



TRBOnet Enterprise/PLUS Linked Capacity Plus

Deployment Guide

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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

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АРАС	+61 28 607 8325	<u>http://kb.trbonet.com</u> — online knowledge base

2 System Components and Terms

2.1 TRBOnet Software

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 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.

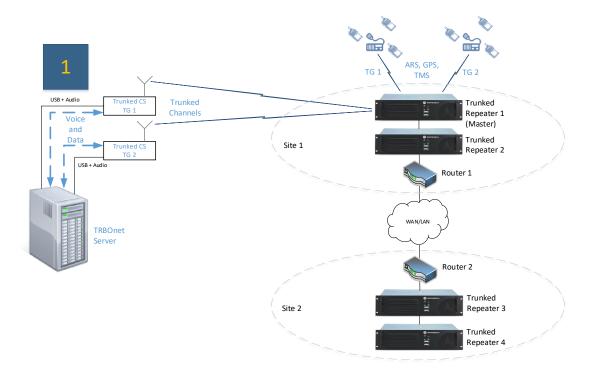


Figure 1: System with Trunked Control Stations



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.

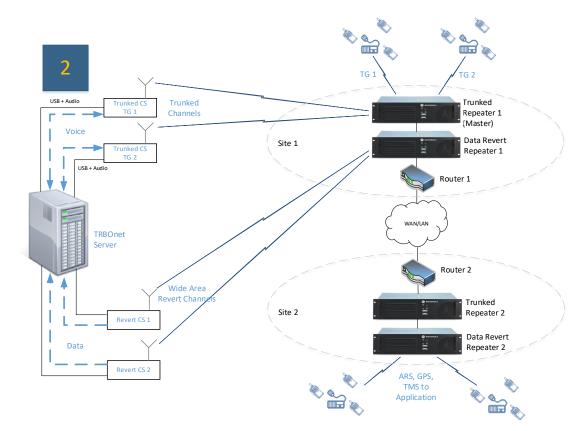


Figure 2: System with Trunked Control Stations and Wide Area Revert Control Stations



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.

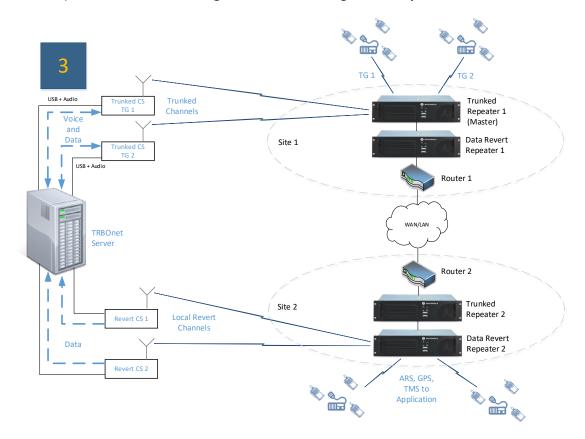


Figure 3: System with Trunked Control Stations and Local Revert Control Stations



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.

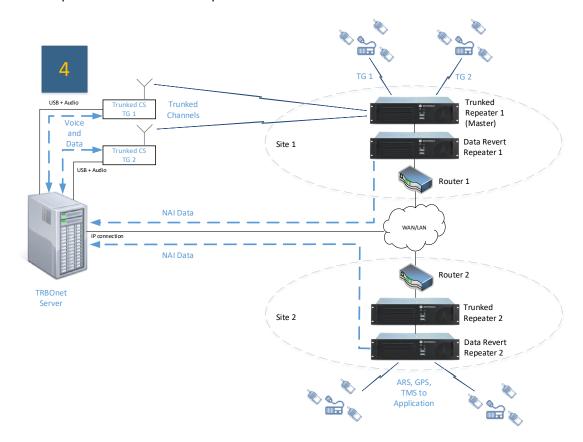


Figure 4: System with NAI Data and Trunked Control Stations



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.

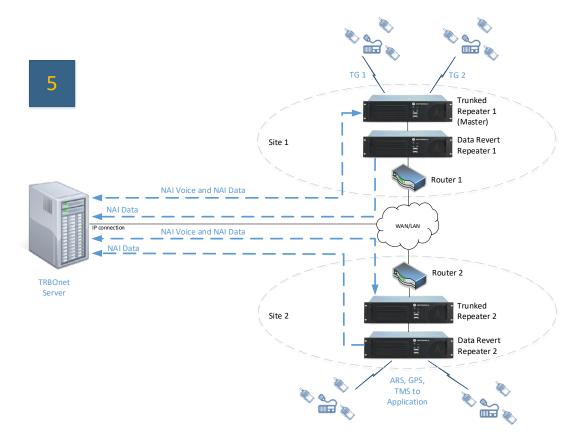


Figure 5: System with NAI Data and NAI Voice



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).
 Or, if an IP connection is available and the network parameters are known (Remote > IP System Settings), establish a connection to your remote repeater (Remote > Connect).
- Click the **Read** button on the toolbar.

B	1 🚔			×	K.	Ba	龠			▶ ₿	⊳ ⊿		192.168.11.1		
					00				• x		U		192.168.11.1	-	
RM	Open	Save	Reports	Delete	Cut	Copy	Paste	Search	Read	Write	Clone	Bluetooth	152110011111		L

4.1.1 General Settings

• In the left pane, select General Settings.

DR 3000	General Settings
Accessories	Top CWID Voting Microphone
Security	Radio Name C+ Master
Link Establishment	Radio ID 222
🕻 🆓 Talkgroups	SIT (ms) 6000
. Hornels (Hannels) (Hannels)	Group Call Hang Time (ms) 3000
	Private Call Hang Time (ms) 4000
	Emergency Call Hang Time (ms) 4000
	Call Hang Time (sec) 3 🗧
	Repeat Gain (dB)
	Antenna Relay Delay Timer (ms)

• In the **General Settings** 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 left pane, select **Network**.

DR 3000	Network
🛛 Accessories	Top Radio Network Network Setting IP Repeater Programming
Network	Radio IP 172 168 0 1 Accessory IP 172.168.0.2 Netmask 255.255.255.0
⊞ 📄 Channels	Radio Network
	CAI Network 12 -
	Network Setting
	DHCP Ethernet IP 192 . 168 . 1 . 15
	Gateway IP 192 168 1 1 Gateway Netmask 255 255 0
	IP Repeater Programming
	Enable

- In the **Network** 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

• In the left pane, select Link Establishment.

