





TRBOnet Enterprise/PLUS MOTOTRBO Link **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. This document describes the steps required to configure communication with a MOTOTRBO Link 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>https://trbonet.com/kb/</u> — online knowledge base



2 System Components

2.1 TRBOnet Enterprise/Plus

The TRBOnet software consists of several modules which enable 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). Two control stations are required to transmit and receive voice and data to/from a repeater, that is, one control station per time slot.



3 System Description

The MOTOTRBO Link system mode consists of Standard repeaters, Link repeaters, Subscribers, Network Application Interface (NAI) and Remote Diagnostic and Alarm Control (RDAC) applications.

The role of the Standard Repeater in a MOTOTRBO Link configuration is essentially the same as a traditional repeater is in a conventional IP Site Connect configuration. The main function of the Standard repeater is to repeat calls received locally over-the-air (OTA) or calls received from the Link repeater on the LAN.

Usually, the site link could be microwave. In MOTOTRBO Link system mode, the role of the Link repeater is unique in that its site link essentially uses an OTA connectivity interface based on Digital Mobile Radio (DMR) protocols. The function of the Link repeater is to forward calls received from an adjacent backhaul site's Link repeater to the next site in the backhaul chain.

Based on location and function, backhaul sites have been defined into three categories:

Origin Site

The Origin Site is the first site in the backhaul chain of repeaters. There is only one Origin Site. Beacons flow towards the Origin Site so that they can be aggregated by the Proxy repeater that is also at the Origin Site.

Interim Site

The Interim Sites are the sites located between the Origin Site and the Terminating Sites in a backhaul chain of repeaters. The number of Interim Sites could be between one and seven. In Dedicated configurations, the Interim Sites must contain at least two Link Repeaters and an optional Standard Repeater.

Terminating Site

The Terminating Site is the site at the end of a backhaul chain.

The system may be deployed with between two and eight MOTOTRBO Link sites. There could be one NAI application and one RDAC connected to the system. Every MOTOTRBO Link site consists of either one or no Standard Repeater, and either one or two Link repeaters. The NAI application can be physically at any site. To monitor presence and alarm status remotely from the MOTOTRBO Link Repeaters, the RDAC must be connected to the Master repeater at the Origin Site.

Synchronization is the key to a MOTOTRBO Link system. It is the role of the Link repeaters to keep all the repeaters within the Backhaul chain synchronized. The GPIO Slot Timing Master Link Repeater at the Terminating Site transmits Beacon messages periodically while the system is idle. GPIO Slot Timing Master Link Repeaters at the Interim/Origin site synchronize to the transmissions. After adjusting the slot boundary, the GPIO Slot Timing Master Link Repeaters



toggle the General Purpose Input/Output (GPIO) pin of the Drop and Link repeater at the same site, then the Drop and Link repeater adjusts their slot boundary.

3.1 System Restrictions

According to the MOTOTRBO System Planner, a MOTOTRBO Link system does not support the following features:

- Transmit Interrupt
- Digital Telephone Patch
- Digital Voting
- Confirmed Group Data
- GPS Revert, Data Revert
- Enhanced/Scheduled GPS
- Repeater Call Monitoring (RCM)
- CSBK Data

Therefore, you need to take into account the above-listed restrictions when configuring your MOTOTRBO Link system.

3.2 System Topologies

There are two possible topologies when using the MOTOTRBO Link system with TRBOnet software.

3.2.1 IP Connection to Repeater

This topology is used when TRBOnet Server has an IP connection to the master repeater. Note the use of NAI Voice and NAI Data in this configuration.

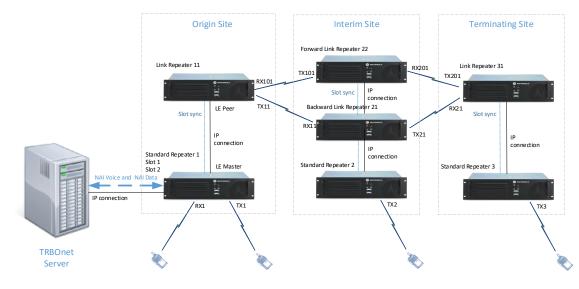


Figure 1 IP Connection to the repeater



3.2.2 Connection via Control Stations

This topology is used when TRBOnet Server doesn't have an IP connection to the repeater. In this case, it can be connected via two control stations (also known as control radios or donor radios).

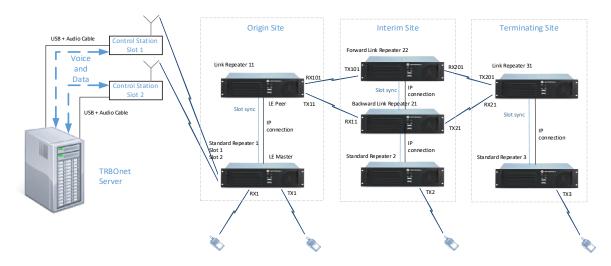


Figure 2 Wireless connection to the repeater



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 Standard Repeater

This section describes how to configure a Standard repeater located at the Origin (Interim, or Terminating) Site of a MOTOTRBO Link 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**.

et Categories 🛛 🗍	General Battery A	larm Type CWID Voting	
▼ ☐ Configuration*			
Device Information			
General General Settings	Radio Alias	Origine Standard	
Accessories	Radio ID	102	
Security	SIT (ms)	6000	
Network	Group Call Hang Time (ms)	3000	
Link Establishment	Private Call Hang Time (ms)	4000	
	Emergency Call Hang Time (ms)	4000	
Sites Talkgroups	Call Hang Time (sec)	3	
Zone/Channel Assignment	Repeat Gain (dB)	0.0	
	Antenna Relay Delay Timer (ms)	100	

• 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 Accessories

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



ategories	a			CTIC 71 - 1 - 1 - 7	
			General	GPIO Physical Pins	
Configuration*					
 Device Information General 	 General 				
♥ ☐ General ☐ General Settings		Analog Acce	ssory Emphasis	De & Pre	•
Accessories			Audio Type	Filtered Squelch	•
Security		מ	(Audio Priority	0	
Network		Repeate	r Audio Priority	0	-
Link Establishment			ole Repeat Path		
MOTOTRBO Link		Debounce	• • Duration (ms)	100	
🗅 Sites					
Talkgroups	 GPIO Physical Pins 				
Zone/Channel Assignment		Feature	Acti	ve Level Debounce	
	GPIO1	External PTT	Low	▼ √	
	GPIO2	Unassigned 🔽	Low		
	GPIO3	Unassigned 🔹	Low		
	GPIO4	Site Slot Sync Input 🔽	Low		
	GPIO5	Unassigned 🔽	Low		
	GPIO6	Unassigned	Low		
	GPIO7	Unassigned	Low		
	GPIO8				

- In the right pane, go to the **GPIO Physical Pins** section.
 - GPIO4

From the drop-down list, select **Site Slot Sync Input**.

