



**GW3-TRBO®**  
**Trbo Quickstart Guide**  
**Software Version 2.17.4**

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***GW3-TRBO®***



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Refer to the GW3-TRBO Manual Overview for your full license. All license information contained on pages 4-7 (Book 600-2.17.4-AA.1) are to be considered as contained herein.

## Support

Customer satisfaction is our number one priority at Genesis. We are here to provide you with the best software possible, and we want to know when you have any questions, concerns or problems with GW3-TRBO so that we can make it a better product for everyone.

Refer to the *Troubleshooting & Support* section of the GW3-TRBO Manual Shell (Book 600-2.17.4-AA.1) for complete support and contact information.

## **Document History**

<b>Revision</b>	<b>Description</b>	<b>Author</b>
2.0.5	Initial Release	CBH
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2.10	Revisions Before Release	REB
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2.13	Revisions Before Release	ATG
2.14	Revisions Before Release	JAW
2.15	Revisions Before Release	REB
2.16	Revisions Before Release	JPS

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### Goals

This document guides you through the GW3-TRBO connection setup process. After you complete the steps in this document, your GW3-TRBO installation will be configured to receive data from your MOTOTRBO Network.

### Who Should Read This Manual?

This document is written for an audience with an understanding of computer and network administration. Specifically, it is for those who have purchased GW3-TRBO.

### How This Manual Is Organized

This manual is organized as follows:

- **Configuring the Trbo Module:** Instructions on setting up a connection to a MOTOTRBO Network.

This manual contains the following images, used to indicate that a segment of text requires special attention:



**Additional Information:** Additional information is used to indicate shortcuts or tips.



**Warning:** Warnings are used to indicate possible problem areas, such as a risk of data loss, or incorrect/unexpected functionality.





## What is Trbo?

The Trbo module receives and decodes packets from a MOTOTRBO™ radio system. Trbo can receive packets from an IP network or a radio set up as a control station to listen for call activity. Each packet source is accessed via a Trbo connection. The Trbo GUI shows the current configuration of each of your Trbo module connection(s).

The number of connections you can create within the Trbo module is limited by your license. Please contact GW3-TRBO Support with questions regarding licensing for additional connections.

## Loading the Trbo GUI

Launch the Trbo GUI by following the steps below:

1. Start Launch (see *GW3-TRBO Core Manual*).
2. Locate the Trbo module icon in the **Modules** list.
3. Double-click the Trbo icon: This will load the Trbo GUI.

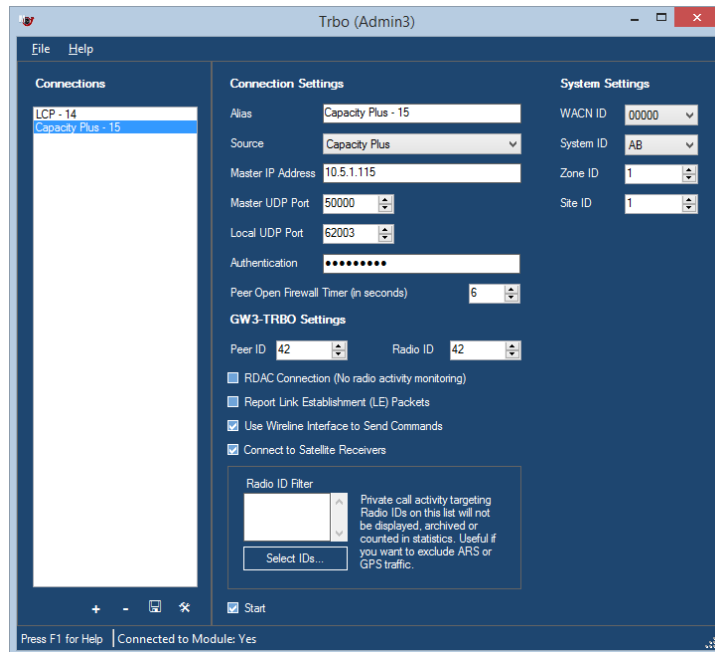
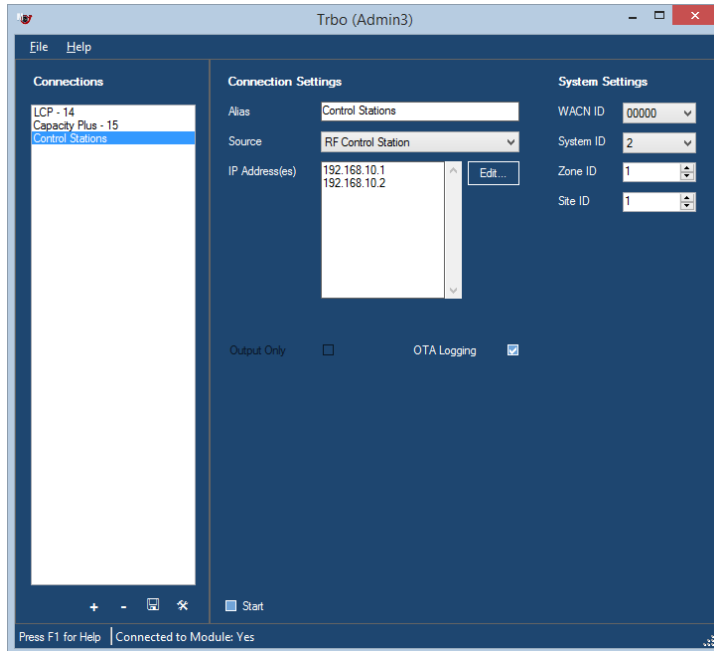