DR 3000	Link Establishment
Accessories	Top IP Site Connect Capacity Plus
Network	Link Type Master
(∰ Talkgroups ⊞ (Channels	Master IP 10 . 10 . 188 . 35
	UDP Port 50000 ÷
	Peer Firewall Open Timer (sec)
	Master Archive File
	IP Site Connect
	Beacon Duration (ms) 4320 + Beacon Interval (sec) 60 +
	Capacity Plus
	Site ID 1 =
	Beacon Duration (ms) 180 -
	Beacon Interval (ms)
	Rest Channel/Site IP 192 . 168 . 1 . 10
	Rest Channel/Site UDP Port 55004
	Rest Channel TOT (min) 8

- 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 left pane, under **Channels**, right-click **Zone** and from the drop-down menu, select **Add** > **Capacity Plus Voice Channel (Linked)**.



		gs		Zone1												
	Accessories						Drag o	hannels to desi	ired positic	n						
	 Security Network Link Establishr Sites 	nent	nt		n	Channel Name	Channel Bandwidth (kHz)	Squelch	Squeich Level	Wireline Mute GPIO Pin	Voice Emphasis	Color Code	System Controller Mode			
	Talkgroups		▶ л.⊚			Channel1	N/A	N/A	6 ÷	N/A	N/A	1 📫				
: 	Channels	Add		•	А	nalog Channel		Shift+F5								
		Cut Copy Paste	Ctrl+X Ctrl+C Ctrl+V		C	igital Channel lynamic Mixed Mode apacity Plus Voice C apacity Plus Data Ch	hannel	Shift+F6 Shift+F11 Shift+F8 Shift+F9								
		Delete Renam Sort	Del e F2	•	c	apacity Plus Data Cl apacity Plus Voice C apacity Plus Data Cl	hannel (Linked)	Ctrl+Shift+F8 Ctrl+Shift+F9								
			•										Þ			

 In the left pane, right-click the channel you have added and from the dropdown menu select **Rename**, or select the channel and just press **F2** on the keyboard. Enter a new name for the channel, for example, "LCapPlus_V".

DR 3000 DR 3000 General Settings		LCapPlus_V	
		<u>Top RX TX</u>	
Network		Color Code 1	
	Network	Application Interface Phone Messaging Delay Normal	
È… 🚔 Channels È… 🚔 Zone1		RSSI Threshold (dBm)	
LCapPlus_V		IF Filter Type Wide 💌	
		Slot 1 Channel ID 1	
		Slot 2 Channel ID 2	
	RX		ТХ
		Offset (MHz)	
	Frequency (MHz) 146.420000	0.000000	Frequency (MHz) 167.420000
	Ref Frequency Default -	Сору	Ref Frequency Default
			Power Level High
			TOT (sec) 60 .

- In the **Channel** 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.

- 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.
 - Note: Make sure that the channel you have added is the first in the list of channels as the repeater will work on the channel which is on top of the list.



	DR 3000							Z	one1						
	🞈 Accessories							Drag channel	s to desired posi	tion					
	Security Setwork Link Establishment Sites		Position	Channel Name	Channel Bandwidth (kHz)	Squeich	Squeich Level	Wireline Mute GPIO Pin	Voice Emphasis	Color Code	Network Application Interface Phone	System Controller Mode	IP Site Connect	Messaging Delay	RSSI Threshold (dBm)
		₽₹	\bigcirc	LCapPlus_V	N/A	N/A	6 🕂	N/A	N/A	1 📑			N/A	Normal	-100
		n (0)	2	Channel1	N/A	N/A	6 ÷	N/A	N/A	1 🔅			None	Normal	-100
	Channel1	•													

4.1.4.2 Adding a Data Channel

• In the left pane, under **Channels**, right-click **Zone** and from the drop-down menu, select **Add** > **Capacity Plus Data Channel (Linked)**.

DR 3000	igs		Zone1													
			Drag channels to desired position													
Network	ment	ent		tion	Channel Name	Channel Bandwidth (kHz)	Squelch	Sq Lev	uelch /el	Wireline Mute GPIO Pin	Voice Emphasis	Color Code		Network Application Interface Phone	System Controller Mode	IP Site Connect
Talkgroups		▶ n.o	1		Channel1	N/A	N/A	6	÷	N/A	N/A	1	÷			None
Channels									1							
	Add		•	Δ	nalog Channel		Shift+F5		1							
	Cut	Ctrl+X		0	igital Channel		Shift+F6									
	Сору	Ctrl+C		0	ynamic Mixed Mode	Channel	Shift+F11									
	Paste	Ctrl+V		C	Capacity Plus Voice C	Channel	Shift+F8									
	Delete	Del		c	Capacity Plus Data Cl	hannel	Shift+F9									
	Rename			c	Capacity Plus Voice C	Channel (Linked)	Ctrl+Shift+F8									
		6 12		c	Capacity Plus Data Cl	hannel (Linked)	Ctrl+Shift+F9									
	Sort		•													

• In the left pane, right-click the channel you have added and from the dropdown menu select **Rename**, or select the channel and just press **F2** on the keyboard. Enter a new name for the channel, for example, "LCapPlus_D".

DR 3000 DR 3000 General Settings	LCapPLus_D
	Top Enhanced GPS RX TX
Security Security	Color Code 1 📩 Messaging Delay Normal 💌 RSSI Threshold (dBm) 100 🛨 IF Filter Type Wide 💌 Wide Area 🗌 Elset 1 Channel ID 33 🚔
	Sidt 2 Chennel ID 34 Enhanced GPS
	Enable Window Periodic Window Shared Channel Size Reservation (%) Frequency
	Stot 1 8 7 75 7
	RX TX
	Offset (MHz)

• In the **Channel** 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 1-6.

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

	DP4801	^	General Settings	
	General Settings		Ceneral Cetaings	
			Top CWID Audio Profile Microphone Backlight Battery Saver Alerts Over-the-A	ir Proc
	Buttons		Persistent LRRP Requests Lone Worker Power Up Password and Lock Front Programmin	a Dee
	Text Messages		Persistent LRRP Requests Lone Worker Power Up Password and Lock Front Programmin	<u>g ras</u>
	💷 Telemetry		Delete All 5 Tone Radio ID	
	🛅 Menu			^
			Radio Name Control Station	
	Network		Select	
[🕂 ···· 🚞 Job Tickets		Welcome Image	
[🕂 🖳 Signaling Systems		Remove	
[🗄 🖻 Encoder			
[🛨 💼 Decoder			
[E Contacts		Radio ID 64250	
[🗄 🖻 RX Group Lists		·	>
r	L. Channele	▼ 1		/

4.2.1 General Settings

- In the left pane, select General Settings.
- In the General Settings 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
64250
192.168.10.2 🔻 🕫
Linked Capacity Plus
Department 1



4.2.2 Network

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

DP4801	Network	
Accessories	Top Radio Network Services Control Station IP Site Connect Bluetooth Bluetooth Serial Port Profile Dat USB HID Data Routing	ta i
····· 🔯 Text Messages ····· 💷 Telemetry ····· 💼 Menu	Radio IP 192 . 168 . 98 . 1	^
Security Network Notwork Notwork Nonuncement	Accessory IP 192.168.98.2 Netmask 255.255.256.0	
	Bluetooth IP 192.168.99.1 Bluetooth Accessory IP 192.168.99.2 USB DNS-SD Interval 90 sec V	
È È Decoder Contacts È È RX Group Lists	Radio Network	
⊕ 📄 Channels ⊕ 📄 Scan ⊕ 📄 Roam	CAI Network 12 ÷	
Em Capacity Plus	CAI Group Network 225 ÷ Max TX PDU Size (bytes) 750 ▼	
	Telemetry UDP Port 4008 Forward to PC Via USB	~

• 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 5.1.2, Adding a Control Station.

