MOTOTRBO
Connect Plus Upgrade Guide



August 2016
Version 1.77

References:

[1] MOTOTRBO Connect Plus System Planner
[2] MOTOTRBO System Planner
[3] MOTOTRBO Connect Plus Portable User Guide
[4] MOTOTRBO Connect Plus Mobile User Guide
[5] MOTOTRBO Connect Plus XRC Controller User Guide

1 Introduction

The purpose of this document is to provide the high-level backward compatibility and upgrade guideline for MOTOTRBO Connect Plus releases. This document outlines the product upgrades required for each feature, the backward compatibility issues in the releases, and the recommended order in which the product upgrades shall be carried out. This document is not intended to capture the system setup details. The system setup details will be captured in the System Planner document [1] and in the user manuals [3], [4], and [5].

1.1 Document Intent

This document provides details on any compatibility issues between the Connect Plus releases and provides upgrade procedure guidelines and process steps that should be followed to ensure smooth upgrade experience with minimal downtime.

1.2 Version and Revision History

Version	Date	Description
1.0	02-Sep-2011	Initial document version
1.41	17-Dec-2013	Updates for R1.4A
1.44	27-Jun-2014	Updates for R1.4B
1.51	28-Jul-2014	Updates for R1.5
1.52	22-Aug-2014	Update for R1.5.1 – difference with R1.5 is CP CPS version only.
1.53	05-Nov-2014	Update for R1.5.2 – difference with R1.5.1 is XRC F/W version only.
1.60	10-Jun-2015	Updates for R1.6
1.61	19-Oct-2015	Added another exception for the R1.6.x upgrade
1.62	20-Nov-2015	Added exceptions for the R2.5 upgrade
1.73	09-May-2016	Updates for R1.7 (R2.6.0)
1.75	20-Jun-2016	Added content to sections 4.10 & 6.9.5 regarding XRI Key Manager File
1.76	05-Aug-2016	Added content to section 4.10 regarding DID & section 6.9.3 regarding radio upgrade
1.77	19-Aug-2016	Updated F/W versions for R2.6.5

1.3 Definitions and Acronyms

- AF - Automatic Fallback
- ATB - All Trunks Busy
- AP - Asia Pacific (business region)
- CCH - Control Channel
- CFS - Charge For Software
- Data Apps - Third party data applications
- EM - Europe & Middle East (business region)
- ETCA - Enhanced Traffic Channel Access
- FGPS - Fast GPS (Connect Plus feature introduced in R1.6)
- F/W - Firmware
- LA - Latin America (business region)
- MOL - Motorola Online
- N/A - Not Applicable
- NA - North America (business region)
- OB - Option Board
- PCR - Professional and Commercial Radio
- PC - Personal Computer
- Products - CPS, Subscribers, Repeaters and Data Apps
- RDAC - Repeater Diagnostics, Alarms and Control
- RRP - Remote Repeater Programming
- Subscribers - Portable and Mobile Radios
- SU - Subscriber Unit; see Subscribers

2 Notes on Backward Compatibility

Interoperability between different releases is expected from the latest released version of Connect Plus. For example, R1.4 shall be fully backward compatible with the prior release (R1.3); i.e. all system features introduced in R1.3 shall be supported in R1.4.

The Connect Plus subscriber consists of two components – the main radio board and the Option Board – which are both loaded with their respective firmware platforms. It is important to note that backward compatibility issues may arise when incompatible firmware loads are installed in the repeater, subscriber's main radio board or the subscriber's Option Board.

When any product or system release cannot meet the backward compatibility requirements, an appropriate notice (bulletin) shall be provided to the MOTOTRBO Connect Plus dealers. Any affected functionality that could impact customer expectation shall be captured in the release notes of that system release.

3 Connect Plus Feature Upgrade Matrix

Feature Upgrade Table 1 is used to identify Motorola products that must be upgraded to enable a particular system feature for full system functionality or a feature that affects more than one product. This table is not intended to list any product specific internal features or enhancements that do not impact other products. The products listed in this table are the minimum set that are required to enable the feature, and it might not include all the products that have been modified in the target new release.

Connect Plus upgrade is based on feature support, and it could require one or multiple products to be upgraded.

- "Yes" – Indicates that the product requires upgrade for using the feature if the product is used by the customer.
- "No" – Indicates that the product does not require upgrade for using the feature if the product is used by the customer.
- "N/A" – Indicates that the support for the particular Motorola product is not supported or discontinued in the release.

