



Intuicom®

**RTK Bridge-M
Quick Start Guide**

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FCC Notification Statement (United States)

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 must be operated as supplied by Intuicom, Inc. Any changes or modifications made to the device without the express written approval of Intuicom may void the user's authority to operate the device.

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.



Note: Whenever any Intuicom module is placed inside an enclosure a label must be placed on the outside of that enclosure which includes the module's FCC ID

Product Safety Notices



Read all instructions before operating device.



Operate only in accordance with the law and this user guide. Any warranty will be void if the product is used in a way contradictory to the instructions in this manual or if the product has been opened or tampered with.



Only use Intuicom supplied cable assemblies, antennas and accessories.



Do not open or disassemble the device – could result in electric shock.



Be sure all antennas are correctly and securely connected before connecting power.



Power the RTK Bridge – M through only one port (P1 or P2) at a time.



Do not place unit where antennas risk contact with any electrical wires.



For indoor use only when using AC/DC adapter, for Indoor/Outdoor use when using a battery or other DC connection.



Any third party DC supply must be fused at no greater than 10A in-line.



Use caution to avoid electrical shock when connecting or disconnecting power cables. Connect the country specific power cable to the AC/DC adapter prior to connecting the power plug to power source/outlet.



Not all accessories may be authorized or legal in all countries or regions.

1 Product Overview

The Intuicom RTK Bridge-M is designed specifically for in-cab or on-machine applications such as Precision Agriculture and Machine Control. The RTK Bridge-M expands access to GNSS network RTK corrections for GNSS equipment and replaces the need for RTK base stations.

The RTK Bridge-M comes in a variety of configurations. Some of the options include:

- CDMA or HSPA/GSM/GPRS/EDGE/ network ready.
- Embedded L1 GPS or no Embedded GPS.

This allows you to choose from a wide range of deployment options, depending on your particular needs.

Other Key Features

- Connect to any NTRIP Caster and stream any data/messages/corrections, etc.
- Connect to Raw/Dedicated TCP Sockets (non NTRIP) with or without authentication.
- The RTK Bridge's embedded GPS can provide unit's position to the GNSS network server for individualized corrections or virtual reference station creation. Optionally enter a user supplied fixed location or stream GGA messages from an external connected source.
- Correction data stream available through a rear-panel RS232 serial port for either direct connection to equipment. A second serial port is provided to check status or configure the unit.
- Up to four configuration sets called "Profiles" that can be selected for use in the field – a profile contains configuration data such as server IP, port number, username, password, mountpoint, location, data port baud, etc.

1.1 RTK Bridge-M Front Panel



Figure 1-1: RTK Bridge-M Front Panel

- (1) Profile Select / Mode Select Button
- (2) Current Profile / Modem Signal Strength (Antenna Aiming Mode)
- (3) Status LEDs

1.2 Front Panel LEDs

There are 10 Green LEDs visible on the front panel (5) and (4).

PWR – When illuminated indicates that the unit is powered and has been turned on.

GPS:

LED	DESCRIPTION
Solid Green	Internal GPS is selected for use in the current Profile and is tracking.
Flashing Green	Internal GPS is selected for use in the current Profile, and the GPS is not tracking or Data Port is selected to receive GGA messages from an external GPS and either these messages are not being received, or the external GPS is not tracking.
Off	Either a Static position has been selected or the sending of a GPS position to the server is disabled.

SIG:

LED	DESCRIPTION
Solid Green	Indicates a strong cellular signal as sampled during the power-up/boot-up stage.
Flashing Green	Indicates a marginal cellular signal – communication may or may not be possible.
Off	Indicates a very weak or absent cellular signal – it is very unlikely communications will be possible.

MDM – Indicates a successful connection to the carrier's IP network (and thus the Internet).

SVR – Indicates a successful network connection to the IP socket (either RAW or NTRIP).

TXD – Indicates data being transmitted out the internal Intuicom Wireless Data Radio, and/or the Data port (2) on the front panel.

1 – 4 –In normal operation, the LEDs labeled 1-4 indicate the currently selected Profile. In antenna alignment mode, the LEDs are used as a bar graph to indicate cellular signal strength.

2 Getting Started

2.1 5 Steps to Started

There are 5 steps to get your RTK Bridge-M connected to the real-time network and operational:

1. Load the RTK Bridge-M Configuration Utility Software (Windows® based) on your PC.
2. Connect the RTK Bridge-M to the PC.
3. Activate your Verizon Wireless (CDMA) or install and configure for SIM (HSPA/GSM/GPRS/EDGE) carrier.
4. Proceed to Configuration and check operation.
5. Load your own Configuration and confirm operation.

2.2 Required Items to Get Started

Items you will need to begin using the Intuicom RTK Bridge-M include the following:

1. Intuicom RTK Bridge-M
2. RTK Bridge-M cable assembly with a P1 connection
3. Antenna for your cellular network
4. PC with serial interface to program the unit (loaded with RTK Bridge-M Configuration Utility)

In addition to these items, you will need the following information:

The IP address and port number of the Real-Time Network Server you wish to connect to;
The login information to make the connection (authorization, user name, password); and
Mount point on the Real-Time Network Server.