Note: For the Link (Peer) repeater on the same site, select **Site Slot Sync Output** for this GPIO. In addition, provide a wired connection between the pins # 16 (GND) and # 23 (SYNC) on the repeaters' rear panels.

4.1.3 Network

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

SLR 5500 • Network*		×
Set Categories 4	General Radio Network Network Setting IP Repeater Programming Time Zone NTP Settings	DNS Addresses
▼		
Device Information		
 General General Settings 	Radio IP 192.168.40.1	
Accessories	Accessory IP 192.168.40.2	
Security	⊘ Radio Network	- 1
Link Establishment	CAI Network 12	Ş
	CAI Group Network 225	
Sites	⊙ Network Setting	
Zone/Channel Assignment	SLR Series Repeater	
	Link Speed Auto Negotiation	
	DHCP	
	Ethernet IP 10.10.102.131	
	Gateway IP 10.10.0.1	
	Gateway Netmask 255.255.0.0	
	Primary DNS Server IP 0.0.0.0	
	Secondary DNS Server IP 0.0.0.0	
	IP Repeater Programming	
	Enable	*
Validation Results(1*) Warning Messages Search Resul		
vandauon results(1) (vanning Messages Search Resul		Number: 478IRW1074

• In the right pane, specify the following parameters:



Radio IP

This is the IP address used by the repeater 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.

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, **255.255.0** or **255.255.0**.0 depending on the subnet.

IP Repeater Programming

Enable

Select this check box to provide the ability to remotely program the repeater.

4.1.4 Link Establishment

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

t Categories	Network Setting IP Site Connect Capacity Plus	
 Configuration* 		
Device Information	Network Setting	
▼ 🗍 General	Link Type Master	
General Settings		
Accessories	Authentication Key 99999	
Security	DNS 🗌	
Network	Master IP 10.10.102.131	
🗋 Link Establishment 🔅	Master DNS Address None	
MOTOTRBO Link	Master UDP Port 50011	
Sites		
Talkgroups	UDP Port 50011	
Zone/Channel Assignment	Peer Firewall Open Timer (sec) 6	

- In the right pane, specify the following parameters:
 - Link Type
 From the drop-down list, select Master.

Authentication Key

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



Master IP

Enter the Ethernet IP address of the master repeater.

Master UDP Port

Enter the UDP port number of the master repeater.

UDP Port

Enter the UDP port number.

Note: Every repeater on the same site must have the same **UDP Port** value.

4.1.5 MOTOTRBO Link

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

SLR 5500 F MOTOTRBO Link*	د
Set Categories	MOTOTRBO Link
 Configuration* Device Information Ceneral General Settings Accessories Security Network Link Establishment MOTOTRB0 Link 12 Sites Talkgroups Zone/Channel Assignment 	 MOTOTRBO Link Link Mode Dedicated Link Cite Type Origin Site Gepester Type Standard Repeater GPIO Slot Timing Master Maximum Number of Links Link Beacon Interval (sec) 60 F
Validation Results(1*) Warning Messages Search Res	Its Help
	Serial Number: 478IRW107

- In the **MOTOTRBO Link** pane, specify the following parameters:
 - Link Mode

From the drop-down list, select **Dedicated Link**.

Site Type

From the drop-down list, select either **Origin Site**, **Interim Site**, or **Terminating Site**.

Repeater Type

From the drop-down list, select Standard Repeater.

4.1.6 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: Digital**.
- In the right pane, select the channel (for example, named Link S1) you have added and click the pencil button.



Categories 4	General Enhanced GNSS RX/TX
 Configuration*	⊙ General Channel Type Digital
 Zone/Channel Assignment Zone 	Channel Name Link S1
	Extended Range Direct Mode Disabled
	Outbound Color Color 2 Outbound Color Color 2 Network Application Interface Phone
	System Controller Mode No [19 Site Connect (Repeater) Slot 1 & Slot 2
	Messaging Delay (ms) 60

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

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

IP Site Connect

From the drop-down-list, select **Slot 1 & Slot 2**.

SLR 5500 Zone Zone Zone1 Zone Items L Set Categories	ink S1*	General Enhanced GNSS	RX/TX	×
✓ ✓ Configuration*	SHOT 2	8	75	No
	RX Frequency (MHz) 167 420000	Offset (MHz) 0.000000	Frequency (MHz) 146.4	20000
		Сору	Power Level Low TOT (sec) 60 Enhanced Channel No Access	
Validation Results(1*) Warning Messages(1*) Searce	h Results Help			

- 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.



LR 5500 ► Zone ► Zone I* Set Categories	Zone Name Zone Items	Zone1		
Zone	Position Channel Type	Channel Name Link S1 Channel2	Color Code 1 1	Extended R Disabled
	2 items found (1 currently selected).			Þ

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

4.2 Configuring a Link Repeater

This section describes how to configure a Link repeater located at the Origin or Terminating Site of a MOTOTRBO Link system.

For how to configure Link Repeaters on Interim Sites, see *MOTOTRBO System Planner (Release 2.10.5), 2.2.1.7 MOTOTRBO Link Mode.*

4.2.1 General Settings

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

Set Categories 📮	General Battery A	larm Type CWID Voting
✓		Origin Link
Security Network Link Establishment MOTOTRBO Link Sites Talkgroups	SIT (ma) Group Call Hang Time (ma) Private Call Hang Time (ma) Emergency Call Hang Time (sec) Call Hang Time (sec) Receat Gain (dB)	6000 9 3000 9 4000 9 4000 9 3 0.0 9
Zone/Channel Assignment	Antenna Relay Delay Timer (ms)	100

• 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.