System Release	Feature	Data Applications				XRC Controller	Network Manager[1]	XRT Gateway[2]	MOTOTRBO CPS / CP CPS		Repeater	Subscriber	
		Location		Text Messaging									
		Server	Client	Server	Client							Radio	OB
1.2	Network Wide All Call	No	No	No	No	Yes	Yes	Yes	No	No	No	No	Yes
	Emergency Alert	No	No	No	No	Yes	Yes	Yes	No	Yes	No	No	Yes

[1] Upgrading the Network Manager also implies upgrading the *Network Manager Connection Tool*.
[2] Upgrading XRT Gateway also implies upgrading the *XRT Configuration Tool*.

	35 Site Support	No	No	No	No	Yes	Yes	Yes	No	Yes	No	No	Yes
	Multi-Zone Scan	No	No	No	No	No	No	No	No	Yes	No	No	Yes
1.2.3	ETCA	No	No	No	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes
1.3	Auto Fallback	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
	Multiple NIDs	No	No	No	No	No	No	No	No	Yes	No	Yes	Yes
	Enhanced SU-SU Privacy	N/A	N/A	N/A	N/A	No	No	No	No	Yes	No	Yes	Yes
	RRP[3]	No	No	No	No	Yes	Yes	No	Yes	No	Yes	No	No
	Third-Party XCMP Support	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes
1.4	70-site System	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
	XPR 7550 Radio Support	No	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes
1.4A	Enhanced Radios Support	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
1.4B	Introduction of XRC/XRT 9100	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No
1.5.X	Telephone Interconnect	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
	Redundant XRT	No	No	No	No	No	Yes	Yes	No	No	No	No	No
	Scan Talkback options	No	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes
1.6	Fast GPS	Yes	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
	Priority Monitor Scan	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
	250-site System	No	No	No	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes
	Robust	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

[3] RRP (Remote Repeater Programming) is supported on XPR™ 8400 and MTR3000 repeaters.

	Registration												
	Roaming Enhancement	No	No	No	No	No	No	No	No	No	No	Yes	Yes
2.5	Vibrating Belt Clip	No	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes
1.7 / 2.6	SIP Telephony	No	No	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
	Permanent Talk Group	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
	Talk Group Restriction	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
	Indoor Location	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
	Digital BSI	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	No	No
	Extended Text Message	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
	Ignore Emergency RX	No	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes

Table 1 Connect Plus Feature Upgrade Table

Approximate upgrade time for each product:

Repeaters: Approximately 10 minutes per XPR repeater and 20~25 minutes per MTR3000 Repeater.

Subscribers: Approximately 10 minutes per subscriber including 5 minutes per OB.

Data Apps: Installation or upgrade times vary. Refer to the specific data application documentation.

Controller: Approximately 30 minutes per controller, which includes uploading[4] the firmware file to the controller, enabling the firmware and rebooting the controller.

[4] The controller functions are not affected during the firmware file transfer (upload). The controller reboots automatically after the transferred firmware is enabled by the administrator.

Table 2 and Table 3 provide a list of software versions for the Connect Plus system components for the latest and prior System Releases.

System Release	Network Manager	NM Conn Tool	XRC Controller	XRT Config Tool	XRT Gateway	CPS	CP CPS	Repeater[5]	Subscriber	
									Main Radio	OB
1.3	R01.30.25	R01.30.19	R01.03.215	R01.03.24	R01.03.35.215	8.6 Build 453	R01.30.104	R02.20.10	R01.11.10	R01.05.91
1.4	R01.40.17	R01.40.17	R01.04.245	R01.40.20	R01.04.20.245	9.0 Build 470	R01.40.055	R02.20.12	See Table 3	
1.4A	R01.40.17	R01.40.17	R01.04.245	R01.40.20	R01.04.24.251	10.0 Build 510	R01.41.012	R02.30.02	See Table 3	
1.4B	R01.40.27	R01.40.26	R01.04.521 ([6])	R01.40.30	R01.04.24.521 ([7])	10.0 Build 510	R01.41.012	R02.30.02	See Table 3	
1.5.1	R01.50.18	R01.50.18	R01.05.548	R01.05.17	R01.05.548	10.5 Build 551	R01.05.02	R02.30.12	See Table 3	
1.5.2	R01.50.18	R01.50.18	**R01.05.550**	R01.05.17	R01.05.548	10.5 Build 551	R01.05.02	R02.30.12	See Table 3	
1.6	R01.60.16	R01.60.11	R01.06.636	R01.06.20	R01.06.636	11.5 Build 621	R01.06.02	R02.40.12 R01.01.03	See Table 3	
2.5	R01.60.16	R01.60.11	R01.06.639	R01.06.20	R01.06.639	12.0 Build 642	R02.05.02	R02.40.20 R01.02.00	See Table 3	
1.7/2.6	R02.60.312	R02.60.312	R02.60.312	R02.60.312	R02.60.312	13.0 Build 666	R02.06.03	R02.06.07	See Table 3	
2.6.5	R02.60.05.0424					13.5 Build 679	R02.06.05	R02.06.07 R02.06.08 R02.06.08 R02.06.53 R02.06.72	See Table 3	

