JLink 3G

User Manual

Version 1.2

Last Revised May 19, 2015

www.javad.com

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Preface

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Regulatory Information

The following sections provide information on this product's compliance with government regulations.

FCC Class B Compliance

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

This device may not cause harmful interference, and

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 residential installations. 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 interference to radio or television equipment 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.

Move the equipment away from the JLink 3G.

Plug the equipment into an outlet on a circuit different from that to which the unit is powered.

Consult the dealer or an experienced radio/television technician for additional suggestions.

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 B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

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

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

Getting Started

JLink 3G is a family of devices designed for organizing a local network between different devices via WiFi, Ethernet, and Bluetooth, connecting to the Internet using 3.5G cellular digital communication services.

Figure 1.   JLink 3G

JLink 3G provides a robust solution linking the field GNSS equipment to RTN, where no cell phone cover is available. JLink 3G devices may contain 1 W either UHF (406 to 470 MHz) or VHF (138-174 MHz), or ISM license free USA band (902-928 MHz) and European CEPT license free (868-870 MHz) radio transceiver. Marine Radiobeacon receiver (283.5 to 325 kHz) can be built-in into JLink 3G device.

JLink 3G can be configured and supported using web-interface through Internet, and this makes the set-up mechanism simple and accessible from anywhere in the world.

JLink 3G LED Functionality

The purpose of this document is to describe how to indicates LED's device state on JLink 3G.

The JLink 3G has four LED's which allows to indicates device status:

POWER LED

Power LED indicates the power and battery status:

LED STATE	EXTERNAL POWER	BAT STATE
Flashing	Yes	Charged or Not BAT
Blinking at interval of 1 second	Yes	Not Charged
Blinking at interval of 4 seconds	Not	BAT Charged
Blinking at interval of 0.5 second	Not	BAT LOW

UHF LED

This LED indicates the UHF modem status.

LED STATE	UHF STATE
Not Flashing	UHF OFF
Flashing	UHF ON but not active
Blinking at interval of 0.5 second	UHF ON and active

GSM LED

GSM LED indicates the GSM modem status.

LED STATE	GSM STATE
Not Flashing	GSM OFF
Flashing	GSM ON but on wait state
Blinking at interval of 0.5 second	GSM ON and have connection

WIFI/BT LED

WIFI/BT LED indicates or WIFI or BT status, which is configurable(default configuration is WIFI indication).

LED STATE	CONFIGURATION	BAT STATE
Not Flashing	WIFI	WIFI WIFI OFF
Flashing	WIFI	WIFI ON but on wait state
Blinking at interval of 0.5 second	WIFI	WIFI ON and have connection
Not Flashing	BT	BT OFF
Flashing	BT	BT ON but on wait state
Blinking at interval of 0.5 second	BT	BT ON and have connection

LED's behavior at power on device

1. All LED's are turned off.

2. PWR LED Lights up when the system is in the U-BOOT.

3. Lights up two LED's Radio and GSM LED's and hold until the check need to update the Kernel and FS with SD-card. If an update is required, go to step 4, and if not, to step 6.

4. Radio and GSM LED's blinks while the update process Kernel and FS with SD-card. Intensity of flashing different for update Kernel and FS.

5. All LED's are turned off while the unit is able to reboot. Then re-run all the items from step 1.

6. The lights up all LED's while loading FS (approximately 30 seconds).

7. Lights up LED's, depending on the mode of the device. For example: If all the internal devices (Radio, GSM, WF, BT) are disabled, only PWR LED lighted according to the mode of the power supply unit.

Installation

1. Connect Bluetooth and GSM antennas to JLink 3G as shown on the picture below.

2. Connect JLink 3G to external power supply (10…30 V).

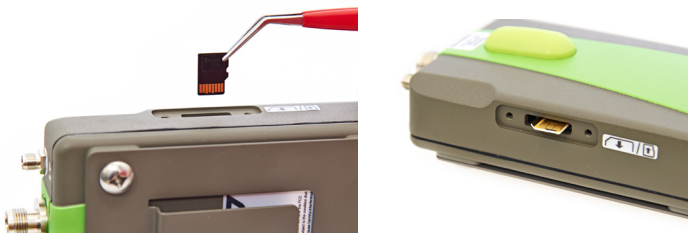3. Insert SIM card to the SIM card slot if you would like to use GSM connection to connect to Internet.