4.2.2 Accessories

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

Categories 🔮	1		General	GPIO Physical Pins		
Device Information	General					
▼ 🛅 General	<u> </u>	Analog Arr	essory Emphasis	De & Pre		
General Settings		renary rea		Filtered Squelch		
🗋 Accessories 🔅			Audio Type			·
Security			TX Audio Priority	0		·
Network		Repeat	er Audio Priority	0		
Link Establishment		Dis	able Repeat Path			
MOTOTRBO Link		Deboun	ce Duration (ms)	100		5
🗅 Sites	GPIO Physical Pins					
Talkgroups	CPIO Physical Pins					
Zone/Channel Assignment	GPI01	Feature		ive Level	Debounce	
		External PTT		-		
	GPIO2	Unassigned	Low	•		
	GPIO3	Unassigned 💽	Low			
	GPI04	Site Slot Sync Output	Low			
	GPIO5	Unassigned 💌	Low			
	GPI06	Unassigned	Low	•		
	GPI07	Unassigned 💌	Low			
	GPIOR		(1			

- In the right pane, go to the **GPIO Physical Pins** section.
 - GPIO4

From the drop-down list, select **Site Slot Sync Output**.

Note: For the Standard (Master) repeater on the same site, select **Site Slot Sync Input** for this GPIO. In addition to an IP connection between the repeaters, provide a wired connection between the pins # 16 (GND) and # 23 (SYNC) on the repeaters' rear panels.

4.2.3 Network

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

SLR 5500 🕨 Network*							×
Set Categories	General	Radio Network	Network Setting	IP Repeater Programming	Time Zone	NTP Settings	
 Configuration* 	DNS Add	dresses					
Device Information							
General	General						Â
General Settings	-		Radio IP	192.168.50.1			- 11
Security			Accessory IP	192.168.50.2			
Network	🔿 Radio Ne	twork					
MOTOTRBO Link			CAI Network	12		A N	
Sites			CAI Group Network	225			
 Talkgroups Zone/Channel Assignment 	⊘ Network	Setting					_
	SLR Serie	s Repeater					
			Link Speed	Auto Negotiation			
			DHCP				
			Ethernet IP	10.10.102.132			
			Gateway IP	10.10.0.1			
			Gateway Netmask	255.255.0.0			
							•
Validation Results(1*) Warning Messages Search Results	Help						
					Seria	al Number: 478IR)	W1074

• In the right pane, specify the following parameters:



Radio IP

This is the IP address used by the repeater 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.

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.

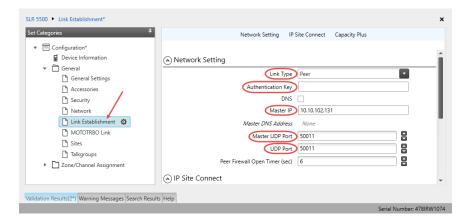
IP Repeater Programming

Enable

Select this check box to provide the ability to remotely program the repeater.

4.2.4 Link Establishment

• In the Set Categories pane, select General > Link Establishment.



• In the right pane, specify the following parameters:

Link Type

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



Authentication Key

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

Master IP

Enter the Ethernet IP address of the master repeater.

Master UDP Port

Enter the UDP port number as that for the standard repeater on the same site.

UDP Port

Enter the UDP port number.

Note: Repeaters under the same backhaul site must use the same port.

4.2.5 MOTOTRBO Link

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

et Categories 4	MOTOTR	tBO Link
	Site Type Repeater Type GPIO Slot Timing Master Maximum Number of Links Link Beacon Interval (sec)	

- In the **MOTOTRBO Link** pane, specify the following parameters:
 - Link Mode

From the drop-down list, select **Dedicated Link**.

Site Type

From the drop-down list, select **Origin Site** or **Terminating Site**.

- Repeater Type
 From the drop-down list, select Link Repeater.
- GPIO Slot Timing Master

Select this option so that this repeater is configured as the slot sync master.

4.2.6 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: Digital**.
- In the right pane, select the channel (for example, named Link S2) you have added and click the pencil button.

SLR 5500 + Zone + Zone1 + Zone Items + Link S2	• • • • • • • • • • • • • • • • • • •	×
Set Categories 7	General Enhanced GNSS RX/TX	
	General Channel Type Digital Channel Name Link 52 Color Code 1 Extended Range Direct Mode Disabled Inbound Color Code 1 Outbound Color Code 2 Network Application Interface Phone System Controller Mode No P Site Connect (Repeater) Slot 1 & Slot 2 Messaging Delay (ms) 60 Here	-
	Serial Number: 478IRW	1074

- In the **Channel** pane, specify the following channel-related parameters.
 - Color Code

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

IP Site Connect

From the drop-down-list, select **Slot 1 & Slot 2**.

SLR 5500 + Zone + Zone1 + Zone Items +	Link S2*							×
Set Categories [‡]				General	Enhanced GNS	SS RX/TX		
Configuration* Device Information Configuration* General Conc/Channel Assignment	○ RX/TX	Slot 2		8	3	75	No	•
Zone 🔅	RX					TX		
	Frequer	ncy (MHz) 419.9	972500		Offset (MHz) 0.000000 Copy	Frequency (MHz	431.725000	
						Power Leve TOT (sec		
						Enhanced Channel Acces		Ļ
Validation Results(1*) Warning Messages Search	Results Help							
							Serial Number:	478IRW1074

- 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.

4.3 Configuring a Control Station

This section describes how to configure the radio to be used as a control station in a MOTOTRBO Link system. Control stations are used in the scheme depicted in Figure 2.

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

871	TPH7036 🕨 General Settings*		×
Set	Set Categories 🗢	Microphone Backlight Battery Saver Alerts Persistent LRRP Requests Lone Worker Power Up Password and Lock	
Set Categories	▼	elete All 5 Tone ID	
lorie	Device Information		
is.	▼ 🗍 General		^
	🗋 Welcome Bitmap		
	Language Packs	Radio Alias Control Station	
	🕒 General Settings 🔅	Radio ID 64250	
	Accessories	GNSS 🖌	
	Control Buttons	GNSS GPS/QZSS	
		Private Calls	
		Cita Caarch Timor (rar) A	•
	Validation Results Warning Messages Search Re	esuits Help Social Number 9	

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 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>Connecting a Control</u> <u>Station</u>.



