

GPS Products

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6.1 Overview

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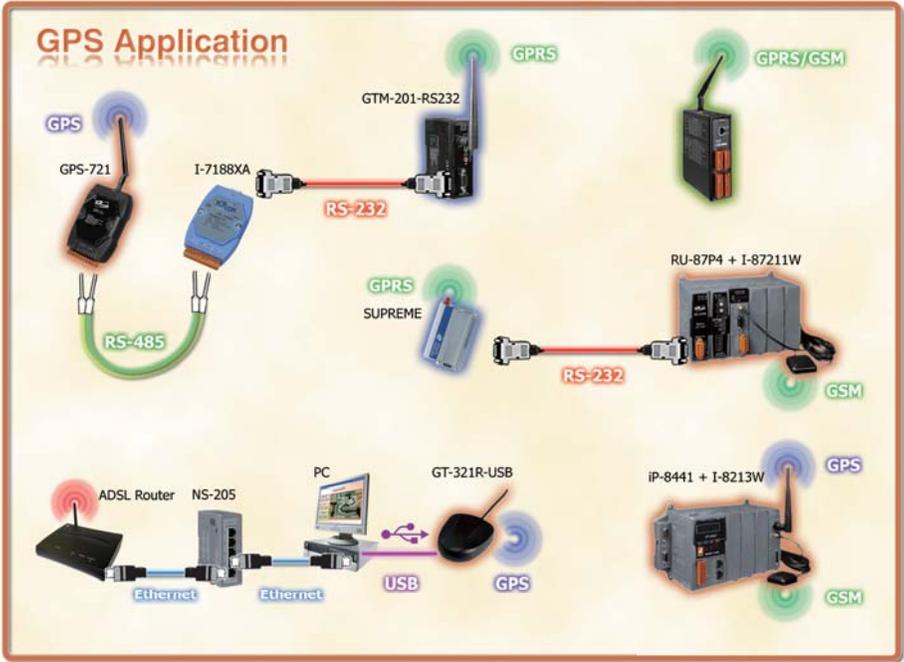
6.1. Overview

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GPS Products

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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

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GPS Products



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.

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GPS Receivers

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 Vdc	
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	

GT-321R-USB/GT-321R-RS232

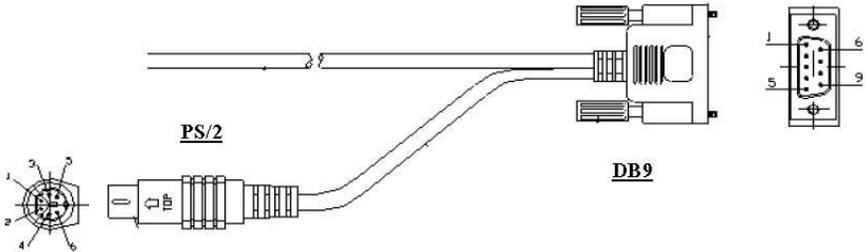
Applications

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

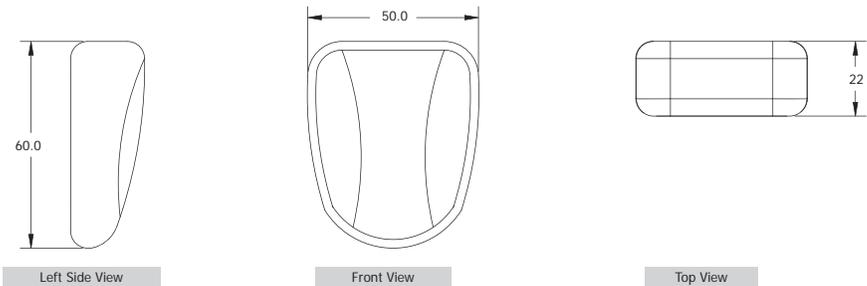


PS/2	
Terminal No.	Pin Assignment
01	N/C
02	N/C
03	GND
04	VCC
05	N/C
06	N/C

DB9			
Pin Assignment	Terminal No.	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)



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

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.

I/O Specifications

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

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

Features

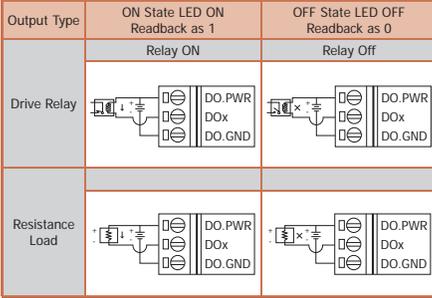
- Supports PACs and Remote I/O expansion units of ICP DAS
- Supports 66-channel GPS
- RS-232 supports NEMA v0183 v3.01 format or DCON protocol
- Built-in 2-channel DO, 1-channel PPS (1 pulse/s)
- PPS: 100 ms pulse output/sec for precise timekeeping and time measurement
- With various system LED indicators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



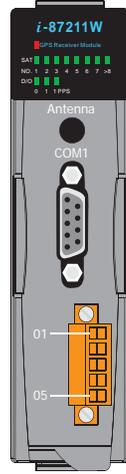
Applications

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

Wiring



Appearance

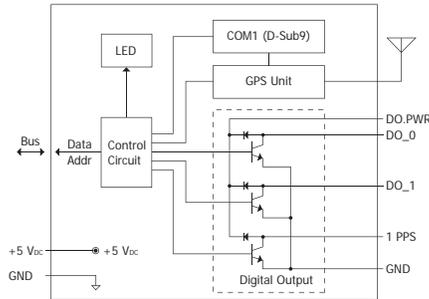


Pin Assignment	Terminal No.	No.	Pin Assignment
-	01	06	-
GPS_TxD	02	07	-
GPS_RxD	03	08	-
-	04	09	-
GND	05		

