Industrial Wireless Communication Products
2011 Product Catalog

Vol. IWCP 1.0.00 (2011.MAY.20)

WLAN Products

DSSS RF Products

2G/3G Products

ZigBee Products

GPS Products

Infrared Products

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1.1. Industrial Wireless Communication Products

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.

• WLAN Products

Chapter 2

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.

• DSSS RF Products

Chapter 3

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.

• 2G/3G Products

Chapter 4

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 telecom 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.

• ZigBee Products

Chapter 5

ZigBee is a specification based on the IEEE 802.15.4 standard for wireless personal area networks (WPANs). 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.

• GPS Products

Chapter 6

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.

• Infrared Products

Chapter 7

IR data transmission is employed in short-range communication among computer peripherals and personal digital assistants. These devices usually conform to standards published by IrDA.

ICP DAS has developed various IR products to apply in home automation. Theses IR products will help users to control and integrate these IR devices into a control system. Therefore, by integrating the PAC and others series of ICP DAS, users can easily to establish the home automation system.

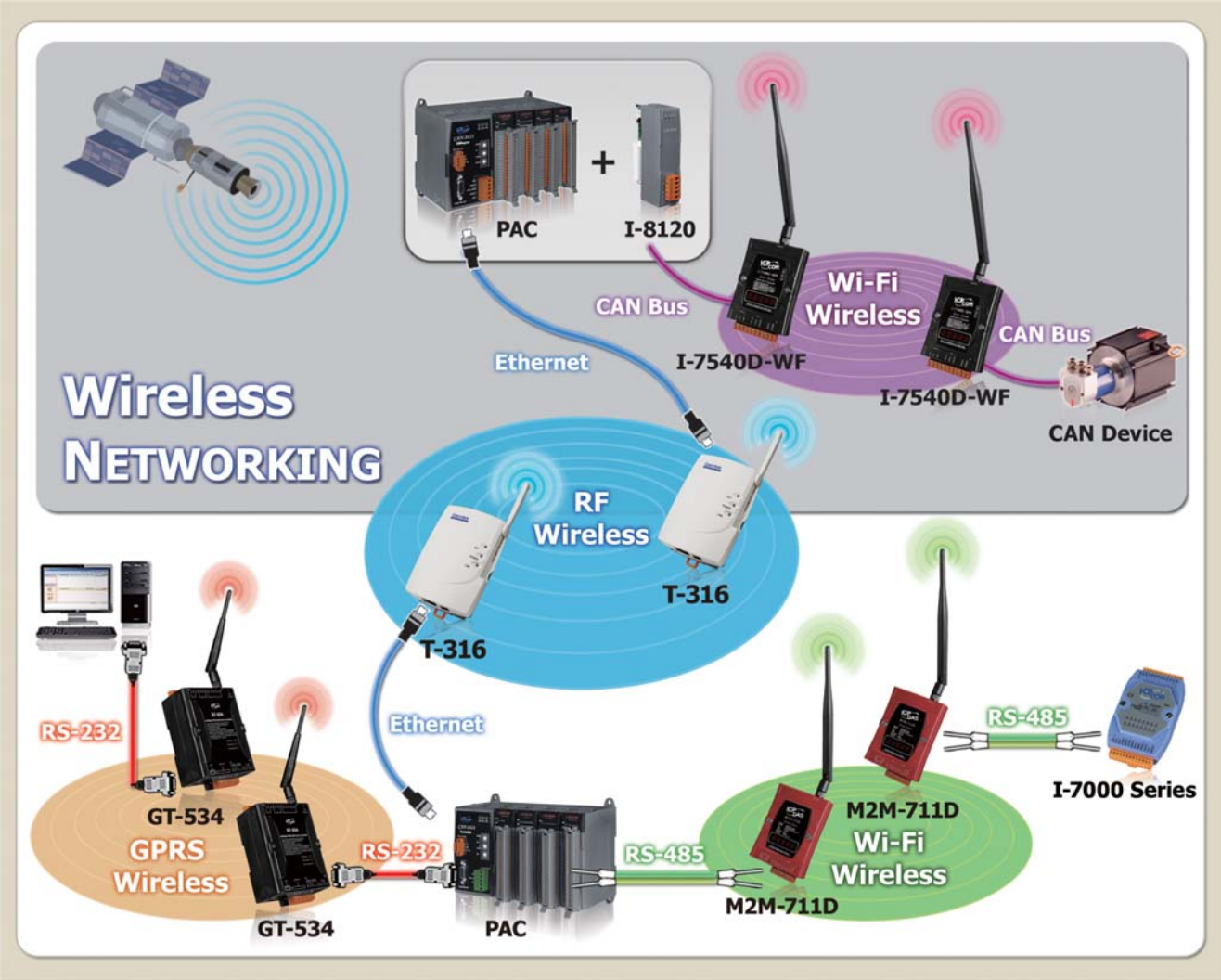
• Accessories

Chapter 8

Antennas are required by any radio receiver or transmitter in order to couple its electrical connection to the electromagnetic field. Amplifier is a device for increasing the power of a signal. ICP DAS provides various accessories including external antennas and amplifiers to extend communication length of a wireless network.

1.2. Wired to Wireless Solutions

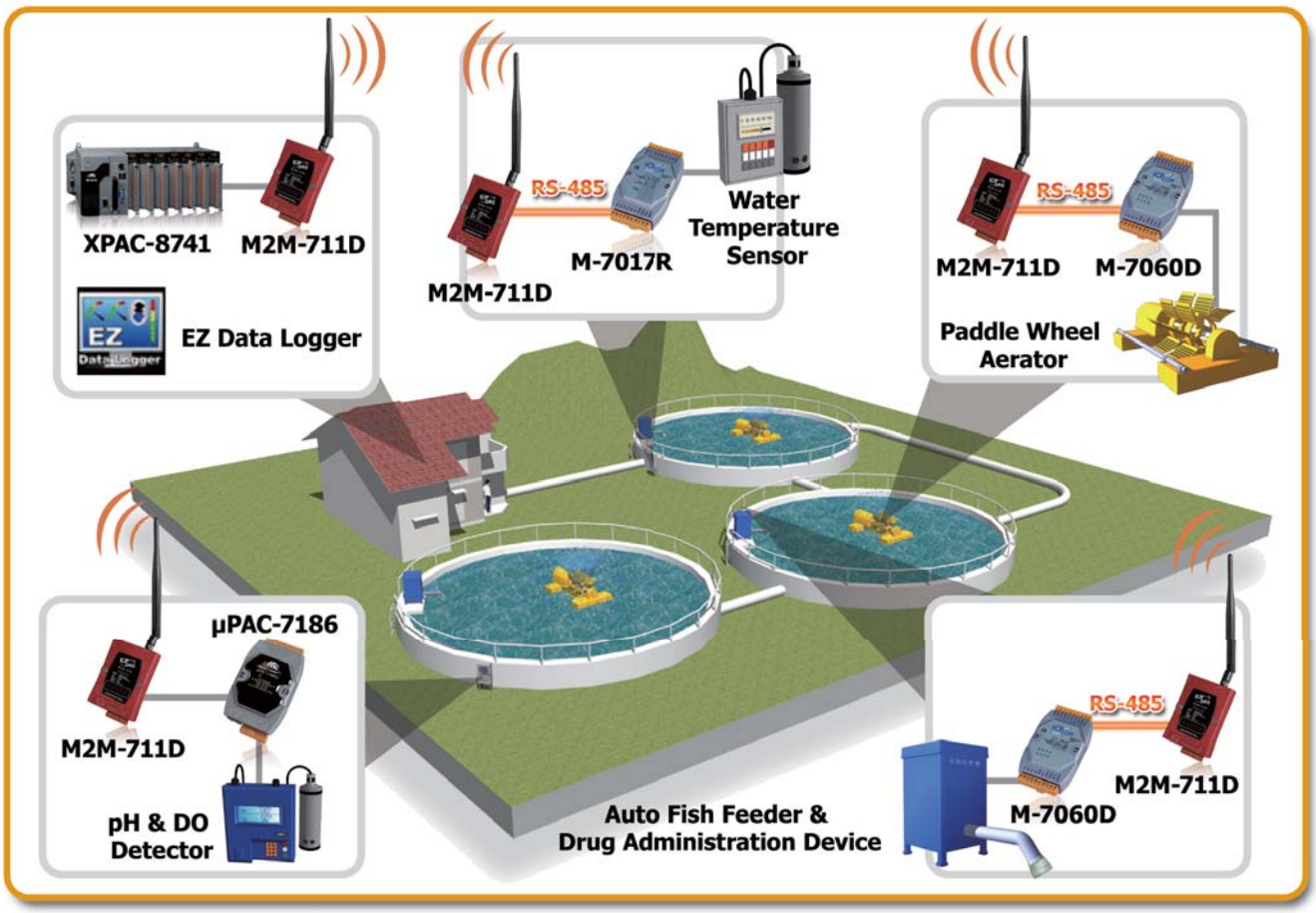
ICP DAS Wired to Wireless Solution is a cost effective solution designed to offer users more flexible and inexpensive ways to send and receive data. The aim of wireless technology is quite simple: to remove the restrictions put on messy wires and cables both inside the site and out. The wireless products by ICP DAS are also designed to be as easy as cables in use. There is no complex wireless connection software or intimate knowledge is required to connect your serial device over wireless. To achieve multiple goals, ICP DAS Wired to Wireless Solutions include , serial to wireless, CAN to wireless, Ethernet to wireless, and wireless I/O products to provide ubiquitous wireless coverage through the entire network.



The key benefits of wireless technology:

- Increase efficiency – improved communications leads to faster transfer of information
- Users are rarely out of touch – stay in communication anywhere and anytime
- Greater flexibility and mobility – access network more freely
- Reduce costs – cheaper to install and maintain a wireless network

• Serial to Wireless Solutions

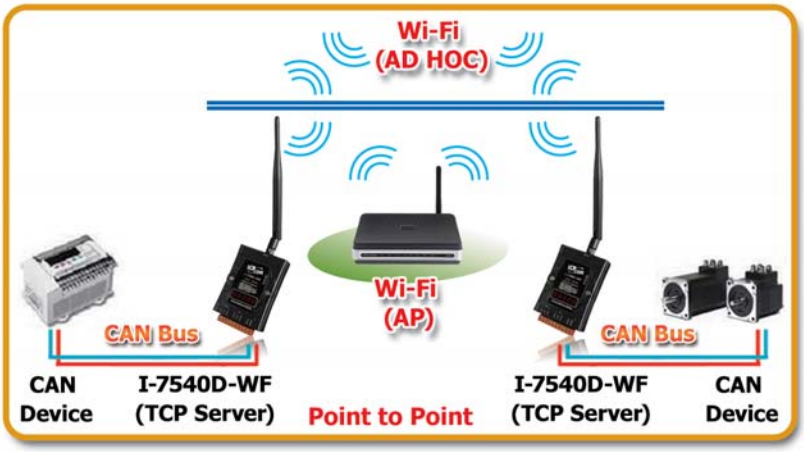


Setting up a fixed-line network on site is relatively complicated, makes the agricultural production technology underdeveloped, and left behind the state of the art in factories of manufactured products. The application shown above is a project aiming to improve the production process in fish farms using 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.

Model Name	Interface	Wireless	Page
Serial to WLAN			
M2M-711D	RS-232 RS-485	Wi-Fi (802.11b/g)	2-2-1
Serial to DSSS RF			
SST-900B	RS-232 RS-485	DSSS RF (900 MHz)	3-2-1
SST-2450	RS-232 RS-485	DSSS RF (2.4 GHz)	3-3-1
Serial to ZigBee			
ZB-2550(P)	RS-232 RS-485	ZigBee Host (2.4 GHz)	5-2-1
ZB-2551(P)	RS-232 RS-485	ZigBee Slave (2.4 GHz)	5-2-1

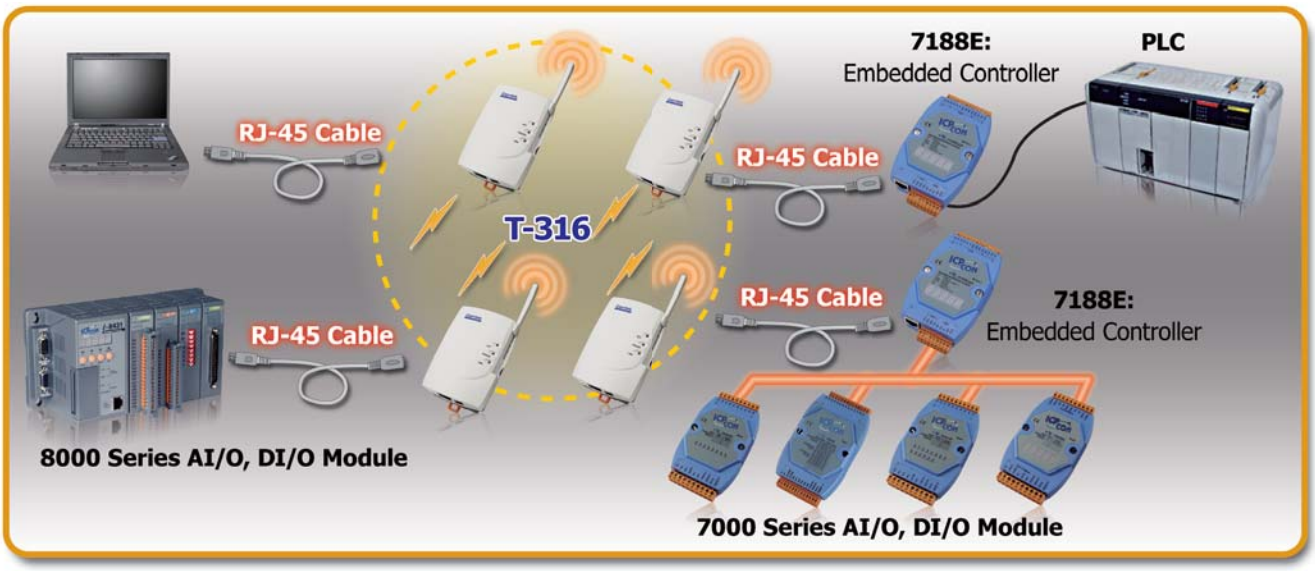
• CAN Bus Wireless Solutions



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.

Model Name	Interface	Wireless	Page
CAN to WLAN			
I-7540D-WF	CAN / RS-232	Wi-Fi (802.11b/g)	2-3-1

• Ethernet to Wireless Solutions



The applications of 802.11b/g wireless LAN are getting more popular by mature technology. It is not only faster than the industrial traditional transmission i.e. RS-232, RS-485, RS-422 etc, but also able to reduce the troublesomely wiring works. It also has higher mobility than Ethernet network. The multipoint wireless network of a short distance using Ad-hoc mode is shown in the above figure. There is also infrastructure mode which supports long distance as user's option.

Model Name	Interface	Wireless	Page
Ethernet to WLAN			
T-316	Ethernet	Wi-Fi (802.11b/g)	2-3-3
Ethernet to ZigBee			
ZB-2570(P)	Ethernet	ZigBee Host (2.4 GHz)	5-2-4
ZB-2571(P)	Ethernet	ZigBee Slave (2.4 GHz)	5-2-4

• Real-time GPS Tracking Solutions

The application shown above is a vehicle and parcel tracking system using GPS and GPRS technology. The GT-540P collects information including GPS location, speed, heading and events such as key on/off, door open/close and transmits the data in real-time via cellular or satellite networks to a computer or shipping warehouse for evaluation. Other than vehicle tracking, package loading or delivering will be transmitted as well. When a cellular network is available and GT-540P is connected, it transmits data to a server; when a network is not available the device stores data in the internal memory and will transmit stored data to the server later.

Model Name	Interface	Wireless	Page
GTM-201P-3GWA	GPS RS-232 USB 2.0	2G (GSM/GPRS) 3G (UMTS/HSDPA/HSUPA)	4-2-4
I-8213W	GPS	2G (GSM/GPRS)	4-2-7
GT-540P	GPS RS-232 RS-485	2G (GSM/GPRS)	4-3-7
G-4500P(D)-2G	GPS RS-232 RS-485	2G (GSM/GPRS)	4-4-1
G-4500P(D)-3GWA	GPS RS-232 RS-485	2G (GSM/GPRS) 3G (UMTS/HSDPA/HSUPA)	4-4-4

WLAN Products

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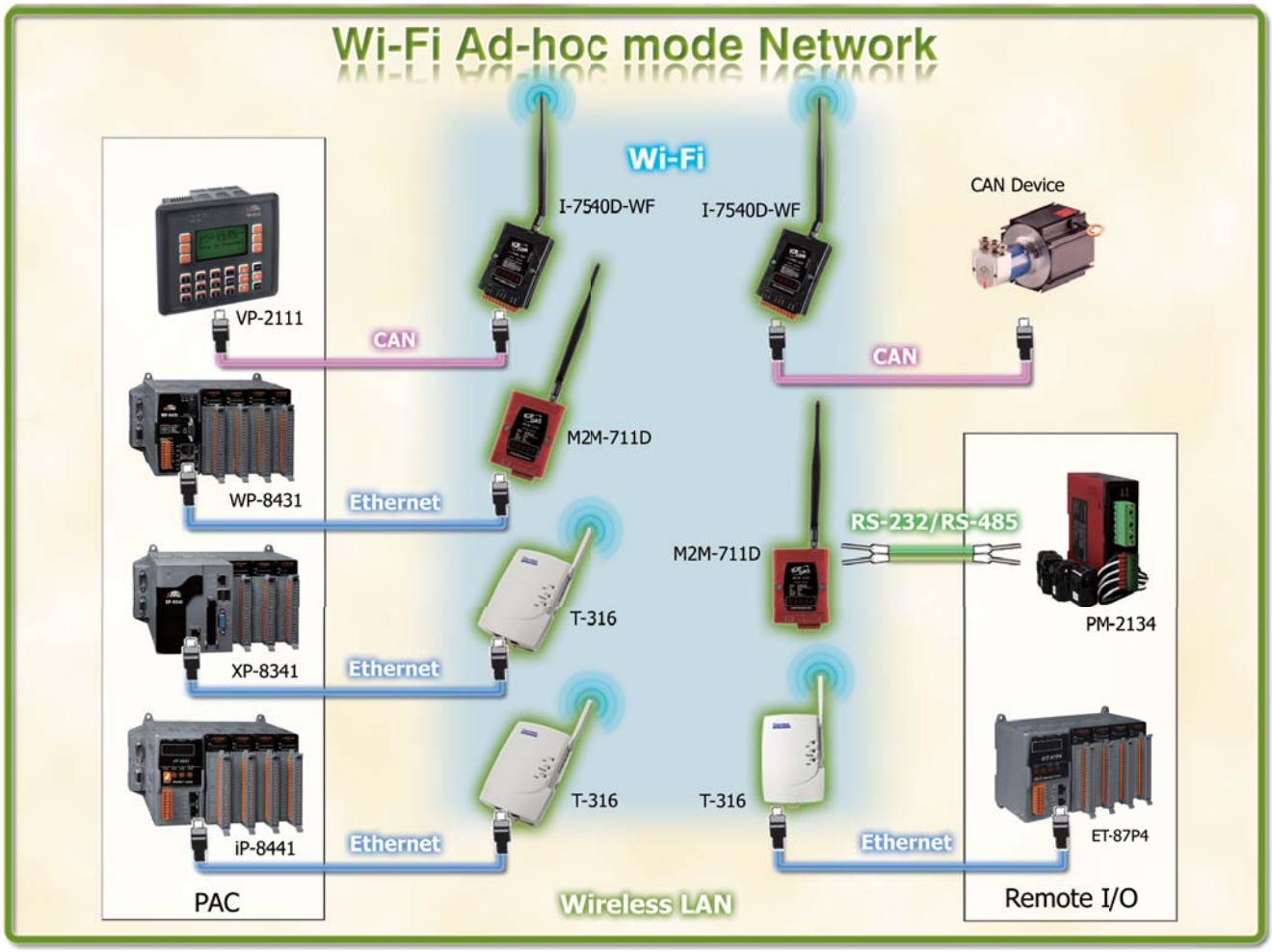
2.1. Overview



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.

Advantages & Benefits

- Build a wireless network via Wi-Fi technology. There is no need to build an expansive 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.
- Support IEEE 802.11 b/g for Wi-Fi and Ad Hoc modes.
- Secure data access with WEP, WPA, WPA2.

• WLAN Product Selection Guide

Nowadays, Wireless LAN applications are very popular. They're not only faster than traditional industrial transmissions, i.e. RS-232, RS-485, RS-422 etc, but are also able to minimize the need for troublesome wiring tasks and have a higher mobility than an Ethernet network. 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.

WLAN Remote Maintenance Device

Model Name	Standard	Data Rate	Page
M2M-711D	IEEE 802.11b DSSS (2.4 GHz ISM radio band)	11 Mbps, 5.5 Mbps, 1 Mbps (Auto scaling)	2-2-1

CAN to WLAN Converter

Model Name	Standard	Data Rate	Page
I-7540D-WF	IEEE 802.11b DSSS (2.4 GHz ISM radio band)	11 Mbps, 5.5 Mbps, 1 Mbps (Auto scaling)	2-3-1

LAN to WLAN Converter

Model Name	Standard	Data Rate	Page
T-316	IEEE 802.11b DSSS (2.4 GHz ISM radio band)	11 Mbps, 5.5 Mbps, 1 Mbps (Auto scaling)	2-3-3

2.2. WLAN Remote Maintenance Device

M2M-711D

Remote Maintenance Wi-Fi Device Terminal Unit

Features

- Supplie static IP/DHCP (Ad Hoc mode don't support DHCP)
- Ethernet Protocol: TCP, UDP, IP, ICMP, ARP,RARP
- Provide dynamic DNS function
- Support IEEE 802.11 b/g for Wi-Fi mode and Ad Hoc mode
- Support WEP-64,WEP-128, WPA-TKIP and WPA2-AES encryption for Wi-Fi mode
- Support WEP-64,WEP-128 encryption for Ad Hoc mode
- Support 1~13 RF channels
- Auto control channel in AP mode
- Ad Hoc mode transmission range up to 100 m(Line of sight)
- Accommodate with M-4132, M2M-720A, M2M-710D
- Web-based administration

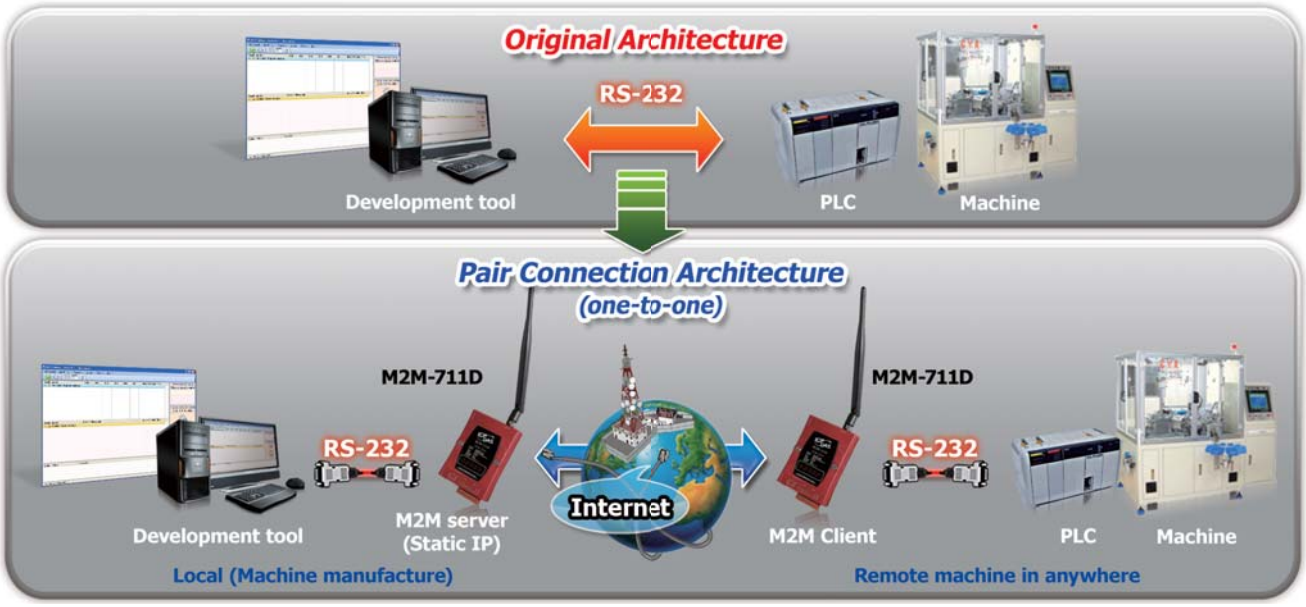
Introduction

The M2M-711D module is specially designed for the remote maintenance and upgrading the serial to network application solution. Users can choose Ethernet mode or Wi-Fi mode to do the pair connection, which provides TCP data tunneling between two serial devices.
In addition to M2M-710D original features, M2M-711D has the Ad Hoc mode of operation. This operation mode can be used to extend the distance of RS232/485 network without Wi-Fi AP and Ethernet Hub.

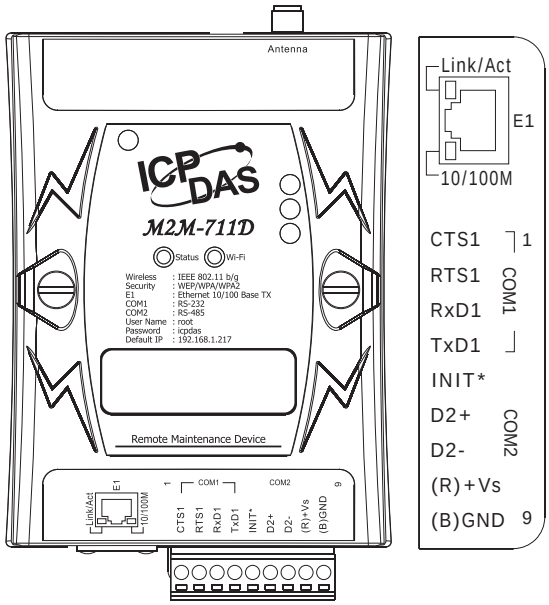
Specifications

Models	M2M-711D
System	
CPU	80186, 80 MHz
SRAM	512 KB
Flash	Flash ROM: 512 DB; Erase unit is one sector (64 KB); 100,000 erase/write cycles
EEPROM	16KB; Data retention: 40 years; 1,000,000 erase/write cycles
Built-in Watchdog Timer	Yes
Communication Interface	
COM1	RS-232 (RxD, TxD,RTS,CTS,DTR,DSR,GND); Non-isolation
COM2	RS-485 (DATA+, DATA-); Non-isolation
Ethernet Port	10/100 Base-TX
LED Display	
5-Digit 7 Segment LED	Yes
System LED Indicator	Yes
Wi-Fi Module	
RF channels	0~13; 0: Auto control channel in AP mode
Receiving sensitivity	-87 dBm(IEEE 802.11b) / -72 dBm (IEEE 802.11g)
Data encryption	WPA-TKIP / WPA2-AES / WEP-64 /WEP-128
Transmit Power	12 dBm(IEEE 802.11b) / 14 dBm(IEEE 802.11g)
Antenna	2.4 GHz - 2 dBi Omni-Directional antenna
Transmission range (LOS)	100M
Power	
Protection	Power reverse polarity protection
Required Supply Voltage	+10 VDC ~ +30 VDC
Mechanical	
Casing	Plastic
Flammability	Fire Retardant Materials (UL 94V-0 Level)
Dimensions (W x L x H)	76 mm x 117 mm x 37 mm
Installation	DIN-Rail
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-40 °C ~ +80 °C
Humidity	5% ~ 90% RH, Non-condensing

Applications

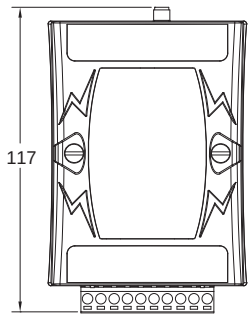


Appearance

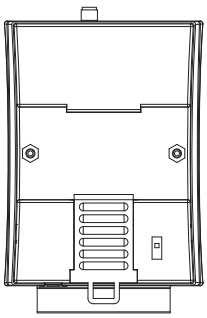


Pin	Name	Description
1	CTS1	CTS of RS-232
2	RTS1	RTS of RS-232
3	RxD1	Rx of RS-232
4	TxD1	Tx of RS-232
5	INIT*	Init Pin
6	D2+	DATA+ of RS-485
7	D2-	DATA- of RS-485
8	(R)+Vs	V+ of Power Supply (+10 ~ +30 VDC)
9	(B)GND	GND of Power Supply

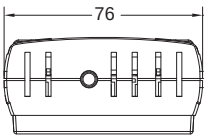
Dimensions (Units: mm)



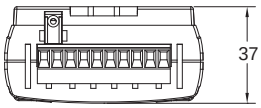
Front View



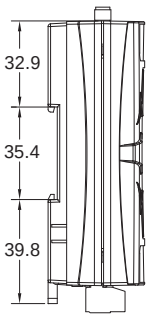
Rear View



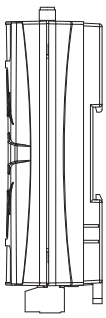
Top View



Bottom View



Left Side View



Right Side View

Ordering Information

M2M-711D CR	Remote maintenance Wi-Fi Device Terminal Unit

2.3. WLAN Converter

I-7540D-WF

CAN to WiFi Converter

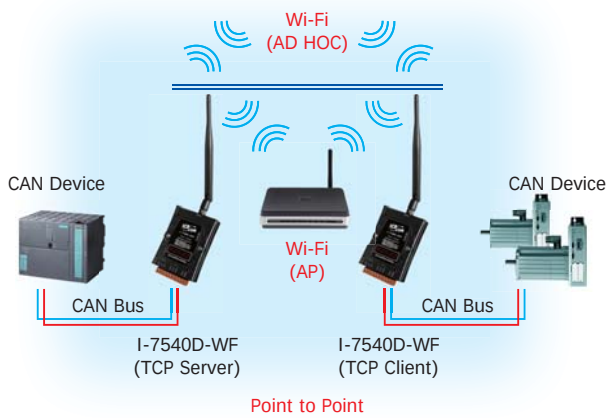
Features

- IEEE 802.11b/g compliant
- Wireless data transmission via WLAN
- Two different operation modes: infrastructure and ad-hoc
- Point to point or point to multi-points connection via wireless LAN
- Support WEP, WPA and WPA2 encryption for wireless LAN
- CAN 2.0A/2.0B compliant
- Connect CAN networks via a WLAN bridge
- Communication efficiency: one-way is up to 700 fps (client->server, server->client), two-way 350 fps (client<=>server)
- Wireless communication: 100m(Without PA) / 300m(With PA)

Introduction

I-7540D-WF supports 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. I-7540D-WF is highly suitable for connecting mobile (e.g., vehicles or machines) or stationary CAN networks and often used for short ranges up to 100 or 300 m.(TCP data protocols are available.) Using an appropriately configured router, CAN data can be transmitted over the Internet. There are two operating modes in the I-7540D-WF: access point mode and ad-hoc mode. In the access point mode, the data connection takes place over one or several WLAN access points that are often part of the company's internal IT infrastructure. In the ad-hoc mode, a direct connection is established between a single I-7540D-WF device and a PC or laptop (with an integrated WLAN interface), or with a second I-7540D-WF device. In this way, the I-7540D-WF can be used as a CAN diagnosis interface. 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.

Applications

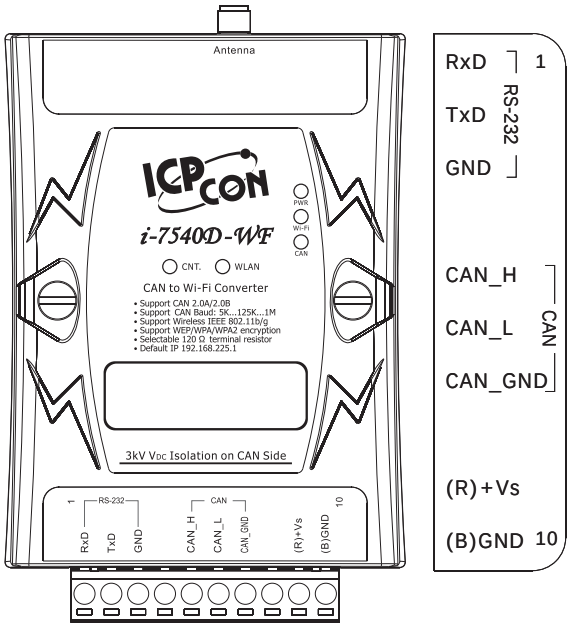


Specifications

Models	I-7540D-WF
Hardware	
CAN Port Channels	1
CAN Interface	
Controller	CAN Controller inside
Transceiver	NXP 82C250
Connector	10-pin screw terminal connecter
Bause Rate (bps)	5K ~ 1 Mbps
Isolation	3000 V_{DC} power protection on CAN side, 2500 V_{rms} photo-couple isolation on CAN bus
Terminator Resistor	Selectable 120 Ω terminator resistor by jumper
Specification	ISO-11898-2, CAN 2.0A and CAN 2.0B
Pin Assignment	CAN_H, CAN_L
Max. Data Flow	700 fps (one-way)
UART Interface	
Connector	10-pin screw terminal connecter
COM	RS-232 (TxD, RxD, GND)
Baud Rate (bps)	115200
Wi-Fi Module	
RF channels	0~13; 0: Auto control channel in AP mode
Receiving sensitivity	-87 dBm (IEEE 802.11b) / -72 dBm (IEEE 802.11g)
Data encryption	WPA-TKIP / WPA2-AES / WEP-64 /WEP-128
Transmit Power	12 dBm (IEEE 802.11b) / 14 dBm (IEEE 802.11g)
Antenna	2.4 GHz - 2 dBi Omni-Directional antenna
Transmission range (LOS)	100M

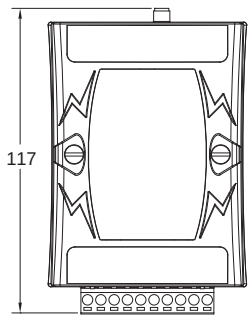
Models	I-7540D-WF
LED Indicators	
Round LED	PWR / Wi-Fi / CAN / CNT / WLAN
Power	
Required Supply Voltage	+10 VDC ~ +30 VDC
Power Consumption	1.5 W
Dip Switch	Init (Firmware Update) / Normal (Firmware Operation)
Mechanical	
Casing	Plastic
Flammability	Fire Retardant Materials (UL 94V-0 Level)
Dimensions (W x L x H)	76 mm x 117 mm x 37 mm
Installation	DIN-Rail
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-40 °C ~ +80 °C
Humidity	5% ~ 90% RH, Non-condensing

Appearance

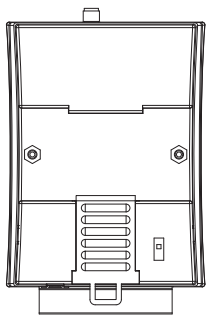


COM Port & Power Input		
Pin	Name	Description
1	RxD	RS-232
2	TxD	
3	GND	
4	--	--
5	CAN_H	CAN
6	CAN_L	
7	CAN_GND	
8	--	--
9	(R)+Vs	Power Input +10 VDC ~ +30 VDC
10	(B)GND	

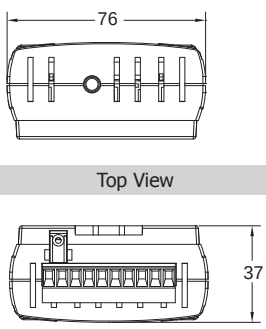
Dimensions (Units: mm)



Front View

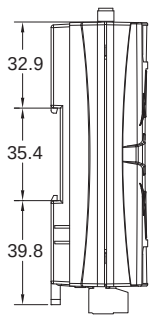


Rear View

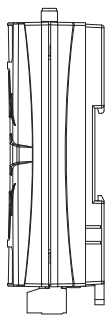


Top View

Bottom View



Left Side View



Right Side View

Ordering Information

I-7540D-WF CR	CAN to Wi-Fi Converter (RoHS)

T-316

Smart WLAN Ethernet Client

Features

- 802.11b Ethernet Client
- Web-based Configuration
- Web-based Firmware Upgrades
- 64/128-bit WEP
- No Driver Installation Required
- Plug and Play Operation
- Directional 6dBi Gain Antenna
- AP Priority List
- Small and Compact

Introduction

The T-316 is an Ethernet LAN to wireless LAN converter. It requires no software or drivers to be installed and the configuration process is very simple. The current hardware system or currently running programs do not need to be modified in order to enjoy the benefits of wireless transmission.

Operating Modes

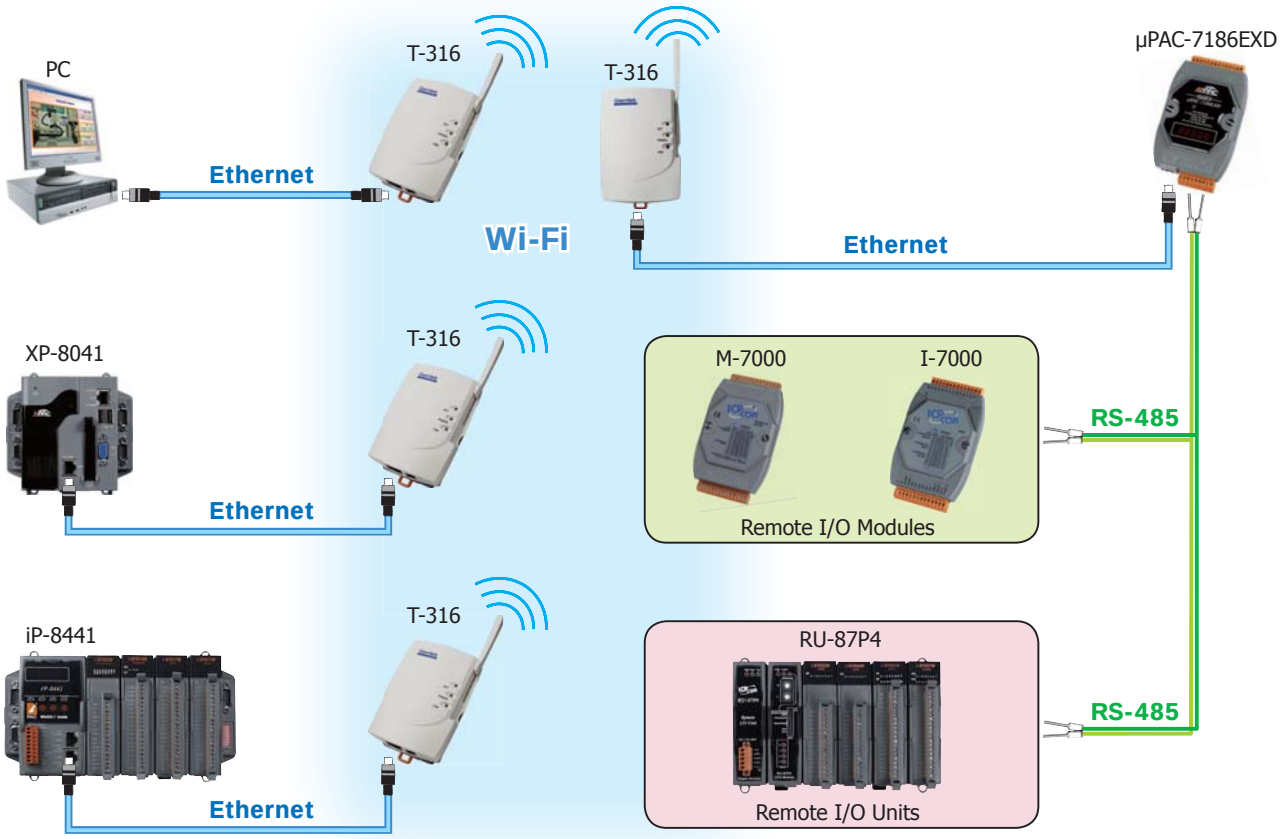
Ad-hoc Mode

An Ad-hoc network is formed using a number of wireless stations (without an Access Point) and communicates via radio waves. For the user, the shared resources on the wireless network appear exactly as they would on a regular wired network. The wireless operation of the network is totally transparent.

Infrastructure Mode

An Infrastructure network is formed using a number of stations together with one or more Access Points (APs), with the stations positioned within a set distance from the AP. This mode supports long distance transmissions.