Control Station #1	
Name:	Control Station #1
Radio ID:	64250
IP Address:	192.168.98.2 🔻 🕫
Mode:	IP Site Connect
System Identifier:	Department 1

4.3.2 Network

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

Set Categories Services Control Station IP Site Connect Bluetooth Bluetooth Bluetooth Bluetooth Bluetooth Services Services Control Station IP Site Connect Bluetooth Bluetooth Bluetooth Bluetooth Services Serv	871T	PH7036 • Network*			×
(Forward to PC) Via USB		Set Categories	CAI Network CAI Station Protected Mode Control Station Max TX PDU Size (bytes)	nect Bluetooth Bluetooth Serial Port Profile Data Routing USB HID Data Routing P 192.168.98.1 P 192.168.98.2 90 sec ork 12 ork 225 ork 25	×
Validation Results Warning Messages Search Results Help	N	< >		PC Via USB	•

- 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.

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, Connecting a Control</u> <u>Station</u>.

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Control Station #1	
Name:	Control Station #1
Radio ID:	64250
IP Address:	192.168.98.2 🔻 🕫
Mode:	IP Site Connect
System Identifier:	Department 1

Forward to PC

From the drop-down list, select **Via USB**.

4.3.3 Contacts

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

Set Categories	ţ.	View by: By Nam	е 🗌 Ву Ту	pe 🗌 Name Only	
 Configuration* Device Information 	î	≠ ⊕ €	•		
 General 	- 11	Contact Name		Call Type	Call ID
Job Tickets	- 11	Firemen	лад	Digital Calls-Group Call	20
 Systems Encoder 	- 11	Police	лав	Digital Calls-Group Call	10
Decoder	- 11			1	
 ▼ Contacts ▼ Contacts ↔ 	Ш				
Police					
Firemen					
RX Group Lists	-				
•	•				
alidation Results(4*) Warning Me	ssames Sea	rch Results Help			
(i) Harring the		and the second second			

• 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 > Digital RX Group List.
- In the right pane, click the plus sign button and add the corresponding group list.



871TPH7036 Digital RGroup List List1	la	×
Set Categories 7	General	
♥	General Digital Name List1 Available Members	-Î
 Decoder Contacts RX Group Lists Digital RX Group List Capacity Plus RX Group Flexible Capacity Plus RD Cone/Channel Assignment Scan Lists Capacity Plus Lists 	Police Firemen	
Validation Results(1*) Warning Messages Searc	rch Results Help Serial Number: 8	717047026
	Serial Number: 8	/ TIPH/036

- 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 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: Digital**.
- In the right pane, select the channel (for example, named Slot 1) you have added and click the pencil button.

Configuration*			Voice Announ		ne1	
General Job Tickets Job Tickets Systems Decoder Deconterts	Zone Items		hannel Type	Channel Name Slot 1	Voice Announcement File	Dual Capacity Direct Mo
 Contacts AX Group Lists Cone/Channel Assignment Zone Zone1 Channel Pool 			jita)	3101 1	ivone	
Gapacity Plus Lists	1 items for	ound (1 currently se	elected).			Þ



871TPH7036 + Zone + Zone1 + Zone Items	 Slot 1* 	×
Set Categories 📮	Gener	ral RX/TX
▼	General General	1
General Job Tickets	Channel Type	Digital
Systems	Channel Name	Slot 1
Encoder	Voice Announcement File	None
Decoder	Dual Capacity Direct Mode	No
Contacts	Timing Leader Preference	Eligible
RX Group Lists Discrete Channel Assignment	Scan/Roam List	None
Zone Zone	Auto Scan	No
🖀 Zone1 🔅	Color Code	
Channel Pool		
Scan Lists	Extended Range Direct Mode	
Capacity Plus Lists	Inbound Color Code	1
	Outbound Color Cade	Ť
	Repeater/Time Slot	
	Phone System	Sys1
	ARS	On System Change
	Enhanced GNSS	
	Window Size	8
	Privacy	
	Privacy Alias	Privacy Key1
	Fixed Privacy Key Decryption	
	Ignore Rx Clear Voice/Packet Data	
	RAS Alias	None
	Option Board Option Board Trunking	
	Lone Worker	
	Allow Talkaround	
	IP Site Connect	
	MOTOTRBO Link	· ·
Validation Results Warning Messages Search Resu	Its Help	
		Serial Number: 871TPH7036

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

Repeater/Time Slot

Select the time slot of the repeater the radio operates on.

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.

IP Site Connect

Select this option to configure the channel as an IP Site Connect channel.



MOTOTRBO Link Ensure that this option is selected.

et Categories		General RX/TX
♥	Frequency (MH2) 148.420000	Offset (MHz) 0.000000 Copy
 ⇒ Encoder > Decoder > Contacts > Cark Group Lists > Dack Group Lists > Dach/Channel Assignment > Dach/Channel Assignment > Cone Zone Conserved Pool > Scan Lists > Capacity Plus Lists 	Ref Frequency (MHz) Default	Ref Frequency (MHz) Default Contact Name Police Emergency System None CAX No Power Level Low TOT (sec) 60 TOT Rekey Delay (sec) Allow Interruptible Frequencies Admin Cristria [Color Code 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 repeater the radio operates on. 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.

• RX Group List

Select the Group list you have specified in section <u>4.3.4, RX Group Lists</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>.

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

4.4 Configuring a Subscriber Radio

This section describes how to configure a subscriber radio to be used in a MOTOTRBO Link system.

- Connect your radio to the PC via a programming cable.
- Turn on the radio.



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

871TPH7036 General Settings*		x
Set Categories	General CWID Audio Profile Microphone Backlight Battery Saver Alerts Persistent LRRP Requests Lone Worker Power Up Password and Lock Front Programming Password Delete All 5 Tone ID Comparison of the second secon	A
	Serial Number: 871TPH7	/036

4.4.1 General Settings

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

Enter the Radio ID of the radio. This ID is used by other radios to contact this radio, for instance, communicating via a private call or text message.

