





TRBOnet Enterprise/PLUS Linked Capacity Plus (Capacity Plus Multi Site) **Deployment Guide**

World HQ

Neocom Software 8th Line 29, Vasilyevsky Island, St. Petersburg, 199004, Russia

USA Office

Neocom Software 150 South Pine Island Rd., Suite 300 Plantation, FL 33324 USA

Sales

EMEA: +44 203 608 0598 Americas: +1 872 222 8726 APAC: +61 28 607 8325

www.trbonet.com

info@trbonet.com

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Contents

1	Introduction				
	1.1	About This Document			
	1.2	About TRBOnet1			
	1.3	Contacts1			
2	Syste	m Components and Terms2			
	2.1	TRBOnet Software			
	2.2	IP Connection (Wireline Connection)			
	2.3	Wireless Connection (Control Stations)			
	2.4	Using Routers			
3	Syste	n Topology3			
	3.1	Linked Capacity Plus without NAI3			
	3.2	Linked Capacity Plus with NAI7			
4	Config	guring MOTOTRBO Equipment9			
	4.1	Configuring a Repeater9			
	4.2	Configuring a Control Station15			
	4.3	Configuring a Subscriber Radio			
	4.4	Configuring MOTOTRBO DDMS			
	4.5	Configuring MOTOTRBO MNIS			
5	Config	guring TRBOnet Enterprise			
	5.1	Configuring TRBOnet Server			
	5.2	Configuring TRBOnet Dispatch Console			



1 Introduction

1.1 About This Document

The information in this guide is intended for administrators setting up evaluation and proof-of-concept deployments of MOTOTRBO Dispatch over IP solutions. The document describes the steps required to configure communication with a MOTOTRBO Linked Capacity Plus system.

For more comprehensive information on the Neocom TRBOnet family of radio network software tools, refer to the <u>Documentation section</u> of our web site.

1.2 About TRBOnet

TRBOnet is a suite of professional applications for MOTOTRBO digital two-way radio networks. TRBOnet manages voice and data communication paths across network endpoints. It provides a unified graphical dispatcher workbench interface for the entire range of workforce fleet management tasks.

1.3 Contacts

Region	Phone	Email & Support
EMEA	+44 203 608 0598	<u>info@trbonet.com</u> — general and commercial inquiries
Americas	+1 872 222 8726	<u>support@trbonet.com</u> — technical support
АРАС	+61 28 607 8325	<u>http://trbonet.com/kb/</u> — online knowledge base



2 System Components and Terms

2.1 TRBOnet Software

The TRBOnet software consists of several modules, a combination of which enables you to build enterprise dispatch solutions of different levels of complexity and redundancy. The first step in implementing the best solution is determining the topology for the customer's system; then identifying the combination of modules to implement the best customer solution.

2.2 IP Connection (Wireline Connection)

TRBOnet Server can be connected to a two-way radio system via an IP connection creating a direct communications path for all voice and data information between them. The topologies can be in the form of a LAN, WAN, or VLAN and/or any combination thereof.

2.3 Wireless Connection (Control Stations)

If TRBOnet Server doesn't have an IP connection to the radio system, it can be connected via control stations (also known as control radios or donor radios). The number of control stations depends on how many talk groups and revert channels are registered in your system.

2.4 Using Routers

All repeaters at a site must be on the same LAN, in other words, they must be behind the same router and plugged into the same network switch. It is strongly recommended that no other device be present on the LAN.



3 System Topology

Linked Capacity Plus (also known as Capacity Plus Multi Site) is a digital trunked multisite two-way MOTOTRBO system that enables you to accommodate high volume and wide area communication that is required for your business allowing you to connect via IP up to 15 single Linked Capacity Plus sites (including host PCs) located in one place or in separated territories. This system type allows you to increase the RF coverage area and the number of channels for voice and data transmission between the radio units and control centers. The main objective of Linked Capacity Plus is to support more simultaneous voice and data transmissions regardless of the distance.

Note that, according to the Motorola MOTOTRBO System Planner, all repeaters at a site must be on the same LAN, in other words, they must be behind the same router and plugged into the same network switch. Also note that each site in a Linked Capacity Plus system must be equipped with a router. In addition, the PC with TRBOnet Server must not reside on the same LANs with the repeaters.

3.1 Linked Capacity Plus without NAI

3.1.1 System with Trunked Control Stations

TRBOnet Server can be connected to a Linked Capacity Plus system using one or more Trunked Control Stations. The number of Trunked Control Stations depends on how many talk groups are registered in your system. To make a call to a talk group, the dispatcher uses the Trunked Control Station associated with the group.

Note: It is reasonable that the number of Trunked Control Stations shouldn't be greater than the total number of repeaters slots.



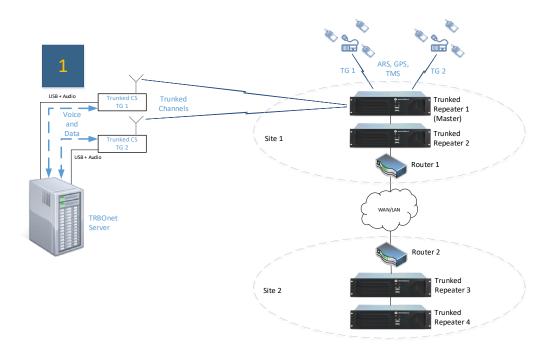


Figure 1: System with Trunked Control Stations



3.1.2 System with Trunked Control Stations and Wide Area Revert Control Stations

For a higher data throughput, the preferred configuration is to have channels dedicated for data only. Such channels are defined as Data Revert Channels. If Data Revert Repeaters are present in the system, then one Revert Control Station is required per Data Revert Slot.

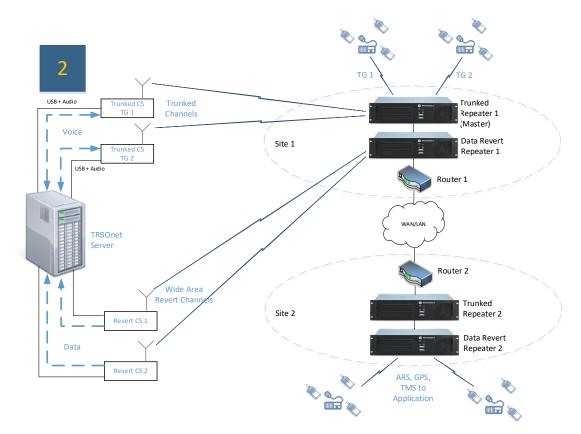


Figure 2: System with Trunked Control Stations and Wide Area Revert Control Stations



3.1.3 System with Trunked Control Stations and Local Revert Control Stations

In this configuration, Local Revert Channels are used to gather data from a Data Revert Repeater, that is data are gathered from a single site only.

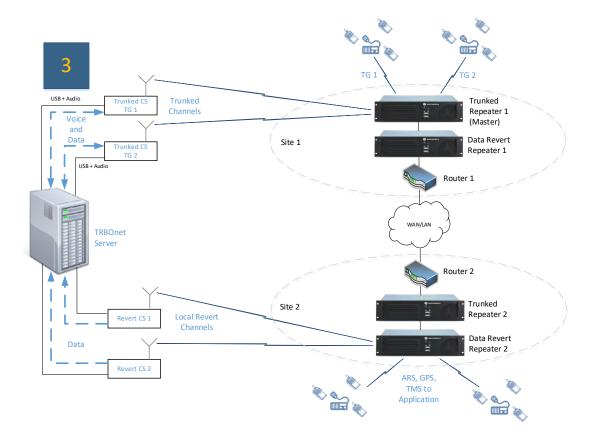


Figure 3: System with Trunked Control Stations and Local Revert Control Stations



3.2 Linked Capacity Plus with NAI

In the following configurations, Motorola's NAI Data and NAI Voice protocols are used, which provide two-way transmission of data and voice over IP connection.

3.2.1 System with NAI Data and Trunked Control Stations

In this configuration, TRBOnet Server has an IP connection to Data Revert Repeaters as well as to Trunked Repeaters. In addition, NAI Data protocol is used on Data Revert repeaters and Trunked repeaters.

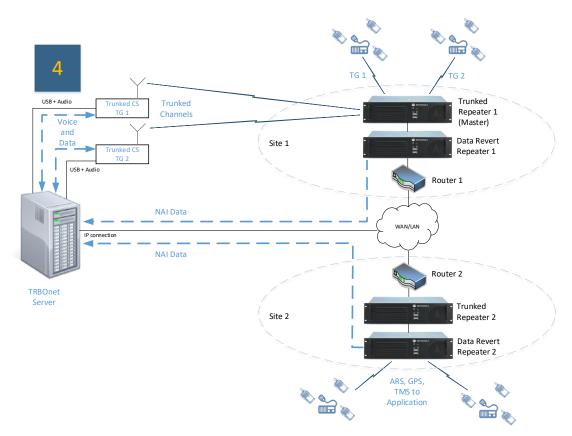


Figure 4: System with NAI Data and Trunked Control Stations



3.2.2 System with NAI Data and NAI Voice

This is the most advanced configuration using the power of NAI Data and NAI Voice protocols. All voice and data will be received and transmitted over an IP connection, that is, no Control Stations are required. Note that TRBOnet PLUS is required to utilize this system topology.

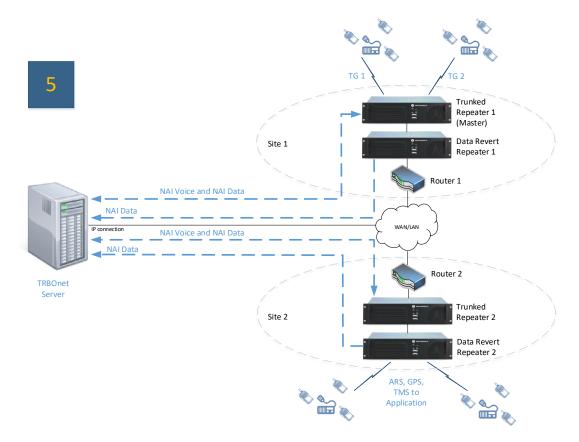


Figure 5: System with NAI Data and NAI Voice



4 Configuring MOTOTRBO Equipment

This section describes how to configure MOTOTRBO equipment, such as repeaters, control stations and subscriber radios, using MOTOTRBO Customer Programming Software (CPS).

- Launch MOTOTRBO CPS.
- On the menu bar, select **View > Expert**.

4.1 Configuring a Repeater

This section describes how to configure a repeater to be used in a Linked Capacity Plus system.

- Connect your repeater to the PC via a programming cable (USB).
- Click the **Read** button on the toolbar.

4.1.1 General Settings

• In the **Set Categories** pane, select **General > General Settings**.

ategories 🕂	General CWID	Voting Microphone	
Configuration*			
Device Information) General		
General	Radio Alias	C+ Master	
🗋 General Settings 🏚			
Accessories	Radio ID	222	
C Security	SIT (ms)	6000	
Network	Group Call Hang Time (ms)	3000	< >
Link Establishment	Private Call Hang Time (ms)	4000	
Sites	Emergency Call Hang Time (ms)	4000	
Talkgroups	Call Hang Time (sec)	3	8
Zone/Channel Assignment	Repeat Gain (dB)	0.0	
	Antenna Relay Delay Timer (ms)	100	
	Digital/Band 1 TX Low Power (W)	1.0	
	Digital/Band 1 TX High Power (W)	1.0	\mathbf{A}
	Band 1 DC TX Power (W)	1.0	~
	Disable All LEDs		
	Backup Repeater Connected		
	Codeplug Password		•

• In the right pane, specify the **Radio ID** of the repeater. This must be a unique Peer ID among the repeaters in a radio system and also not in conflict with any other third party application Peer ID. The recommended range is from 1 to 255.

4.1.2 Network

• In the **Set Categories** pane, select **General > Network**.



DR3000 • Network Set Categories	General Radio Network Netwo	X wrk Setting IP Repeater Programming
▼	 ◇ General Radio IP Accessory IP ◇ Radio Network 	172.168.0.1
 Link Establishment Sites Talkgroups Cone/Channel Assignment 	CAI Network CAI Group Network O Network Setting	12 2 25
	MOTOTRBO & MTR3000 Repeater DHCP Ethernet IP Gateway IP Gateway Netmask	192.168.1.15 192.168.1.1 255.255.255.0
Validation Results Warning Messages Search Res	() IP Repeater Programming	Serial Number: 494TMG4110

• In the right pane, specify the following parameters:

Radio IP

This is the IP address used by the radio to communicate with a PC (using USB connection) and has to be unique. To avoid conflicts in case there are several stations connected with USB, you can change the third octet of the address.

Network Setting

If your radio system is on a Private Network, specify the following network parameters:

Ethernet IP

This is the LAN address of the repeater that can be obtained from your network details; the last octet of the IP address must be unique for the system's local network.

Gateway IP

This is the address of an upstream system (router). If a router exists, specify its LAN address here.

Gateway Netmask

Set the Subnet Mask, for example, **255.255.255.0** or **255.255.0.0** depending on the subnet.

IP repeater Programming

Enable

Select this checkbox to provide the ability to remotely program the repeater.



