



LinPAC + I-8211W User Manual (GPS Time Synchronization)

V1.0.0 Jan 2018



**LX-8131/LX-8331/LX-8731
LX-8171/LX-8371/LX-8771
LP-8121/LP-8421/LP-8821**

Warranty

All products manufactured by ICP DAS are under warranty regarding defective materials for a period of one year, beginning from the date of delivery to the original purchaser.

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If you have any problem, please feel free to contact us.

You can count on us for quick response.

Email: service@icpdas.com

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1. Introduction

The I-8211W is a GPS receiver that been designed to be automatically and precisely time synchronized for the GPS satellite time transmissions. The I-8211W can be plugged into either slot of the LinPAC, the LinPAC will automatically launch the application and get the GPS time to minimize the RTC drift to 1 ms.

1.1. Features

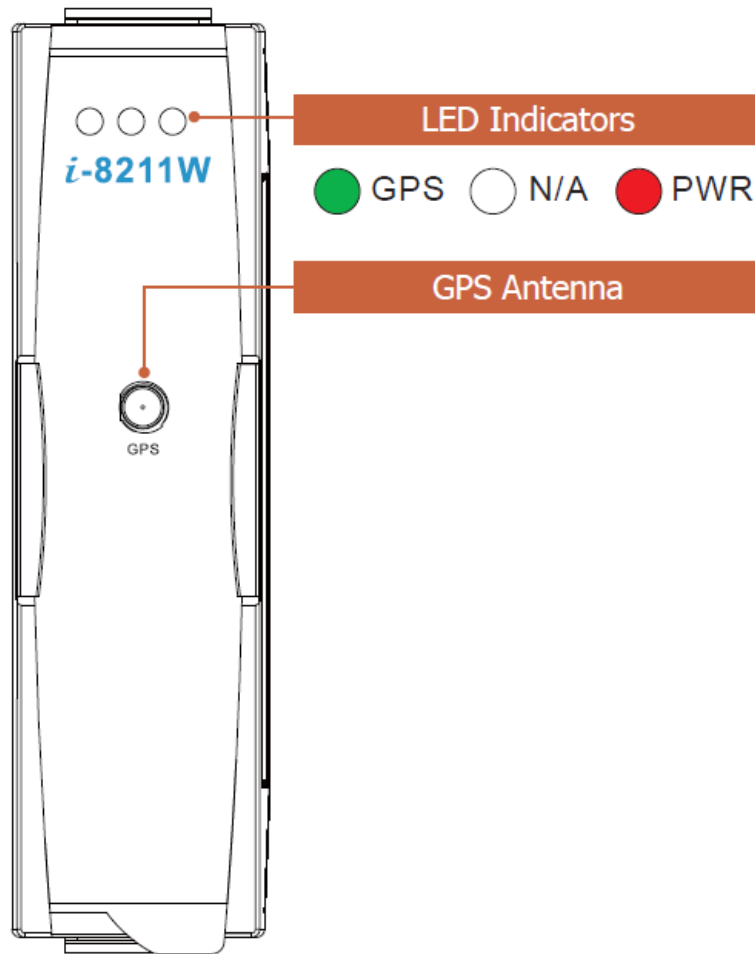
- Plug and Play in LinPAC (LX-8x31, 8x71, LP-8x21) series.
 - LX-8131/8331/8731
 - LX-8171/8371/8771
 - LP-8121/8421/8821
- Satellite time correction
- Precise timekeeping and time measurement

1.2. Specifications

The table below summarizes the specifications of I-8211W.

| GPS Receiver | |
|------------------------|--------------------------------------|
| 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 |
| Acquisition 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 |
| LED Indicators | |
| Power | 1 LED |
| Communication | 1 LED |
| Power | |
| Power Consumption | 0.75 W (Max.) |
| Mechanical | |
| Dimensions (W x L x H) | 32 mm x 87 mm x 114 mm |
| Environment | |
| Operating Temperature | -25 to +75°C |
| Storage Temperature | -30 to +75°C |
| Humidity | 5 to 95% RH, Non-condensing |