GNSS

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

Private calls

Select this check box 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.

4.4.2 Network

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



871TPH7036 ► Network* Set Categories	General Radio Network Services	Control Station IP Site Connect Bluetooth	×
✓	Bluetooth Serial Port Profile Data Routing	USB HID Data Routing	—Î
General Settings Accessories Control Buttons	Accessory /P USB DNS-SD Interval	192.168.10.2 90 sec	
Text Messages Telemetry Menu Security Network	CAI Network CAI Group Network Protected Mode Control Station Max TX PDU Size (bytes) Telemetry UDP Port Forward to PO	12 225 750 750 750 750 750 750 750 750 750 75]
	Services ARS Radio ID ARS IP ARS UDP Port TMS Radio ID	64250 \$ 13.0.250.250 4005 64250	
Validation Results Warning Messages Search Result	s Help	Serial Numb	er: 871TPH7036

• 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 **MNIS Application ID** (see section <u>4.6</u>, <u>Configuring</u> <u>MOTOTRBO MNIS</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>). The recommended value is **64250** for both parameters.

4.4.3 Contacts

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



Set Categories 🌵	View by: By Name	е 🗌 Ву Ту	pe 🗌 Name Only	
▼	∕ ⊕ ⊝ €	•		
 General 	Contact Name		Call Type	
Job Tickets	Firemen	ъ	Digital Calls-Group Call	20
Systems Encoder	Police	лад	Digital Calls-Group Call	10
Decoder				
▼ ☐ Contacts				
✓ D Contacts D				
Police				
Firemen				
🕨 🗋 RX Group Lists 🛛 👻				
↓ ▶				

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

4.4.4 RX Group Lists

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

t Categories 🕴		General	
Configuration* Device Information) General		
General Job Tickets	Digital N	Name List1	
Systems Encoder	Available	Members	
 Decoder Contacts RX Group List Digital RX Group List Capacity Plus RX Group Flexible Capacity Plus RV Zone/Channel Assignment Scan Lists Capacity Plus Lists 	Police	Add	
idation Results(1*) Warning Messages Search Re			

- 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.

4.4.5 Channels

- 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: Digital**.
- In the right pane, select the channel (for example, named Slot 1) you have added and click the pencil button.

Note: You'll have to create two digital channels for the repeater's slots 1 and 2.

871TPH7036 🕨 Zone 🕨 Zone1*				
Set Categories 4 Configuration* Device Information General Dob Tickets Systems Systems	Zone Items	Zone Name Zor uncement File No		
 Encoder Decoder Contacts Rx Group Lists Zone/Channel Assignment Zone 	Position Channel Type 1 Digital 1 2 1 Digital	Channel Name Slot 1 Slot 2	Voice Announcement File None None	Dual Capacity Direct Mo
Channel Pool Scan Lists Capacity Plus Lists	 Z items found (1 currently selected). 			Þ
Validation Results Warning Messages Search Results H	elp	_	_	Serial Number: 871TPH7

Categories R	Gener	al RX/TX
Configuration*		
Device Information	General	
General	Channel Type	Digital
Job Tickets	Channel Name	Slot 1
Systems Encoder		
Decoder	Voice Announcement File	None
Contacts	Dual Capacity Direct Mode	No
RX Group Lists	Timing Leader Preference	Eligible
 Zone/Channel Assignment 	Scan/Roam List	RoamList/List1
🔻 🗋 Zone	Auto Scan	No
😑 Zone1 🚯	Color Code	1
Channel Pool	Extended Range Direct Mode	Disabled
Scan Lists	Inbound Color Code	1
Capacity Plus Lists	Outbound Color Code	1
	Repeater/Time Slot	•
		Sys1
	ARS	On System Change
	Enhanced GNSS	
	Window Size	8
	Privacy	
	Privacy Alias	Privacy Key1
	Fixed Privacy Key Decryption	
	Ignore Rx Clear Voice/Packet Data	
	RAS Alias	None
	Option Board	
	Option Board Trunking	
	Lone Worker	No
	Allow Talkaround	
	MOTOTRBO Link	

• In the right pane, specify the following parameters:

Scan/Roam List

Select the Roam list you have specified in section <u>4.4.6, Roam Lists</u>.



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.

Repeater/Time Slot

Select one of the repeater time slots.

Phone System

Select the phone system you have specified in section <u>4.4.7, Phone</u> <u>System</u>.

ARS

Select **On System 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 otherwise this feature will not function.

IP Site Connect

Select this option to configure the channel as an IP Site Connect channel. If this option is selected, you can add the channel to a Roam List (see section <u>4.4.6, Roam Lists</u>).

MOTOTRBO Link

Ensure that this option is selected.



871TPH7036 V Zone V Zone V Zone Items Set Categories		General RX/TX	×
▼	Frequency (MH2) 146.420000	Offset (MHz) 0.000000 Copy Cffset (MH2) 167.420000	
 ▶ ☐ Encoder ▶ ☐ Decoder > ☐ Contacts > ☐ XC Group Lists > ☐ ZONE ▲ Zone ▲	Ref Frequency (MH2) Default Group List DigitalRXGroupList Emergency Alarm Indication Emergency Call Mark No Emergency Call Indication Emergency Call Decode Tone No	Ref Frequency (MHz) Default Contact Nam> Police Emergency System None VOX No Power Level Low TOT (sec) 60 O TOT Rekey Delay (sec) 0 Allow Interruption ✓	
Validation Results Warning Messages Search Resu	Its Help	TX Interruptible 🗹 Frequencies 🗹	•

- 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.

RX Group List

Select the Group list you have specified in section <u>4.4.4, RX Group Lists</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>4.4.3</u>, <u>Contacts</u>.



4.4.6 Roam Lists

Roaming will allow using the radio on different sites of a MOTOTRBO Link system.

- In the **Set Categories** pane, select **Scan Lists > Roam List**.
- In the right pane, click the plus sign button and add the corresponding roam list.

