

PTT EXPRESS

INSTALLATION AND

CONFIGURATION GUIDE

PTT EXPRESS INSTALLATION AND CONFIGURATION GUIDE

MN000074A02

Rev. B

April 2015

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Revision History

Changes to the original guide are listed below:

Change	Date	Description
Rev A	10/2013	Initial release

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ABOUT THIS GUIDE

Introduction

The PTT Express solution is part of Zebra's comprehensive portfolio of high performance, feature rich, converged voice and data solutions that provide communication solutions to meet the needs of many different types of enterprises and enterprise users.

The purpose of this document is to describe the installation and configuration procedures necessary in order to prepare a site to take advantage of the PTT Express voice client.

Since wireless network infrastructure equipment varies from site to site, detailed network configuration is not included. However, this document provides guidelines to aid in selecting parameters of the wireless infrastructure that should ensure that the PTT Express client performs optimally.

This book provides an overview of the PTT Express solution and procedures for deployment.

Chapter Descriptions

Topics covered in this guide are as follows:

- [Chapter 1, Introduction](#) — This chapter provides an overview of the PTT Express solution, including the PTT Express Portfolio, the supported enterprise devices, and specific requirements for the solution.
- [Chapter 2, PTT Express Client Installation](#) — This chapter provides instructions for installing the PTT Express client on supported devices.
- [Chapter 3, Device Configurations](#) — This chapter describes the process for modifying required settings that must be assigned particular values.
- [Chapter 4, Verification and Troubleshooting](#) — This chapter lists the steps in the validation process and presents a troubleshooting FAQ.
- [Chapter 5, Tested Configurations](#) — This chapter shows typical test environments for validating the enterprise devices with the Symbol WS5100 and Cisco WLAN.

Related Documents

Refer to the following documents for associated information about the system.

Document Name	Purpose
PTT Express User Guide	Provides an overview of Push-To-Talk (PTT) features of the PTT Express Solution.
Support information for your target devices	View the website at: http://www.zebra.com/support .

For the latest version of this guide and all guides, go to: <http://www.zebra.com/support>.

Notational Conventions

The following conventions are used in this document:

- *Italics* are used to highlight the following:
 - Chapters and sections in this and related documents
 - Dialog box, window and screen names
 - Drop-down list and list box names
 - Check box and radio button names
 - Icons on a screen.
- **Bold** text is used to highlight the following:
 - Key names on a keypad
 - Button names on a screen or window.
- bullets (•) indicate:
 - Action items
 - Lists of alternatives
 - Lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.



NOTE This symbol indicates something of special interest or importance to the reader. Failure to read the note will not result in physical harm to the reader, equipment or data.



CAUTION This symbol indicates that if this information is ignored, the possibility of data or material damage may occur.



WARNING! This symbol indicates that if this information is ignored the possibility that serious personal injury may occur.

Service Information

If you have a problem with your equipment, contact Zebra Support for your region. Contact information is available at: <http://www.zebra.com/support>.

When contacting Global Customer Support, please have the following information available:

- Serial number of the unit
- Model number or product name
- Software type and version number.

Zebra responds to calls by E-mail or telephone within the time limits set forth in support agreements.

If your problem cannot be solved by Zebra Support, you may need to return your equipment for servicing and will be given specific directions. Zebra is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

If you purchased your Zebra business product from a Zebra business partner, contact that business partner for support.

CHAPTER 1 INTRODUCTION

Introduction

The PTT Express solution is one of Zebra's converged voice and data solutions which provide communication solutions for many different types of enterprises and enterprise users.

PTT Express Solution Portfolio

PTT Express solutions include:

- PTT VoWLAN is a single mode solution designed to provide service to mobile users inside the enterprise without regard to their location inside the facility or throughout a campus environment. The solution provides mobile access over the enterprise Wireless Local Area Network (WLAN) to comprehensive voice and data services. This includes services such as telephony, Push-To-Talk (PTT), email, and text messaging that are typically tethered to the desk.
- PTT Express client creates Push-To-Talk communication capability between different types of devices including PTT Smartphones, and Mobile Computers. Leveraging existing WLAN infrastructure, this solution delivers simple communications across devices without the need for a voice communication server.
- EWB extends PTT Express across multiple channels.
- Radio Link Solutions (RLS) bridges analog radio channels to digital talk groups allowing radios to communicate with PTT smartphones and mobile computers.

Devices Supported by PTT Express

Refer to the *PTT Express User Guide* for a list of supported devices.

The PTT Express client allows these devices to create Push-To-Talk communication capability between different types of devices. Some of the devices listed may require a software download/install to add PTT express to the device, but for many of the devices PTT Express comes pre-installed. The solution leverages existing WLAN infrastructure and does not require a server. This solution is also compatible with 2-way radio systems by deploying the PTT Radio Link Solution.

PTT Communication Using the PTT Express Client

To establish PTT communication:

1. A user with a PTT Express enabled device presses the Group Broadcast button to initiate communication.
2. The initial message is broadcast to all users in the form of a **Group Broadcast**.
3. After the initial broadcast message, the users have two options:
 - Any user can continue the **Group Broadcast** by pressing the Group Broadcast button.
 - The intended recipient can turn the conversation into a **Private Response** with the originator of the broadcast, using the Private Response key.



