115200 bps	
ESD Protection		Yes	
Isolated Voltage		3000 VDC on the RS-422/485 side	
Connector	RS-232	9-Pin Female D-Sub x 1	
	RS-422/485	9-Pin Male D-Sub x 1	
Power			
Input Voltage Range		+5 VDC from the PC	
Power Consumption		1.0 W	
Mechanical			
Dimensions (L x W x D)		118 mm x 72 mm x 22 mm	
Environment			
Operating Temperature		0 °C ~ +50 °C	
Storage Temperature		-20 °C ~ +70 °C	
Humidity		0 ~ 90% RH, non-condensing	

Applications





Pin Assignments



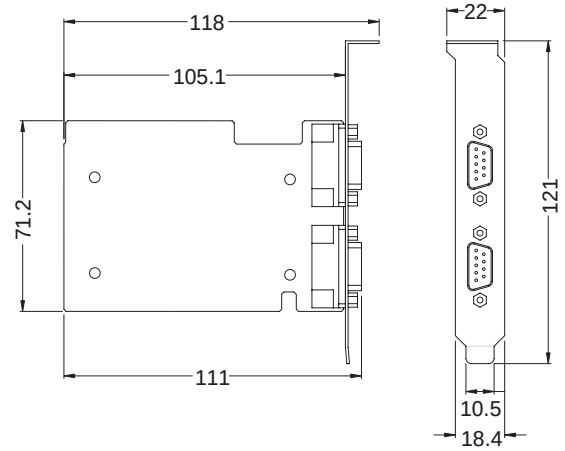
PCISA-7520R

Pin	2-wire for RS-485
01	DATA+
02	
03	NC
04	
05	
06	DATA-
07	
08	NC
09	

PCISA-7520AR

Pin	2-wire for RS-485	4-wire for RS-422
01	DATA+	Tx+
02		
03	NC	
04	NC	Rx+
05		
06	DATA-	Tx-
07		
08	NC	Rx-
09		

Dimensions (Units: mm)



Ordering Information

PCISA-7520R CR	Isolated RS-232 to RS-485 Converter Card (RoHS)
PCISA-7520AR CR	Isolated RS-232 to RS-422/485 Converter Card (RoHS)

Accessories

I-7510 CR	Isolated RS-485 Repeater (RoHS)
I-7510A CR	Isolated RS-422/485 Repeater (RoHS)
CA-0915	9-Pin Male-Female D-Sub Cable, 1.5 m

I-7520

Isolated RS-232 to RS-485 Converter

I-7520A

Isolated RS-232 to RS-422/485 Converter

I-7520R

RS-232 to Isolated RS-485 Converter

I-7520AR

RS-232 to Isolated RS-422/485 Converter

Features

- Automatic RS-485 Direction Control
- ESD Protection for the RS-232/422/485 Data Line
- Power Input, +10 ~ +30 V_{DC}
- DIN-Rail Mounting
- 3000 V_{DC} Isolation Protection on the RS-485 side
- Transmission Speed of up to 115200 bps
- Operating Temperatures, -25 °C ~ +75 °C

Introduction

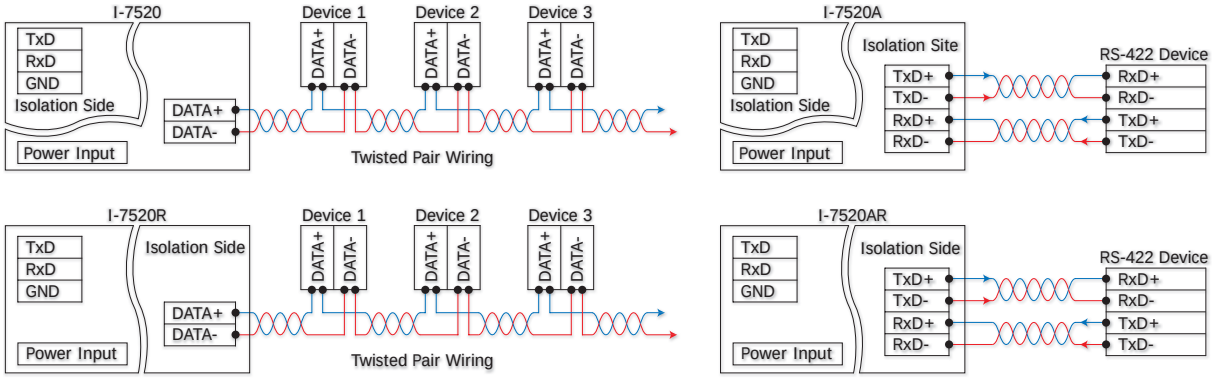
Most industrial computer systems provide standard RS-232 serial ports. Though widely accepted, RS-232 has limited transmission speed, range, and networking capabilities. The RS-422 and RS-485 standards overcome these limitations by using differential voltage lines for data and control signals, which transparently converts RS-232 signals into isolated RS-422 or RS-485 signal with no need to change any hardware or software. The I-7520/I-7520A lets you easily build an industrial grade, long-distance communication system using standard PC hardware.

The design of the isolation between the I-7520 and the I-7520R/AR is different. If the user wants to supply power from the PLC/PC, the I-7520R/AR should be used, otherwise the isolation will be broken. Refer to the I-7000 bus converter manual for detailed information.

System Specifications

Models		I-7520	I-7520R	I-7520A	I-7520AR
Interface					
Serial Interface	RS-232	TxD, RxD, GND			
	RS-422	–		TxD+, TxD-, RxD+, RxD- The RS-422 and RS-485 cannot be used simultaneously	
	RS-485	Data+, Data-			
Transmission Distance		Max. 1,200 m at 9.6 kbps; Max. 400 m at 115.2 kbps (Belden 9841 2P twisted-pair cable, if different cables are used, the transmission distance may change)			
Self-Tuner Asic Inside		Yes			
Speed		300 ~ 115200 bps			
ESD Protection		Yes			
3000 V_{DC} Isolated Voltage		on RS-232 side	on RS-485 side	on RS-232 side	on RS-485 side
Connector	RS-232	9-Pin Female D-Sub			
	RS-422/485	Removable 10-Pin Terminal Block			
LED Indicators					
Power/Communication		Yes			
Power					
Input Voltage Range		+10 V_{DC} ~ +30 V_{DC} (Non-isolated)			
Power Consumption		1.2 W			
Mechanical					
Casing		Plastic			
Dimensions (W x H x D)		72 mm x 118 mm x 35 mm			
Installation		DIN-Rail Mounting			
Environment					
Operating Temperature		-25 °C ~ +75 °C			
Storage Temperature		-30 °C ~ +75 °C			
Humidity		10 ~ 90% RH, non-condensing			

Applications



Pin Assignments

I-7520/I-7520R

Terminal No.		Pin Assignment
RS-485	01	DATA+
	02	DATA-
	03	--
	04	--
	05	--
	06	--
	07	--
	08	--
	09	(R)+Vs
	10	(B)GND

Pin Assign-ment	Terminal No.		Pin Assign-ment
--	01	06	--
TxD	02	07	--
RxD	03	08	--
--	04	09	--
GND	05		

RS-232: Female DB-9 Connector

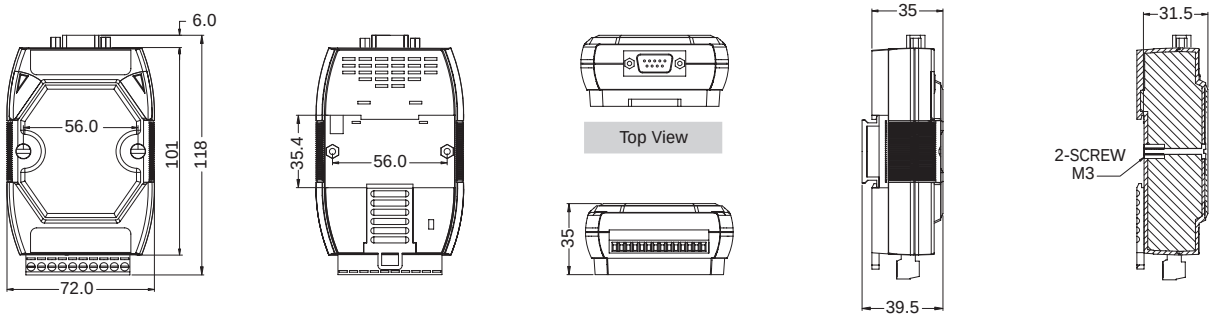
I-7520A/I-7520AR

Terminal No.		Pin Assignment
RS-485	01	DATA1+
	02	DATA1-
	03	--
RS-422/ 485	04	TxD+
	05	TxD-
	06	RxD+/DATA2+
	07	RxD-/DATA2-
	08	--
	09	(R)+Vs
	10	(B)GND

Pin Assign-ment	Terminal No.		Pin Assign-ment
--	01	06	--
TxD	02	07	--
RxD	03	08	--
--	04	09	--
GND	05		

RS-232: Female DB-9 Connector

Dimensions (Units: mm)



Front View | Rear View | Bottom View | DIN-Rail Mounting Bracket | Side View

Ordering Information

I-7520 CR	Isolated RS-232 to RS-485 Converter (RoHS)
I-7520A CR	Isolated RS-232 to RS-422/485 Converter (RoHS)
I-7520-G CR	Isolated RS-232 to RS-485 Converter (Gray Cover) (RoHS)
I-7520A-G CR	Isolated RS-232 to RS-422/485 Converter (Gray Cover) (RoHS)
I-7520R CR	RS-232 to Isolated RS-485 Converter (RoHS)
I-7520AR CR	RS-232 to Isolated RS-422/485 Converter (RoHS)
I-7520R-G CR	RS-232 to Isolated RS-485 Converter (Gray Cover) (RoHS)
I-7520AR-G CR	RS-232 to Isolated RS-422/485 Converter (Gray Cover) (RoHS)

Accessories

GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
DIN-KA52F	24 VDC/1.04 A, 25 W Power Supply with DIN-Rail Mounting
I-7510 CR	Isolated RS-485 Repeater (RoHS)
I-7510A CR	Isolated RS-422/485 Repeater (RoHS)
CA-0915	9-Pin Male-Female D-Sub Cable, 1.5 m

I-7551

Isolated RS-232 to RS-232 Converter

Features

- 3000 VDC 3-way Isolation Protection
- Transmission Speed of up 115200 bps
- Operating Temperatures, -25 °C ~ +75 °
- ESD Protection
- Power Input, +10 ~ +30 VDC
- DIN-Rail Mounting

Introduction

The I-7551 provides a complete full-duplex (including control signal) electrical isolation channel between two RS-232 devices. This isolation is an important consideration if a system uses different power sources, has noisy signals, or must operate at different ground potentials.

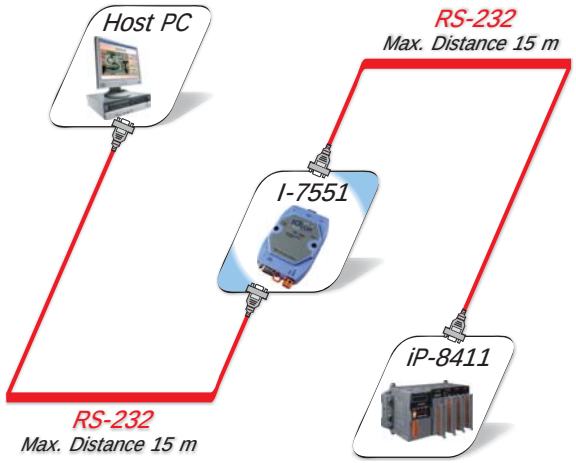
The CTS/RTS pins of the I-7551 module can be reconfigured as DSR/DTR to meet requirements on different applications.

The I-7551 incorporates two DC-to-DC converters, the isolation side of the I-7551 is located in the input and output interface circuit. In other words, the I-7551 is 3-way isolated RS-232 to RS-232 converter.

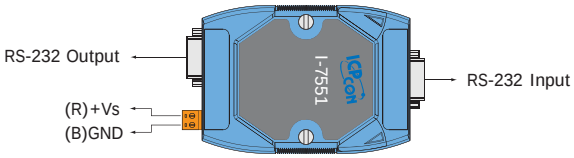
System Specifications

Interface		
Input		TxD, RxD, CTS, RTS, GND (Default) or TxD, RxD, DSR, DTR, GND Jumpers JP1 and JP2 are used to select the RS-232 input source type
Output		TxD, RxD, CTS, RTS, GND (Default) or TxD, RxD, DSR, DTR, GND
Transmission Distance		Max. 15 M at 115200 bps
Speed		300 ~ 115200 bps
ESD Protection		Yes
3000 VDC Three Way Isolated Protection		Yes
Connector	RS-232 Input	9-Pin Female D-Sub
	RS-232 Output	9-Pin Male D-Sub
LED Indicators		
Power/Communication		Yes
Power		
Input Voltage Range		+10 VDC ~ +30 VDC (Non-isolated)
Power Consumption		1.2 W
Mechanical		
Casing		Plastic
Dimensions (W x H x D)		72 mm x 118 mm x 35 mm
Installation		DIN-Rail Mounting
Environment		
Operating Temperature		-25 °C ~ +75 °C
Storage Temperature		-30 °C ~ +75 °C
Humidity		10 ~ 90% RH, non-condensing

Applications



Pin Assignments



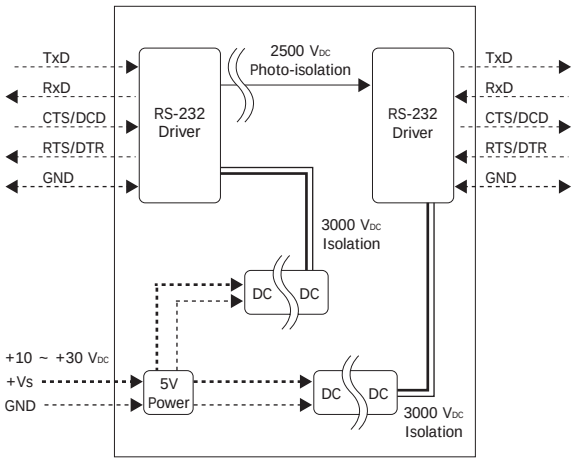
TxD, RxD, CTS, RTS, GND (Default)

RS-232 Input			RS-232 Output		
Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
GND	01	06 --	GND	05	09 --
TxD	02	07 CTS	--	04	08 CTS
RxD	03	08 RTS	TxD	03	07 RTS
--	04	09 --	RxD	02	06 --
--	05		--	01	
Female DB-9 Connector			Male DB-9 Connector		

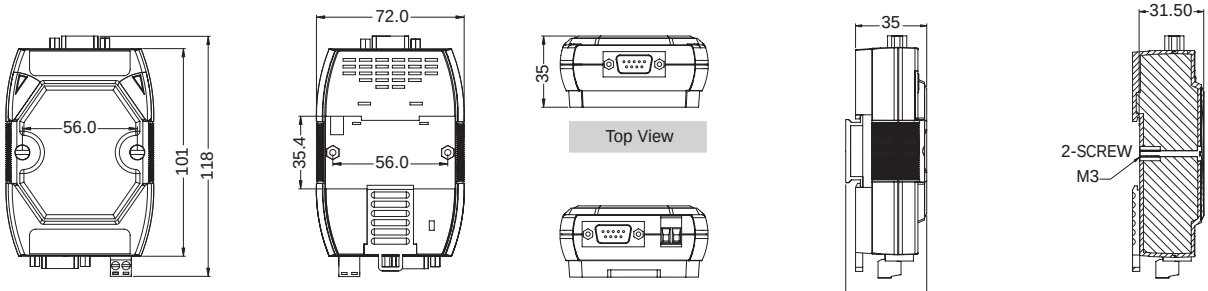
TxD, RxD, DTR, DSR, GND

RS-232 Input			RS-232 Output		
Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
GND	01	06 DTR	GND	05	09 DTR
TxD	02	07 --	--	04	08 --
RxD	03	08 --	TxD	03	07 --
--	04	09 DSR	RxD	02	06 DSR
--	05		--	01	
Female DB-9 Connector			Male DB-9 Connector		

Internal I/O Structure



Dimensions (Units: mm)



Front View | Rear View | Top View | Bottom View | DIN-Rail Mounting Bracket | Side View

Ordering Information

I-7551 CR	Isolated RS-232 to RS-232 Converter (RoHS)
I-7551-G CR	Isolated RS-232 to RS-232 Converter (Gray Cover) (RoHS)

Accessories

GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
DIN-KA52F	24 VDC/1.04 A, 25 W Power Supply with DIN-Rail Mounting

4-5 Intelligent Communication Controllers

I-752N Series

Programmable Intelligent Communication Controller

Features

- Built-in "Addressable RS-485 to RS-232 Converter" firmware
- Supports about 30 well-defined commands
- Supports power-up and safe value for DO
- R.O.C. Invention Patent No. 086674, No.103060 and No.132457
- Programmable Intelligent Communication Controller
- Supports Dual-Watchdog commands
- Watchdog timer provides fault tolerance and recovery
- Low power consumption

Introduction

There are many RS-232 devices in industry applications. Nowadays it becomes important to link all those RS-232 devices together for automation and information. Usually those RS-232 devices are far away from the host-PC and widely distributed in the factory. So it is not a good idea to use multi-serial cards to connect all these RS-232 devices together. The I-752N series product can be used to link multiple RS-232 devices by a single RS-485 network. The RS-485 is famous for its easy maintenance, simple cabling, stable, reliable and low cost.

Onboard 1 KB Queue buffer

The I-752N series module is equipped with a 1 KB queue buffer for its local RS-232 device. All input data can be stored in the queue buffer until the Host PC has time to read it. This feature allows the Host PC to link thousands of RS-232 devices without any loss of data.

3000V isolation on RS-485 side

COM2 of the I-752N modules is an isolated RS-485 port with 3000 V_{DC} isolation, which protects the local RS-232 devices from transient noises coming from the RS-485 network.

Self-Tuner ASIC inside

The built-in Self-Tuner ASIC on an RS-485 port can auto detect and control the send/receive direction of the RS-485 network. Thus, there is no need for application programs to be concerned about direction control of the RS-485 network.

Can be used as Addressable RS-485 to RS-232 Converter

Most RS-232 devices don't support device addressing. The ICP DAS I-752N module assigns a unique address for each RS-232 device installed. When Host PC sends a command with a device address to the RS-485 network, the destination I-752N module will remove the address field, and then pass the other commands to the specified local RS-232 devices. The response from the local RS-232 devices will be returned to the Host PC via the I-752N.

Master-type Addressable RS-485 to RS-232 Converter

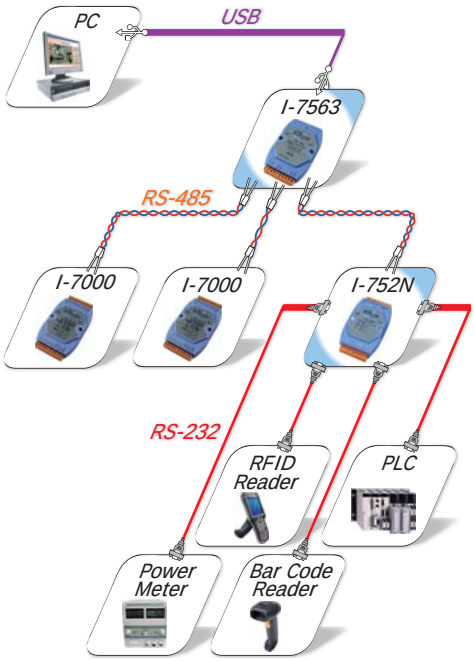
The ICP DAS I-752N product is unique that they are Master type converters which use our R.O.C. Patent 086674, while most other converters are Slave-type, which are helpless without a Host PC. In real industrial applications, many users are not satisfied with Slave-type converters as they cannot be adapted to individual requirement. The powerful I-752N series analyzes the local RS-232 devices, DI and DO without the need for a Host PC. Refer to Applications 5 ~ 9 for more information in the manual.

Can be used as RS-232 to RS-485 Device Server

The Device Server is an appliance that networking any device with a serial communication port. The I-752N series Intelligent Communication Controller allows the RS-232 serial devices to connect to the RS-485 network. Also, there are PDS series products available from ICP DAS, which provide Ethernet connectivity for serial devices.

Applications

- Factory Automation
- Building Automation
- Home Automation



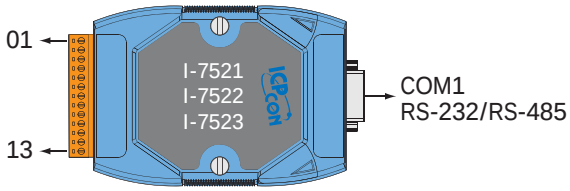
I/O Specifications

Models	I-7521(D)	I-7522(D)	I-7523(D)	I-7522A(D)	I-7524(D)	I-7527(D)
User-Defined I/O						
I/O Channel	3	–	–	–	–	–
Digital Output						
DI Channel	2	2	1	5	1	1
Input Type	Source (Dry Type), Common Ground, non-isolated					
Off Voltage	+1 V max.					
On Voltage	+3.5 V_{DC} ~ +30 V_{DC}					
Digital Output						
DO Channel	3	1	–	5	1	1
Output Type	Open Collector (Sink/NPN), non-isolated					
Load Voltage	+30 V_{DC} max.					
Load Current	100 mA max.					

System Specifications

Models	I-7521(D)	I-7522(D)	I-7523(D)	I-7522A(D)	I-7524(D)	I-7527(D)
System						
CPU	80188, 20 MHz (MiniOS7 Operating System)					
Memory	128 KB SRAM, 512 KB Flash, 2 KB EEPROM					
Real-Time Clock	–					
Watchdog Timer	Yes					
Communication Interface						
COM1	5-wire RS-232 or 2-wire RS-485					
COM2	Isolated 2-wire RS-485			2-wire RS-485		
COM3	–	5-wire RS-232	5-wire RS-232	4-wire RS-422	5-wire RS-232	3-wire RS-232
COM4	–	–	3-wire RS-232	–	5-wire RS-232	3-wire RS-232
COM5	–	–	–	–	5-wire RS-232	3-wire RS-232
COM6	–	–	–	–	–	3-wire RS-232
COM7	–	–	–	–	–	3-wire RS-232
COM8	–	–	–	–	–	3-wire RS-232
Baud Rate	300 ~ 115200 bps					
Data Bit	COM1 ~ COM2: 7 or 8					
	COM3 ~ COM8: 5, 6, 7 or 8					
Parity	COM1 ~ COM2: None, Even, Odd					
	COM3 ~ COM8: None, Even, Odd, Mark , Space					
Stop Bit	COM1 ~ COM2: 1 or 2 (data bit must be 7)					
	COM3 ~ COM8: 1 or 2					
Connector	Male DB-9 x 1 13-Pin screw terminal block x 1 (for 16 ~ 26 AWG wires; 3.81 mm pitch)			14-Pin screw terminal block x 2 (for 16 ~ 22 AWG wires; 3.5 mm pitch)		
LED Indicators						
LED Display	5-digit 7-segment LED display for D versions					
Power						
Protection	Power input reverse polarity protection					
Power Requirement	Unregulated +10 V_{DC} ~ 30 V_{DC}					
Power Consumption	2 W (without display), 3 W (with display)					
Mechanical						
Casing	Plastic					
Dimensions (W x H x D)	72 mm x 118 mm x 35 mm			72 mm x 120 mm x 35 mm		
Installation	DIN-Rail Mounting					
Environment						
Operating Temperature	-25 °C ~ +75 °C					
Storage Temperature	-40 °C ~ +80 °C					
Humidity	0 ~ 90% RH, non-condensing					
Note: 3-wire RS-232: RxD, TxD, GND 5-wire RS-232: RxD, TxD, CTS, RTS, GND 2-wire RS-485: DATA+, DATA-, GND; Self-Tuner inside Isolated 2-wire RS-485: DATA+, DATA-; Self-Tuner inside; 3000 VDC Isolation 4-wire RS-422: RxD+, RxD-, TxD+, TxD-, GND						

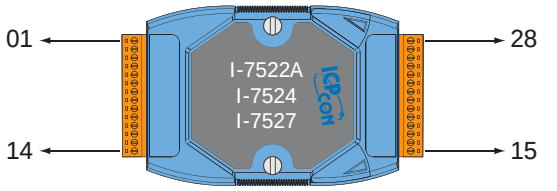
Pin Assignments



Terminal No.		Pin Assignment
	01	X3
	02	X2
	03	X1
DO	04	DO3
	05	DO2
	06	DO1
DI	07	DI3
	08	DI2
	09	INIT*
COM2	10	(Y)D2+
	11	(G)D2-
Power Input	12	(R)+Vs
	13	(B)GND

Pin Assignment	Terminal No.	Pin Assignment
GND	05	09 Data-
N.C.	04	08 RTS
RxD	03	07 CTS
TxD	02	06 N.C.
Data+	01	

COM1: RS-232
Male DB-9 Connector



Terminal No.		Pin Assignment
DO	01	DO
DI	02	DI
COM1	03	D1+
	04	D1-
	05	CTS1
	06	RTS1
	07	GND
	08	TxD1
	09	RxD1
	10	INIT*
COM2	11	(Y)D2+
	12	(G)D2-
Power Input	13	(R)+Vs
	14	(B)GND

X507

Terminal No.		Pin Assignment
DO	28	DO3
	27	DO2
	26	DO1
	25	DO0
	24	DO.PWR
	23	GND
DI	22	DI3
	21	DI2
	20	DI1
	19	DI0
COM3	18	RxD3-
	17	RxD3+
	16	TxD3-
	15	TxD3+

Terminal No.		Pin Assignment
COM3	01	CTS3
	02	RTS3
	03	RxD3
	04	TxD3
	05	GND
DO	06	DO1
DI	07	DI3
	08	DI2
	09	INIT*
COM2	10	(Y)D2+
	11	(G)D2-
Power Input	12	(R)+Vs
	13	(B)GND

Pin Assignment	Terminal No.	Pin Assignment
GND	05	09 Data-
N.C.	04	08 RTS
RxD	03	07 CTS
TxD	02	06 N.C.
Data+	01	

COM1: RS-232
Male DB-9 Connector

Terminal No.		Pin Assignment
DO	01	DO
DI	02	DI
COM1	03	D1+
	04	D1-
	05	CTS1
	06	RTS1
	07	GND
	08	TxD1
	09	RxD1
	10	INIT*
COM2	11	(Y)D2+
	12	(G)D2-
Power Input	13	(R)+Vs
	14	(B)GND

X505

Terminal No.		Pin Assignment
COM5	28	RxD5
	27	TxD5
	26	RTS5
	25	CTS5
	24	GND
COM4	23	RxD4
	22	TxD4
	21	RTS4
	20	CTS4
	19	GND
COM3	18	RxD3
	17	TxD3
	16	RTS3
	15	CTS3

Terminal No.		Pin Assignment
COM3	01	CTS3
	02	RTS3
	03	RxD3
	04	TxD3
	05	GND
COM4	06	TxD4
	07	RxD4
DI	08	DI2
	09	INIT*
COM2	10	(Y)D2+
	11	(G)D2-
Power Input	12	(R)+Vs
	13	(B)GND

Pin Assignment	Terminal No.	Pin Assignment
GND	05	09 Data-
N.C.	04	08 RTS
RxD	03	07 CTS
TxD	02	06 N.C.
Data+	01	

COM1: RS-232
Male DB-9 Connector

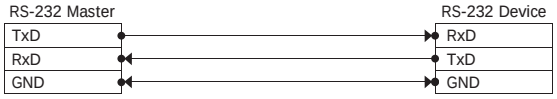
Terminal No.		Pin Assignment
DO	01	DO
DI	02	DI
COM1	03	D1+
	04	D1-
	05	CTS1
	06	RTS1
	07	GND
	08	TxD1
	09	RxD1
	10	INIT*
COM2	11	(Y)D2+
	12	(G)D2-
Power Input	13	(R)+Vs
	14	(B)GND

X506

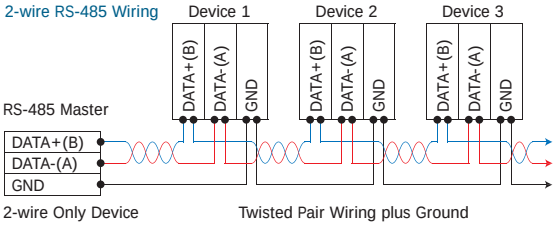
Terminal No.		Pin Assignment
COM7/8	28	TxD8
	27	RxD8
	26	TxD7
	25	RxD7
	24	GND
COM5/6	23	TxD6
	22	RxD6
	21	TxD5
	20	RxD5
	19	GND
COM3/4	18	TxD4
	17	RxD4
	16	TxD3
	15	RxD3

Wiring

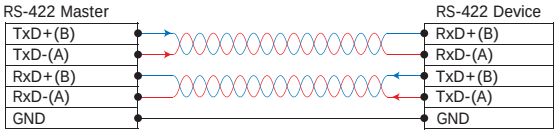
3-wire RS-232 Wiring

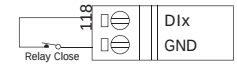
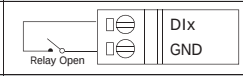
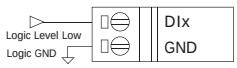
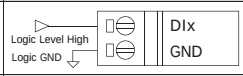
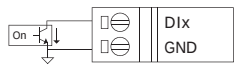
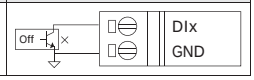


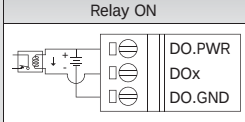
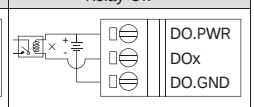
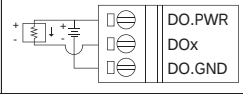
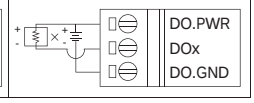
2-wire RS-485 Wiring



4-wire RS-422 Wiring

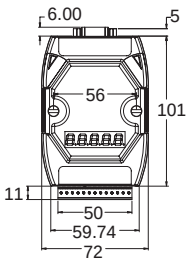


Input Type	DI Value as 0	DI Value as 1
Relay Contact	Relay ON	Relay Off
		
TTL/CMOS Logic	Voltage < 1V	Voltage > 3.5V
		
Open Collector	Open Collector On	Open Collector Off
		

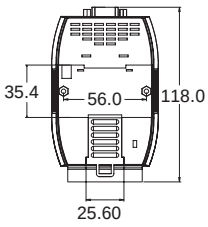
Output Type	DO Command as 1	DO Command as 0
Drive Relay	Relay ON	Relay Off
		
Resistance Load		
		

Dimensions (Units: mm)

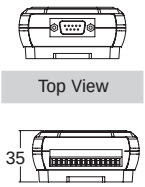
I-7521(D)/I-7522(D)/I-7523(D)



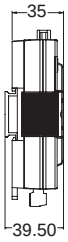
Front View



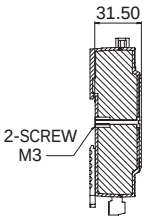
Rear View



Bottom View

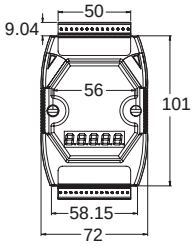


DIN-Rail Mounting Bracket

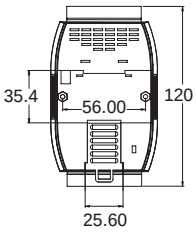


Side View

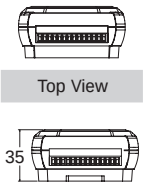
I-7521(D)/I-7522(D)/I-7523(D)



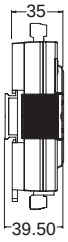
Front View



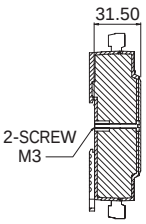
Rear View



Bottom View



DIN-Rail Mounting Bracket



Side View

Ordering Information

I-7521 CR	Programmable Intelligent Communication Controller (RoHS)	I-7523 CR	Programmable Intelligent Communication Controller (RoHS)
I-7521D CR	I-7521 with Display	I-7523D CR	I-7523 with Display
I-7522 CR	Programmable Intelligent Communication Controller (RoHS)	I-7524 CR	Programmable Intelligent Communication Controller (RoHS)
I-7522D CR	I-7522 with Display	I-7524D CR	I-7524 with Display
I-7522A CR	Programmable Intelligent Communication Controller (RoHS)	I-7527 CR	Programmable Intelligent Communication Controller (RoHS)
I-7522AD CR	I-7522A with Display	I-7527D CR	I-7527 with Display

Accessories

MDR-20-24	24 VDC/1 A, 24 W Power Supply with DIN-Rail Mounting	GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
DIN-KA52F	24 VDC/1.04 A, 25 W Power Supply with DIN-Rail Mounting	KA-52F	24 VDC/1.04 A, 25 W Power Supply

4-6. USB to RS-232/422/485 Converters

USB-2514

USB to 4-Port RS-232 Converter

Features

- Hi-Speed USB 2.0 for up to 480 Mbps USB transmission
- Power and data flow indicator for troubleshooting
- Driver Supports Windows 98/ME/2000/XP/Vista (32/64-bit)/7 (32/64-bit)/8 (32/64-bit)/8.1 (32/64-bit)/Linux
- Transmission speed up to 921.6 kbps
- Bus-powered; no need for external power supply for USB-2514
- Operating Temperatures, -25 °C ~ +75 °C
- DIN-Rail Mounting

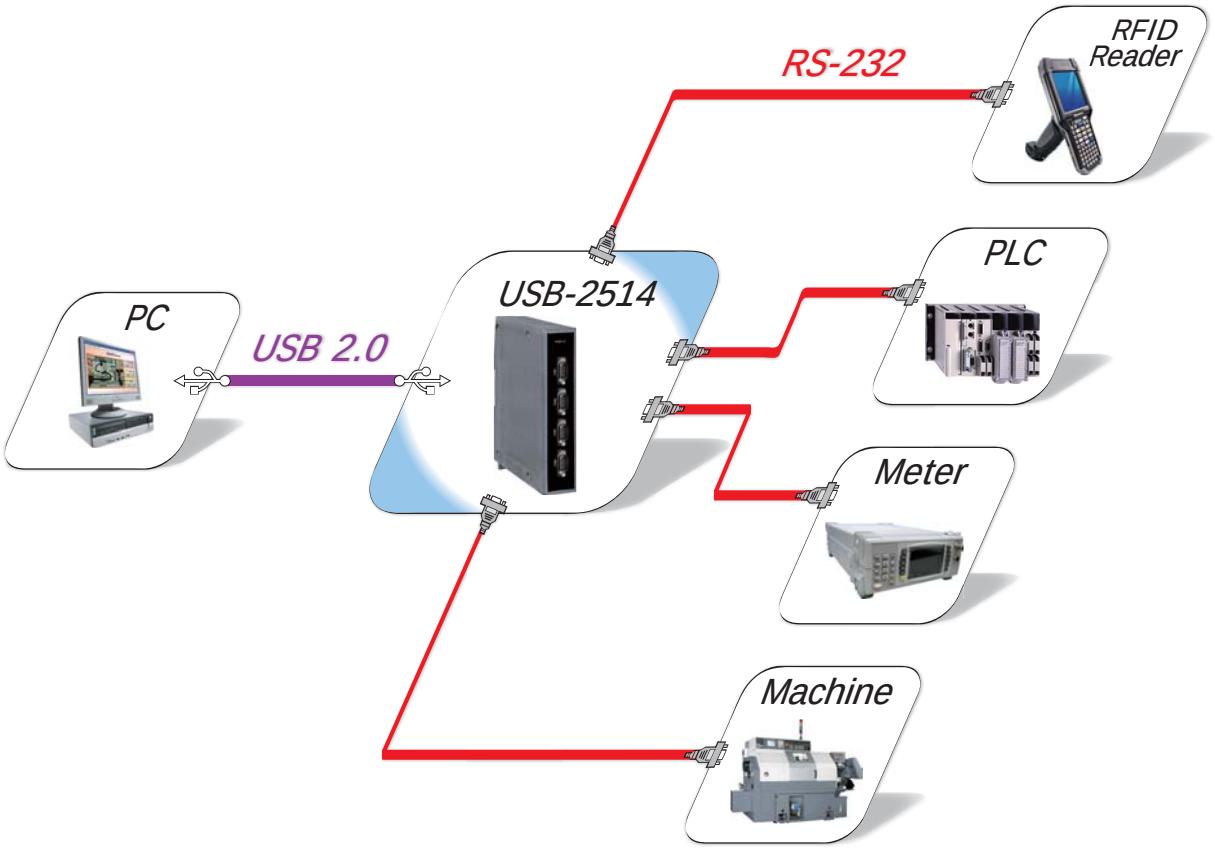
Introduction

USB-2514 allows PC users to connect a serial device to a system that use a USB interface. To attach the USB-2514 to a PC, you don't need to open the chassis or power down your PC. Instantly get extra high-speed RS-232 ports. The power is derived from the USB port, so there are no power adapters to deal with. Supporting high-speed 921.6 kbps transmission.

System Specifications

Interface		
USB		Fully Compliant with the USB 1.1/2.0/3.0
RS-232		TxD, RxD, RTS, CTS, DTR, DSR, DCD, RI, GND
Speed		300 bps ~ 921.6 Kbps
Connector	RS-232	DB9 male x 4
	USB	Type B
LED Indicators		
Power/Communication		Yes
Power		
Input Voltage Range		Bus-powered
Power Consumption		4 W
Mechanical		
Casing		Plastic
Dimensions (W x H x D)		31 mm x 157 mm x 116 mm
Environment		
Operating Temperature		-25 °C ~ +75 °C
Storage Temperature		-30 °C ~ +75 °C
Humidity		10 ~ 90% RH, non-condensing

Applications



Ordering Information

USB-2514 CR	USB to 4-Port RS-232 Converter (RoHS)
Include Cable	CA-USB18 (1.8 m Cable) x 1

Accessories

USB-2560 CR		Industrial 4-port USB 2.0 Hub

I-7560

USB to RS-232 Converter

I-7560U NEW

USB to RS-232 Converter (Windows 8 / 8.1)

Features

- Fully Compliant with the USB 1.1/2.0/3.0
- Transmission speed up to 921.6 kbps (For I-7560U)
- No External Power Supply required
- Operating Temperatures, -25 °C ~ +75 °C

Introduction

The I-7560/I-7560U provides a Windows serial COM port via it's USB connection and is compatible with new and legacy RS-232 devices. USB Plug-and-Play allows easy serial port expansion and requires no IRQ, DMA, or I/O port settings manually.

The I-7560/I-7560U features a full set of RS-232 modem data and control signals (TxD, RxD, RTS, CTS, DSR, DTR, DCD, RI and GND) on it's PC compatible DB-9 male connector. It also features a high-speed 115200 bps transmission rate.

The I-7560/I-7560U is powered from the USB bus and no additional power supply is needed.

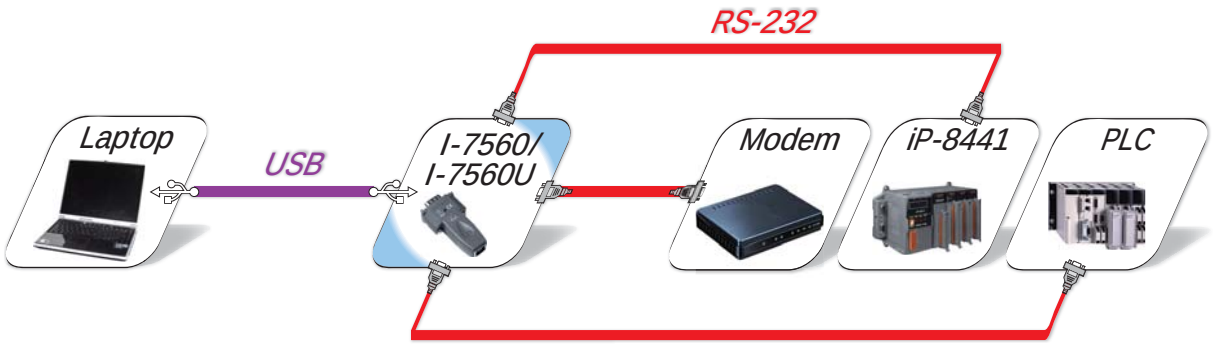
Software

I-7560 Driver	Windows 98/ME/2000/XP/Vista (32/64-bit)/7 (32/64-bit)/Linux
I-7560U Driver	Windows 98/ME/2000/XP/Vista (32/64-bit)/7 32/64-bit)/8 (32/64-bit)/8.1 (32/64-bit)/Linux

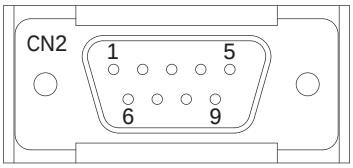
System Specifications

Models		I-7560	I-7560U
Interface			
USB		Fully Compliant with the USB 1.1/2.0/3.0	
RS-232		TxD, RxD, RTS, CTS, DSR, DTR, DCD, RI and GND; non-isolated	
Speed		300 ~ 115200 bps	300 ~ 921.6 kbps
Connector	RS-232	9-Pin Male D-Sub	
	USB	Type B	
Cable Included		CA-USB18 (1.8 m Cable) x 1	
LED Indicators			
Power		Yes	
Power			
Input Voltage Range		+5 V_{DC} from USB	
Power Consumption		0.3 W	
Mechanical			
Casing		Plastic	
Dimensions (W x H x D)		33 mm x 60 mm x 15 mm	
Environment			
Operating Temperature		-25 °C ~ +75 °C	
Storage Temperature		-30 °C ~ +75 °C	
Humidity		10 ~ 90% RH, non-condensing	

Applications

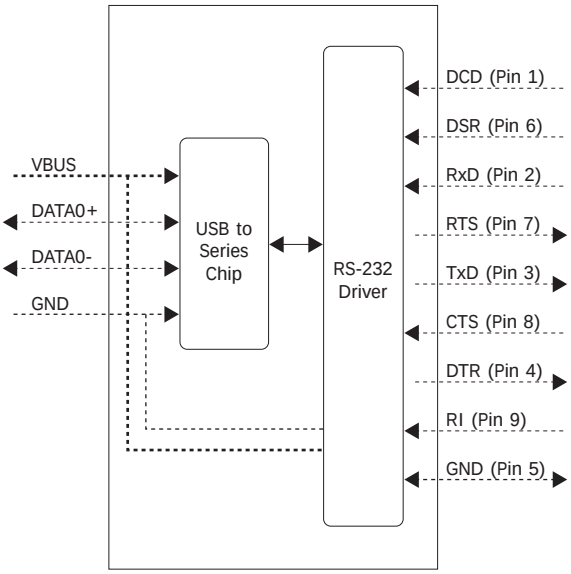


Pin Assignments

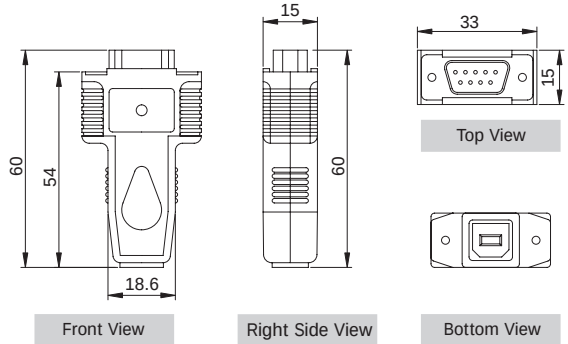


Pin	Signal		Mode
01	DCD	Data Carrier Detect	Input
02	RxD	Receive Data	Input
03	TxD	Transmit Data	Output
04	DTR	Data Term Ready	Output
05	GND	Ground	--
06	DSR	Data Set Ready	Input
07	RTS	Request To Send	Output
08	CTS	Clear To Send	Input
09	RI	Ring Indicator	Input

Internal I/O Structure



Dimensions (Units: mm)



Ordering Information

I-7560 CR	USB to RS-232 Converter (RoHS)
I-7560U CR	USB to RS-232 Converter (RoHS)

Accessories

USB-2560 CR	CA-USB18
Industrial 4-port USB 2.0 Hub	USB Type A to Type B Cable

tM-7561

USB to Isolated RS-485 Converter

Features

- Fully Compliant with the USB 1.1/2.0/3.0
- Power and data flow indicator for troubleshooting
- 2500 V_{DC} Isolation Protection on the RS-485 side
- Driver Supports Windows 98/ME/2000/XP/Vista (32/64-bit)/7 (32/64-bit)/8 (32/64-bit)/8.1 (32/64-bit)/Linux
- Tiny packaging fits on your DIN-Rail Mounting
- No External Power Supply required
- Automatic RS-485 Direction Control
- Operating Temperatures, -25 °C ~ +75 °C
- Low power consumption
- Cost-effective Converter

Introduction

The tM-7561 is a cost-effective USB to RS-485 converter. Connecting the tM-7561 to a PC, you get one RS-485 port that allows you to access RS-485 devices through the USB interface. Like the I-7520, the tM-7561 contains "Self-Tuner" chip auto-tunes the baud rate and data format to the RS-485 network. The tM-7561 module derives its power from the USB port and doesn't need external power adapter.

Comparison Table of Converter

Models Name	tM-7561	I-7561U	I-7561
Serial Interface	Only RS-485	RS-232/422/485	RS-232/422/485
Dimensions (W x H x D)	52 mm x 87 mm x 27 mm	72 mm x 115 mm x 35 mm	72 mm x 115 mm x 35 mm
Remarks	Cost-effective, Entry-level	Entry-level	Entry-level

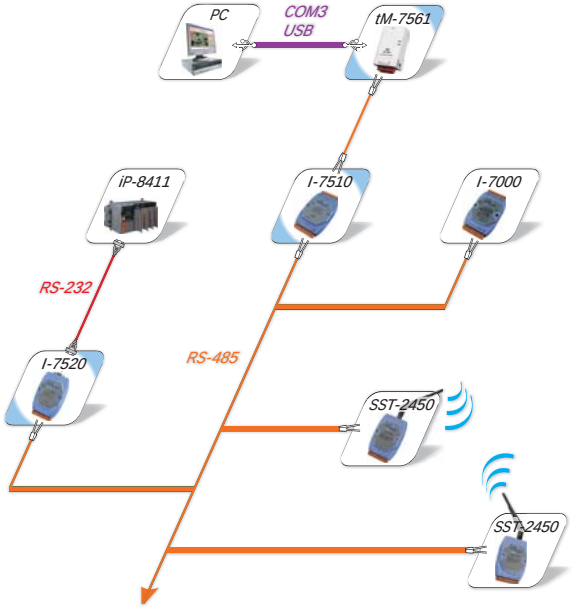
Software

Driver	Windows 98/ME/2000/XP/Vista (32/64-bit)/7 (32/64-bit)/8 (32/64-bit)/8.1 (32/64-bit)/Linux

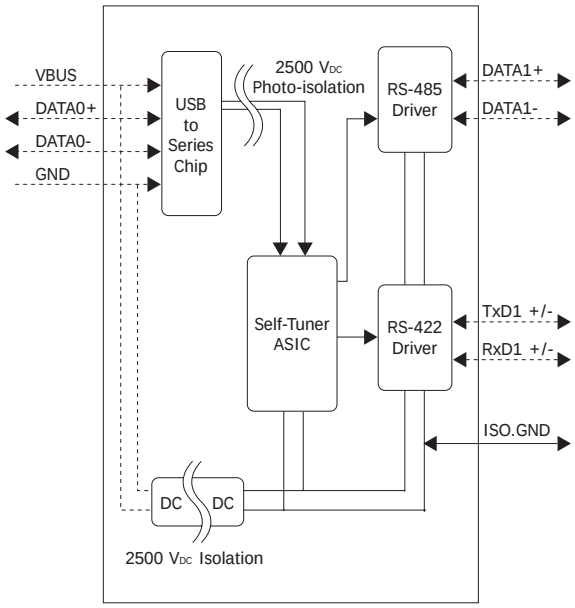
System Specifications

Models		tM-7561
Interface		
USB		Fully Compliant with the USB 1.1/2.0/3.0
Serial Interface	RS-422	–
	RS-485	Data+, Data-
Serial Interface Transmission Distance		Max. 1,200 m at 9.6 kbps; Max. 400 m at 115.2 kbps (Belden 9841 2P twisted-pair cable, if different cables are used, the transmission distance may change)
Self-Tuner Asic Inside		Yes
Speed		300 ~ 115200 bps
Connector	RS-422/485	Removable 7-Pin Terminal Block
	USB	Type B
Cable Included		CA-USB18 (1.8 m Cable) x 1
LED Indicators		
Power		Yes
Power		
Input Voltage Range		+5 V_{DC} from USB
Power Consumption		0.4 W
Mechanical		
Casing		Plastic
Dimensions (W x H x D)		52 mm x 87 mm x 27 mm
Installation		DIN-Rail Mounting
Environment		
Operating Temperature		-25 °C ~ +75 °C
Storage Temperature		-30 °C ~ +75 °C
Humidity		10 ~ 90% RH, non-condensing

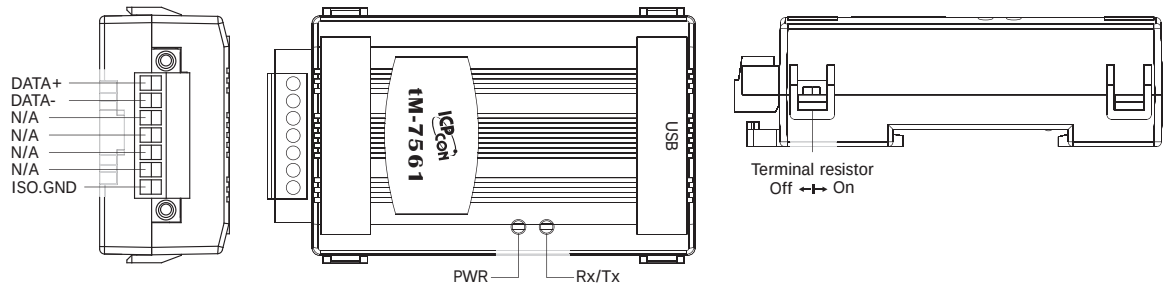
Applications



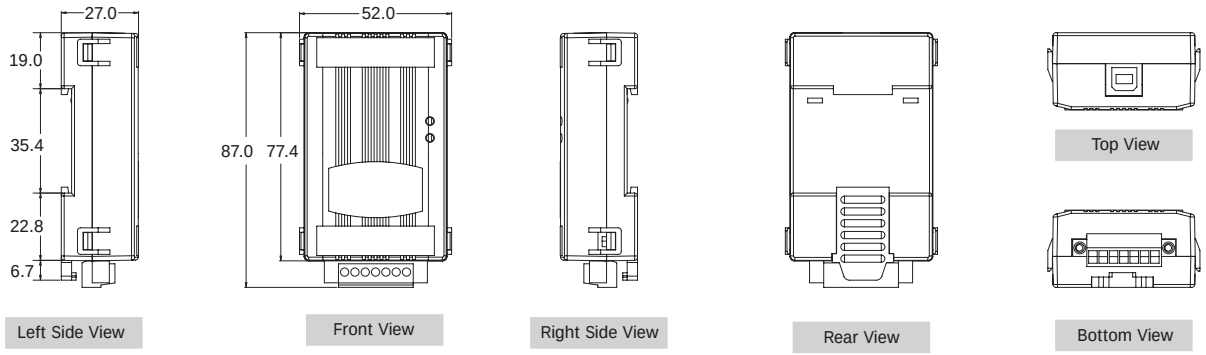
Internal I/O Structure



Pin Assignments



Dimensions (Units: mm)



Ordering Information

tM-7561 CR	USB to Isolated RS-485 Converter (RoHS)
Include Cable	CA-USB18 (1.8 m Cable) x 1

Accessories

USB-2560 CR	Industrial 4-port USB 2.0 Hub
CA-USB18	USB Type A to Type B Cable

I-7561

USB to Isolated RS-232/422/485 Converter

I-7561U NEW

USB to Isolated RS-232/422/485 Converter (Windows 8 / 8.1)

Features

- Fully Compliant with the USB 1.1/2.0/3.0
- 3000 VDC Isolation Protection on the RS-232/422/485 side
- ESD Protection for the RS-232/422/485 Data Line
- Transmission speed up to 921.6 kbps (For I-7561U)
- No External Power Supply required
- Automatic RS-485 Direction Control
- Operating Temperatures, -25 °C ~ +75 °C
- DIN-Rail Mounting

Introduction

The I-7561/I-7561U is a cost-effective module for transferring serial data via USB. It allows you to connect your serial devices to systems that use a USB interface. Connecting the I-7561/I-7561U to a PC, you get one RS-232/422/485 port. Like the I-7520A, the I-7561 contains "Self-Tuner" chip auto-tunes the Baud Rate and data format to the RS-485 network. The I-7561/I-7561U module derives its power from the USB port and doesn't need any power adapter.

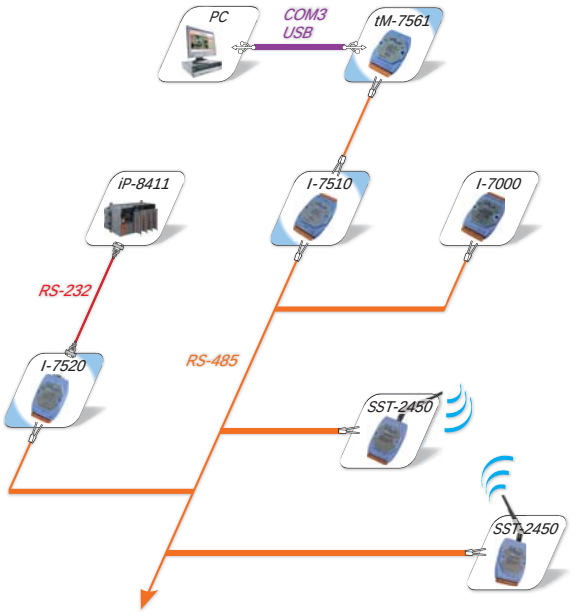
Software

I-7561 Driver	Windows 98/ME/2000/XP/Vista (32/64-bit)/7 (32/64-bit)/Linux
I-7561U Driver	Windows 98/ME/2000/XP/Vista (32/64-bit)/7 (32/64-bit)/8 (32/64-bit)/8.1 (32/64-bit)/Linux

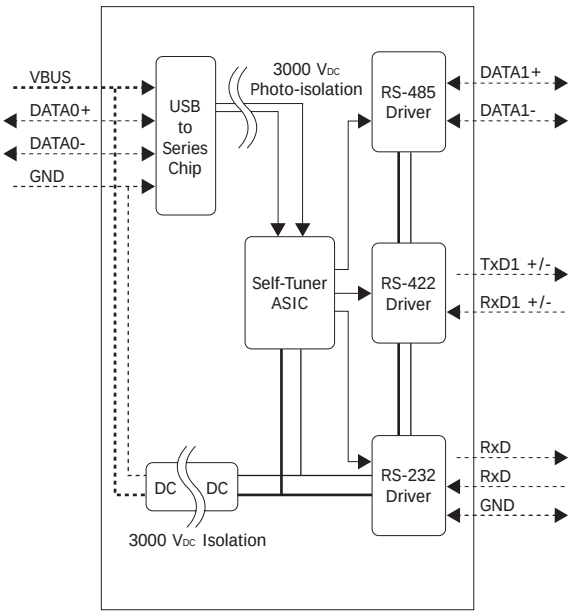
System Specifications

Models		I-7561	I-7561U
Interface			
USB		Fully Compliant with the USB 1.1/2.0/3.0	
Serial Interface	RS-232	The RS-232, RS-422 and RS-485 cannot be used simultaneously • TxD, RxD, GND • TxD+, TxD-, RxD+, RxD- • Data+, Data-	
	RS-422		
	RS-485		
RS-422/485 Transmission Distance		Max. 1,200 m at 9.6 kbps; Max. 400 m at 115.2 kbps (Belden 9841 2P twisted-pair cable, if different cables are used, the transmission distance may change)	
Self-Tuner Asic Inside (RS-485)		Yes	
Speed		300 ~ 115200 bps	300 ~ 921.6 kbps
Connector	RS-232/422/485	Removable 10-Pin Terminal Block	
	USB	Type B	
Cable Included		CA-USB18 (1.8 m Cable) x 1	
LED Indicators			
Power		Yes	
Power			
Input Voltage Range		+5 VDC from USB	
Power Consumption		0.5 W	
Mechanical			
Casing		Plastic	
Dimensions (W x H x D)		72 mm x 115 mm x 35 mm	
Installation		DIN-Rail Mounting	
Environment			
Operating Temperature		-25 °C ~ +75 °C	
Storage Temperature		-30 °C ~ +75 °C	
Humidity		10 ~ 90% RH, non-condensing	

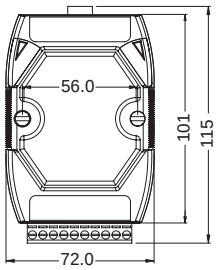
Applications



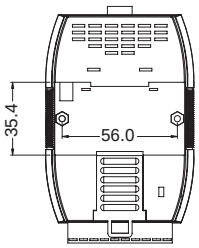
Internal I/O Structure



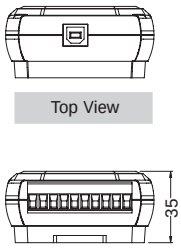
Dimensions (Units: mm)



Front View

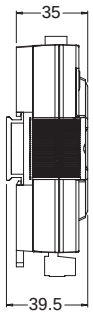


Rear View

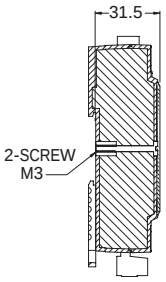


Top View

Bottom View



DIN-Rail Mounting Bracket



Side View

Pin Assignments

Terminal No.		Pin Assignment
RS-485	01	DATA+
	02	DATA-
RS-422/485	03	TxD+
	04	TxD-
	05	RxD+/DATA2+
	06	RxD-/DATA2-
RS-232	07	TxD
	08	RxD
	09	(B)GND
	10	(B)GND

Ordering Information

I-7561 CR	USB to Isolated RS-232/422/485 Converter (RoHS)
I-7561-G CR	USB to Isolated RS-232/422/485 Converter (Gray Cover) (RoHS)
I-7561U-G CR	USB to Isolated RS-232/422/485 Converter (Gray Cover) (RoHS)
Include Cable	CA-USB18 (1.8 m Cable) x 1

Accessories

USB-2560 CR	Industrial 4-port USB 2.0 Hub
CA-USB18	USB Type A to Type B Cable

I-7563

USB to Isolated RS-485 Active Star Wiring Converter

I-7563U NEW

USB to Isolated RS-485 Active Star Wiring Converter (Windows 8 / 8.1)

I-7563/I-7563-G I-7563U-G

Features

- Fully Compliant with the USB 1.1/2.0/3.0
- RS-485 Active Star Wiring Applications
- 3000 V_{DC} Isolation Protection on the RS-485 side
- Transmission speed up to 921.6 kbps (For I-7563U)
- No External Power Supply required
- Automatic RS-485 Direction Control
- ESD Protection for the RS-485 Data Line
- Operating Temperatures, -25 °C ~ +75 °C
- DIN-Rail Mounting

Introduction

The I-7563/I-7563U is a cost-effective module for transferring serial data via USB. It allows you to connect your serial devices to systems that use a USB interface. Connecting the I-7563/I-7563U to a PC, you get one COM port on system. The I-7563/I-7563U contains "Self-Tuner", this chip auto-tunes the Baud Rate and data format to the RS-485 network. The I-7563/I-7563U module derives its power from the USB port and doesn't need any power adapter.

Do you have any RS-485 wiring problems I-7563/I-7563U is a USB to 1-channel RS-485 converter with a 3-way RS-485 Hub. Each channel contains its own RS-485 driver IC, so it can support star-shaped wiring.

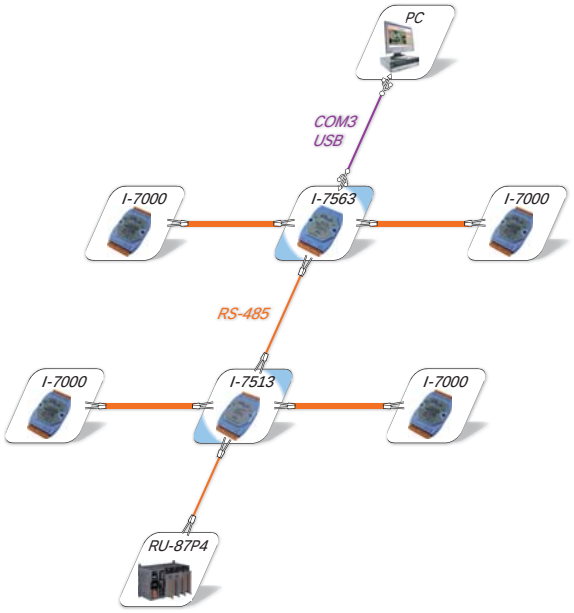
Software

I-7563 Driver	Windows 98/ME/2000/XP/Vista (32/64-bit)/7 (32/64-bit)/Linux
I-7563U Driver	Windows 98/ME/2000/XP/Vista (32/64-bit)/7 (32/64-bit)/8 (32/64-bit)/8.1 (32/64-bit)/Linux

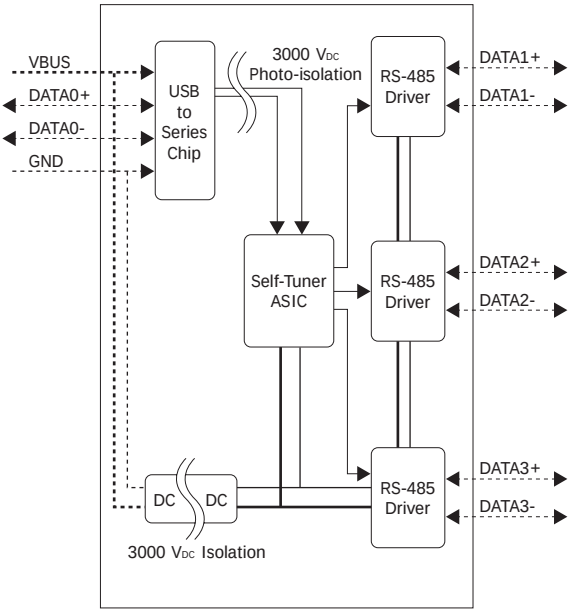
System Specifications

Models		I-7563	I-7563U
Interface			
USB		Fully Compliant with the USB 1.1/2.0/3.0	
RS-485		3 Channels: For active star wiring applications	
		Data1+, Data1-	
		Data2+, Data2-	
		Data3+, Data3-	
RS-485 Transmission Distance		Max. 1,200 m at 9.6 kbps; Max. 400 m at 115.2 kbps (Belden 9841 2P twisted-pair cable, if different cables are used, the transmission distance may change)	
Self-Tuner Asic Inside for RS-485		Yes	
Speed		300 ~ 115200 bps	300 ~ 921.6 kbps
Connector	RS-485	Removable 10-Pin Terminal Block	
	USB	Type B	
Cable Included		CA-USB18 (1.8 m Cable) x 1	
LED Indicators			
Power		Yes	
Power			
Input Voltage Range		+5 V_{DC} from USB	
Power Consumption		0.5 W	
Mechanical			
Casing		Plastic	
Dimensions (W x H x D)		72 mm x 115 mm x 35 mm	
Installation		DIN-Rail Mounting	
Environment			
Operating Temperature		-25 °C ~ +75 °C	
Storage Temperature		-30 °C ~ +75 °C	
Humidity		10 ~ 90% RH, non-condensing	

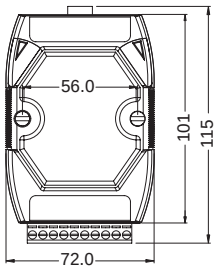
Applications



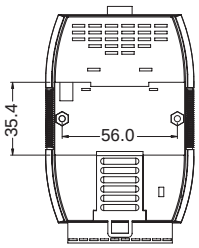
Internal I/O Structure



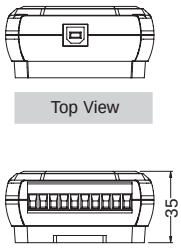
Dimensions (Units: mm)



Front View

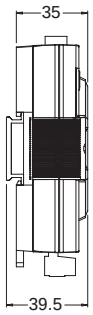


Rear View

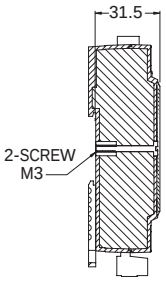


Top View

Bottom View



DIN-Rail Mounting Bracket



Side View

Pin Assignments

Terminal No.		Pin Assignment
RS-485	01	DATA3-
	02	DATA3+
	03	--
RS-485	04	DATA2-
	05	DATA2+
	06	--
	07	--
	08	--
RS-485	09	DATA1-
	10	DATA1+

Ordering Information

I-7563 CR	USB to Isolated RS-485 Active Star Wiring Converter (RoHS)
I-7563-G CR	USB to Isolated RS-485 Active Star Wiring Converter (Gray Cover) (RoHS)
I-7563U-G CR	USB to Isolated RS-485 Active Star Wiring Converter (Gray Cover) (RoHS)
Include Cable	CA-USB18 (1.8 m Cable) x 1

Accessories

USB-2560 CR	Industrial 4-port USB 2.0 Hub
CA-USB18	USB Type A to Type B Cable

4-7. RS-232/422/485 to Fiber Optic Converter

I-2541

RS-232/422/485 to Multi-Mode Fiber optic converter

I-2542 series NEW

RS-232/422/485 to Single-Mode Fiber optic converter

Features

- Automatic RS-485 Direction Control
- Avoids lightning strikes and EMI/RFI interference
- Supports +10 V_{DC} ~ +30 V_{DC}
- DIN-Rail Mounting
- ESD Protection for the RS-232/422/485 Data Line
- Optical fibers enable transmission: 2 km for I-2541
  15 km for I-2542-A/I-2542-B
  25 km for I-2542-A25/I-2542-B25
- Supports operating temperatures from -25 °C ~ +75 °C

Introduction

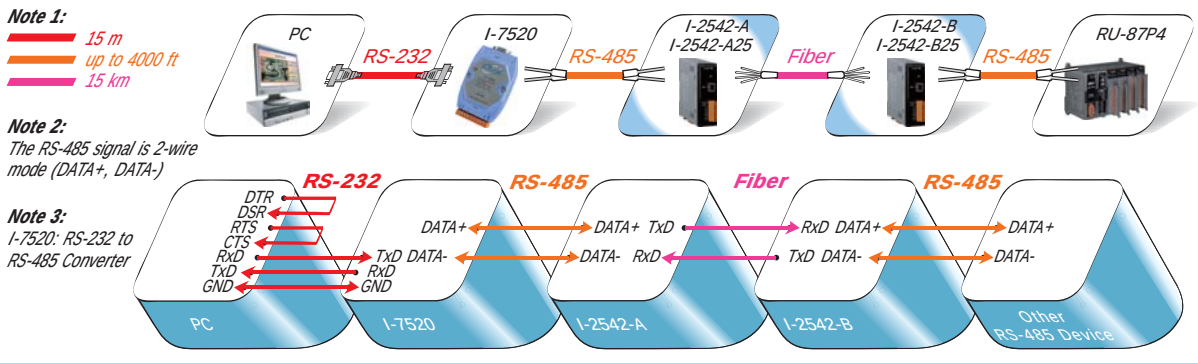
The I-2541 is an RS-232/422/485 to fiber optic converter that secures data transmission by using fiber optic transmission to provide immunity from EMI/RFI interference. The I-2541 is used for RS-232/422 point-to-point connections and RS-485 multi-drop applications for transmitting a signal up to 2 km and is the perfect solution for applications where transmission must be protected from electrical exposure, surges or chemical corrosion.
The I-2542 series of Single-Strand Fiber Converters supports Wavelength Division Multiplexing (WDM) technology that allows two independent data communication channels to transmit and receive over one standard, single mode, fiber optic line. This not only doubles your existing bandwidth, but also effectively reduces the cost of creating a new fiber optic infrastructure.

System Specifications

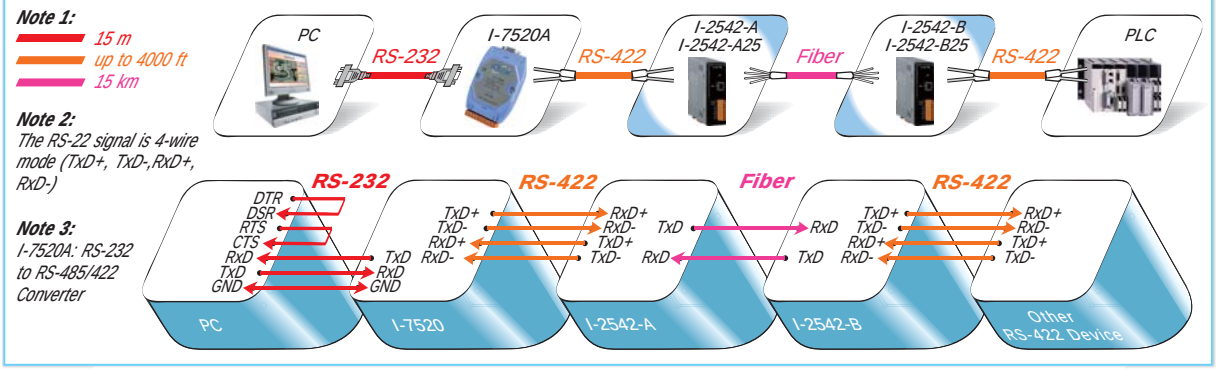
Models			I-2541	I-2542 series
Interface				
Fiber Interface	Fiber Port		Multi-Mode; ST connector	Single-Mode; SC connector
	Wavelength		850 nm	TX: 1310, RX: 1550 nm for I-2542-A/I-2542-A25 TX: 1550, RX: 1310 nm for I-2542-B/I-2542-B25
	Fiber Cable		50/125, 62.5/125, 100/140 µm	8.3/125, 8.7/125, 9/125 or 10/125 µm
	Distance		2 km, (62.5/125 µm recommended)	15 km for I-2542-A/I-2542-B 25 km for I-2542-A25/I-2542-B25 (9/125 µm recommended)
Serial Interface	RS-232	The RS-232, RS-422 and RS-485 cannot be used simultaneously	TxD, RxD, GND	
	RS-422		TxD+, TxD-, RxD+, RxD-	
	RS-485		Data+, Data-	
RS-422/485 Transmission Distance			Max. 1,200 m at 9.6 kbps; Max. 400 m at 115.2 kbps (Belden 9841 2P twisted-pair cable, if different cables are used, the transmission distance may change)	
Self-Tuner Asic Inside			Yes	
Speed			300 ~ 115200 bps	1200 ~ 115200 bps
ESD Protection			Yes	
RS-232/422/485 Connector			Removable 8-Pin Terminal Block	
LED Indicators				
Power			Yes	
Power				
Input Voltage Range			+10 V_{DC} ~ +30 V_{DC} (Non-isolated)	
Power Consumption			1.5 W	2 W
Mechanical				
Casing			Plastic	
Dimensions (W x L x H)			33 mm x 89 mm x 107 mm	33 mm x 88 mm x 107 mm
Installation			DIN-Rail Mounting	
Environment				
Operating Temperature			-25 °C ~ +75 °C	
Storage Temperature			-30 °C ~ +75 °C	
Humidity			10 ~ 90% RH, non-condensing	

Applications

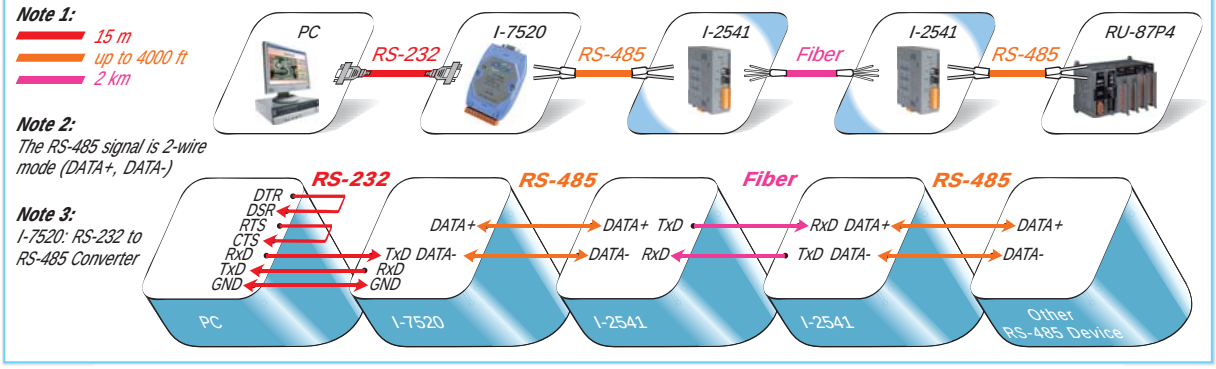
An illustration of the I-2542 for RS-485 Devices



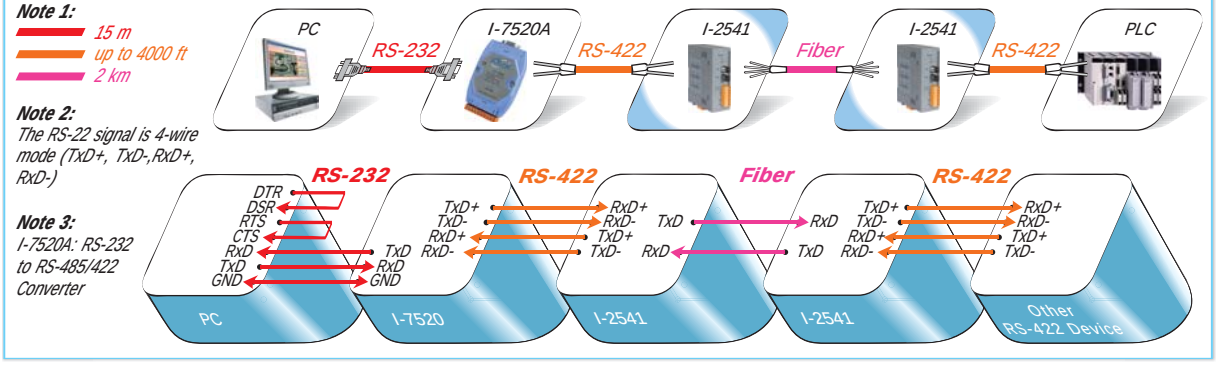
An illustration of the I-2542 for RS-422 Devices



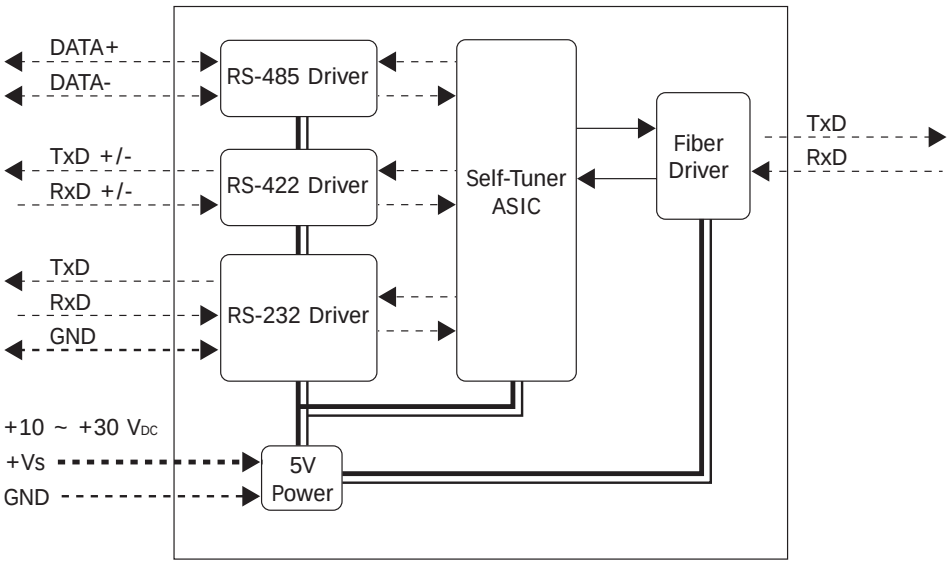
An illustration of the I-2541 for RS-485 Devices



An illustration of the I-2541 for RS-422 Devices

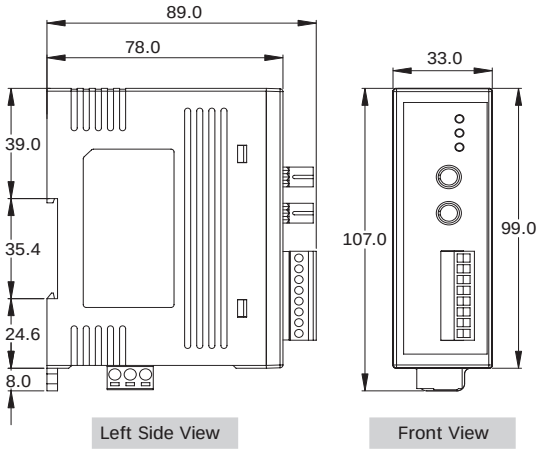


Internal I/O Structure

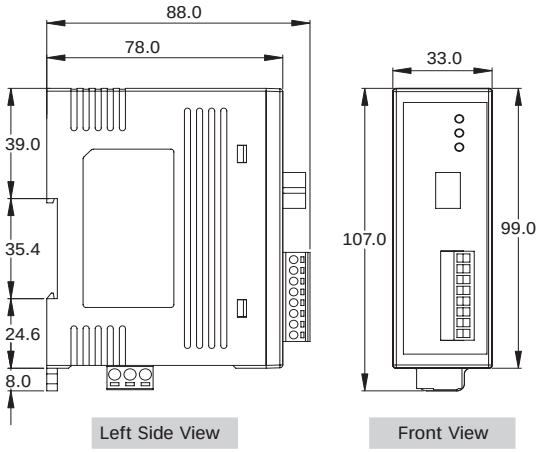


Dimensions (Units: mm)

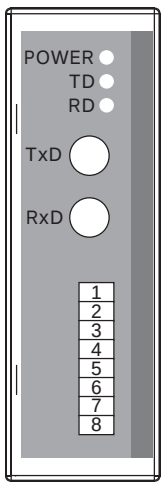
I-2541



I-2542 series



Pin Assignments



Terminal No.	Pin Assignment
TxD	Fiber TxD
RxD	Fiber RxD
01	TxD+/DATA+
02	TxD-/DATA-
03	RxD+
04	RxD-
05	NC
06	GND
07	TxD
08	RxD

Ordering Information

I-2541 CR	RS-232/422/485 to Multi-Mode 2 Km, ST Fiber optic converter
I-2542-A CR	RS-232/422/485 to Single-Mode 15 Km, SC Fiber optic converter, TX 1310 nm, RX 1550 nm (RoHS)
I-2542-B CR	RS-232/422/485 to Single-Mode 15 Km, SC Fiber optic converter, TX 1550 nm, RX 1310 nm (RoHS)
I-2542-A25 CR	RS-232/422/485 to Single-Mode 25 Km, SC Fiber optic converter, TX 1310 nm, RX 1550 nm (RoHS)
I-2542-B25 CR	RS-232/422/485 to Single-Mode 25 Km, SC Fiber optic converter, TX 1550 nm, RX 1310 nm (RoHS)

Important Note:
You must purchase both **I-2542-A/I-2542-A25** and **I-2542-B/I-2542-B25** since these products work as a pair.