871TPH7036 🕨 Roam List 🕨 List1*	2	¢
Set Categories 4	General	
Set Categories P Image: Configuration* Image: Configuration* Image: Configuration* Image: Configuration* Image: Configuration* Image: Configuration* Image: Contacts Image: Contacts Image: Contacts Image: C	General RoamList Name List Available Members Selected IPSC 2 Add Remove	
	Use Per-Site RSSI Threshold RSSI Threshold (dBm) -108	
Validation Results Warning Messages Search F	lesults Help Serial Number: 871TPH703	6

- In the left pane, select the roam 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.

• RSSI Threshold (dBm)

If the RSSI measurement of the site is above the specified RSSI Threshold, then the radio will remain on that site and not roam.



4.5 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 schemes using DDMS are depicted in Figure 1. 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				
۵ 💿 🐼 🎄 🔜 😓 🕲				
Service	Watcher Settings			
🖃 🐺 Interfaces	PortWatcher	3000		
ARS Settings	WatcherTO	14400		
	NotifyGroup	0		
	NotifyRate	5		
🛄 🥤 Logging				
	PortWatcher			
	Port listening for Watcher S	Subscribe requests.		
	Range: 1000 - 65535			
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**.

🍰 MOTOTRBO DDMS			_	×
File Action Help				
۵ 💿 🏟 🔅 🔘 💿				
Service	Authentication Server S	Settings		
🖃 🐺 Interfaces	AuthenticationServerIP	127.0.0.1		
ARS Settings	Authentication ServerPort	5055		
Authentication Server Settings	•			
🛄 🗹 Logging				
	AuthenticationServerIP			
	Authentication Server IP Addre	SS		
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.

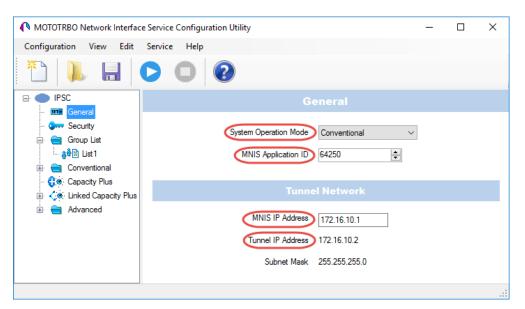
🍰 MOTOTRBO DDMS	
File Action Help	
00 🏟 🏟 🔜 🔜 🐁	
Service	Service
E Start Interfaces	Version
🔤 🦉 Logging	ServiceName
	DisplayName
	Description
	ServiceMode



4.6 Configuring MOTOTRBO MNIS

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. The topologies using MNIS are depicted in Figure 1. 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**.



System Operation Mode

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

MNIS Application ID

This is 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**).

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MNIS data service						
🗹 Use Data Gateway	/					
🗹 Service is on a local host						
IP Address:	\supset	172.16.10.2		•	¢	
Control port:		5000			÷	

• In the left pane, select **Conventional > Domain 1**.

MNIS Data Gateway Configuration Utility *			-	×
Configuration View Edit Service Help				
1 1 2 2 2				
				^
- General				
👽 Security 	Master IP Address 10.10.102.131			
	Master UDP Port 50011			
<mark>}-⊡ Domain 1</mark> 	Automatically Assigned			
Capacity Plus	MNIS LE Port OManually Assigned	None	*	
Sites				
🗄 🧰 Advanced	Authentication Key			
	SFR Mode			
	Repeater Slot 1			
	Enable			
	Revert Channel			
	Security Setting None ~			
	Security Alias			
	Group List None ~			
	Repeater Slot 2			
	Enable			
	Revert Channel			~
J				.:

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).
- MOTOTRBO Link
 Make sure this option is selected.
- Repeater Slot 1 Enable/Repeater Slot 2 Enable
 Select these options so that MNIS will be able to send or receive data over these slots.



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

MOTOTRBO Network Interface Service	Configuration Utility *	-		×
Configuration View Edit Service	Help			
	Advanced			
General Group List Group List Conventional Group Capacity Plus Advanced Advanced Growarding Rules	Data Call Confirmed Compressed UDP Data Header None Battery Saver Preamble Individual Data to Registered Site Selective Forwarding □			
Application Override Rules	TX Preamble Duration (ms)			
	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**.



onfiguration View Edit	Service Help				
È 📜 🖬 🤇		2			
Untitled					
💷 General		CAI Network	12 🜩		
🖶 💼 Group List		CAI Group Network	225 🜲		
🖻 🚖 Conventional		S	bervices		
- 📲 Domain 1		ARS UDP Port			
 Linked Capacity Plus Advanced 		TMS UDP Port			
- Rovanced			4007		
 Forwarding Rule: Application Oven 		Telemetry UDP Port	4008		
		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 Discover	ry and Mobility Service		
		Server Address	127.0.0.1		
		Watcher Port	3000 ≑		
		MNIS Co	ontrol Interface		
	Q	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**.

MOTOTRBO Network Interface Ser	ce Configuration Utility *				_		×
Configuration View Edit Serv	ce Help						
New Open							
Import Delete		Ge	eneral				
Set as Active Configuration Select Active Configuration	Syst	em Operation Mode	Conventional	\sim			
Save		MNIS Application ID	64250 🜲				
Save as Close						_	
Exit		Tunne					
H Advanced	_	MNIS IP Address	172.16.10.1				
		Tunnel IP Address	172.16.10.2				
		Subnet Mask	255.255.255.0				
							.::

• 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 IP Site Connect 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**

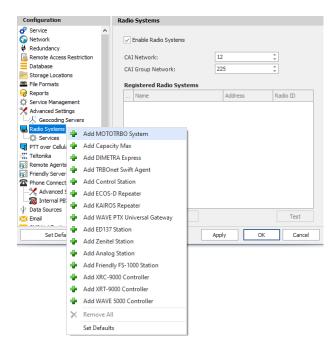
For instructions on how to configure TRBOnet Server's Database, Service, Network parameters, etc., refer to *TRBOnet Enterprise Quick Start Guide*.