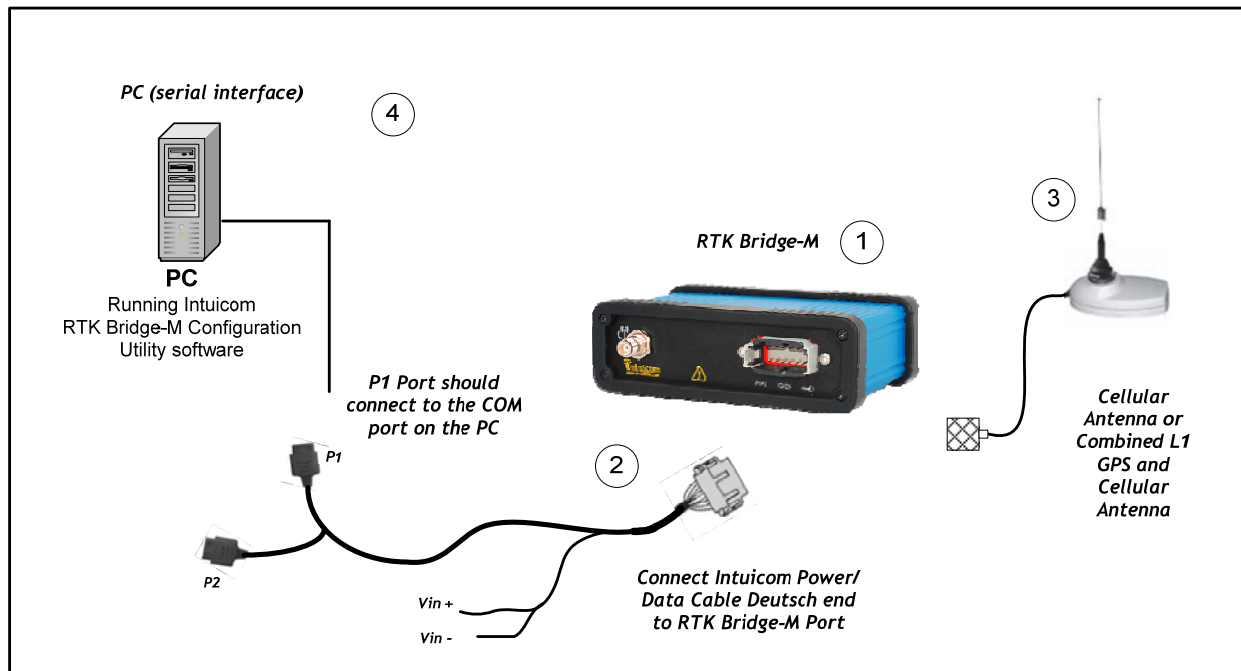


Figure 2.0: Getting Started

2.3 RTK Bridge-M Configuration Utility Software

The RTK Bridge-M Configuration Utility Software is included on a CD that shipped with your RTK Bridge-M. Install this software on your PC by simply copying this executable file to your desktop or to a folder. This software requires Microsoft's .NET files, which may require you to download them from the Microsoft website.

Once the RTK Bridge-M Configuration Utility Software is loaded and started, your monitor should display software as is shown in Figure 2.1.

The Software interface can be divided into two parts:

Live Status: Provides a Real-Time display of the status and operation of the RTK Bridge-M. This includes, but is not limited to: Profile selection, Cellular status, Connectivity to RTN.

Configuration: Provides the ability to set-up your RTK Bridge-M, Register/Activate your cellular connection, configure your login parameters, and more.