Accessories

GPSU06U-6	24 VDC/0.25 A, 6 W Power Supply
DIN-KA52F	24 VDC/1.04 A, 25 W Power Supply with DIN-Rail Mounting

4.8. RS-232/RS-485/USB to DALI Gateway

DGW-521 NEW

RS-232/RS-485/USB to DALI Gateway

Features

- Conversion between RS-485/RS-232/USB and DALI Interfaces
- ±4 ESD Protection for the RS-232/485/USB Data Line
- Built-in DALI Power can be enabled or disabled using a Switch
- ±4 kV EFT Protection and ±2 kV Surge Protection for the Power Line
- Simplified Wiring Process
- 1500 VDC Isolation
- DIN-Rail Mounting
- Wide Operating Temperature Range: -25 °C ~ +75 °C

Introduction

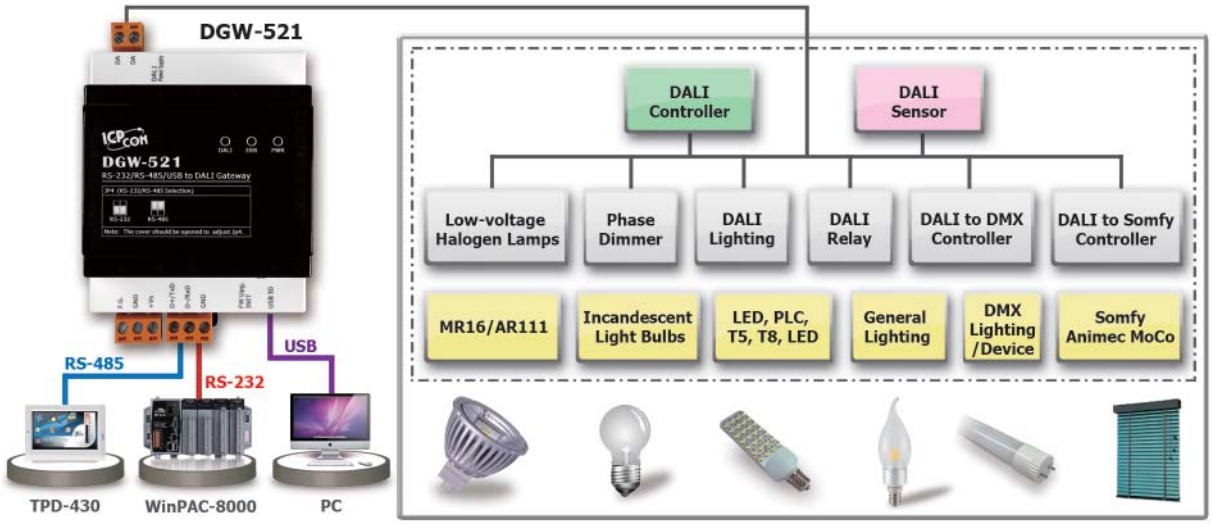
The DGW-521 is a communication gateway between the Modbus RTU/DCON and the DALI (Digital Addressable Lighting Interface) protocols, and allows a Host PC, PAC, or TouchPAD to access DALI devices by providing three interfaces that enable conversion from RS-232/RS-485/USB to DALI. The module provides a built-in DALI power supply that can be enabled or disabled via a switch. DALI is an international standard for lighting control interfaces, and is suitable for DALI lighting systems covering small areas. The maximum length of the DALI signal cables cannot exceed 300 m.

System Specifications

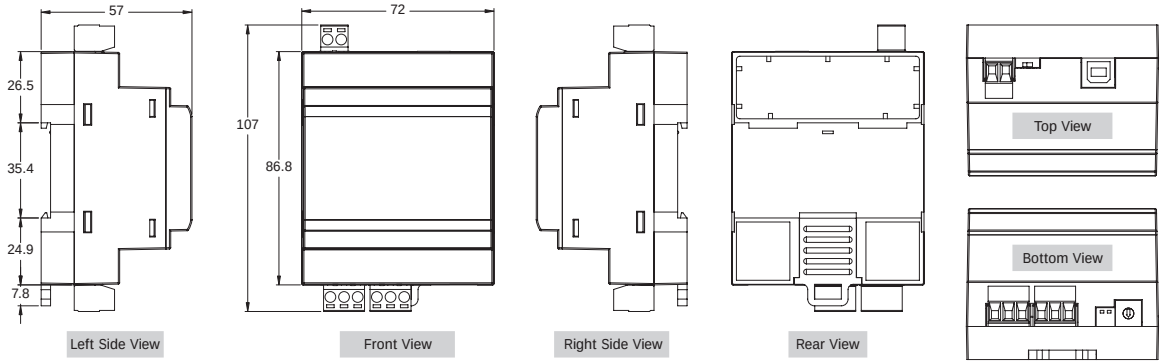
Model		DGW-521
Interface		
DALI	Connector	2-pin Terminal Block
	Baud Rate (bps)	1200
	Isolation	1500 VDC
	Built-in DALI power	16 VDC ±5%, Max. Current 250 mA (Enabled/Disabled via a switch)
UART	COM Port	RS-485/RS-232
	Connector	3-pin Terminal Block (D+, D-, GND/TxD, RxD, GND), Jumper Selectable
	Transmission Distance (m)	Depends on Baud Rate
	Baud Rate (bps)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
	Protocol	DCON, Modbus RTU
USB	Connector	USB Type B
	Transmission Speed	12M bps
	Specification	USB 1.1 and USB 2.0 standard compatible
	OS Support	Windows XP (32/64-bit), Windows 7 (32/64-bit)
	Protocol	DCON and Modbus RTU via Virtual COM port
LED Indicators		
System LED Indicators		PWR/RUN/ERR LED
EMS Protection		
ESD (IEC 61000-4-2)		±4 kV Contact for Each Terminal, ±8 kV Air for Random Point
EFT (IEC 61000-4-4)		±4 kV for Power Line
Surge (IEC 61000-4-5)		±2 kV for Power Line
Power		
Power Supply		Unregulated +10 VDC ~ +30 VDC
Connector		3-pin Terminal Block
Protection		Power Reverse Polarity Protection, Overvoltage Brown-out Protection
Power Consumption		6 W

Model	DGW-521
Mechanical	
Casing	Plastic
Dimensions (L x W x H)	107 mm x 72 mm x 57 mm
Installation	DIN-Rail Mounting
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +80 °C
Humidity	10 ~ 90% RH, Non-condensing

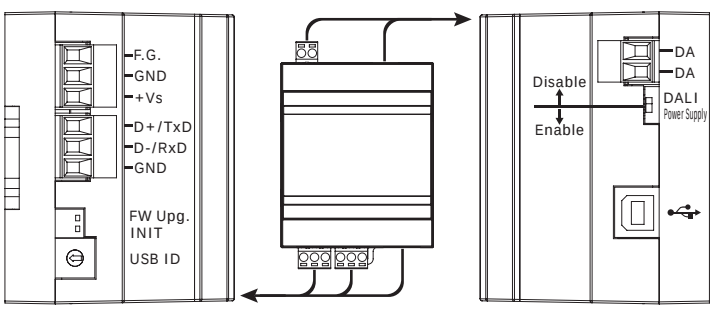
Applications



Dimensions (Units: mm)



Pin Assignments



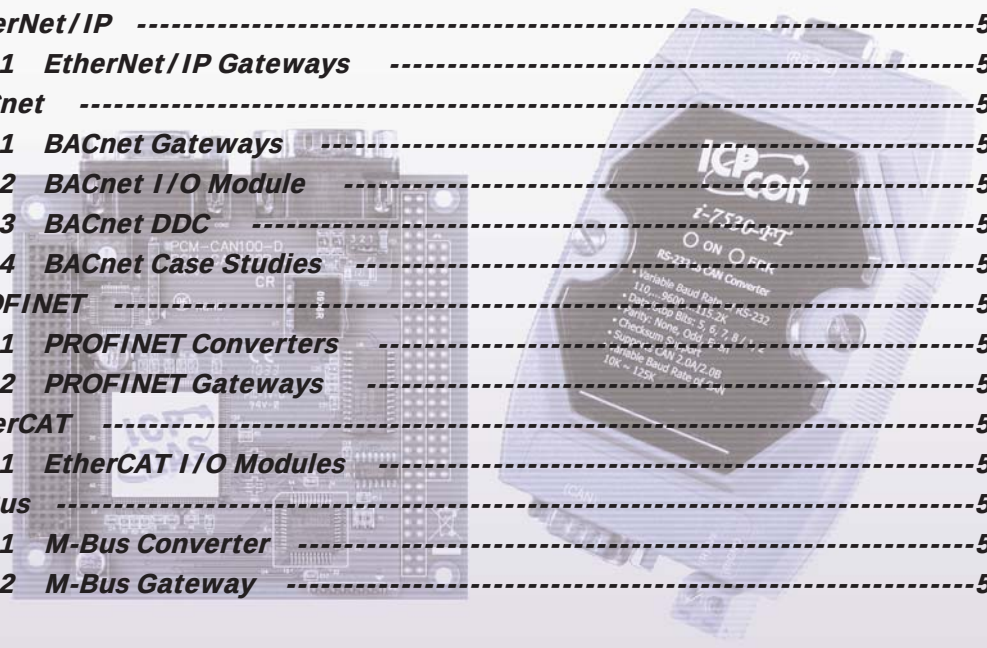
Ordering Information

DGW-521 CR	RS-232/RS-485/USB to DALI Gateway (RoHS)

Accessories

GPSU06U-6	24 VDC /0.25 A, 6 W Power Supply
DIN-KA52F	24 VDC /1.04 A, 25 W Power Supply with DIN-Rail Mounting

Fieldbus Solutions



5-1 Overview

Fieldbus is an industrial network system for real-time distributed control. It is a way to connect instruments in a manufacturing plant. Fieldbus works on a network structure which typically allows daisy-chain, star, ring, branch, and tree network topologies. Fieldbus reduces both the length and the number of cables required. Fieldbus has many major advantages to all applications of automation. The technology of fieldbus is mature and well accepted in various fields in markets. ICP DAS has focused on these fieldbus products for several years and offers various fieldbus solutions in different industrial applications, covering the entire scope of process and manufacturing automation: CAN bus, CANopen, DeviceNet, J1939, PROFIBUS, HART, M-Bus, EtherNet/IP and BACnet applications.

ICP DAS's Fieldbus Development Services group has been involved in the design and development of industrial fieldbus and industrial Ethernet products for several years. Besides providing the various fieldbus products, the rich experience and expertise helps the customer to arrange the proper system architecture and to solve the problems occurred during setting up a system. By using the certificated IC and certificated tool, all products are reliable and compatible with other manufacturers' products.

Solutions for Fieldbus and industrial Ethernet

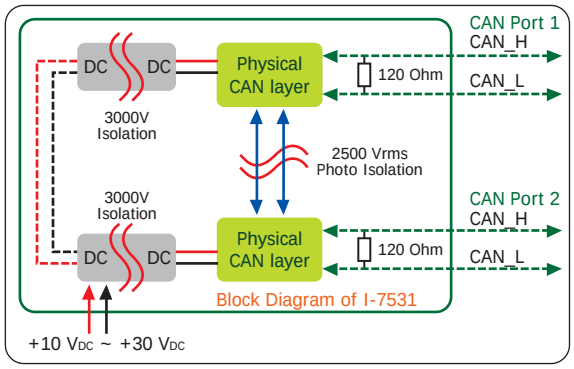
In order to solve various communication problems in different fieldbus and industrial Ethernet applications, ICP DAS provides converters, gateways, PC based, and PAC based solutions of fieldbus and industrial Ethernet for users. Users can choose corresponding solutions depending on various field applications.

User-friendly software and tools

ICP DAS has developed a large numbers of user-friendly and convenient libraries and development tools based on VB, VC, BCB, Delphi, VB.Net, and C#.Net that enable users to develop custom applications for these Fieldbus products. For SCADA software, we also provide InduSoft, LabVIEW, and DASYLab drivers. For real time applications, the RTX driver is also useful. Those features provide the necessary resources to allow you to efficiently establish or debug your system.

High protection hardware design

In order to protect against harsh environments, many protection mechanisms are built in to the hardware, such as galvanic isolation, photocoupler isolation, power reverse polarity protection, over-voltage brown-out protection, EMI, ESD, EFT, surge protection, and so forth. All ICP DAS products are certified as CE and FCC compliant.



ODM and Technology Service

ICP DAS has been focused on Fieldbus products for several years to accumulate rich development experience on that and announce a variety of new Fieldbus projects for different applications. Whether it is software or hardware, ICP DAS always provides the best product for our customers.

Perfect for Harsh Environments

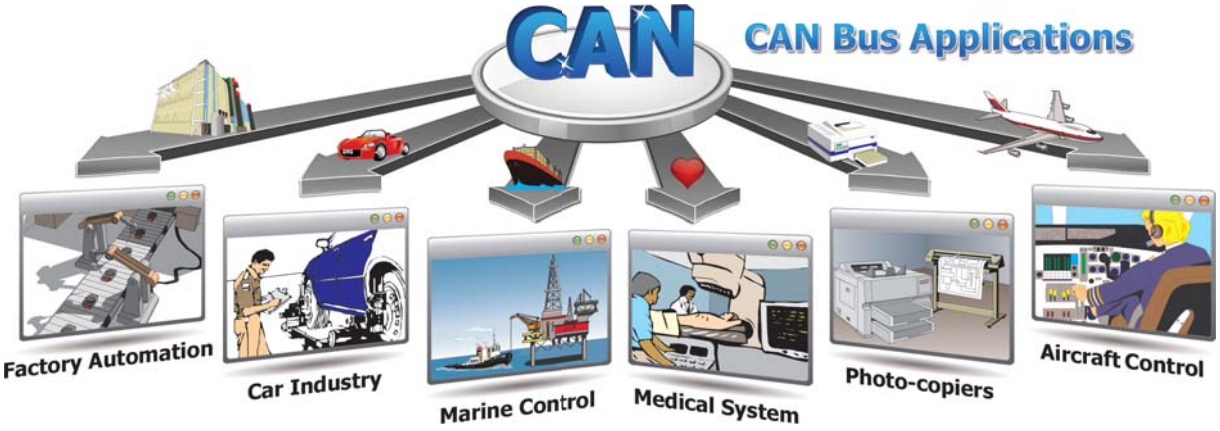
ICP DAS products can be operated in a wide range of temperatures and humidity levels, providing you with high reliability.

RoHS and WEEE Directive

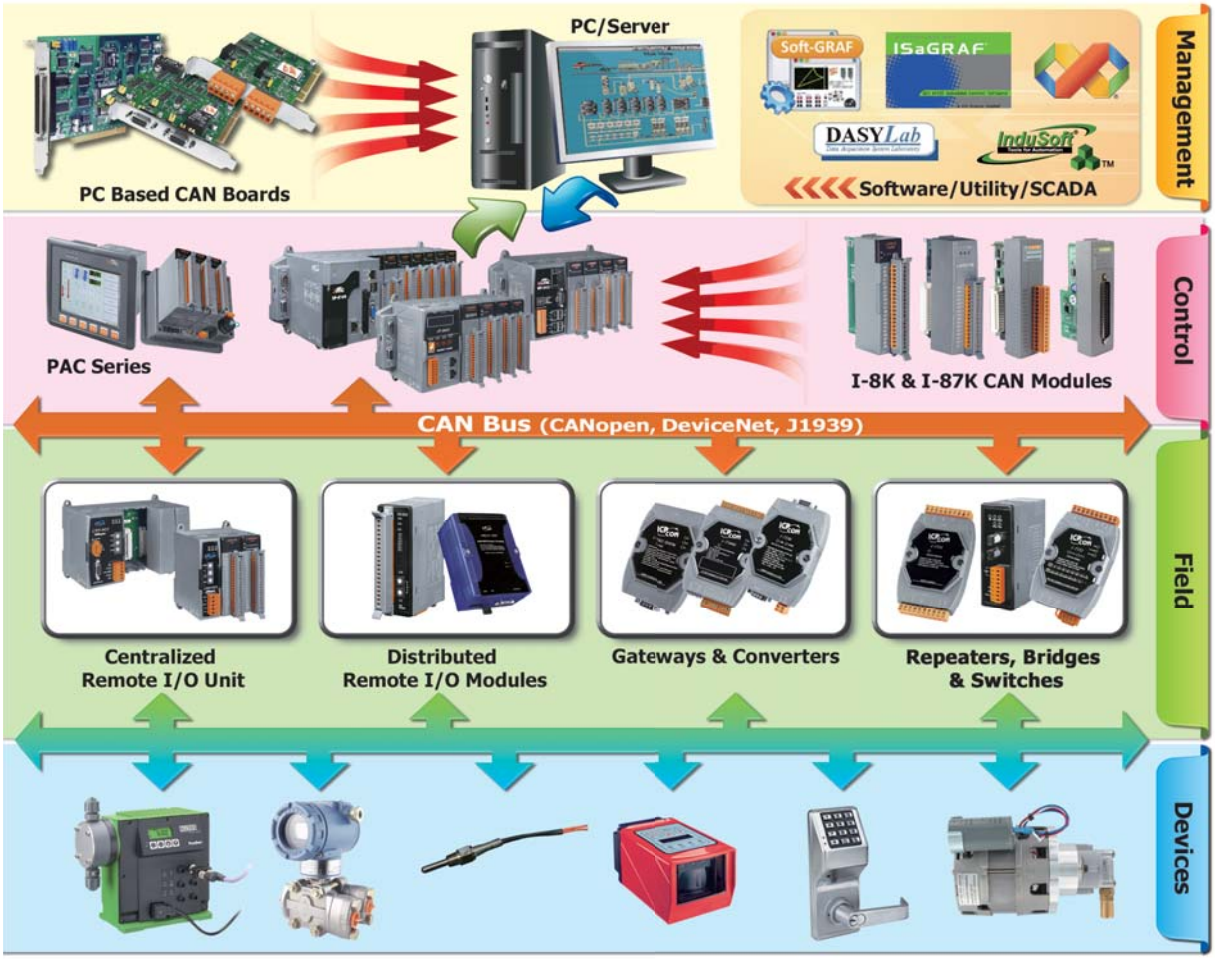
ICP DAS will support customers by providing RoHS compliant products for many existing products together with new products. However in some OEM cases outside the scope of the RoHS Directive, we will also maintain normal supplies of lead-based products for customers placing their electrical and electronic equipment onto the market without EU. ICP DAS identifies lead-free RoHS compliant products using a unique part number and by adding a CR to the product name.

DIN-Rail Mounting

5-2 CAN Bus (CANopen/DeviceNet/J1939)



ICP DAS has been developing rich **CAN-based/DeviceNet/CANopen/J1939** products for more than 10 years, including PCI interface cards, Fieldbus converters, PACs, gateways and remote I/O modules. We provide complete hardware solutions to satisfy a wide variety of CAN-based applications that can effectively solve issues related of data acquisition and calculation, transmission distance extension, network topology limitations, communication interface transformation, and noise resistance. In addition, ICP DAS supplies a large ranges of software resource, such as utility tools, APIs, demo programs, OPC, ActiveX and third-party drivers, which can help users to develop complex custom control and monitoring systems more easily and quickly. For certain special applications, we can offer flexible OEM/ODM projects to match the different requirements of our customers. Through ICP DAS's efficient and reliable service, you can easily complete your complex CAN-based projects.

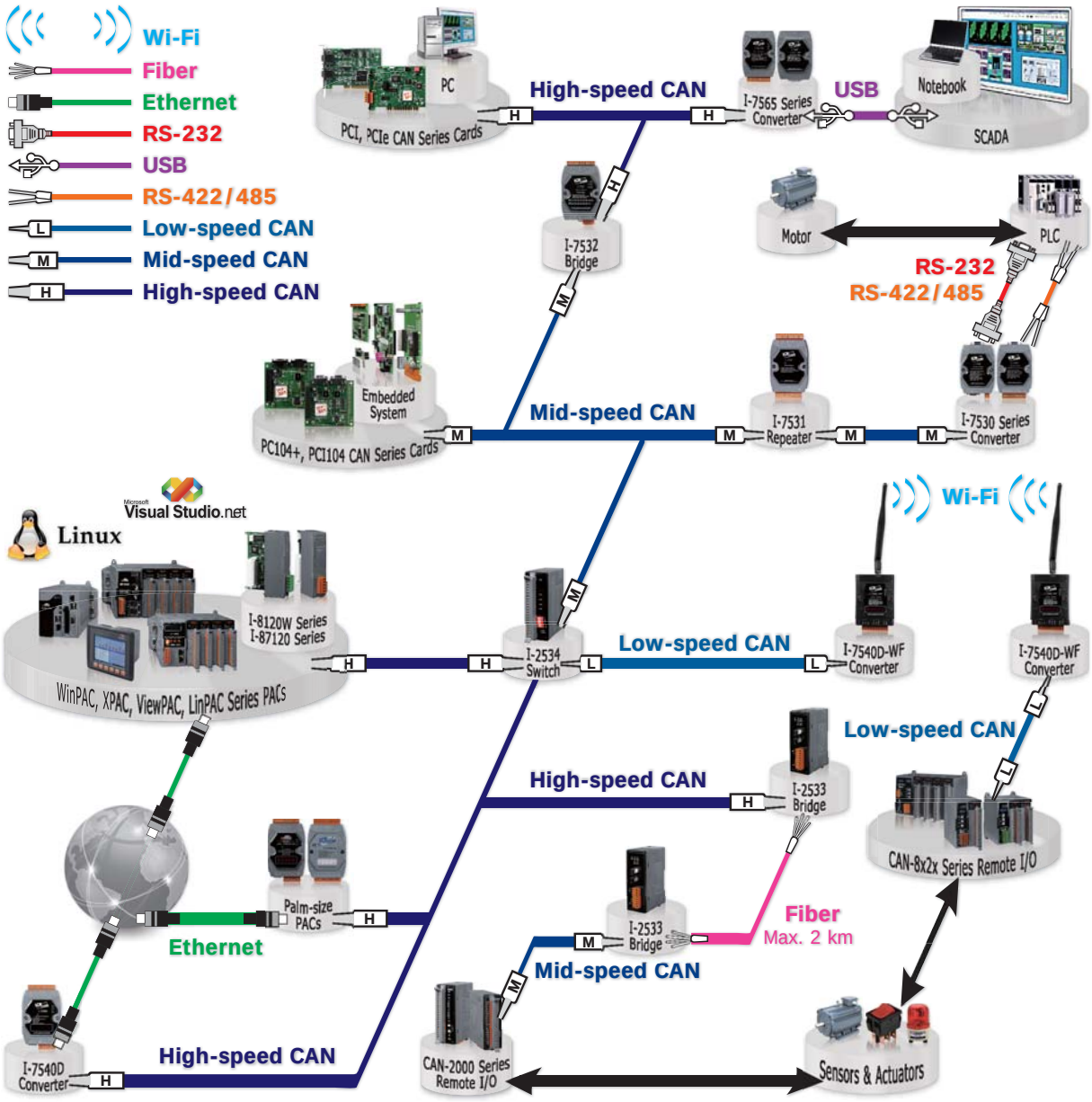


CAN Bus Introduction

ICP DAS has been developing various CAN products for several years, including PCI interface cards, converters, PACs and expansion modules. ICP DAS holds CAN conference, exhibition and training course all of the world. We also help customers to resolve various CAN technology problems. In addition, we can provide CAN bus solutions for our customers.

CAN Bus Features

- **Multi-master**
  When the CAN bus is idle, any unit which wants to send a CAN message may start to transmit a message at the same time. Therefore, the multi-master architecture can be realized easily without message conflict. The unit with the message of highest priority to be transmitted gains bus access.
- **Safety**
  In order to achieve the utmost safety of data transfer, powerful measures for error detection, signaling and self-checking are implemented in every CAN node.
- **Priorities**
  The CAN IDENTIFIER defines a static message priority during bus access.
- **Arbitration**
  If two or more nodes start transmitting messages at the same time, the arbitration mechanism is applied to guarantee that one of these messages can be sent successfully according to the priority.

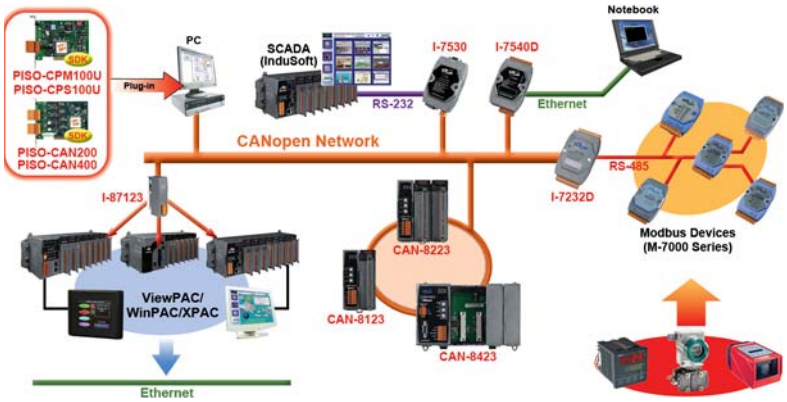


CANopen Introduction

CANopen is a kind of network protocol based on CAN bus and has been used in various applications, such as vehicles, industrial machines, building automation, medical devices, maritime applications, restaurant appliances, laboratory equipment & research.

ICP DAS has been developing CAN-based CANopen protocol products for several years. Our products include PCI interface boards, gateway modules, CANopen remote I/O and CANopen module for ICP DAS's ViewPAC/WinPAC/XPAC.

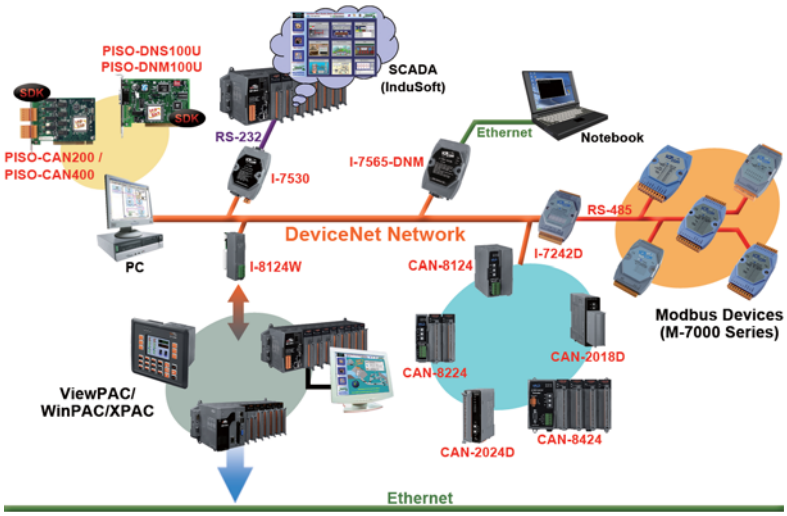
We also help customers solving various CANopen network technology problems. In addition, we can provide comprehensive CANopen solutions for users.



DeviceNet Introduction

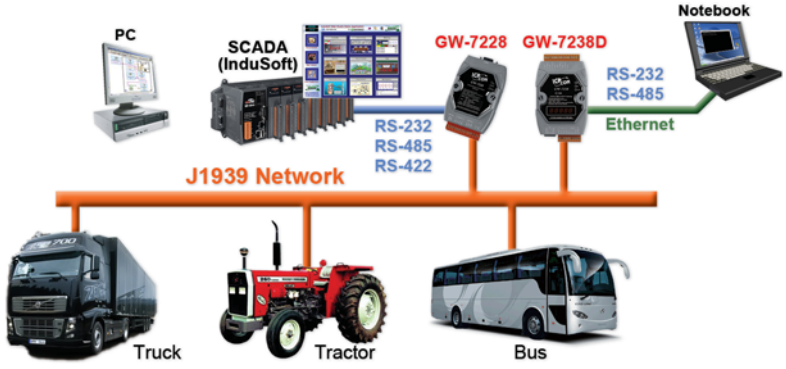
DeviceNet based on the CAN bus is one of the world's leading device-level networks for industrial automation. In fact, more than 40% of end users surveyed by independent industry analysis report choose DeviceNet over other networks.

ICP DAS has been developing CAN-based DeviceNet protocol products for several years, include PCI interface boards, gateway modules, DeviceNet remote I/O and DeviceNet modules for ICP DAS's PACs, ViewPAC/WinPAC/XPAC series main control unit. We also help customers resolving various DeviceNet network technology problems. In addition, we can provide DeviceNet solutions for users. ICP DAS also holds DeviceNet conferences, exhibitions and training courses all over the world.



J1939 Introduction

SAE J1939 is the vehicle bus standard for communication and diagnostics among vehicle components, originally by the car and heavy duty truck industry in the United States. Because of the success of applying in vehicles, J1939 has become the accepted industry standard and the vehicle network technology of choice for off-highway machines in applications such as construction, material handling, and forestry machines. It is a higher-layer protocol based on Controller Area Network (CAN), which provides serial data communications between microprocessor systems (ECU) in any kind of heavy duty vehicles. The messages exchanged between these units can be the vehicle road speed, torque control message from the transmission to the engine, oil temperature, and so forth.



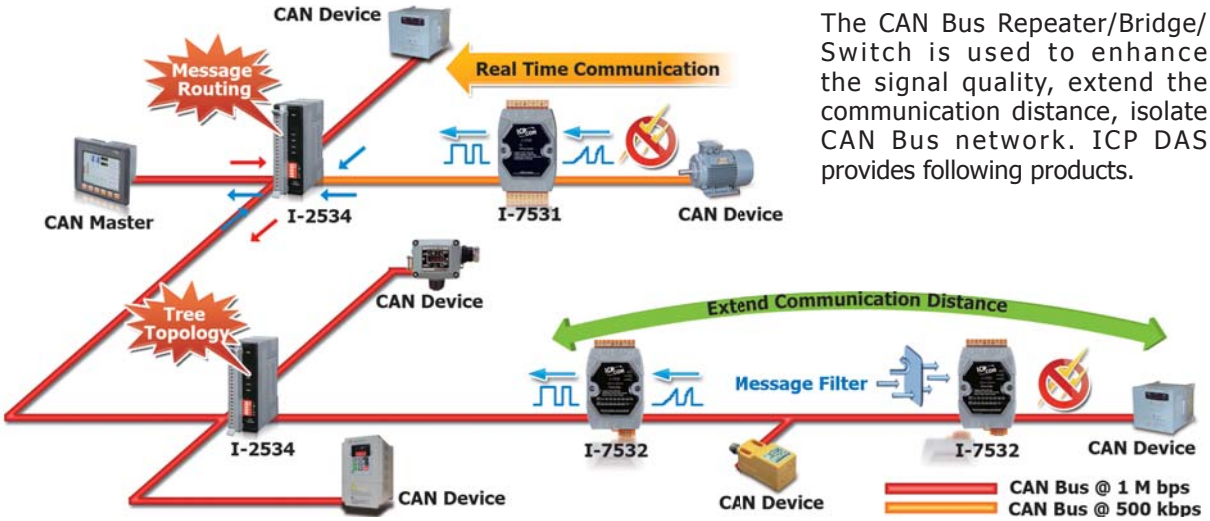
Selection Guide

▲ Available soon

Models			Description
CAN Bus Repeater/Bridge/Switch		I-7531	Isolated CAN Bus Repeater
		I-7532	Isolated Two-channel CAN Bus Bridge
		I-2534	4-Port CAN Bus Switch
		I-5534-M	4-Port CAN Bus Switch with Metal Casing
CAN Converter	USB to CAN Converter	I-7565	1-Port Cost Effective USB to CAN Converter
		I-7565-H1	1-Port High Performance USB to CAN Converter
		I-7565-H2	2-Port High Performance USB to CAN Converter
		I-7565-CPM	Intelligent USB to CANopen Converter
		I-7565-DNM	Intelligent USB to DeviceNet Converter
	CAN to Fiber Converter/Bridge	I-2532	CAN to Multi-mode Fiber Converter
		I-2533	CAN to Multi-mode Bridge
		I-2533CS/ I-2533CS-60	CAN to Single-mode Fiber Bridge with 1-port SC Duplex Fiber connector
		I-2533CS-A/I-2533CS-B	CAN to Single-mode Fiber Bridge with 1-port SC Fiber connector
	Ethernet/Wi-Fi to CAN Converter	I-7540D-MTCP	Modbus TCP to CAN Converter
		I-7540D	Ethernet to CAN Converter
		I-7540D-WF	Wi-Fi to CAN Converter
	Uart to CAN Converter	I-7530-FT	RS-232 to Fault-Tolerance CAN Converter
		I-7530	RS-232 to CAN Converter
		tM-7530	Tiny RS-232 to CAN Converter
		I-7530A	RS-232/422/485 to CAN Converter
		I-7530A-MR	Modbus RTU to CAN Converter
Gateway/Protocol Converter	CANopen Gateway	I-7231D	CANopen Slave to DCON Master Gateway
		I-7232D	CANopen Slave to Modbus RTU Master Gateway
		GW-7433D	Modbus TCP/RTU Slave to CANopen Master Gateway
	DeviceNet Gateway	I-7241D	DeviceNet Slave to DCON Master Gateway
		I-7242D	DeviceNet Slave to Modbus RTU Master Gateway
		GW-7243D	DeviceNet Slave to Modbus TCP/RTU Master Gateway
		GW-7434D	Modbus TCP/RTU Slave to DeviceNet Master Gateway
	J1939 Gateway	GW-7228	Modbus RTU Slave to J1939 Master Gateway
		GW-7238D	Modbus TCP/RTU Slave to J1939 Master Gateway
Palm-size Programmable CAN Controller		I-7188XBD-CAN	1-port programmable CAN controller with RS-232/485
		uPAC-7186EXD-CAN	1-port programmable CAN controller with Ethernet and RS-232/485
		uPAC-5001D-CAN2	2-port programmable CAN controller with Ethernet and RS-232/485
PC-based CAN Bus Boards		PEX-CAN200i	2-port PCI Express CAN Communication Board
		PISO-CAN series	1/2/4/8 ports Universal PCI CAN Communication Board
		PCM-CAN100	1-port PCI-104 CAN Communication Module
		PCM-CAN200	2-port PCI-104 CAN Communication Module
		PCM-CAN200P	2-port PCI-104 + CAN Communication Module
		PISO-CM100U	1-port Universal PCI CAN Board with Built-in Programmable CPU
		PISO-CM200U ▲	2-port Universal PCI CAN Board with Built-in Programmable CPU
		PCM-CM100	1-port PCI-104 CAN Board with Built-in Programmable CPU
		PISO-DNM100U	1-port Universal PCI CAN Board with Built-in DeviceNet Master Firmware
		PISO-DNS100U	1-port Universal PCI CAN Board with Built-in DeviceNet Slave Firmware
		PISO-CPM100U	1-port Universal PCI CAN Board with Built-in CANopen Master Firmware
		PCM-CPM100	1-port PCI-104 CAN Board with Built-in Programmable CPU
PAC-based CAN Modules		I-8120W/I-87120	1-port Intelligent CAN Bus Communication Module
		I-8123W/I-87123	1-port High Performance CANopen Master Module
		I-8124W/I-87124	1-port High Performance DeviceNet Master Module
CAN Specific Device	CAN bus Power Meter	PM-3133-CPS series	3 Phase Compact Smart Meter with CANopen Protocol
		PM-3112-CPS	2 loops single-phase Power Meter with CANopen Protocol
		PM-3114-CPS	4 loops single-phase Power Meter with CANopen Protocol
	CAN bus Data Logger	CAN-Logger100	USB to 1-port CAN bus data logger device
		CAN-Logger200	USB to 2-port CAN bus data logger device

5-2-1 CAN Bus Repeater/Bridge/Switch

Introduction



The CAN Bus Repeater/Bridge/Switch is used to enhance the signal quality, extend the communication distance, isolate CAN Bus network. ICP DAS provides following products.

Specifications

Models	I-7531	I-7532	I-2534 NEW	I-5534-M
Pictures	Isolated CAN Bus Repeater	Isolated Two-channel CAN Bus Bridge	4-port CAN Bus Switch	4-port CAN Bus Switch with Metal Casing
				
CAN Interface				
Transceiver	NXP 82C250		NXP TJA1042	
Channel number	2		4	
Connector	3-pin screwed terminal block (CAN_GND, CAN_L, CAN_H)	4-pin screwed terminal block (CAN_GND, CAN_L, CAN_SHLD, CAN_H)	3-pin screwed terminal block (CAN_GND, CAN_L, CAN_H)	9-pin male D-Sub with CAN_GND, CAN_SHLD, CAN_H, CAN_L
Transmission speed (bps)	5 k ~ 800 k with auto baud rate detection	5 k ~ 1 M selected by rotary switch or utility tool		
Transmission Distance (m)	Depends on the CAN baud rate	Duplicates the transmission distance depended on the CAN baud rate		
Propagation Delay	Max. 200ns (shortens the transmission distance by ~ 40 m)	Depends on the CAN baud rate (Max. 134 us @ 1 Mbps)	Depends on the CAN baud rate (Max. 440 us @ 1 Mbps)	
Terminator Resistor	Jumper for 120 Ω terminator resistor		DIP switch for the 120 Ω terminator resistor	Jumper for 120 Ω terminator resistor
Isolation	3000 V_{DC} for DC-to-DC, 2500 V_{rms} for photo-couple			
Specification	ISO 11898-2, CAN 2.0A and CAN 2.0B			
LED Indicators				
Round LED	CAN Status LED	PWR LED, Rx LED, ERR LED	PWR LED, CAN1 LED, CAN2 LED, CAN3 LED, CAN4 LED	
Power				
Power Supply	Unregulated +10 V_{DC} ~ +30 V_{DC}			
Protection	Power reverse polarity protection, Over-voltage brown-out protection			
Power Consumption	2 W		3 W	
Mechanical				
Installation	DIN-Rail			
Casing	Plastic			Metal
Dimensions (W x L x H)	72 mm x 118 mm x 33 mm		32.3 mm x 99 mm x 77.5 mm	116.5 mm x 127 mm x 61.3 mm
Environment				
Operating Temperature	-25 °C ~ +75°C			
Storage Temperature	-30 °C ~ +80°C			
Relative Humidity	10 ~ 90% RH, non-condensing			

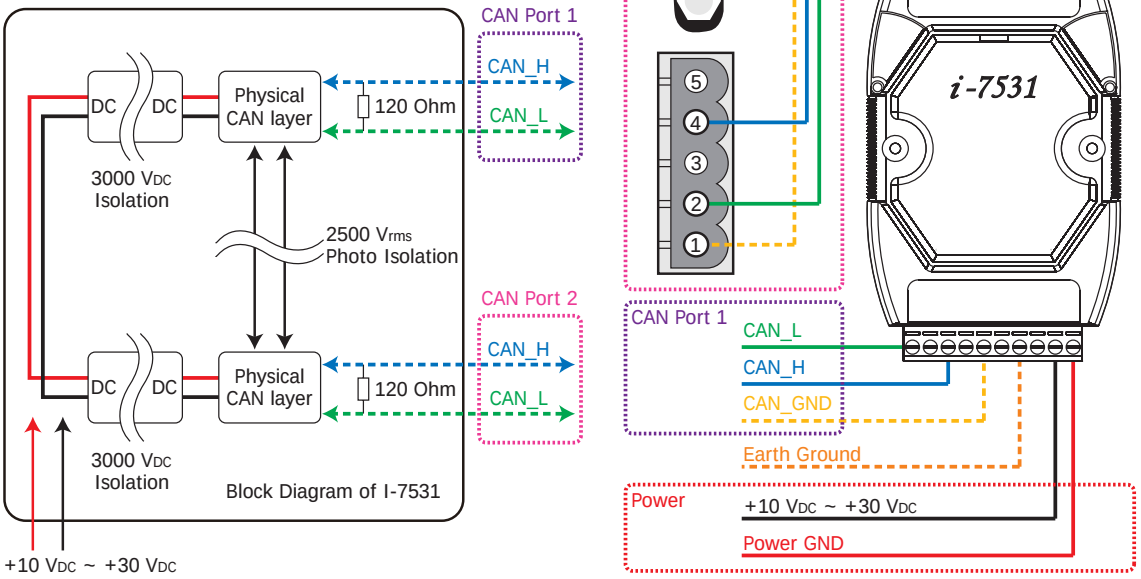
Product Showcase

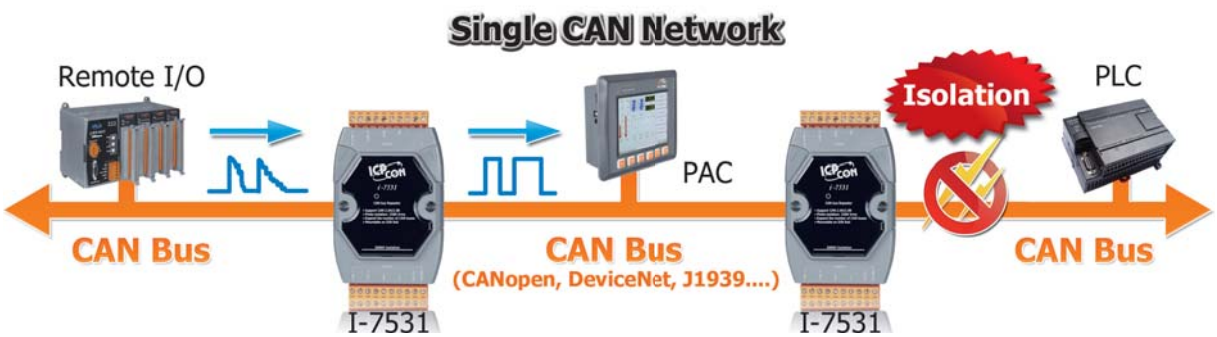
Isolated CAN Bus Repeater

I-7531 CR

The I-7531 is an isolated CAN repeater that can be used to establish a physical coupling of two segments of a CAN bus system. This module is designed to isolate the noise and disturbance between the two CAN ports of the I-7531. When the CAN signal is decayed because of the rough bus cable or noise, the I-7531 can recover the shape of the CAN signals to the original ones. Tree topologies can be implemented as well as long drop lines using the I-7531. In order to use the I-7531 easily, the module can automatically adjust the baud rate by itself to match the CAN network. Users just connect the I-7531 with the CAN buses, check the terminator resistor and power it on, subsequently the I-7531 enable to work normally.

- Compatible with CAN specification 2.0 parts A and B
- Supports a wide range of baud rates from 5 kbps ~ 800 kbps
- Jumper for the 120 Ω terminator resistor of the CAN bus
- 3 kV galvanic isolation between the power supply and the two CAN channels
- Fully compatible with the ISO 11898-2 standard
- 2500 Vrms photocoupler isolation on the CAN side
- Automatic baud rate detection
- Up to 100 nodes on each CAN port



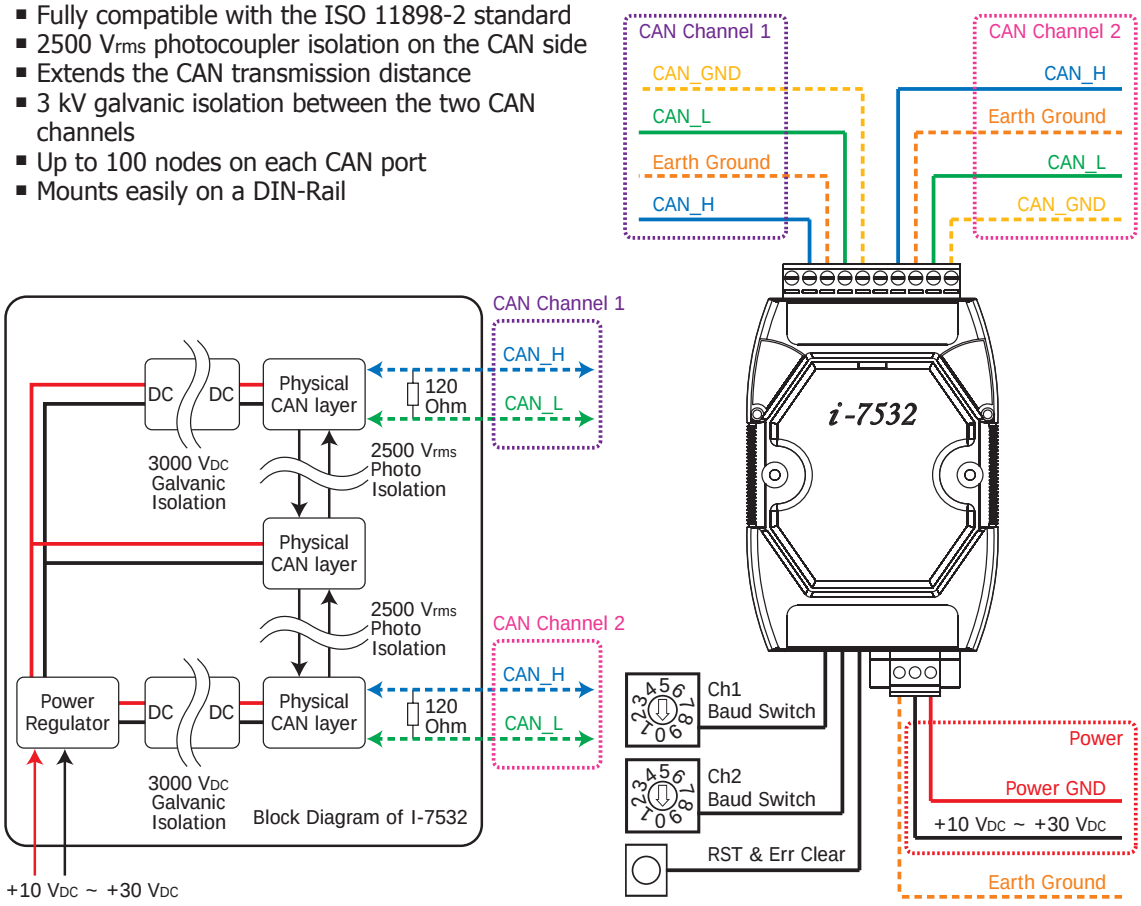


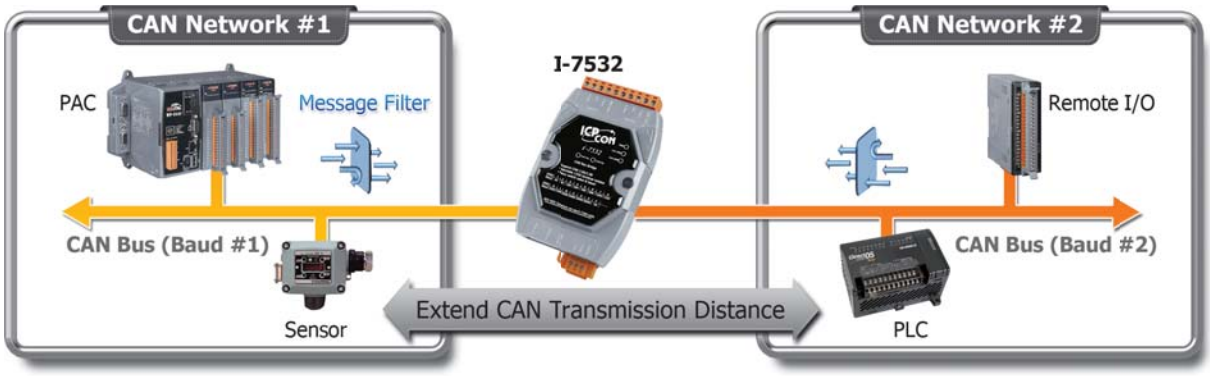
Isolated two-channel CAN Bus Bridge

I-7532 CR

The I-7532 is a CAN bus bridge that can be used to integrate two CAN networks even they implement different CAN baud rate. Compared with the I-7531, the I-7532 offers more than 3 useful features. First, the transmission distance limitation of the CAN bus system on each side of the I-7532 is independent, which means the total CAN network distance can be extended. Second, when some errors (e.g. bit error) happened on one CAN port of the I-7532, the other CAN port of the I-7532 will not be affected and can still work correctly. Last, the baud rate and CAN message filter configuration of these two CAN ports on the I-7532 is able to be tuned following users' applications. These features mean that users can design their applications more flexible and efficient.

- Compatible with CAN specification 2.0 parts A and B
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- Jumper for the 120 Ω terminator resistor of the CAN bus
- Two CAN channels
- Able to configure the CAN baud rate for each channel using a rotary switch
- Fully compatible with the ISO 11898-2 standard
- 2500 Vrms photocoupler isolation on the CAN side
- Extends the CAN transmission distance
- 3 kV galvanic isolation between the two CAN channels
- Up to 100 nodes on each CAN port
- Mounts easily on a DIN-Rail





Isolated 4-Port CAN Bus Switch

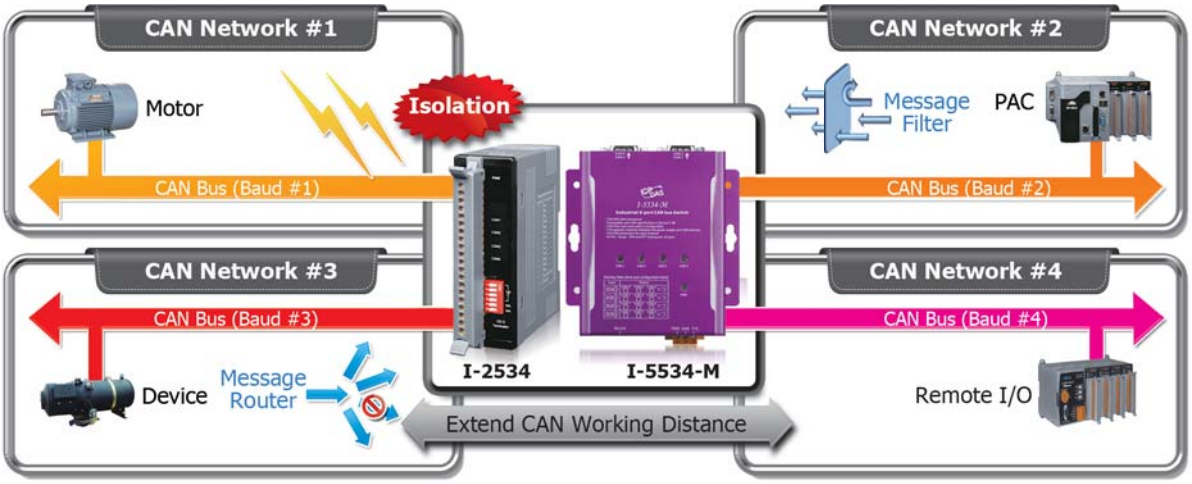
I-2534/I-5534-M CR NEW


I-2534

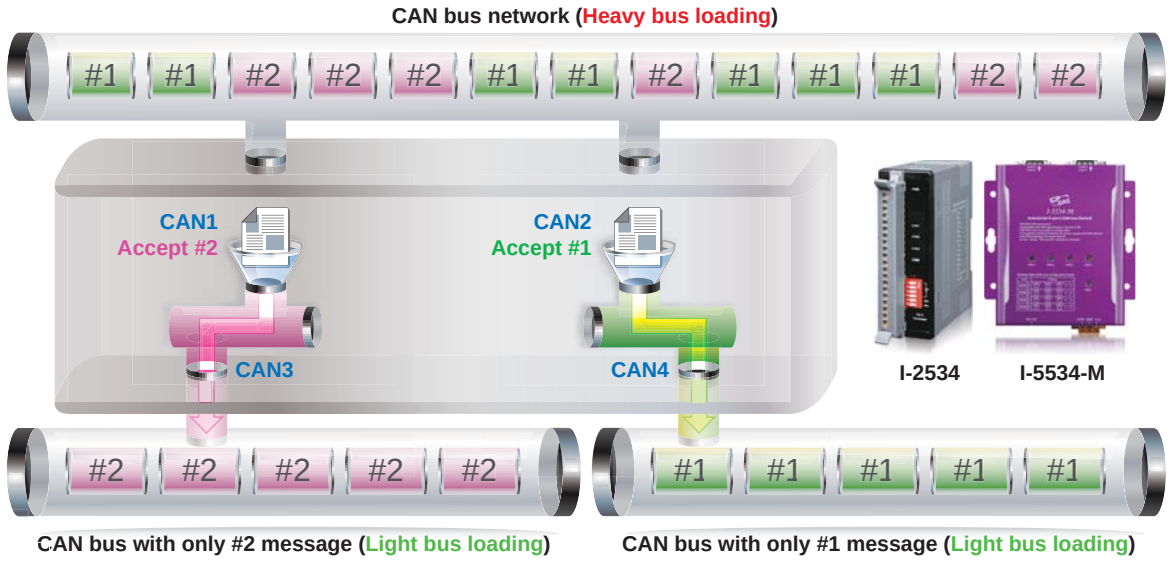

I-5534-M

The I-2534/I-5534-M provides 4 isolated independent CAN ports that can be used to link 4 CAN networks. The I-2534/I-5534-M follows the ISO 11898-2 specification which is applied in widely range of CAN-based protocols. In order to fit the industrial application, this module provides the functions of reshaping the CAN signals and isolating the disturbance among 4 CAN ports. When users apply the I-2534/I-5534-M in the CAN networks which use different baud rate, the I-2534/I-5534-M offers the baud rate configuration, CAN message filters, and message router, and effectively help users solve the problems related to network-to-network data exchanging, message filtering and routing, and tree topology for the CAN bus. The transmission distance limitation for each CAN port of the I-2534/I-5534-M is independent, which means that the total length of the network can be extended.

- 4 CAN communication ports
- Compatible with CAN specification 2.0 parts A and B Supports baud rates from 5 kbps ~ 1 Mbps
- DIP switch for the 120 Ω terminator resistor of the CAN bus
- 3 kV DC-DC isolation and 2500 V_{rms} isolation
- Fully compatible with the ISO 11898-2 standard
- Rotary switch used to select the baud rate for each CAN port
- The message filter for each CAN port is configurable
- I-5534-M is for the metallic casing
- Power requirements: Unregulated +10 V_{DC} ~ +30 V_{DC}



Divide one heavy loading of CAN bus into two light ones

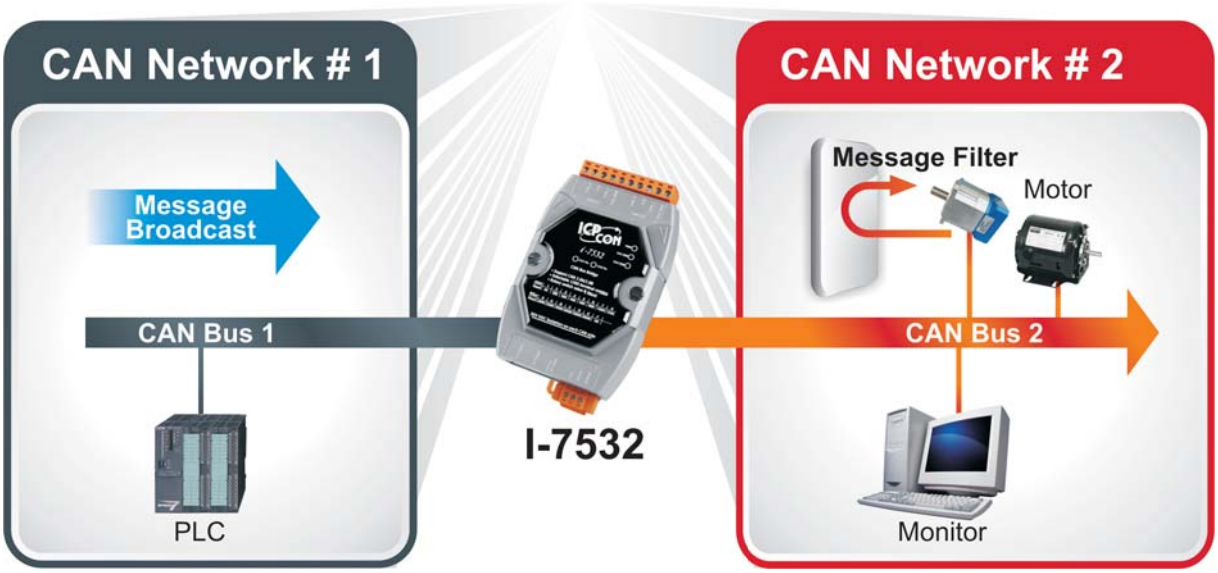


Case Studies: CAN network monitoring

Location: United States

Product: I-7532

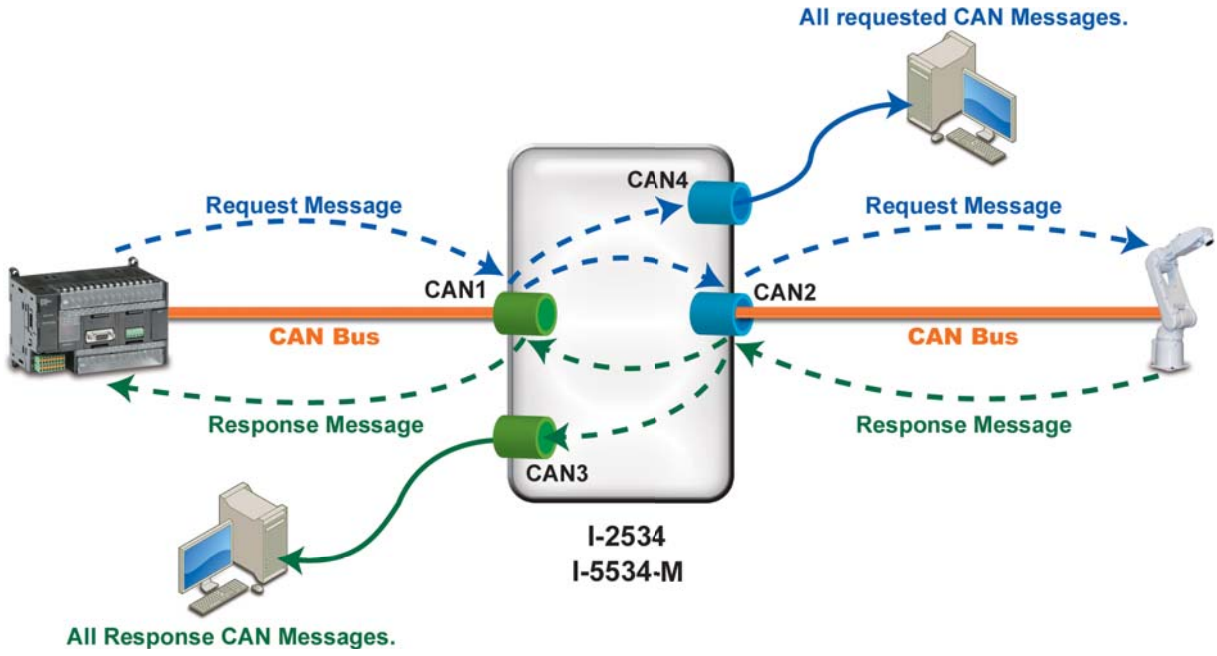
There is a electric vehicle system which works fine with the CAN bus. The system need extra monitor and extend further functionality. It is important that the newer subsystem should not influence the original system. The user use the I-7532 to isolate these two system. The original system works in the CAN ch.1 of the I-7532 and the newer subsystem will work in the CAN ch.2. After the CAN filter and listen mode has been configured, The newer subsystem could get all the messages which comes from the CAN ch.1 and the original system never receive the messages which comes from the newer subsystem.



Location: Iran

Product: I-2534

The application is a robot control system. The user need to monitor the CAN messages between the PLC and the robot. The user need separate the requested CAN messages from the replied CAN messages. The user applied the I-2534 in the CAN bus with specific routing configuration like below. The requested CAN messages has been transmitted to the CAN ch4 and the replied CAN message has been transmitted to the CAN ch3. The user could monitor and record the communication messages between the PLC and the robot.



5-2-2 CAN Converters

Introduction

ICP DAS CAN converters are used to establish a physical coupling of two or more communication interfaces and infrastructure components with which complex network structures can be implemented. They also can be used to implement the data conversion between CAN and USB, Uart, Ethernet or Wi-Fi interface.

- CAN to USB: I-7565 series
- CAN to Fiber: I-253x series
- CAN to Ethernet or Wi-Fi: I-7540 series
- CAN to Uart: I-7530 series

5-2-2-1 USB to CAN Converters

Introduction

The I-7565 series is the USB to CAN converter with a maximum of two independent CAN channels that supports CAN protocols 2.0A and 2.0B. It becomes very convenient and easy to access and control the CAN devices via the USB port of the PC.

Specifications

Models	I-7565	I-7565-H1	I-7565-H2	I-7565-CPM	I-7565-DNM
Pictures	1-port Cost Effective USB to CAN Converter	1-port High Performance USB to CAN Converter	2-port High Performance USB to CAN Converter	Intelligent USB to CANopen Converter	Intelligent USB to DeviceNet Converter
					
USB Interface					
Connector	USB Type B				
Compatibility	USB 1.1 and 2.0 standard				
Compatibility					
Cannel	1	1	2	1	1
Transceiver	82C250	NXP TJA1042		82C250	82C250
Connector	9-pin male D-Sub		10-pin terminal block	9-pin male D-Sub	
Baud Rate	10k, 20k, 50k, 100k, 125k, 250k, 500k, 800k, 1M				125k, 250k, 500k
Isolation	3000 V_{rms}			3000 V_{DC}	
Terminator Resistor	Selectable 120 Ω terminator resistor by a jumper				
Protocol	CAN 2.0A/2.0B			CiA 301 V4.02	DeviceNet Volume I ver2.0, Volume II ver2.0
Receive Buffer	1000 data frames	256 data frames	128 data frames for each CAN port	1000 data frames	256 data frames
Max. Data Flow	250 fps	3000 fps	1500 fps for each CAN port	–	–
System					
Software Drivers	Windows 2K/XP/7, Linux				
Software SDK	N/A			VB6, VC++ 6.0, C#, VB .NET	VB6, VC++ 6.0, BCB 6.0
LED Indicators	ON, ERR	PWR, RUN, ERR	PWR, RUN, ERR	PWR, ACT, ERR, Tx/Rx	PWR, RUN, NS, MS
Power Consumption	1.5 W			3 W	3 W
Dimensions (W x W x D)	108 mm x 72 mm x 35 mm				

Product Showcase

USB to CAN Converter

I-7565 CR

The I-7565 is a cost-effective device that can be used for connecting a CAN bus to a PC via a standard USB interface.

- I-7565 used PL-2303 USB chip, I-7565F used FTDI USB chip. Both of two chips used different drivers.
- Driver supported for Windows 2K/XP/Vista/7 (32 or 64-bit), and Linux
- Powered by the USB port (no external power supply required)
- Jumper for the 120 Ω terminator resistor of the CAN bus
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- Compatible with CAN specification 2.0 parts A and B
- 2500 Vrms photocoupler isolation on the CAN side
- Fully compatible with the ISO 11898-2 standard
- Fully compliant with USB 1.1/2.0 (Full Speed)
- 3 kV galvanic isolation for the CAN port
- One CAN port and one USB channel

High-performance 1-port USB to CAN Converter

I-7565-H1 CR

The I-7565-H1 is a high-performance intelligent USB to CAN converter with one CAN port that can help users to make data collection and process on a CAN bus network easily and quickly. It improves the transformation speed of the I-7565, and allows receiving max. 3000 standard 2.0A CAN frames per second. The powerful CPU of the I-7565-H1 provides the accurately time-stamp for each CAN message that is useful to analysis and diagnostic the CAN network.

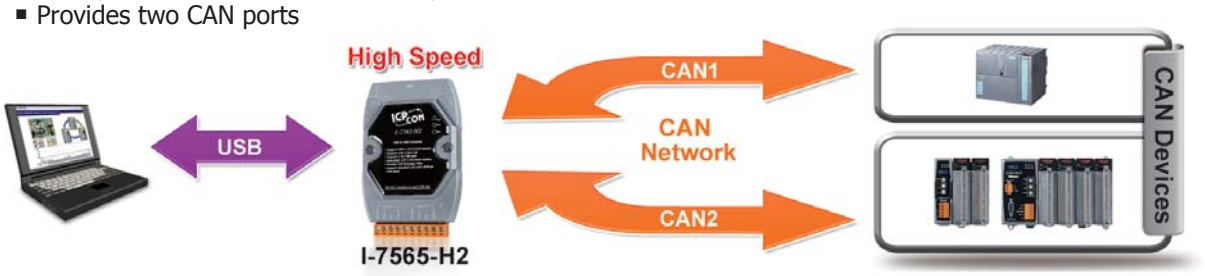
- Provides a configuration utility that can be used to transmit/receive CAN messages
- Driver supported for Windows 2K/XP/Vista/7 (32 or 64-bit)/8.x , and Linux
- Max. data flow for a single channel is 3000 fps (standard frame)
- No external power supply required (powered by the USB port)
- Built-in jumper for the 120 Ω terminal resister of the CAN bus
- Programmable CAN bus baud rate from 5 kbps ~ 1 Mbps
- Compatible with CAN specification 2.0 parts A and B
- 2500 Vrms photocoupler isolation on the CAN side
- Supports CAN bus acceptance filter configuration
- Fully compatible with the ISO 11898-2 standard
- 3 kV galvanic isolation for the CAN port
- Removable terminal block
- Provides one CAN port

▶▶▶▶ High-performance 2-port USB to CAN Converter

I-7565-H2 CR

The I-7565-H2 is a high-performance intelligent USB to CAN converter with two CAN channels that help users to make data collection and process on a CAN bus network easily and quickly.

- Provides a configuration utility that can be used to transmit/receive CAN messages
- Driver supported for Windows 2K/XP/Vista/7 (32 or 64-bit)/8.x , and Linux
- Max. data flow for a single channel is 3000 fps (standard frame)
- No external power supply required (powered by the USB port)
- Built-in jumper for the 120 Ω terminal resister of the CAN bus
- Programmable CAN bus baud rate from 5 kbps ~ 1 Mbps
- Compatible with CAN specification 2.0 parts A and B
- 2500 V_{rms} photocoupler isolation on the CAN side
- Supports CAN bus acceptance filter configuration
- Fully compatible with the ISO 11898-2 standard
- 3 kV galvanic isolation for the CAN port
- Provides two CAN ports

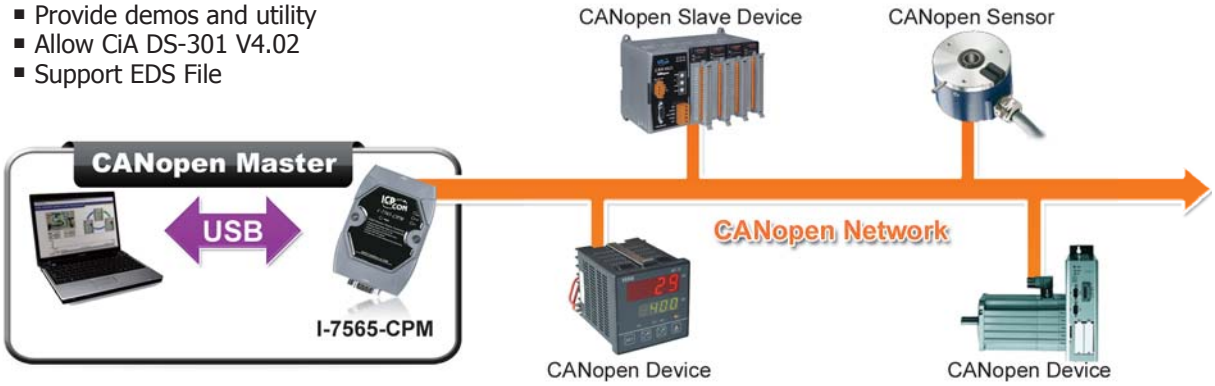


▶▶▶▶ Intelligent USB to CANopen Converter

I-7565-CPM CR

I-7565-CPM can represent an economic master solution of CANopen application. It follows CiA 301 specification such as, SDO, PDO, NMT, SYNC and so on. Besides, I-7565-CPM support EDS file interpretation, Heartbeat, Guarding, Slave Boot-up detection, and EMCY event functions. It is suited for portable diagnostic tool or main control unit of a CANopen network.

- Support event trigger, such as EMCY event, Guarding event, Heartbeat event, and Slave Boot-up events
- Support baud: 10 Kbps, 20 Kbps, 50 Kbps, 125 Kbps, 250 Kbps, 500 Kbps, 800 Kbps, and 1 Mbps
- Driver supported for Windows 2K/XP/Vista/7 (32 or 64-bit), and Linux
- Support NMT, PDO, SDO, SYNC and EMCY protocol
- Four indication LEDs (Pwr, Tx/Rx, Act and Err LEDs)
- Support Node Guarding and Heartbeat protocol
- Support VC6, VB6, VB.net, and C# development
- Free software development tools for windows
- Support on-line adding and removing devices
- Fully compliant with USB 1.1/2.0 (Full Speed)
- Support Auto-Search slave device functions
- Provide demos and utility
- Allow CiA DS-301 V4.02
- Support EDS File



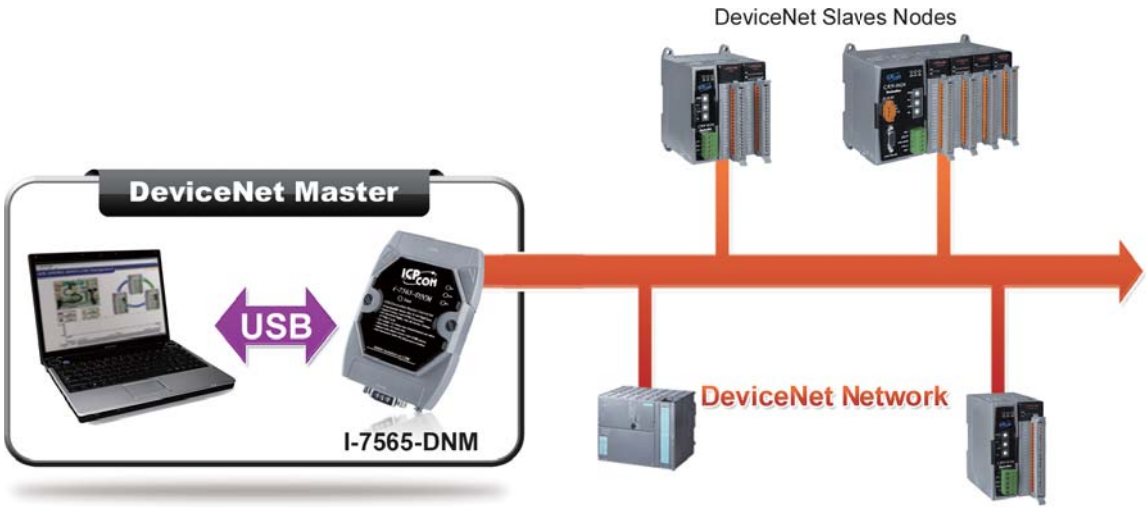
Intelligent USB to DeviceNet Converter

I-7565-DNM CR

I-7565-DNM can represent an economic master solution of DeviceNet application. It is a "Predefined Master-Slave connection Set". I-7565-DNM supports Group 2 only Server and UCMM functions to communication with slave devices. It has an independent CAN bus communication port to cover a wide range of DeviceNet applications.

Besides, I-7565-DNM uses the new CAN controller Phillips SJA1000T and transceiver 82C250, which provide bus arbitration, error detection with auto correction and re-transmission function. It can be installed on almost any windows-based system. It is popularly applied in the industrial automation, building automation, vehicle, marine, and embedded control network. In order to expand the DeviceNet functions of ICP DAS products, I-7565-DNM is developed for this purpose.

- Fully compliant with USB 1.1/2.0 (Full Speed)
- DeviceNet Version: Volume I & II, Release 2.0
- Programmable Master MAC ID and Baud Rate
- Support Group 2 and UCMM connection
- I/O Length: 512 Bytes Max. (Input/Output) per slave
- Support Auto-Search slave device function
- Support Auto-detect Group 2 and UCMM device
- Status LED: RUN, MS, NS
- No external power supply is required as I-7565 takes it's power from the USB bus
- Baud Rate: 125k, 250k, 500k
- I/O Operating Modes: Poll, Bit-Strobe, Change of State/Cyclic
- Slave Node: 63 nodes Max.
- Support on-line adding and removing devices
- Auto-Reconnect when the connection is broken
- Free Software development tools for Windows
- Driver supported for Windows 2K/XP/Vista/7 (32 or 64-bit), and Linux



5-2-2-2 CAN to Fiber Converter/Bridge

Introduction

Specifications

Models	I-2532	I-2533	I-2533CS	I-2533CS-60	I-2533CS-A/ I-2533CS-B
Pictures	CAN to Multi-mode Fiber Converter	CAN to Multi-mode Fiber Bridge	CAN to Single-mode Fiber Bridge		
					
CAN Interface					
Connector	Screwed terminal block (CAN_GND, CAN_L, CAN_H)				
Baud Rate (bps)	10 k ~ 500 k	10 k ~ 1 M			
Transmission Distance (m)	Depends on baud rate				
Propagation Delay	Max 125 ns	Max. 125 μs (depends on the CAN baud rate)			
Terminator Resistor	DIP switch for the 120 Ω terminator resistor				
Isolation	3000 V_{DC} for DC-to-DC, 2500 V_{rms} for photo-couple				
Specification	ISO 11898-2, CAN 2.0A and CAN 2.0B				
Fiber Interface					
Connector	ST (Multi-mode)		SC (Single-mode)		SC type
Wave Length (nm)	850		1300 or 1310		TX: 1310, RX: 1550 for I-2533CS-A TX: 1550, RX: 1310 for I-2533CS-B
Fiber Cable (μm)	Multi-mode 50/125, 62.5/125 or 100/140		Single-mode 8.3/125, 8.7/125, 9/125 or 10/125		
Transmission Distance	Max. 1.4 km	Max. 2 km	Max. 30 km	Max. 60 km	Max. 15 km
UART Interface					
COM1	–	RS-232 (for configuration)			
COM 1 Connector	–	3-pin screwed terminal block (RxD, TxD, GND)			
Transmission Speed (bps)	–	115200			
Data bit	–	8			
Stop bit	–	1			
Parity	–	None			
LED					
Round LED	PWR LED, TD LED, RD LED	PWR LED, CAN_Tx LED, CAN_Rx LED, CAN_Err LED, FB_Err LED	PWR LED, CAN_Tx LED, CAN_Rx LED, CAN_Err LED, FB_Err LED, FB_Ack LED		
Power					
Power Supply	Unregulated +10 V_{DC} ~ +30 V_{DC}				
Protection	Power reverse polarity protection, Over-voltage brown-out protection				
Power Consumption	0.5 W	3 W			
Mechanical					
Installation	DIN-Rail				
Dimensions (W x L x H)	32.3 mm x 107 mm x 102 mm		33.0 mm x 126.8 mm x 104.5 mm		
Environment					
Operating Temperature	-25 °C ~ +75°C				
Storage Temperature	-30 °C ~ +80°C				
Relative Humidity	10 ~ 90% RH, non-condensing				

Product Showcase

CAN to Multi-mode Fiber Converter


I-2532

I-2532 CR

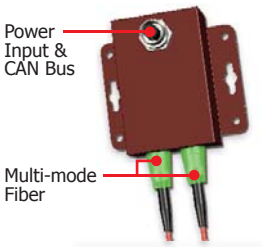
The I-2532 is a CAN to fiber optic converter, and fits to various CAN-based applications, such as CANopen, DeviceNet, J1939, and so forth. The module is designed not only to convert CAN bus signals to optical signals on a fiber optic cable, to reshape the CAN signal to compensate for distortion, but to isolate the bus error due to the wire short or disturbance. With the advantage of fiber optic, the I-2532 enables secure data transmission via fiber optic transmission, and helps the CAN network to prevent the noise from EMS/RFI interference. In order to use the I-2532 easily and conveniently, the converter is designed to automatically tune the baud rate by itself to match the CAN network. Users just connect the I-2532 with the fiber optic cable and CAN bus and check the terminator resistor and power it on, then the I-2532 enable to work normally.