Table 2 Released Versions

Repeater – XPR 8300/8400 Series, XiR P8200, DR 3000,	**R02.06.00.07**
Repeater – MTR 3000	**R02.06.00.08**
Repeater – SLR 5000 Series	**R02.06.00.08**
Repeater – SLR 8000 (UHF)	**R02.06.00.53**
Repeater – SLR 8000 (VHF)	**R02.06.00.72**

[5] If two repeater versions are listed, then the second entry is for the SLR repeater.
[6] This firmware version is applicable to XRC 9100 only.
[7] This firmware version is applicable to XRT 9100 only.

System Release	Core Radios		Enhanced Radios	
	Main Radio	OB	Main Radio	OB
1.4	R01.11.20 (mobile) R01.11.21 (portable)	R01.06.17	R02.06.33	R01.00.52
1.4A/B	R01.12.02	R01.06.17	R02.30.01	R01.04.11
1.5.X	R01.12.11	R01.07.16	R02.30.13	R01.05.01
1.6	R01.12.15	R01.07.31	R02.40.11	R01.06.01
2.5	R01.12.15	R01.07.42	R02.50.xx	R02.05.01
1.7/2.6	R01.12.17	R01.07.44	R02.60.03	R02.06.03
2.6.5		R01.07.45	R02.06.05	R02.06.05

Table 3 Subscriber Firmware Versions

Table 4 provides a list of product versions supported on particular Connect Plus system release.

System Release	MIP 5000	Genesis GW3-TRBO®	Avtec		Elcomplus SmartPTT	Neocom TRBOnet
			VPGate™	Scout™ Console		
1.3	4.1.1	3.2.7.4.0	2.5.8.1	2.5.6.3		
1.4	4.1.1	3.2.8.4.0	3.1.11.2	3.1.9.1		
1.4A/B	4.1.1	3.2.8.4.0	3.1.11.2 3.1.12.13	3.1.11.11		
1.5.X	4.1.1	3.2.10.15.16	3.3.4.3 3.3.3.7	3.3.3.40		
1.6	4.02.00.04.02.3	3.2.12.13.33	4.0.19.7	4.0.19.6	8.7	4.7.756
1.7/2.6	4.02.00.04.02.3	3.2.12.27.0	4.1.9.2	4.1.7.14 4.1.7.5	9.0	5.0

Table 4 Supported Product Versions

System Release	XRP 8300/8400	MTR 3000	SLR	
			Main Radio	OB
2.6.5			R02.06.33	R01.00.52

Table 5 Repeater Firmware Versions

4 Backward Compatibility Exceptions

The exceptions are captured in this section and can be found in the customer release notes:

4.1 Exceptions for Release 1.0A/B

Note: the content is this section has been retired.

4.2 Exceptions for Release 1.1

Note: the content is this section has been retired.

4.3 Exceptions for Release 1.2

Note: the content is this section has been retired.

4.4 Exceptions for Release 1.3

The following features introduced in Release 1.3 may cause unexpected behavior in subscribers that have not been upgraded to this release.

- Automatic Fallback – this feature allows the Connect Plus radio to automatically detect certain failure scenarios where the site repeaters are no longer communicating with the XRC 9000 Controller. When the Auto Fallback is **disabled** in the XRC 9000 Site Configuration, the controller instructs the repeaters to switch to disabled mode when the repeaters lose communication with the controller. This means that legacy subscribers cannot utilize the “conventional failsoft” operation when the users manually switch to conventional zone and try to key up on that conventional radio personality.

