

# TRBOnet Enterprise/PLUS

## Phone Interconnect

### User Guide

Version 5.2

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# 1 Introduction

## 1.1 About This Guide

This document is intended for administrators setting up evaluation and proof-of-concept deployments of MOTOTRBO Dispatch over IP solutions. The document describes the minimum steps to configure the telephony voice dispatch workplace.

## 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.

For more information about TRBOnet products, refer to our [website](#).

## 1.3 Contacts

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EMEA	+44 203 608 0598	<a href="mailto:info@trbonet.com">info@trbonet.com</a> — general and commercial inquiries
Americas	+1 872 222 8726	<a href="mailto:support@trbonet.com">support@trbonet.com</a> — technical support
APAC	+61 28 607 8325	<a href="http://kb.trbonet.com">http://kb.trbonet.com</a> — online knowledge base

## 2 Overview

The Phone Interconnect feature is designed to extend the TRBOnet voice functions to SIP and PSTN endpoints. From the dispatcher's perspective, the multi-line phone connection becomes part of the voice dispatch workspace along with the radio PTT boxes.

When the feature is activated, the phone subscribers registered on the built-in or external SIP servers as well as PSTN users become first-class peers in TRBOnet: the phone calls can be joined to a conference with the radio subscribers, the phone endpoints can directly dial into and be reachable for the radios and the dispatcher, the audio messages can be sent to phones (played back when the number answers), etc.

TRBOnet includes an internal SIP telephony PBX server. You can also create a SIP trunk connection with an external PBX or route calls to an external PBX as if it is just another SIP endpoint.

### 3 Telephony Configuration

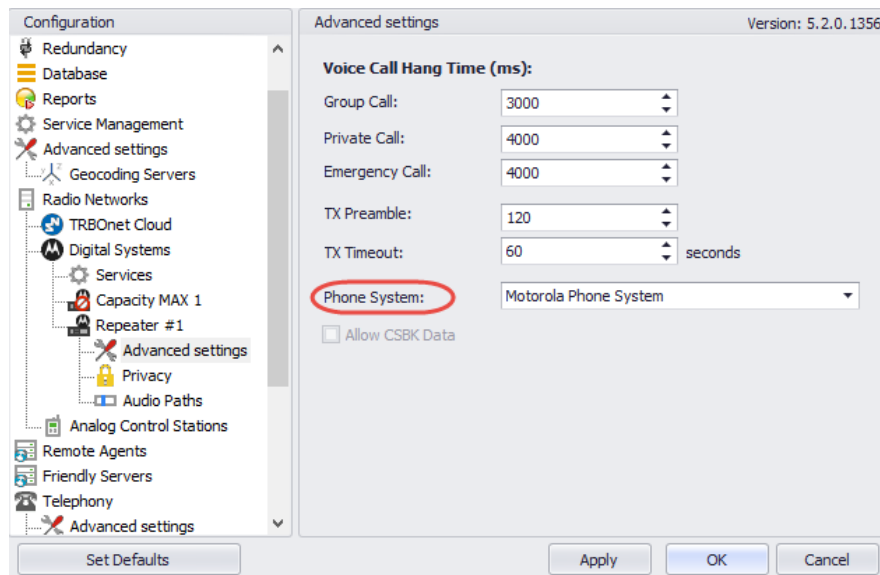
You will need to use the following three software tools to edit the configuration settings for the telephony integration:

- TRBOnet Server
- TRBOnet Dispatch Console
- Motorola CPS to edit the codeplugs for the repeater and the radio stations

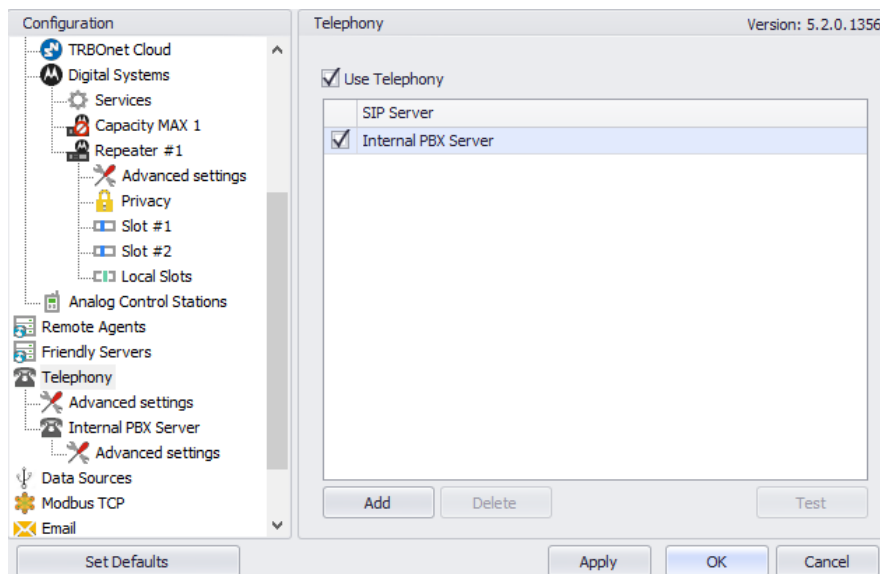
Follow the guidance below to configure the necessary telephony-related settings.

#### 3.1 TRBOnet Server

- Navigate to **Radio Networks > Digital Systems > Repeater > Advanced settings** and from the **Phone System** list, select either 'Motorola Phone System' or 'TRBOnet Phone System (TX Interrupt)'.