Figure 1.1 – Trbo GUI for an IP Connection



**Figure 1.2** – Trbo GUI for an RF Control Station connection

## Adding Trbo Connections

When the GW3-TRBO application is installed, no connections exist. You must create a connection to receive Trbo data. To create a new connection, follow the steps below:

1. Click the **Add** button toward the bottom left of the GUI: This will create a new connection, named something similar to “New Connection 1” in the **Connections** list with default properties.
2. Change the properties in the **Connection Settings**.
3. Click the **Update** button to store the new connection.

## Connection Settings

- **Alias:** A name that describes this connection.
- **Source:** One of the following options:
  - **RF Control Station:** Select this option to connect to an RF control station for over-the-air monitoring or for sending radio commands.
  - **IP Site Connect:** Select this option to connect via Ethernet to an IP Site Connect system.
  - **Capacity Plus:** Select this option to connect via Ethernet to a Capacity Plus system.
  - **Connect Plus RDACs Collection:** Select this option to monitor repeater alarms on one or more Connect Plus systems via Ethernet.
  - **Linked Capacity Plus:** Select this option to connect via Ethernet to a Linked Capacity Plus system.
- **Master IP Address:** Static IP address of the master peer on the peer network.
- **IP Address(es):** IP Address(es) of the RF control station(s).

- **Master UDP Port:** The UDP port that the master peer uses to communicate with GW3-TRBO.
- **Local UDP Port:** The UDP port used by the GW3-TRBO host machine to communicate with the peer network. Specifying port 0 will allow the Trbo module to be dynamically assigned an available port.
- **Authentication:** The hexadecimal authentication key used by GW3-TRBO to connect to a MOTOTRBO peer network. All peers within the same repeater network must use the same authentication key. Valid characters are 0-9 and A-F. Up to 40 characters may be entered.
- **Peer Open Firewall Timer (in seconds):** Sets the amount of time between “keep-alive” packets sent by GW3-TRBO to each repeater. This setting should be set to the Peer Open Firewall Timer setting in the repeaters.
- **Output Only:** If checked, the RF control station connection will be used *only* to send radio commands from GW3-TRBO. GW3-TRBO will not monitor system activity over the control station radio. Check this option if you are using a control station to issue radio commands and an IP connection to monitor a Linked Capacity Plus system.
- **OTA Logging:** If checked, the control station radio will use Motorola’s OTA Logging feature to get a more complete view of system activity. This feature requires a radio using R01.06.00 or higher firmware.