5.1.1 Adding a Master Repeater

This section describes how to configure TRBOnet Server for communication with the master repeater of a MOTOTRBO Link 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:	130	÷			
Remote Access Restriction		TRBOnet Radio ID:	64250	*			
Database				*			
Storage Locations		TRBOnet Local Port:	50000	Ŧ			
Eile Formats		Master Repeater Conr	nection Informatio	n:			
😪 Reports 🔅 Service Management		IP Address:	10.12.110.29	-			
X Advanced Settings		UDP Port:	50011	÷	Test		
Geocoding Servers		Authentication Key:	123456				1
🔜 Radio Systems		System Type:	IP Site Connect				
Services		System Identifier:	Department 1				_
Repeater #1		System Identifier.	Department 1				
Advanced Settings		✓ Use NAI Voice					
Privacy		🗸 Use NAI Data (MNIS ar	nd DDMS)				
DDMS service		Use RCM to monitor ra	dio activity				
MNIS data service							
Slot #1							
Local Slots							
PTT over Cellular	~						
Set Defaults			Apply		ОК	Car	ncel

• 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.

• 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>4.4</u>, <u>Configuring a Subscriber</u> <u>Radio, 4.4.2</u>, <u>Network</u>). The default value is **64250**.

• TRBOnet Local Port

Enter the port number on the TRBOnet Server computer 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 Repeater Connection Information

• IP Address

Enter the Ethernet IP address of the master repeater.

Note: This value is programmed for a repeater via MOTOTRBO CPS, in *Link Establishment>Master IP*. See section <u>4.1.4</u>.

• 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>4.1.4</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>4.1.4</u>.

• System Type

From the drop-down list, select **IP Site Connect**.

• Test

Click this button to check the connection to your master repeater. If the test is successful, you'll see the information about 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. Note that the Network Application Interface Voice and Network Application Interface Data features must be 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**.



C	onfiguration		Advanced Settings				
đ	Service	~					
6	Network		Call Hangtime (ms):				
ψ	Redundancy		Group Call:	3000	÷		
10	Remote Access Restriction		Private Call:	4000	*		
	Database		Private Call:	4000	*		
	Storage Locations		Emergency Call:	4000	÷		
2	File Formats		TX Preamble:				
P	Reports		TX Preamble:	120	÷		
¢	Service Management		TX Timeout:	60	÷	seconds	
X	Advanced Settings					4	
	ーズ Geocoding Servers		Phone System:	Motor	ola Phone System		*
	Radio Systems		TX Interrupt Mode:	MSI Pr	oprietary		-
-	Services						
	Repeater #1		Allow CSBK Data				
	Slot #2						
	Local Slots						
-	PTT over Cellular	v					
					_		
	Set Defaults				Apply	OK	Cancel

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

Call Hangtime (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.

5.1.1.2 Privacy

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

Configuration		Privacy	
💣 Service	~		
S Network		Privacy Type: Enhanced -	
🕸 Redundancy		Basic Privacy Key ID: 1	
Remote Access Restriction		Enhanced Privacy Keys:	
Database			
Storage Locations		Algorithm ID Name Value	
🚔 File Formats		ARC4 (40 bit) 👻 1	
😪 Reports		ARC4 (40 bit)	
Service Management		AES (256 bit)	
🔀 Advanced Settings		AES (256 bit) Legacy	
Geocoding Servers			
Radio Systems			
Services			
Repeater #1			
DDMS service			
MNIS data service			
Slot #1			
Slot #2			
Local Slots			A cite
PTT over Cellular	~	Add Remove	File
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 s	ervic	e			
💣 Service	^	_					
S Network		✓ Use	DDMS	service			
Redundancy		Loca	port:		0	÷	
Remote Access Restriction		Cont	co TD	Address:	127.0.0	1 -	Test
Database		Serv	CE IP	Auuress;			TESC
Storage Locations		Serv	ce po	rt:	3000	÷	
File Formats		Auth	entica	tion Port:	5055	*	
Reports		D - d		services:			
Service Management		Real	Indan			1	
💥 Advanced Settings				Service IP A	ddress	Service port	Local port
Geocoding Servers		1	\checkmark	10.10.101.2	207	3000	0
Radio Systems							
🗘 Services							
Repeater #1							
DDMS service							
X Advanced Settings							
III Slot #1							
						1	
Local Slots	v		Add	De	elete		Test 🔺 🔻
					Г		
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

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 MNIS.

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

Configuration	MNIS data service		
 Service Network Redundancy Remote Access Restriction Database Storage Locations File Formats Reports Service Management Advanced Settings Services Repeater #1 Advanced Settings Privacy DMS service Advanced Settings 	✓ Use Data Gateway ✓ Service is on a local host IP Address: 172.16 ✓ Control port: 55000	5. 10.2 - P TRBO Network Interfac Control port	Test te Service v the ? Local port
MNIS data service	Add Delete		Test 🔺 🔻
Set Defaults		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 Slots

• In the **Configuration** pane, under the corresponding **Repeater**, select **Slot #1** or **Slot #2**.

Configuration	Slot #1
🔗 Service 🖌	✓ Slot #1
S Network	
🛱 Redundancy	Name: Slot 1
Page Remote Access Restriction	Messaging Delay: Normal -
Database	Use slot for RX data only (GPS Revert or Data Revert)
Storage Locations	
File Formats	Use Privacy
😪 Reports	Privacy Key:
Service Management	Allow interruption
X Advanced Settings	Always transmit when the PTT is pressed ("Impolite" channel access)
Geocoding Servers	Data Call Confirmed
Radio Systems	Private call confirmed
Services	Emergency Alarm Ack
Repeater #1	
	Emergency Call/Alarm Indication
DDMS service	
🔀 Advanced Settings	
MNIS data service	
Advanced Settings	
I Slot #1	
· · ·	
Set Defaults	Apply OK Cancel

• In the **Slot #1** (or **Slot #2**) pane, specify the following slot-related parameters:

Note: Some of the features may not be applicable. See section <u>3.1, System Restrictions</u>.

Name

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

Messaging Delay

From the drop-down list, select the inter-repeater messaging delay based on the IP network configuration.

• Normal

The inter-repeater messaging delay is 60 ms.

• High

The inter-repeater messaging delay is 90 ms.

Use slot for RX data only (GPS Revert or Data Revert)

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

Use Privacy

Select this option to use Privacy for the slot.



