



# **Locix Outdoor Hub**

**Model: L-HUB-01-IP65, L-HUB-01**

## **User's Manual**



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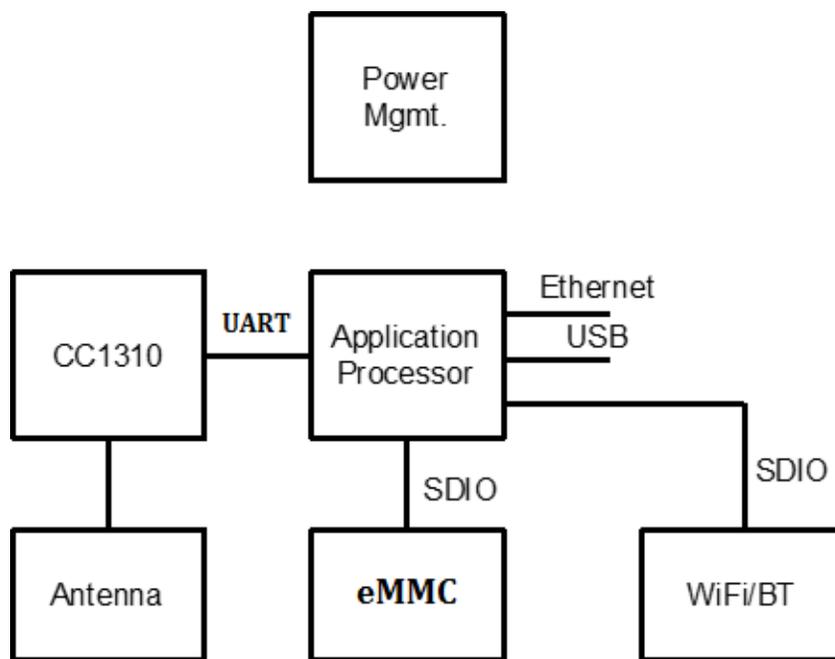


## 1 Introduction

The Locix Hub is device designed to manage the Locix sub-GHz wireless network and connect devices on the sub-GHz network to a cloud platform. The hub is designed to communicate to other Locix devices over a range 50m (line of sight) with Sub-1Ghz technology, and connect to an internet connection over Ethernet or Wi-Fi.

## 2 System Architecture

### 2.1 System Block Diagram



### 2.2 Main Board

#### 2.2.1 TI CC1310

CC1310 performs the control, monitoring and management of the sub-GHz wireless network. The 900MHz wireless communication is designed to communicate with Locix sensor nodes.

The CC1310 device combines a flexible, very low power RF transceiver with a powerful 48-MHz Cortex-M3 microcontroller in a platform supporting multiple physical layers and RF standards. A dedicated Radio Controller (Cortex-M3) handles low-level RF protocol commands that are stored in ROM or RAM, thus ensuring ultralow power and flexibility. The low-power consumption of the CC1310 device does not come at the expense of RF performance; the CC1310 device has excellent sensitivity and robustness (selectivity and blocking) performance.



The CC1310 device is a highly integrated, true single-chip solution incorporating a complete RF system and an on-chip DC-DC converter.

### 2.2.2 i.MX6 Processor

The current hub board uses i.MX6 UL processor to manage multiple sensor devices and acts as a router to connect to Locix cloud infrastructure.

### 2.2.3 Wi-Fi

Jorjin WiFi/BT module WG7833-B0 is deployed as a connectivity module. This module supports 802.11 a/b/g/n for WiFi connectivity. The WiFi system is connected to i.MX6 through SDIO interfaces.

### 2.2.4 Ethernet

One standard 10/100 Ethernet is equipped with the hub board.

### 2.2.5 Bluetooth

Jorjin WG7833-B0 is also used for BT connection and BT4.0 is supported. BT is used at initial setup to input WiFi SSID and password.

### 2.2.6 eMMC

The file system for the hub Linux system will reside on eMMC memory.

### 2.2.7 Connectors

#### 2.2.7.1 JTAG Connector FTSH-105-01-L-DV-K

There are two JTAG on the board; one of them is for the i.MX6 and the other is for the CC1310.

1	VDDS	2	JTAG TMS
3	GND	4	JTAG TCK
5	GND	6	JTAG TDO
7	NC	8	JTAG TDI
9	NC	10	Nreset



### **2.2.7.2 Ethernet port**

Standard 10/100 Ethernet port with Link and Activity LED respectively, capable of accepting Power over Ethernet (PoE).