## GW3-TRBO Settings

- **Peer ID:** The peer ID used by GW3-TRBO when connecting to the MOTOTRBO peer network. This ID must be distinct from every other peer on the network. If a duplicate peer ID exists on the system, it can cause severe connectivity issues on the repeater network.
- **Radio ID:** The radio ID used by GW3-TRBO when issuing radio commands on the MOTOTRBO radio network.
- **RDAC Connection:** If checked, the Trbo connection will not monitor radio activity, such as calls. The connection will be used only to report on diagnostic alarms from the repeaters.
- **Report Link Establishment (LE) Packets:** If checked, the Trbo connection will send LE packets to the other GW3-TRBO modules.
- **Use Wireline Interface to Send Commands:** If checked, the Trbo connection will use the wireline interface to send commands (call alert, IP console inhibit, etc.). To use this option, the Network Application Interface Data feature must be purchased by all repeaters in the network. This option requires R2.3 repeater firmware or higher.
- **Request Digital Backhaul Information:** (IP Site Connect only.) If checked, the connection will query each repeater as to whether it is a backhaul proxy. The connection will periodically send a request to any proxies found for their Backhaul Chain Status. Their status will be shown in Activity and the backhaul repeaters will be shown appropriately in SystemMap. When this option is checked, the **RDAC Connection** option

will be enabled automatically; see the warning in the *IP Site Connect* section for more information.

- **Connect to Satellite Receivers:** If checked, the Trbo module will connect to any satellite receivers on the system. Leave this unchecked if the system does not have any satellite receivers.
- **Voting Information Update Rate:** Specifies the rate at which voting repeaters provide voting status updates. Voting status updates will be provided only when a change in voting status occurs. This is a global option for the repeater and will affect other applications that are connected. The options are:
  - **None:** The voting repeater will not provide voting status updates.
  - **Normal:** The voting repeater will provide voting status updates at most every three seconds.
  - **Diagnostic:** The voting repeater will provide voting status updates at most once a second.
- **Emergency Shutdown Recovery Interval (mins):** If GW3-TRBO detects a network routing condition that may result in unstable performance on the repeater network, GW3-TRBO will disable its connection automatically. This setting specifies the amount of time (in minutes) after an emergency shutdown before the Trbo module will attempt to restart the connection. Please note that if the network problem persists, performance issues on the repeater network may occur briefly each time the connection restarts. Choose 0 for the interval to require a manual restart of the connection.
- **Call Timeout Timer (in seconds):** Calls will be timed out after the specified number of seconds. This prevents calls from appearing to never end if the end-of-call notification is not received over the network. This field should always be set at least a few seconds higher than the Time-Out Timer (TOT) value in your radio or repeater programming.
- **Radio ID Filter:** Allows you to choose to filter out private call activity targeting certain radio IDs. This can be useful to cut down on reporting of calls generated by data transmissions such as ARS data. Any call activity whose *target radio ID* is listed on the Radio ID Filter control will not be visible anywhere in GW3-TRBO.
- **Enable RSSI Debounce:** Enables the RSSI debounce feature. See the *RSSI Debounce Feature* section below.
- **Start of PTT:** RSSI Debounce milliseconds for start of PTT.
- **End of PTT:** RSSI Debounce milliseconds for end of PTT.
- **Enable “Expected Resource Not Found” Alarms:** Toggles whether to generate alarms when an “expected resource” is not found on the peer network.
  - “Expected resources” include:
    1. Any channel that has been defined in the Alias database under the connection’s zone and site(s), excluding those that are marked as **Offline** in the channel settings in Alias
    2. Connect Plus site controllers

- Diagnostics will be created under the following circumstances:
  1. Trbo fails to connect to the master peer for two minutes. This will generate diagnostics for all the connection's expected resources.
  2. The peer map provided by the master peer does not contain a channel identified in Alias.
  3. A repeater or controller disconnects from Trbo.
  4. The Trbo connection is stopped. This will generate diagnostics for all the resources connected at the time the connection is stopped.
- An active Expected Resource Not Found diagnostic will be cleared when any of the following conditions are met:
  1. Trbo connects to the resource.
  2. A user deletes the channel in Alias.
  3. A user marks the channel as **Offline** in Alias.
- **Start:** If checked, the Trbo module will start this connection when the module is started. If you want to retain the settings for a connection, but do not want to receive packets from the connection, uncheck this option. In most cases, this option should be checked.