NOTE While a PTT communication key is pressed the user will not be able to use other device keys to perform separate tasks. In general pressing multiple keys simultaneously will lead to inconsistent client behavior.

Network

Many characteristics of a wireless local-area network (WLAN) impact its ability to be used for deployment of a Voice over Wireless LAN (VoWLAN) solution such as PTT Express. This section describes some of the parameters of the wireless network that should be considered to ensure the network's ability to successfully deliver voice traffic between devices running the PTT Express client.

PTT Express allows 63 users to communicate across a single sub-net. The Group Broadcast feature only permits a single user to transmit to the other members of the Talkgroup at a given moment in time. Additionally, it is assumed that at most half of the Talkgroup members (that is, approximately 32 users) are served by a single access point. As members in the Talkgroup reply via the Private Call feature, they may communicate privately to one another and Group Broadcasts may continue.

PTT Express Communication has been designed to minimize end-to-end audio delay. However, audio delay may be up to two seconds or more depending on conditions of the network.

The PTT Express client Group Broadcast communication is made possible by transmitting audio packets to a multicast address. Each device is configured to transmit to and receive from this address. The default value for this address on Windows devices is provided in [Table 1-1](#), along with the IP_PORT_BASE (Group Broadcast port) that is required to be available on each device. These values may be modified from their default values as described in [Microsoft Windows Registry Settings on page 3-1](#), but each device in the group must be configured with the same values for the parameters.

The PTT Express client Private Response communication utilizes SIP (Session Initiation Protocol) for call signaling and sends audio packets via unicast transmissions between the devices in the Private Response. The PvtLocalPort (SIP Private Response port) listed in [Table 1-1](#) must be the same value on all devices.

Table 1-1 Configurable System Parameters

Parameter	Description	Default	Range
IP_ADDRESS_BASE	IP Multicast address used for Group Broadcast communication	239.192.2.2	239.0.0.0 - 239.255.255.255
IP_PORT_BASE	Port used for receiving Group Broadcasts	5000	1024 - 49151 <65535>
PvtLocalPort	Port used for receiving SIP signaling	4080	1024 - 49151 <65535>

Network Recommendations

If possible, preference should be given to running PTT Express in an 802.11a network because of common interference sources in the frequency bands used by 802.11b/g. However, many 802.11b/g environments exist and PTT Express can be installed on devices that operate in those frequency bands used by 802.11b/g. When PTT Express is deployed in those 802.11b/g environments, preference should be given to using 802.11g to avoid any 802.11b devices that would force the network to operate at slower speeds.

When using 802.11b/g, configure the network to operate on channels 1, 6, and 11 to minimize the frequencies in use that interfere with one another. These channels are recommended when using 802.11b/g equipment. Also, some devices which support 802.11b/g may be pre-configured to only scan for 802.11 beacons on these channels.

✓ **NOTE** The use of DFS Channels is not recommended.

The country code associated with network Access Points (APs) and the enterprise devices must be in agreement. It is necessary that you assign the country code of the AP based on the country of operation and that the same country code be assigned on the enterprise device.

It is not recommended to use 5.5 or 11 as the lowest basic rates with MPA2.0 devices.

Recommended WLAN Access Point (AP) Configuration for PTT Express

PTT Express communicates half-duplex voice traffic at a QoS of VOICE with sample rates of 200ms for Group and 100ms for Private calls. It is recommended that the network support a DTIM of 2 based on a Beacon Interval of 100ms. To ensure timely delivery against lower priority traffic a QoS of VOICE should be honored across the network by supporting WMM.

Multicast rates on the AP configuration should be optimized. There is some variation between manufacturers (Cisco, Zebra etc). Customers should use the following guidelines to set the multicast rates on their APs to optimize performance.

Multicast Rate Selection

1. Choosing a Multicast Rate

Team Express uses multicast distribution to implement Group Call. In contrast to unicast mode, each AP in the ESS transmits the multicast packet once (no retries), at a fixed rate.

Choice of MC rate is similar to picking a Beacon rate, and should strike a balance between:

- a. Lower rates propagate further. Multicast Tx rate should be low enough for a reception rate of at least 90% anywhere within a cell, by all of the target mobile devices.
- b. However, an MC rate lower than necessary wastes airtime, and contributes to co-channel interference.

2. Setting the Multicast Rate

The MC rate policy varies with AP vendor, but usually cues on the Basic Rate settings. Two examples:

- a. Zebra WLAN infrastructure: The MC rate is the lowest basic rate.
- b. Cisco: MC rate is different for the Wireless Controllers and standalone APs:
 - Access points running recent Cisco IOS versions are transmitting multicast and management frames at the highest configured basic rate, and is a situation that could cause reliability problems.
 - Access points running LWAPP or autonomous IOS should transmit multicast and management frames at the lowest configured basic rate If reliable reception is a goal, then multicasts should be transmitted at a low data rate.