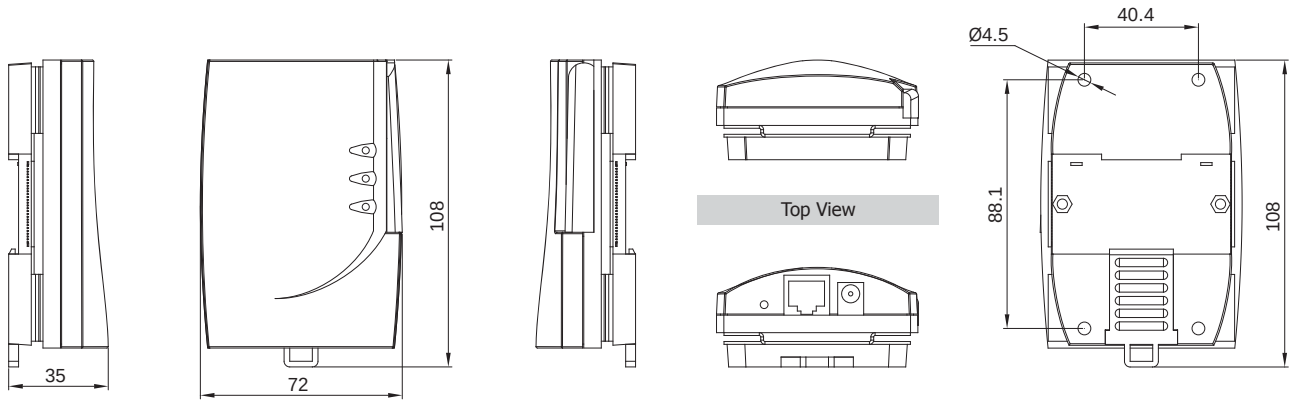
Applications



Specifications

Models		T-316
Wireless		
Standard		IEEE 802.11b DSSS (2.4 GHz ISM radio band)
Data Rate		11 Mbps, 5.5 Mbps, 1 Mbps (Auto scaling)
Transmit Power		+15 dBm (typical)
Data Rate Sensitivity	11 Mbps	-84 dBm
	5.5 Mbps	-87 dBm
	1 Mbps	-90 dBm
Modulation	11 Mbps	CCK
	5.5 Mbps	CCK
	1 Mbps	DBPSK
Antenna		Internal patch antenna with diversity
Transmission Range		100 m
General		
System Interface		Ethernet (RJ-45)
LAN		802.3 compliant for wired LAN
LED Indicators		
Power		Yes
RF Activity		Yes
LAN Activity		Yes
Power		
Operating Voltage		+3.3 VDC +/-5 % or +5.0 VDC +/-5 %
Current Consumption		500 mA (Max.)
Mechanical		
Dimensions (W x H x D)		72 mm x 108 mm x 35 mm
Weight		250 g
Environment		
Operating Temperature		0 °C ~ +55 °C
Humidity		10 ~ 95% RH, Non-condensing

Dimensions (Units: mm)



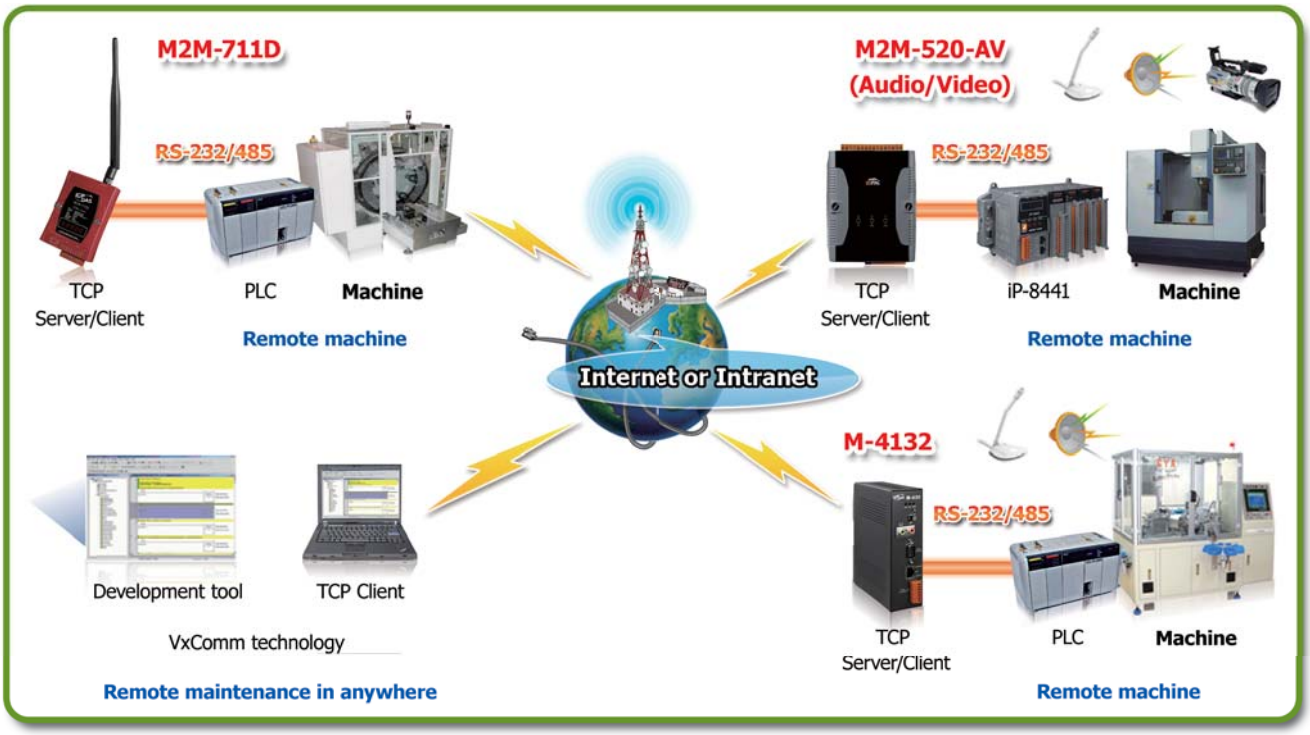
Left Side View | Front View | Right Side View | Bottom View | Rear View

Ordering Information

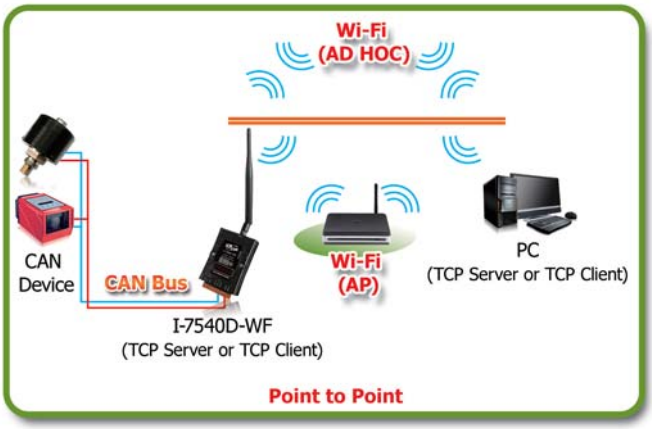
T-316	Smart WLAN Ethernet Client

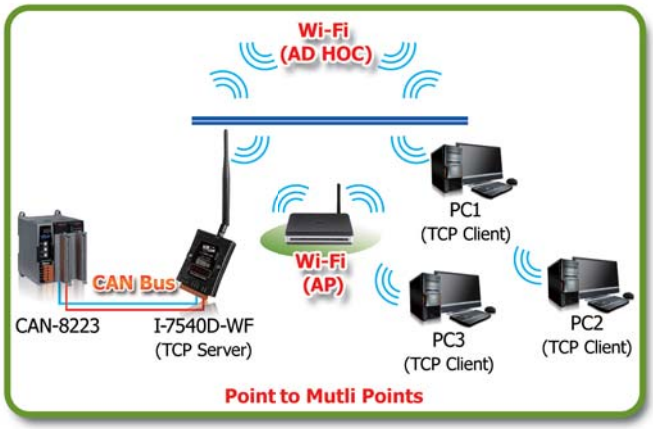
2.4. Applications

Remote Maintenance Application



CAN to Wi-Fi Application





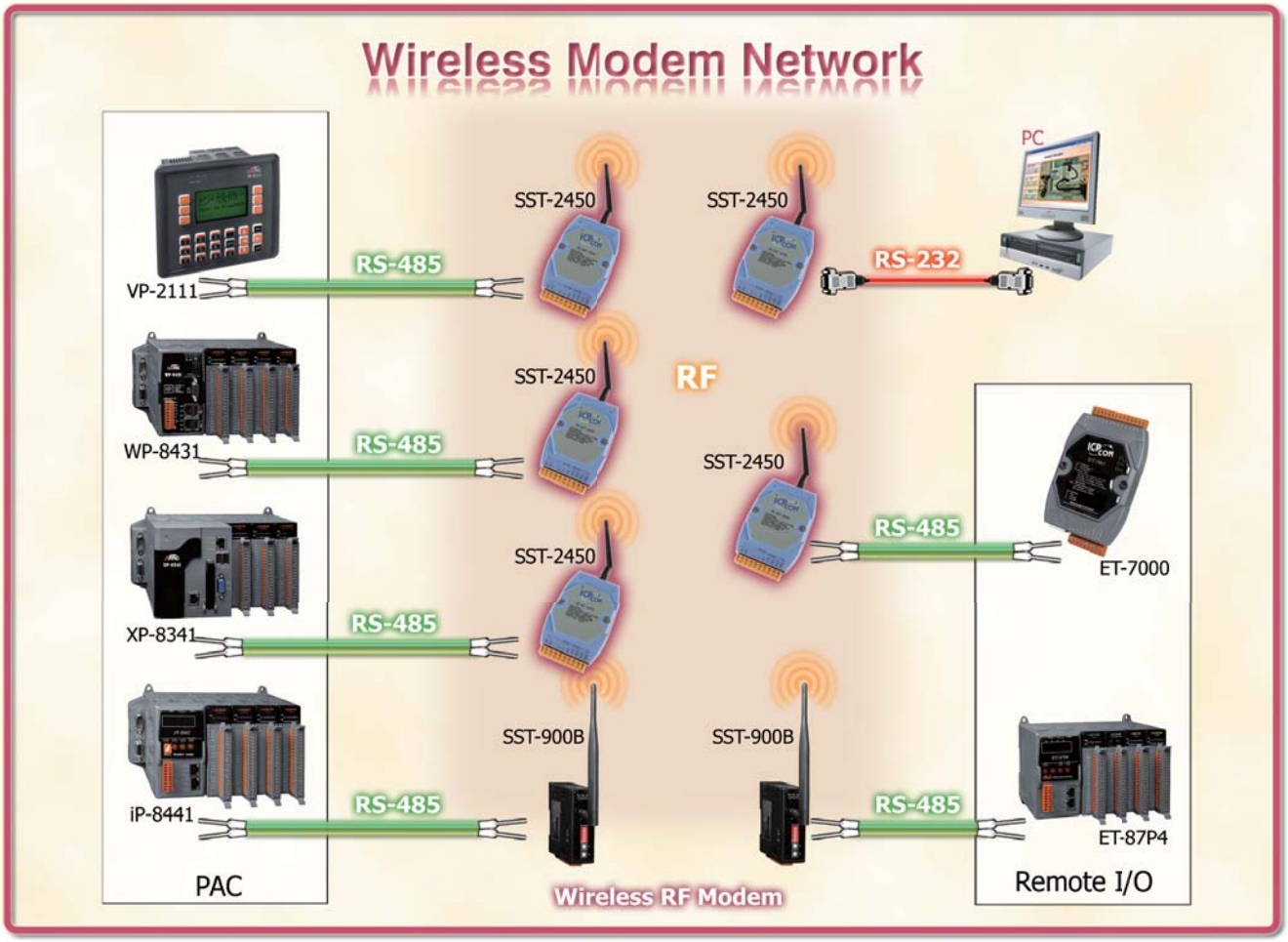
Wireless LAN Application

DSSS RF Products

3

3.1.	Overview	P3-1-1
3.2.	900 MHz Radio Modem	P3-2-1
3.3.	2.4 GHz Radio Modem	P3-3-1
3.4.	Applications	P3-4-1

3.1. Overview



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 57600bps
- Auto band-rate settings
- Direct sequence spread spectrum using RF technology
- Reduce wiring cost and inconvenience

• Wireless Modem Selection Guide

ICP DAS provides SST series which is designed for data acquisition and control applications between a host and remote sensors. It is also useful for those applications where the installation of cable wire is inconvenient.

The SST Series is a spread spectrum radio modem with an RS-232/ RS-485 interface port. The module can be used not only in peer-to-peer mode, but also in a multi-point structure.

Model Name	Frequency	Interface	Transmission Range	Page
SST-900B	900 MHz (902-928 MHz)	RS-232/RS-485	Typical 700 m, Max. 1 Km	3-2-1
SST-2450	2.4 GHz (2410.496 MHz ~ 2471.936 MHz	RS-232/RS-485	300 m (Typical)	3-3-1

2.4 GHz Omni-directional Antennas

Model Name	Ordering Information	Connector	Radiation	Band	Gain (dBi)	Note	Page
ANT-8	1 km, 2.4 GHz External Antenna	RP SMA Male (Plug)	Omni-Directional	2.4 ~ 2.5 GHz	8	Dipole	8-2-1
ANT-15	5 km, 2.4 GHz External Antenna	RP SMA Male (Plug)	Omni-Directional	2.4 ~ 2.5 GHz	15	Dipole	8-2-2

2.4 GHz Directional Antennas

Model Name	Ordering Information	Connector	Radiation	Band	Gain (dBi)	Note	Page
ANT-15YG	5 km, 2.4 GHz External Antenna	RP SMA Male (Plug)	Directional	2.4 ~ 2.5 GHz	15	Yagi	8-3-1
ANT-18	9 km, 2.4 GHz External Antenna	RP SMA Male (Plug)	Directional	2.4 ~ 2.5 GHz	18	Panel	8-3-2

3.2. 900 MHz Radio Modem

SST-900B

900 MHz Wireless Modem

Features

- Half-duplex up to 115200 bps
- Internal Self-Tuner
- ISM Band 900 MHz
- Typical wireless transmission range is 700 meters (LOS)
- UI Configuration via external switch

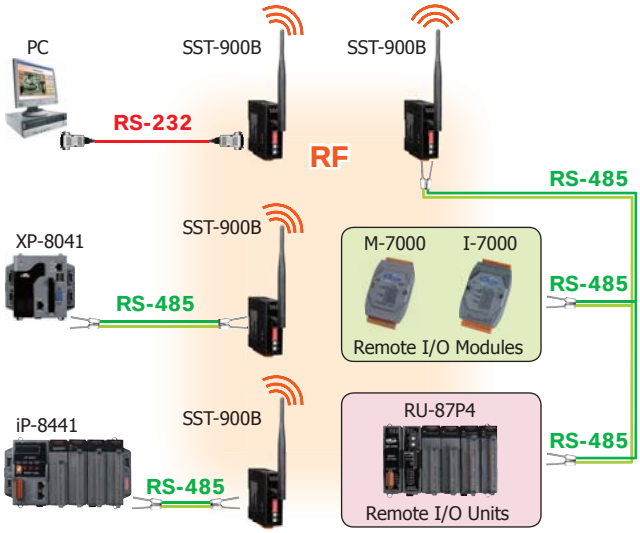
Introduction

The SST-900B is a radio frequency modem with an RS-232/RS-485 interface port and is designed for data acquisition and control applications between a host and remote sensors. It is also useful for those applications where the installation of cable wire is inconvenient.
The SST-900B module is a wireless module that works in a frequency range of 902-928 MHz, and includes adjustable 16 RF channels and each channel can be allocated one of sixteen group IDs. The SST-900B can be used not only in peer-to-peer mode but also in a multi-point structure.

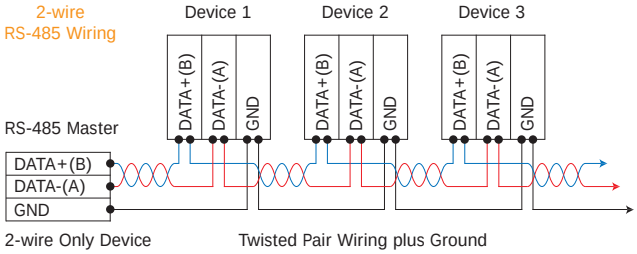
Specifications

Models		SST-900B
Wireless		
Operating Frequency Range		915 MHz (902 MHz ~ 928 MHz)
Channel Spacing		1.5 MHz
Transmit Power		Up to 20 dBm
Number of Channel		16
Transmission Range		700 m
Receive Sensitivity		-100 dBm @ 150k bps
Antenna		
Type		3 dBi Omni-directional, bendable
Connector		Reverse Polarity SMA (RP-SMA) Plug (Male)
Com 0 Settings		
Interface	RS-232	TxD, RxD, GND
	RS-485	DATA+, DATA-; internal self-tuner ASIC; Non-isolated
Baud Rate		1200 ~ 115200 bps
Data Bit		8
Parity Check		None, Even , Odd
Stop Bit		1
Power		
Operating Voltage		+10 VDC ~ +30 VDC
Mechanical		
Dimensions (W x L x H)		84 mm x 108 mm x 33 mm
Environment		
Operating Temperature		-25 °C ~ +70 °C
Storage Temperature		-40 °C ~ +80 °C
Humidity		0% ~ 90% RH, Non-condensing

Applications



Wiring

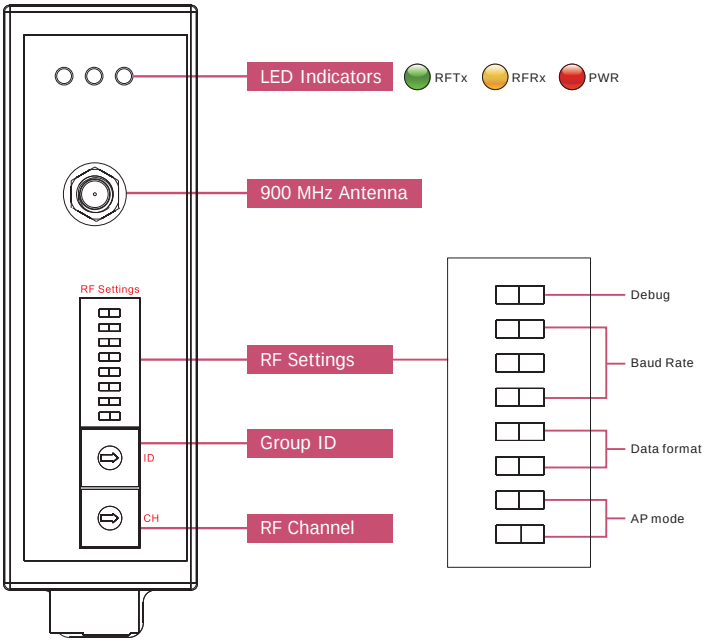


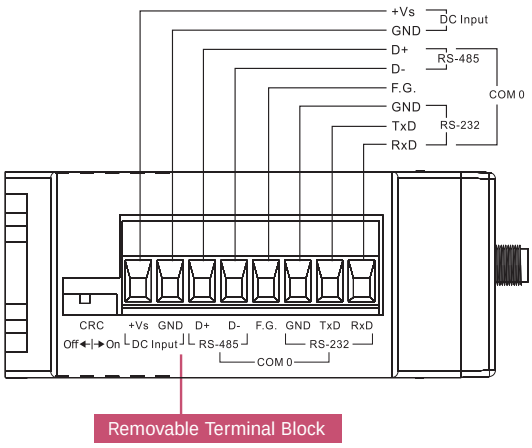
3-wire RS-232 Wiring

RS-232 Master

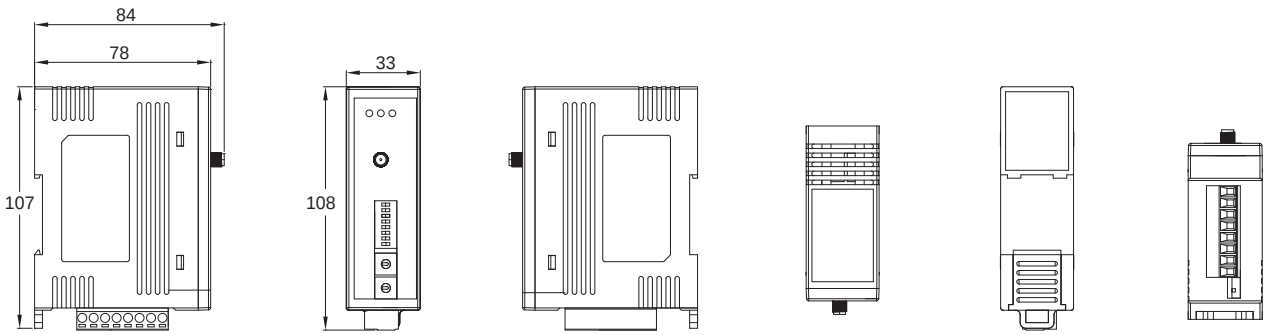
RS-232 Device

Pin Assignments





Dimensions (Units: mm)



Left View | Front View | Right View | Top View | Rear View | Bottom View

Ordering Information

SST-900B	900 MHz Wireless Modem

3.3. 2.4 GHz Radio Modem

SST-2450

2450 MHz Wireless Modem

Features

- Half-duplex up to 57600 bps
- Internal Self-Tuner
- ISM Band 2.4 GHz
- Support Full-duplex and Half-duplex communication
- Spread Spectrum Technology

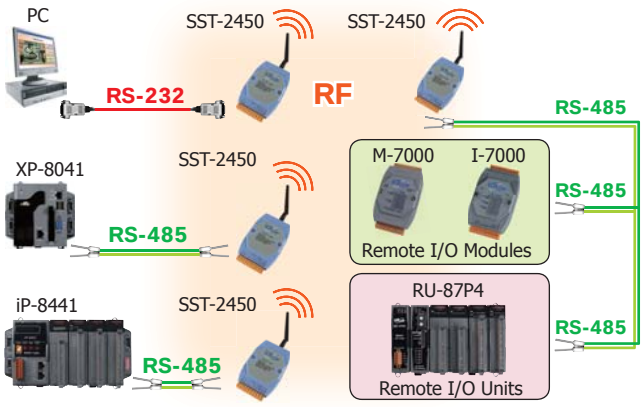
Introduction

The SST-2450 is a spread spectrum radio modem with an RS-232/RS-485 interface port and is designed for data acquisition and control applications between host and remote sensors. It is also useful for those applications, the cable wire is inconvenient to be installed. The SST-2450 can be used in not only peer to peer mode but also multi-point structure.

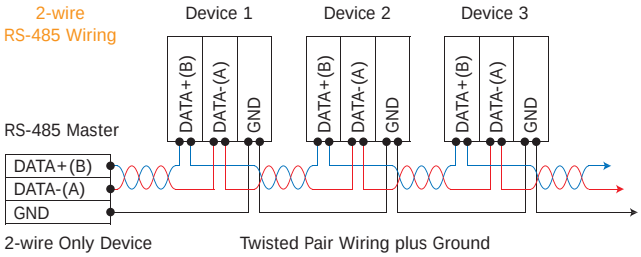
Specifications

Models		SST-2450
Wireless		
Operating Frequency Range		2.4 GHz (2410.496 MHz ~ 2471.936 MHz)
Channel Spacing		4.096 MHz
Output Power		0.05 W
Transmit Power		17 dBm +/-2 dBm
Modulation		MSKG
Radio Technique		Direct Sequence Spread Spectrum
Duplex Mode		TDD (for Full-duplex)
Number of Channel		16
Number of PN Code		16
PN Code Rate		1.365 Mchips/Sec.
Transmission Range		Typical 300 m
Data Bit Error Rate		< 1/1000 @ -102 dBm
Antenna		
Type		3 dBi Omni-directional, bendable
Connector		Reverse-Polarity SMA-Jack
Serial Link		
Interface	RS-232	TxD, RxD, GND
	RS-485	D+, D-; internal self-tuner ASIC; Non-isolated
Max. Data Transfer Rate in Asynchronous Mode	Full-duplex Mode	9600 bps
	Half-duplex Mode	28800 bps
Max. Data Transfer Rate in Synchronous Mode	Full-duplex Mode	19200 bps
	Half-duplex Mode	57600 bps
Data Format 28800 bps		N, 8, 1 or E, 8, 1
Power		
Operating Voltage		+10 V_{DC} ~ +30 V_{DC}
Current Consumption	Typical	Less than 250 mA
	Transmission	2 W
	Receive	1 W
Mechanical		
Dimensions (W x H x D)		72 mm x 117 mm x 35 mm
Environment		
Operating Temperature		-10 °C ~ +50 °C
Storage Temperature		-20 °C ~ +70 °C
Humidity		0% ~ 90% RH, Non-condensing

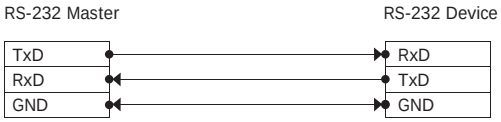
Applications



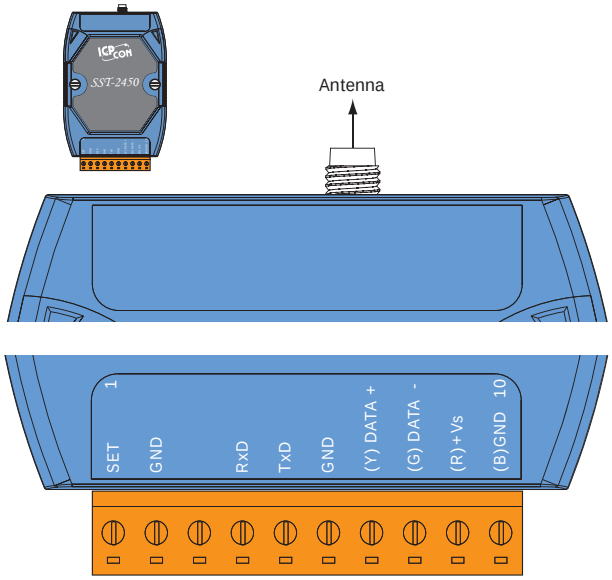
Wiring



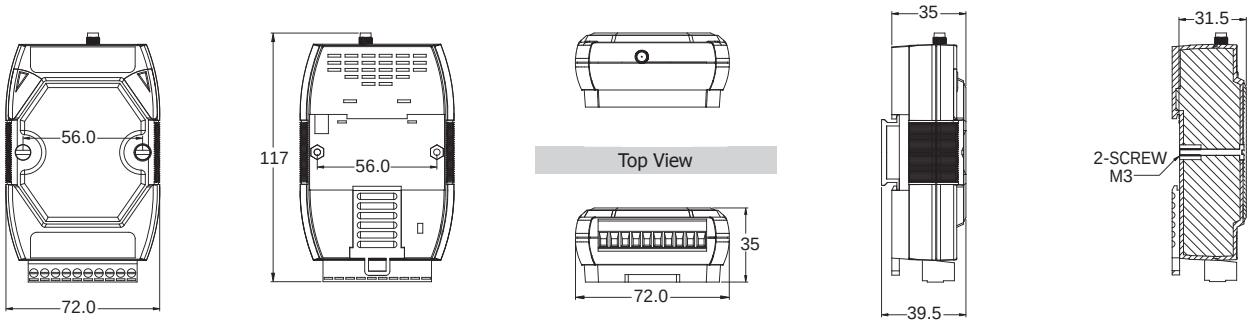
3-wire RS-232 Wiring



Pin Assignments



Dimensions (Units: mm)



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

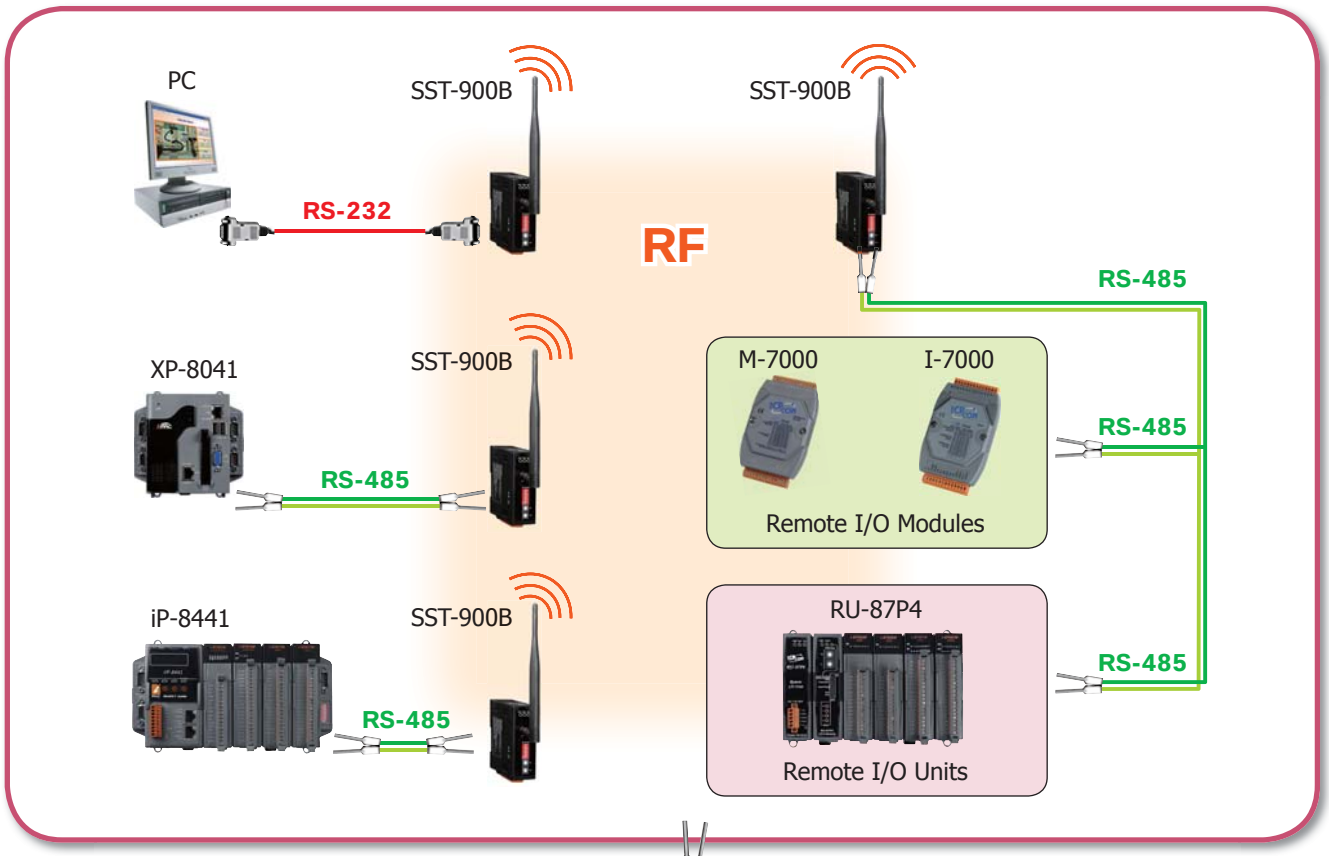
Ordering Information

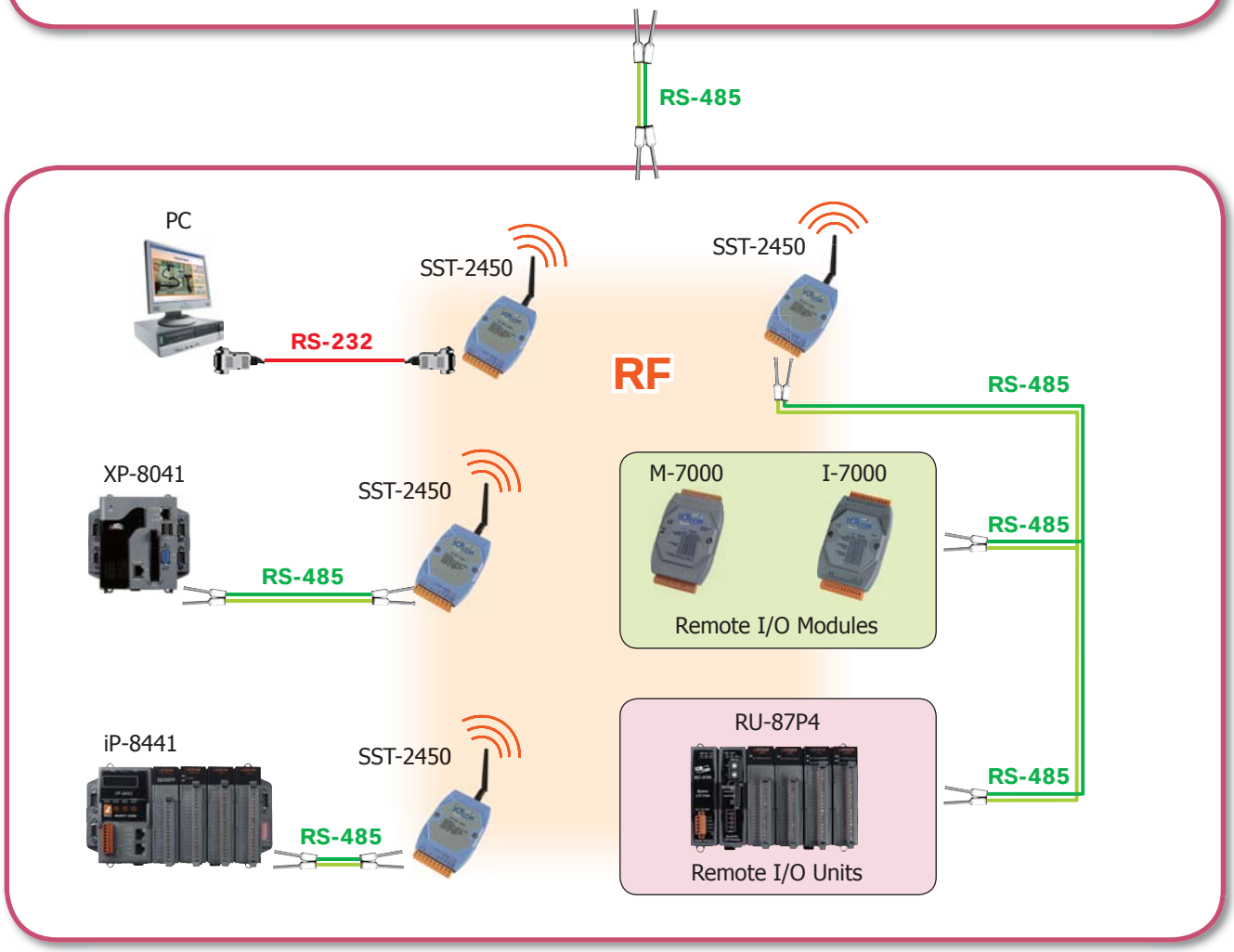
SST-2450	2450 MHz Wireless Modem

Accessories

ANT-8	1 km, 2.4 GHz External Antenna (Omni-directional). Gain: 8 dBi
ANT-15	5 km, 2.4 GHz External Antenna (Omni-directional). Gain: 15 dBi
ANT-18	9 km, 2.4 GHz External Antenna (Directional). Gain: 18 dBi
ANT-15YG	5 km, 2.4 GHz External Antenna (Directional). Gain: 15 dBi

3.4. Applications



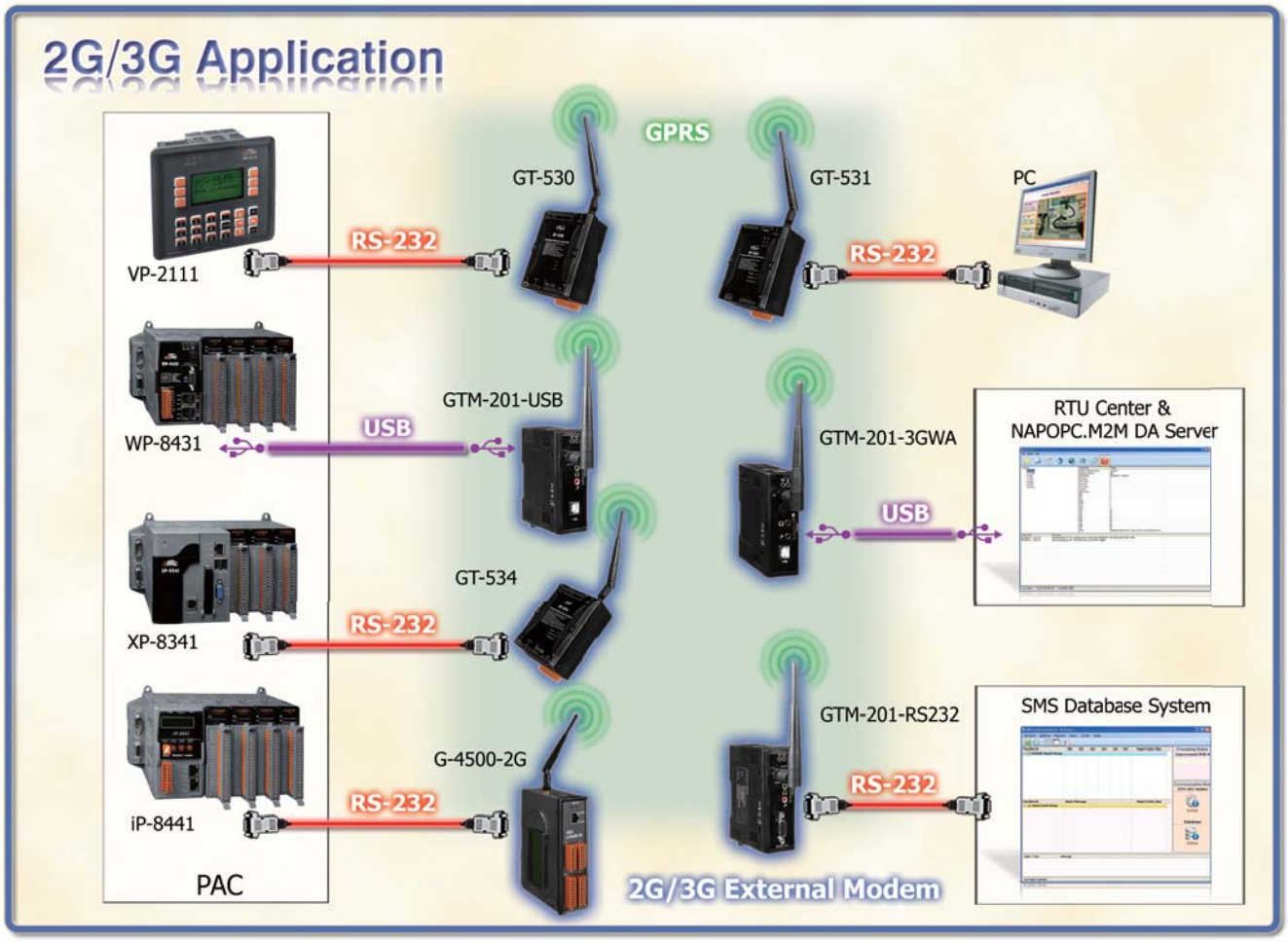


2G/3G Products

4

4.1.	Overview	P4-1-1
4.2.	2G/3G Modems	P4-2-1
4.3.	Intelligent 2G/3G Module	P4-3-1
4.4.	Mini-PAC with 2G/3G modem	P4-4-1
4.5.	Software Solutions	P4-5-1

4.1. Overview



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.

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 Name	Frequency (MHz)	Reset Input	MIC Input /Audio Output	GPS	TCP/IP Stack	Baud Rate (bps)	Interface	Driver	Page
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	4-2-1
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	4-2-1
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 Windows CE Linux	4-2-4
GTM-201P-3GWA	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 2100/1900/850	Yes	Yes	Yes	Yes	9.6K~115.2K	USB2.0 RS-232 GPS	Windows XP / 7 Windows CE Linux	4-2-4

GSM/GPRS Module

Model Name	Frequency (MHz)	GPS Interface	Max. Dowload Speed	AT Command	TCP/IP Protocol	Page
I-8212W	2G (GSM/GPRS): 850/900/1800/1900	-	85.6 Kbps	Yes	Yes	4-2-7
I-8213W	2G (GSM/GPRS): 850/900/1800/1900	Yes	85.6 Kbps	Yes	Yes	4-2-7

• 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.

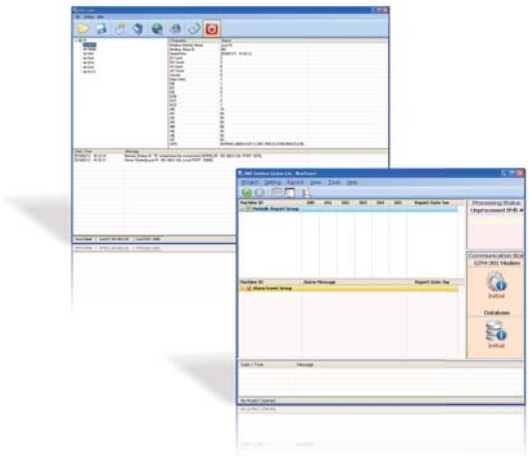
Model Name	CPU	Interface	Frequency (MHz)	I/O	Alarm	Micro SD	Battery Backup	Transparent Communication	Page
GT-530	32 bit	2 × RS-232	2G: 850/900/1800/1900	2 × DO 10 × DI	Yes (SMS)	Yes	Yes	SMS	4-3-1
GT-531	32 bit	2 × RS-232 1 × RS-485	2G: 850/900/1800/1900	-	Yes (SMS, Voice)	Yes	-	Modbus RTU	4-3-3
GT-534	32 bit	1 × RS-232 1 × RS-232/485	2G: 850/900/1800/1900	2 × DO 6 × DI 1 × AI	Yes (SMS, Voice)	Yes	Yes	SMS	4-3-5
GT-540	32 bit	1 × RS-232 1 × RS-485	2G: 850/900/1800/1900	2 × DO 6 × DI 1 × AI	Yes (GPRS)	Yes	-	GPRS	4-3-7
GT-540P	32 bit	1 × RS-232 1 × RS-485 GPS	2G: 850/900/1800/1900	2 × DO 6 × DI 1 × AI	Yes (GPRS)	Yes	-	GPRS	4-3-7
GT-541	32 bit	1 × RS-232 1 × RS-485	2G: 850/900/1800/1900	-	-	-	-	GPRS	4-3-10
WISE-4000	16 bit	1 × Ethernet	2G: 850/900/1800/1900	3 × DO 3 × DI 8 × AI	-	-	-	SMS	4-3-12
WISE-4000D	16 bit	1 × Ethernet	2G: 850/900/1800/1900	3 × DO 3 × DI 8 × AI	-	-	-	SMS	4-3-12

• 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 Name	OS	CPU	Flash/RAM (KB)	Interface	I/O	Frequency (MHz)	Speed (Down/UP)	LCM (Dot)	GPS/ ZigBee	Page
G-4500-2G	MiniOS7	80 MHz	512/512	1 × Ethernet 2 × RS-232 1 × RS-485	3 × DO 3 × DI 8 × AI	2G (GSM/GPRS): 850/900/1800/1900	85.6/42.8 kbps	-	-	4-4-1
G-4500D-2G	MiniOS7	80 MHz	512/512	1 × Ethernet 2 × RS-232 1 × RS-485	3 × DO 3 × DI 8 × AI	2G (GSM/GPRS): 850/900/1800/1900	85.6/42.8 kbps	128 × 64	-	4-4-1
G-4500P-2G	MiniOS7	80 MHz	512/512	1 × Ethernet 2 × RS-232 1 × RS-485	3 × DO 3 × DI 8 × AI	2G (GSM/GPRS): 850/900/1800/1900	85.6/42.8 kbps	-	GPS	4-4-1
G-4500PD-2G	MiniOS7	80 MHz	512/512	1 × Ethernet 2 × RS-232 1 × RS-485	3 × DO 3 × DI 8 × AI	2G (GSM/GPRS): 850/900/1800/1900	85.6/42.8 kbps	128 × 64	GPS	4-4-1
G-4500-3GWA	MiniOS7	80 MHz	512/512	1 × Ethernet 2 × RS-232 1 × RS-485	3 × DO 3 × DI 8 × AI	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 2100/1900/850	7.2/5.76 Mbps	-	-	4-4-4
G-4500D-3GWA	MiniOS7	80 MHz	512/512	1 × Ethernet 2 × RS-232 1 × RS-485	3 × DO 3 × DI 8 × AI	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 2100/1900/850	7.2/5.76 Mbps	128 × 64	-	4-4-4
G-4500P-3GWA	MiniOS7	80 MHz	512/512	1 × Ethernet 2 × RS-232 1 × RS-485	3 × DO 3 × DI 8 × AI	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 2100/1900/850	7.2/5.76 Mbps	-	GPS	4-4-4
G-4500PD-3GWA	MiniOS7	80 MHz	512/512	1 × Ethernet 2 × RS-232 1 × RS-485	3 × DO 3 × DI 8 × AI	2G (GSM/GPRS): 850/900/1800/1900 3G (UMTS/HSDPA/HSUPA): 2100/1900/850	7.2/5.76 Mbps	128 × 64	GPS	4-4-4

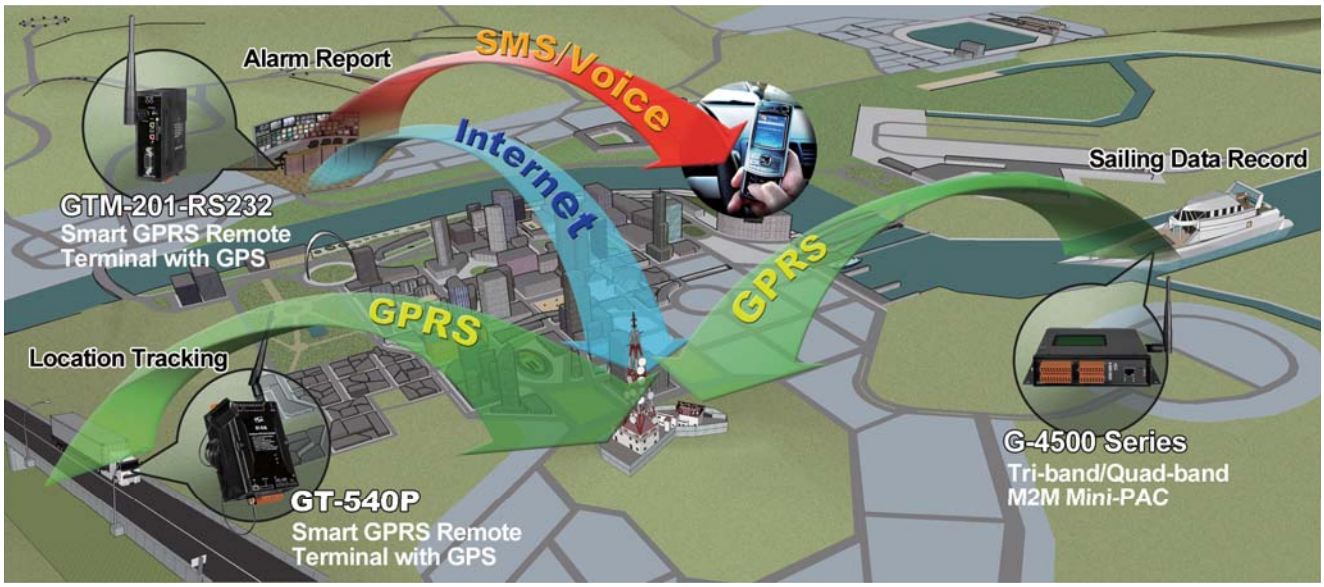
• Software Solutions



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	Page
SMS DBS	SMS Monitor/Database System software solution for GT-53x series	Free with 3 phone numbers	4-5-1
M2M RTU Center	M2M RTU series management software	Free	4-5-2
M2M RTU API Tool	M2M RTU Win32 API library	Free	4-5-3
NAPOPC.M2M DA Server	OPC server for RTU devices	Free	4-5-4

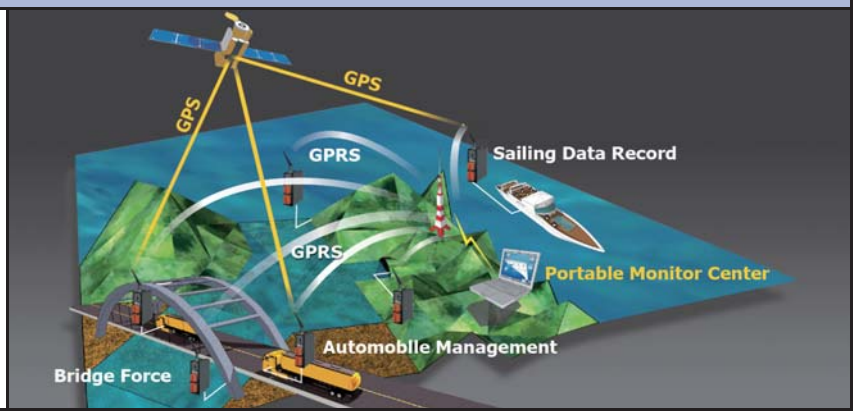
• 2G/3G Wireless Applications



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 trillian 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.

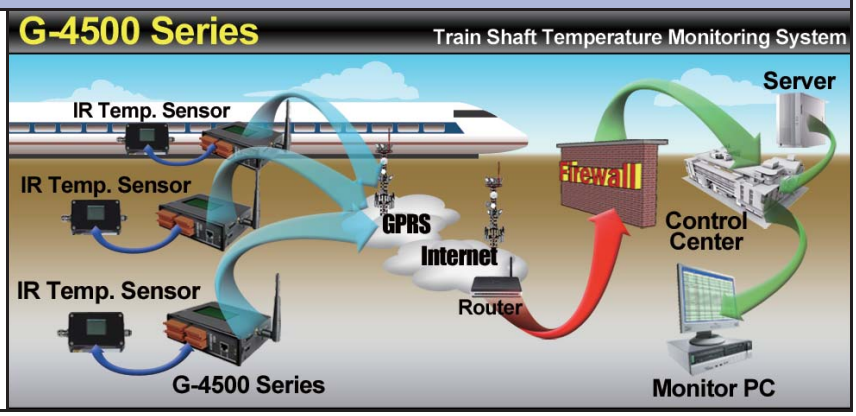
G-4500 Series General Application

By using G-4500 series, user can easily acquire data from any site without wiring limitation. G-4500 can also combine with a GPS module which allows user to monitor the location of moving transportations. To place the G-4500 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-4500 series** (M2M Mini-Programmable Automation Control). G-4500 controller will transmit data via GPRS service to Internet back to control center in real-time.