Control Station #1	
Name:	Control Station #1
Radio ID:	64250
IP Address:	192.168.10.2 v
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 left pane, select **Contacts** > **Capacity Plus** and right-click it. Click **Add** > and from the drop-down menu select the type of a call you want to add a contact for.

3 (4801 General Settin	as		Digital								
	🧔				Contact	Name		Call ID	Connection Type	Route Type	Call Receive Tone	Ring Style	Text Message Alert Tone
	(10)	Telemetry		Ւոցն					🛨 USB	Regular		No Style	Repetitive
	7	Menu		лав	Firemen			20	🛨 USB	Regular		No Style	Repetitive
		Security											
		Network											
	(0)	Announcemen	t										
E	8 💼	Job Tickets											
Ē	j 🧰	Signaling Syst											
		· ····································	ems										
E		Encoder	ems										
	9 💼		ems										
E	3 (C	Encoder Decoder Contacts	ems										
E	8 (8 (8 (8 (Encoder Decoder Contacts	enis										
E		Encoder Decoder Contacts 5 Tone MDC											
E		Encoder Decoder Contacts 5 Tone MDC											
E		Encoder Decoder Contacts 5 Tone MDC				Group Call	Ctrl+F7						
E		Encoder Decoder Contacts - 5 Tone - MDC - Quik-Cai	II II			Group Call Private Call	Ctrl+F7 Ctrl+F8						
E		Encoder Decoder Contacts - 5 Tone - MDC - Quik-Cal	III Add Cut (Ctrl+X									
E		Encoder Decoder Contacts - 5 Tone - MDC - Quik-Ca - 1 - 1 - 1 - Ca	LII Add Cut C Copy C	Ctrl+X Ctrl+C		Private Call All Call	Ctrl+F8						
E		Encoder Decoder Contacts - 5 Tone - MDC - Quik-Ca - 1 - 1 - 1 - Ca	LII Add Cut C Copy C	Ctrl+X		Private Call	Ctrl+F8 Ctrl+F9						

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

4.2.4 RX Group Lists

 In the left pane, select RX Group Lists > Capacity Plus. Right-click it, and choose Add > RX Group List.

			Li	st_LCP_TG1	0	
- 1						
	Security		Available		Members	
	Network					
(0)))	Announcement		rg 20		TG 10	
🕂 🕂 🗎	Job Tickets	1	rg 77			
🕂 🗀	Signaling Systems					
🗄 … 🚞	Encoder			Add >>		
÷ 🚞	Decoder					
🗄 🚞	Contacts			<< Remove		
🚊 🗠 🔁	RX Group Lists					
÷.	- 🚞 Digital					
<u> </u>	- 💼 Capacity Plus					
	🛶 👌 🖹 List_LCP_TG10					
	👬 List_LCP_TG20					
±.	Flexible RX List					
🗄 ··· 🚞	Channels					
🗄 🚞	Scan					
🗄 🧰	Roam					
÷ 🗀	Capacity Plus					

- 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.



4.2.5 Channel

4.2.5.1 Important Notes

Depending on its role in a Linked Capacity Plus system (Trunked Control Station or Data Revert Control Station), 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 Adding a Capacity Plus Personality Channel

🔟 Tele		^				Channels	
im Seci						Drag zones to desired position	
Netv							
	ouncement					Set Voice Files Clear Voice Files	
🕂 🖮 🚞 Job	Tickets			Position	Zone Name	Voice Announcement File	
🗄 💼 Sign	naling System:	s			Zone1	None	
🗄 💼 Enco	oder		1	2	Channel Pool	None	
T _	oder						
— —	itacts						
	Group Lists						
	Zon	Add		• z	one Ctrl+F2		
		Cut (Ctrl+X				-
		Сору (Ctrl+C				1
÷ 🗊	Cha	Paste (Ctrl+V				
🗄 📄 Scar	n	Sort					
🕂 🗀 Roa	im	_					
🕂 ···· 📄 Cap	acity Plus	\sim					

• In the left pane, select **Channels**. Right-click it, and choose **Add** > **Zone**.

In the left pane, select the zone you have added. Right-click it, and choose
 Add > Capacity Plus Personality (Linked).



	DP4	4801							Zon	⊳ 1			
	····· SET	General Setti	ings						2011	61			
	🮈	Accessories						Drag	channels to	desired posit	ion		
	💷 🔳	Buttons						Set Voice	Files	Clear Voice F	iles		
	🖂	Text Messag	ges						1103		100		
	101	Telemetry											
	1	Menu			Position		Channel	Voice Announcer	ont File		Channel Bandwidth	Dual Capacity	Timing Leader
		Security			Position		Name	Voice Announcen			(kHz)	Direct Mode	Preference
		Network											
	(0))	Announceme	ent	▶ <mark>n</mark> ⊗			IPSC1	None			N/A		Eligible
	÷ 🗎	Job Tickets											
	÷ 🚞	Signaling Sys	stems										
	÷ 🚞	Encoder											
	÷ 🚞	Decoder											
	÷ 🚞	Contacts											
	Ė 🚞	RX Group Lis	sts										
	Ġ 🗎	Channels											
	Ġ	- 🔁 Zone1											
			Add		•		Analog Channel		Shift+F5				
	Đ	- 🕥 Cha	Cut	Ctrl+	۰X		Digital Channel		Shift+F6				
	Ė 🚞	Scan	Cop	v Ctrl+	-c		Capacity Plus Pers	onality	Shift+F7				
	÷ 🚞	Roam	Past	-			Capacity Plus Pers	onality (Linked)	Ctrl+Shift+F7				
	Ē 🛅	Capacity	Faa	ie cun	- V		5 Tone Channel		Shift+F4				
			Dele	ete D	el	-			-				
			Ren	ame F	-2								
			Sort		•								Þ

• In the left pane, select the channel (for example, named LCapPlus_TG10) that has previously been added.

DP4801		LCapl	Plus_TG10		
Accessories		Top	RX IX		
Buttons		100			•
Text Messages		Voice Announcement File	None	~	~
Telemetry		ARS	Disabled		
🛅 Menu					
Security		Privacy			
Announcement		Privacy Alias	Privacy Key1	•	
Job Tickets		450 45-			
		AES Alias	None	•	
Encoder		RAS Alias	None	•	
🕀 💼 Decoder		Option Board		_	
🕂 💼 Contacts					
RX Group Lists		Lone Worker			
白 😑 Channels		Messaging Delay (ms)	60 ÷		
LCapPlus_TG10		Compressed UDP Data Header			
+ Channel Pool		compressed ODP Data Header	None		
🛨 🚞 Scan	01	ver-the-Air Battery Management			
🕀 🚞 Roam		Auto Roam	v		
主 🧰 Capacity Plus				_	
		Site List	Site_1	•	
	Rest	Channel Acquisition TOT (min)	5 🕂		
		Beacon Interval (ms)	1920 ÷		
		Channel Inhibit			
		RX Only			
	RX			ТХ	
	Emergency Alarm Indication		Contact Name	None	•
	Emergency Alarm Ack		Emergency System	None	-
	Emergency Call Indication			1	_
			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>4.2.7</u>, <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 4.2.3, Contacts.

