900 Rock Avenue, San Jose, CA 95131, USA

HPT404BT JL

User Manual

Version 1.0
Last revised July 25, 2018

PREFACE

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SAFETY – Improper use of HPT404BT JL can lead to injury to persons or property and/or malfunction of the product. The HPT404BT JL should only be repaired by authorized JAVAD GNSS warranty service centers. Users should review and heed the safety warnings.

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Regulatory Information

A license may be required for operation.

FCC Class A Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may

cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Any changes or modifications to the equipment not expressly approved by the party responsible for compliance could void your authority to operate such equipment.

Canadian Emissions Labeling Requirements

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

Industry Canada

The term “IC:” before the equipment certification number only signifies that the Industry Canada technical specifications were met.

WEEE Directive

The following information is for EU-member states only: The use of the symbol indicates that this product may not be treated as household waste. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about the take-back and recycling of this product, please contact your supplier where you purchased the product or consult.

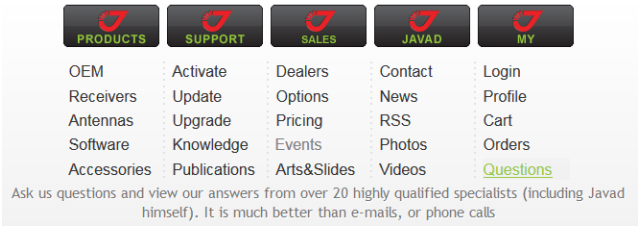
Screen Captures

This manual includes sample screen captures. Your actual screen can look slightly different from the sample screen due to the unit you have connected, operating system used and settings you have specified. This is normal and not a cause for concern.

Technical Assistance

If you have a problem and cannot find the information you need in the product documentation, contact your local dealer. Alternatively, request technical support using the JAVAD GNSS World Wide Web site at: www.javad.com

To contact JAVAD GNSS Customer Support use the QUESTIONS button available on the www.javad.com.



DESCRIPTION AND OPERATION

HPT404BT JL is a device designed for organizing a local network between different devices via WiFi, Ethernet, and Bluetooth, connecting to the Internet using 4G cellular digital communication services.

HPT404BT JL provides a robust solution linking the field GNSS equipment to RTN, where no cell phone cover is available. HPT404BT JL devices may contain 4 W UHF (406 to 470 MHz) radio transceiver.

HPT404BT JL can be configured and supported using web-interface through Internet, and this makes the setup mechanism simple and accessible from anywhere in the world.

HPT404BT JL LED Functionality

The table below describes the LED indicators and device state:

<table>
<tr><th>LED</th><th>Symbol</th><th colspan="9">Device State</th></tr>
<tr><td>POWER</td><td></td><td colspan="3">External power normal</td><td colspan="3">External Power low</td><td colspan="3">External power high</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td colspan="3"></td><td colspan="3">BLINK</td></tr>
<tr><td rowspan="4">UHF</td><td rowspan="4"></td><td colspan="2"></td><td rowspan="2">Error</td><td colspan="2">RX</td><td colspan="2">TX</td></tr>
<tr><td colspan="2">TR and RX / TX</td><td colspan="2">LOW RSSI (< -90 dBm) (BLINK)</td><td colspan="2">LOW OUTPUT POWER (<20dBm) (BLINK)</td></tr>
<tr><td rowspan="2">SEARCH</td><td rowspan="3"></td><td rowspan="3"></td><td colspan="2">MIDDLE RSSII (-90 .. -50dBm) (BLINK)</td><td colspan="2">MIDDLE OUTPUT POWER(20..27dBm) (BLINK)</td></tr>
<tr><td colspan="2">HIGH RSSI (> -50 dBm) (BLINK)</td><td colspan="2">HIGH OUTPUT POWER(27dBm) (BLINK)</td></tr>
<tr><td rowspan="4">GSM</td><td rowspan="4"></td><td colspan="2"></td><td>Error</td><td colspan="4">Active</td></tr>
<tr><td colspan="2">REGISTRATION</td><td rowspan="4"></td><td colspan="4">2G (BLINK)</td></tr>
<tr><td colspan="2">2G</td><td colspan="4">3G (BLINK)</td></tr>
<tr><td colspan="2">3G</td><td colspan="4" rowspan="2">4G (BLINK)</td></tr>
<tr><td colspan="2">4G</td></tr>
<tr><td rowspan="3">BT/WIFI</td><td rowspan="3"></td><td colspan="3">BT</td><td colspan="6">WIFI</td></tr>
<tr><td></td><td colspan="3">Client</td><td colspan="3">Access Point</td></tr>
<tr><td></td><td>Error</td><td>Active</td><td></td><td>Error</td><td>Active</td><td></td><td>Error</td><td>Active</td></tr>
<tr><td></td><td></td><td>BLINK</td><td></td><td></td><td>BLINK</td><td></td><td></td><td>BLINK</td></tr>
</table>

Figure 1. LED indication

Installation

1. Connect antennas to HPT404BT JL.

WARNING! To avoid serious damage of the equipment, do not use the radio without the antenna.

2. Connect HPT404BT JL to external power supply (10...30 V).

3. Insert optional SIM card and SD card to the appropriate card slot if you would like to use GSM connection to connect to the Internet.

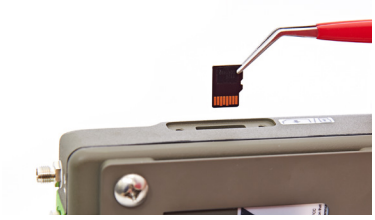


Figure 1. Card (optional) installation

4. Plug in the LAN cable if you would like to use Ethernet connection to connect to Internet.

5. Plug in COM PORT cable if you would like to use CLI interface to communicate with device.

Powering HPT404BT

To power HPT404BT use the Battery kit 1 (p/n 99-587300-10).

Figure 2. Battery Kit 1

Power supply requirements

A single external power supply is necessary to operate HPT404BT JL. The external power supply needs to be Listed for US and Certified for EU countries, it needs also to be a Limited Power Source and rated for Outdoor Use and have an output rated for +9 ... +36V, 4A. This may not be the same range as other JAVAD GNSS products with which you are familiar.

CAUTION: To avoid the introduction of hazards when operating and installing, before connecting of the equipment to the supply, make sure that the supply meets local and national safety ordinances and matches the equipment's voltage and current requirements.

CAUTION: Never attempt any maintenance or cleaning of the supply while plugged in. Always remove supply from AC power before attempting service or cleaning.

WARNING! If the voltage supplied is below the minimum specification, the modem will suspend operation. If the voltage supplied is above the maximum specification, the modem may be permanently damaged, voiding your warranty.

WARNING! Make sure cords are located so that will not be stepped on, tripped over, or otherwise subjected to damage or stress. Do not operate equipment with a damaged cord or plug – replace immediately. To reduce the risk of damage to the equipment, pull by the plug body rather than the output cord when disconnecting the equipment.

WARNING! Do not operate the supply if it has received a sharp blow, been dropped, or otherwise damaged. Do not disassemble the supply.