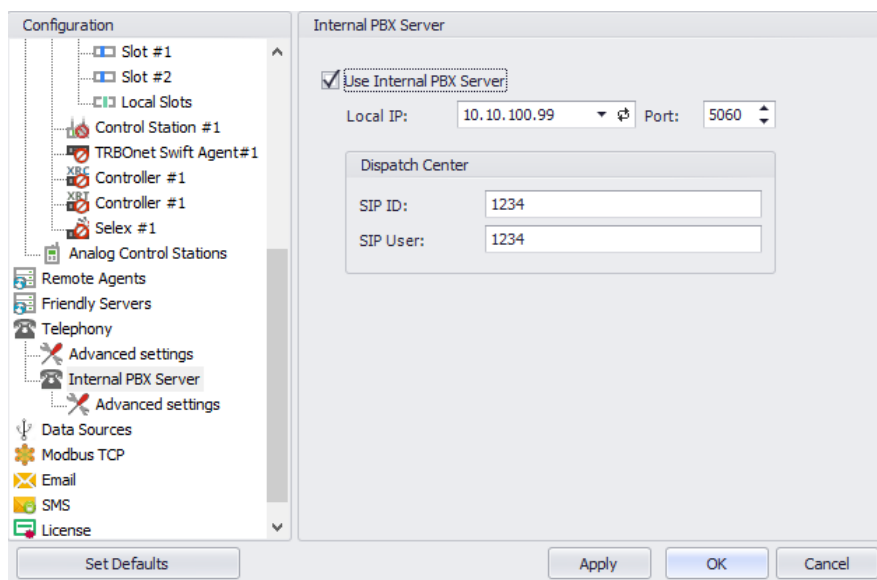


- In the **Configuration** pane, select **Telephony**
- In the **Telephony** pane, select **Use Telephony**.



### 3.1.1 Internal PBX Server

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



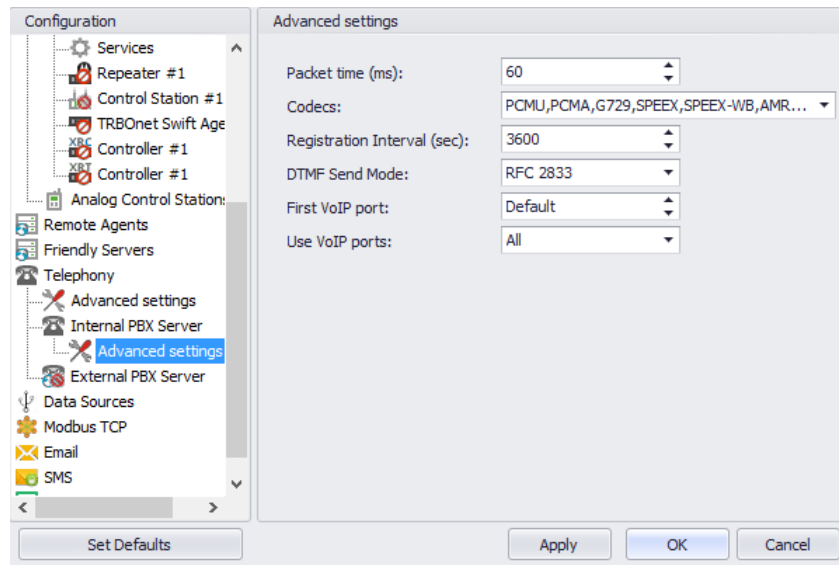
- In the **Internal PBX Server** pane, specify the following parameters:
  - **Local IP**  
Enter the IP address of the PC with TRBOnet Server.
  - **Port**  
Enter the local UDP port number for the SIP service (5060, by default).

#### 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.

#### 3.1.1.1 Advanced Settings

- In the **Configuration** pane, under **Internal PBX Server**, select **Advanced Settings**.



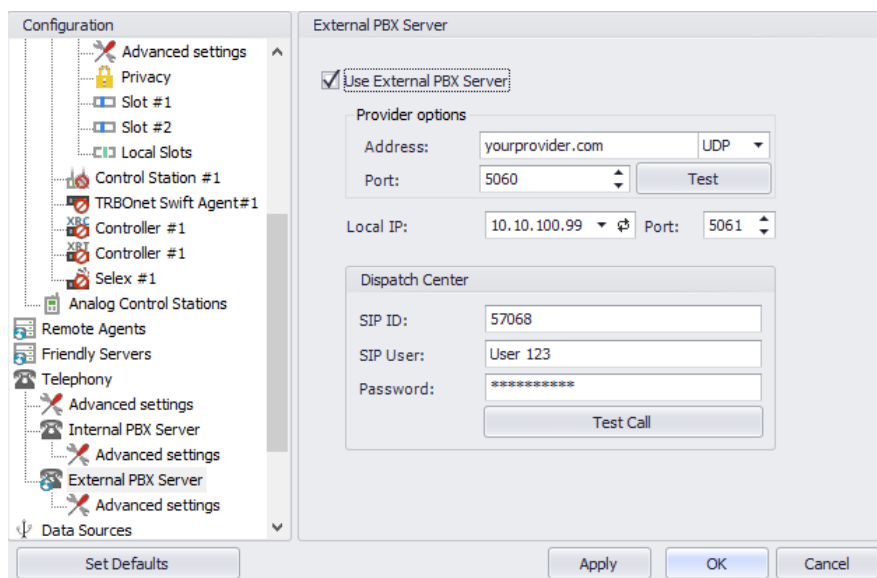
- In the **Advanced Settings** pane, specify the following Internal PBX Server-related advanced settings:
  - **Packet time**  
Enter the packet length, in milliseconds.
  - **Codecs**  
In the drop-down list, select/deselect the codecs to be used.
  - **Registration Interval (sec)**  
Enter the time interval, in seconds, to check the SIP registration status of subscribers.
  - **DTMF Send Mode**  
Enter mode for sending DTMF tones. The available modes are RFC 2833, SIP INFO (DTMF relay), and SIP INFO (DTMF).
  - **First VoIP port**  
Enter the number of the first VoIP port for audio communications
  - **Use VoIP ports**  
From the drop-down list, select which VoIP ports will be used (all, even, or odd).