Figure 2. **SIM card installation**

4. Plug in 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.

Figure 3. **JLink 3G interfaces**

Setup and Configuration

1. Turn on power of JLink 3G.

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

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

Connection can be established in one o the following ways:

- **via Bluetooth interface:** the device (PC, hand-held/pad) should be with Bluetooth interface with PAN profile support. JLink 3G Bluetooth-interface is in visibility mode, has the name "`Jlink 3G`" 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. JLink 3G Wi-Fi-interface has the name "`Jlink 3G`" and password "`testtest`". When connection is established open the web-browser and enter the address 10.1.10.1:8080.
- **via Ethernet:** JLink 3G LAN static IP adress 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`).
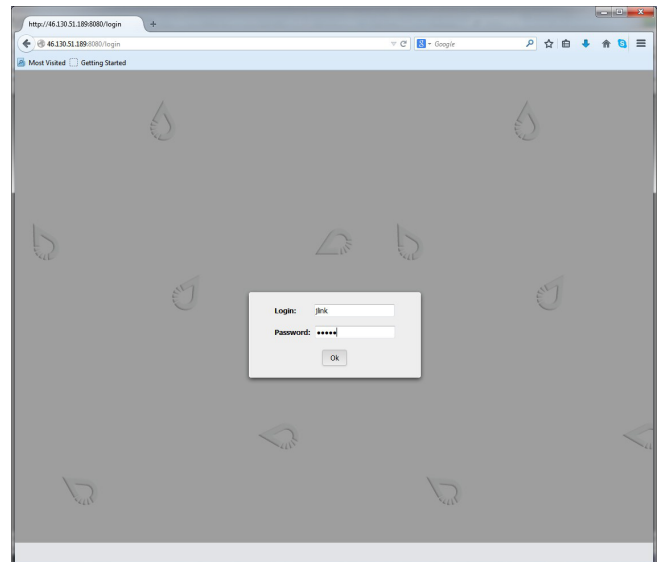

Figure 4. **Login and password entering**

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

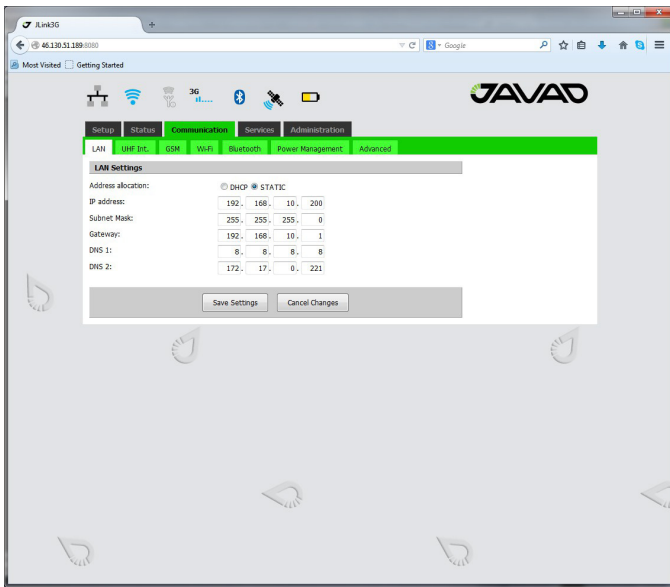*Administration*/*Management* tab see figure below.

Figure 5.   LAN configuration tab

• **GSM/3G/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.
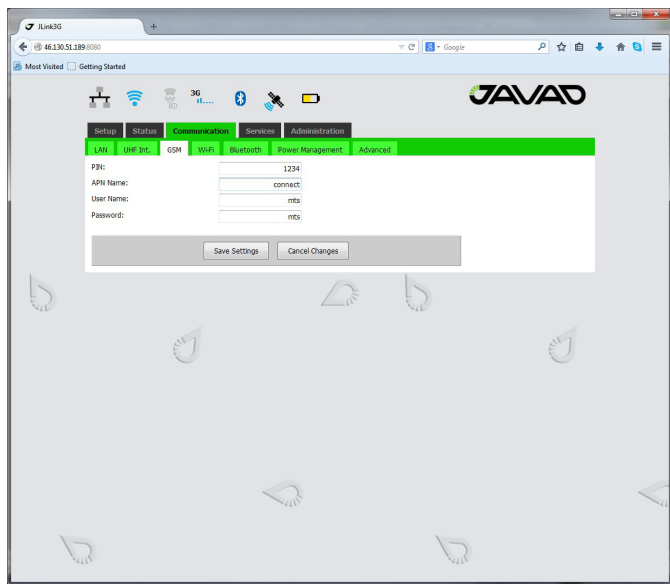