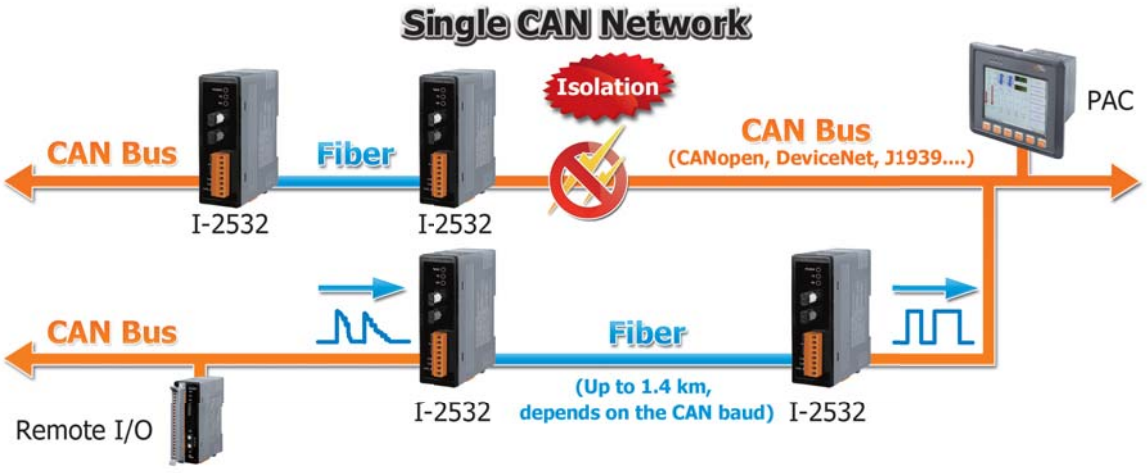
I-2532-M CR

I-2532-M is a CAN to multi-mode fiber converter that with the same specifications as I-2532 but with metal housing.
If you need other products with metal housing, call us.
The dimensions are W x H x D = 77 x 81 x 28 mm

- Compatible with CAN specification 2.0 parts A and B
- Supports a range of baud rates from 10 kbps ~ 500 kbps
- DIP switch for the 120 Ω terminator resistor of the CAN bus
- Fiber Port: ST (Multi-mode)
- Fiber Cable: 62.5/125 μm
- Fully compatible with the ISO 11898-2 standard
- 2500 V_{rms} photocoupler isolation on the CAN side
- 3 kV galvanic isolation
- Wavelength: 850 nm
- One CAN and one fiber channel

I-2532-M
Metal Housing Product



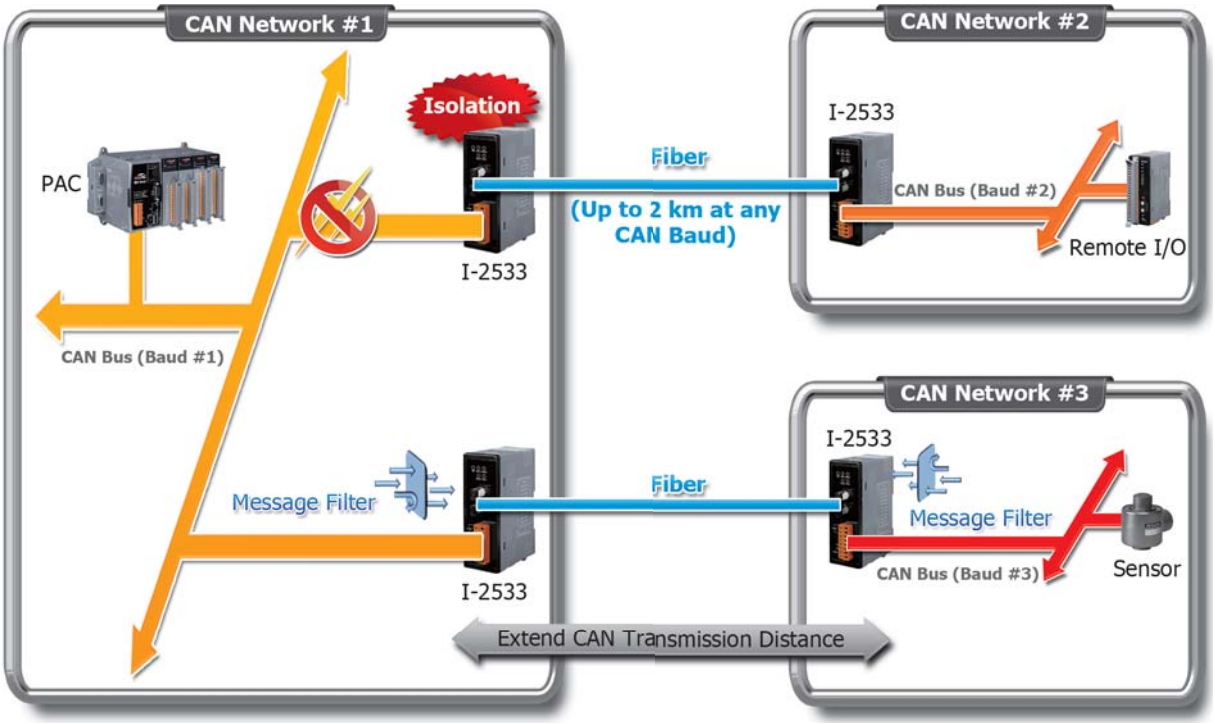


▶▶▶▶ CAN to Multi-mode Fiber Bridge

I-2533 CR

The I-2533 is an intelligent CAN bridge that can be used to establish the connection between two CAN bus systems via fiber optic cable. Similar to the I-2532, the I-2533 can also apply in various CAN-based protocols to convert CAN bus signals to optical signals and reshape the CAN signals. The difference between the I-2532 and I-2533 is the CAN configuration functions and the distance limitation of CAN communication. The I-2533 offers the functions to configure the CAN baud rate and CAN message filters. These are useful when using the I-2533 to link two CAN networks which may have different baud rates. By using the I-2533, the transmission distance limitation of the CAN bus system will not be reduced because of the CAN baud rate, which means that the total network length can be extended. This feature means that users can develop the applications more powerful and flexible with the I-2533.

- Fiber Port: ST (Multi-mode)
- Fiber Cable: 62.5/125 μm
- 2500 V_{rms} iCoupler isolation on the CAN side
- Compatible with CAN specification 2.0 parts A and B
- Built-in switch for the 120 Ω terminator resistor
- Rotary switch for CAN baud rate configuration
- Software utility tool for message filter configuration
- Wavelength: 850 nm
- Max. transmission distance of up to 2 km at any CAN baud rate
- Fully compatible with the ISO 11898-2 standard
- Up to 100 CAN nodes on each channel
- Broken line detection for fiber cable



CAN to Single-mode Fiber Bridge

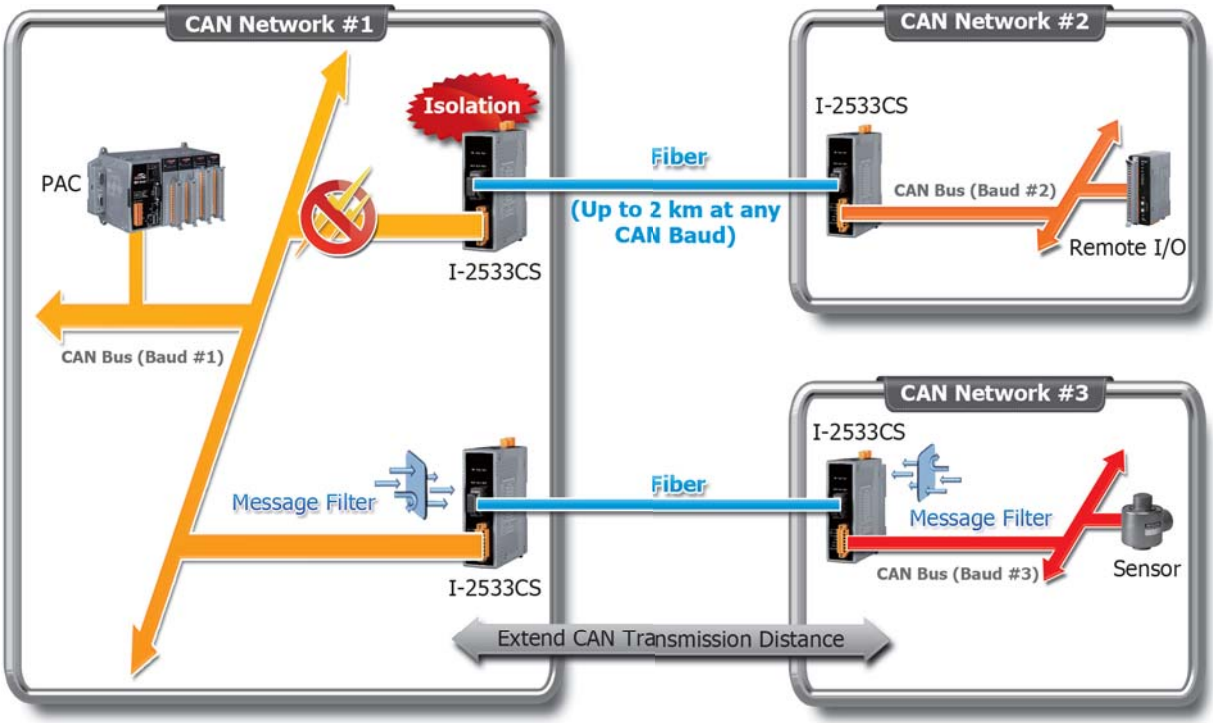
I-2533CS CR
I-2533CS-60 CR *Available soon*


I-2533CS


I-2533CS-60

The I-2533CS series (I-2533CS/I-2533CS-60) is a local CAN bridge used to establish a connection between two CAN bus systems via single mode fiber transmission medium. In order to solve the problem between CAN and fiber transmission mediums, the I-2533CS series is specially designed for converting the electrical CAN bus signal to the optical signal- and recover the signal to CAN bus by using another I-2533CS series. Compared with other CAN/Fiber converters, the I-2533CS series has three more important features. First, the transmission distance limitation of the CAN bus system will not be reduced due to higher CAN baud rate. No matter what kind of CAN baud rates you use, the data transmission distance of fiber is up to 30 km (60 km for I-2533CS-60). It means that the total network working distance can be extended.

- Fully compatible with the ISO 11898-2 standard
- Support both CAN 2.0A and CAN 2.0B
- NXP TJA1042 CAN transceiver
- 2500 V_{rms} isolation on the CAN side
- 3 kV galvanic isolation between the power supply and CAN channel
- Build-in switch to select 120 Ω terminal resistor
- Rotary switch for CAN baud rate configuration
- Wave Length: 1310 nm
- Fiber Cable: 8.3/125, 8.7/125, 9/125 or 10/125 μm
- Transmission distance up to 30 km at any CAN baud rate (60km for I-2533CS-60)
- Removable terminal block, Mount easily on DIN-rail
- Allow user-defined CAN baud rate
- Utility tool for CAN message filter configuration

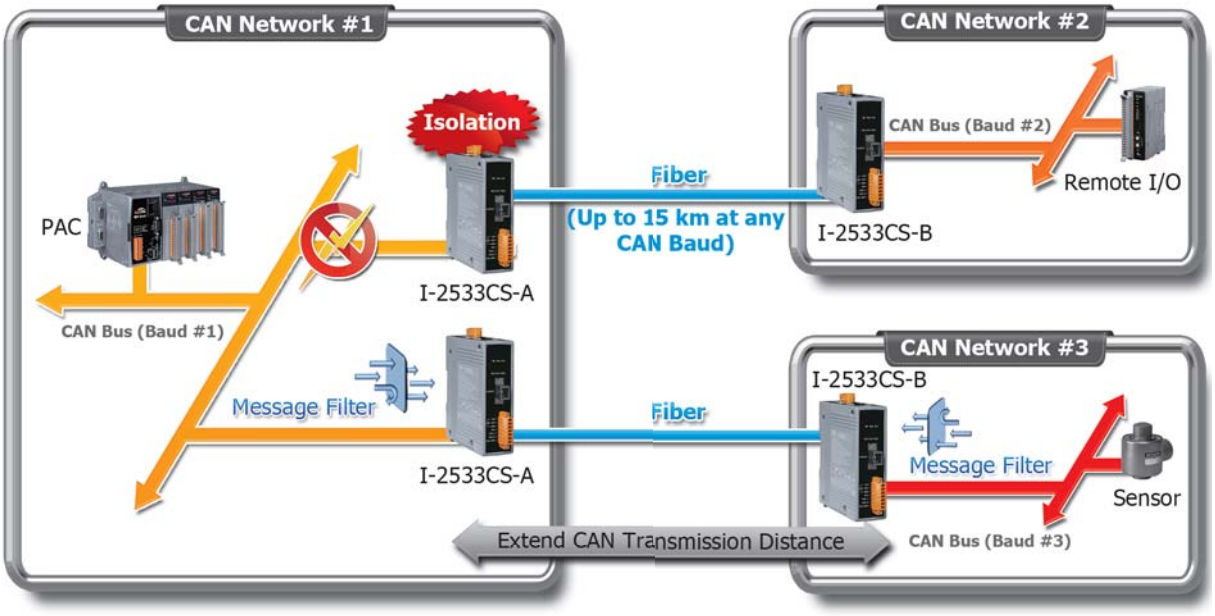


▶▶▶▶ CAN to Single-mode Fiber Bridge

I-2533CS-A CR
I-2533CS-B CR

The I-2533CS-A/B is a type of CAN-to-Fiber Bridge that can be used to establish a connection between two CAN networks. It supports Wavelength Division Multiplexing (WDM) technology so that only a single fiber cable is needed for transmitting bi-directional CAN data. As the I-2533CS-A and I-2533CS-B must be paired because of hardware limitations, this means that the cost of deploying fiber cable can be effectively reduced. Compared with other CAN/Fiber converters, the I-2533CS-A/B has three significant features. First, the I-2533CS-A/B can be used to overcome the transmission distance limitations of the CAN Bus. Consequently, the transmission distance can be extended to up to 15 km using fiber cable, regardless of the CAN baud rates used in the system.

- Fully compatible with the ISO 11898-2 standard
- Supports both CAN 2.0A and CAN 2.0B specifications
- Embedded NXP TJA1042 CAN transceiver
- 2500 V_{rms} isolation on the CAN side
- 3 kV galvanic isolation between the power supply and the CAN channel
- 120 Ω terminal resistor selectable via DIP switch
- CAN baud rate configurable via rotary switch
- Fiber Type: SC, Single mode, 100 Base-FX
- Utility for CAN message filter configuration
- Wavelength:
  - Tx: 1310 nm, Rx: 1550 nm for I-2533CS-A
  - Tx: 1550 nm, Rx: 1310 nm for I-2533CS-B
- Fiber Cable: 8.3/125, 8.7/125, 9/125 or 10/125 μm
- Max. transmission distance up to 15 km at any CAN baud rate
- Removable terminal block, easily mounted on a DIN-Rail
- Allows user-defined CAN baud rates



5-2-2-3 Ethernet/Wi-Fi to CAN Converters

Introduction

The Ethernet or Wi-Fi to CAN converters are the solutions that enable CAN networks to be integrated into the Internet/Ethernet or Wi-Fi, whereby remote monitor and control is possible.
The I-7540D-WF supports the wireless transmission of CAN data between a CAN network and a WLAN network according to the 802.11b/g standard. The I-7540D-WF is highly suitable for connecting mobile (e.g., vehicles or machines) or stationary CAN networks and is often used for short ranges up to 100 m.
The Ethernet or Wi-Fi converters help to implement various Ethernet or wireless transmission applications.

Specifications

Models	I-7540D	I-7540D-MTCP	I-7540D-WF
Pictures			
CAN Interface			
Connector	NXP SJA1000T with 16 MHz clock		CAN Controller inside
Transceiver	NXP 82C250		
Channel number	1		
Connector	2-pin screwed terminal block (CAN_L, CAN_H)		3-pin screwed terminal block (CAN_L, CAN_H, CAN_GND)
Baud Rate (bps)	10 k, 20 k, 50 k, 125 k, 250 k, 500 k, 800 k, 1 M		
Isolation	1000 V_{DC} for DC-to-DC, 2500 V_{rms} for photo-couple		3000 V_{DC} for DC-to-DC, 2500 V_{rms} for photo-couple
Terminator Resistor	Jumper for 120 Ω terminator resistor		
Specification	ISO-11898-2, CAN 2.0A and CAN 2.0B		
UART Interface			
COM 1	RS-232		
COM 1 Connector	5-pin screwed terminal block (TxD, RxD, RTS, CTS, GND)		3-pin screwed terminal block (TxD, RxD, GND)
COM 2	RS-485 (Self-Turner inside)		–
COM 2 Connector	2-pin screwed terminal block (DATA+, DATA-)		–
Baud Rate (bps)	110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200		115200
Data bit	7, 8		8
Stop bit	1		1
Parity	None, Even, Odd		None
Protocol	ICP DAS Protocol	Modbus RTU	For Configuration
Ethernet Interface			
Controller	10/100Base-TX Ethernet Controller (Auto-negotiating, Auto_MDIX)		–
Connector	RJ-45 with LED indicator		–
Protocol	ICP DAS Protocol	Modbus TCP	–
Wi-Fi Interface			
Antenna	–		5 dBi (Omni-Directional)
Standard Supported	–		IEEE 802.11b/g
Operation Mode	–		Infrastructure & Ad-hoc
Encryption	–		WEP, WPA and WPA2
Frequency Ranges	–		2.412GHz ~ 2.484GHz
Transmission distance	–		Up to 100 meters
Mechanical			
Installation	DIN-Rail		
Dimensions (W x L x H)	72 mm x 122 mm x 33 mm		117 mm x 76 mm x 37 mm
Environment			
Operating Temperature	-25 °C ~ +75°C		
Storage Temperature	-30 °C ~ +80°C		
Relative Humidity	10 ~ 90% RH, non-condensing		

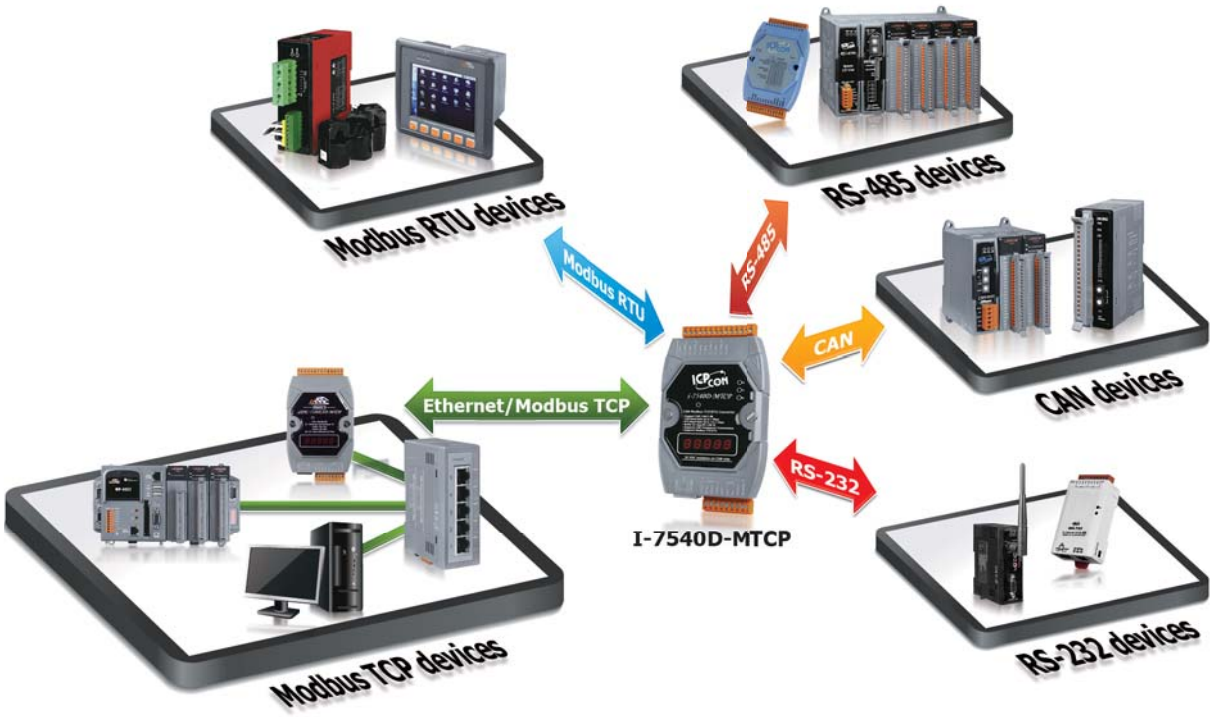
Product Showcase

Modbus TCP to CAN Converter

I-7540D-MTCP CR

Inheriting to the most of all features of the I-7540D, the I-7540D-MTCP enables CAN networks to be combined with the Internet/Ethernet. It can be used to not only access the CAN network via the Ethernet, but can also realize Ethernet transparent transmission on the CAN network. In order to connect the PLCs, HMIs and SCADAs with the CAN devices more easily and conveniently, the I-7540D-MTCP supports the Modbus TCP and Modbus RTU communication protocol. This module can act as a Modbus TCP server, and wait for the commands from the Modbus TCP client. When the controller is a Modbus RTU master, the I-7540D-MTCP is able to be the Modbus RTU slave, and transfer the Modbus RTU commands to the CAN messages. These features mean that users can setup their applications more flexibly and conveniently.

- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-2 standard
- Provides one channel each for CAN, RS-232, RS-485 and 10/100 Base-T Ethernet
- Includes a software utility for monitoring and configuration
- Built-in watchdog
- 1 kV galvanic isolation
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- Jumper for the 120 Ω terminator resistor of the CAN bus
- Supports Modbus function code: 0x03/0x04/0x10
- 2500 V_{rms} photocoupler isolation on the CAN side
- Support maximum 24 Ethernet clients connection
- Provide the transparent communication between the CAN devices via Ethernet
- Support 30 specific CAN IDs in the Modbus TCP/RTU mode



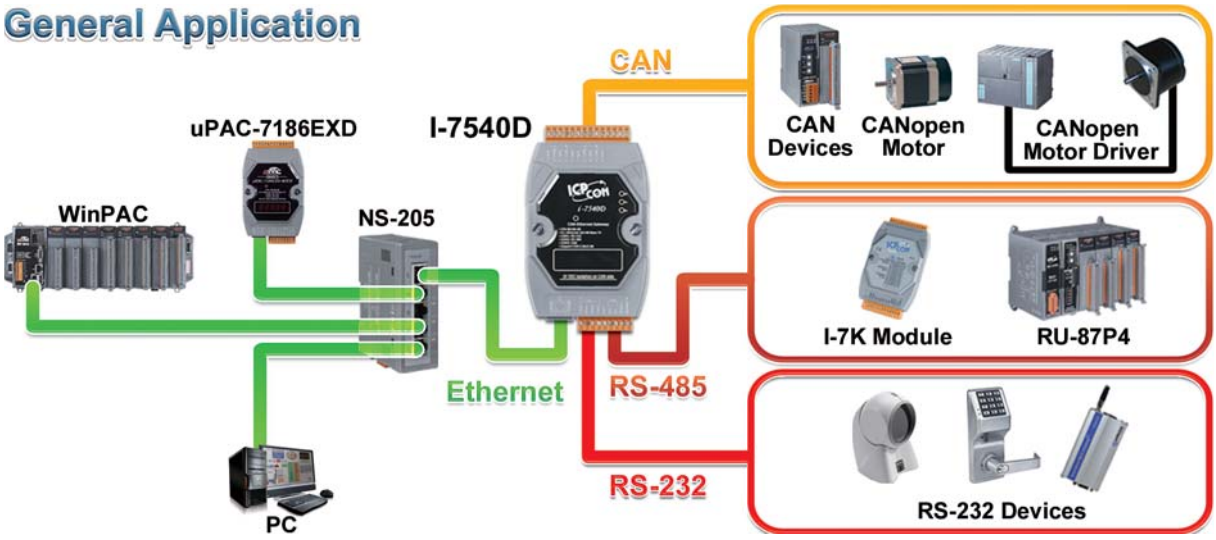
Ethernet to CAN Converter

I-7540D CR

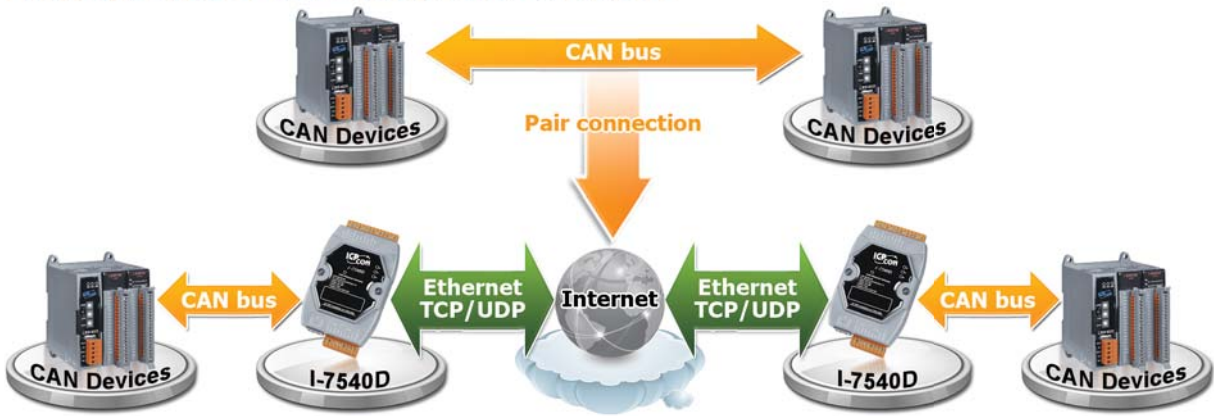
The I-7540D is a CAN to Ethernet converter, and is usually applied as an Ethernet to CAN/RS-232/485 Device Server. It supports socket access functions and virtual COM port technology which helps users to get the CAN, RS-232, RS-485 data via virtual COM port. The I-7540D also provides transparent mode, which enables CAN networks to be coupled together over the Internet/Ethernet, whereby remote monitoring and control is possible. By the features of tiny operating system, protocol independence, small casing and flexibility, it is able to widely fit various RS-232, RS-485 and CAN applications, which may be based on private RS-232 protocol, private CAN protocol, Modbus protocol, CANopen protocol, DeviceNet protocol or J1939 protocol.

- Compatible with CAN specification 2.0 parts A and B
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- Jumper for the 120 Ω terminator resistor of the CAN bus
- 10/100 Base-T Ethernet port
- Provide one channel each for CAN, RS-232, RS-485 and Ethernet
- Fully compatible with the ISO 11898-2 standard
- 2500 V_{rms} photocoupler isolation on the CAN side
- Built-in watchdog
- 1 kV galvanic isolation
- Provides connections for a maximum of 25 Ethernet clients
- Supports the Virtual COM technology
- Provide the transparent communication between the CAN devices via Ethernet

General Application



Extend CAN communication distance

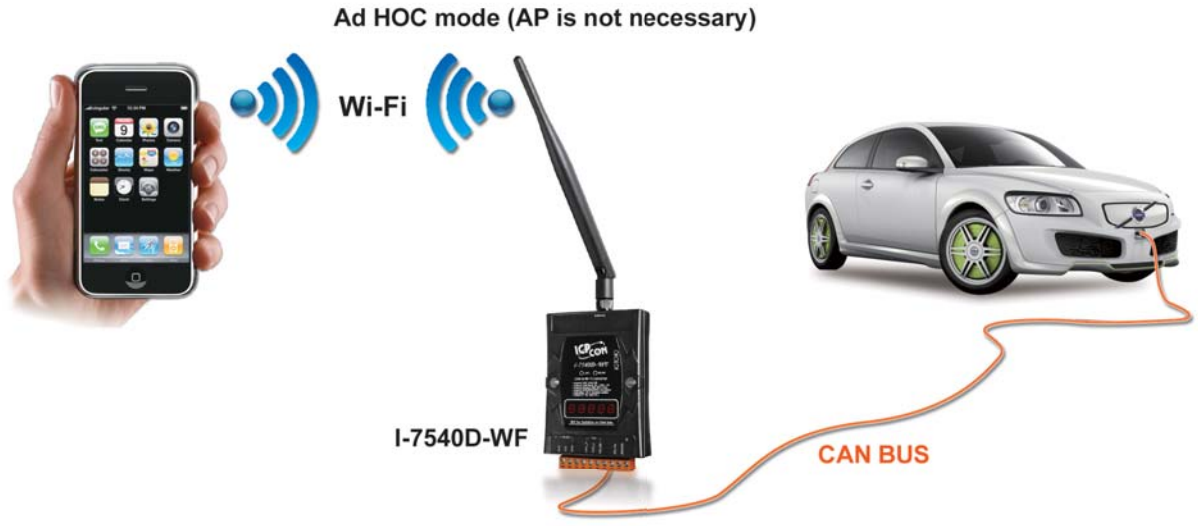


▶▶▶▶ Wi-Fi to CAN Converter

I-7540D-WF CR

The I-7540D-WF supports the wireless transmission of CAN data between a CAN network and a WLAN network according to the 802.11b/g standard. It provides CAN to WLAN converter functionality together with wireless transparent transmission on the CAN network. The I-7540D-WF is highly suitable for connecting mobile (e.g., vehicles or machines) or stationary CAN networks and is often used in short ranges up to 100 m. Using an appropriately configured router, CAN data can be determined to pass or filter from the CAN networks to the Ethernet. The wireless connection that is established between two I-7540D-WF units can be used instead of a cable, and enables the connection of CAN networks that would otherwise be difficult to link such as rotational machineries.

- IEEE 802.11 b/g compliant
- Wireless data transmission via WLAN
- Supports WEP, WPA and WPA2 encryption for wireless LAN
- Communication efficiency (peak value): one-way is up to 700 fps (client->server, server->client), two-way 350 fps (client<=>server)
- Two different operation modes: infrastructure and ad-hoc
- Point to point or point to multi-point connection via wireless LAN
- Compatible with CAN specification 2.0 parts A and B
- Connects CAN networks via a WLAN bridge
- Wireless transmission distance: up to 100 meters

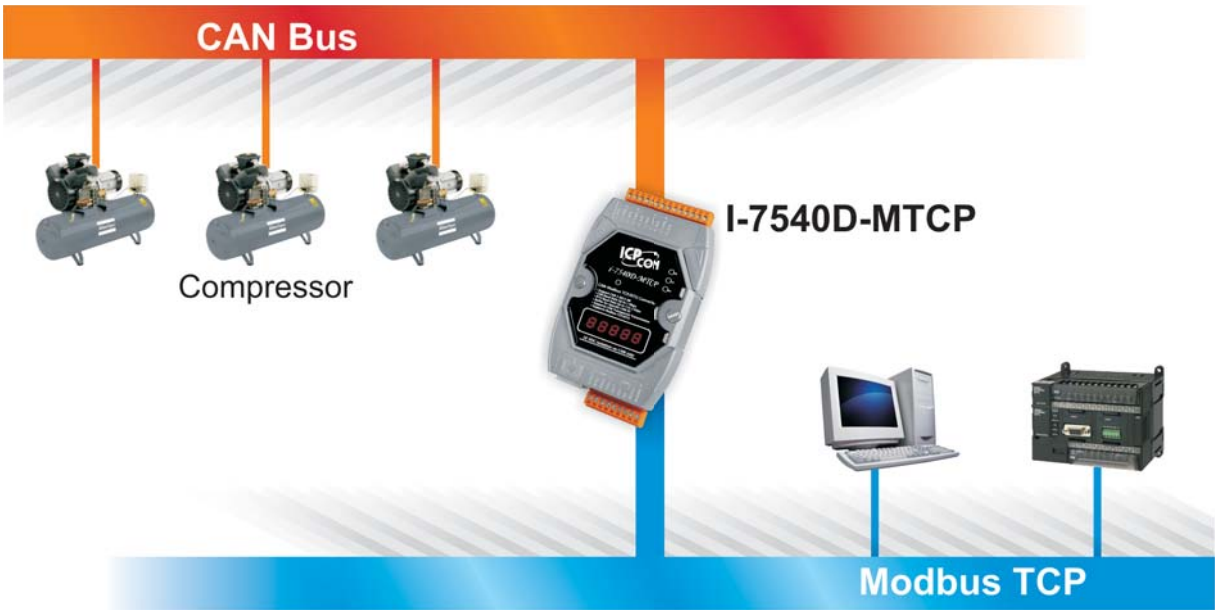


Case Studies: Modbus TCP to CAN converter

▶▶▶▶ Location: Taiwan

Product: I-7565-H1

By using the OBD-II interface, the I-7565-H1 and CANcheck software can be used to diagnose the vehicle. In the usual maintenance, the I-7565-H1 with CANcheck software could help to check vehicle safety systems and sensing components, including airbags, ABS, brake systems, oxygen sensors and etc. That will shorten the diagnostic time and make the maintenance become easy. In other CAN-based applications or equipments, the I-7565-H1 and CANcheck software would be the great and friendly tool.



5-2-2-4 Uart to CAN Converters

Introduction

The I-7530 series is the Uart to CAN converter that support CAN protocols 2.0A and 2.0B. The I-7530-FT is designed for the fault tolerance CAN bus (ISO 11898-3). The I-7530A-MR supports Modbus RTU command especially.

Specifications

Models	I-7530-FT	I-7530	I-7530T	I-7530A	I-7530A-MR	tM-7530
Pictures	RS-232 to Fault-Tolerance CAN Converter	RS-232 to CAN Converter	RS-232 to CAN Converter	RS-232/422/485 to CAN Converter	Modbus RTU to CAN Converter	Tiny RS-232 to CAN Converter
						
CAN Interface						
Transceiver	AMIS 41682	NXP 82C250	TJA1042	NXP 82C250		NXP TJA1042
Connector	9-pin male D-sub					3 pins spring type terminal block
Baud Rate	10k, 20k, 50k ,125k bps	10k, 20k, 50k ,125k, 250k, 500k, 800k, 1M bps				
Protocol	ISO 11898-3 (low speed fault tolerance), CAN 2.0A and CAN 2.0B	ISO 11898-2, CAN 2.0A and CAN 2.0B				
Receiver Buffer	1000 data frames					256 data frames
Isolation	–	3000 V_{DC} for DC-to-DC				1000 V_{DC} for DC-to-DC
UART Interface						
Type	RS-232			RS-232/422/485		RS-232
Protocol	–				Modbus RTU slave	–
Connector	9-pin female D-sub			14-pin terminal block		9-pin female D-sub
Baud Rate	110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps				300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400 bps	
Receiver Buffer	900 data frames					256 bytes
System						
Power Consumption	1 W					
Power Input	+10 V_{DC} ~ +30 V_{DC}					
Dimensions (W x L x H)	72 mm x 118 mm x 33 mm					52 mm x 98 mm x 27 mm
Operating Temperature	-25 °C ~ +75 °C					
Storage Temperature	-30 °C ~ +80 °C					

Performance Table

I-7530, I-7530FT, I-7530A performance table:

The test is the performance which transfer 8 bytes data frame from CAN to RS-232 (for I-7530/I-7530T)								
CAN setting	Transfer frames	Transfer time (ms)	RS-232 setting	Receive frames	Receive time (ms)	The max frames/sec	Data<8 byes/frame	RS-232 command length
2.0A 1 Mbps	1,000	200	115200, n, 8, 1	1,000	2954	338	>=338	22 Bytes
2.0A 1 Mbps	1,000	200	115200, n, 7, 1	1,000	2775	360	>=360	22 Bytes
2.0B 1 Mbps	1,000	200	115200, n, 8, 1	1,000	3580	279	>=279	27 Bytes
2.0B 1 Mbps	1,000	200	115200, n, 7, 1	1,000	3337	299	>=299	27 Bytes

The test is the performance which transfer 8 bytes data frame from RS-232 to CAN (for I-7530/I-7530T)								
CAN setting	Transfer frames	Transfer time (ms)	RS-232 setting	Receive frames	Receive time (ms)	The max frames/sec	Data<8 byes/frame	RS-232 command length
2.0A 1 Mbps	1,000,000	2,612,243	115200, n, 8, 1	1,000,000	2,612,243	382	>=382	22 Bytes
2.0A 1 Mbps	1,000,000	2,441,130	115200, n, 7, 1	1,000,000	2,441,130	409	>=409	22 Bytes
2.0B 1 Mbps	1,000,000	3,142,043	115200, n, 8, 1	1,000,000	3,142,043	318	>=318	27 Bytes
2.0B 1 Mbps	1,000,000	3,142,043	115200, n, 7, 1	1,000,000	2,966,646	337	>=337	27 Bytes

tM-7530 performance table:

Performance test: from CAN to RS-232(115200, n, 8, 1). Unit: Frames Per Second (FPS)								
Baud rate	1000K	800K	500K	250K	125K	50K	20K	10K
CAN 2.0A	519	519	523	522	522	416	176	88
CAN 2.0B	423	423	426	425	426	353	146	74

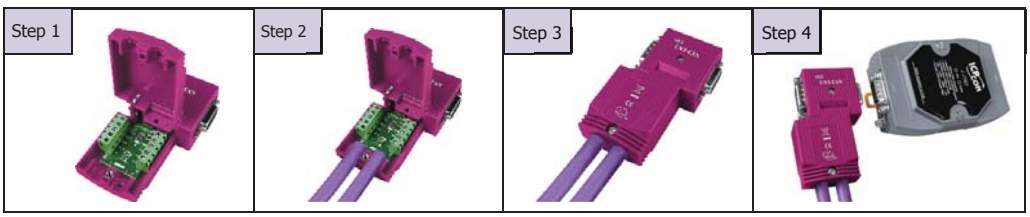
Performance test: from RS-232(115200, n, 8, 1) to CAN. Unit: Frames Per Second (FPS)								
Baud rate	1000K	800K	500K	250K	125K	50K	20K	10K
CAN 2.0A	523	524	523	522	520	451	180	90
CAN 2.0B	425	426	427	426	427	377	150	75

I-7530A-MR performance table:

RS-232/422 full-duplex communication mode			
CAN setting	RS-232/422 setting	RS-232/422 command length	The max frames/sec
2.0B 1 Mbps	115200, n, 8, 1	27 Bytes	370
2.0B 1 Mbps	230400, n, 8, 1	27 Bytes	666
2.0B 1 Mbps	460800, n, 8, 1	27 Bytes	1250

Accessories

Optional CAN bus connector: CNT-CAN



Installation

Product Showcase

▶▶▶▶ Low-Speed/Fault-Tolerance CAN to RS-232 Converter

I-7530-FT CR

The I-7530-FT is a low speed but reliable CAN to RS-232 converter. The "FT" stands for "Fault Tolerance". It follows ISO 11898-3 standard, and is suited for the applications which may have a lot of noise in the harsh environment. Generally, the I-7530-FT communicates with other CAN devices by two-line CAN bus. As one of the CAN bus lines is malfunction, the I-7530-FT even uses a single line of the CAN bus to access the CAN devices. The utility tool supports sending or receiving CAN messages, and the configuration of the I-7530-FT. This tool is free, and is helpful to diagnostic the CAN networks.

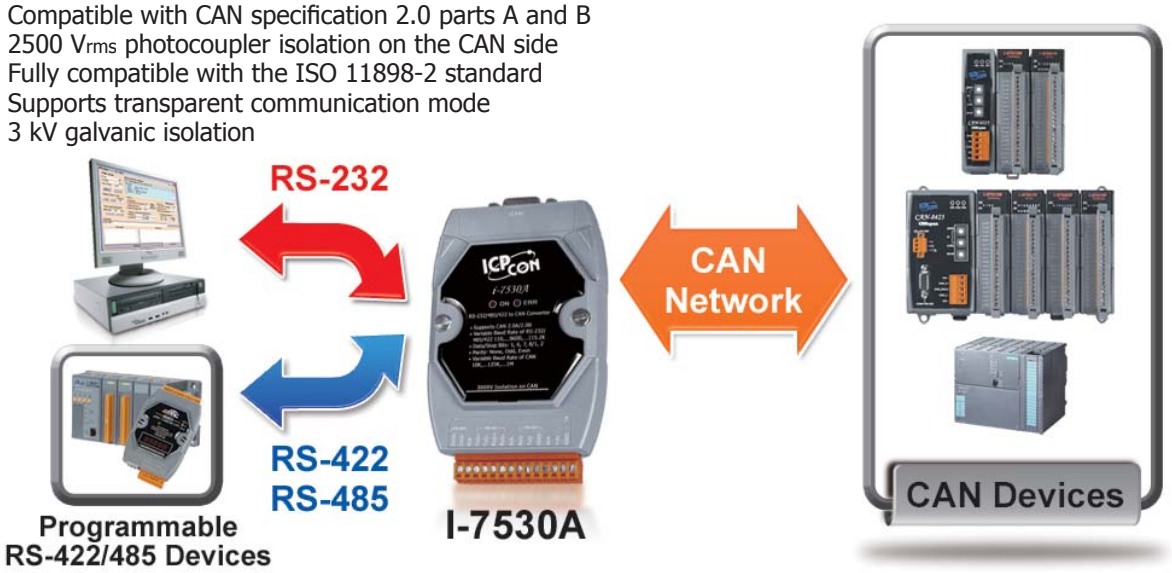
- Max. transmission speed of up to 125 kbps for CAN and 115.2 kbps for RS-232
- Power, data flow and error indicator for CAN and RS-232 transmission
- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-3 standard
- Built-in CAN/RS-232 converter firmware
- Built-in RS-232/CAN FIFO buffers

▶▶▶▶ CAN to RS-232/422/485 Converter

I-7530A CR

The I-7530A is an RS-232/422/485 to CAN converter. It is a member of the I-7530 serial family, and inherits all of the features of the I-7530. The CAN interface of the I-7530A follows ISO 11898-2 specification, the maximum CAN baud is up to 1 Mbps. There is one COM port in the I-7530A. As the I-7530A runs, it only receives the commands from one of these COM interfaces (i.e. from the RS-232, RS-485 or RS-422 interface) at the same time, but the CAN messages will be forwarded to all of these COM interfaces.

- Provides one channel each for CAN, RS-232, RS-422 and RS-485
- CAN and serial COM parameters can be configured via software
- Jumper for the 120 Ω terminator resistor of the CAN bus
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- Compatible with CAN specification 2.0 parts A and B
- 2500 V_{rms} photocoupler isolation on the CAN side
- Fully compatible with the ISO 11898-2 standard
- Supports transparent communication mode
- 3 kV galvanic isolation

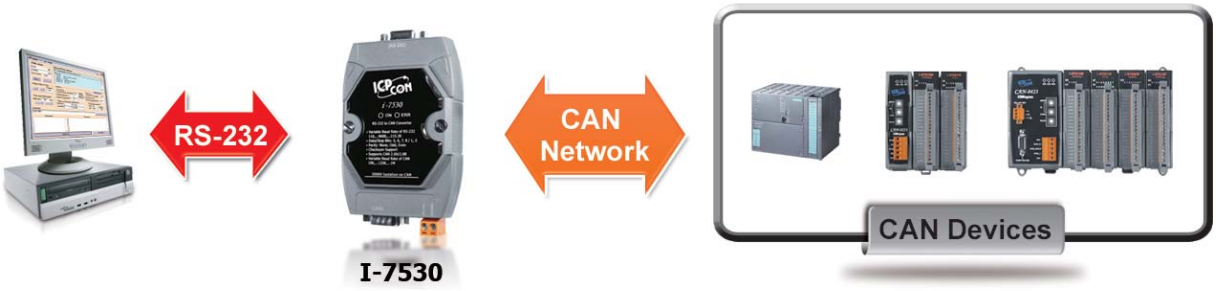


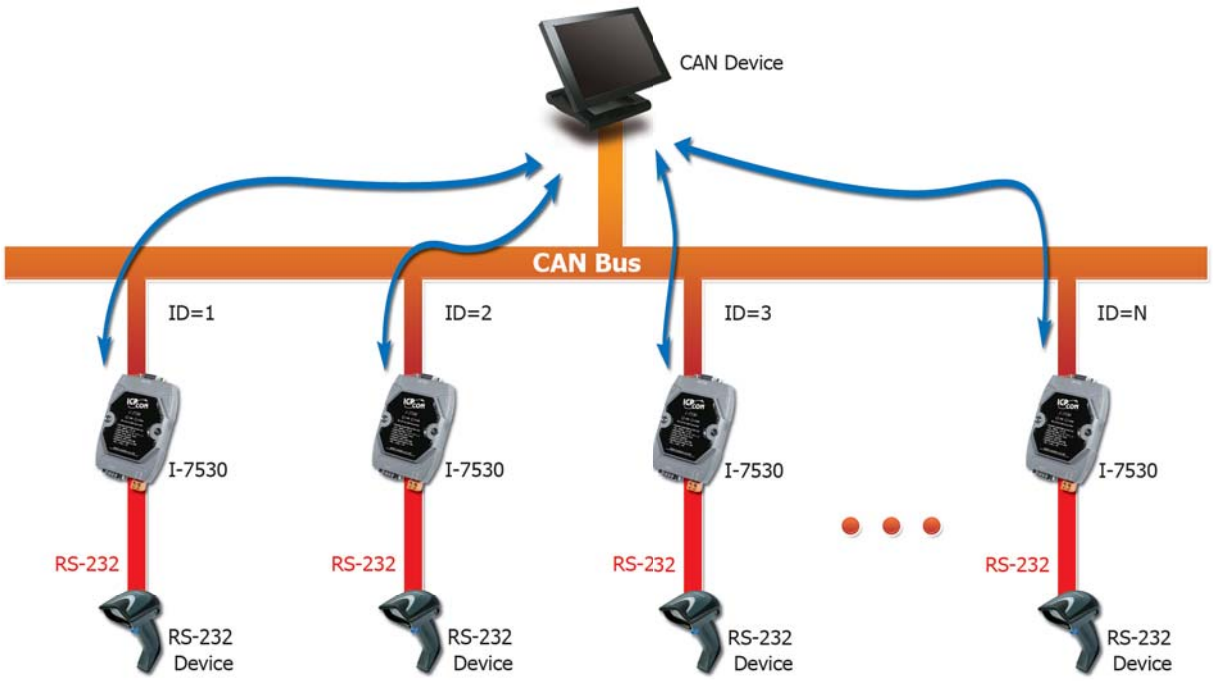
▶▶▶▶ CAN to RS-232 Converter

I-7530 CR

The I-7530 is designed for integrating the traditional RS-232 devices into the CAN network. It is a RS-232 to CAN converter which unleashes the power of the CAN bus via an RS-232 communication interface, converting messages between a CAN network and an RS-232 device. The CAN interface of the I-7530 follows ISO 11898-2 specification, the maximum CAN baud is up to 1 Mbps. Sometimes, users need to control several RS-232 devices at the same time. In this case, the I-7530 provides the station ID for the RS-232 device which is connected with the I-7530. These RS-232 devices can be grouped in a CAN network, and be controlled by one CAN master via setting pair connection mode.

- Compatible with CAN specification 2.0 parts A and B
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- Jumper for the 120 Ω terminator resistor of the CAN bus
- 3 kV galvanic isolation
- Mounts easily on a DIN-Rail
- Fully compatible with the ISO 11898-2 standard
- 2500 V_{rms} photocoupler isolation on the CAN side
- Built-in watchdog
- One CAN port and one RS-232 port
- Support transparent communication mode
- CAN and RS-232 parameters can be configured via software



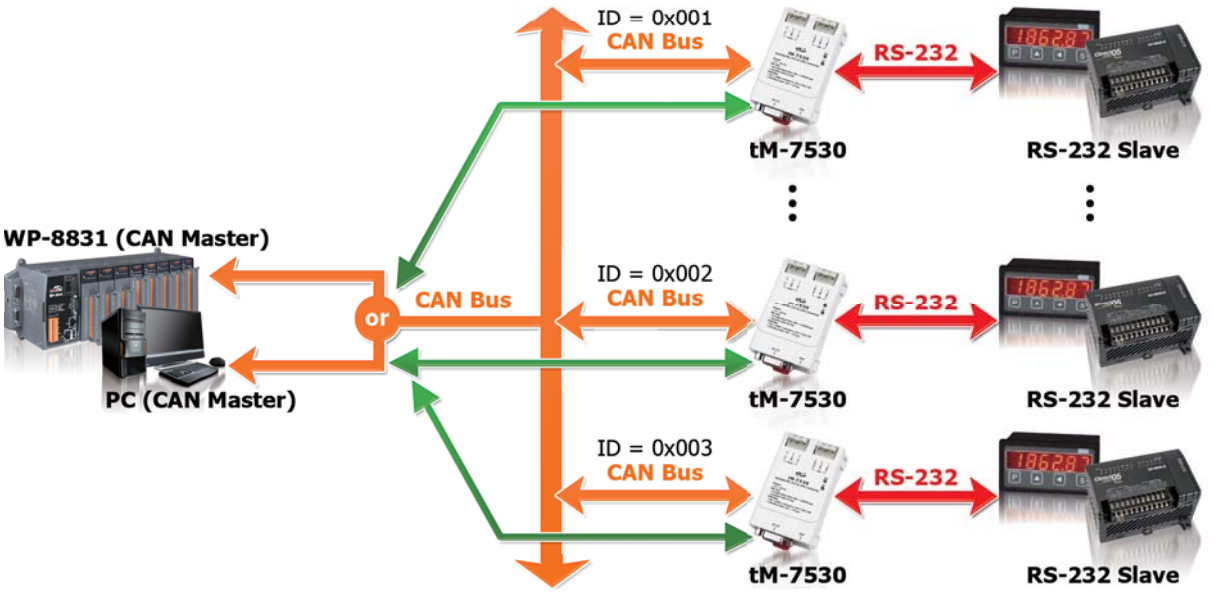


▶▶▶▶ Tiny CAN to RS-232 Converter

tM-7530 CR

The tM-7530 is a tiny form-factory, cost-efficient, and low consumption module. And it is designed for integrating the traditional RS-232 devices into the CAN network. With its high performance, it is more efficient to convert messages between the CAN network and the RS-232 interface. The CAN interface of the tM-7530 follows ISO 11898-2 specification, the maximum CAN baud is up to 1 Mbps. The functional design of tM-7530 is the same as I-7530 series, including basic communication and pair connection mode. tM-7530 supports RS-232 baud rate up to 230400 bps.

- Compatible with CAN specification 2.0 parts A and B
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- Optional external 125 Ω terminator resistor of the CAN Bus
- 1 kV galvanic isolation
- Mounts easily on a DIN-Rail
- Fully compatible with the ISO 11898-2 standard
- 2500 V_{rms} photocoupler isolation on the CAN side
- Built-in watchdog
- One CAN port and one RS-232 port
- Support transparent communication mode
- CAN and RS-232 parameters can be configured via software
- RS-232 baud rate up to 230400

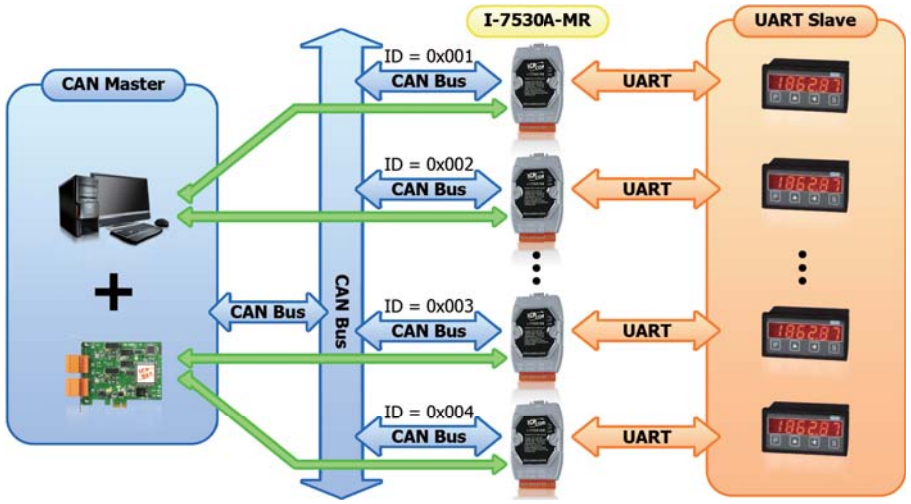


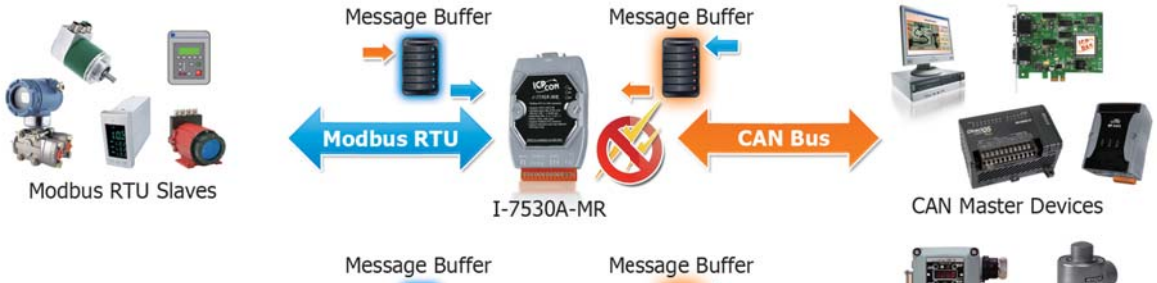
CAN to Modbus RTU Converter

I-7530A-MR CR

The I-7530A-MR is a CAN bus to Modbus RTU converter and allows the Modbus RTU master/slave device to communicate with CAN devices on a CAN network. Different from the I-7530A, the I-7530A-MR supports Modbus RTU protocol in its RS-232/422/485 port. It is helpful to use standard Modbus RTU protocol to access CAN networks. Besides, the higher COM baud and full-duplex RS-232/RS-422 transparent communication of the I-7530A-MR solve more difficult problems of applications which may not be touched by the I-7530A. The I-7530A-MR provides three kinds of communication modes, ASCII communication mode, Modbus RTU communication mode, Modbus RTU master/slave mode, and transparent communication mode.

- Compatible with CAN specification 2.0 parts A and B
- Programmable CAN bus baud rate from 10 kbps ~ 1 Mbps, or a user-defined baud rate
- Supports CAN bus acceptance filter configuration
- Include a software utility that enables users to easily configure module settings and test CAN bus communication
- Converts CAN messages to specific ASCII command string
- Provides pair-connection communication between RS-232/RS-485/RS-422 devices via the CAN bus
- Allows Modbus RTU master/slave devices to communicate with CAN slave/master devices





5-2-3 Gateway/Protocol Converters (CANopen/DeviceNet/J1939)

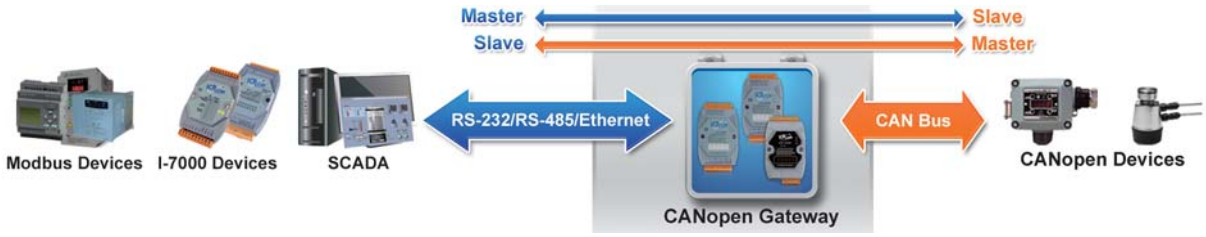
Introduction

The stand alone industrial gateways are designed to connect existing devices to the fieldbus via the serial bus or the Ethernet. It is easy to use and setup without programming. The following protocols are supported by ICP DAS gateways.

- DCON protocol: a kind of protocol based on the RS-485 network. It is special for ICP DAS I-7000 and I-87K series modules.
- Modbus RTU: a kind of protocol based on the RS-232/485 network. The Modbus RTU devices may be a PLC, a Modbus RTU sensor, ICP DAS M-7000 series modules, and so forth.
- Modbus TCP: a kind of protocol based on the Ethernet. The Modbus TCP devices may be a PLC, a Modbus TCP sensor, ICP DAS ET-7000 series modules, and so forth.

5-2-3-1 CANopen Gateways

Introduction



Specifications

Models	I-7231D	I-7232D	GW-7433D
Pictures	CANopen Slave to DCON Master Gateway	CANopen Slave to Modbus RTU Master Gateway	Modbus TCP/RTU Slave to CANopen Master Gateway
			
CANopen Interface			
CANopen Interface	1 channel (CAN_H, CAN_L), and the other is for bypass		
CANopen Function	CANopen slave		CANopen master (Supports at least 120 CANopen commands)
CANopen Baud Rate	10 k, 20 k, 50 k, 125 k , 250 kbps , 500 k, 800 k, 1M		
CANopen Version	CiA 301 v 4.02 and CiA 401 v2.01		
Guarding Function	Yes		
Heartbeat Function	Heartbeat Producer		Heartbeat Consumer
Emergency Message	Yes		–
UART Interface			
COM1 Connector	RS-232 (TxD, RxD, RTS, CTS, GND) or RS-485 (Data+, Data-), Non-isolated		RS-232 (TxD, RxD, RTS, CTS, GND), Non-isolated
COM1 Function	Only for configuration		Modbus RTU Slave
COM2 Connector	RS-485 (Data+, Data-) with internal Self-Tuner ASIC; Non-isolated		
COM2 Function	DCON Master (Supports Max. 15 I-7K or I-87K modules)	Modbus RTU Master (Supports Max. 10 Modbus RTU commands)	Modbus RTU Slave
Ethernet Interface			
Ethernet	–		10/100 Base-TX
Ethernet Function	–		Configuration or Modbus TCP Server
Modbus Function Code	–	01, 02, 03, 04, 06, 15	01, 02, 03, 04, 05, 06, 15,16
System			
Power Consumption	3 W		
Power Input	+10 V_{DC} ~ +30 V_{DC}		
Dimension (W x L x H)	72 mm x 122 mm x 33 mm		
Operating Temperature	-25 °C ~ +75 °C		
Storage Temperature	-30 °C ~ +80 °C		

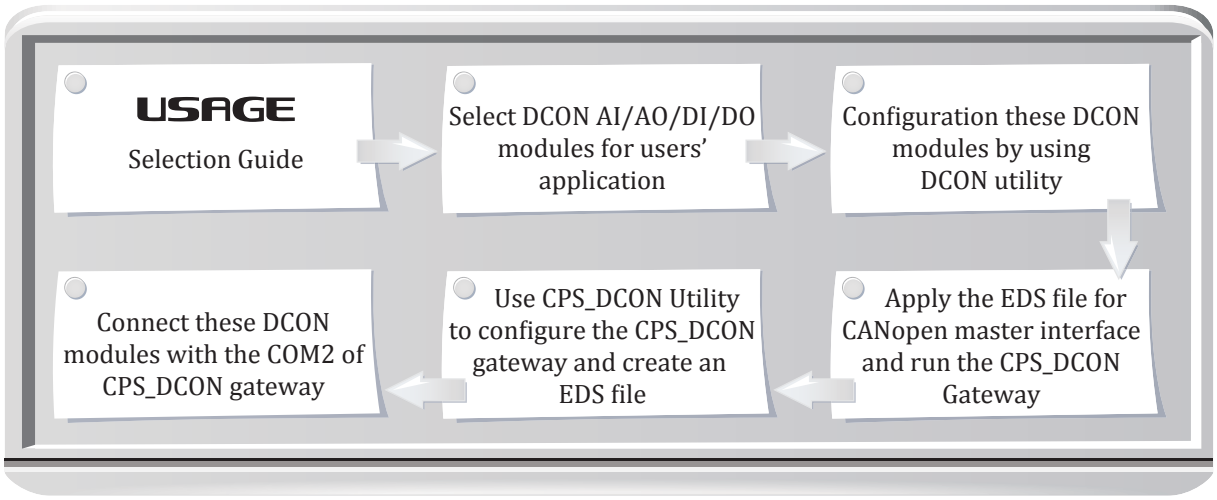
Product Showcase

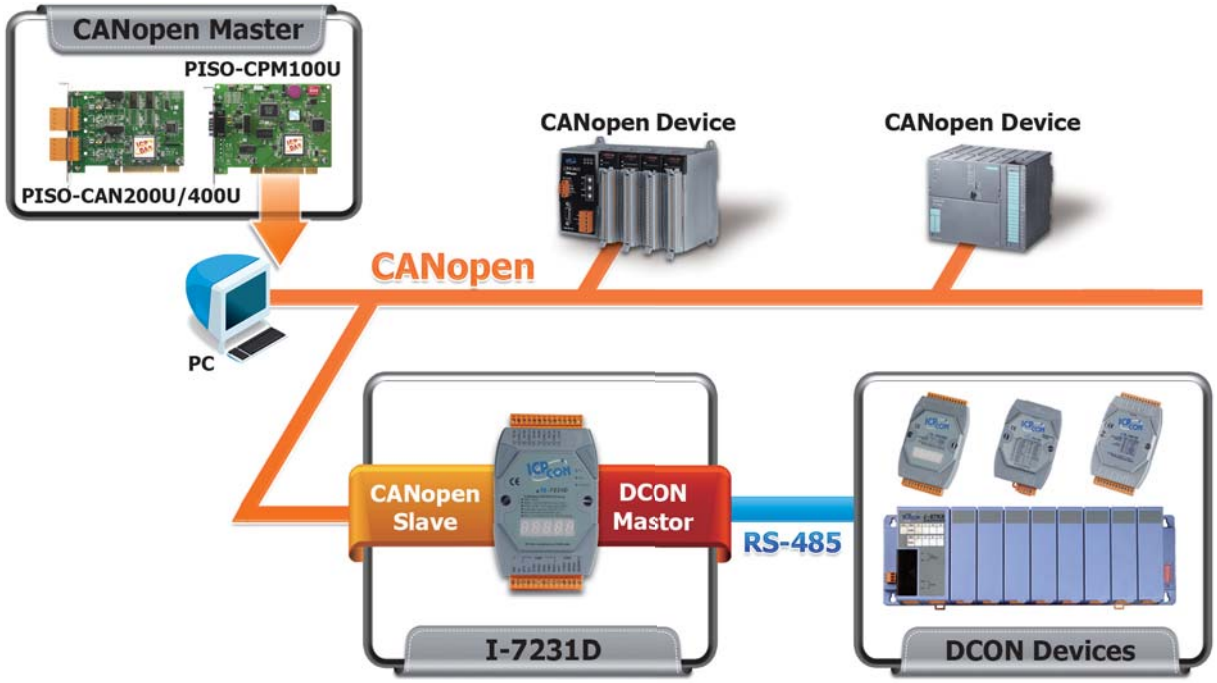
CANopen Slave to DCON Master Gateway

I-7231D CR

The I-7231D is a CANopen slave device with DCON protocol to connect to ICP DAS I/O modules, such as I-7000 series and I-87K series modules. By way of applying the I-7231D, the DCON I/O modules can be integrated to the CANopen network. From the view of CANopen applications, the I-7231D is a CANopen slave device. It can produce or consume the PDO messages, receive the SDO message with proper responses, and deal with the NMT messages from the NMT master. In the DCON network, it is a DCON master device which collects all of the I/O statuses of the I-7000 and I-87K series modules. The utility tool is given to configure the device parameters and build EDS file. Users can easily apply I-7k and I-87K IO modules in any CANopen master interface via this EDS file.

- PDO: Event-triggered, RTR, cyclic, acyclic SYNC and dynamic PDO mapping
- Support Max. 15 I-7000/I-87K I/O series modules
- CANopen Version: DS-301 v4.02 , DSP-401 v2.1
- Error Control: Node Guarding protocol
- Product EDS file dynamically by utility
- No of SDOs: 1 server, 0 client
- NMT: Slave



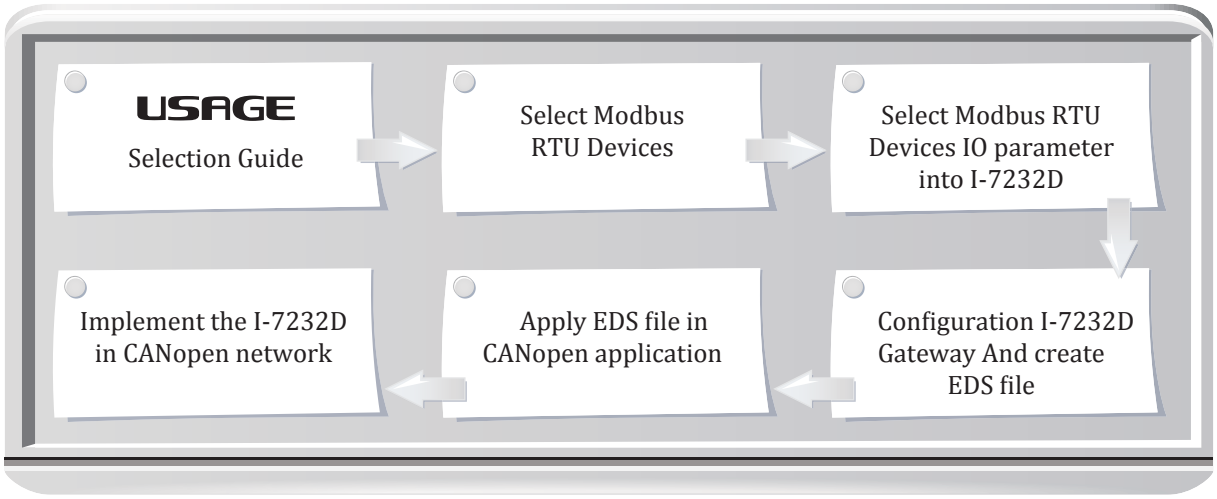


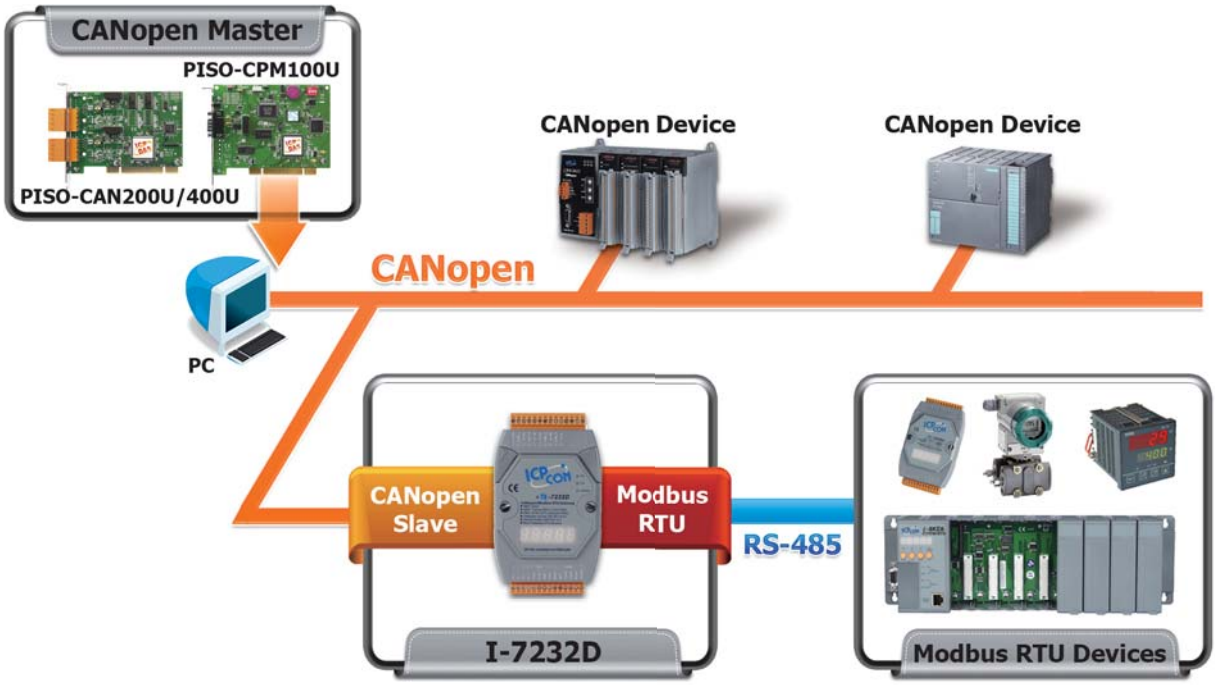
▶▶▶▶ CANopen Slave to Modbus RTU Master Gateway

I-7232D CR

The I-7232D is a CANopen slave to Modbus RTU master gateway, and allows a CANopen master to have ability to access the Modbus slave devices. In the CANopen network, the I-7232D is a NMT slave, SDO server, PDO producer, and PDO consumer. From the view of the Modbus network, it is a Modbus RTU master which polls all the predefined data of the Modbus RTU slaves, and bypass the CANopen control commands to the Modbus slaves. The I-7232D follows the CANopen specification CiA-301 v4.02 and CiA-401 v2.1, and supplies many features of CANopen protocols, such as dynamic PDO, EMCY object, error output value, SYNC cyclic and acyclic. Like the I-7231D, the EDS file is also provided by the utility tool. Users can easily apply the I-7232D in the standard CANopen master with the EDS file.

- PDO: Event-triggered, RTR, cyclic, acyclic SYNC and dynamic PDO mapping
- CANopen Version: DS-301 v4.02 , DSP-401 v2.1
- Support Max. 10 Modbus RTU commands
- Error Control: Node Guarding protocol
- Product EDS file dynamically by utility
- No of SDOs: 1 server, 0 client
- NMT: Slave



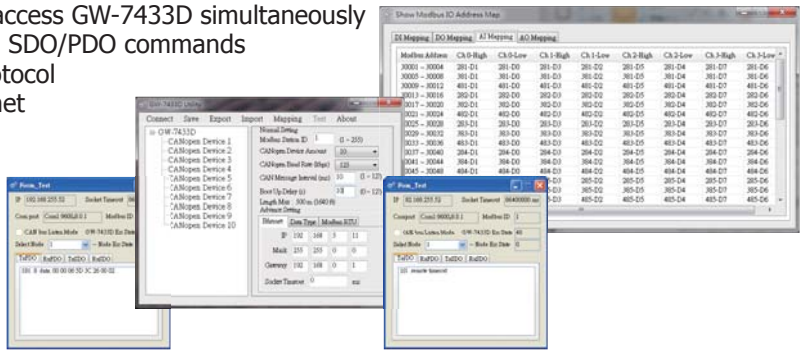


▶▶▶▶ Modbus TCP/RTU Slave to CANopen Master Gateway

GW-7433D CR

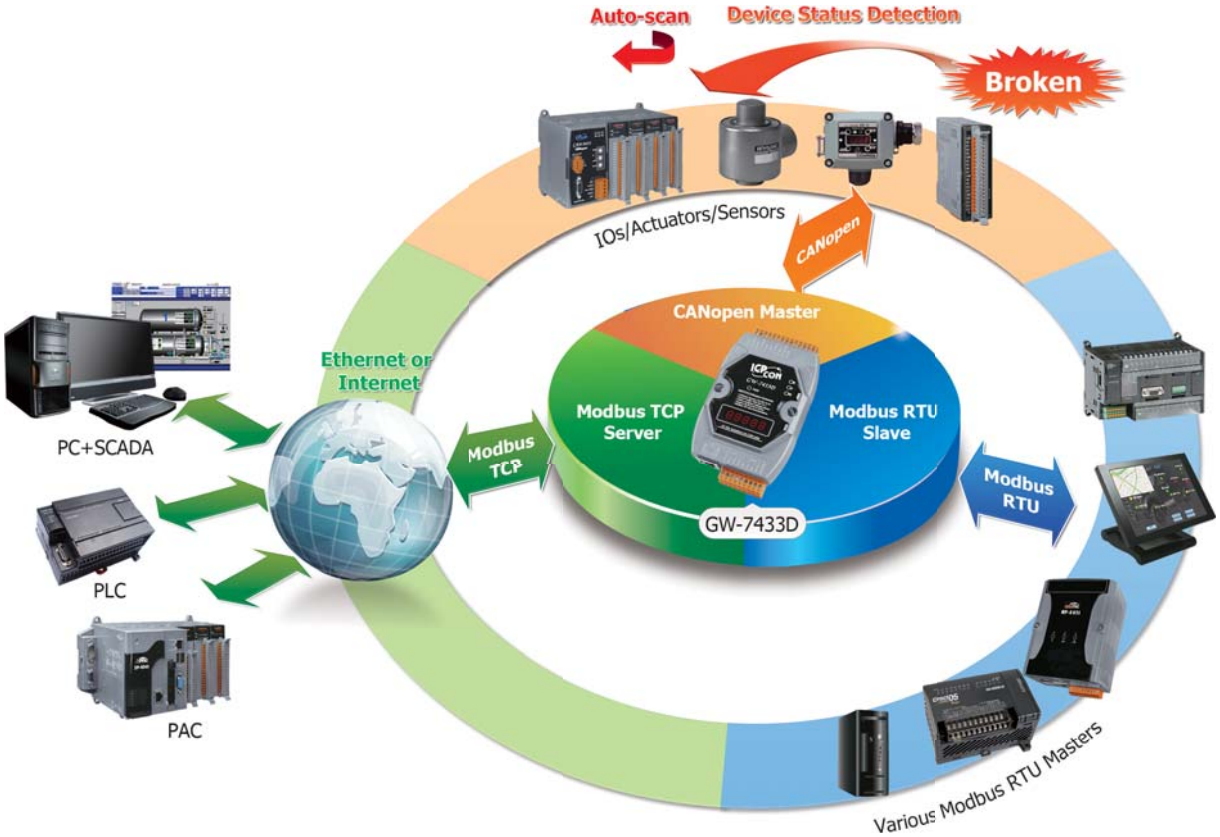
The GW-7433D is an economic Fieldbus solution that provides the communication transformation mechanisms between the Modbus protocol and the CANopen protocol. This module is able to collect the information of the CANopen slaves periodically, and returns these data to the Modbus TCP client or Modbus RTU master while receiving the Modbus commands. When the Modbus TCP client or Modbus RTU master needs to output data to the CANopen slaves, the GW-7433D transfers the received Modbus commands to the CANopen messages to handle the CANopen slaves. Both of the Modbus TCP server and the Modbus RTU slave functions can work on the GW-7433D simultaneously. The GW-7433D also offers the Modbus registers for recording the life statuses of the CANopen slaves. These features mean that users can set up their applications more reliably and flexibly.

- Allow 5 Modbus TCP masters to access GW-7433D simultaneously
- Support more than 120 CANopen SDO/PDO commands
- Error Control: Node Guarding protocol
- Configuration by utility via Ethernet
- CANopen Version: DS-301 v4.02
- PDO: Event-triggered, RTR
- Emergency Message: Yes
- NMT: Master



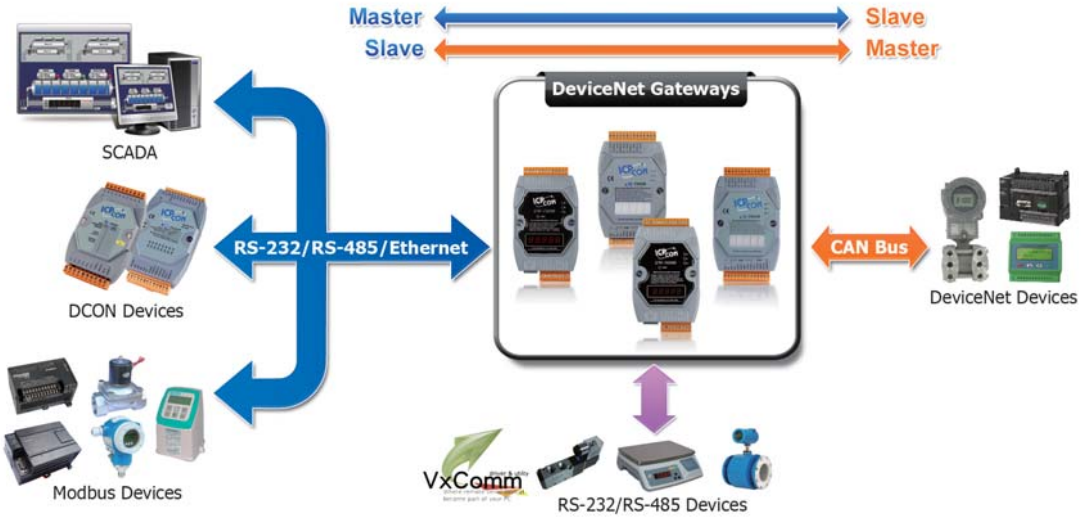
Utility Features

- User-friendly GUI for CANopen and Modbus configuration
- Provide TxPDO, RxPDO, TxSDO, and RxSDO CANopen messages
- The Modbus TCP and CANopen network diagnosis while setting up the applications
- Automatic data mapping between the Modbus registers and CANopen objects
- Provides export/import the configuration file from/to the GW-7433D



5-2-3-2 DeviceNet Gateways

Introduction



Specifications

Models	I-7241D	I-7242D	GW-7243D	GW-7434D
Pictures	DeviceNet Slave to DCON Master Gateway	DeviceNet Slave to Modbus RTU Master Gateway	DeviceNet Slave to Modbus TCP/RTU Master Gateway	Modbus TCP/RTU Slave to DeviceNet Master Gateway
				
DeviceNet Interface				
DeviceNet Connector	1 channel (CAN_H, CAN_L), and the other is for bypass			
DeviceNet Function	DeviceNet slave			DeviceNet master
DeviceNet Baud Rate	125k, 250k, 500k bps			
DeviceNet Specification	DeviceNet specification Volume I/II, Release 2.0			
I/O operating modes	Polling, Bit-Strobe, Change of State/Cyclic		Polling	Polling, Bit-Strobe, Change of State/Cyclic
Heartbeat Function	Yes			–
Shutdown Message	Yes			–
Shutdown Message	Yes			–
UART Interface				
COM1 Connector	RS-232 (TxD, RxD, RTS, CTS, GND) or RS-485 (Data+, Data-), Non-isolated		RS-232 (TxD, RxD, RTS, CTS, GND), Non-isolated	
COM1 Function	Only for configuration			Modbus RTU Master/Slave, VxComm
COM2 Connector	RS-485 (Data+, Data-) with internal Self-Tuner ASIC; Non-isolated			
COM2 Function	DCON Master (Supports Max. 15 I-7K or I-87K modules)	Modbus RTU Master (Supports Max. 10 Modbus RTU commands)	Modbus RTU/ASCII Master	Modbus RTU Master/Slave, VxComm
Ethernet Interface				
Ethernet	–		10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)	
Ethernet Function	–		Modbus TCP Client	Configuration, Modbus TCP Server, VxComm
Modbus Function Code	–	0x01, 0x 02, 0x 03, 0x04, 0x0F, 0x10	0x01, 0x 02, 0x 03, 0x04, 0x05, 0x06, 0x0F, 0x10	
System				
WDT	Yes (0.8 second)			
Power Consumption	3 W		2.5 W	
Power Input	+10 V_{DC} ~ +30 V_{DC}			
Dimension (W x L x H)	72 mm x 122 mm x 33 mm			
Operating Temperature	-25 °C ~ +75 °C			
Storage Temperature	-30 °C ~ +80 °C			

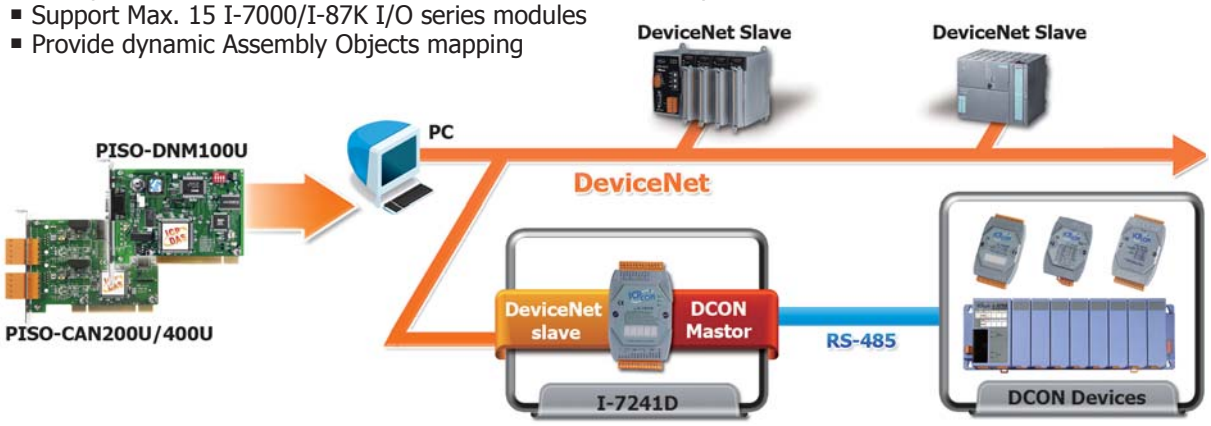
Product Showcase

DeviceNet Slave to DCON Master Gateway

I-7241D CR

The I-7241D is the communication gateway between DeviceNet and DCON protocols. It is a DeviceNet slave device in the DeviceNet network, which functions as a "Group 2 Only Slave" device, and supports "Predefined Master/slave Connection Set". In the DCON network, the I-7241D is a DCON master and can access the data of the I-7000 or I-87k series modules. The utility software is given to configure the device parameters and build EDS file for the DeviceNet slave device. Through the I-7241D, the DeviceNet master can quickly integrate the I-7000 and I-87K series modules into the DeviceNet network.