### 3.1.2 External PBX Server

You can enable an external PBX server to use the SIP Interconnect feature. This feature enables calls from the radio to the phone and vice versa. The dispatcher can make a call from the Dispatch Console to a phone as well as redirect a phone call to a subscriber radio.

- In the **Telephony** pane, click **Add**.  
Or, in the **Configuration** pane, right-click **Telephony** and choose **Add PBX Server**.





- In the **External PBX Server** pane, specify the following parameters:

- **Use External PBX Server**

Select this option to enable an external PBX server.

#### Provider options

- **Address**

Enter your SIP provider address, and select the protocol from the drop-down list on the right of the address (for more details, contact your SIP provider).

- **Port**

Enter the port number of the SIP provider (5060, by default).

- Click **Test** to check the connection to the provider.

- **Local IP**

Enter the IP address of the PC with TRBOnet Server.

- **Port**

Enter the local port number to make connections from.

#### Dispatcher Center

Note: This information is provided by the SIP provider.

- **SIP ID**

Enter the SIP ID that will be associated with TRBOnet Server to make and receive calls.

- **SIP user**

Enter the SIP user name for the login.

- **Password**

Enter the password for the login.

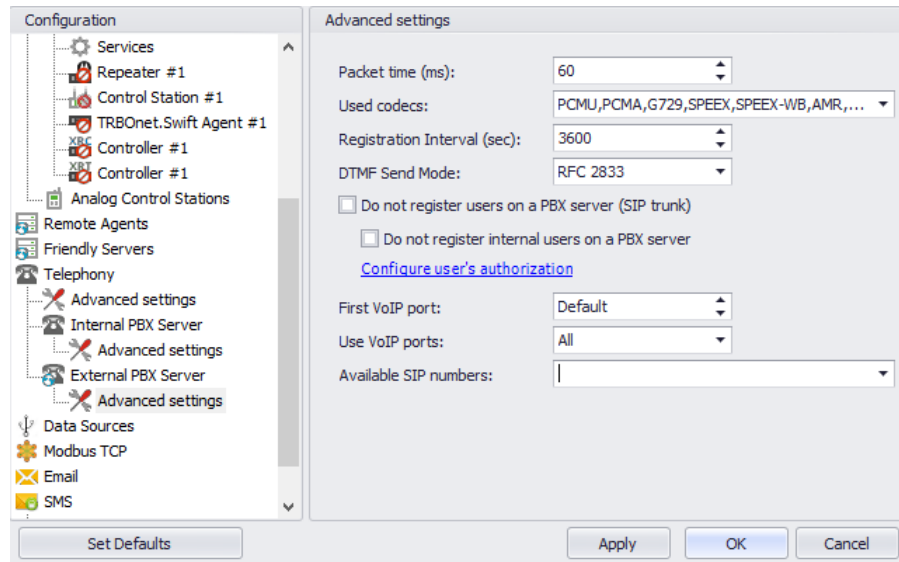
- **Test Call**

Click this button to make a test call.

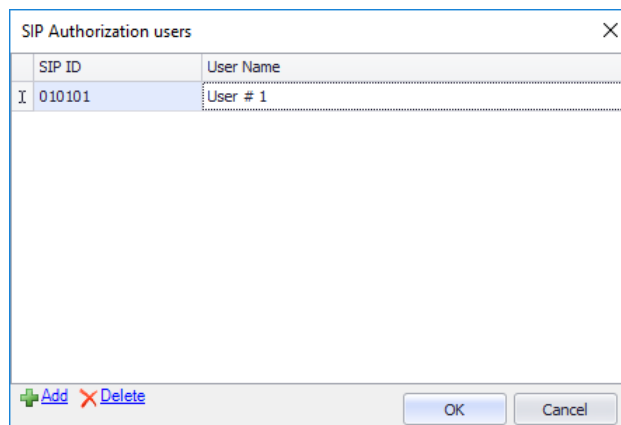
Note: To make a test call, make sure that the TRBOnet Server service is not running.

### 3.1.2.1 Advanced Settings

- In the **Configuration** pane, under **External PBX Server**, select **Advanced Settings**.