The **Report Link Establishment (LE) Packets** option is useful for troubleshooting but can cause high CPU load. It should be unchecked for normal operation.



If the **Enable “Expected Resource Not Found” Alarms** feature is enabled and then later disabled, some “Expected Resource Not Found” diagnostics may remain active. If you wish to clear the diagnostics, you can mark the affected channels as Offline in the Alias GUI to clear all alarm states, then uncheck the Offline checkbox.

## RSSI Debounce Feature

The RSSI debounce feature prevents processing and archiving of invalid “ramp up” or “ramp down” RSSI values. The “ramp up” period is the time require for a repeater to go from idle to active RSSI power. The “ramp down” period is the time required for a repeater to go from active to idle power.

This feature applies only to *RDAC Radio Status Reply* packets containing RSSI values. If an RSSI RDAC Radio Status Reply packet is received for a slot within **Start of PTT** milliseconds of a start of a PTT on the slot, the RSSI value is discarded. Similarly, if an RSSI RDAC Radio Status Reply packet is received for a slot within **End of PTT** milliseconds of an end of a PTT on the slot, the RSSI value is discarded.

## System Settings

- **WACN ID:** Five-digit hexadecimal WACN ID assigned to your infrastructure. (These values are limited to the WACN IDs in your license.)
- **System ID:** Four-digit, hexadecimal system ID assigned to your infrastructure. (These values are limited to the systems in your license under the selected WACN ID.)
- **Zone ID:** Decimal zone ID (values 1-64). This logical zone ID allows the user to easily distinguish connections from each other.
- **Site ID:** Decimal site ID (values 1-128). This logical site ID allows the user to easily distinguish connections from each other. IP Site Connect, Linked Capacity Plus and RF Control Station (with **Output Only** checked) connections do not use a Site ID.
- **Licensed Sites:** The GW3-TRBO license restricts the number of Linked Capacity Plus sites that may be monitored by connections in the Trbo module. When creating an LCP connection, you must assign site IDs to the connection using your available site licenses. The **Licenses Remaining** counter will indicate how many sites may still be added. If the connection receives packets from a site that is not in the **Licensed Sites** list, they will be flagged as corrupt and will not be processed by GW3-TRBO.
  - To add a site, enter a site ID or a range of site IDs into the text entry field under the **Licensed Sites** list, then press Enter or click the **Add Site** button. Ranges may be specified with numbers separated by commas or hyphens. Examples of valid ranges: “1” or “1-5” or “1,6” or “1-3,7-10.”
  - To remove a site, select the site ID in the **Licensed Sites** list and click the **Delete Site** button. Alternately, you can select the site and press the Delete key or right-click the site and click the **Delete** option from the context menu.
  - To remove all sites from the **Licensed Sites** list, click the **Clear Sites** button.
  - To export the list of sites, right-click in the **Licensed Sites** list and click the **Export Sites to Clipboard** option from the context menu. This places the text into your Windows clipboard so it can be pasted into another connection or application.

## IP Peer Connections

In an IP peer connection, as used for an IP Site Connect, Capacity Plus, Linked Capacity Plus or Connect Plus system, all repeaters must be connected to the GW3-TRBO computer via UDP. The GW3-TRBO host must be connected to the same network.

GW3-TRBO will connect to the master peer repeater you specified in the Trbo module connection settings. No additional configuration is needed for GW3-TRBO to monitor activity on the other repeaters on the network.

## IP Site Connect

When connected via IP to an IP Site Connect system, GW3-TRBO can monitor all activity on your system and issue radio commands over the IP backbone, all in one connection.

To create an IP Site Connect connection, select **IP Site Connect** from the **Source** drop-down list and enter the settings detailed above.



IPSC systems using digital backhaul repeaters do not support the call monitoring interface that GW3-TRBO uses to monitor call activity. For these systems, GW3-TRBO can monitor and report on repeater diagnostic information only.