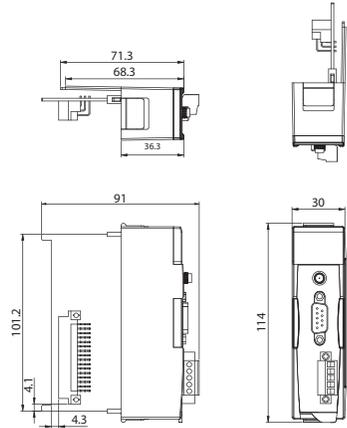
COM1 9-Pin Female D-Sub Connector

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 and 2 DO, 1 PPS Output Module (RoHS)
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Accessories

ANT-115-03 CR	4PJ81K0000001	5 m GPS Active External Antenna (SMA Plug) (RoHS)
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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.

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}

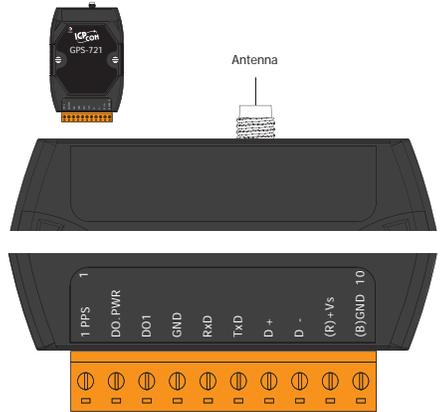
System Specifications

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

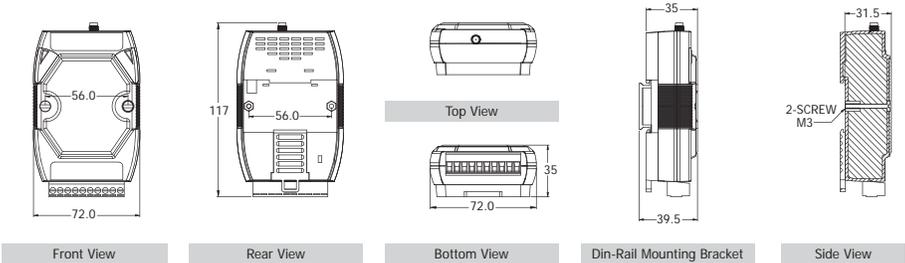
Wiring

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

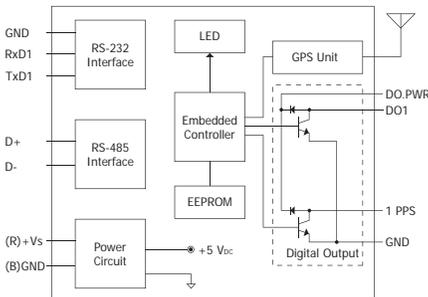
Appearance



Dimensions (Units: mm)



Internal I/O Structure



Ordering Information

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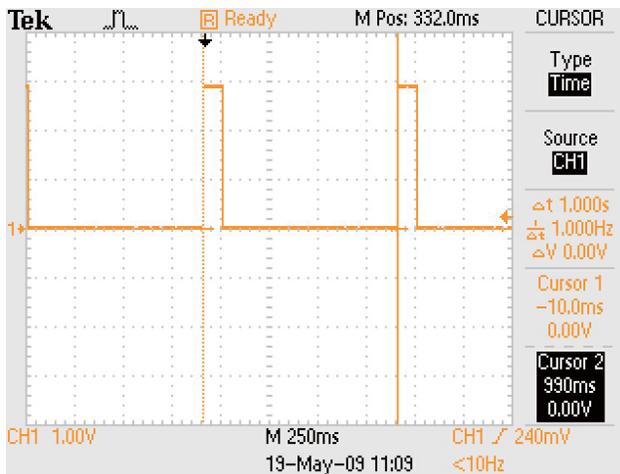
Accessories

ANT-115-03 CR	4PI81K0000001	5 m GPS Active External Antenna (SMA Plug) (RoHS)
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1 Pulse Per Second (Pulse duration is 100 ms/pulse)

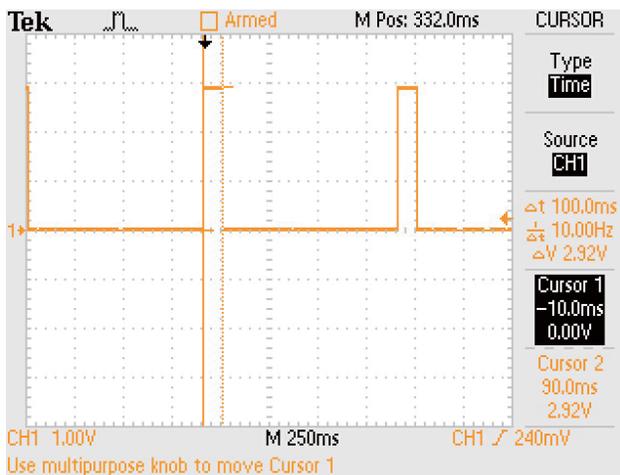
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GPS Products



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GPS Receivers



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.

GPS-721