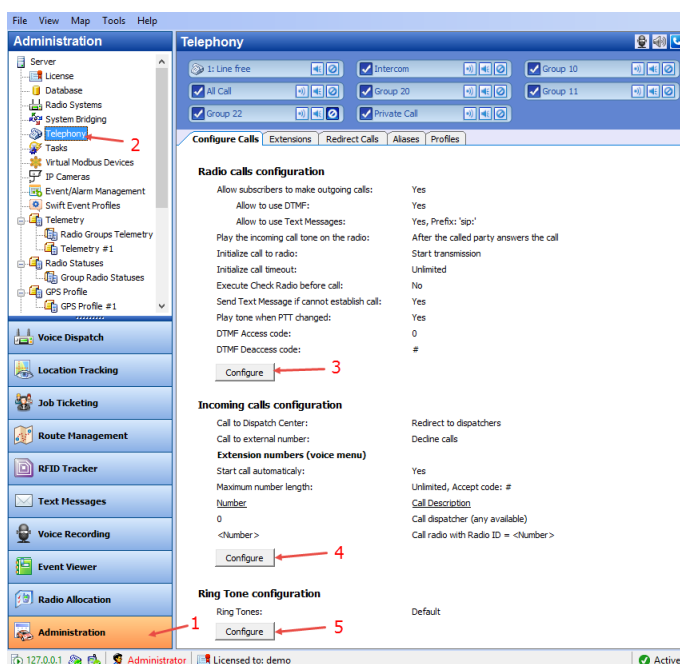
- In the **Advanced Settings** pane, specify the following External PBX Server-related advanced settings:
  - Packet time**  
 Enter the same value as specified in the phone system;
  - Codecs**  
 In the drop-down list, select/deselect the codecs specified in the phone system.
  - Registration Interval (sec)**  
 Enter the time interval, in seconds, to check the SIP registration status of subscribers.
  - Do not register users on a PBX server (SIP trunk)**  
 Select this option so that radios will use the SIP trunk system to get extensions.
  - Configure user's authorization**  
 Click this link to set up user authorization for the systems with enhanced authorization parameters. It is recommended to be used when Radio ID is equal to SIP ID. In case when Voice is transmitted via Radio Channel, Radio ID is used. When voice is transmitted via GSM channel, SIP ID is used.



- Click **Add** to add a new user authorization.
- **SIP ID**  
Enter the SIP ID for the new user.
- **User Name**  
Enter the User Name for the new user;
- Click **OK** to save the new user authorization.

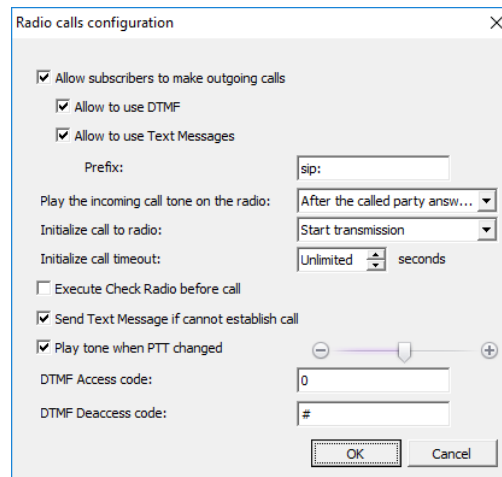
## 3.2 TRBOnet Dispatch Console

- Click **Administration** (1), and then **Telephony** (2) to configure incoming and outgoing SIP calls:



### 3.2.1 Radio Calls Configuration

- Click the **Configure** button (3) to set radio call configuration parameters:



The dialog box titled "Radio calls configuration" contains the following settings:

- ☒ Allow subscribers to make outgoing calls
  - ☒ Allow to use DTMF
  - ☒ Allow to use Text Messages
- Prefix:
- Play the incoming call tone on the radio:
- Initialize call to radio:
- Initialize call timeout:  seconds
- ☐ Execute Check Radio before call
- ☒ Send Text Message if cannot establish call
- ☒ Play tone when PTT changed
- DTMF Access code:
- DTMF Deaccess code:

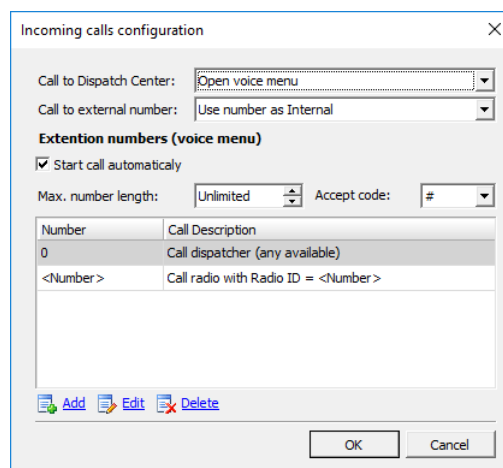
Buttons: OK, Cancel

- **Allow subscribers to make outgoing calls**  
Select this option to enable outgoing phone calls from the radio subscribers.
- **Allow to use DTMF**  
Select this option to allow radio subscribers to dial the phone number as a sequence of DTMF tones.
- **Allow to use Text Messages**  
Select this option to allow radio subscribers to initialize phone calls via sending TMS messages with a specified prefix to the dispatcher.
  - **Prefix**  
Enter the standard prefix for a text message.
- **Play the incoming call tone on the radio**  
Select the mode for playing the incoming call tone on the radio that initiates a call.
  - **After the called party answers the call**  
When a radio initiates a phone call to a subscriber via DTMF tones or a TMS message, the incoming call tone will be played on the radio after the called party answers the call.
  - **Immediately**  
When a radio initiates a phone call to a subscriber via DTMF tones or a TMS message, the incoming call tone will be played on the radio immediately that is without waiting for the called party to answer the call.
- **Initialize call to radio**  
Select the option how to start a call on a radio.
  - **Start transmission**  
Select to start a call to a radio automatically.
  - **Send ring tone**  
Select to play a ring tone until the radio user presses the PTT.

- **Initialize call timeout**  
Specify a timeout that defines how long to attempt to connect to the called party.
- **Execute Check Radio before call**  
Select this option to execute a Check Radio command before placing a call.
- **Send text message if cannot establish call**  
Select this option to send a text message to the radio when the channel is busy and a phone call cannot be established.
- **Play tone when PTT changed**  
Select this option so that the phone will sound a tone when the remote radio's PTT is pressed or released.
- **DTMF Access Code**  
Set the value to that configured for the radios as **Access Code** in MOTOTRBO CPS.
- **DTMF Deaccess Code**  
Set the value to that configured for the radios as **Deaccess Code** in MOTOTRBO CPS.