4.1.3 Link Establishment

 Configuration Device Information General General Settings Accessories Security Network Link Establishment Sites Talkgroups Zone/Channel Assignment Peer Firewall Open Timer (sec) IP Site Connect Beacon Duration (ms) Beacon Duration (ms) Beacon Interval (sec) Go Capacity Plus Site 1 - MSTR Beacon Interval (sec) Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Beacon Interval (sec) Site Alias Site 1 - MSTR Site Alias Sit	t Categories 🕴 🗍	Network Setting IP Si	te Connect Capacity Plus	
 General Settings Accessories Security Network Link Stablishment Sites Talkgroups Zone/Channel Assignment 	Device Information	Network Setting ■		
Security Matter IP 10.10.188.35 Network Matter IDP Port 50000 \$ Sites Talkgroups \$ \$ Talkgroups IP Site Connect \$ \$ Beacon Duration (ms) 4320 \$ \$ Capacity Plus \$ \$ \$ Site ID 1 \$ \$ Beacon Interval (sec) \$ \$ \$ Capacity Plus \$ \$ \$ Site Alias \$ \$ \$ Rescon Interval (ms) 1920 \$ \$ Rest Channel/Site IP 192.168.1.10 \$ \$ Rest Channel/Site IP \$ \$ \$	General Settings			
 Link Establishment ♦ Sites Talkgroups Zone/Channel Assignment IP Site Connect Beacon Duration (ms) 4320 Beacon Interval (sec) 60 Capacity Plus Capacity Plus Capacity Plus Site Alias Site 1 - MSTR Beacon Interval (ms) 180 Rest Channel/Site IDP Port 192.168.1.10 Rest Channel/Site IDP Port 55004 	Security			
Sites Peer Firewall Open Timer (sec) 6 € Talkgroups IP Site Connect 60 € Beacon Duration (ms) 4320 € Beacon Interval (sec) 60 € Capacity Plus € € Site Alias Site 1 - MSTR € Beacon Interval (ms) 180 € Rest Channel/Site ID € € Rest Channel/Site ID € €	Link Establishment			
Beacon Duration (ms) 4320 Beacon Interval (sec) 60 Capacity Plus Site ID 1 Site Alias Site 1 - MSTR Beacon Duration (ms) 180 Beacon Interval (ms) 1920 Rest Channel/Site IP 192.168.1.10 Rest Channel/Site IP 192.168.1.10 Capacity Plus Capacity Plus	Talkgroups	Peer Firewall Open Timer (sec)	6	
Capacity Plus	Zone/Channel Assignment	<u> </u>	4320	<
Site ID 1 Site Alias Site 1 - MSTR Beacon Duration (ms) 180 Beacon Interval (ms) 1920 Rest Channel/Site IP 192.168.1.10 Rest Channel/Site UDP Port 55004			60	
Beacon Duration (ms) 180 C Beacon Interval (ms) 1920 C Rest Channel/Site IP 192.168.1.10 Rest Channel/Site UDP Port 55004		<u> </u>	1	
Beacon Interval (ms) 1920				
Rest Channel/Site UDP Port 55004			1920	
		Rest Channel TOT (min)	8	•

• In the left pane, select Link Establishment.

- In the Link Establishment pane, specify the following parameters:
 - Link Type

From the drop-down list, select **Master** if you are configuring a master repeater, or **Peer** if you are configuring a peer repeater.

Authentication Key

Specify the authentication key that can optionally be used to access the repeater.

- Master IP
 - If you are configuring a master repeater and peer repeaters residing on other sites:
 - ✓ Enter the WAN IP address of the main site router behind which the master repeater resides.
 - If you are configuring peer repeaters residing on the master site:
 - Enter the WAN IP address of the main site router if a NAT loopback is enabled and the port forwarding rules are specified for all the repeaters and the rest channel on the main site router.
 - ✓ Enter the LAN IP address of the master repeater if you are configuring a peer repeater and a NAT loopback is disabled on the router.



Note: In all the cases, the port forwarding rules must be specified for both the master repeater and the rest channel on the main site router.

Master UDP Port

Enter the UDP port number of the master repeater.

UDP Port

Enter the UDP port number of this repeater. If you are configuring a master repeater, set this value the same as that for **Master UDP Port**.

Site ID

Enter the ID of the site that the Repeater is on.

Note: All the Repeaters on the same site must have the same ID.

Rest Channel/Site IP

This is a private network IP address that is required for correct operation of a Linked Capacity Plus system. This IP address MUST be the same for all repeaters.

Rest Channel/Site UDP Port

This is the UDP port of the Repeater's rest channel. This UDP port MUST be the same for all repeaters.

4.1.4 Linked Capacity Plus Channel

Depending on its role in a Linked Capacity Plus system (Trunked or Data Revert Repeater), the repeater can be configured either with a Voice Channel or with a Data Channel, respectively.

4.1.4.1 Adding a Voice Channel

- In the Set Categories pane, select Zone/Channel Assignment > Zone.
- In the right pane, click the plus sign button and then choose **Type: Capacity Plus Voice (Linked)**.
- In the right pane, select the channel you have added (for example, LCapPlus_V) and click the pencil button.

TRBOnet Linked Capacity Plus — **Deployment Guide**



t Categories	Zone Name Zone 1 Zone Items
idation Results Warning Messages Search F DR3000 + Zone + Zone1 + Zone Items	Serial Number: 484TMG
0.00 · · · ·	4
Set Categories	General RX/TX
▼	General RX/TX
 ▼ □ Configuration* ☐ Device Information ▶ □ General 	ueneral KA/IA
▼	General Channel Type Capacity Plus Voice (Linked) Channel Name LCapPlus, V
	General Channel Type Capacity Plus Voice (Linked)
	Ceneral KVIX Channel Type Capacity Plus Voice (Linked) Channel Name [LapPlus_V Color Code 1 Network Application Interface Phone]
	General Channel Type Capacity Plus Voice (Lintest) Channel Name (CapPlus_V Color Code Network Application Interface Phone Messaging Delay (ma) 60
	General Channel Type Capacity Plus Voice (Linked) Channel Name (LicapPlus, V Color Code Network Application Interface Phone Messaging Delay (ma) 60 Repeater RSSI Threshold (dBm) -100
	Ceneral Channel Type Capacity Plus Voice (Linked) Channel Name LCapPlus, V Color Code 1 Network Application Interface Phone Messaging Delay (m) 60 Repeater RSI Threshold (dBm) -100 IF Filter Type Wide
	General Channel Type Capacity Plus Voice (Linked) Channel Name (LCapPlus_V Color Code 1 Petrovick Application Interface Phone Messaging Delay (ms) 60 Repeater RSSI Threshold (Bm) -100 IF Filter Type (Wide Preference Level 1
	Ceneral Channel Type Capacity Plus Voice (Linked) Channel Name LCapPlus_V Color Code 1 2 Network Application Interface Phone Messaging Delay (ms) 6 Repeater RSSI Threshold (Bm) 100 IF II-Titler Type Wide Preference Level 1 Slot 1 Channel ID 1
	Ceneral Channel Type Capacity Plus Voice (Linked) Channel Name LCapPlus_V Color Code 1 Network Application Interface Phone Messaging Delay (ms) 60 Repeater RSSI Threshold (Bm) 100 I Filter Type Vide Preference Level 1 Slot 1 Channel ID 2
	Ceneral Channel Type Capacity Plus Voice (Linked) Channel Name LCapPlus_V Color Code 1 Network Application Interface Phone Messaging Delay (ms) 60 Repeater RSSI Threshold (Bm) 100 I Filter Type Vide Preference Level 1 Slot 1 Channel ID 1
	Ceneral Channel Type Channel Type Capacity Plus Voice (Linked) Channel Name LCapPlus_V Color Code Network Application Interface Phone Messaging Delay (ma) Go Repeater RSNI Threshold (dBm) IF Filter Type Vide Vide Slot 1 Channel ID 1 Slot 2 Channel ID 2
	Ceneral Channel Type Capacity Plus Voice (Linked) Channel Type Capacity Plus Voice (Linked) Channel Name LCapPlus_V Color Code 1 Metsority Delsy (mol) 0 Messagin Delsy (mol) 0 Repeater RSSI Threshold (dBm) -100 IF Filter Type Wide Preference Level 1 Stot 1 Channel ID 1 Stot 2 Channel ID 2 Offset (MHz) Frequency If requency 146.420000 Copy 167.420000
	Ceneral Channel Type Capacity Plus Voice (Linked) Channel Type Capacity Plus Voice (Linked) Channel Name LCapPlus, V Color Code • Messagin (Debty (m)) 60 Respetter RSSI Threshold (dBm) -100 IF Filter Type Wide Vide • Stot 1 Channel ID 1 Stot 2 Channel ID 2 Offset (MHz) Corego TX TX

• In the right pane, specify the following channel-related parameters.

Slot 1 Channel ID

Validation Results Warning Messages Search Results Help

Specify the Channel ID of Slot 1 for voice channels. This also determines the value for **Slot 2 Channel ID** which is always one increment higher than the value of Slot 1 Channel ID.

- In the **RX Frequency** box, enter the radio frequency the repeater will receive on.
- In the **TX Frequency** box, enter the radio frequency the repeater will transmit on.

4.1.4.2 Adding a Data Channel

- In the **Set Categories** pane, select **Zone/Channel Assignment > Zone**.
- In the right pane, click the plus sign button and then choose **Type: Capacity Plus Data (Linked)**.
- In the right pane, select the channel you have added (for example, LCapPlus_D) and click the pencil button.



DR3000 + Zone + Zone1* Set Categories	Zone Name Zone 1 Zone Items Postion Channel Type Channel Name Color Code Me Postion 1 Capacity Plus Data (Linked) LCapPlus_D 1 60	51
Validation Results Warning Messages Search Results Help	1 items found (1 currently selected).	ł

• In the right pane, specify the following channel-related parameters.

Categories	Ф	Gener	al Enhan	ced GNSS	RX/TX	
Configuration*	General					
General General Zone/Channel Assignment		Cha	nnel Type	Capacity Pl	lus Data (Linked)	
Zone 🌣		Chan	nel Name	LCapPlus_D		
		c	olor Code	1		
		Messaging [elay (ms)	60		•
	Rep	eater RSSI Thresh	old (dBm)	-100		< ×
		IF F	ilter Type	Wide		-
		_	Vide Area			
			hannel ID	33		
		Slot 2 C	hannel ID	34		
	 Enhanced GNSS 					
		Enable	Wir	ndow Size	Periodic Window Reservation (%)	Shared Channel Frequency
	Slot 1		8		75	No
	Slot 2		8		75	No
	RX			T	(
			_			
	Frequency 147.0	87500	Offse	t (MHz)	Frequency	159.662000
	(MHz)		0.000	000	(MHz)	
			C	ору		
	Ref Frequency (MHz) Defa	ult 🔽			Ref Frequency (MHz)	Default
					Power Level	
					TOT (sec)	

• In the right pane, specify the following channel-related parameters.

Slot 1 Channel ID

Specify the Channel ID of Slot 1 for voice channels. This also determines the value for **Slot 2 Channel ID** which is always one increment higher than the value of Slot 1 Channel ID.

Note: The allowed range for **Slot 1 Channel ID** is from 33 to 253.

- In the **RX Frequency** box, enter the radio frequency the repeater will receive on.
- In the **TX Frequency** box, enter the radio frequency the repeater will transmit on.
- Once you have finished configuring the desired repeater parameters, click the **Write** button on the toolbar.



4.2 Configuring a Control Station

This section describes how to configure the radio to be used as a control station in a Linked Capacity Plus system. Control stations are used in the topologies depicted in Figures 1-5.

- Connect your radio to the PC via a programming cable.
- Turn on the radio.
- Click the **Read** button on the toolbar.

4.2.1 General Settings

• In the **Set Categories** pane, select **General > General Settings**.

871	PH7036 🕨 General Settings*						×
Set Categories	Set Categories 🕂 🖶	Microphone Backlight Battery S	aver Alerts	Persistent LRRP Requests	Lone Worker Power U	Jp Password and Lock	
ateg	▼	elete All 5 Tone ID					
Jorie	Device Information						
v	▼ 🗍 General						_
	🗅 Welcome Bitmap						
	Language Packs	Radio	Alias Control	Station			
	🗋 General Settings 🔅	Radi	io ID 64250				
	Accessories	G	NSS 🖌				
	Control Buttons	G	INSS GPS/QZS	S		-	
		Private	Calls 🖌				
		Cito Coarch Timor	(coc) 6				•
		1. 11. 1.					
	Validation Results Warning Messages Search Re	sults Help					
						Serial Number: 87	71TPH7036

- In the right pane, specify the following:
 - Radio ID

Enter the Radio ID of the control station. The default value is 64250.

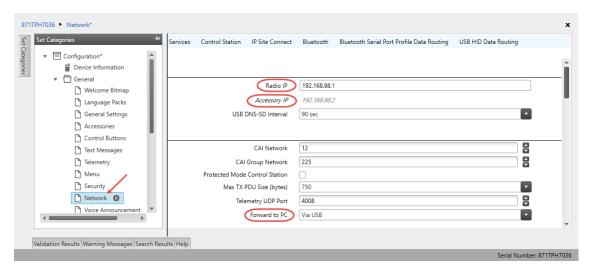
Note: This value will then be used as the control station's **Radio ID** when connecting a control station to the TRBOnet Server. See section <u>5.1.2</u>, <u>Adding a Control Station</u>.

Control Station #1							
Name:	Control Station #1						
Radio ID:	64250						
IP Address:	192.168.10.2 🔻 🕫						
Mode:	Linked Capacity Plus						
System Identifier:	Department 1						



4.2.2 Network

• In the **Set Categories** pane, select **General > Network**.



- In the **Network** pane, specify the following parameters:
 - Radio IP

This is the IP address used by the radio to communicate with the PC (using the USB connection) and has to be unique. To avoid conflicts in case there are several stations connected with USB, you can change the third octet of the address.

Accessory IP

This is the IP address that is given to the PC by the radio that is connected to it.