3. Summary

Determine how the MC rate is derived, typically from the Basic Rate settings, for the specific vendor, model, and firmware Rev in play. Then, apply section 1.1 above.

a. Quick Start

Use just 1 basic rate. Start with 24Mb/s basic, and adjust downwards for good performance. As a safety margin, drop the rate one more step.

Other Settings

1. IGMP Snooping

IGMP Snooping must be disabled.

2. Session Timer

The infrastructure session timer should be disabled or set to longer than the default value(24 hours is the suggested value).

CHAPTER 2 PTT EXPRESS CLIENT INSTALLATION

Introduction

It is recommended (but not required) that the enterprise device is associated on the network before installing the PTT Express client on the device. Since at the end of the installation procedure, the device reboots and a start up tone is played to indicate that the PTT Express application is functional.

Installing the PTT Express Client



NOTE Zebra does not support installations performed using 3rd party Device Manager solutions.

The default keys used for triggering PTT Express calls need to be remapped when installing PTT Express on the devices listed in [Chapter 3, Device Configurations](#).

For Windows devices, the use of ActiveSync is recommended for installation on the Mobile Computing devices. This method is straightforward in that the files are copied to the target device and then run from the target device.

In order to obtain application software or any available update files please go to the Zebra website <http://www.zebra.com/support>. Once purchased, the requestor is assigned a username and password to access and download the client.

Windows Devices Using ActiveSync

To install the client software on a Windows Mobile Computing device:

1. Establish **ActiveSync** connection by connecting your device to a computer with **ActiveSync** installed.
2. From the **ActiveSync** window click on the **Explore** icon.
3. Click on the **My Windows Mobile-Based Device** icon for full folder list.
4. Open the Temp folder and copy the `installer_vc_fb_XXXX.cab` file to the device.
5. From the device, use the **File Explorer** to select and run the `installer_vc_fb_XXXX.cab` file.

6. After execution of the installer cab file, the device reboots. After reboot, if the device is connected to a Wi-Fi network a tone is heard, indicating that the PTT Express services are available on the device.

Windows Devices Using an SD Card

To Install the PTT Express client using SD cards:

1. Remove the SD card from the device and connect to a host computer. For information on removing the SD card refer to device's user guide.
2. Copy the `installer_vc_fb_xxxx.cab` file to the SD card.
3. Reinsert the SD card into the device.
4. From the device, use the **File Explorer** to select and run the `installer_vc_fb_xxxx.cab` file.
5. After the execution of the installer cab file, the device reboots. After reboot, if the device is connected to a Wi-Fi network a tone is heard, indicating that the PTT Express services are available on the device.

Android Devices

The PTT Express Client comes pre-installed on all Android devices that support PTT.

Enterprise Wi-Fi Phone

The TEAM Express client comes pre-installed on the Enterprise Wi-Fi Phone (EWP) smartphones. See the EWP customer documentation for details.

Uninstalling the PTT Express Client

Windows Devices

- ✓ **NOTE** You can only uninstall a Client that was previously install on the mobile computer. Clients that are part of the factory image cannot be uninstalled.

1. Go to **Start > Settings > System > Remove Program**.
2. Select the PTT Express application and touch **Remove**. The **Remove Program** window appears. "Are you sure you want to remove it?"
3. Select **Yes**.

- ✓ **NOTE** For some versions of PTT Express the following message may appear. "The application is currently being used... Re run after reboot." Press **OK** to restart the device. After restart, follow steps 1 through 3 again to uninstall the application.

4. After successful uninstallation the device will restart.

Android Devices

For Android devices, only updated versions of PTT Express can be uninstalled. Uninstalling an updated versions of PTT Express replaces the updated version with the factory default version.

To uninstall updated PTT versions and revert to factory version:

1. Touch  **Settings**.
2. Touch **Apps**.
3. Select **PTT Express**.
4. Touch **Uninstall updates**. The **Uninstall updates?** screen appears.
5. Touch **OK**.
6. Touch **OK**.
7. Reboot the device.

Updating PTT Express from a Prior Version

Windows Devices

To update PTT Express from a prior version on a Windows device:

1. Uninstall the old version of PTT Express. See [Uninstalling the PTT Express Client](#).
2. After Uninstallation completes, install the new version of PTT Express. See [Installing the PTT Express Client](#).

Android Devices

To update PTT Express from a prior version on an Android device:

1. Connect the device to a host computer using a micro USB cable.
2. The device will be displayed as mass storage device on the host computer.
3. Copy the **PTTExpress-XXXX.APK** file to the device.
4. Disconnect the micro USB cable from the device.
5. On the device, touch  >  to open the **File Browser**.
6. Touch  to view the microSD card root folder.
7. Select the **PTTExpress-XXXX.APK** file. The **Replace app?** window appears.
8. Touch **OK**.
9. Touch **Install**.
10. After Installation, touch **Done**.



NOTE After installation of a PTT Express update on an Android device it is recommended that the user performs a reset (restart the device).

Installation/Operation Verification

Ensure the device is connected to the network, with at least one other PTT Express enabled device and perform the following tests to confirm successful operation:

1. Confirm that a Group Broadcast, or page communication can be initiated and that other devices receive the spoken voice from the originating device.
2. Once a Group Broadcast communication has been successfully established, confirm that a page-to-private, or Private Response, can be established.
3. While in a WAN call, ensure that page communication cannot be heard.