- Support Offline Connection Set, Device Heartbeat message and Device Shutdown message
- Comply with DeviceNet specification volume I, release 2.0 & volume II, release 2.0
- Support Predefined Master/Slave Connection Set (Group 2 Only Server)
- I/O operating modes: Polling, Bit-Strobe, Change of State/Cyclic
- Support Max. 15 I-7000/I-87K I/O series modules
- Provide dynamic Assembly Objects mapping

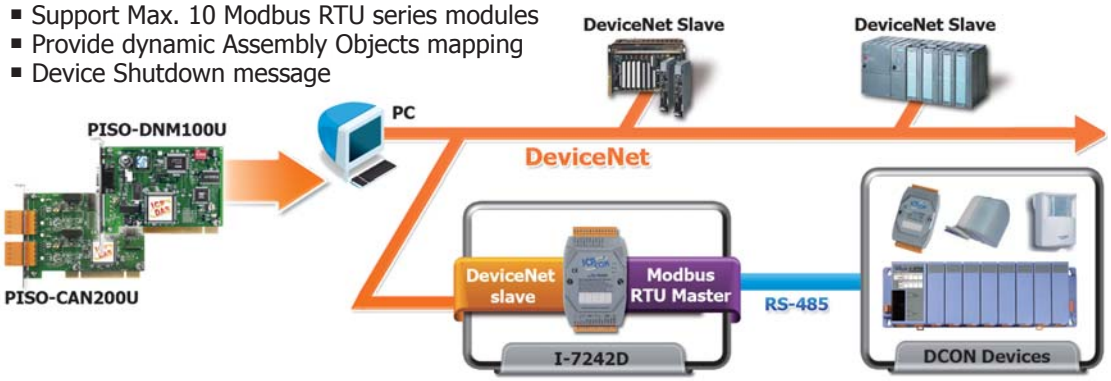


DeviceNet Slave to Modbus RTU Master Gateway

I-7242D CR

The I-7242D allows a master located on a DeviceNet network to enter into a dialogue with the slaves on a Modbus RTU network. It's a "Group 2 Only Slave" device in the DeviceNet network, and supports "Predefined Master/Slave Connection Set". From the view of the Modbus network, it is a Modbus RTU master which polls all the predefined data of the Modbus RTU slaves, and bypass the DeviceNet control commands to the Modbus slaves. This device is widely used in the application of building automation, remote data acquisition, environment control and monitoring, laboratory equipment & research, factory automation, etc. The I-7242D also has the utility tool which is used to configure the I-7242D's parameters and build the EDS file. Through the EDS file to the I-7242D, it is easy to apply the Modbus RTU devices in DeviceNet applications.

- Support Offline Connection Set, Device Heartbeat message and Device Shutdown message
- Comply with DeviceNet specification volume I, release 2.0 & volume II, release 2.0
- Support Predefined Master/Slave Connection Set (Group 2 Only Server)
- I/O operating modes: Polling, Bit-Strobe, Change of State/Cyclic
- Support Max. 10 Modbus RTU series modules
- Provide dynamic Assembly Objects mapping
- Device Shutdown message



▶▶▶▶ DeviceNet Slave to Modbus TCP/RTU/ASCII Master Gateway

GW-7243D CR

The GW-7243D offers the DeviceNet slave and Modbus master functions, and enables the DeviceNet master to access the Modbus slave devices. In the DeviceNet network, the module acts as a Group 2 Only Server device, and waits to build the connection with the DeviceNet master. In the Modbus network, the GW-7243D is a master device, and cyclically sends the commands to access the Modbus slave devices. Both the Modbus TCP client and Modbus RTU/ASCII master interfaces of the GW-7243D can work simultaneously. This feature means that users are able to integrate different kinds of Modbus slave devices together into the DeviceNet network no matter these devices provide Ethernet, RS-232 or RS-485 communication interfaces. In order to simplify the use of the GW-7243D, the GW-7243D Utility tool for configuration and EDS file production is given. This is helpful to build the applications easily and quickly.

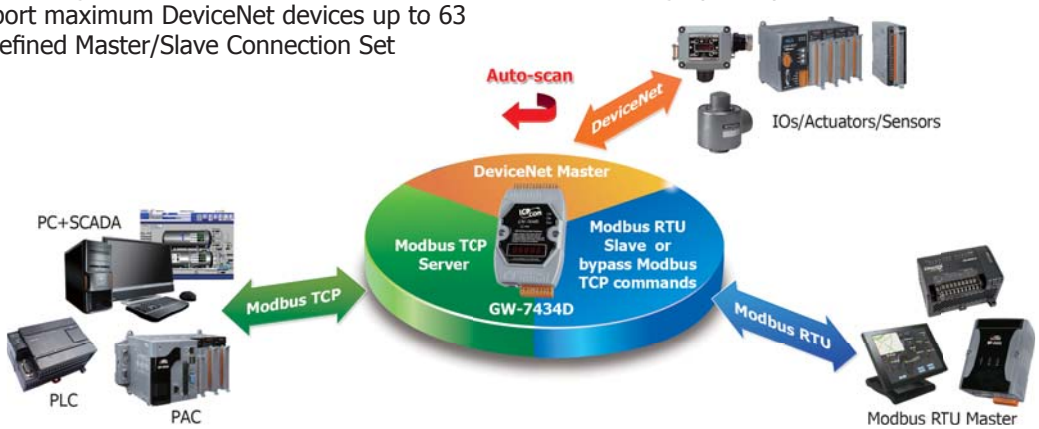
- Support Modbus function codes: 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x0F and 0x10
- Maximum support 4 Modbus TCP devices Support Explicit and Poll Connection
- Maximum support 5 Modbus TCP commands for each Modbus TCP device
- Maximum support 10 Modbus RTU/ASCII commands for each COM port
- Group 2 Only Server DeviceNet subscriber

▶▶▶▶ Modbus TCP/RTU/ASCII Slave to DeviceNet Master Gateway

GW-7434D CR

The GW-7434D is an economic solution that provides a communication protocol transformation between the DeviceNet protocol and the Modbus TCP protocol. This module solves the problem to connect an existing DeviceNet network to the Ethernet-based PLC, HMI or SCADA for setting up a control or monitoring system. Different to the GW-7243D, the GW-7434D offers the Predefined Master connection Set function and Group 2 only Server function as a DeviceNet master, and enables accessing the DeviceNet slaves automatically and cyclically. If the PLC, HMI or SCADA would like to access the DeviceNet slaves and simultaneously communicate with the Modbus slaves or COM-based devices connected with the RS-232 or RS-485 port of the GW-7434D, the GW-7434D can be the Modbus TCP server or VxComm server to exchange the data with those devices.

- Support one Poll, one Bit-Strobe, one COS or one Cyclic IO connection for each DeviceNet device
- Support VxComm technique for every COM ports of controllers, setting by Utility
- Convert single Modbus TCP to multi Modbus RTU devices, setting by Utility
- Support maximum DeviceNet devices up to 63
- Predefined Master/Slave Connection Set



5-2-3-3 J1939 Gateways

Introduction

J1939 is the vehicle bus standard used for communication and diagnostics among vehicle components, originally by the car and heavy duty truck industry in the United States. Because of the success of applying in vehicles, J1939 has become the accepted industry standard and the vehicle network technology of choice for off-highway machines in applications such as construction, material handling, and forestry machines. It is a higher-layer protocol based on Controller Area Network (CAN), which provides serial data communications between microprocessor systems (ECU) in any kind of heavy duty vehicles. The messages exchanged between these units can be data such as vehicle road speed, torque control message from the transmission to the engine, oil temperature, and many more.

Specifications

Models	GW-7228	GW-7238D NEW
Pictures		
Hardware		
J1939 Channels	1	
CAN Interface		
Controller	Microprocessor inside with 96 MHz	NXP SJA1000T with 16 MHz clock
Transceiver	NXP 82C250/NXP TJA1042	
Connector	9-pin D-Sub connector	5-pin screwed terminal block (CAN_L, CAN_H, N/A for others)
Baud Rate (bps)	250 k	
Isolation	3000 V_{DC} for DC-to-DC 2500 V_{rms} for photo-couple	1000 V_{DC} for DC-to-DC 2500 V_{rms} for photo-couple
Terminator Resistor	Selectable 120 Ω terminator resistor by jumper	
Specification/Protocol	ISO-11898-2, CAN 2.0A and CAN 2.0B/**J1939**	
UART Interface		
COM 1/Protocol	RS-232/RS-422/RS-485/**Modbus RTU**	RS-232/**Modbus RTU**
COM 1 Connector	14-pin screw terminal connecter RS-232 (TXD, RXD, GND)/ RS-422 (Tx+, Tx-, Rx+, Rx-)/ RS-485 (D+, D-)	5-pin screwed terminal block (TxD, RxD, RTS, CTS, GND)
COM 2/Protocol	–	RS-485 (Self-Turner inside)/**Modbus RTU**
COM 2 Connector	–	2-pin screwed terminal block (DATA+, DATA-)
Ethernet Interface		
Controller	–	10/100Base-TX Ethernet Controller(Auto-negotiating, Auto_MDIX)
Connector/Protocol	–	RJ-45 with LED indicator/Modbus TCP
Power		
Power Supply	Unregulated +10 V_{DC} ~ +30 V_{DC}	
Protection	Power reverse polarity protection, Over-voltage brown-out protection	
Power Consumption	1.5 W	2 W
Mechanical		
Dimensions (L x W x H)	122 mm x 72 mm x 33 mm	108 mm x 72 mm x 33 mm
Environment		
Operating Temperature	-25 °C ~ +75 °C	
Storage Temperature	-30 °C ~ +80 °C	
Relative Humidity	10 ~ 90% RH, non-condensing	

Product Showcase

▶▶▶▶ Modbus RTU Slave to J1939 Master Gateway

GW-7228 CR

The GW-7228 enables the Modbus RTU master to exchange the data with the devices in the J1939 network. This module provides the Modbus slave functions on the RS-232, RS-422, and RS-485 ports so that the Modbus RTU master can easily control and monitor the J1939-based devices. If users use one of the communication ports for application, the other two ports can be used to monitor the Modbus communication situations between the Modbus master and the GW-7228. This feature is helpful for diagnosis while setting up an application system. For J1939 CAN networks, the GW-7228 supports PDU1, PDU2, broadcast and destination specific type of J1939 messages, and is widely applied in the Diesel power-train, in-vehicle networks for trucks and buses or where the Modbus RTU and J1939 protocols transformation is needed.

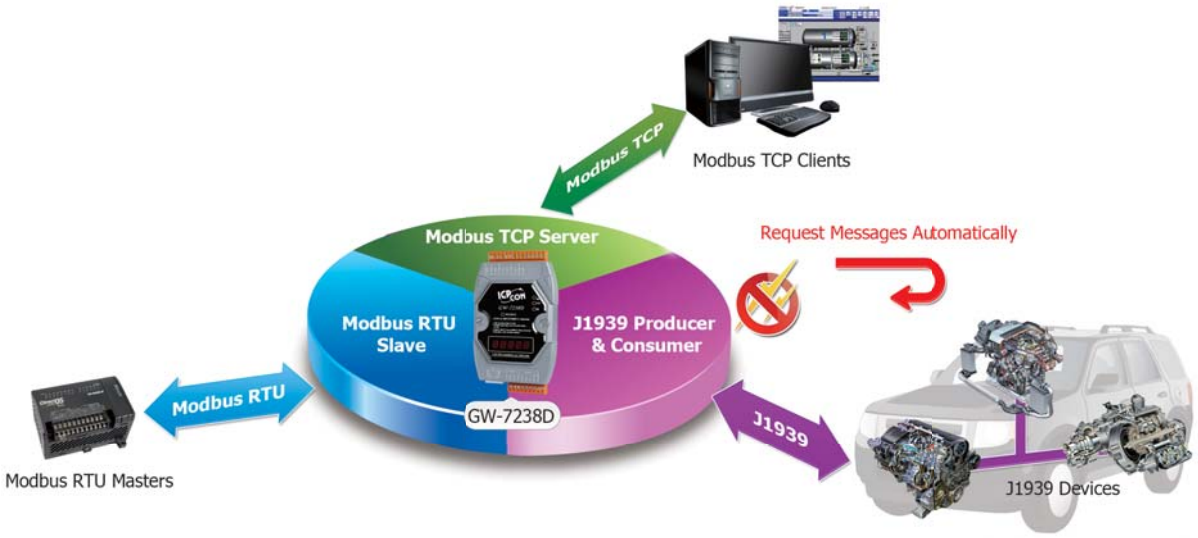
- Transmission and reception of all types of J1939 messages, including PDU1, PDU2, broadcast and destination specific
- Support Modbus RTU slave protocol with function codes 03, 04, 06 and 16
- Support BAM of Connection Management message
- Built-in jumper to select 120 Ω terminal resister
- Support RS-232, RS-485 and RS-422 interfaces
- Provide PWR/J1939/MODBUS indication LED
- Built-in watchdog

▶▶▶▶ Modbus TCP/RTU Slave to J1939 Master Gateway

GW-7238D CR *NEW*

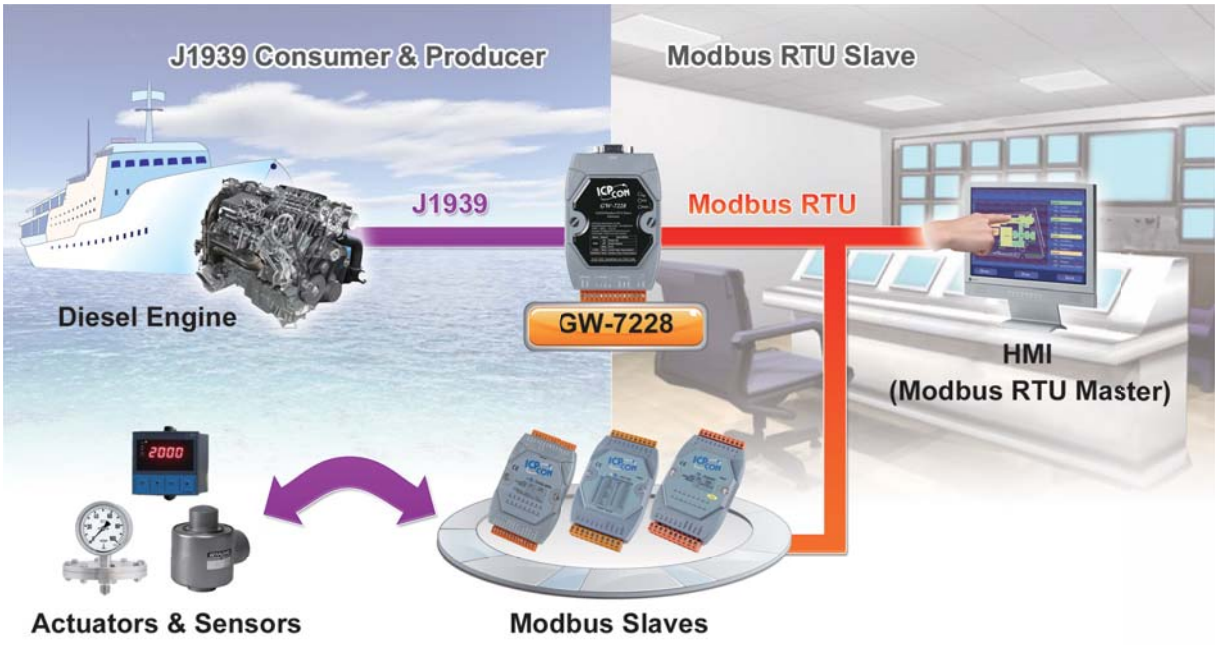
Similar to the GW-7228, the GW-7238D is a J1939 to Modbus master gateway. The main difference is that the GW-7238D has an Ethernet port as the Modbus TCP server, and allows connecting with up to 5 Modbus TCP clients. The GW-7238D also offers an RS-232 and RS-485 ports which are the Modbus RTU slaves and enable the Modbus RTU master to exchange the data with the devices in the J1939 network. Both the Modbus TCP server and the Modbus RTU slave functions of the GW-7238D can work simultaneously. This feature means that users can apply the GW-7238D in their applications more flexibly and more economically. For J1939 CAN networks, the GW-7238 supports PDU1, PDU2, broadcast and destination specific type of J1939 messages, and is widely applied in the various J1939-based applications.

- Transmission and reception of all types of J1939 messages, including PDU1, PDU2, broadcast and destination specific
- Provide PWR/J1939/MODBUS/ERR indication LEDs
- Communication support both Modbus TCP/RTU to J1939 at the same time
- Support RS-232, RS-485 and Ethernet interfaces
- Support Modbus TCP server/RTU slave protocol with function code 03, 04, 06 and 16
- Support BAM of Connection Management message
- Built-in jumper to select 120 Ω terminal resister
- Built-in watchdog



Case Studies

The user from the vessel power research institute needs to set up an engine test system to adjust the performance of the vessel engines. In this system, the Volvo Penta Diesel engine which offers the J1939 communication interface is used. The user would like to control and monitor the engine parameters, such as the engine oil temperature, the engine coolant temperature, the engine rotational speed, the toque speed and the value of the frequency switch, on the touch screen which provides the RS-485 interface as a Modbus RTU master. In order to overcome the problem of the data exchange between the J1939 network and the Modbus RTU network, the user applies the GW-7228 to resolve this issue. The GW-7228 provides the J1939 interface and the Modbus RTU slave function. In the J1939 network, the GW-7228 listens to the J1939 network and obtains all of the J1939 messages automatically sent from the engine. When receiving the Modbus RTU messages from the touch screen, the GW-7228 returns the data of the engine or commands the engine to change the rotational speed and toque that is corresponding to the content of the Modbus commands.



5-2-4 Palm-size Programmable CAN Controllers

Introduction

The palm size PACs (Programmable Automation Controller) include I-7188XBD-CAN, uPAC-7186EXD-CAN and µPAC-5001D-CAN2. With abundant and various peripherals and communication ports, the PAC can integrate different communication interface, like CAN bus, RS-232, RS-485, Ethernet and so on. In order to increase the modules openness and applications flexibility, the PAC provides MiniOS7, a DOS-like real-time single-task operation system for adapting to all kinds of needs. Users can develop application programs via C/C++ compiler.

Unique 64-bit Hardware Serial Number

Built-in RTC - Real Time Clock

5-Digit 7-Segment LED Display

microSD expansion

Specifications

Models	I-7188XBD-CAN	uPAC-7186EXD-CAN	uPAC-5001D-CAN2
Pictures			
System Software			
OS	MiniOS7 (DOS-like embedded operating system)		
Development Software			
Download Interface	RS-232 (COM1) or Ethernet		
Language	C language		
Compilers	TC++ 1.01, TC 2.01, BC++3.1 ~ 5.2x, MSC 6.0, MSVC++ (before version 1.5.2)		
CPU Module			
CPU	80188, 40 MHz or compatible	80186, 80 MHz or compatible	
SRAM	512 KB	512 KB	512 KB
Flash	512 KB	512 KB	512 KB
microSD Expansion	–		Up to 4 GB
EEPROM	2 KB	16 KB	
NVRAM	31 Bytes (battery backup, data valid up to 10 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)		
Communication Ports			
Ethernet	–	10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)	
COM 1	RS-232 (TxD, RxD, RTS, CTS, GND) or RS-485 (Data+, Data-), Non-isolated	RS-232 (TxD, RxD, RTS, CTS, GND), Non-isolated	
COM 2	RS-485 (Data+, Data-) with internal Self-Tuner ASIC; Non-isolated		
CAN	1 channel	1 channel	2 channels
LED Indicator			
7-Segment LED	Yes		
Programmable LED Indicators	4		5
Mechanical			
Dimension (W x L x H)	72 mm x 122 mm x 33 mm		91 mm x 123 mm x 52 mm
Installation	DIN-Rail Mounting		
Environmental			
Operating Temperature	-25 °C ~ +75 °C		
Storage Temperature	-30 °C ~ +80 °C		
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)		
Power			
Input Range	+10 V_{DC} ~ +30 V_{DC}		12 V_{DC} ~ 48 V_{DC}
Redundant Power Inputs	–		Yes
Power Consumption	3 W		

5-2-5 PC-based CAN Bus Boards

Introduction

To access the CAN sensors, actuators, and I/O modules we provide communication boards for PC-based solution.

CAN bus Boards

The PCI and PCI Express CAN bus boards use the new CAN controller Phillips SJA1000T and transceiver TJA1042, which provide bus arbitration, error detection with auto correction and re-transmission function. It can be installed in a 5V or 3.3V PCI slot and supported truly "Plug & play".

PISO-CAN800U-D: 8-Port isolated PCI CAN board

Communication Boards

The following CAN bus communication boards are designed for different interface and different CAN port number. The common features are:

1. Compatible with CAN specification 2.0 parts A and B
2. Fully compatible with ISO 11898-2 standard
3. Supports baud rate from 10 kbps to 1 Mbps
4. 2 kV galvanic isolated
5. Direct memory mapping to the CAN controller

Software Support

For Windows:

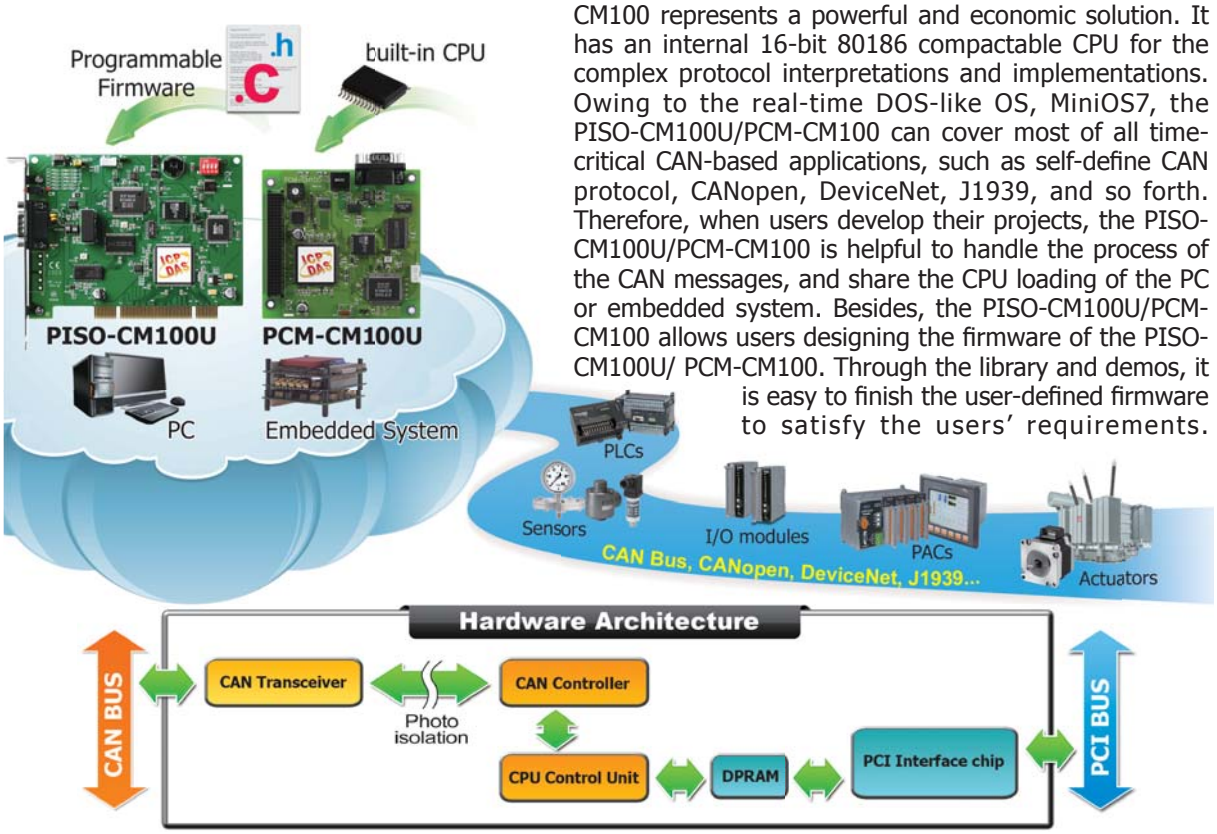
- Driver for 32-bit and 64-bit Windows XP/2003/Vista/7
- Driver for Linux

For Linux:

- SocketCAN Device Driver

CAN board with built-in programmable CPU

As a stand-alone CAN controller, the PISO-CM100U/PCM-CM100 represents a powerful and economic solution. It has an internal 16-bit 80186 compactable CPU for the complex protocol interpretations and implementations. Owing to the real-time DOS-like OS, MiniOS7, the PISO-CM100U/PCM-CM100 can cover most of all time-critical CAN-based applications, such as self-define CAN protocol, CANopen, DeviceNet, J1939, and so forth. Therefore, when users develop their projects, the PISO-CM100U/PCM-CM100 is helpful to handle the process of the CAN messages, and share the CPU loading of the PC or embedded system. Besides, the PISO-CM100U/PCM-CM100 allows users designing the firmware of the PISO-CM100U/ PCM-CM100. Through the library and demos, it is easy to finish the user-defined firmware to satisfy the users' requirements.



Built-In CPU Specifications

System Software		CPU Module	
OS	MiniOS7 (DOS-like embedded operating system)	CPU	80186, 80 MHz
Program Download Interface	RS-232 (needs an optional cable: CA-0904)	SRAM	512 KB
Programming Language	C language	Flash	512 KB
Compilers to create.exe Files	TC++ 1.01	EEPROM	16 KB
	TC 2.01	DPRAM	8 KB
	BC++3.1 ~ 5.2x	NVRAM	31 Bytes (battery backup, data valid up to 10 years)
	MSC 6.0	RTC (Real Time Clock)	Provides second, minute, hour, date, day of week, month, year
	MSVC++ (before version 1.5.2)	Watchdog Timers	Yes (0.8 second)

Common Features

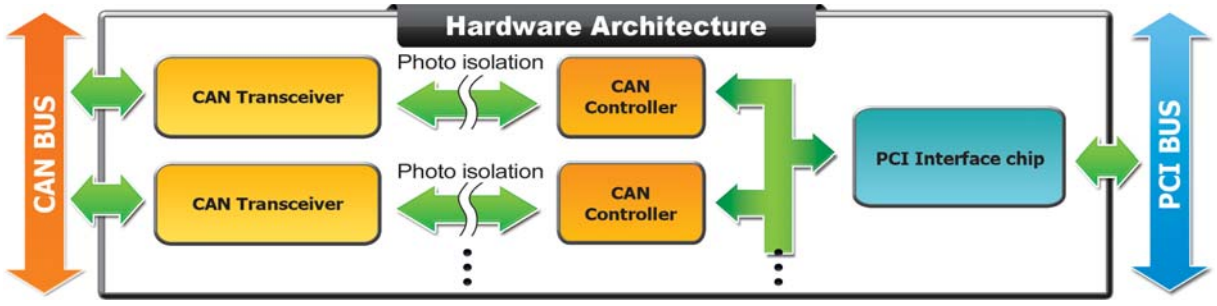
- Universal PCI card, supports both the 5 V and the 3.3 V PCI bus
- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898 -2 standard
- Support a range of baud rates from 10 kbps ~ 1 Mbps
- 2500 Vrms photocoupler isolation on the CAN side
- Built-in jumper for the 120 Ω terminator resistor of the CAN bus
- Provide 1/2/4/8 independent CAN channels
- 2 kV galvanic isolation for each CAN port
- Direct memory mapping to the CAN controller
- VB, VC++, Delphi, and Borland C++ builder demos are provided
- Supports LabVIEW and DASYLab drivers

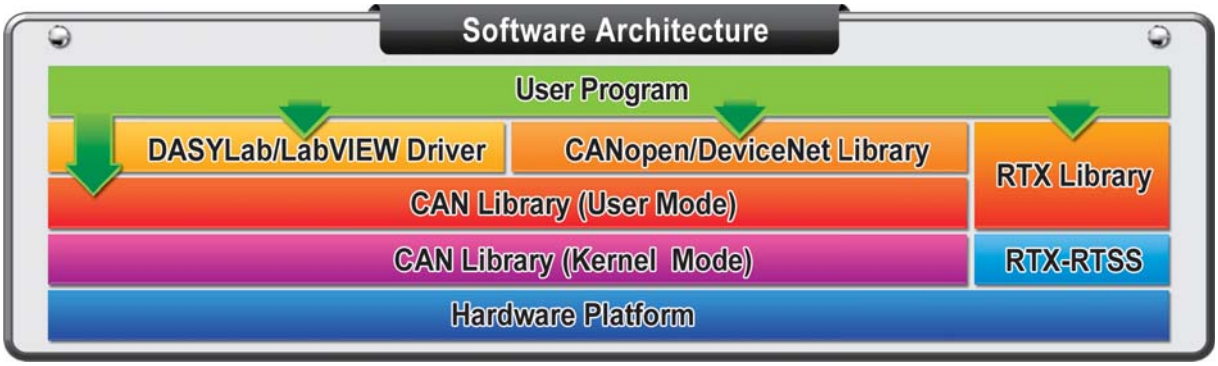
Connector Types: -T/-D

Each CAN bus board includes two types of connector, a DB9 and a terminal block.

PISO-xxxxx-D

PISO-xxxxx-T





Specifications

Models	PEX-CAN200i	PISO-CAN100U	PISO-CAN200U	PISO-CAN400U	PISO-CAN800U
Pictures					
CAN Channel	2	1	2	4	8
Bus Interface	X1 PCI Express	Universal PCI			
On-board CPU	–				
Baud Rate	Programmable transfer rate up to 1 Mbps				
Terminator Resistor	Jumper for 120 Ω terminator resistor				
Galvanic Isolation	2 kV				
PC APIs	API for VB, VC, BCB, VB.Net, C#.Net				
RTX Driver	Yes				Yes
LabVIEW Driver	Yes				
InduSoft Driver	Yes				
OPC Server	Yes				
OCX	Yes				
SocketCAN Driver	Yes				Yes
Device Driver	Windows 2K/XP/7/8 (32-bit/64-bit OS), Linux 2.6.x ~ 3.2.20				

Models	PCM-CAN100	PCM-CAN200	PCM-CAN200P
Pictures			
CAN Channel	1, and the other for bypass	2	
Bus Interface	PCI-104		PC/104-Plus
On-board CPU	–		
Baud Rate	Programmable transfer rate up to 1 Mbps		
Terminator Resistor	Jumper for 120 Ω terminator resistor		
Galvanic Isolation	2 kV		
PC APIs	API for VB, VC, BCB, VB.Net, C#.Net		
RTX Driver	Yes		
LabVIEW Driver	Yes		
InduSoft Driver	Yes		
OPC Server	Yes		
OCX	Yes		
SocketCAN Driver	Yes		
Device Driver	Windows XP/7, Linux		

Models	PISO-CM200U	PISO-CM100U	PCM-CM100	PISO-DNM100U	PISO-DNS100U	PISO-CPM100U	PCM-CPM100
Pictures	Available soon 						
CAN Channel	2	1					
Bus Interface	Universal PCI		PCI-104	Universal PCI			PCI-104
On-board CPU	Yes						
On-board CPU OS	Free RTOS	MiniOS7					
On-board CPU APIs	C/C++			–			
Default Firmware	CAN 2.0A/2.0B			DeviceNet Master	DeviceNet Slave	CANopen Master	
EDS File Support	–				Yes		
Baud Rate	Programmable transfer rate up to 1 Mbps			125 k, 250 k, and 500 kbps		10 k, 20 k, 50 k, 125 k, 250 k, 500 k, 800 k, 1 Mbps	
Terminator Resistor	Jumper for 120 Ω terminator resistor						
Galvanic Isolation	2 kV						
PC APIs	API for VB, VC++, BCB, Delphi			API for VB, VC++, VB.Net, C#.Net			
LabVIEW Driver	–			Yes	–		
InduSoft Driver	Yes				–	Yes	
Power Meter Driver	Yes			–		Yes	
Device Driver	Windows XP/7, Linux						

Accessories

Optional Cable for PISO-CAN800U

CA-9-3705 CR

DB-37 Male (D-Sub) to 4-port DB-9 Male (D-Sub) cable. 0.3 M (90°)

CA-9-3715D CR

DB-37 Male (D-Sub) to 4-port DB-9 Male (D-Sub) cable. 1.5 M (180°)

CA-0910-C CR

9-Pin Female D-Sub & 3-wire CAN bus cable (1 M)

CNT-CAN CR

CNT-CAN connector is used for connecting a CAN bus node to the CAN bus line featuring quick-connect technology, making the stripping of bus conductors superfluous. The connector is quick to install, and has a plastic housing and integrated terminating resistors. Anyway the CNT-CAN could link a CAN device to a CAN bus line easily and fast.

Installation

Step 1 

Step 2 

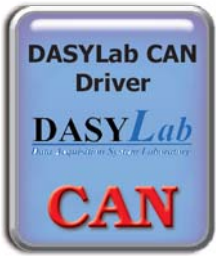
Step 3 

Software

LabVIEW CAN Driver

The LabVIEW driver includes a configuration utility to configure the ICP DAS's DeviceNet hardware in your PC. By means of this driver, you don't need to Study the complex and abstruse technology of the DeviceNet protocol.

- OS environment: Windows 2000/XP
- Supports NI LabVIEW version 8.0 or later
- Supports CAN specification 2.0A and 2.0B
- Provides 3000-record Rx buffer for each CAN port
- Offers functions for directly accessing SJA1000 register
- Supports time-stamp for each received CAN messages



DASYLab CAN Driver

DASYLab CAN driver makes users interactively develop PC-based applications by simply attaching functional icons. DASYLab offers real-time analysis, control, and the ability to create custom graphical user interfaces. Besides, it can require weeks of training to master. This is useful in some application cases.

- OS environment: Windows 2000/XP
- Supports DASYLab version 8.0
- Follows CAN specification 2.0A and 2.0B
- Supports maximum 64 CAN ports and maximum 4096 block size.
- Provides Intel mode and Motorola mode for remote CAN device
- Offers two kinds of languages, German and English

PISOCANX ActiveX Object

PISOCANX uses ActiveX technology to simplify the procedure while developing the application by using PISO-CAN series CAN card. The ActiveX object (OCX) can be not only used in general program development environment, but used in the SCADA software which supports the ActiveX technology.

- OS environment: Windows 2000/XP
- Allows polling mode and interrupt mode
- Provides 3000-record Rx buffer for each CAN port
- Supports functions for directly accessing SJA1000 register
- Allows users to read the card No. and relative information
- Supports time-stamp for each received CAN messages

NAPOPC.CAN DA Server

NAPOPC.CAN DA Server is a CAN OPC server to be as an expert bridge between ICP DAS CAN products and the OPC client of the third party software. Besides, it also provides the easy-to-use integral APIs to access the different CAN ports without through the OPC server.

- OS environment: Windows 2000/XP
- Follows OPC 1.0, OPC 2.0 Data Access Standards
- Configures CAN hardware filter by the APIs of the Virtual CAN Driver
- Provides CAN Engine Utility to monitor the CAN messages
- Collects the data from the different CAN devices in one OPC server
- Provides the CAN devices and the virtual CAN mapping table

RTX CAN Driver

The RTX CAN Driver helps users to develop the highly real-time CAN bus applications on Windows OS by PISOCAN series boards. The name and parameters of the APIs in the RTX driver are the same as the ones in the Windows driver. Users don't need to pay more efforts to study how to use the APIs of the RTX driver.

- OS environment: Windows2000 SP4, and Windows XP SP2
- Supports interrupt function if the PISO-CAN series CAN card can get the independent IRQ
- Direct I/O control and highly real-time feature
- Supports RTX version 8.0 and RTX 2011
- Provides VC 6.0 demos

SocketCAN Device Driver

The SocketCAN driver is a kind of device driver based on the Linux operating system with x86 hardware platform.
Users can implement their SocketCAN-based application on the Linux platform by using PISO-CAN series board.

- OS environment: Linux kernel version 2.6.31 ~ 3.2.20 (x86 hardware platform only)
- Provides CANopen/DeviceNet master static library Standard interface for SocketCAN package.
- Supports Virtual CAN interface. Users can map several virtual CAN port into one physical CAN port.
- Provides the RAW socket, CANopen master and DeviceNet master demos

CANcheck

CANcheck is one software which is used to verify the functions of CAN devices from any manufacturers. It provides users to design the test commands and the expected response. When starting the test, the software will go the predefined procedure to send the messages and check if the responses are correct.

- OS environment: Windows XP, Window 7
- Support: ICP DAS CAN board, CAN converter
- No need to write any programs. The graphical interface is ready-made and easy to operate.
- Can be used to operate and diagnose lights, windows, dashboard or other vehicular electronic systems.
- Supports CAN 2.0A and CAN 2.0B specifications.

CAN Test Tool

CAN test tool helps users to test the CAN communication of CAN series of ICP DAS. You can use these devices to be an simple CANopen master/slave, DeviceNet master/slave, J1939 transmitter/receiver to test the DUT (device under test).It can easily and quickly test if the DUT works well or not.

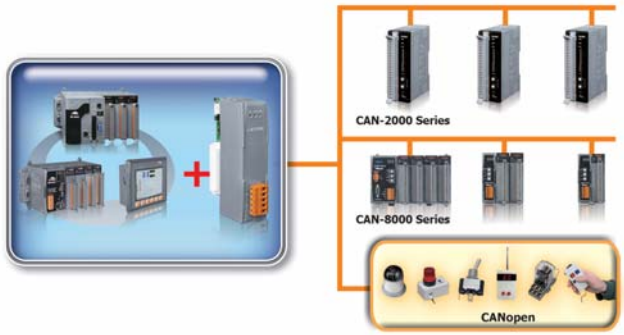
- OS environment: Windows XP, Window 7
- Support: ICP DAS CAN board, CAN converter
- Test Function: Two CAN port test to each other, Test with other CAN device, CANopen Master, CANopen Slave, DeviceNet Master, DeviceNet Slave, J1939 Receiver, J1939 Transmitter
- Auto scan all supported ICP DAS CAN device on your PC
- Three steps, easy to test

5-2-6 PAC-based CAN Modules

Introduction

These CAN bus communication modules are the solutions to the various CAN application requirements in PAC family with rich CAN bus protocols. The I-8123W, I-87123, I-8124W, and I-87124 separately support CANopen and DeviceNet master protocols. Users can apply them in PAC to connect to CANopen and DeviceNet devices to reach various CANopen/DeviceNet systems easily.

For the especial CAN bus applications, the I-8120W and I-87120 are designed for users to apply in PAC series. The default firmware of I-8120W and I-87120 provides the transmission and reception of CAN bus messages in PAC. In addition, users can design the specific firmware in these modules to reduce the loading of the PAC in C language.



Specifications

CAN/CANopen/DeviceNet Communication Module (Parallel/Serial Bus)						
Model Name	I-8120W	I-87120	I-8123W	I-87123	I-8124W	I-87124
Pictures						
Communication						
Interface	ISO 11898-2 CAN					
Port	1					
Terminator	120 Ω Selected By Jumper					
Max. Speed (K bps)	1000		1000		500	
Controller Chip	SJA1000T					
Transceiver Chip	82C250					
Protocol	CAN 2.0 A/2.0 B		CANopen CiA 301 ver 4.02, CiA 401 ver 2.1		DeviceNet Volume I ver 2.0, Volume II ver 2.0	
System						
Hot Swap	-	Yes	-	Yes	-	Yes
Data Communication	Parallel Interface	Serial Interface	Parallel Interface	Serial Interface	Parallel Interface	Serial Interface
User-defined Firmware	Yes		-		-	
Isolation	2500 V_{rms}					
Power Consumption	2 W					
Connector	5-pin Terminal Block					
Optional Accessories	CA-0904 Cable 					
PAC Driver Support						
I-8000, iP-8000 VP-2111	-	BC, TC	-	-	-	-
WP-8000 VP-2000	eVC++ 4.0, VB.Net 2005, C#.Net 2005					
XP-8000-CE6, XP-8000-Atom-CE6	VB.Net 2005, C#.Net 2005, VC 2005					
XP-8000, XP-8000-Atom	VB.Net 2005, C#.Net 2005, VC 6					
LP-8000	-	GCC	-	-	-	-

5-2-7 CAN Bus Power Meter

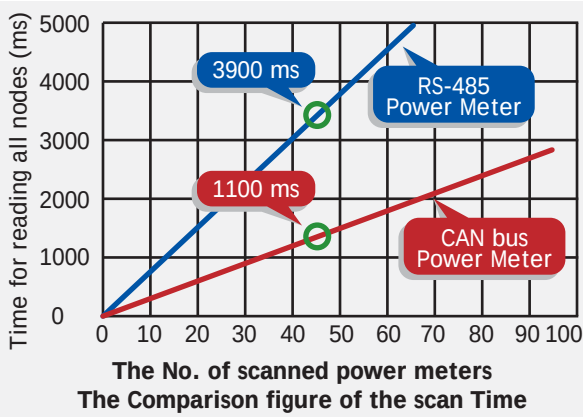
Introduction

PPM-311x-CPS/PM-3133-CPS series power meter/PM-4324-CPS Multi-Channel power meter is used for gathering the real-time power consumption information by the CAN interface. It supports not only polling mode, but also Auto-response mode which lets the power meter automatically reply the CAN messages in the predefine time period. This makes the communication more efficient while building a large power monitor system.

The PM-4324 Multi-Channel Power Meter up to 8 three phase circuits or 24 single phase circuits, or any combination of single or three phase circuits.

The PM-4324 up to 24 currents via external Current Transformers (CTs).
This flexibility makes the PM-4324 perfect for multi-tenant facilities such as residential projects, office buildings and shopping malls.

This compact instrument is designed to easily fit into existing panel boards or be flush mounted nearby, thus eliminating the need for expensive retrofit projects or for allocating extra space for the device.



The No. of scanned power meters
The Comparison figure of the scan Time

Specifications

Models	PM-3133-CPS NEW	PM-3112-CPS NEW	PM-3114-CPS NEW	PM-4324-CPS Available soon
Pictures				
AC Power Measurement				
Wiring	1P2W-1CT 1P3W-2CT 3P3W-2CT 3P3W-3CT 3P4W	1P2W-2CT	1P4W-4CT	1P2W-1CT 1P3W-2CT 3P3W-2CT 3P3W-3CT 3P4W
Measurement Voltage	10 ~ 500 V	10 ~ 300 V		10 ~ 500 V
Measurement Current	CTØ10 mm (60 A); CTØ16 mm (100 A); CTØ24 mm (200 A); CTØ36 mm (300 A)			
Measurement Frequency	50/60 Hz			
W Accuracy	Better than 0.5% (PF=1)			
Power Parameter Measurement	True RMS voltage (V_{rms}), True RMS current (I_{rms}), Active Power (kW), Active Energy (kWh), Apparent Power (kVA), Apparent Energy (kVAh), Reactive Power (kVAR), Reactive Energy (kVARh), Power Factor (PF), Frequency			
Data Update Rate	1 Second			
Alarm Output				
Power Relay	Form A (Normal Open) x 2; 5 A @ 250 V_{AC} (47 ~ 63 Hz), 5 A @ 30 V_{DC}			
Power				
Input Range	+12 V_{DC} ~ +48 V_{DC}			+90 V_{AC} ~ +240 V_{AC}
Power Consumption	2 W			4 W
Mechanical				
Casing	Plastic			
Module Installation	DIN-Rail Mounting			
Environment				
Operating Temperature	-20 °C ~ +70 °C			
Storage Temperature	-25 °C ~ +80 °C			
Ambient Relative Humidity	10 ~ 90% RH, non-condensing			

Product Showcase

CAN Bus Power Meter

PM-3133-CPS CR **PM-3112-CPS CR** **PM-3114-CPS CR**

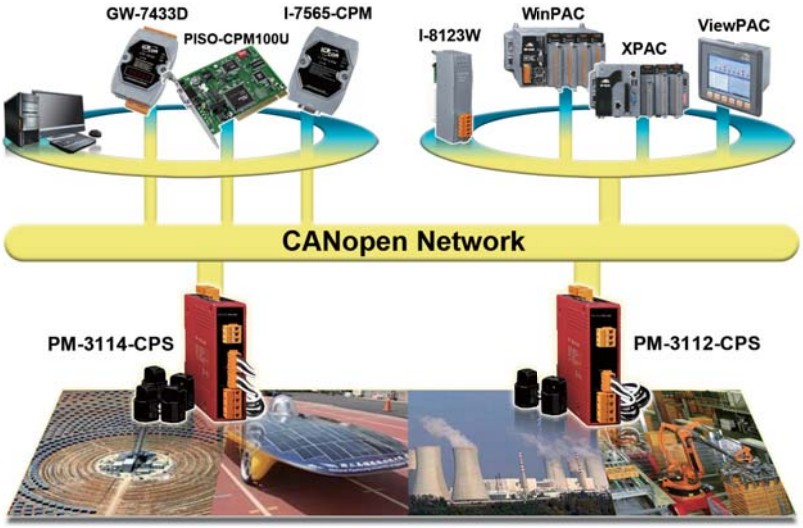
The Smart Power Meter PM-3000 Series can give you access to real-time electric usage for power management. With its high accuracy (<0.5%, PF=1), the power meter series can be applied to both low voltage primary side and/or medium/high voltage secondary side and enables the users to obtain reliable and accurate energy consumption readings from the monitored equipment in real time under operation. These compact size and cost-effective power meters are equipped with revolutionary wired clip-on CT (various types, support input current up to 300 A).

PM-3133-CPS

- Supports 2 Power Relay Output (Form A)
- W Accuracy Better than 0.5% (PF=1)
- Voltage Measurements Up to 500 V
- Total Harmonic Distortion (THD)
- Energy Analysis for 1P2W, 1P4W
- True RMS Power Measurements
- Clip-on CT for Easy Installation
- Supports CANopen Protocol

PM-3114-CPS

PM-3112-CPS

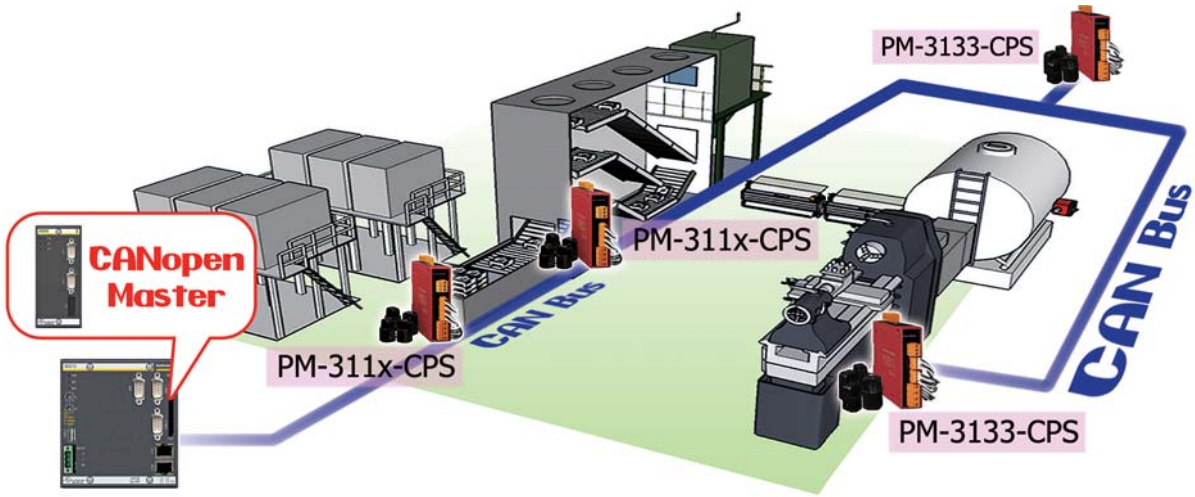


Case Studies: Power Control System of Factory

Location: German

Product: PM-3114-CPS

In this case, user add several PM-3114-CPS into existing CANopen network for monitoring power system of factory. The PM-3133-CPS and PM-311x-CPS can be accessed by any standard CANopen master. It makes the communication more efficient when collecting a lot of remote power information.



5-2-8 CAN Bus Data Logger

Introduction

The CAN bus data logging device serves for logging of communication over the CAN data bus. Each received data packet is given a specific time mark, which shows the precise arrival time of data. The actual time mark is obtained from the internal real time clock (RTC), therefore it is independent of the global system time. Data logging on a common SD card allows further analysis and system monitoring on a PC. The CAN-Logger100/200 device by ICP DAS is the result of extensive CAN bus testing and CAN bus programming and is suited for all type of CAN bus application.

Specifications

Models	CAN-Logger100 *Available soon*	CAN-Logger200 *Available soon*
Pictures		
CAN Interface		
Transceiver	NXP TJA1042	
Channel Number	1	2
Connector	5-Pin male M12 x 1 (Drain: Pin 1, V+: Pin 2, V-: Pin 3, CAN_H: Pin 4, CAN_L: Pin 5)	5-Pin male M12 x 2 (Drain: Pin 1, V+: Pin 2, V-: Pin 3, CAN_H: Pin 4, CAN_L: Pin 5)
Transmission Speed (bps)	10 k, 20 k, 50 k, 100 k, 125 k, 250 k, 500 k, 800 k, 1 M	
Terminator Resistor	DIP switch for the 120 Ω terminator resistor	
Isolation	3000 VDC for DC-to-DC, 2500 Vrms for photocoupler	
Specification	ISO-11898-2, CAN 2.0A and CAN 2.0B	
Receive Buffer	512 data frame	256 data frame for each CAN port
Max. Data Flow	3000 fps	1500 fps for each CAN port
CAN Filter	Configurable filter	
USB Interface		
Connector	USB Type B	
Compatibility	USB 1.1 and 2.0 standard	
Software Driver	Windows 2K/XP/7	
Receive Buffer	100 data frames	
Data Logger Capability		
Storage Media	MMC, SD or SDHC type flash – up to 32 GB	
Recording Format	Binary	
Time Stamp	10 us	
Configuration	Utility tool	
Trigger	■ Log continuously ■ Triggered by messages on the CAN bus	
Software	many program samples, written in C, C++, C# and Visual Basic	
LED		
Round LED	PWR, CANTx, CANRx, CANEr, SDWr, SDEr	
Power		
Power Supply	USB power or CAN bus power delivery	
Power Consumption	1.5 W	
Mechanical		
Installation	DIN-Rail	
Casing	Metal	
Dimensions (W x L x H)	116.5 mm x 127 mm x 61.3 mm	
Environment		
Operating Temperature	-25 °C ~ +75 °C	
Storage Temperature	-30 °C ~ +80 °C	
Relative Humidity	10 ~ 90% RH, non-condensing	

Product Showcase

USB to 1-port CAN bus data logger device

CAN-Logger100 CR *Available soon*

The CAN-Logger100 is a high-performance intelligent CAN bus data logger device with one CAN port that can help to make data collection and to process on a CAN bus network easier and quicker. The powerful CPU of the CAN-Logger100 provides the accurately time-stamp for each CAN message and supports storage media like MMC, SD or SDHC type flash for saving these CAN messages that is useful to analysis and diagnostic the CAN network. In order to enhance the portability of the CAN-Logger100, this module is powered by the USB interface or a M12 connector of CAN bus interface. The CAN-Logger100 uses the standard USB driver of the Windows system. Operating systems supported include Windows 2K/XP/7/8.

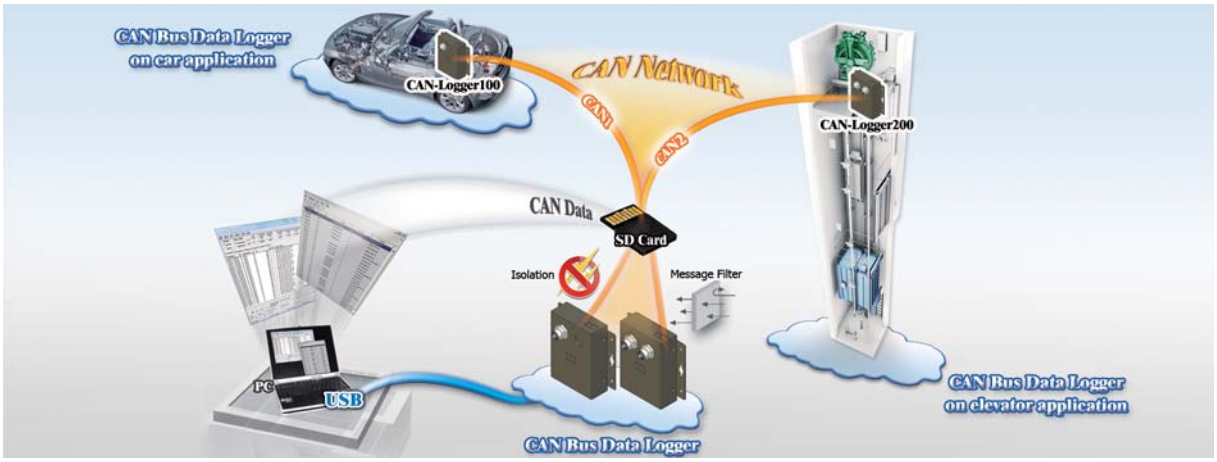
- Provides a configuration utility that can be used to transmit/receive CAN messages
- Supports up to 32 GB MMC, SD or SDHC type flash for saving CAN messages
- Max. data flow for a single channel is 3000 fps (standard frame)
- Built-in jumper for the 120 Ω terminal resistor of the CAN side
- Programmable CAN bus baud rate from 10 kbps ~ 1 Mbps
- Compatible with CAN specification 2.0 parts A and B
- 2500 V_{rms} photocoupler isolation on the CAN side
- Full compatible with the ISO 11898-2 standard
- Power by the USB port or CAN port
- Supports CAN bus acceptance filter configuration
- 3 kV galvanic isolation for the CAN port
- Provides one CAN port

USB to 2-port CAN bus data logger device

CAN-Logger200 CR *Available soon*

The CAN-Logger200 is a high-performance intelligent CAN bus data logger device with two CAN port that can help to make data collection and to process on a CAN bus network easier and quicker. The powerful CPU of the CAN-Logger200 provides the accurately time-stamp for each CAN message and supports storage media like MMC, SD or SDHC type flash for saving these CAN messages that is useful to analysis and diagnostic the CAN network. In order to enhance the portability of the CAN-Logger200, this module is powered by the USB interface or M12 connectors of CAN bus interface. The CAN-Logger200 uses the standard USB driver of the Windows system. Operating systems supported include Windows 2K/XP/7/8.

- Provides a configuration utility that can be used to transmit/receive CAN messages
- Supports up to 32 GB MMC, SD or SDHC type flash for saving CAN messages
- Max. data flow for a single channel is 1500 fps (standard frame)
- Built-in jumper for the 120 Ω terminal resistor of the CAN side
- Programmable CAN bus baud rate from 10 kbps ~ 1 Mbps
- Compatible with CAN specification 2.0 parts A and B
- 2500 V_{rms} photocoupler isolation on the CAN side
- Full compatible with the ISO 11898-2 standard
- Power by the USB port or CAN port
- Supports CAN bus acceptance filter configuration
- 3 kV galvanic isolation for the CAN port
- Provides two CAN port



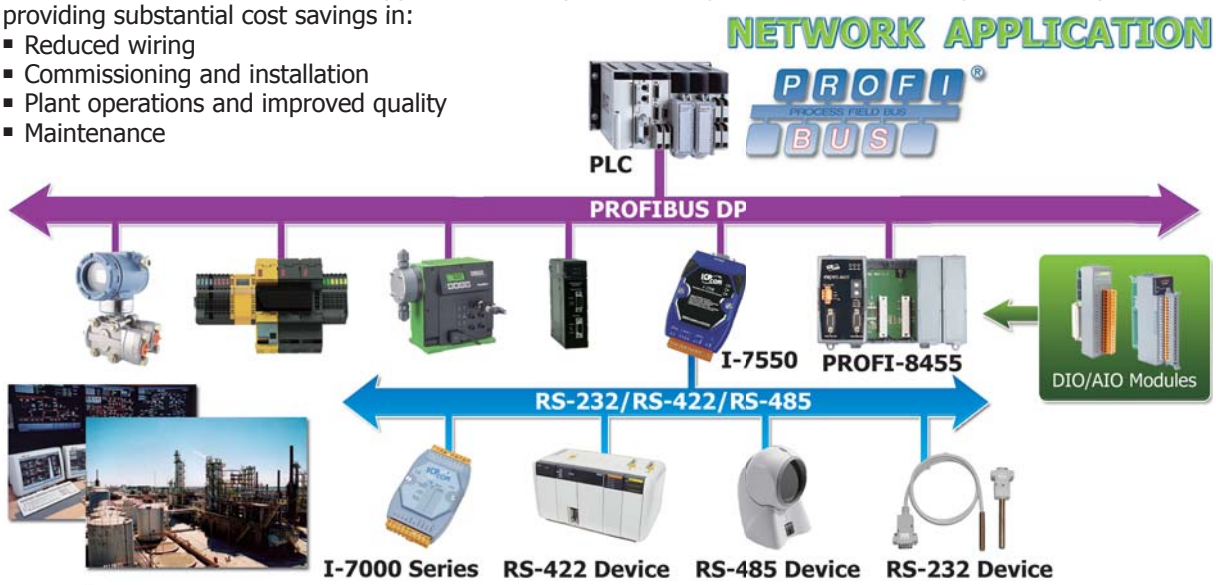
5-3 PROFIBUS

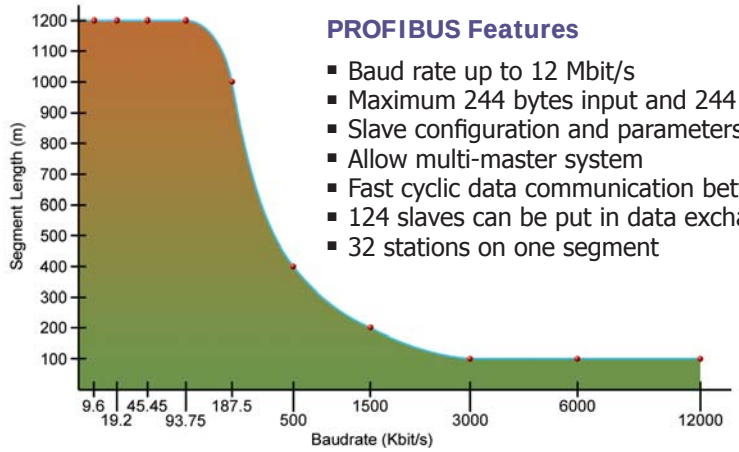
Introduction

PROFIBUS (PROCESS FIELD BUS) which is anchored in the international standards IEC 61158 and IEC 61784, is an open, digital communication system with a wide range of applications, particularly in the fields of factory and process automation. It is suitable for both fast, time-critical applications and complex communication tasks. ICP DAS provides a lot PROFIBUS DP products and help the user develop PROFIBUS application system easily. We have been developing and studying PROFIBUS DP for years. ICP DAS will always secure user's industrial safety and stable automation system as our mission.

These fieldbus solutions also support multi-drop networking of devices on a single twisted-pair cable providing substantial cost savings in:

- Reduced wiring
- Commissioning and installation
- Plant operations and improved quality
- Maintenance





PROFIBUS Features

- Baud rate up to 12 Mbit/s
- Maximum 244 bytes input and 244 bytes output per slave
- Slave configuration and parameters are set from the master side by GSD file
- Allow multi-master system
- Fast cyclic data communication between master and slave
- 124 slaves can be put in data exchange
- 32 stations on one segment

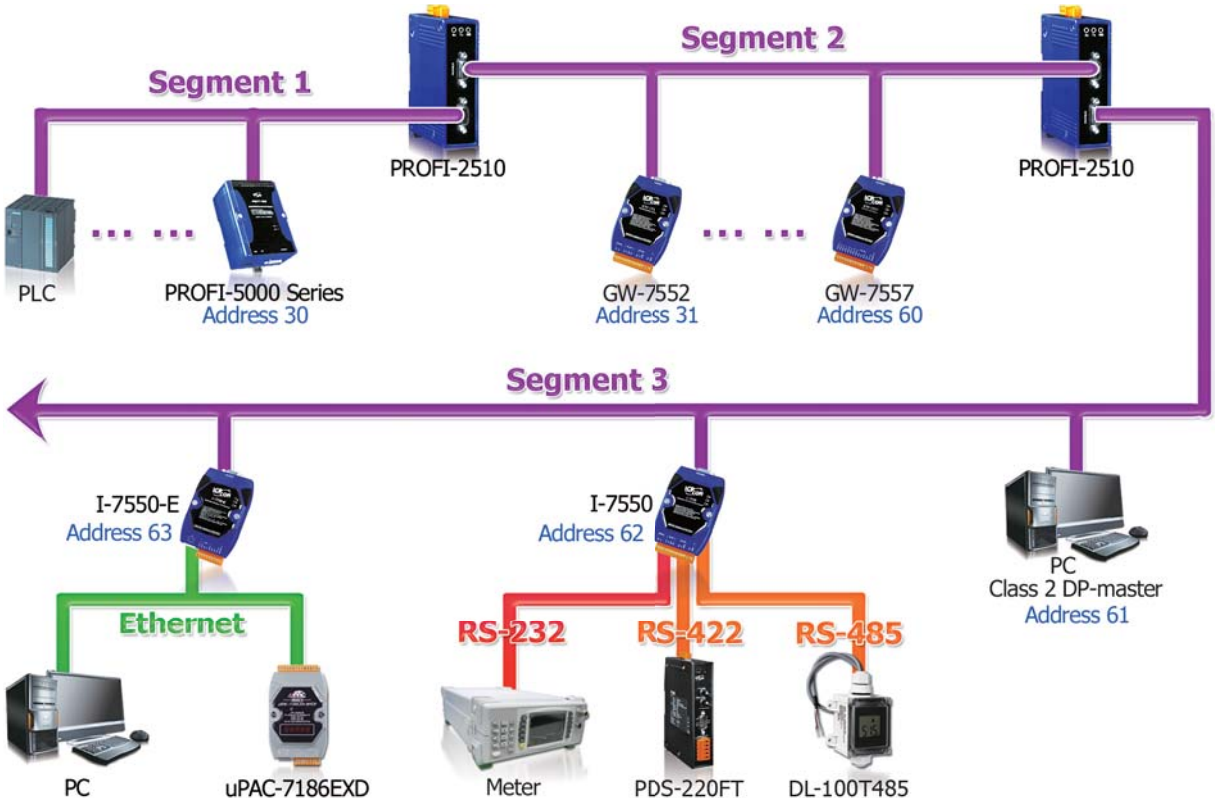
Selection Guide

Models		Description
Converters	I-7550	PROFIBUS to RS-232/422/485 Converter
	I-7550-E	PROFIBUS to Ethernet Converter
	PROFI-2510	Isolated PROFIBUS Repeater
	PROFI-2541	PROFIBUS to Fiber (ST connector) Converter
	PROFI-2541-SC	PROFIBUS to Fiber (SC connector) Converter
Gateways	GW-7552	PROFIBUS DP Slave to Modbus RTU Gateway
	GW-7553	PROFIBUS DP Slave to Modbus TCP/RTU Gateway
	GW-7553-CPM	PROFIBUS DP Slave to CANopen Master Gateway
	GW-7557	PROFIBUS DP Slave to HART Master Gateway

5-3-1 PROFIBUS Repeaters & Converters

Introduction

The PROFIBUS repeaters/converters are used to solve the issues of the PROFIBUS segment, transmission distance and disturbance when setting up a PROFIBUS network. If it is necessary to integrate the different communication interface, the PROFIBUS converter is helpful. The application architectures as following figures provide the examples to show when and how to apply these products.

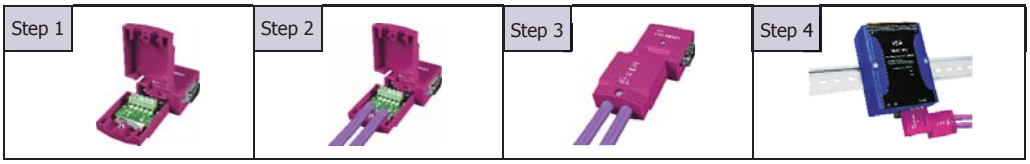


Specifications

Models	I-7550	I-7550-E	PROFI-2510	PROFI-2541	PROFI-2541-SC
Pictures	PROFIBUS to RS-232/422/485 Converter	PROFIBUS to Ethernet Converter	Isolated PROFIBUS Repeater	PROFIBUS to Fiber Converter	PROFIBUS to Fiber Converter
					
PROFIBUS Channel	1		2	1	
PROFIBUS Baud Rate (bps)	9.6 k ~ 12 M			9.6 k ~ 3 M	
PROFIBUS Protocol	DP-V0 Slave		DP-V0/DP-V1/DP-V2		
PROFIBUS Address	0 ~ 126 set by DIP switch		–		
PROFIBUS Transmission Distance (m)	Depend on baud rate				
COM 1	RS-232/RS-485/RS-422	RS-232	–		
COM 1 Baud Rate (bps)	1.2 K ~ 115.2 K	115.2K	–		
Fiber Channel	–			1	
Fiber Connector				ST (Multi-mode)	SC (Multi-mode)
Fiber Transmission Distance (m)				1.4 km Max. (in 62.5/125 μm fiber cable)	
Ethernet Speed	–	10/100M	–		
Ethernet Protocol	–	TCP/UDP Server/Client	–		

Accessories

Optional PROFIBUS connector: CNT-PROFI



Installation

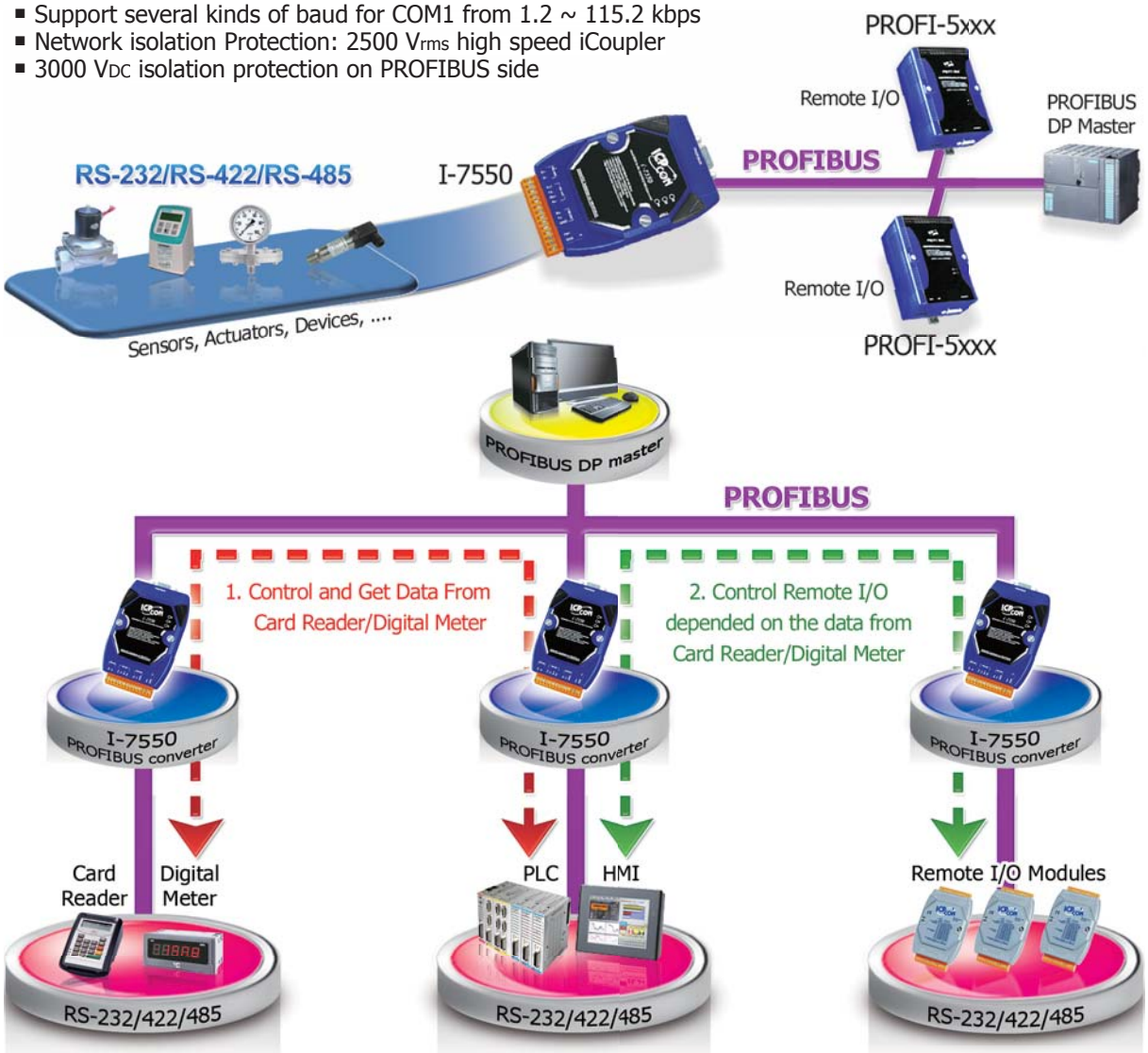
Product Showcase

▶▶▶▶ PROFIBUS to RS-232/422/485 Converter

I-7550-B CR

The I-7550 converter is specially designed for the slave device of PROFIBUS DP protocol. It offers RS-232, RS-422, and RS-485 communication ports. With the hybrid design of the COM 1, you can choose one type of this COM port for implement. Through the I-7550, applying RS-232/RS-422/RS-485 devices into PROFIBUS network is getting easily.

- Protocol PROFIBUS DP-V0 slave
- Detect transmission rate (9.6 to 12000 kbps) on PROFIBUS automatically
- 128 bytes Max. input data length
- 128 bytes Max. output data length
- PROFIBUS address 0 ~ 126 set by DIP switch
- Support several kinds of baud for COM1 from 1.2 ~ 115.2 kbps
- Network isolation Protection: 2500 V_{rms} high speed iCoupler
- 3000 V_{DC} isolation protection on PROFIBUS side

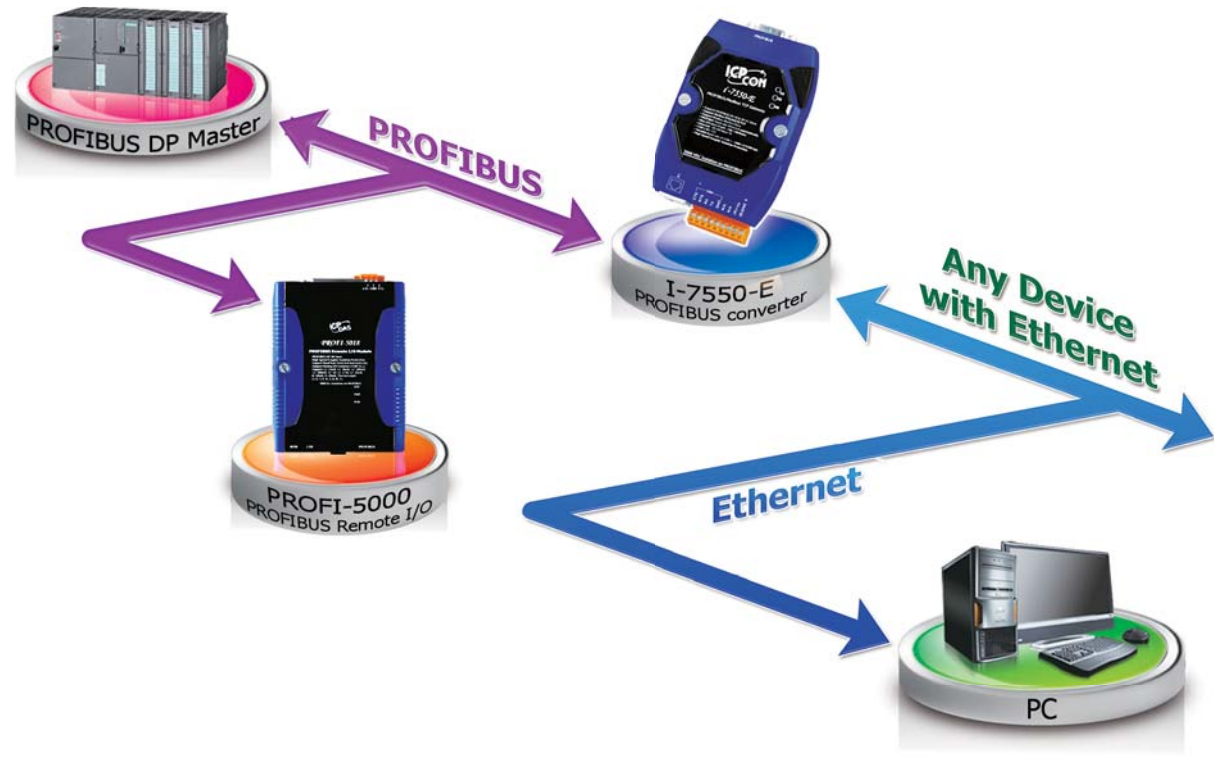


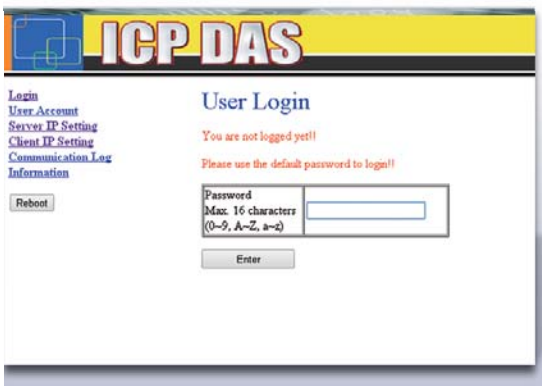
▶▶▶▶ PROFIBUS to Ethernet Converter

I-7550-E CR *NEW*

The I-7550-E converter is a PRFIBUS DP slave device that provides the communication between PRFIBUS master device and Ethernet device. In the Ethernet network, the I-7550-E offers TCP and UDP Protocol. It can be set as Server to access TCP/UDP clients, or be set as Client to connect with TCP/UDP Server. I-7550-E also provides web configuration that helps user setup the communication of Ethernet. Through the I-7550-E, applying Ethernet device into PROFIBUS network is getting easily.

- Protocol PROFIBUS DP-V0 slave
- Detect transmission rate (9.6 to 12000 kbps) on PROFIBUS automatically
- Support one 10/100 Base-TX Ethernet port
- 240 bytes Max. input data length
- 240 bytes Max. output data length
- Support TCP/UDP Client/Server
- Support Ethernet/RS-232 update firmware
- PROFIBUS address 0 ~ 126 set by DIP switch
- Support Web Configuration
- Network isolation protection: 2500 V_{rms} high speed iCoupler





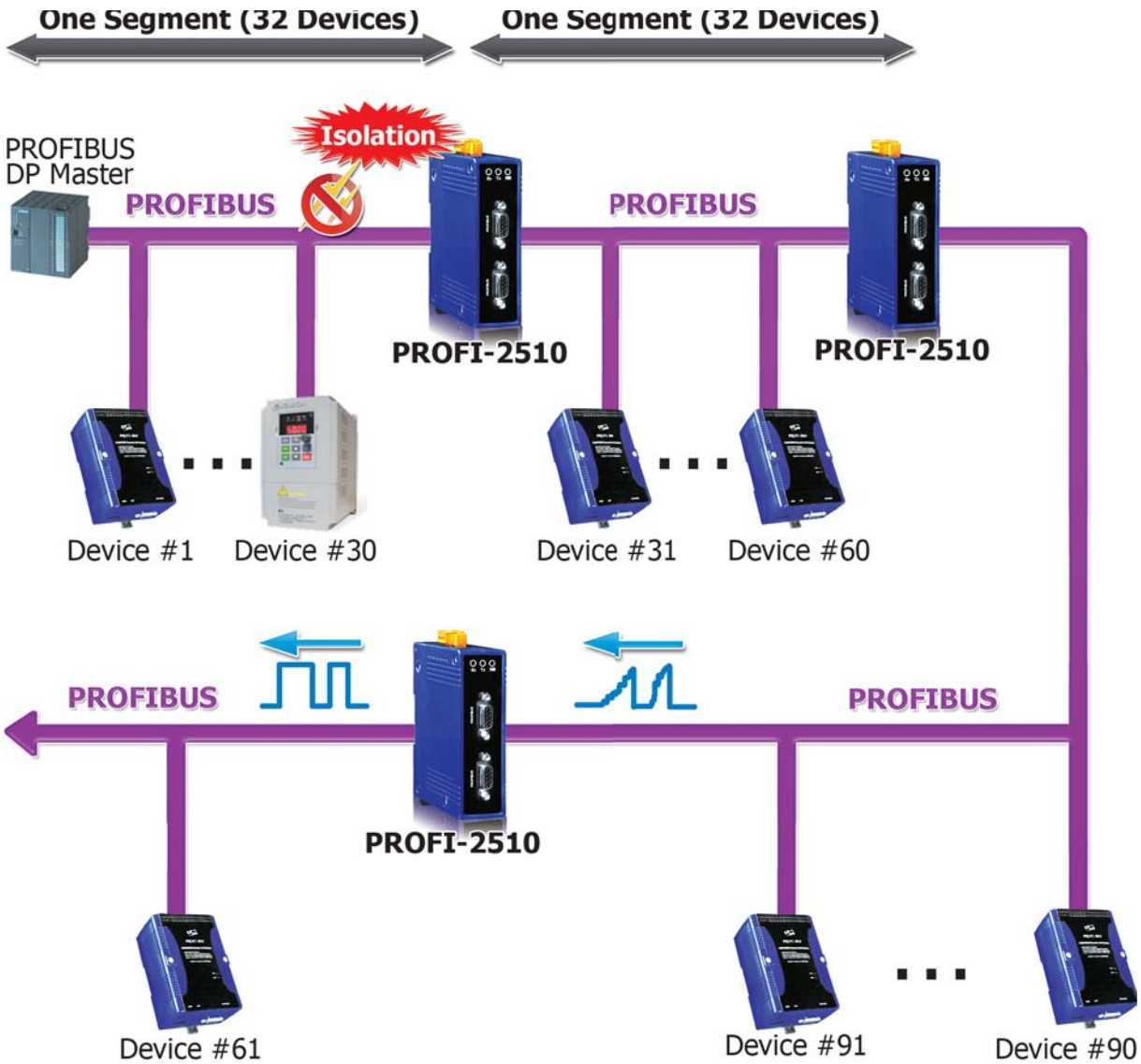
Login: Password security
User Account: Password change
Server IP Setting: TCP/UDP Server configuration
Client IP Setting: TCP/UDP Client configuration
Communication Log: Show up law data of communication
Information: Display Diagnostic Message/ Ethernet connection status/PROFIBUS connection status

▶▶▶▶ Isolated PROFIBUS Repeater

PROFI-2510 CR

The PROFI-2510 is a PROFIBUS repeater adaptor. According to the RPOFIBUS DP specification, there are maximum 32 devices in one PROFIBUS network segment. The maximum bus length of one segment is decided by the network baud rate. Any two segments need to be connected with each other by a repeater adaptor. If the users' application structure includes more than 32 PROFIBUS devices in the network or has more than 1 network segment in order to extend the total bus length, the PROFI-2510 is helpful to solve the issue of the bus length or device number expansion. As other Fieldbus networks, the PROFIBUS network also follows daisy-chain topology. Through the PROFI-2510, it is allowed that users are able to set up their PROFIBUS networks by using various topologies, such as stub lines, tree topology, and star topology.