Note: This value will then be used as the control station's **IP Address** when connecting a control station to the TRBOnet Server. See section <u>5.1.2</u>, <u>Adding a Control Station</u>.

Control Station #1				
Name:	Control Station #1			
Radio ID:	64250			
IP Address:	192.168.10.2 🔻 🕫			
Mode:	Linked Capacity Plus			
System Identifier:	Department 1			

Forward to PC

From the drop-down list, select Via USB.

4.2.3 Contacts

• In the **Set Categories** pane, select **Contacts > Contacts**.



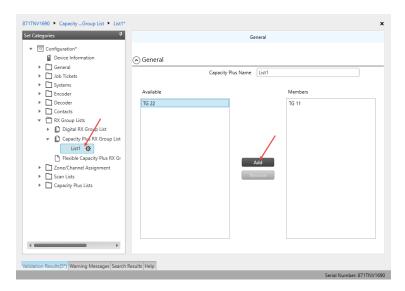
• In the right pane, click the plus sign button, then click **Capacity Plus** and choose the call type.

871TNV1690 Contacts*		0			×
Set Categories #	View by: By Name	∪By	r Type 📋 Name Only		
▼	1 🕀 \varTheta 💬				
Device Information					
General	Contact Name		Call Type	Call ID	
 Job Tickets 	All	C®	Capacity Plus Calls-All Call	255	
Systems	Radio 125	Co	Capacity Plus Calls-Private Call	125	3
Encoder		-			
Decoder	TG 11	Caô	Capacity Plus Calls-Group Call	11	
Contacts Contacts	TG 22	Cað	Capacity Plus Calls-Group Call	22	
All					
TG 11					
TG 22					
Radio 125					
RX Group Lists					
 Zone/Channel Assignment 					
Zone					
Scan Lists					
Capacity Plus Lists					
Validation Results(13*) Warning Messages Search Resu	ilts Help				
					Serial Number: 871TNV1690

• Enter the **Contact Name** and **Call ID** for the contacts you have added.

4.2.4 RX Group Lists

- In the Set Categories pane, select RX Group Lists > Capacity Plus RX Group List.
- In the right pane, click the plus sign button and add the corresponding group list.



- In the left pane, select the group list you have added.
- In the right pane, in the **Available** list select a group, or multiple groups using the SHIFT key, and click the **Add** button.

As a result, the group(s) will appear in the **Members** list.



4.2.5 Channel

4.2.5.1 Important Notes

Depending on its role in a Linked Capacity Plus system (<u>Trunked Control</u> <u>Station</u> or <u>Data Revert Control Station</u>), the control station can be configured either with a Linked Capacity Plus Personality Channel or with a Digital Channel, respectively.

When using the configurations depicted on figures 1, 4, 5, you are employing a Linked Capacity Plus Personality Channel.

In the configurations depicted in figs. 2 and 3, that is configurations with the data revert repeater, you will need to use a Digital Channel. The fact is that there are no rest channels on a data revert repeater. Thus, to send data to TRBOnet Server, the subscriber radios will use a data revert channel. In this case, you'll have to forcibly set the control station to the corresponding frequencies of the data revert repeater.

A single data revert control station may receive data from only one data revert slot. If there is only one data revert control station in the radio system, then all subscribers must send data only to the slot with which this control station operates. The Radio ID of this data revert control station must match the Radio ID of at least one voice control station. If the system has several data revert control stations, their Radio ID's be the same and match at least one voice control station.

Also note that the system identifier in TRBOnet Server should be the same for all control stations and repeaters used in the same radio system.

4.2.5.2 Trunked Control Station

This section describes how to configure channels on a trunked control station.

Adding Channels to Channel Pool

Channel Pool is used for organizing channels in the radio that are not tied to a channel selector position. The Channel Pool is not visible when the radio user navigates through the zones.

- In the Set Categories pane, select Zone/Channel Assignment > Zone > Channel Pool.
- In the right pane, click the plus sign button and then choose **Type: Capacity Plus Voice**.
- In the right pane, select the channel you have added (for example, CPlusMaster) and click the pencil button.

TRBOnet Linked Capacity Plus — Deployment Guide



71TNV1690 > Zone > Channel Pool* Set Categories			one Name Chan	nel Pool		
▼						
Device Information		Voice Annound	ement File None			
General	Zone Items					
Job Tickets						
Systems	$\checkmark \oplus \Theta \odot$) 🔺 🔻				
Encoder	Position	CI 17	Channel Name	Color Code	Phone System	RX:Frequency ()
Decoder		Channel Type				
Contacts	• •	1 Capacity Plus Voice	CPlusMaster	1	my phone	167.420000
 RX Group Lists 						
Zone/Channel Assignment						
V D Zone						
Zone1						
Channel Pool	4			_		
Scan Lists	1 items found (1 cu	rrently selected).		_		
Capacity Plus Lists						
 Capacity Plus Voice List 						
Voice List_1						
 Capacity Plus Data List 						
 Capacity Plus Site List 						
alidation Results(7*) Warning Messages Search Result	lts Help					

• In the right pane, specify the following parameters:

71TNV1690 Zone Channel Pool Zone It	General RX/TX
 ▼ □ Configuration* ■ Device Information ▶ □ General 	⊘ General
Job Tickets Systems	Channel Type Capacity Plus Voice Channel Name CPlusMaster
Encoder Decoder Decoder Contacts	Color Code 1 8
Carl RX Group Lists Discrete Control Assignment Discrete Control Assignment Discrete Control Contro Control Control Contro Control Control Control Control Control Co	© RX/TX RX
 ■ Zone1 ③ Channel Pool ♦ □ Scan Lists ▼ □ Capacity Plus Lists 	(Frequency (MH2) 167.420000 Offset (MH2) (Frequency (MH2) 146.420000 0.000000 Copy Copy
Capacity Plus Voice List Voice List_1 Capacity Plus Data List Capacity Plus Site List	Ref Frequency (MH2) Default Ref Frequency (MH2) Default
<	
alidation Results(7*) Warning Messages Search Re	sults Help

Color Code

Enter the color code for the radio. Note that the color codes on the radios must match the color code of the repeater.

Phone System

Select the phone system you have specified in section <u>4.3.6, Phone</u> <u>System</u>.

- In the **RX Frequency** box, specify the radio frequency the radio will receive on.
- In the **TX Frequency** box, specify the radio frequency the radio will transmit on.

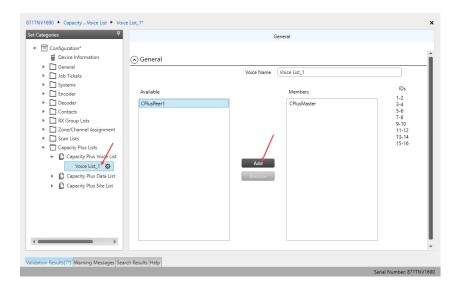


Note: The RX and TX frequencies of the radio must be the opposite to the RX and TX frequencies of the repeater. In other words, the RX frequency of the repeater must be the same as the TX frequency of the radio; the TX frequency of the repeater must be the same as the RX frequency of the radio.

Capacity Plus Voice List

This section describes how to add the channels contained in the Channels Pool to a Capacity Plus Voice List.

- In the Set Categories pane, select Capacity Plus Lists> Capacity Plus Voice List.
- In the right pane, click the plus sign button and add the corresponding voice list.



- In the left pane, select the Voice List you have added.
- In the right pane, in the **Available** list select a channel, or multiple channels using the SHIFT key, and click the **Add** button.

As a result, the channel(s) will appear in the **Members** list.

Note: The order of the channels in the Members list must follow the order of their respective Slot IDs, for example 1-2, 3-4, and so on.

Capacity Plus Site List

This section describes how to add sites to a Capacity Plus Site List.

- In the Set Categories pane, select Capacity Plus Lists > Capacity Plus Site List.
- In the right pane, click the plus sign button and add the corresponding site list.



• In the left pane, select the Site List you have added (for example, named Site List 1).

Categories 4				Ge	eneral			
 ✓ Configuration* ✓ Device Information ▶ ☐ General 	⊙ Genera	I		65 M	(m. 1).4			
Job Tickets				Site Name	Site List 1			
 Systems 			R	SSI Threshold (dBm)	-108			
Decoder Decoder Ontacts RX Group Lists	Capa	city Plus Site List						
Zone/Channel Assignment		Site ID	Site Alias	Voice Announce	ement File (Voice List	Data List	RX Group List
Scan Lists		1	Site1	None	N	/oiceList_1	DataList_1	RX ALL
 Capacity Plus Lists 	•	2	Site2	None	N	/oiceList_2	DataList_2	List1
Capacity Plus Voice List Capacity Plus Data List Capacity Plus Data List Site List Site List Site List ★	4	items found (1 cu	urrently selected).					

- In the right pane, click the plus sign button and add a site to the list.
- For the site you have added, specify the following parameters:
 - Site ID

Enter the ID of the site that the radio will connect to.

Site Alias

Enter a name for the site that the radio will connect to.

Voice List

From the drop-down list, select a Capacity Plus Voice List that the radio will use to make voice calls when on the site.

Data List

From the drop-down list, select a Capacity Plus Data List that the radio will use to make data calls when on the site.

RX Group List

From the drop-down list, select an RX Group List that the radio will use to make Group Calls when on the site.

Adding a Capacity Plus Personality Channel

- In the Set Categories pane, select Zone/Channel Assignment.
- In the right pane, click the plus sign button to add a zone.
- In the **Set Categories** pane, select the zone you have added.
- In the right pane, click the plus sign button and then choose **Type: Capacity Plus Personality (Linked)**.
- In the right pane, select the channel (for example, TG 11) you have added and click the pencil button.



Set Categories 4						
Configuration*		Zone	Name Zone1			
Device Information		Voice Announcem	ent File None			
General Job Tickets Systems	Zone Items					
Encoder Decoder	Position	Channel Type	Channel Name	Voice Announcement File	ARS	Privacy
Contacts	►	1 Capacity Plus Personality (Linked)	TG 11	None	Disabled	✓
RX Group Lists D Zone/Channel Assignment D Zone Zone Zone Channel Pool						
Capacity Plus Lists	titems found (1 cur	l rently selected).				•
()						
alidation Results Warning Messages Search Results Help						

Categories 🕴	General RX/TX		
Configuration*			
Device Information	Seneral		
General Job Tickets	Channel Type Capacity Plus Personal	lity (Linked)	
Systems	Channel Name TG 11		
Encoder	Voice Announcement File None		
Decoder	ARS Disabled		
Contacts RX Group Lists	Privacy		_
Zone/Channel Assignment	Privacy Alias Privacy Key1		
 Zone 	AES Alias None		
🖿 Zone1 🔅	RAS Alias None		
Channel Pool	Option Board		
Scan Lists	Lone Worker No		
Capacity Plus Lists	Messaging Delay (ms) 60		
	Compressed UDP Data Header None		
	Over-the-Air Battery Management		
	Auto Roam 🗹		
	Site List Site_1		•
	Rest Channel Acquisition TOT (min) 5		
	Beacon Interval (ms) 1920		
	Channel Inhibit		
	RX Only		
	⊗ RX/TX		
	RX TX		-
			_
		Contact Name TG 11	-
	Emergency Alarm Ack No Eme Emergency Call Indication	ergency System None	· ·
)	Emergency Call Indication	vox 🗆	
,		Power Level High	· · · ·

• In the right pane, specify the following parameters:

Privacy

Select this option to allow privacy on the channel.

- Note: The **Privacy** option is available if the Basic or Enhanced Privacy Type has been selected in the Security section.
- Privacy Alias

From the drop-down list, select the Key Alias.

Note: The **Privacy Alias** option is available if the Enhanced Privacy Type has been selected in the Security section. The same Key Alias must be used on all system nodes (repeaters and radios).



Option Board

Select this option to enable the option board capability on the channel. The option board must be installed and enabled in the radio otherwise this feature will not function.

Site List

Select the Linked Capacity Plus Site List you have specified in section <u>Capacity Plus Site List</u>.

TX Contact Name

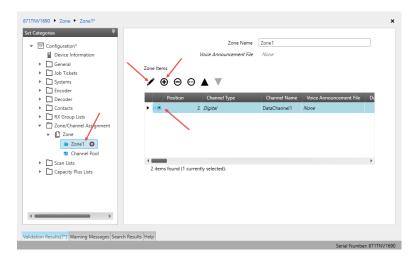
Select the contact to which a call will be initiated on the channel when pressing the PTT button. The contact is selected from the Contact list you have created in section <u>4.2.3, Contacts</u>.

4.2.5.3 Data Revert Control Station

Adding a Digital Channel for Receiving Data

This section describes how to configure a data revert channel for receiving data on a control station (see also section <u>4.2.5.1, Important Note</u>).

- In the Set Categories pane, select Zone/Channel Assignment >Zone > Zone1.
- In the right pane, click the plus sign button and then choose **Type: Digital**.
- In the right pane, select the channel (for example, DataChannel1) you have added and click the pencil button.



• In the right pane, specify the following parameters:



ategories [‡]	General RX/TX
Configuration* Device Information Do Tackets Do Tackets Encoder Decoder Contacts R Group Lists ConcChannel Assignment	General Channel Type Digital Channel Name DataChannel1 Voice Announcement File None Dual Capacity Direct Mode Timing Leader Preference Eligible ScarReam List None
Cone Control Cont	Auto Scan No Color Code 1 2 Repeater/Time Slot 1 2 Phone_100 2 AS Disabled 2 Enhanced CNSS 3 Window Size 8 Window Size 7 Window Size

Color Code

Enter the color code for the radio. Note that the color codes on the radios must match the color code of the data repeater.