Figure 6.   GSM configuration tab

• **WiFi client:** In the Communication/WiFi it is necessary to switch the interface to the client mode. In the Communication/Power Managment 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
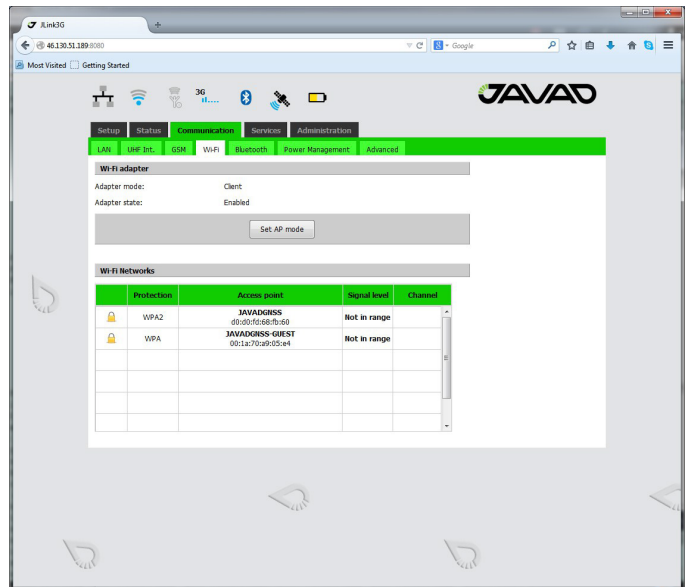
can check in Status/WiFi tab.

Figure 7.   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 username "root" (CLI help command is "jlink3g help"). For connecting to JLink 3G serial port needed to setup with following parameters:

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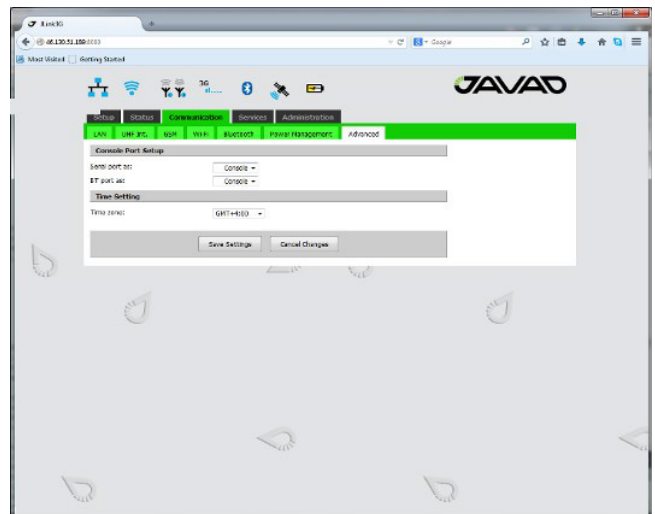- Stop Bits 1
- Handshake hardware

Figure 8.   Advanced configuration tab

• **Access to Serial port via Network.**

In the Communication/Advanced tab it is necessary

to select Serial port as Terminal (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 "`jlink3g`" as password. For connecting to JLink 3G serial port needed to setup with following parameters:

- ▪ Baudrate 115200
- ▪ Parity none
- ▪ Data Bits 8
- ▪ Stop Bits 1
- ▪ Handshake hardware
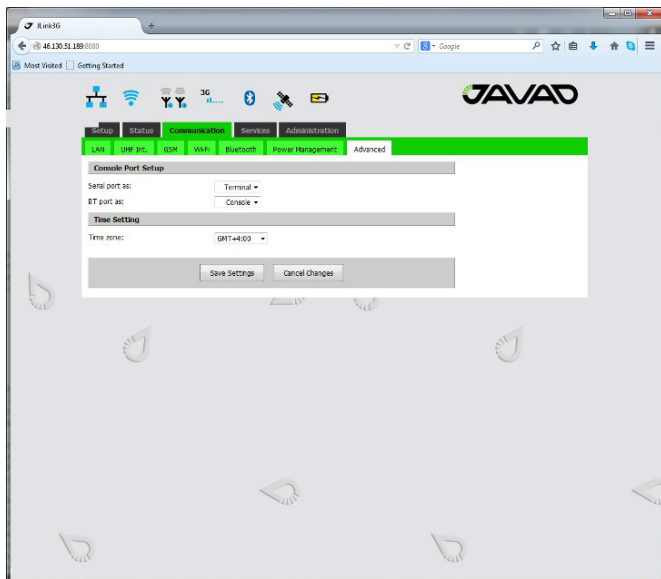
Figure 9.   Advanced configuration tab