- Detect transmission rate (9.6 k ~ 12000 kbps) automatically
- No additional space needed in the cabinet
- Can be used as a bus extension or spur line
- Increases the number of nodes
- System expansion
- Provide status LEDs
- 2500 VDC isolation protection on PROFIBUS side
- 4 kV Contact ESD protection for any terminal
- Wide range of power input (+10 VDC ~ +30 VDC) and operating temperature (-25 °C ~ +75 °C)



PROFIBUS to Fiber Converter

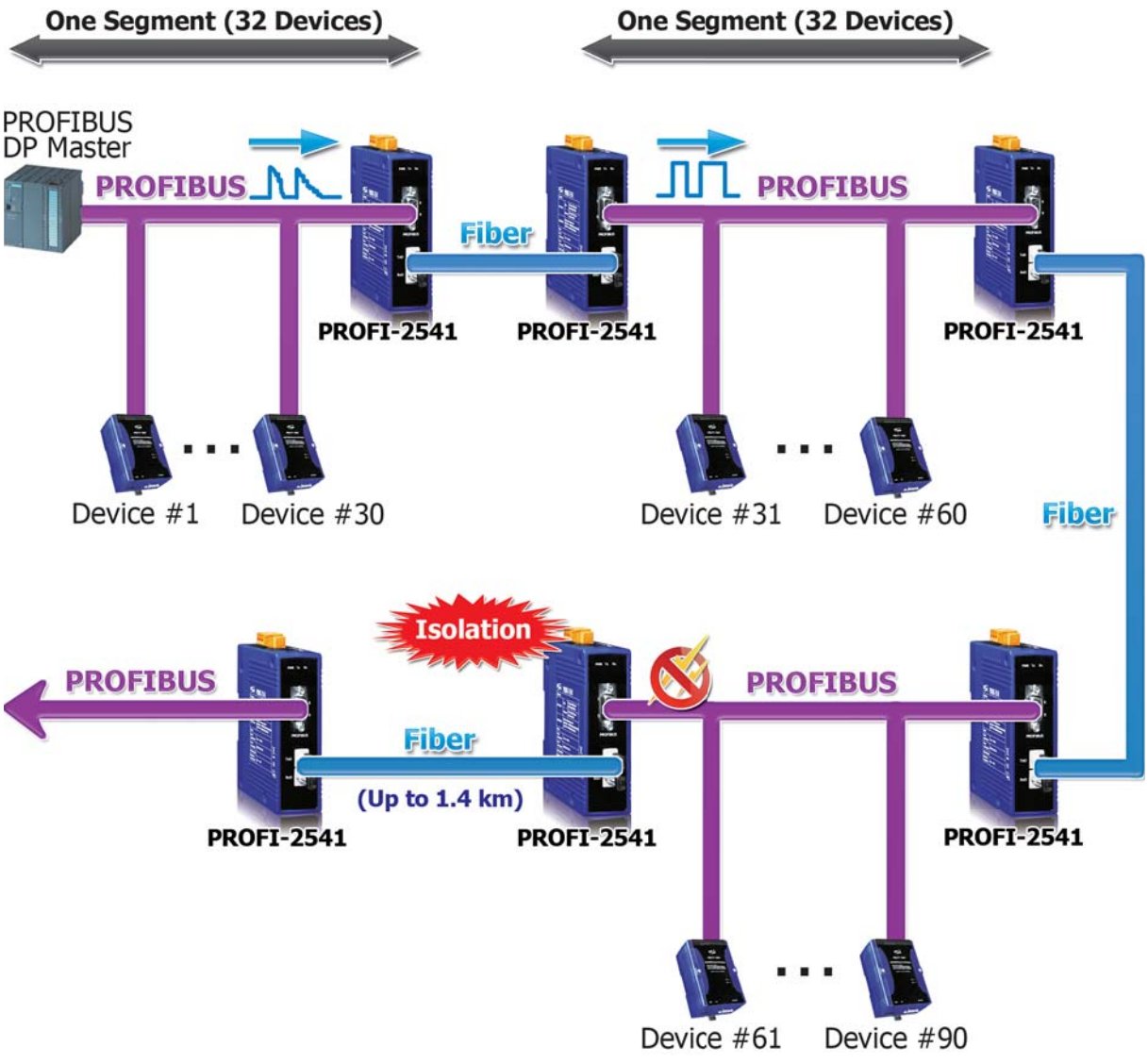
PROFI-2541 CR
PROFI-2541-SC CR

PROFI-2541

PROFI-2541-SC

Similar to the PROFI-2510, the PROFI-2541 can reshape the PROFIBUS waveform disturbed by the noise, and expand the connectable number of the PROFIBUS devices in the network. The difference is that the PROFI-2541 offers the fiber optic interface which can transfer the PROFIBUS messages to fiber signals, and users can extend the PROFIBUS bus length as the maximum transmission distance of the applied fiber optic. Users can use one pair of the PROFI-2541s instead of more repeaters while extending the bus length. The PROFI-2541 has passed the test of the 4 kV contact ESD, and provides the isolation protections on each PROFIBUS communication port. This feature means that the PROFIBUS-2541 can offer effective protection, and prevent the devices of one segment from the noise of the other segments.

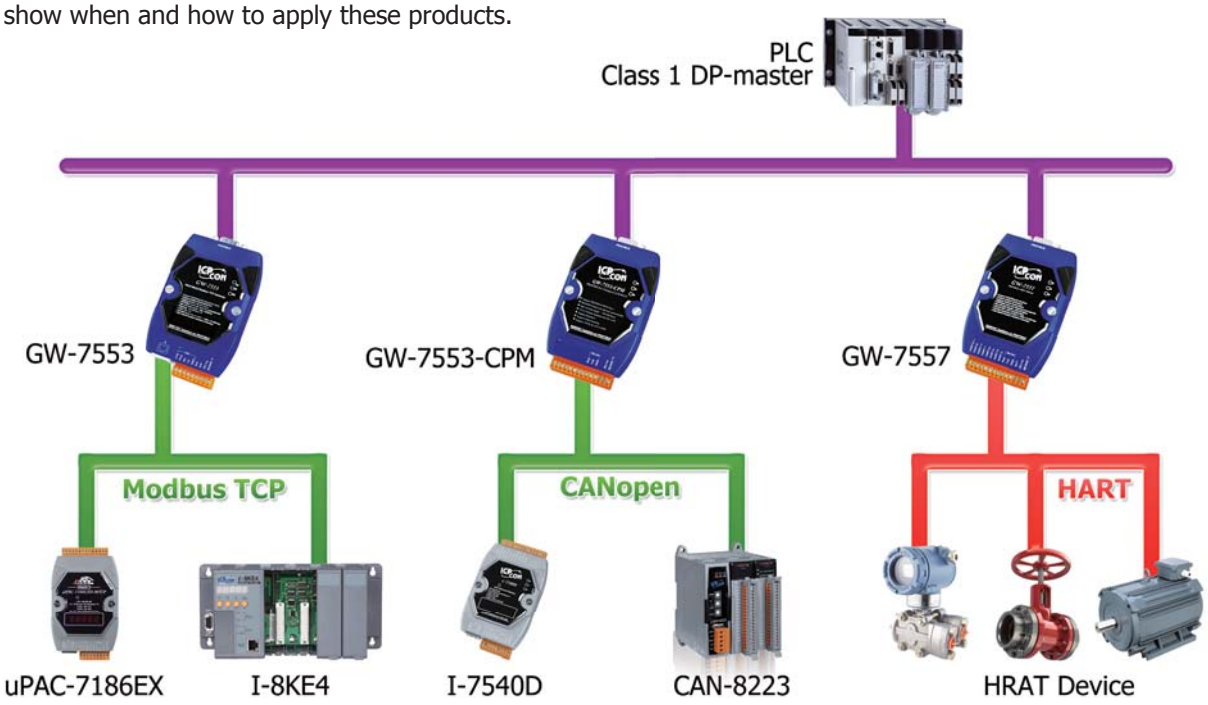
- Detect transmission rate (9.6 k ~ 3000 kbps) automatically
- Fiber Port: ST (Multi-mode)
- Wave Length: 850 nm
- Provide status LEDs
- DIN-Rail mounting
- 2500 VDC isolation protection on PROFIBUS side
- 4 kV Contact ESD protection for any terminal
- Wide range of power input (+10 VDC ~ +30 VDC) and operating temperature (-25 °C ~ +75 °C)



5-3-2 PROFIBUS Gateways

Introduction

The PROFIBUS gateway is used to solve data-exchanging between different communication network and PROFIBUS network. If it is necessary to integrate different communication protocols to PROFIBUS, the PROFIBUS gateway is helpful. The application architectures as following figures provide the examples to show when and how to apply these products.



Specifications

Models		GW-7552	GW-7553	GW-7553-CPM Available soon	GW-7557
Pictures					
		PROFIBUS DP Slave to Modbus RTU Gateway	PROFIBUS DP Slave to Modbus TCP/RTU Gateway	PROFIBUS DP Slave to CANopen Gateway	PROFIBUS DP Slave to HART Master Gateway
PROFIBUS	Channel	1			
	Baud Rate (bps)	9.6 k ~ 12 M			
	Protocol	DP-V0 Slave	DP-V0 Slave/DP-V1 Slave	DP-V0 Slave	
	Input/Output Data Length	132/131 Bytes	240/240 Bytes		
COM port	Type	1 x RS-232/422/485	1 x RS-232		
	Baud Rate (bps)	2.4 k ~ 115.2 k			
	Protocol	Modbus RTU/ASCII, Master/Slave		Only for configuration	
Ethernet Port	Speed	–	10/100 M	–	–
	Protocol	–	Modbus TCP Server/Client	–	–
HART	Channel	–		–	4
	Protocol	–		–	HART Master
CANopen	Channel	–		1	–
	Baud Rate (bps)	–		10 K, 20 K, 50 K, 125 K, 250 K, 500 K, 800 K, 1 M	–
	Protocol	–		CANopen master	–

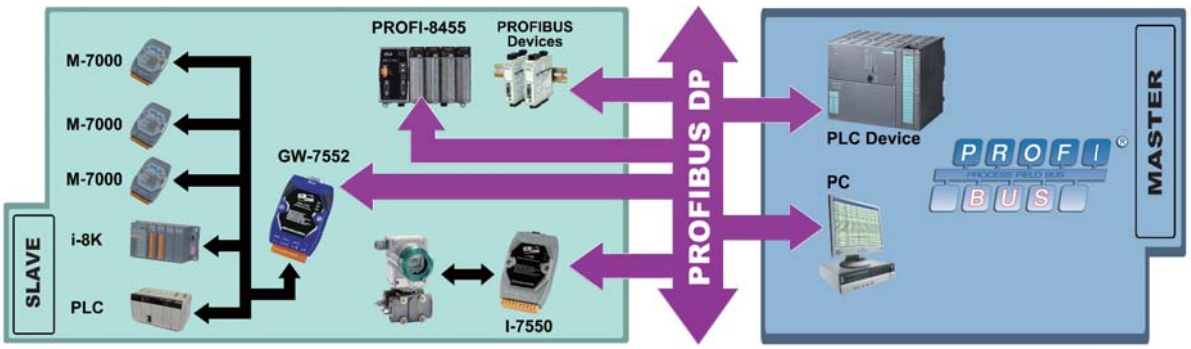
Product Showcase

PROFIBUS DP Slave to Modbus RTU Gateway

GW-7552-B CR

The GW-7552 gateway is a PROFIBUS DP slave. It allows the PROFIBUS master to access the Modbus RTU devices. In the Modbus network, the GW-7552 can be a master to access the Modbus slaves, or be a slave to provide the data from the PROFIBUS master. The flexible design lets the GW-7552 widely applying in the many applications.

- Protocol PROFIBUS DP-V0 Slave
- Detect transmission rate (9.6 to 12000 kbps) on PROFIBUS automatically
- 132 bytes Max. input data length
- 131 bytes Max. output data length
- Support Modbus master mode and slave mode
- PROFIBUS address 0 ~ 126 set by DIP switch
- Support several kinds of baud for COM1 from 2.4 ~ 115.2 kbps
- Network Isolation Protection: 2500 V_{rms} High Speed iCoupler
- 3000 V_{DC} isolation protection on PROFIBUS side



PROFIBUS DP Slave to Modbus TCP/RTU Gateway

GW-7553-B CR

The GW-7553 is used for data-exchange between the Modbus TCP/RTU network and the PROFIBUS network. It provides not only the Modbus TCP client and server functions, but the Modbus RTU master and slave functions. Therefore, the GW-7553 can satisfy most of the applications of the data transfer between Modbus and PROFIBUS.

- Protocol PROFIBUS DP-V0 & DP-V1 slave
- Detect transmission rate (9.6 to 12000 kbps) on PROFIBUS automatically
- Support one 10/100 Base-TX Ethernet port
- Support one RS-232 port
- 240 bytes Max. input data length
- 240 bytes Max. output data length
- Support Modbus TCP/RTU/ASCII protocol
- PROFIBUS address 0 ~ 126 set by DIP switch
- Network isolation protection: 2500 V_{rms} high speed iCoupler
- 3000 V_{DC} isolation protection on PROFIBUS side

▶▶▶▶ PROFIBUS DP Slave to CANopen Master Gateway

GW-7553-CPM CR *Available soon*

The GW-7553-CPM is designed for the slave device of PROFIBUS DP protocol. It allows PROFIBUS master to access CANopen slave devices. These CANopen slave device may be a sensor, actuators, ICPDAS CAN-2000 series modules and so forth. In addition, we also provide the utility software for users to configure the GW-7553-CPM. By using this module, users can put their CANopen slave devices into PROFIBUS network very easily.

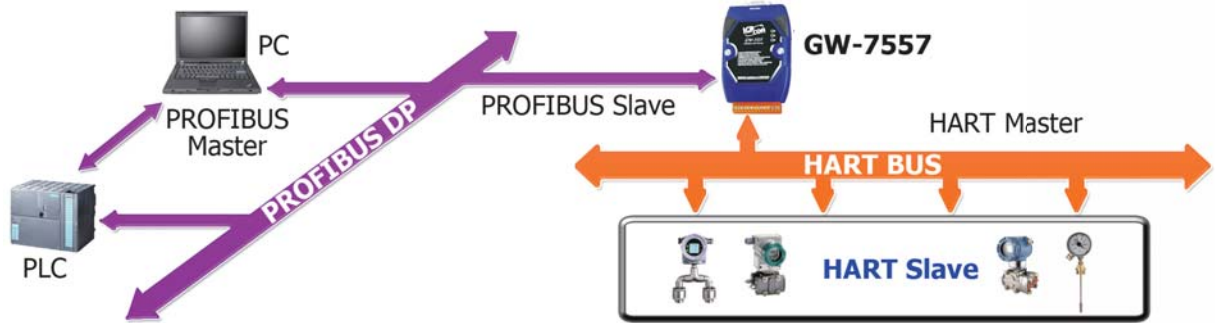
- Protocol: PROFIBUS DP-V0 slave
- Detect Transmission rate (9.6 to 12000 kbps) on PROFIBUS automatically
- 240 bytes Max. input data length
- 240 bytes Max. output data length
- PROFIBUS address 0 ~ 126 set by DIP switch
- Follow the CiA CANopen Standard DS-301 v4.02
- Support Heartbeat function
- Support Node Guarding
- Support 230 Rx & 230 Tx PDO
- Network isolation protection: 2500 V_{rms} high speed iCoupler
- 3000 V_{DC} isolation protection on PROFIBUS side

▶▶▶▶ PROFIBUS DP Slave to HART Master Gateway

GW-7557-B CR

The GW-7557 is designed for the slave device of PROFIBUS DP protocol. It allows the PROFIBUS master to access the HART slave devices. These HART devices may be a transmitter, an actuator, a current output device and so forth. Owing to the GW-7557, you can communicate the HART slave devices into PROFIBUS network very easily.

- Protocol: PROFIBUS DP-V0 slave
- Detect transmission rate (9.6 to 12000 kbps) on PROFIBUS automatically
- 240 bytes Max. input data length
- 240 bytes Max. output data length
- PROFIBUS address 0 ~ 126 set by DIP switch
- Support HART mode: point-to-point/multi-drop
- Support 4 HART channels, each for Max. 15 HART modules
- Support HART Short/Long frame
- Network isolation protection: 2500 V_{rms} high speed iCoupler
- 3000 V_{DC} isolation protection on PROFIBUS side



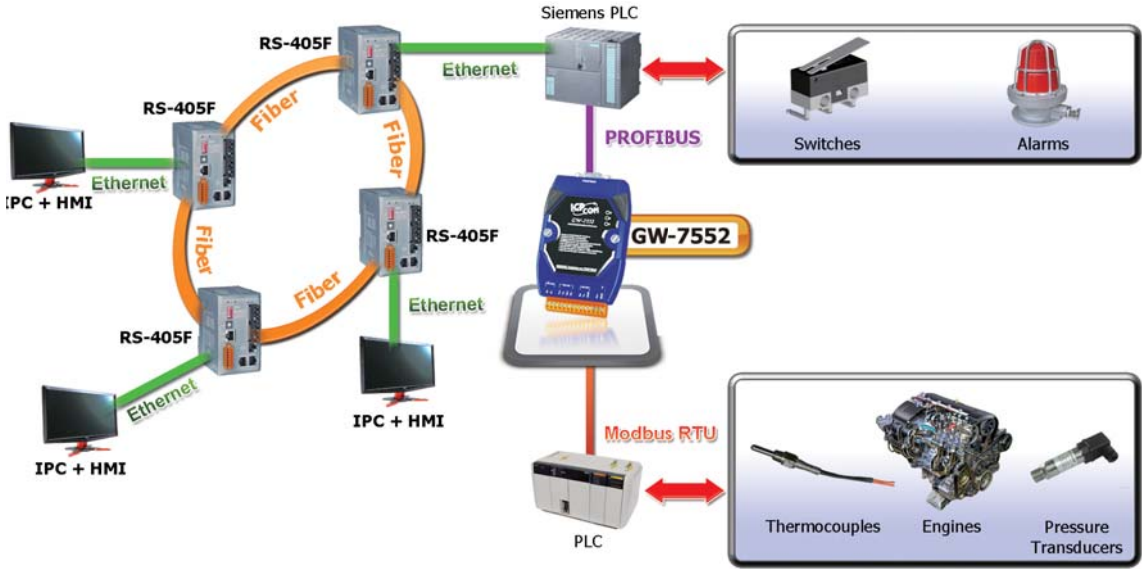
5-3-3 PROFIBUS Case Studies

● Vessel Propulsion Control and Monitor System

▶▶▶▶ Location: Kaohsiung, Taiwan

Product: GW-7552

The propulsion system is the most important and complex part of one ocean fishing vessels. It is composed of many electronic devices to control and monitor the engine speed, cooling system, residual fuel content, exhaust gas temperature, engine oil pressure, and so forth. Each of these devices may be handled by several PLCs via the different communication interfaces. In order to integrate the information from these devices, the user can apply the GW-7552 for data-exchange between the Siemens PLC and the Modbus PLC. Therefore, the HMI can collect and configure the important parameters of the propulsion systems quickly and easily through the GW-7552.

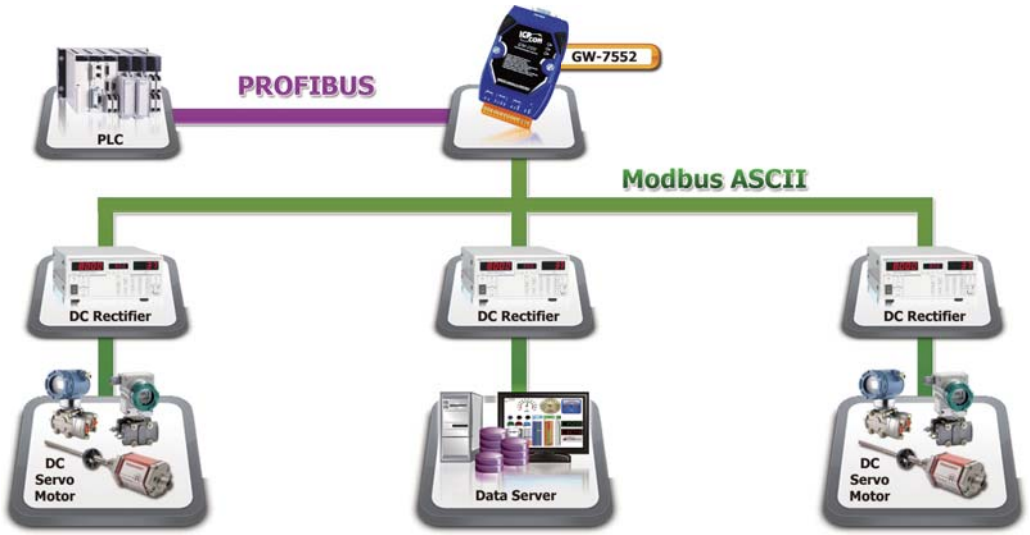


● DC Rectifier Control and Monitor System

▶▶▶▶ Location: U.S.A

Product: GW-7552

For most of Precision Instrument, it needs stable voltage and current. How to control and monitor it is a major task for stabling power system. The DC rectifier with PROFIBUS interface provides good way to monitor and control it. Customer can adjust power as soon as possible when exception occurs.

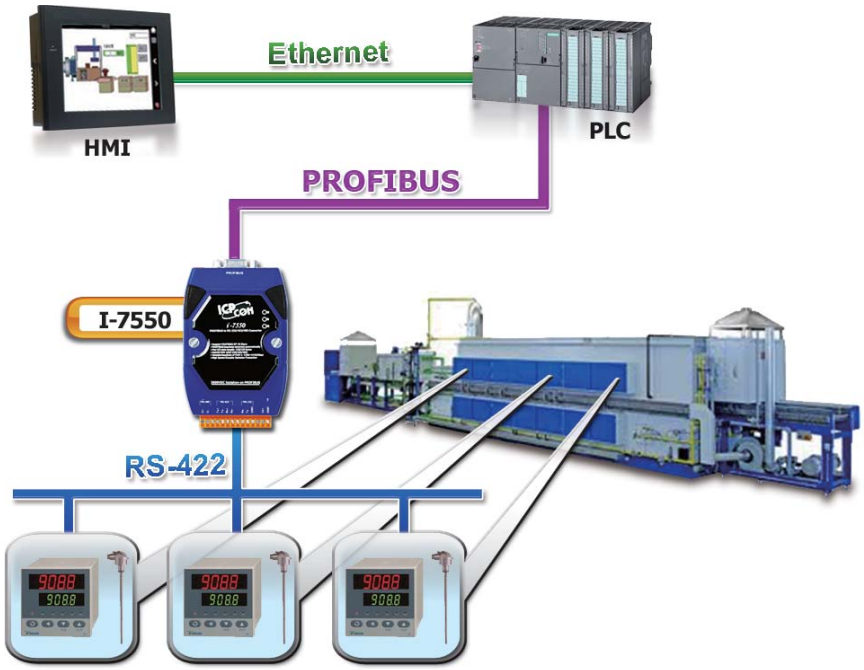


High Temperature Industrial Furnaces Monitoring System

Location: China

Product: I-7550

An industrial furnace refers to equipment which is used to provide heat for a certain process or reaction. Precise temperature profiles are absolutely mandatory for the often highly complex processes involved in firing, annealing and hardening of different materials. In order to achieve accurate and stable temperature control, the user can apply the I-7550 to collect temperature information to ensure energy-optimized control of the processes.

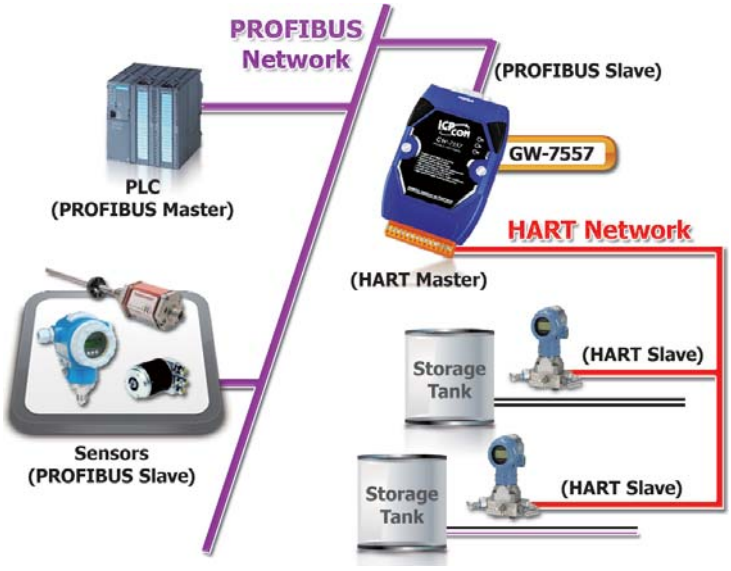


Flow Control System

Location: Kaohsiung, Taiwan

Product: GW-7557

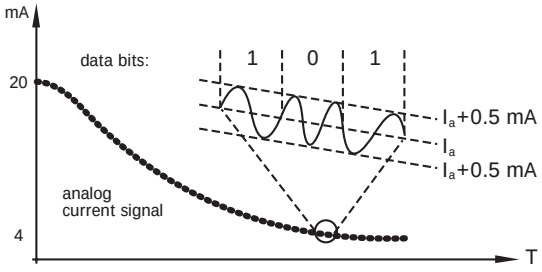
Beverage manufacturers use flow meters whose communication interface of flow meter is HART to monitor flow production line. However, the other end communication interface of main controller is PROFIBUS. In order to integrate the information from flow meters, the customer can use the GW-7557 to acquire data quickly and easily between main controller and flow meters.



5-4 HART

Introduction

HART Field Communications Protocol extends this 4 ~ 20 mA standard to enhance communication with smart field instruments. The protocol preserves the 4 ~ 20 mA signal and enables two-way digital communications to occur without disturbing the integrity of the 4 ~ 20 mA signal. Unlike other communication technologies, the HART protocol can maintain compatibility with existing 4 ~ 20 mA systems with a uniquely backward compatible solution. Here are two main operational modes of HART instruments: analog/digital mode, and multi-drop mode.



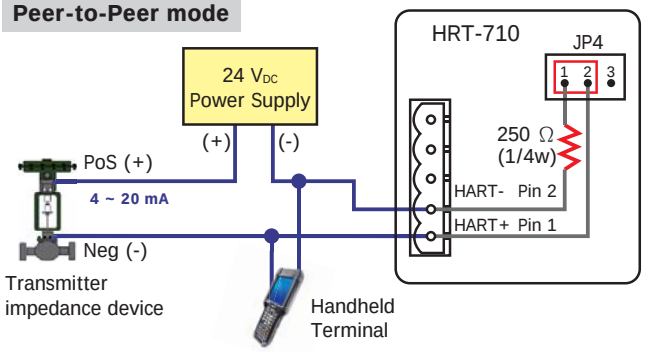
Multi-drop mode (digital)

In this mode, only the digital signals are used. The analog loop current is fixed at 4 mA. In multi-drop mode it is possible to have up to 15 instruments on one signal cable. The polling addresses of the instruments will be in the range 1 ~ 15. Each meter needs to have a unique address.

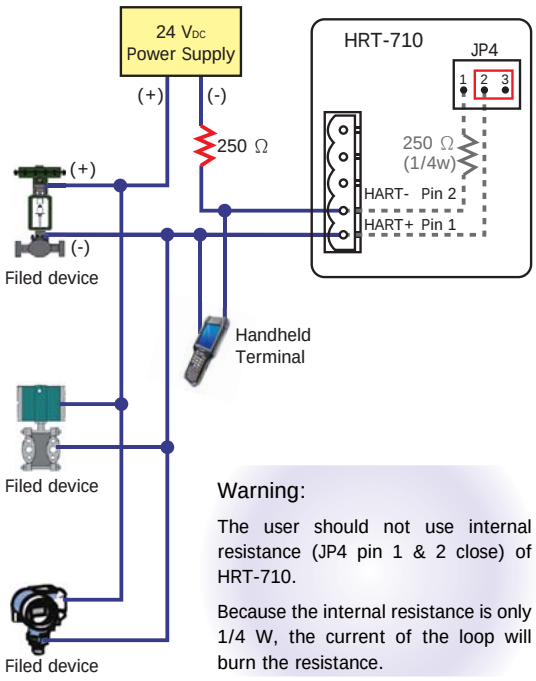
Peer-to-Peer mode

The analog and digital signals can be communicated in this mode. Here the digital signals are overlaid on the 4 ~ 20 mA loop current. Both the 4 ~ 20 mA current and the digital signal are valid output values from the instrument. The polling address of the instrument is set to "0". Only one instrument can be put on each instrument cable signal pair.

Peer-to-Peer mode



Multi-drop mode (digital)



Warning:

The user should not use internal resistance (JP4 pin 1 & 2 close) of HRT-710.

Because the internal resistance is only 1/4 W, the current of the loop will burn the resistance.

Features

- Relatively easy to understand and use, the HART protocol provides access to the wealth of additional information (variables, diagnostics, calibration, etc.)
- HART is a no risk solution for enhanced field communication
- Compatibility with standard 4 ~ 20 mA wiring
- Simultaneous transmission of digital data
- Risk reduction through a highly accurate and robust protocol
- Increase plant Availability
- Improve regulatory compliance

Selection Guide

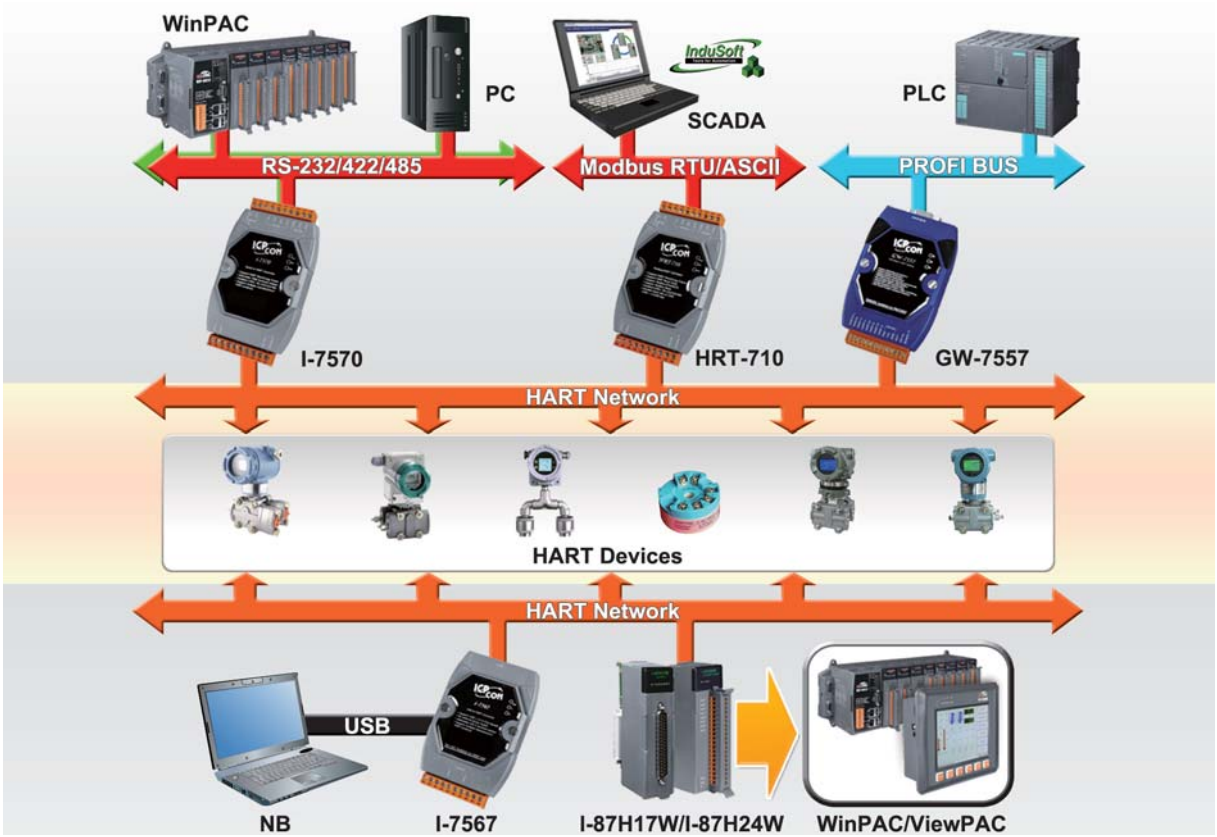
Models		Description
Converters	I-7547	Ethernet to HART Converter
	I-7567	USB to HART Converter
	I-7570	RS-232/422/485 to HART Converter
	HRT-227CS	Fiber to HART Converter
	HRT-228-A4	HART-to-Analog Converter and Loop Monitor
Gateways	HRT-710	Modbus RTU/ASCII Slave to HART Master Gateway
	HRT-711	Modbus TCP Slave to HART Master Gateway
	GW-7557	PROFIBUS DP Slave to HART Master Gateway

5-4-1 HART System Integration Solution

Introduction

ICP DAS have deeply researched on the HART bus technology for many years. The total HART products have been developed by ICP DAS including HART converter, HART gateway and HART I/O modules. The HART converter can be used to access HART devices via COM, USB or Ethernet interface. The HART gateway can integrate HART communication to the different protocols like Modbus, PROFIBUS etc. The HART I/O module can be used to access or control HART devices directly. Therefore, by using ICP DAS HART products, users can easily and quickly integrate HART devices and complete the data acquisition to SCADA, HMI or PLC system.

The following diagram will illustrate the HART bus applications and understand the roles of ICP DAS HART communication modules in HART network.



5-4-2 HART Converters

Product Showcase

▶▶▶▶ Ethernet to HART Converter

I-7547 CR *NEW*

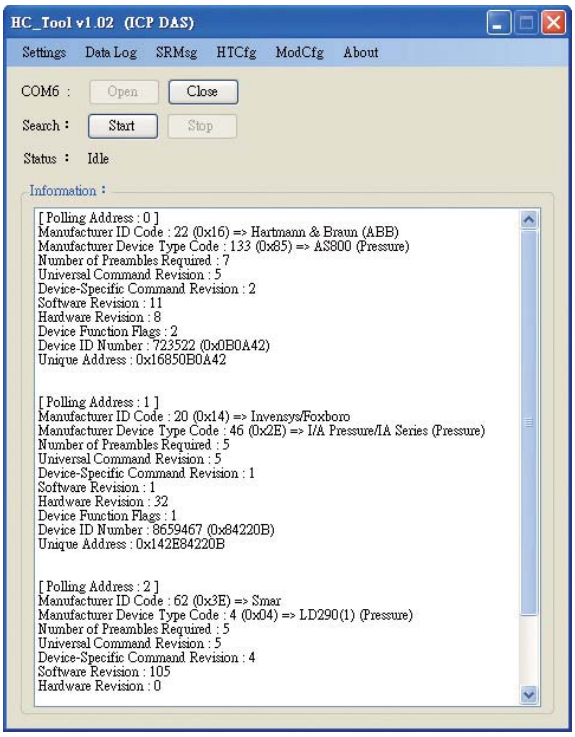
The I-7547 is an Ethernet to HART converter designed as the master device of HART protocol. It allows users to access the HART slave via Ethernet. These HART slave devices may be a transmitter, actuator, current output device and so forth. In addition, by using the HC_Tool utility, users can configure module and test HART communication easily and quickly.

Features

- Support HART Short/Long frame.
- Support HART Burst mode.
- Support point-to-point or multi-drop HART mode.
- Support connecting up to 15 HART slave devices.
- Allow two HART masters.
- Provide HC_Tool utility for module configuration and HART communication.
- Support firmware update via Ethernet.
- Provide PWR/TxRx indication LED
- 4 kV ESD Protection
- Built-in Watchdog
- Selectable 250 Ω load resistor
- Provide four HART channels
- Support FDT (Field Device Tool) technology (like: PACTware/FieldCare/Seimens PDM…)
- Support HART Pair-Connection (FW_v1.03)

Utility Features

- Search all HART devices automatically
- Provide HART Universal & Common-Practice command (v6.0) for HART device configuration
- Provide module configuration and HART communication easily and quickly
- Provide data logging for HART communication



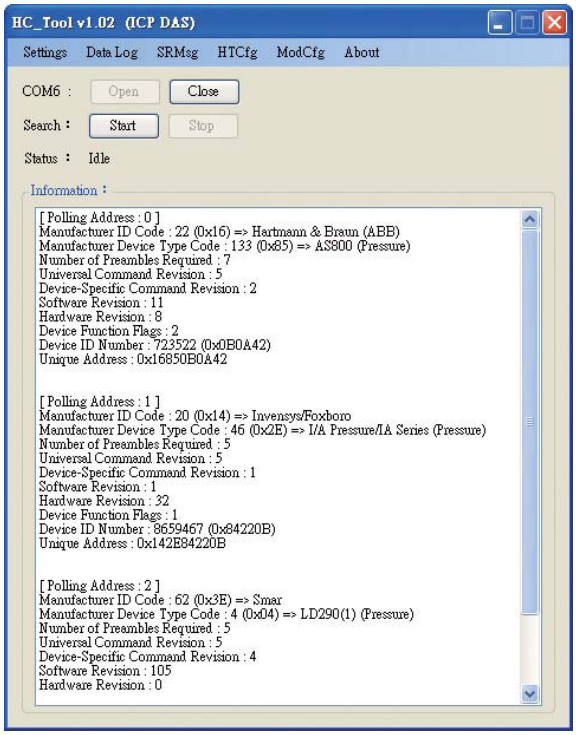
▶▶▶▶ USB to HART Converter

I-7567 CR

The USB interface is comprehensive applied in PCs and notebooks. In order to meet the users' requirements more closely, the I-7567 is presented. It is a USB to HART converter specially designed as the master device of HART protocol. Through it, users can easily to access the HART network via USB port which is implemented as a virtual COM port on PCs or notebooks. Because the I-7567 is powered by the USB interface, the external power is not necessary. Moreover, the I-7567 provides the Utility tool which is helpful for diagnosing and configuring the HART network. If you would like to develop a HART network, the I-7567 will be a good tool to reduce your setup costs.

Features

- Support HART Short/Long frame
- Support HART Burst mode
- Allow two HART masters
- Support the in point-to-point or multi-drop HART network mode
- Allow to connect with Max. 15 HART modules
- Provide selectable 250 Ω load resistor
- Compatible with USB 1.1 and 2.0 standards
- Powered by USB (external power is not necessary)
- Support firmware update via USB
- Provide utility tool for module configuration
- Built-in watchdog
- 4 kV ESD protection
- 3000 VDC intra-module isolation
- Support FDT (Field Device Tool) technology (like: PACTware/FieldCare/Seimens PDM…)
- Support HART OPC Server provided by HART COMMUNICATION FOUDATION (HCF)



Utility Features

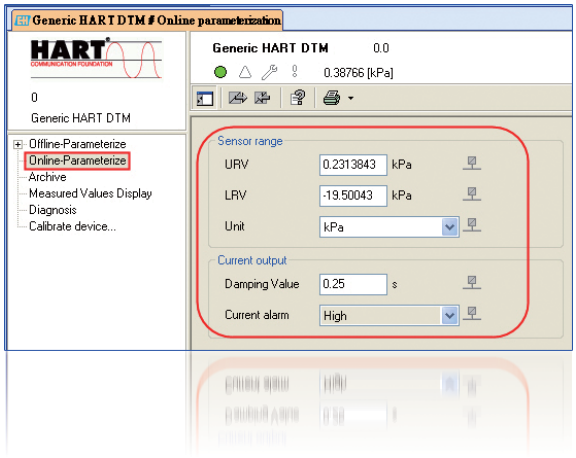
- Search all HART devices automatically
- Provide HART Universal & Common-Practice command (v6.0) for HART device configuration
- Provide module configuration and HART communication easily and quickly
- Provide data logging for HART communication

RS-232/422/485 to HART Converter

I-7570 CR

The I-7570 is a Serial to HART converter specially designed as the master device of HART protocol. By using I-7570, the HART devices, such transmitters, actuators, gauges, meters, and the current output devices, can be easily integrated into the HMI/PLC/PC devices via serial port which may be RS-232/RS-422/RS-485 interface. In order to diagnose and configure the HART network more easily, the I-7570 Utility tool with friendly configuration interface is given. It is helpful for diagnosing and configuring the HART network. Through it, you can build a HART network more easily and quickly.

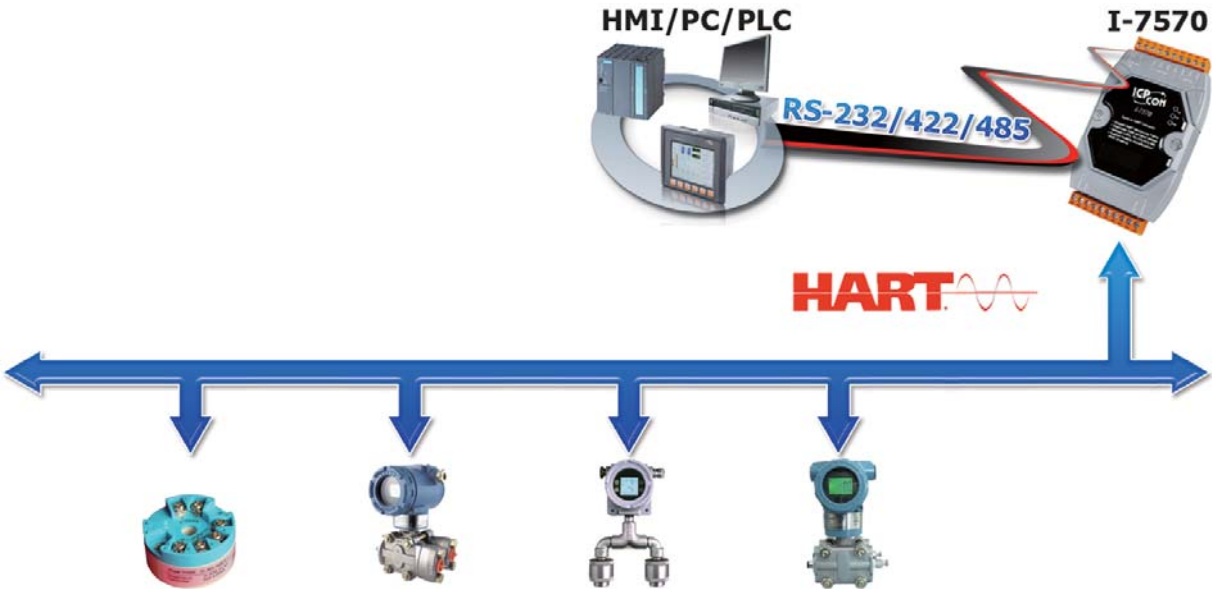
Features



- Support HART Short/Long frame
- Support HART Burst mode
- Allow two HART masters
- Support the in point-to-point or multi-drop HART network mode
- Allow to connect with Max. 15 HART modules
- Provide selectable 250 Ω load resistor
- Isolated COM 1: 3-wire RS-232/RS-422/RS-485
- Support firmware update via COM1
- Provide utility tool for module configuration
- Provide PWR/RUN/ERR LED indicators
- Built-in watchdog
- 4 kV ESD protection
- Mountable on DIN Rail
- Support FDT (Field Device Tool) technology (like: PACTware/FieldCare/Seimens PDM...)
- Support HART OPC Server provided by HART COMMUNICATION FOUDATION (HCF)

Utility Features

- Search all HART devices automatically
- Provide HART Universal & Common-Practice command (v6.0) for HART device configuration
- Provide module configuration and HART communication easily and quickly
- Provide data logging for HART communication



▶▶▶▶ Fiber to HART Converter

HRT-227CS CR

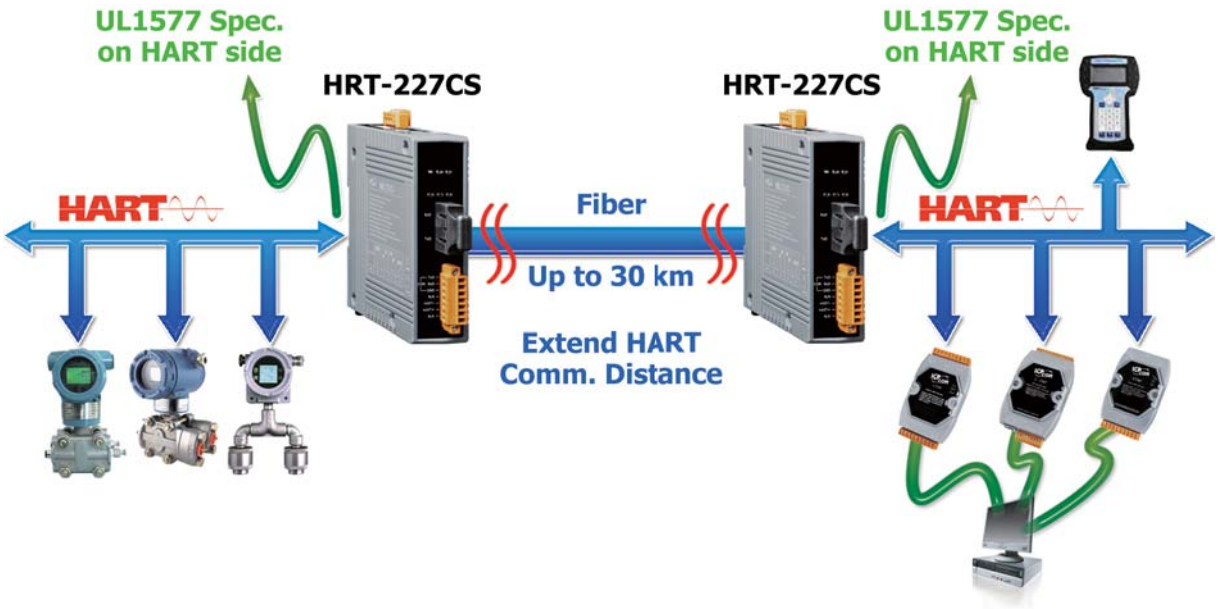
The HRT-227CS is a HART to Fiber converter paired used to extend HART communication distance via single mode fiber optic transmission medium. In order to solve the problem between HART and fiber transmission medium, HRT-227CS is specially designed for converting the HART signal to fiber optic cables. Therefore, users can make data collection and processing of HART network easier and quicker by applying HRT-227CS. In addition, we also provide the free HC_Tool utility for module configuration easily.

Features

- Support HART Short/Long frame
- Support HART Burst mode
- Support point-to-point or multi-drop HART mode
- Support connecting up to 15 HART slave devices
- Allow two HART masters
- Provide HC_Tool utility for module configuration
- Support firmware update via COM port
- Fiber Type: SC ; Single mode ; 100 Base-FX
- Maximum transmission distance up to 30 km
- 4KV ESD Protection
- Built-in Watchdog
- Selectable 250 Ω load resistor
- The HART port with the same Group ID can

Utility Features

- Search all HART devices automatically
- Provide HART Universal & Common-Practice
- Command (v6.0) for HART device configuration
- Provide module configuration and HART



▶▶▶▶ HART-to-Analog Converter and Loop Monitor

HRT-228-A4 CR

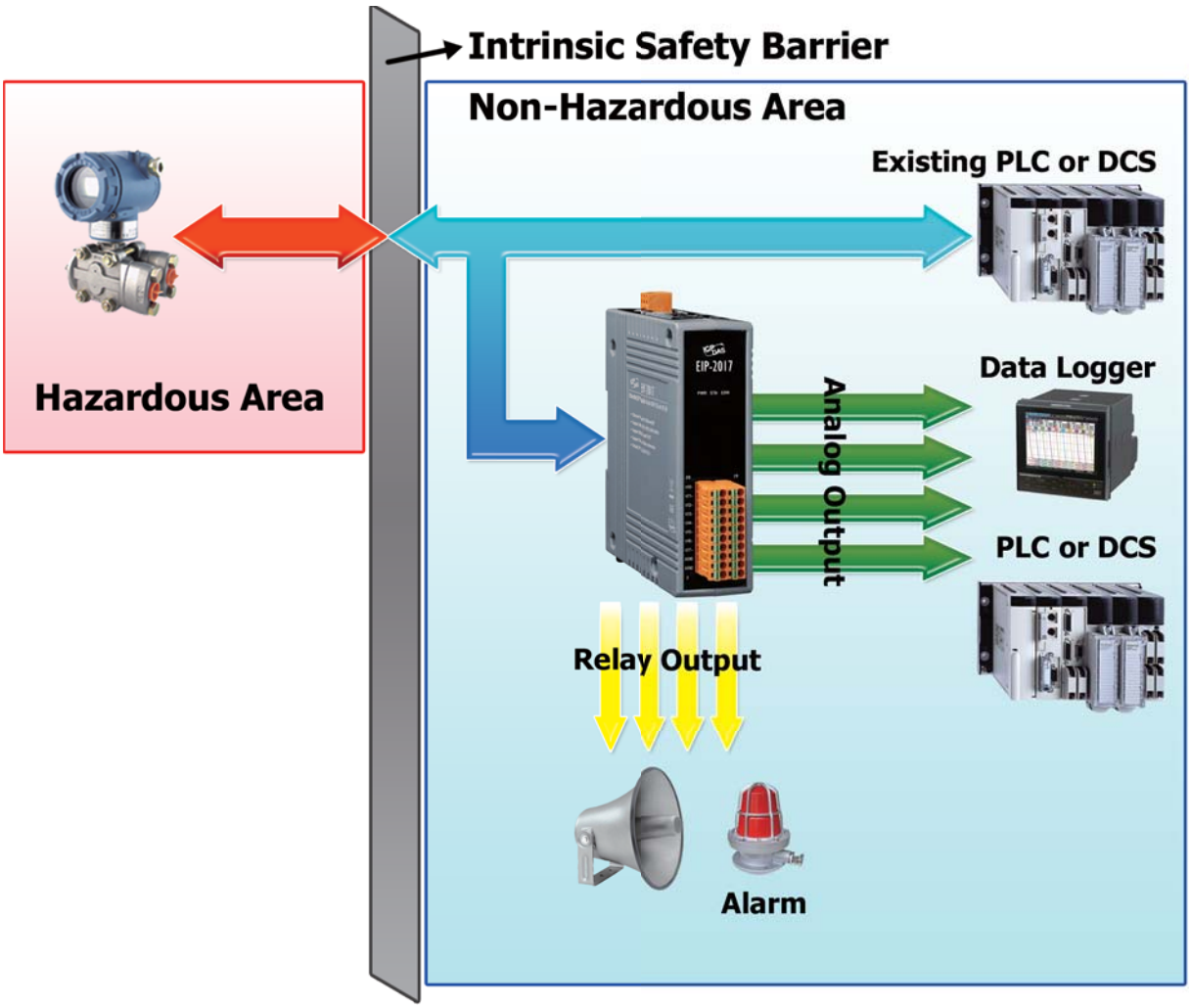
The ICPDAS HRT-228-A4 HART Loop Converter enables the conversion of a digital multivariable HART signal into four independent 4 ~ 20 mA analog process variables. The HRT-228-A4 can apply in control or monitoring application to obtain up to four additional analog outputs without additional process penetrations.

Features

- Support HART Short/Long frame
- Support HART Burst mode
- Allow two HART Masters
- Working in Point-to-Point Mode
- 4 Independent Analog Output Signals
- Support Firmware Update
- Support Acquire Long Frame Address Automatically
- Provide LED indicators
- Built-in Watchdog
- Built-in 2 Form A and 2 Form C relays
- Intelligent Activate Relay Alarm automatically

Utility Features

- Provide the configuration of HRT-228-A4
- Provide the diagnostic information of HRT-228-A4 module and HART device
- Provide send HART command transparently to HART device
- Provide "Load/Save" module configuration file to apply to other HRT-228-A4 quickly



5-4-3 HART Gateways

Product Showcase

▶▶▶▶ Modbus RTU/ASCII Slave to HART Master Gateway

HRT-710 CR

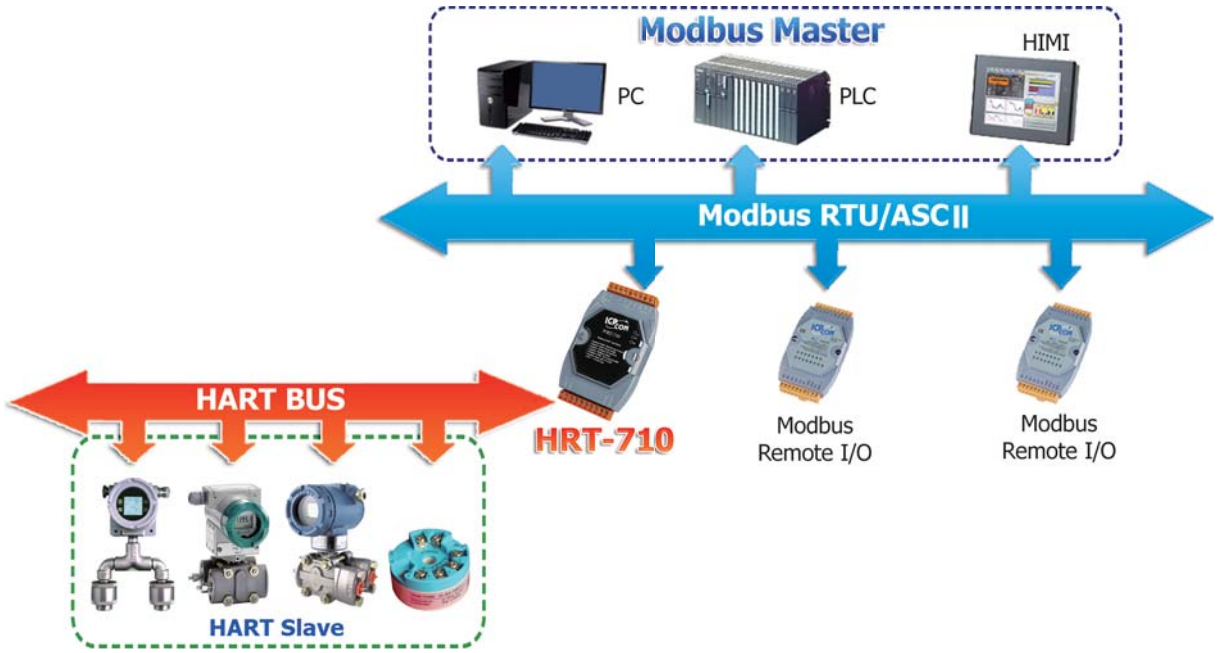
The HRT-710 is a Modbus RTU/ASCII slave to HART master gateway. It provides an economic solution for Modbus master device to access the HART slave devices. In order to diagnose and configure the HART network more easily, the HRT-710 Utility tool with friendly configuration interface is given.

Features

- Support HART Short/Long frame
- Support HART Burst mode
- Allow two HART Masters
- Working in point-to-point or multi-drop HART mode
- Connecting up to 15 HART modules
- Support Modbus RTU and ASCII format
- Support Modbus Slave mode
- Support firmware update via Com Port. (FW_v1.2 and HW_v1.2)
- Support on-line replacement of HART devices. (FW_v1.5)
- Support acquire Long Frame Address automatically (FW_v1.5)
- Isolated COM 1: RS-232/422/485
- Provide LED indicators
- Built-in Watchdog

Utility Features

- Provide the system and communication configuration of HRT-710
- Provide the Modbus address table for HART command data
- Provide the diagnostic information of HRT-710 module and HART device
- Provide send/receive HART command to access HART device
- Provide "Load/Save" module configuration file to apply to other HRT-710 quickly



Modbus TCP Slave to HART Master Gateway

HRT-711 CR *NEW*

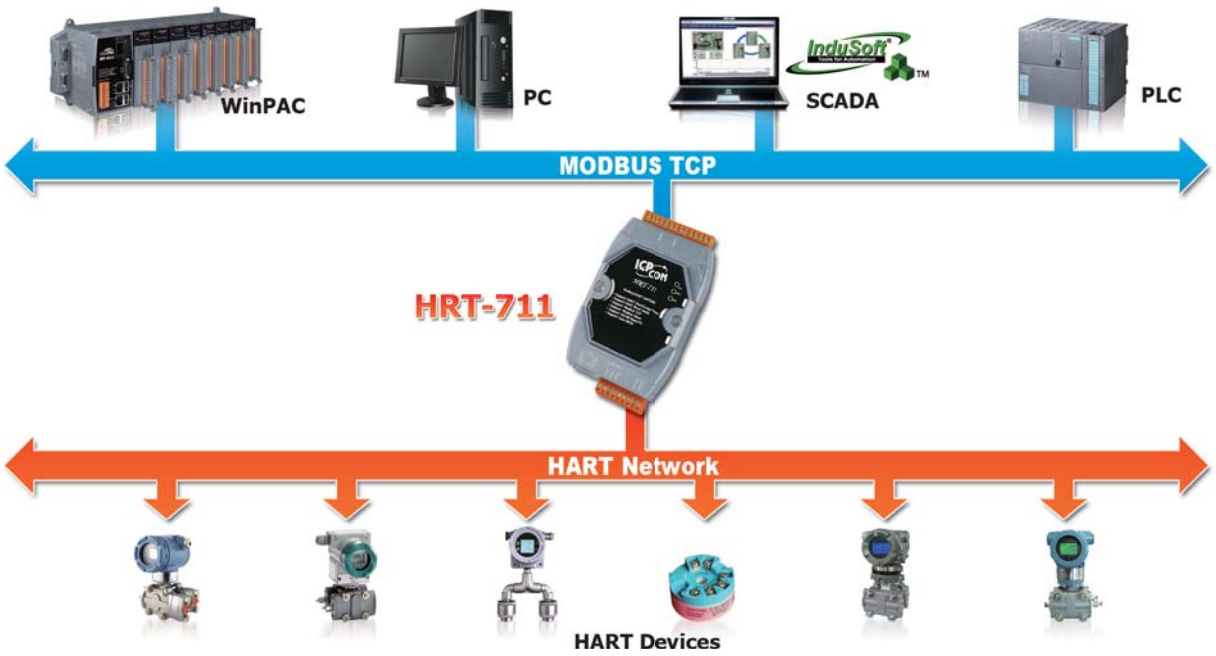
The HRT-711 is a new Modbus/TCP to HART Gateway. It allows the Modbus/TCP Master to access the HART Slave devices. These HART devices may be a transmitter, an actuator, a current output device and so forth. By using the HRT-711, users can integrate their HART devices into Modbus network easily. Therefore, HRT-711 can be a powerful gateway to exchange the data between Modbus and HART network. Moreover, the HRT-711 can be applied in the various hard environments because its high isolation protection designs. This design makes users to apply widely application for the remote data acquisition, control, process automation, and factory automation, etc.

Features

- Support HART Short/Long frame
- Support HART Burst mode
- Allow two HART Masters
- Working in point-to-point or multi-drop HART mode
- Connecting up to 15 HART modules
- Support Modbus TCP
- Support Modbus Slave mode
- Support firmware update via Com Port
- Support on-line replacement of HART devices
- Support acquire Long Frame Address automatically
- Provide LED indicators
- Built-in Watchdog

Utility Features

- Provide the system and communication configuration of HRT-711
- Provide the Modbus address table for HART command data
- Provide the diagnostic information of HRT-711 module and HART device
- Provide send/receive HART command to access HART device
- Provide "Load/Save" module configuration file to apply to other HRT-711 quickly



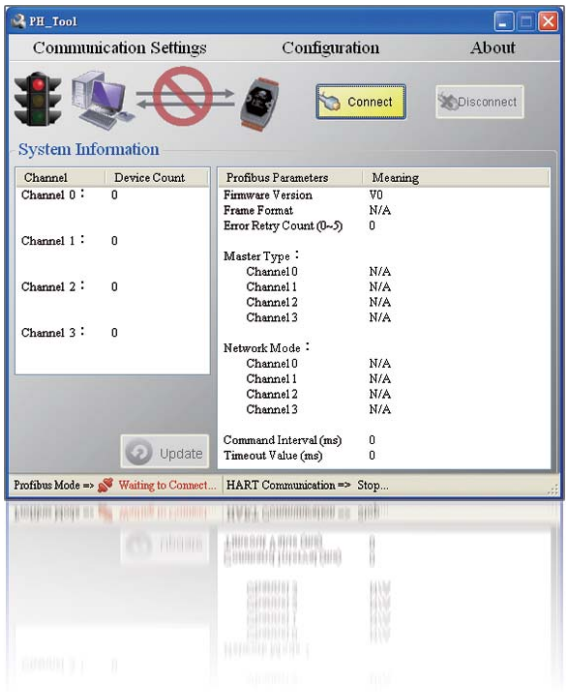
▶▶▶▶ PROFIBUS DP Slave to HART Master Gateway

GW-7557 CR

The GW-7557 is designed for the slave device of PROFIBUS DP protocol. It allows the PROFIBUS master to access the HART slave devices. These HART devices may be a transmitter, an actuator, a current output device and so forth. Owing to the GW-7557, you can put the HART slave devices into PROFIBUS network very easily.

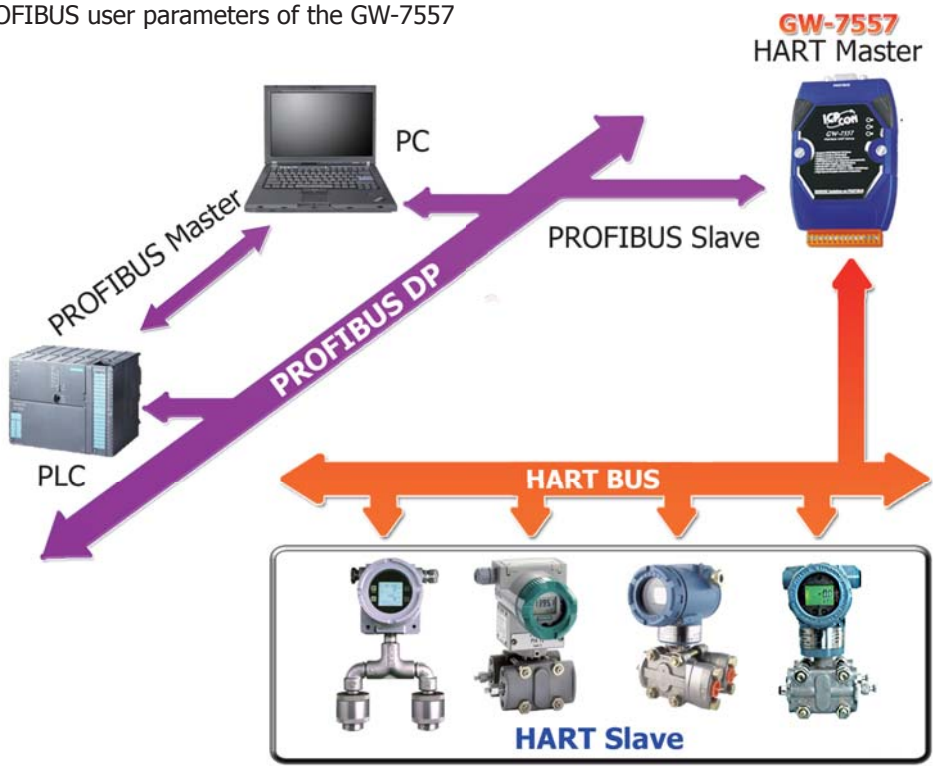
Features

- Support PROFIBUS DP-V0 slave
- Protocol & Hierarchy: DP-V0 Slave
- Detect transmission rate (9.6 ~ 12000 kbps) automatically
- Max transmission speed up to 12 Mbps for PROFIBUS and 115.2 kbps for COM Port
- Max I/O Data Length: 240/240 Bytes
- Support 4 HART Channels
- Support HART Short/Long frame
- Support HART Burst mode
- Allow two HART Masters
- Working in point-to-point or multi-drop HART mode
- Connecting up to 15 HART modules
- Network Isolation Protection: High Speed iCoupler
- 3000 VDC isolation protection on PROFIBUS side
- 4 kV ESD Protection



Utility Features

- Read/Write module configuration of the
- Provide auto-scan function for HART communication parameters
- Provide test function for HART slave devices
- Show PROFIBUS user parameters of the GW-7557



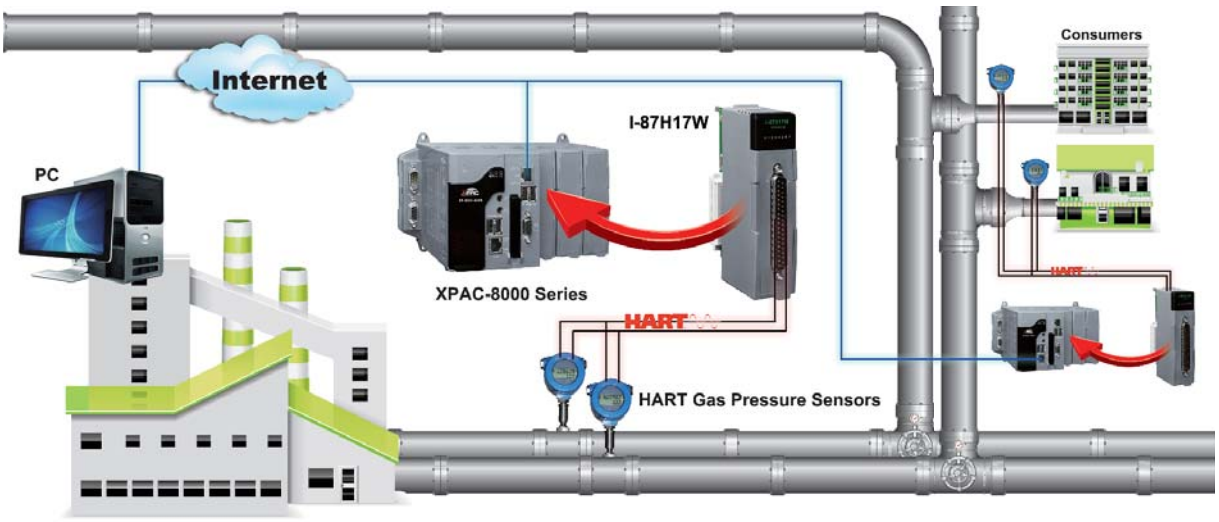
5-4-4 HART Case Studies

Pressure Detection of Gas Pipeline

Location: Taiwan

Product: I-87H17W

In general, the process of the natural gas transported to users' families requires long-distance pipeline. The gas pressure in the pipeline will be reduced gradually from high to medium until low. If the gas pipeline ruptures and no body knows it, it will cause the great loss of company. Further, it even causes the more serious disaster. So the most important mission for gas transportation system is strict control of the gas pipeline pressure. The gas company uses HART bus manometer for stable measurement and easy maintenance. The XPAC-8000 controller and I-87H17W with eight HART AI channels are used to collect these HART manometers data quickly and easily. Through Ethernet, the control center can monitor all gas pipeline pressure remotely.

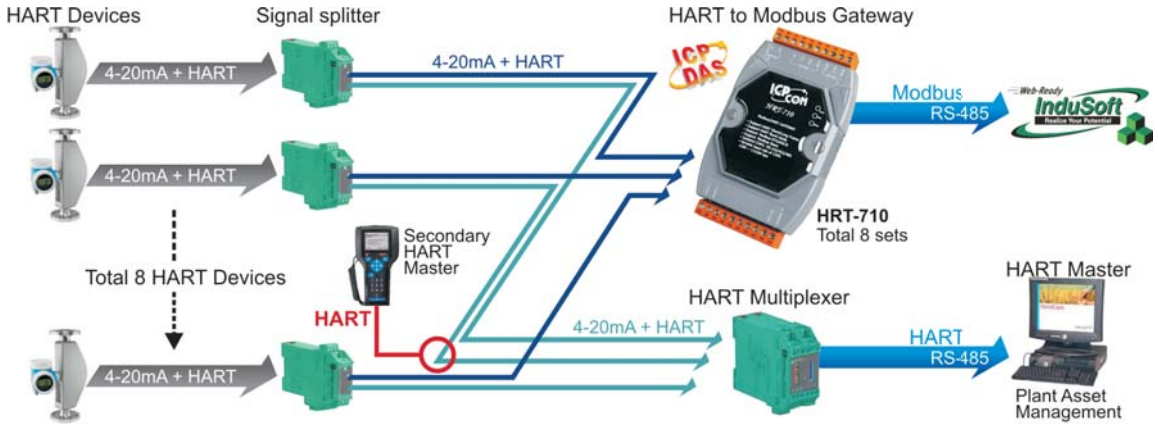


Wastewater Treatment Toll Collection System

Location: America

Product: HRT-710

The wastewater treatment is an important issue of the environment protection all over the world. During the process of manufacture and production, the wastewater is made, and needs to be processed by the wastewater treatment plants (WWTP). The customer from the WWTP needs to know the quantity of the draining wastewater from the factories, and charges proper tolls for treating the wastewater. Therefore, the HRT-710, a HART master to Modbus slave gateway, is applied to integrate the information from the Endress+Hauser (E+H) flow meters into the customer's HMI system. Through the HRT-710, all of the flow meters will be regarded as one Modbus slave. The HMI system can use the built-in Modbus RTU communication mode to easily access the flow meters.

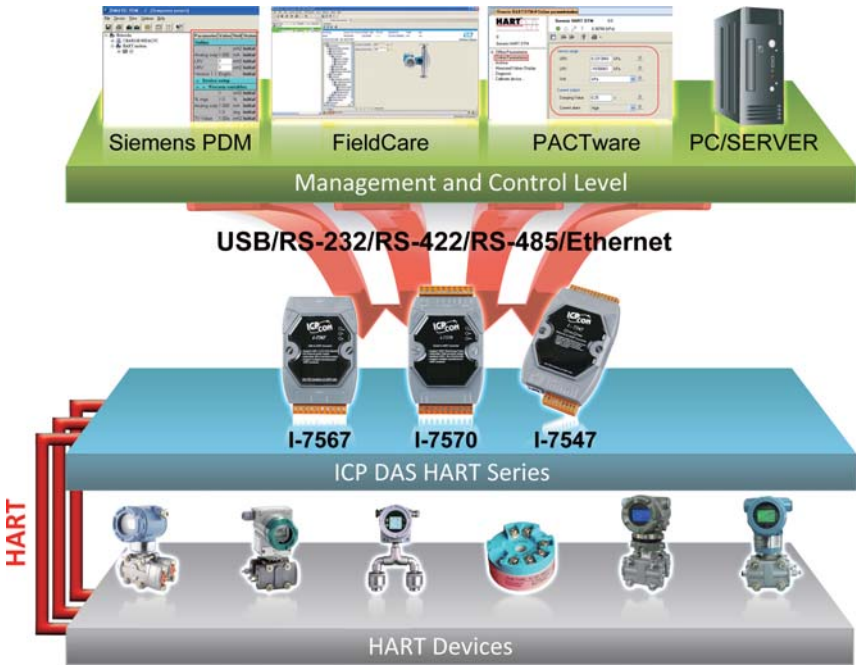


Support FDT Online Control & Configuration System

Location: Russia

Product: I-7567/I-7570/I-7547

FDT (Field Device Tool) standardizes the communication and configuration interface between all field devices and host systems. FDT provides a common environment for accessing the devices' most sophisticated features. Any device can be configured, operated, and maintained through the standardized user interface – regardless of supplier, type or communication protocol. Therefore, by using the I-7567, I-7570 or I-7547, ICP DAS HART converters, users can easily and quickly construct HART online control and configuration system.

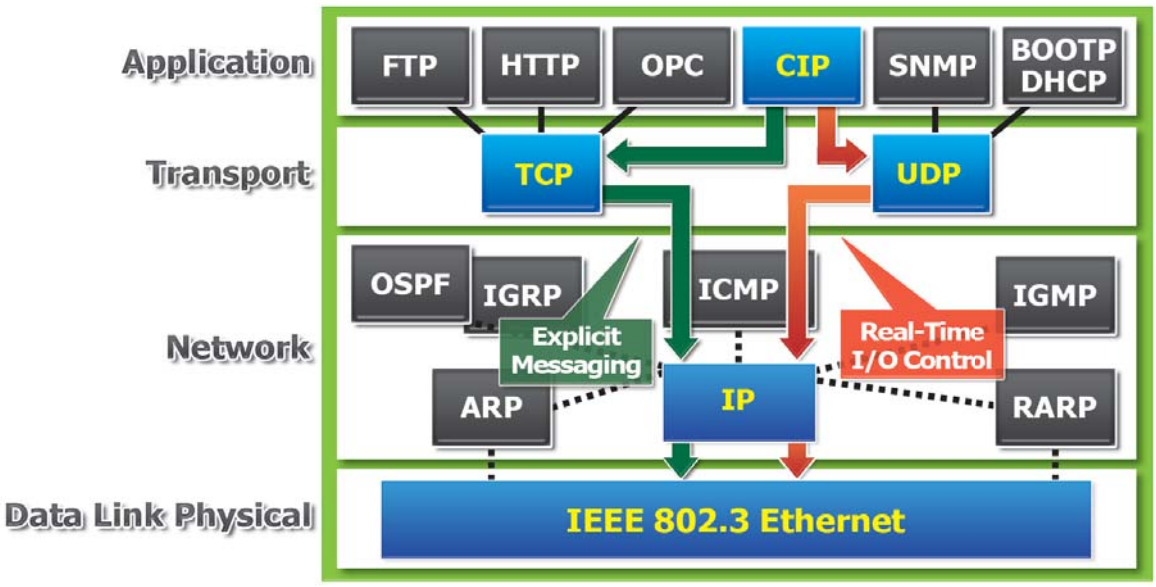


5-5 EtherNet/IP

Introduction

EtherNet/IP is one of the open network standards, like DeviceNet and ControlNet. It is an industrial application layer protocol for industrial automation applications. EtherNet/IP uses all of the protocols of traditional Ethernet including the Transport Control Protocol (TCP), the Internet Protocol (IP) and the media access and signaling technologies. Building on standard Ethernet technologies means that EtherNet/IP will work transparently with all the standard Ethernet devices found today. EtherNet/IP application layer is based on the "Common Industrial Protocol" (CIP) which is used in both DeviceNet and ControlNet. This standard organizes networked devices as a collection of objects. It defines the access, behavior and extensions, which allow vastly different devices to be accessed using a common protocol. Based on these protocols, EtherNet/IP provides a seam-less integrated system from the Industrial floor to the enterprise network.

EtherNet/IP uses all the transport and control protocols of standard Ethernet including the Transport Control Protocol (TCP), the User Datagram Protocol (UDP), the Internet Protocol (IP) and the media access and signaling technologies found in off-the-shelf Ethernet technology. Building on these standard communication technologies means that EtherNet/IP works transparently with all the standard Ethernet devices found in today's market-place.



Features

- Offer Producer-consumer service that enable users to control, configure and collect data
- Uses exiting IEEE standards for Ethernet physical layer and data link layer
- Provide flexible installation options leveraging commercially available industrial infrastructure products, including copper, fiber, fiber ring and wireless solutions
- Provide robust physical layer options for industrial environments and includes the use of sealed RJ45 and M12 D-coding connector.
- Compatible with general communication standards, including OPC, TCP/IP, HTTP, FTP, SNMP, DHCP
- Use TCP port number 44818 for explicit messaging and UDP port number 2222 for implicit messaging
- Transfer of basic I/O data via UDP-based implicit messaging
- Uploading and downloading of parameters, programs and recipes via TCP
- Polled, cyclic and change-of-state monitoring via UDP
- One-to-one (unicast), one-to-many (multicast), and one-to-all (broadcast) communication via TCP

Selection Guide

Models		Description
EtherNet/IP Gateways	GW-7472	Ethernet/IP Adapter to Modbus TCP/RTU Master Gateway
	GW-7473	Modbus TCP/RTU Slave to EtherNet/IP Scanner Gateway

5-5-1 EtherNet/IP Gateways

Product Showcase

EtherNet/IP Adapter to Modbus TCP/RTU Master Gateway

GW-7472 CR *NEW*

The GW-7472 (EtherNet/IP adapter to Modbus TCP/RTU Master Gateway) is helpful for data-exchanging between the Modbus RTU Network, Modbus TCP Network, and the EtherNet/IP Network. It reads the register data from the Modbus RTU slaves as well as Modbus TCP servers and publishes these data to the input register data of the EtherNet/IP scanner. The output data transmitted by the EtherNet/IP scanner are updated to the register data of Modbus TCP/RTU slaves via the GW-7472. In order to save the installation space, the GW-7472 is offered in an amazing tiny form-factor that makes it easy to install in anywhere, even directly attached to a serial device or embedded into a machine.