### 3.2.2 Incoming Calls Configuration

Click the **Configure** button (4) to set incoming call configuration parameters:



The dialog box titled "Incoming calls configuration" contains the following fields and controls:

- Call to Dispatch Center:** A dropdown menu with "Open voice menu" selected.
- Call to external number:** A dropdown menu with "Use number as Internal" selected.
- Extention numbers (voice menu):** A section containing:
  - ☒ **Start call automatically**
  - Max. number length:** A spinner box set to "Unlimited".
  - Accept code:** A dropdown menu with "#".
- Table:** A table with two columns: "Number" and "Call Description".
 

Number	Call Description
0	Call dispatcher (any available)
<Number>	Call radio with Radio ID = <Number>
- Buttons:** "Add", "Edit", and "Delete" icons at the bottom left, and "OK" and "Cancel" buttons at the bottom right.

- **Call to Dispatch Center**  
Select the mode for handling incoming calls made to the dispatcher.
  - **Decline calls**  
All incoming phone calls will be declined.
  - **Open voice menu**  
When an incoming call arrives, the subscriber will hear Voice menu commands.
  - **Redirect to dispatchers**  
All incoming voice calls will be redirected to all dispatchers of the Dispatch center and any free dispatcher will answer the phone call.

- **Call to external number**

Select the mode for handling incoming calls made from unregistered subscribers.

- **Decline Calls**

Select this option to decline all phone calls from unregistered subscribers.

- **Use number as Radio ID**

Select this option so that the system will use unregistered numbers as a Radio ID and start a Private Call.

- **Use number as Internal**

Select this option to allow the system to read unregistered numbers according to Voice Menu rules.

### Extension numbers (Voice menu)

- **Start call automatically**

Select this option to search for the number in the Extensions table automatically. When this option is disabled, the subscriber must dial the number according to the following example: **0(phone number)#**. The character **#** is used to search for the phone number in the table.

- **Max. number length**

Specify the maximum number of characters allowed in a phone number.

- **Accept Code**

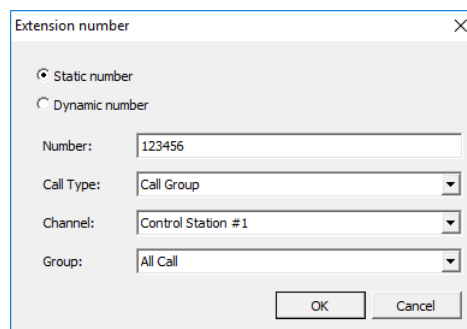
Specify the character that will be used to finish dialing the number.

All available numbers are listed in the table below.

- Click the **Add** link to add a number to the table.

#### To add a static number

- Choose **Static number**.



- **Number**

Enter a phone number to add to the table (contact list).

- **Call Type**

Select the call type from the drop-down list.

- **Call Dispatcher**

Select this type to make a phone call to the dispatcher.

- **Call Radio**

Select this type to make a phone call to the selected radio.

- **Call Group**

Select this type to make a phone call to the selected group.

- **Channel**

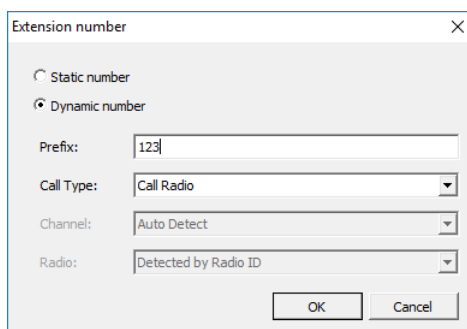
Select the channel to make a group phone call through (available for Group Calls only).

- **Dispatcher/Radio/Group**

Select the dispatcher, radio, or group depending on what you have selected in the **Call Type** box.

### To add a dynamic number

- Choose **Dynamic number**.



- **Prefix**

Specify a prefix to type in on the keyboard.

- **Call Type**

Select the call type from the drop-down list.

- **Call Radio**

Select this type to make a phone call to a radio.

- **Call Group**

Select this type to make a phone call to a group.

- **Call Phone**

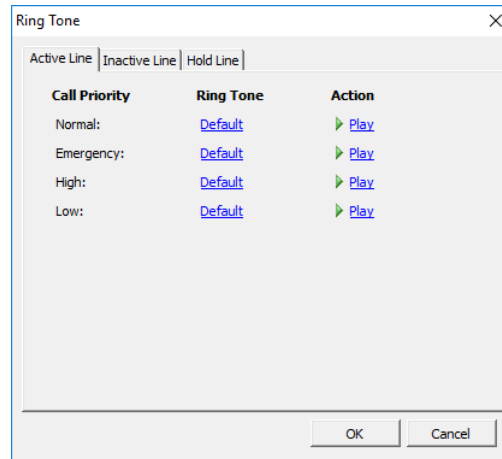
Select this type to make a phone call to a telephone.

- **Channel**

Select the channel to make a group phone call through (available for Group Calls only).