Repeater/Time Slot

Select one of the data repeater time slots.

Privacy

Select this option to allow privacy on the channel.

Note: The **Privacy** option is available if the Basic or Enhanced Privacy Type has been selected in the Security section.

Privacy Alias

From the drop-down list, select the Key Alias.

Note: The **Privacy Alias** option is available if the Enhanced Privacy Type has been selected in the Security section. The same Key Alias must be used on all system nodes (repeaters and radios).

Set Categories 4				D/		
Configuration* Device Information	RX/TX Ref Frequency [1] Ref Frequency [1] Group List [k Emergency Atam Indication Emergency Call Indication	Default	General RX/	TX Frequency (MHz) Contact Name Emergency System VOX Power Level TOT (sec) Allow Interruption TX Interruptible Frequencies	None None High 60 0	
Validation Results(7*) Warning Messages Search	Results Help			Admit Criteria	Channel Free	·



- In the **RX Frequency** box, specify the radio frequency the radio will receive on.
- In the **TX Frequency** box, specify the radio frequency the radio will transmit on.
 - Note: The RX and TX frequencies of the radio must be the opposite to the RX and TX frequencies of the corresponding data repeater. In other words, the RX frequency of the repeater must be the same as the TX frequency of the radio; the TX frequency of the repeater must be the same as the RX frequency of the radio.
- Once you have finished configuring the desired radio parameters, click the **Write** button on the toolbar.

4.3 Configuring a Subscriber Radio

This section describes how to configure a subscriber radio to be used in a Linked Capacity Plus system.

- Connect your radio to the PC via a programming cable.
- Turn on the radio.
- Click the **Read** button on the toolbar.

Categories	đ	General CWID Audio Profile Microphone Backlight Battery Saver Alerts	
Configuration*	A	Persistent LRRP Requests Lone Worker Power Up Password and Lock Front Programming Password	
Device Information		Delete All 5 Tone ID	
▼ 🛅 General			
🗋 Welcome Bitmap	·		
🗋 Language Packs			
🗋 General Setting 🕏 🔅		Radio Alias Radio 235	
Accessories		Radio ID 235	
Control Buttons		GNSS	
Text Messages	-	GNSS GPS/QZSS	
	Þ	Private Calls	

4.3.1 General Settings

- In the **Set Categories** pane, select **General > General Settings**.
- In the right pane, specify the following:
 - Radio ID

Enter the Radio ID of the radio. This ID is used by other calling radios when addressing the radio, for instance, when making a private call or sending a text message.

GNSS

Select this checkbox to track the location of the radio if the radio is equipped with a GPS module.



Private calls

Select this checkbox to enable the initiation of a Private Call on a digital channel. When disabled, a prohibit tone will sound when the user tries to initiate a Private Call.

4.3.2 Network

• In the **Set Categories** pane, select **General > Network**.

Configuration* Device Information Central Device Information Central Welcome Bitmap Language Packs General Welcome Bitmap Language Packs General Settings Accessories Control Buttons Text Messages Telemetry Menu Security Network © Network © Network © CAI Group Network Cal Group Network Protected Mode Control Station Max TX PDU Size (byte) To Decoder Contacts RX Group Lists Contacts RX Group Lists Contacts RX Group Lists Canacts Arx of Cal Assignment ARS UDP Port A005 Contacts ARS UDP Port A005	871TPH7036 Network*			×
Considered and the construction of the base heating is a construct			Control Station IP Site Connect	Bluetooth
General Welcome Bitmap Language Packs General Settings Accessories Control Buttons Text Messages Telemetry Menu Security Network Voice Announcement Systems Encoder Contacts Systems Contacts Radio Detroits Services ARS Radio Detroits ARS Radio Detroits ARS Radio Detroits ARS Radio Detroits Services		Bluetooth Serial Port Profile Data Routing	USB HID Data Routing	
Welcome Bitmap Language Packs General Settings Accessories USB DNS-SD Interval General Settings Accessories USB DNS-SD Interval 90 sec Control Buttons Test Messages Telemetry Menu Security Network Voice Announcement Job Tickets Systems Encoder Decoder Contacts RX Group Lists Contacts RX Group Lists Account ARS Radio D 64250 ARS UDP Port 4005				
Welcome Bitmap Language Packs General Settings Accessory IP 192.168.10.2 Accessory IP Control Buttons Text Messages Telemetry Nenu Security Network Security Network Voice Announcement Dob Tickets Systems Contacts RX Group Lists RX Group Lists RX Group Lists Accesson ARS Radio Markur Language Markur Language Markur Language Menu Security Network CAI Group Network Protected Mode Control Station Max TX PDU Size (bytes) Forward to PC Disabled Services ARS Radio ARS UDP Port 4005		(General		Â
Language Packs General Settings Accessory /P Accessory /P 192.168.10.2 Accessory /P 192.168.10.2 Security Menu Security Network Security Network Voice Announcement Job Tickets Systems Encoder Decoder Contacts RX Group Lists RX Group Lists Tone/Channel Assignment		ř – – – – – – – – – – – – – – – – – – –	100100101	
Accessories USB DNS-SD Interval 90 sec ▼ Control Buttons Text Messages Radio Network 12 ♥ Telemetry Menu CAI Group Network 225 ♥ Security Protected Mode Control Station Max TX PDU Size (bytes) 750 ♥ Voice Announcement Dob Tickets ♥ Disabled ♥ Dob Tickets ● Orward to PP Disabled ♥ Decoder ● Services ● ● RX Group Lists ARS Interval ● ● ● Telemetry DA Drotexts ARS UDP Port 4005 ●	Language Packs	Radio IP	192.108.10.1	
Control Buttons Text Messages Telemetry Menu Security Network Voice Announcement Job Tickets Discoder Contacts RX Group Lists RX Group Lists ARS Radio Mark TAPDU Size (bytes) ARS Radio Mark TAPDU Size (bytes) Telemetry UDP Port 4008 Convard to PC Disabiled ARS Radio Mark TAPDU Size (bytes) Telemetry UDP Port 4008 Contacts RX Group Lists Contacts ARS UDP Port 4005	General Settings	Accessory IP	192.168.10.2	
Text Messages Telemetry Menu Security Network Voice Announcement Job Tickets Systems Encoder Decoder Contacts RX Group Lists RX Group Lists ARS Radio D 64250	Accessories	USB DNS-SD Interval	90 sec	
Intervention CAI Network 12 Image: Telemetry Menu CAI Group Network 225 Image: Security Protected Mode Control Station Image: Security Image: Network Protected Mode Control Station Image: Security Image: Network Image: Security Protected Mode Control Station Image: Network Image: Security Image: Security Image: Network Image: Security Image: Security <td>Control Buttons</td> <td></td> <td></td> <td></td>	Control Buttons			
Menu CAI Group Network 225 Security Protected Mode Control Station Network Max TX PDU Size (bytes) Voice Announcement Max TX PDU Size (bytes) Job Tickets Max TX PDU Size (bytes) Systems Gorward to PP Decoder Decoder RX Group Lists ARS Radio ID 64250 P ARS UDP Port 4005	Text Messages	Radio Network		
Security Protected Mode Control Station Max TX PDU Size (bytes) Voice Announcement Voice Announcement Obb Tickets Systems Decoder Contacts RX Group Lists ARS Radio ID 64250 6425	Telemetry	CAI Network	12	
Security Protected Mode Control Station Max TX PDU Size (bytes) Voice Announcement Voice Announcement Obb Tickets Systems Decoder Contacts RX Group Lists ARS Radio ID 64250 6425	🗋 Menu	CAI Group Network	225	
Wink K PED Size Gytes) 7.30 Image: Voice Announcement Telemetry UDP Port Job Tickets Forward to Po Systems Forward to Po Encoder Forward to Po Decoder Services Contacts ARS Radio ID Fit State ARS IP 13.0.250.250 Image: Voice State	🗋 Security	Protected Mode Control Station		
Noice Announcement Telemetry UDP Port 4008 ♀ > Job Tickets ♥ Disabled ♥ > Encoder ● Services ● > Contacts ARS Radio ID 64250 ♥ > RX Group Lists ARS UDP Port 4005 ♥	🗋 Network 🔯	Max TX PDU Size (bytes)	750	•
Do lickets Systems Encoder Contacts RX Group Lists ARS UDP Port 4005	Voice Announcement		4009	
Services Encoder Contacts RX Group Lists Concolories ARS UDP Port 4005	Job Tickets			
	 Systems 	Forward to PC	Disabled	
	Encoder	Services		
RX Group Lists ARS IP 13.0.250.250 Diamon Channel Assignment ARS UDP Port 4005	Decoder	<u> </u>	[
Zone/Channel Assignment ARS UDP Port 4005		ARS Radio ID	64250	
		ARS IP	13.0.250.250	
		ARS UDP Port	4005	
	• 19 7one •	TMS Radio ID	64250	
	J			
Validation Results Warning Messages Search Results Help	Validation Results Warning Messages Search Resu	Its Help		

- In the right pane, specify the following parameters.
 - Radio IP

This is the IP address used by the radio to communicate with the PC (using the USB connection) and has to be unique. To avoid conflicts in case there are several stations connected with USB, you can change the third octet of the address.

Forward to PC

From the drop-down list, select **Disabled**.

ARS Radio ID

Specify the Radio ID of the ARS server.

TMS Radio ID
 Specify the Radio ID of the TMS server.



Note: The **ARS Radio ID** and **TMS Radio ID** must be the same as either **TRBOnet Radio ID** in the Repeater settings if the master repeater is connected to TRBOnet Server via a wireline connection (see section <u>5.1.1</u>, <u>Adding a</u> <u>Master Repeater</u>), or **Radio ID** in the Control Station settings if the control station is connected to TRBOnet Server via USB (see section <u>5.1.2</u>, <u>Adding a Control</u> <u>Station</u>), or **MNIS Application ID**, if MNIS is enabled (see section <u>4.5</u>, <u>Configuring MOTOTRBO MNIS</u>). The recommended value is **64250** for both parameters.

4.3.3 Contacts

- In the Set Categories pane, select Contacts > Contacts.
- In the right pane, click the plus sign button, then click **Capacity Plus** and choose the call type.

871TNV1690 Contacts*					×
Set Categories	View by: By Na	ime 🗌 By	Type 🗌 Name Only		
▼		\odot			
Device Information	Contact Name		c	Call ID	
General	Contact Name		Call Type	Call ID	/
Job Tickets	All	080	Capacity Plus Calls-All Call	255	
Systems Encoder	Radio 125	C è	Capacity Plus Calls-Private Call	125	
Decoder	TG 11	Cað	Capacity Plus Calls-Group Call		
Contacts Contacts	TG 22	Caa	Capacity Plus Calls-Group Call	22	
All					
TG 11					
TG 22					
Radio 125					
RX Group Lists					
 Zone/Channel Assignment 					
Zone					
Scan Lists					
Capacity Plus Lists					
Validation Results(13*) Warning Messages Search	n Results Help				
					Serial Number: 871TNV1690

• Enter the **Contact Name** and **Call ID** for the contacts you have added.



4.3.4 RX Group Lists

- In the Set Categories pane, select RX Group Lists > Capacity Plus RX Group List.
- In the right pane, click the plus sign button and add the corresponding group list.

871TNV1690 CapacityGroup List List1*		×
Set Categories 7	General	
Configuration* Device Information	(c) General	
General Job Tickets	Capacity Plus Name List1	_
Systems Encoder Decoder	Available Members	
	Add	
· >		1
Validation Results(5*) Warning Messages Search R	esults Help Serial Number: 871TNV	1690

- In the left pane, select the group you have added.
- In the right pane, in the **Available** list select a group, or multiple groups using the SHIFT key, and click the **Add** button.

As a result, the group(s) will appear in the **Members** list.

4.3.5 Channels

4.3.5.1 Adding Channels to Channel Pool

Channel Pool is used for organizing channels in the radio that are not tied to a channel selector position. The Channel Pool is not visible when the radio user navigates through the zones.

Adding Capacity Plus Voice Channel

- In the Set Categories pane, select Zone/Channel Assignment > Zone > Channel Pool.
- In the right pane, click the plus sign button and then choose **Type: Capacity Plus Voice**.
- In the right pane, select the channel you have added (for example, CPlusMaster) and click the pencil button.

TRBOnet Linked Capacity Plus — Deployment Guide



871TNV1690 Zone Channel Pool* Set Categories						
Configuration*		2 Voice Annound		nel Pool		
Device Information General Job Tickets	Zone Items	voice Announc	ement rite Nom			
Systems Encoder	`∕⊕ ⊖ ⊙					
Decoder Decoder Ontacts Cantacts Cantacts	Position ► C :::::::::::::::::::::::::::::::::::	Channel Type 1 Capacity Plus Voice	Channel Name CPlusMaster	Color Code	Phone System my phone	RX:Frequency () 167.420000
Cone/Channel Assignment D Zone						
 Zone1 Channel Pool 				_		
Capacity Plus Lists	1 items found (1 cu	rrently selected).		_		ŀ
Capacity Plus Voice List Voice List_1 Capacity Plus Data List						
Capacity Plus Site List						
۰ ›						
alidation Results(7*) Warning Messages Search Re	esults Help					Carial Mumbau 07176

• In the right pane, specify the following parameters:

71TNV1690 V Zone V Channel Pool V Zone It Set Categories	General RX/TX
 ▼ □ Configuration* ■ Device Information ▶ □ General 	⊘ General
Job Tickets Systems	Channel Type Capacity Plus Voice Channel Name CPlusMaster
Encoder Decoder Decoder Contacts	Color Code 1 8
Carl RX Group Lists Discrete Control Assignment Discrete Control Assignment Discrete Control Contro Control Control Contro Control Control Control Control Control Co	© RX/TX RX
 ■ Zone1 ③ Channel Pool ♦ □ Scan Lists ▼ □ Capacity Plus Lists 	(Frequency (MHz) 167.420000 Offset (MHz) (Frequency (MHz) 146.420000 0.0000000 Copy Copy
Capacity Plus Voice List Voice List_1 Capacity Plus Data List Capacity Plus Site List	Ref Frequency (MHz) Default Ref Frequency (MHz) Default
<	
alidation Results(7*) Warning Messages Search Re	sults Help

Color Code

Enter the color code for the radio. Note that the color codes on the radios must match the color code of the repeater.