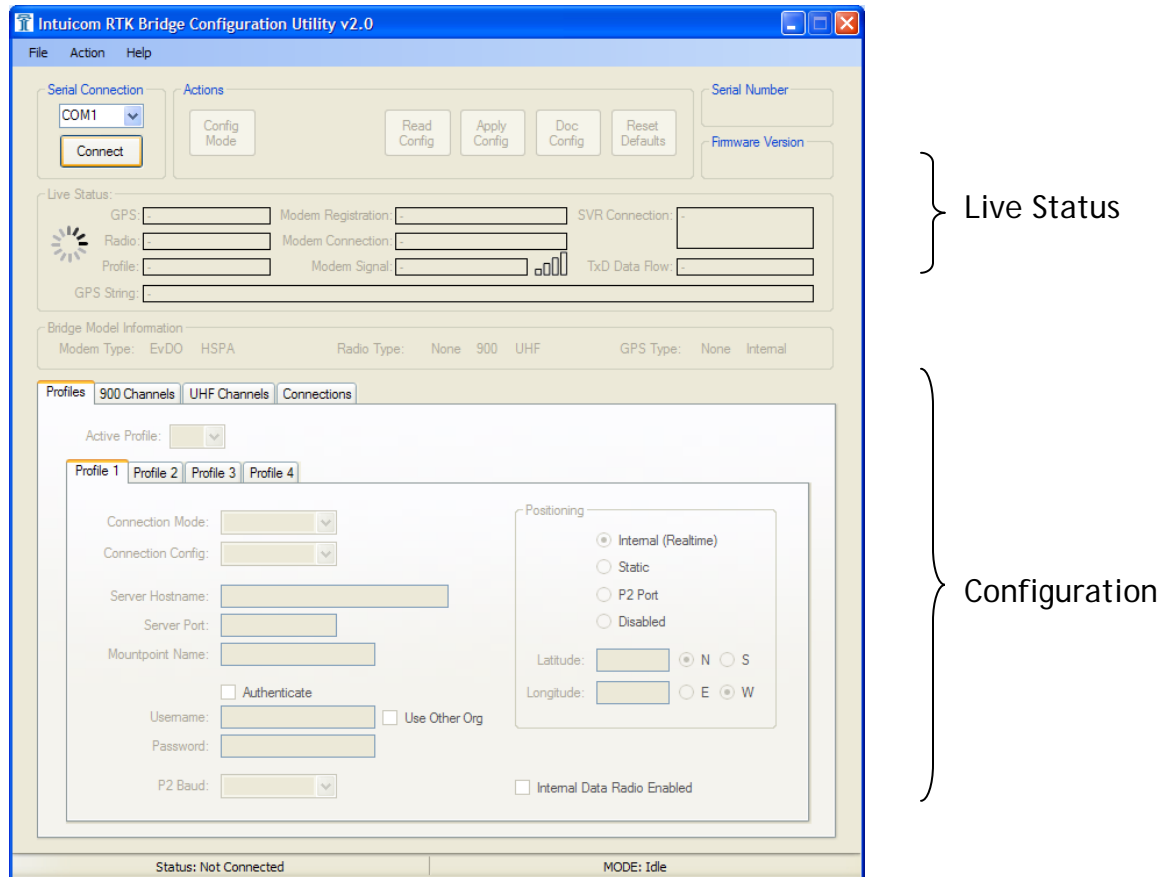


Figure 2.1: RTK Bridge-M Configuration Utility

Once the RTK Bridge-M is connected to a COM port on the PC (Port 1 on the cable assembly), you can connect the software to the unit by selecting the appropriate COM port and selecting “CONNECT” in the upper left corner of the interface. Follow this by applying power to the RTK Bridge-M.



Note: If you are connecting to a SIM-based RTK Bridge-M, this process requires that you have installed an active SIM with a valid data service plan.

Initially, the software will reflect the **Live Status** of the RTK Bridge-M unit. If you have not registered or activated the modem, the software will reflect that the Modem Registration is “Unknown” on the network and the other fields display in the **Live Status** section will reflect this non-registered/inactive state, see Figure 2.2.

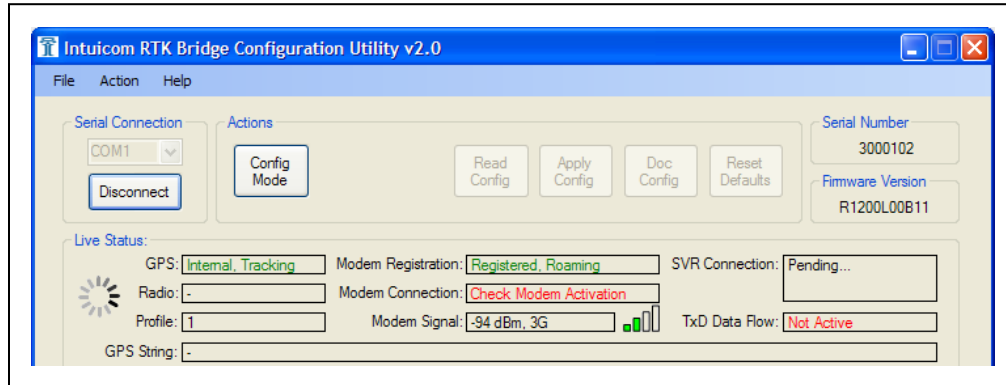


Figure 2.2: Initial LIVE STATUS screen of a non-registered RTK Bridge-M (Verizon Wireless model)

Once the connection is established, the first step is to activate your internal modem. To accomplish this, proceed to the configuration of the RTK Bridge-M. This will be accomplished by selecting the “CONFIG MODE” button at the top of the software interface. This will activate the *Configuration* portion of the software.