## Capacity Plus

Monitoring a Capacity Plus MOTOTRBO system using GW3-TRBO works in much the same way as on an IP Site Connect system.

To create your Capacity Plus connection, first create an IP connection using the option **Capacity Plus** from the **Source** drop-down list. Fill out the information for the IP connection.

## Connect Plus RDACs Collection

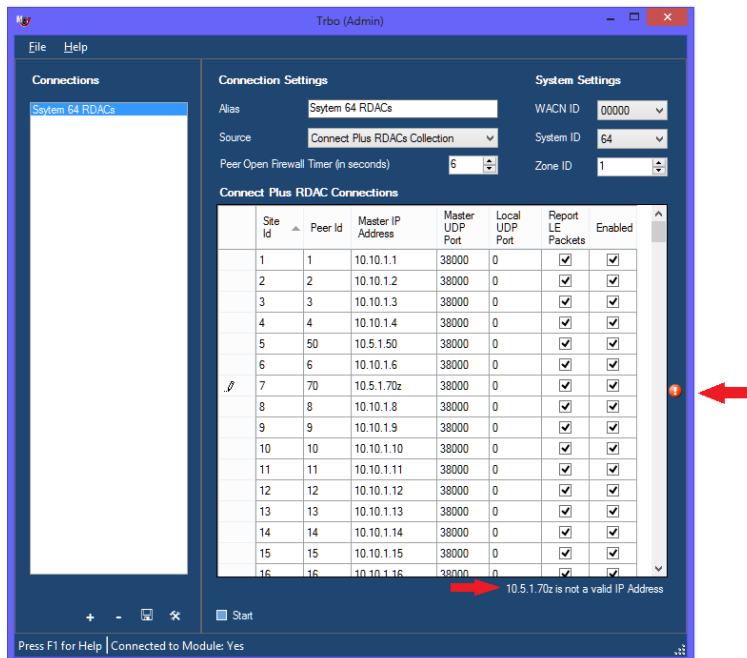
Trbo also can be used to monitor repeater alarms on a Connect Plus system. The Trbo module cannot interpret call activity on a Connect Plus system. To monitor call activity, see the *Connect Module Book* for information on setting up a Connect Plus connection.

To create a Connect Plus RDACs Collection connection, select **Connect Plus RDACs Collection** from the **Source** drop-down list and enter the settings detailed above. Each connection can monitor alarms on multiple sites. Enter the settings for each site in the Connect Plus RDAC Connections grid. All sites must be on the same LAN or VPN. For each connection, the **IP Address** field must contain the IP address of the XRC 9000 controller for the selected site. In each Connect Plus site, the XRC 9000 controller acts as the master repeater.

### Connect Plus RDACs Collection Grid

For Connect Plus RDACs Collection connections, the Connect Plus RDACs collection grid allows you to quickly and easily manage many Connect Plus RDAC connections.

Data entry on the Connect Plus RDACs collection grid is validated as you leave each edited cell. If validation for a cell's value fails, you will see the warnings indicated by red arrows in the image below. If you move your mouse over the red and white exclamation point icon, you will see the validation message shown in the text under the grid. Before you can leave the cell, you must correct the validation error, or press the **Esc** button on your keyboard to abandon the edit.



**Figure 1.3** – Trbo GUI for Connect Plus RDACs Collection

To add a Connect Plus RDAC Connection:

1. Navigate to the grid row with an asterisk in the far-left column.
2. Start typing in the grid row, use the **Tab** and **Shift + Tab** keys to navigate between columns.
3. Repeat for each new Connect Plus RDAC connection.
4. Click the **Update** button to save your changes.

To update a Connect Plus RDAC Connection:

1. Navigate to the grid row you wish to update.
2. Start typing in the grid row, use the **Tab** and **Shift + Tab** keys to navigate between columns.
3. Repeat for each Connect Plus RDAC Connection you wish to edit.
4. Click the **Update** button to save your changes.