WARNING! Before connecting the external power source and the modem, make sure that the power source matches the modem's voltage and current requirements.

Antenna Installation

To avoid the equipment serious damage, do not switch the modem to transmit mode if RF antenna is not connected!

Select the type of antenna that best fits your application and the one that offers the highest dB gain. In addition, setup your system in the highest possible location to minimize obstacles between the transmitting and receiving systems. Always place the antenna on the highest point available. At a minimum, set the antenna to at least ten feet above the terrain using an antenna mast.

Some antennas intended to be attached to the pole mount adapter (p/n 14-578117-01) are designed to be operated with a ground plane and some without it. Antennas operating without ground plane marked in our catalogue as NGP, e.g. UHF NGP Antenna 1/2, 2.4 dB gain, NMO:

- UHF NGP Antenna 406-430 MHz, 1/2, 2.4 dBd gain, NMO
- UHF NGP Antenna 430-450 MHz, 1/2, 2.4 dBd gain, NMO
- UHF NGP Antenna 450-470 MHz, 1/2, 2.4 dBd gain, NMO

Theses antennas are NO GROUND PLANE antennas with gain 2.4 dB and NMO specified connector type with should match with your antenna adapter (pole mount or magnet mount). Antennas designed to be operated with ground plane

- UHF Antenna 406-430 MHz, 5/8, 5 dBd gain, NMO
- UHF Antenna 430-450 MHz, 5/8, 5 dBd gain, NMO
- UHF Antenna 450-455 MHz, 5/8, 5 dBd gain, NMO
- UHF Antenna 455-460 MHz, 5/8, 5 dBd gain, NMO
- UHF Antenna 460-465 MHz, 5/8, 5 dBd gain, NMO
- UHF Antenna 465-470 MHz, 5/8, 5 dBd gain, NMO

provide better gain, but to achieve the best performance of your antenna, add a UHF Antenna Ground Plane Disk (p/n 10-587400-01) to the bottom of the antenna for a ground plane. UHF antenna Ground Plane disk improves VSWR and as result increase RF power delivered from transmitter to antenna and system distance range.

To install antenna with ground plane disc:

- Unscrew the cone-shaped cable part;
- Place the ground plane disc between cable parts and screw all parts together;
- Attach cable with ground plane to the UHF antenna;
- Place the antenna on the pole.

Use coaxial cable and connectors that are impedance-matched with the radio equipment, and make sure to use the shortest length of cable to move the signal between the radio and the antenna:

- UHF Ant Cable TNC/Pole Mount, 12ft
- UHF Ant Cable TNC/Magn Mount, 12ft.

Setup and Configuration

1. Turn on power of HPT404BT JL.

2. Wait for complete loading. When it is complete, Power LED will blink.

3. Connect to the device and configure it using a web-browser.

Connection can be established in one of the following ways:

- via Bluetooth interface: the device (PC, handheld/pad) should be with Bluetooth interface with PAN profile support. HPT-404BT JL Bluetooth-interface is in visibility mode, has the name “HPT404BT JL” and PIN

code 0000. When connection is established open the web-browser and enter the address 10.1.11.1:8080.

- via WiFi interface: The device (PC, handheld/pad) should be with WiFi interface. HPT404BT JL WiFi-interface has the name “HPT404BT JL” and password “test-test”. When connection is established open the web-browser and enter the address 10.1.10.1:8080.
- via Ethernet: HPT404BT JL LAN static IP address is 192.168.0.200 and network mask is 255.255.255.0. On the PC connected to the same LAN, open the web browser and enter the address 192.168.0.200:8080. The dialog window appears with login/password request. Enter login and password (jlink/jlink).

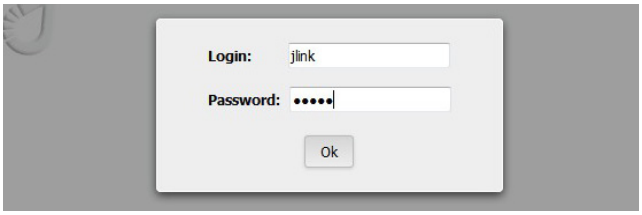


Figure 3. Login and password entering

Thereafter the device is ready for setup and configuration.

4. Select the interface which will be used to connect to Internet and configure it. The following interfaces are available:

Ethernet: Configure Ethernet interface in the Communication/LAN tab. Set the network parameters and reboot the device using Reboot button in the Administration/Management tab see figure below.

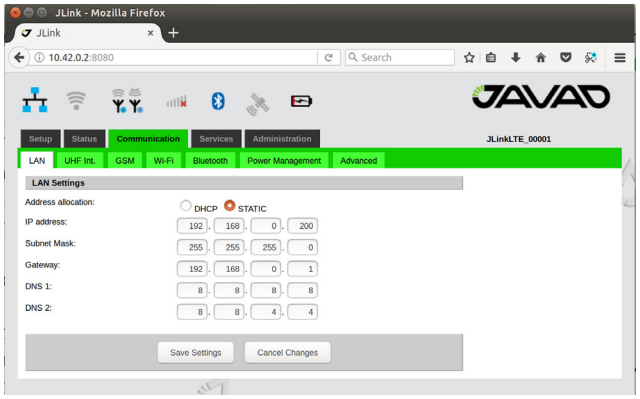


Figure 4. LAN configuration tab

GSM/LTE/4G: Configure this interface using Communication/GSM tab. Set the APN parameters (if necessary) and select the SIM-card slot. In the Communication/Power Management tab activate the interface and wait for registering in the network and Internet access availability. More detailed connection status you can check in Status/GSM tab see below.

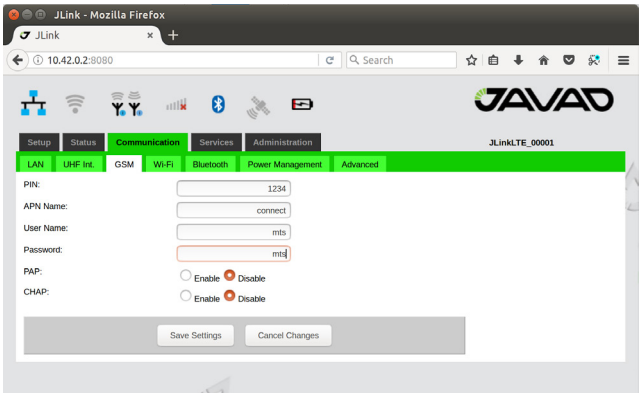


Figure 5. GSM configuration tab

WiFi client: In the Communication/WiFi it is necessary to switch the interface to the client mode. In the Communication/Power Management tab turn the WiFi interface on. Select the network you would like to connect in the Communication/WiFi tab, enter password to get access and wait for the connection see below. More detailed connection status you can check in Status/WiFi tab.