How to setup JLink 3G to provide RTK data received via NTRIP Client to Serial Port

The following are the steps of configuration of JLink 3G:

1. Connect to JLink 3G via web interface as described above.

2. Configure the Cellular (GSM):
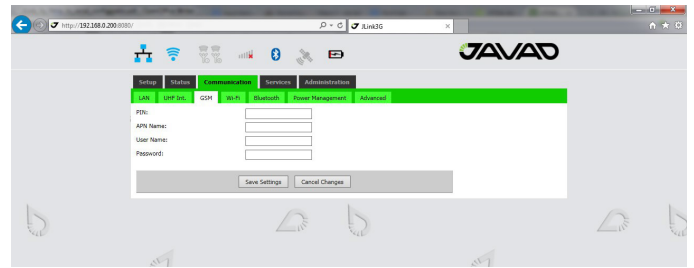 • In the *Communication/GSM* tab set the PIN code and APN parameters (if necessary);

Figure 10.   JLink 3G 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.
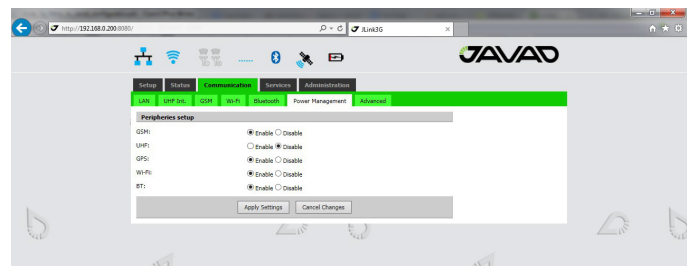• In the *Communication/Power Management* tab activate the GSM interface.

Figure 11.   JLink 3G Power Management tab

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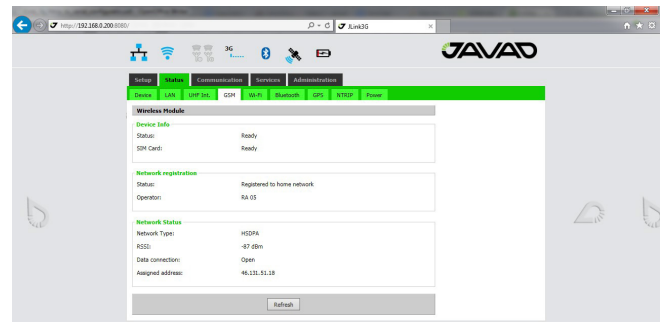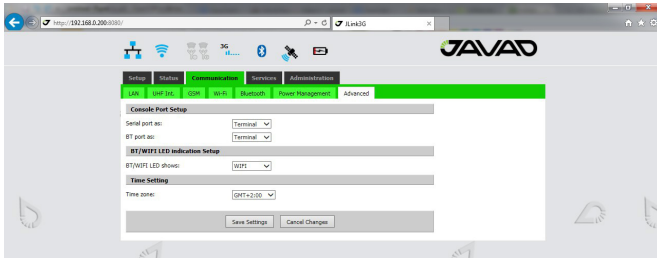

Figure 12.   JLink 3G GSM Status tab

It is possible also to connect JLink 3G 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.
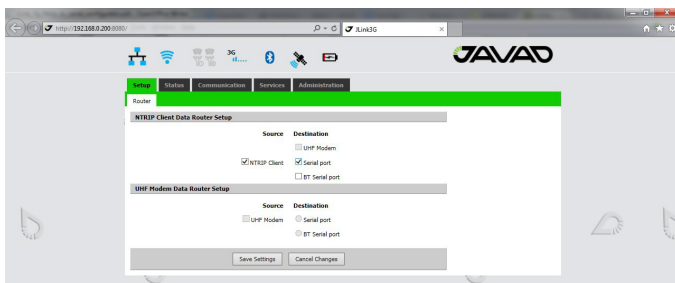
Figure 13.   JLink 3G Advanced tab