General Features

- 10/100 Base-TX Ethernet, RJ-45 x1
- Redundant power inputs: PoE (IEEE 802.3af, Class 1) and DC jack
- Automatically RS-485 direction control
- Tiny form-factor and low power consumption

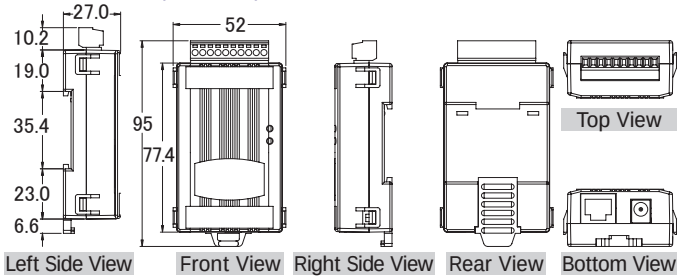
EtherNet/IP Features

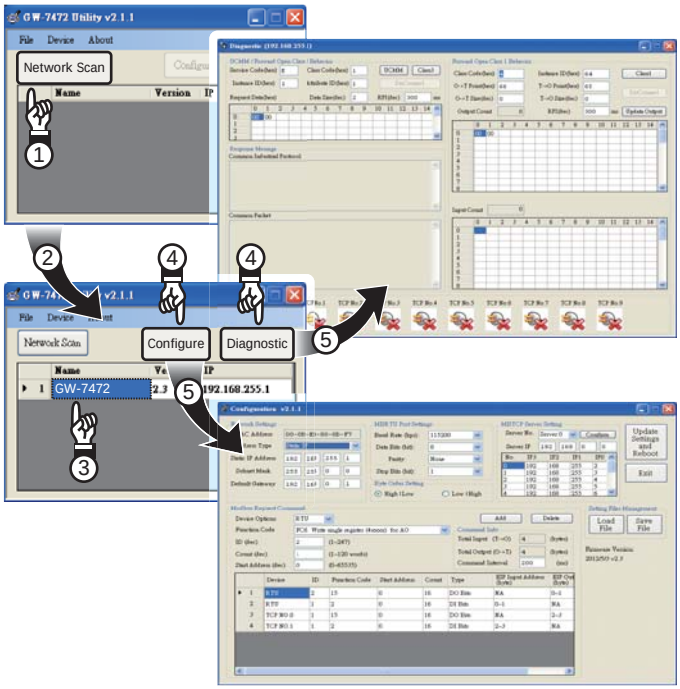
- Ethernet Protocol: EtherNet/IP adapter
- Maximum number of connections for Explicit Messages: 6
- Maximum number of connections for Implicit Messages: 1
- EtherNet/IP Input/Output command data size: maximum 500 bytes
- Supported I/O connection methods:
  - Transport and trigger: Exclusive-Owner, Cyclic
  - Originator to Target Type: POINT2POINT
  - Target to Originator Type: POINT2POINT, MULTICAST

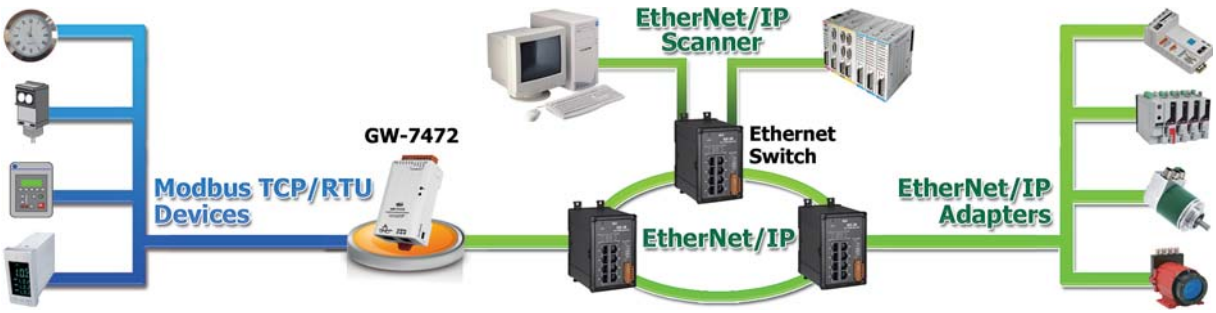
Modbus Features

- Maximum support 8 Modbus commands for each one Modbus TCP server
- Modbus Input/Output command data size: maximum 500 bytes
- Supported Modbus Function Code 01, 02, 03, 04, 05, 06, 15, and 16
- Modbus Protocol: Modbus TCP/RTU master protocols
- Maximum support 30 Modbus RTU commands
- Maximum support 10 Modbus TCP servers

Dimensions (Unit: mm)







▶▶▶▶ Modbus TCP/RTU Slave to EtherNet/IP Scanner Gateway

GW-7473 CR *NEW*

The GW-7473 (Modbus TCP/RTU Slave to EtherNet/IP Scanner Gateway) is helpful for data-exchanging between Modbus Master and EtherNet/IP adapter. It reads the register data from the EtherNet/IP adapter and publishes these data to the input register data of the Modbus TCP client as well as Modbus RTU Master. The output data transmitted by the Modbus TCP/RTU Master are updated to the register data of EtherNet/IP adapter. In order to save the installation space, the GW-7473 is also offered in an amazing tiny form-factor that makes it easy to install in anywhere, even directly attached to a serial device or embedded into a machine.

General Features

- 10/100 Base-TX Ethernet, RJ-45 x1
- Redundant power inputs: PoE (IEEE 802.3af, Class 1) and DC jack
- Automatically RS-485 direction control
- Tiny form-factor and low power consumption

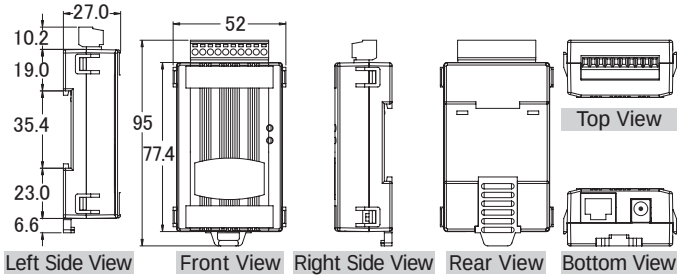
EtherNet/IP Features

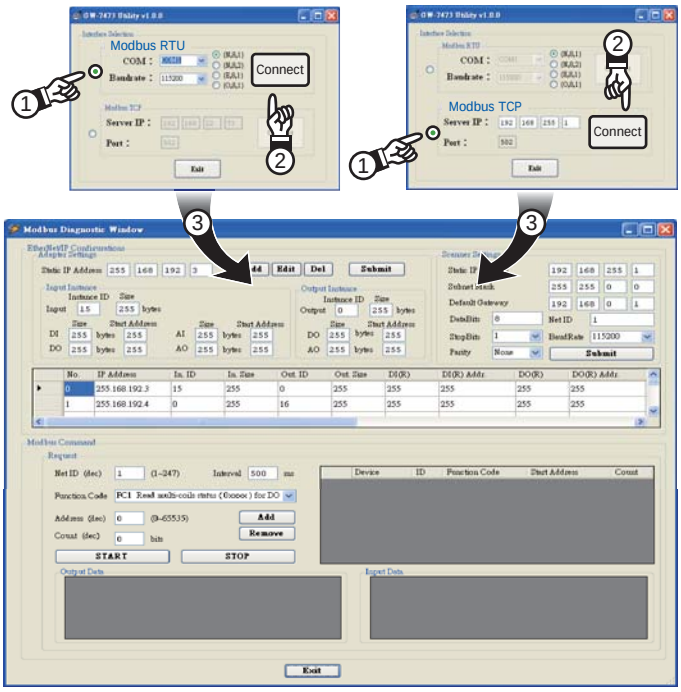
- Supported Objects according to CIP Standard
  - Assembly Object
  - Connection Manager Object
  - Ethernet Link Object
  - Message Router Object
  - TCP/IP Interface Object
- Ethernet Protocol: EtherNet/IP Scanner
  - Scanner Class Functionality
  - Class 1 (connected) I/O Server and Client

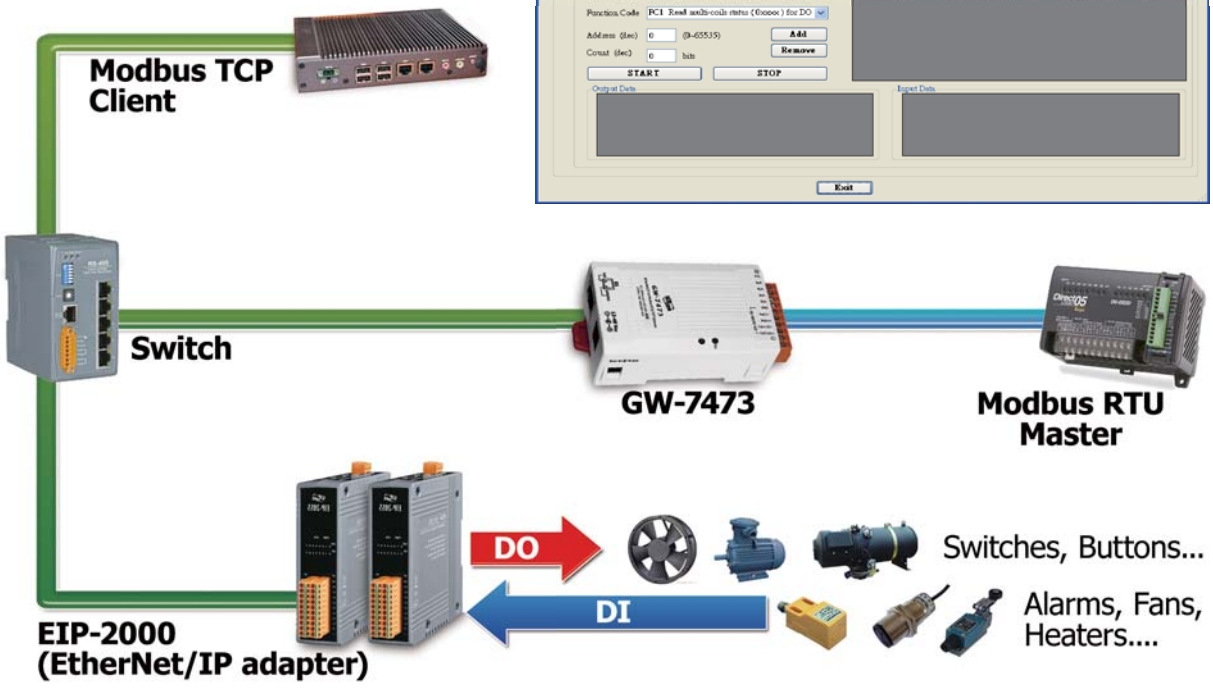
Modbus Features

- Modbus Protocol: Modbus TCP Server/ RTU Slave protocols
- Supported Modbus Function Code 01, 02, 03, 04, 05, 06, 15, and 16
- Maximum support 15 Modbus TCP clients

Dimensions (Unit: mm)



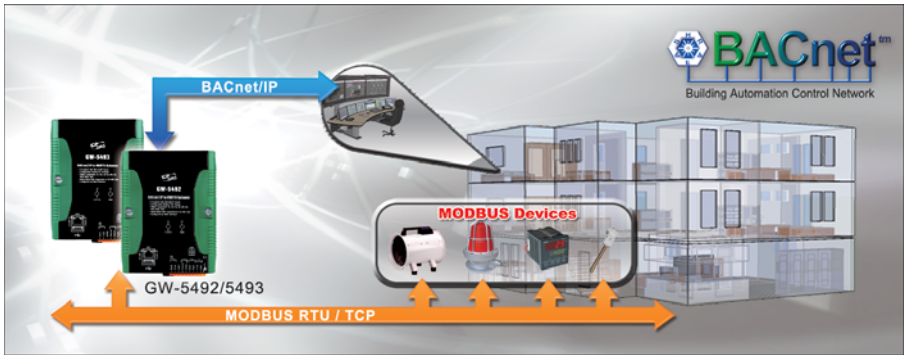




5-6 BACnet

Introduction

BACnet, a data communication protocol for building automation and control networks, is developed under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). It is an American national standard, a European standard, an national standard in more than 30 countries, and an ISO global standard. This protocol is comprehensive applied in vastly different applications such as heating, ventilating, and air-conditioning control, lighting control, access control, and fire detection systems. The BACnet protocol also provides mechanisms for computerized building automation devices to exchange information, regardless of the particular building service they perform.



Features

- Designed specifically for building automation control
- Conformance to ANSI/ASHRAE standard 135-2008 or ISO 16484-5
- A completely non-proprietary open communication software standard
- Support several different physical and link layers (BACnet/IP, Ethernet, ARCNET, MS/TP, PTP and LonTalk)
- All data in a BACnet system is represented in terms of "objects", "properties" and "services"

BACnet Stack Layers

BACnet Defined

<table>
<tr><td colspan="5">BACnet Application Layer</td></tr>
<tr><td colspan="5">BACnet Network Layer</td></tr>
<tr><td colspan="2" rowspan="2">ISO 8802-2 (IEEE 8802.3) Type 1</td><td rowspan="2">MS/TP</td><td rowspan="2">PTP</td><td rowspan="2">LonTalk</td><td>BVLL</td></tr>
<tr><td>UDP/IP</td></tr>
<tr><td>ISO 8802-3 Ethernet</td><td>ARCNET</td><td>EIA 485</td><td>EIA 232</td><td></td><td>IP Supporting Data link</td></tr>
</table>

OSI Layer

Application (7)	Handles the actual interface with the user's application program
Network (3)	Establishes logical circuits and routing between two machines
Data-Link (2)	Controls orderly access to the physical medium
Physical (1)	Transmits and receives individual bits on the physical medium

Object_Name	SAMPLE OBJECT	Status_Flags	Out-of Service
Object_Type	ANALOG INPUT	High_Limit	78.0
Present_Values	72.3	Low_Limit	68.0

Selection Guide

Models		Description
BACnet Gateway	GW-5492	BACnet to Modbus RTU Gateway
	GW-5493	BACnet to Modbus TCP Gateway
BACnet I/O Module	BNET-5304	Multi-function BACnet/IP I/O Module with 6 AI, 1 AO, 4 DI and 4 DO
	BNET-5310	Multi-function BACnet/IP I/O Module with 4 AI, 2 AO, 3 DI and 3 DO
BACnet DDC	DDC-6270-BNET	BACnet/IP DDC Controller Built-in 8 UI, 4 UO, 8 DI and 4 DO

5-6-1 BACnet Gateways

Product Showcase

BACnet/IP Server to Modbus RTU Master Gateway

GW-5492 CR NEW
GW-5493 CR NEW

GW-5492 and GW-5493 are the fully configurable universal BACnet/IP to Modbus RTU/TCP gateways. The GW-549x includes BACnet/IP Server and Modbus RTU Master (GW-5492) or TCP Client (GW-5493) which is used to make Modbus devices accessible on a BACnet network. BACnet (Building Automation and Control Networking) protocol has been designed specifically to meet the communication needs of building automation and control systems for applications such as heating, ventilating. The GW-549x contains a large number of BACnet objects gives you flexibility in mapping Modbus registers to any combination of BACnet objects. Multiple BIBBs are supported. All the data transfer is configurable using a standard Web browser.


GW-5492


GW-5493

Features

- No Programming Required
- Fully compliant with BACnet/IP server
- Fully user configurable Modbus RTU slave
- Read/Write Standard Modbus RTU Register via BACnet/IP
- Modbus register mapping configured via web interface
- Quickly and cost effectively integrate networks

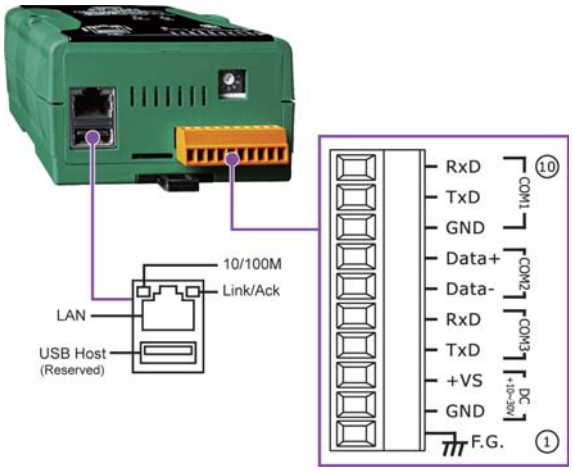
BACnet Support

- **Object**
  Binary Input, Binary Output, Binary Value, Analog Input, Analog Output, Analog Value, Multi-State Input, Multi-State Output, Multi-State Value, Device
- **BIBB**
  DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DS-COV-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-TS-B, DM-UTC-B, DM-RD-B

Utility

- Configured via standard Web browser
- Provide Modbus and BACnet configuration interface
- Update firmware remotely
- Easily mapping Modbus Register to BACnet object

Pin Assignments



Modbus Support

Code	Type	Description
01	Read Coil Status	Read the ON/OFF status of discrete outputs in the slave
02	Read Input Status	Read the ON/OFF status of discrete inputs in the slave
03	Read Holding Registers	Read the binary contents of holding registers in the slave
04	Read Input Registers	Read the binary contents of input registers in the slave
05	Force Single Coil	Write a single output to either ON or OFF in the slave
06	Preset Single Register	Write an integer value into a single register in the slave
15	Force Multi Coils	Write each coil in the sequence of coils to either ON or OFF in the slave
16	Preset Multi Registers	Write a block of contiguous registers in the slave

5-6-2 BACnet I/O Module

Product Showcase

Multi-function BACnet/IP I/O Module

BNET-5304 CR NEW
BNET-5310 CR NEW

BNET-5304 and BNET-5310 are multi-function BACnet/IP modules with on-board AI, AO, DI, and DO channels. The module contains number of BACnet objects including Device, AI, AO, BI, and BO with multiple BIBBS (DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM, DS-COV-B... etc.) supported. The modules also feature a built-in website server which allows remote configuration via a regular web browser for an easy and safe access at any time anywhere.

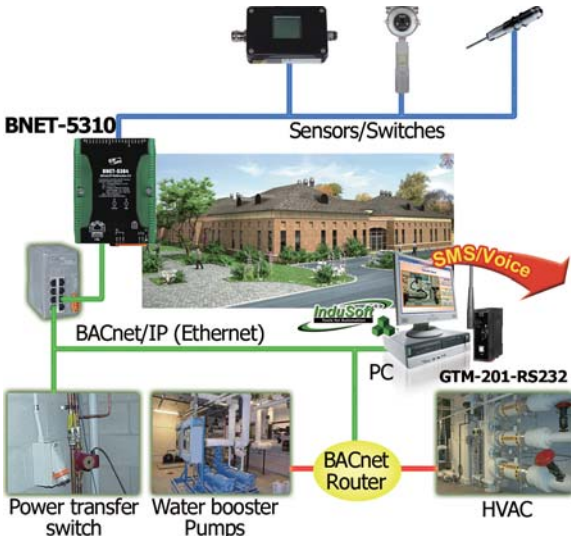

BNET-5304

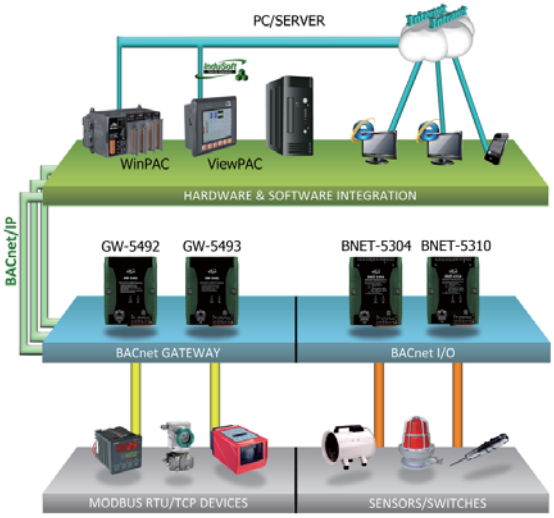

BNET-5310

Features

- Fully Compliant with BACnet/IP Server
- Web-based administration
- Configured via standard Web browser
- Update firmware remotely via Web Utility
- 10/100 Base-TX compatible Ethernet controller
- High reliability in harsh environments
- DIN-Rail mountable

Applications





BACnet I/O Selections

Model	Picture	I/O				Protocol		
		AI	AO	DI	DO	BACnet	BACnet Objects	BIBBs
BNET-5304		6	1	4	4	BACnet/IP Server	6 AI, 1 AO, 4 BI, 4 BO, 1 Device	DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DS-COV-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-TS-B, DM-UTC-B, DM-RD-B
BNET-5310		4	2	3	3		4 AI, 2 AO, 3 BI, 3 BO, 1 Device	

5-6-3 BACnet DDC

Product Showcase

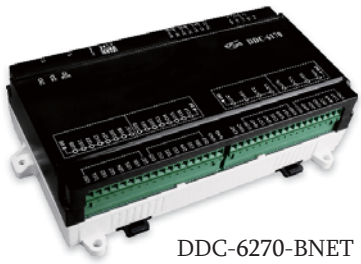
DDC-6270-BNET (BACnet / IP DDC)

Product: DDC-6270-BNET

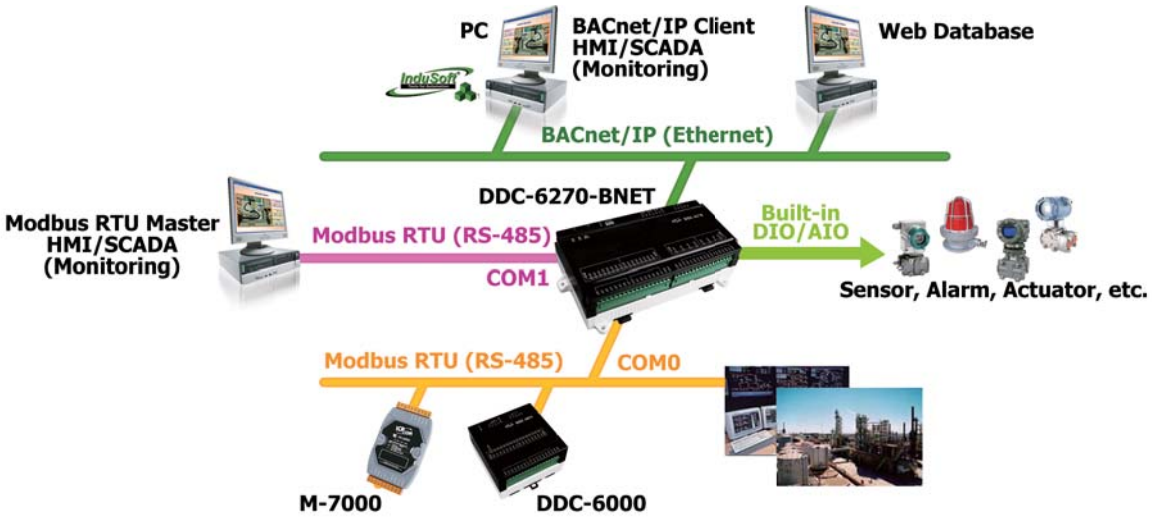
The DDC-6270-BNET is a powerful and programmable DDC(Direct Digital Controller) integrated BACnet Application Specific Controller (B-ASC), especially suitable for building automation applications. It provides software selectable universal input and output, digital input and digital output, and includes flexible options that satisfy the majority of application requirements, and you can monitor the status of field equipments through BACnet/IP or Modbus RTU quickly and accurately. It can apply M-7000 Digital I/O modules directly which can be used to provide additional I/O channels, ensuring that the system is a fully scalable solution. The DDC-6270-BNET also features a VB-Like programming tool which provides a plenty of functions for building automation applications, such as a HVAC calculation, sequential control and PID function. The DDC-6270-BNET enables a quick and easy way to develop or deploy BACnet/IP applications, mainly used in building control and plant monitoring, focused on areas such as monitoring of air conditioning, lighting, and power control systems, restaurants, and hotels, etc.

Features

- Built-in DDC Editor SoftLogic
- VB-Like Programming Language
- MRAM is a Non-volatile Memory that can Store Data and Prevent Data Loss while the Power is Shut-off or Interrupted
- Built-in Watchdog Timer (WDT) to increase System Stability
- Dual 10/100M Ethernet Port
- Support BACnet/IP Server and MB/RTU Slave for HMI or SCADA
- COM0 (RS-485) for Additional I/O (M-7000)
- PID Control Function
- Independent (Standalone) Direct Digital Controller
- Wide Operating Temperature Range: -25°C to +75°C



DDC-6270-BNET



CPU	1 GHz
Memory	256 MB Flash, 256MB DDR3, 512 KB MRAM and 16KB EEPROM
Ethernet	BACnet/IP, and 2 x RJ-45, 10/100 Base-TX, Switch Ports
RS-485	COM0: MB/RTU Master for Additional I/O (M-7000)
	COM1: MB/RTU Slave for HMI or SCADA
	COM2: Reserved
Universal Input	8 Channels via Software Configuration: 4 ~ 20 mA, 0 ~ 20 mA, 2 ~ 10 V_{DC}, 0 ~ 10 V_{DC}, Digital Input
Universal Output	4 Channels via Software Configuration: 4 ~ 20 mA, 0 ~ 20 mA, 2 ~ 10 V_{DC}, 0 ~ 10 V_{DC}, Digital Output
Digital Input	8 Channels Source and Dry Contact
Digital Output	4 Channels Open-Collector and 600 mA/channel

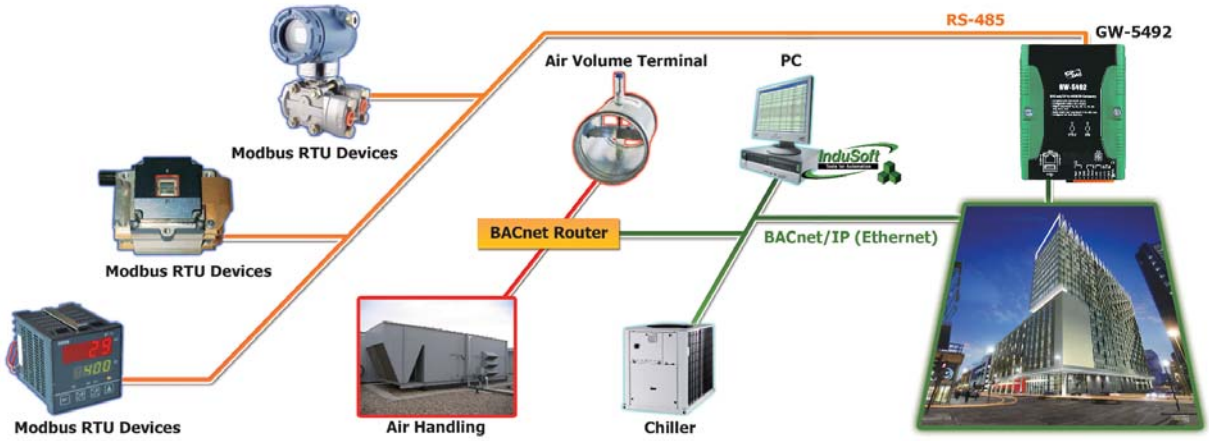
5-6-4 BACnet Case Studies

Commercial Building Automation System

Location: China

Product: GW-5492

The user used the SCADA, InduSoft Web Studio, with BACnet/IP driver to integrate with BACnet/IP devices and controllers in a commercial building including 210 air volume terminals, 22 air handling units, 3 chillers…etc. Using GW-5492, the user was able to integrate those Modbus RTU devices to BACnet/IP network. By doing these is to eliminate multiple protocols on the network and easy maintenance in the future. The system monitors and controls nearly 2500 physical inputs and outputs which are connected to the InduSoft residing on the BACnet/IP networks. InduSoft also configured a powerful feature that showed facility personnel peak demand trends on energy usage and sequence unit operations to minimize energy consumption. The building retains 10% energy savings each month after new system installed.

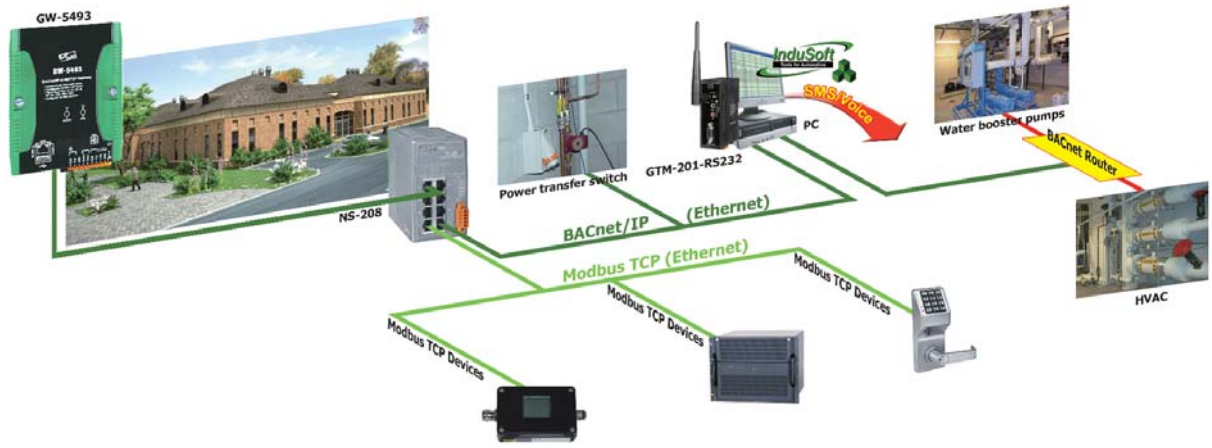


Building Automation of a Medical Center

Location: USA

Product: GW-5493

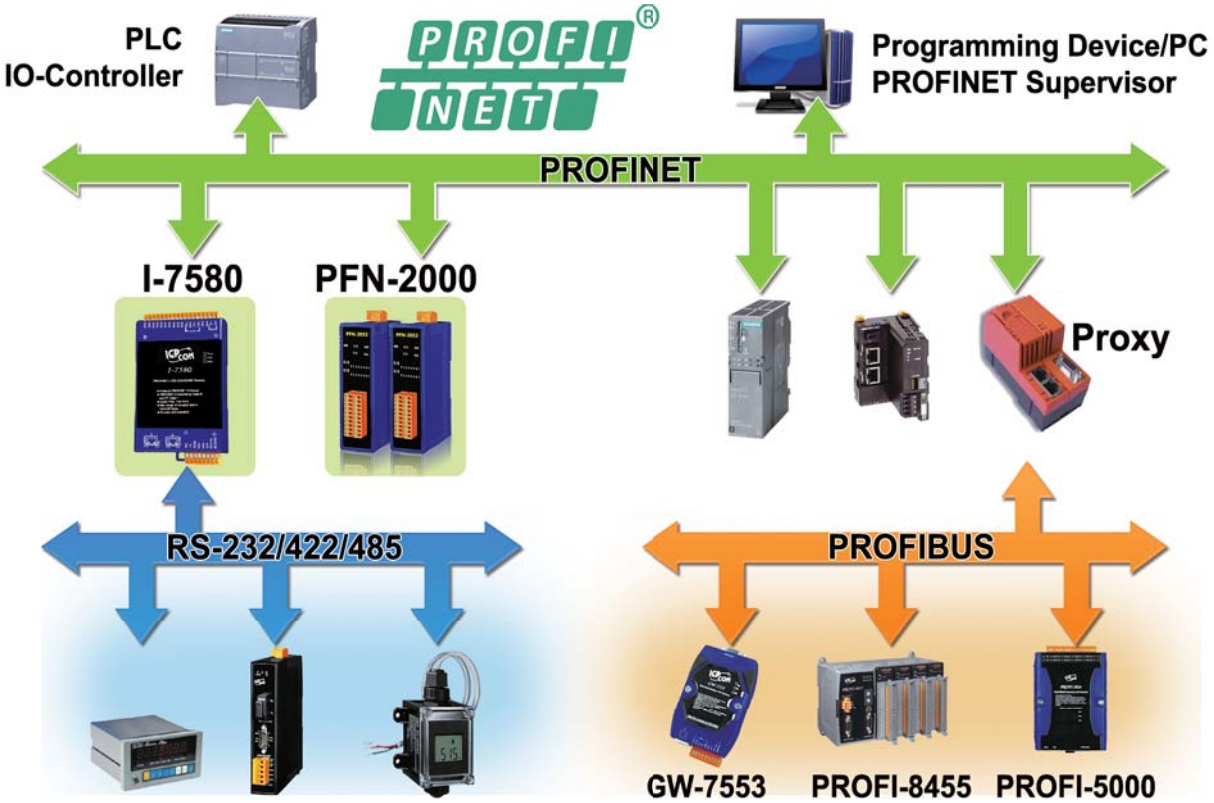
The user form a medical center used the SCADA, InduSoft Web Studio, to integrate numerous third party devices using BACnet/IP protocol – including the hospital emergency power transfer switches, water booster pumps, and HVAC system. For those existing Modbus TCP devices, the user added the GW-5493 BACnet/IP to Modbus gateway in order to make the devices accessible using BACnet/IP protocol. The system integration provides the information necessary to make complex decisions driving energy savings and properly monitor the equipment. With GTM-201, the system allows the operator to receive alarms and monitoring points via SMS messages. The building automation system also trends data regularly so that the client can use the information to track costs and troubleshoot equipment from historical data.



5-7 PROFINET

Introduction

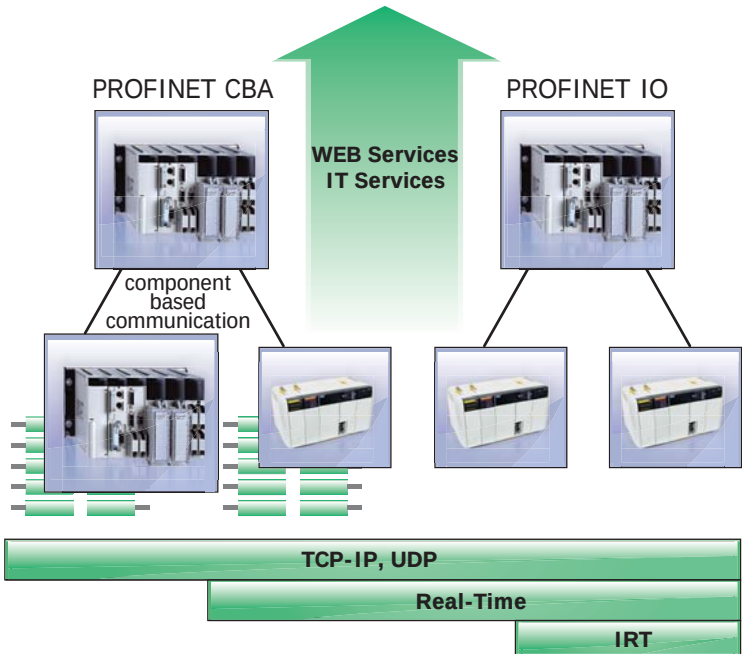
PROFINET is the Ethernet based standard for real-time automation that specified and published by PI (PROFIBUS & PROFINET International – http://www.profibus.com). PROFINET uses Ethernet standard as well as TCP, UDP and IP as protocols for communication, configuration and diagnosis in the network. Therefore, it is easy to be integrated to existing fieldbus systems, like PROFIBUS DP, PROFIBUS PA, Interbus, DeviceNet and other technologies to an open Ethernet based network without changes to existing field devices.



PROFINET contains 2 different solutions. They are PROFINET IO and PROFINET CBA (Component Based Automation).

PROFINET CBA is a communication solution for autonomously acting partial units of machines or plants. PROFINET IO is used for communication with decentral periphery like IOs, drives, etc. PROFINET products of ICP DAS are PROFINET IO devices.

The PROFINET standard defines three different performance levels which cover the various requirements from different applications.



PROFINET NRT (Non Real Time)

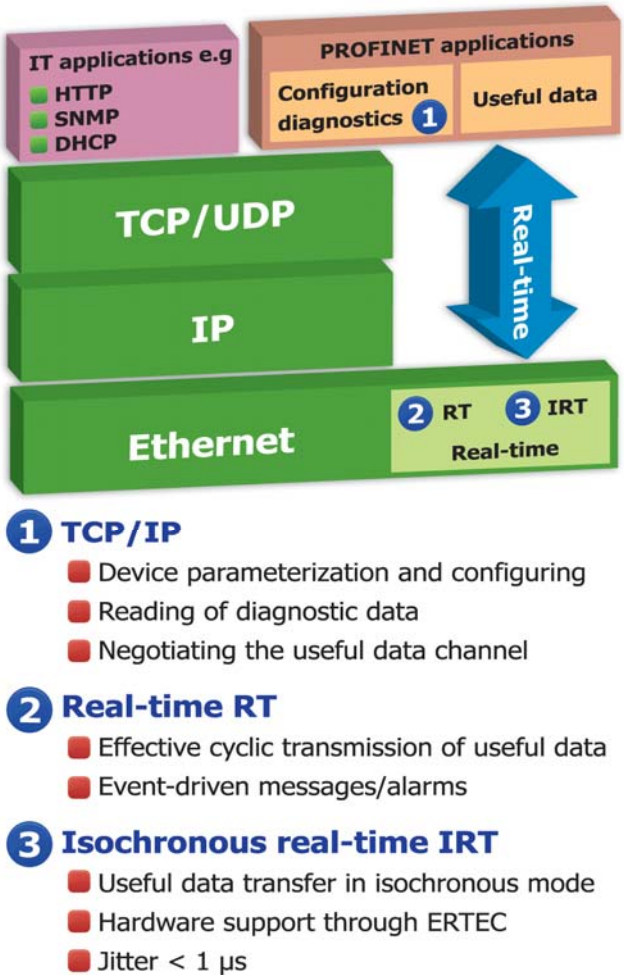
It uses standard protocols as UDP/IP. With response time approx. 100 ms PROFINET NRT targets for applications in process automation.

PROFINET RT (Real Time)

For applications with higher requirements on cycle time like factory automation, it directly uses the Ethernet protocol to exchange I/O data, while diagnosis and configuration uses standard UDP/IP. PROFINET RT enables applications With response time approx. > 10 ms.

PROFINET IRT (Isochronous Real Time)

The highest requirements come from the control of complex industrial drive systems, like packaging machines or robotics. With applications with cycle time < 1 ms and jitter < 1 µs are possible. The PFN-2000 series provides various I/O modules that meet PROFINET RT for process automation, factory automation.



Features

- Transfer protocol: PROFINET IO
- Supported Ethernet services: ICMP, IGMP, ARP, DHCP, TELNET, TFTP, SNMP, VLAN Priority Tagging
- Supported PROFINET services: RTC, RTA, CL-RPC, DCP, LLDP, I&M
- PROFINET Conformance Class B and RT Class 1
- Cyclic Time: 1 ms (min)
- Generic GSDML File Provided
- Automatic MDI / MDI-X Crossover for Plug-and-play

Selection Guide

Models		Description
PROFINET Converter	I-7580	PROFINET to RS-232/422/485 Converter
PROFINET Gateway	GW-7662	PROFINET to Modbus RTU Gateway
	GW-7663	PROFINET to Modbus TCP Gateway

5-7-1 PROFINET Converters

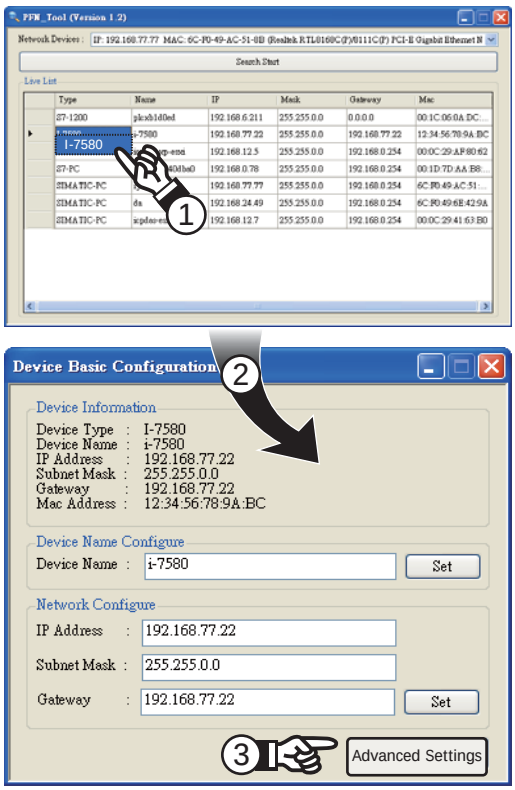
Product Showcase

PROFINET to RS-232/422/485 Converter

I-7580 CR

The I-7580 is specially designed for PROFINET IO device. It offers RS-232, RS-422, and RS-485 three kinds of communication way. With the Hybrid COM 1 design, users can readily choose one type of com port to use. Through the GSDML file, it is easy to communicate with any standard PROFINET IO controller.

- Protocol: PROFINET IO Device
- PROFINET Conformance Class B and RT Class 1
- Cyclic Time: 1 ms (min)
- Generic GSDML File Provided (Version 2.25)
- Max length of in/output data is 512/384 Bytes
- Provide LED indicators
- 4 kV Contact ESD protection for any terminal
- Wide range of power input (+10 VDC ~ +30 VDC) and operating temperature (-25 °C ~ +75 °C)

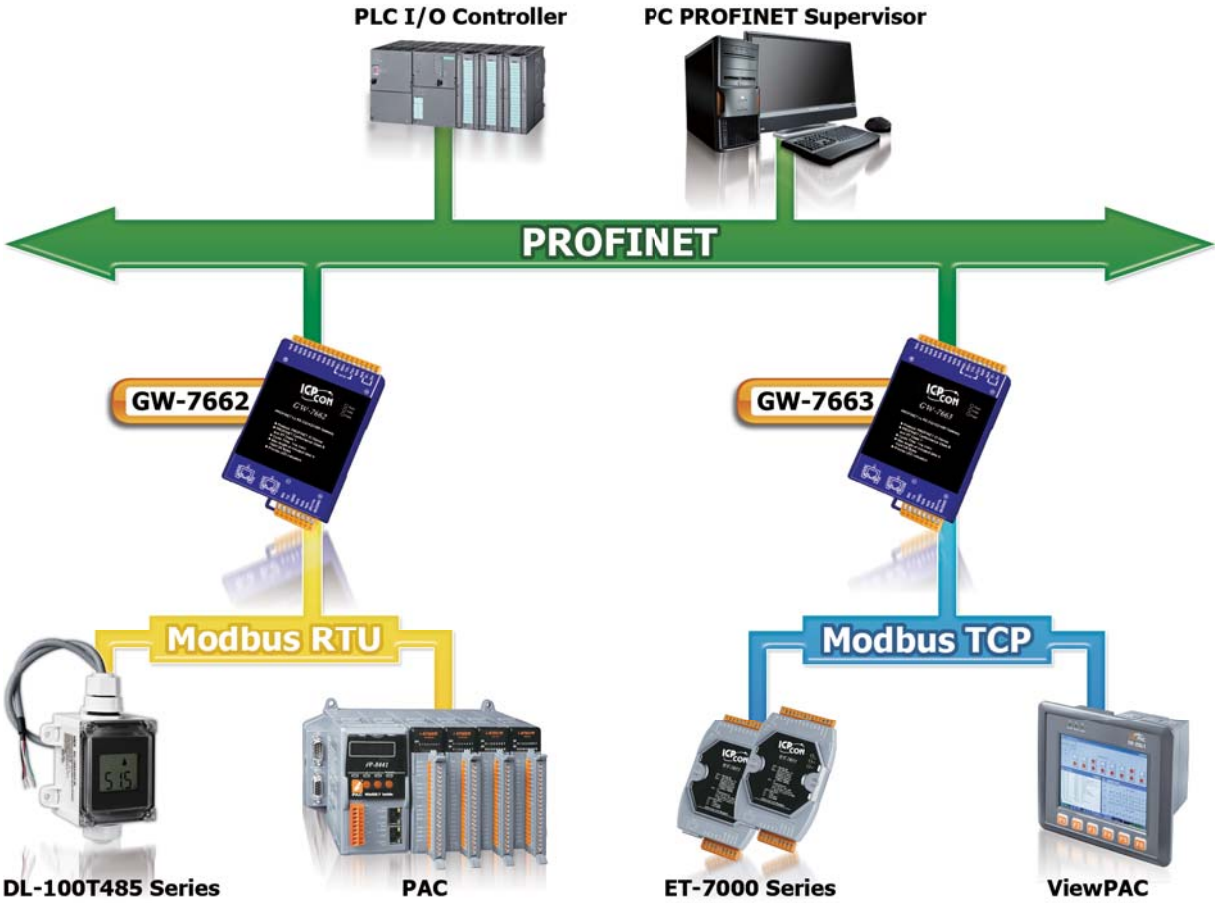


- Show PROFINET user parameters of the I-7580
- Show diagnostic messages of the I-7580
- Provide comport test function
- Provide Communication Log of comport

5-7-2 PROFINET Gateways

Introduction

The PROFINET gateway is used to solve data-exchanging between different communication network and PROFINET network. If it is necessary to integrate different communication protocols to PROFINET, the PROFINET gateway is helpful. The application architectures as following figures provide the examples to show when and how to apply these products.



Specifications

Models		GW-7662	GW-7663
Pictures			
		PROFINET to Modbus RTU Gateway	PROFINET to Modbus TCP Gateway
PROFINET	Protocol	IO device	
	Conformance Classes	Class B	
	RT Classes	Class 1	
	Cyclic Time	1 ms	
COM port	Type	1 x RS-232/422/485	N/A
	Baud Rate (bps)	2.4 k ~ 115.2 k	N/A
	Protocol	Modbus RTU/ASCII, Master/Slave	N/A
Ethernet Port	Speed	10/100M	
	Protocol	PROFINET IO device	Modbus TCP Server/Client & PROFINET IO device

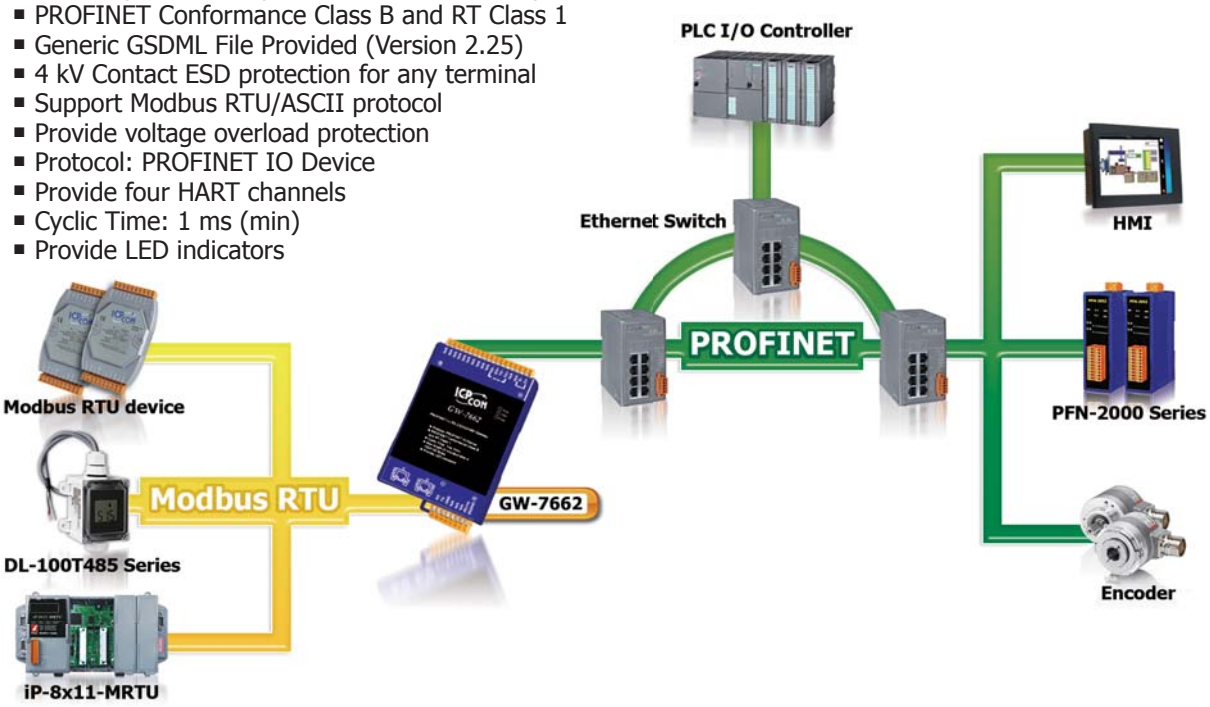
Product Showcase

PROFINET to Modbus RTU Master Gateway

GW-7662 CR *NEW*

The GW-7662 gateway is a PROFINET IO device that allows the PROFINET controller to access the Modbus RTU devices. In the Modbus network, the GW-7662 can be a Modbus master to access the Modbus slaves, can be a Modbus slave provide the data from the PROFINET controller. The flexible design lets the GW-7662 widely applying in the many applications.

- Wide range of power input (+10 ~ +30 VDC) and operating temperature (-25 °C ~ +75 °C)
- Support several kinds of baud for COM1 from 2.4 ~ 115.2 kbps
- Max length of in/output data is 1024/1024 Bytes
- PROFINET Conformance Class B and RT Class 1
- Generic GSDML File Provided (Version 2.25)
- 4 kV Contact ESD protection for any terminal
- Support Modbus RTU/ASCII protocol
- Provide voltage overload protection
- Protocol: PROFINET IO Device
- Provide four HART channels
- Cyclic Time: 1 ms (min)
- Provide LED indicators

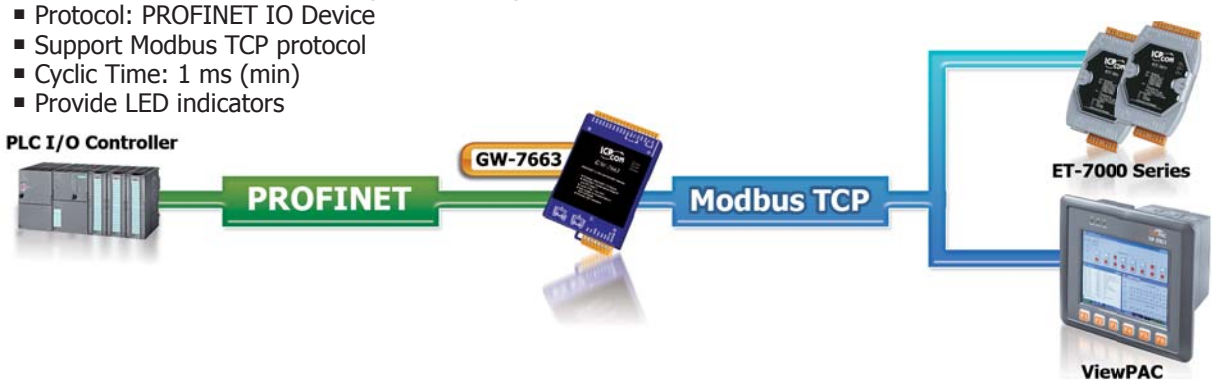


PROFINET to Modbus TCP Master Gateway

GW-7663 CR *NEW*

The GW-7663 is used for data-exchange between the Modbus TCP network and the PROFINET network. It provides the Modbus TCP client and server functions. Therefore, the GW-7663 can satisfy most of the applications of the data transfer between Modbus and PROFINET.

- Wide range of power input (+10 ~ +30 VDC) and operating temperature (-25 °C ~ +75 °C)
- Max length of in/output data is 1024/1024 Bytes
- PROFINET Conformance Class B and RT Class 1
- 4 kV Contact ESD protection for any terminal
- Generic GSDML File Provided (Version 2.25)
- Protocol: PROFINET IO Device
- Support Modbus TCP protocol
- Cyclic Time: 1 ms (min)
- Provide LED indicators

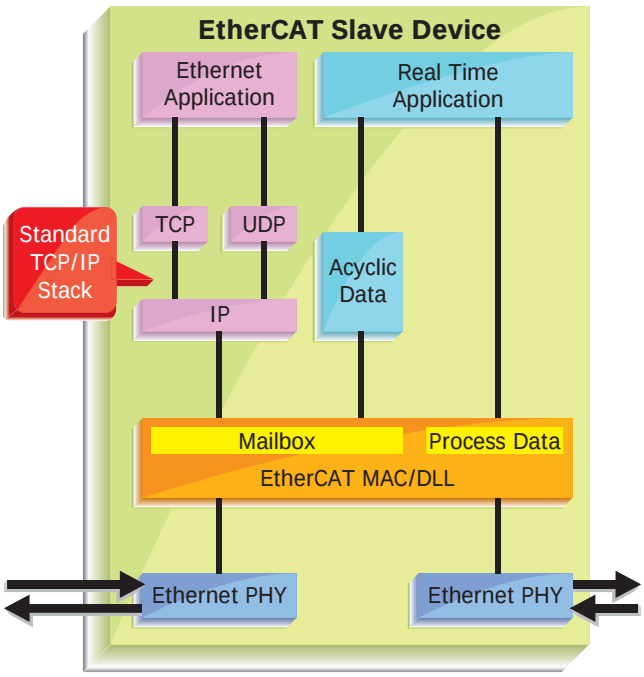


5-8 EtherCAT

Introduction

EtherCAT (Ethernet for Control Automation Technology) is an open, high-performance Ethernet-based fieldbus system that makes Internet technologies available at the I/O level. With EtherCAT, the controller can update the input and/or output information at the time when the data is needed.

The ECAT-2000 is an Industrial EtherCAT Remote I/O module series. It is equipped with the EtherCAT protocol, and allows daisy chain connection, making it possible to transfer data much faster during process control and other industrial automation applications. Daisy chain connectivity provides a more scalable system with fewer wires to help avoid interference common in factory settings.



EtherCAT is Industrial Ethernet

- EtherCAT uses Standard Ethernet Frames: IEEE 802.3
- Alternatively via UDP/IP (if IP Routing is needed)
- No shortened frames
- Fully transparent for TCP/IP
- All Internet technologies (HTTP, FTP, Web server,...) available without restricting the real time capabilities
- Full tool access to devices at real time operation with and without TCP/IP

Features

- Full compliance with the Ethernet standard
- High Performance
- Flexible Topology
- Easy configuration and maintenance
- Inexpensive implementation & infrastructure
- Safety communication integrated
- Great variety of available EtherCAT products

Applications

- Packaging machines
- High speed presses
- Injection molding machines
- Woodworking machines
- Machine tooling (CNC)
- Robotics
- Materials handling
- Data acquisition

Selection Guide

Models		Description
EtherCAT I/O Modules	ECAT-2045	EtherCAT I/O Module with 16-Ch DO
	ECAT-2051	EtherCAT I/O Module with 16-Ch DI
	ECAT-2055	EtherCAT I/O Module with 8-Ch DI, 8-Ch DO
	ECAT-2060	EtherCAT I/O Module with 6-Ch DI, 6-Ch Relay

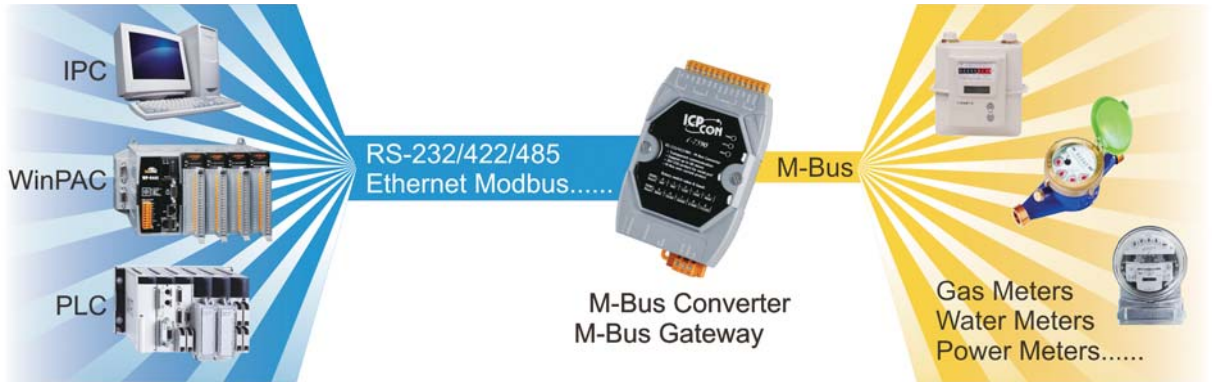
5-8-1 EtherCAT I/O Modules

Specifications

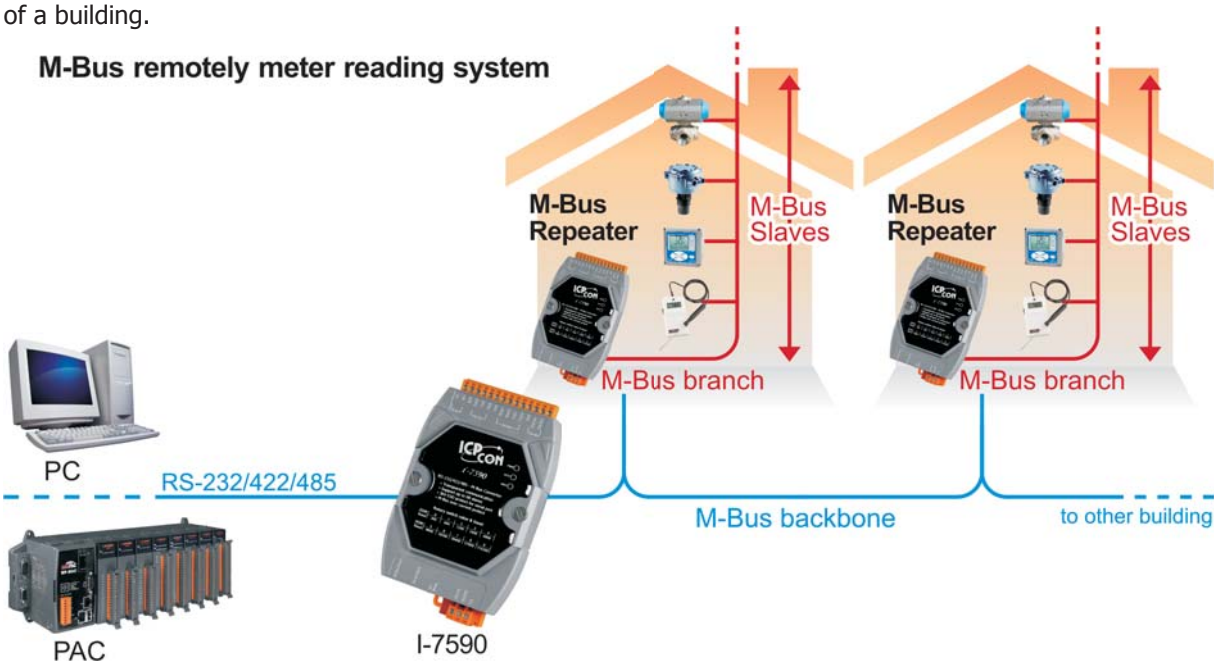
Models		ECAT-2045 NEW	ECAT-2051 NEW	ECAT-2055 NEW	ECAT-2060 NEW
Pictures		16-Ch DO Module 	16-Ch DI Module 	8-Ch DI, 8-Ch DO Module 	6-Ch DI, 6-Ch Relay Module 
Digital Input					
Channels		–	16	8	6
Contact		–	Wet/Dry		
Dry Contact	Type	–	Sink/Source		
	ON Voltage Level	–	Close to GND		
	OFF Voltage Level	–	Open		
Wet Contact	Type	–	Source		
	ON Voltage Level	–	+10 V_{DC} ~ +50 V_{DC}		
	OFF Voltage Level	–	+4 V_{DC} Max.		
Isolation Voltage		–	3750 V_{rms}		
Digital Output					Relay Output
Channels		16	–	8	6
Type		Open Collector	–	Open Collector	Form A (SPST-NO)
Sink/Source (NPN/PNP)		Sink	–	Sink	–
Load Voltage		+3.5 V_{DC} ~ +50 V_{DC}	–	+3.5 V_{DC} ~ +50 V_{DC}	–
Max. Load Current		700 mA/channel	–	700 mA/channel	5 A @ 250 V_{AC}, 5 A @ 30 V_{DC} /channel
Isolation Voltage		3750 V_{rms}	–	3750 V_{rms}	–
Communication					
Ethernet Port		2 x RJ-45, 10/100 Base-TX			
Protocol		EtherCAT			
System					
ESD (IEC 61000-4-2)		4 kV Contact for Each Channel			
EFT (IEC 61000-4-4)		Signal: 1 kV Class A, Power: 1 kV Class A.			
Surge (IEC 61000-4-5)		1 KV Class A			
Power Input		+10 V_{DC} ~ +30 V_{DC}			
Power Consumption		4 W			
Dimensions (W x H x D)		33 mm x 110 mm x 90 mm			
Operating Temperature		-25 °C ~ +75 °C			

5-9 M-Bus

Introduction



The M-Bus ("Meter-Bus") is a European standard for remote reading of meters. It is usable for most types of consumption meters as well as for various sensors and actuators.
The M-Bus was developed to fill the need for a system for the networking and remote reading of utility meters in the home. This bus fulfills the special requirements of remotely powered or battery-driven systems. When interrogated, different from the classical manual reading, the meters deliver the data they have collected to a common master, such as a PAC, connected at periodic intervals to read all utility meters of a building.



Features

- Large number of connectable devices
- Possibility for network expansion
- Fail-safe characteristics/robustness
- Minimum cost
- Minimum power consumption in the meters
- Acceptable transmission speed

Applications

- Automatic meter reading system
- Remotely powered system
- Types meters integrated application

Selection Guide

Models		Description
M-Bus converter	I-7590	RS-232/422/485 to M-Bus converter
M-Bus gateway	GW-7838	Modbus RTU/TCP slave to M-Bus master gateway

5-9-1 M-Bus Converter

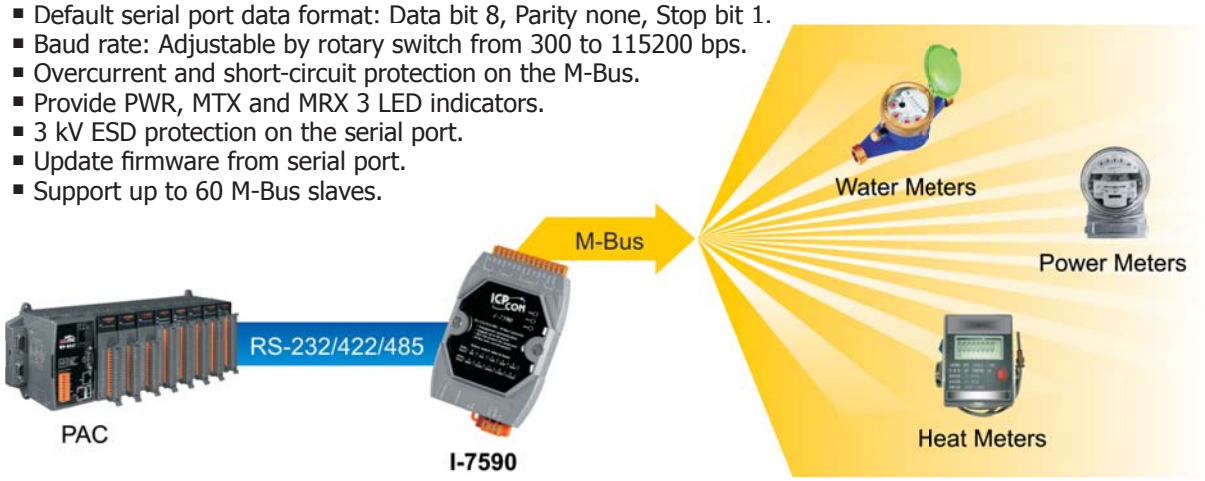
Product Showcase

RS-232/422/485 to M-Bus converter

I-7590 CR *NEW*

The I-7590 is specially designed for M-Bus slave device. It offers RS-232, RS-422 and RS-485 three kinds of communication way. On hardware the I-7590 has two rotary switches for serial port and M-Bus port baud rate. On communication the I-7590 uses transparent communication. Through these two designs, it is easy to communicate with any standard M-Bus slave.

- Wide range of power input (+10 VDC ~ +30 VDC) and operating temperature (-25 °C ~ +75 °C)
- Default M-Bus port data format: Data bit 8, Parity even, Stop bit 1.
- Default serial port data format: Data bit 8, Parity none, Stop bit 1.
- Baud rate: Adjustable by rotary switch from 300 to 115200 bps.
- Overcurrent and short-circuit protection on the M-Bus.
- Provide PWR, MTX and MRX 3 LED indicators.
- 3 kV ESD protection on the serial port.
- Update firmware from serial port.
- Support up to 60 M-Bus slaves.



5-9-2 M-Bus Gateway

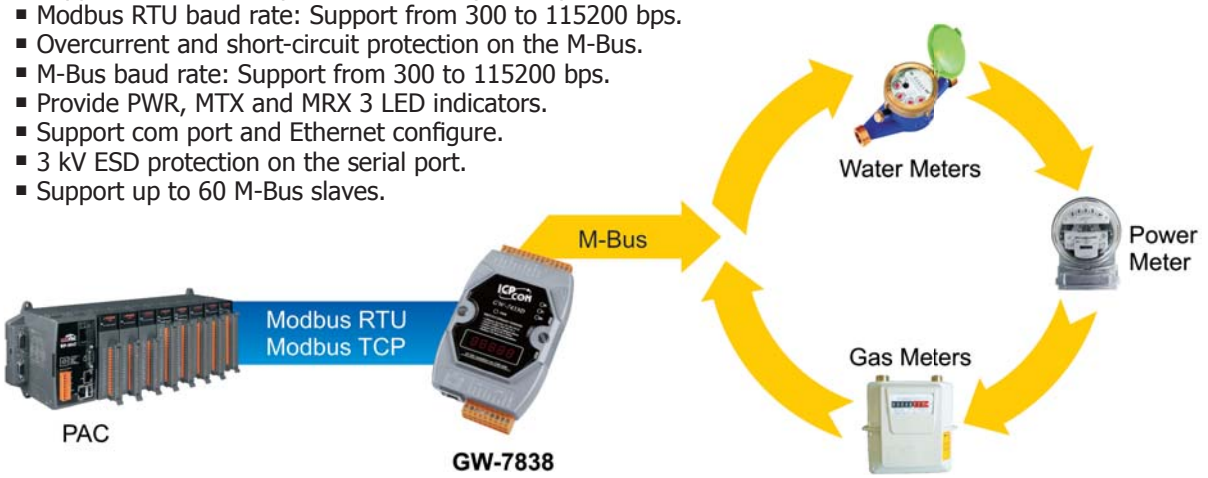
Product Showcase

Modbus RTU/TCP to M-Bus Gateway

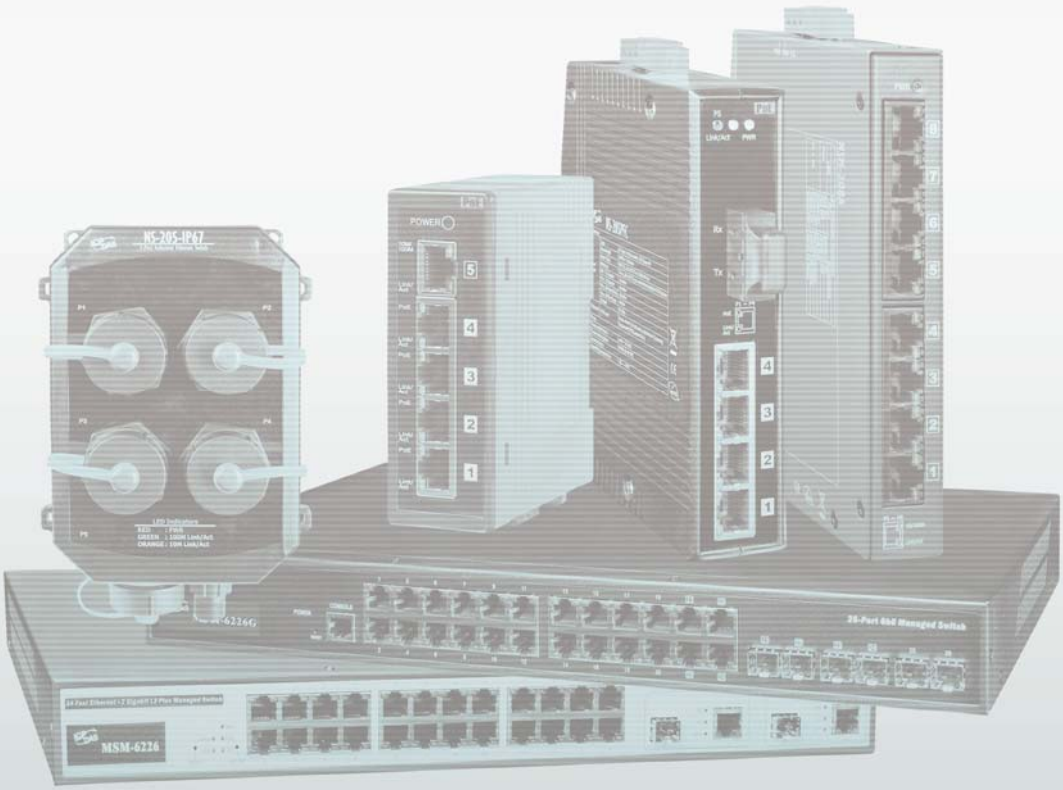
GW-7838 CR *Available soon*

The I-7838 gateway is a Modbus slave device that allows the Modbus RTU master or Modbus TCP client to access the M-Bus slave devices. These M-Bus devices may be a water meter, electric meter, power meter and so forth. Owing to the GW-7838, you can put the M-Bus slave devices into Modbus network very easily.

- Wide range of power input (+10 VDC ~ +30 VDC) and operating temperature (-25 °C ~ +75 °C)
- Support command request mode and cyclic request mode.
- Modbus RTU baud rate: Support from 300 to 115200 bps.
- Overcurrent and short-circuit protection on the M-Bus.
- M-Bus baud rate: Support from 300 to 115200 bps.
- Provide PWR, MTX and MRX 3 LED indicators.
- Support com port and Ethernet configure.
- 3 kV ESD protection on the serial port.
- Support up to 60 M-Bus slaves.



Ethernet Switches

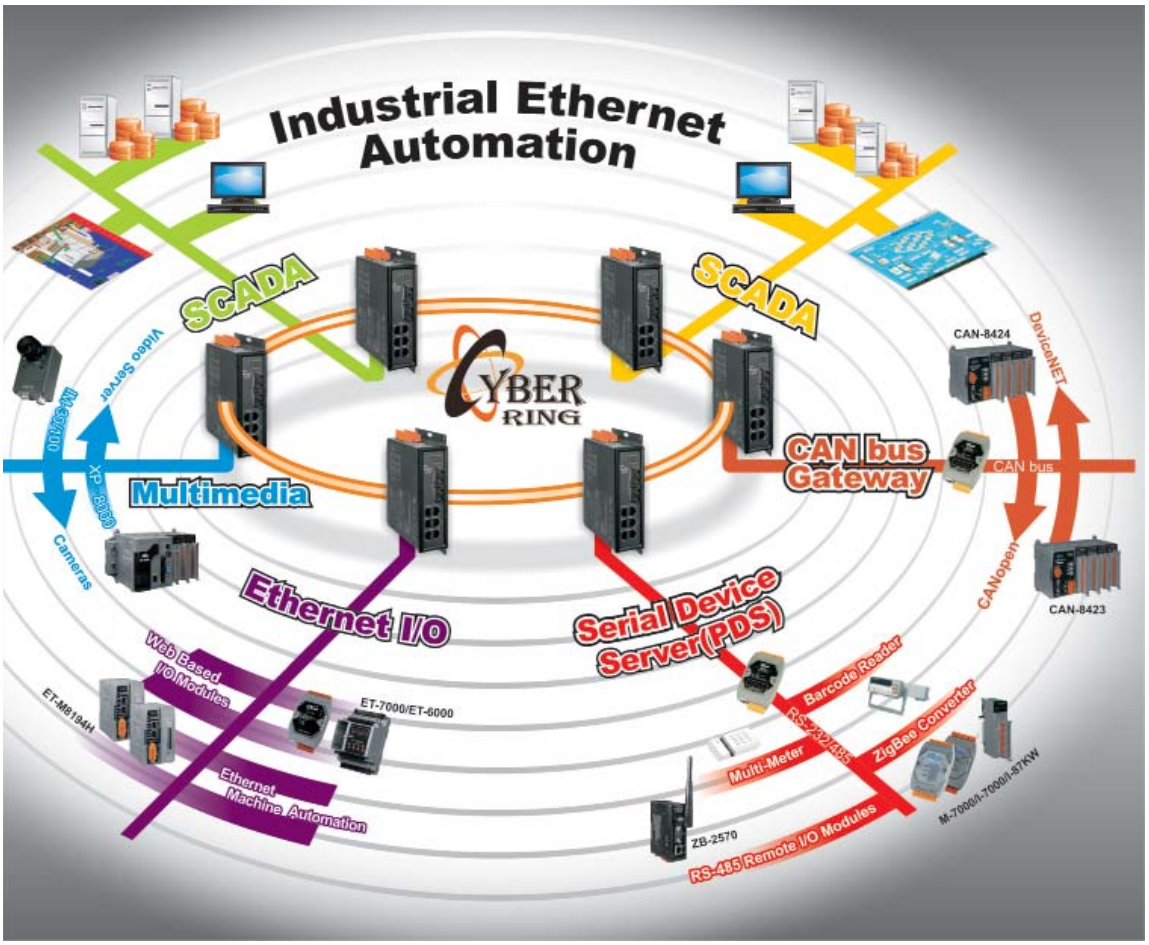


6-1 Overview

The Ethernet is an ideal medium for transporting large volumes of data across great distances at high speed. Previously, multiple networks carrying specific protocols were installed side by side in order to carry out unique tasks. This inevitably lead to increases in project costs as additional fiber optic or copper cables needed to be installed so as to accommodate the increasing volume of data. Using the Ethernet, multiple protocols can be carried over a single fiber optic cable. Furthermore, manufacturers are now exporting their legacy protocols onto the Ethernet, designing new IP-based communication protocols and providing embedded web pages within their devices that offer real-time information using simple tools such as Internet Explorer, Firefox or Google Chrome.

Early Ethernet networks were based on a hub or a repeater. However, these devices have no intelligence and are therefore unable to identify any information contained within the Header frame of an Ethernet packet, which means that they are not capable of determining the destination port for the frame. Consequently, every frame is sent to every port.

Like a hub, a switch is used to forward and receive packets between one network or device and another. Of course, the switch could forward all packets, but, if this was the case, the behavior would be similar to a hub. It would be more logical if the switch was able to identify the destination of the packets and only forward those that needed to travel from one network or device to another.



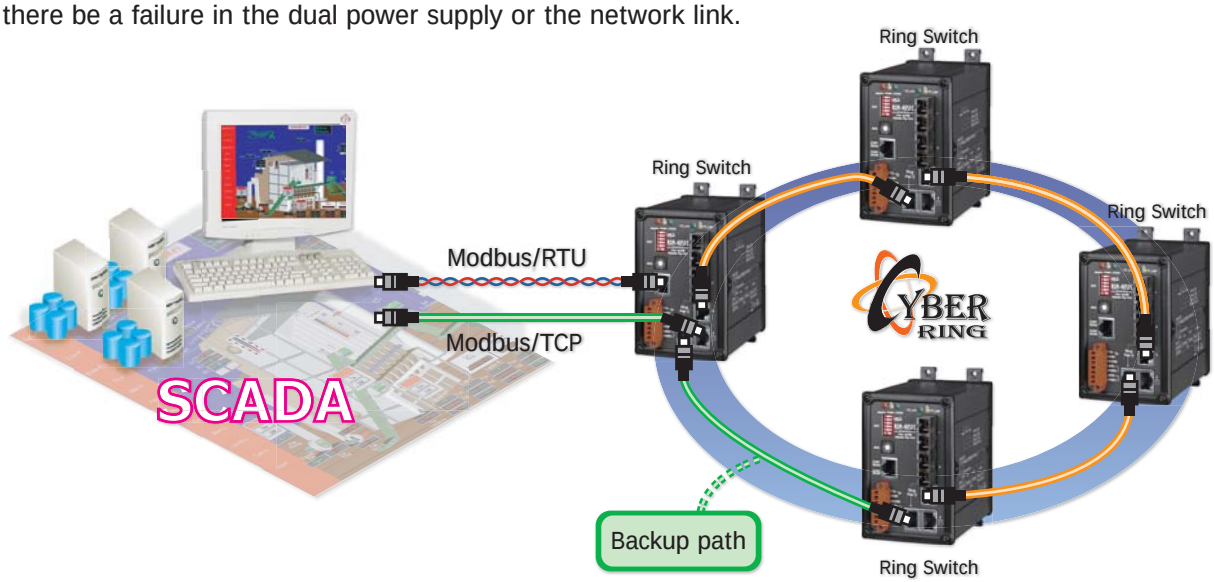
Many poorly designed switches exist in the market, and the majority of them are fragile, fail easily, and often suffer from transmission delay or unreliable communication conditions due to packet collisions or other issues. In contrast, ICP DAS switches are built using truly industrial-grade switch chips that are temperature tolerant and highly reliable. The switches are all well designed by skilled engineers, and are subjected to very strict communication and environment tests prior to shipment. All ICP DAS switches have a long operational lifetime and are guaranteed to function perfectly under harsh environmental conditions.

▶▶▶▶ Managed Switch for Industrial Ethernet Applications

Managed switches provide performance, management, diagnostics, and security capabilities that are not supported on unmanaged switches. These types of features allow the network administrator to configure the switch to provide traffic prioritization, basic and advanced security capabilities, multicast traffic control, diagnostic capabilities, and a number of other features that are important for most industrial and office network environments. Given the critical nature and performance requirements of automation and control networks, a managed switched Ethernet architecture is the most appropriate choice for most industrial environments.

Real-time Redundant Ring Switch

The ICP DAS Real-time Redundant Ring Switch offers fault-tolerant industrial Ethernet with ring network topology. The built-in proprietary ICP DAS Cyber-Ring technology is able to detect and recover from a fiber or copper link failure within approximately 20 ms, which is a seamless process for the majority of applications. The Modbus/TCP, Modbus/RTU and OPC protocols are supported, and SCADA applications can be used to monitor the status of an Ethernet or fiber port via the Modbus or OPC protocol. In addition, the Relay Output feature can be used to deliver a warning signal should there be a failure in the dual power supply or the network link.



Managed Ethernet Switch

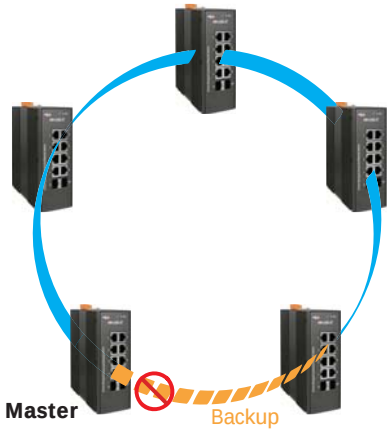
The ICP DAS Managed Switch provides a cost-effective managed Ethernet solution for industrial control and automation applications. The switch provides a wide range powerful managed functions, including 802.1Q Tag-based VLAN, Port-based VLAN, 802.1p QoS (Quality of Service), Port Trunking, Spanning Tree, Cable Testing and Port Mirroring, each of which can be configured using telnet or a web browser through an RS-232 port via either a serial console or an Ethernet port. In addition, the built-in proprietary ICP DAS Cyber-Ring technology offers a real-time, fault-tolerant ring topology that increases the reliability and performance of the network, meaning that the ICP DAS Managed Switch is an ideal solution for industrial environments.

Cyber-Ring

Cyber-Ring self-healing Ethernet technology is a proprietary developed by ICP DAS that can be used to help establish industrial-grade Ethernet with high reliability and fault-tolerance capabilities, and can be used to implement a ring topology network of either copper or fiber optic cable. While standard STP typically requires around 20 to 30 seconds before the network structure is reconfigured following a link failure, Cyber-Ring technology reduces this downtime to within half a second. Experience indicates that the typical recovery time is 20 ms on average for a Cyber-Ring fault-tolerant network.