Installation Using Mobile Device Managers

The PTT Client installation file automatically reboots the device after installation. When installing the PTT Express client application using a Mobile Device Management (MDM) tool, it might be desired not to reboot the device after the PTT Express Client application installation. Especially when installing other applications after the PTT Express Client.

To disable the reboot, the client must be set to a Silent Install mode. Silent Install disables the automatic reboot after the PTT Express Client installation.

Using a text editor, create a text file with the following:

```
[installation]
reboot=false
```

Save the text file with the filename: `pttexpress.ini`.

Using the MDM push the file to the Application folder before installing the PTT Express Client application.

✓ **NOTE** After all applications are installed using the MDM, the MDM must reboot the device.

CHAPTER 3 DEVICE CONFIGURATIONS

Introduction

This chapter provides information for configuring PTT Express on Microsoft Windows devices and Android devices.

Microsoft Windows Registry Settings

A registry editor is required to view and modify the registry settings on a device. Note that after modifying registry settings, a warm boot or cold boot of the device is required in order to have the changes take effect.

✓ **NOTE** Altering any registry items other than those described in this manual are not supported and could result in the impaired operation of the device.

If installing PTT Express on the MC3190, the buttons for initiating PTT Express group calls and private calls must be remapped.

There are two types of mobile computer devices for PTT; those with side grey buttons used for PTT Group Calls and those without.

The devices with the side buttons are the MC55 and MC75; for these devices, after installation the side gray button is used for PTT group and the green key for PTT private call. For the rest of the devices, after installation, the user needs to define which keys to use, normally users use the =5' key (Group) and the =9' (Private) keys. They define the keys by modifying values in the registry; the values are hex codes obtained from a key check application which displays the hex code upon pressing a key. The application is obtained from the <http://www.zebra.com/support> web site as part of the EMDK sample applications.

Call Timer Registry Settings

Use a registry key to modify the parameters indicated in [Table 3-1](#). The registry path is:
HKEY_LOCAL_MACHINE\Software\Motorola\CVC

Table 3-1 Call Timer Registry Settings

Key	Type	Range/Default	Description
PrivateTalkTimeOut	DWORD	10000 - 90000 ms default = 60000 ms	The amount of time that has to elapse after which the Private Response terminates and the unit switches to PTT mode. Decimal Value in milliseconds. disable = 0
TalkTimeOut	DWORD	10000 - 90000 ms default = 60000 ms	The amount of time the user is allowed to hold the floor (talk without interruption). Decimal Value in milliseconds. disable = 0
END_SESSION	DWORD	1000 - 10000 ms default = 10000 ms	The amount of time that has to elapse after which a Private Response cannot be made to the last known talker in the session. Decimal Value in milliseconds.

✓ **NOTE** Note that the hang time represents a minimum value and may vary by up to 1 second due to possible network and protocol delays. For example, if a value of 5 is entered, the hang time is actually between 5 and 6 seconds.

Private Response Registry Settings

Use a registry key to modify the parameters indicated in [Table 3-2](#). The registry path is:
HKEY_LOCAL_MACHINE\Software\Motorola\CVC\DCMe

Table 3-2 Private Response Registry Settings

Key	Type	Default	Description
PvtHangTimerDuration	DWORD	1000 - 10000 ms default = 10000 ms	The amount of time that has to elapse after which the Private Response will terminate and the device will switch to Group Broadcast mode. Decimal Value in milliseconds.
PvtLocalPort	DWORD	4080	IP Port to be used for Private Response communications. Decimal value.

Group Broadcast Multicast Registry Settings

Use a registry key to modify the indicated parameters in [Table 3-3](#). The registry path is:
HKEY_LOCAL_MACHINE\Software\Motorola\CVC\WTM

Table 3-3 Group Broadcast Multicast Registry Settings

Key	Type	Default	Description
IP_ADDRESS_BASE		239.192.2.2	Multicast address to be used for Group Broadcast communications.
IP_PORT_BASE	DWORD	5000	IP Port number of the multicast address being used for Group Broadcast communications. Decimal value

User Configurable Device Key for PTT Private Response and PTT Group Broadcast

A registry editor is required to view and modify the user configurable device keys. Note that after modifying the configurable device key, a soft-reset of the device is required in order to have the changes take effect.

The registry path is: HKEY_LOCAL_MACHINE\Software\Motorola\CVC\Keys\

- ✓ **NOTE** The following key settings apply to Zebra Mobile Computing devices only. Only one button can be assigned as the pttPrivateCall (Private Response) key and one button can be assigned as the pttGroupCall (Group Broadcast) key.