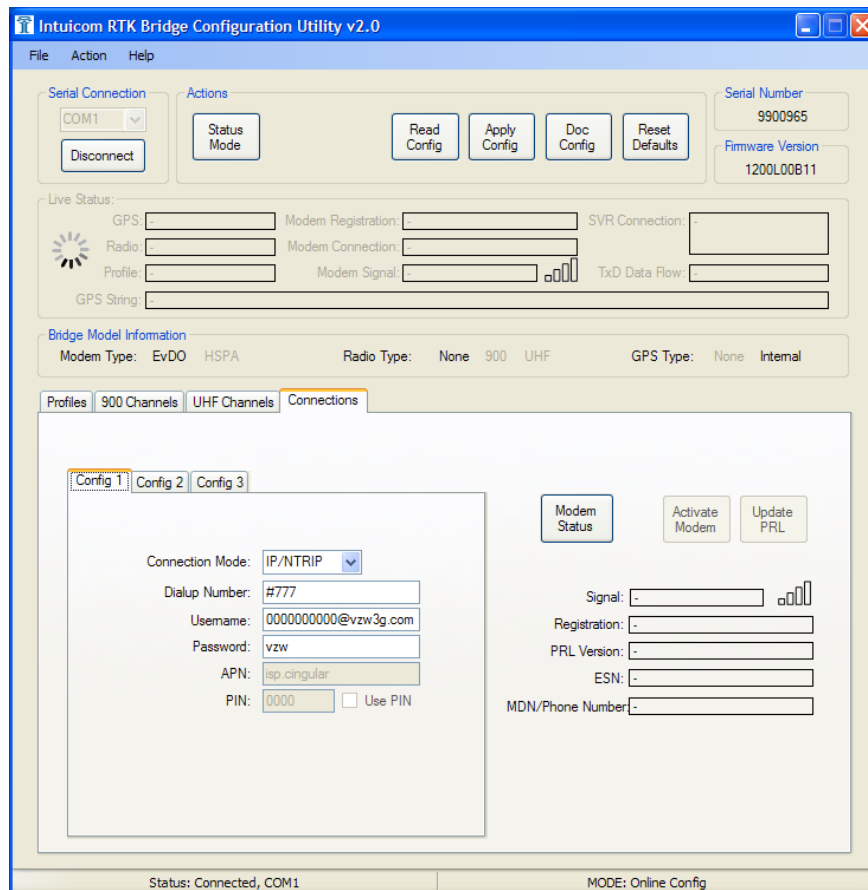
Currently the Intuicom RTK Bridge-M can be ordered with an embedded modem compatible with either Verizon Wireless (EVDO) or any SIM-based carrier such as AT&T or T-Mobile (HSPA/GSM/GPRS/ EDGE). At this point, we will divide the activation process into Verizon Wireless Activation and SIM-based Activation.

3 Wireless Activation

3.1 Verizon Wireless Activation

Intuicom's Configuration Utility software will automatically detect the RTK Bridge-M model it is configuring. The software will display the Modem type: "EVDO" which designates a Verizon Wireless model.

Operating the software, enter the Configuration Mode as noted above. Once in the Configuration Mode, proceed by selecting the "Connections" tab as shown in Figure 3.1.



Intuicom RTK Bridge Configuration Utility v2.0

File Action Help

Serial Connection: COM1

Actions: Status Mode, Read Config, Apply Config, Doc Config, Reset Defaults

Serial Number: 9900965

Firmware Version: 1200L00B11

Live Status:

GPS: [] Modem Registration: [] SVR Connection: []

Radio: [] Modem Connection: []

Profile: [] Modem Signal: [] Tx/D Data Flow: []

GPS String: []

Bridge Model Information

Modem Type: EvDO HSPA Radio Type: None 900 UHF GPS Type: None Internal

Profiles 900 Channels UHF Channels **Connections**

Config 1 Config 2 Config 3

Connection Mode: IP/NTRIP

Dialup Number: #777

Username: 0000000000@vzw3g.com

Password: vzw

APN: isp.cingular

PIN: 0000 ☐ Use PIN

Modem Status Activate Modem Update PRL

Signal: []

Registration: []

PRL Version: []

ESN: []

MDN/Phone Number: []

Status: Connected, COM1 MODE: Online Config

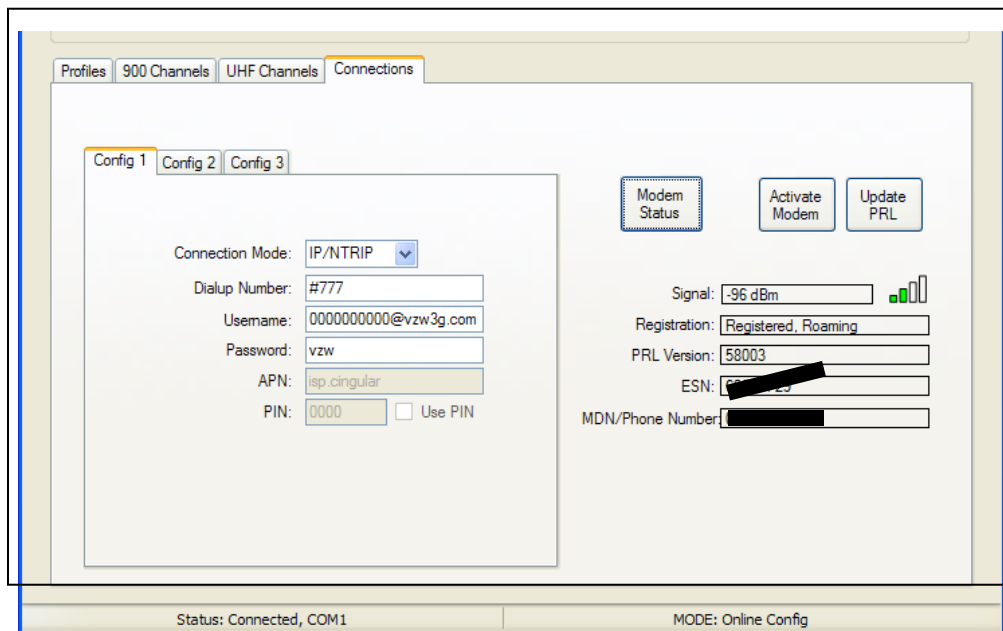
Figure 3.1: Initial CONNECTIONS screen for a Verizon Wireless RTK Bridge-M

