



**Ionics EMS, Inc.**  
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# IoT Platform Advance



## User Guide

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### IoT Platform Advance User Guide

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<b>Date:</b> September 29, 2017	<b>Phone:</b> +63495081111 local 403	<b>Document No.:</b> 53-15	<b>page</b> 1 of 13

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### 1. Product Key Features

Description	
Processor	NXP I.MX6 Dual Lite
Memory	2GB DDR3L SDRAM, 400 MHz
Internal Storage	8GB eMMC
LAN	2 x Gigabit Ethernet
Button	1 x Hardware Reset Button 1 x Software Reset Button
USB	2 x USB2.0 Port
microSD	2 x microSD Card Port
Debug	1 x Debug Console Port
Debug LED	1 x Programming Port 6 x Status LED
Wi-Fi/BT	1 x 802.11 b/g/n 2.4 GHz / BT 2.1 +EDR, BT 4.0
IEEE 802.15.4 Sub Ghz	1 x 908 MHz Module
RFM900	1 x 915 MHz RFM900 Module
Power Supply	9V-12V DC, 2A

The Internet-of-Things (IoT) Platform Advance implements a modular design which makes use of interchangeable features like the system-on-modules (SOM), carrier boards, radio frequency (RF) modules, sensor modules, and optional enclosures. Additional modules can be added using a [mikroBus™](#) connector. Note that this IoT Platform Advance is a hardware and software development platform, end user or developer must still need to develop its own application on top of the existing operating system of the unit.



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- 1 – AC-DC 4-pins header Power Supply
- 2 – AC-DC Barrel Type Power Supply
- 3 – 2 x USB Port
- 4 – Local Area Network (LAN) port
- 5 – Wide Area Network (WAN) port
- 6 – micro SD card slot
- 7 – Screw Hole
- 8 – Hardware Reset Button
- 9 – External Antenna Connector
- 10 – Console UART port
- 11 – USB OTG port
- 12 – LED Indicators
- 13 – GPIO Button



**Warning:** The AC-DC power supply slot must not be used simultaneously if provided or bought with both connector open. Either use one of the port

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## 2. Quick Setup Guide

1. Connect the AC-DC Adapter to the IoT Platform Advance. Make sure you plug in on the correct port.



2. To check for the console output and interact with the IoT Platform Advance, connect the microUSB connector the Console port of the unit as shown below.



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**Warning:** Please note that power supply must be connected first before connecting the microUSB connector. If the unit needs to be powered off by unplugging the power supply, make sure to unplug the microUSB connector as well, and connect the power supply first before the the microUSB cable.

If ask for the Windows driver, you can download the Windows Certified driver at FTDI website located here <http://www.ftdichip.com/Drivers/D2XX.htm> . Note that this Windows driver is owned by FTDI, licensing, warranties or installation is governed by FTDI regulation. Installation issues that can be associated with the hardware can be inquired through our support channel at the end of this document.

3. On host PC, open up any preferred serial terminal console application (i.e Teraterm) and access the IoT Platform Advance serial console port with the following setting: Baudrate: 115200, Databit: 8, Parity: None, Stop Bit: 1 and No Flow Control.
4. On host terminal console, once prompted with username and password, enter following information:  
  
 Username: root  
 Password: root
5. The IoT Platform Advance platform can now be used for development of applications and software on top of the pre-installed operating system.

### 3. Advance Functional Setup

This functional setup will check that all ports and functions is working upon the initial setup of the device.

#### 1. USB Function

To check if USB port is working, insert USB stick in the port. And check in the console if it was detected. Additional test can be performed by issuing commands in the console.