### 3.2.3 Ring Tones Configuration

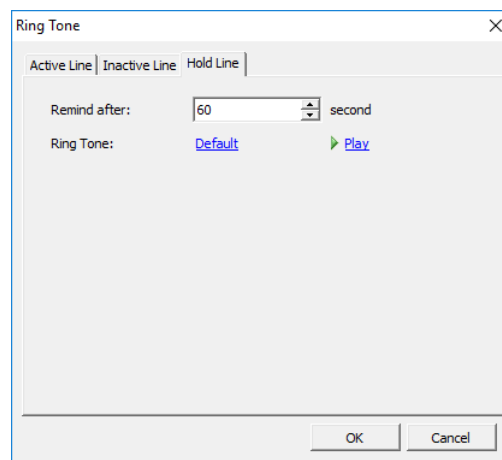
- To configure ring tones, click the **Configure** button (5):



On the **Active Line (Inactive Line)** tab:

- Click a corresponding link in the **Ring Tone** column, and from the pull-down menu, select either **Set Default**, **Set Custom**, or **Disable**.  
If you select **Custom**, in the dialog box that opens, browse for the audio file on the local PC and click Open.
- Click a **Play** link in the **Action** column to play back the corresponding ring tone.

On the **Hold Line** tab:

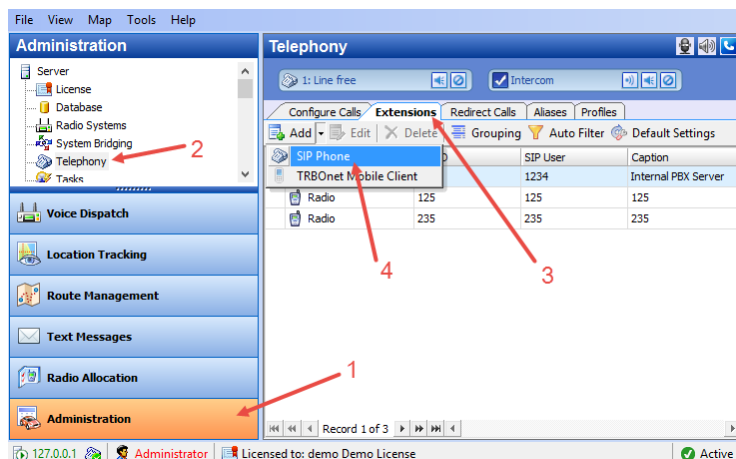


- Remind after**  
Enter the timeout, in seconds, that will be used for playing the reminder tone when a call is on Hold.
- Ring Tone**  
Specify the reminder tone to be played when a call is on Hold.

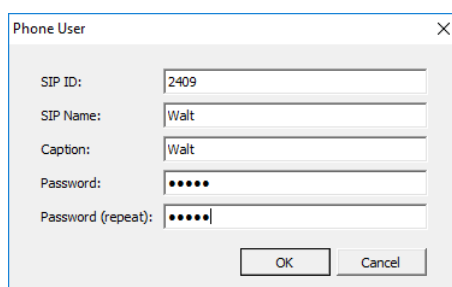
### 3.2.4 Adding SIP Extensions

- Click Administration (1), Telephony (2), Extensions (3), Add > SIP Phone (4)





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



Phone User

SIP ID: 2409

SIP Name: Walt

Caption: Walt

Password: •••••

Password (repeat): •••••

OK Cancel

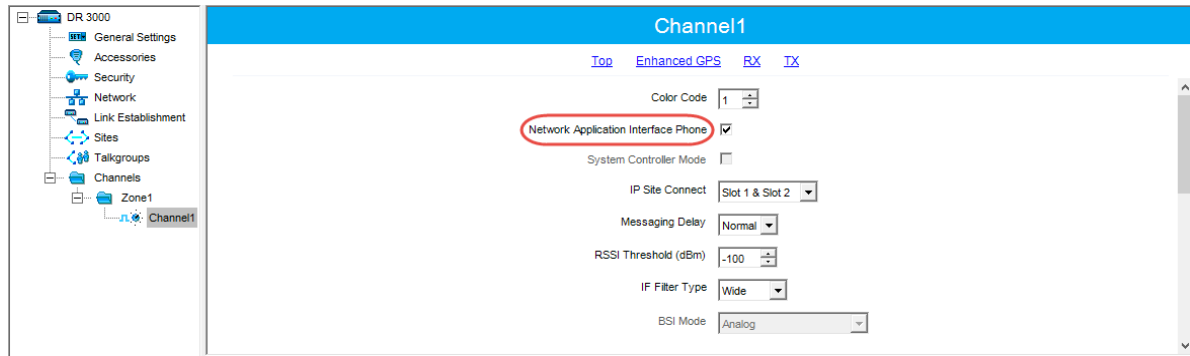
- **SIP ID**  
Enter the SIP ID that will be used by the phone user.
- **SIP Name**  
Enter the SIP user name that will be used by the phone user.
- **Caption**  
Enter the caption to be displayed for the phone user.
- **Password**  
Enter the password for the phone user to be authenticated by the telephone system.
- **Password (repeat)**  
Enter the password again.

### 3.3 MOTOTRBO CPS

#### 3.3.1 Repeater

If the NAI protocol is used in your radio system, then:

- In the left pane, select **Channels > Zone > Channel**. In the Channel pane, select the **Network Application Interface Phone** check box.