Table 3-4 User Configurable Device key to be used for Private Response on a Mobile Computer

KEY	Type	Range/Default	Description
pttPrivateCall	DWORD	7E (hex) 126 (decimal)	Hex/decimal value of physical key to be pressed for usage in Private Call. Green Key (most MCs)
		20 (hex) 32 (decimal)	Space Bar
		D (hex) 13 (decimal)	Enter/Return Key
pttGroupCall	DWORD	7E (hex) 126 (decimal)	Hex/decimal value of physical key to be pressed for usage in Group Call.
		20 (hex) 32 (decimal)	Space Bar
		D (hex) 13 (decimal)	Enter/Return Key

- ✓ **NOTE** Registry key values need to be updated after installing PTT Express on the MC3190 as it lacks dedicated keys for PTT Express group calls and private calls:

To determine key codes, the KeyCheck.exe application is run on the device, key to be used is pressed and keycode in hex is displayed. For example, the =5' key will show 0x35 and the =9' will show =0x39' in the WM_KEYUP and WM_KEYDOWN events, it is the 0x35, 0x39 values that will be set in the registry key(s).

The KeyCheck.exe application is obtained from the support.symbol.com web site as part of the EMDK/SMDK sample applications.

Private Key Configurations

A registry editor is required to view and modify the user configurable device keys. Note that after modifying the configurable device key, a soft-reset of the device is required in order to have the changes take effect.

The registry path is: HKEY_LOCAL_MACHINE\Software\Motorola\CVC\Keys.

Table 3-5 User Configurable Device key to be used for Private Response on a Mobile Computer

KEY	Type	Range/Default	Description
PrivateKeyConfig	DWORD	0 1 NP or any other value	Disable private calls. Private Call is made using 1.5 Key press of Group Call button. 1.5 Key press implies Group Call button pattern: Press + Release + Press back within durations specified by PrivatecallOffset1 and PrivatecallOffset2. Dedicated keys for Group Call and Private Call.
PrivatecallOffset1 PrivatecallOffset2	DWORD	NP, NP 0, 0 t1, t2 0, t2	300ms and 500 ms respectively (default) 300ms and 500 ms respectively (default) (T2-T1) ms, (T3-T2) ms The total window (T3 – T1) will be t2 ms.

NP = Not present.

Valid when Private Call is made using 1.5 key press of Group Call button. (i.e. when PrivateKeyConfig = 1).

Key press timings in milliseconds:

- T1 - 1st Group Call button press
 - T2 - Group Call button release
 - T3 - 2nd Group Call button press.
1. By default PrivatecallOffset1 and PrivatecallOffset2 shall not be present in the registry. In this case and when PrivatecallOffset1 and PrivatecallOffset2 are set to zero, default values of 300ms and 500 ms are assigned respectively.
 2. If PrivatecallOffset1 = 0, then the total window (T3 - T1) will be PrivatecallOffset2 ms.
 3. If PrivatecallOffset1 and PrivatecallOffset2 are non-zero, then T2 - T1 should be PrivatecallOffset1ms and T3 - T2 should be PrivatecallOffset2 ms.
 4. T3 - T1 should always be less than 1000 ms., if it's more, then we will set to default : T2-T1 = 300 ms and T3-T2 = 500 ms.
 5. On the VC70, by default, PrivateKeyConfig = 1 and PrivatecallOffset1 = NP and PrivateCallOffset2 = NP.
 6. All other devices, by default, PrivateKeyConfig = NP and PrivatecallOffset1 = NP and PrivateCallOffset2 = NP.
 7. On the VC70, the microphone button is used for Group Call and the 1.5 key press of the microphone button for Private Calls.

Do Not Disturb

A registry editor is required to view and modify the user configurable device keys. Note that after modifying the configurable device key, a soft-reset of the device is required in order to have the changes take effect.

The registry path is: HKEY_LOCAL_MACHINE\Software\Motorola\CVC\.

Table 3-6 *Do Not Disturb*

KEY	Type	Range/Default	Description
DNDSupport	DWORD	0, NP 1	Disabled (default) Enabled

NP = Not present.

Android Configuration File Settings

The system administrator can manually configure PTT Express by creating an xml file and loading it onto the device. [Table 3-7](#) list all the key options for the PTT Express application. The filename of the xml file must be: te_settings.xml. The xml file must be located in the folder: = /enterprise/device/settings/te.

Table 3-7 Android PTT Configuration File

Key	Range	Default	Description
te_enable	True or False	False	Enable or disable the PTT Express service.
te_channel	1 through 32	1	Sets the default Talk Group Channel.
te_TalkTimeOut	10,000 through 90,000	60,000	In a group call, the amount of time the user is allowed to hold the floor (talk without interruption). Decimal value in milliseconds. Disable = 0.
te_pvtTalkTimeOut	10,000 through 90,000	60,000	In a private call, the amount of time the user is allowed to hold the floor (talk without interruption). Decimal value in milliseconds. Disable = 0.
te_END_SESSION	1,000 through 10,000	10,000	The amount of time that has to elapse after which a Private Response cannot be made to the last known talker in the session. Decimal value in milliseconds.
te_PvtHangTimerDuration	1,000 through 10,000	10,000	The amount of time that has to elapse after which the Private Response will terminate. Decimal value in milliseconds.
te_PvtLocalPort		4,080	IP Port to be used for Private Response communications. Decimal value.
te_ipgroup		239.192.2.2	Multicast address to be used for Group Broadcast communications.
te_IP_PORT_BASE		5,000	IP Port number of the multicast address being used for Group Broadcast communications. Decimal value.
ignoreKeysInLockMode	True or False	False	Ignore hard keys in locked screen mode.
groupCallKey	L1, L2, R1	L2	The Group Call Key intent. For MC40: L2 = PTT Key L1 = Left Trigger
privateCallKey	L1, L2, R1	L1	The Private Call Key Intent. L2 = PTT Key L1 = Left Trigger
pttHeadSetKey	R2	R2	The PTT Headset Key Intent.

