Lola HT 2

User's Manual

Version 2.2

June 1st 2021

1. Introduction to Lola HT 2

1.1 Lola HT 2 Overview

Lola HT 2 is an LTE GNSS IoT module designed to be embedded inside Trimble's Total Station Land Survey equipment. Lola HT 2 has two models: LOLA HT 2-N and LOLA HT 2-E

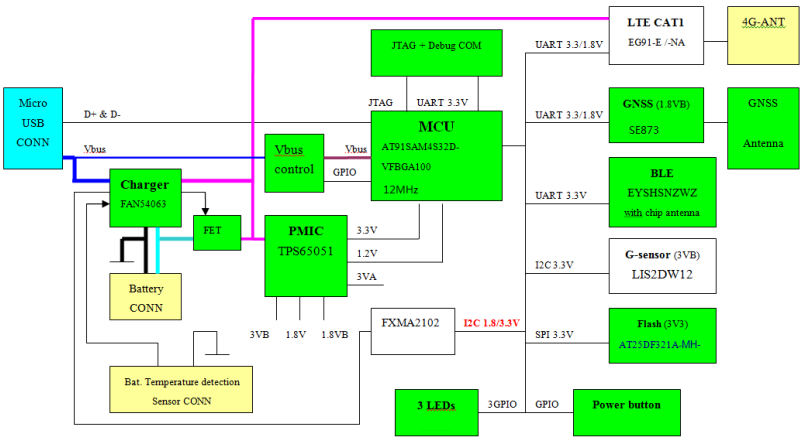
1.2 Features

LTE bands:

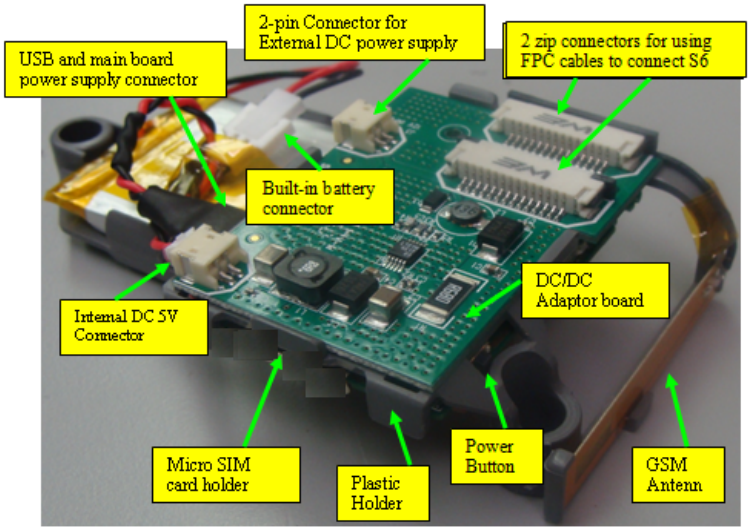
- EG91–NA (used by Lola HT 2-N):
  - LTE FDD: B2/B4/B5/B12/B13
  - WCDMA: B2/B4/B5
- EG91–E (used by Lola HT 2-E):
  - LTE FDD: B1/B3/B7/B8/B20/B28A
  - WCDMA: B1/B8
  - GSM/GPRS: 900/1800MHz

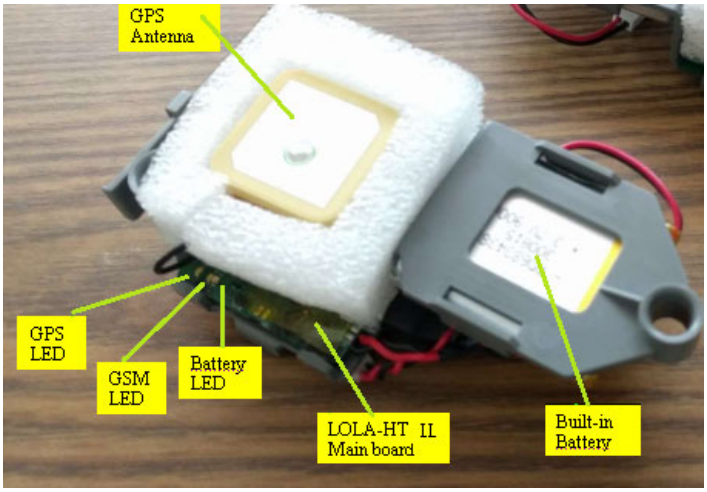
- LEDs for indicating GNSS, LTE & Battery Status
- Built-in Li-Ion Polymer rechargeable battery
- High-Sensitivity GNSS receiver with AGPS support
- Power button for powering on/off
- SmartLog designed to store dynamic waypoint outside of the cell coverage
- Report real-time positions based on preset time interval or distance travelled
- 20 geofence setting with crossing fence alert
- Over-speed warning and Impact alert
- Versatile working mode for diverse applications
- Bluetooth (optional)