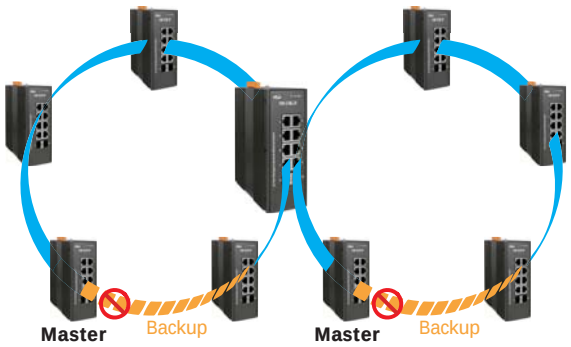
Single Ring

A Single Ring network topology based on Cyber-Ring technology is an effective solution to meeting the requirements for link-loss backup in industrial field applications. In normal operations, traffic on the backup path is either blocked or ignored, so that if there is a failure in any of the network nodes or within a cable segment on the active path, Cyber-Ring will automatically redirect the disrupted traffic to the backup path. After the affected path is repaired, the network will again be reconfigured to normal operational status.



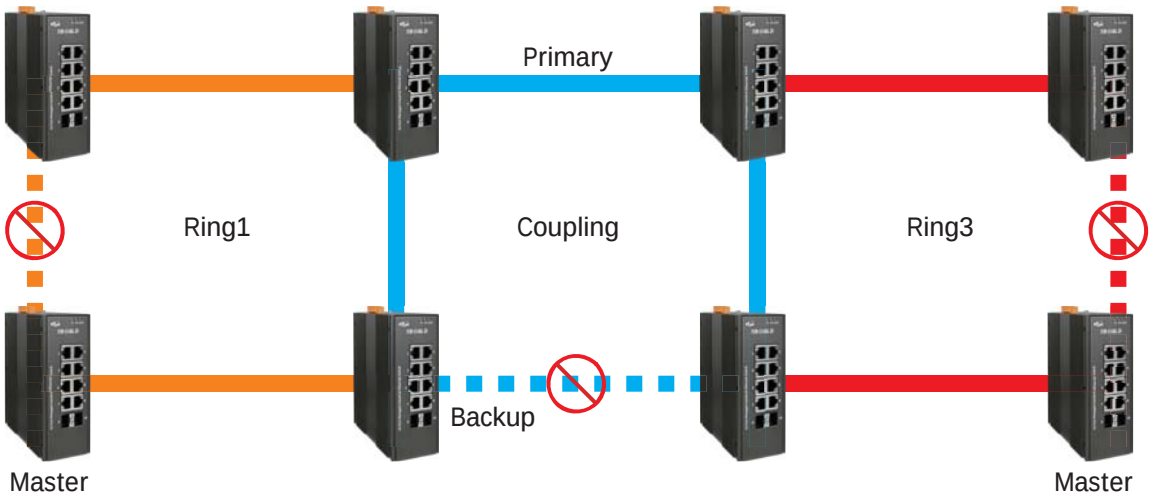
Dual Ring

Dual Ring network topology can be used to integrate two individual Cyber-Ring networks using a single switch.



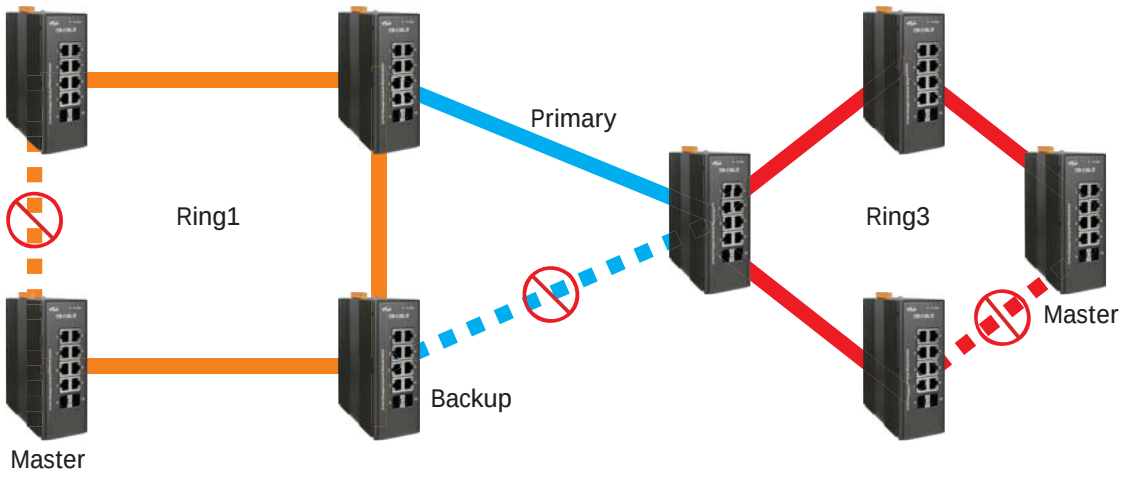
Coupling

Coupling is an enhanced version of a Dual Ring topology that can be implemented to improve the reliability of Dual Ring network topology by preventing the failure of a single device from affecting the entire network.



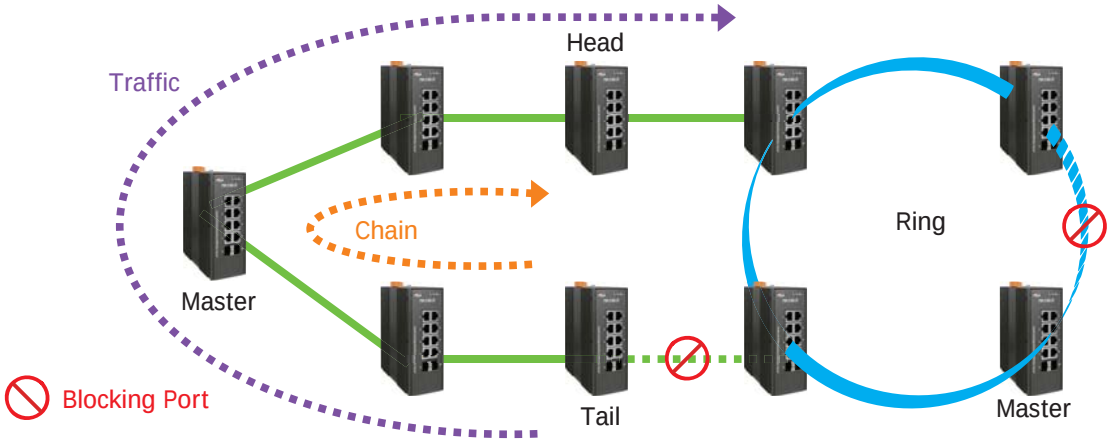
Dual-Homing

Dual Homing is the process of coupling two separate rings using a single FSM switch that is connected to two independent connection points.
If there is only one FSM switch that is easy to connect, or if there is only one FSM switch implemented in a stable environment, then Dual Homing is a better solution.



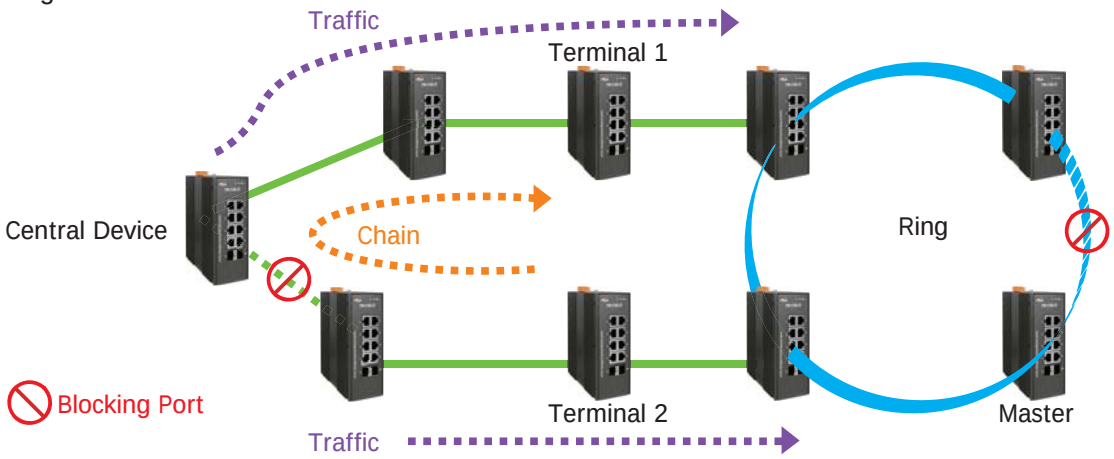
Daisy Chain

A Daisy Chain solution can be employed to easily connect and/or extend an existing redundant network, providing a cost-efficient approach to reconfiguration, since the integration of different redundant networks can be achieved directly without requiring any ring coupling effort.



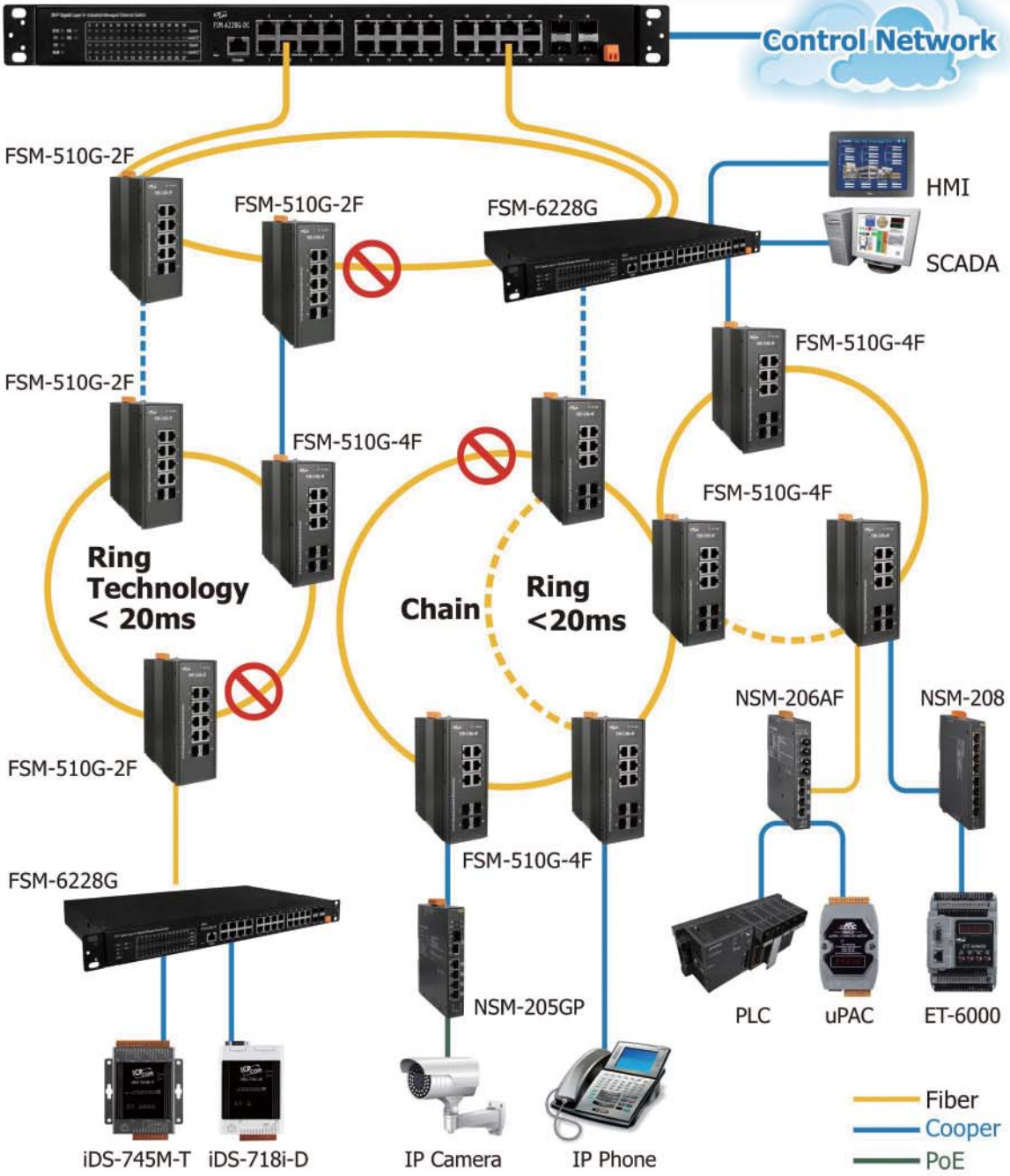
Balanced Chain

Using a Balanced Chain solution, the direction of the traffic can be defined and an individual node can be designated as the central device in order to achieve load balance.



Product Portfolio of Industrial Ethernet Switches

☑ Rack Mount/DIN-Rail mount ☑ Unmanaged Switch
☑ PoE Switch ☑ Layer2 Managed Switch ☑ Media Converter



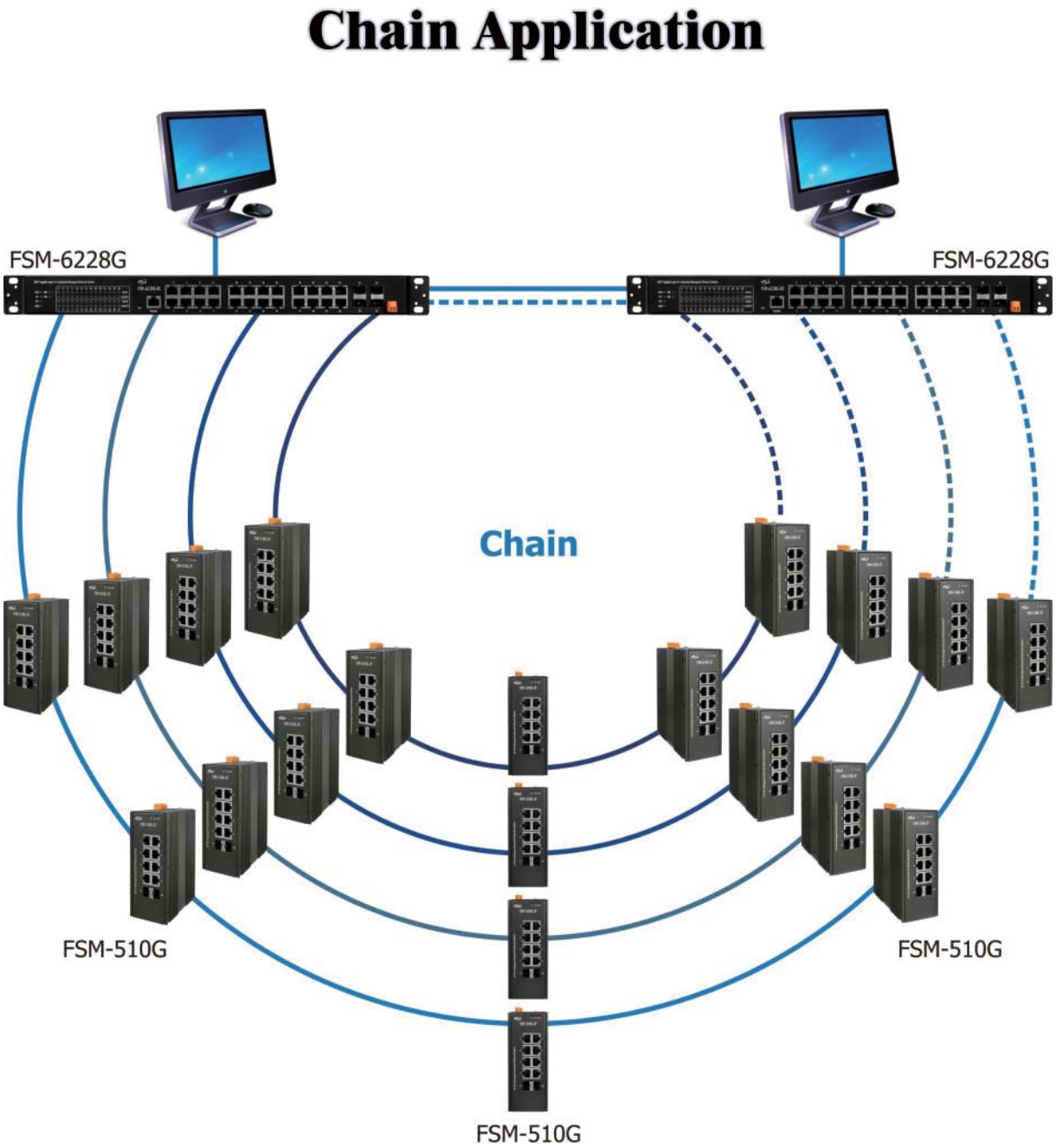
6.2. Applications

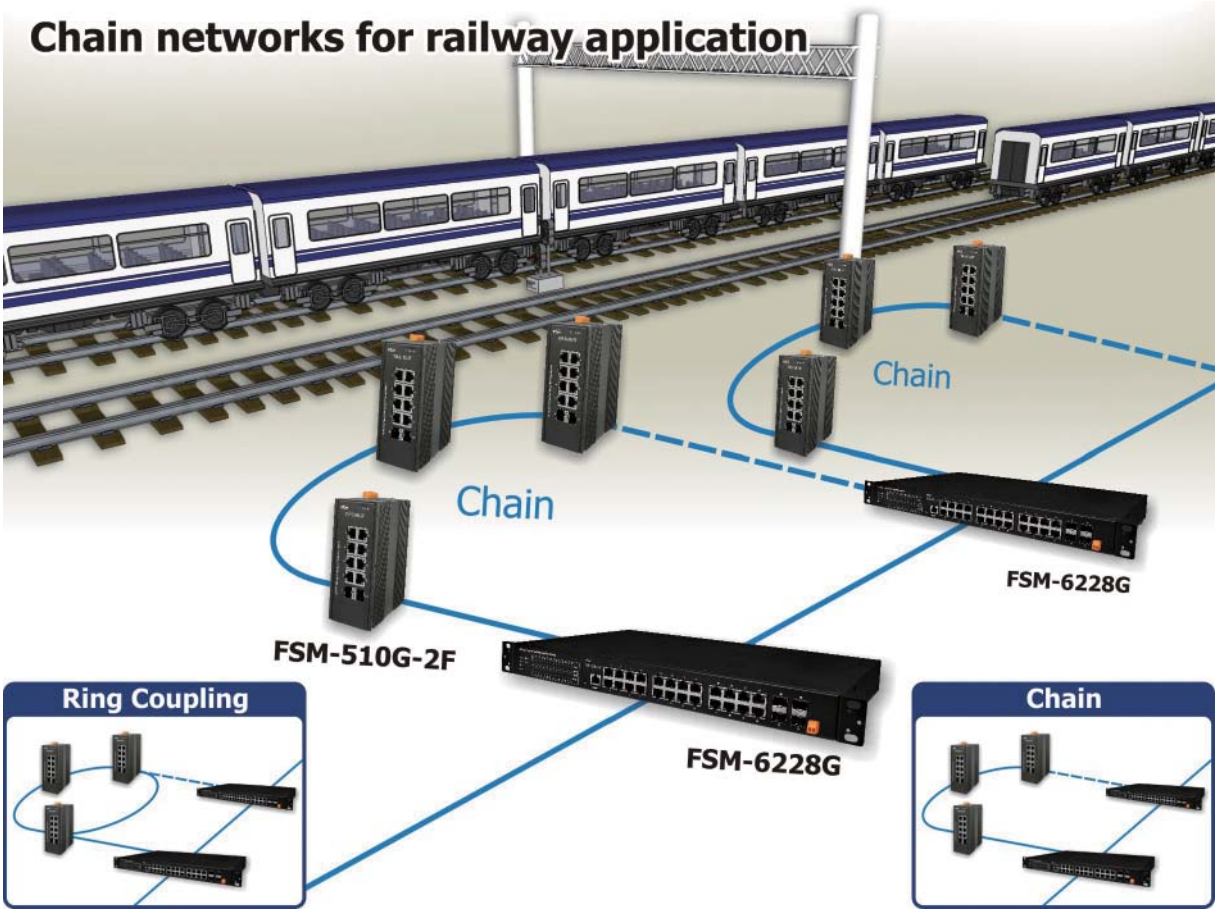
Cost-efficient Approach to Reconfiguration

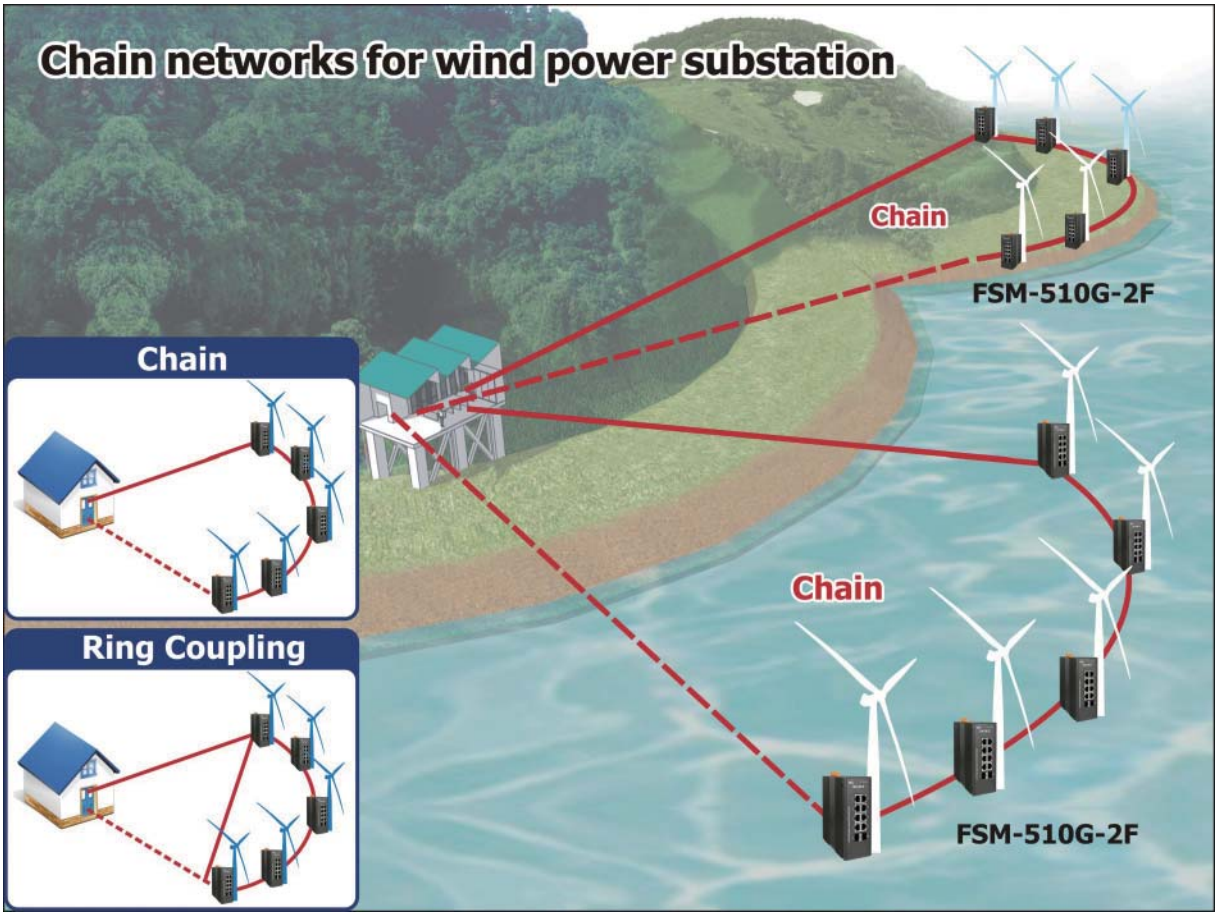
A Daisy Chain solution can be employed to easily connect and/or extend an existing redundant network, providing a cost-efficient approach to reconfiguration, since the integration of different redundant networks can be achieved directly without requiring any ring coupling effort.

Flexible and Expandable Redundancy

Chain is a technological adaptation of daisy chains that allows unrestricted network expansion without requiring the full reconfiguration or rewiring of an existing network.
You can immediately scale up networks with new branches without sacrificing any redundancy, security, or speed.




Chain networks for railway application
Chain
Chain
FSM-6228G
FSM-510G-2F
FSM-6228G
Ring Coupling
Chain


Chain networks for wind power substation
Chain
FSM-510G-2F
Chain
Chain
Ring Coupling
FSM-510G-2F

6.3. Selection Guide

Unmanaged Ethernet Switches

Model	Ethernet		Fiber Port		Power Input	Casing	Page
	Speed	Port	Speed	Port			
NS-208A/NSM-208A	10/100 Mbps	8	–	–	+12 ~ 48 VDC	Plastic/Metal	6-3-1
NS-205AG	10/100/1000 Mbps	5	–	–	+12 ~ 48 VDC	Plastic	6-3-1
NSM-316G	10/100/1000 Mbps	16	–	–	+12 ~ 48 VDC	Metal	6-3-1
NS-205AF/NSM-205AF series	10/100 Mbps	4	100 Mbps	1	+12 ~ 48 VDC	Plastic/Metal	6-3-1
NS-206AF/NSM-206AF series	10/100 Mbps	4	100 Mbps	2	+12 ~ 48 VDC	Plastic/Metal	6-3-2
NSM-216	10/100 Mbps	16	–	–	+12 ~ 48 VDC	Metal	6-3-2

Unmanaged Industrial PoE (Power over Ethernet) Ethernet Switch with Fiber Port

Model	Ethernet			Fiber Port		Power Input	Casing	Page
	Ethernet Type	Speed	Port	Speed	Port			
NS-205PF/NSM-205PF Series	PSE x 4 (IEEE 802.3af)	10/100 Mbps	4	100 Mbps	1	+46 ~ 55 VDC	Plastic/Metal	6-3-2

Unmanaged Industrial PoE (Power over Ethernet) Ethernet Switch

Model	Speed	Port	Type	Power Input	Casing	Page
NSM-205GP	10/100/1000 Mbps	5	PSE x 4 (IEEE 802.3at)	+18 ~ 55 VDC	Metal	6-3-2
NS-208PSE/NSM-208PSE	10/100 Mbps	8	PSE x 8 (IEEE 802.3af)	+46 ~ 55 VDC	Plastic/Metal	6-3-3
NSM-208PSE-24V	10/100 Mbps	8	PSE x 8 (IEEE 802.3af)	+18 ~ 55 VDC	Metal	6-3-3

PoE Injector (PSE)/Splitter (PD)

Model	Speed	Port	Type	Power Output	Casing	Page
NS-200PS	10/100/1000 Mbps	2	PD x 1 (IEEE 802.3af, Class 1)	+24 VDC	Plastic	6-3-2

PoE injector

Model	Speed	Port	Type	Power Input	Casing	Page
tNS-200IN	10/100 Mbps	2	PSE x 1 (IEEE 802.3af)	+46 ~ 55 VDC	Plastic	6-3-3
tNS-200IN-24V	10/100 Mbps	2	PSE x 1 (IEEE 802.3af)	+18 ~ 32 VDC	Plastic	6-3-3

Managed Ethernet/Fiber Port Switch

Model	Ethernet		Fiber Port				Power Input	Casing	Page
	Speed	Port	Mode	Connector	Speed	Port			
MSM-508	10/100 Mbps	8	–	–	–	–	+12 ~ 48 VDC	Metal	6-3-3
MSM-508F Series	10/100 Mbps	6	–	–	100 Mbps	2	+12 ~ 48 VDC	Metal	6-3-3
FSM-510G-2F	10/100/1000 Mbps	8	SFP cage	LC	100/1000 Mbps	2	+12 ~ 48 VDC	Metal	6-3-4
FSM-510G-4F	10/100/1000 Mbps	6	SFP cage	LC	100/1000 Mbps	4	+12 ~ 48 VDC	Metal	6-3-4
FSM-6228G-DC	10/100/1000 Mbps	24	SFP cage	LC	100/1000 Mbps	4	+12 ~ 48 VDC	Metal	6-3-4
FSM-6228G-AC	10/100/1000 Mbps	24	SFP cage	LC	100/1000 Mbps	4	+100 ~ 240 VAC	Metal	6-3-4

Real-time Redundant Ring Ethernet/Fiber Port Switch

Model	Ethernet		Fiber Port		Power Input	Casing	Page
	Speed	Port	Speed	Port			
RS-405/RSM-405	10/100 Mbps	5	–	–	+10 ~ 30 VDC	Plastic/Metal	6-3-3
RS-408/RSM-408	10/100 Mbps	8	–	–	+10 ~ 30 VDC	Plastic/Metal	6-3-3
RS-405F/RSM-405F Series	10/100 Mbps	3	100 Mbps	2	+10 ~ 30 VDC	Plastic/Metal	6-3-3
RSM-405-R	10/100 Mbps	5	–	–	+12 ~ 48 VDC	Plastic/Metal	6-3-3

Unmanaged Ethernet Switch

Industrial rated switches are intended to be installed in both harsh climatic environments and noisy electrical installations. Such switches are an excellent example of true industrial design principles

- Very high operating temperatures (down to -40 °C and up to +75 °C)
- DIN-Rail Mounting
- Wide DC operating voltages (+12 VDC ~ +48 VDC)

PoE Ethernet Switch

The PoE (Power over Ethernet) Ethernet Switch makes centralized power supply come true and provides up to 15.4 watts of power per port.

Rugged M12 Ethernet Switch

The Rugged M12 Ethernet Switch is designed for industrial applications in harsh environments. The M12 connectors ensure tight, robust connections, and guarantee reliable operation, even for applications that are subject to high vibration and shock.

It complies with EN 50155/50121-3-2/50121-4 and NEMA TS2 standards, making the switches suitable for a variety of industrial applications.

Media Converter

The utilization of fiber optic data transmission for industrial automation and process control has become increasingly popular over the past decade. A basic fiber optic system, using an optical transceiver circuit and fiber optic media, offers a wide array of benefits that are not available with traditional copper conductors.

IP67 Water Proof Switch

IP67 Ethernet Switches are designed for use in industrial waterproof/harsh environments. The rugged packaging and IP67 connectors guarantee a total protection that can withstand a variety of extreme conditions such as high temperatures, extreme shocks & vibrations, dust particles or even liquid immersion. They can be directly mounted to any machine or convenient flat surface.

6.4. Product Showcase

Unmanaged Ethernet Switches

▶▶▶▶ 8-port 10/100 Base-TX with IP67

NS-208PSE-M12-IP67 CR *NEW*

The NS-208PSE-M12-IP67 is designed for industrial applications in harsh environments. The rugged M12 connectors ensure tight, robust connections, and guarantee reliable operation, even for applications that are subject to high vibration and shock.

The NS-208PSE-M12-IP67 PoE switch provides 8 fast Ethernet with 8 IEEE 802.3af compliant PoE ports. The switch is classified as power source equipment (PSE) and provide up to 15.4 W of power per port.

- 8-port 10/100 Mbps M12 type connector with IP67 protection
- Full duplex IEEE 802.3x, auto MDI/MDI-X connection and half duplex backpressure flow control
- Power Inputs +12 VDC ~ +53 VDC
- PoE ports with Power Sourcing Equipment (PSE) operation Up to 15.4 watts output per PoE port
- Automatic MDI/MDI-X crossover for plug-and-play
- Operating temperature range: -40 °C ~ +75 °C

NS-208PSE-M12-IP67

▶▶▶▶ 8-port 10/100 Base-TX

NS-208A CR
NSM-208A CR

The NS-208A/NSM-208A series has 8 Ethernet Switching ports that support 10/100 Base-TX, with a 10/100M auto negotiation feature and auto MDI/MDI-X function.

- Automatic MDI/MDI-X crossover for plug-and-play
- Store-and-forward architecture
- 2 Gbps high performance memory bandwidth
- Operating temperature range: -40 °C ~ +75 °C
- DIN-Rail Mounting
- Each port supports both 10/100 Mbps speed auto negotiation
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- Power Input +12 VDC ~ +48 VDC

NSM-208A NS-208A

▶▶▶▶ 5-port 10/100/1000 Base-T

NS-205AG CR *NEW*

The NS-205AG is 5-port unmanaged gigabit switch that support 10/100/1000 Base-T, with a 10/100/1000M auto negotiation feature and auto MDI/MDI-X function. It can connect 5 workstations and automatically switch the transmission speed (10 Mbps or 100 Mbps or 1000 Mbps) for corresponding connections.

- Redundant Power Input
- Each port supports 10/100 and 1000 Mbps speed auto negotiation
- 10 Gbps high performance memory bandwidth
- Power Input +12 VDC ~ +48 VDC
- DIN-Rail Mounting
- Automatic MDI/MDI-X crossover for plug-and-play
- Store-and-forward architecture
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- Operating temperature range: -40 °C ~ +75 °C
- Supports 10 KB Jumbo Frame

NS-205AG

▶▶▶▶ 16-port 10/100/1000 Base-T

NSM-316G CR *NEW*

The NSM-316G series has 16 Ethernet Switching ports that support 10/100/1000 Base-T, with a 10/100/1000M auto negotiation feature and auto MDI/MDI-X function. It can connect 16 workstations and automatically switches the transmission speed (10 Mbps or 100 Mbps or 1000 Mbps) for corresponding connections.

- Automatic MDI/MDI-X crossover for plug-and-play
- Each port supports 10/100 and 1000 Mbps speed auto negotiation
- Store-and-forward architecture
- Redundant Power Inputs +12 VDC ~ +48 VDC
- Operating temperature range: -40 °C ~ +75 °C
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- DIN-Rail Mounting
- Relay output warning for power failure and port break alarm

NSM-316G

▶▶▶▶ 4-port 10/100 Base-TX and 100 Base-FX Fiber

NS-205AF CR Series
NSM-205AF CR Series

The NS-205AF/NSM-205AF series is a Unmanaged 4-port Industrial Ethernet (10/100 Base-TX) to Fiber Port (100 Base-FX) switch that secures data transmission by using fiber optic transmission to provide immunity from EMI/RFI interference.

- Automatic MDI/MDI-X crossover for plug-and-play
- Store-and-forward architecture
- 2 Gbps high performance memory bandwidth
- Redundant Power Input
- Operating temperature range: -30 °C ~ +75 °C
- Redundant Power Inputs +12 VDC ~ +48 VDC
- Each port supports both 10/100 Mbps speed auto negotiation
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- Frame buffer memory: 512 Kbit

NSM-205AFT-T

NS-205AFT-T

4-port 10/100 Base-TX and Dual 100 Base-FX Fiber

NS-206AF CR Series
NSM-206AF CR Series

The NS-206AF/NSM-206AF series is a Unmanaged 4-port Industrial 10/100 Base-TX and Dual 100 Base-FX Switch that secures data transmission by using fiber optic transmission to provide immunity from EMI/RFI interference.

- Automatic MDI/MDI-X crossover for plug-and-play
- Store-and-forward architecture
- 2 Gbps high performance memory bandwidth
- Frame buffer memory: 512 Kbit
- Redundant Power Inputs +12 V_{DC} ~ +48 V_{DC}
- Operating temperature range: -30 °C ~ +75 °C
- Each port supports both 10/100 Mbps speed auto negotiation
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- DIN-Rail Mounting
- Redundant Power Input

NSM-206AFT-T

NS-206AFT-T

16-port 10/100 Base-TX

NSM-216 CR

The NSM-216 has 16 Ethernet ports that support 10/100 Base-TX, with a 10/100M auto negotiation feature and auto MDI/MDI-X function. It can connect 16 workstations and automatically switches the transmission speed (10 Mbps or 100 Mbps) for corresponding connections.

- Provides 16 10/100 Mbps Ethernet ports
- DIN-Rail, Wall Mounting
- Supports 4 kV Ethernet ESD protection and 1 kV EFT protection
- Supports operating temperatures from -40 °C ~ +75 °C
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- Automatic MDI/MDI-X crossover for plug-and-play
- Store-and-forward architecture
- Supports Dual +12 ~ 48 V_{DC} power input and 1 relay output

NSM-216

PoE Splitter

NS-200PS CR

The NS-200PS plays the role of PD, and splits the data signal and power signal that are transmitted from the PSE. The NS-200PS plays a dual role of providing power to industrial devices, and enabling Ethernet connections.

- Supports 10/100/1000 Base-TX for PoE in and Data out
- IEEE 802.3af compliant split power/data from PoE equipment
- Supports output power up to 10 W at 24 V_{DC}
- Power isolation and short circuit protection for power output
- Slim packaging fits on your DIN-Rail Mounting
- Supports operating temperatures from -40 °C ~ 75 °C

NS-200PS

4-port PoE and 1 RJ-45 Uplink

NS-105PSE CR

The NS-105PSE is a 5-port unmanaged PoE (Power over Ethernet) Industrial Ethernet Switch, it supports 4-PoE Port which are classified as power source equipments (PSE).

- Automatic MDI/MDI-X crossover for plug-and-play
- Each port supports both 10/100 Mbps speed auto negotiation
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- 3.2 Gbps high performance memory bandwidth
- DIN-Rail Mounting
- Operating temperature range: -40 °C ~ +75 °C
- Store-and-forward architecture
- Up to 15.4 watts output per PoE port

NS-105PSE

4-port PoE and 100 Base-FX Fiber

NS-205PF CR Series
NSM-205PF CR Series

The NS-205PF is a 5-port unmanaged PoE (Power over Ethernet) Industrial Ethernet Switch, it supports 4-PoE Port which are classified as power source equipments (PSE).

- Automatic MDI/MDI-X crossover for plug-and-play
- Each port supports both 10/100 Mbps speed auto negotiation
- Store-and-forward architecture
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- 3.2 Gbps high performance memory bandwidth
- Power Input +46 V_{DC} ~ +55 V_{DC}
- Operating temperature range: -30 °C ~ +75 °C
- DIN-Rail Mounting
- Up to 15.4 watts output per PoE port

NSM-205PFT-T

NS-205PFC-T

5-port full Gigabit unmanaged Ethernet switches with 4 IEEE 802.3af/at PoE ports

NSM-205GP CR *NEW*

The NSM-205GP switch has 4 x 10/100/1000BASE-T Ethernet ports with PoE+ function and one combo (10/100/1000 baseT(X) or 1000 baseSFP socket) LAN port, it has been designed to work within a wide operating temperature range. The equipment also meets the IEEE 802.3 at standard and can provide 30 Watts output per PoE port.

- Each port supports 10/100 and 1000 Mbps speed auto negotiation
- Supports 10 KB Jumbo Frame
- 10 Gbps high performance memory bandwidth
- One combo (10/100/1000 baseT(X) or 1000 baseSFP slot) LAN port
- 24/48 V_{DC} redundant power inputs
- Operating temperature range: -40 °C ~ +75 °C
- DIN-Rail Mounting
- IEEE 802.3af/at, PoE/PoE+ standards
- Up to 30 watts output per PoE port
- Redundant Power Input

NSM-205GP

▶▶▶▶ 8-port Industrial 10/100 Mbps Ethernet with 8-PoE (PSE) Switch

NS-208PSE CR
NSM-208PSE CR
NSM-208PSE-24V CR

The NS-208PSE/NSM-208PSE/NSM-208PSE-24V is a 8-port unmanaged PoE (Power over Ethernet) Industrial Ethernet Switch, it supports 8-PoE Port which are classified as power source equipments (PSE).

- Automatic MDI/MDI-X crossover for plug-and-play
- Each port supports both 10/100 Mbps speed auto negotiation
- Store-and-forward architecture
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- Up to 15.4 watts output per PoE port
- 3.2 Gbps high performance memory bandwidth
- Power Input +46 V_{DC} ~ +55 V_{DC} for NSM-208PSE/ NS-208PSE
- Power Input +18 V_{DC} ~ +55 V_{DC} for NSM-208PSE-24V
- Operating temperature range: -40 °C ~ +75 °C
- DIN-Rail Mounting

NSM-208PSE
NSM-208PSE-24V

NS-208PSE

▶▶▶▶ PoE injector

tNS-200IN
tNS-200IN-24V

The tNS-200IN/tNS-200IN-24V delivers both data and power over a single standard Ethernet cable to a PoE Powered Device designed to receive both Data and Power through its RJ-45 port connector.

- Auto-detection of PD (powered devices)
- Power Sourcing Equipment (PSE) operation
- Over-temperature, over-current and over/under-voltage detection
- Supplies up to 15.4 watts
- No user settings
- Tiny packaging fits on your DIN-Rail
- Cost-effective for tNS-200IN

tNS-200IN

tNS-200IN-24V

Managed Ethernet Switches

▶▶▶▶ 5-port Real-time Redundant Ring Switch

RSM-405-R CR

The RS-405-R series is a 5-port Industrial Ethernet (10/100 Base-TX) Real-time Redundant Ring Switch.

- Automatic MDI/MDI-X crossover for plug-and-play
- Store-and-forward architecture
- 3.2 Gbps high performance memory bandwidth
- Frame buffer memory: 1 Mbit
- Supports 1K MAC Addresses
- Operating temperature range: -40 °C ~ +75 °C
- DIN-Rail Mounting
- Each port supports both 10/100 Mbps speed auto negotiation
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- Redundant Power Inputs +12 V_{DC} ~ +48 V_{DC}
- Power failure alarm by relay output

RSM-405-R

▶▶▶▶ 8-port Real-time Redundant Ring Switch

RS-408 CR Series
RSM-408 CR Series

The RS-408/RSM-408 series is an 8-port Industrial Ethernet (10/100 Base-TX) Real-time Redundant Ring Switch.

- Automatic MDI/MDI-X crossover for plug-and-play
- Store-and-forward architecture
- 3.2 Gbps high performance memory bandwidth
- Frame buffer memory: 1 Mbit
- Supports 2K MAC Addresses
- Operating temperature range: -40 °C ~ +75 °C
- DIN-Rail Mounting
- Each port supports both 10/100 Mbps speed auto negotiation
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- Redundant Power Inputs +10 V_{DC} ~ +30 V_{DC}
- Power failure alarm by relay output

RSM-408 RS-408

▶▶▶▶ 8-port Industrial Ethernet Layer 2 Managed Switch

MSM-508 CR

The MSM-508 is an 8-port Industrial Ethernet (10/100 Base-TX) Layer 2 Managed Switch. MSM-508 supports 10/100M auto negotiation feature and auto MDI/MDI-X function.

- Automatic MDI/MDI-X crossover for plug-and-play
- Store-and-forward architecture
- 3.2 Gbps high performance memory bandwidth
- Frame buffer memory: 1 Mbit
- Supports 2K MAC Addresses
- Operating temperature range: -40 °C ~ +75 °C
- Power failure alarm by relay output
- Each port supports both 10/100 Mbps speed auto negotiation
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- Redundant Power Inputs +12 V_{DC} ~ +48 V_{DC}
- DIN-Rail Mounting and Screw hole for wall mounting kit

MSM-508

▶▶▶▶ 8-port Industrial Ethernet Layer 2 Managed Switch with 2-Fiber Port

MSM-508F CR Series

The MSM-508F series is an 8-port Industrial Ethernet Layer 2 Managed Switch with 2-Fiber Port that secures data transmission by using fiber optic transmission to provide immunity from EMI/RFI interference.

- Automatic MDI/MDI-X crossover for plug-and-play
- Store-and-forward architecture
- 3.2 Gbps high performance memory bandwidth
- Frame buffer memory: 1 Mbit
- Supports 2K MAC Addresses
- Operating temperature range: -30 °C ~ +75 °C
- Power failure alarm by relay output
- Each port supports both 10/100 Mbps speed auto negotiation
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- Redundant Power Inputs +12 V_{DC} ~ +48 V_{DC}
- DIN-Rail Mounting and Screw hole for wall mounting kit

MSM-508FT-T

MSM-508FC-T

▶▶▶▶ 6-Port 10/100/1000 Base-T + 4 SFP Port L2 Managed Switch
8-Port 10/100/1000 Base-T + 2 SFP Port L2 Managed Switch

FSM-510G Series NEW

FSM-510G-4F

FSM-510G-2F

FSM-510G-4F is a L2 Managed Switch that meets all IEEE 802.3ab/u/x/z Gigabit, Gigabit Ethernet and Ethernet specifications. It provides 6 gigabit Ethernet ports (10/100/1000 Mbps TP) 4 SFP ports.

The switch can be managed through RS-232 serial port via direct connection, or through Ethernet port using Telnet or Web-Based management unit, associated with SNMP agent. With the SNMP agent, the network administrator can logon the switch to monitor, configure and control each port activity in a friendly way. The overall network management is enhanced and the network efficiency is also improved to accommodate high bandwidth applications. In addition, the switch features comprehensive and useful function such as DHCP Option 82, QoS (Quality of Service), Spanning Tree, VLAN, Port Trunking, Bandwidth Control, Port Security, SNMP/RMON

- IEEE 802.3ab 1000BASE-T Gigabit Ethernet
- Network redundant Ring fail-over protection (< 20 ms)
- Multicasting support IGMP v1/v2, proxy & snooping
- L2+ features provide better manageability, security, QoS, and performance
- Multicast/Broadcast/Flooding Storm Control

▶▶▶▶ 24-port Ethernet + 4 SFP Layer 2 Gigabit Managed Switch

FSM-6228G-AC/FSM-6228G-DC NEW

FSM-6228G

FSM-6228G is a L2 Managed Switch that meets all IEEE 802.3ab/u/x/z Gigabit, Gigabit Ethernet and Ethernet specifications. It provides 24 gigabit Ethernet ports (10/100/1000 Mbps TP) 4 SFP ports.

- IEEE 802.3ab 1000BASE-T Gigabit Ethernet
- Network redundant Ring fail-over protection (< 20 ms)
- Multicast/Broadcast/Flooding Storm Control
- L2+ features provide better manageability, security, QoS, and performance
- Multicasting support IGMP v1/v2/v3, proxy & snooping

Accessories

SFP-1G85M-SX	Multi-mode 850 nm, 0.5 km SFP module
SFP-1G13M-SX2	Multi-mode 1310 nm, 2 km SFP module
SFP-1G13S-LX	Single-mode 1310 nm, 10 km SFP module
SFP-1G13S-LX20	Single-mode 1310 nm, 20 km SFP module
SFP-1G13S-LHX	Single-mode 1310 nm, 40 km SFP module
SFP-1G15S-XD	Single-mode 1550 nm, 60 km SFP module

Media Converters

▶▶▶▶ 10/100 Base-TX to 100 Base-FX

NS-200AF CR Series

NS-200AFT-T NS-200AFC-T

The NS-200AF series is a Ethernet (10/100 Base-TX) to Media (100 Base-FX) converter. The Ethernet supports 10/100M auto negotiation feature and auto MDI/MDI-X function.

- Automatic MDI/MDI-X crossover for plug-and-play
- Store-and-forward architecture
- 1.4 Gbps high performance memory bandwidth
- Operating temperature range: -30 °C ~ +75 °C
- Reverse Polarity Protection
- Supports both 10/100 Mbps speed auto negotiation
- Full duplex IEEE 802.3x flow control
- Frame buffer memory: 256 Kbit
- Power Input +12 V_{DC} ~ +48 V_{DC}
- DIN-Rail Mounting

▶▶▶▶ 1000 Base-T to 1000 Base-SX/LX

NSM-200SX/LX NEW

NSM-200G-SFP

NSM-200SX2

NSM-200SX/LX is an enhanced gigabit Ethernet to fiber optic converter. Aside from its standard features, the versatile NSM-200SX/LX also has the LFP (Link Fault Pass-through) feature. When one side of the link fails, the other side continues transmitting packets, and waiting for a response that never arrives from the disconnected side. NSM-200SX/LX will force the link to shut down as soon as noticed that the other link has failed, giving the application software a chance to react to the situation.

- Provides 1 x 1000 Mbps fiber port with SC type connector for 1000 Base-SX/LX device
- Supports Jumbo Frames 9K bytes
- Provides Link Fault Pass-through (LFP)
- Supports redundant +12 V_{DC} ~ +48 V_{DC} power input
- Supports wide operating temperatures from -30 °C ~ +75 °C

▶▶▶▶ Single-Strand 10/100 Base-TX to 100 Base-FX

NS-200WDM CR Series

NS-200WDM-A NS-200WDM-B

Using the fiber optic medium for Ethernet applications has become more popular due to fiber optic's excellent physical features, especially for long distance networks.

- Automatic MDI/MDI-X crossover for plug-and-play
- Store-and-forward architecture
- 1.4 Gbps high performance memory bandwidth
- Operating temperature range: 0 °C ~ +70 °C
- Reverse Polarity Protection
- Supports both 10/100 Mbps speed auto negotiation
- Full duplex IEEE 802.3x and half duplex backpressure flow control
- Power Input +12 V_{DC} ~ +48 V_{DC}
- DIN-Rail Mounting

Wireless Networking Solutions

7-1 Overview

Industrial Wireless Communication creates new prospects for automation. In the harsh environment, chemicals, vibrations, or moving parts could potentially damage cabling. Industrial Wireless Communication system substantially reduces cost and time for the installation and maintenance of the large number of cable, thus makes plants setup and reconfiguration easy and safe.

ICP DAS provides a great variety of wireless products with modular and universal solution specially designed for industrial harsh environment.

7-2 WLAN Products

WLAN (Wireless Local Area Network) links devices by wireless distribution method (spread-spectrum or OFDM radio), and generally provides a connection through an access point to the internet. WLAN allows users to move device within a local coverage area, and still be connected to the network. High-bandwidth allocation for wireless will make a relatively low-cost wiring possible.

ICP DAS provides a great variety of WLAN products which are compliant with standard of IEEE 802.11. The WLAN products have two modes: Ad-hoc and Infrastructure.

Advantages & Benefits

- Build a wireless network via Wi-Fi technology. There is no need to build an expensive fixed line network.
- Enable CAN/Serial/Ethernet device to be connected to the same network via Wi-Fi without any cable.
- Use widely available IEEE 802.11 (Wi-Fi) or Ethernet network infrastructure.
- Compatible with IEEE 802.11b/g standards
- Secure data access with WEP, WPA, WPA2.

WLAN Selection Guide

WLAN Remote Maintenance Device

Models	Interface	Wi-Fi standard	Data Encryption
M2M-711D	5-wire RS-232 x 1 2-wire RS-485 x 1 10/100M Ethernet x 1	IEEE 802.11 b/g Data rate: up to 54 Mbps (Auto scaling)	64/128-bit WEP, WPA-TKIP and WPA2-AES
RMV-760D-MTCP	3-wire RS-232 x1 4-wire RS-422 x1 2-wire RS-485 x1 10/100M Ethernet x1	IEEE 802.11 b/g Data rate: up to 54 Mbps(Auto scaling)	64/128-bit WEP, WPA-TKIP and WPA2-AES

CAN to Wi-Fi

Models	Interface	Wi-Fi standard	Data Encryption
I-7540D-WF	CAN bus x 1 (CAN 2.0A/B) 3-wire RS-232 x 1	IEEE 802.11 b/g Data rate: up to 54 Mbps (Auto scaling)	64/128-bit WEP, WPA-TKIP and WPA2-AES

Ethernet to Wi-Fi Bridge

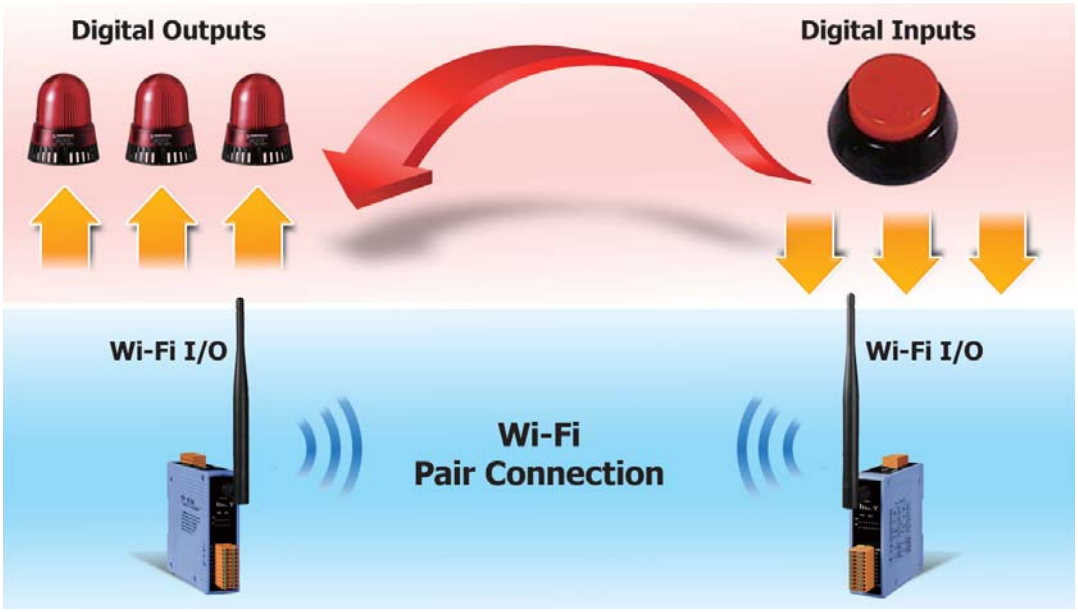
Models	Interface	Wi-Fi standard	Data Encryption
WF-2571	10/100M Ethernet	IEEE 802.11b/g Data rate: up to 54 Mbps (Auto scaling)	64/128-bit WEP, WPA-TKIP and WPA2-AES

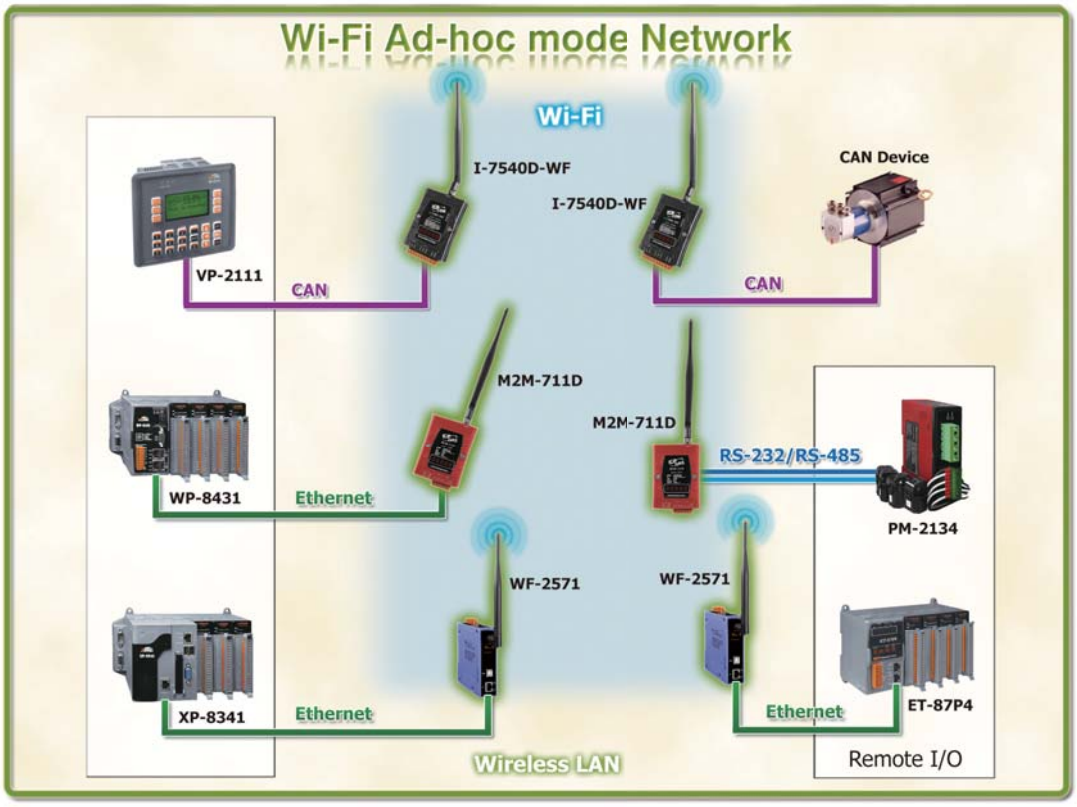
Wi-Fi I/O Selection Guide

Models	Protocol	Input Channel	Output Channel	Transmit Power	Antenna (Omni-Directional)	Distance (Line of Sign, LOS)
WF-2015	Modbus TCP/UDP	6 x RTD	–	8 dBm @ 11Mbps	5 dBi	50 m (Typical)
WF-2017	Modbus TCP/UDP	8/16 x AI	–	8 dBm @ 11Mbps	5 dBi	50 m (Typical)
WF-2019	Modbus TCP/UDP	10 x AI	–	8 dBm @ 11Mbps	5 dBi	50 m (Typical)
WF-2026	Modbus TCP/UDP	2 x DI 5 x AI	3 x DO 2 x AO	8 dBm @ 11Mbps	5 dBi	50 m (Typical)
WF-2042	Modbus TCP/UDP	–	16 x DO	8 dBm @ 11Mbps	5 dBi	50 m (Typical)
WF-2051	Modbus TCP/UDP	16 x DI	–	8 dBm @ 11Mbps	5 dBi	50 m (Typical)
WF-2055	Modbus TCP/UDP	8 x DI	8 x DO	8 dBm @ 11Mbps	5 dBi	50 m (Typical)
WF-2060	Modbus TCP/UDP	6 x DI	6 x Relay	8 dBm @ 11Mbps	5 dBi	50 m (Typical)

Wi-Fi I/O with Metal Case Selection Guide

Models	Protocol	Input Channel	Output Channel		Transmit Power	Antenna (Omni-Directional)	Distance (Line of Sign, LOS)
WFM-P16C16	Modbus TCP/UDP	6 x DI	16 x DO		8 dBm @ 11Mbps	5 dBi	50 m (Typical)
WFM-P16R10	Modbus TCP/UDP	16 x DI	10 x Relay		8 dBm @ 11Mbps	5 dBi	50 m (Typical)
WFM-R14	Modbus TCP/UDP	–	14 x Relay	2 FormA 12 FormC	8 dBm @ 11Mbps	5 dBi	50 m (Typical)
WFM-P32	Modbus TCP/UDP	32 x DI	–		8 dBm @ 11Mbps	5 dBi	50 m (Typical)
WFM-C32	Modbus TCP/UDP	–	32 x DO		8 dBm @ 11Mbps	5 dBi	50 m (Typical)

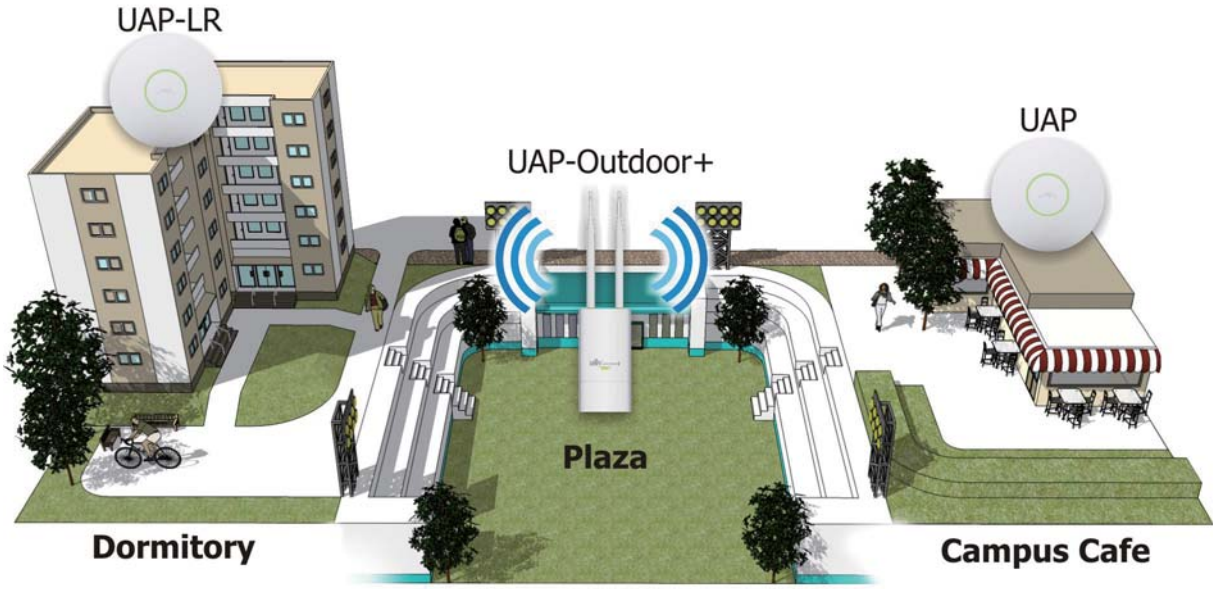




Wi-Fi Access Point

The UAP System from the UBIQUITI NETWORKS is a scalable enterprise access point solution designed to be easily deployed and managed. The UAP System includes the UniFi APs and UniFi Controller software. The software can be installed on any PC, Mac, or Linux machine within the network and is easily accessible through any standard web browser.

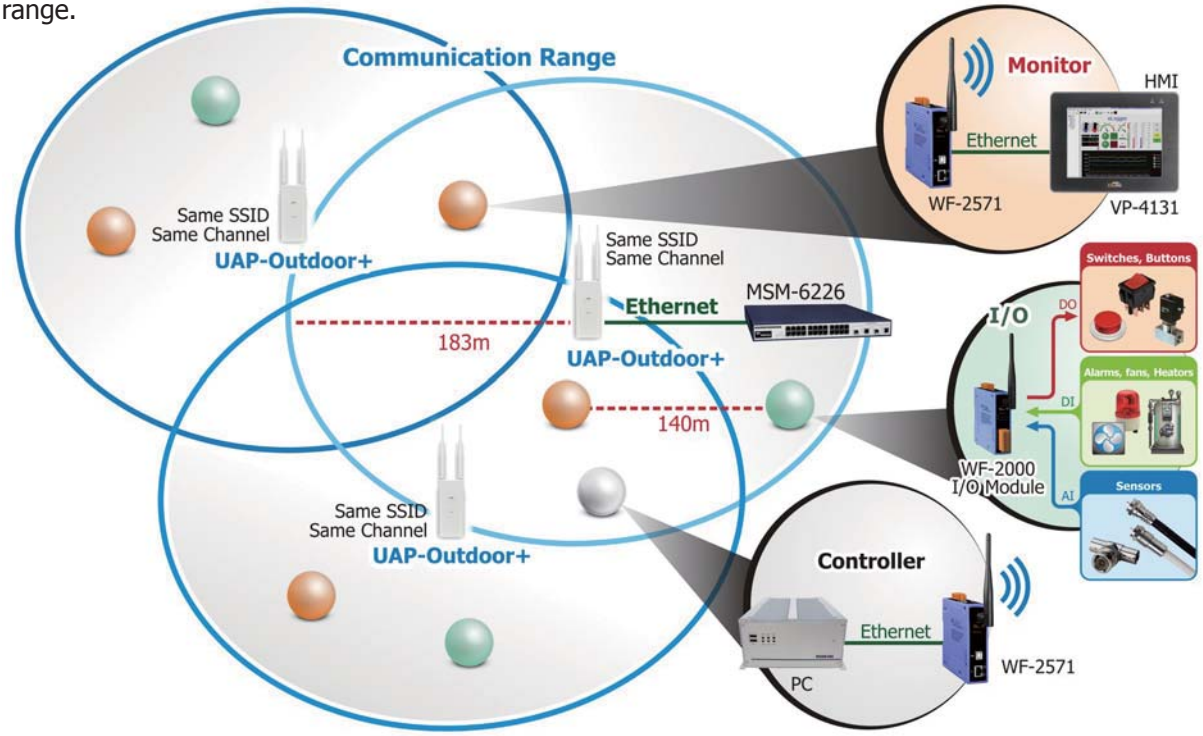
Name	UniFi AP 	UniFi AP-LR 	UniFi AP-Outdoor+ 
2.4G	Yes	Yes	Yes
2.4G Speed	300 Mbps	300 Mbps	300 Mbps
Range	122 m (400ft)	183 m (600ft)	183 m (600ft)
Multi-Lane RF	–	–	Yes
2nd Ethernet Port	–	–	Yes
Wi-Fi standards	801.11 b/g/n	801.11 b/g/n	801.11 b/g/n
Ubiquiti PoE	Yes	Yes	Yes
External Antennas	–	–	Yes
Maximum TX Power	20 dBm	27 dBm	28 dBm
Power Consumption	4 W	6 W	8 W
Dimension	200 x 200 x 36.5 mm	200 x 200 x3 6.5 mm	205 x 83 x 37 mm
Operating Temperature	-10 to 70 °C	-10 to 70 °C	-30 to 65 °C
Operating Humidity	5-80% Non-Condensing	5-80% Non-Condensing	5-95% Non-Condensing



WLAN Applications

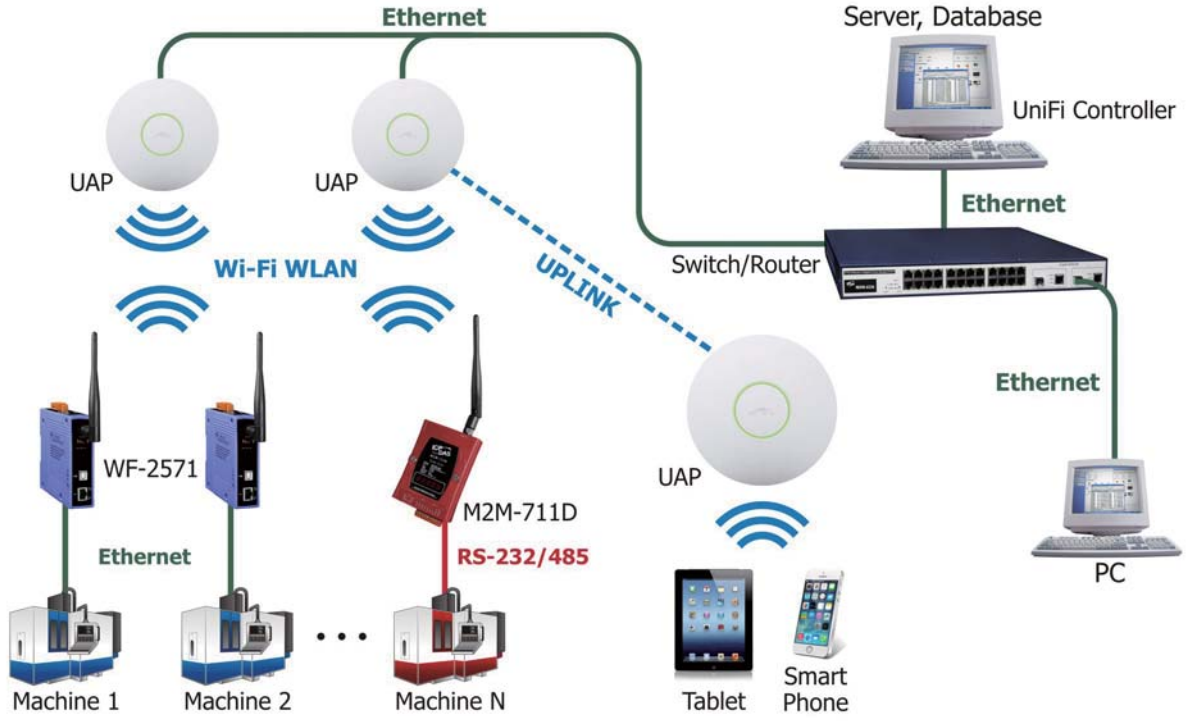
UniFi AP Application

Users can connect all the ICP DAS's Wi-Fi module via UAP. It is very convenient for the data-exchange between our Wi-Fi modules. ALL the UAP are able to be set in the same SSID and RF channel. These features make the communication more stable and faster, when Users move across to the other UAP coverage. The fast roaming is provided on the UAP system. The coverage can be also extended easily. ALL the UAPs are connected by Ethernet routers via Ethernet cable, or extended by wireless Uplink functionality. Wireless Uplink functionality enables wireless connectivity between UAPs for extended range.



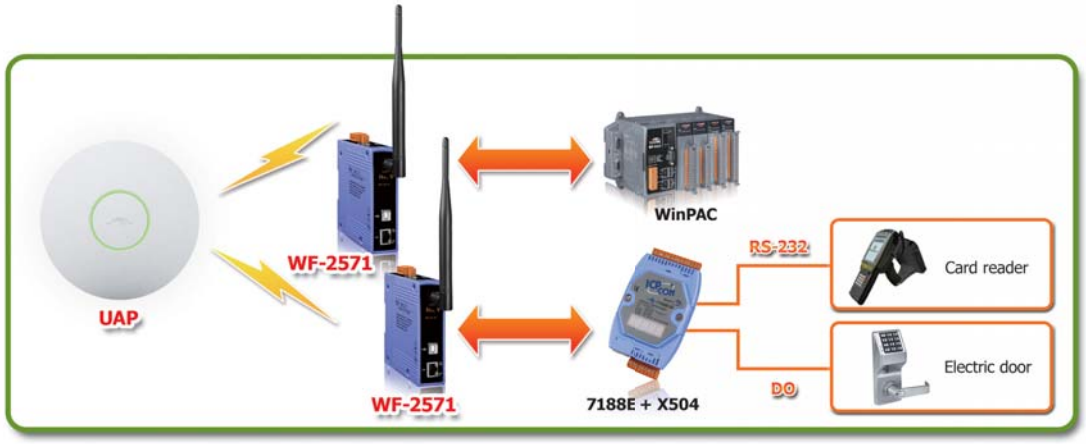
Remote Machine Maintenance

Users can connect all the ICP DAS's Wi-Fi modules via UAP and observe the connection status via smart phone or tablet. It is more convenient and easier to maintain the remote machine.



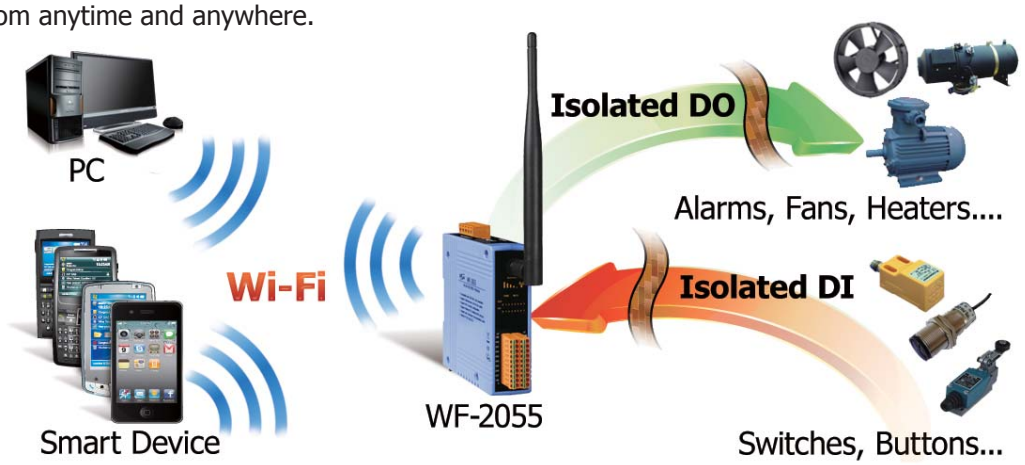
WF-2571

The WF-2571 is an Industrial Ethernet to Wi-Fi Bridge that creates a connection between an 802.11b/g wireless LAN and a device with a standard Ethernet port (WinPAC/uPAC).



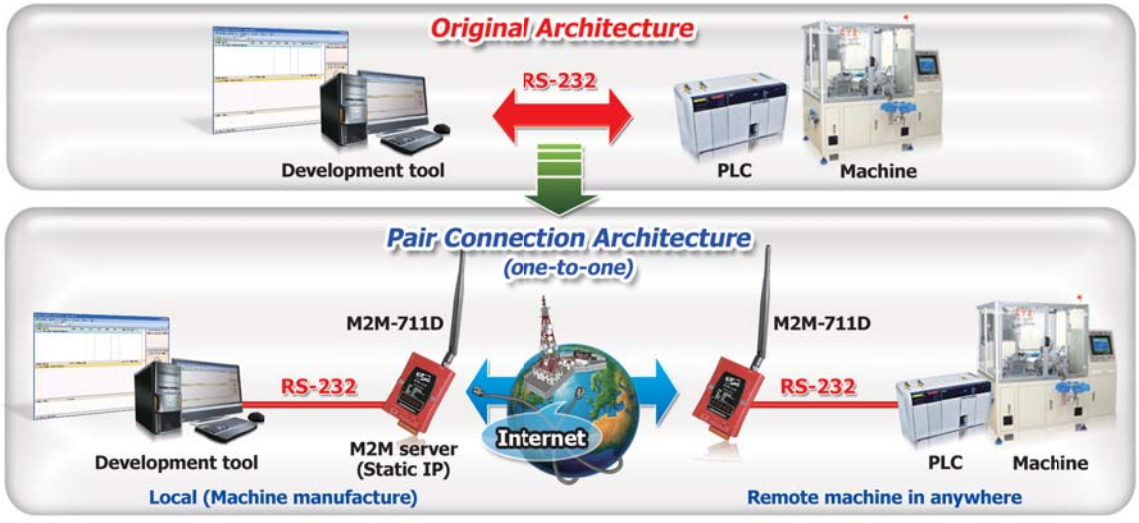
WF-2000 I/O module

The WF-2000 I/O modules support Modbus TCP/UDP protocols and the network encryption configuration, which makes perfect integration to SCADA software and offer easy and safe access for users from anytime and anywhere.



M2M-711D

M2M-711D can provide the remote serial data transmission by Ethernet or Wi-Fi (IEEE 802.11b/g) between local and remote sides.



7-3 DSSS RF Products

DSSS RF (direct-sequence spread spectrum) is a modulation technique, which is the process of varying one or more properties of a high frequency periodic wave called the carrier signal, with respect to a modulating signal. The benefits of using DSSS include, but not limited to, 1) reduced signal/background-noise level hampers interception and 2) resistance to intended or unintended jamming.

ICP DAS provides SST series which is designed for data acquisition control applications between a host and remote sensors. It is also useful for those applications where the installation of cable wire is inconvenient.

Advantages & Benefits

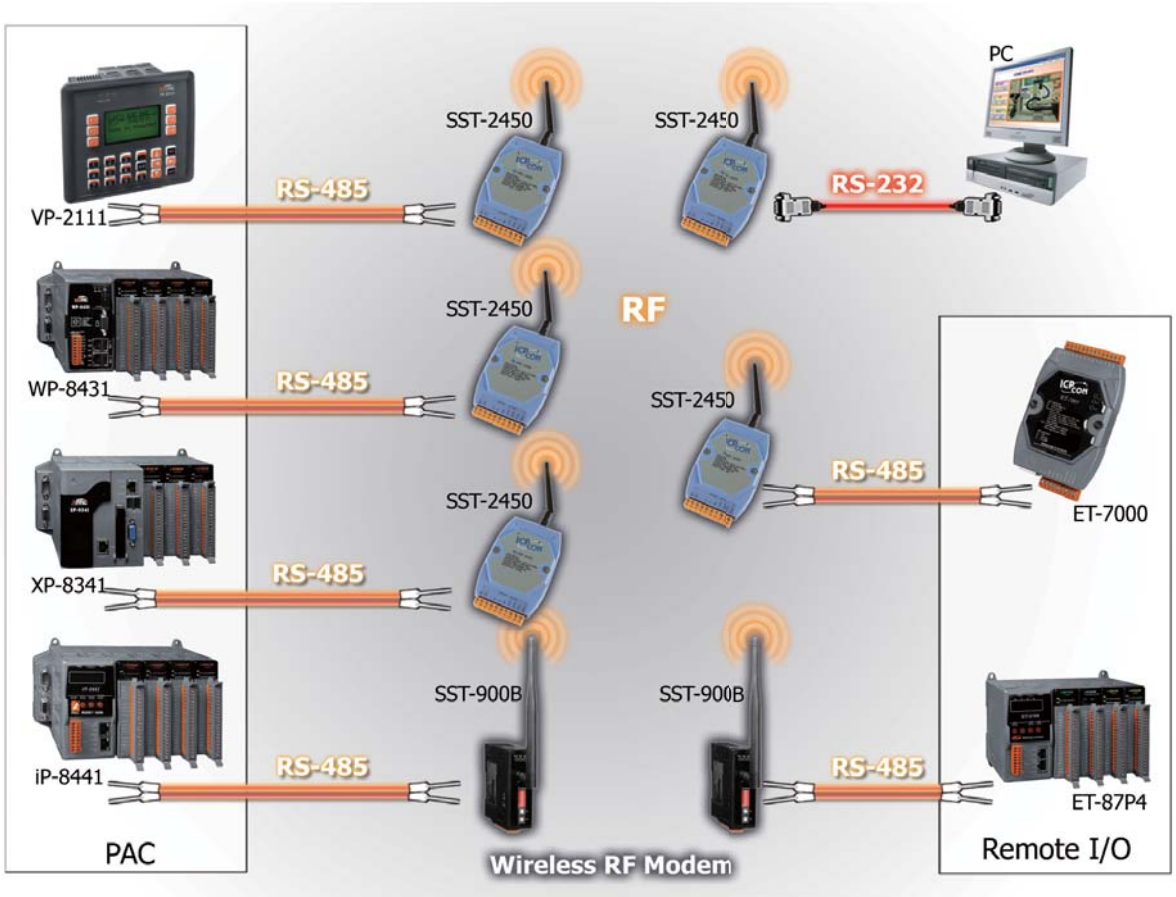
- Full-duplex and Half-duplex up to 57600 bps
- Auto band-rate settings
- Direct sequence spread spectrum using RF technology
- Reduce wiring cost and inconvenience

SST-2450 SST-900B

DSSS RF Selection Guide

Models	Frequency	Interface	Transmission Range
SST-900B	900 MHz (902-928 MHz)	RS-232/RS-485	Typical 700 m, Max. 1 km
SST-2450	2.4 GHz (2410.496 MHz ~ 2471.936 MHz)	RS-232/RS-485	300 m (Typical)

Wireless Modem Network



7-4 2G/3G Products

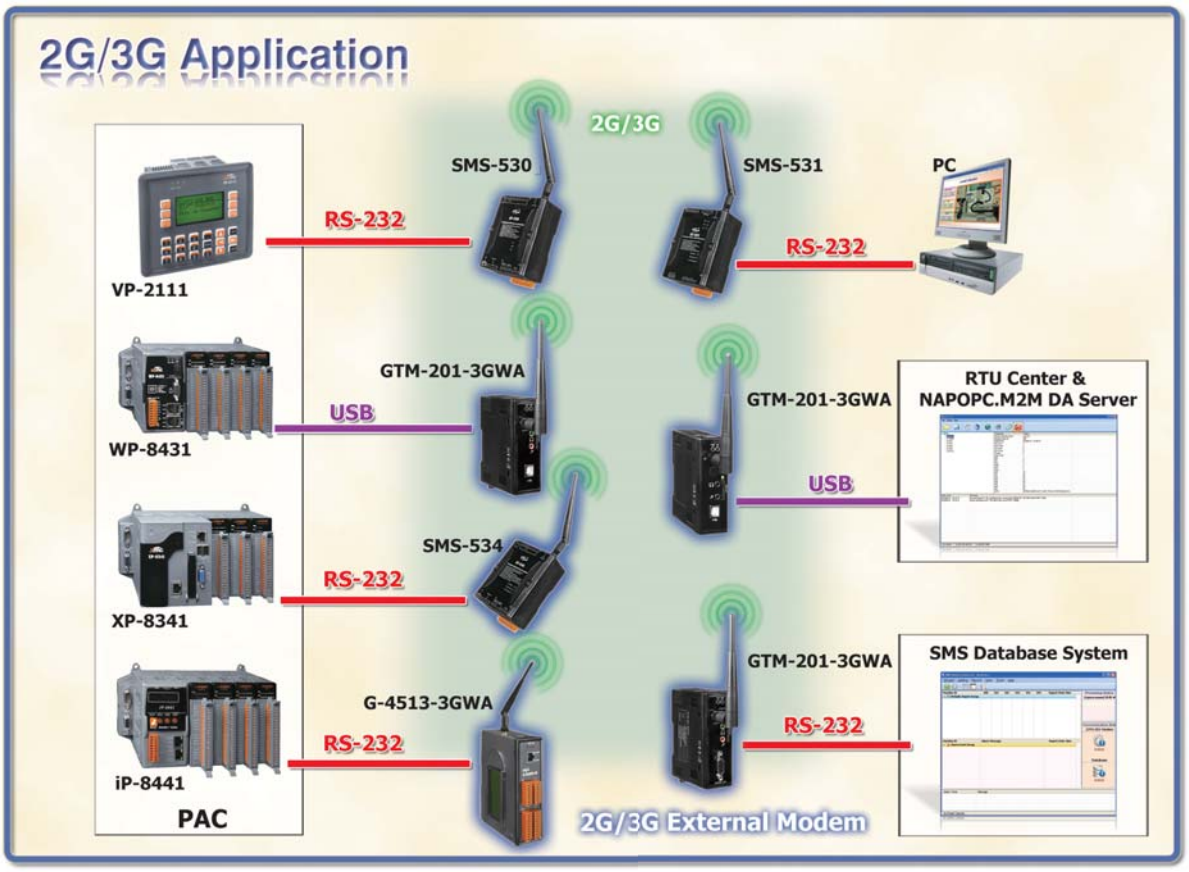
ICP DAS 2G/3G wireless solutions are uniquely designed to meet the challenges of implementing and managing a small, medium and large number of unmanned remote devices as well as mobile terminals using the 2G/3G network. The ICP DAS 2G/3G wireless system is comprised of intelligent 2G/3G modems with versatile interfaces, a 2G/3G Data Server (DS), and 2G/3G PACs with embedded dynamic IP resolution technology to help system integrators and application service providers can quickly integrate 2G/3G technology into their own solutions, and save development time with reduced costs and assured performance.