Example:

```
root@xenial:~# lsusb
Bus 001 Device 002: ID 0781:556b SanDisk Corp.
Bus 001 Device 002: ID 05e3:0608 Genesys Logic, Inc. Hub
```

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Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub

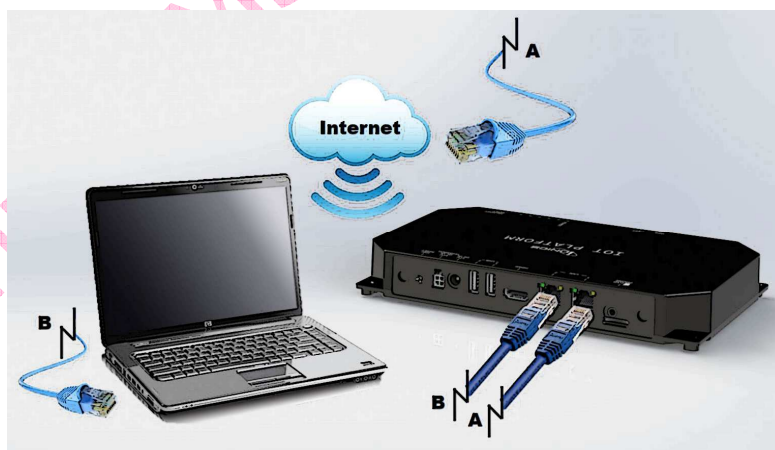


```
root@xenial:~# mount /dev/sda1 /mnt or dev/sdb1 /mnt
```

Once mounted you can use the mount point /mnt to work with as an additional storage of the device.

## 2. Ethernet Ports

The Ethernet port is configured as WAN and the other for local area network, they are labeled well in the enclosure of the unit.



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### 3. microSD card slot

To check if microSD card port is working, insert microSD card in the port. And check in the console if it was detected. Check for microSD card information like size and do some basic read write test.

Example:

```
root@xenial:~# blockdev --getsize64 /dev/mmcblk2 | awk '{ split(
"KB MB GB" ,v ); s=1; while( $1>1024 ){ $1/=1024; s++ } print $1
v[s-1] }'
root@xenial:~# mount /dev/mmcblk2p1 /mnt/
root@xenial:~# dd if=/dev/zero of=/mnt/write-test bs=8k
count=10k
```

### 4. WLAN

To check for Wi-Fi module is working. The WLAN module is a USB device. List the available USB devices to verify that the module is detected.

Example:

```
root@xenial:~# lsusb
Bus 001 Device 002: ID 05e3:0608 Genesys Logic, Inc. Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 002: ID 0bda:b720 Realtek Semiconductor Corp.
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
root@xenial:~# ifconfig wlan0
wlan0 Link encap:Ethernet HWaddr 38:1d:d9:96:66:f9
inet addr:192.168.8.1 Bcast:192.168.8.255 Mask:255.255.255.0
inet6 addr: fe80::3ald:d9ff:fe96:66f9/64 Scope:Link
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:3976 errors:0 dropped:19 overruns:0 frame:0
TX packets:12 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:264 (264.0 B) TX bytes:640 (640.0 B)
root@xenial:~# iw dev wlan0 info
Interface wlan0
ifindex 4
wdev 0x1
addr 38:1d:d9:96:66:f9
ssid ionics_iot-9666f9
type AP
wiphy 0
```

### 5. CC1310

#### a. Server mode

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Set the module as 6LowPAN server.

Example:  
 root@xenial:~# /root/.setup/cc1310/ctrl\_cc1310 -m 2 -n  
 server  
 Created new RPL dag  
 IPv6 Addresses:  
 fd00::212:4b00:a29:45fe  
 fe80::212:4b00:a29:45fe  
 CLIENT ID: HOPS: PAYLOAD: RSSI:  
 When the server receives data from client, additional lines like below would  
 be seen.  
 244 1 Hello World -15 dBm

**b. Client mode**

Set the module as 6LowPAN client.

Example:  
 root@xenial:~# /root/.setup/cc1310/ctrl\_cc1310 -m 2 -n  
 client  
 Removing fd00::212:4b00:a29:46f4  
 Removing previous RPL Root...  
 Waiting for Server...

Information below will be seen if the client created a connection to server.