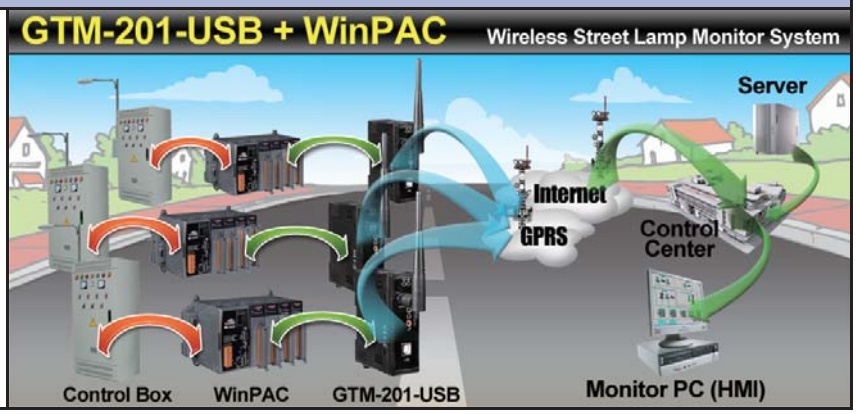


Vending/Gaming Machine Monitoring System

Each machine has a **GT-530** or **GT-534** (Intelligent SMS/GSM Alarm Controller) inside itself. Once the specific circumstances occurred (for example, vending machine ran out of drink), GT-530/GT-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-USB** (Industrial Quad-band GPRS/GSM Modem).



4.2. 2G/3G Modem

GTM-201-RS232
GTM-201-USB

Industrial Quad-band 2G GSM/GPRS Modem

Features

- Quad-band 2G Modem Operating of 850/900/1800/1900 MHz
- Designed for GPRS, Data, Fax, SMS and Voice Applications
- Support TCP Server, TCP Client, UDP Client connection from 2G network
- Support Standard AT Commands
- Include a Digital Input Channel to reset the system
- Provide the MIC Input and Audio (32 Ω) Output Interface
- LED Indicators for GSM and Power Indication
- High reliability in harsh environments
- The RS-232 Port support 9600 to 115200 bps (GTM-201-RS232)
- USB Driver for Windows, WinPAC (WinCE5.0), LinPAC (Linux 2.6) (GTM-201-USB)
- DIN-Rail mountable

Introduction

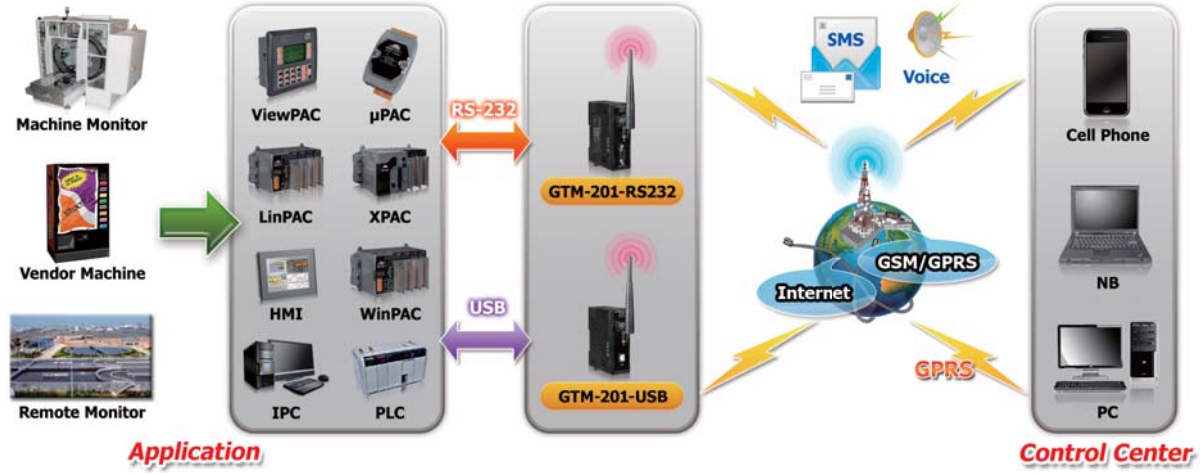
The GTM-201 is a series of industrial Quad-band GSM/GPRS modems with RS-232 and USB interfaces that work at frequencies of GSM 850 MHz, EGSM 900 MHz DCS 1800 MHz and PCS 1900 MHz. The modems utilize the GSM/GPRS network for convenient and inexpensive data transfer from remote instruments, meters, computers or control systems in either live data or packet data acquisition. The GTM-201 series has an integrated TCP/IP stack so that even simple controllers with serial communications ports can be connected to the modem without the need for special installation of drivers. The features of the GTM-201 series allow a variety of PLC and PC applications to take advantage of SMS and GPRS connectivity. The voice interface allows these modems to be also applied to alarm systems with sounds.

Specifications

Models	GTM-201-RS232	GTM-201-USB
2G System		
Frequency Band	Quad-band 850/900/1800/1900 MHz	
GPRS Multi-slot	Class 10/8	
GPRS Mobile Station	Class B	
GPRS Class 10	Max. download speed 85.6 kbps	
Compliant with GSM Phase 2/2+	Class 4 (2 W @ 850/900 MHz); Class 1 (1 W @ 1800/1900 MHz)	
Coding Schemes	CS 1, CS 2, CS 3, CS 4	
SMS	Text and PDU Mode	
Serial Ports		
Serial Standards	RS-232 (DB-9 Female)	USB (B-TYPE) to RS232 (VCP)
RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, RI, GND	TxD, RxD, RTS, CTS, DTR, DSR, DCD, RI, GND
Baud Rate	9600 bps ~ 115200 bps	
Include Cable	RS-232 9-Pin Female to Male cable (CA-0915)	SB Type A to Type B cable (CA-USB18)
Compatibility	-	USB 1.1 and 2.0 standard
USB Driver Support	-	Windows 98/2000/XP/Vista/7 WinPAC (WinCE5.0) LinPAC (Linux kernel 2.6)
Reset Input		
Input Type	Isolated, 3750 V_{rms}	
On Voltage Level	+3.5 V_{DC} ~ +30 V_{DC}	
Off Voltage Level	+1V Max.	
Input Impedance	3 kΩ, 0.25 W	
LED Indicators		
Power	Red	
GSM/GPRS	Green	
Power		
Protection	Power reverse polarity protection	
Frame Ground Protection	ESD, Surge, EFT, Hi-Pot	
Required Supply Voltage	+10 V_{DC} ~ +30 V_{DC}	
Power Consumption	dle: 25 mA @ 24 V_{DC}; Data Link: 100 ~ 400 mA (peak) @ 24 V_{DC}	
Connection	5-Pin 2.81 mm removable Terminal Block	
Mechanical		
Casing	Plastic	
Flammability	UL 94V-0 materials	
Dimensions (W x L x H)	33 mm x 87 mm x 107 mm	
Installation	DIN-Rail	

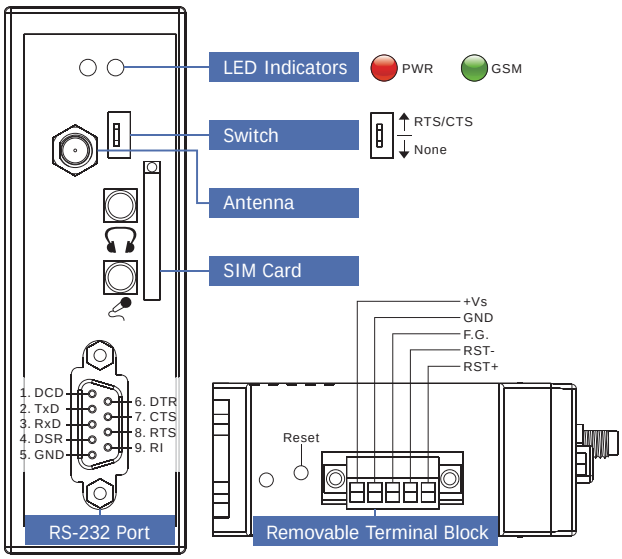
Models	GTM-201-RS232	GTM-201-USB
Environment		
Operating Temperature	-25 °C ~ +75 °C	
Storage Temperature	-40 °C ~ +80 °C	
Humidity	5% ~ 90% RH, Non-condensing	

Applications

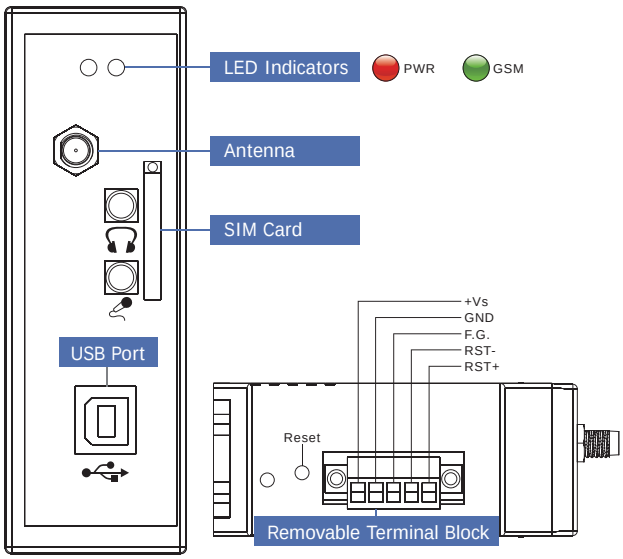


Appearance

GTM-201-RS232

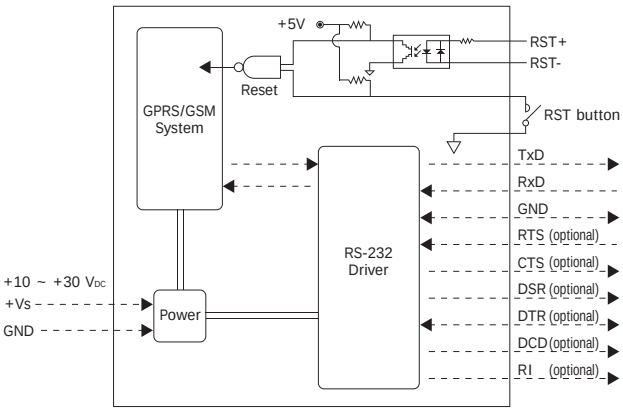


GTM-201-USB

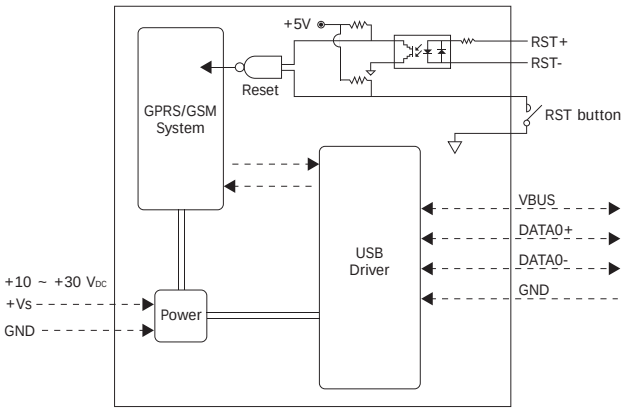


Internal I/O Structure

GTM-201-RS232

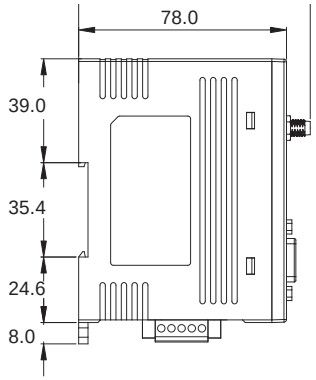


GTM-201-USB

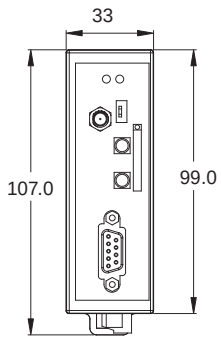


Dimensions (Units: mm)

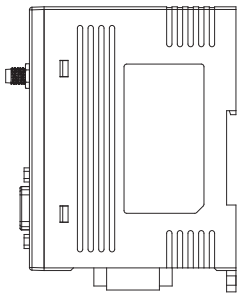
GTM-201-RS232



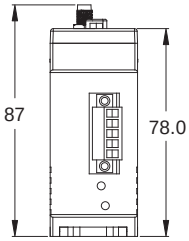
Left Side View



Front View

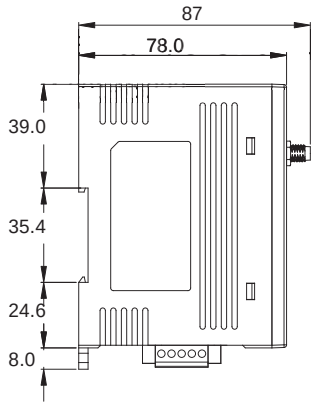


Right Side View

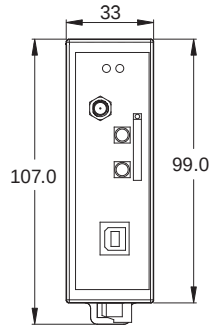


Bottom View

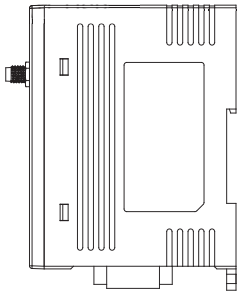
GTM-201-USB



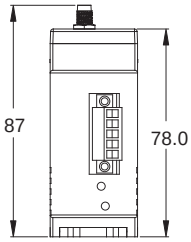
Left Side View



Front View

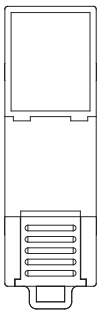


Right Side View

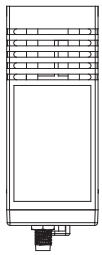


Bottom View

GTM-201-RS232/GTM-201-USB



Rear View



Top View

Ordering Information

GTM-201-RS232 CR	Industrial Quad-band 2G GSM/GPRS modem with RS232 Interface (RoHS)
GTM-201-USB CR	Industrial Quad-band 2G Modem with USB Interface (RoHS)

Accessories

ANT-421-01	3m External GPRS/GSM Antenna

GTM-201-3GWA
GTM-201P-3GWA

Industrial Tri-band 3G WCDMA Modem

Features

- Support 3G Tri-band UMTS/HSDPA/HSUPA 850/1900/2100 MHz
- Support Quad-band GSM/GPRS/EDGE 850/900/1800/1900 MHz
- Designed for Data, SMS and Voice Applications
- Support TCP Server, TCP Client, UDP Client connection from 2G/3G network
- Support Standard AT Commands
- Include a Digital Input Channel uses to reset the system
- Provide the MIC Input and Audio (32 Ω) Output Interface
- LED Indicators for 3G and Power Indication
- High reliability in harsh environments
- The RS-232 Port supports 9600 to 115200 bps
- USB Driver for Windows, WinPAC (WinCE5.0), LinPAC (Linux 2.6)
- DIN-Rail mountable

Introduction

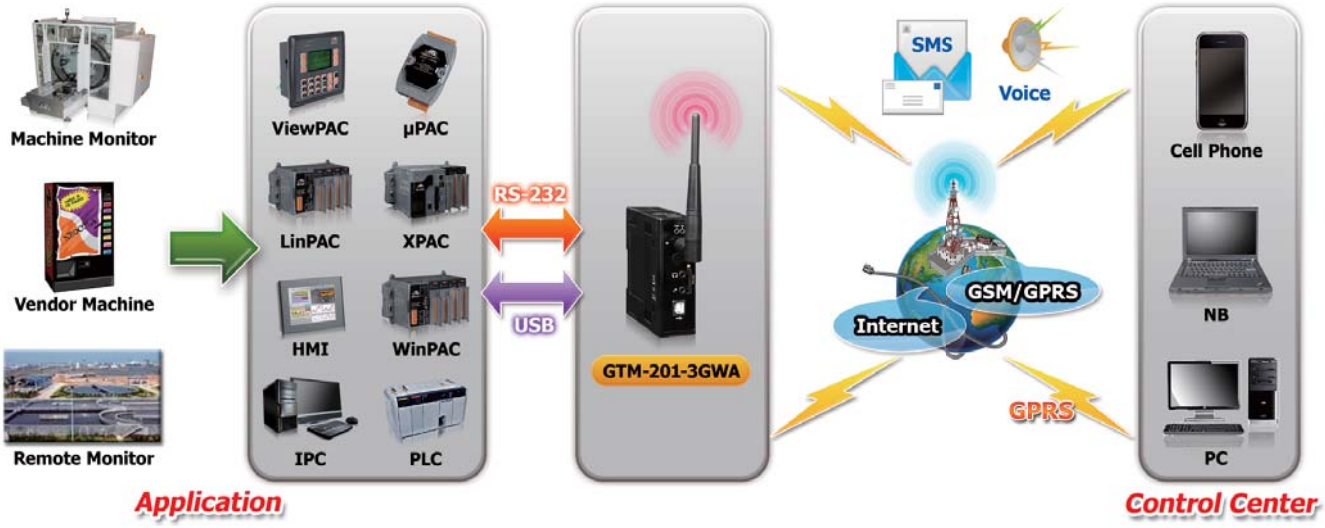
The GTM-201-3GWA/GTM-201P-3GWA is an industrial Tri-band 3G WCDMA cellular modem with RS-232, USB and GPS (only GTM-201P-3GWA) interfaces working on frequencies of Tri-band WCDMA 2100/1900/850 MHz, and Quad-band GSM 850/900/1800/1900 MHz. The modem which supports up to 7.2 Mbps downlink speed and 5.76 Mbps uplink speed services can utilize the 3G/GSM/GPRS network for convenient and inexpensive data transfer from remote instruments, meters, computers or control systems in either live data or packet data. The GTM-201-3GWA/ GTM-201P-3GWA enables internet connection over 3G, when 3G service is available. It automatically selects 3G or GPRS continue to work. Moreover, with the voice interface, these modems can also be applied to the alarm system with sounds.

Specifications

Models	GTM-201-3GWA	GTM-201P-3GWA
3G System		
Frequency Band	UMTS: 2100/1900/850 MHz	
Data Transmission	UMTS/HSDPA/HSUPA Downlink transfer: Max. 7.2 Mbps; Uplink transfer: Max. 5.76 Mbps	
GSM / GPRS System		
Frequency Band	GSM: 850/900/1800/1900 MHz	
GPRS Connectivity	GPRS class 12/10; GPRS station class B	
DATA GPRS	Downlink transfer: Max. 85.6 Kbps; Uplink transfer: Max. 42.8 Kbps	
CSD	Up to 14.4 Kbps	
Coding Schemes	CS 1, CS 2, CS 3, CS 4	
SMS		
SMS	MT, MO, CB, Text and PDU mode	
GPS System		
Support Channels	-	32
Protocol Support	-	NMEA 0183
Comm. Interface		
COM Ports	TxD, RxD, GND	
COM Port Baud Rate	9600 bps ~ 115200 bps	
USB	USB 2.0 (high speed)	
USB Driver Support	Windows 98/2000/XP/Vista/7 LinPAC (Linux kernel 2.6)	
LED Indicators		
Power	Red	
3G/GSM	Green	
Power		
Protection	Power reverse polarity protection	
Frame Ground Protection	ESD, Surge, EFT, Hi-Pot	
Required Supply Voltage	+10 V_{DC} ~ +30 V_{DC}	
Power Consumption	Idle: 25 mA @ 24 V_{DC}; Data Link: 100 ~ 400 mA (peak) @ 24 V_{DC}	
Connection	8-Pin 3.5 mm Removable Terminal Blockhh	

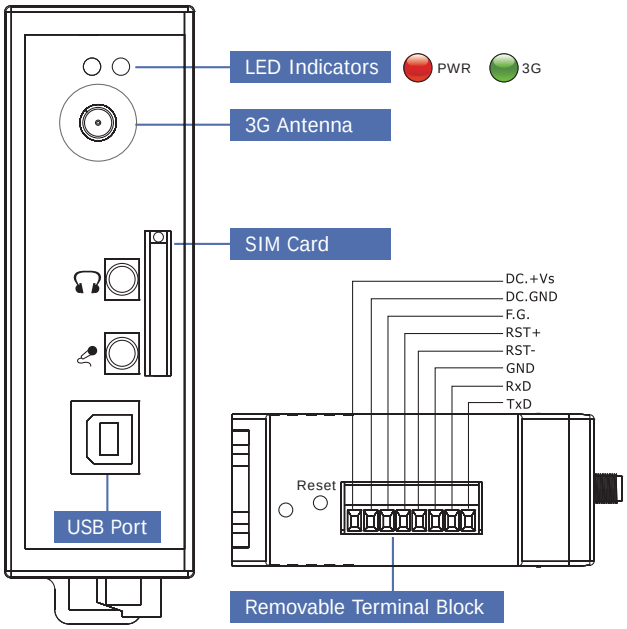
Models	GTM-201-3GWA	GTM-201P-3GWA
Reset Input		
Input Type	Isolated, 3750 V_{rms}	
On Voltage Level	+3.5 V_{DC} ~ +30 V_{DC}	
Off Voltage Level	+1 V_{DC} Max.	
Input Impedance	3 kΩ, 0.25 W	
Mechanical		
Casing	Plastic	
Flammability	UL 94V-0 materials	
Dimensions (W x L x H)	33 mm x 87 mm x 107 mm	
Installation	DIN-Rail	
Environment		
Operating Temperature	-25 °C ~ +75 °C	
Storage Temperature	-40 °C ~ +80 °C	
Humidity	5% ~ 95% RH, Non-condensing	

Applications

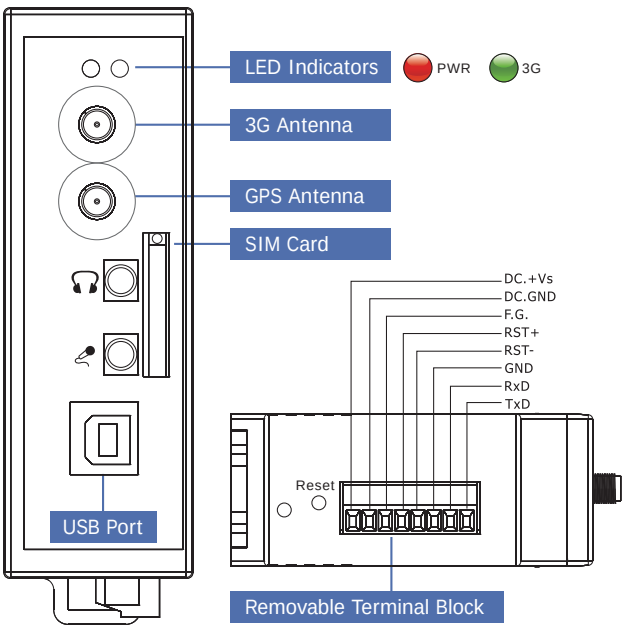


Appearance

GTM-201-3GWA

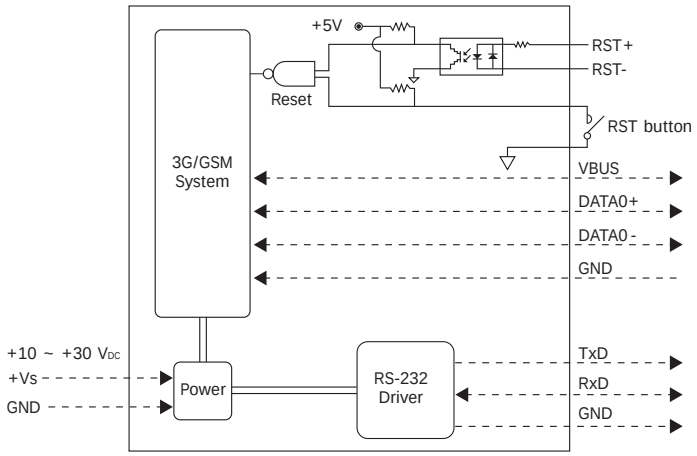


GTM-201P-3GWA



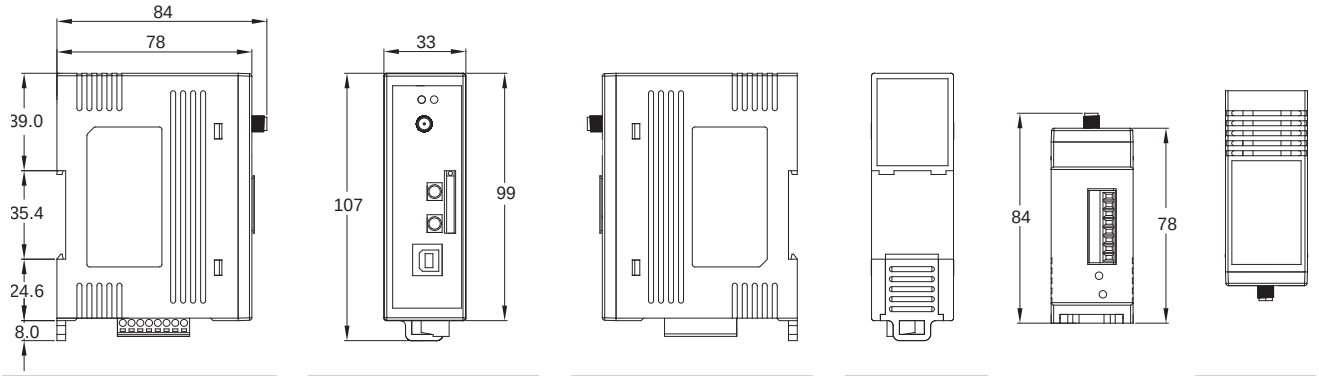
Internal I/O Structure

GTM-201-3GWA/GTM-201P-3GWA



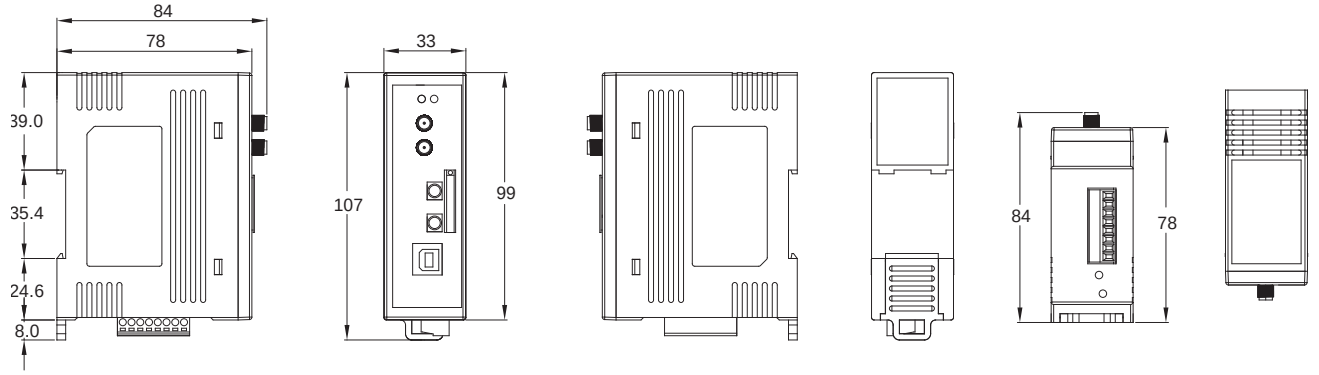
Dimensions (Units: mm)

GTM-201-3GWA



Left Side View | Front View | Right Side View | Rear View | Top View | Bottom View

GTM-201P-3GWA



Left Side View | Front View | Right Side View | Rear View | Top View | Bottom View

Ordering Information

GTM-201-3GWA	Industrial Tri-band 3G WCDMA modem with RS-232 and USB (RoHS)
GTM-201P-3GWA	Industrial Tri-band 3G WCDMA modem with RS-232, USB and GPS (RoHS)

Accessories

ANT-421-01	3 m External GPRS/GSM Antenna
ANT-115-03	5 m GPS Active External Antenna

I-8212W/I-8213W

Industrial Quad-band 2G GSM/GPRS Modem

Features

- Quad-band 2G Modem Operating of 850/900/1800/1900 MHz
- Designed for GPRS and SMS Applications
- Support TCP Server, TCP Client, UDP Client connection from 2G network
- Supports 32 channels GPS and NMEA 0183 version 3.01 (I-8213W only)
- PPS: 100ms pulse ouput/sec for precise timekeeping and time measurement (I-8213W only)
- Support Standard AT Commands
- High reliability in harsh environments
- LED indicators for power, GSM and GPS (I-8213W only) indication
- 4 KV ESD Protection
- DIN-Rail mountable
- Connect any Serial Device to GPRS and the Internet

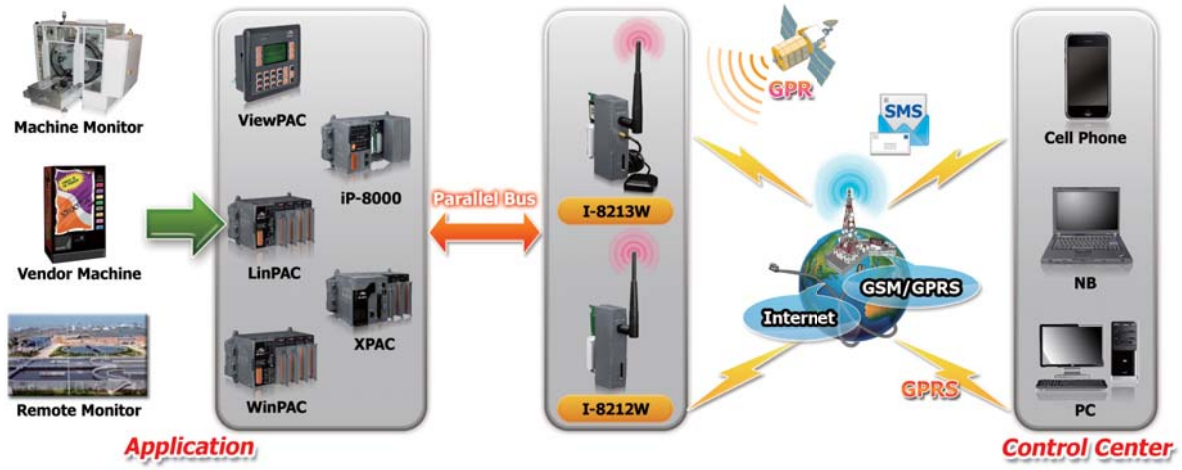
Introduction

The I-8212W/I-8213W are industrial Quad-band GSM/GPRS module with GPS function (I-8213W only) that work on frequencies of GSM 850 MHz, EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz. These modules utilize the GSM/GPRS network for convenient and inexpensive data transfer from remote instruments, meters, computers or control systems in either live data or packet data. I-8212W/I-8213W has 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. With the features of I-8212W/I-8213W, the systems can be SMS and GPRS connection applications with our PAC series like iP-8000, WinPAC, LinPAC or XPAC.

Specifications

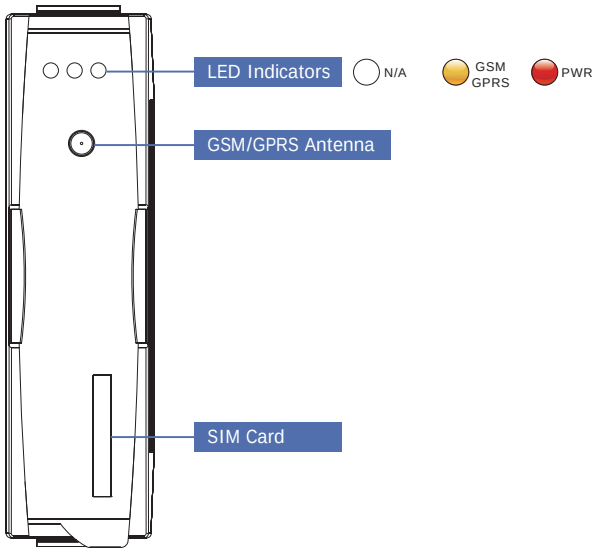
Models	I-8212W	I-8213W
2G System		
Frequency Band	Quad-band: 850/900/1800/1900 MHz	
GPRS Multi-slot	Class 10/8	
GPRS Mobile Station	Class B	
GPRS Class 10	Up to 85.6 kbps download speed	
CSD	Up to 14.4 kbps	
Compliant with GSM Phase 2/2+	Class 4 (2 W @ 850/900 MHz); Class 1 (1 W @ 1800/1900 MHz)	
Coding Schemes	CS 1, CS 2, CS 3, CS 4	
SMS	Text and PDU Mode	
GPS Interface		
Support Channels	-	32
Sensitivity	-	Tracking = up to 159 dBm (with external LNA) Cold start = up to 146 dBm (with external LNA)
Acquisition Time	-	Hot Start (Open Sky) = 2s (typical) Cold Start (Open Sky) = 36s (typical)
Protocol Support	-	NMEA 0 183 version 3.01
LED Indicators		
Power	Red	
GSM/GPRS	Yellow	
GPS	-	Green
Power		
Frame Ground Protection	ESD, Surge, EFT, Hi-Pot	
Power Consumption	Idle: 0.16 A @ 5 V_{DC}; Data Link: 0.2 ~ 1.64 A (peak) @ 5 V_{DC}	
Mechanical		
Casing	Plastic	
Dimensions (W x L x H)	30mm x 85 mm x 114mm	
Environment		
Operating Temperature	-25 °C ~ +75 °C	
Storage Temperature	-40 °C ~ +80 °C	
Humidity	5% ~ 90% RH, Non-condensing	

Applications

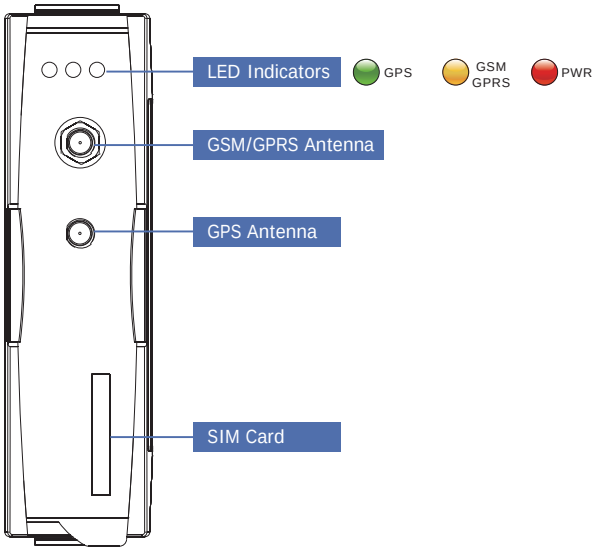


Appearance

I-8212W

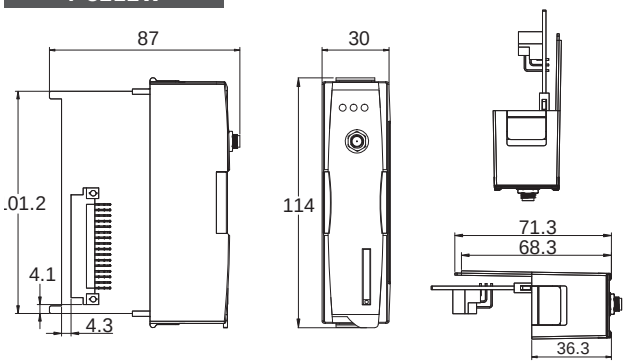


I-8213W



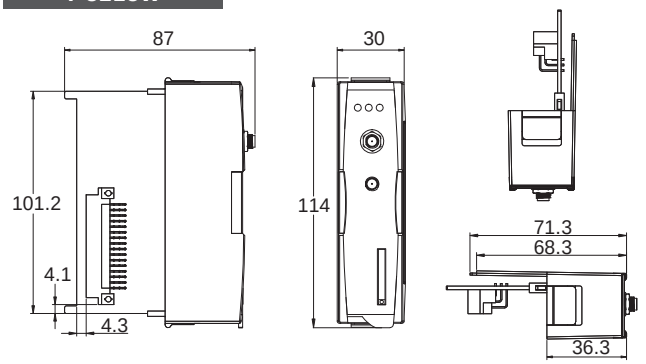
Dimensions (Units: mm)

I-8212W



Left Side View | Front View | Top View

I-8213W



Left Side View | Front View | Top View

Ordering Information

I-8212W CR	Industrial Quad-band 2G GSM/GPRS module (RoHS)
I-8213W CR	Industrial Quad-band 2G GSM/GPRS module with GPS function (RoHS)

Accessories

ANT-421-01	3 m External GPRS/GSM Antenna
ANT-115-03	5 m GPS Active External Antenna

4.3. Intelligent 2G/3G Module

GT-530

Intelligent SMS Alarm Controller

Features

- Quad-band 2G Modem Operating of 850/900/1800/1900 MHz
- Identify ASCII or Unicode SMS Automatically
- Support up to 160 ASCII Characters
- Support Max. 70 Unicode Characters
- Built-in ASCII Command and Transparent Communication Modes
- Max. 10 Default Phone Numbers
- Support DC +10 V_{DC} ~ +30 V_{DC} Power Input
- Support 3.7 V Li-ion Battery Backup
- Built-in Watch-dog Function
- Industrial Design with Surge Protection

Introduction

GT-530 is an intelligent SMS controller for industry applications with the simple commands and SMS tunnel function, and power can be input by the external power or Li-Battery. It supports UNICODE or 7 bit format for users to implement sending SMS messages with various languages. Applying GT-530, the SMS report can be sent by defined time or DI/counter event trigger. This can be a remote control and alarm system allowing you to use your mobile phone to monitor and control your business from any location. Its alarm facilities provide a flexible way to distribute critical alarm information to any number of mobile phone users. GT-530 can monitor total 10 digital inputs (or 6 counters). The user can also obtain the status of I/O through SMS messages. The GT-530 also has 2 Digital output which can be activated via DI trigger or SMS to control the lamps, pumps, heaters etc.

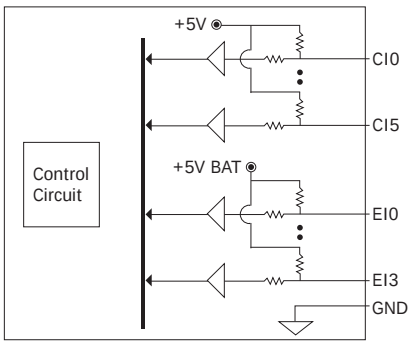
Specifications

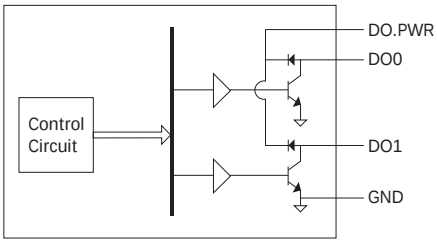
Models	GT-530
System	
CPU	32 bit
SRAM	32 Kbytes
Flash Memory	512 Kbytes
RTC	Gives time (sec, min, hour) & date, leap year compensation
WDT	Yes
2G System	
Frequency Band	Quad-band: 850/900/1800/1900 MHz
Compliant with GSM Phase 2/2+	Class 4 (2 W @ 850/900 MHz); Class 1 (1 W @ 1800/1900 MHz)
Coding Schemes	CS 1, CS 2, CS 3, CS 4
SMS	7 bits and UCS2
Serial Ports	
COM 2	RS-232: TxD, RxD, GND (use for device configuration)
COM 3	RS-232: TxD, RxD, GND (use for communication with other devices)
Baud Rate	9600 bps ~ 115200 bps
Digital Input	
Input Channels	10 Channel (6 Counter 5~40Hz + 4 Channel Digital input powered by external power or Li-battery)
On Voltage Level	+3.5 V_{DC} ~ +30 V_{DC}
Off Voltage Level	+1 V Max.
Digital Output	
Output Channels	2
Output Type	Open Collector Output
Load Voltage	+30 V_{DC} Max.
Load Current	100 mA Max.
Power	
Protection	Power reverse polarity protection
Frame Ground Protection	ESD, Surge, EFT, Hi-Pot
Required Supply Voltage	+10 V_{DC} ~ +30 V_{DC}
Mechanical	
Casing	Plastic
Flammability	UL 94V-0 materials
Dimensions (W x L x H)	91 mm x 132 mm x 52 mm
Installation	DIN-Rail
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-40 °C ~ +80 °C
Humidity	5% ~ 90% RH, Non-condensing

Applications

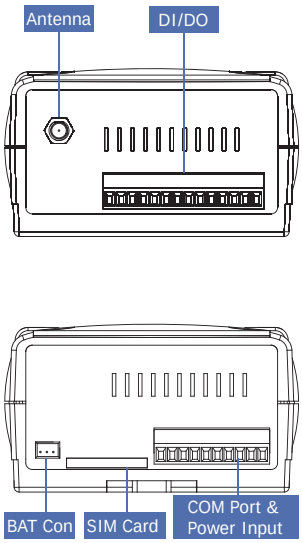
- Signal Alarm and SMS communication
- Home security
- Remote maintenance

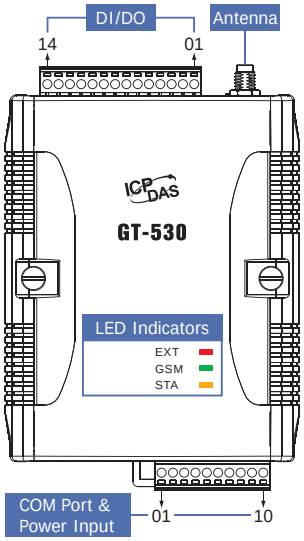
Internal I/O Structure





Appearance

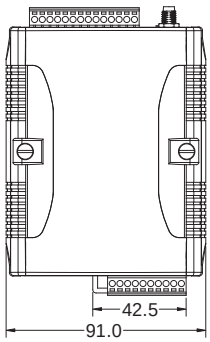




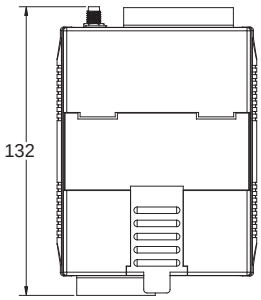
DI/DO		
Terminal No.		Pin Assignment
DI	01	DI0
	02	DI1
	03	DI2
	04	DI3
	05	DI4
	06	DI5
	07	DI6
	08	DI7
	09	DI8
	10	DI9
DO	11	DO0
	12	DO1
	13	DO.PWR
DI/DO	14	Ext.GND

COM Port & Power Input		
Terminal No.		Pin Assignment
COM3 RS-232	01	GND
	02	RxD3
	03	TxD3
COM2 RS-232	04	GND
	05	RxD2
	06	TxD2
N/A	07	N/A
Power Input: +10 VDC ~ +30 VDC	08	DC.+Vs
	09	DC.GND
Frame Ground	10	F.G.

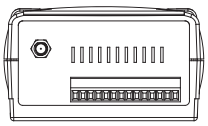
Dimensions (Units: mm)



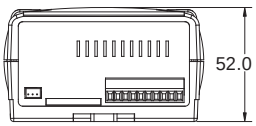
Front View



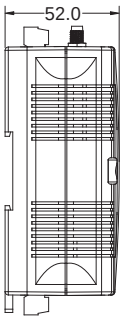
Rear View



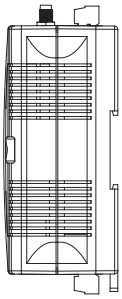
Top View



Bottom View



Left Side View



Right Side View

Ordering Information

GT-530 CR	Intelligent SMS Alarm Controller (RoHS)

Accessories

ANT-421-01	3 m External GPRS/GSM Antenna

GT-531

Intelligent Modbus SMS/GSM Gateway

Features

- Quad-band 2G Modem Operating of 850/900/1800/1900 MHz
- Support Modbus RTU slave protocol
- Support Max. 256 short messages and voice alarms
- Support Max. 70 Unicode Characters
- Escalation and reminder function
- Configurable SMS messages
- Up to 256 mobile phones can be alerted for each alarm point
- The phone numbers can be divided into groups
- Built-in Watch-dog Function
- DIN-Rail mountable

Introduction

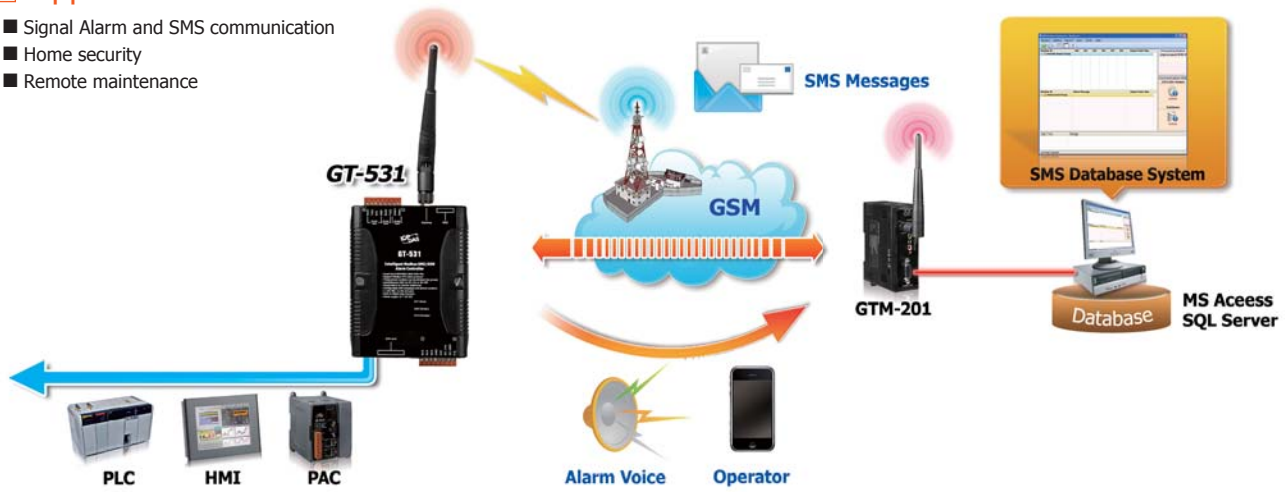
GT-531 is an intelligent Modbus SMS/GSM Gateway for industry M2M applications. It is convenient for users to apply to M2M applications with the host like PC, PLC, HMI and PAC. It supports UNICODE format for users to send SMS messages to the specific mobile phones by Modbus protocol with various language. That can make the current system to M2M applications. Moreover, the GT-531 also supports the sound alarm application with the pre-defined voice files. It can be used to inform operator the urgent event immediately. For managing more GT-53x series remotely, ICP DAS provides SMS DBS software for users to apply in the system. Therefore, the GT-531 can be a powerful tool allowing you to use your mobile phone to monitor and control your business from any location.