4.2.5.3 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 left pane, select Channels > Channel Pool. Right-click on it, and choose Add > Capacity Plus Voice Channel.
- In the left pane, select the first channel (for example, named CPlusMaster) that has previously been added.

Network Network Network Network		CPlusMaster	
Job Tickets		TOD RX IX	
🕂 💼 Signaling Systems			
🕂 🧰 Encoder		Color Code 1 ÷	
🛨 💼 Decoder		Phone System Phone_100	
Contacts		Phone_100	•
RX Group Lists			
🛱 🔁 Channels	RX		TX
E Zone1			
E 😭 Channel Pool		Offset (MHz)	
CPlusMaster	(Frequency (MHz)) 167.420000	0.000000	Frequency (MHz) 146.420000
F Scan		Carry	
E Roam	Ref Frequency Default -	Сору	Ref Frequency Default -
	,		,

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>4.3.9, Phone 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.

4.2.5.4 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 4.2.5.1, Important Note).

- In the left pane, select the zone you have added. Right-click it, and choose Add > Digital Channel.
- In the left pane, select the channel (for example, named DataChannel1) that has previously been added.

DP4801	DataChannel1
Accessories	IOP RX IX
Buttons	
Text Messages	<u>Coder Code</u> 1 <u></u> <u> </u>
💷 Telemetry	Repeater/Time Slot 1 -
🛅 Menu	
Security	Phone System Phone_100
Network	ARS Disabled
Dob Tickets	Enhanced GPS
🕀 😑 Signaling Systems	Window Size 8 v
Encoder	
T	Privacy 🕫
Contacts RX Group Lists	Privacy Alas Privacy Key1
E- Channels	
E- Cone1	AES Allas None -
DataChannel1	RAS Allas None -
E Channel Pool	
🕀 💼 Scan	Option Board
🗄 🧰 Roam	Option Board Trunking
🗄 ··· 🚞 Capacity Plus	Lone Worker
	Allow Tskaround
	IP Site Connect
	Messaging Deby (ms) 60 👘
	Compressed UDP Data Header None
	Text Message Type Proprietary 💌
	Over-the-Air Battery Management
	Channel Inhibit
	RX only
	RX TX
	Offset (MHz)
	Frequency (MHz) 159.682500
	Copy
	Ref Frequency Default

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).
- 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.

4.2.6 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 left pane, select Capacity Plus > Voice. Right-click on it, and choose Add > Capacity Plus Voice List.

Network O Network O N Announcement	^	VoiceList_1						
	6	Available	Members	IDs				
Encoder Decoder		CPlusPeer1	CPlusMaster	1-2 3-4 5-6				
Contacts RX Group Lists			Add >>	7-8 9-10 11-12				
⊞ — Channels ⊞ — Channels			<< Remove	11-12 13-14 15-16				
	.ist_1							
主 📄 Data	~		I					

- 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.

4.2.7 Capacity Plus Site List

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

- In the left pane, select Capacity Plus > Sites. Right-click on it, and choose Add > Capacity Plus Site List.
- In the left pane, select the Site List you have added (for example, named Site_1).

Security	^				Site_1		
					RSSI Threshold (dBm)	108 •	
Signaling Systems Encoder					Add Delete		
Decoder Contacts		Site ID	/ Site Alias	Voice Announcement File	Voice List	Data List	RX Group List
E RX Group Lists		1	Site1	None	VoiceList_Site_1 VoiceList_Site_2	DataList_Site1 DataList_Site2	List_LCP_TG10 List_LCP_TG20
Channels Gan		V -	• Shez	NOTE	VOICELISI_SWE_Z	DataLISI_Site2	LISI_LCP_1020
🕀 📄 Roam							
Capacity Plus							
🕂 🧰 Data							
🗎 💼 Sites	_						

- In the right pane, click the **Add** button.
- 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.

• 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.

-	DP480		General Settings	
	SET	General Settings		
		ccessories	Top CWID Audio Profile Microphone Backlight Battery Saver Alerts Over-the-Air Programming Persistent LRRP Rev	que
	💷 E	luttons	Lone Worker Power Up Password and Lock Front Programming Password Delete All 5 Tone Radio ID	
	····· 🖂 T	ext Messages	Lone worker Fower ob Fassword and Lock Front Front Front Programming Fassword Denete Air S Tone Radio D	
	🚥 T	elemetry	Radio Name Radio 235	^
	- 🔚 N	lenu	Radio Later (Radio 256	
	s	ecurity	Select	
		letwork		
		Announcement	Welcome Image Remove	
	庄 - 🧰 J	ob Tickets		
		ignaling Systems		
	T	incoder		
	Ē. 🔁 🛛	Decoder	Radio ID 235	
	T -	Contacts	GPS) 🗸	
	T	X Group Lists		
	T -	Channels	GNSS GPS/QZSS V	
	- <u>-</u>	ican v		
<	ф 🗖 🧧	>	Private Calls	~

4.3.1 General Settings

- In the left pane, select General Settings.
- In the General Settings 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.

GPS

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 left pane, select **Network**.
- In the **Network** pane, click the **Radio Network** link, or scroll down to the Radio Network section.

DP4801				Ne	etwork		
General S	_						
🞈 Accesso	ries <u>Top</u>	Radio Network	Services	Control Station	IP Site Connect	Bluetooth	Bluetooth Serial Port Profile Data F
Buttons	USB	HID Data Routing					
Text Mes	sages	no oddi rooding					
💷 Telemetry	/			Radio IP	192 . 168	. 10 . 1	^
🛅 Menu				\sim			
🐨 Security				Accessory IF	192.168.10.2		
Network				Netmask	255.255.255.0		
	ement						
🕂 🖮 🚞 Job Ticke	ets			Bluetooth IP	192.168.11.1		
🕂 📄 💼 Signaling	Systems		В	luetooth Accessory IF	192.168.11.2		
🕀 🚞 Encoder		_					
🕀 💼 Decoder				Radio	Network		
🕂 💼 Contacts							_
🕀 💼 🛚 RX Grou	p Lists			CAI Network	12 ÷		
🕂 💼 Channels	a						
🕂 🚞 Scan				CAI Group Network	225 ÷		
🕀 🚞 Roam			Max	TX PDU Size (bytes)	750 💌		
🕂 📄 Capacity	Plus						
				Telemetry UDP Port	4008 🛨		
				Forward to PC			
				I Of Ward to PC	Disabled	•	
				Sei	vices		
				00	1000		-
				ARS Radio ID	64250 ÷		
				100.0			
				ARS IF	13.0.250.250		
				ARS UDP Port	4005 ÷		
				TMS Radio ID	64250 🗧		÷
	1						

• In the **Radio Network** section, specify the following parameter:

Forward to PC

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

- In the Services section, specify the following parameters:
 - 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 5.1.1, Adding a Master Repeater), or Radio ID in the Control Station settings if the control station is connected to TRBOnet Server via USB (see section 5.1.2, Adding a Control Station), or MNIS Application ID, if MNIS is enabled (see section 4.5, Configuring MOTOTRBO MNIS). The recommended value is 64250 for both parameters.



4.3.3 Contacts

In the left pane, select Contacts > Capacity Plus and right-click on it. Click
 Add > and from the drop-down menu select the type of a call you want to add a contact for.