1.3 Hardware Diagram



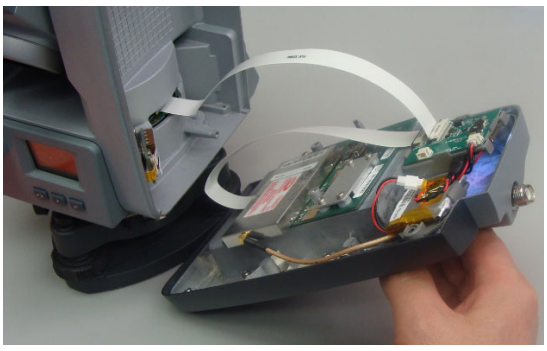
LOLA HT 2 review

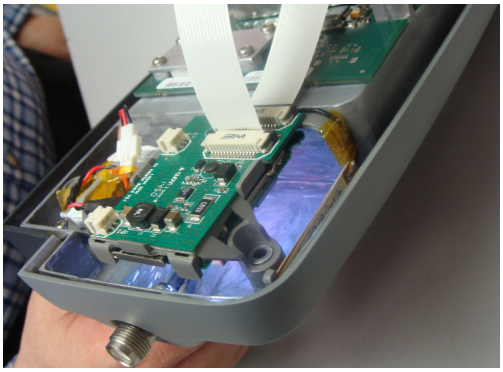




1.4 Installation with Trimble Total Station

The following pictures demonstrate the installation of Lola HT 2 with Trimble Total Station. Lola HT 2 is to be installed from the Total Station's battery side cover. Details of the installation process will not be discussed in this document due to the sensitivity of the information under Trimble's copyright.





2. Specifications

2.1 LTE Specification

- Multi-band LTE module (Quectel)
  - ❖ EG91–NA (used by Lola HT 2-N)
    - LTE FDD: B2/B4/B5/B12/B13
    - WCDMA: B2/B4/B5
  - ❖ EG91–E (used by Lola HT 2-E)
    - LTE FDD: B1/B3/B7/B8/B20/B28A
    - WCDMA: B1/B8
    - GSM/GPRS: 900/1800MHz

- Output Power:
  - Class 3 (23dBm±2dB) for LTE FDD
  - Class 3 (24dBm+1/-3dB) for WCDMA
  - Class 4 (33dBm±2dB) for EGSM900
  - Class 1 (30dBm±2dB) for DCS1800
  - Class E2 (27dBm±3dB) for EGSM900 8-PSK
  - Class E2 (26dBm±3dB) for DCS1800 8-PSK

- Data Speed
  - ❖ LTE:
    - LTE FDD: Max 10Mbps(DL)/Max 5Mbps (UL)
  - ❖ UMTS:
    - DC-HSDPA: Max 42Mbps (DL)
    - HSUPA: Max 5.76Mbps (UL)
    - WCDMA Max 384Kbps (DL)/Max 384Kbps (UL)
  - ❖ GSM:
    - EDGE: Max 296Kbps (DL)/Max 236.8Kbps (UL)
    - GPRS: Max 107Kbps (DL)/Max 85.6Kbps (UL)

2.2 GNSS Specification

Item	Value	Units
Channels	33 Tracking Channels; 99 Acquisition Channels; 210 PRN Channels	Channels
RF Frequency	1575.42 – GPS; 1602.5625 - GLONASS	MHz
Position update rate	1	Hz
Position accuracy	< 10	Meters
Velocity accuracy	0.1	m/s
Time accuracy	1	uS
Cold start acquisition time	35	Seconds
Warm start acquisition time	35	Seconds
Hot start acquisition time	< 1	Seconds