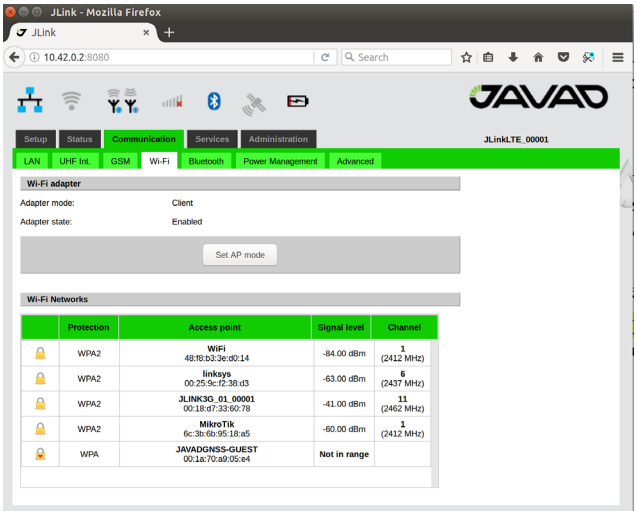


Figure 6. WiFi client configuration tab

Access to Serial port via Network: In the Communication/Advanced tab it is necessary to select Serial port as Console (see figure below) and reboot deice from Administration/Management or do power cycle. After reboot the device is ready for connection to serial port CLI interface with user name “jlink” password “jLTEXXXXX” where “XXXXX” is serial number of device which is written in device label. For connecting to HPT404BT JL serial port needed to setup with following parameters:

- Baudrate 115200
- Parity none
- Data Bits 8
- Stop Bits 1
- Handshake hardware

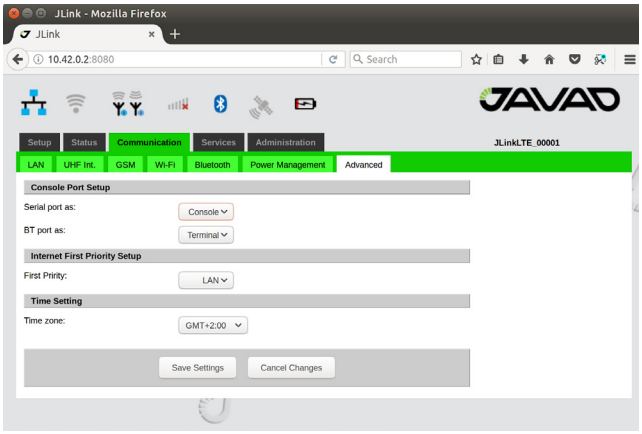


Figure 7. Advanced configuration tab

Access to Serial port via Network: In the Communication/Advanced tab it is necessary to select Serial port as Network (see figure below) and reboot device from Administration/Management or do power cycle.

After reboot device is ready for telnet connection to serial port using “Ser2Net” as login and “jlinklte” as password. For connecting to HPT404BT JL serial port needed to setup with following parameters:

- Baudrate 115200
- Parity none
- Data Bits 8
- Stop Bits 1
- Handshake hardware

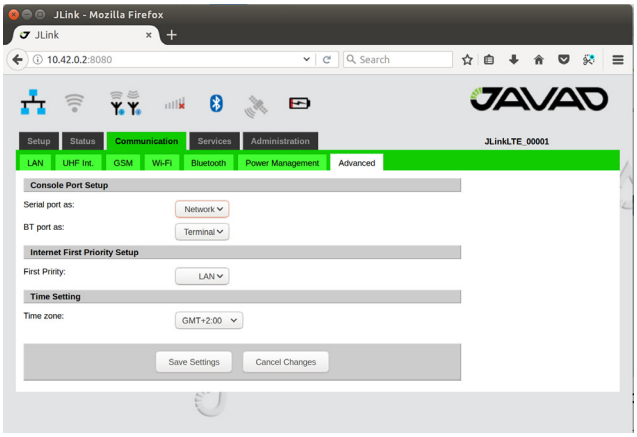


Figure 8. Advanced configuration tab

How to...

...Setup HPT404BT JL to provide RTK data received via NTRIP Client to Serial Port

The following are the steps of configuration of HPT404BT JL:

1. Connect to HPT404BT JL via web interface as described above.

2. Configure the Cellular (GSM):

In the Communication/GSM tab set the PIN code and APN parameters (if necessary);

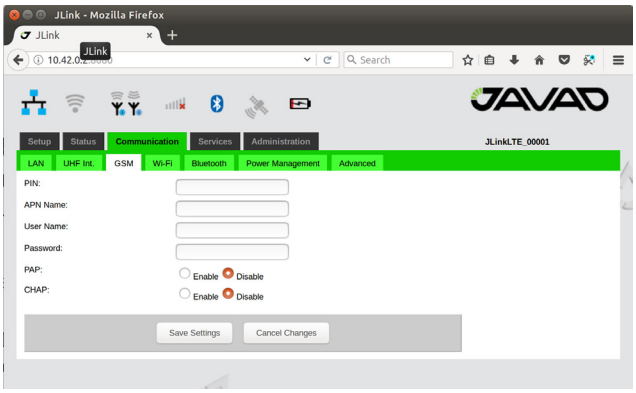


Figure 9. HPT404BT JL GSM configuration tab

Use tweezers to install or remove micro SIM card. Insert the SIM card to its slot. The first slot from the green top cover is for micro SIM, the second slot is for micro SD.

In the Communication/Power Management tab activate the GSM interface.

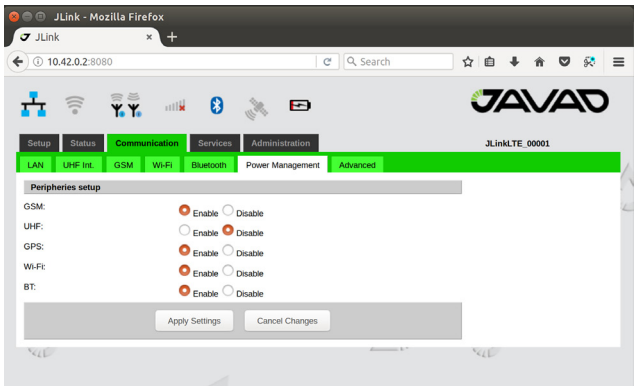


Figure 10. HPT404BT JL Power Management tab

Wait for registering in the network and Internet access availability . Detailed connection status you can check in Status/GSM tab.

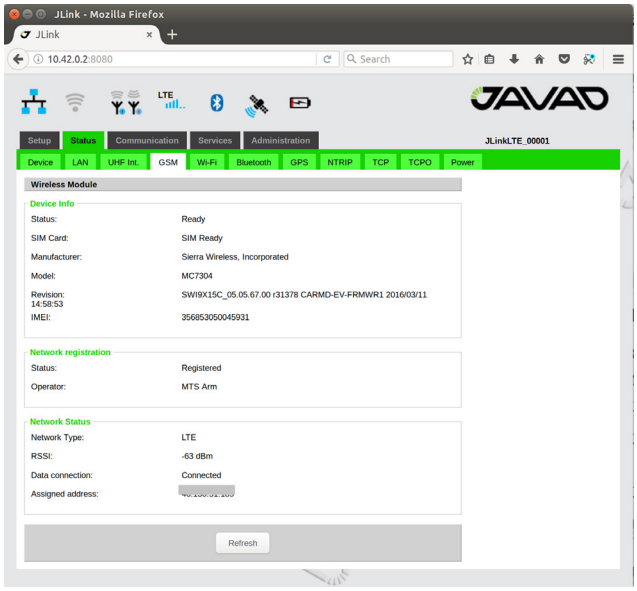


Figure 11. HPT404BT JL GSM Status tab

It is possible also to connect HPT404BT JL to Internet via LAN or WiFi using any WiFi router, MiFi device or even smart-phone configured in hot spot mode.