To delete a Connect Plus RDAC Connection:

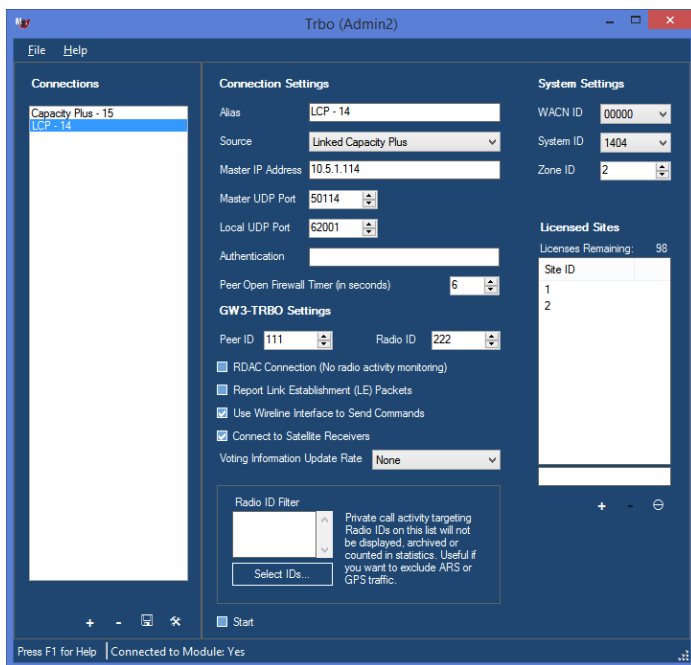
1. Click on the far-left column of the grid row you wish to delete. This will highlight the grid row.
2. Press the **Delete** button on your keyboard.
3. Repeat for each Connect Plus RDAC Connection you wish to delete.
4. Click the **Update** button to save your changes.



## Linked Capacity Plus

Monitoring a Linked Capacity Plus system works in much the same way as on an IP Site Connect or Capacity Plus system. However, to send radio commands over the IP connection, you will need to check the **Use Wireline Interface to Send Commands** option and purchase the Network Application Interface Data feature for all the repeaters on the network.

If your repeaters do not have the Network Application Interface Data feature, GW3-TRBO allows you to create an RF control station connection to be used in concert with your IP connection. The IP link will monitor the activity on your system, while the control station connection will be used only to issue radio commands from GW3-TRBO.



**Figure 1.4** – Trbo GUI for an LCP system with two sites

To create your Linked Capacity Plus connection, first create an IP connection using the option **Linked Capacity Plus** from the **Source** drop-down list. Fill out the information for the IP connection. In the *Licensed Sites* list, you must specify which site IDs you wish to monitor. The number of sites you may assign is limited by your GW3-TRBO license. See the *Connection Properties* section above for more information on assigning sites to a connection.

Next, create a second connection using the option **RF Control Station** from the **Source** drop-down list. Click the **Edit...** box to bring up a window where you can enter the IP address of the control station radio. (For more on control stations, see below.) Be sure to check the **Output Only** box—this will tell GW3-TRBO not to monitor your system with the control station and prevent duplicate activity from

showing up in GW3-TRBO. Finally, ensure that the **Zone ID** of your control station connection matches the zone setting of your IP connection.

## ***RF Control Station Connections***

### **What is a control station?**

A *control station* is an ordinary radio (portable or mobile) that has been physically connected to the GW3-TRBO host computer to listen to activity on a system.

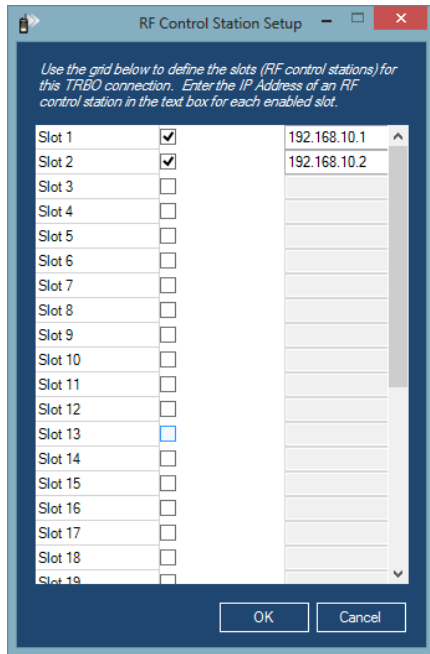
An RF Control Station connection in GW3-TRBO allows you to use an ordinary MOTOTRBO radio to monitor activity on your system. You may use either a portable or mobile radio for this purpose. A local connection to MOTOTRBO utilizes the same USB cable required for programming the radios with the Customer Programming Software (CPS); therefore, the MOTOTRBO radio must be located near the PC to connect the cable.