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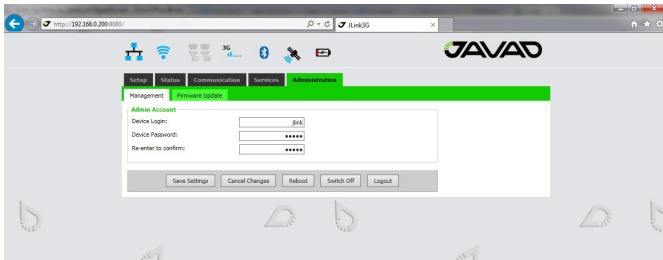

Figure 14.   JLink 3G Administration Management tab

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 15.   JLink 3G NTRIP Data Router tab

6. Setup NTRIP Client. In the Services/NTRIP tab set following parameters: "Server name/address", "Port", "User" , "Password" .
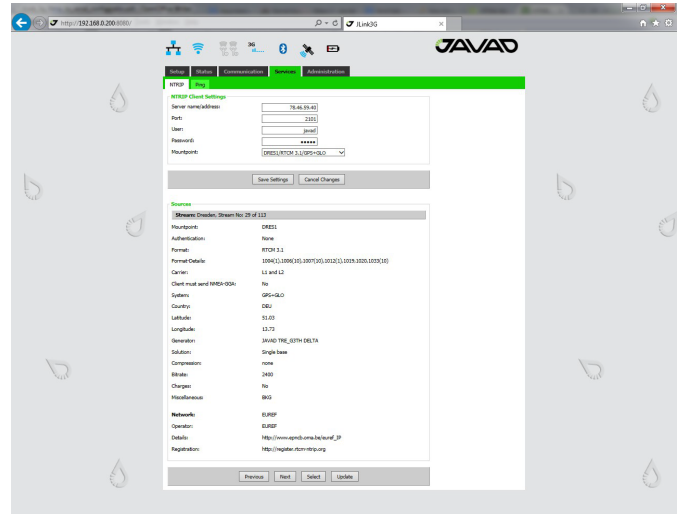
Figure 16.   JLink 3G NTRIP configuration tab

- Click "Save Setting" button and wait until finish.
- Click '"Update" button and select "Mountpoint" .
- Click "Save Setting" button and wait until finish. Detailed connection status you can check in Status/NTRIP tab:
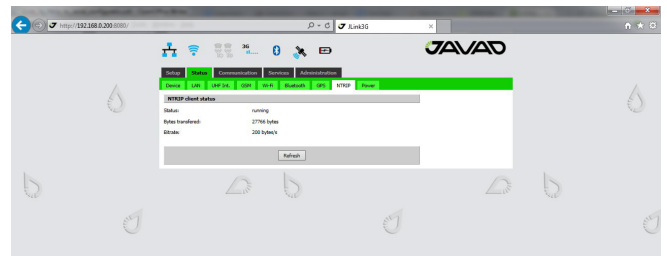
Figure 17.   JLink 3G Status NTRIP tab

7. Connect Serial Port. se any application to connect serial port of JLink 3G with following parameters:

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

How to setup JLink 3G to provide RTK data received via UHF channel (in Satel mode) to Serial Port

The following are the steps of configuration of JLink 3G:

1. Connect to JLink 3G 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
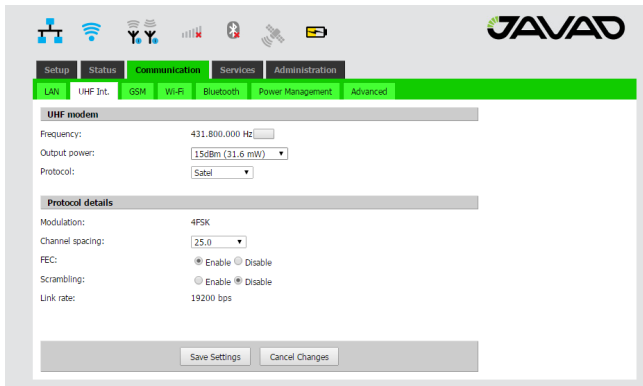 • verify FEC (Forward Error Correction) state is correct

Figure 18.   JLink 3G UHF parameters configuration tab

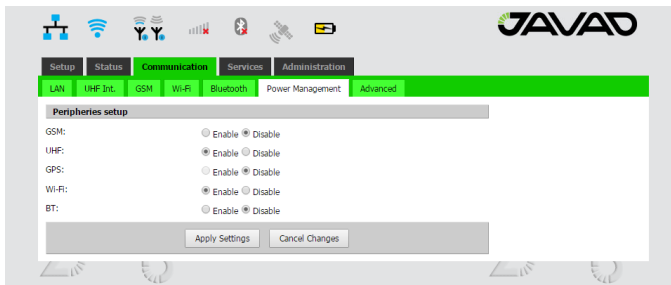◦ In the Communication/Power Management tab activate the UHF interface:

Figure 19.   JLink 3G Power Management tab

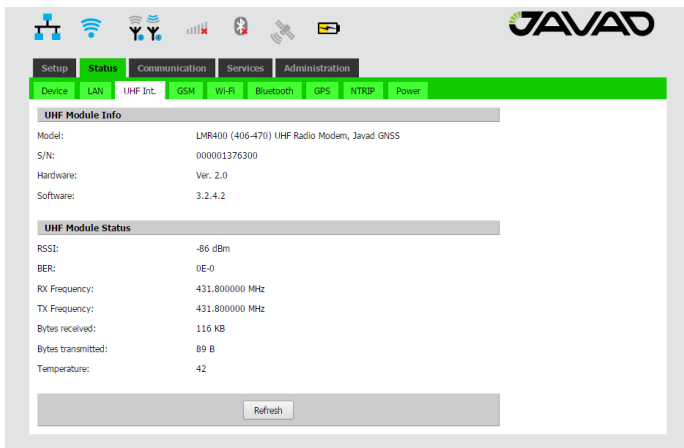◦ Detailed connection status you can check in Status/UHF int. tab

Figure 20.   JLink 3G 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.
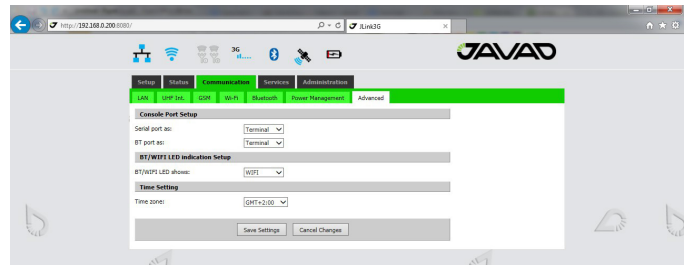
Figure 21.   JLink 3G Advanced tab

4. Reboot device

◦ In the Administration/Management tab click "Reboot" button and wait until reboot.
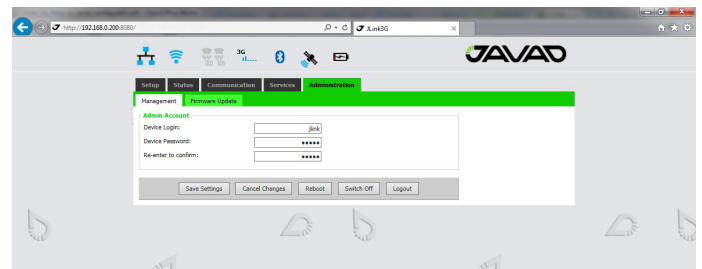
Figure 22.   JLink 3G Administration Management tab

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 23.   JLink 3G UHF Modem Router tab

6. Connect Serial Port

◦ Use any application to connect serial port of JLink 3G with following parameters:

▪ Baudrate 115200

▪ Parity none

▪ Data Bits 8

▪ Stop Bits 1

▪ Handshake hardware

How to configure TRIUMPH-2 and JLink 3G to provide TRIUMPH-2 services through Internet

In this configuration JLink 3G will share its internet connection (established by GSM interface) with TRIUMPH-2 connected to JLink 3G as a WiFi client.
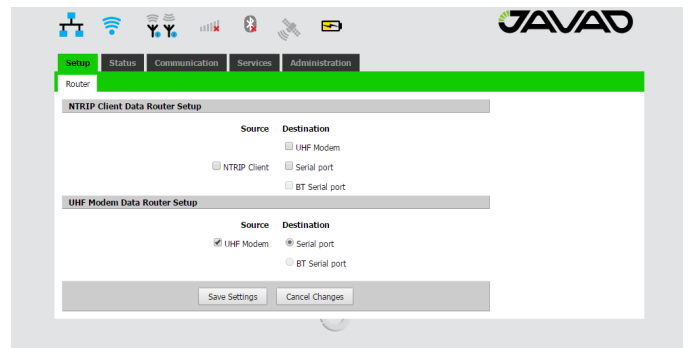
The following are the steps of configuration of JLink 3G:

1. Connect to Jlink 3G via web interface (For more detail see document "Jlink 3g Getting Started").

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.
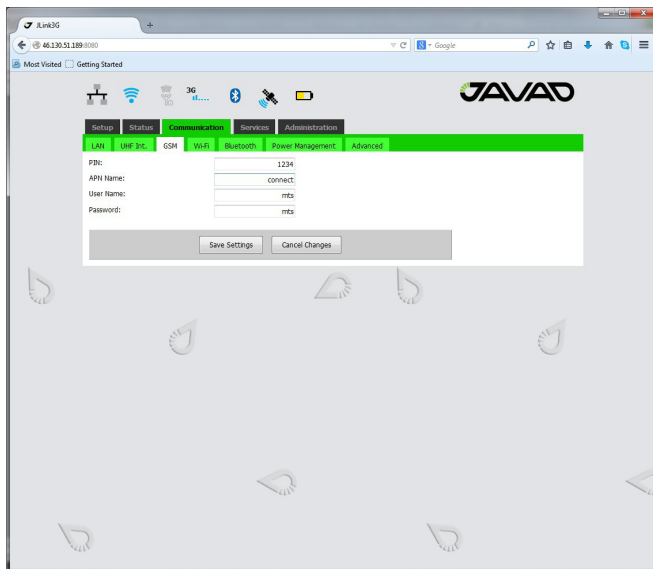

Figure 24.   JLink 3G GSM configuration tab

3. Setup WiFi configuration
• In the Communication/WiFi tab click on "Set AP mode" button to switch the interface to the AP mode and set following AP parameters: SSID(WiFi Acsses pointname), Protection(WPA2) and Security passphrase("password") .
• In theCommunication/Power Managment tab turn the WiFi interface on.

• Detailed connection status you can check in Status/WiFi tab.
• Here JLink 3G provides port forwarding mechanism from internet (GSM interface) to WiFi clients.
• Port forwarding mechanism works in a following way: JLink 3G receives data from internet and redirects it to its WiFi clients. Data packets received by 1110-1119 ports will be redirected to Wi-
• 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 redirected data of JLink 3G the Triumph2 unit should be connected to JLink 3G through
• WiFi interface and TRIUMPH-2's IP address should be set 10.1.10.110 or 10.1.10.120. (the default gateway is 10.1.10.1).
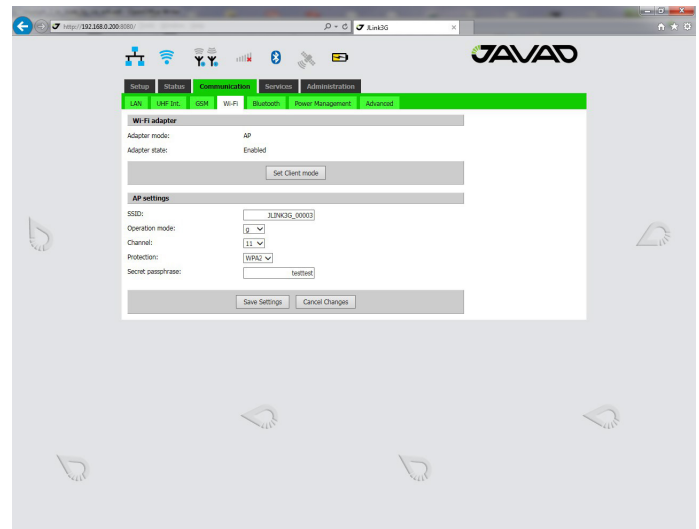
Figure 25.   JLink 3G WiFi configuration tab

TRIUMPH-2 configuration steps are the following:

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

2. Click *Connection*, select the connection using port, specify the COM port the receiver is connected to. Click *Connect* to connect to the receiver.
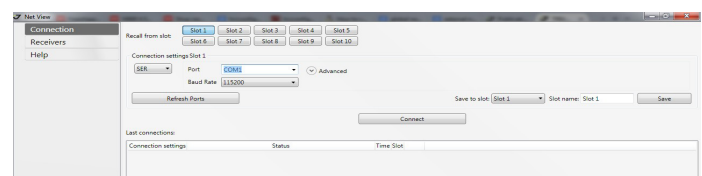
Figure 26.   NetView connection tab

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 27.   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 JLink 3G), WLAN AP mode(wpa).

• Set the WPA parameter: WLAN WPA Passphrase (enter passphrase of JLink 3G).