3. Setup Serial Port. In the Communication/Advanced tab select “Serial port as” parameter as Terminal. Click “Save Setting” button and wait until finish.

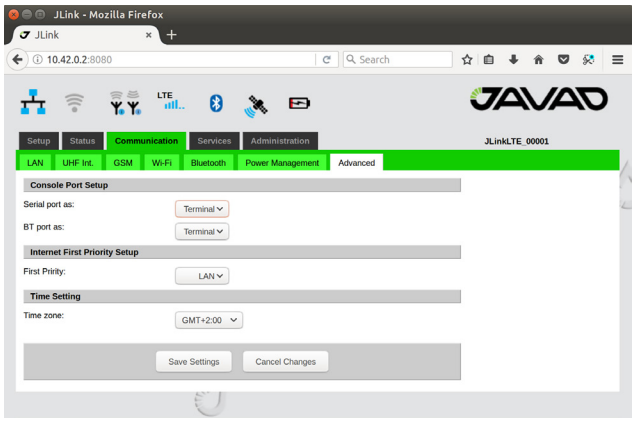


Figure 12. HPT404BT JL Advanced tab

4. Reboot device. In the Administration/ Management tab click “Reboot” button and wait until reboot.

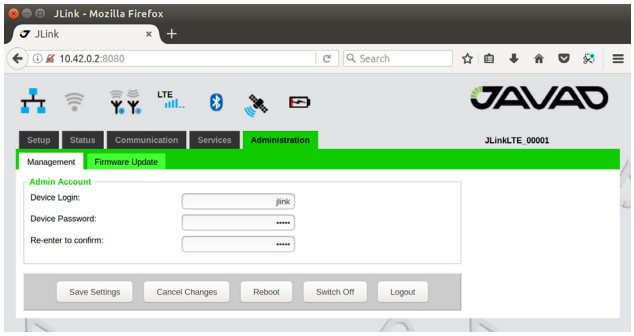


Figure 13. HPT404BT JL Administration Management tab

5. Setup Router. In the Setup/Router tab select following parameters “NTRIP Client” as Source and “Serial port“ as Destination. Click “Save Setting” button and wait until finish.

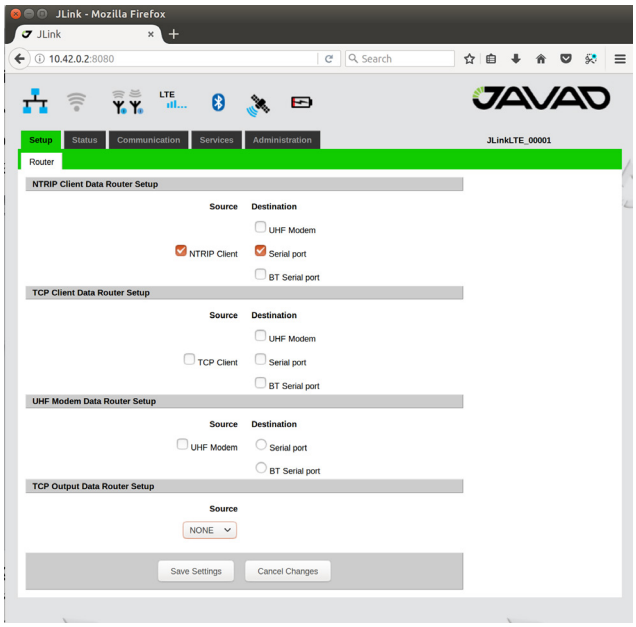


Figure 14. HPT404BT JL NTRIP Data Router tab

6. Setup NTRIP Client. In the Services/NTRIP tab set following parameters: “Server name/ address”, “Port”, “User” , “Password” .

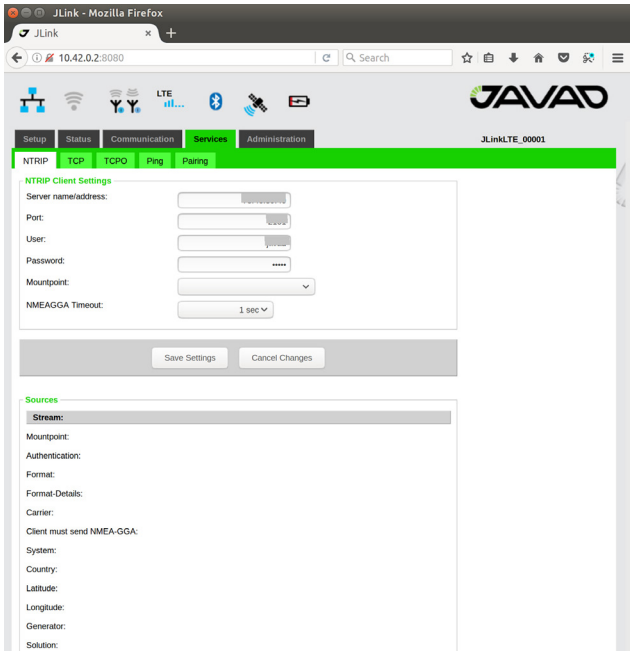


Figure 15. HPT404BT JL NTRIP configuration tab

Click “Save Setting” button and wait until finish.

Click “”Update” and select “Mountpoint”.

Click “Save Setting” and wait until finish. Detailed connection status you can check in Status/NTRIP tab:

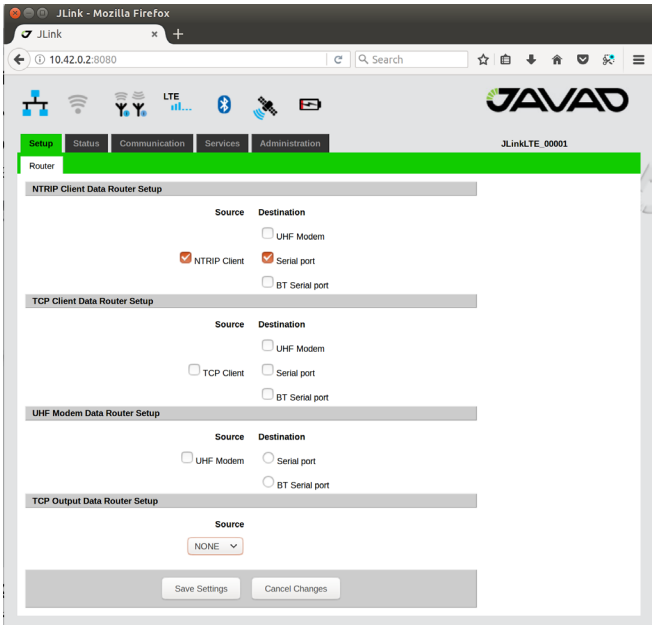


Figure 16. HPT404BT JL Status NTRIP tab

7. Connect Serial Port. Use any application to connect serial port of HPT404BT JL using the following parameters:

- Baudrate 115200
- Parity none
- Data Bits 8
- Stop Bits 1
- Handshake hardware

...Setup HPT404BT JL to provide RTK data received via UHF channel (in Satel mode) to Serial Port