A control station is required for each timeslot you wish to monitor, and each control station can listen to activity on up to 16 talkgroups. If there are more than 16 talkgroups operating on a single timeslot, additional control stations must be connected. For example, if you have 32 talkgroups operating on two timeslots, then you will need two control stations for each timeslot – one to monitor talkgroups 1-16, the other to monitor talkgroups 17-32.



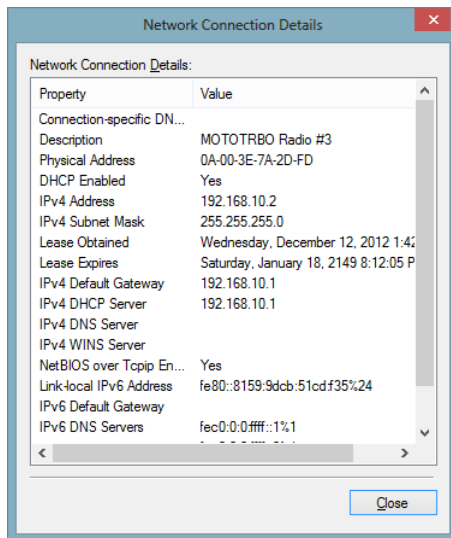
**Control station limitations:** A radio being used as a control station can monitor only activity on the timeslot and talkgroups for which it is programmed. For example, if the radio is programmed for Talkgroups 1 and 2, it will not decode a group call on Talkgroup 4. Control stations will never detect private calls unless the radio used as a control station is the target of the private call. To change the talkgroups monitored by a control station, update its group list in Motorola's Customer Programming Software.

To set up a control station connection, select the **RF Control Station** option from the **Source** drop-down list. Click the **Edit...** box to bring up a window where you can enter the IP addresses of the control station radios.



**Figure 1.5** –RF Control Station setup

If you do not know the IP address of the radios, go to the Windows **Control Panel** and select **Network and Sharing Center**. There will be a network for each radio plugged into the computer via USB. Click **View Status**, followed by **Details...**. Then copy the address contained in the *IPv4 Default Gateway* field.



**Figure 1.6** – Network Connection Details

## OTA Logging Feature

A radio that is using the R01.06.00 firmware version or higher can take advantage of MOTOTRBO's Over-The-Air Logging feature to receive a more complete view of radio system activity than is possible through a normal control station connection. Using OTA Logging allows a single control station to monitor all over-the-air activity — group or private, voice or data — on a single repeater timeslot.

One control station is required per logical channel to be monitored. Each control station must be programmed to listen for transmissions on the channel it will monitor and must be in range to receive those transmissions over the air.



To monitor a Capacity Plus system, the control station for each channel must be programmed as if it were monitoring an IP Site Connect channel. That is, it must be configured in CPS to use a Digital Channel instead of a Capacity Plus Voice Channel. This is necessary because a radio in Capacity Plus mode adjusts its listening frequency to follow the rest slot, which would result in missed activity.

To activate OTA Logging mode, check the box on the Trbo GUI labeled **OTA Logging**.

The table below compares the types of activity reported by a standard control station versus a control station using the OTA Logging feature.

Activity Type	Reported by Standard Control Station?	Reported by OTA Logging Radio?
Group Voice Call	Only if programmed to receive calls on the target talkgroup.	Yes
Private Voice Call	Only if the control station is the target of the call.	Yes
Group Data Call	No	Yes
Private Data Call	No	Yes
Radio Commands	Only if the control station is a party to the command.	Yes
Repeater Diagnostics	No	No

**Figure 1.7** – Comparison of radio activity reported by a standard control station versus an OTA Logging-enabled control station