Maximum velocity tracked	515	m/s
Maximum altitude tracked	18,000	Meters
Tracking Sensitivity	-165	dBm
Navigation Sensitivity	-160	dBm

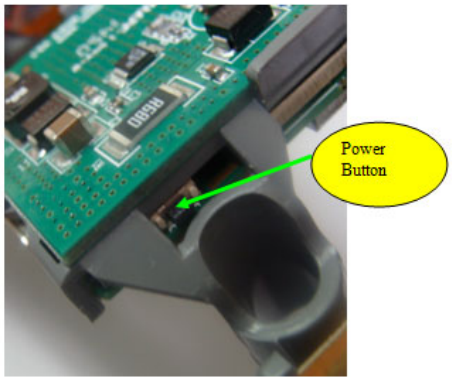
2.3 Electrical & Environmental Specs & Hardware and Firmware

Item	Min	Typical	Max	Units
Li-Ion polymer battery voltage	3	3.7	4.2	V
External DC input voltage range	9	12	32	V
Current Consumption while connecting (Battery charging state)	50	210	218	mA
Current Consumption in operation mode (Idling)	20	25	33	mA
Current consumption in operation mode (Reporting)	90	120	180	mA
Current consumption in power off mode	-	4	-	mA
Peak Current (< 100mS)	-	-	500	mA
Ambient operating temperature	-20	-	60	° C
Storage temperature	-20	-	40	° C

Note:
The above parameters are for reference; they may change based on the firmware. Lola HT 2 works in a low-power mode. The current consumption is subject to change in areas with lower cellular signal strengths compared with areas of higher signal strength.

3. Operation Procedure

3.1 Power button and its operation



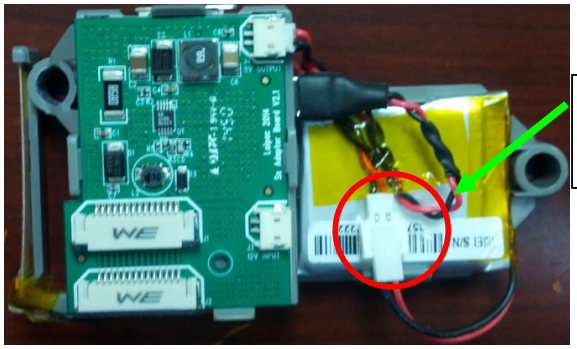
The Power Button is the only operation button on the device. When Lola HT 2 is under "Normal Mode", the power button is used for powering on and off the device.

Power on: Press and hold the power button over 3 seconds; the GNSS LED and the LTE LED will be flashing.

Power off: Press and hold the power button for over 3 seconds; the GNSS LED and the LTE LED will be turned off.

3.2 How to reset Lola HT 2

The following image shows Lola HT 2 with an onboard backup battery. By disconnecting the 2 pin connector and reconnecting it will reset the device.



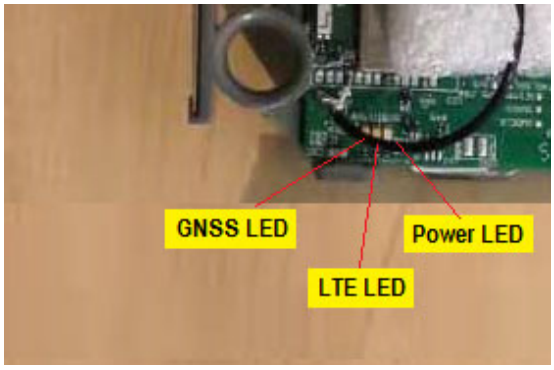
2 pin connector is used to connect the battery and the main board

If Lola HT 2 is installed inside the Total Station, please reset Lola HT 2 following the steps:

(1) Open the Radio/Battery side cover, remove the main battery
(2) Wait for 5 seconds and re-insert the main battery and close the Radio/Battery side cover

3.3 LOLA HT 2 working status by LEDs

There are 3 LED indicators on Lola HT 2



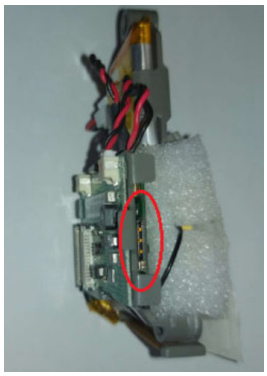
- GNSS LED (White colour)
- LTE LED (White colour)
- Power LED (Red colour)