The following are the steps of configuration of HPT404BT JL:

1. Connect to HPT404BT JL via web interface as described above.

2. UHF configuration in Satel mode:

In the Communication/UHF Int. tab:

- select operating frequency or add new frequency to the list
- select Protocol type Satel
- select channel bandwidth (spacing) either 25.0 or, 20.0, or 12.5 kHz
- verify FEC (Forward Error Correction) state is correct

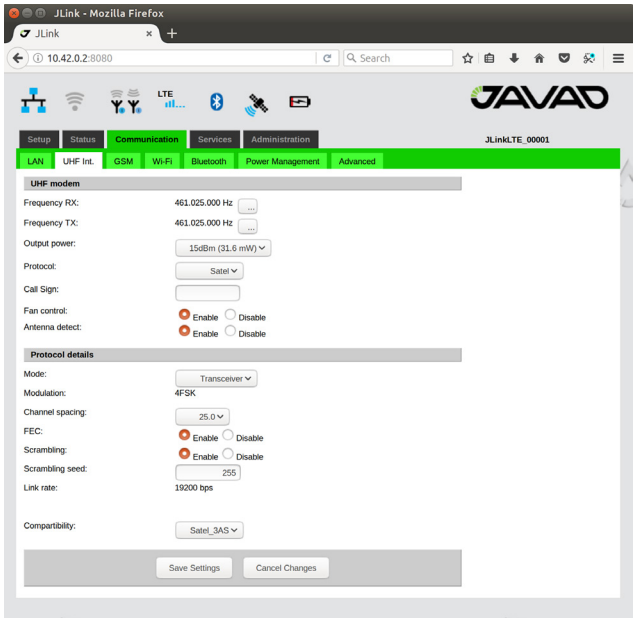


Figure 17. HPT404BT JL UHF parameters configuration tab

In the Communication/Power Management tab activate the UHF interface:

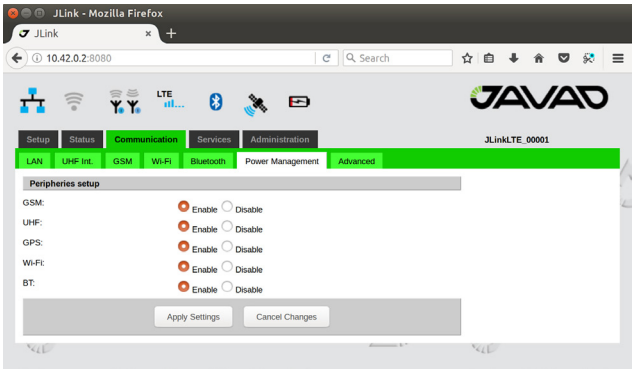


Figure 18. HPT404BT JL Power Management tab

Detailed connection status you can check in Status/UHF int. tab

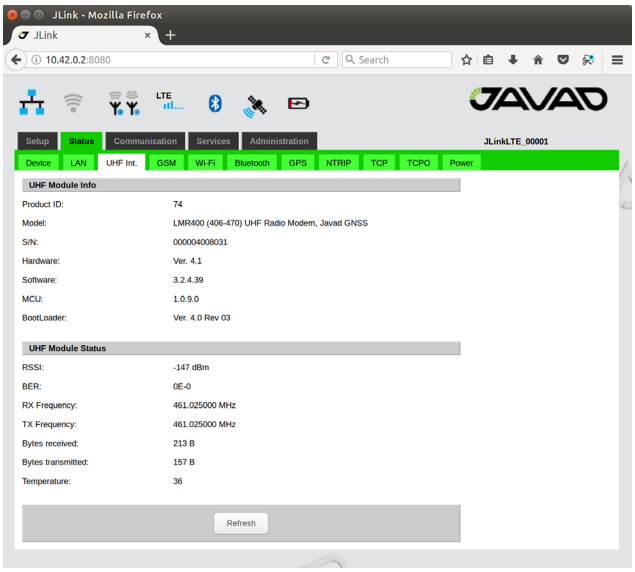


Figure 19. HPT404BT JL UHF Int. Status tab

3. Setup Serial Port

In the Communication/Advanced tab select “Serial port as” parameter as Terminal.

Click “Save Setting” button and wait until finish.

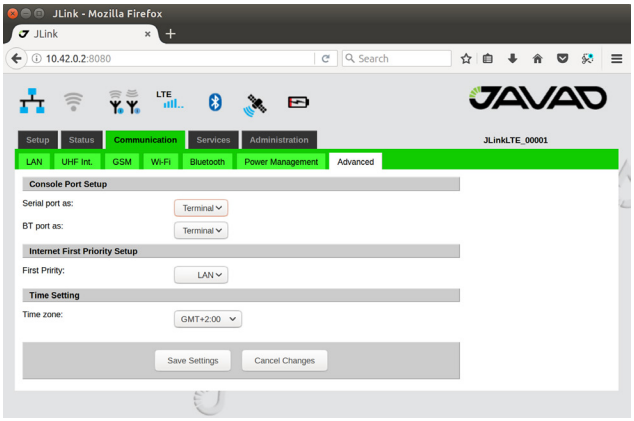


Figure 20. HPT404BT JL Advanced tab

4. Reboot device

In the Administration/Management tab click “Reboot” button and wait until reboot.

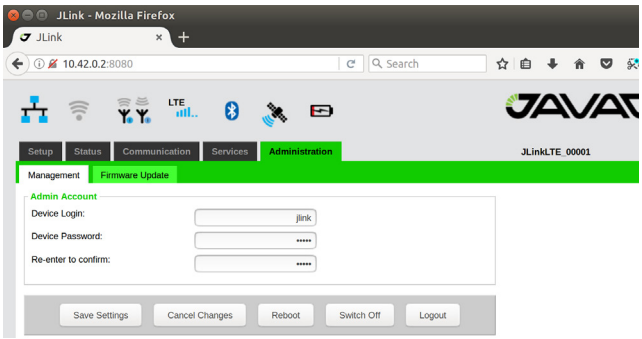


Figure 21. HPT404BT JL Administration Management tab

5. Setup Router

In the Setup/Router tab select following parameters “UHF Modem” as Source and “Serial port“ as Destination.

Click “Save Setting” button and wait until finish.