On the Connections page, the Configuration #1 is pre-configured for Verizon Wireless. There is likely no change required here.

Next, select the “Modem Status” button to the right. This will connect and display the most current status of the internal modem. Typical information is shown in Figure 3.2.

Modem status provides the following information:

- Signal Strength- Current signal strength to the Verizon Wireless network
- Registration Status- Initially this will display registered, roaming if in cellular network coverage
- PRL Version-current table of cell towers
- ESN- Electronic Serial Number- specific to each unit
- MDM/Phone Number –specific to each unit



The screenshot shows a software interface with a top navigation bar containing 'Profiles', '900 Channels', 'UHF Channels', and 'Connections'. The 'Connections' tab is selected. Below this, there are three sub-tabs: 'Config 1', 'Config 2', and 'Config 3'. The 'Config 1' tab is active, displaying a form with the following fields: 'Connection Mode' (set to 'IP/NTRIP'), 'Dialup Number' (set to '#777'), 'Username' (set to '0000000000@vzw3g.com'), 'Password' (set to 'vzw'), 'APN' (set to 'isp.cingular'), and 'PIN' (set to '0000'). There is a checkbox for 'Use PIN' which is currently unchecked. To the right of the configuration form, there are three buttons: 'Modem Status' (highlighted with a blue border), 'Activate Modem', and 'Update PRL'. Below these buttons, the modem status is displayed: 'Signal: -96 dBm' with a signal strength indicator, 'Registration: Registered, Roaming', 'PRL Version: 58003', 'ESN: [REDACTED]', and 'MDN/Phone Number: [REDACTED]'. At the bottom of the window, a status bar shows 'Status: Connected, COM1' and 'MODE: Online Config'.

Figure 3.2: Verizon Wireless Initial Modem Status Display

3.1.1 Contacting Verizon Wireless to Activate an Account

For a Verizon Wireless version of the RTK Bridge-M, data service will need to be established by contacting a Verizon Wireless customer service representative:

Business Sales: 800-899-4249

Government Sales: 800-293-3048

Customer Service: 800-922-0204

Provide the Verizon Wireless representative with the Intuicom RTK Bridge – M ESN# noted in the software or on the product label. Select the appropriate Data Plan.

- 250 MB / month: \$39.99
- 5 GB / month: \$59.99

Typical usage of the RKT Bridge-M will require only a 250 MB/month plan. Very heavy data users may require the larger data plan. For more details on the data usage of the RTK Bridge, please see the complete RTK Bridge Manual which outlines data usage and data plan recommendations in greater detail.



Note: Intuicom does not recommend attempting to activate the device at a Verizon Wireless retail location. Verizon Wireless also recommends against this approach.

3.1.2 Activate the RTK Bridge-M on Verizon Wireless

Once you have contacted Verizon Wireless and set up your account, they will proceed with the over-the-air (OTA) activation. This requires no action on your part other than selecting the “Activate Modem” button on the software when you have completed your call with Verizon Wireless. Selecting this button will produce a prompt to confirm this activation process and that it will take three (3) minutes-during which time the RTK Bridge-M cannot be powered off.

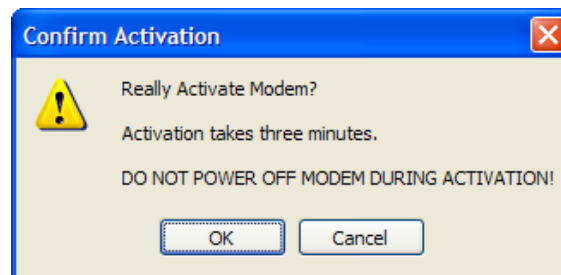


Figure 3.3: Verizon Wireless Activation Prompt

Once the Activation process is completed, you will get a Window confirming the completion of this activation process, Figure 3.4. Next, proceed to the Confirmation of Activation and Operation section of this document to confirm proper activation and operation of the Intuicom RTK Bridge-M.