— …	.	DP4801 General Setti	inas			Capacity Plus							
		 Accessories Buttons Text Messac 			Contact	Name	\supset	Call ID	Connection Type	Route Type	Call Receive Tone	Ring Style	Text Messag Alert Tone
	(Telemetry						10 -	USB	Regular		No Style	Repetitive
	· '	Menu		Cað	TG 20			20 -	USB	Regular		No Style	Repetitive
				TG 77			77 -		Regular		No Style	Repetitive	
		Network			Radio 12				USB	Regular	~	No Style	Repetitive
6		Job Tickets Signaling Sys Encoder Decoder Contacts MDC MDC Quik-C Digital Gapar											
		- 689 -	Add		•	Group Call	Ctrl+F7						
			Cut	Ctrl+X		Private Call	Ctrl+F8						
			Сору	Ctrl+C		All Call	Ctrl+F9						
		- () • •	Paste	Ctrl+V		Dispatch Call	Ctrl+F10						
r		RX Group L	Sort		•	PC Call	Ctrl+F11						Þ

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

4.3.4 RX Group Lists

 In the left pane, select RX Group Lists > Capacity Plus. Right-click on it, and choose Add > RX Group List.

101 Telemetry	^	Li	st_LCP_TG1	0	
Tel Menu					
				Marshare	
Network		Available		Members	
		TG 20		TG 10	
🗄 🗠 💼 Job Tickets		TG 77			
🗄 🖻 📋 Signaling Systems					
🗄 🖻 Encoder			Add >>		
庄 🖳 Decoder					
🗄 💼 Contacts			<< Remove		
🚊 🗠 🔁 RX Group Lists					
🕀 \cdots 💼 Digital					
🖃 💼 Capacity Plus					
🖓 🛱 List_LCP_TG20					
🕂 🗁 💼 Flexible RX List					
Channels					
🕀 💼 Scan					
🗄 🗠 💼 Roam					
🛨 💼 Capacity Plus	v				

- 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 a Capacity Plus Personality Channel

• In the left pane, select **Channels**. Right-click on it, and choose **Add** > **Zone**.

		Telemetry Menu	^				Channels	
		Security					Drag zones to desired position	
		Network		L			Set Voice Files Clear Voice Files	
F					Position	Zone Name	Voice Announcement File	
				•	1	Zone1	None	
E	Encoder			1	2	Channel Pool	None	
	ŧ. 📄	Decoder						
	₽····	Contacts RX Group Lists						
E		Channels	_	L				
	ļ.	📄 Zon	Add		× z	one Ctrl+F2		
			Cut	Ctrl+X				~
			Сору	Ctrl+C				
	÷.	- 🕥 Cha	Paste	Ctrl+V				
	‡) 📄 ‡) 🥅	Scan Roam	Sort		•			
	<u>+</u> 📄	Capacity Plus	~					~

 In the left pane, select the zone you have added. Right-click on it, and choose Add > Capacity Plus Personality (Linked).

	DP4					Zone1						
		General Settings				201101						
	🮈	Accessories			Drag channels to desired position							
	🔲 🔳	Buttons		Set Voice Files Clear Voice Files								
	🖂	Text Messages										
-	101	Telemetry										
	🖬	Menu		Position	Channel	Voice Announcement File	Channel Bandwidth (kHz)	Dual Capacity Direct Mode	Timing Leader			
-	···· 0	Security		1 OSIDON	Name	Voice Amouncement inc			Preference			
		Network						-				
	@))	Announcement	▶ n. ⊜	1	IPSC1	None	N/A		Eligible			
ŧ	···· 💼	Job Tickets				l						
Ė	···· 💼	Signaling Systems										
Ė	···· 💼	Encoder										
Ė	···· 💼	Decoder										
÷	🧰	Constants.										
		Contacts										
Ē	_	RX Group Lists										
÷.] 🛅											
1] 🛅	RX Group Lists Channels										
1] 🚞] 🚞	RX Group Lists Channels	dd	•	Analog Channel	Shift+F5						
1] 🚞] 🚞	RX Group Lists Channels	dd Cut Ctri		Analog Channel Digital Channel	Shift+F5 Shift+F6						
1]] 	RX Group Lists Channels Zonat r. () Cha		I+X	-	Shift+F6						
		RX Group Lists Channels Zona no Cha Cha Scan Cha Cha Cha Cha Cha Cha Cha Cha Cha Cha	ut Ctr	+X +C	Digital Channel	Shift+F6 sonality Shift+F7						
] ()] () []] ()] ()	RX Group Lists Channels Chan Chan Co Scan Co Roam P Capacity	Cut Ctri Copy Ctri Paste Ctri	+X +C +V	Digital Channel Capacity Plus Pers	Shift+F6 sonality Shift+F7						
] ()] () []] ()] ()	RX Group Lists Channels Chan Chan Co Scan Co Roam P Capacity	Cut Ctri Copy Ctri Paste Ctri Delete I	+X +C +V Del	Digital Channel Capacity Plus Pers Capacity Plus Pers	Shift+F6 sonality Shift+F7 sonality (Linked) Ctrl+Shift+F7						
] ()] () []] ()] ()	RX Group Lists Channels Channels Chan Cha Scan Capacity Capacity	Cut Ctri Copy Ctri Paste Ctri Delete I	+X +C +V	Digital Channel Capacity Plus Pers Capacity Plus Pers	Shift+F6 sonality Shift+F7 sonality (Linked) Ctrl+Shift+F7						

• In the left pane, select the first channel (for example, named LCapPlus) that has previously been added.



⊟ ।		801 General Settings		LC	apPlus		
		Accessories		Top	RX IX		
		Buttons		100			
		Text Messages		Voice Announcement File	None	-	^
-		Telemetry					
	🛅	Menu		ARS	On System/Site Change		
-		Security		Privacy			
-		Network		Privacy Alias			
-		Announcement		Privacy Alas	Privacy Key1	-	
Ē	J 🚞	Job Tickets		AES Alias	None	•	
±	 	Signaling Systems					
Ē	_	Encoder Decoder		RAS Alias	None	•	
Ē		Contacts		Option Board			
Ē	_			Lone Worker	-		
Ē		Channels					
T		- 😑 Zone1		Messaging Delay (ms)	60 🛨		
	T	CapPlus		Compressed UDP Data Header	None		
	÷	Channel Pool			·		
Ē	J 🚞	Scan		Over-the-Air Battery Management			
Ē	_	Roam		Auto Roam	V		
Ē] 🚞	Capacity Plus		(Site List)			
				Site List	Site_1	•	
				Rest Channel Acquisition TOT (min)	5 📫		
				Beacon Interval (ms)	1920 ÷		
				Channel Inhibit			
				RX Only			
			RX			ТХ	
							_
			Emergency Alarm Indication		Contact Name	None 💌	[
			Emergency Alarm Ack		Emergency System	None	[
			Emergency Call Indication		VOX	1	·
					Power Level	High 💌	~
							•

• 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>4.3.8,</u> <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>4.3.3, Contacts</u>.