Specifications

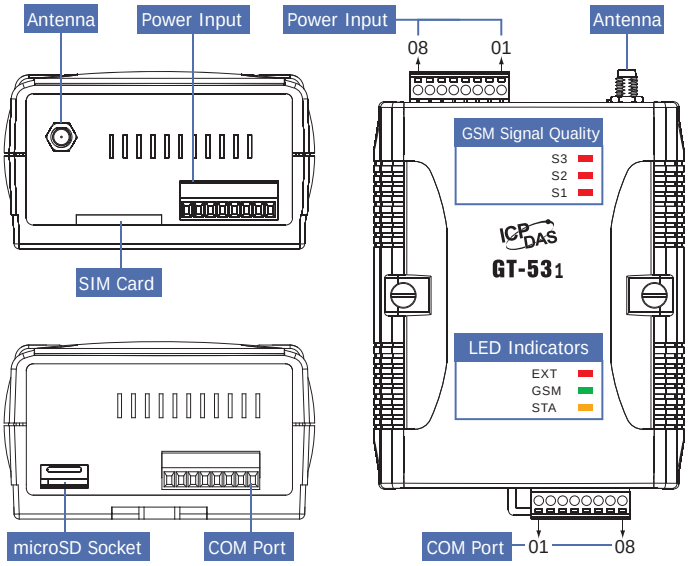
Models	GT-531
System	
CPU	32 bit
SRAM	32 Kbytes
Flash Memory	512 Kbytes
RTC	Gives time (sec, min, hour) & date, leap year compensation
WDT	Yes
SD Interface	Yes (2 GB Max.)
2G System	
Frequency Band	Quad-band: 850/900/1800/1900 MHz
Compliant with GSM Phase 2/2+	Class 4 (2 W @ 850/900 MHz); Class 1 (1 W @ 1800/1900 MHz)
Coding Schemes	CS 1, CS 2, CS 3, CS 4
SMS	UCS2
Serial Ports	
COM 1	RS-232: TxD, RxD, GND (use for device configuration and debug)
COM 2	RS-232: TxD, RxD, GND (use for communication with other devices)
COM 3	RS-485: D+, D- (use for communication with other devices)
Baud Rate	9600 bps ~ 115200 bps
Power	
Protection	Power reverse polarity protection
Frame Ground Protection	ESD, Surge, EFT, Hi-Pot
Required Supply Voltage	+10 VDC ~ +30 VDC
Mechanical	
Casing	Plastic
Flammability	UL 94V-0 materials
Dimensions (W x L x H)	91 mm x 132 mm x 52 mm
Installation	DIN-Rail
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-40 °C ~ +80 °C
Humidity	5% ~ 90% RH, Non-condensing

Applications

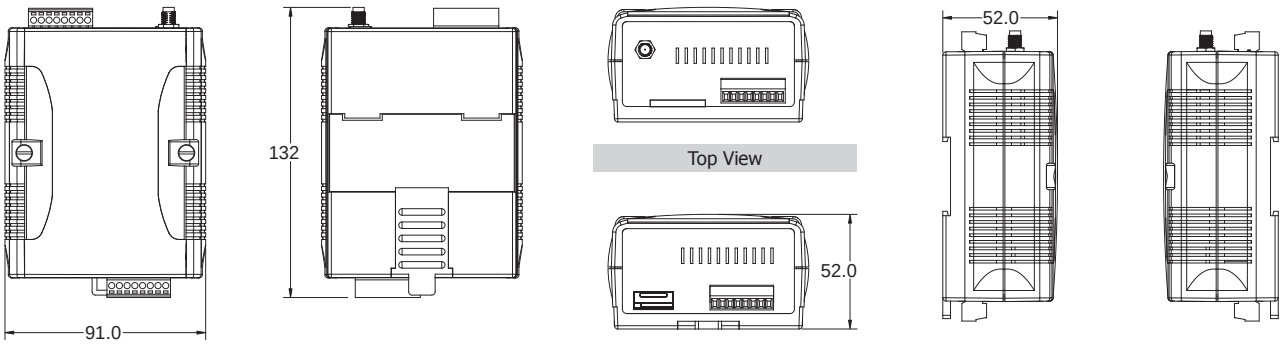
- Signal Alarm and SMS communication
- Home security
- Remote maintenance



Appearance



Dimensions (Units: mm)



Front View | Rear View | Bottom View | Left Side View | Right Side View

Ordering Information

GT-531 CR	Intelligent Modbus SMS/GSM Gateway (RoHS)

Accessories

ANT-421-01	3 m External GPRS/GSM Antenna

GT-534

Intelligent SMS/GSM Alarm Controller

Features

- Quad-band 2G Modem Operating of 850/900/1800/1900 MHz
- Support SMS DBS software
- Identify ASCII or Unicode SMS Automatically
- Support Max. 140 ASCII and 70 Unicode Characters
- Built-in ASCII Command and Transparent Communication Modes
- Max. 10 Default Phone Numbers
- Voice Alarm and SMS triggered by DI trigger or exceed AI/ Counter preset limits
- DO control by dual-tone multi-frequency
- Support 3.7 V Li-ion Battery Backup
- Built-in Watch-dog Function
- Industrial Design with Surge Protection

Introduction

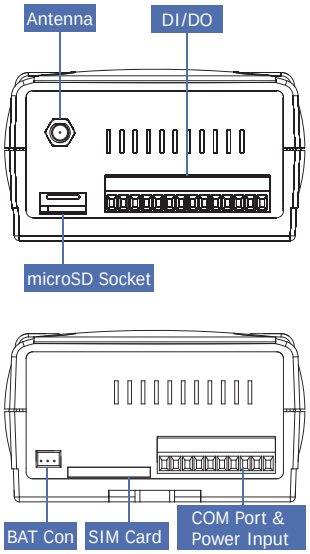
The GT-534 is an intelligent SMS/GSM controller for industry applications with the simple commands and SMS tunnel function, and power can be input by the external power or Li-Battery. It supports UNICODE or 7 bit format for users to implement sending SMS messages with various languages. The GT-534 also provides the sound alarm application with the pre-defined voice files. In addition, the DTMF function of the GT-534 is for the applications with the keypad of phones to control the local I/O. And, With the SMS DBS software of ICP DAS, users can manage the GT-534 in PC centrally.

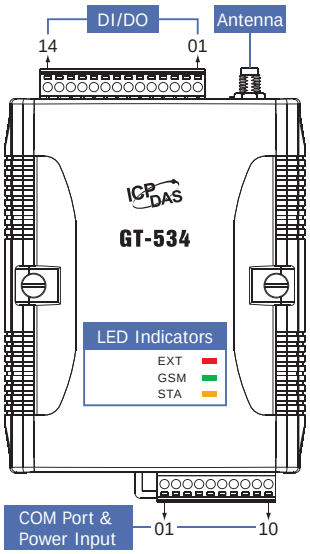
Specifications

Models	GT-534
2G System	
Frequency Band	Quad-band: 850/900/1800/1900 MHz
Compliant with GSM Phase 2/2+	Class 4 (2 W @ 850/900 MHz); Class 1 (1 W @ 1800/1900 MHz)
Coding Schemes	CS 1, CS 2, CS 3, CS 4
SMS	7 bits and UCS2
Serial Ports	
COM 1	RS-232: TxD, RxD, GND (use for device configuration)
COM 2	RS-232, RS-485 (Transparency)
Baud Rate	9600 bps ~ 115200 bps
Digital Input	
Input Channels	6 (Wet Contact)
Input Type	Isolated
On Voltage Level	+3.5 VDC ~ 30 VDC
Off Voltage Level	+1 V Max.
Digital Output	
Output Channels	2
Output Type	Isolated
Load Current	100 mA/channel
Analog Input	
Input Channels	1
Resolution	12-bit
Input Range/Type	0 ~ 20 mA
Sample Rate	1 Hz Max.
Power	
Protection	Power reverse polarity protection
Frame Ground Protection	ESD, Surge, EFT, Hi-Pot
Required Supply Voltage	+10 VDC ~ +30 VDC
Mechanical	
Casing	Plastic
Flammability	UL 94V-0 materials
Dimensions (W x L x H)	91 mm x 132 mm x 52 mm
Installation	DIN-Rail
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-40 °C ~ +80 °C
Humidity	5% ~ 90% RH, Non-condensing

Applications

Appearance

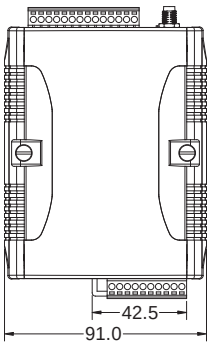




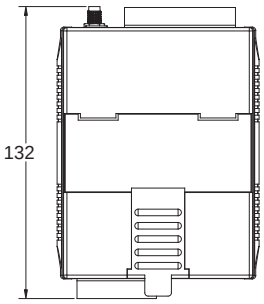
DI/DO/AI		
Terminal No.		Pin Assignment
DI	01	DI0
	02	DI1
	03	DI2
	04	DI3
	05	DI4
	06	DI5
	07	DI.COM
DO	08	DO.PWR
	09	DO0
	10	DO1
	11	DO.GND
	12	N/A
AI	13	Ain+
	14	Ain -

COM Port & Power Input		
Terminal No.		Pin Assignment
COM1 RS-232	01	GND
	02	RxD1
	03	TxD1
COM2 RS-485	04	D+
	05	D -
	06	RTS+
	07	RTS -
Power Input: +10 VDC ~ +30 VDC	08	DC.+Vs
	09	DC.GND
Frame Ground	10	F.G.

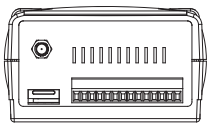
Dimensions (Units: mm)



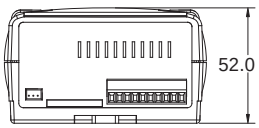
Front View



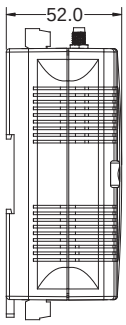
Rear View



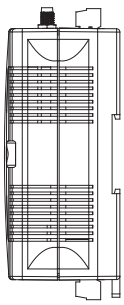
Top View



Bottom View



Left Side View



Right Side View

Ordering Information

GT-534 CR	Intelligent SMS/GSM Alarm Controller (RoHS, include: 2G micro SD card)

Accessories

ANT-421-01	3 m External GPRS/GSM Antenna
BT600	3.7 V 600 mAh Battery
BT1200	3.7 V 1200 mAh Battery

GT-540/GT-540P

Intelligent GPRS Remote Terminal Unit with GPS

Features

- Quad-band 2G Modem Operating of 850/900/1800/1900 MHz
- Automatic/continuous GPRS Link Management
- Support Modbus RTU protocol with Max. 3 Modbus RTU devices.
- Support M2M OPC Server for SCADA system
- Easy-to-use API tool for users to develop their applications by various program development tools
- Can be the GPRS I/O device
- Support data transferring by E-mail
- DO control by dual-tone multi-frequency
- Support 3.7 V Li-ion Battery Backup
- Built-in Watch-dog Function
- Industrial Design with Surge Protection

Introduction

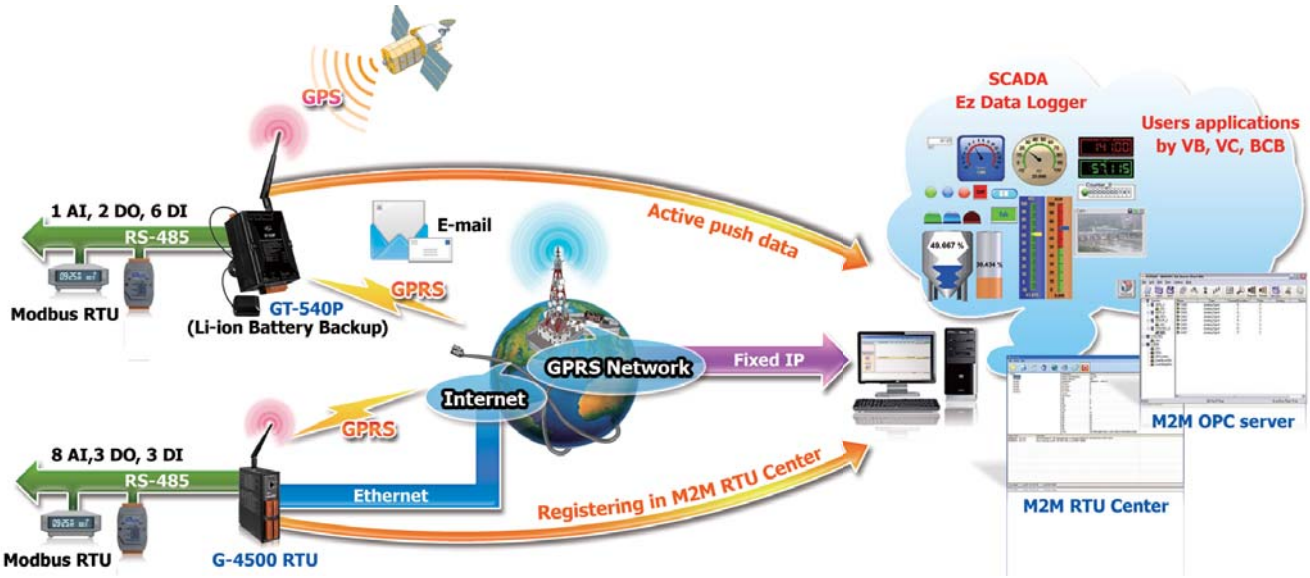
The GT-540/GT-540P is an intelligent Active GPRS Remote Terminal Unit with GPS (GT-540P only). It features GPRS/GSM module, 6 digital inputs, 2 digital outputs, 1 analog input, 2 RS-232, 1 RS-485 and SD interface. It can be used in M2M application fields to transfer the local I/O or Modbus device's data by GPRS by the defined period or DI/AI triggers. The local I/O or GPS data can also be stored in the SD card to become a remote data logger. For another communication path, the unit offers the e-mail mode to transfer the data by e-mail via GPRS for users to choose. The simple I/O linkage function of the module can reach the real time control in local field. It also supports Li-ion battery as another power source when the main power is failed temporarily. Therefore, the GT-540/GT-540P is an ideal solution for environmental monitoring and remote device management for M2M applications.

Specifications

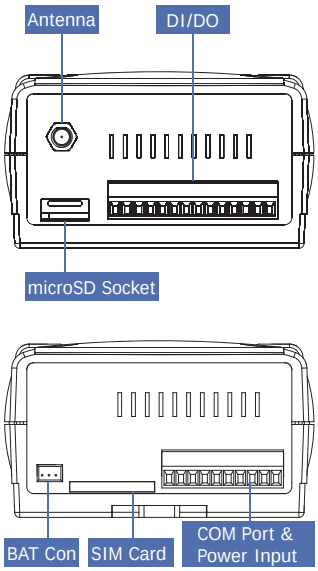
Models	GT-540	GT-540P
System		
CPU	32 bit	
SRAM	64 Kbytes	
Flash Memory	512 Kbytes	
RTC	Gives time (sec, min, hour) & date, leap year compensation	
WDT	Yes	
SD Interface	Yes (2 GB Max.)	
2G System		
Frequency Band	Quad-band: 850/900/1800/1900 MHz	
GPRS Multi-slot	Class 10/8	
GPRS Mobile Station	Class B	
GPRS Class 10	Up to 85.6 kbps download speed	
Compliant with GSM Phase 2/2+	Class 4 (2 W @ 850/900 MHz); Class 1 (1 W @ 1800/1900 MHz)	
Coding Schemes	CS 1, CS 2, CS 3, CS 4	
Serial Ports		
COM 1	RS-232: TxD, RxD, GND (use for device configuration)	
COM 2	RS-232, RS-485 (Transparency)	
GPS System		
Support Channels	-	32
Protocol Support	-	NMEA 0183
Digital Input		
Input Channels	6 (Wet Contact)	
Input Type	Sink or Source, Isolated channel with common power or ground	
On Voltage Level	+3.5 VDC ~ 30 VDC	
Off Voltage Level	+1 V Max.	
Counters	6 (16 bit, 5 ~ 40 Hz), Min. Pulse Width: 25 ms	
Digital Output		
Output Channels	2	
Output Type	Open-Collector (NPN) (100 mA @ 24 VDC)	
Load Voltage / Current	+24 V / 100 mA Max.	

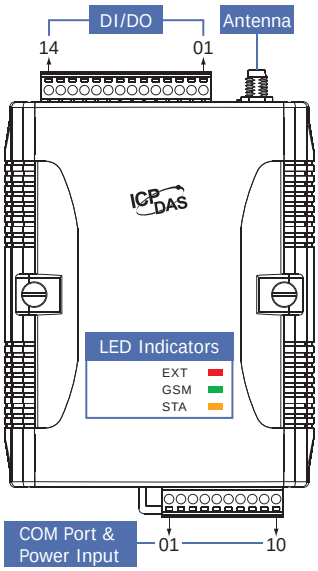
Models	GT-540	GT-540P
Analog Input		
Input Channels	1	
Resolution	12-bit	
Input Range/Type	0 ~ 20 mA	
Power		
Protection	Power reverse polarity protection	
Frame Ground Protection	ESD, Surge, EFT, Hi-Pot	
Required Supply Voltage	+10 VDC ~ +30 VDC	
Mechanical		
Casing	Plastic	
Flammability	UL 94V-0 materials	
Dimensions (W x L x H)	91 mm x 132 mm x 52 mm	
Installation	DIN-Rail	
Environment		
Operating Temperature	-25 °C ~ +75 °C	
Storage Temperature	-40 °C ~ +80 °C	
Humidity	5% ~ 90% RH, Non-condensing	

Applications



Appearance

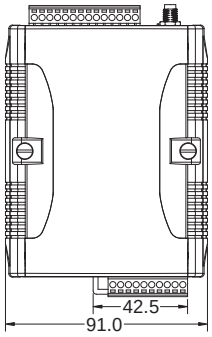




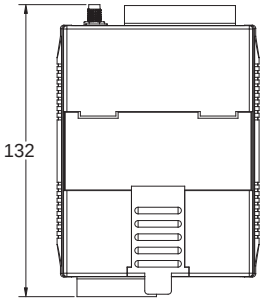
DI/DO/AI		
Terminal No.		Pin Assignment
DI	01	DI0
	02	DI1
	03	DI2
	04	DI3
	05	DI4
	06	DI5
	07	DI.COM
DO	08	DO.PWR
	09	DO0
	10	DO1
	11	DO.GND
	12	N/A
AI	13	Ain+
	14	Ain -

COM Port & Power Input		
Terminal No.		Pin Assignment
COM1 RS-232	01	GND
	02	RxD1
	03	TxD1
COM2 RS-485	04	D+
	05	D -
	06	RTS+
	07	RTS -
Power Input: +10 VDC ~ +30 VDC	08	DC.+Vs
	09	DC.GND
Frame Ground	10	F.G.

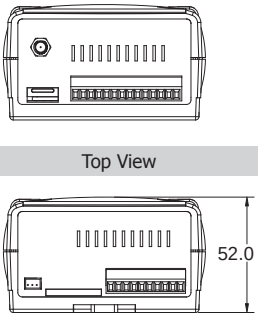
Dimensions (Units: mm)



Front View

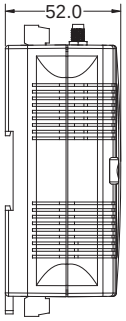


Rear View

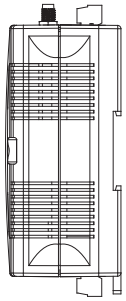


Top View

Bottom View

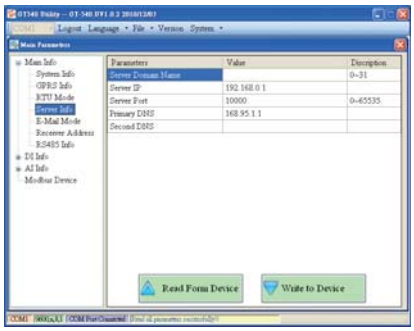


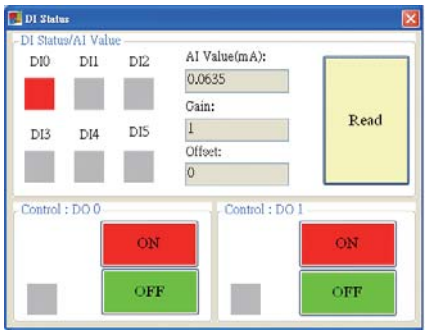
Left Side View



Right Side View

Utility





Ordering Information

GT-540 CR	Intelligent GPRS Remote Terminal Unit (RoHS, include: 2G micro SD card)
GT-540P CR	Intelligent GPRS Remote Terminal Unit with GPS (RoHS, include: 2G micro SD card)

Accessories

ANT-421-01	3 m External GPRS/GSM Antenna
ANT-115-03	5 m GPS Active External Antenna
BT600	3.7 V 600 mAh Battery
BT1200	3.7 V 1200 mAh Battery

GT-541

Intelligent Multiport Serial to GPRS Gateway

Features

- Quad-band 2G Modem Operating of 850/900/1800/1900 MHz
- Virtual COM Extend Real COM Ports via GPRS
- Remote Configuration by Virtual COM
- 1 x RS-232 port and 1 x RS-485 port for Virtual COM. 1 x Utility port for Configuration
- Built-in Watch-dog Function
- Power Reverse Polarity Protection
- Power supply +10 VDC ~ +30 VDC
- DIN-Rail mountable

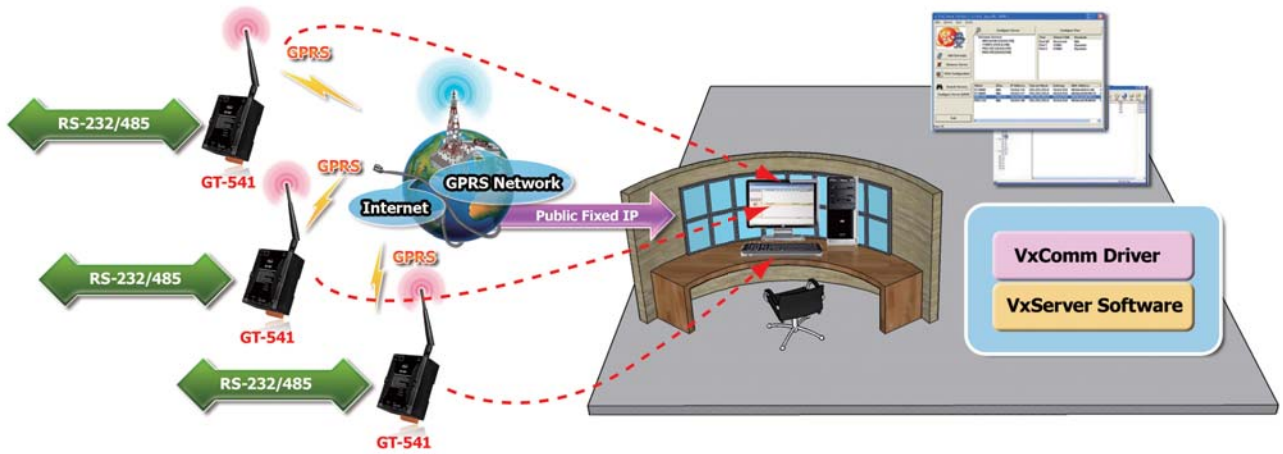
Introduction

GT-541 is an intelligent multiport serial to GPRS gateway for industry M2M applications. It is designed for linking RS-232/485 devices to a GPRS network. The user-friendly VxComm Driver/Utility and VxServer allow users to easily turn the built-in COM ports of the GT-541 into standard COM ports on a PC. By virtue of its protocol independence, a small-core OS and high flexibility, the GT-541 is able to meet the demands of every network-enabled application. M2M solution will improve the service quality and reduce operating costs. Many application areas can be improved by using GT-541.

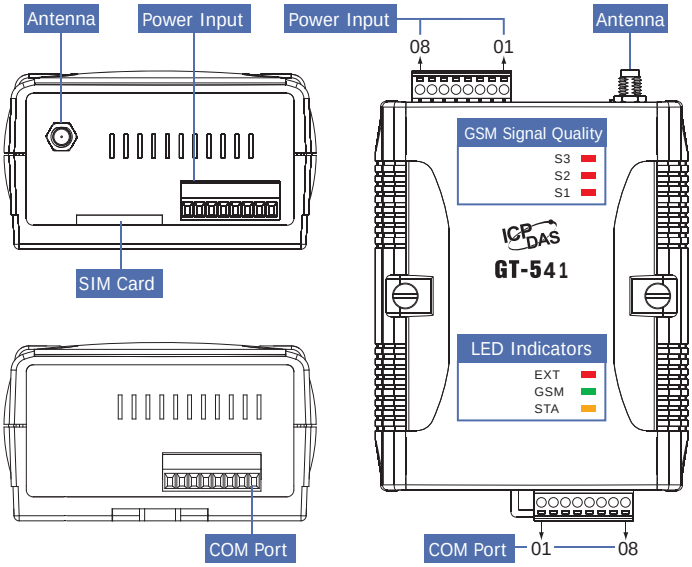
Specifications

Models	GT-541
System	
CPU	32 bit
SRAM	32 Kbytes
Flash Memory	512 Kbytes
WDT	Yes
2G System	
Frequency Band	Quad-band: 850/900/1800/1900 MHz
Compliant with GSM Phase 2/2+	Class 4 (2 W @ 850/900 MHz); Class 1 (1 W @ 1800/1900 MHz)
Coding Schemes	CS 1, CS 2, CS 3, CS 4
Serial Ports	
Unility Port	RS-232: TxD, RxD, GND (use for device configuration and debug)
COM 1	RS-232: TxD, RxD, GND (use for communication with other devices)
COM 2	RS-485: D+, D- (use for communication with other devices)
Baud Rate	9600 bps ~ 115200 bps
Power	
Protection	Power reverse polarity protection
Frame Ground Protection	ESD, Surge, EFT, Hi-Pot
Required Supply Voltage	+10 VDC ~ +30 VDC
Mechanical	
Casing	Plastic
Flammability	UL 94V-0 materials
Dimensions (W x L x H)	91 mm x 132 mm x 52 mm
Installation	DIN-Rail
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-40 °C ~ +80 °C
Humidity	5% ~ 90% RH, Non-condensing

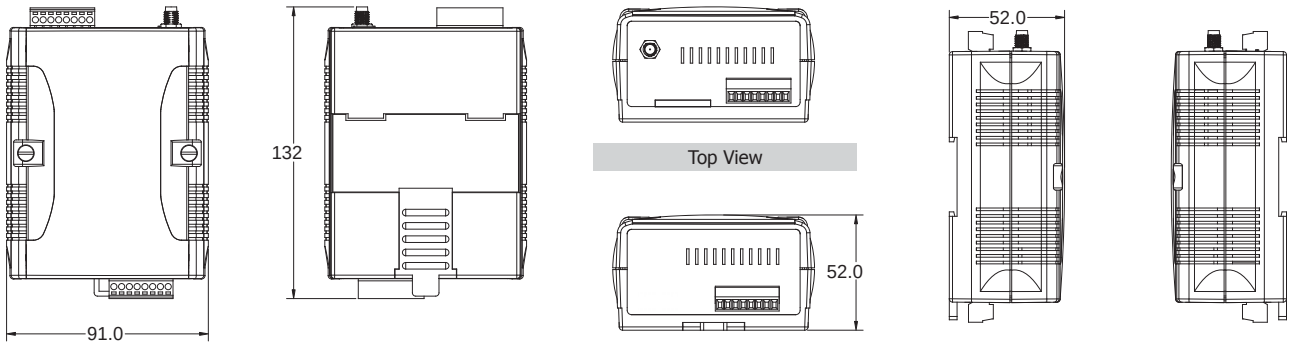
Applications



Appearance



Dimensions (Units: mm)



Front View | Rear View | Bottom View | Left Side View | Right Side View

Ordering Information

GT-541	Intelligent Multiport Serial to GPRS Gateway

Accessories

ANT-421-01	3 m External GPRS/GSM Antenna

WISE-4000/WISE-4000D

WISE I/O SMS Module

Features

- Built-in Web Server for IF-THEN-ELSE rule setting
- Built-in IF-THEN-ELSE rule enigne for logic operation
- No more programming. Just click and get done!
- Support IO, Counter, Timer, Email operations
- Modbus/TCP Protocol for SCADA Software Seamless Integration
- 10/100 Base-TX Ethernet
- Support GSM: Quad-band 850/900/1800/1900 MHz
- I/O: 3 channels DI, 3 channels DO, 8 channels AI
- 128 × 64 dots LCM display (only for WISE-4000D)

Introduction

WISE (Web Inside, Smart Engine) is a product series developed by ICP DAS that functions as control units for use in remote logic control and monitoring in various industrial applications. WISE offers a user-friendly and intuitive web site interface that allows users to implement IF-THEN-ELSE control logic on controllers just a few clicks away; no programming is required. With its powerful and easy-to-use features, it will minimize the learning curve, shorten time to market and dramatically reduce the effort and cost spent on system development.

The WISE-4000 is an embedded controller that is perfect for use in real-time industrial equipment monitoring and environment monitoring. It allows updated status information being sent to the backend monitoring system via Ethernet interface. WISE-4000 supports Modbus/TCP protocol that allows seamless integration with SCADA software. It features 3 digital inputs, 3 digital outputs and 8 analog inputs. WISE-4000 also features SMS sending function for alarm report. By integrating with IF-THEN-ELSE rule engine, WISE-4000 even provides more powerful functions such as Schedule, Send SMS, Send e-mail, Timer & I/O operation for use in various industrial applications.

Specifications

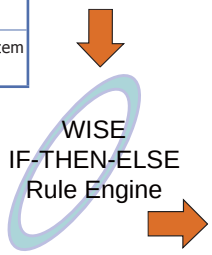
Models		WISE-4000	WISE-4000D
System			
CPU		16-bit CPU	
SRAM/Flash		512K/512K, real time clock, watchdog timer	
NVRAM		31 bytes, battery backup, data valid up to 10 years	
EEPROM		16 KB	
Communication Interface			
COM ports		No (Unsupported by WISE firmware)	
Ethernet		10/100 Base-TX Ethernet controller	
SMS Function			
Frequency Band		Quad-band 850/900/1800/1900 MHz	
GPRS connectivity		GPRS class 10/8; GPRS station class B	
DATA GPRS		Downlink transfer: Max. 85.6 kbps; Uplink transfer: Max. 42.8kbps	
Mode		Text and Unicode mode	
LCD Interface			
General	Effective display area	-	80.61 mm x 14.37 mm (W x H)
	Module Dimension	-	93 mm x 70 mm x 1.6 mm (W x H x T)
Life Time		-	Expected life is more than 100,000 hours under normal operation
LED Indicators			
System		Red	
GPRS		Yellow	
Digital Input			
Input Channels		3	
Input Type		Source (Dry Type), Common Ground	
On Voltage Level		+3.5 V_{DC} ~ 30 V_{DC}	
Off Voltage Level		+1 V_{DC} Max.	
Isolated Voltag		Non-isolated	
Counters	Max. Count	65535 (16 bits)	
	Max. Input Frequency	50 Hz	
	Min. Pulse Width	10 ms	

Models		WISE-4000	WISE-4000D
Digital Output			
Output Channels		3	
Output Type		Open Collector (Sink/NPN)	
Load Voltage		+30 V_{DC} Max.	
Load Current		100 mA Max.	
Isolated Voltage		Non-isolated	
Counters	Max. Count	65535 (16 bits)	
	Max. Input Frequency	50 Hz	
	Min. Pulse Width	10 ms	
Analog Input			
Input Channels		8	
Resolution		12-bit	
Input Range/Type		0 ~ 20 mA	
Sample Rate		1 KHz Max. (Read one channel)	
Power			
Protection		Power reverse polarity protection	
Frame Ground Protection		ESD, Surge, EFT, Hi-Pot	
Power Requirement		15W; Unregulated +10 V_{DC} ~ +30 V_{DC}	
Power Consumption		Idle: 75 mA @ 24 V_{DC}; Data Link: 150 ~ 400 mA (peak) @ 24 V_{DC}	
Mechanical			
Dimensions (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	-15 °C ~ +55 °C
Storage Temperature		-40 °C ~ +80 °C	-20 °C ~ +70 °C
Humidity		5% ~ 90% RH, Non-condensing	

Software Specifications

Functions	
Rule Configuration Website	Access Web server on WISE controllers to edit and upload logic rules through web browser.
36 IF-THEN-ELSE Logic Rules	3 IF conditions with AND or OR operators 3 THEN actions and 3 ELSE actions
48 Internal Registers	Hold temporary variables and read/write data via Modbus/TCP address.
12 Timers	Delay / Timing functions.
12 Schedules	Setup prescheduled routine tasks.
12 SMS	Send SMS to pre-set mobile phone numbers.
12 Emails	Send Email messages to pre-set Email receivers.
12 CGI Commands	Send pre-set CGI commands.
12 Recipes	Set up THEN/ELSE action groups.
8 P2P remote modules	Set up the connection information for the remote WISE modules
Modbus/TCP Protocol	Real time control and monitoring I/O channels and system status of controllers via SCADA software.

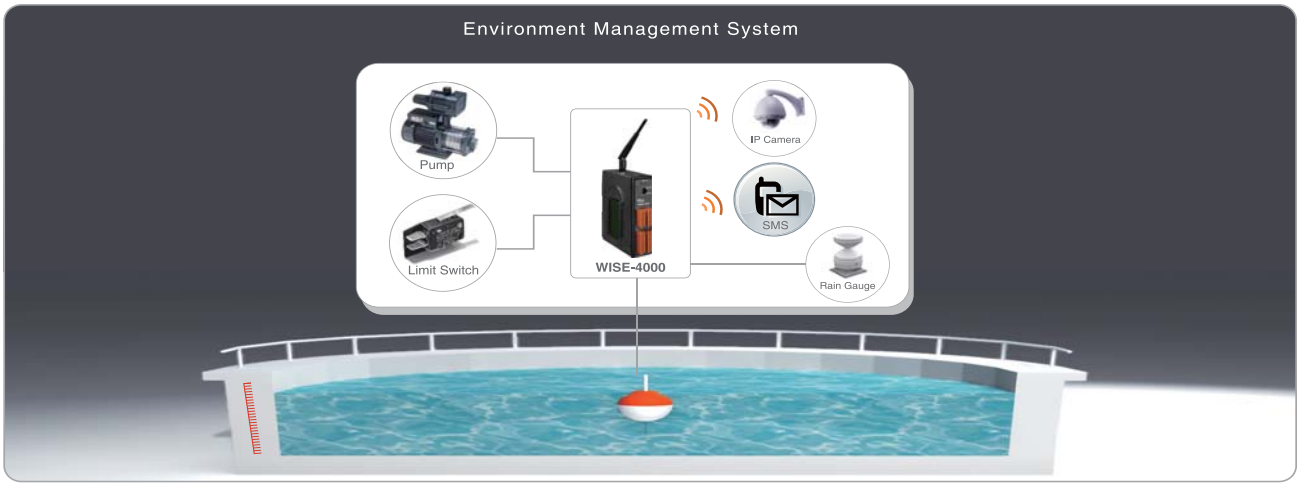
IF Condition	
DI Channel	ON' OFF' ON to OFF' OFF to ON' Change
AI Channel	=' >' <' >=' <=(value)
Internal Register	
DI Counter	=' >' <' >=' <=(value)' Change
DO Counter	
Timer	Timeout' Not Timeout
Schedule	In Range' Out of Range
P2P	DI' AI' DI counter' DO counter' IR
Rule Status	Enable' Disable



THEN / ELSE Action	
DO Channel	ON' OFF' Pulse Output
Internal Register	Change the value
DI Counter	Reset
DO Counter	
Timer	Start' Stop
Schedule	
SMS	Send
Email	
CGI Commands	
Recipe	Execute
P2P	DO (On/Off)' AO' IR
Rule Status	Enable' Disable

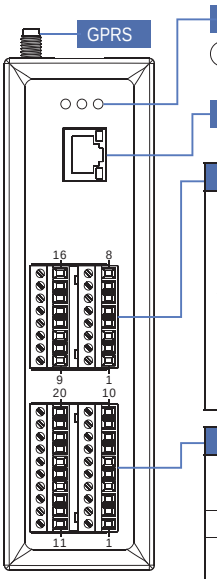
Applications

Building Automation, Factory Automation, Machine Automation, Remote Maintenance, Remote diagnosis and Testing Equipment, etc.



Appearance

WISE-4000/WISE-4000D



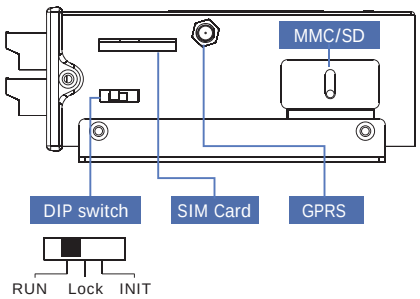
Front View

CN2 Pin Assignment

Analog Input 0 ~ +20 mA	AI7	Pin 16	Pin 8	AGND	Analog Ground
	AI6	Pin 15	Pin 7	AGND	
	AI5	Pin 14	Pin 6	AGND	
	AI4	Pin 13	Pin 5	AGND	
	AI3	Pin 12	Pin 4	GND	Digital Input
	AI2	Pin 11	Pin 3	DI2	
	AI1	Pin 10	Pin 2	DI1	
	AI0	Pin 9	Pin 1	DI0	

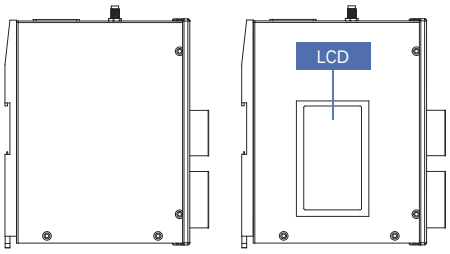
CN1 Pin Assignment

COM3 RS-232	RxD3	Pin 20	Pin 10	DO.PWR	Digital Output
	TxD3	Pin 19	Pin 9	DO2	
Ground of RS-232	GND	Pin 18	Pin 8	DO1	
COM1 RS-232	CTS1	Pin 17	Pin 7	DO0	
	RTS1	Pin 16	Pin 6	D+	COM2 RS-485
	RxD1	Pin 15	Pin 5	D-	
	TxD1	Pin 14	Pin 4	GND	Ground of RS-232
Power Input: +10 V_{DC} ~ +30 V_{DC}	DC.+Vs	Pin 13	Pin 3	DC.+Vs	Power Input: +10 V_{DC} ~ +30 V_{DC}
	DC.GND	Pin 12	Pin 2	DC.GND	
	N/A	Pin 11	Pin 1	F.G.	Frame Ground



Top View

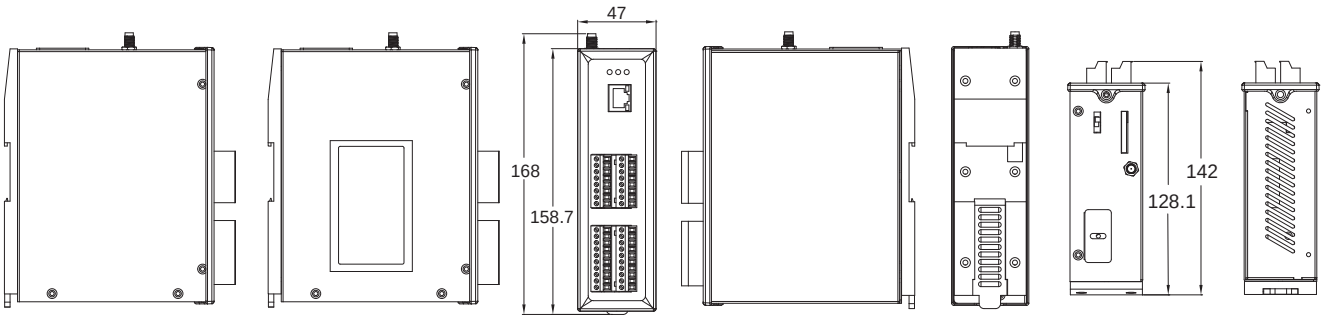
WISE-4000 **WISE-4000D**



Right Side View

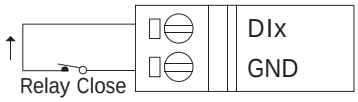
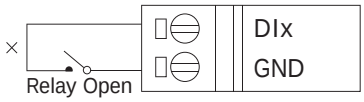
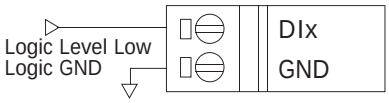
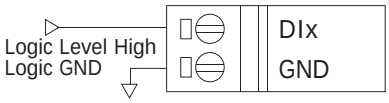
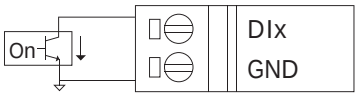
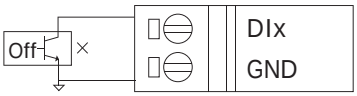
Dimensions (Units: mm)

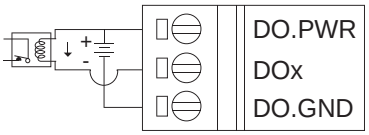
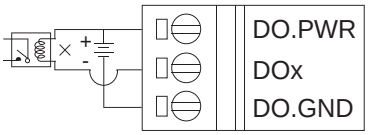
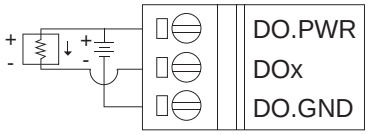
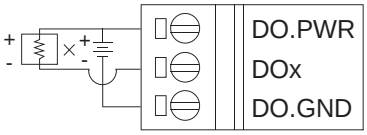
WISE-4000 **WISE-4000D** **WISE-4000/WISE-4000D**

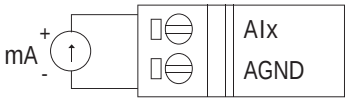


Right Side View | Right Side View | Front View | Left Side View | Rear View | Top View | Bottom View

Wire Connection

Input Type	DI Value as 0	DI Value as 1
Sink	Relay On	Relay Off
		
Source	Voltage < 1V	Voltage < 3.5V
		
	Open Collector On	Open Collector Off
		

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

Current Input Wire Connection	
Input Type	

Ordering Information

WISE-4000 CR	3-channel DI, 3-channel DO, and 8-channel AI WISE Controller with SMS Module (RoHS)
WISE-4000D CR	3-channel DI, 3-channel DO, and 8-channel AI WISE Controller with SMS Module and LCD Display (RoHS)

Accessories

ANT-421-01	3 m External GPRS/GSM Antenna

4.5. Mini PAC with 2G/3G Modem

G-4500(D)-2G
G-4500P(D)-2G

Quad-band 2G GSM/GPRS M2M Mini-PAC

Features

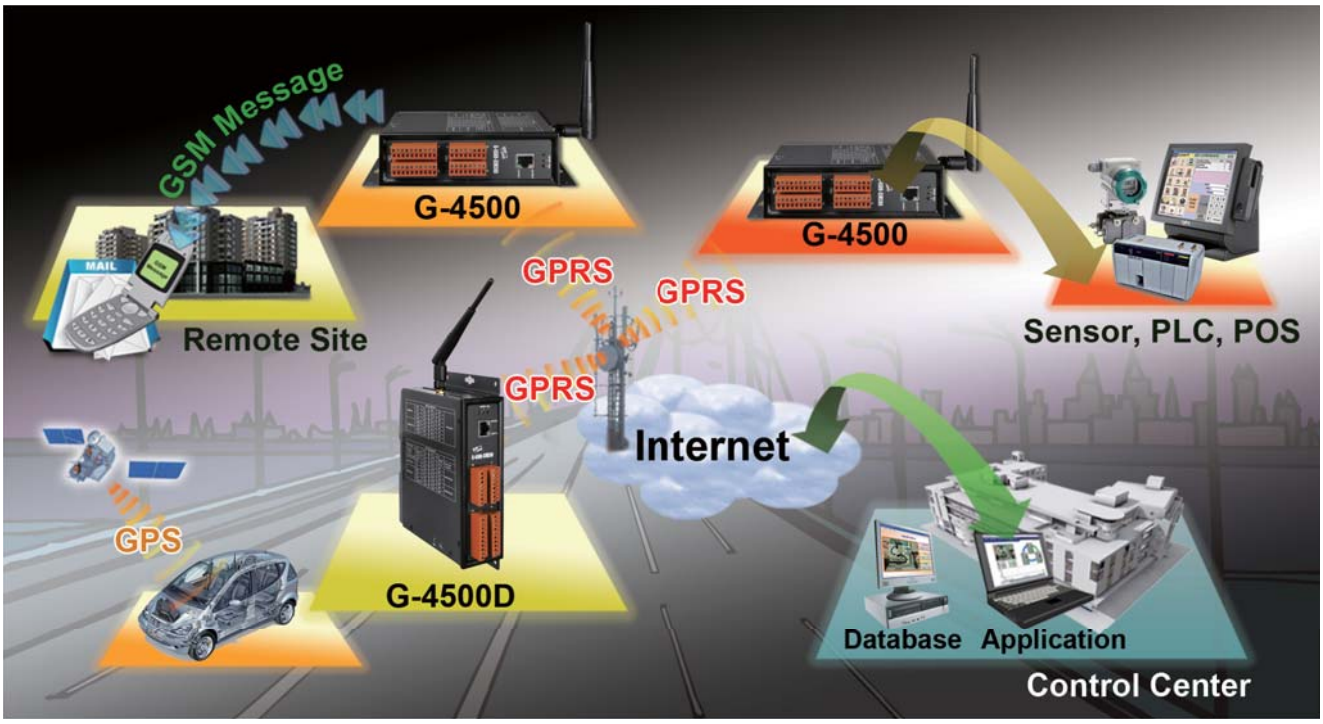
- Embedded MiniOS7, anti-virus
- Support a variety of TCP/IP features, including TCP, UDP, IP, ICMP, ARP
- 10/100Base-TX Ethernet Controller
- COM port: COM1 (5-wire RS-232), COM2 (RS-485), COM3 (3-wire RS-232)
- Built-in self-tuner ASIC controller on RS-485 port
- I/O: 3 channel DI, 3 channel DO, 8 channel AI
- Support SD storage card
- GSM/GPRS: Quad-band 850/900/1800/1900 MHz
- Support TCP server, TCP client, UDP client connection from GPRS
- GPS: 32 channels with All-In-View tracking (option)
- 128 x 64 dots LCM display (only for G-4500D-2G and G-4500PD-2G)
- Support Virtual COM technology
- Support Modbus Protocol
- High reliability in harsh environment
- Free easy-to-use software development toolkits

Introduction

The Quad-band G-4500 series provided by ICP DAS are M2M (Machine to Machine) mini programmable controllers which are widely recommended in the market. They are widely applied in various applications like hydrographic monitoring, intelligent power, flow meter report system and GPS car-tracking system. The G-4500-2G series also features GSM/GPRS module, Ethernet interface, optional GPS module, 3 digital inputs, 3 digital outputs, 8 analog inputs, 2 RS-232 and 1 RS-485 port which can be used in various application field to transfer data by GPRS, SMS, Ethernet or serial bus. By using G-4500 series, a machine can be installed virtually anywhere but still be connected to a support centre. M2M solution will improve the service quality and reduce operating costs. Many application areas can be improved by using G-4500-2G.