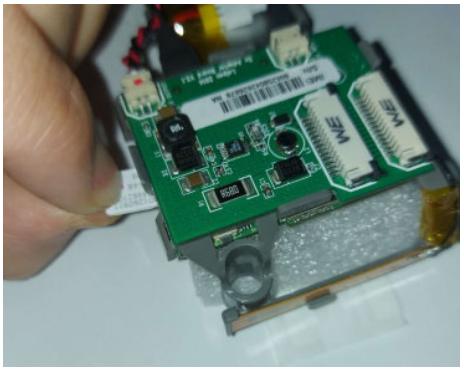
The following table describes the working status of Lola HT 2 by LEDs:

Working status	GNSS LED white	LTE LED white	Power LED red
Powered off by power button or No Power	*Off*	*Off*	*Off*
Built-in battery has used up its capacity and need to be charged			*Flashing*
Built-in battery is being charged			*On*
Position is not located	*Flashing*		
Not registered on LTE network yet		*Flashing*	
Position is located	*On*		
Registered on LTE network		*On*	

3.4 SIM Card Requirement

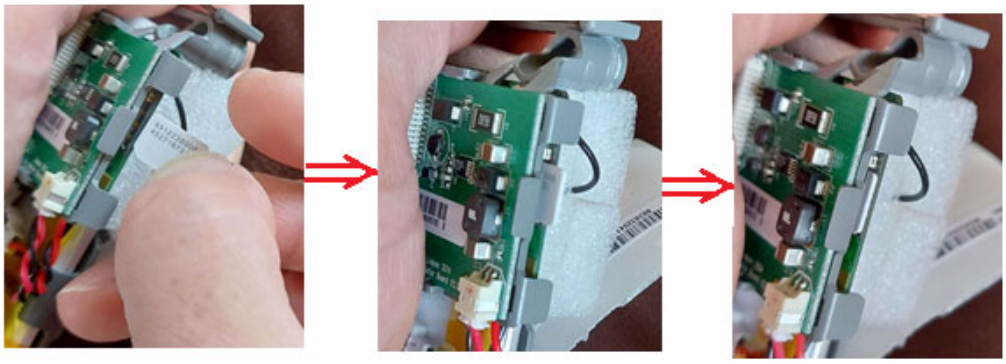
Lola HT 2 module comes with an embedded 4G Nano SIM with global coverage. The SIM number will be required for the activation of the module to connect with the L2P server. To replace the SIM, find the SIM card socket in between the foam and the upper board.





Insert a Nano-SIM, and push the Nano-SIM to the end, and it will be locked.

See the orientation of the Nano-SIM before inserting the SIM.

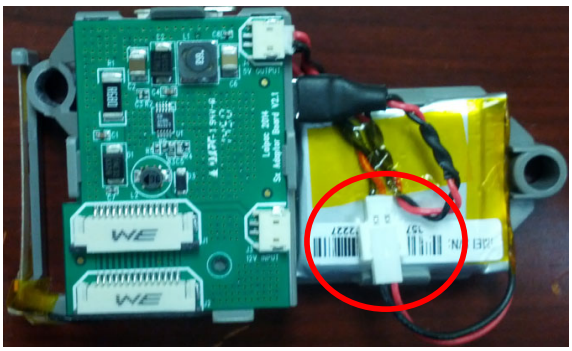


4. Installation of the Utility Software

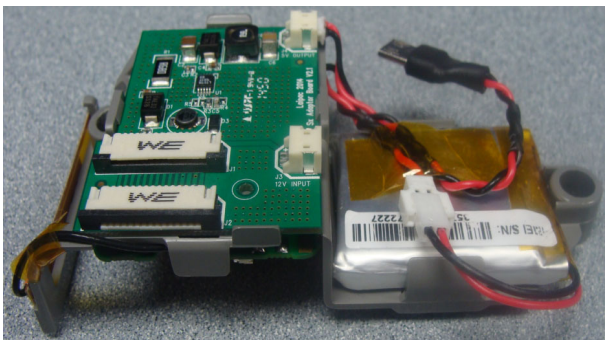
Lola HT 2 is configured with factory default before shipping. Users can also configure Lola HT 2 with LocationNow suite utility software (or L2P utility software). This utility software can perform the configuration and firmware update.