4.3.5.2 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 left pane, select **Channels > Channel Pool**. Right-click on it, and choose **Add > Capacity Plus Voice Channel**.
- In the left pane, select the first channel (for example, named CPlusMaster) that has previously been added.

Network	<u>^</u>		CPlusMaster	
🕂 🚞 Job Tickets			TOD RX TX	
庄 😑 Signaling Systems				
Encoder			Color Code 1 ÷	
🕀 💼 Decoder	_			
🕀 💼 Contacts		C.	Phone System Phone_100	•
庄 🚞 RX Group Lists				
🕂 🔁 Channels		RX		TX
🖽 💼 Zone1				
📩 👘 Channel Pool			Offset (MHz)	
			0.000000	
CPlusPeer1		Frequency (MHz) 167.420000	0.00000	Frequency (MHz) 146.420000
庄 💼 Scan			Сору	
庄 💼 Roam		Ref Frequency Default -		Ref Frequency Default -
🗄 🗠 🚞 Capacity Plus	¥ /			

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>4.3.9, Phone System</u>.

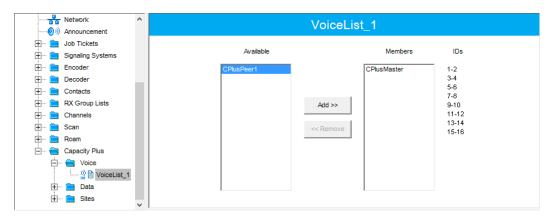
- In the **RX Frequency** box, specify the radio frequency the radio will receive on.
- In the **TX Frequency** box, specify the radio frequency the radio will transmit on.
 - Note: The RX and TX frequencies of the radio must be the opposite to the RX and TX frequencies of the repeater. In other words, 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.



4.3.6 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 left pane, select Capacity Plus > Voice. Right-click on it, and choose Add > Capacity Plus 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.

4.3.7 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 left pane, select Capacity Plus > Data. Right-click on it, and choose Add > Capacity Plus Data List.

101 Telemetry	^		DataList_1							
······ 📷 Menu			Butuelot_1							
Security										
Network		Available		Members						
		CaPlus_D2		CaPlus_D1						
🕂 🚞 Job Tickets										
🕂 🖳 🚞 Signaling Systems										
🕂 🚞 Encoder			Add >>							
🕂 🚞 Decoder										
🕂 🗀 Contacts			<< Remove							
🕂 🚞 RX Group Lists										
🕂 🗂 💼 Channels										
🕂 🚞 Scan										
🕂 🚞 Roam										
🗄 💼 Capacity Plus										
🕂 💼 Voice										
🖻 🗠 💼 Data		Enhanced GPS Win	Enhanced GPS Window Size 5							
🚻 DataLis	:t_1		Enhanced Channel Access							
🕂 💼 Sites		Enhanced Channe								
	× 1									

• 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.

4.3.8 Capacity Plus Site List

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

- In the left pane, select Capacity Plus > Sites. Right-click on it, and choose Add > Capacity Plus Site List.
- In the left pane, select the Site List you have added (for example, named Site_1).

Security	^				Site_1		
→ ⑦ Announcement					RSSI Threshold (dBm)	108 -	
Signaling Systems Image: Signaling Systems Image: Signaling Systems Image: Signaling Systems					Add Delete		
🕀 💼 Decoder		Site ID	/ Site Alias	Voice Announcement File	(Voice List)	(Data List)	RX Group List
Contacts		1	÷ Site1	None	VoiceList_Site_1	DataList_Site1	List_LCP_TG10
RX Group Lists Channels		<mark>▶</mark> 2	Site2	None	VoiceList_Site_2	DataList_Site2	List_LCP_TG20
E Scan		· · · · ·					
E Roam							
占 – 🚖 Capacity Plus							
🕂 💼 Voice							
🕀 🚞 Data							
🖻 💼 Sites							
🕻 🗎 Site_1	~						

- In the right pane, click the **Add** button.
- 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.



4.3.9 Phone System

- In the left pane, select **Signaling Systems > Phone**. Right-click on it, and choose **Add > System**.
- In the left pane, under **Phone**, select the phone system that has been just added.

_	General Settings	Phone_100
	Text Messages Telemetry Menu	Top DTME Gateway ID 100 Access Code 0 Deaccess Code #
	tob Tickets Signaling Systems W User Defined 5 Ton 5 Tone MDC Quik-Call II Digital Emergency Capacity Plus Emer Phone W Phone_100 incoder	DTMF Pretime (ms) 500 • TX Tone Duration (ms) 120 • TX Tone Interval (ms) 80 • Pause Duration (ms) 4000 •
🕂 🖻 c	Decoder Contacts XX Group Lists	

- 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.

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						
o o o 🏟 🎄 🔜 🔜 🐀						
Service	Watcher Settings					
🖃 🙀 Interfaces	PortWatcher	3000				
ARS Settings	WatcherTO	14400				
	NotifyGroup	0				
	NotifyRate	5				
I 🥤 Logging						
	PortWatcher					
	Port listening for Watcher Subscribe requests. Range: 1000 - 65535					
	Hunge. 1000 - 00000					
Settings for Watcher interface						

Settings for Watcher interface

PortWatcher

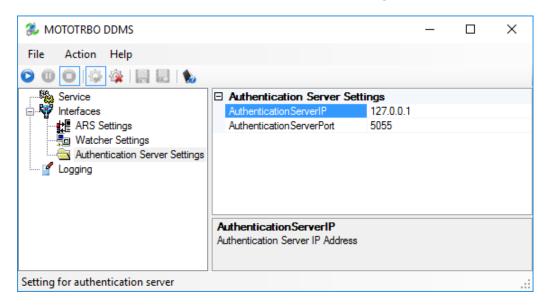
This is the port number for listening TRBOnet Server requests.

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

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.



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	
00 🖗 🎄 🔚 😓 🐁	
Service	□ Service
G 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 *		Х
Configuration View Edit	Service Help		
1			
CAP+ General General Group List Group List Conventional	General		
	System Operation Mode Linked Capacity Plus V MNIS Application ID 64250		
 George Capacity Plus George Capacity Plus 	Tunnel Network		
🕀 📻 Advanced	MNIS IP Address 172.168.10.1 Tunnel IP Address 172.168.10.2		
	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 **172.168.10.1** 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**).

MNIS data service					
🗹 Use Data Gateway					
Service is on a local host					
IP Address:	172.168.10.2	- ¢			
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				
LCAP+ General		List1			
Group List		Group List Type All Groups	Capacity Plus/LCP	~	
📄 💼 Conventional		Group Call	ID Ranges		
Ge Capacity Plus ↓ Capacity Plus		Add	Delete		
🔤 🧹 🗎 Sites		First Call ID	Last Call ID		
🖻 🔄 Advanced		10	10		
······································		20	77		
Application Override 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.



• In the left pane, select Linked Capacity Plus.

MOTOTRBO Network Interfac	e Service Configuration Utilit	y*	_		×
Configuration View Edit	Service Help				
E CAP+		Linked Capacity Plus			
 Security Group List Conventional Generative Plus Linked Capacity Plus 	Master IP / Master U				
🛄 🕻 🗎 Sites	MNIS	LE Port Automatically Assigned	N 1		
		Manually Assigned	None	* *	
	Authenticat	Ø			
	Security	Setting Basic ~			
	Secur	ity Alias 🗸 🗸 🗸			
					.:

- 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).