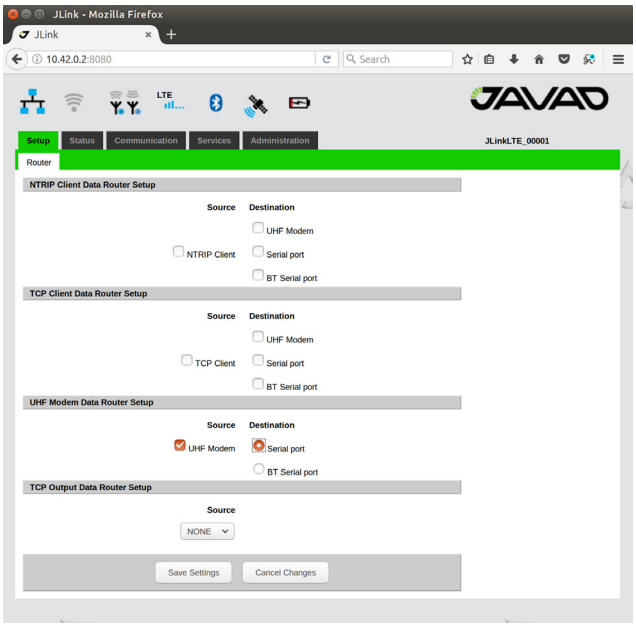


Figure 22. HPT404BT JL UHF Modem Router tab

6. Connect Serial Port

Use any application to connect serial port of HPT404BT JL with following parameters:

- Baudrate 115200
- Parity none
- Data Bits 8
- Stop Bits 1
- Handshake hardware

...Configure TRIUMPH-2 and HPT404BT JL to provide TRIUMPH-2 services through Internet

In this configuration HPT404BT JL will share its internet connection (established by GSM interface) with TRIUMPH-2 connected to HPT404BT JL as a WiFi client.

The following are the steps of configuration of HPT404BT JL:

1. Connect to HPT404BT JL via web interface.

2. GSM configuration:

In the Communication/GSM tab set the APN parameters (if necessary) and insert the SIM card to its slot(SIM card must by provide Static IP).

In the Communication/Power Management tab activate the GSM interface and wait for registering in the network and Internet access availability. Detailed connection status you can check in Status/GSM tab.

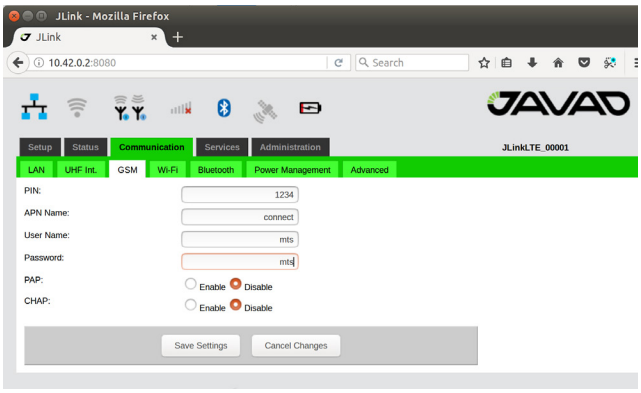


Figure 23. HPT404BT JL GSM configuration tab

3. Setup WiFi configuration

In the Communication/WiFi tab click on the “Set AP mode” to switch the interface to the AP mode and set following AP parameters: SSID (WiFi Accesses pointname), Protection (WPA2) and Security passphrase (“password”) .

In the Communication/Power Management tab turn the WiFi interface on.

The detailed connection status you can check in the Status/WiFi tab. Here HPT404BT JL provides port forwarding mechanism from internet (GSM interface) to WiFi clients.

The port forwarding mechanism works in a following way: HPT404BT JL receives data from internet and redirects it to its WiFi clients. Data packets received by 1110-1119 ports will be redirected to Wi-Fi.

WiFi client which IP address is 10.1.10.110. Data packets received by 1120-1129 ports will be redirected to WiFi client which IP address is 10.1.10.120.

To receive the redirected data of HPT404BT JL the TRIUMPH-2 unit should be connected to HPT404BT JL through WiFi interface and TRIUMPH-2’s IP address should be set to 10.1.10.110 or 10.1.10.120 (the default gateway is 10.1.10.1).

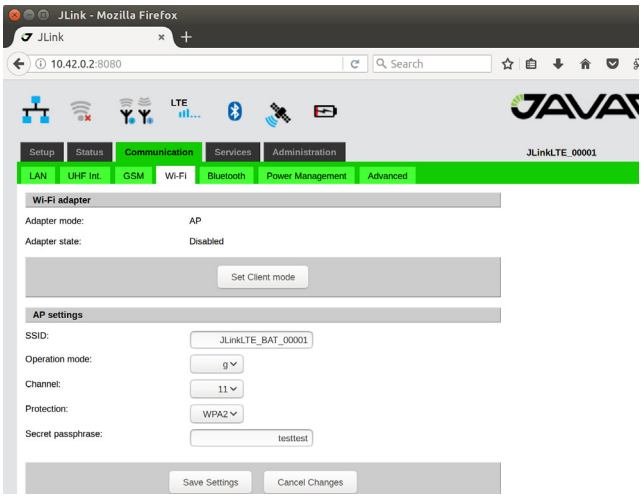


Figure 24. HPT404BT JL WiFi configuration tab

TRIUMPH-2 configuration steps are the following:

1. Connect TRIUMPH-2 to PC via USB or Bluetooth interface and start NetView&Modem.

2. Click Connection, select the port, specify the COM port the receiver is connected to. Click Connect to connect to the receiver.

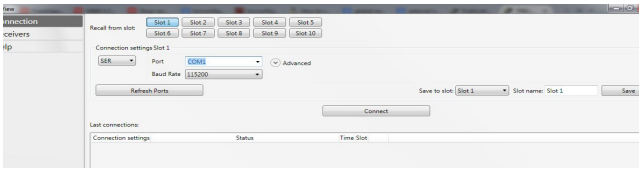


Figure 25. NetView connection tab

3. Select the receiver from the list of the connected receivers and click Parameters/Networking/Server , to setup Service port.

- Set the TCP/FTP parameter: TCP Port (1125).
- Set the TCP/FTP parameter: TCP Output Base Port (1120).
- Click Apply.

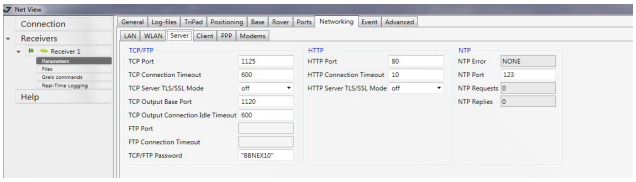


Figure 26. NetView Server tab

4. Select the receiver from the list of the connected receivers and click Parameters/Networking/WLAN, to setup the WiFi connection.

Set the following IP parameters: WLAN Receiver IP Address(10.1.10.120), WLAN Default Gateway (e.g, 10.1.10.1), and WLAN Network Mask (e.g, 255.255.255.0).

Set the AccessPoint parameters: WLAN Access Point ID (enter SSID of HPT404BT JL), WLAN AP mode(wpa).

Set the WPA parameter: WLAN WPA Pass-

phrase (enter passphrase of HPT404BT JL).

Set the WLAN Mode to on and click Apply.