UDP-CLIENT: Server's Address: fd00::212:4b00:a29:45fe  
 Created a connection with the server  
 Connected in 10 s

Sending data "Hello World" to server.

root@xenial:~# /root/.setup/cc1310/ctrl\_cc1310 -m 2  
 -s "Hello World"  
 Example:  
 root@xenial:~# /root/.setup/cc1310/ctrl\_cc1310 -m 2 -s  
 "Hello World"  
 Client sending: "Hello World" to server  
 Server replied: Hi 244 from Server

**6. RFM900**

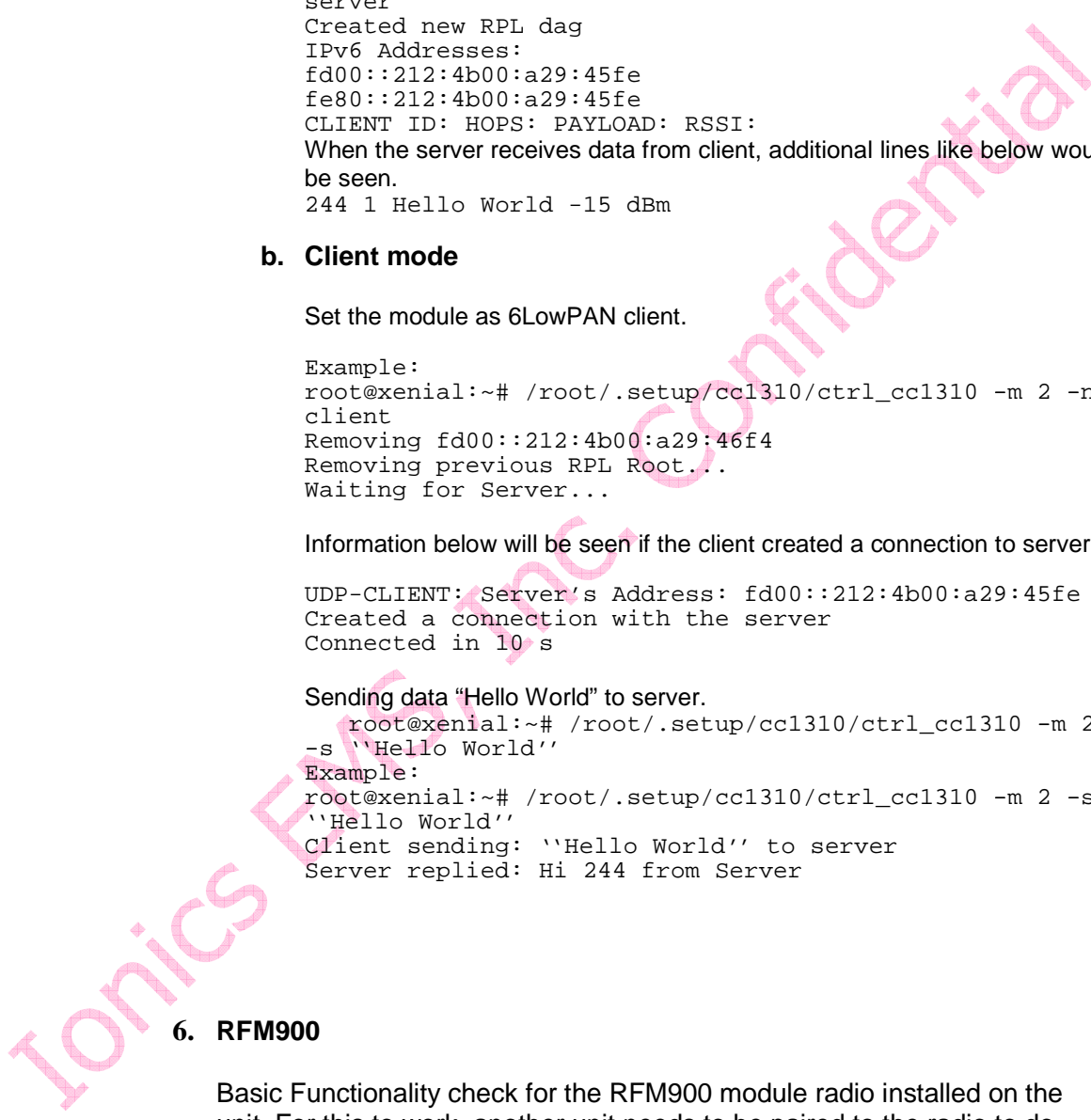
Basic Functionality check for the RFM900 module radio installed on the unit. For this to work, another unit needs to be paired to the radio to do some ping-pong testing. Set one device as a ping by issuing the below command.