4.5 Exceptions for Release 1.4

The following features introduced in Release 1.4 may cause unexpected behavior in subscribers that have not been upgraded to this release.

- Site numbers above 35 – legacy subscribes will not be able to roam to higher number sites (above site ID 35) until the firmware has been upgraded.
- Language pack for XPR 7550 radio – when upgrading XPR 7550 units acquired prior to Connect Plus Release 1.4, it may be necessary to load the **OBEnglish** language pack using MOTOTRBO CPS if the radio LCD display renders unintelligible text when navigating through the menus. Another symptom of this issue is the text "Unknown" shown on the display when the radio is in a certain state, such as Site Search. Follow these steps to correct the problem.
    - **Read** the radio codeplug using MOTOTRBO CPS for Release 1.4 (see Table 2).
    - Select **Device ⇒ Load Language Pack(s**) from the CPS menu.
    - Select the **OBEnglish** language pack and click **Load** to complete the update.

- Upgrading primary /redundant pair of XRC 9000 controllers
    - To minimize system downtime, following steps should be performed when upgrading to R1.4 firmware from any previous version:
    - Step 1 – Perform firmware upgrade on Inactive XRC 9000
        - § The upgrade will cause a reboot which takes approximately 2 minutes.
        - § Recommended wait time before upgrading Active XRC 9000 is 5 minutes.
        - § **Note**: At this point, previous upgrades (prior to R1.4) could be done by switching the Active XRC 9000 to Inactive XRC 9000 which causes approximately 30 seconds of site downtime, and would avoid a reboot on an Active XRC 9000 which would cause a 2 minute downtime. However, when upgrading to R1.4 from any previous version, switching the Active XRC 9000 to Inactive XRC 9000 would take approximately **5 minutes**.
    - Step 2 – Perform firmware upgrade on Active XCR 9000
        - § The upgrade will cause a reboot which takes approximately **2 minutes**.
        - § The reboot will cause an approximate 2 minute site downtime experienced by users.

4.6 Exceptions for Release 1.4A/B

The following changes introduced in Release 1.4A/B will cause unexpected system behavior.

- **System Controller Mode** setting in repeater – this parameter has been added to the codeplug starting with repeater version R2.3. The repeater cannot be used as a Connect Plus resource until System Controller Mode is enabled; refer to section 6.6.1.
- Upgrading primary /redundant pair of XRC controllers – see the corresponding exception for Release 1.4.

4.7 Exceptions for Release 1.5.X

The following changes introduced in Release 1.5.1/1.5.2 will cause unexpected system behavior.

- **Support for Internationalization (Unicode text)** – this feature affects how text is stored inside XRC/XRT. Therefore when an upgraded equipment or new R1.5 equipment is configured, all settings containing user descriptions or other text values will be converted to a new format (Unicode). This results in incompatibility between R1.5 XRT/XRT backup files with prior releases. If a configuration or User Registry restore is necessary on a legacy (pre-R1.5) XRC/XRT, a R1.5 backup file cannot be used. It is *highly* recommended to keep a backup file for the legacy XRC/XRT devices.

4.8 Exceptions for Release 1.6

The following changes introduced in Release 1.6 should be accounted for when upgrading the system.

- **Large System Topology (up to 250 RF sites)** – if controllers with site numbers higher than 100 are deployed, the legacy (pre-R1.6) subscribers must be upgraded to allow them to roam to those sites. In addition, the GW3-TRBO deployment may need special consideration, when the product is installed on a system with more than **85** sites; contact Genesis for evaluation of the system call activity associated with a higher site count in determining the proper system design.

- **Multisite UDP Start Port** in XRT – for legacy XRT (pre-R1.6), if the *Multisite UDP Start Port* is configured in the range of 65,336 to 65,503, it will cause an out of range error message when the R1.6 XRT Configuration Tool reads this configuration. Since *Multisite UDP Start Port* value defaults to 46,000, most likely this issue will not be exhibited.

- **Fast GPS** – the supported update intervals are 30 seconds, 1 minute, 2 minutes, 4 minutes or 8 minutes. If a location application requests a periodic update interval that is different from one of these supported values, and if the target SU is enabled for Fast GPS on its SU record, then the request will be denied by the controller. Additionally, if a call monitoring application, such as GW3-TRBO is used, 1 kbps additional XRC-XRT link bandwidth needs to be accounted for, per Fast GPS report channel.