1.3. LED indicators



| LED | Status | Description |
|----------------|---------------------|---|
| PWR (Red) | ON | The module's power is working correctly. |
| | OFF | The module's power turned off(or error). |
| GPS (Green) | ON | The module is searching GPS. |
| | OFF | The module's GPS error. |
| | Blanking (1 sec) | The module is working correctly and receiving GPS data. |

2. LinPAC + I-8211W Getting Started

This chapter provides a guided tour of the I-8211W installation for user working with the LinPAC for the first time.

Before starting any task, please check the package contents. If any of the following package contents are missing or damaged, contact your dealer, distributor.

■ I-8211W Package Checklist



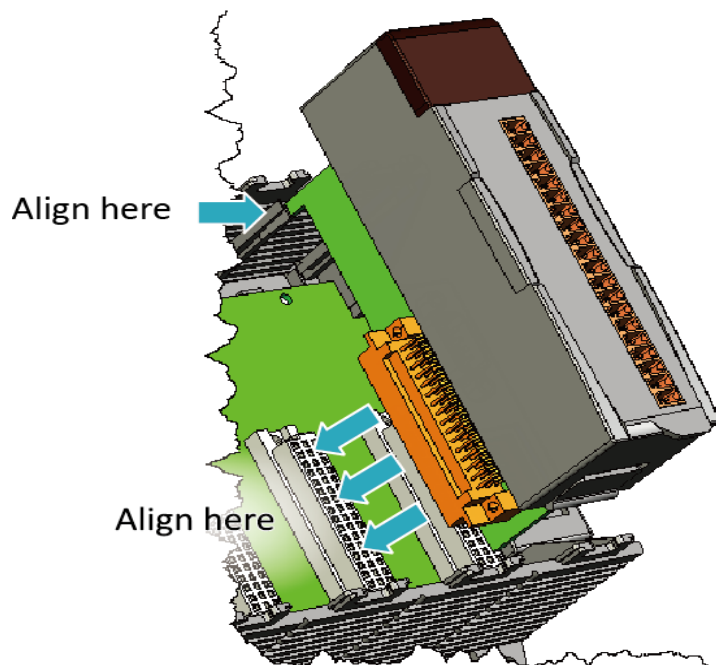
I-8211W GPS Receiver Module (RoHS) and ANT-115-03 GPS Antenna (Length 5m)

2.1. I-8211W(GPS Time Synchronization)

Please refer to below steps to insert a I-8211W module into any expansion slot of LinPAC and synchronize GPS time automatically.

■ LinPAC (LX-8x31, LX-8x71 and LP-8x21) Series

Step 1: Align circuit card with slot and press firmly to seat module into connector

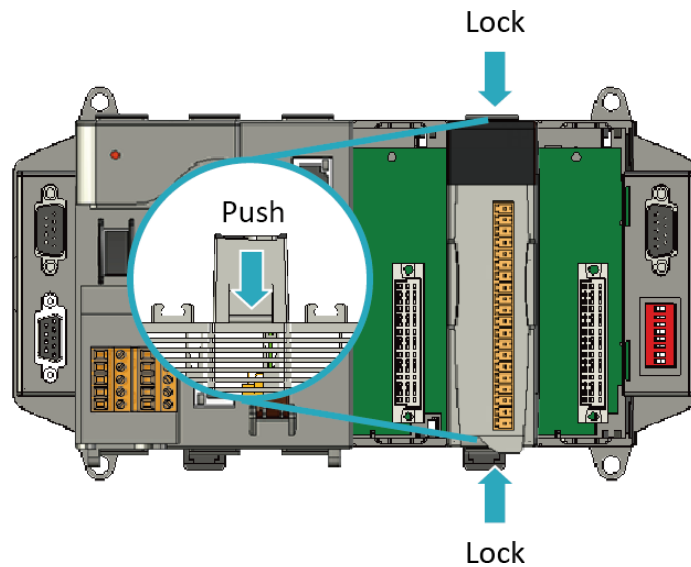


Tips & Warnings



It is recommended that the power to the LinPAC is switched off when wiring the I/O module which are plugging in the LinPAC slots.