Table 3-7 Android PTT Configuration File

Key	Range	Default	Description
log_level	None, Error, Warning, Info, Debug	None	Log Level for logs generated at /sdcard/te
keyConfiguration	0, 1, 2	2	Key Configuration 0 – On-screen buttons (where no on-device buttons are available) 1 – Use 'groupCallKey' for Group Call and Use 1.5 Key press (of 'groupCallKey') for Private Call 2 – Use 'groupCallKey' and 'privateCallKey'
disablePTTClient	True or False	False	Disable PTT Express user interface and service.
disablePrivateCall	True or False	False	Disable initiation of Private Call.
onekeyTimerDelay	400 to 1,000	600	The delay in milliseconds to detect privateCall key press in one key or headset configuration.

The administrator can edit an xml configuration file and import it into any MC40 device. Use any text editor to create or edit an xml file. Use the sample below to create the xml file.

```
<?xml version="1.0" encoding="UTF-8"?>
<TeSettingList>

    <setting>
        <te_enable>>false</te_enable>
        <explanation>Enable or disable the TE service.</explanation>
    </setting>

    <setting>
        <te_channel>1</te_channel>
        <explanation>Talk group channel.</explanation>
    </setting>

    <setting>
        <te_TalkTimeOut>60000</te_TalkTimeOut>
        <explanation>In a group call, the amount of time the user is allowed to hold the floor (talk without interruption). Decimal value in milliseconds. disable = 0.</explanation>
    </setting>
```

```
<setting>
    <te_pvtTalkTimeOut>60000</te_pvtTalkTimeOut>
    <explanation>In a private call, the amount of time the user is allowed to
hold the floor in the private call (talk without interruption). Decimal value in
milliseconds. disable = 0.</explanation>
</setting>

<setting>
    <te_END_SESSION>10000</te_END_SESSION>
    <explanation>The amount of time that has to elapse after which a Private
Response cannot be made to the last known talker in the session. Decimal value in
milliseconds.</explanation>
</setting>

<setting>
    <te_PvtHangTimerDuration>10000</te_PvtHangTimerDuration>
    <explanation>The amount of time that has to elapse after which the Private
Response will terminate. Decimal value in milliseconds.</explanation>
</setting>

<setting>
    <te_PvtLocalPort>4080</te_PvtLocalPort>
    <explanation>SIP IP Port to be used for Private Response communications.
Decimal value.</explanation>
</setting>

<setting>
    <te_ipgroup>239.192.2.2</te_ipgroup>
    <explanation>Multicast address to be used for Group Broadcast
communications.</explanation>
</setting>

<setting>
    <te_IP_PORT_BASE>5000</te_IP_PORT_BASE>
    <explanation>IP Port number of the multicast address being used for Group
Broadcast communications. Decimal value.</explanation>
</setting>
```

```
<setting>
    <log_level>None</log_level>
    <explanation>Log level: None, Error, Warning, Info, Debug. The default is
None.</explanation>
</setting>

<setting>
    <groupCallKey>L2</groupCallKey>
    <explanation>The button for group call. The default is L2.</explanation>
</setting>

<setting>
    <privateCallKey>L1</privateCallKey>
    <explanation>The button for private call. The default is
L1.</explanation>
</setting>

<setting>
    <pttHeadsetKey>R2</pttHeadsetKey>
    <explanation>The headset button for group call. The default is
R2.</explanation>
</setting>

<setting>
    <ignoreKeysInLockMode>>false</ignoreKeysInLockMode>
    <explanation>Ignore keys in lock mode. The default is
false.</explanation>
</setting>

<setting>
    <gcJitterSize>3</gcJitterSize>
    <explanation>One group call packet holds 200 ms data. The default jitter
buffer size is 3 which means the maximum data the jitter holds is 600
ms.</explanation>
</setting>

<setting>
    <pcJitterSize>3</pcJitterSize>
```

```
<explanation>One private call packet holds 100 ms data. The default jitter
buffer size is 3 which means the maximum data the jitter holds is 300
ms.</explanation>
```

```
</setting>
```

```
</TeSettingList>
```

To import a PTT Express configuration file:

1. Copy the configuration file `te_settings.xml` from a host computer to the root of the On-device Storage or sd card.
2. On the device, use **File Browser** to move the `te_settings.xml` file from the root of the On-device Storage or sd card to the folder: `/enterprise/device/settings/te`.



NOTE The configuration file can also be loaded on the device using ADB.

Radio Link Solution (RLS) Setup

RLS solution is required to allow PTT Express enterprise devices to conduct Group Broadcasts with 2-Way radios. For a complete understanding of RLS, see the quick reference guide included with the RLS unit.