Phone System

Select the phone system you have specified in section <u>4.3.6, Phone</u> <u>System</u>.

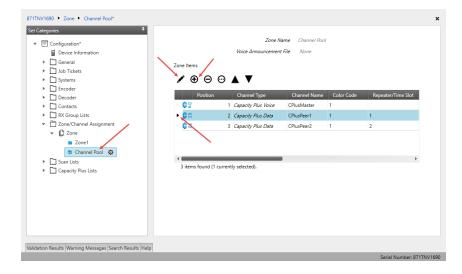
- In the **RX Frequency** box, specify the radio frequency the radio will receive on.
- In the **TX Frequency** box, specify the radio frequency the radio will transmit on.



Note: The RX and TX frequencies of the radio must be the opposite to the RX and TX frequencies of the repeater. In other words, the RX frequency of the repeater must be the same as the TX frequency of the radio; the TX frequency of the repeater must be the same as the RX frequency of the radio.

Adding Capacity Plus Data Channel

- In the Set Categories pane, select Zone/Channel Assignment > Zone > Channel Pool.
- In the right pane, click the plus sign button and then choose **Type: Capacity Plus Data**.
- In the right pane, select the channel you have added (for example, CPlusPeer1) and click the pencil button.



• In the right pane, specify the following parameters:

871TNV1690 Zone Channel Pool Zone Items Set Categories	CPlusPeer1* General RX/TX	×
▼	General €	
 General Job Tickets Systems Encoder Contacts Contacts RX Group Lists Zone/Channel Asignment 2 Zone1 Channel Pool \$ Scan Lists Capacity Plus Lists 	Channel Type Capacity Pil Channel Name (CPlusDeer) Color Code 1 Cepester/Time Slot) 1 Enhanced GNSS	us Data
	RX TX (MH2) (MH2) (0,00000 (Copy) (C	(Trequenc) (MH2) 147.087500
Validation Results Warning Messages Search Results Hel	Ref Frequency (MHz) Default	Ref Frequency (MHz) Default
vanuation nesures warning Messages Search Results Hel	p	Serial Number: 871TNV1690



Color Code

Enter the color code for the radio. Note that the color codes on the radios must match the color code of the data repeater.

Repeater/Time Slot

Select one of the data repeater time slots.

- In the **RX Frequency** box, specify the radio frequency the radio will receive on.
- In the **TX Frequency** box, specify the radio frequency the radio will transmit on.

Note: The RX and TX frequencies of the radio must be the opposite to the RX and TX frequencies of the repeater (see section <u>4.1.4.2</u>, Adding a Data Channel).

4.3.5.2 Capacity Plus Voice List

This section describes how to add the channels contained in the Channels Pool to a Capacity Plus Voice List.

- In the Set Categories pane, select Capacity Plus Lists> Capacity Plus Voice List.
- In the right pane, click the plus sign button and add the corresponding voice list.

) General		P. C.
		Voice Name Voice List_1	
Systems Encoder	Available	Members	1Ds
 Decoder Contacts X Group Lists Zone/Channel Assignment Scan Lists Capacity Plus Lists Capacity Plus Voic List Voice List_1 ⊕ Capacity Plus Site List Capacity Plus Site List Capacity Plus Site List 	CPlusPeer1	CPlusMaster	3-4 5-6 7-8 9-10 11-12 13-14 13-14 15-16

- In the left pane, select the Voice List you have added.
- In the right pane, in the **Available** list select a channel, or multiple channels using the SHIFT key, and click the **Add** button.

As a result, the channel(s) will appear in the **Members** list.

Note: The order of the channels in the Members list must follow the order of their respective Slot IDs, for example 1-2, 3-4, and so on.



4.3.5.3 Capacity Plus Data List

This section describes how to add the channels contained in the Channels Pool to a Capacity Plus Data List.

- In the Set Categories pane, select Capacity Plus Lists> Capacity Plus Data List.
- In the right pane, click the plus sign button and add the corresponding data list.

871TNV1690 🕨 Capacity Data List 🕨 Data List_1*	x
Set Categories #	General
 Configuration* Device Information Device Information Systems Systems Encoder Contacts Contacts RK Group Lists Scan Lists Capacity Plus Sites Capacity Plus Site List Capacity Plus Site List 	© General Oata Name Data List_1 Available Members CPUspPer2
McCardina Develop Managine Managine Consulta Develop Hala	
Validation Results Warning Messages Search Results Help	Serial Number: 871TNV1690

- In the left pane, select the Data List you have added.
- In the right pane, in the **Available** list select a channel, or multiple channels using the SHIFT key, and click the **Add** button.

As a result, the channel(s) will appear in the **Members** list.

4.3.5.4 Capacity Plus Site List

This section describes how to add the sites to a Capacity Plus Site List.

- In the Set Categories pane, select Capacity Plus Lists > Capacity Plus Site List.
- In the right pane, click the plus sign button and add the corresponding site list.
- In the left pane, select the Site List you have added (for example, named Site List 1).



Categories [‡]				Ge	eneral		
 ✓ Configuration* ✓ Device Information ▶ ☐ General 	Genera	I		Site Name	Site List 1		
Job Tickets							
Systems			,	RSSI Threshold (dBm)	-108		
Encoder Decoder Contacts RX Group Lists	Capa	city Plus St					
Zone/Channel Assignment		Site II	D Site Alias	Voice Announce	ment File Voice List	Data List	RX Group List
Scan Lists		1	Site1	None	VoiceList_1	DataList_1	RX ALL
▼ 🛅 Capacity Plus Lists		2	Site2	None	VoiceList_2	DataList_2	List1
 ▶ Capacity Plus Voice List ▶ Capacity Plus Data List ♥ Capacity Plus Data List ♥ Site List 	2	items found	i (1 currently selected).				

- In the right pane, click the plus sign button and add a site to the list.
- For the site you have added, specify the following parameters:
 - Site ID

Enter the ID of the site that the radio will connect to.

Site Alias

Enter a name for the site that the radio will connect to.

Voice List

From the drop-down list, select a Capacity Plus Voice Channel List that the radio will use to make voice calls when on the site.

Data List

From the drop-down list, select a Capacity Plus Data Channel List that the radio will use to make data calls when on the site.

RX Group List

From the drop-down list, select an RX Group List that the radio will use to make Group Calls when on the site.

4.3.5.5 Adding a Capacity Plus Personality Channel

- In the Set Categories pane, select Zone/Channel Assignment.
- In the right pane, click the plus sign button to add a zone.
- In the **Set Categories** pane, select the zone you have added.
- In the right pane, click the plus sign button and then choose **Type: Capacity Plus Personality (Linked)**.
- In the right pane, select the channel (for example, TG 11) you have added and click the pencil button.



: Categories 🛛 🖗		-	Name Zone1			
Configuration*						
Device Information		Voice Announcem	ent File None			
General	Zone Items					
Job Tickets						
Systems Encoder	Ƴ ⊕ ⊝ ⊙					
Decoder	Position	Channel Type	Channel Name	Voice Announcement File	ARS	Privacy
Contacts	► <u><</u> @	1 Capacity Plus Personality (Linked)	TG 11	None	Disabled	v
RX Group Lists	X					
 Zone/Channel Assignment 						
🗸 🗋 Zone						
😑 Zone1 🔅						
1 Channel Pool						
Scan Lists	•					•
Capacity Plus Lists	1 items found (1 curr	ently selected).				

Categories [‡]	General RX/TX
Configuration*	
Device Information	(A) General
General	Channel Type Capacity Plus Personality (Linked)
Job Tickets	
Systems	Channel Name TG 11
Encoder	Voice Announcement File None
Decoder Contacts	ARS On System/Site Change
Contacts RX Group Lists	Privacy V
 Zone/Channel Assignment 	Privacy Alias Privacy Key1
 Zone 	AES Alias None
🔳 Zone1 🚯	RAS Alias None
Channel Pool	
Scan Lists	Lane Worker No
Capacity Plus Lists	
	Messaging Delay (ms) 60
	Compressed UDP Data Header None
	Over-the-Air Battery Management
	Auto Roam
	Site List 1
	Rest Channel Acquisition TOT (min) 5
	Beacon Interval (ms) 1920
	Channel Inhibit
	RX Only
	(A) RX/TX
	RX TX
	· · · · · · · · · · · · · · · · ·
	Emergency Alarm Contact Name) TG 11
	Indication Emergency System None
	Emergency Call Indication Power Level High
	ingin

- In the right pane, specify the following parameters:
 - ARS

Select **On System/Site Change** to provide the automated registration for the radio.

Privacy

Select this option to allow privacy on the channel.

Note: The **Privacy** option is available if the Basic or Enhanced Privacy Type has been selected in the Security section.

Privacy Alias

From the drop-down list, select the Key Alias.



Note: The **Privacy Alias** option is available if the Enhanced Privacy Type has been selected in the Security section. The same Key Alias must be used on all system nodes (repeaters and radios).

Option Board

Select this option to enable the option board capability on the channel. The option board must be installed and enabled in the radio or this feature will not function.

Site List

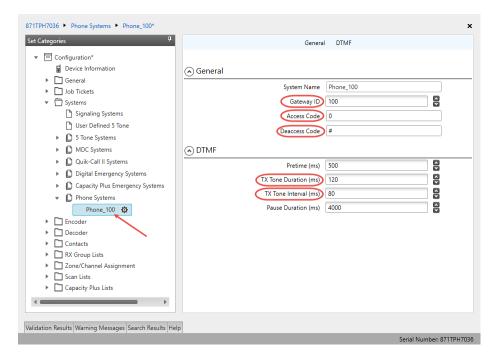
Select the Linked Capacity Plus Site List you have specified in section <u>4.3.5.4, Capacity Plus Site List</u>.

TX Contact Name

Select the contact to which a call will be initiated on the channel when pressing the PTT button. The contact is selected from the Contact list you have created in section <u>4.3.3, Contacts</u>.

4.3.6 Phone System

- In the Set Categories pane, select Systems > Phone Systems.
- In the right pane, click the plus sign button and add the corresponding phone system.
- In the left pane, select the phone system you have added.



• In the right pane, specify the following parameters:

Gateway ID

Enter the same ID as **TRBOnet Peer ID** in the Repeater settings of TRBOnet Server.



Set Access Code to 0 and Deaccess Code to #, respectively.

• TX Tone Duration (ms)

Enter the duration of the DTMF tone digits, in milliseconds, for the phone system. It is recommended to set this value to **120**.

TX Tone Interval (ms)

Enter the duration of the intervals between the DTMF tone digits in a transmission sequence, in milliseconds, for the phone system. It is recommended to set this value to **80**.

• Once you have finished configuring the desired radio parameters, click the **Write** button on the toolbar.

4.4 Configuring MOTOTRBO DDMS

The DDMS, or Device Discovery and Mobility Service is a service for tracking the presence of radio subscribers in the radio network and transmitting the data to the server. The topologies using DDMS are depicted in Figures 6-7. This section describes how to configure and run MOTOTRBO DDMS service using MOTOTRBO DDMS Administrative Client.

- Launch MOTOTRBO DDMS Administrative Client.
- In the left pane, select Watcher Settings.

🌫 MOTOTRBO DDMS			_	\times
File Action Help				
0 0 🗿 🖗 🙀 🔜 😓				
: 🙀 Service	Watcher Settings			
🚊 📲 Interfaces	PortWatcher	3000		
ARS Settings	WatcherTO	14400		
	NotifyGroup	0		
- 🗐 Authentication Server Settings	NotifyRate	5		
🛄 🚰 Logging				
	PortWatcher			
	Port listening for Watcher	Subscribe requests.		
	Range: 1000 - 65535			
Catting of the Westerland interferen				
Settings for Watcher interface				

PortWatcher

This is the port number for listening TRBOnet Server requests.

Note: This value will be used when configuring DDMS parameters in section <u>5.1.1.3</u>, DDMS Service, **Service port**.

TRBOnet Linked Capacity Plus — Deployment Guide



DDMS service		
🗹 Use DDMS service		
Local port:	0 🗘]
Service IP Address:	127.0.0.1 👻	
Service port:	3000 🗘]
Authentication Port:	5055 🗘	

• In the left pane, select **Authentication Server Settings**.

🍰 MOTOTRBO DDMS			_	×
File Action Help				
۵ 🛛 🏟 🏟 🔘 🛇				
: Service	Authentication Server Set	tings		
🖨 🐺 Interfaces	AuthenticationServerIP	127.0.0.1		
ARS Settings	AuthenticationServerPort	5055		
Authentication Server Settings				
🛄 🥤 Logging				
	AuthenticationServerIP			
	Authentication Server IP Address			
Setting for authentication server				.:

AuthenticationServerIP

This is the authentication server IP address.

AuthenticationServerPort

This is the authentication server port number.