### **2.2.7.3 Expansion Connector**

The Hub will have an additional connector that enables expansion daughter card to be added to the device. Specifically, it will need to support the connector for a Locix Localization module, including power, SPI connection, and GPIO pins. The expansion connector should be the same form factor as is used on the Locix Wireless Camera, with 14 pins connected to the i.MX6.

### **2.2.7.4 Antenna SMA Connector**

The CC1310 is connected to the 900MHz SMA antenna through the connector. The antenna must be capable of supporting open-air distances of 50m.

## **2.3 Power**

The hub can be powered via PoE 802.3af connection with water-proof. It can optionally be powered via 5V DC provided by a wall-plugged AC power adapter. On average, the hub takes ~300mA current from the adapter, but should be rated to 3A. On the board, the NXP PMIC provides multiple rails for all components on the board.

## **2.4 Antenna**

While 900MHz connects to the antenna through the SMA connector, the WiFi/BT module uses a chip antenna on the PCB. The antenna works for both 2.4GHz band and 5GHz band. Currently, an antenna H2U84W1H1S0100 from Unitron is deployed.

# **3 Mechanical**

## **3.1 Enclosure size**

The enclosure should be roughly of the size of 145x145x45mm (TBD).

## **3.2 Fit/Finish**

Indoor: Pure white, matte finish (top). white, matte finish (bottom).  
Outdoor: Pure black, matte finish (top). black, matte finish (bottom).



### 3.3 LED's

The hub will have four external LED's, with behavior managed by the I.MX6.

Power	Green
Wi-Fi	Blue
Ethernet Link	Green
Ethernet speed	Green

### 3.4 Reset Button

The hub will have a reset button, recessed via “pin hole”, which will perform a hard reset of the device. The reset button can also be used to perform a factory reset by holding down for a longer period of time (to be determined by Locix).

### 3.5 Localization Daughter Board

TBD

## 4 Software (Need to confirm by Locix)

The Locix Hub maintains the Locix network, which sensors can provide various functionality in surveillance, fire detection, asset tracking, and occupancy monitoring applications. The Software section describes the functionality of the hub. All software will be the responsibility of the Locix team.

### 4.1 Hub/Network Features

#### 4.1.1 Node Support:

The hub can support up to 10 Locix camera nodes connected simultaneously over the sub-GHz network.

#### 4.1.2 Interfaces

The hub has multiple interfaces which can be used to exercise the various functions of the hub/network.

##### 4.1.2.1 Local Web User Interface

The local web user interface allows the user to issue commands to cameras associated with the hub, as well as view media transmitted back to the hub.



#### **4.1.2.2 Local API**

The local API enables control of the network and the ability to view and transfer media off the hub.

#### **4.1.2.3 Cloud Connector**

The cloud connector will facilitate connection to one or more back-end cloud platforms for remote connectivity.

#### **4.1.3 Media Request**

The hub must be capable of initiating requests an image or clip (of a specified length) from one or more cameras. This scenario is driven by use cases where a user, schedule, or externally-driven event requires image or clip data to be pulled. The request can include all cameras, a group of cameras, or a single node. Supported clip lengths can be up to 3 frames per second, with lengths from a single frame up to 9 (3 seconds @ 3fps).

#### **4.1.4 Node Management**

The hub will be able to add new nodes and remove existing nodes from the network. To add a node, a unique ID must match the sensor and what was input into the hub (to exclude unknown devices from adding to the network). Once a hub is deleted, it must no longer be able to communicate on the network.

## **5 Physical & Environment**

### **5.1.1 Power**

- PoE DC 48V
- 5VDC via Jack (optional, external AC-DC power adapter without water proof)

### **5.1.2 Operation Temperature**

- Temp: -20° C to +60° C
- Humidity: 5% ~ 95%R.H non-condensing

### **5.1.3 Storage Temperature**

- Temp: -25°C to 70°C
- Humidity: 5% ~ 95% non-condensing

### **5.1.4 IP Grade: IP65 rated**



## Federal Communication Commission Interference Statement

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 or more 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 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 device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

### IMPORTANT NOTE:

#### FCC 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.

#### Professional Installation instruction

1. **Professional installer:** this product is designed for specific application and needs to be installed by trained personnel. The general user shall not attempt to install or change the setting.
2. **External Antenna:** use only the antenna(s) (Wi-SUN function: Dipole, 0.05dBi) that have been approved by the manufacturer. The non-approved antenna(s) may produce unwanted spurious or excessive RF transmitting power that may lead to the violation of FCC limit and is prohibited.
3. **Warning:** Please carefully select the installation position and ensure that the final output power does not exceed the limit set forth in relevant rules.