Before performing the configuration process with the utility software, make sure the following:

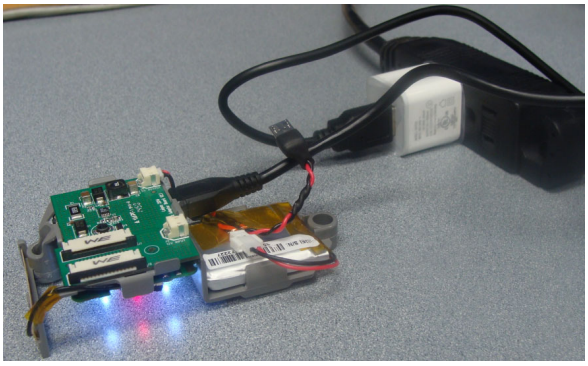
- The 2 pin connector remains connected
- SIM card must be activated



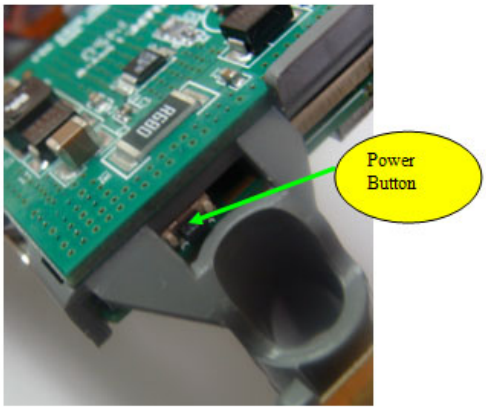
- Remove the connection between the DC/DC adaptor board and the mainboard



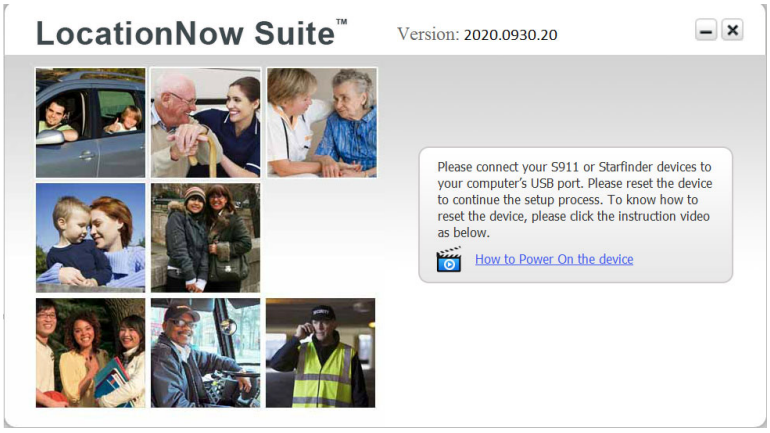
- Connect the USB power adaptor to charge the backup battery over 30min, disconnect the charger.
- This step ensures the device having enough power to complete the configuration process and restart.



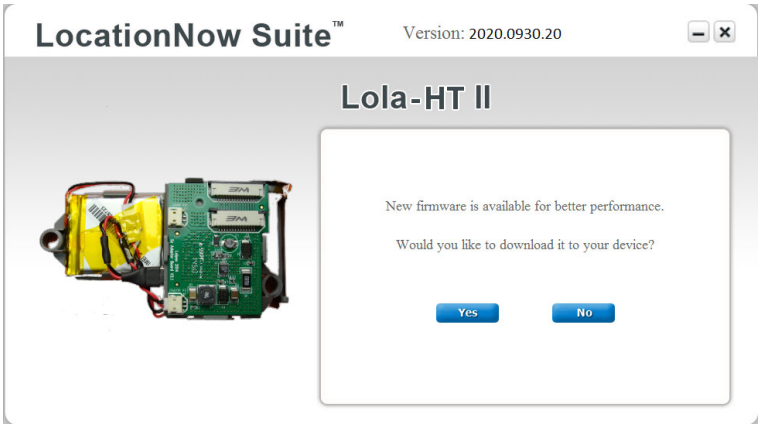
- Wait for 20 seconds, press the power button for more than 3 seconds to turn off the Lola HT 2. This step ensures that the device is generating a reset when it is connected to the utility software.