Step 2: Pull top and bottom locking tabs toward module face. Click indicates lock is engaged.



Step 3: Power on LinPAC

After boot the Linux OS, the LinPAC will automatically launch the application and get the GPS time to minimize the RTC drift to 1 millisecond. Using “**ntpq -p**” command to check the time’s error (the time error < 1ms). Please refer to below diagram:

```
root@icpdas:~# ntpq -p
      remote           refid  st  t  when poll reach  delay  Time error < 1ms
-----
oGPS_NMEA(0)   .GPS.    0  1   37   64  377   0.000  0.013  0.037
```

Tips & Warnings



Sometime the ntpd daemon need to spend 10~20 minutes to minimize the time error, so the command “**ntpq -p**” can’t show the symbol ‘o’ or time error less than 1ms immediately.

3. Internet Service

The [internet service](#) provided by ICP DAS will be satisfied and it includes [Technical Support](#) and [User's Manual Download](#) etc. Users can refer to the following web site to get more information:

1. ICP DAS Web Site :

<http://www.icpdas.com/>

2. LX-8x31/LX-8x71/LP-8x21 Product Page:

<http://www.icpdas.com/root/product/solutions/pac/linpac/lx-8x3x.html>

<http://www.icpdas.com/root/product/solutions/pac/linpac/lx-8x7x.html>

<http://www.icpdas.com/root/product/solutions/pac/linpac/lp-8x2x.html>

3. I-8211W Product Page:

http://www.icpdas.com/root/product/solutions/remote_io/rs-485/i-8k_i-87k/i-8211w.html

4. E-mail for Technical Support : service@icpdas.com

Appendix

A. Troubleshooting

Q1: No I-8211W's Linux device name.

Ans: It means the Linux driver isn't installed or the module isn't setup correctly. User can re-plug the I-8211W module into the slot. After the I-8211W installed, user must reinstall the Linux driver module (8250.ko), please refer to below steps:

■ LP-8x21/9x21

```
~# modprobe -r 8250 Remove Linux driver module "8250"
~#
~# modprobe 8250 Install Linux driver module "8250"
~#
~# dmesg | grep ttyS3 Check the driver had detected the i-8211W device name "ttyS3" on slot 1
[ 4769.158641] serial8250.0: ttyS3 at MMIO 0x1001060 (irq = 640) is a 16550A
```

■ LX-8x31/8x71

```
~# modprobe -r icpdas_8250 Remove Linux driver module "icpdas_8250"
~#
~# modprobe icpdas_8250 Install Linux driver module "icpdas_8250"
~#
~# dmesg | grep ttyS7 Check the driver had detected the i-8211W device name "ttyS7" on slot 1.
[ 4769.162708] serial8250.0: ttyS7 at MMIO 0x1002060 (irq = 641) is a 16550A
```

Q2: The I-8211W's GPS led always show "ON" or "OFF" status.

Ans: If the GPS led (green) of I-8211W always show the "ON" or "OFF" status, it means the I-8211W can't receive the GPS data.

For some complicated reasons:

- (1) The location can't receive the GPS signal.
- (2) No antenna inserted.
- (3) Wrong operator parameters.
- (4) Hardware data interface (/dev/ttyS*) configured incorrectly.