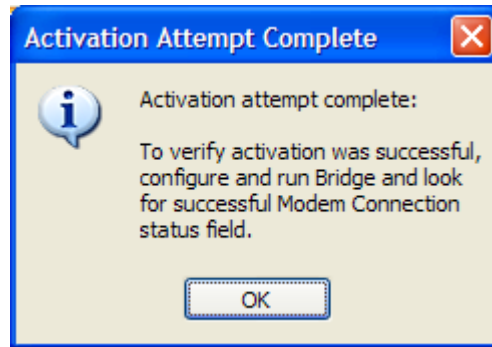


Figure 3.4: Verizon Wireless Activation Prompt

3.2 SIM-Based Activation (i.e. AT&T, T-Mobile, etc.)

The RTK Bridge-M supports carriers such as AT&T, T-Mobile, Telus and more with its embedded SIM-based HSPA/GSM/GPRS/ EDGE modem. Activation of the RTK Bridge-M (SIM-based) requires the following:

- A SIM card enabled for data service
- The APN (Access Point Name) of the carrier

Some carriers may require specific details such as user name and password to access their network.

The first step in the SIM-based activation is to insert the SIM card into a non-powered RTK Bridge-M. Then you can power up and connect to the unit with Intuicom's RTK Bridge-M Configuration Utility software.



Note: Inserting or Removing a SIM from a powered up RTK-M Bridge may result in damage to the RTK Bridge-M and the SIM itself.

Intuicom's Configuration Utility software will automatically detect the RTK Bridge-M model it is configuring. The software will display the Modem type: "HSPA" that designates a SIM-based model.

Operating the software, enter the Configuration Mode as noted above. Once in the Configuration Mode, proceed by selecting the "Connections" tab as shown in Figure 3.5.

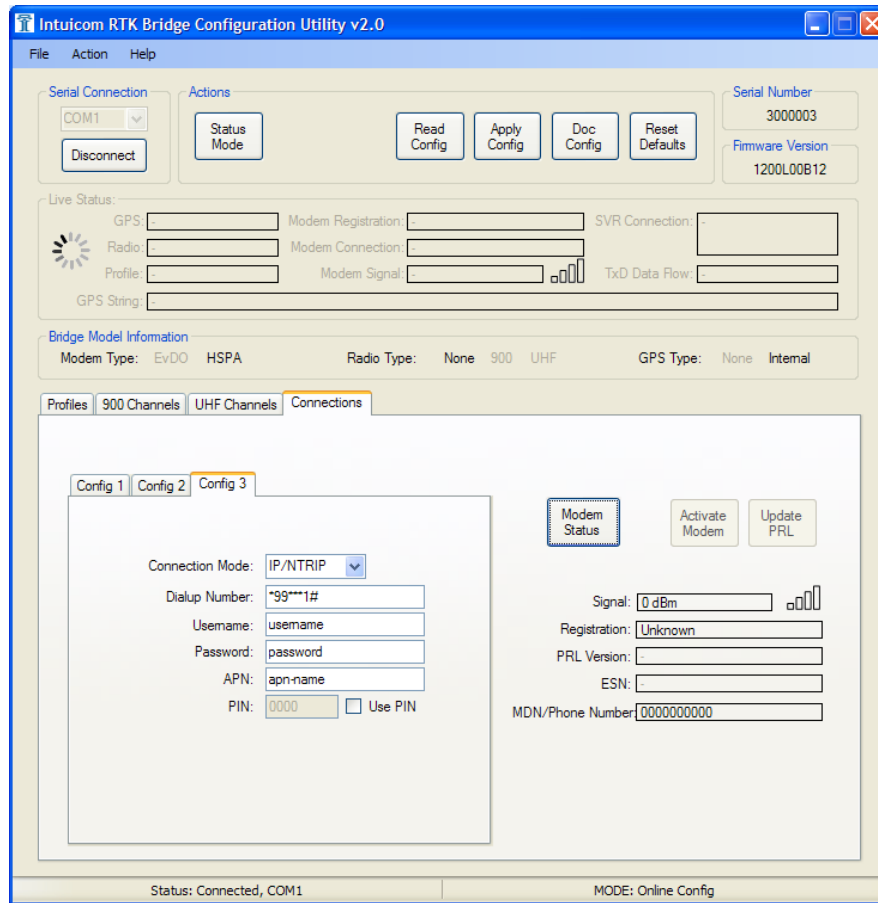


Figure 3.5: Initial CONNECTIONS screen for a SIM-based RTK Bridge-M

On the Connections page, the Configuration #1 is pre-configured for AT&T, but may be altered if you require a different APN or other parameters. Please enter or confirm your parameters. Any changes you make in the software is not loaded onto the RTK Bridge-M until you select the “Apply Config” button at the top of the software (Figure 3.6)



Note: Selecting the APPLY CONFIG button is required to load/store any configuration changes to the RTK Bridge-M.