• Set the WLAN Mode to on Click *Apply*.

Figure 28.   NetView WLAN configuration tab

After Restating the device you can check WiFi connection on web interface Status/WiFi tab of web interface of JLink 3G.

Figure 29.   JLink 3G WiFi status tab

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

Specifications

3.5 G Module

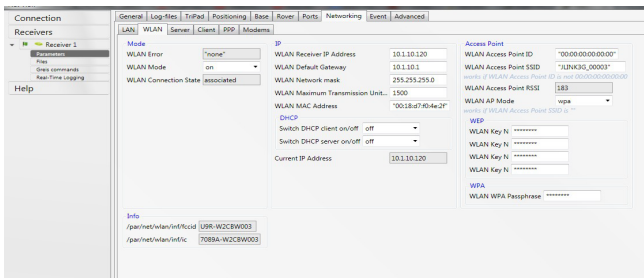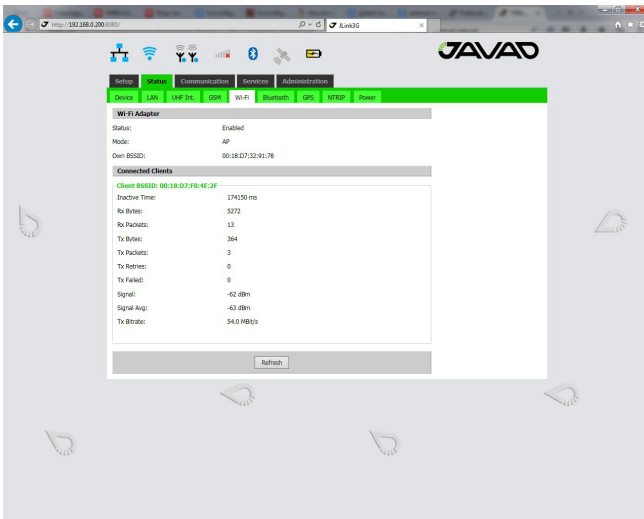|	
Supported frequencies	GSM/GPRS/EDGE: 850, 900, 1800, 1900 MHz UMTS/HSPA: 800/850, 900, AWS1700, 1900, 2100 MHz
Data	HSPA category 6 in uplink and up to category 14 in downlink - Uplink up to 5.76 Mbps - Downlink up to 21.0 Mbps UMTS - Uplink/Downlink up to 384 kbps EDGE - Uplink up to 236.8 kbps - Downlink up to 296 kbps GPRS CSD
SIM card slot	One microSIM card can be used; user accessible, fully sealed

UHF/VHF Radio (optional)

Frequency Range	Frequency Range
Channel Bandwidth	Channel Bandwidth
Modulation	Modulation
Transmitter Output Power	Transmitter Output Power
Communication Mode	Communication Mode

ISM Radio (optional)

Frequency Range	902-928 MHz (USA)/ 915-928 MHz (Australia)/ 868-870 MHz (EU) with 25/12.5 kHz CS
Modulation	GMSK
Data Rate of Radio Interface (USA/Australia)	64000 bps
Data Rate Radio Interface (EU)	9600 bps
Transmitter Output Power	1W (+30 dBm)
Communication Mode	Half duplex, simplex, repeater

Beacon Receiver (optional)

Frequency Range	283.5- 325 kHz
User Data Rates	50, 100, 200 bps (manual or Auto selection)
Sensitivity	1.5 mV/m for 6 dB SNR (200 bps)

GPS Receiver

Tracking Channels	GPS 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

Enclosure	aluminum, IP67
Color	Two-tone Gray / Green
Operating Temperature	-40° C to +70° C *
Storage Temperature	-40° C to +85° C **
Humidity	100% condensing
Weight	468 g / 970 g
Power Supply Voltage	+5.5...36V without battery charging, 4Amax +12...34V when the battery is charged, 3.6Amax
Battery (optional)	One embedded, 7.2V, 5850 mAh

* The operating temperature of Li-Ion batteries is -20 ° C to+45° C
** The storage temperature range of Li-Ion batteries is -20 ° C to +60° C

Pinout of power and communication port

Pin #	Signal Name	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)

Pin #	Signal Name	I/O	Description
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

JAVAD GNSS receivers are designed for measuring and measuring related uses (that is, measuring coordinates, distances, angles and depths, and recording such measurements). 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.

Warning: The JLink 3G 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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