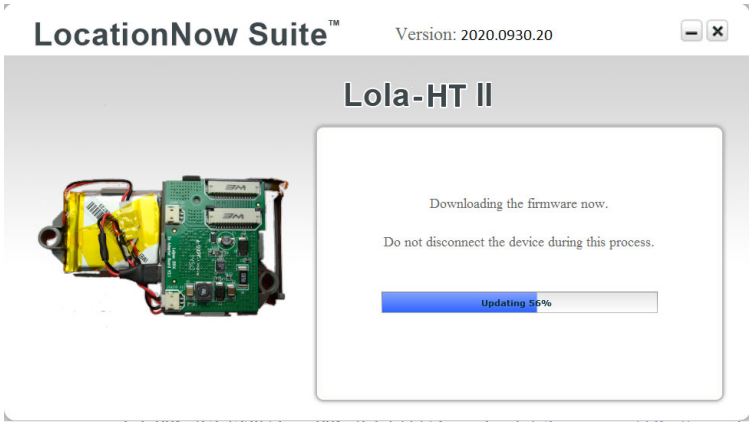


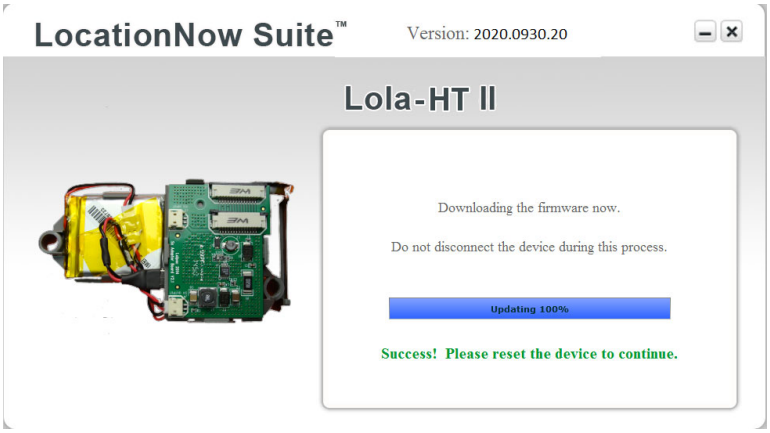
- Now, run the Location Now Suite utility software



- Connect Lola HT 2 to the Laptop's USB port with a micro USB cable.
- Lola HT 2 will connect with the utility software. If there is a newer firmware in the server, the utility software will notify a firmware upgrade.