Applications

- Remote Control/Monitoring Systems
- Car Monitor Systems
- GIS Systems
- Redundant Communication Systems

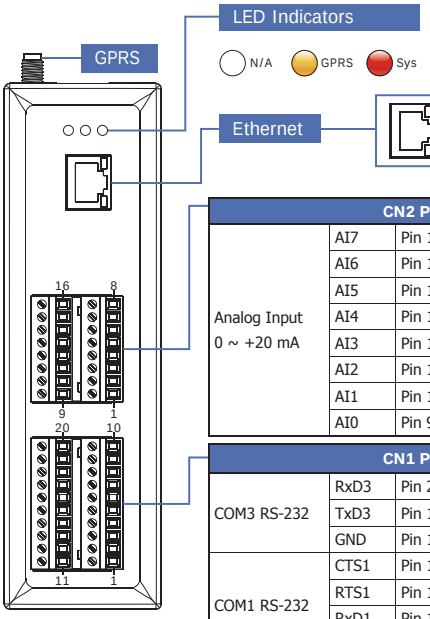


Specifications

Models		G-4500-2G	G-4500D-2G	G-4500P-2G	G-4500PD-2G
System					
CPU		80 MHz			
SRAM		512 Kbytes			
Flash Memory		512 Kbytes			
NVRAM		31 bytes, battery backup, data valid up to 10 years			
EEPROM		16 KB, data retention >40 years. 1,000,000 erase/write cycles			
2G System					
Frequency Band		Quad-band GSM/GPRS: 850/900/1800/1900 MHz			
GPRS Multi-slot		Class 10/8			
GPRS Mobile Station		Class B			
GPRS Class 10		Up to 85.6 kbps download speed			
CSD		Up to 14.4 kbps			
Compliant with GSM Phase 2/2+		Class 4 (2 W @ 850/900 MHz); Class 1 (1 W @ 1800/1900 MHz)			
Coding Schemes		CS 1, CS 2, CS 3, CS 4			
SMS		MT, MO, CB, Text and PDU mode			
Serial Port					
COM1		RS-232 (RxD, TxD, CTS, RTS, GND)			
COM2		RS-485 (D+, D-)			
COM3		RS-232 (RxD, TxD, GND)			
Ethernet		10/100 Base-TX Ethernet controller			
LCD Interface					
General	Effective display area	-	80.61 mm x 14.37 mm (W x H)	-	80.61 mm x 14.37 mm (W x H)
	Module Dimension	-	93 mm x 70 mm x 1.6 mm (W x H x T)	-	93 mm x 70 mm x 1.6 mm (W x H x T)
Life Time		-	Expected life is more than 100,000 hours under normal operation	-	Expected life is more than 100,000 hours under normal operation
GPS Interface					
Support Channels		-		32	
Acquisition Time		-		Hot Start (Open Sky) = 2s (typical) Cold Start (Open Sky) = 36s (typical)	
Protocol		-		MNEA 0183 version 3.01	
Digital Input					
Input Channels		3			
Input Type		Source (Dry Type), Common Ground			
Protocol		On: +1 V Max. Off: +3.5 ~ +30 V			
Digital Output					
Output Channels		3			
Output Type		Open Collector (Sink/NPN)			
Load Voltage		+30 V_{DC} Max.			
Load Current		100 mA Max.			
Analog Input					
Input Channel		8 (Single-ended)			
Resolution		12-bit			
Input Range/Type		0 ~ 20 mA			
Sample Rate		1 KHz Max. (read one channel)			
Power					
Protection		Power reverse polarity protection			
Frame Ground Protection		ESD, Surge, EFT, Hi-Pot			
Required Supply Voltage		15W; Unregulated +10 V_{DC} ~ +30 V_{DC}			
Power Consumption		Idle: 75 mA @ 24 V_{DC}; Data Link: 150 ~ 400 mA (peak) @ 24 V_{DC}			
Mechanical					
Casing		Metal			
Dimensions (W x L x H)		47mm x 142 mm x 168mm			
Installation		DIN-Rail and Wall Mounting			
Environment					
Operating Temperature		-20°C ~ +70 °C	-15 °C ~ +55 °C	-20 °C ~ +70 °C	-15 °C ~ +55 °C
Storage Temperature		-40 °C ~ +80 °C	-20 °C ~ +70 °C	-40 °C ~ +80 °C	-20 °C ~ +70 °C
Humidity		5% ~ 90% RH, Non-condensing			

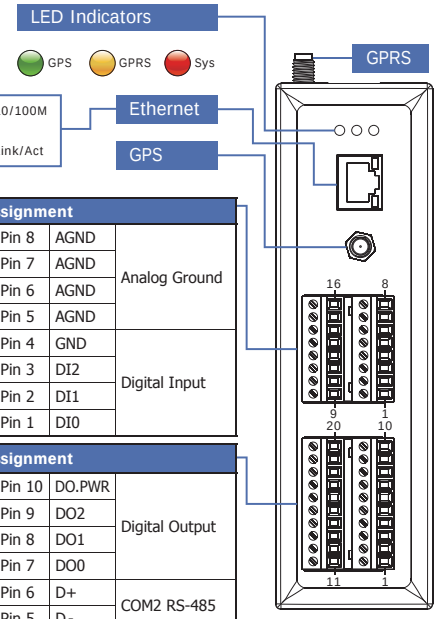
Appearance

G-4500(D)-2G



Front View

G-4500P(D)-2G



Front View

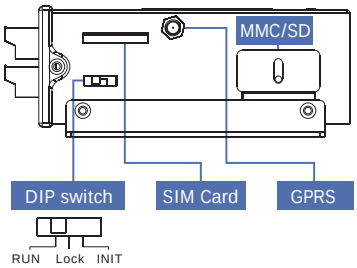
CN2 Pin Assignment

Analog Input 0 ~ +20 mA	AI7	Pin 16	Pin 8	AGND	Analog Ground
	AI6	Pin 15	Pin 7	AGND	
	AI5	Pin 14	Pin 6	AGND	
	AI4	Pin 13	Pin 5	AGND	
	AI3	Pin 12	Pin 4	GND	Digital Input
	AI2	Pin 11	Pin 3	DI2	
	AI1	Pin 10	Pin 2	DI1	
	AI0	Pin 9	Pin 1	DI0	

CN1 Pin Assignment

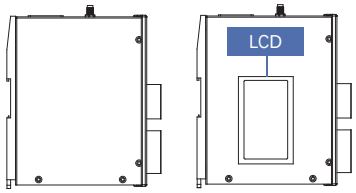
COM3 RS-232	RxD3	Pin 20	Pin 10	DO.PWR	Digital Output
	TxD3	Pin 19	Pin 9	DO2	
	GND	Pin 18	Pin 8	DO1	
COM1 RS-232	CTS1	Pin 17	Pin 7	DO0	
	RTS1	Pin 16	Pin 6	D+	COM2 RS-485
	RxD1	Pin 15	Pin 5	D-	
	TxD1	Pin 14	Pin 4	GND	Ground For COM1
Power Input: +10 ~ +30 VDC	DC.+VS	Pin 13	Pin 3	DC.+VS	Power Input: +10 ~ +30 VDC
	DC.GND	Pin 12	Pin 2	DC.GND	
	N/A	Pin 11	Pin 1	F.G.	Frame Ground

G-4500(D)-2G/G-4500P(D)-2G



Top View

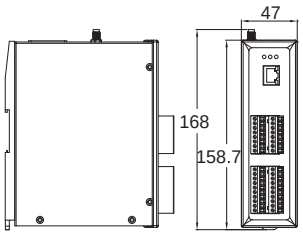
G-4500(P)-2G GD-4500(P)-2G | **G-4500(P)D-2G GD-4500(P)D-2G**



Right Side View

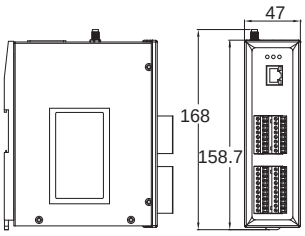
Dimensions (Units: mm)

G-4500-2G



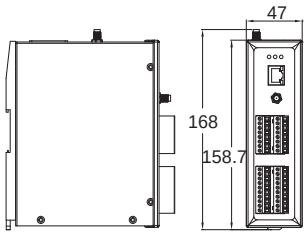
Right Side View | Front View

G-4500D-2G



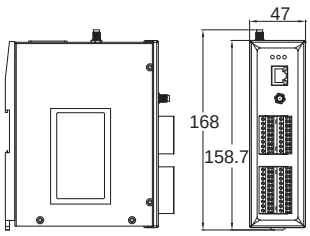
Right Side View | Front View

G-4500P-2G



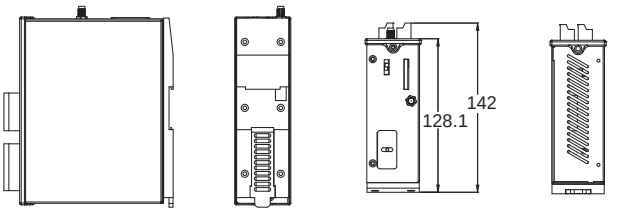
Right Side View | Front View

G-4500PD-2G



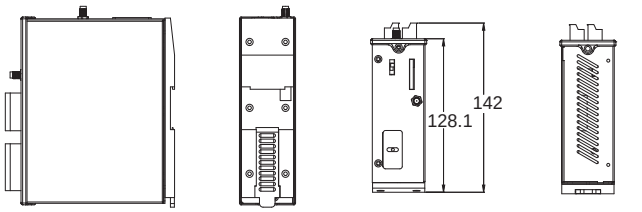
Right Side View | Front View

G-4500(D)-2G



Left Side View | Rear View | Top View | Bottom View

G-4500P(D)-2G



Left Side View | Rear View | Top View | Bottom View

Ordering Information

G-4500-2G CR	Quad-band M2M Mini-Programmable Automation Controller (RoHS)
G-4500D-2G CR	Quad-band M2M Mini-Programmable Automation Controller with LCD display (RoHS)
G-4500P-2G CR	Quad-band M2M Mini-Programmable Automation Controller with GPS Function (RoHS)
G-4500PD-2G CR	Quad-band M2M Mini-Programmable Automation Controller with LCD display and GPS Function (RoHS)

Accessories

ANT-421-01	3 m External GPRS/GSM Antenna
ANT-115-03	5 m GPS Active External Antenna

NEW

G-4500(D)-3GWA
G-4500P(D)-3GWA

Tri-band 3G WCDMA M2M Mini-PAC

Features

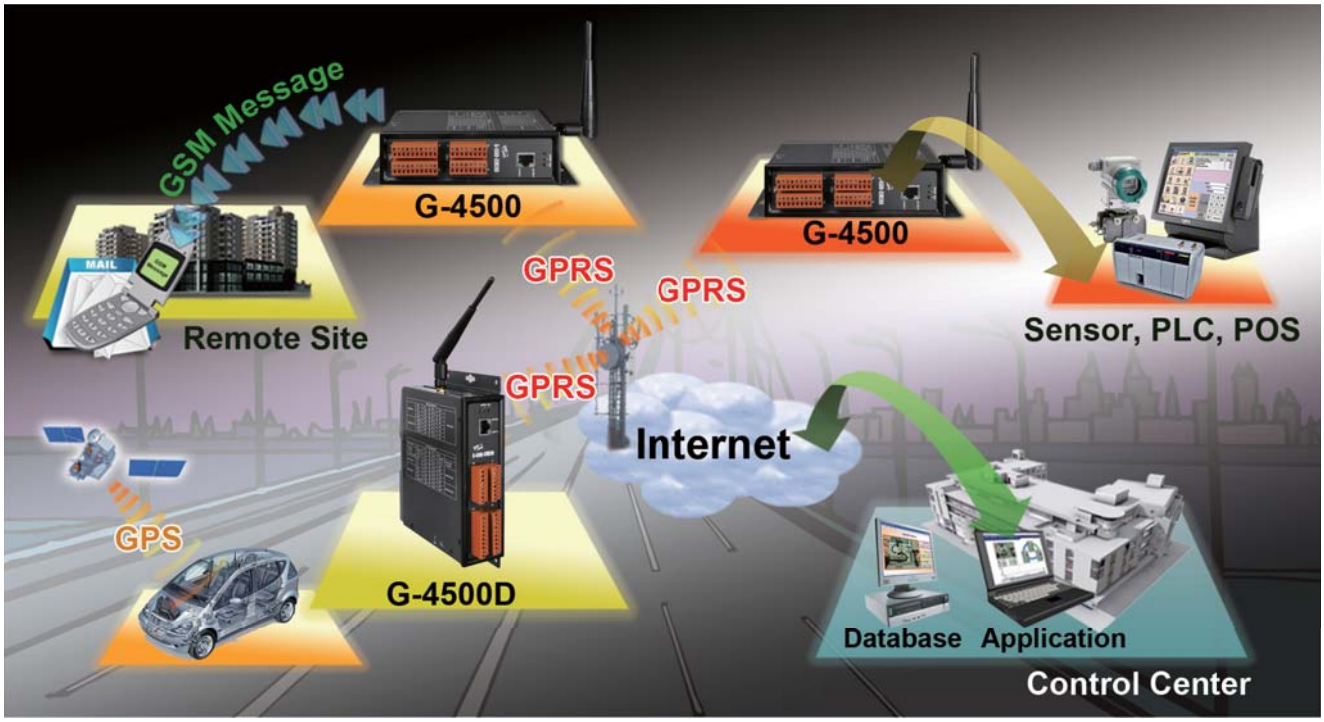
- Embedded MiniOS7, anti-virus
- Support a variety of TCP/IP features, including TCP, UDP, IP, ICMP, ARP
- 10/100Base-TX Ethernet Controller
- COM port: COM1 (5-wire RS-232), COM2 (RS-485), COM3 (3-wire RS-232)
- Support SD storage card
- Tri-band 850/1900/2100 MHz WCDMA supporting UMTS/HSDPA/HSUPA
- Quad-band 850/900/1800/1900 MHz GSM supporting GPRS
- Support TCP server, TCP client, UDP client connection stack
- GPS : 32 channels with All-In-View tracking (option)
- 128 x 64 dots LCM display (only for G-4500D-3GWA and G-4500PD-3GWA)
- Support Virtual COM technology
- Support Modbus Protocol
- High reliability in harsh environment
- Free easy-to-use software development toolkits

Introduction

The G-4500 series provided by ICP DAS are M2M (Machine to Machine) mini programmable controllers 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. Within the high performance CPU, the G-4500 series can handle a large of data and suit for the harsh industrial environment. The G-4500-3GWA series features 3G/GSM module, Ethernet interface, optional GPS module, 3 digital inputs, 3 digital outputs, 8 analog inputs, 2 RS-232 and 1 RS-485 port.

Applications

- Remote Control/Monitoring Systems
- Car Monitor Systems
- GIS Systems
- Redundant Communication Systems

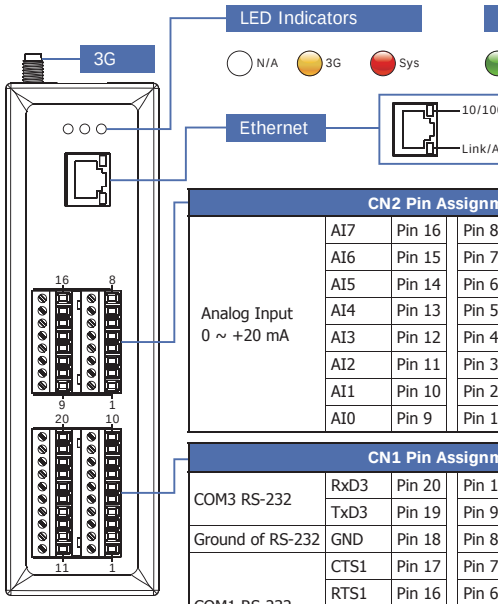


Specifications

Models		G-4500-3GWA	G-4500D-3GWA	G-4500P-3GWA	G-4500PD-3GWA
System					
CPU		80 MHz			
SRAM		512 Kbytes			
Flash Memory		512 Kbytes			
NVRAM		31 bytes, battery backup, data valid up to 10 years			
EEPROM		16 KB, data retention >40 years. 1,000,000 erase/write cycles			
2G/3G System					
Frequency Band		3G UMTS/HSDPA/HSUPA: Tri-band 850/1900/2100 MHz, 2G GSM/GPRS: Quad-band 850/900/1800/1900 MHz			
3G Data Transmission		Downlink: Max. 7.2 Mbps; Uplink: Max. 5.76 Mbps			
2G Data Transmission		Downlink: Max. 85.6 kbps; Uplink: Max. 42.8 kbps			
2G Connectivity		GPRS class 12/10; GPRS station class B			
Serial Port					
COM1		RS-232 (CTS, TRS, RxD, TxD, GND)			
COM2		RS-485 (D+, D-)			
COM3		RS-232 (RxD, TxD, GND)			
Ethernet		10/100 Base-TX Ethernet controller			
LCD Interface					
General	Effective display area	-	80.61 mm x 14.37 mm (W x H)	-	80.61 mm x 14.37 mm (W x H)
	Module Dimension	-	93 mm x 70 mm x 1.6 mm (W x H x T)	-	93 mm x 70 mm x 1.6 mm (W x H x T)
Life Time		-	Expected life is more than 100,000 hours under normal operation	--	Expected life is more than 100,000 hours under normal operation
GPS Interface					
Support Channels		-		32	
Acquisition Time		-		Hot Start (Open Sky) = 2s (typical) Cold Start (Open Sky) = 36s (typical)	
Protocol		-		NMEA 0183 version 3.01	
Digital Input					
Input Channels		3			
Input Type		Source (Dry Type), Common Ground			
On Voltage Level		+1 V Max.			
Off Voltage Level		+3.5 V_{DC} ~ +30 V_{DC}			
Digital Output					
Output Channels		3			
Output Type		Open Collector (Sink/NPN)			
Load Voltage		+30 V_{DC} Max.			
Load Current		100 mA Max.			
Analog Input					
Input Channel		8 (Single-ended)			
Resolution		12 bit			
Input Range/Type		0 ~ 20 mA			
Sample Rate		1 KHz Max. (read one channel)			
Power					
Protection		Power reverse polarity protection			
Frame Ground Protection		ESD, Surge, EFT, Hi-Pot			
Required Supply Voltage		15 W; Unregulated +10 V_{DC} ~ +30 V_{DC}			
Power Consumption		Idle: 75 mA @ 24 V_{DC}; Data Link: 150 ~ 400 mA (peak) @ 24 V_{DC}			
Mechanical					
Casing		Metal			
Dimensions (W x L x H)		47mm x 142 mm x 168mm			
Installation		DIN-Rail and Wall mounting			
Environment					
Operating Temperature		-20°C ~ +70 °C	-15 °C ~ +55 °C	-20 °C ~ +70 °C	-15 °C ~ +55 °C
Storage Temperature		-40 °C ~ +80 °C	-20 °C ~ +70 °C	-40 °C ~ +80 °C	-20 °C ~ +70 °C
Humidity		5% ~ 90% RH, Non-condensing			

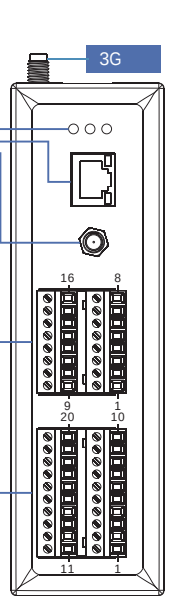
Appearance

G-4500-3GWA/G-4500D-3GWA



Front View

G-4500P-3GWA/G-4500PD-3GWA



Front View

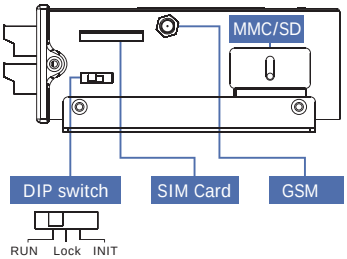
CN2 Pin Assignment

Analog Input 0 ~ +20 mA	AI7	Pin 16	Pin 8	AGND	Analog Ground
	AI6	Pin 15	Pin 7	AGND	
	AI5	Pin 14	Pin 6	AGND	
	AI4	Pin 13	Pin 5	AGND	
	AI3	Pin 12	Pin 4	GND	Digital Input
	AI2	Pin 11	Pin 3	DI2	
	AI1	Pin 10	Pin 2	DI1	
	AI0	Pin 9	Pin 1	DI0	

CN1 Pin Assignment

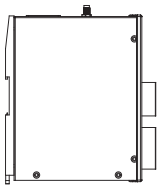
COM3 RS-232	RxD3	Pin 20	Pin 10	DO.PWR	Digital Output
	TxD3	Pin 19	Pin 9	DO2	
Ground of RS-232	GND	Pin 18	Pin 8	DO1	
COM1 RS-232	CTS1	Pin 17	Pin 7	DO0	
	RTS1	Pin 16	Pin 6	D+	COM2 RS-485
	RxD1	Pin 15	Pin 5	D -	
	TxD1	Pin 14	Pin 4	GND	Ground For RS-232
Power Input: +10 ~ +30 VDC	DC.+Vs	Pin 13	Pin 3	DC.+Vs	Power Input: +10 ~ +30 VDC
	DC.GND	Pin 12	Pin 2	DC.GND	
	N/A	Pin 11	Pin 1	F.G.	Frame Ground

G-4500-3GWA/G-4500D-3GWA
G-4500P-3GWA/G-4500PD-3GWA

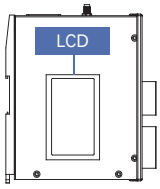


Top View

G-4500-3GWA
G-4500P-3GWA



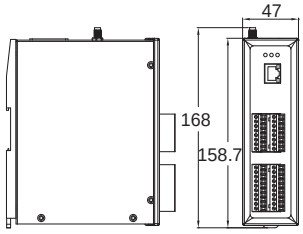
G-4500D-3GWA
G-4500PD-3GWA



Right Side View

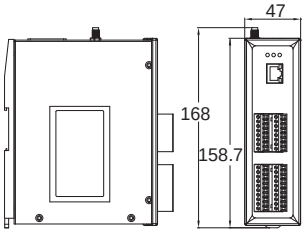
Dimensions (Units: mm)

G-4500-3GWA



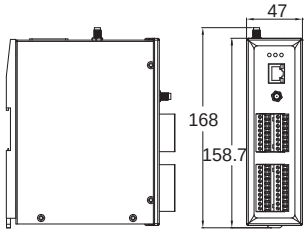
Right Side View | Front View

G-4500D-3GWA



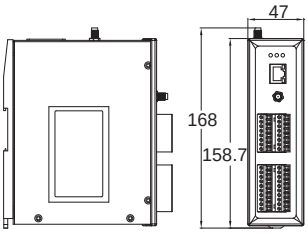
Right Side View | Front View

G-4500P-3GWA



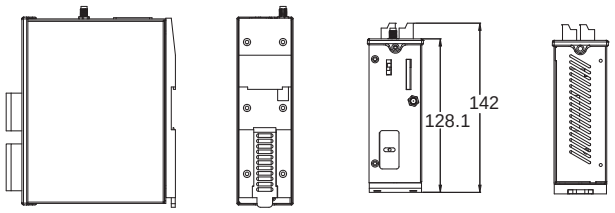
Right Side View | Front View

G-4500PD-3GWA



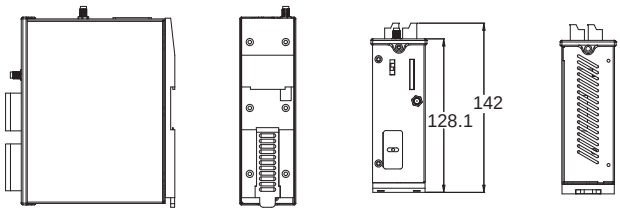
Right Side View | Front View

G-4500(D)-3GWA



Left Side View | Rear View | Top View | Bottom View

G-4500P(D)-3GWA



Left Side View | Rear View | Top View | Bottom View

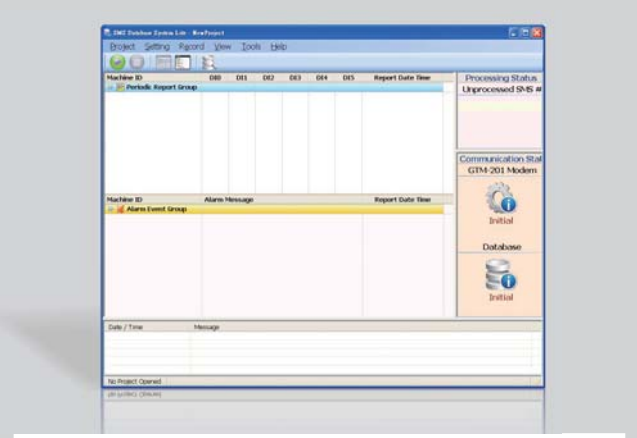
Ordering Information

G-4500-3GWA CR	Tri-band 3G WCDMA M2M Mini-Programmable Automation Controller (RoHS)
G-4500D-3GWA CR	Tri-band 3G WCDMA M2M Mini-Programmable Automation Controller with LCD display (RoHS)
G-4500P-3GWA CR	Tri-band 3G WCDMA M2M Mini-Programmable Automation Controller with GPS function (RoHS)
G-4500PD-3GWA CR	Tri-band 3G WCDMA M2M Mini-Programmable Automation Controller with LCD display and GPS function (RoHS)

Accessories

ANT-421-01	3 m External GPRS/GSM Antenna
ANT-115-03	5 m GPS Active External Antenna

4.5. Software Solutions



SMS DBS

SMS Database System

Features

- Quickly and easily build a GT-53x management system
- Support MS SQL Server and MS Access 2003 Database
- Provide backup mechanism in local sites: when experiencing unexpected disconnection and not able to transmit and store data in remote SQL Server database, the data will be safely kept in local sites
- Allow to view real-time or historical data of SMS messages sent by GT-53x series
- Support filter function that enables to receive SMS messages by specific phone numbers
- Support Windows 2000, Windows XP, Windows Vista, Windows 7
- Support GT-530, GT-531, and GT-534

Introduction

ICP DAS's SMS Database System is a software solution that allows to manage remote GT-53x series more efficiently. GT-53x series are intelligent GSM controllers great for use in industry applications; they feature easy-to-use interface, SMS tunnel function voice communication and can be powered with an external power supply or Li-Battery. They support UNICODE and 7 bit format that allows users to send SMS messages in various languages; the SMS messages can be sent at user-defined time or whenever a predefined DI/counter event is triggered. With SMS Database System, it enables remote monitoring and database system for GT-53x, therefore, allows the 3rd party software tools being easily integrated with GT-53x series as well as users' applications.

Applications

Remote Maintenance

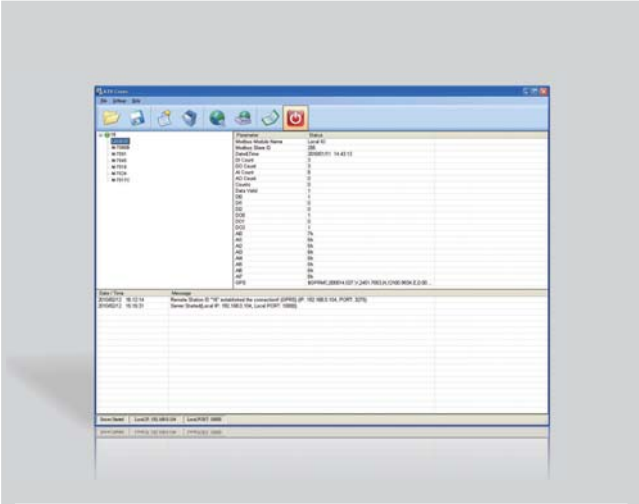
Vendor Machine Automation

Version Comparison

Version	Max. Phone Number Supported	Database	License
SMS Database System Lite v1.0	3	MS Access 2003	Free
SMS Database System Pro v1.0	Unlimited	MS SQL Server / MS Access 2003	Charge

Ordering Information

SMS DBS	SMS Monitor/Database System Software for GT-53x series



M2M RTU Center

M2M RTU Series Management Software

Features

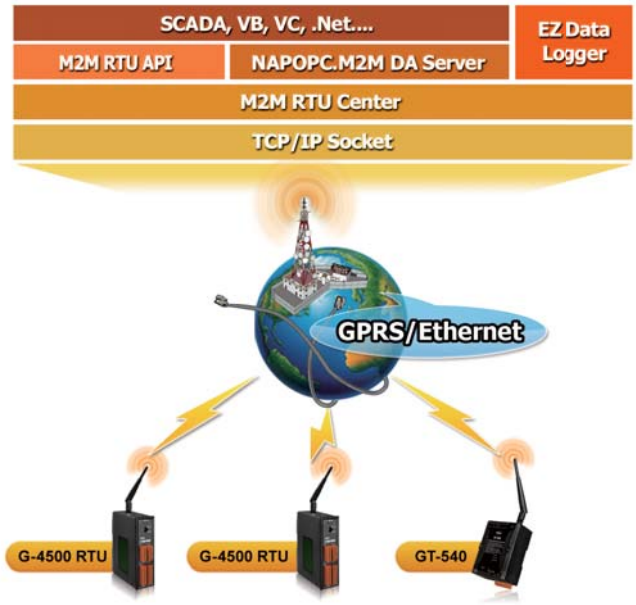
- RTU series Management tool
- Support up to 128 M2M RTU devices
- Easy and quick to build a Remote monitor system
- Windows-based software
- Support NAPOPC.M2M server, EzDatalog and M2M API tool of ICP DAS
- Allow any Modbus device connecting to GPRS/Ethernet via RTU devices.

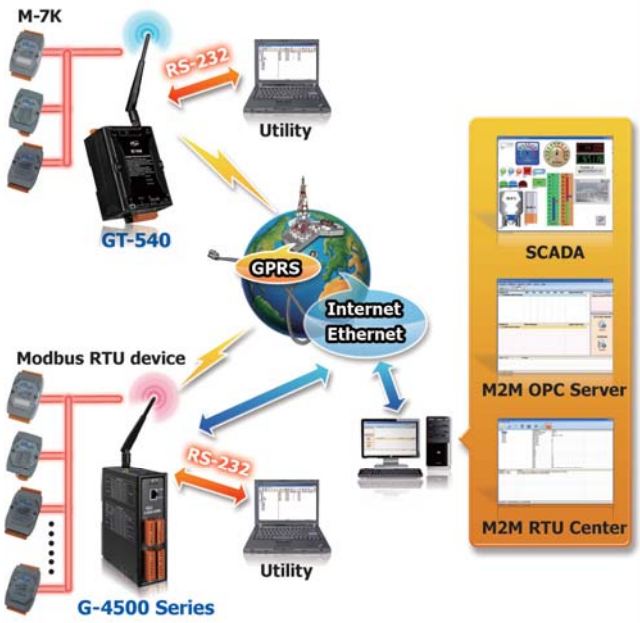
Introduction

The M2M RTU Center provided by ICP DAS 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 RTU Center supports the G-4500 series, GT-540 and other RTU products from ICP DAS and allows users to manage these RTU devices remotely. It is not only monitor the local IO and GPS data but also IO data of Modbus RTU devices. With M2M RTU Center, users can easily establish a remote system by using EZ Data Logger or OPC Client of user's SCADA to access data.

Software Architecture and Application

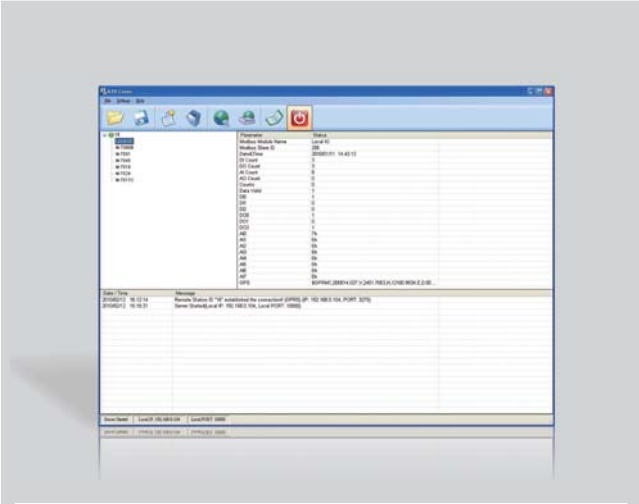
When users want to use the following software or others to their system with RTU products of ICP DAS, M2M RTU Center must be executed at the same time.





Product Support

Product	Description
RTU firmware	Management Firmware that supports G-4500 Series
GT-540	Intelligent GPRS Remote Terminal Unit



M2M RTU API Tool

M2M RTU Win32 API Library

Features

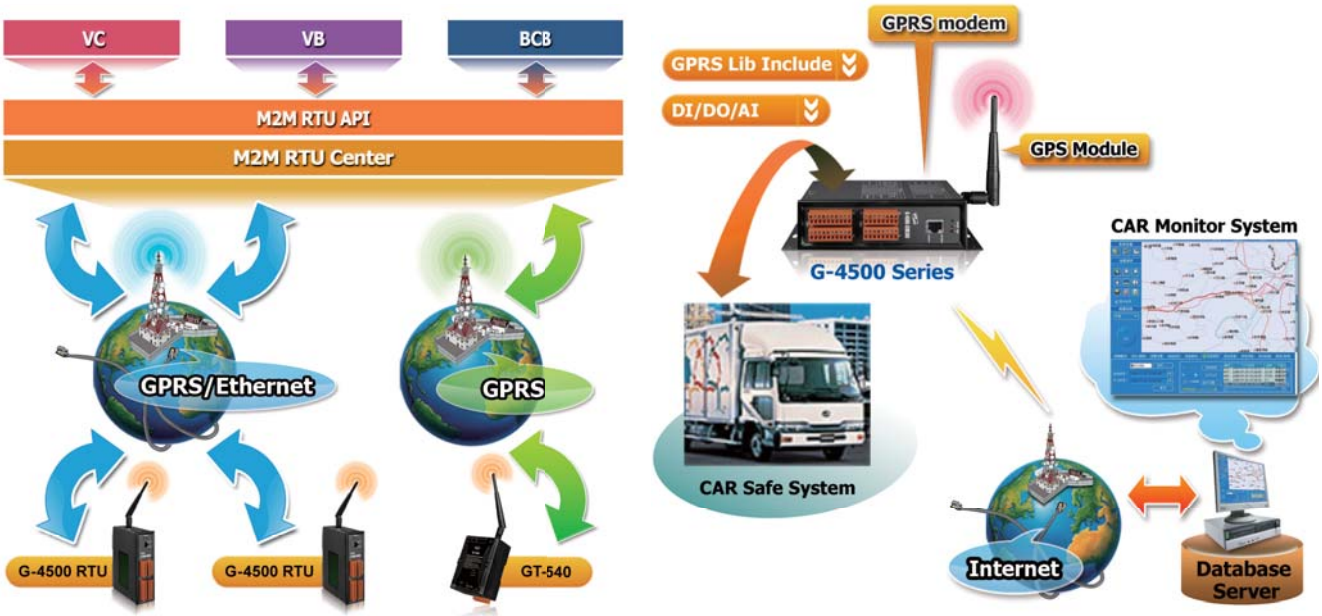
- Provide simple API functions for users to reduce the development time
- Easy to perform M2M RTU devices status monitoring and control
- Up to 128 M2M RTU devices can be managed
- Allow any Modbus device connecting to GPRS/Ethernet via RTU devices.
- Easily manage and control distributed remote devices via GPRS/Ethernet
- Support for M2M RTU products from ICP DAS

Introduction

M2M RTU API Tools is a Win32 API Library for M2M RTU products (G-4500 RTU, GT-540…) from ICP DAS. It provides the seamless connection between a user-designed system and M2M RTU products. With APIs of the library, programmer can access M2M RTU devices by developing program using most integrated development environments, such as VC, VB, BCB, visual studio.Net… etc. It is easy to integrate these GPRS RTU devices to various applications including real time data and database management system. Therefore, the Library can help users to apply the ICP DAS M2M RTU products in their applications to monitor the data and sends them out in real time to the control center through GPRS or Ethernet Network. Also, by combining a GPS (optional) with M2M GPRS RTU, they suddenly become a tracking system which you can often find out in the car system, marine system, etc.

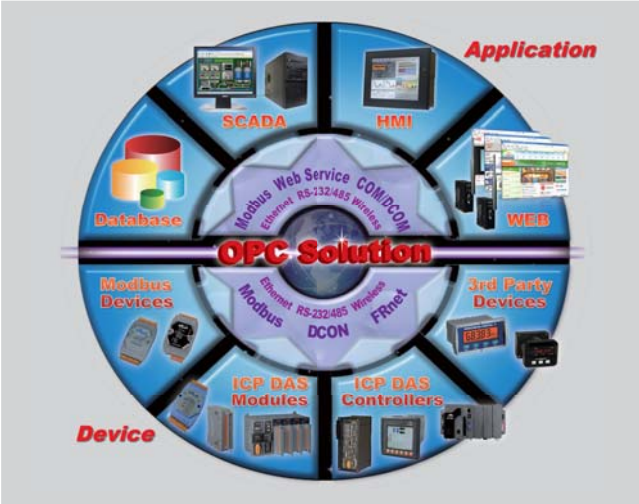
Software Architecture and Application

When users want to use the following software or others to their system with RTU products of ICP DAS, M2M RTU Center must be executed at the same time.



Product Support

Product	Description
RTU firmware	Management Firmware that supports G-4500 Series
GT-540	Intelligent GPRS Remote Terminal Unit



NAPOPC.M2M DA Server

OPC Server for RTU Devices

Features

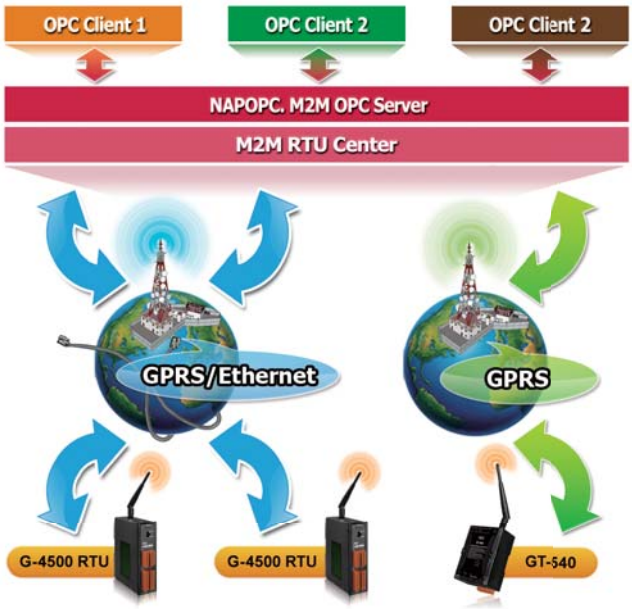
- Provide an Explorer-style user interface.
- Provide multi-thread communication to communicate with RTU devices
- Support searching RTU devices automatically
- Allow any Modbus device connecting to GPRS/Ethernet via RTU devices.
- Real-time monitoring and controlling for RTU devices

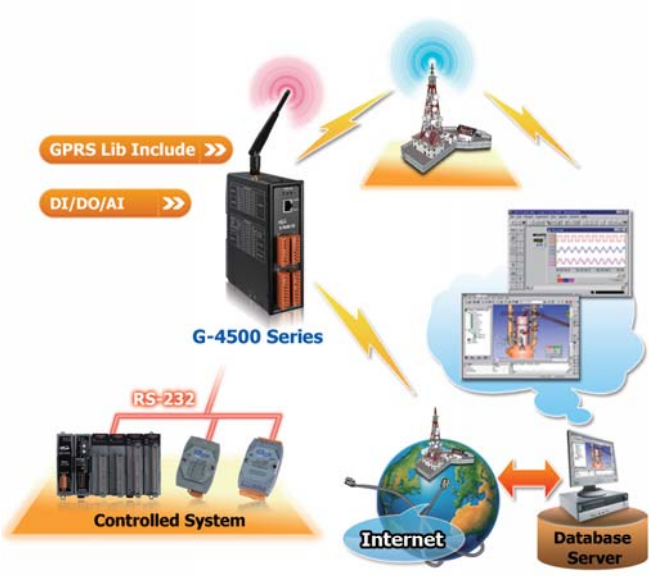
Introduction

ICP DAS NAPOPC.M2M DA Server is an OPC software package operated as an OPC driver of a HMI or SCADA system. It provides seamless connection with GPRS RTU products (G-4500 RTU, GT-540…) from ICP DAS to SCADA system (InduSoft, Wonderware, iFix, Citec, LabView and etc) following OPC 2.0 Data Access Standards. By using NAPOPC.M2M DA server and ICP DAS RTU products not only monitors the data but sends them out in real time to the control center through GPRS or Ethernet Network. Also, by combining a GPS (optional) with G-4500 RTU, it suddenly becomes a tracking system which you can often find out in the car system, marine system, etc.

Software Architecture and Application

M2M RTU Center is the M2M (Machine to Machine) management software of ICP DAS that has a strong core technology for handling data and lets the user save the trouble of dealing with large IO data. NAPOPC M2M server would get/set these RTU devices through M2M RTU Center. The architecture and application are as following.