**Channel1**

Top Enhanced GPS RX TX

Color Code 1

**Network Application Interface Phone** ☒

System Controller Mode ☐

IP Site Connect Slot 1 & Slot 2

Messaging Delay Normal

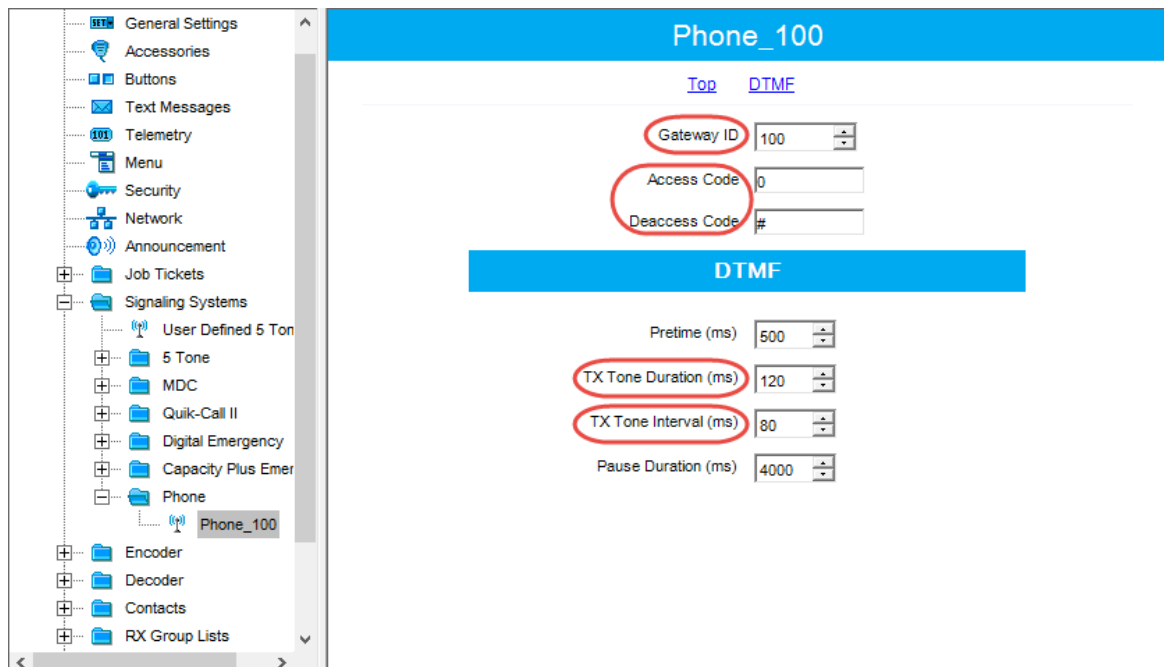
RSSI Threshold (dBm) -100

IF Filter Type Wide

BSI Mode Analog

### 3.3.2 Subscriber radio

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



**Phone\_100**

Top DTMF

**Gateway ID** 100

**Access Code** 0

**Deaccess Code** #

**DTMF**

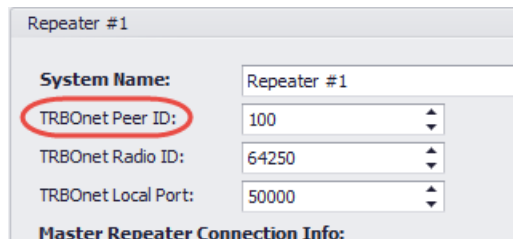
Pretime (ms) 500

**TX Tone Duration (ms)** 120

**TX Tone Interval (ms)** 80

Pause Duration (ms) 4000

- 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.



**Repeater #1**

**System Name:** Repeater #1

**TRBOnet Peer ID:** 100

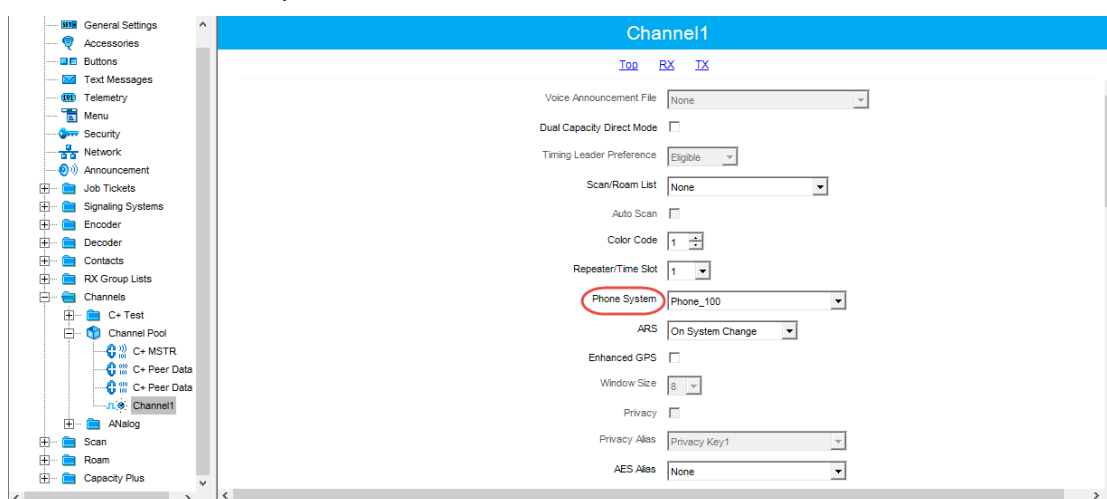
**TRBOnet Radio ID:** 64250

**TRBOnet Local Port:** 50000

**Master Repeater Connection Info:**

- **Access Code and Deaccess Code**  
These codes must be the same on all the radios and reflect the corresponding values set in the Dispatch Console.
- **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**.

- In the left pane, select **Channels > Zone (Channel Pool) > Channel**.