Note: This option is available only if the **Basic** or **Enhanced** Privacy Type have been selected in Repeater's <u>Privacy</u> settings.

Privacy Key

From the drop-down list, select the privacy key.

Note: This option is available only if the **Enhanced** Privacy Type has been selected in Repeater's <u>Privacy</u> settings).

Allow interruption

Select this option to allow interrupting dispatcher transmissions by radios that are Transmit Interrupt capable.

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

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

Private Call Confirmed

Select this option to set Private calls on the current slot as confirmed. By default, Private calls are unconfirmed.

Emergency Alarm Ack

Select this option so that the Dispatch Console is allowed to acknowledge an emergency alarm received via this slot.

Emergency Call/Alarm Indication

Select this option so that audio and visual indication is given for an emergency call/emergency alarm received via this slot.

5.1.2 Adding a Control Station

This section describes how to configure TRBOnet Server for communication with a control station in a MOTOTRBO Link 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**.

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Configuration		Control Station #1				
💣 Service	^					
S Network		Name:	Control Station #1			
🛱 Redundancy		Radio ID:	64250 🇘			
Remote Access Restriction				Test		
Database		IP Address:	192.168.10.2 - 🕫	Test		
Storage Locations		Mode:	IP Site Connect			-
File Formats		System Identifier:				=
😪 Reports		o your additioner				
Service Management		Use radio for RX data	only (GPS Revert or Data Re	evert)		
🔀 Advanced Settings		Playback device:	BenQ GL2460 (Intel(R) Dis	plav Audio)		¢
Geocoding Servers						
Radio Systems		Recording device:	Microphone (Logitech USB	Headset)	*	¢
Services						
Control Station #1						
TT over Cellular						
Teltonika						
Remote Agents						
Friendly Servers						
2 Phone Connect						
💥 Advanced Settings						
Thernal PBX Server	~					
Set Defaults			Apply	ОК	Cano	el

• 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 **IP Site Connect**.



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 to the control station.

Recorder device

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

• 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						
💣 Service	~							
Network		Automatically reset ala	arm mode					
Redundancy		Automatically handle c	all alert					
Remote Access Restriction		Emergency Call/Alarm indication						
Database		Use front microphone						
Storage Locations		·	the PTT is pressed ("Impo	lite" channel access)				
File Formats		Use serial port for PTT		,				
😪 Reports		·	uevice					
Service Management		Serial port:		7				
🔀 Advanced Settings		TX Timeout:	60	seconds				
Geocoding Servers		✓ Mic delay time:	600	milliseconds				
🔛 Radio Systems		Mic delay une:	000	miniseconds				
Services		Roger beep:	D:\WAV\RingMobile.wav	× …				
Control Station #1		Signaling System:	None	Configure				
Advanced Settings		orginaling oystem.		comigare				
🖵 PTT over Cellular		Allow CSBK Data						
Teltonika								
🔂 Remote Agents								
Friendly Servers								
Phone Connect								
Advanced Settings								
Thernal PBX Server	•							
<i>x</i> . <u>_</u> . <u>_</u>								
Set Defaults			Apply	OK Cancel				

• In the **Advanced Settings** pane, specify the following control stationrelated 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

Select this option to use the speaker microphone on the front of 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 device

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.

Mic delay time

Select this option and specify the time, in milliseconds, to be used as a delay time interval between pushing the PTT and enabling the microphone.

• Roger beep

Select this option to play a beep sound for the time interval until the microphone is enabled. Click the ellipsis button (...) on the right and locate the desired sound file (WAV).

Signaling system

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

Allow CSBK Data

Select this option so that GPS data is sent in a single CSBK.



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	Radi	o Groups					👲 🐠 🛂
Disabled Radios Dispatcher Groups Dispatchers Dispatchers Email Groups SMS Groups		Intercom Group 10 Private Call	0) 46 (0) 0) 46 (0) 0) 46 (0)	I: Line free ✓ Group 20	€0 •) €0	All Call) .) .)
Logical Groups □ Logical Groups □ Radio Groups □ Radios	Vame Cleaner Firemer	s	Δ Radio ID 30 20	uping 🍸 Auto Fil	lter 🗇 Default Settin MDC / Sel-5 (Hex) 5	Descriprion Cleaning grou	p
Uvice Dispatch	Police	3	10		0		
RFID Tracker							
Text Messages							
Event Viewer		1					
Administration	H H H	 Record 1 of 3 	► H+ HH - I				Þ
🔂 127.0.0.1 🛞 🕵 🙎 Administrator		o: demo Demo Li					🕑 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: Ensure that the radio group(s) created in the Dispatch Console are present in the radio's RX Group List (see section <u>4.4.4, RX</u> <u>Group Lists</u>).



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						9	0 🔽
- 🌉 Dispatcher Groups	^	Registered Unregist							
		🖶 Add Group 🛃 Ad	d Digital Radio 🔜 Ado	d Range 🛛 🛃 Add TRE	Onet Mobile 🔜 Add	TRBO.SOS 🔜 Add W	oC Radio 📑 Add WA	VE 5000 🛛 📑 Edi	it 🐥
		Radio Name		Radio ID	MDC ID	User Extension/Login	Radio Groups	Logical Groups	
		Radio 235	Digital Radio	235	0		Cleaners		
Logical Groups		Radio 125	Digital Radio	125	0		Cleaners		
		🛞 Radio 100	Digital Radio	100	0		Cleaners		
Device Lists 2			TRBO.SOS	2222	0	2222			
Radios		Radio 4444	TRBOnet Mobile	4444	0	4444			
< >		3333	TRBOnet Mobile	3333	0	3333			
		5555	TRBOnet Mobile	5555	0	5555			
Location Tracking Location Tracking Route Management				3					
Text Messages									
Voice Recording									
Reports									
Event Viewer		1							
Administration	<	141 44 4 Record 2 of 7 🕨	₩ 4						Þ
🐻 Connected 🚷 🕵 🕵	<u>}</u> 2	💈 Administrator 🛛 📑 Lice	ensed to: demo (Walt) (Demo License)				🔡 1 🕑 Ac	ctive •

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