Product Support

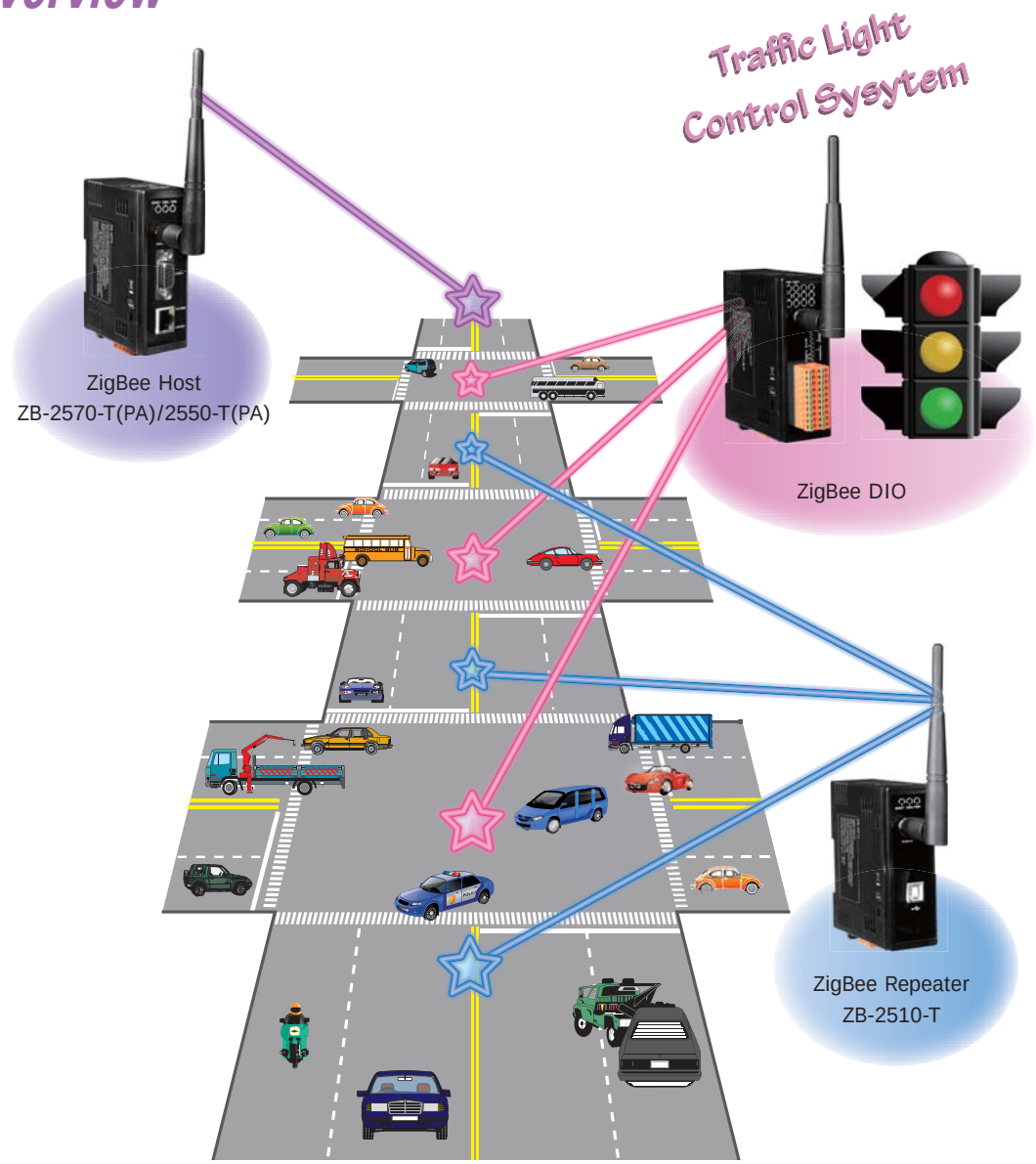
Product	Description
RTU firmware	Management Firmware that supports G-4500 Series
GT-540	Intelligent GPRS Remote Terminal Unit

ZigBee Products

5

5.1.	Overview	P5-1-1
5.2.	ZigBee Converters	P5-2-1
5.3.	ZigBee I/O Modules	P5-3-1

5.1. Overview



Based on the IEEE 802.15.4 standard for Wireless Personal Area Networks (WPANs), ZigBee operates in the ISM radio bands and works as 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.

ZigBee uses a basic master-slave configuration that is suited to the static star networks of many infrequently used devices that talk via small data packets. ICP DAS provides various ZigBee products such as Ethernet/RS-232/RS-485 to ZigBee converters, ZigBee repeater and ZigBee wireless I/O modules.

Advantages & Benefits

- ISM 2.4 GHz operating frequency and fully compliant 2.4 G IEEE 802.15.4 ZigBee specifications
- Wireless transmission range up to 100m (Line of sight)
- Provide friendly GUI configuration software (Windows Version)
- Support three different types of ZigBee devices (Coordinator, Full function device, Reduced function device) in a ZigBee network.
- Support three topologies (MESH, STAR, CLUSTER TREE) defined in the IEEE 802.15.4

• ZigBee Version Comparison

	Normal-version	T-version	P-version	PA-version
Transmission power	9 dBm	3 ~ 4 dBm	22 ~ 24 dBm	22 ~ 24 dBm
Antenna 2.4 GHz –	3 dBi Omni-Directional antenna	3 dBi Omni-Directional antenna	5 dBi Omni-Directional antenna	5 dBi Omni-Directional antenna
Transmission range (LOS)	100 m	100 m	700 m (Typical) 1 km (Max.)	700 m (Typical) 1 km (Max.)
ZB-100R/ZB-100T Supported	No	Yes	No	Yes
Max. Slaves Supported (Host)	60	256	60	256
Certification	No	CE/FCC,FCC ID	No	No

• ZigBee Converter Selection Guide

In some existing systems that use an Ethernet, RS-485 or RS-232 network, it is sometimes difficult to extend the new devices due to building structure issues, wiring problems or other reasons. The ZigBee Converter can be easily added to an existing system in order to extend the network

Model Name	Interface	Module Type	Transmit Power	Antenna	Distance (LOS)	Page
ZB-2550-T	1 × RS-232 1 × RS-485	Host	3 ~ 4 dBm	2.4GHz - 3dBi Omni-Directional antenna	100 m	5-2-1
ZB-2550-PA	1 × RS-232 1 × RS-485	Host	22 ~ 24 dBm	2.4GHz - 5dBi Omni-Directional antenna	700 m (Typical) 1 km (Max.)	5-2-1
ZB-2551-T	1 × RS-232 1 × RS-485	Slave	3 ~ 4 dBm	2.4GHz - 3dBi Omni-Directional antenna	100 m	5-2-1
ZB-2551-PA	1 × RS-232 1 × RS-485	Slave	22 ~ 24 dBm	2.4GHz - 5dBi Omni-Directional antenna	700 m (Typical) 1 km (Max.)	5-2-1
ZB-2570-T	1 × RS-232 1 × RS-485 1 × Ethernet	Host	3 ~ 4 dBm	2.4GHz - 3dBi Omni-Directional antenna	100 m	5-2-4
ZB-2570-PA	1 × RS-232 1 × RS-485 1 × Ethernet	Host	22 ~ 24 dBm	2.4GHz - 5dBi Omni-Directional antenna	700 m (Typical) 1 km (Max.)	5-2-4
ZB-2571-T	1 × RS-232 1 × RS-485 1 × Ethernet	Slave	3 ~ 4 dBm	2.4GHz - 3dBi Omni-Directional antenna	100 m	5-2-4
ZB-2571-PA	1 × RS-232 1 × RS-485 1 × Ethernet	Slave	22 ~ 24 dBm	2.4GHz - 5dBi Omni-Directional antenna	700 m (Typical) 1 km (Max.)	5-2-4

• ZigBee I/O Selection Guide

ICP DAS provides varies ZigBee I/O modules. Each module has standard 4 kV ESD protection and 3000/3750 V_{DC} intra-module isolation. Users can easily configure the module address, Protocol, Checksum, ZB-PID, ZB-ch and type code by rotary and DIP switch.

Model Name	Protocol	Input Channel	Output Channel	Transmit Power	Antenna	Distance (LOS)	Page
ZB-2015-T	DCON Modbus RTU	6 × AI	-	4 dBm	2.4GHz - 3dBi Omni-Directional antenna	100 M	5-3-1
ZB-2018-T	DCON Modbus RTU	8 × AI	-	4 dBm	2.4GHz - 3dBi Omni-Directional antenna	100 M	5-3-3
ZB-2052-T	DCON Modbus RTU	8 × DI	-	4 dBm	2.4GHz - 3dBi Omni-Directional antenna	100 M	5-3-5
ZB-2053-T	DCON Modbus RTU	14 × DI	-	4 dBm	2.4GHz - 3dBi Omni-Directional antenna	100 M	5-3-7
ZB-2060-T	DCON Modbus RTU	6 × DI	4 × Relay Out	4 dBm	2.4GHz - 3dBi Omni-Directional antenna	100 M	5-3-9

5.2. ZigBee Converters

ZB-2550-T/ZB-2550-PA
ZB-2551-T/ZB-2551-PA

RS-485/RS-232 to ZigBee Converter

Features

- ISM 2.4 GHz Operating Frequency
- Fully Compliant with 2.4 G IEEE802.15.4/ZigBee Specifications
- Wireless transmission Range up to 100 m (ZB-2550-T/ZB-2550-PA/ZB-2551-T/ZB-2551-PA)
- Wireless Transmission Range up to 700 m (ZB-2550-PA/ZB-2551-PA)
- GUI Configuration Software (Windows Version)
- DIN-Rail Mountable

Introduction

The ZB-2550 and ZB-2551 series are small-sized wireless ZigBee converters based on the IEEE 802.15.4 standard. The converters allow the deivces which have RS-485/RS-232 interfaces, to transfer and transmit the data to a ZigBee wireless network.

Only one ZB-2550-T series (host) is allowed in a ZigBee network and used to initialize and manage the data transmission routes. The ZB-2551-T series (slave) ZigBee router is responsible for transmitting/receiving data from its child/parent router or the host. ICP DAS ZigBee products are designed for low data rates. The main benefit of ICP DAS ZigBee products is that they can be used to define a general-purpose, self-organizing mesh network, which can be highly advantageous for industrial control.

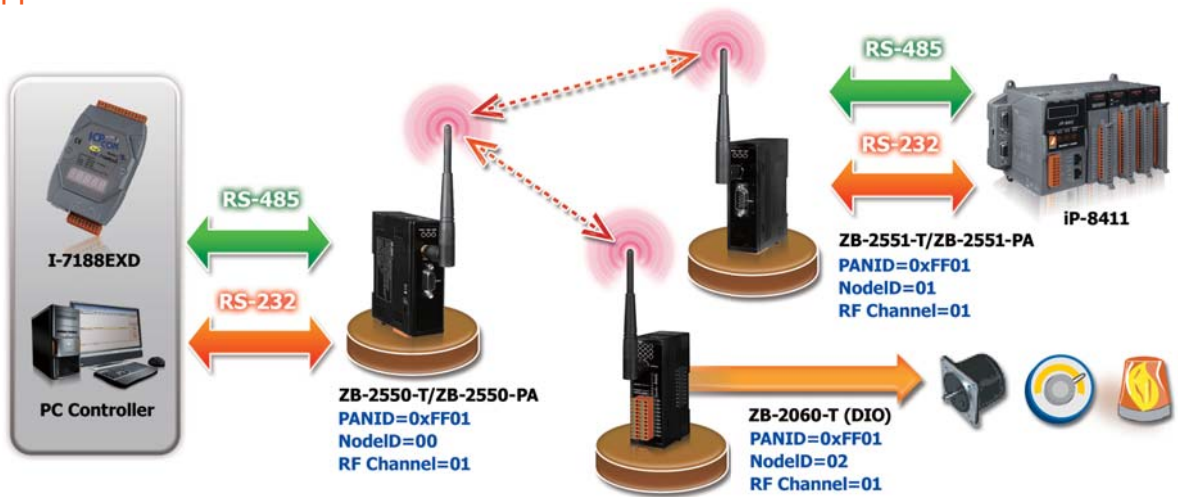
The typical transmission range of the ICP DAS ZigBee ZB-2550-T/ZB-2551-T converter is 100m, and 700m for the ZB-2550-PA/ZB-2551-PA.

Specifications

Models	ZB-2550-T	ZB-2550-PA	ZB-2551-T	ZB-2551-PA
ZigBee Module				
RF Channels	16			
Receiving Sensitivity	-102 dBm			
Transmit Power	3 ~ 4 dBm	22 ~ 24 dBm	3 ~ 4 dBm	22 ~ 24 dBm
Network Topology	Star, Mesh and Cluster tree			
Antenna (Omni-Directional antenna)	2.4 GHz – 3 dBi	2.4 GHz – 5 dBi	2.4 GHz – 3 dBi	2.4 GHz – 5 dBi
Transmission Range	100 m	700 m	100 m	700 m
General				
Module Type	Host		Slave	
Communication Interface				
COM 0	D-Sub 9 Female Non-isolated ; RS-232 (TxD, RxD, GND); RS-485 (DATA+, DATA-;internal self-tuner ASIC)		D-Sub 9 Male Non-isolated; RS-232 (TxD, RxD, GND); RS-485 (DATA+, DATA-;internal self-tuner ASIC)	
Baud Rate	1200 ~ 115200 bps			
LED Indicators				
ZigBee Net State	Green			
ZigBee RxD	Yellow			
Power	Red			
Power				
Protection	Power reverse polarity protection			
EMS Protection	ESD, Surge, EFT			
Required Supply Voltage	+10 V_{DC} ~ +30 V_{DC}			
Power Consumption	0.5 W	2.0 W (max.)	0.5 W	2.0 W (max.)
Connector	5-Pin 5.08 mm Removable Terminal Block			
Mechanical				
Casing	Plastic			
Flammability	UL 94V-0 fire-retardant materials			
Dimensions (W x L x H)	33 mm x 107 mm x 78mm			
Installation	DIN-Rail			

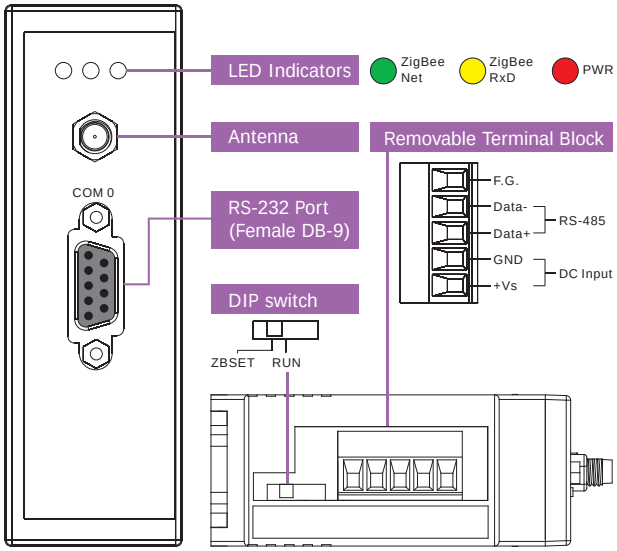
Models	ZB-2550-T	ZB-2550-PA	ZB-2551-T	ZB-2551-PA
Environment				
Operating Temperature	-25 °C ~ +75 °C			
Storage Temperature	-40 °C ~ +80 °C			
Relative Humidity	5% ~ 90% RH, Non-condensing			

Applications

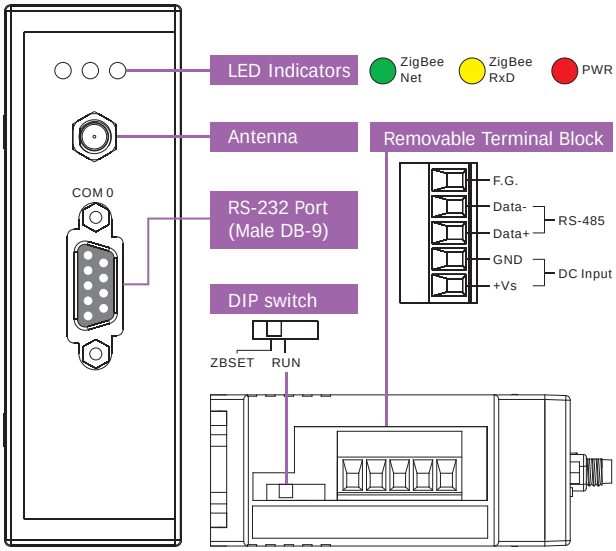


Appearance

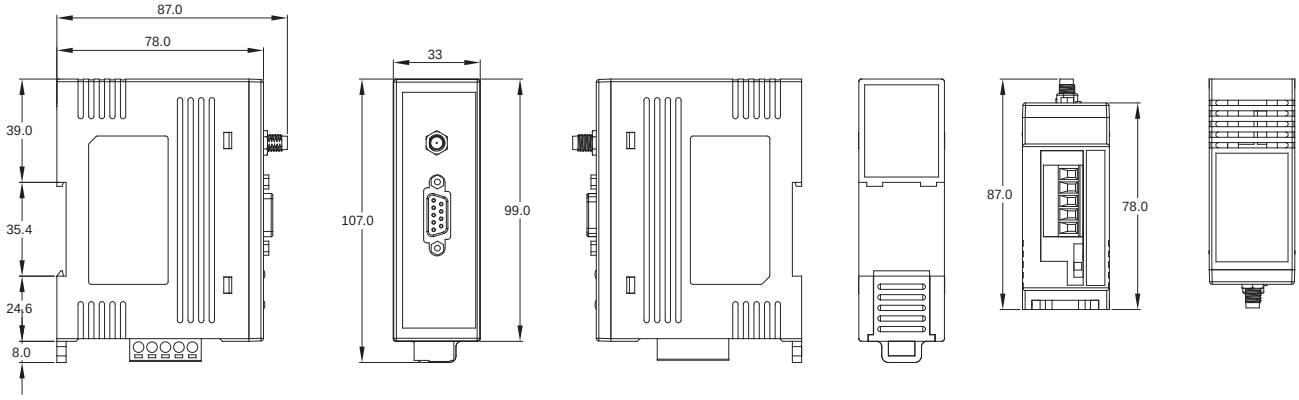
ZB-2550-T/2550-PA



ZB-2551-T/2551-PA



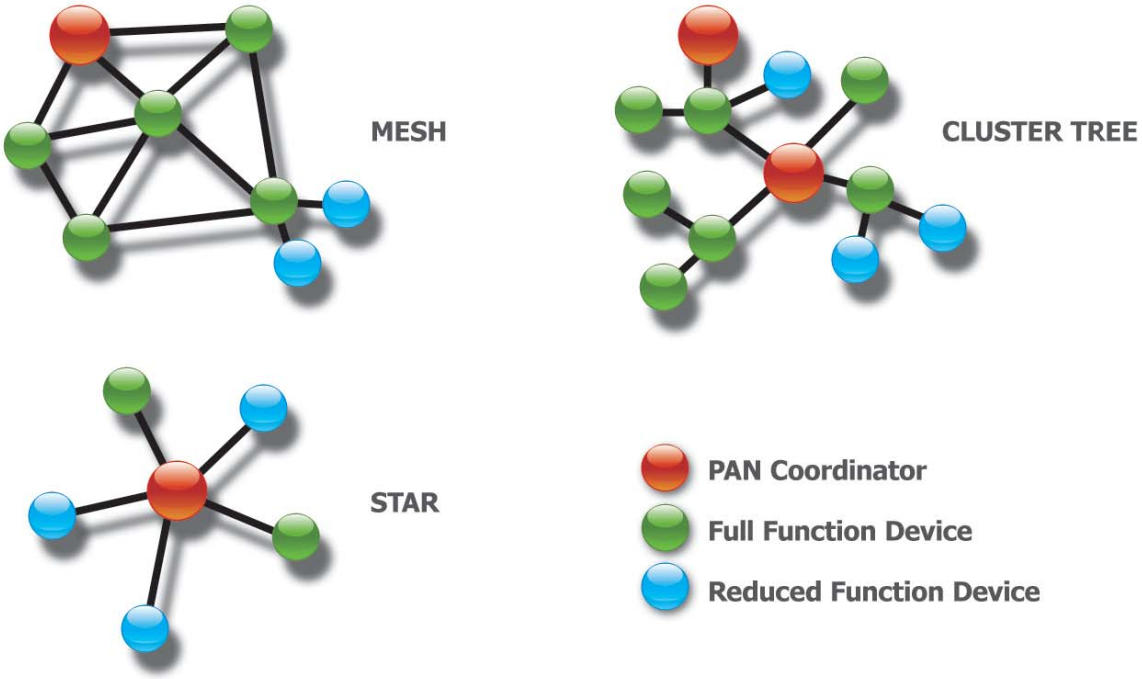
Dimensions (Units: mm)



Left Side View | Front View | Right Side View | Rear View | Bottom View | Top View

Operation Mode

There are three topologies defined in the IEEE 802.15.4 standard, Star, Cluster Tree and Mesh.



Ordering Information

ZB-2550-T CR	RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2550-T/S CR	RS-485/RS-232 to ZigBee Converter (Host) (RoHS) + GPSU06U-6 (Power Supply)
ZB-2550-PA CR	RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)
ZB-2550-PA/S CR	RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS) + GPSU06U-6 (Power Supply)
ZB-2551-T CR	RS-485/RS-232 to ZigBee Converter (Slave) (RoHS)
ZB-2551-T/S CR	RS-485/RS-232 to ZigBee Converter (Slave) (RoHS) + GPSU06U-6 (Power Supply)
ZB-2551-PA CR	RS-485/RS-232 to High Power Amplifier ZigBee Converter (Slave) (RoHS)
ZB-2551-PA/S CR	RS-485/RS-232 to High Power Amplifier ZigBee Converter (Slave) (RoHS) + GPSU06U-6 (Power Supply)

Accessories

ZB-2570-T CR	Ethernet/RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2571-T CR	Ethernet/RS-485/RS-232 to ZigBee Converter (Slave) (RoHS)
ZB-2570-PA CR	Ethernet/RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)
ZB-2571-PA CR	Ethernet/RS-485/RS-232 to High Power Amplifier ZigBee Converter (Slave) (RoHS)
ZB-2510-T CR	ZigBee Repeater (RoHS)
ZB-2510-PA CR	High Power Amplifier ZigBee Repeater (RoHS)

ZB-2570-T/ZB-2570-PA
ZB-2571-T/ZB-2571-PA

Ethernet/RS-485/RS-232 to ZigBee Converter

Features

- ISM 2.4 GHz Operating Frequency
- Fully Compliant with 2.4 G IEEE802.15.4/ZigBee Specifications
- Wireless transmission range up to 100 m (ZB-2570-T/ZB-2571-T)
- Wireless Transmission Range up to 700 m (ZB-2570-PA/ZB-2571-PA)
- Topologies Supported: Star, Cluster Tree, and Mesh
- GUI Configuration Software (Windows Version)
- DIN-Rail Mountable

Introduction

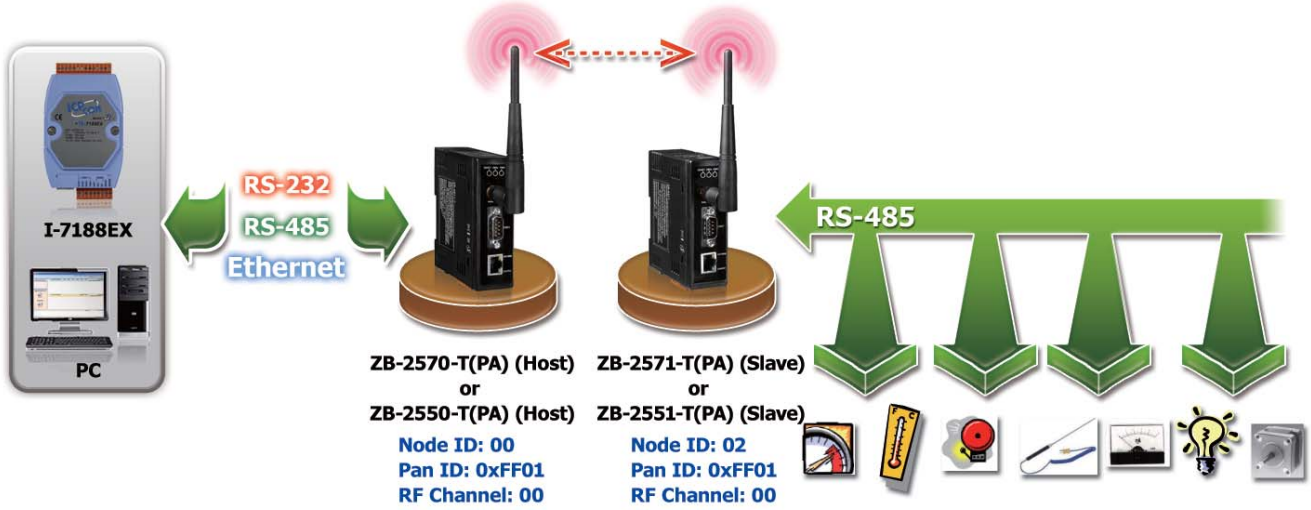
The ZB-2570 series is a host ZigBee converter, and the ZB-2571 series is a slave ZigBee converter. Each features an Ethernet/RS-485/RS-232 interface. Devices that have an Ethernet/RS-485/RS-232 interface are also able to be connected using the ZB-2570 and ZB-2571 series. By distributing host and slave ZigBee converters in the field, users can easily build a wireless network for monitoring and control.

ZigBee is based on the IEEE 802.15.4 standard for wireless personal area networks (WPANs). It is aiming at applications that require secure networking as well as high flexibility for network expansion anytime. It is also widely used in the industrial control field, hospitals, labs and building automation.

Specifications

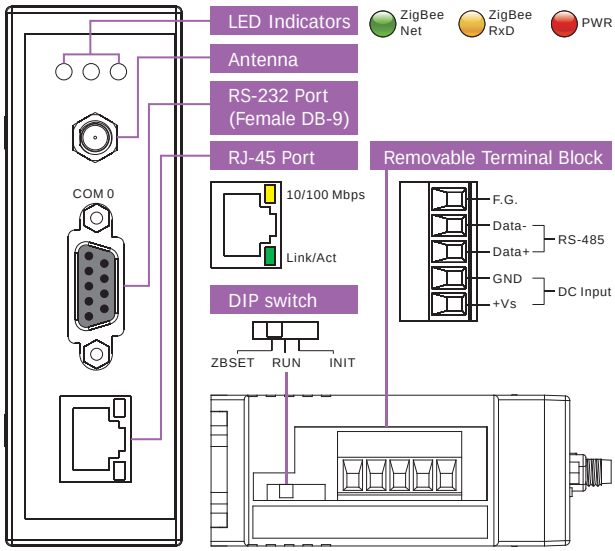
Models	ZB-2570-T	ZB-2570-PA	ZB-2571-T	ZB-2571-PA
ZigBee Module				
RF Channels	16			
Receiving Sensitivity	-102 dBm			
Transmit Power	4 dBm	22 dBm	4 dBm	22 dBm
Network Topology	Star, Mesh and Cluster tree			
Antenna (Omni-Directional)	2.4 GHz – 3 dBi	2.4 GHz – 5 dBi	2.4 GHz – 3 dBi	2.4 GHz – 5 dBi
Transmission Range	100 m	700 m	100 m	700 m
General				
Module Type	Host		Slave	
Communication Interface				
COM 0	D-Sub 9 Female Non-isolated ; RS-232 (TxD, RxD, GND); RS-485 (DATA+, DATA-;internal self-tuner ASIC)		D-Sub 9 Male Non-isolated; RS-232 (TxD, RxD, GND); RS-485 (DATA+, DATA-;internal self-tuner ASIC)	
Ethernet	10/100 Base-TX (Auto-negotiating, auto MDI/MDI-X, LED indicators)			
LED Indicators				
ZigBee Net State	Green			
ZigBee RxD	Yellow			
Power	Red			
Power				
Protection	Power reverse polarity protection			
EMS Protection	ESD, Surge, EFT			
Required Supply Voltage	+10 V_{DC} ~ +30 V_{DC}			
Power Consumption	2.5 W	4 W (max.)	2.5 W	4 W (max.)
Connection	5-Pin 5.08 mm Removable Terminal Block			
Mechanical				
Casing	Plastic			
Flammability	UL 94V-0 fire-retardant materials			
Dimensions (W x L x H)	33 mm x 107 mm x 78mm			
Installation	DIN-Rail			
Environment				
Operating Temperature	-25 °C ~ +75 °C			
Storage Temperature	-40 °C ~ +80 °C			
Relative Humidity	5% ~ 90% RH, Non-condensing			

Applications

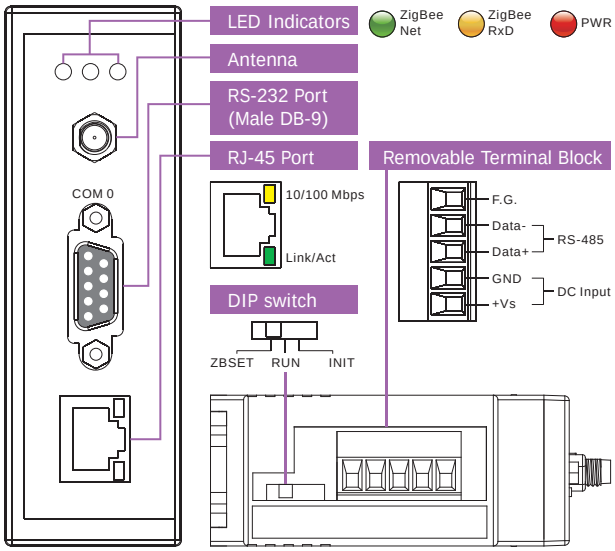


Appearance

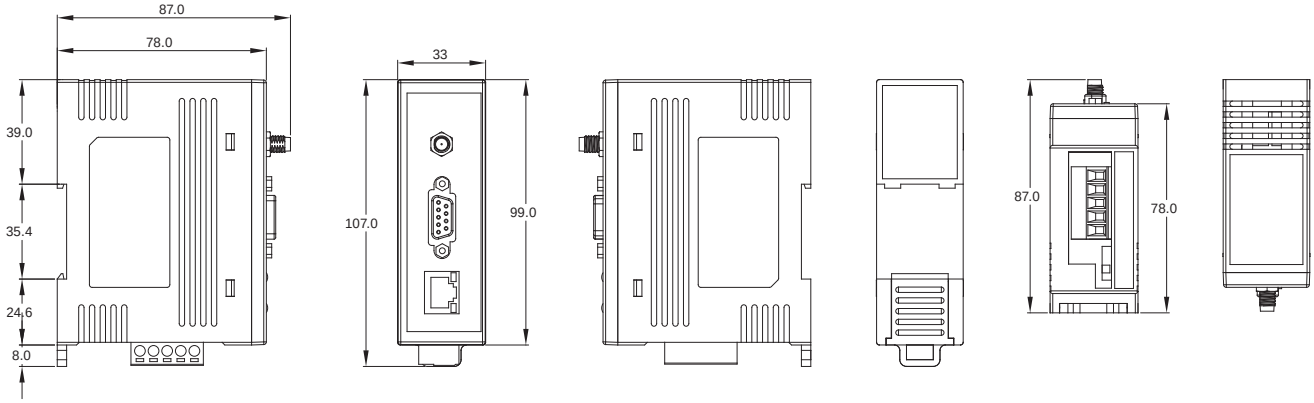
ZB-2570-T/2570-PA



ZB-2571-T/2571-PA



Dimensions (Units: mm)



Left Side View | Front View | Right Side View | Rear View | Bottom View | Top View

Ordering Information

ZB-2570-T CR	Ethernet/RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2570-T/S CR	Ethernet/RS-485/RS-232 to ZigBee Converter (Host) (RoHS) + GPSU06U-6 (Power Supply)
ZB-2570-PA CR	Ethernet/RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)
ZB-2570-PA/S CR	Ethernet/RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS) + GPSU06U-6 (Power Supply)
ZB-2571-T CR	Ethernet/RS-485/RS-232 to ZigBee Converter (Slave) (RoHS)
ZB-2571-T/S CR	Ethernet/RS-485/RS-232 to ZigBee Converter (Slave) (RoHS) + GPSU06U-6 (Power Supply)
ZB-2571-PA CR	Ethernet/RS-485/RS-232 to High Power Amplifier ZigBee Converter (Slave) (RoHS)
ZB-2571-PA/S CR	Ethernet/RS-485/RS-232 to High Power Amplifier ZigBee Converter (Slave) (RoHS) + GPSU06U-6 (Power Supply)

Accessories

ZB-2550-T CR	RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2551-T CR	RS-485/RS-232 to ZigBee Converter (Slave) (RoHS)
ZB-2550-PA CR	RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)
ZB-2551-PA CR	RS-485/RS-232 to High Power Amplifier ZigBee Converter (Slave) (RoHS)
ZB-2510-T CR	ZigBee Repeater (RoHS)
ZB-2510-PA CR	High Power Amplifier ZigBee Repeater (RoHS)

5.3. ZigBee I/O Modules

ZB-2015-T

Wireless 6-ch RTD Input Module
with 3-wire RTD Lead Resistance Elimination

Features

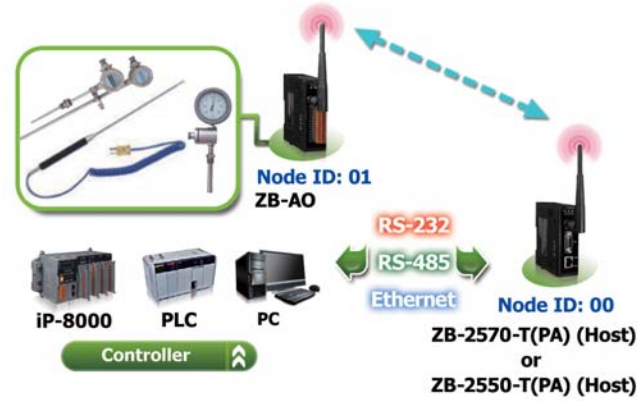
- ISM 2.4 GHz Operating Frequency
- Fully Compliant 2.4 G IEEE802.15.4/ZigBee Specifications
- Wireless Transmission Range up to 700 m (PA-Version)
- Wireless Transmission Range up to 100 m (None/T-Version)
- GUI Configuration Software (Windows Version)
- 3-wire RTD Input with Lead Resistance Elimination
- Individual Channel Configuration
- Open Wire Detection
- Overvoltage Protection
- DIN-Rail Mounting

Introduction

The ZB-2015-T offers 6 channels, each of which could be connected with different kinds of RTD. It features automatic compensation for 3-wire RTD with long-distance measurement so that it can measure right regardless of the length of wires. Also, ZB-2015-T is fully RoHS-compliant and has qualification for 4 kV ESD protection as well as 3000 VDC intra-module isolation. Users can easily configure the module address, Protocol, Checksum, ZB-PID, ZB-ch and type code by rotary and DIP switch.

Applications

Building Automation, Factory Automation, Machine Automation, Remote Maintenance, Remote diagnosis, Testing Equipment.



I/O Specifications

Analog Input	
Input Channel	6
Input Type	2/3-wire RTD
RTD Type	Pt100, Pt1000, Ni120, Cu100, Cu1000
Resolution	16-bit
Sampling Rate	12 Sample/Sec. (Total)
Accuracy	+/-0.05%
Zero Drift	+/-0.5 μV/°C
Span Drift	+/-20 μV/°C
Common Mode Rejection	150 dB
Normal Mode Rejection	100 dB
Open Wire Detection	Yes
Overvoltage Protection	120 VDC/110 VAC
Individual Channel Configurable	Yes
3-wire RTD Lead Resistance Elimination	Yes
ESD Protection	+/-4 kV Contact for Each Channel and +/-8 kV Air for random point
Intra-module Isolated, Field-to-Logic	3000 VDC

System Specifications

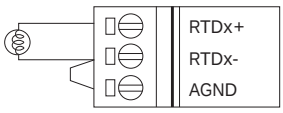
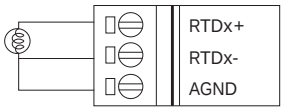
Communication Interface	
Wireless	ZigBee, IEEE 802.15.4 Standard
Antenna	2.4 GHz-3 dBi Omni-Directional antenna
Protocols	Supports DCON and Modbus RTU Protocols
Hot Swap	By Rotary and DIP switch
LED Indicators	
Power	1 LED, red
ZigBee Communication	1 LED, green
Power	
Power Consumption	1.5 W max.
Mechanical	
Flammability	Fire Retardant Materials (UL94-V0 Level)
Dimensions (W x L x H)	33 mm x 87 mm x 107 mm
Installation	DIN-Rail
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +80 °C
Humidity	10% ~ 90% RH, Non-condensing

RTD Type Setting (TT)

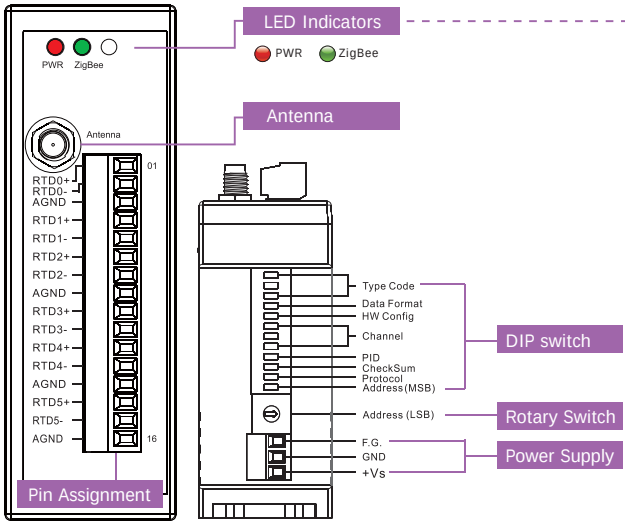
Type Cod	RTD Type	Temperature Range
20	Platinum 100, α=0.00385	-100 °C ~ +100 °C
21	Platinum 100, α= 0.00385	0 °C ~ +100 °C
22	Platinum 100, α= 0.00385	0 °C ~ +200 °C
23	Platinum 100, α= 0.00385	0 °C ~ +600 °C
24	Platinum 100, α= 0.003916	-100 °C ~ +100 °C
25	Platinum 100, α= 0.003916	0 °C ~ +100 °C
26	Platinum 100, α= 0.003916	0 °C ~ +200 °C
27	Platinum 100, α= 0.003916	0 °C ~ +600 °C

Type Cod	RTD Type	Temperature Range
28	Nickel 120	-80 °C ~ +100 °C
29	Nickel 120	0 °C ~ +100 °C
2A	Platinum 1000, α= 0.00385	-200 °C ~ +600 °C
2E	PT 100, α= 0.00385	-200 °C ~ +200 °C
2F	PT 100, α= 0.003916	-200 °C ~ +200 °C
80	PT 100, α= 0.00385	-200 °C ~ +600 °C
81	PT 100, α= 0.003916	-200 °C ~ +600 °C

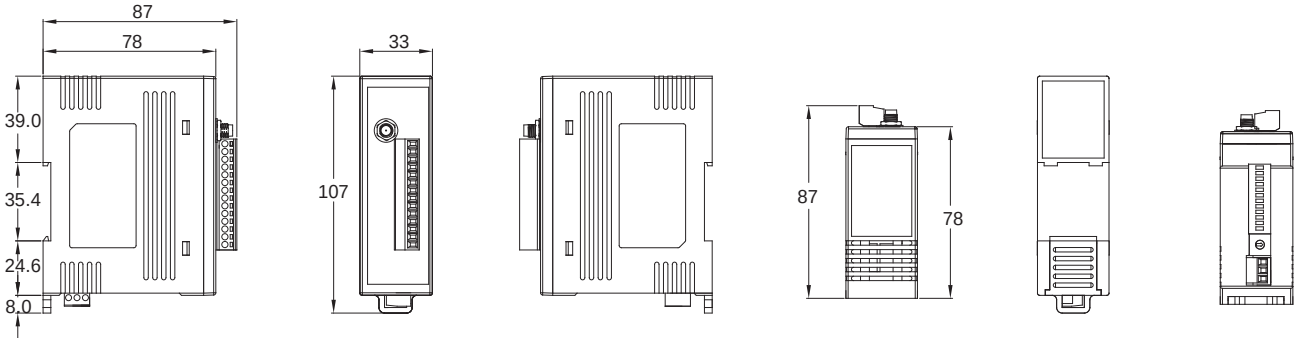
Wiring

	CH0, 1, 2, 5 and 6
2-wire of RTD	
	CH0, 1, 2, 5 and 6
3-wire of RTD	

Appearance



Dimensions (Units: mm)



Left Side View | Front View | Right Side View | Top View | Rear View | Bottom View

Ordering Information

ZB-2015-T CR	Wireless 6-ch RTD Input Module with 3-wire RTD Lead Resistance Elimination (RoHS)

Important Note:The Zigbee Data Acquisition modules need a Zigbee host converter to coordinate the data transmission route. Please remember to order a ZB-2550, ZB-2550-T, ZB-2550PA, ZB-2570, ZB-2570-T or ZB-2570PA ZigBee host converter when you purchase the Zigbee Data Acquisition products.

Accessories

MDR-20-24	24 VDC/1.0 A, 24 W Power Supply with DIN-Rail Mounting
ZB-2510-T CR	ZigBee Repeater (RoHS)
ZB-2510-PA CR	High Power Amplifier ZigBee Repeater (RoHS)
ZB-2550-T CR	RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2550-PA CR	RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)
ZB-2570-T CR	Ethernet/RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2570-PA CR	Ethernet/RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)

ZB-2018-T

Wireless 8-ch Analog Input Module with High Voltage Protection

Features

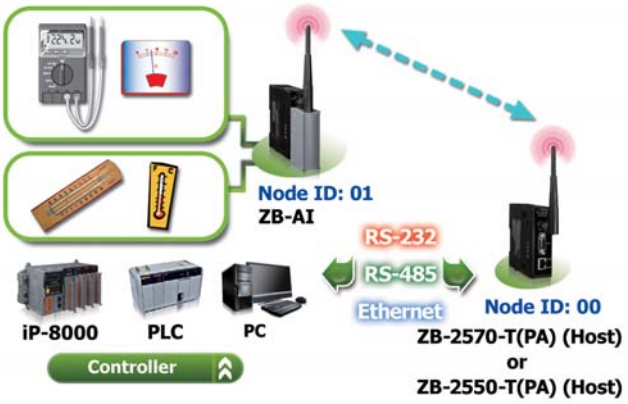
- ISM 2.4 GHz Operating Frequency
- Fully Compliant 2.4 G IEEE802.15.4/ZigBee Specifications
- Wireless Transmission Range up to 700 m (PA-Version)
- Wireless Transmission Range up to 100 m (None/T-Version)
- GUI Configuration Software (Windows Version)
- 8 Differential AI (TC, mV, V)
- Individual Channel Configuration
- Open Thermocouple Detection
- Overvoltage Protection is up to 240 V_{rms}
- DIN-Rail Mounting

Introduction

The ZB-2018-T is an analog input module with an extremely excellent protection mechanism where overvoltage protection is up to 240 V_{rms}. Its input type includes current, voltage as well as thermocouple. It is much more suitable for critically harsh environment! Moreover, a newly-added feature for open thermocouple detection makes ZB-2018-T more sweet than ever. ZB-2018-T also has qualification for 4 kV ESD protection and 3000 V_{DC} intra-module isolation. Users can easily configure the module address, Protocol, Checksum, ZB-PID, ZB-ch and type code by rotary and DIP switch.

Applications

Building Automation, Factory Automation, Machine Automation, Remote Maintenance, Remote diagnosis, Testing Equipment.