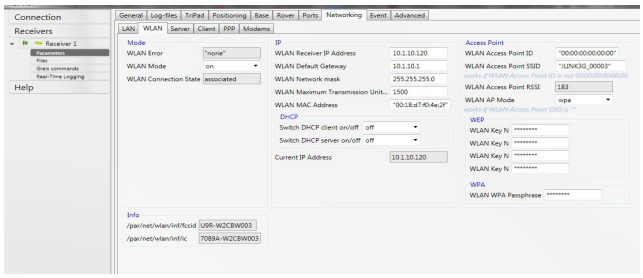


Figure 27. NetView WLAN configuration tab

After restarting the device you can check the WiFi connection in the web interface Status/ WiFi tab of HPT404BT JL.

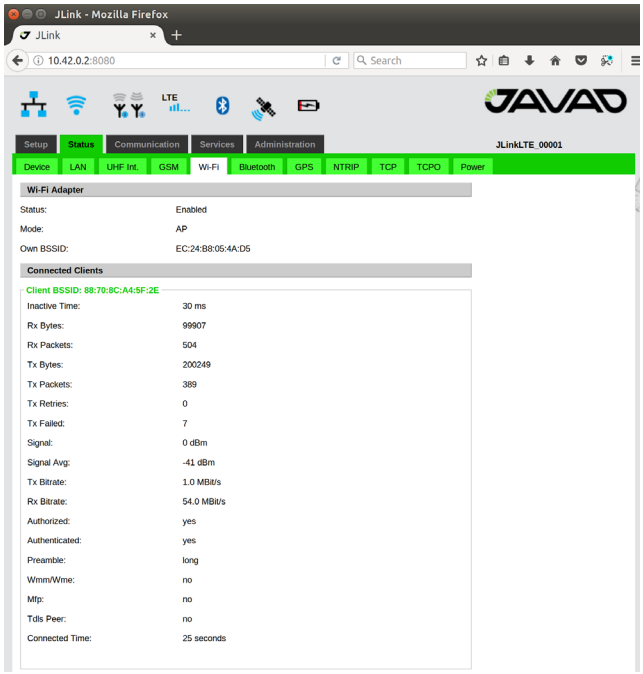


Figure 28. HPT404BT JL WiFi status tab

Now TRIUMPH-2 can provide the services trough the Internet by 1120-1125 port.

SPECIFICATIONS

UHF Radio

Parameter	Specification
Operating Frequency Range	406 - 470 MHz (EU) 406.1 - 470 MHz (USA) 406.1 - 430; 450 - 470 MHz (Canada)
Channel Bandwidth	25/12.5/6.25 kHz (USA for 406-420 MHz) 12.5/6.25 kHz (USA for 421 -470 MHz) 25/12.5/6.25 kHz (Canada) 25/20/12.5 kHz (EU)
Data Rate (25/20/12.5/6.25 kHz Channel Bandwidth)	9600/7500/4800/2400 bps – DBPSK/GMSK 19200/15000/9600/4800 bps – DQPSK/4FSK 28800/22500/14400/7200 bps – D8PSK 38400/30000/19200/9600 bps – D16QAM
Roaming Speed for DBPSK modulation	75 mph / 120 km/h
Modulation	GMSK/4FSK/DBPSK/DQPSK/D8PSK/D16QAM
Nominal Impedance	50 Ohms
End to End delay	60 ms
Communication Mode	Time Division Duplex (TDD) Time Division Multiple Access (TDMA)
Maximum Distance Range	16 miles / 26 km

Transmitter Specification

Parameter	Specification
Output Power USA, Canada EU	15 dBm to 36 dBm in 1 dB steps (32mW to 4W) 15 dBm to 33 dBm in 1 dB steps (32mW to 2W)
Output Power Control Accuracy	±1.5dB (at normal test conditions) +2.0dB and -3.0dB (under extreme test conditions)
Carrier Frequency Stability	±1.5 ppm initial stability over temp with ±3.0 ppm aging/year
Max. Frequency Error	±1.0 kHz (at normal test conditions) ±1.5 kHz (under extreme test conditions)
Adjacent Channel Power 25/12.5/6.25 kHz CB 25/20/12.5 kHz CB	Part §90.210 (C, D, E) (USA, Canada) 60 dBc (EU)
Spurious Emission (Conducted)	-36 dBm (9 kHz – 1GHz) -30 dBm (1GHz – 4 GHz)
Spurious Emission (Radiated)	-36 dBm (9 kHz to 1 GHz) -30 dBm (1 GHz to 4 GHz)

Receiver Specification

Parameter	Specification
Noise Figure	4 dB
Receiver Sensitivity (BER $1x10^{-4}$, 25 kHz CS)	
DBPSK	-116 dBm 25kHz / -117 dBm 12.5kHz
DQPSK	-115 dBm 25kHz / -116 dBm 12.5kHz
D8PSK	-110 dBm 25kHz / -111 dBm 12.5kHz
D16QAM	-106 dBm 25kHz / -107 dBm 12.5kHz
GMSK	-113 dBm 25kHz / -114 dBm 12.5kHz
Dynamic Range	-115 to –15 dBm
Max. Input Signal Level	-10 dBm
Co-channel Rejection	-8 dB for 25 kHz Channel Bandwith -8 dB for 20 kHz Channel Bandwith -12 dB for 12.5 kHz Channel Bandwith -16 dB for 6.25 kHz Channel Bandwith
Adjacent Channel Selectivity	70 dB for 25 kHz Channel Bandwith 70 dB for 20 kHz Channel Bandwith 60 dB for 12.5 kHz Channel Bandwith 50 dB for 6.25 kHz Channel Bandwith

4G cellular module (optional)

4G LTE Mini Card (option 1)	LTE, DC-HSPA+, HSPA+, EDGE, GPRS, GSM and CDMA networks
Technology:	
LTE	Bands: 1 (2100 MHz), 3 (1800MHz), 7 (2600 MHz), 8 (900 MHz), 20 (800 MHz) Data Rates: Category 3 Downlink 100 Mbps (20 MHz bandwidth), 50 Mbps (10 MHz bandwidth) Uplink 50 Mbps (20 MHz bandwidth), 25 Mbps (10 MHz bandwidth)
UMTS (WCDMA), HSDPA, HSUPA, HSPA+,DC-HSPA+	Bands: 1 (2100 MHz), 2 (1900 MHz), 5 (850 MHz), 6 (800 MHz), 8 (900 MHz) Data Rates: HSPA+ rates Downlink up to 42 Mbps (category 24) Uplink up to 5.76 Mbps (category 6)
GSM, GPRS, EDGE	GSM 850 (850 MHz), EGSM 900 (900 MHz), DCS 1800 (1800 MHz), PCS 1900 (1900 MHz) Data Rates: EDGE throughput up to 236 kbps
4G LTE Mini Card (option 2)	LTE, DC-HSPA+, HSPA+, EDGE, GPRS, GSM and CDMA networks
Technology:	
LTE	Bands: 2 (1900 MHz), 4 (AWS) (1700/2100MHz), 5 (850 MHz), 13 (700 MHz), 17 (700 MHz), 25 (1900 MHz G Bl ock) Data Rates: Category 3 Downlink 100 Mbps (20 MHz bandwidth), 50 Mbps (10 MHz bandwidth) Uplink 50 Mbps (20 MHz bandwidth), 25 Mbps (10 MHz bandwidth)
CDMA (EVDO Rel. 0 and Rel.A)	Bands: BC0 (Cellular 800 MHz), BC1 (PCS 1900 MHz), BC10 (Secondary 800 MHz) Data Rates: CDMA IS-856 (1xEV-DO Release A) Up to 3.1 Mbps forward channel Up to 1.8 Mbps reverse channel CDMA IS-2000 Up to 153 kbps, simultaneous forward and reverse channels
UMTS (WCDMA), HSDPA, HSUPA, HSPA+,DC-HSPA+	Bands: 1 (2100 MHz), 2 (1900 MHz), 4 (AWS 1700/2100 MHz), 5 (850 MHz),8 (900 MHz) Data Rates: HSPA+ rates Downlink up to 42 Mbps (category 24) Uplink up to 5.76 Mbps (category 6)
GSM, GPRS, EDGE	GSM 850 (850 MHz), EGSM 900 (900 MHz), DCS 1800 (1800 MHz), PCS 1900 (1900 MHz) Data Rates: EDGE throughput up to 236 kbps