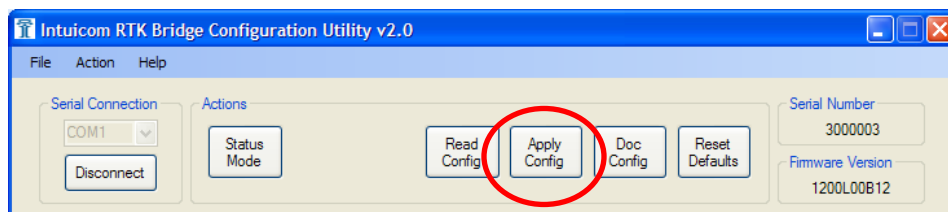


Figure 3.6: “Apply Configuration” Loads the Configuration onto the RTK Bridge-M

The RTK Bridge-M also offers the ability to store two more unique carrier configurations (Configurations #2 and #3). These configurations are selected in the PROFILE set up which is discussed later in this document.

4 Confirmation of Activation and Operation

Confirmation of Activation and proper operation of the RTK Bridge-M is easily accomplished with Intuicom's Configuration Utility software. While in the Configuration Mode, select the "PROFILES" tab. In the Profiles menu, there is a pull down for the "Active Profile", select Profile #4. See Figure 4.1. Profile #4 is pre-loaded with the proper settings to connect with Intuicom's Real-Time Network server.

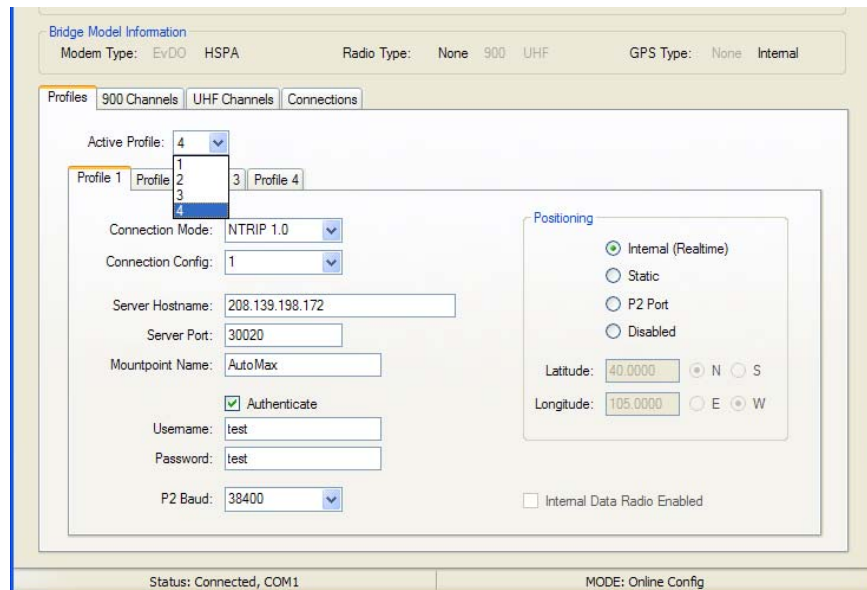


Figure 4.1: Active Profile Selection >> #4 in the Configuration Mode

With Profile #4 selected, click on the "Apply Config" button as shown in Figure 3.5. Next, proceed by selecting the "Status Mode" button to enter the LIVE STATUS mode of operation. This selection will bring up a reminder window to confirm you have "Applied Config" and that you are exiting the Configuration Mode (Figure 3.8).

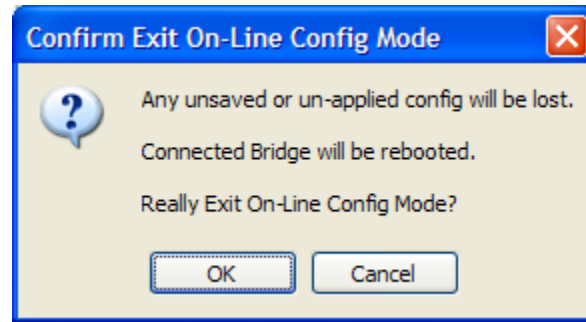


Figure 4.2 *Reminder to Confirm the Exit of Configuration Mode*

Selecting the Live Status mode will cause the RTK Bridge-M to re-start. Take notice that the profile #4 is being utilized as is indicated by the #4 Profile LED blinking during this initial re-start.

Allow a few moments for the RTK Bridge-M to proceed through its start-up process. During this time, note the Live Status fields will be updating. Positive outcome is presented as follows:

1. The “MODEM CONNECTION” will read “Established” if the internal modem is activated and properly configured.
2. The “SVR CONNECTION” reads “Successful Connection” indicating the RTK Bridge-M is fully operating, utilizing the Profile #4 which connects to Intuicom’s Real-Time Server.
3. The “TxD DATA FLOW” displays “Active” indicating corrections are being sent out from the RTK Bridge-M.