Only Group Calls are supported using the RLS Solution. Private responses are not supported.

Talk Group Configuration

Up to 32 talk groups can be created by PTT Express users. However, only one talk group may be enabled at a time. To toggle between desired talk groups:

1. From the enterprise device Start button, select **Programs > PTT Express Configuration**.
The PTT Express Configuration window opens showing the default values of:
 - Voice Client Enable: selected
 - Current Talk Group: 1
2. To determine the PTT Express version at any time, select the **About** button at the bottom of the screen.
3. To disable the PTT Express voice client PTT communication, select or deselect the **Voice Client Enable** field. This toggles the service between active and inactive.
4. To select a different talk group, click the drop down menu of the **Current Talk Group** field.
Talk groups 1 through 32 are displayed.
5. Select the desired talk group.
The newly selected talk group is the one that is enabled.
6. Press **Save** to activate changes.
An audible service tone indicates the Voice Client status.

CHAPTER 4 VERIFICATION AND TROUBLESHOOTING

Introduction

It is important to verify the operation of the PTT Express after installing the PTT Express client on the enterprise devices. Verify that on a Group Broadcast, the target devices are able to receive/playback audio from the originator and that the user is able to respond to Group Broadcast requests. Then verify that a Private Response request and response can be established.

The following sections list the verification procedures used to validate the successful installation and configuration of the PTT Express client and a Frequently Asked Questions (FAQ) related to installation and configuration.

Verification

The following list indicates the tests recommended to validate the installation and configuration of the PTT Express Client.

- Download client software from a pre-defined web site.
- Install PTT Express Client software.
- Hold Multicast/ Group Broadcast Conversation. See the PTT Express Users Guide for instructions. The guide can be downloaded from: <http://www.zebra.com/support>.
- Hold a Private Conversation. See the PTT Express Users Guide for instructions. The guide can be downloaded from: <http://www.zebra.com/support>.
- Provision Mobility Services Platform Server with PTT Express client package (for subsequent download)
- Enable/ disable PTT Express client.
- Dual Mode (Cellular/Express) call interactions.
- Roaming
- Interoperate with Radio Link Server Donor device.
- Set Group/Private Response Key.
- Configure handset device parameters.

- Configure WLAN parameters.
- Configure Multicast Traffic Processing router/device parameters.
- PTT Express interaction with Line of Business application.

Troubleshooting

Table 4-1 provides solutions to frequently encountered problems.

Table 4-1 *Frequently Asked Questions*

Question	Answer
What should the WLAN Adapter be set to?	WLAN Adapter should be set to Fast PowerSafe.
What if you hear a “bonk” tone when pressing Group Broadcast key?	<p>Check following items on the device</p> <ul style="list-style-type: none"> • Check that the Wi-Fi is enabled. <ul style="list-style-type: none"> • MCxx devices: check the Wi-Fi icon on bottom right hand corner of the screen. If there is a red “X” it means that Wi-Fi is disabled. • If disabled click the Wi-Fi icon and click on enable option. • Check that the device is associated to Wi-Fi network and has acquired an IP address. <ul style="list-style-type: none"> • For MCxx devices, click on Wi-Fi icon on bottom right hand corner of the screen. • Click Wireless status. • Click Current Profile [This will show ESSID: Channel Number: & Signal Strength]. • Click on back arrow on top right hand corner. • Click on IPv4 Status (This shows the Device IP address: Dynamic Host Configuration Protocol IP address: DNS IP address etc.).
What if you hear non-intelligible audio?	Check signal strength, packet loss, speaker/microphone position.
What if there are association issues?	Check country code settings on both the device and the access point.
What happens if I perform a clean boot?	The PTT Express client is stored in persistent storage on supported Mobile Computers. The client remain loaded and in operation after a device warm or cold boot. A user must re-install the client after a clean boot
What happens if I press multiple keys simultaneously?	While a PTT communication key is pressed the user will not be able to use other device keys to perform separate tasks. In general pressing multiple keys simultaneously will lead to inconsistent client behavior.

CHAPTER 5 TESTED CONFIGURATIONS

Introduction

This following section contains the environments for which the operation of PTT Express Group Broadcast and Private Response has been tested and validated:

✓ **NOTE** Updated firmware versions may be available.

Symbol WS5100 Test Environment 1

Table 5-1 *Symbol WS5100 Test Environment 1*

WLAN Configuration	Parameter Value
Radio Access Network Switch	RFS 6000 Series
Software Version	5.4.0.0-047R
Local Dynamic Host Configuration Protocol	Enable
Multicast Configuration	IGMP Snooping Disabled
Access Point1	AP650
Access Point2	AP650
Access Point Image	5.4.0.0-047R
WiFi Band	802.11 a/b/g
Access Point1 a Channel	149
Access Point2 a Channel	153
Access Point1 b/g Channel	1
Access Point2 b/g Channel	11
Encryption/ Security Setting	WPA2/PSK/AES
Country Code	US