GNSS Receiver (optional)

Tracking Channels	GPS/GLONASS L1
Signals Tracked	C/A Code
Cold / Warm Start	42 / 30 seconds
Sensitivity for Reacquisition	- 161dBm

Communication ports

Wi-Fi (IEEE 802.11 b, g, n, d, e, i)
Full-duplex 10BASE-T/100BASE-TX Ethernet port
Bluetooth V2.0+EDR Class 2
High Speed USB 2.0 configurable as Device or Host port
MicroSD card slot (fully sealed)
Serial port configurable as RS232/RS422/RS485

Environmental

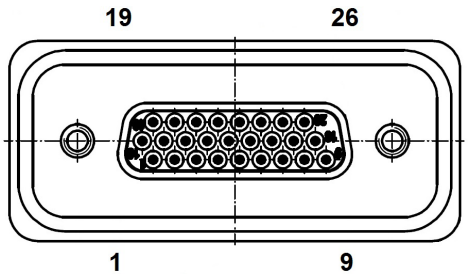
Parameter	Specification
Temperature	Operating –40° C to +70° C Storage –40° C to +85° C
Environmental	IP 67
Dimensions (H x W x D)	5.75 x 2.95 x1.73 inches (146 x75 x44 mm)
Weight	1.07 lbs (488 g)
Power Supply Voltage	+9 to +36 VDC nominal
Power Consumption Average)	18W / 2W / 0.01W –Transmit / Receive / Sleep
Housing/Color	Aluminum / Two-tone Green / Gray
Antenna Connector	TNC, 50Ω

Variant 1: 4 W UHF Transceiver, Bluetooth, WiFi, Ethernet, USB and Serial port.

Variant 2: 4 W UHF Transceiver, 4G cellular data module, GNSS receiver, Bluetooth, WiFi, Ethernet, USB and Serial port.

Pinout of HPT404BT JL power and communication port

#	SIGNAL	I/O	DESCRIPTION
1	TX+/RTS_ OUT	O	Transmit Data positive line (RS-422) / Request to Send (RS-232)
2	RX+/ CTS_IN	I	Receive Data positive line (RS-422) /Clear to Send (RS-232)
3	DTR_OUT	O	Data Terminal Ready (RS-232)
4	USB0_DP	I/O	Data Positive line (USB)
5	USB0_DM	I/O	Data Negative line (USB)
6	ELED+	O	LED line (LAN)
7	ETD+	O	Transmit Data positive line (LAN)
8	ERD+	I	Receive Data positive line (LAN)
9	PWR_IN	PWR	+5.5 to +36 VDC Power Input
10	TX-/TX_ OUT	O	Transmit Data negative line (RS-422) / Transmit Data (RS-232)
11	RX-/RX_IN	I	Receive Data negative line (RS-422) / Receive Data (RS-232)
12	DSR_IN	I	Data Set Ready (RS-232)
13	DCD_OUT	O	Data Carrier Detect (RS-232)
14	USB0_VBUS	PWR	Power line (USB)
15	USB0_ID	I	USB0 ID line
16	ETD-	O	Transmit Data negative line (LAN)
17	ERD-	I	Receive Data negative line (LAN)
18	PWR_IN	PWR	+5.5 to +36 VDC Power Input
19	GND	PWR	Power Ground
20	GND	PWR	Power Ground
21	GND	PWR	Power Ground
22	RESERVE	-	Not used. Reserve
23	RESERVE	-	Not used. Reserve
24	RESERVE	-	Not used. Reserve
25	RESERVE	-	Not used. Reserve
26	PWR_IN	PWR	+5.5 to +36 VDC Power Input



Safety Warnings

Read these instructions. Keep these instructions. Heed all warnings. Follow all instructions.

Clean only with a damp cloth.

Do not block any of the ventilation openings. Install in accordance with the manufacturer's instructions.

Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

Only use attachments/accessories specified by the manufacturer.

Use only with a pole, cart, stand, or tripod, specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

Unplug this apparatus during lightning storms or when unused for long periods of time.

Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, or has been dropped.

Apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, shall be placed on the apparatus.

Storage Precautions

Always clean the instrument after use. Wipe off dust with a cleaning brush, then wipe off dirt with a soft cloth. Store in a location with a temperature of from -40° to +85°C, and no exposure to direct sunlight. Use a clean cloth, moistened with a neutral detergent or water, to clean the receiver. Never use an abrasive cleaner, ether, thinner benzene, or other solvents. Always make sure the instrument is completely dry before storing. Dry the receiver with a soft, clean cloth.

General Warnings

This product should never be used:

- Without the user thoroughly understanding operator's manual.
- After disabling safety systems or altering the product.
- With unauthorized accessories.
- Without proper safeguards at the measuring site.
- Contrary to applicable laws, rules, and regulations.
- The HPT404BT JL receiver should never be used in dangerous environments. Use in rain or snow for a limited period is permitted.

Warranty terms

JAVAD GNSS electronic equipment are guaranteed against defective material and workmanship under normal use and application consistent with this Manual. The equipment is guaranteed for the period indicated, on the warranty card accompanying the product, starting from the date that the product is sold to the original purchaser by JAVAD GNSS' Authorized Dealers.

During the warranty period, JAVAD GNSS will, at its option, repair or replace this product at no additional charge. Repair parts and replacement products will be furnished on an exchange basis and will be either reconditioned or new. This limited warranty does not include service to repair damage to the product resulting from an accident, disaster, misuses, abuse or modification of the product.

Warranty service may be obtained from an authorized JAVAD GNSS warranty service dealer. If this product is delivered by mail, purchaser agrees to insure the product or assume the risk of loss or damage in transit, to prepay shipping charges to the warranty service location and to use the original shipping container or equivalent. A letter should accompany the package furnishing a description of the problem and/or defect.

The purchaser's sole remedy shall be replacement as provided above. In no event shall JAVAD GNSS be liable for any damages or other claim including any claim for lost profits, lost savings or other incidental or consequential damages arising out of the use of, or inability to use, the product.

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