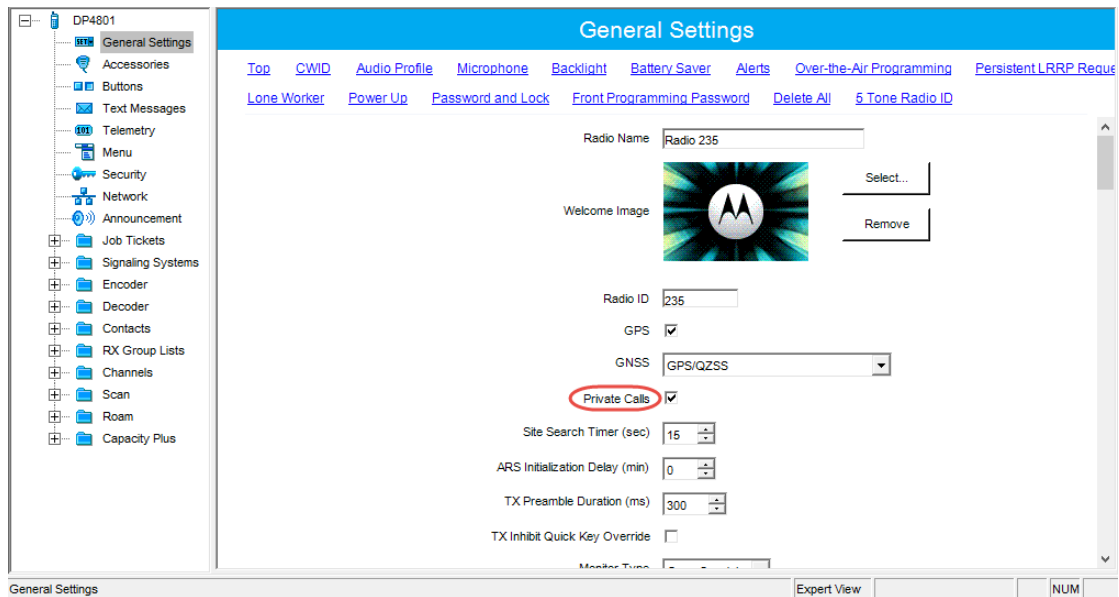


- In the Channel pane:
  - **Phone System**  
Select the phone system you have previously specified.

### 3.3.3 TRBOnet Phone System


If your radio system uses TRBOnet Phone System, make sure that the following parameters are appropriately configured in the radios that are used as control stations and subscriber radios.

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



**General Settings**

Radio Name: Radio 235

Welcome Image:  Select... Remove

Radio ID: 235

GPS: ☒

GNSS: GPS/QZSS

**Private Calls** ☒

Site Search Timer (sec): 15

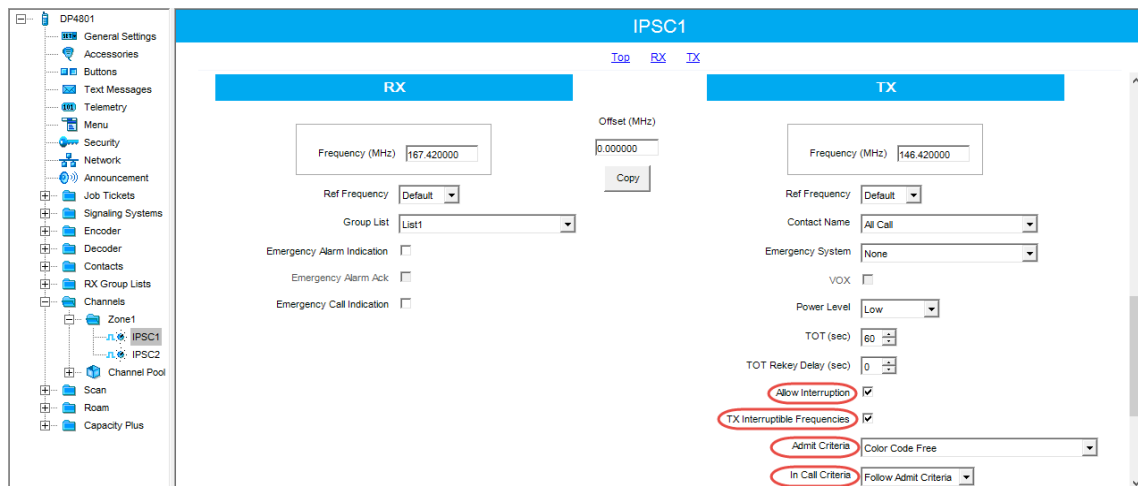
ARS Initialization Delay (min): 0

TX Preamble Duration (ms): 300

TX Inhibit Quick Key Override: ☐

Monitor Time: Expert View NUM

- Make sure the **Private Calls** check box is selected.
- In the left pane, select **Channels > Zone (Channel Pool) > Channel**.



**IPSC1**

Top RX TX

**RX**

Frequency (MHz): 167.420000

Offset (MHz): 0.000000 Copy

Ref Frequency: Default

Group List: List1

Emergency Alarm Indication: ☐

Emergency Alarm Ack: ☐

Emergency Call Indication: ☐

**TX**

Frequency (MHz): 146.420000

Ref Frequency: Default

Contact Name: All Call

Emergency System: None

VOX: ☐

Power Level: Low

TOT (sec): 60

TOT Rekey Delay (sec): 0

**Allow Interruption** ☒

**TX Interruptible Frequencies** ☒

**Admit Criteria**: Color Code Free

**In Call Criteria**: Follow Admit Criteria

- Select both the **Allow Interruption** and **TX Interruptible Frequencies** check boxes.
- From the **Admit Criteria** drop-down list, select 'Color Code Free'.
- From the **In Call Criteria** drop-down list, select 'Follow Admit Criteria' if the will be used as a control station. For a subscriber radio, select 'TX Interrupt'.