I/O Specifications

Analog Input	
Input Channel	8 Differential
Input Type	+/-15 mV, +/-50 mV, +/-100 mV, +/-500 mV, +/-1V, +/-2.5V, +/-20 mA, 0 ~ 20 mA, 4 ~ 20 mA (Requires Optional External 125 Ω Resistor). Thermocouple (J, K, T, E. R. S, B, N, C, L, M, LDIN43710)
Resolution	16-bit
Sampling Rate	10 Samples/Sec. (Total)
Accuracy	+/-0.1% of FSR
-3dB Bandwidth	15.7 Hz
Zero Drift	+/-10 μV/°C
Span Drift	+/-25 ppm/°C
Common Mode Rejection	86 dB min.
Normal Mode Rejection	100 dB
Input Impedance	>400 kΩ
Open Thermocouple Detection	Yes
Overvoltage Protection	240 V_{rms}
Intra-module Isolated, Field-to-Logic	3000 V_{DC}
ESD Protection	+/-4 kV Contact for Each Channel

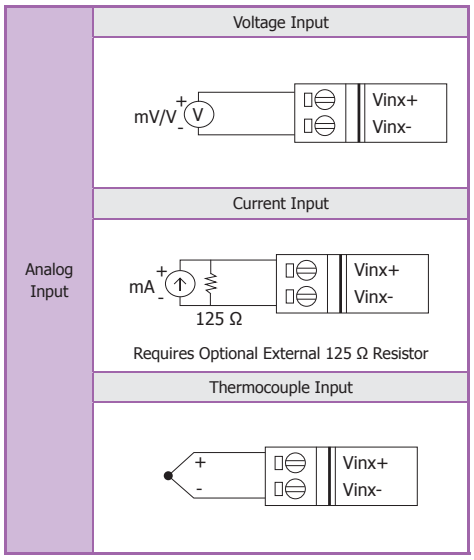
Thermocouple Type

Type Cod	Temperature Range	Type Cod	Temperature Range
J	-210 °C ~ +760 °C	B	0 °C ~ +1820 °C
K	-270 °C ~ +1372 °C	N	-270 °C ~ +1300 °C
T	-270 °C ~ +400 °C	C	0 °C ~ +2320 °C
E	-270 °C ~ +1000 °C	L	-200 °C ~ +800 °C
R	0 °C ~ +1768 °C	M	-200 °C ~ +100 °C
S	0 °C ~ +1768 °C	L2 (DIN43710)	-200 °C ~ +900 °C

System Specifications

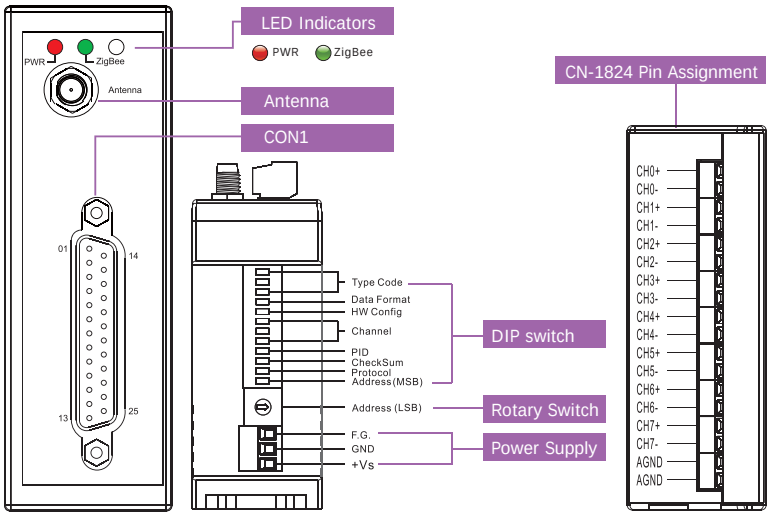
Communication Interface	
Wireless	ZigBee, IEEE 802.15.4 Standard
Antenna	2.4 GHz-3 dBi Omni-Directional antenna
Protocols	Supports DCON and Modbus RTU Protocols
Hot Swap	By Rotary and DIP switch
LED Indicators	
Power	1 LED, red
ZigBee Communication	1 LED, green
Power	
Power Consumption	0.88 W max.
Mechanical	
Flammability	Fire Retardant Materials (UL94-V0 Level)
Dimensions (W x L x H)	33 mm x 87 mm x 107 mm
Installation	DIN-Rail
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +80 °C
Humidity	10% ~ 90% RH, Non-condensing

Wiring



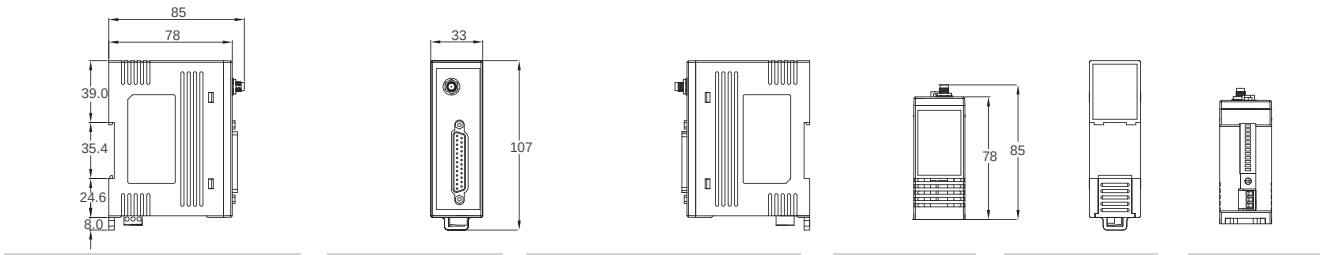
Appearance

ZB-2018-T + CN1824



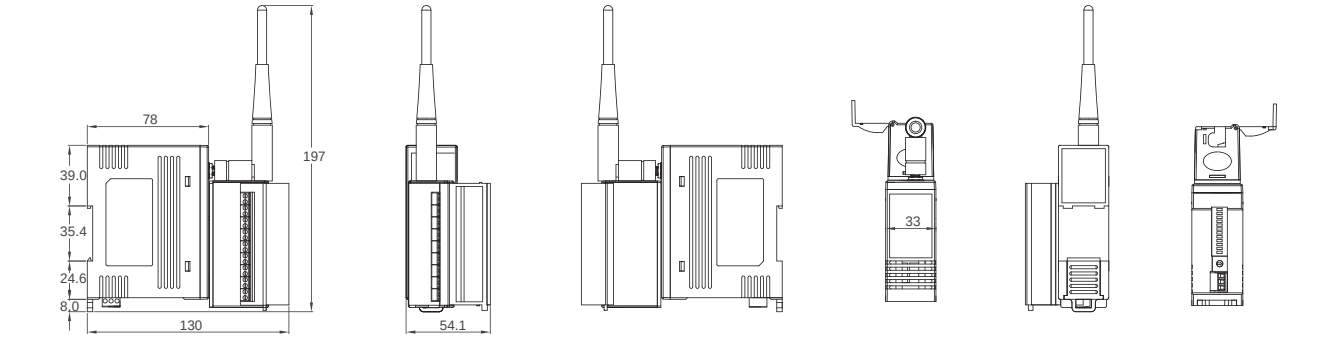
Dimensions (Units: mm)

ZB-2018-T



Left Side View | Front View | Right Side View | Top View | Rear View | Bottom View

ZB-2018-T + CN1824



Left Side View | Front View | Right Side View | Top View | Rear View | Bottom View

Ordering Information

ZB-2018-T CR	Wireless 8-ch Analog Input Module with High Voltage Protection (RoHS)

Important Note:The Zigbee Data Acquisition modules need a Zigbee host converter to coordinate the data transmission route. Please remember to order a ZB-2550, ZB-2550-T, ZB-2550PA, ZB-2570, ZB-2570-T or ZB-2570PA ZigBee host converter when you purchase the Zigbee Data Acquisition products.

Accessories

MDR-20-24	24 VDC/1.0 A, 24 W Power Supply with DIN-Rail Mounting
ZB-2510-T CR	ZigBee Repeater (RoHS)
ZB-2510-PA CR	High Power Amplifier ZigBee Repeater (RoHS)
ZB-2550-T CR	RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2550-PA CR	RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)
ZB-2570-T CR	Ethernet/RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2570-PA CR	Ethernet/RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)

ZB-2052-T

Wireless 8-ch Isolated Digital Input Module with 16-bit Counters

Features

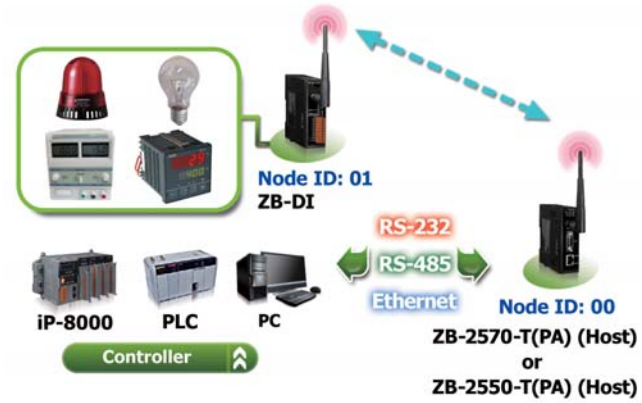
- ISM 2.4 GHz Operating Frequency
- Fully Compliant 2.4 G IEEE802.15.4/ZigBee Specifications
- Wireless Transmission Range up to 700 m (PA-Version)
- Wireless Transmission Range up to 100 M (None/T-Version)
- GUI Configuration Software (Windows Version)
- 8 Digital Input for Wet Contact
- Supports 16-bit Counters for Digital Inputs
- Surge and ESD Protection
- DIN-Rail Mounting

Introduction

The ZB-2052-T offers 8-ch for digital input, each of which features photo couple isolation. Moreover, you can choose sink type or source type input by wire connections. All channels can be used as 16-bit counters. ZB-2052-T not only has 8 LED indicators for channel status but also gets qualification for 4 kV ESD protection and 3000 V_{DC} intra-module isolation. Users can be easy to configure the module address, Protocol, Checksum, ZB-PID and ZB-ch by rotary and DIP switch.

Applications

Building Automation, Factory Automation, Machine Automation, Remote Maintenance, Remote diagnosis, Testing Equipment.



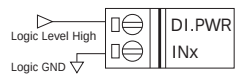
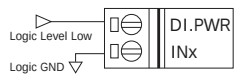
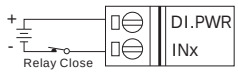
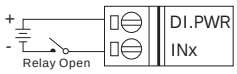
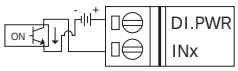
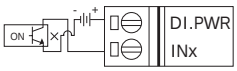
I/O Specifications

Digital Input	
Input Channel	8
Wet Contact (Sink/Source)	On Voltage Level: +3.5 V_{DC} ~ +30 V_{DC}
	Off Voltage Level: +1 V_{DC} max.
Input Impedance	3 kΩ, 0.33 W
Counter	Channels: 8
	Max. Counts: 16-bit (65535)
	Max. Input Frequency: 100 Hz
	Min. Pulse Width: 5 ms
Intra-module Isolated, Field-to-Logic	3750 V_{rms}
ESD Protection	+/-4 kV Contact for Each Channel

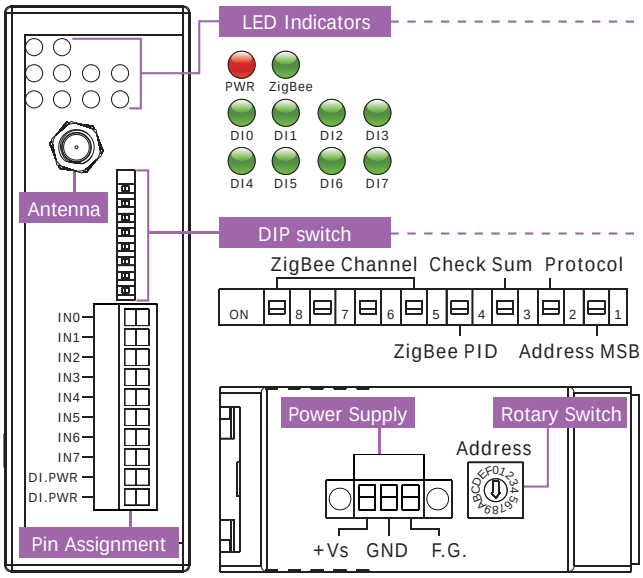
System Specifications

Communication Interface	
Wireless	ZigBee, IEEE 802.15.4 Standard
Antenna	2.4 GHz-3 dBi Omni-Directional antenna
Protocols	Supports DCON and Modbus RTU Protocols
Hot Swap	By Rotary and DIP switch
LED Indicators	
Power	1 LED, red
ZigBee Communication	1 LED, green
Digital Input	8 LEDs, green
Power	
Power Consumption	1 W max.
Mechanical	
Flammability	Fire Retardant Materials (UL94-V0 Level)
Dimensions (W x L x H)	33 mm x 87 mm x 107 mm
Installation	DIN-Rail
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +80 °C
Humidity	10% ~ 90% RH, Non-condensing

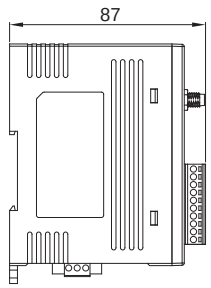
Wiring

Input Type	ON State LED ON Readback as 1	OFF State LED OFF Readback as 0
TTL/ CMOS Logic	Voltage > 3.5V	Voltage < 1V
		
Relay Contact	Relay ON	Relay OFF
		
Open Collector	Open Collector ON	Open Collector OFF
		

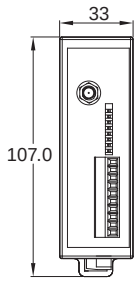
Appearance



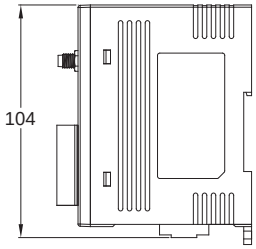
Dimensions (Units: mm)



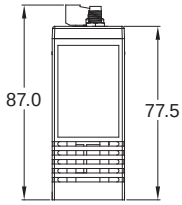
Left Side View



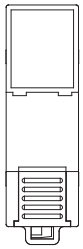
Front View



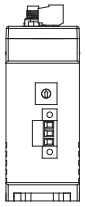
Right Side View



Top View



Rear View



Bottom View

Ordering Information

ZB-2052-T CR	Wireless 8-ch Isolated Digital Input Module with 16-bit Counters (RoHS)

Important Note:The Zigbee Data Acquisition modules need a Zigbee host converter to coordinate the data transmission route. Please remember to order a ZB-2550, ZB-2550-T, ZB-2550PA, ZB-2570, ZB-2570-T or ZB-2570PA ZigBee host converter when you purchase the Zigbee Data Acquisition products.

Accessories

MDR-20-24	24 V_{DC}/1.0 A, 24 W Power Supply with DIN-Rail Mounting
ZB-2510-T CR	ZigBee Repeater (RoHS)
ZB-2510-PA CR	High Power Amplifier ZigBee Repeater (RoHS)
ZB-2550-T CR	RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2550-PA CR	RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)
ZB-2570-T CR	Ethernet/RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2570-PA CR	Ethernet/RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)

ZB-2053-T

Wireless 14-ch Isolated Digital Input Module

Features

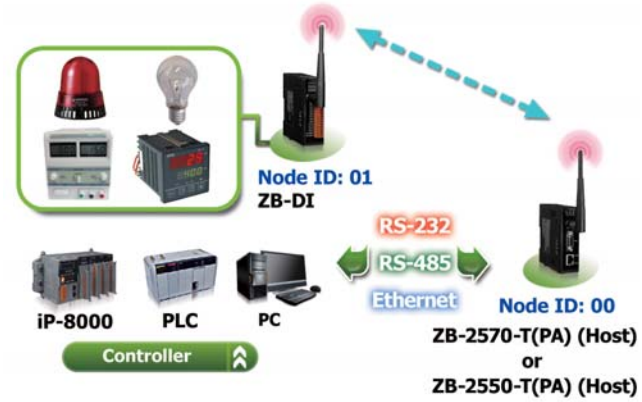
- ISM 2.4 GHz Operating Frequency
- Fully Compliant 2.4 G IEEE802.15.4/ZigBee Specifications
- Wireless Transmission Range up to 700 m (PA-Version)
- Wireless Transmission Range up to 100 m (None/T-Version)
- GUI Configuration Software (Windows Version)
- 14 Digital Input for Dry Contact and Wet Contact
- Supports 16-bit Counters for Digital Inputs
- Surge and ESD Protection
- DIN-Rail Mounting

Introduction

The ZB-2053-T offers 14-ch for digital input which cover dry contact and wet contact as well. Its effective distance for dry contact is up to 500 meters. All of its channels are not only with isolation but also able to be used as counter. ZB-2053-T has 14 LED indicators for channel status as well as qualification for 4 kV ESD protection and 3750 V_{rms} intra-module isolation. Users can easily configure the module address, Protocol, Checksum, ZB-PID and ZB-ch by rotary and DIP switch.

Applications

Building Automation, Factory Automation, Machine Automation, Remote Maintenance, Remote diagnosis, Testing Equipment.



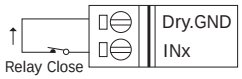
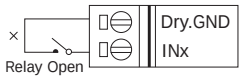
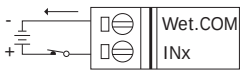
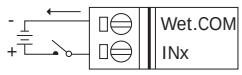
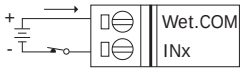
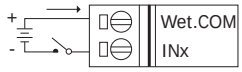
I/O Specifications

Digital Input	
Input Channel	14
Dry Contact (Sink)	On Voltage Level: Close to GND
	Off Voltage Level: Open
	Effective Distance for Dry Contact: 500 m max.
Wet Contact (Sink/Source)	On Voltage Level: +3.5 V_{DC} ~ +30 V_{DC}
	Off Voltage Level: +1 V_{DC} max.
Input Impedance	3 kΩ, 0.33 W
Counter	Channels: 14
	Max. Counts: 16-bit (65535)
	Max. Input Frequency: 100 Hz
	Min. Pulse Width: 5 ms
Intra-module Isolated, Field-to-Logic	3750 V_{DC}
ESD Protection	+/-4 kV Contact for Each Channel

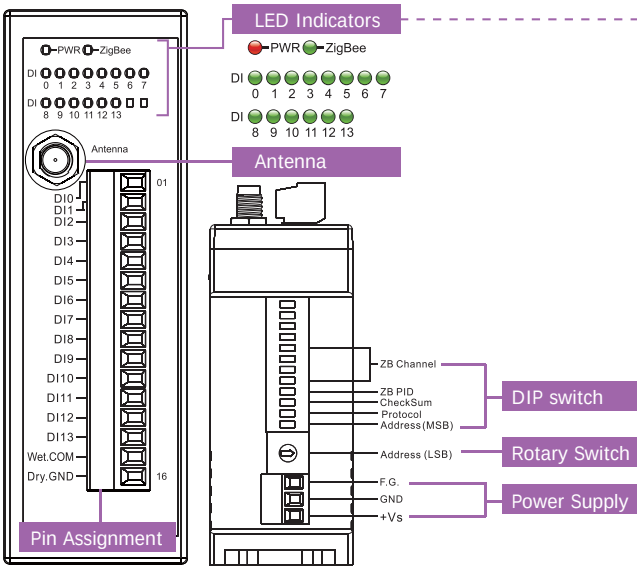
System Specifications

Communication Interface	
Wireless	ZigBee, IEEE 802.15.4 Standard
Antenna	2.4 GHz-3 dBi Omni-Directional antenna
Protocols	Supports DCON and Modbus RTU Protocols
Hot Swap	By Rotary and DIP switch
LED Indicators	
Power	1 LED, red
ZigBee Communication	1 LED, green
Digital Input	14 LEDs, green
Power	
Power Consumption	0.84 W max.
Mechanical	
Flammability	Fire Retardant Materials (UL94-V0 Level)
Dimensions (W x L x H)	33 mm x 87 mm x 107 mm
Installation	DIN-Rail
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +80 °C
Humidity	10% ~ 90% RH, Non-condensing

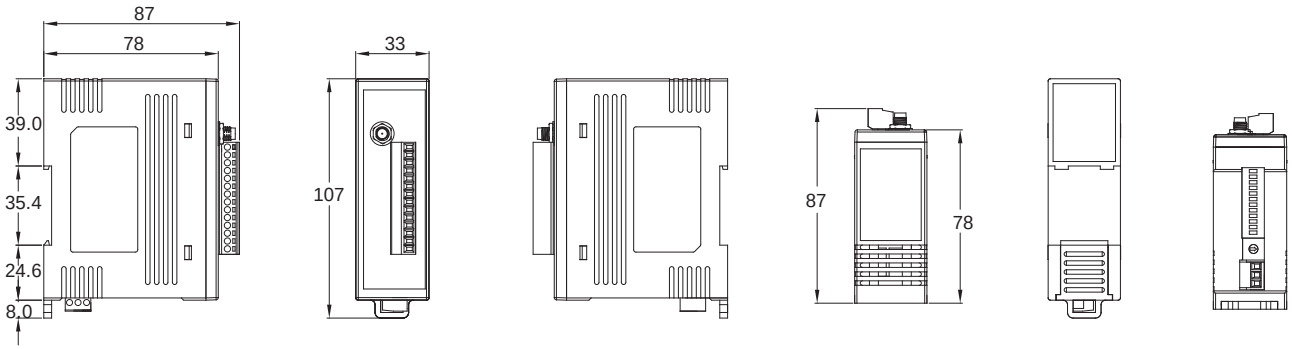
Wiring

Input Type	ON State LED ON Readback as 1	OFF State LED OFF Readback as 0
Dry Contact	Relay ON	Relay OFF
		
Wet Contact (Source)	Voltage > 3.5V	Voltage < 1V
		
Wet Contact (Sink)	Open Collector ON	Open Collector OFF
		

Appearance



Dimensions (Units: mm)



Left Side View | Front View | Right Side View | Top View | Rear View | Bottom View

Ordering Information

ZB-2053-T CR	Wireless 14-ch Isolated Digital Input Module (RoHS)

Important Note:The Zigbee Data Acquisition modules need a Zigbee host converter to coordinate the data transmission route. Please remember to order a ZB-2550, ZB-2550-T, ZB-2550PA, ZB-2570, ZB-2570-T or ZB-2570PA ZigBee host converter when you purchase the Zigbee Data Acquisition products.

Accessories

MDR-20-24	24 V_{DC}/1.0 A, 24 W Power Supply with DIN-Rail Mounting
ZB-2510-T CR	ZigBee Repeater (RoHS)
ZB-2510-PA CR	High Power Amplifier ZigBee Repeater (RoHS)
ZB-2550-T CR	RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2550-PA CR	RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)
ZB-2570-T CR	Ethernet/RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2570-PA CR	Ethernet/RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)

ZB-2060-T

Wireless 6-ch Isolated Digital Input and 4-ch Relay Output Module

Features

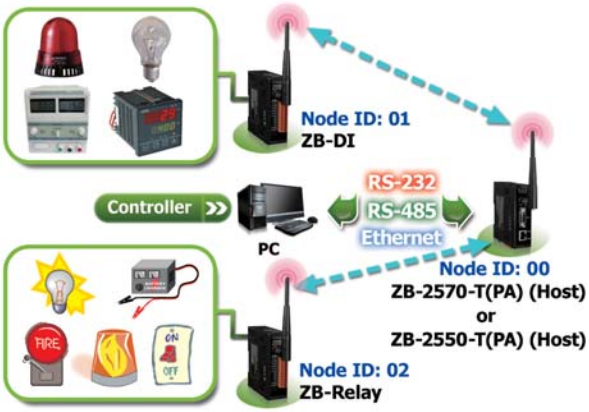
- ISM 2.4 GHz Operating Frequency
- Fully Compliant 2.4 G IEEE802.15.4/ZigBee Specifications
- Wireless Transmission Range up to 700 m (PA-Version)
- Wireless Transmission Range up to 100 m (None/T-Version)
- GUI Configuration Software (Windows Version)
- 6 Digital Input & 4 Relay Output
- Supports 16-bit Counters for Digital Inputs
- Surge and ESD Protection
- DIN-Rail Mounting

Introduction

The ZB-2060-T offers 4-ch form power relay outputs and 6-ch digital input, each of which features photo couple isolation. Moreover, you can choose sink type or source type input by wire connections. All channels can be used as 16-bit counters. ZB-2060-T not only has 10 LED indicators for channel status but also gets qualification for 4 kV ESD protection and 3000 V_{DC} intra-module isolation. Users can easily configure the module address, Protocol, Checksum, ZB-PID and ZB-ch by rotary and DIP switch.

Applications

Building Automation, Factory Automation, Machine Automation, Remote Maintenance, Remote diagnosis, Testing Equipment.



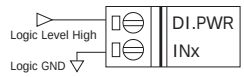
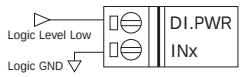
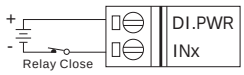
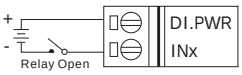
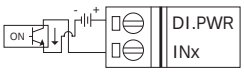
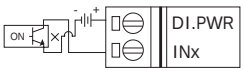
I/O Specifications

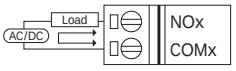
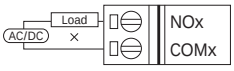
Digital Input		
Input Channel		6
Input Type		Isolated, Wet Contact (Sink/Source)
Input Level		On Voltage Level: +3.5 V_{DC} ~ +30 V_{DC}
		Off Voltage Level: +1 V_{DC} max.
Input Impedance		3 kΩ, 0.33 W
Counters		Channels: 6
		Max. Count: 16-bit (65535)
		Max. Input Frequency: 100 Hz
		Min. Pulse Width: 5 ms
Relay Output		
Output Channel		4
Output Type		Power Relay, Form A
Contact Rating		5 A @ (250 V_{AC}/30 V_{DC})
Max. Contact voltage		270 V_{AC}/125 V_{DC}
Operate Time		10 ms max. at rated voltage
Release Time		5 ms max. at rated voltage
Endurance	Electrically	Resistive Load: 100,000 ops. min. (10 ops/minute)
	Mechanically	At No Load: 20,000,000 ops. min. 300 ops/minute)
Dielectric Strength	Between Contacts	750 V_{AC} for 1 minute
	Between Coil to Contacts	3,000 V_{AC} for 1 minute
Insulation Resistance		5,080 V (1.2/50 μs)
Surge Strength		5 ms max. at rated voltage
ESD Protection		+/-4 kV Contact for Each Channel

System Specifications

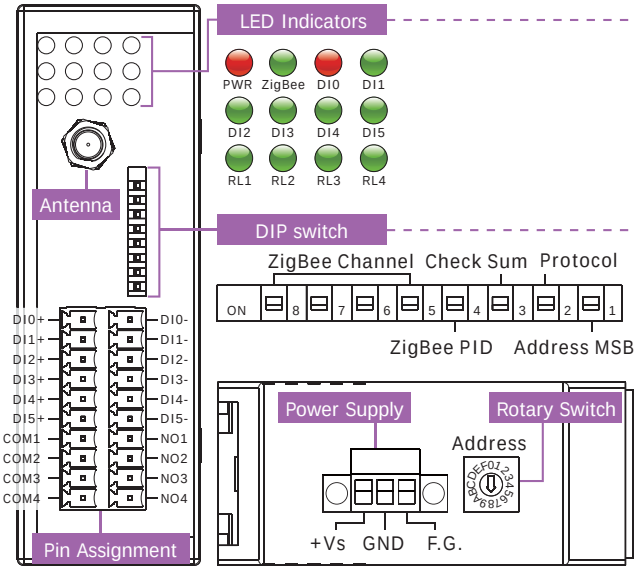
Communication Interface	
Wireless	ZigBee, IEEE 802.15.4 Standard
Antenna	2.4 GHz-3 dBi Omni-Directional antenna
Protocols	Supports DCON and Modbus RTU Protocols
Hot Swap	By Rotary and DIP switch
LED Indicators	
Power	1 LED, red
ZigBee Communication	1 LED, green
Digital Input & Output	10 LEDs, green
Power	
Power Consumption	1.2 W max.
Mechanical	
Flammability	Fire Retardant Materials (UL94-V0 Level)
Dimensions (W x L x H)	33 mm x 87 mm x 107 mm
Installation	DIN-Rail
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +80 °C
Humidity	10% ~ 90% RH, Non-condensing

Wiring

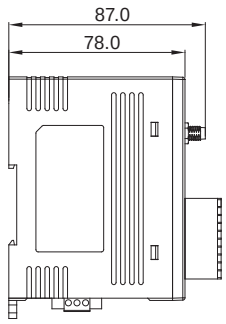
Input Type	ON State LED ON Readback as 1	OFF State LED OFF Readback as 0
TTL/ CMOS Logic	Voltage > 3.5V	Voltage < 1V
		
Relay Contact	Relay ON	Relay OFF
		
Open Collector	Open Collector ON	Open Collector OFF
		

Output Type	ON State LED ON Readback as 1	OFF State LED OFF Readback as 0
Relay Contact	Relay ON	Relay OFF
		

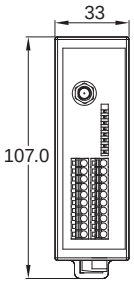
Appearance



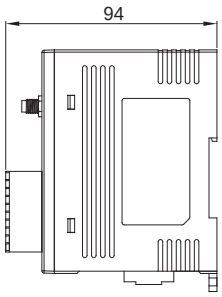
Dimensions (Units: mm)



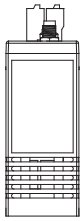
Left Side View



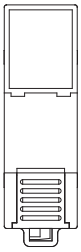
Front View



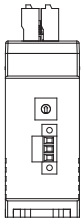
Right Side View



Top View



Rear View



Bottom View

Ordering Information

ZB-2060-T CR	Wireless 6-ch Isolated Digital Input and 4-ch Relay Output Module (RoHS)

Important Note:The Zigbee Data Acquisition modules need a Zigbee host converter to coordinate the data transmission route. Please remember to order a ZB-2550, ZB-2550-T, ZB-2550PA, ZB-2570, ZB-2570-T or ZB-2570PA ZigBee host converter when you purchase the Zigbee Data Acquisition products.

Accessories

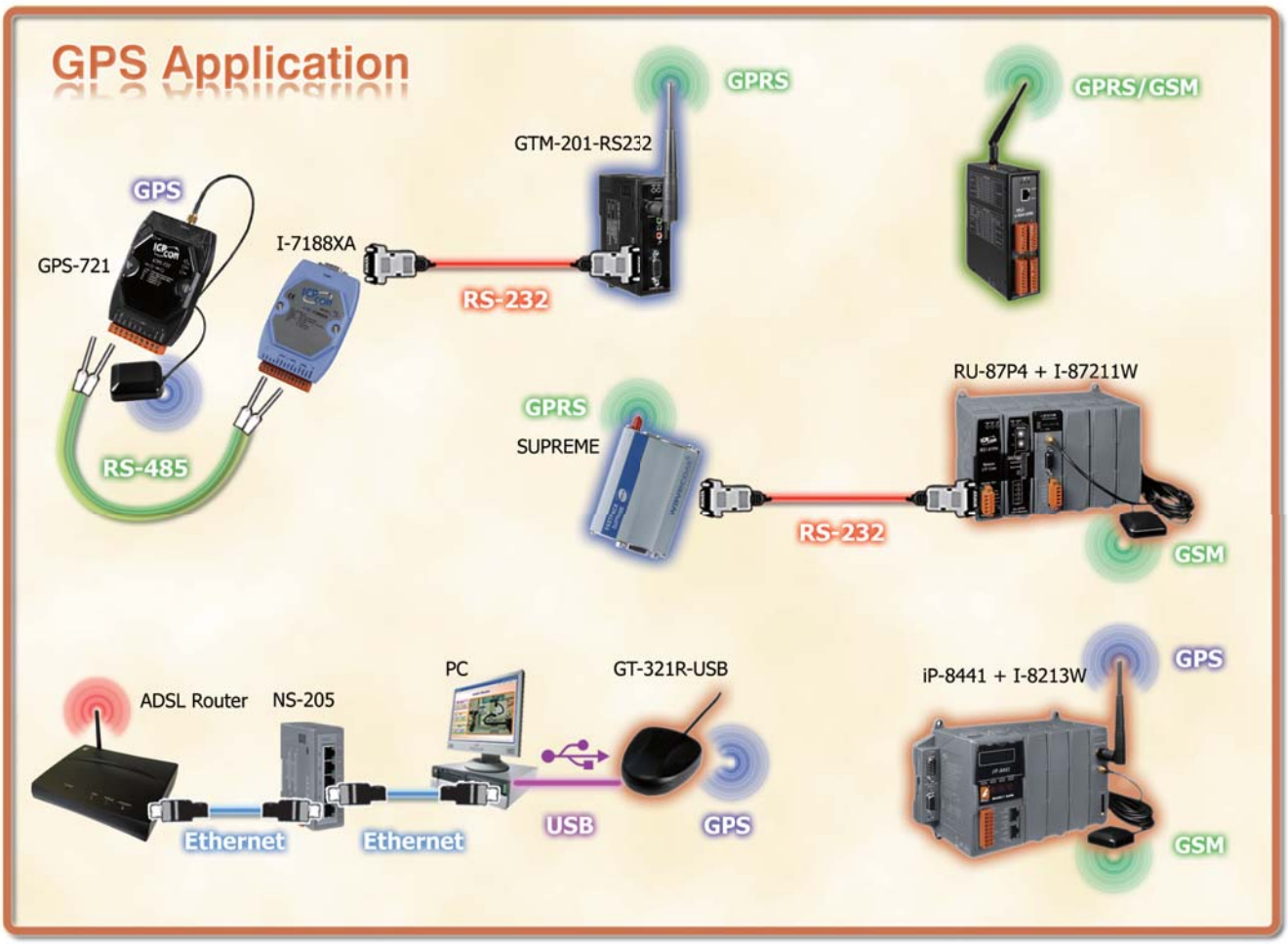
MDR-20-24	24 V_{DC}/1.0 A, 24 W Power Supply with DIN-Rail Mounting
ZB-2510-T CR	ZigBee Repeater (RoHS)
ZB-2510-PA CR	High Power Amplifier ZigBee Repeater (RoHS)
ZB-2550-T CR	RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2550-PA CR	RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)
ZB-2570-T CR	Ethernet/RS-485/RS-232 to ZigBee Converter (Host) (RoHS)
ZB-2570-PA CR	Ethernet/RS-485/RS-232 to High Power Amplifier ZigBee Converter (Host) (RoHS)

GPS Products

6

6.1.	Overview	P6-1-1
6.2.	GPS Receivers	P6-2-1

6.1. Overview



The Global Positioning System (GPS) is a space-based global navigation satellite system (GNSS) that provides reliable location and time information anytime and anywhere on the Earth when and where there is an unobstructed line of sight to four or more GPS satellites. ICP DAS provides various GPS products which are designed for rapid startup time and high performance in foliage and urban canyon environment.

Advantages & Benefits

- Support up to 66-channel GPS and NMEM v0183 v3.01
- Apply for Automotive, Marine or Personal positioning and navigation
- Current time from Satellite
- Easy installation

• GPS Product Selection Guide

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).

Model Name	GPS Channels	SBAS	GPS Output Interface	GSM/GPRS	Digital Output	Protocol/ Interface	Description	Page
GTM-201P-3GWA	32	WAAS, EGNOS, MSAS	USB/RS-232	Yes	-	-	GPs Receiver	4-2-4
GT-321R-USB	12	WAAS, EGNOS	RS-232	-	-	-	GPS Receiver	6-2-1
GT-321R-RS232	12	WAAS, EGNOS	USB	-	-	-	GPS Receiver	6-2-1
I-87211W	32	WAAS, EGNOS, MSAS	RS-232	-	2	DCON/*Note1	GPS Receiver and 2 DO Module	6-2-3
I-8213W	32	WAAS, EGNOS, MSAS	*Note2	Yes (TCP/IP protocol) *Note3	-	-	GPS Receiver and GPRS Controller Module	4-2-7
GPS-721	32	WAAS, EGNOS, MSAS	RS-232	-	1	DCON/RS-485	GPS Receiver and 1 DO Module	6-2-5

[*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, I-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.

6.2. GPS Receivers

GT-321R-USB
GT-321R-RS232
GPS Receiver

Features

- GPS Receiver with 12 parallel channel
- 4100 simultaneous time-frequency search bins
- SBAS (WAAS, EGNOS) support
- -140 dBm acquisition sensitivity
- -150 dBm tracking sensitivity
- <10 second hot start
- <50 second cold start
- 5 m CEP accuracy
- USB/RS232 Interface
- Easy plug in Notebook and PC

Introduction

With a miniature form factor, the GT-321R-RS232/USB GPS Receiver module utilizes 12-channel GPS technology and is designed for rapid startup time and high performance in foliage and urban canyon environments. The GT-321R-RS232/USB applies the latest semiconductor technology so as to provide robust performance, enhanced position and velocity filtering for smooth navigation, onboard patch antenna and RS-232/USB driver for simple interfacing.
The GT-321R is optimized for applications requiring good performance, low cost and maximum flexibility. It is suitable for a wide range of applications including asset tracking and monitoring. Satellite-based augmentation systems (SBAS) such as EGNOS and WAAS are supported to yield improved accuracy.

Specifications

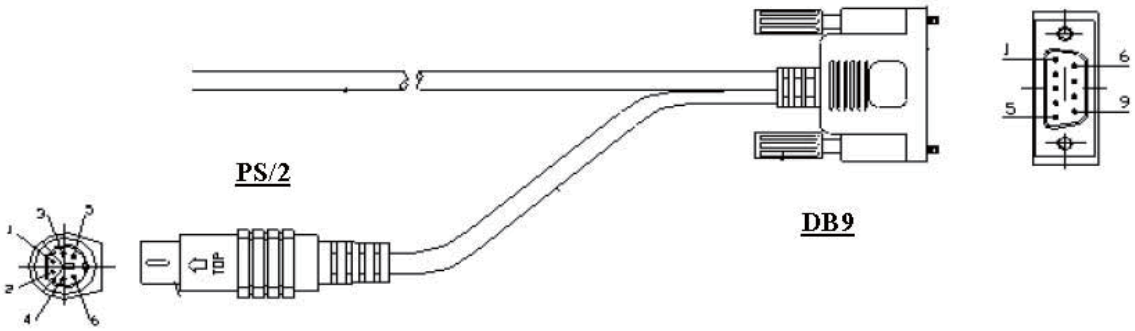
Models	GT-321R-RS232	GT-321R-USB
General		
General	L1 frequency, C/A code, 12 Parallel Channels	
Sensitivity	-165 dBW minimum	-140 dBm acquisition -150 dBm tracking
Update Rate	1 Hz	
Reacquisition	100 millisecond	
Accuracy		
Position	25 m CEP S/A off	5 m CEP
Velocity	0.1 m/sec S/A off	0.1 m/sec
Startup time		
Cold Start	120 sec	<50 sec (typical)
Warm Start	40 sec	<25 sec (typical)
Hot Start	10 sec	<10 sec
Dynamics		
Altitude	-1000 m ~ +18,000 m	<18,000 m
Velocity	500 m/sec	515 m/sec
Acceleration	+/-4 g	4 g
Communication Interface		
Serial Port	Standard RS-232	USB
Protocols		
Baud Rate	4800/9600 baud, 8-None-1	4800 baud, 8-None-1
Datum	219 standard datum; WGS-84 (default)	
NMEA Messages	GGA, GSA, GSV, RMC, GLL, VTG	GGA, GLL, GSA, GSV, RMC, VTG, ZDA
Power		
Required Supply Voltage	3.8 ~ 8 V_{DC}	
Power Consumption	<100 mW	
Mechanical		
Dimensions (L x W x D)	60 mm x 50 mm x 22 mm	
Weight	25 g	
Environment		
Operating Temperature	-40 °C ~ +85 °C	
Storage Temperature	-55 °C ~ +100 °C	-55 °C ~ +90 °C
Relative Humidity	5% ~ 95% RH, Non-condensing	

Applications

The GT-321R-RS232/USB is a high performance, low power consumption, small size, very easy integrated GPS receiver. It can be used as a satellite navigator for map applications running on a PC or a notebook. The GT-321R-RS232/USB GPS receiver will track satellites at a time while providing fast time-to-first-fix and one second navigation updates. Combining this Receiver with an embedded controller module plus Data Acquisition modules/daughter boards and using some simple programming, Mobile Assets can be tracked as well as other sensor data being reported.

Pin Assignments

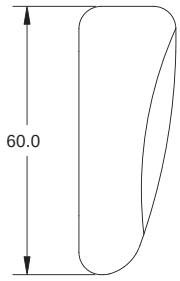
GT-321R-RS232



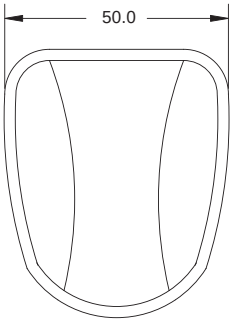
PS/2	
Terminal No.	Pin Assignment
01	N/C
02	N/C
03	GND
04	VCC
05	N/C
06	N/C

DB9			
Pin Assignment	Terminal	No.	Pin Assignment
N/C	01	06	N/C
TX	02	07	N/C
RX	03	08	N/C
N/C	04	09	N/C
GND	05		
		9-Pin Male D-Sub Connector	

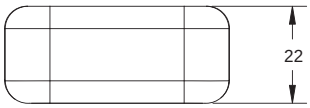
Dimensions (Units: mm)



Left Side View



Front View



Top View

Ordering Information

GT-321R-USB CR	GPS Receiver USB Interface (RoHS)
GT-321R-RS232 CR	GPS Receiver RS-232 Interface (RoHS)

I-87211W

GPS Receiver and 2 DO, 1 PPS Output Module with GPS Active External Antenna

Features

- Support PACs and Remote I/O expansion units of ICP DAS
- Support 66-channel GPS
- RS-232 supports NEMA v0183 v3.01 format or DCON protocol
- Built-in 2-channel DO, 1-channel PPS (1 pulse/s)
- PPS: 100 ms pulse output/sec for precise timekeeping and time measurement
- With various system LED indicators
- Capable of SBAS (WAAS, EGNOS, MSAS)
- DIN Rail mounting

Introduction

I-87211W module features high sensitivity, low power and ultra small form factor. This GPS module is powered by MediaTek solution, it can provide you with superior sensitivity and performance even in urban canyon and dense foliage environment.

Applications

- Satellite time correction
- Personal positioning and navigation
- Automotive navigation
- Marine navigation

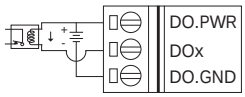
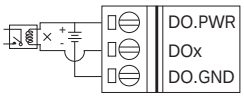
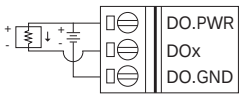
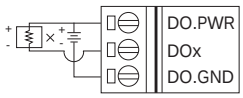
I/O Specifications

Digital Output	
Output Channel	2 (Sink)
Output Type	Non-isolated Open Collector
Output Current	100 mA
Load Voltage	+5 V_{DC} ~ +30 V_{DC}

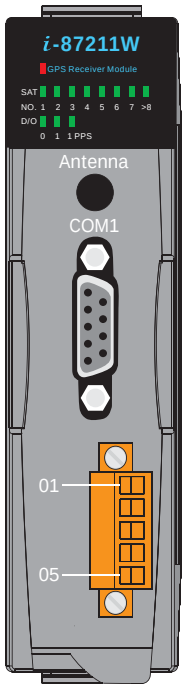
System Specifications

Models	I-87211W
GPS Receiver	
Chip	MediaTek solution
Frequency	L1 1575.42 MHz, C/A code
Support Channel	32
Position Accuracy	Capable of SBAS (WAAS, EGNOS, MSAS)
Max. Altitude	<18,000 m
Max. Velocity	<515 m/s
Startup Time	Cold Start (Open Sky) = 42 s (typical)
Sensitivity	Tracking = Up to -158 dBm
	Cold start = Up to -142 dBm
Protocol Support	NMEA 0183 version 3.01
GPS Output	
1 PPS	Pulse per second output (Default 100 ms pulse/sec)
RS-232 Interface	GPS information output
LED Indicators	
Power/Communication	1 LED
Digital Output	3 LEDs
GPS	8 LEDs
Power	
Power Consumption	0.75 W (Max.)
Mechanical	
Dimensions (W x L x H)	30 mm x 91 mm x 114 mm
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +75 °C
Humidity	5% ~ 95% RH, Non-condensing

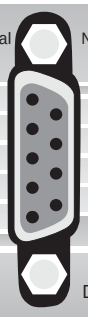
Wiring

Output Type	ON State LED ON Readback as 1	OFF State LED OFF Readback as 0
Drive Relay	Relay ON	Relay Off
		
Resistance Load		
		

Appearance



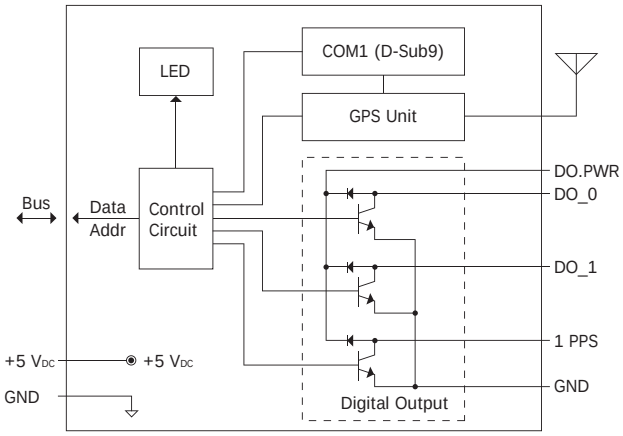
Pin Assignment	Terminal No.	Pin Assignment
-	01	
GPS_TxD	02	06 -
GPS_RxD	03	07 -
-	04	08 -
GND	05	09 -



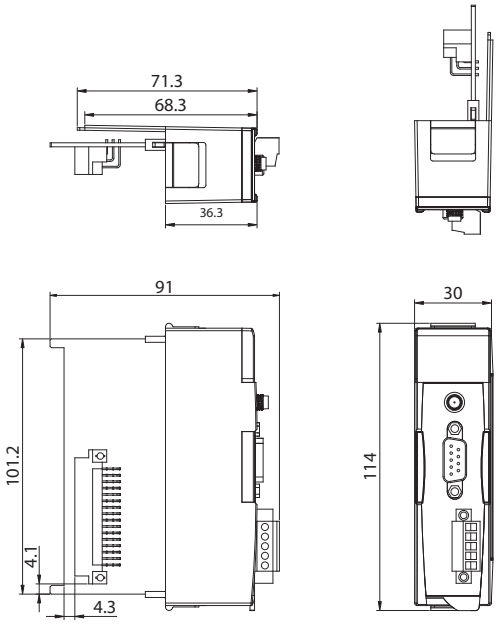
COM1 — 9-Pin Female D-Sub Connector

Terminal No.	Pin Assignment
01	DO.PWR
02	DO_0
03	DO_1
04	1 PPS
05	GND

Internal I/O Structure



Dimensions (Units: mm)



Ordering Information

I-87211W CR	GPS Receiver Module with 2 DO and 1 PPS output, includs ANT-115-03 (Gray Cover) (RoHS)

Accessories

ANT-115-03 CR	4PI81K0000001	5 m GPS Active External Antenna (SMA Plug) (RoHS)

GPS-721

GPS Receiver and 2 DO, 1 PPS Output Module with GPS Active External Antenna

Features

- Support 66-channel GPS
- RS-485 supports DCON protocol
- RS-232 supports NEMA v0183 v3.01 format or DCON protocol
- Built-in 1-channel DO, 1-channel PPS (1 pulse/sec), 1 RS-485, and 1 RS-232
- PPS: 100 ms pulse output/sec for precise timekeeping and time measurement
- With various system LED indicators
- Capable of SBAS (WAAS, EGNOS, MSAS)
- DIN Rail mounting

Introduction

GPS-721 module features high sensitivity, low power and ultra small form factor. This GPS module is powered by MediaTek solution, it provides you with superior sensitivity and performance even in urban canyon and dense foliage environment.