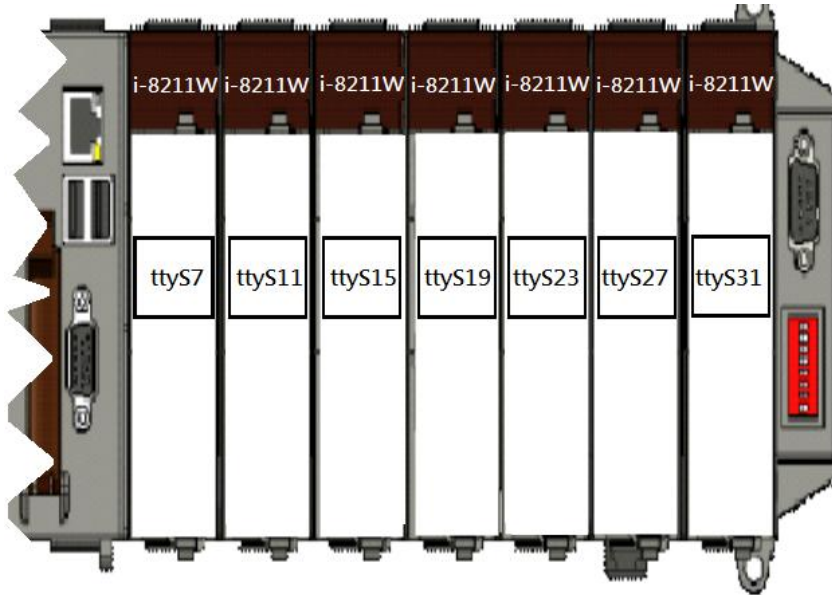
When this happens:

- (1) Connecting antenna correctly.
- (2) Moving the antenna to the location that can receive the GPS signal.
- (3) Checking the I-8211W device name that you used are correct or reinstall the Linux driver again (please refer to the "Q1: No I-8211W's Linux device name?")

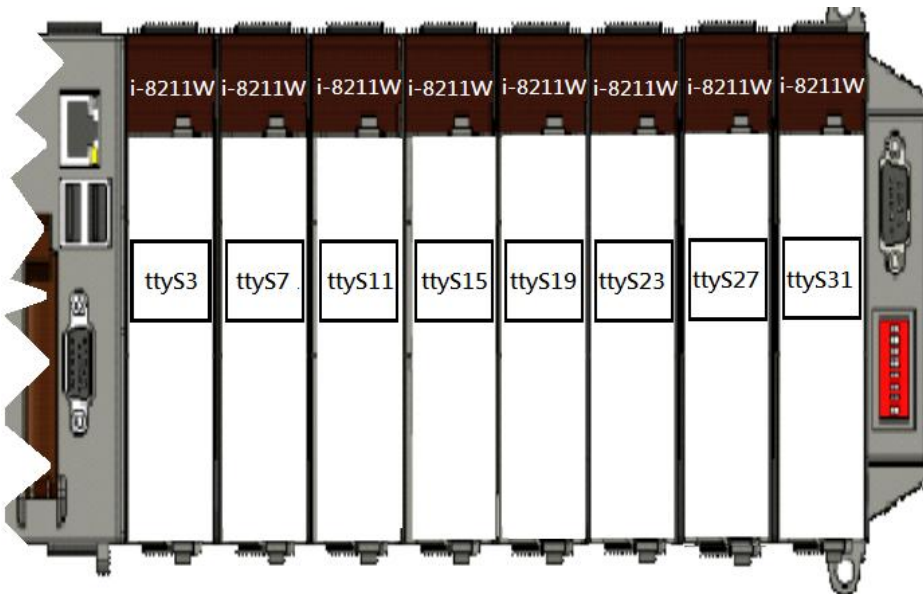
After you have done the above, if the error still exists, try to unplug the power and plug the power again.

B. I-8211W's Device Name in LinPAC

■ LX-8x31/8x71(support 1, 3, 7 slots):



■ LP-8x21(support 1,4,8 slots):



C. Revision History

This chapter provides revision history information to this document.

The table below shows the revision history.

| Revision | Date | Description |
|----------|----------|---------------|
| V1.0.0 | Nov 2017 | Initial issue |