The 2G/3G products support Quad-band GSM (850, 900, 1800, 1900MHz) and Tri-band 3G WCDMA (850, 1900, 2100 MHz), two of the major frequency bands. By supporting these two bands, 2G/3G products are compatible with most mobile networks worldwide.

G-4513-3GWA

Advantages & Benefits

- There is no need to build an expensive fixed line network.
- Enable any devices to be connected to the Internet via serial port over a 2G/3G network.
- The most efficient method of handling data over a 2G/3G wireless network and the Internet.
- A full turnkey solution that is designed for both fixed and mobile machine to machine applications.
- Reliable GSM/GPRS/EDGE/UMTS/HSPA network connectivity, providing fast and cost-effective long-range wireless applications



2G/3G Modem Selection Guide

ICP DAS provides various industrial Quad-band 2G or Tri-band 3G modem. The modems utilize the 2G/3G network for convenient and inexpensive data transfer from remote instruments, meters, computers or control systems in either live data or packet data. The modems have the integrated TCP/IP stack so that even simple controllers with serial communications ports can be connected to the modem without the need for special driver implementation.

Stand Alone Modem

Model	Frequency (MHz)	Reset Input	MIC Input Audio Output	GPS	TCP/IP Stack	Baud Rate (bps)	Interface	Driver	Driver
GTM-201-RS232	2G (GSM/GPRS): 850/900/1800/1900	Yes	Yes	-	Yes	9.6K ~ 115.2K	RS-232	Windows XP / 7 Windows CE Linux	Plastic
GTM-201-USB	2G (GSM/GPRS): 850/900/1800/1900	Yes	Yes	-	Yes	9.6K ~ 115.2K	USB2.0	Windows XP / 7 Windows CE Linux	
GTM-201-3GWA	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 2100/1900/850	Yes	Yes	-	Yes	9.6K ~ 115.2K	USB2.0 RS-232	Windows XP / 7 Linux	
GTM-203M-3GWA	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 2100/1900/900/850	Yes	Yes	-	Yes	9.6K ~ 115.2K	USB2.0 RS-232	Windows XP / 7 / 8 Linux	Metal

GSM/GPRS Module

Model	Frequency (MHz)	GPS Interface	Max. Download Speed	AT Command	TCP/IP Protocol
I-8212W-3GWA	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 2100/1900/850	-	115.2 Kbps	Yes	Yes
I-8213W-3GWA	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 2100/1900/850	Yes	115.2 Kbps	Yes	Yes

Intelligent 2G/3G Modules Selection Guide

ICP DAS provides various intelligent 2G/3G modules and gateway, GT-5xx Series. The Module is GSM remote control and alarm system allows users to use their mobile phone to monitor and control the business from any location. Its alarm facilities provide a flexible way to distribute critical alarm information to any number of mobile phone users. The Gateway allows user to access mobile phone by using standard protocol, such as Modbus.

Model	Interface	Frequency (MHz)	I/O	Alarm	Micro SD	Battery Backup	Transparent Communication	VxComm	3G Router
GT-530	2 × RS-232	2G (GSM/GPRS): 850/900/1800/1900	2 × DO 10 × DI	Yes (SMS)	-	Yes	SMS	-	-
SMS-530	2 × RS-232	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 850/900/1900/2100	2 × DO 10 × DI	Yes (SMS)	-	Yes	SMS	-	-
GT-531	2 × RS-232 1 × RS-485	2G (GSM/GPRS): 850/900/1800/1900	-	Yes (SMS, Voice)	Yes	-	Modbus RTU	-	-
SMS-531	2 × RS-232 1 × RS-485	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 850/900/1900/2100	-	Yes (SMS, Voice)	Yes	-	Modbus RTU	-	-
GT-534	1 × RS-232 1 × RS-485	2G (GSM/GPRS): 850/900/1800/1900	2 × DO 6 × DI 1 × AI	Yes (SMS, Voice)	Yes	Yes	SMS	-	-
SMS-534	1 × RS-232 1 × RS-485	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 850/900/1900/2100	2 × DO 6 × DI 1 × AI	Yes (SMS, Voice)	Yes	Yes	SMS	-	-
GT-540	1 × RS-232 1 × RS-485	2G (GSM/GPRS): 850/900/1800/1900	2 × DO 6 × DI 1 × AI	Yes (GPRS)	Yes	Yes	GPRS	-	-
GT-540-3GWA	1 x RS-232 1 x RS-485	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 850/900/1900/2100	2 x DO 6 x DI 1 x AI	Yes (GPRS)	Yes	Yes	3G/GPRS	-	-
GT-540P	1 × RS-232 1 × RS-485 GPS	2G (GSM/GPRS): 850/900/1800/1900	2 × DO 6 × DI 1 × AI	Yes (GPRS)	Yes	Yes	GPRS	-	-
GT-540P-3GWA	1 x RS-232 1 x RS-485 GPS	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 850/900/1900/2100	2 x DO 6 x DI 1 x AI	Yes (GPRS)	Yes	Yes	3G/GPRS	-	-
GT-541	1 × RS-232 1 × RS-485	2G (GSM/GPRS): 850/900/1800/1900	-	-	-	-	GPRS	Yes	-

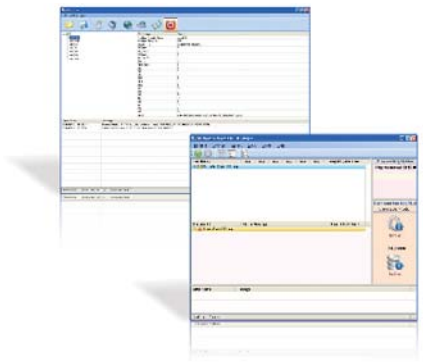
Model	Interface	Frequency (MHz)	I/O	Alarm	Micro SD	Battery Backup	Transparent Communication	VxComm	3G Router
RMV-531	1 × RS-232 1 × RS-485	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 850/900/1900/2100	-	-	-	-	3G/GPRS	Yes	-
RMV-514	1 x RS-485	2G (GSM/GPRS): 850/900/1800/1900	2 x DO 6 x DI 1 x AI	-	-	Yes	3G/GPRS	Yes	-
GRP-520	1 × RS-232 1 × RS-485	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 2100/1900/850	-	-	Yes	-	3G/GPRS	Yes	Yes
GRP-530	1 × RS-232 1 × RS-485	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 2100/1900/900/850	-	-	Yes	-	3G/GPRS	Yes	Yes

Mini PAC with 2G/3G Selection Guide

The G-4500 series provided by ICP DAS are M2M (machine to machine) mini programmable controller with a cellular transceiver can monitor industrial equipment that sends live data to the monitoring system, providing real-time status. With optional GPS model, the G-4500 can also be a GPS tracking system. It can be used in vehicle management system or maritime system.

Model	OS	Interface	I/O	Frequency (MHz)	LCM (Dot)	GPS	Power Saving	Solar Charging	Case
G-4513-3GWA	MiniOS7	1 × Ethernet 1 × RS-232 1 × RS-485	3x DO 3x DI 8x AI 1x Relay	2G (GSM/GPRS): 850/900/1800/1900 3G(WCDMA): 850/900/1900/2100	-	-	YES	for 12V Lead-Acid Battery	Metal
G-4513D-3GWA	MiniOS7	1 × Ethernet 1 × RS-232 1 × RS-485	3x DO 3x DI 8x AI 1x Relay	2G (GSM/GPRS): 850/900/1800/1900 3G(WCDMA): 850/900/1900/2100	128 x 64	-	YES	for 12V Lead-Acid Battery	Metal
G-4513P-3GWA	MiniOS7	1 × Ethernet 1 × RS-232 1 × RS-485	3x DO 3x DI 8x AI 1x Relay	2G (GSM/GPRS): 850/900/1800/1900 3G(WCDMA): 850/900/1900/2100	-	YES	YES	for 12V Lead-Acid Battery	Metal
G-4513PD-3GWA	MiniOS7	1 × Ethernet 1 × RS-232 1 × RS-485	3x DO 3x DI 8x AI 1x Relay	2G (GSM/GPRS): 850/900/1800/1900 3G(WCDMA): 850/900/1900/2100	128 x 64	YES	YES	for 12V Lead-Acid Battery	Metal

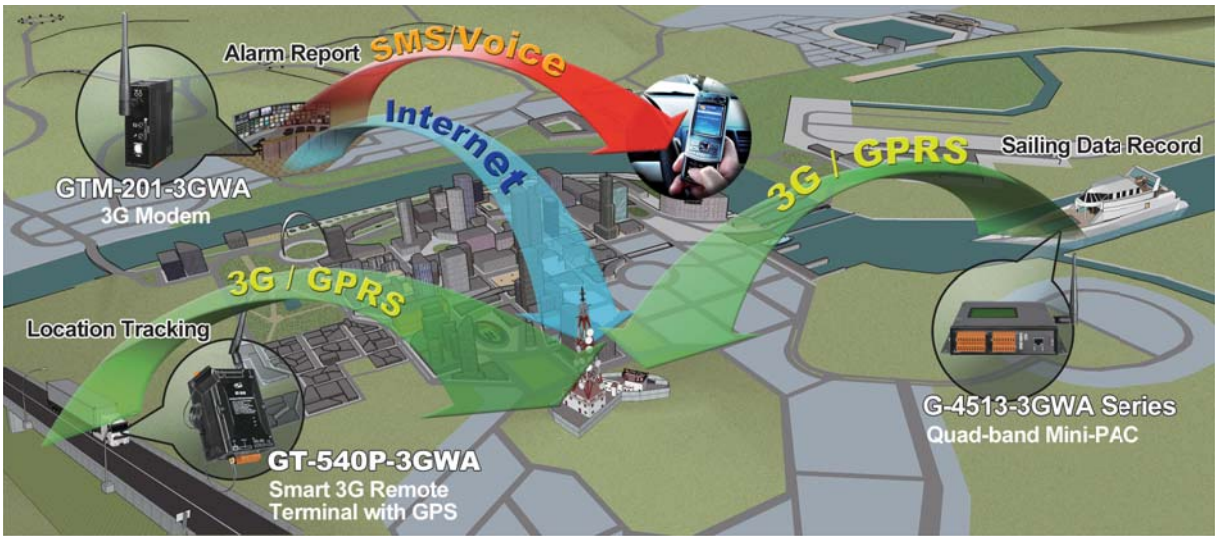
Software Solutions



ICP DAS provides various software solutions which allow users to manage 2G/3G products more efficiently with easy-to-use interface. The SMS Database System is a GT-53x series management tool which allows the 3rd party software being easily integrated with the modules. The M2M RTU Center is a M2M (Machine to Machine) management software that has a strong core technology for handling data and lets the user save the trouble of dealing with large IO data. The M2M RTU Center can also work with NAPOPC.M2M DA Server, so user can easily access or monitor IO data by using OPC 2.0 Data Access Standards. ICP DAS also provides M2M RTU API Tool for those users who want to develop their own application.

Software Name	Description	Charge
SMS DBS	SMS Monitor/Database System software solution6 for GT-53x series	Free with 3 phone numbers
M2M RTU Center	M2M RTU series management software	Free with 256 device
M2M RTU API Tool	M2M RTU Win32 API library	Free
NAPOPC.M2M DA Server	OPC server for RTU devices	Free

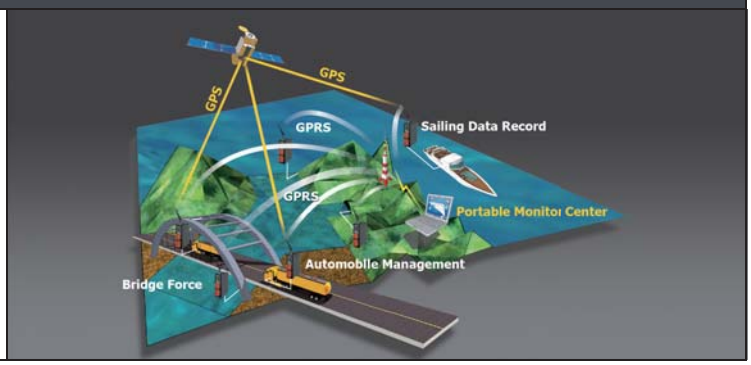
2G/3G Wireless Applications



The absorption of ICP DAS Co., Ltd. is to develop cost effective solutions to the industries. In recent years, the significance of communication is expanding exponentially. It is not only people who communicate via internet or telecommunication technologies, but also machines. The technology which allows you to connect your physical resources online is also called M2M Technology. From home application to large scale industrial machines, there are trillion of machines waited to be connected online. The advancement in 2G and 3G technologies has enabled wireless integration with wired-machines more affordable & effective than ever. The live applications are showed below.

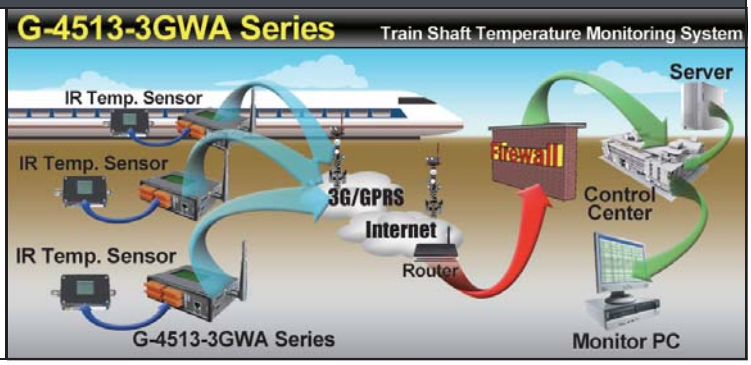
G-4513-3GWA Series General Application

By using G-4513-3GWA series, user can easily acquire data from any site without wiring limitation. G-4513-3GWA can also combine with a GPS module which allows user to monitor the location of moving transportations. To place the G-4513-3GWA on a vehicle or ship, users not only monitor its position but also record the fuel consumption.



Temperature Monitoring system

Placed infrared temperature sensors around shafts, and these sensors are connected to G-4513-3GWA series (M2M Mini-Programmable Automation Control). G-4513-3GWA controller will transmit data via 3G/GPRS service to Internet back to control center in real-time.

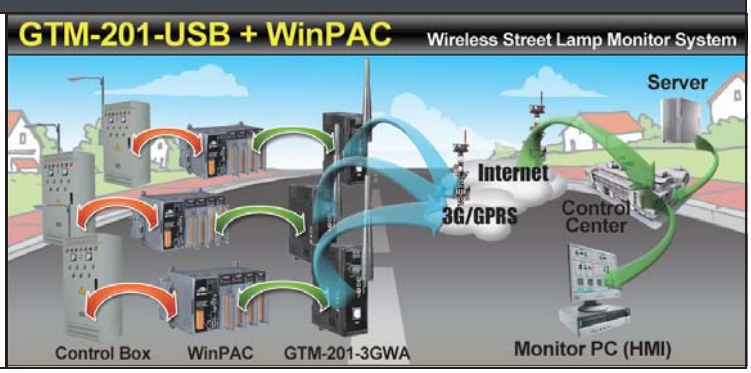


Vending/Gaming Machine Monitoring System

Each machine has a SMS-530 or SMS-534 (Intelligent SMS/Voice Alarm Controller) inside itself. Once the specific circumstances occurred (for example, vending machine ran out of drink), SMS-530/SMS-534 will automatically send either SMS or voice message to users in program list.

Street Lamp Monitor System

In each control box of street lamp, we placed a WinPAC (Windows CE embedded Programmable Automation Controller) and I/O Modules to acquire data from control box. All data will be transmitted back to control center in real-time by using GTM-201-3GWA (Industrial 3G Modem).



7-5 ZigBee Products

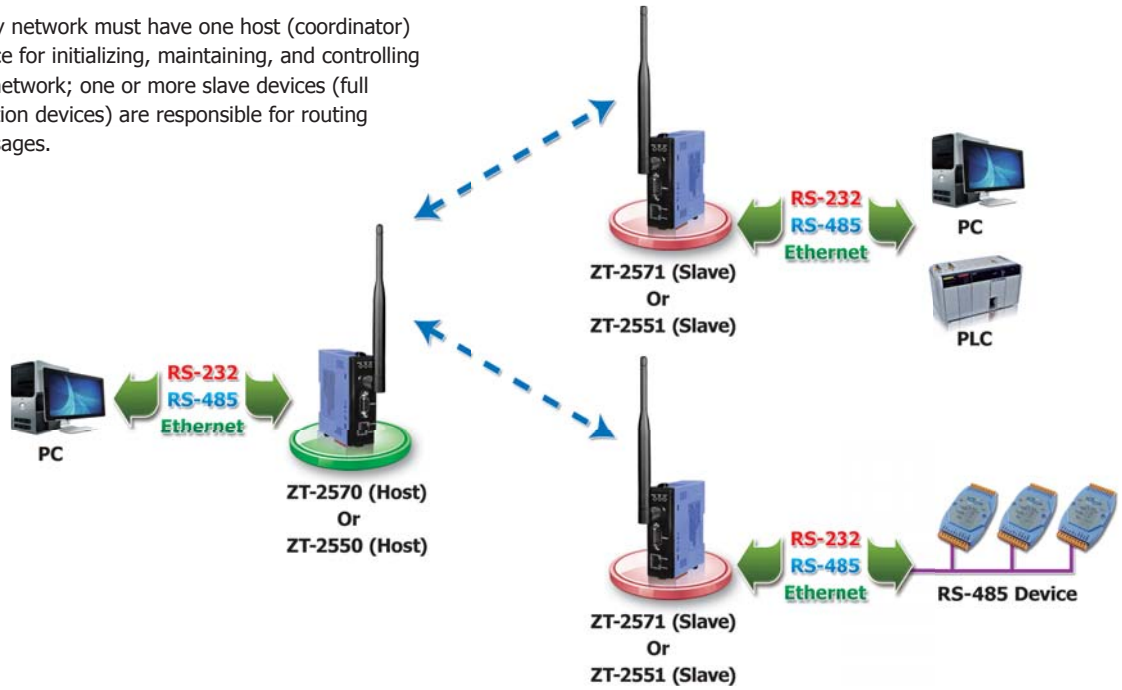
ZigBee is a specification based on the IEEE 802.15.4 standard for wireless sensor network (WSN) and is typically used in low data rate and low power consumption applications that require secure and reliability networking.
ZigBee operates in the ISM radio bands and its focus is to define a general purpose, inexpensive, self-organizing, mesh network that can be used for industrial control, embedded sensing, medical data collection, smoke and intruder warning, building automation, and home automation, etc.

Advantages & Benefits

- ISM 2.4 GHz operating frequency and fully compliant 2.4 G IEEE 802.15.4 and ZigBee PRO (2007) specifications
- Support the 128-bit AES (Advanced Encryption Standard) encryption.
- Wireless transmission range up to 700m (Line of sight)
- Provide friendly GUI configuration software (Windows Version)
- Support three different types of ZigBee devices
  - Coordinator (Host device)
  - Router/Repeater (Slave/Full function device)
  - End I/O module (Slave/Reduced function device)
- Support three topologies (MESH, STAR, CLUSTER TREE) defined in the IEEE 802.15.4
- Wide operation temperature (-25°C ~ 75°C)

ZigBee Converter

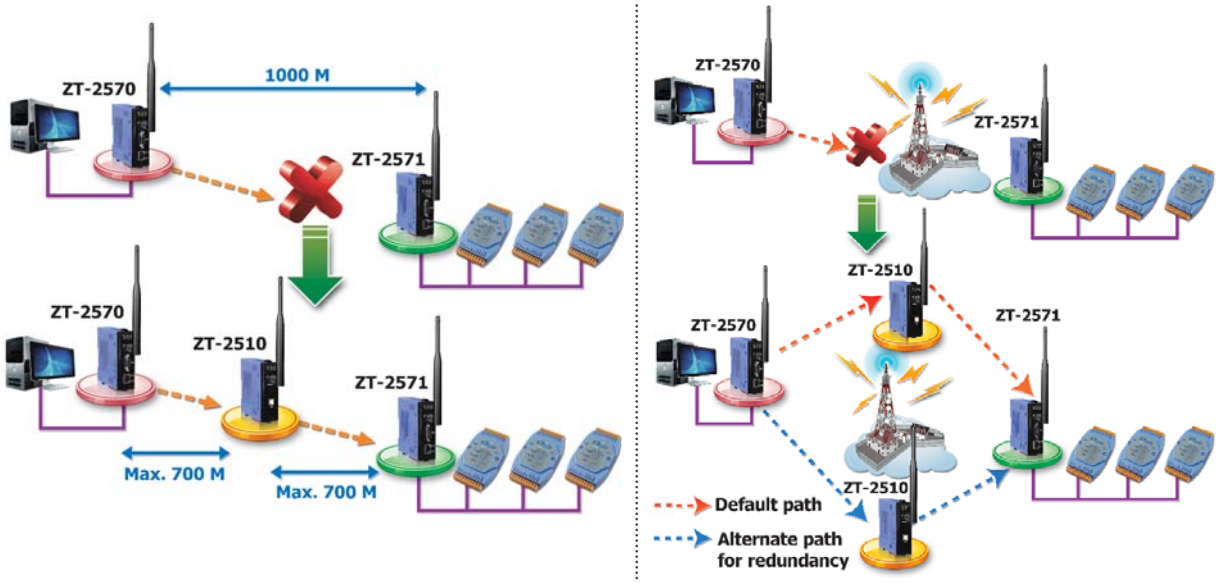
Every network must have one host (coordinator) device for initializing, maintaining, and controlling the network; one or more slave devices (full function devices) are responsible for routing messages.



Model	Interface	Module Type	Transmit Power	Antenna	Distance (LOS)
ZT-2550	1 × RS-232 1 × RS-485	Host (Coordinator)	11 dBm	2.4 GHz, 5 dBi Omni-Directional antenna	700 m
ZT-2551	1 × RS-232 1 × RS-485	Slave (Full Function Device)	11 dBm	2.4 GHz - 5 dBi Omni-Directional antenna	700 m
ZT-2570	1 × RS-232 1 × RS-485 1 × Ethernet	Host (Coordinator)	11 dBm	2.4 GHz - 5 dBi Omni-Directional antenna	700 m
ZT-2571	1 × RS-232 1 × RS-485 1 × Ethernet	Slave (Full Function Device)	11 dBm	2.4 GHz - 5 dBi Omni-Directional antenna	700 m
ZT-USBC	1 × USB	Host (Coordinator) / Slave (Full Function Device)	3 dBm	2.4 GHz, PCB antenna	60 m

ZigBee Repeater

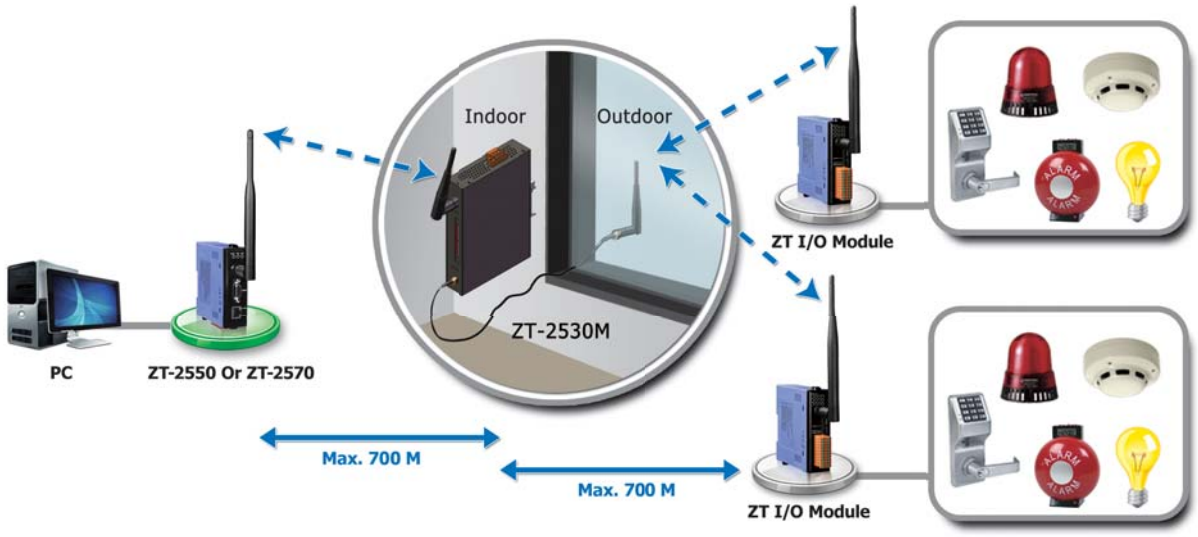
The ZT-2510 is a ZigBee repeater to extend the distance of ZigBee network or avoid an obstacle that may be located between two wireless devices.



Models	Interface	Module Type	Transmit Power	Antenna	Distance (LOS)
ZT-2510	ZigBee	Repeater (Full Function Device)	11 dBm	2.4 GHz, 5 dBi Omni-Directional antenna	700 m

ZigBee Bridge

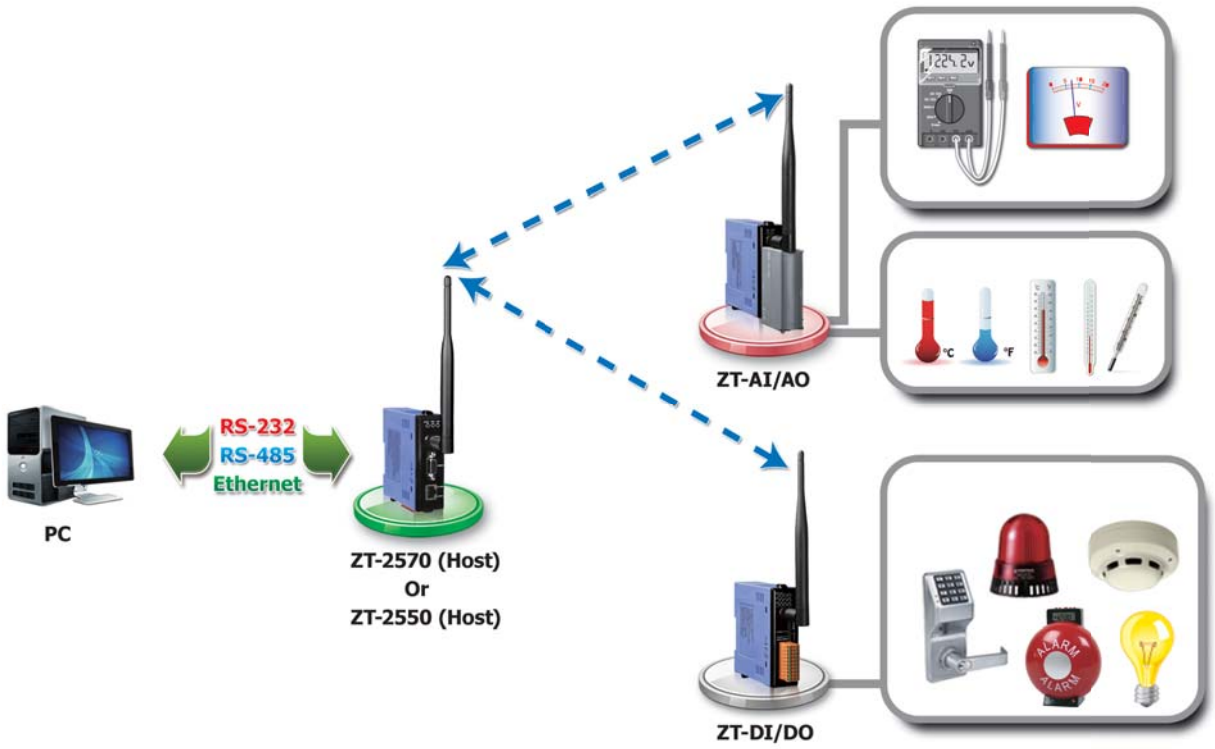
The ZT-2530M is a ZigBee bridge operating as a bridge between two ZigBee networks. It is full hardware configuration, used to communicate indoor and outdoor units or divide complex network to enhance efficiency.



Models	Interface	Module Type	Transmit Power	Antenna	Distance (LOS)
ZT-2530M	ZigBee	Host (Coordinator)/ Slave (Full Function Device)	11 dBm	2.4 GHz, 5 dBi Omni-Directional antenna	700 m

● ZigBee I/O Module

The ZT-2000 AI/AO/DI/DO modules support both Modbus RTU and DCON protocols.



Models	AI		AO	
	Channels	Type	Channels	Type
ZT-2015	6	2/3 Wire RTD	-	-
ZT-2017	8	Voltage, Current (requires 125 Ω resistor)	-	-
ZT-2017C	8	Current (Built-in 125 Ω Resistor)	-	-
ZT-2018	8	Voltage, Current (requires 125 Ω resistor), Thermo-couple	-	-
ZT-2024	-	-	4	Voltage, Current
ZT-2026 (*)	4	Voltage, Current (requires 125 Ω resistor)	2	Voltage Only
(*): ZT-2026 also includes 2 DI (Wet, Sink) and 2 DO (Open Collector, Sink, 700 mA/channel)				

Models	DI		DO		
	Channels	Type	Channels	Type	Max. Load
ZT-2042	-	-	8	4 × PhotoMOS Relay, 4 × Open Collector	60 V/1 A for PhotoMOS Relay 700 mA for Open Collector
ZT-2043	-	-	14	14 × Open Collector	700 mA
ZT-2052	8	Wet (Sink, Source)	-	-	-
ZT-2053	14	Dry, Wet (Sink, Source)	-	-	-
ZT-2055	8	Dry, Wet (Sink, Source)	8	Open Collector	650 mA
ZT-2060	6	Wet (Sink, Source)	4	Power Relay	5A (250 VAC/30 VDC)

ZigBee I/O Pair-connection Modules

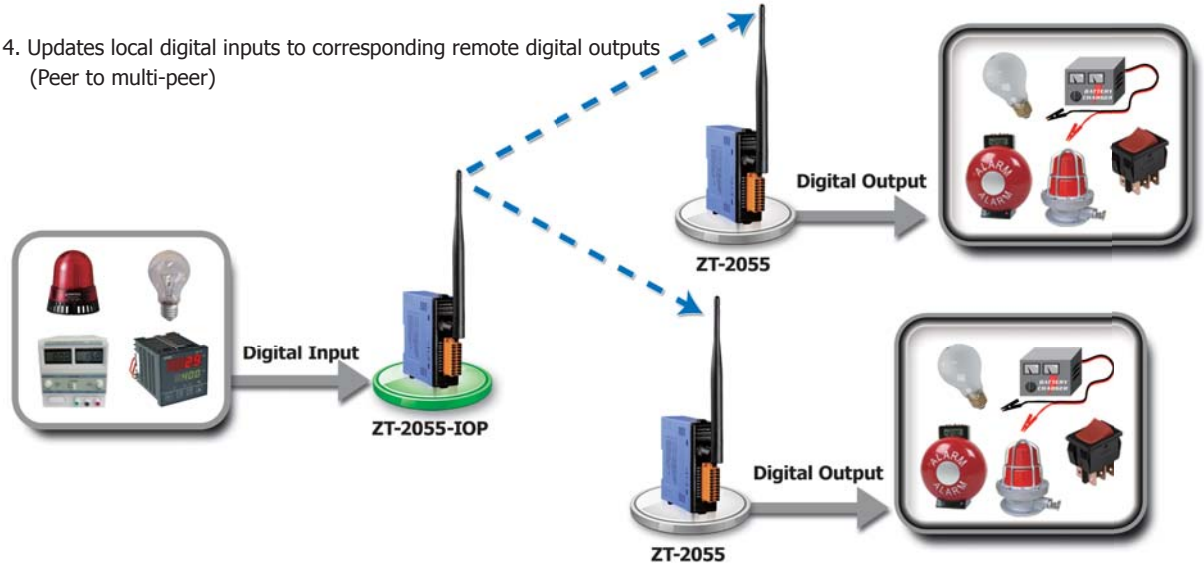
The modules which are named with the same number in ZT-20xx series and ZT-20xx-IOP series have the same I/O specifications. In addition, the ZT-20xx-IOP features the following functions to meet the requirements of variety ZigBee applications.

1. Pair-connecting digital signals with needless of a PC/Controller or other ZigBee coordinator

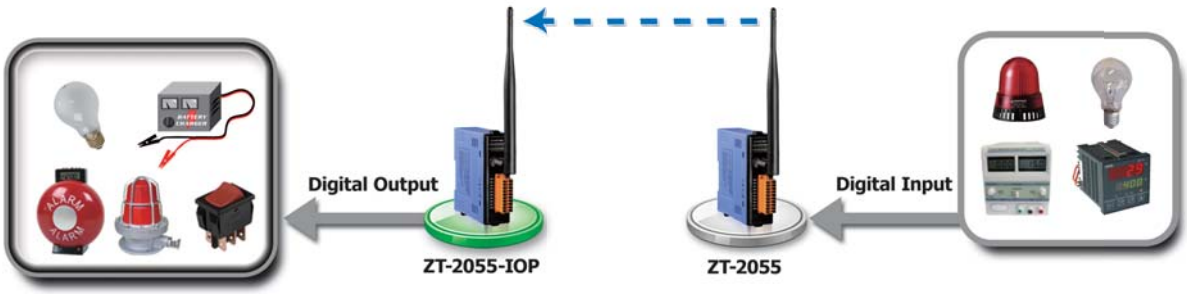
2. Full hardware configuration in case creating pair-connection of a ZT-20xx-IOP module and ZT-20xx modules which all have the same number in their module name.

3. Software configuration in case creating pair-connection of a ZT-20xx-IOP module and ZT-20xx modules which are named with different number.

4. Updates local digital inputs to corresponding remote digital outputs (Peer to multi-peer)



5. Polling remote digital inputs and then updates to corresponding local digital output (Peer to peer)



Models	Description
ZT-2052-IOP	ZigBee I/O pair-connection module with 8 DI
ZT-2053-IOP	ZigBee I/O pair-connection module with 14 DI
ZT-2055-IOP	ZigBee I/O pair-connection module with 8 DI, 8 DO
ZT-2060-IOP	ZigBee I/O pair-connection module with 6 DI, 4 Relay

7-6 GPS Products

GPS (Global Positioning System) is widely used for driving navigation, geographic monitoring, fleet management and cargo tracking, etc. We also can use GPS for industrial application according to its longitude and latitude value and UTC time. ICP DAS provides various modules for different applications. Some are pure GPS data receivers and some add DO channels. Some even can generate a UTC synchronized 1 PPS (Pulse Per Second) output signal. You can refer the following selection guide in chapter 5 to choose the suitable GPS modules for your application.

Advantages & Benefits

- Support up to 32-channel GPS and NMEM v0183 v3.01
- Apply for Automotive, Marine or Personal positioning and navigation
- Current time from Satellite
- Easy installation

GPS Selection Guide

Models	GPS Channels	SBAS	GPS Output Interface	GSM/GPRS	Digital Output	Protocol/ Interface	Description
GTM-201P-3GWA	32	WAAS, EGNOS, MSAS	USB/RS-232	Yes	–	–	GPS Receiver
GT-321R-USB	12	WAAS, EGNOS	RS-232	–	–	–	GPS Receiver
GT-321R-RS232	12	WAAS, EGNOS	USB	–	–	–	GPS Receiver
I-87211W	32	WAAS, EGNOS, MSAS	RS-232	–	2	DCON/*Note1	GPS Receiver and 2 DO Module
I-8213W	32	WAAS, EGNOS, MSAS	*Note2	Yes (TCP/IP protocol) *Note3	–	–	GPS Receiver and GPRS Controller Module
GPS-721	32	WAAS, EGNOS, MSAS	RS-232	–	1	DCON/RS-485	GPS Receiver and 1 DO Module

[*Note1] The support list of MCU (Main Control Unit) and I/O expansion unit are: XPAC, WinPAC, LinPAC, iPAC, ViewPAC, U-87P1/2/4/8, USB-87P1/2/4/8, I-8000, TI-8KE4/8, I-8KE4/8-MTCP, I-87K4/5/8/9

[*Note2] Gets GPS Information from Parallel bus (API). The support list of MCU: XPAC, WinPAC, LinPAC, iPAC, ViewPAC, etc.

[*Note3] Gets GSM/GPRS Information from Parallel bus (API). This GPRS/GSM module is integrated with the TCP/IP protocol, Extended TCP/IP AT commands. The support list of MCU : XPAC, WinPAC, LinPAC, iPAC, ViewPAC, etc.

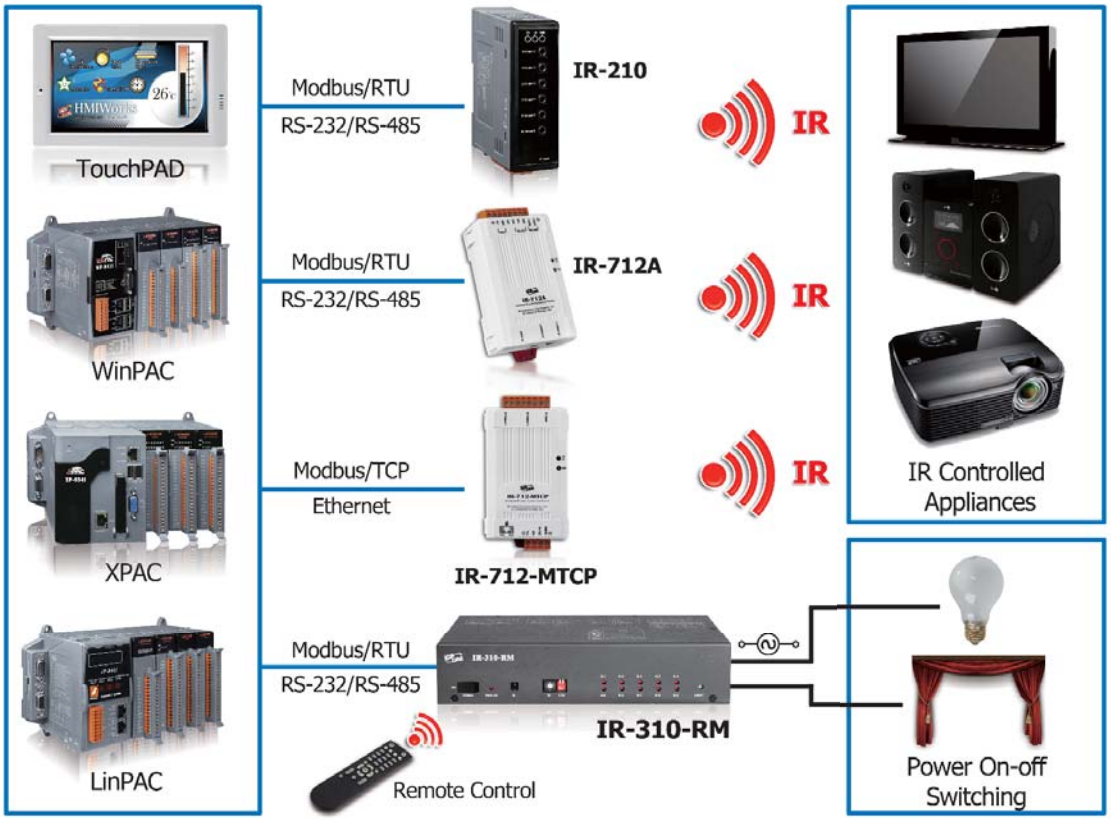
7-7 Infrared Products

Infrared technology is commonly used for remote control on home appliances such as television, air conditioner and so on. ICP DAS has developed various IR products for home automation. They will help users to control the IR appliances and combine them into the e-Home applications. By integrating the PAC and others series of ICP DAS, users can easily establish the home automation systems.

IR-210

Advantages & Benefits

- Multiple IR outputs
- Support Modbus protocol
- Easy to integrate with home/building automation systems



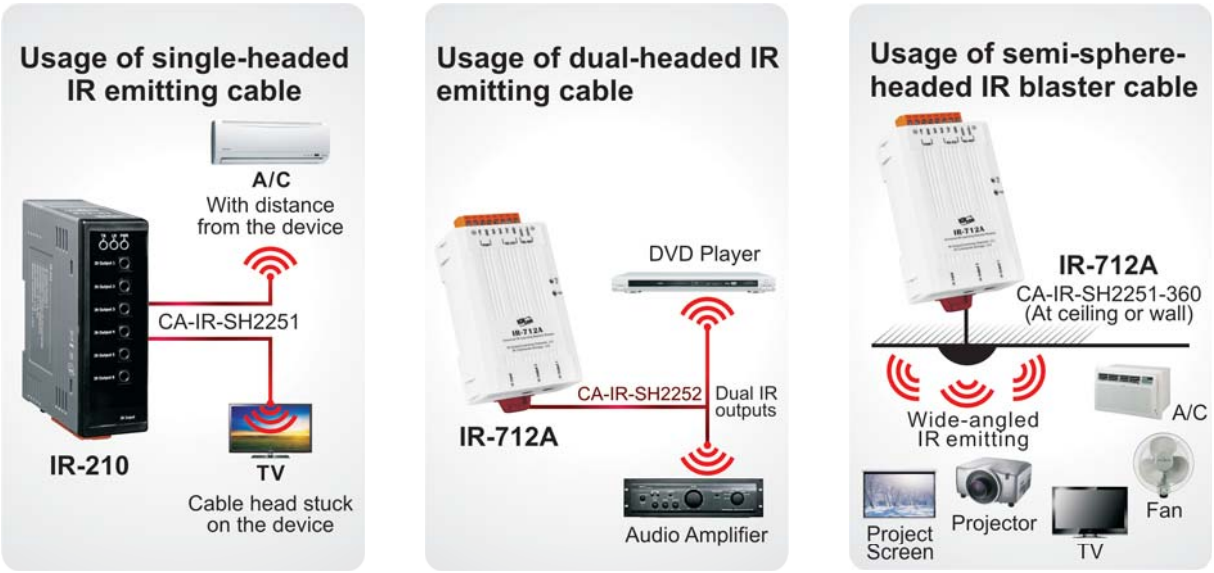
Infrared Selection Guide

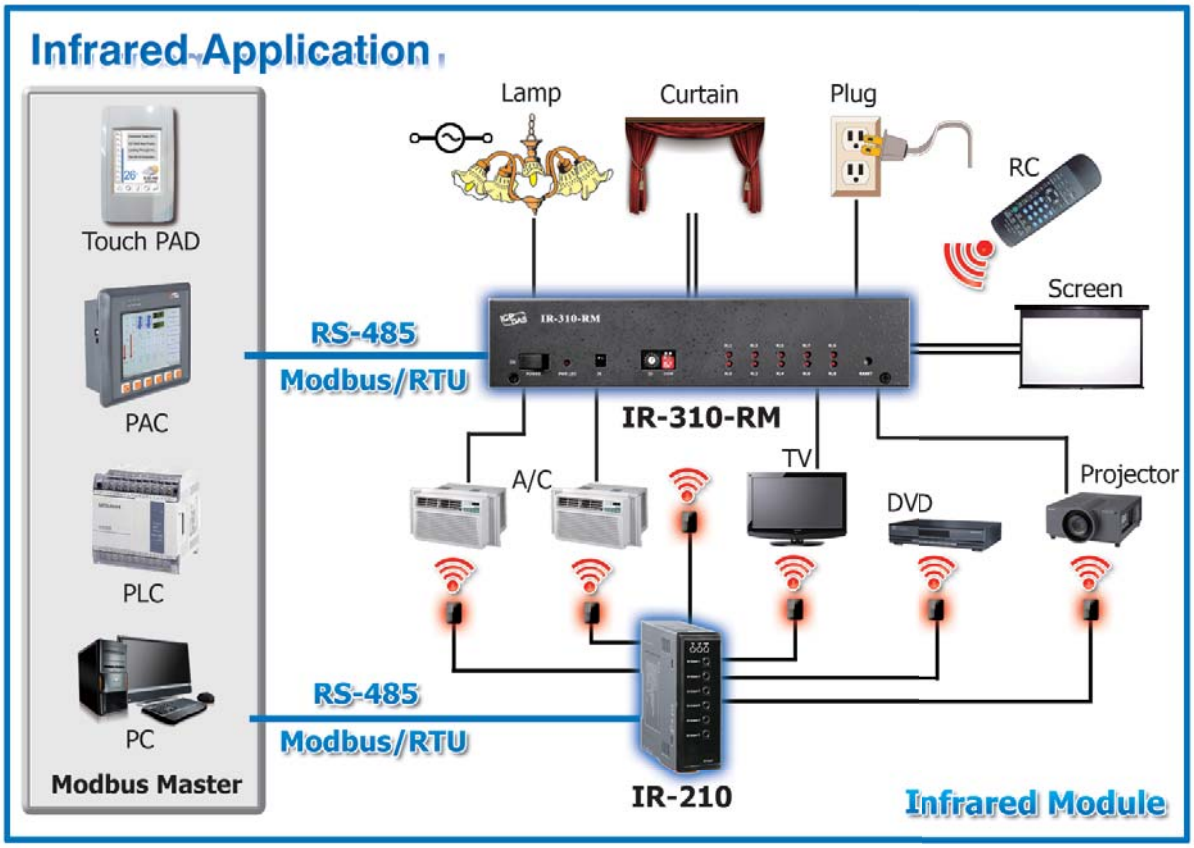
IR Learning Remote Modules

Models	IR Outputs	IR Commands	Communication Interface	Protocol
IR-210	IR Output Channels x 6	224	RS-232 x 1, RS-485 x 1	Modbus/RTU
IR-712A	IR Output Channels x 2	224	RS-232 x 1, RS-485 x 1	Modbus/RTU
IR-712-MTCP	IR Output Channels x 2	512	Ethernet x 1	Modbus/TCP

IR Controlled Relay Modules

Modes	Relay Output	Contact Rating	IR receiver	IR Output (for IR learning RC)	Communication Interface	Protocol
IR-310-RM	10	5 A @220 VAC x 6, 10 A @220 VAC x 4 (At 25 °C)	1	1	RS-232 x 1, RS-485 x 1	Modbus/RTU





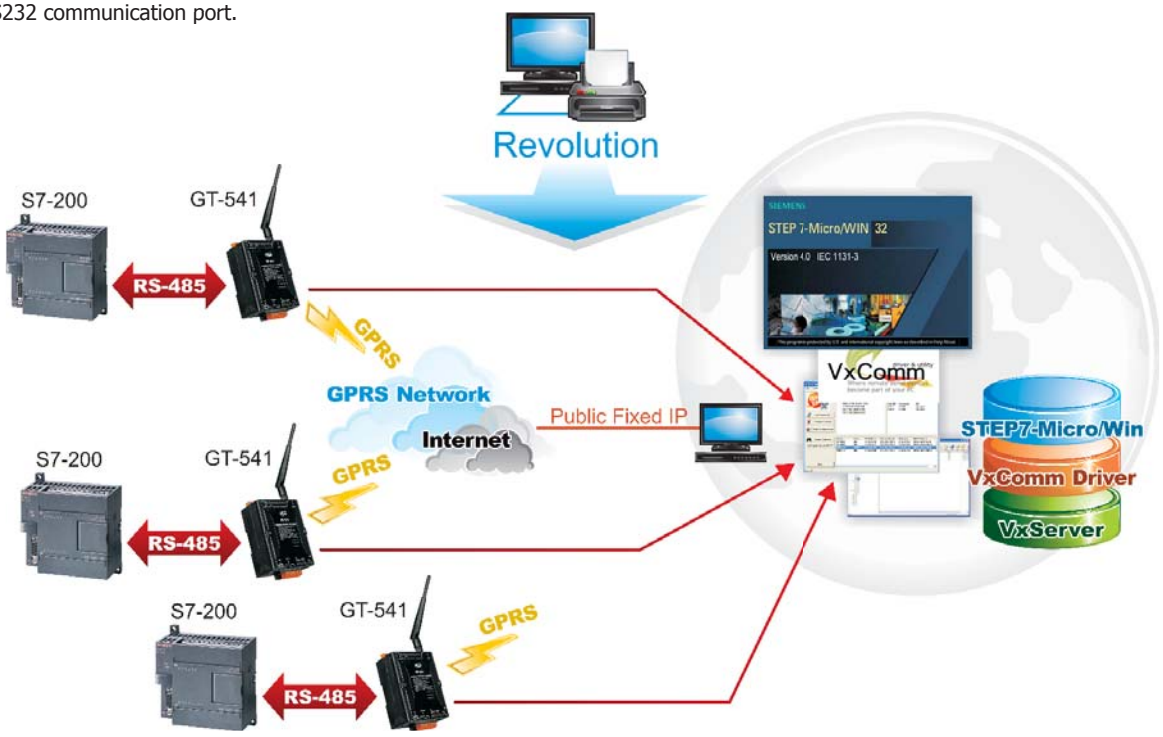
Accessories

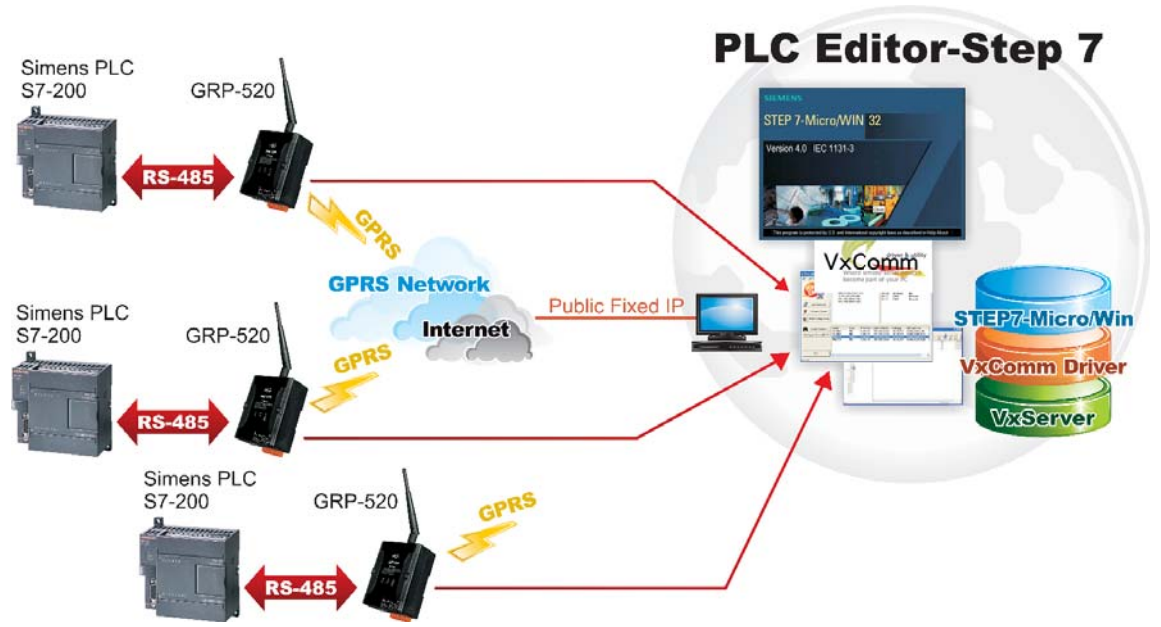
Part Name	Description
CA-IR-SH2251	Single-headed IR emitter cable (with adhesive pad, Ø 3 mm IRED, 2.5 m)
CA-IR-SH2252	Dual-headed IR emitter cable (with adhesive pad, Ø 3 mm IRED, 2.5 m)
CA-IR-SH2251-5	Single-headed IR emitter cable (with adhesive pad, Ø 5 mm IRED, 2.5 m)
CA-IR-SH2252-5	Dual-headed IR emitter cable (with adhesive pad, Ø 5 mm IRED, 2.5 m)
CA-IR-SH2251-360	Semi-sphere-headed IR blaster cable (with adhesive pad, 2.5 m)
CA-IR-SH1251-360	Semi-sphere-headed IR receiver cable (with adhesive pad, 2.5 m)
CA-IR-001	IR receiver cable (with adhesive pad, 3 m)

7-8 Wireless Applications

● PAC/PLC Remote Maintenance by 2G/3G Wireless Communication

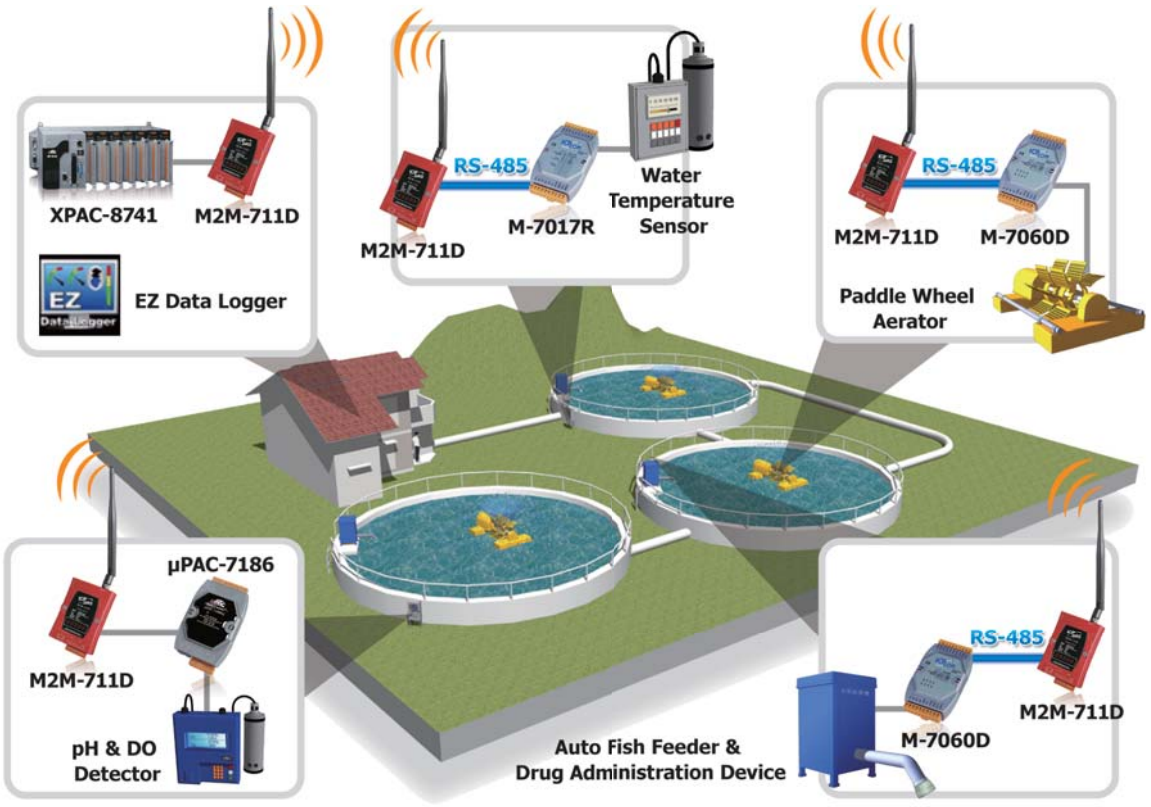
These 2G/3G products are specially designed by ICP DAS for the PLC/PAC remote maintenance and upgrading the serial to network application solution. It is suitable for the harsh industrial field. This solution can transfer the site condition of equipment accurately. The maintenance engineer can directly check and diagnose the device/PLC like on-site. This can reduce the huge maintenance cost to increase the competition of enterprises. These PLC can be Siemens, Mitsubishi or Omron with RS485/ RS232 communication port.





Models	CPU	Interface	Frequency	I/O	Transparent Communication
GT-541	32-bit	1 RS-232 1 RS-485 or RS-232	GSM 850/900/1800/1900 MHz	–	GPRS
GRP-520	32-bit	1 RS-232 1 RS-485	WCDMA 2100/1900/850 MHz GSM 850/900/1800/1900 MHz	–	WCDMA/HSPA

Serial to Wireless Solution



Setting up a fixed-line network on site is relatively complicated, makes the agricultural production technology underdeveloped, and left behind the state of the art in factories of manufactured products. The application shown above is a project aiming to improve the production process in fish farms using new perception, control and automation technologies. Simply converting serial signal to wireless allows fisher to monitor or control fish farm easily.

It is easy to convert serial RS-232/485 to a wireless product by wireless modems or with converters instead of running a wire. All of the following products allow you to convert a serial port to a wireless serial connection.

Models	Interface	Wireless
Serial to WLAN		
M2M-711D	RS-232 RS-485	Wi-Fi (802.11b/g)
Serial to DSSS RF		
SST-900B	RS-232 RS-485	DSSS RF (900 MHz)
SST-2450	RS-232 RS-485	DSSS RF (2.4 GHz)
Serial to ZigBee		
ZT-2550	RS-232 RS-485	ZigBee Host (2.4 GHz)
ZT-2551	RS-232 RS-485	ZigBee Slave (2.4 GHz)

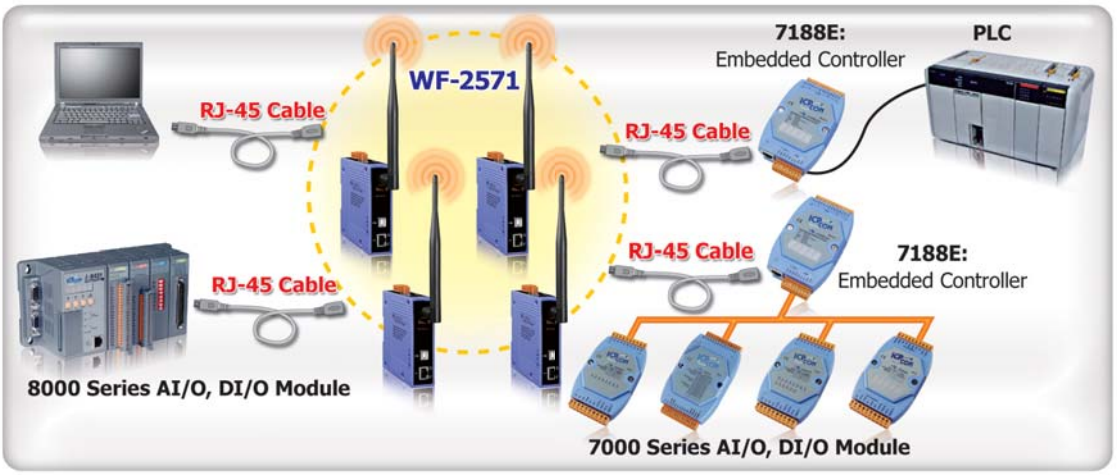
CAN bus Wireless Solution

Controller Area Network (CAN) is a message-based protocol, designed specifically for automotive applications but now also used in other areas such as industrial automation and medical equipment. ICP DAS provides CAN to Wi-Fi product to support the wireless transmission of CAN data between various CAN networks or a CAN network and a WLAN network according to the 802.11b/g standard.

Models	Interface	Wireless
CAN to WLAN		
I-7540D-WF	CAN/RS-232	Wi-Fi (802.11b/g)

Ethernet to Wireless Solution

Ethernet is a family of computer networking technologies for local area networks (LANs) commercially introduced in 1980 and has become the public wired network in commerce or industry field. It has great benefits and extends the Ethernet application if wireless technology can be applied in Ethernet application. According to this issue, we develop Ethernet/Wi-Fi and Ethernet/ZigBee for users to apply in their Ethernet application.



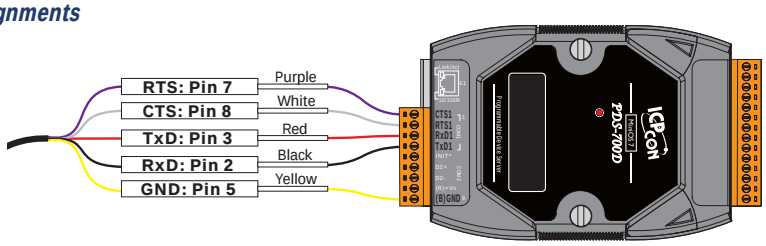
Models	Interface	Wireless
Ethernet to WLAN		
WF-2571	Ethernet	Wi-Fi (802.11b/g)
Ethernet to ZigBee		
ZT-2570	Ethernet	ZigBee Host (2.4 GHz)
ZT-2571	Ethernet	ZigBee Slave (2.4 GHz)

Accessories

8.1. Cables

CA-0903

Pin Assignments

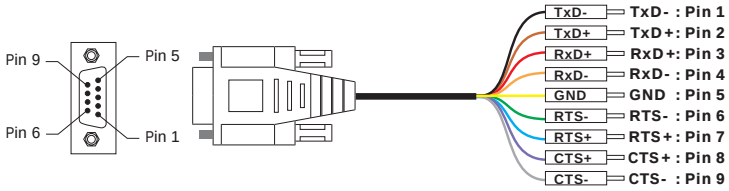


Ordering Information

CA-0903	9-Pin Female D-Sub and RS-232 Connector Cable, 30 cm

CA-090910

Pin Assignments

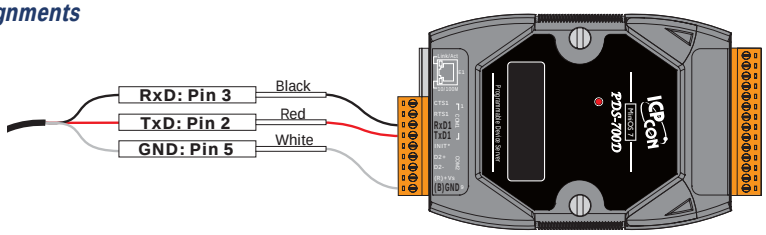


Ordering Information

CA-090910	9-Pin Female D-Sub Cable for RS-422 Connector, 1 m

CA-0910

Pin Assignments



Ordering Information

CA-0910	9-Pin Female D-Sub and 3-wire RS-232 Cable, 1 m

CA-0910F
CA-0915

Pin Assignments

CA-0910F

CA-0915

Ordering Information

CA-0910F	9-Pin Female-Female D-Sub Cable, 1 m
CA-0915	9-Pin Male-Female D-Sub Cable, 1.5 m

CA-9-2505D

Ordering Information

CA-9-2505D	Male DB-25 to 6 Male DB-9 Cable, 0.5 m

CA-9-3705
CA-9-3715D

Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
N.C.	01	
DCD3	02	20 RI3
GND	03	21 DTR3
CTS3	04	22 DSR3
RxD3	05	23 RTS3
RI4	06	24 TxD3
DTR4	07	25 DCD4
DSR4	08	26 GND
RTS4	09	27 CTS4
TxD4	10	28 RxD4
DCD2	11	29 RI2
GND	12	30 DTR2
CTS2	13	31 DSR2
RxD2	14	32 RTS2
RI1	15	33 TxD2
DTR1	16	34 DCD1
DSR1	17	35 GND
RTS1	18	36 CTS1
TxD1	19	37 RxD1

RS-232 Female DB-37 Connector

Pin Assignment	Terminal No.	Pin Assignment
GND	05	09 RI
DTR	04	08 CTS
TxD	03	07 RTS
RxD	02	06 DSR
DCD	01	

RS-232 Female DB-37 to Male DB-9 Connector

CA-9-3705

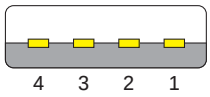
CA-9-3715D

Ordering Information

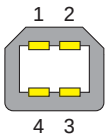
CA-9-3705	Male DB-37 to 4 Male DB-9 Cable (90°), 0.3 m
CA-9-3715D	Male DB-37 to 4 Male DB-9 Cable (180°), 1.5 m

CA-USB18

Pin Assignments



Type A



Type B

Pin	Name	Description
1	VCC	+5V
2	D-	Data-
3	D+	Data+
4	GND	Ground

Ordering Information

CA-USB18	USB Type A to Type B Cable, 1.8 m

CA-9-6210

Ordering Information

CA-9-6210	Male DB-62 to 8-port Male DB-9 Cable, 1.0 M

8.2. Power Supplies

GPSU06U-6 / GPSU06E-6

Specifications

Input	
Range	100 ~ 240 VAC or 127 ~ 370 VDC
Frequency	50 Hz ~ 60 Hz
Output	
Power	24 VDC/0.25 A max., 6 W
Mechanical	
Dimensions (W x H x D)	32 mm x 66 mm x 68 mm
Installation	No-mounting
Environmental	
Operating Temperature	0 °C ~ +40 °C
Storage Temperature	-20 °C ~ +85 °C

Ordering Information

GPSU06U-6	24 VDC/0.25 A, 6W Power Supply
GPSU06E-6	24 VDC/0.25 A, 6W Power Supply with 2 pole EURO plug

GPSU06U-6

GPSU06E-6

MDR-20-24 / MDR-60-24 / MDR-60-48

Specifications

Models	MDR-20-24	MDR-60-24	MDR-60-48
Input			
Range	100 ~ 250 AC		
Frequency	50 Hz ~ 60 Hz		
Output			
Power	24 VDC/1 A max., 24 W	24 VDC/2.5 A max., 60 W	48 VDC/1.25 A max., 60 W
Mechanical			
Dimensions (W x H x D)	22.5 x 90 x 100	40 x 90 x 100	40 x 90 x 100
Installation	DIN-Rail Mounting		
Environmental			
Operating Temperature	-20 °C ~ +70 °C		
Storage Temperature	-20 °C ~ +85 °C		

Ordering Information

MDR-20-24	24 VDC/1 A, 24 W Power Supply with DIN-Rail Mounting
MDR-60-24	24 VDC/2.5 A, 60 W Power Supply with DIN-Rail Mounting
MDR-60-48	48 VDC/1.25 A, 60 W Power Supply with DIN-Rail Mounting

MDR-60-24/ MDR-60-48 MDR-20-24

KA-52F / DIN-KA52F KA52F-48 / DIN-KA52F-48

Specifications

Models	KA-52F	DIN-KA52F	KA-52F-48	DIN-KA52F-48
Input				
Range	100 ~ 250 AC			
Frequency	50 Hz ~ 60 Hz			
Output				
Power	24 VDC/1.04 A max., 25 W		48 VDC/0.52 A max., 25 W	
Mechanical				
Dimensions (W x H x D, Unit: mm)	54 x 93 x 36	68 x 107 x 50	54 x 93 x 36	68 x 107 x 50
Installation	No-mounting	DIN-Rail Mounting	No-mounting	DIN-Rail Mounting
Environmental				
Operating Temperature	0 °C ~ +50 °C			
Storage Temperature	-20 °C ~ +85 °C			

Ordering Information

KA-52F	24 VDC/1.04 A, 25 W Power Supply
DIN-KA52F	24 VDC/1.04 A, 25 W Power Supply with DIN-Rail Mounting
KA-52F-48	48 VDC/0.52 A, 25 W Power Supply
DIN-KA52F-48	48 VDC/0.52 A, 25 W Power Supply with DIN-Rail Mounting

KA-52F/KA-52F-48

DIN-KA52F/ DIN-KA52F-48

▶▶▶▶ DR-120-24
DR-120-48

Specifications

Models	DR-120-24	DR-120-48
Input		
Range	88 ~ 264 AC	
Frequency	47 Hz ~ 63 Hz	
Output		
Power	24 VDC/5.0 A max., 120 W	48 VDC/2.5 A max., 120 W
Mechanical		
Dimensions (W x H x D)	65 mm x 125 mm x 100 mm	
Installation	DIN-Rail Mounting	
Environmental		
Operating Temperature	-10 °C ~ +60 °C	
Storage Temperature	-20 °C ~ +85 °C	-25 °C ~ +85 °C

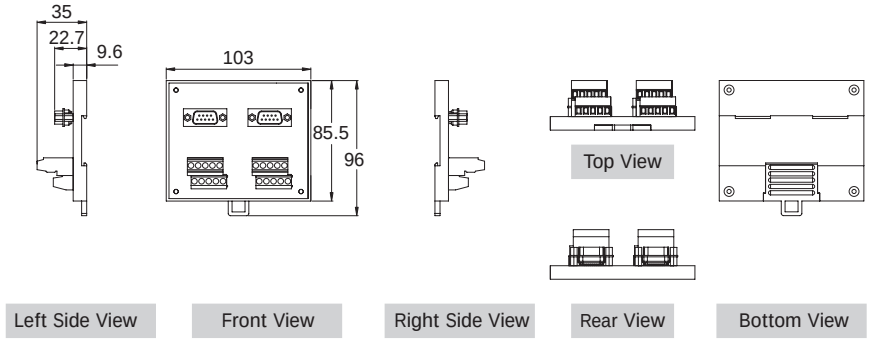
Ordering Information

DR-120-24	24 VDC/5.0 A, 120 W Power Supply with DIN-Rail Mounting
DR-120-48	48 VDC/2.5 A, 120W Power Supply with DIN-Rail Mounting

8.3. Terminal Boards & Connector

▶▶▶▶ DN-09-2
DN-09-2F

Dimensions (Units: mm)



Ordering Information

DN-09-2	I/O Connector Block with DIN-Rail Mounting and Two 9-Pin Male Header Includes: CA-0915 x 2 (9-Pin Male-Female D-Sub Cable 1.5 M)
DN-09-2F	I/O Connector Block with DIN-Rail Mounting and Two 9-Pin Male Header Includes: CA-0910F x 2 (9-Pin Female-Female D-Sub Cable 1.0 M)

▶▶▶▶ CA-4002

Ordering Information

CA-4002	37-Pin Male D-Sub Connector with Plastic Cover

▶▶▶▶ CA-PC09F

Ordering Information

CA-PC09F	Female D-Sub Connector with Plastic Cover

8.4. USB Hub

USB-2560

Features

- Compliant with USB Specification Revision 2.0
- Provides 4 Downstream Ports
- Only Supports Self-powered Mode +10 ~ + 30 VDC Power Input (power adapter included for USB-2560/S)
- DIN-Rail Mounting
- Built-in NEC uPD720114 USB 2.0 Hub Controller
- Supports High-speed (480 Mbps) and Full-speed (12 Mbps)
- Supports Downstream Port Status with LED

Introduction

The USB-2560 allows you to add multiple high performance USB 2.0 peripheral devices to your computer (Or XP-8000 series). It supports the USB 2.0 high-speed mode that can achieve 480 Mbps data transmitting rate.

The USB-2560 only supports self-powered mode (drawing power from an external power supply). Externally powered USB hubs are the only way to guarantee the broadest compatibility for USB devices.

Specifications

Interface	
Ports	Upstream x 1 (Type B), Downstream x 4 (Type A)
Compatibility	Universal serial bus; Specification Rev. 2.0/1.1/1.0
Transfer Speed	480 Mbit/s-high speed mode, 12 Mbit/s- full speed mode, 1.5 Mbit/s-low speed mode
Supply Current	500 mA max. per port
Include Cable	CA-USB18 (1.8 m Cable) x 1
Power Supply Included (USB-2560/S Only)	GPSU06U-6 x 1 for 250 mA per port
LED Indicators	
Power	1 LED
Downstream Ports	4 LEDs
Power	
Input Voltage Range	+10 ~ + 30 VDC
Power Consumption	0.25 A @ 24 VDC for 250 mA per port, 0.5 A @ 24 VDC for 500 mA per port
Power Input Connection	Removable 3-Pin Terminal Block
Mechanical	
Casing	Plastic
Flammability	UL 94V-0 materials
Dimensions (W x L x H)	33 mm x 78 mm x 107 mm
Installation	DIN-Rail Mounting
Environment	
Operating Temperature	0 °C ~ +70 °C
Storage Temperature	-20 °C ~ +80 °C
Humidity	10 ~ 90% RH, non-condensing

Ordering Information

USB-2560 CR	4-port Industrial USB 2.0 Hub (RoHS)
USB-2560/S CR	4-port Industrial USB 2.0 Hub with GPSU06U-6 (Power Supply) (RoHS)

Accessories

DIN-KA52F	24 VDC/1.04 A, 25 W Power Supply with DIN-Rail Mounting
MDR-20-24	24 VDC/1 A, 24 W Power Supply with DIN-Rail Mounting
GPSU06E-6	24 VDC/0.25 A, 6W Power Supply with 2 pole EURO plug

ICP DAS Catalogs

ICP DAS Product Catalog

- 7188/7186, 5000, ViewPAC, Compact PAC
- Industrial Panel PC, Touch Monitor
- SmartView, TouchPAD, ViewPAD, IWS
- RS-485, Ethernet and WISE I/O Products
- CAN Bus, PROFIBUS and FRnet Products
- Multi-serial Card, Serial Device Server
- Managed and Unmanaged Ethernet Switch
- Radio Modem, 2G/3G, WLAN/ZigBee, GPS
- Ethernet, PC/PAC-based Motion Control
- Energy Management and Power Meter
- PCI Express, PCI and ISA DAQ Boards

PAC Products Catalog

- XP-8000-Atom Series
- XP-8000 Series
- WP-8000 Series
- LP-8000 Series
- iP-8000 Series
- ViewPAC Series
- MotionPAC Series
- I/O Expansion Units
- I/O Modules
- 7188/7186 Series
- 5000 Series

Smart Building/Home Automation - BA & HA Brochure

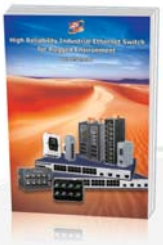
- HVAC (heating, ventilation, and air conditioning)
- Lighting Control, Security
- Power Monitoring, Fire Safety
- Electrical Devices, Central Monitoring
- TouchPAD Series - Touch HMI Solutions
- SC/LC Series - Smart Control Solutions
- DDC Series - Smart HVAC Solution
- Wi-Fi, ZigBee, IR Series - Wireless Solutions
- DL/PIR Series - Sensor Solutions

Remote I/O Modules and I/O Expansion Units Products Catalog

- RS-485 Products
- Ethernet Remote I/O Modules
- FRnet I/O Modules
- CAN Bus Products
- PROFIBUS Remote I/O Modules
- HART Products
- Smart Power Meters
- Temperature and Humidity Data Logger
- WISE I/O Modules

High Reliability Industrial Ethernet Switch Catalog

- Managed Ethernet Switches
- Unmanaged Ethernet Switches
- PoE Ethernet Switches
- Media Converters
- Real-time Redundant Ring Ethernet Switches
- IP67 Waterproof Switches
- Cyber-Ring Ethernet Self-healing Technology

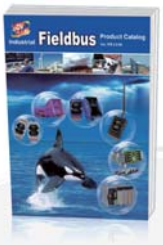


Industrial Data Acquisition for ISA and PCI Bus Short Form

- PCI Express Data Acquisition Boards
- PCI Data Acquisition Boards
- ISA Data Acquisition Boards
- Memory/Watchdog/Counter Boards
- Software Overview

Industrial Fieldbus Product Catalog

- RS-485
- Industrial Ethernet
- Profinet
- CAN Bus, CANopen, DeviceNet
- J1939
- PROFIBUS
- HART
- EtherCAT
- Ethernet/IP
- BACnet
- Wi-Fi



Energy Management Solutions - EM Brochure

- True RMS Input Module
- TouchPAD - VPD series
- Smart Power Meter
- Smart Power Meter Concentrator
- Power Data Management Software

A Web-based Intelligent PAC Controller - WISE Brochure

- Intelligent I/O Module
- Intelligent I/O Controller
- Intelligent Data Logger
- Intelligent Multifunction IoT Controller

Machine to Machine Solutions

- 2G/3G Solutions
- WLAN Solutions
- Remote Maintenance Solutions
- DSSS RF/GPS Solutions
- SMS Database System
- M2M RTU Center
- NAPOPC.M2M DA Server

ICP DAS CO., LTD.

Taiwan (Headquarters)
Website: http://www.icpdas.com
E-mail: sales@icpdas.com
TEL: +886-3-597-3366
FAX: +886-3-597-3733

China
Website: http://www.icpdas.com.cn
E-mail: sales_sh@icpdas.com.cn
TEL: +86-21-6247-1722
FAX: +86-21-6247-1725

Europe
Website: http://www.icpdas-europe.com
E-mail: info@icpdas-europe.com
TEL: +49(0)7121-14324-0
FAX: +49(0)7121-14324-90

USA
Website: http://www.icpdas-usa.com
E-mail: sales@icpdas-usa.com
TEL: +1-310-517-9888
FAX: +1-310-517-0998

Local Distributor