Applications

- Satellite time correction
- Personal positioning and navigation
- Automotive navigation
- Marine navigation

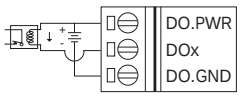
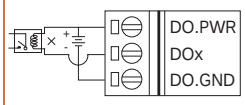
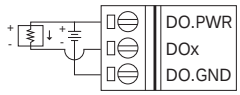
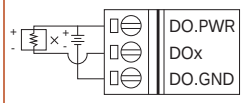
I/O Specifications

Digital Output	
Output Channel	1 (Sink)
Output Type	Non-isolated Open Collector
Output Current	100 mA
Load Voltage	+5 V_{DC} ~ +30 V_{DC}

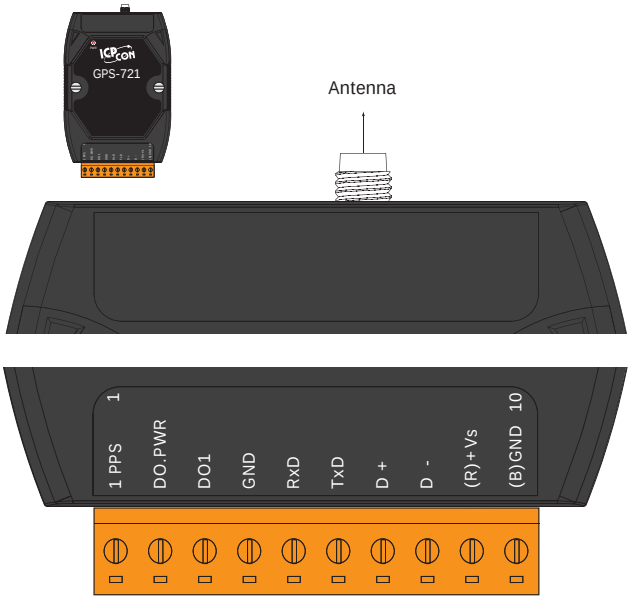
System Specifications

Models	GPS-721
GPS Receiver	
Chip	MediaTek solution
Frequency	L1 1575.42 MHz, C/A code
Support Channel	32
Position Accuracy	Capable of SBAS (WAAS, EGNOS, MSAS)
Max. Altitude	<18,000 m
Max. Velocity	<515 m/s
Startup Time	Cold Start (Open Sky) = 42 s (typical)
Sensitivity	Tracking = Up to -158 dBm
	Cold start = Up to -142 dBm
Protocol Support	NMEA 0183 version 3.01
GPS Output	
1 PPS	Pulse per second output (Default 100 ms pulse/sec)
RS-232 Interface	GPS information output
LED Indicators	
Power/Communication	1 LED
GPS	3 LEDs
Power	
Protection	Power reverse polarity protection
Frame Ground for ESD Protection	Yes
Required Supply Voltage	+10 V_{DC} ~ +30 V_{DC} (Non-regulated)
Power Consumption	0.8 W
Mechanical	
Dimensions (W x H x D)	72 mm x 117 mm x 35 mm
Environment	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-40 °C ~ +85 °C
Humidity	5% ~ 95% RH, Non-condensing

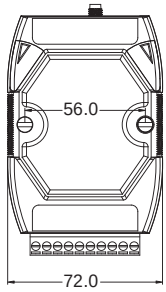
Wiring

Output Type	ON State LED ON Readback as 1	OFF State LED OFF Readback as 0
Drive Relay	Relay ON	Relay Off
		
Resistance Load		
		

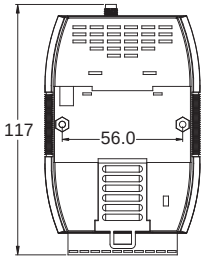
Appearance



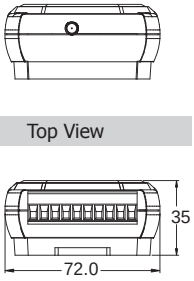
Dimensions (Units: mm)



Front View

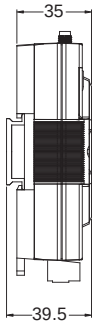


Rear View

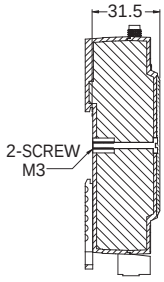


Top View

Bottom View

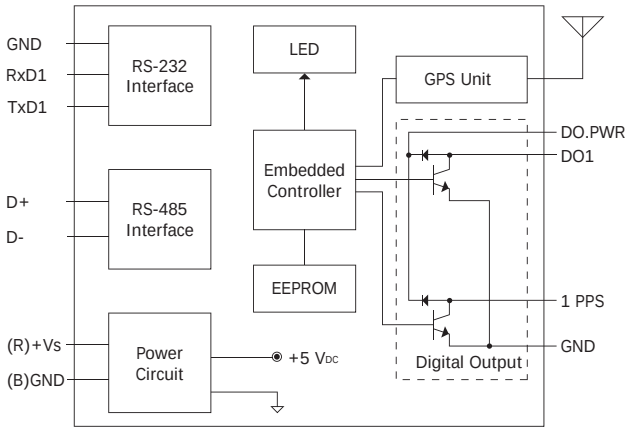


Din-Rail Mounting Bracket



Side View

Internal I/O Structure



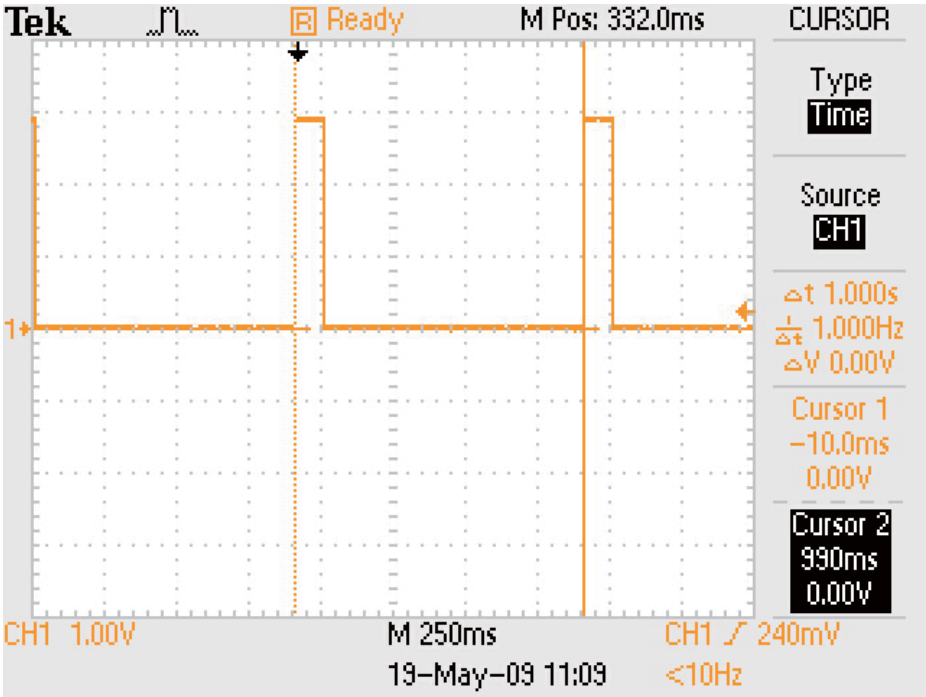
Ordering Information

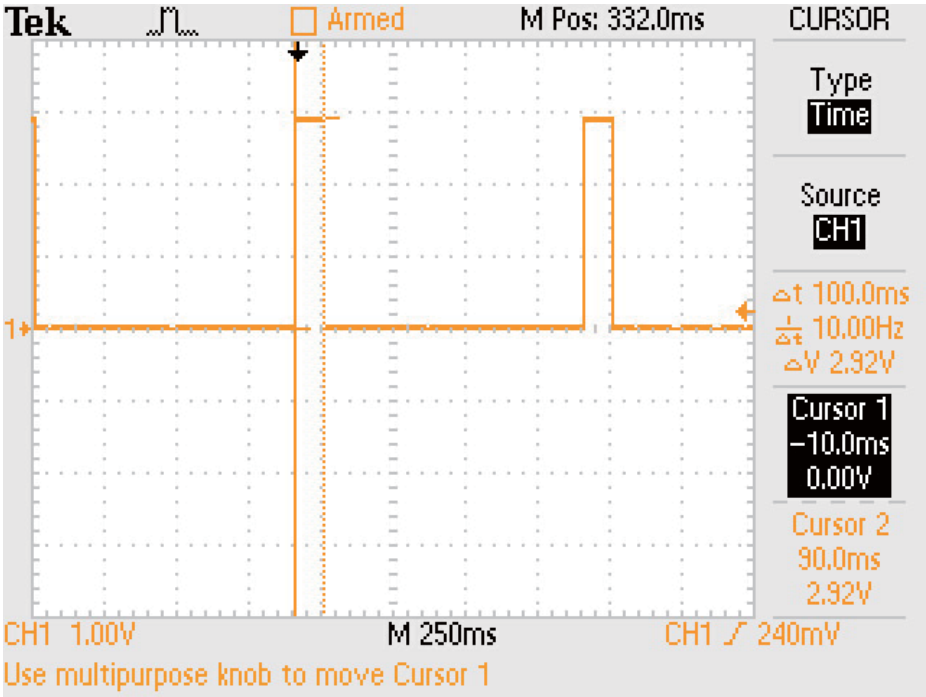
GPS-721 CR	GPS Receiver and 1 DO, 1 PPS Output Module (RoHS)

Accessories

ANT-115-03 CR	4PI81K0000001	5 m GPS Active External Antenna (SMA Plug) (RoHS)

1 Pulse Per Second (Pulse duration is 100 ms/pulse)





The Global Positioning System can also be used as a time reference for radio clocks, but require an accurate 1PPS output to be reliably used for time signals.

A Pulse per second (PPS) is an electrical signal that very precisely indicates the start of a second. PPS signals are output by various types of precision clock, including some models of GPS receivers. Depending on the source, properly operating PPS signals have an accuracy ranging from a few nanoseconds to a few milliseconds.

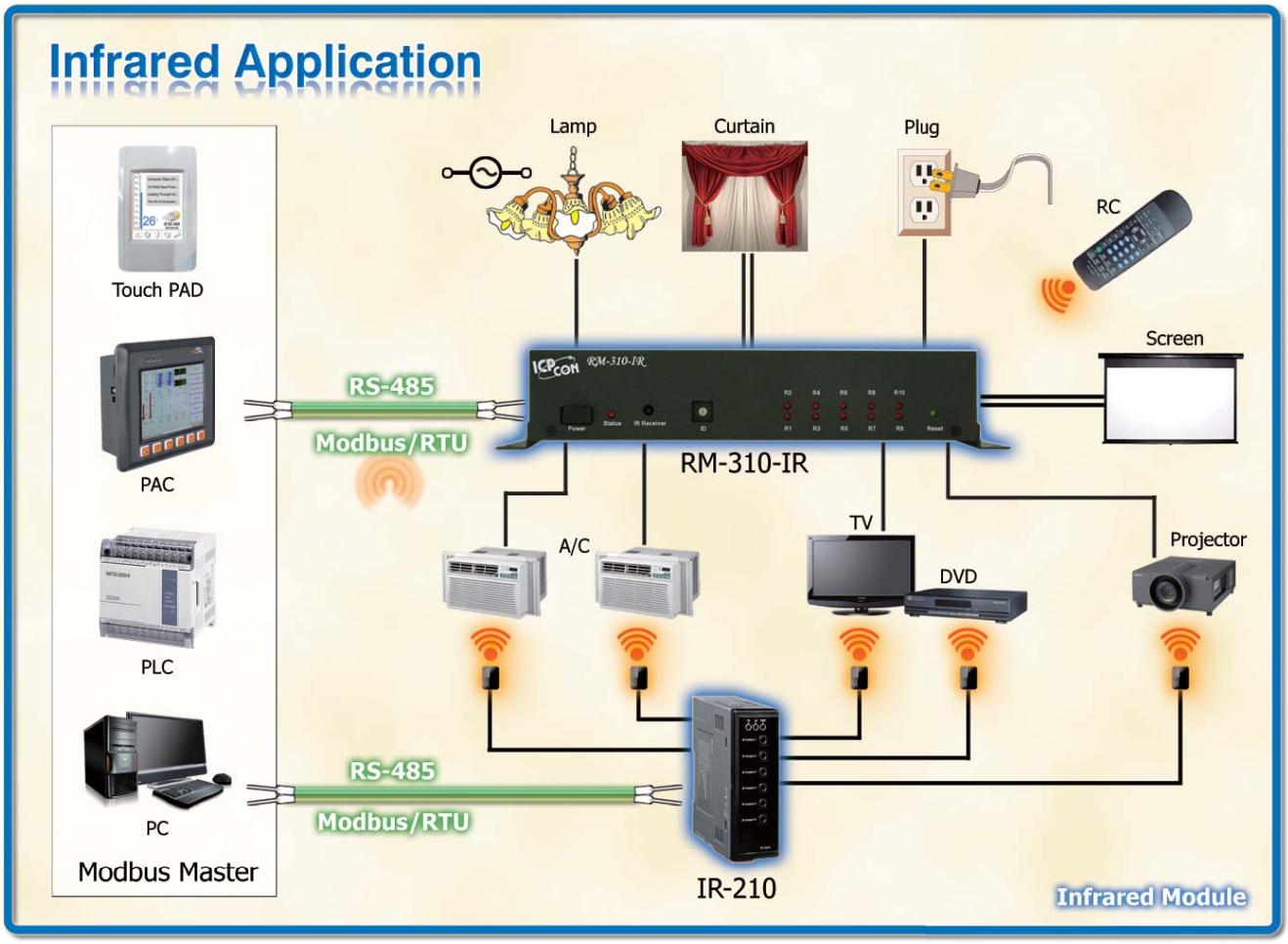
PPS signals are used for precise timekeeping and time measurement. One increasingly common use is in computer timekeeping, including the NTP protocol. Since GPS is considered a stratum-0 source, a common use for the PPS signal is to connect it to a PC using a low-latency, low-jitter wire connection and allow a program to synchronize with it: this makes the PC a stratum-1 time source. Note that because the PPS signal does not specify the time, but merely the start of a second, one must combine the PPS function with another time source that provides the full date and time in order to ascertain the time accurately and precisely.

Infrared Products

7

7.1.	Overview	P7-1-1
7.2.	Infrared Modules	P7-2-1

7.1. Overview



Infrared (IR) light is invisible to human being because its wavelength is below the visible spectrum. The consumer electronics industry has been employing the infrared (around 950nm) for a long time. Invisibility, low power consumption and low cost are the reason why IR is chosen for remote control purpose. Because IR behaves as a normal light, the target devices require line-of-sight to be controlled by an IR remote control. There are many IR sources all around, however, modulation of IR signal at emitter side and demodulation at the receiver side are done to diminish the interference of ambient light. The IR signal is often modulated at a frequency between 30 kHz and 60 kHz which are commonly used in consumer electronics. These devices usually apply different IR protocols and commands of their own without a unified standard. If the IR commands can be collected together and be integrated with the control interface, it can provide convenience and flexibility for the automated applications.

ICP DAS has developed various IR products to apply in home automation. Theses IR products will help users to control and integrate these IR devices into a control system. Therefore, by integrating the PAC and others series of ICP DAS, users can easily to establish the home automation system.

Advantages & Benefits

- With RS-232 and RS-485 Interfaces.
- Support Modbus/RTU protocol.
- No special or proprietary hardware is required.
- Easy to integrated with automation.
- High noise immunity.

• Infrared Product Selection Guide

IR series products here are classified into IR Remote Module and IR Power Relay Module. They can be easily integrated with the PACs and other series of ICP DAS's products to establish the home automation application.

Model Name	Output	UART Interface	Protocol Support	Page
IR-210	6 x IR Output Channels	1 x RS-232 1 x RS-485	Modbus RTU	7-2-1
RM-310-IR	10 x High Power Relay Channels	1 x RS-232 1 x RS-485	Modbus RTU IR commands	7-2-1

7.2. Infrared Modules

IR-210

Universal IR Learning Remote Module

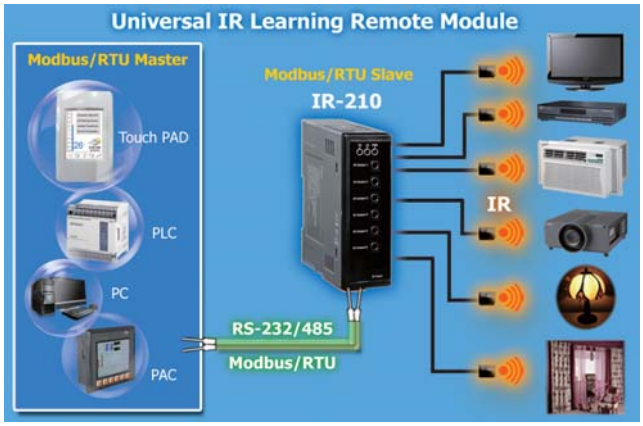
Features

- 6 IR output channels for controlling multiple devices
- 1 IR learning input
- Supports IR carrier frequencies: 32.768, 36, 37.037, 38, 40 and 56 kHz
- Can learn and store 176 IR commands
- Supports RS-232 and RS-485 serial interface
- Supports Modbus/RTU protocol
- Assignable 256 Modbus Network IDs
- Baud rate settings: 9600, 19200, 38400, 57600 and 115200 bps
- Configurable NONE / ODD / EVEN parity and 1 or 2 stop bits
- Provides transmitting / learning / power indication LEDs
- Built-in Watchdog
- RoHS Compliance

Introduction

The IR-210 is a universal IR learning remote module which can learn IR remote commands of diverse electronic devices. The learning results can be stored in the module or saved to a file. The IR-210 supplies 6 IR output channels for individual and simultaneous control on multiple devices. The accompanied RS-232 and RS-485 interfaces with Modbus/RTU protocol provide an easy way of remote control by the Modbus master devices. The application can be home entertainment devices, video conferencing, light control and e-Classroom service etc. IR-210 is well-suited for smart home and building automation.

Applications



RM-310-IR

10-ch High Power Relay Module

Features

- 10 channels high power loops: 15A x 2, 10A x 2, 5A x 6
- NO and NC for each channel
- Protection circuit for each channel
- Independent and sequential power control
- Supports maximum 5 sets of CW/CCW motor control
- Supports RS-232 and RS-485 serial interface
- Supports Modbus/RTU protocol
- Assignable Modbus Network IDs: 0 ~ 15
- Supports IR commands for IR remote control
- Built-in watchdog

Introduction

The RM-310-IR is a 10-channel high power relay module designed for the power control of indoor appliances. The relay module can switch up to 15 A loads. There are NO/NC switches and protection circuit for each channel. The channels can be controlled independently or sequentially by serial communication with Modbus RTU protocol, as well as by wireless IR remote control. Maximum 5 sets of CW & CCW motor control are also provided. The application field can be manual/automatic power switch, timer switch, light scenario control and energy conservation etc.

Ordering Information

IR-210 CR	Universal IR Learning Remote Module (RoHS)
RM-310-IR CR	10-CH High Power Relay Module

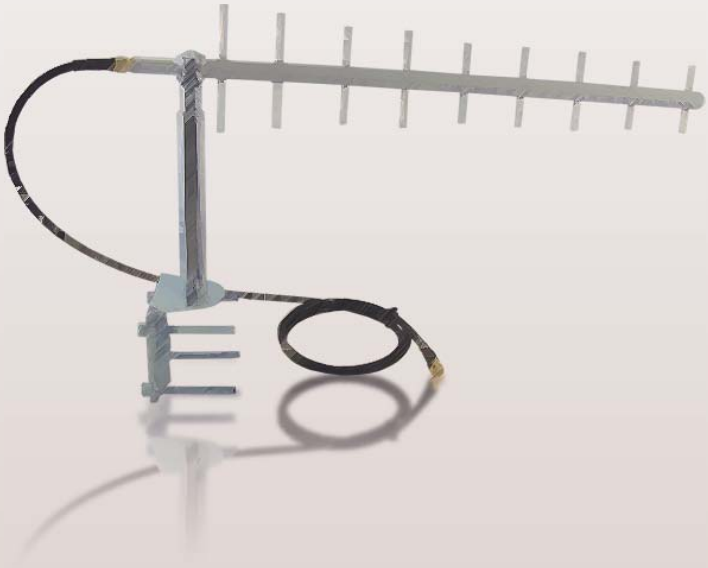
Accessories

CA-IR-SH2251	Single-headed IR emitter (with adhesive pad)
CA-IR-SH2252	Dual-headed IR emitter (with adhesive pad)

Accessories

8

8.1.	Applications & Selection Guides	P8-1-1
8.2.	2.4 GHz Omni-directional External Antennas	P8-2-1
8.3.	2.4 GHz Directional External Antennas	P8-3-1



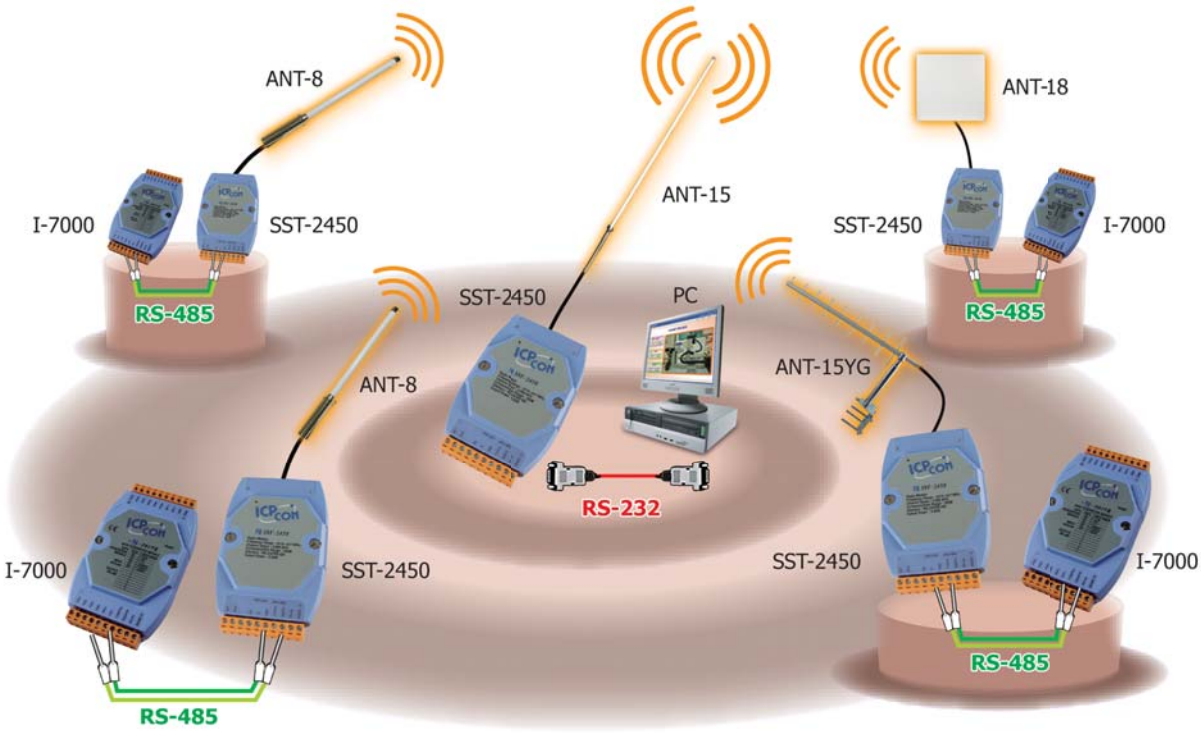
8.1. Applications & Selection Guides

• Applications

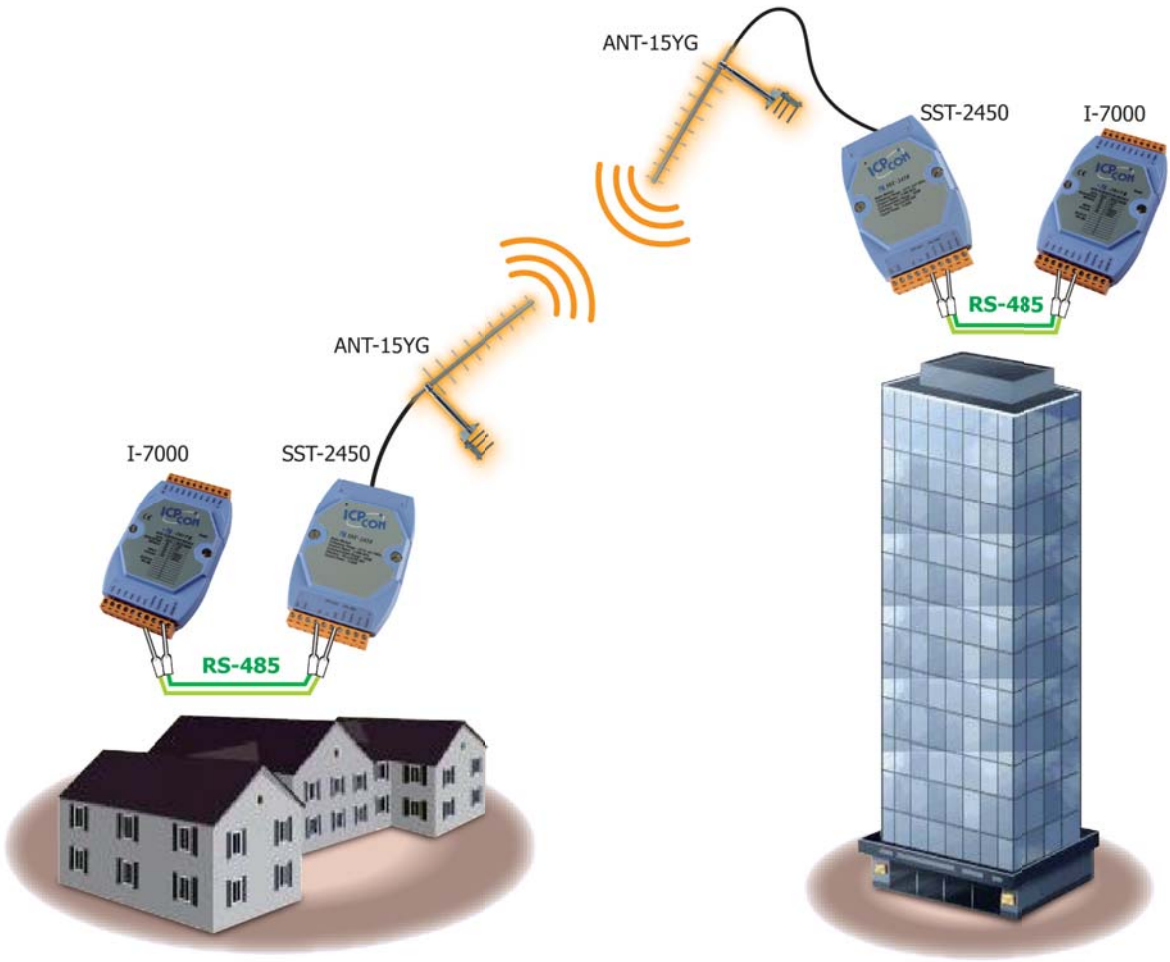
1. Omni-directional Antenna to Omni-directional Antenna

Note: As the antennas rely on line-of-sight for connection, they should be placed at the same height.

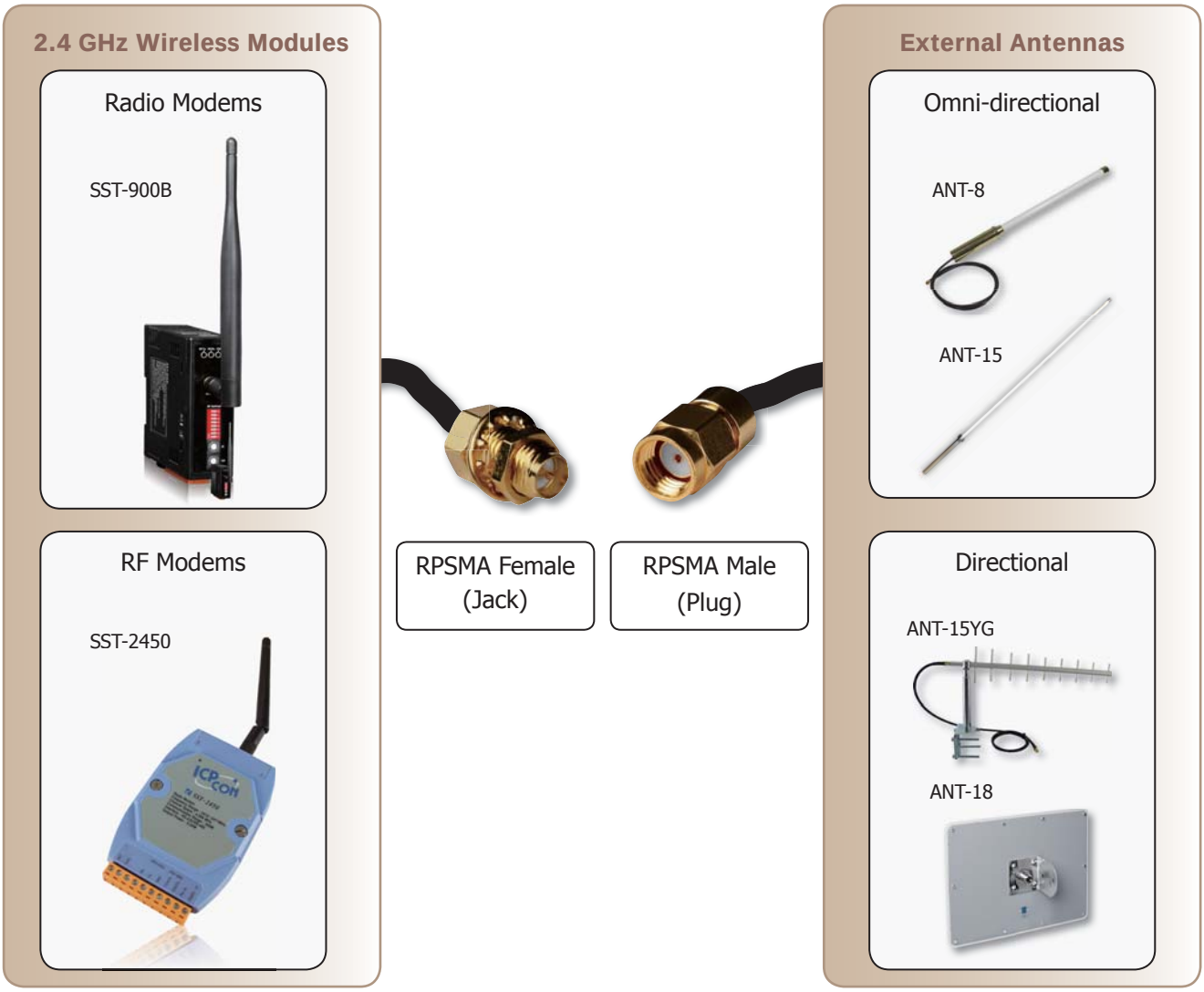
2. Omni-directional Antenna to Directional Antenna



3. Directional Antenna to Directional Antenna



4. Connector Type for 2.4 GHz Antenna



• Selection Guide

2.4 GHz Omni-directional Antennas

Model Name	Ordering Information	Connector	Radiation	Band	Gain (dBi)	Note	Page
ANT-8	1 km, 2.4 GHz External Antenna	RP SMA Male (Plug)	Omni-Directional	2.4 ~ 2.5 GHz	8	Dipole	8-2-1
ANT-15	5 km, 2.4 GHz External Antenna	RP SMA Male (Plug)	Omni-Directional	2.4 ~ 2.5 GHz	15	Dipole	8-2-2

2.4 GHz Directional Antennas

Model Name	Ordering Information	Connector	Radiation	Band	Gain (dBi)	Note	Page
ANT-15YG	5 km, 2.4 GHz External Antenna	RP SMA Male (Plug)	Directional	2.4 ~ 2.5 GHz	15	Yagi	8-3-1
ANT-18	9 km, 2.4 GHz External Antenna	RP SMA Male (Plug)	Directional	2.4 ~ 2.5 GHz	18	Panel	8-3-2

8.2. 2.4 GHz Omni-directional External Antenna

ANT-8

1 km, 2.4 GHz External Antenna

Features

- 802.11b/g
- 10 dBi
- N Type Female (Jack)
- N Type Male (Plug) to RP SMA Male (Plug) Cable

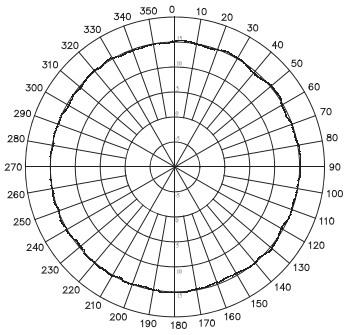
Introduction

ANT-8 is a 10 dBi Antenna

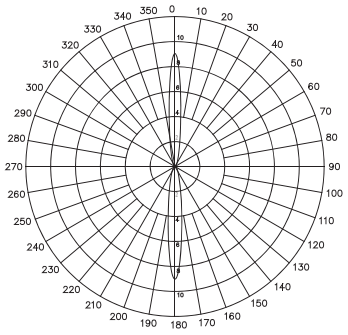
Applications

For ZigBee and SST-2450 Products

H-PLANE FIELD PATTERNS



E-PLANE FIELD PATTERNS



Specifications

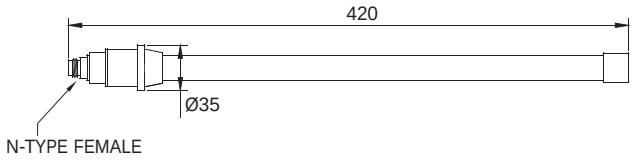
Antenna Type	
Operating Environment	Indoor or Outdoor
Radiation	Directional Sector
Electrical Specifications	
Frequency Range	2400 ~ 2500 MHz
Gain	9 dBi
VSWR	1.3:1 (Max.)
Polarization	Linear
HPBW/Horizontal	360°
HPBW/Vertical	10°
Power Handing	15 W (Max.)
Impedance	50 Ω +/-5 Ω
Cable	-
Connector	N Type Female
Environmental and Mechanical Characteristics	
Operating Temperature	-20 °C ~ +60 °C
Radome Material	Glass fiber
Weight	430 g
Dimensions (L x W)	420 mm x φ35 mm

Ordering Information

ANT-8	1 km, 2.4 GHz External Antenna (Omnidirectional) Gain: 8 dBi
Includes	3S004 x 1 HDF 200 Cable, 1 m N Type Male to SMA Male

Important Note: Distance data is for reference only.
Actual results may be different depending on the environment.

Dimensions (Units: mm)



Accessories

3S005	HDF 200 Cable, 3 Meter Long N Type Male to SMA Male
3S006	HDF 200 Cable, 5 Meter Long N Type Male to SMA Male

ANT-15

5 km, 2.4 GHz External Antenna

Features

- 802.11b/g
- 15 dBi
- N Type Female (Jack)
- N Type Male (Plug) to RP SMA Male (Plug) Cable

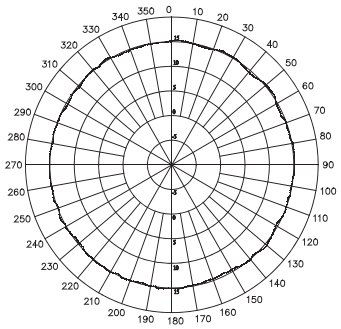
Introduction

ANT-15 is a 15 dBi Antenna

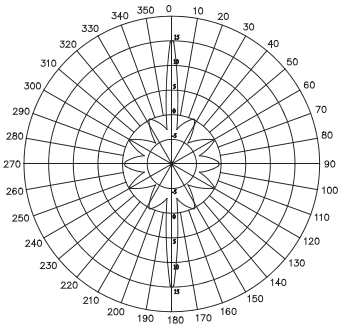
Applications

For ZigBee and SST-2450 Products

H-PLANE FIELD PATTERNS



E-PLANE FIELD PATTERNS



Specifications

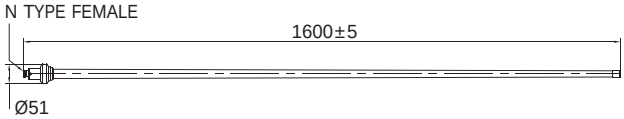
Antenna Type	
Operating Environment	Outdoor
Radiation	Directional Sector
Electrical Specifications	
Frequency Range	2400 ~ 2500 MHz
Gain	15 dBi
VSWR	1.3:1 (Max.)
Polarization	Linear
HPBW/Horizontal	360°
HPBW/Vertical	10°
Power Handing	20 W (Max.)
Impedance	50 Ω +/-5 Ω
Cable	RG-58, 100 cm
Connector	N Type Female
Environmental and Mechanical Characteristics	
Operating Temperature	-20 °C ~ +60 °C
Radome Material	Glass fiber
Weight	1050 g
Dimensions (L x W)	1600 mm x 35 mm

Ordering Information

ANT-15	5 km, 2.4 GHz External Antenna (Omnidirectional) Gain: 15 dBi
Includes	3S004 x 1 HDF 200 Cable, 1 m N Type Male to SMA Male

Important Note: Distance data is for reference only.
Actual results may be different depending on the environment.

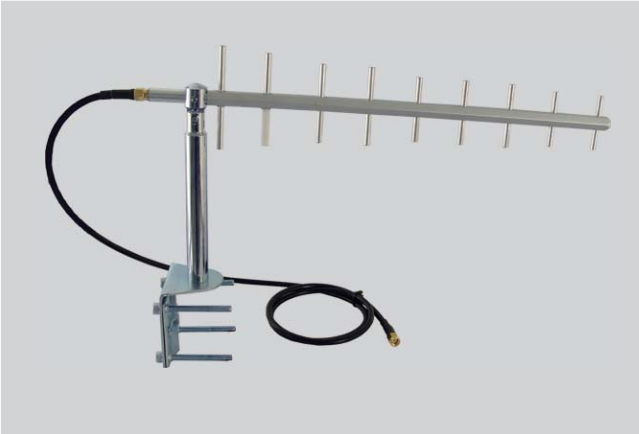
Dimensions (Units: mm)



Accessories

3S005	HDF 200 Cable, 3 Meter Long N Type Male to SMA Male
3S006	HDF 200 Cable, 5 Meter Long N Type Male to SMA Male

8.3. 2.4 GHz Directional External Antenna



ANT-15YG

5 km, 2.4 GHz External Antenna

Features

- 802.11b/g
- 15 dBi
- N Type Female (Jack)
- N Type Male (Plug) to RP SMA Male (Plug) Cable
- Yagi Antenna

RoHS

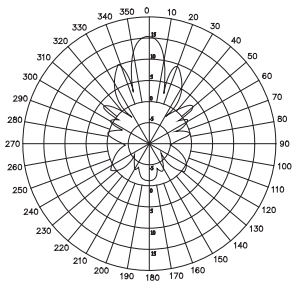
Introduction

ANT-15YG is a 15 dBi Antenna

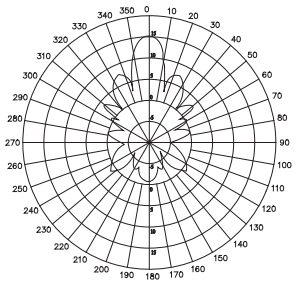
Applications

For ZigBee and SST-2450 Products

H-PLANE FIELD PATTERNS



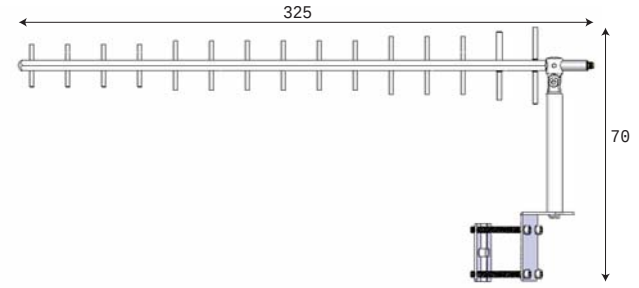
E-PLANE FIELD PATTERNS



Specifications

Antenna Type	
Operating Environment	Outdoor
Radiation	Directional Sector
Electrical Specifications	
Frequency Range	2400 ~ 2500 MHz
Gain	15 dBi
VSWR	2:1 (Max.)
Polarization	Linear
HPBW/Horizontal	25°
HPBW/Vertical	18°
Power Handing	10 W (Max.)
Impedance	50 Ω
Cable	RG-58, 100 cm
Connector	N Type Female
Environmental and Mechanical Characteristics	
Operating Temperature	-40 °C ~ +85 °C
Radome Material	Aluminum
Weight	425 g
Dimensions (L x W)	325 mm x 70 mm x 15 mm

Dimensions (Units: mm)



Ordering Information

ANT-15YG	5 km, 2.4 GHz External Antenna (Directional) Gain: 15 dBi

Important Note: Distance data is for reference only.
Actual results may be different depending on the environment.

Accessories

3S005	HDF 200 Cable, 3 Meter Long N Type Male to SMA Male
3S006	HDF 200 Cable, 5 Meter Long N Type Male to SMA Male

ANT-18

9 km, 2.4 GHz External Antenna

Features

- 802.11b/g
- 15 dBi
- N Type Female (Jack)
- N Type Male (Plug) to RP SMA Male (Plug) Cable
- Panel Antenna

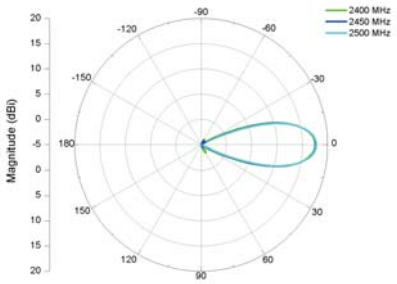
Introduction

ANT-18 is a 18 dBi Antenna

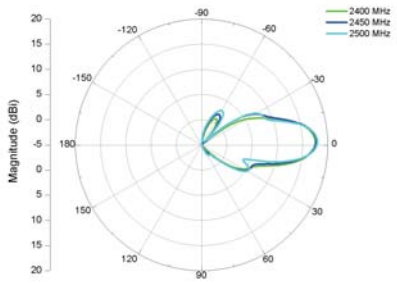
Applications

For ZigBee and SST-2450 Products

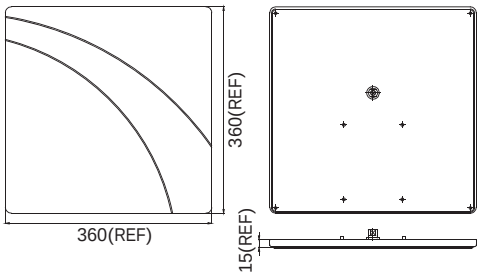
H-PLANE Co-polarization Pattern



V-PLANE Co-polarization Pattern



Dimensions (Units: mm)



Specifications

Antenna Type	
Operating Environment	Outdoor
Radiation	Directional Patch
Electrical Specifications	
Frequency Range	2400 ~ 2500 MHz
Gain	18 dBi
VSWR	1.5:1 (Max.)
Polarization	Vertical
HPBW/Horizontal	15°
HPBW/Vertical	15°
Power Handing	50 W (cw)
Impedance	50 Ω
Cable	RG-58, 100 cm
Connector	N Type Female
Environmental and Mechanical Characteristics	
Operating Temperature	-40 °C ~ +80 °C
Radome Material	ABS
Weight	1600 g
Dimensions (L x W x H)	360 mm x 360 mm x 16 mm

Ordering Information

ANT-18	9 km, 2.4 GHz External Antenna (Directional) Gain: 18 dBi
Includes	3S004 x 1 HDF 200 Cable, 1 m N Type Male to SMA Male

Important Note: Distance data is for reference only.
Actual results may be different depending on the environment.

Accessories

3S005	HDF 200 Cable, 3 Meter Long N Type Male to SMA Male
3S006	HDF 200 Cable, 5 Meter Long N Type Male to SMA Male

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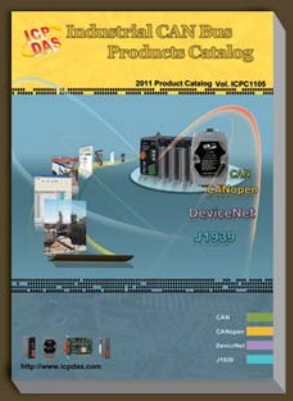

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- CAN bus Remote I/O Modules
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