Symbol WS5100 Test Environment 2

Table 5-2 *Symbol WS5100 Test Environment 2*

WLAN Configuration	Parameter Value
Radio Access Network Switch	RFS 4000 Series
Software Version	5.4.0.0-047R
Local Dynamic Host Configuration Protocol	Enable
Multicast Configuration	IGMP Snooping Disabled
Access Point1	AP650
Access Point2	AP650
Access Point Image	5.4.0.0-047R
WiFi Band	802.11 a/b/g
Access Point1 a Channel	149
Access Point2 a Channel	153
Access Point1 b/g Channel	1
Access Point2 b/g Channel	11
Encryption/ Security Setting	WPA2/PSK/AES
Country Code	US

Cisco WLAN Test Environment 1

Table 5-3 *Cisco WLAN Test Environment 1*

WLAN Configuration	Parameter Value
Radio Access Network Switch	Cisco Wireless LAN Controller 5500 Series
Software Version	7.0.220.0
Local Dynamic Host Configuration Protocol	Enable
Multicast Configuration	IGMP Snooping Disabled
Access Point1	AIR-CAP3502E-A-K9
Access Point2	AIR-CAP3502E-A-K9
Access Point Image	C3500-K9W IOS 12.4(23c)JA3
WiFi Band	802.11 a/b/g
Access Point1 a Channel	149
Access Point2 a Channel	153
Access Point1 b/g Channel	1
Access Point2 b/g Channel	11
Encryption/ Security Setting	WPA2/PSK/AES
Country Code	US

Cisco WLAN Test Environment 2

Table 5-4 Cisco 2500 Series Wireless LAN Controller

WLAN Configuration	Parameter Value
Radio Access Network Switch	Cisco 2500 Series Wireless LAN Controller
Software Version	7.0.220.0
Local Dynamic Host Configuration Protocol	Enable
Multicast Configuration	IGMP Snooping Disabled
IGN Snooping	Disabled
Access Point1	AIR-CAP3502E-A-K9
Access Point2	AIR-CAP3502E-A-K9
Access Point Image	C3500-K9W IOS 12.4(23c)JA3
WiFi Band	802.11 a/b/g
Access Point1 a Channel	149
Access Point2 a Channel	153
Access Point1 b/g Channel	1
Access Point2 b/g Channel	11
Encryption/ Security Setting	WPA2/PSK/AES
Country Code	US

GLOSSARY

A

AP. Access Point or Access Port

ASCII. American Standard Code for Information Interchange

B

Backward Compatibility. Ability of new units to operate within an "old" system infrastructure, or to directly communicate with an "old" unit.

Bandwidth. The difference between the limiting frequencies of a continuous frequency band, typically measured in kilohertz. May be considered, the amount in kilohertz required for a single communications channel.

Broadcast. One to Many half duplex PTT communication

C

Call. An event beginning when a user requests voice resources (primarily RF channels), and ending when those resources are released and available for a new request. A call consists of a series of console and radio transmissions. A call is complete when all of the transmissions have ended and the hang time has expired.

D

dB. Decibels. Unit relating to power levels (for example, of a speech signal). DHCP — Dynamic Host Configuration Protocol

Delay. The delay experienced when a call arriving at an automatic switching device finds no idle channel or facility available to process the call immediately.

DTIM. Delivery Traffic Indication Message

E

EWP. Enterprise Wi-Fi Phone

F

FMC Voice Client. Voice client that delivers multi-group push-to-talk communication, PBX integrated telephony services, and WLAN text messaging. along with Cellular (WAN) voice and data service

G

G.729a. Codec used to Encode/Decode CVC PTT packets Group

Group Broadcast Button. Button for initiating Group Broadcast (1:N).

Group Broadcast Period. The maximum recording duration of a Group Broadcast PTT communication

Group Broadcast Timer. Timer that controls when and how long the user talk in single Group Broadcast

GUI . Graphical User Interface

I

ID. Identifier

IEEE. Institute of Electrical and Electronic Engineers

IM. Instant Messaging

IP. Internet Protocol

ITU-T. International Telecommunications Union-Telephony

L

LMT. Local Maintenance Terminal

LOB. Line of Business

M

MC. Mobile Computer

MS. Mobile Subscriber

Mobility Services Platform (MSP). Device management client server solution for provisioning applications and devices.

P

Page to Private Communication. Group Broadcast and Private Response PTT Communication

Private Response. One to One half duplex PTT Communication

Private Response Period. The maximum recording duration of a Private Response PTT communication.

Private Response Timer. that controls when and how long the user talk in single Private Response

PSTN. Public Switched Telephone Network

PTT. Push-To-Talk. Half duplex voice communication

PTT Express Voice Client. Voice client that enables Multiple Talk Group and Private Response PTT Communication

Q

QoS. Quality of Service

R

RAN. Radio Access Network

Reassured. Link Solution. Gateway that enables communication with 2-Way radios

S

SD. Storage Device

SIP. Session Initiation Protocol

SSID. Service Set Identifier

U

URL. Uniform Resource Locator

V

VoIP. Voice over Internet Protocol

VoWLAN. Voice over Wireless Local Area Network

VoWLAN Voice Client. Voice client that delivers multi-group push-to-talk communication, PBX integrated telephony services, and WLAN text messaging

W

WMM. Wi-Fi Multimedia

WLAN. Wireless Local Area Network

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