Note: These values will be used when configuring DDMS parameters in section <u>5.1.1.3</u>, DDMS Service, **Service IP Address** and **Authentication Port**, respectively.

DDMS service		
🗹 Use DDMS service		
Local port:	0	‡
Service IP Address:	127.0.0.1	•
Service port:	3000	* *
Authentication Port:	5055	*

• Once you have finished configuring the desired DDMS parameters, click the **Start** button on the toolbar.



🌮 MOTOTRBO DDMS	
File Action Help	
000 🖗 🎄 🔜 😸 💊	
Service	Service
E Start sterfaces	Version
🥤 Logging	ServiceName
	DisplayName
	Description
	ServiceMode

4.5 Configuring MOTOTRBO MNIS

This section describes how to configure and run MOTOTRBO MNIS service using MNIS Configuration Utility.

- Launch MNIS Configuration Utility.
- In the left pane, select **General**.

MOTOTRBO Network Interfac	e Service Configuration Utility *	-	×
Configuration View Edit	Service Help		
E· 🛑 LCAP+	General		
Orror Security Group List 	System Operation Mode Linked Capacity Plus ~ MNIS Application ID 64250 😜		
Geo Capacity Plus	Tunnel Network		
逆 च Advanced	MNIS IP Address 172.16.10.1 Tunnel IP Address 172.16.10.2		
	Subnet Mask 255.255.255.0		
			:

System Operation Mode

From the drop-down list, select Linked Capacity Plus.

MNIS Application ID

Configure an individual ID that uniquely identifies the MNIS application in the radio system. The recommended value is **64250**.

Note: This is the ID that TRBOnet Server uses as its **Radio ID** when connecting a master repeater.

MNIS IP Address

It is recommended that the value of **172.16.10.1** is used unless there are conflicts with other network interfaces on the PC.

Tunnel IP Address

This is the IP Address used by the MNIS to communicate with TRBOnet Enterprise (see <u>5.1.1.4</u>, <u>MNIS Data Service</u>, **IP Address**).

TRBOnet Linked Capacity Plus — Deployment Guide



MNIS data service				
🗹 Use Data Gateway				
Service is on a lo	ocal	host		
IP Address:	>	172.16.10.2	•	¢
Control port:		5000		‡

- In the left pane, right-click **Group List** and choose **Add**.
- In the left pane, under **Group List**, select the list you just added (for example, named **List1**).

MOTOTRBO Network Interface Service	Configuration Utilit	y MNIS Restart Required *	_	×
Configuration View Edit Service	Help			
E CAP+		List1		
General Group List Security Group List State S		Group List Type All Groups	Capacity Plus/LCP V	
😑 💼 Conventional				
Capacity Plus Capacity Plus Capacity Plus Capacity Plus		Add	Delete	
🔤 🤇 🖹 Sites		First Call ID	Last Call ID	
🖻 💼 Advanced		10	10	
Network		20	77	
Forwarding Rules				

Group List Type

From the drop-down list, select **Capacity Plus/LCP**.

All Groups

If you select this option, then the list will contain all radio groups.

- Click the **Add** button to add a new row to the Group List table.
- First Call ID and Last Call ID

If the values in these boxes are the same, then the row will represent a single radio group. If the value of **Last Call ID** is greater than the value of **First Call ID**, then the row will represent a corresponding range of the radio groups.



MOTOTRBO Network Interfa	ce Service Configuration Utility *		_	- 🗆	×
Configuration View Edit	Service Help				
1					
🖃 🛑 LCAP+	Link	ed Capacity Plus			
 □□□ General □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□	Master IP Address	10.10.188.35			
Capacity Plus		50000			
🛄 🧹 📄 Sites 🕀 🕽 Advanced	MNIS LE Port	Automatically Assigned	1		
		O Manually Assigned	None	×	
	Authentication Key	Ø			
	Security Setting	Basic ~			
	Security Alias	\sim			
					:

• In the left pane, select Linked Capacity Plus.

- Master IP Address Enter the Ethernet IP address of the master repeater.
- Master UDP Port Enter the UDP port number of the master repeater.
- Authentication Key Enter the master repeater's authentication key (if any).



• In the left pane, under Linked Capacity Plus, select Sites.

MOTOTRBO Network Interface	Service Configuration Uti	lity MNIS Restart Required	*		_	o ×
Configuration View Edit	Service Help					
*1 👢 📕 🕻						
LCAP+ General						
Security		[Add Delete			
🗄 💼 Group List	Site Id	Group List	Outbound Data Limit	GPS Latitude	GPS Longitude	
Conventional	1	List1 ~	2			
Geo Capacity Plus Geo Linked Capacity Plus	2	List2 ~	2			
Sites						
🕀 💼 Advanced						
						.::

- Click the Add button to add a new site to the list.
- Site Id

Enter the ID of the site.

Group List

From the drop-down list, select a group list for the site.

Outbound Data Limit

Enter a limit for the number of available trunked channel that may be simultaneously used by the Network Interface Service to source data calls. The MNIS will schedule messages up to this channel limit for each site at a given time. After the limit is reached it will not schedule another message until the previous messages are processed by the repeater.

• In the left pane, select **Advanced**.

MOTOTRBO Network Interface Service	Configuration Utility *	-		×
Configuration View Edit Service	Help			
🖃 🔶 LCAP+				
General General Group List Group List Conventional Group List Group Linked Capacity Plus Advanced Growarding Rules Forwarding Rules Growarding Rules Application Override Rules	Data Call Confirmed Compressed UDP Data Header None Battery Saver Preamble Individual Data to Registered Site Selective Forwarding TX Preamble Duration (ms) 120 •			
	Conventional Channel Access Normal ~			
	MNIS LE ID Use MNIS ID	200	•	
]				:



Compressed UDP Data Header

From the drop-down list, select the type of compression protocol used for the UDP Data Header (None, MSI, DMR). It is recommended selecting **MSI**. Note that the same type must be set on all subscriber radio channels (*CPS>Channels>Compressed UDP Data Header*).

- MNIS LE ID > Manually Assigned
 Enter a unique Peer ID among the repeaters in a radio system.
- In the left pane, select Network

MOTOTRBO Network Interface Service Configuration Utility *	-	-	×
Configuration View Edit Service Help			
1			
🕀 🌑 Untiled Network			^
- 🚥 General - 🖙 Security CAI Network 12 🖨			
🖃 💼 Group List			
CAI Group Network 225 🖨			
E Conventional Services			
Conactiv Plus			
Capacity Plus			
Advanced TMS UDP Port 4007 😜			
🖙 Forwarding Rules Telemetry UDP Port 4008 🚖			
Application Oven Location Server UDP Port 4001			
Battery Management UDP Port 4012 🖨			
User Defined UDP Port 1 Disabled 🌲			
User Defined UDP Port 2 Disabled			
User Defined UDP Port 3 Disabled 🜩			
XCMP Enable			
XCMP Server UDP Port 4004			
ARS Monitor			
ARS Monitor ID None 💠			
Device Discovery and Mobili	ity Service		
Server Address 127.0.0.1			
Watcher Port 3000			
MNIS Control Interfa	ice		
MNIS Control Interface TCP Port 5000			
			~

Device Discovery and Mobile Service

Server Address

This is the IP address of the MOTOTRBO Device Discovery and Mobility Service (DDMS). The recommended value is **127.0.0.1** if both DDMS and MNIS reside on the same PC.

Watcher Port

This is the port number on the MOTOTRBO Device Discovery and Mobility Service (DDMS) server to which the Watcher requests should be sent.



MNIS Control Interface

MNIS Control Interface TCP Port

This is the Transmission Control Protocol (TCP) port for the MNIS Control Interface server. This value is used when connecting TRBOnet Server to MNIS Service (see <u>5.1.1.4</u>, <u>MNIS Data Service</u>, **Control port**).

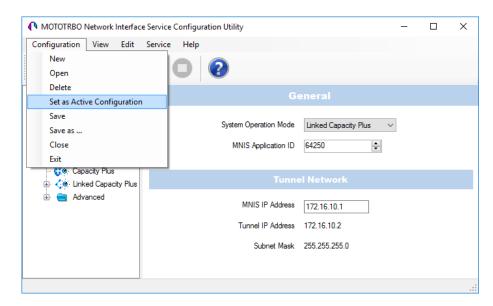
MNIS data service		
🗹 Use Data Gateway		
🗹 Service is on a local	host	
IP Address:	172.16.10.2	- ¢
Control port:	5000	‡

Once you have finished configuring the desired MNIS parameters, do the following:

• Click the **Save** button on the toolbar.



• On the **Configuration** menu, click **Set as Active Configuration**.



• Click the **Start** button on the toolbar.





5 **Configuring TRBOnet Enterprise**

This section describes how to configure TRBOnet Enterprise software. By properly configuring TRBOnet Server and TRBOnet Dispatch Console, you will be able to utilize the full capabilities of your Linked Capacity Plus system.

5.1 Configuring TRBOnet Server

To start TRBOnet Server, click the corresponding shortcut on the desktop, or click **Start > All Programs > Neocom Software > TRBOnet Server x.x**

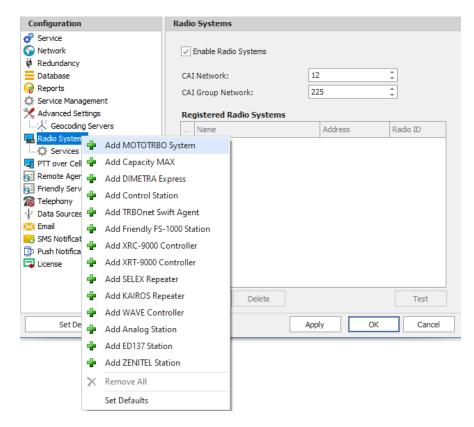
For how to configure TRBOnet Server's Database, Service, Network parameters, etc., refer to *TRBOnet Enterprise Quick Start Guide*.

5.1.1 Adding a Master Repeater

This section describes how to configure TRBOnet Server for communication with the master repeater of a Linked Capacity Plus system.

Note: Only the Master repeater needs to be added to TRBOnet Server.

- In the **Radio Systems** pane, click **Add**. Or, in the **Configuration** pane, right-click **Radio Systems**.
- In the drop-down menu, click Add MOTOTRBO System.





In the **Repeater** pane, specify the connection parameters. To ensure your connection parameters match the actual configuration of your radio network, you may need to use Motorola CPS to determine the values. Contact your radio network administrator, if you do not have this information.

Configuration		Repeater #1					
🛷 Service	^						
S Network		System Name:	Repeater #1				
🛱 Redundancy		TRBOnet Peer ID:	100	÷			
Database		TRBOnet Radio ID:	64250	*			
😪 Reports			64230	*			
Service Management		TRBOnet Local Port:	50000	÷			
X Advanced Settings		Master Repeater Con	nection Info:				
Geocoding Servers		Master IP Address:	10.10.188.35	-			
🔚 Radio Systems		Master UDP Port:	50000	*	Test		
Services			50000	*	Test		
Repeater #1		Authentication Key:	123456				
Advanced Settings		System Type:	Linked Capacity	Plus		*]
Privacy		System Identifier:					í
DDMS service		by been recenter					-
MNIS data service		Use NAI Voice					
Audio Paths		✓ Use NAI Data (MNIS a	nd DDMS)				
PTT over Cellular		Use RCM for control ra	dio activity				
Remote Agents							
Friendly Servers							
Telephony							
0							
Email	Υ.						
Set Defaults			Apply	y 🗌	ОК	Cancel	

• System Name

Enter a name for the repeater. This name will be displayed in the Dispatch Console.

• TRBOnet Peer ID

Enter a Peer ID for TRBOnet Server. The Peer ID must be unique among the repeaters in the radio system. Consult your radio network administrator to enter the correct value.

• TRBOnet Radio ID

Enter the Radio ID of the gateway for voice and data in the radio system. This Radio ID is used as **ARS Radio ID** and **TMS Radio ID** in the Network settings of subscriber radios (see sections <u>4.3, Configuring a Subscriber</u> <u>Radio, 4.3.2, Network</u>). The default value is **64250**.

• TRBOnet Local Port

Enter the local port number that will be used by TRBOnet Server to establish a connection to the repeater. Use unique port numbers for each repeater connection if there are several repeaters connected.

• Master IP Address

Enter the WAN IP address of the main site router behind which the master repeater resides.



Note: This value is programmed for a repeater via MOTOTRBO CPS, in *Link Establishment>Master IP*. See section <u>4.1.3</u>.

• Master UDP Port

Enter the UDP port number of the master repeater.

Note: This value is programmed for a repeater via MOTOTRBO CPS, in *Link Establishment>Master UDP Port*. See section <u>4.1.3</u>.

• Authentication Key

Enter the repeater's authentication key (if any).

Note: This value is programmed for a repeater via MOTOTRBO CPS, in *Link Establishment>Authentication Key*. See section <u>4.1.3</u>.

• System Type

From the drop-down list, select Linked Capacity Plus.

• Test

Click this button to check the connection to your master repeater. If the test is successful, you'll see the information on the repeater you are connected to, such as the serial number, firmware version, and other relevant information.

• System Identifier

Enter the system identifier. Note that the system identifier should be the same for all control stations and repeaters used in the same radio system.

• Use NAI Voice, Use NAI Data (MNIS and DDMS)

Select these options if the Network Application Interface Voice and Network Application Interface Data features are enabled on the repeaters.

Click **Apply** after entering all the required values. A confirmation dialog will appear, prompting you to save the configuration and restart the TRBOnet Server service. You can also restart the service manually.