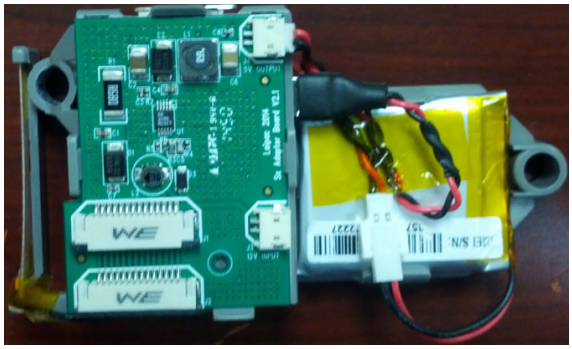




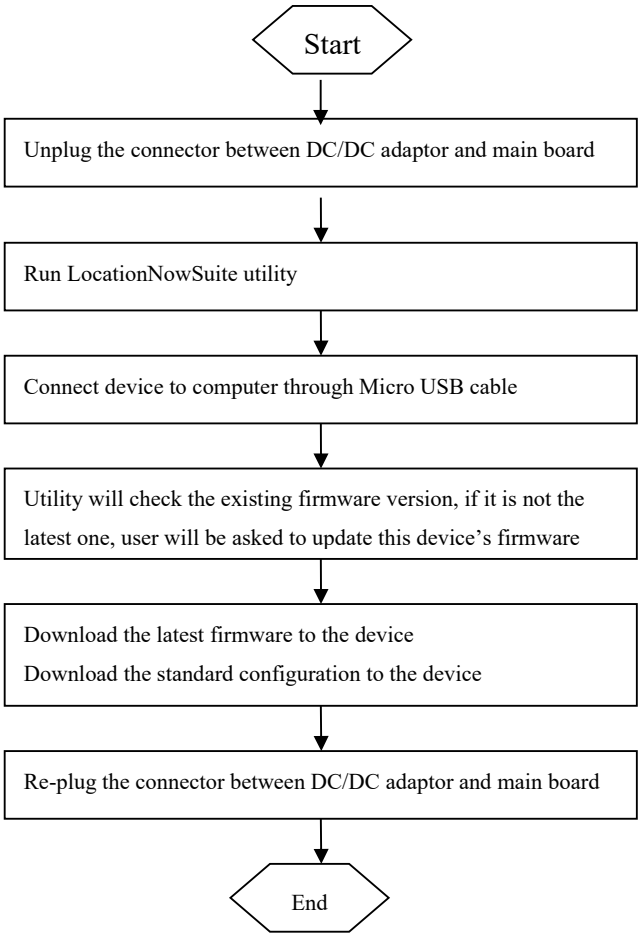
Note:

The user can ignore the notice of "**Please reset the device to continue**" if the factory default setting is to be used for the application with Total Station.

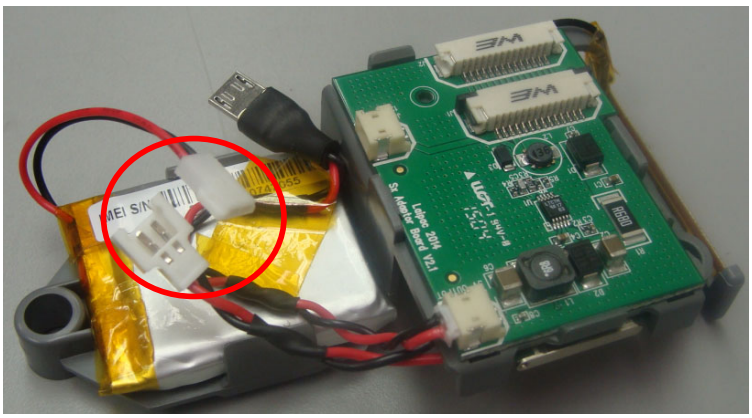
- Unplug the USB cable to disconnect the Lola HT 2 with the laptop, wait for 20 seconds and press the power button to turn off the LOLA HT 2.
- Reconnect the USB between DC/DC adaptor board and the mainboard



Process flow chart



Note:
Lola HT 2 shipping from the factory will have the following characteristics:
• The 2 pin connector between the backup battery and the mainboard is disconnected
• The embedded Nano SIM card is deactivated



ORDERING & CONTACT INFORMATION

REF

Reorder Numbers:

1. Lola HT 2 – N
2. Lola HT 2 – E

Laipac Technology Inc.

25 Valleywood Dr. Unit 11
Markham Ontario L3R 5L9 Canada
email: info@laipac.com
https://www.laipac.com

FCC Statement (USA) / Part 15 of the FCC Rules

FC

The Lola HT 2 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 warranty 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 to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

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.

WARNING! Exposure to Radio Frequency Radiation: the radiated output power of this device is below the FCC and Industry Canada radio frequency exposure limits.

This device must not be co-located or operating in conjunction with any other antenna or transmitter. FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by the manufacturer may void the user's authority to use the device.

RSS Canada

IC

This device complies with Industry Canada's license-exempt RSS standards. Operation is subject to the following two conditions:

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

RF Radiation Exposure Statement:

1. To comply with the Canadian RF exposure compliance requirements, this device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.
2. For body-worn operation, this device has been tested and meets RF exposure guidelines when used with an accessory that contains no metal. Use of other accessories may not ensure compliance with RF exposure guidelines.

ICES-003 (Canada)

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled: "Digital Apparatus", ICES-003 of the Canadian Department of Communications. This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Industry Canada ICES-003 Compliance Label: CAN ICES-3 (B)/NMB-3(B)

Industry Canada statement

This device complies with RSS-210 of Industry Canada.
Operation is subject to the following two conditions: This device may not cause interference, and this device must accept any interference, including interference that may cause undesired operation of the device.
This class B digital apparatus complies with Canadian ICES-003. This class B digital apparatus complies with Canadian NMB-003.

EUROPE

CE / EU Declaration of conformity