Configuration View Edit	Service Help					
1						
LCAP+						
- 🚛 Security			Add Delete	•		
🕀 💼 Group List	Site Id	Group List	Outbound Data Limit	GPS Latitude	GPS Longitude	
Conventional	1	List1 ~	2			
Capacity Plus	2	List2 ~	2			
Control Capacity Plus Control Capacity Control Capacity						

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

- 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 Halling *			×
		_		^
Configuration View Edit Service	Help			
	0			
LCAP+ General	Advanced			
- Convertional - Convertional - Convertional	Data Call Confirmed Compressed UDP Data Header None			
 Linked Capacity Plus 	Battery Saver Preamble			
Advanced	Individual Data to Registered Site			
🖙 Forwarding Rules	Selective Forwarding			
Application Override Rules	TX Preamble Duration (ms) 120			
	Conventional Channel Access Normal V			
	MNIS LE ID Use MNIS ID			
				.:



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 Ut	ility *		-	×
Configuration View Edit	Service Help				
1					
⊡· 🛑 Untitled					^
- General		CAI Network	12 ≑		
🖃 💼 Group List		CALCENE Network			
🚽 👸 🗐 List1		CAI Group Network	225 🖨		
Domain 1		S	ervices		
Geo Capacity Plus definition of the second		ARS UDP Port	4005		
🖻 😑 Advanced		TMS UDP Port	4007		
Ketwork Ketwork Forwarding Rules		Telemetry UDP Port	4008		
Application Oven		Location Server UDP Port	4001		
	Bat	tery 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 Discover	y and Mobility Service		
		Server Address	127.0.0.1		
		Watcher Port	3000		
		MNIS Co	ntrol Interface		
	MNIS	Control Interface TCP Port	5000 ≑		
< >>			L		~

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**).

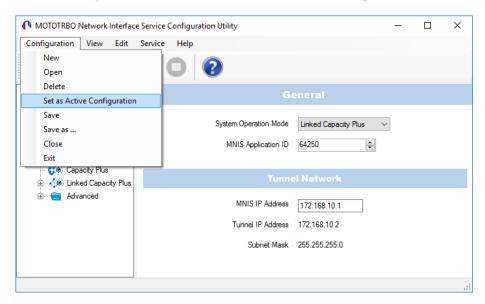
MNIS data service					
🗹 Use Data Gateway					
Service is on a local host					
IP Address:	172.168.10.2	→ ¢			
Control port:	5000	‡			

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

Configuration		Digital Systems			Version: 5.3.0.1703
 Service Network Redundancy 	^	🗹 Enable Digital	Systems		
Database		CAI Network:		12	‡
Reports		CAI Group Netw	ork:	225	÷
Service Management					·
X Advanced settings		Registered Dig	ital Systems		
Geocoding Servers	S	Name		IP Address	Radio ID
Radio Networks					
			1.		
Services	Add MOTOT	RBO System			
💼 Analog Cont 🖶	Add Capacity	MAX			
🔂 Remote Agents 🛛 🚽	Add DIMETRA	A Express			
Friendly Servers	Add Control	Station			
Telephony	Add TRBOnet	Swift Agent			
🐺 Email		FS-1000 Station			
Pres Tocoming Ma	· · · · · ·		Delete		Test
	Add XRC-900	0 Controller			
Set Defau 🚽	Add XRT-900	0 Controller		Apply	OK Cancel
	Add SELEX Re	epeater			
-	Add KAIROS I	Repeater			
4	Add WAVE Co	ontroller			
	AUG WAVE C	oneroner			

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 \land				
🕤 Network	System Name:	Repeater #1		
🛱 Redundancy	TRBOnet Peer ID:	100 🗘	1	
Database	TRBOnet Radio ID:	64250	í .	
😪 Reports	TROUTEL RADIO ID:	•	<u></u>	
Service Management	TRBOnet Local Port:	50000 🗘		
X Advanced settings	Master Repeater Conr	ection Info:		
Geocoding Servers	Master IP Address:	10.10.188.35 -]	
Radio Networks	Master UDP Port:	50000	Test	7
- 🔂 Digital Systems		•	L	<u> </u>
Services	Authentication Key:	123456		
Repeater #1	System Type:	Linked Capacity Plus		-
Advanced setti	System Identifier:	Department 1		
Privacy		Department 1		
DDMS service	Vuse NAI Voice			
MNIS data serv	🗹 Use NAI Data (MNIS an	d DDMS)		
	Use RCM for control rad	dio activity		
Analog Control Station:				
< >				
Set Defaults		Apply	ОК Са	ancel

• 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</u>, <u>Configuring a Subscriber Radio</u>, <u>4.3.2</u>, <u>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.

Configuration		Advanced settings				
♂ Service Network	^	Voice Call Hang Time (ms):			
			_	^	1	
Y ,		Group Call:	3000	÷		
Database		Private Call:	4000	÷		
Service Management		Emergency Call:	4000		1	
		Energency can	1000	•		
		TX Preamble:	120	÷.]	
Radio Networks		TX Timeout:	60	·	seconds	
Digital Systems		TX TIMEOUL.	00	•	seconds	
Services		Phone System:	Motoro	a Phone System		-
Repeater #1						
Advanced settings		Allow CSBK Data				
Privacy						
DDMS service						
🔅 MNIS data service						
Advanced settin						
Audio Paths						
Analog Control Stations	×					
< >						
Set Defaults				Apply	OK	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. The Motorola Phone System is recommended for IP Site Connect mode to minimize Radio response time.

• 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	F	Privacy			Version: 5.3.5.1874
🛷 Service	^				
S Network		Privacy Type:	Enhan	ced 🔻	
🛱 Redundancy		Basic Privacy Key ID:	1	A	
Database		Enhanced Privacy Key	15.		
😪 Reports					
Service Management			ID	Name	Value
💥 Advanced Settings		ARC4 (40 bit) 🔻	1		
→ K Geocoding Servers		ARC4 (40 bit)	1		
Radio Networks		AES (256 bit)			
		AES (256 bit) Legacy			
🛛 🙆 Digital Systems					
Services					
Repeater #1					
Advanced Sett					
Privacy					
🛄 Audio Paths	v	Add	emove		File
< >		Add	emove		
Set Defaults				Apply	OK 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 se	ervice					Version: 5.3.5.1874	
💣 Service 🌍 Network	^	🗸 Use	DDMS	S service					
		Loca	l port	:	0 ‡				
Reports		Serv	ice IP	Address:	127.0.0	.1 •		Test	
Service Management		Serv	ice po	ort:	3000	÷			
Advanced Settings		Auth	entica	ation Port:	5055	÷			
Radio Networks		Red	undan	t services:					
				Service IP A	ddress	ess Service port		Local port	
Digital Systems		1	\checkmark	10.10.101.3	207	3000		0	
Services									
Repeater #1									
DDMS service									
MNIS data service									
Audio Paths	~		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**.