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```
# cd /root/.setup/rfm900/  
# ./lpg.sh  
# siflexcon  
~ trace -1  
~ channel 1  
~ power 10  
~ ping 5 100
```

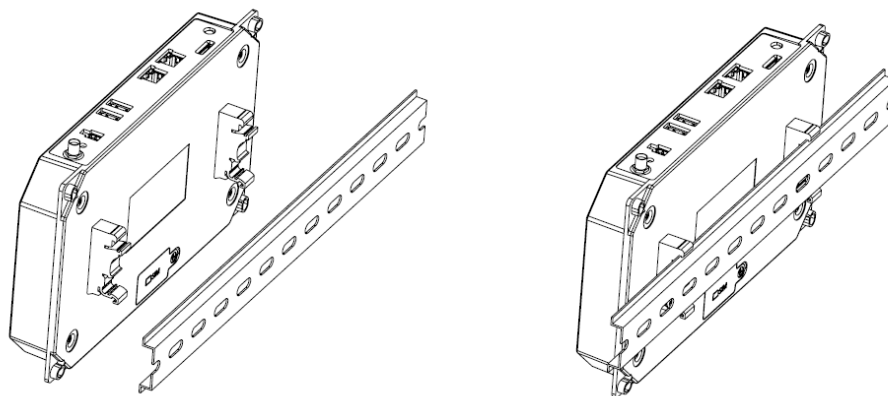
Set the other unit or device as pong by issuing the below command.

```
# cd /root/.setup/rfm900/  
# ./lpg.sh  
# siflexcon  
~ trace -1  
~ channel 1  
~ power 10  
~ pong 1
```

The two unit should now communicate.

#### 4. Mounting Options

The gateway could be placed on the table as a desktop home router but the user also has the option to attach the gateway to a wall via standard DIN Rail. The recommended accessory connectors for this type of wall mounting should be compatible with EN 50022 and EN 50035 standards. Lastly, the gateway could also be attached to any solid surface using 4 x screws fitted at each corner of the enclosure. Recommended screw size is #8 (or 0.16" diameter).



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In a case where the IoT Platform Advance will be mounted to a different enclosure and with a chassis mount power supply will be used having the same rating as stated in the product key features following mounting option is recommended to the final enclosure.

**Gateway Assembly**

Pull the 3 power wires and the Ethernet cable through the 2 enclosure knockouts. (Figure 1.)

Connect wires as shown in the wiring diagram.

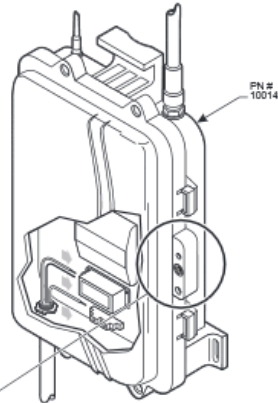
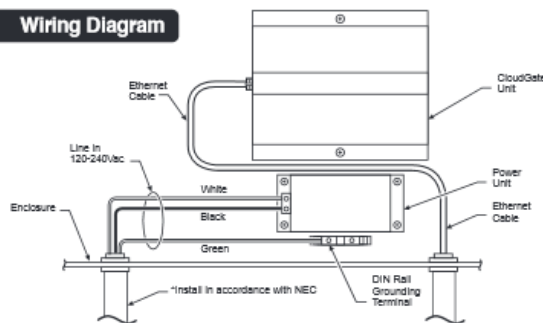


Figure 1.

**Wiring Diagram**



This product contains industrial grade components and accessories that could withstand internal temperatures (inside the plastic enclosure) ranging from -40 to +70 °C. However, for safety precautions the user is advised to operate the product at outside ambient temperatures not lower than -25 °C or higher than 55 °C.



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## 5. Regulatory Information

### Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**FCC Caution:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

#### Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Note: The country code selection is for non-US model only and is not available to all US model. Per FCC regulation, all WiFi product marketed in US must fixed to US operation channels only.

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### Contact Us

If you have any issues or need assistance in setting up your IoT Platform Advance, you can contact our customer service through these channels:

Monday to Friday, 9am – 7pm  
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