5.1.1.1 Advanced Settings

- In the **Configuration** pane, under the corresponding **Repeater**, select **Advanced settings**.
- Note: These settings are applicable only when **Use NAI Voice** and **Use NAI Data (MNIS and DDMS)** are deselected in the Repeater pane.

TRBOnet Linked Capacity Plus — Deployment Guide



Configuration	Advanced Settings			
💣 Service 🧳	•			
S Network	Voice Call Hang Time	(ms):		
🛱 Redundancy	Group Call:	3000 ‡]	
Database	Private Call:	4000]	
😪 Reports	Private Call;	4000 ‡]	
Service Management	Emergency Call:	4000 🇘		
🔀 Advanced Settings	TX Preamble:	100 *	1	
Geocoding Servers	TX Predmble:	120 ‡		
Radio Systems	TX Timeout:	60 🇘	seconds	
Services			-	
Repeater #1	Phone System:	Motorola Phone System		-
X Advanced Settings	TX Interrupt Mode:	MSI Proprietary		~
DDMS service	Allow CSBK Data			
Audio Paths				
🖵 PTT over Cellular				
🔂 Remote Agents				
Friendly Servers				
🔞 Telephony				
🖞 Data Sources				
🔀 Email 🛛 🔍	• I			
Set Defaults		Apply	ОК	Cancel

• In the **Advanced Settings** pane, specify the following repeater-related advanced settings:

Voice Call Hang Time (ms):

Group Call

This value sets the duration the repeater reserves the channel after the end of a group call transmission. During this time, only members of the group that the channel is reserved for can transmit.

Private Call

This value sets the duration a radio keeps the private call setup after a user releases the PTT button. This is to avoid setting up the call again each time a user presses the PTT button to transmit. During this time, other radios can still transmit since the channel is essentially idle. After the hang timer expires, the radio transmits using the *TX Contact Name* parameter specified for this channel in MOTOTRBO CPS.

Emergency Call

This value sets the duration the repeater reserves the channel after the end of an emergency call transmission. During this time, only members of the Group that the channel is reserved for can transmit.

Note: The values of the above three parameters must be taken from the corresponding parameter values programmed for the repeater via MOTOTRBO CPS in *General Settings*.



TX Preamble

Enter the value of the TX Preamble. The TX Preamble is a string of bits added in front of a data or control message (Text Messaging, Location Messaging, Registration, Radio Check, Private Call, and other message types) before transmission. The acceptable range is 0 - 8640 ms. The recommended value is 120 ms.

TX Timeout

Enter the time, in seconds, to be used as a voice session limit. When the dispatcher starts any voice session in the Dispatch Console, transmission will be interrupted after this TX Timeout expires.

Phone system

From the drop-down list, select the system for phone calls:

• Motorola Phone System

This system uses a special call type with the parameters specified for a radio unit in MOTOTRBO CPS.

• TRBOnet Phone System (TX Interrupt)

This is a phone call system based on the private call type using TX Interrupt feature. This phone system is available for radio systems with control stations.

5.1.1.2 Privacy

• In the **Configuration** pane, under the corresponding **Repeater**, select **Privacy**.

Configuration	Privacy				
💣 Service \land					
🕤 Network	Privacy Type:	Enhan	rced -		
🕏 Redundancy	Basic Privacy Key ID:	1	÷		
Database	Enhanced Privacy Ke	vs.			
😪 Reports					
Service Management	Alghoritm	ID	Name	Value	
X Advanced Settings	ARC4 (40 bit) 👻	1			
Geocoding Servers	ARC4 (40 bit)	1	1		
🔜 Radio Systems					
Services					
Repeater #1					
Advanced Settings					
Privacy					
DDMS service					
Audio Paths					
TT over Cellular					
🔂 Remote Agents					
🔂 Friendly Servers					
Telephony					
🜵 Data Sources					
🔀 Email 🗸 🗸	Add	lemove			File
Set Defaults			Apply	ОК	Cancel

• In the **Privacy** pane, specify the following privacy-related settings:



Privacy Type

From the drop-down list, select one of the privacy types: **None**, **Basic**, or **Enhanced**.

Basic Privacy Key ID

Enter the Privacy Key ID available for the **Basic** privacy type.

Enhanced Privacy Keys

Here you add enhanced privacy keys when the **Enhanced** privacy type is selected.

• Click **Add** and specify the required **Algorithm**, **ID**, **Name**, and **Value** for the privacy key being added.

✓ Algorithm

From the drop-down list, select one of the enhanced algorithms if you are going to use additional encryption.

5.1.1.3 DDMS Service

The DDMS, or Device Discovery and Mobility Service is a service for tracking the presence of radio subscribers in the radio network and transmitting the data to the server.

• In the **Configuration** pane, under the corresponding **Repeater**, select **DDMS service**.

Configuration	DDMS :	service			
Service Network	√ Use	DDMS service			
🛱 Redundancy	Loca	al port:	0	÷	
Database Reports	Serv	vice IP Address:	127.0.0	.1 -	Test
Reports Service Management	Serv	ice port:	3000	÷	
Advanced Settings		nentication Port:	5055	÷	
Radio Systems	Red	undant services:		1	
Services		Service IP A	Address	Service port	Local port
Repeater #1	1	✓ 10.10.101.	207	3000	0
Advanced Settings Privacy DDMS service Advanced Setting Advanced Setting MNIS data service Audio Paths					
🖵 PTT over Cellular					
Remote Agents					
Telephony		Add D	elete]	Test 🔺 🔻
Set Defaults				Apply	OK Cancel

• In the **DDMS service** pane, specify the following DDMS service-related settings:

Use DDMS service

Select this option to enable the DDMS service for the server.



Local Port

Enter the number of the local port to be used on a PC with TRBOnet Dispatch Software for DDMS service.

Service IP Address

Enter the IP Address of the PC with the DDMS service installed and running.

Service port

Enter the service port number.

Note: This value is programmed for a DDMS service via MOTOTRBO DDMS Administrative Client, in Interfaces>Watcher Settings>PortWatcher.

Authentication Port

Enter the authentication server port number.

Note: This value is programmed for a DDMS service via MOTOTRBO DDMS Administrative Client, in Interfaces>Authentication Server Settings> AuthenticationServerPort.

Redundant services

Here you see the list of redundant DDMS services for failover purposes.

- Click **Add** and specify the required parameters for the DDMS service being added.
- Click **Test** to test if the selected DDMS service is available.
- Use the Up (
) and Down (
) buttons to move a selected DDMS service up and down in the priority list of DDMS services.

5.1.1.4 MNIS Data Service

The MNIS, or Motorola Network Interface Service, is a Windows application which acts as a data gateway between the data applications and the radio system. Data messages are routed through the MNIS.

• In the **Configuration** pane, under the corresponding **Repeater**, select **MNIS data service**.

TRBOnet Linked Capacity Plus — Deployment Guide



Configuration	MNIS data service
	✓ Use Data Gateway ✓ Service is on a local host IP Address: 172.16.10.2 * ¢ ✓ Control port: 5000 ‡ MNIS Service: MOTOTRBO Network Interface Service * ¢
Geocoding Servers Radio Systems Services Repeater #1 Advanced Settings Privacy DDMS service MNIS data service MNIS data service Advanced Setting MIS data service Advanced Setting Advanced Setting Advanced Setting Advanced Setting Advanced Setting	Redundant services: IP Address Control port Local port 1 ✓ 10.10.101.220 5000 ‡ 0
PTT over Cellular Remote Agents Friendly Servers Set Defaults	Add Delete Test A V Apply OK Cancel

- In the **MNIS data service** pane, specify the following MNIS data service-related settings:
 - Use Data Gateway

Select this option to enable the MNIS data service for the server.

Service is on a local host

Select this option if the MNIS data service will be used on the local PC.

IP Address

Enter the IP Address used by the MNIS to communicate with the PC.

Note: This value is programmed for a MNIS data service via MOTOTRBO MNIS Configuration Utility, and can be retrieved from *General>Tunnel Network>Tunnel IP Address*.

Control port

Enter the number for the MNIS control port.

Note: This value is programmed for a MNIS data service via MOTOTRBO MNIS Configuration Utility, in Advanced>Network>MNIS Control Interface TCP Port.

MNIS Service

Select this option, and from the drop-down list select the available MNIS service.

Redundant services

Here you see the list of redundant MNIS data services for failover purposes.

• Click **Add** and specify the required parameters for the MNIS data service being added.



- Click **Test** to test if the selected MNIS data service is available.
- Use the Up (
) and Down (
) buttons to move a selected MNIS data service up and down in the priority list of MNIS data services.

5.1.1.5 Audio Paths

The Audio Paths are talk paths of the system to make and receive Voice Calls; in general, they are talk groups. TRBOnet Server requires that all audio paths of a Linked Capacity Plus system be registered in its configuration. If an audio path is not registered, the TRBOnet operator will not be able to receive and transmit to the corresponding talk group.

• In the **Configuration** pane, under the corresponding **Repeater**, select **Audio Paths**.

Configuration		Auc	lio Paths				
🗬 Service	^	1.0	ad Groups Map				
S Network							
🛱 Redundancy			Call Type	1	Group ID	Site ID	
Database			Group Call		11	Wide	
😪 Reports			Group Call		22	Wide	
🔅 Service Management					~~	WICE	
💥 Advanced Settings		4	Private Call				
······ ↓ Geocoding Servers			All Call				
🔛 Radio Systems							
Services							
Repeater #1							
🔒 Privacy							
DDMS service							
Advanced Settings							
MNIS data service							
X Advanced Settings							
Audio Paths							
🖵 PTT over Cellular							
Remote Agents							
Friendly Servers				7			
Telephony	~		Add Delete			(Configure
Set Defaults				Ap	ply	ОК	Cancel

- In the **Audio Paths** pane, specify the following Audio Path-related settings:
 - To add an audio path to the system, click **Add**.
 - Make sure the check box in the first column is selected to make and receive voice calls from the selected subscriber.
 - From the drop-down list, select the **Call Type** for the audio path. The available call types are All Call, Group Call, and Private Call.
 - Enter the Group ID, which is an ID of the talk group the dispatcher can make calls to. The Group ID is not applicable for Private Calls and All Calls.
 - Enter the Site ID of the site the audio path will belong to in a Linked Capacity Plus system. Or, leave zero value in this column. In this case, the Site ID will be displayed as Wide, meaning that the audio path will belong to all sites in the system.



- To configure the selected audio path, click **Configure**.
- Specify the desired audio path settings similar to those for a common repeater slot.

5.1.2 Adding a Control Station

This section describes how to configure TRBOnet Server for communication with a control station in a Linked Capacity Plus system.

- In the **Digital Systems** pane, click **Add**. Or, in the **Configuration** pane, right-click **Digital Systems**.
- In the drop-down menu, click Add Control Station.

Configuration	Control Station #1	
💣 Service		
😚 Network	Name:	Control Station #1
🛱 Redundancy	Radio ID:	64250
Database	TD Addresses	192.168.10.2 · •
😪 Reports	IP Address:	192.108.10.2 * ¥
Service Management	Mode:	Linked Capacity Plus 👻
X Advanced Settings	System Identifier:	Department 1
Geocoding Servers	_	
Radio Systems	Use the radio for RX E	Data only (GPS Revert or Data Revert)
Services	Playback device:	Speakers (Logitech USB Headset) - マ
Control Station #1	Recorder device:	Line In (2- High Definition Audio Device) 👻 🕫
Advanced Settings	Recorder device.	
PTT over Cellular		
Remote Agents		
Friendly Servers		
Telephony		
<pre>↓ Data Sources</pre>		
Email		
SMS Notifications		
Push Notifications		
📮 License		
Set Defaults		Appiy OK Cancel

• In the **Control Station** pane, specify the following control station-related parameters:

Name

Enter a name for the control station. This name will be displayed in the Dispatch Console.

Radio ID

This is the Radio ID of the radio unit connected as a control station.

Note: This box is populated automatically once you have successfully tested the control station by clicking the **Test** button.

IP Address

Enter, or select from the list, the IP Address of the control station network interface.



Note: This value can be taken from the radio's configuration in MOTOTRBO CPS, in *Network>Accessory IP*.

Test

Click this button to check the connection to the control station. If the test is successful, you'll see the information on the control station you are connected to, such as radio ID, serial number, firmware version, and other relevant information.

Mode

From the drop-down list, select Linked Capacity Plus.

System Identifier

Enter the system identifier. Note that the system identifier should be the same for all control stations and repeaters used in the same radio system.

Use the radio for RX data only (GPS Revert or Data Revert) Select this option to configure the radio channel so that it will on

Select this option to configure the radio channel so that it will only receive data, thus having no transmission capability.

Playback device

From the drop-down list, select the playback device on the PC that will be used to transfer audio data to the connected control station.

Recorder device

From the drop-down list, select the recording device on the PC that will be used to receive audio data from the control station connected via a line-in jack.

• Click **Apply** after entering all the required values. A confirmation dialog will appear, prompting you to save the configuration and restart the TRBOnet Server service. You can also restart the service manually.

5.1.2.1 Advanced Settings

• In the **Configuration** pane, under the corresponding **Control Station**, select **Advanced Settings**.

TRBOnet Linked Capacity Plus — Deployment Guide



Configuration	Advanced Settings
Service Servi	Automatically reset alarm mode Automatically handle call alert Emergency Call/Alarm indication Use front microphone Always transmit when the PTT is pressed ("Impolite" channel access) Use serial port for PTT key up Serial port: TX Timeout: 60 Signaling System: None Allow CSBK Data
Set Defaults	Apply OK Cancel

• In the **Advanced Settings** pane, specify the following control station-related advanced settings:

Automatically reset alarm mode Select this option to reset alarm mode on the control station radio

automatically. It is recommended to enable this option.