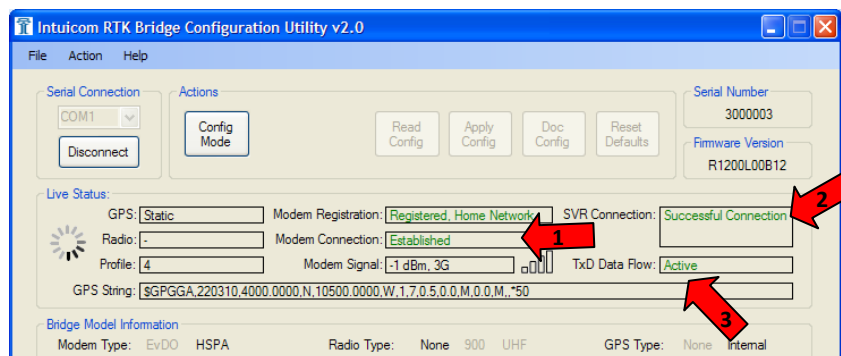


Figure 4.3 *Live Status demonstrating successful operation*

5 Configuration

The Intuicom RTK Bridge-M is configured with the use of the Intuicom Configuration Utility Software. Using the software as we have in the previous set up and activation steps, the configuration is easily accomplished. At this point we have already established and configured our cellular “Connection Configurations” that allowed us to operate the RTK Bridge-M with the default profile #4. Next, we will proceed to set up a profile specific to your application.

5.1 Configuration Profiles

The Intuicom RTK Bridge – M stores four Configuration **Profiles** of which, one can be active at a time. A Configuration Profile contains the necessary parameters for connecting to a data stream of RTK correction messages and forwarding them out the data port to a GNSS Rover.

Prior to configuration, it is helpful to have the following pieces of data available:

Connection Mode: NTRIP, RAW TCP, IBSS, NTRIP2

Connection Config: This is the Connection Configuration # (1-3). Previously we set up Connection #1

Server Host Name: IP Address of the Real-Time Server

Server Port: Server Port Number

MountPoint Name: Name of the MountPoint you will connect to (case-sensitive)

User Name: If authentication is required, you will need to have a user-name

Password: If authentication is required, you will need to have a password

P2 Baud Rate: baud rate must match up with the equipment you are connecting to

GPS: If GPS is required, select the appropriate GPS positioning method

These Configuration parameters are then entered or selected in the Intuicom Configuration Utility software as demonstrated in Figures 5.1.

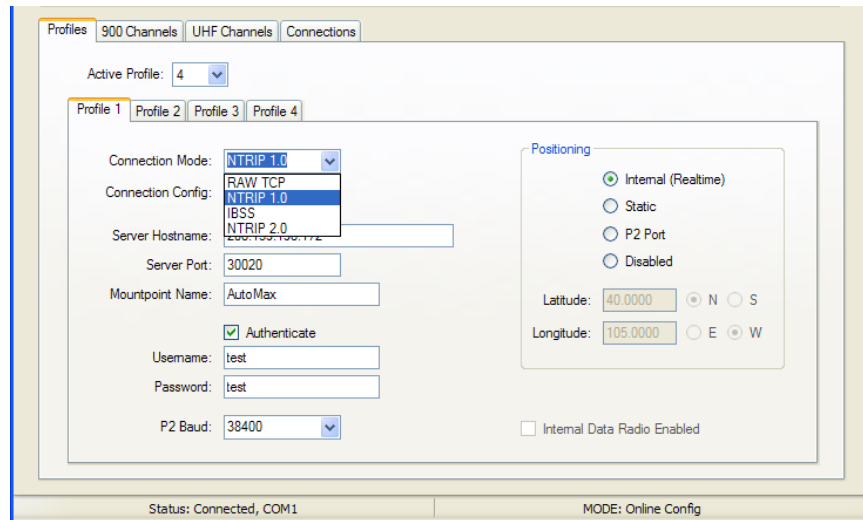


Figure 5.1 Selecting Connection Mode in the Configuration Mode

Once you have completed entering the profile parameters, you must select the “Apply Config” button at the top of the page to load these setting onto the RTK Bridge-M.

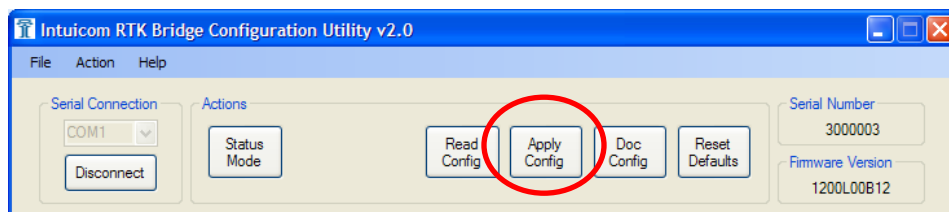


Figure 5.2 “Apply Config” Loads the Configuration onto the RTK Bridge-M

Next, select the status mode which will restart the RTK Bridge-M. Confirm proper operation as stated in Section 4- Confirmation of Activation and Operation. Successful operation will be displayed in the Live Status page as well as on the front panel of the RTK Bridge-M.

Refer to the Primary Manual for additional information regarding your RTK Bridge Product.

Technical Support

Contact Intuicom:

email: support@intuicom.com

Phone: 303-449-4330 – request technical support for the RTK Bridge