Configuration	MN	IS data service					
A	A						
Service /		Use Data Gateway					
🛱 Redundancy		Service is on a local	host				
Database			170.460	(2.2)			
😪 Reports		IP Address:	172.168.	10.2 * 호			
🔅 Service Management		Control port:	5000	÷	Test		
🔀 Advanced settings		MNIS Service:	MOTOTRI	BO Network Inter	face Service	- \$?	,
Geocoding Servers		Redundant services:				. [.	
Radio Networks		IP Address		Control port	Local port		
- 🐼 Digital Systems		IF Address		Control por c	Local port		-
Services							
Repeater #1							
🛛 💥 Advanced setti							
🌣 DDMS service							
MNIS data serv							
Advanced :							
	,						5
< >		Add De	elete		Test		
Set Defaults				Apply	ок	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	Audio Paths		
🖗 Service 🔨 🔨	Load Groups Map		
🕤 Network	Load Groups Map		
🛱 Redundancy	Call Type	Group ID	Site ID
Database	Group Call	10	Wide
🔒 Reports	Group Call	20	Wide
Service Management	✓ Private Call		
🗶 Advanced settings	All Call		
「人" Geocoding Servers			
Radio Networks			
Oigital Systems			
Services			
Repeater #1			
Privacy			
DDMS service			
MNIS data ser			
Advanced :			
💶 Audio Paths 🗸			
C >	Add Delete		Configure
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.
- 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 <u>slot</u>.

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	
DDMS service MINIS data service Advanced settin Advanced setting Control Station #1 Advanced settings Analog Control Stations Remote Agents Friendly Servers	Name: Radio ID: IP Address: Mode: System Identifier: Use the radio for RX D Playback device:	Control Station #1 64250 192.168.10.2 * Inked Capacity Plus * Department 1 Data only (GPS Revert or Data Revert) Speakers (Logitech USB Headset) * \$
Telephony Advanced settings Internal PBX Server Advanced settings Data Sources COM ports TCP/IP	Recorder device:	Line In (2- High Definition Audio Device) 🔹 🕫
Modbus TCP Email Set Defaults		Apply 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 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**.

Configuration	Advanced settings		
Advanced settings Privacy DDMS service MNIS data service Advanced setting Audio Paths Control Station #1 Advanced settings Audio Paths Analog Control Stations Remote Agents Friendly Servers Advanced settings Telephony Advanced settings Telephony Advanced settings Comports COM ports COM ports COM ports COM ports COM ports COM ports COM ports COM ports COM ports	Automatically reset ala Automatically handle of Emergency Call/Alarm Use front microphone	all alert indication the PTT is pressed ("Impoli	te" channel access) seconds Configure
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.

Signaling system

From the drop-down list, select the signaling system.

- **MDC 1200** signaling is a Motorola data system using audio frequency shift keying (ASFK) using a 1,200 baud data rate. A general option is to enable or disable an acknowledgement (ACK) data packet.
- **SELECT 5** (5 Tone Signaling System). In the 5 Tone Signaling Systems, each radio has a unique numeric identity (for example, 12345).

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	
Configuration Services Repeater #1 Advanced setti Privacy DDMS service MNIS data service Advanced : Advanced : Advanced setti Advanced setti Advanced setti	Audio Paths Site ID: 1 Call Type Call Type Group Call Group Call Private Call All Call	Group ID Site 10 Wide 20 Wide
Analog Control Station: Remote Agents Friendly Servers Celephony Advanced settings Internal PBX Server Advanced settings	Add Delete	
Set Defaults	A	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 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
Configuration Control Station #1 Control Station #1 Advanced setti Advine Paths Advanced settion: Remote Agents Friendly Servers Telephony Advanced settings Internal PBX Server Advanced settings U Data Sources	Telephony Image: SIP Server Image: SIP Server Image: SIP Server
COM ports	
Konstruction Email	
SMS	
- -	Add Delete Test
< >	
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	Internal PBX Server
Audio Paths Audio Paths Audio Paths Advanced setti Audio Paths	✓ Use Internal PBX Server Local IP: 10.10.100.99 ▼ ♥ Port: 5060 €
Analog Control Station:	Dispatch Center
Friendly Servers Telephony Advanced settings	SIP ID: 1234 SIP User: 1234
Internal PBX Server	
CP Modbus TCP	
🔀 Email 😴 SMS 🖵 License	
< > >	
Set Defaults	Apply OK 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

SIP ID

Enter the SIP ID that will be used by the Dispatch Center.

SIP user

Enter the SIP user name that will be used by the Dispatch Center.



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 Dispatcher Groups Dispatchers Dispatchers Dispatchers Small Groups SMS Groups		》 1: Line free ④ ✔ Group 20 • 1 € ②	All Call •) • • • • • • • • • • • • • • • • •
	Add Edit Network Name △ Radio ID Cleaners 30	MDC / Sel-5 (Hex) 5	JS Descriprion Cleaning group
Voice Dispatch	Firemen 20 Police 10	0	
Location Tracking Location Tracking Job Ticketing Route Management RFID Tracker Text Messages	3		
Voice Recording Event Viewer	1		
Administration	in in iteration in the interval of the interva		► ♦ 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</u> <u>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							👲 🐠 🕒
	1: Line free Private Call Group 20	*)) * (;	0	Intercom Group 10	•) •) •) •E	0		
Radio Groups 2	Registered		r		AVE Radio 📑			
Radios 🗸 🗸	Radio Name∆	🛃 Add Digital R	adio Radio I		SIP ID			
< >	125 Radio NameΔ	MOTOTRBO Radio	125	0	125	11; Firemen	Logical Gr	Description
Voice Dispatch	 120 13 	MOTOTRBO Radio		0	120	All	cicaning, m	
Voice Dispatch	235	MOTOTRBO Radio		0	235	Firemen; P	Cleaning	
Location Tracking	3333	TRBOnet Mobile	3333	0	3333	11; 22	_	
Contraction of the second seco	555	MOTOTRBO Radio	555	0		All		
🙀 Job Ticketing	🛞 Radio 300	MOTOTRBO Radio	300	0		All		
Route Management				3				
Text Messages								
Voice Recording								
Event Viewer								
Radio Allocation	_1							
Administration	HI II A Record	1of6 ▶ ₩ ₩	(Þ
🔂 127.0.0.1 🗞 🕵 💆 Administrator 🖾	Licensed to: dem	0						🕑 Active 🗸

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



5.2.3 Registering SIP extensions

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

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

File View Map Tools Help	
Administration	Telephony 🔮 🚳 😉
Server	I: Line free Intercom Intercom Configure Calls Extensions Redirect Calls Aliases Profiles Add Edit X Delete If Grouping Auto Filter @ Default Settings
	SIP Phone SIP User Caption TBBOnet Mobile Client 1234 Internal PBX Server
Voice Dispatch	Radio 125 125 125 Radio 235 235 235
Location Tracking	
Route Management	
Text Messages	1
[행] Radio Allocation	
Administration	HI II Record 1 of 3 + + + H I
🔂 127.0.0.1 🛞 🤶 Administrator 📑 Li	ensed to: demo Demo License 🕑 Active 🗸

• In the dialog box that appears, specify the **SIP ID** and **SIP User** of the SIP user you are adding.