Automatically handle call alert

Select this option to automatically redirect call alerts from the control station radio to the Dispatch Console.

Emergency Call/Alarm indication

Select this option so that audio and visual indication is given by the control station radio when an emergency Call/Emergency Alarm is received.

Use front microphone (for PTT key up)

Select this option to use a remote control of the PTT button via a remote speaker microphone on the radio.

Always transmit when the PTT is pressed ("Impolite" channel access)

Select this option so that when the PTT button is pressed, the radio will start transmitting regardless of whether the channel is free or not (that is any transmission in progress will be interrupted).

Use serial port for PTT key up

Select this option to use a remote control of the PTT button via the serial port of the PC, and select the serial port from the drop-down list.



TX Timeout

Enter the time, in seconds, to be used as a voice session limit. When a dispatcher starts any voice session in the Dispatch Console, the ongoing transmission will be interrupted after this TX Timeout expires.

Allow CSBK Data

Select this option so that the GPS data are compressed into a single CSBK data.

5.1.2.2 Audio Paths

The Audio Paths are talk paths of the system to make and receive Voice Calls; in general, they are talk groups. TRBOnet Server requires that all audio paths of a radio system be registered in its configuration. If an audio path is not registered, the TRBOnet operator will not be able to receive and transmit to the corresponding talk group.

• In the **Configuration** pane, under the corresponding **Control Station**, select **Audio Paths**.

Configuration	Audio Paths	
🛷 Service 쥿 Network	Site ID: 1	
韓 Redundancy	Call Type	Group ID Site
Database	Group Call	11 Wide
Reports		
Service Management	Group Call	22 Wide
Advanced Settings	Private Call	
Geocoding Servers	All Call	
Radio Systems		
Services		
Control Station #1		
Advanced Securitys		
T PTT over Cellular		
Remote Agents		
Friendly Servers		
Telephony		
↓ Data Sources		
🔀 Email		
SMS Notifications		
Dev Push Notifications		
📮 License	Add Delete	
Set Defaults	Apply	OK Cancel

- In the **Audio Paths** pane, specify the following Audio Path-related settings:
 - To add an audio path to the system, click **Add**.
 - Make sure the check box in the first column is selected to make and receive voice calls from the selected subscriber.
 - From the drop-down list, select the **Call Type** for the audio path. The available call types are All Call, Group Call, and Private Call.
 - Enter the Group ID, which is an ID of the talk group the dispatcher can make calls to. The Group ID is not applicable for Private Calls and All Calls.



 In the Site column, select either Local or Wide. The value Wide means that the audio path will be available to all sites in the system and not just to the local site.

5.1.3 Enabling Telephony

TRBOnet Server has its own built-in SIP server to support VoIP communications between the radios as well as other SIP-compliant clients.

- In the **Configuration** pane, select **Telephony**
- In the **Telephony** pane, select **Use Telephony**.

Configuration		Telephony
😪 Reports	^	
Service Management		✓ Use Telephony
🔀 Advanced Settings		
Geocoding Servers		SIP Server
🔜 Radio Systems		1 🔽 Internal PBX Server
Services		
Repeater #1		
Privacy		
DDMS service		
Advanced Settings		
MNIS data service		
Advanced Settings		
Audio Paths		
TT over Cellular		
Remote Agents		
Friendly Servers		
Telephony		
Advanced Settings		
Internal PBX Server		
-		Add Delete Test 🔺 🔻
↓ Data Sources	۷.	
Set Defaults		Apply OK Cancel

5.1.3.1 Internal PBX Server

- Make sure the **Internal PBX Server** option is selected in the **Telephony** pane.
- In the **Configuration** pane, select **Internal PBX Server**.



Configuration	Inte	ernal PBX Server				
Configuration Reports Service Management Advanced Settings Radio Systems Radio Systems Services Repeater #1 Advanced Settings Privacy DDMS service MNIS data service Advanced Settings MNIS data service Advanced Settings MNIS data service Advanced Settings MNIS data service Advanced Settings Advanced Settings MNIS data service Advanced Settings Advanced Settings Advanced Settings Advanced Settings Advanced Settings Advanced Settings Telephony Advanced Settings Telephony Advanced Settings Advanced Settings Telephony Advanced Settings Advanced Settings Telephony Advanced Settings Advanced Settings Advanced Settings Telephony Advanced Settings Advanced Settings	^	ernal PBX Server Use Internal PBX Se Local IP: Dispatch Cente User Extension: User Name:	10.10.10	0.99	v ♥ Port:	5060 \$
Set Defaults				Apply	ОК	Cancel

- In the **Internal PBX Server** pane, specify the following parameters:
 - Local IP

Enter the IP address of the PC with TRBOnet Server.

Port

Enter the local UDP port number for the SIP service (5060, by default).

Dispatch Center

User Extension

Enter the user extension number that will be used by the Dispatch Center.

- **User Name** Enter the user name that will be used by the Dispatch Center.
- Note: In addition, make sure that the Private Call audio path has been added to the repeater's Audio Paths (see section <u>5.1.1.5,</u> <u>Audio Paths</u>).



5.2 Configuring TRBOnet Dispatch Console

To start TRBOnet Server, click the corresponding shortcut on the desktop, or click **Start > All Programs > Neocom Software > TRBOnet Dispatch x.x**

The dialog box will appear prompting you to enter the TRBOnet Server IP address, User Name, and Password. The default Administrator credentials are *admin* for the login and *admin* for the password.

For a more detailed information on how to use TRBOnet Dispatch Console, refer to *TRBOnet Enterprise User Manual*.

5.2.1 Registering Radio Groups

Go to **Administration** (1), **Radio Group** (2) to add/edit/delete Radio Groups in the system.

File View Map Tools Help						
Administration	Radio Groups					🔮 🐠 🛂
🔒 Disabled Radios 	Intercom Group 10 Private Call) & 0) & 0) & 0	Sroup 20	ۯ •)€Ø	All Call	•) •: Ø
Logical Groups Radio Groups Radio S	Name Cleaners	∆ Radio ID 30	5	Ø Default Settin DC / Sel-5 (Hex)	Descriprion Cleaning group	
Voice Dispatch	Firemen Police	20 10	0			
Location Tracking	3					
Route Management						
Text Messages						
Voice Recording						
Radio Allocation	1					
Administration	Record 1 of 3	► ₩ 4				Þ
🔂 127.0.0.1 🛞 🕵 🧕 Administrator 🗉	🚦 Licensed to: demo Demo L	icense				🗸 Active -

- Click Add (3) to add a radio group to the system:
- In the dialog box that appears, specify the **Name** and **Group ID** (Radio ID) of the group you are adding.
- Note: Make sure that the radio group(s) created in the Dispatch Console are present in the radio's RX Group List (see section <u>4.3.4, RX Group Lists</u>). In addition, make sure these radio groups have been added to TRBOnet Server as Audio Paths.



5.2.2 Registering Radios

Go to **Administration** (1), **Radios** (2) to add/edit/delete Radios in the system.

File View Map Tools Help								
Administration	Radios							👲 🐠 🕒
Dispatcher Groups Dispatchers Dispatchers Email Groups SMS Groups SMS Groups Users	 1: Line free Private Call Group 20 			Intercom Group 10 All Call)) (0		
Logical Groups	Registered		adio Radio ID	V 🛃 Add WA	VE Radio 📑	1	t Mobile 📑	
Voice Dispatch	 125 13 235 	Digital Radio Digital Radio Digital Radio	125 13 235	0 0 0	235	11; Firemen All Firemen; P		
Location Tracking	3333555	TRBOnet Mobile Digital Radio	3333 555	0	3333	11; 22 All		
Sob Ticketing	💰 Radio 300	Digital Radio	300	3		All		
RFID Tracker Text Messages								
Voice Recording Event Viewer								
Radio Allocation Administration	1	1of6 ▶ ₩ ₩	4					
🚡 127.0.0.1 🛞 🕵 🙎 Administrator 🗏	Licensed to: dem		•					Active •

- Click Add Digital Radio (3) to add a new radio.
- In the dialog box that appears, specify the **Radio Name** and **Radio ID**, and **Radio Groups**, to which the radio belongs.



5.2.3 Configuring Telephony

5.2.3.1 Registering SIP extensions

This section describes how to add SIP extensions to TRBOnet Dispatch Console.

- Go to Administration (1), Telephony (2).
- In the **Telephony** pane, click the **Extensions** tab (3), and then **Add** (4).

File View Map Tools Help		
Administration	Telephony	🔮 🚸 🕓
Server Server Batabase Radio Systems System Bridge) .
Specific lings Section Single Section	Configure Calls Extensions Redirect Calls Phone Contacts Dial Plans Calls Edit Delete Manternal Numbers Torouping Auto Filter Default Settings Type 3 User Extension User Name First Name Last Name Display Na Logical	
Voice Dispatch	Dispatch Ce Phone User Spatch Ce Spatch Ce Spatch Ce	
Location Tracking	Stp Phone General Logical Groups Custom Fields Wait Stp Phone User Extension: 2408 Prune User Extension: 2408 Prune	
Route Management	User Password: Password (repeat):	
Voice Recording	First Name: John Last Name: Bingham	
Reports	Display Name: John B.	
Event Viewer		
[행] Radio Allocation	1 ОК Салсе	
Administration	Kecord 1 of 5 F F K K	Þ
🐻 Connected 🖓 🔂 🔂 🔂 🖉 Admir	strator 📑 Licensed to: demo Demo License	🕑 Active -

In the **Phone User** dialog box, specify the following parameters:

User Extension

Enter the extension number that will be used by the phone user.

User Name

Enter the user name that will be used by the phone user.

User Password

Enter the password for the phone user to be authenticated by the telephone system.

Password (repeat)

Enter the password again.

- Fist Name/Last Name/Display Name
 Enter the first, last and display names of the phone user.
- In addition, on the **Logical Groups** tab, specify logical groups for the phone user.
- On the **Custom Fields** tab, specify the desired values for the custom fields.



5.2.3.2 Setting DTMF codes

This section describes how to set DTMF Access and Deaccess codes in TRBOnet Dispatch Console.

Go to Administration (1), Telephony (2), Configure Calls (3) – Configure (4) and

set **Access code** and **Deaccess code** (5) to **0** and **#**, respectively:

Server Universe Disbusces System Bridge System Bridge System Bridge System Bridge Taska Systems Taska Systems System Bridge Taska Systems	Administration	Telephony		
Total Works Total <t< th=""><th></th><th>I: Line free ☐ Intercom ☐ All Cal ⓓ</th><th>Oceaners O Firemen</th><th>•)</th></t<>		I: Line free ☐ Intercom ☐ All Cal ⓓ	Oceaners O Firemen	•)
Wake Client Podie (TRBOnet Mode) Mode Client Podie (TRBOnet Mode) Mode Client Podie (TRBOnet Mode) Mode Client Podie (TRBOnet Comunication) Modulation Tracking Mode Client Podie (TRBOnet Comunication) Modulation Tracking Mode Client Podie (TRBOnet Comunication) Modulation Tracking Modulation Tracking Mode Client Podie (TRBOnet Comunication) Modulation Tracking Modulation Trackin	Grads Gates Reds Gates Gates Reds Gates Gates	Radio Call Configuration 3 Access code: Deaccess code: Caliback Request Options Allow radio users to make outgoing colis: Send a OTH® command to request a caliback: Send a text message to request a caliback: Start thromesion:	0 # Radio Call Configuration X Yes Yes Yes, P Deaccess code: 5	
Inbound Call Control Response timeout: 120 → seconds Inbound Call Control Call to prospitter on them: Forme If Ones (Frado is available before establishing the call Interactive Voice Response (IVR) Options Forme If Maximum number of digit: 3 Voice Recording Namum number of digit: 3 Accept code: # Number Call and Stations Image: Call and Stations Image: OK Control 10 Aunders / Call and Rado 235 Call and Rado 235 S Call depatcher (my svallable)	Mobile Client Profile (TRBOnet Mobile) Mobile Client Profile (TRBOnet Communicat Trate Toole Mobile Client Profile (TRBOnet Communicat	Response timeout: Check if radio is available before establishing the call: Missel Call indeficiations: Play sound on the phone when PTT is pressed or released: Configure 4	100 per IF Send a DTMF command to request a caliback Yes IF Send a bit message to request a caliback Yes Use this prefix in text messages: Yes Start messages: Yes Immediately Phone-to-Radio Calls	
Image: Revised Management Call bu urregistered number: Forme Interactive Voice Response (VR) Options Do not mail for Accept code: Forme Image: Call bu urregistered number: Forme Image: Call bu urregistered number: <th>🔡 Job Ticketing</th> <th>Inbound Call Control</th> <th>Response timeout:</th> <th></th>	🔡 Job Ticketing	Inbound Call Control	Response timeout:	
Text messages Maxmun number of digits: 3 Sound level: Voice Recording Accept code: # Organization 0 Call de 1 of kmber > Call and or Rado 1D = of kumber > Total radio Allocation 1235 Call and or Rado 235 Sec Call depatcher (any available)		Call to unregistered number: Interactive Voice Response (IVR) Options	Forwa	
Reports 0 Cal de 0K Cancel 1<0kmber > Cal nado with Rado DJ = <0kunber > 0K Cancel 12 S Cal nado with Rado 235 56 Cal depatcher (any available)	<u> </u>	Maximum number of digits: Accept code:	3 Sound level: - + +	
1 56 Call dspatcher (any available)	Reports	0 1 <number></number>	Call de OK Cancel Call radio UD = <number></number>	
	Radio Allocation Administration	56		