- **XRT Connection Tool** – if a legacy (pre-R1.6) Connection Tool is used to connect to a R1.6 XRT, the User Registry entries may appear to be missing.

- **Enable Unconfirmed LRRP Reports** option – the controller will automatically uncheck (disable) the GPS Capable Radio checkbox if it is enabled on the user record, but controller determines that Unconfirmed LRRP is not supported by the subscriber's Option Board firmware. To obtain LRRP reports from the radio, it will be necessary to disable (un-check) the "Enable Unconfirmed LRRP Reports" flag, or to upgrade the Connect Plus Option Board firmware.

- **Wired Option Board Upgrade** Only – deployed subscribers **must** be upgraded to R1.6.x using the tethered/wired method via CPS/CPCPS. Attempting to upgrade the Option Board firmware using the OTA File Transfer feature will render the subscribers inoperable.

4.9 Exceptions for Release 2.5

No new features impacting the Connect Plus infrastructure components – the repeaters, XRC and XRT – have been added to R2.5. However, the firmware builds have been updated to address some internally found issues – refer to Table 2 for the corresponding system component.

- **Wired Option Board Upgrade** Only – deployed subscribers **must** be upgraded to R2.5 using the tethered/wired method via CPS/CPCPS. Attempting to upgrade the Option Board firmware using the OTA File Transfer feature will render the subscribers inoperable.

4.10 Exceptions for Release 1.7/2.6

The following changes or features introduced in Release 1.7 should be accounted for when upgrading the system.

- **Site Talk Group Restriction** – it is highly recommended that the currently deployed subscribers are upgraded to R1.7/2.6 before configuring any "restricted" talk groups in the controller User Registry. Otherwise, a legacy radio will be disabled if it attempts to register on a "restricted" talk group – a disabled radio cannot roam to another site and is no longer able to make or receive calls, which includes the ability to initiate or receive an Emergency call.

- **XRC/XRT Firmware Upgrade** – the firmware upgrade to R1.7 cannot be performed unless, the XRC/XRT is on system release R1.6. This is due to the fact that the firmware image is no longer coupled with the unit serial number – it is now offered as a single common file.

- **Key Manager File required for XRI operation** – upon XRI firmware upgrade to R1.7, a Key Manager File must be obtained from MSI customer service, and uploaded to the XRI. The XRI will not function until the Key Manager File is enabled. Refer to section "6.9.5" for more information.

- **XRI Upgrade over Serial Port** – Do not attempt to perform a firmware upgrade over a **serial port** connection – this may cause unrecoverable malfunction, such that the XRI must be returned to the factory for re-imaging.

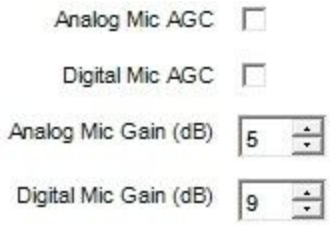
- **Direct Inward Dial (DID) is no longer supported in XRI** – even though the DID Contacts can still be set and the SIP Resource Type can still be provisioned as DID in the XRI configuration screens, the DID settings will have no effect on the XRI operations.

- **Radio/Option Board Upgrade Sequence** – the main radio should be upgraded first, before upgrading the Option Board firmware. Performing the upgrade in the opposite order may generate an error ("failed" message) displayed on the subscriber LCD.

- **Analog and Digital Microphone Gain Adjustments -** for radios which have the Analog Mic AGC or the Digital Mic AGC **disabled**, manual adjustment of the Analog Mic Gain, Analog Accessory Mic Gain, Digital

Mic Gain and Digital Accessory Mic Gain will be necessary. The microphone gain should be reduced by 5 dB for each audio path for which the AGC is disabled in the CPS codeplug – ignoring to make this recommended adjustment may lead to transmit audio that is distorted and overdriven. No changes are needed if the AGC is enabled.

- For example, the following changes are recommended for radios which have been upgraded to R2.6, if the AGC is disabled as shown below.
  - Mic Gain Values (original):



  - R2.6 Mic Gain Values (adjusted):

  - Accessory Mic Gain Values (original):

  - R2.6 Accessory Mic Gain Values (adjusted):

5 Recommended System Upgrade Sequence

The Connect Plus system downtime could be minimized if the following recommended upgrade order is followed:

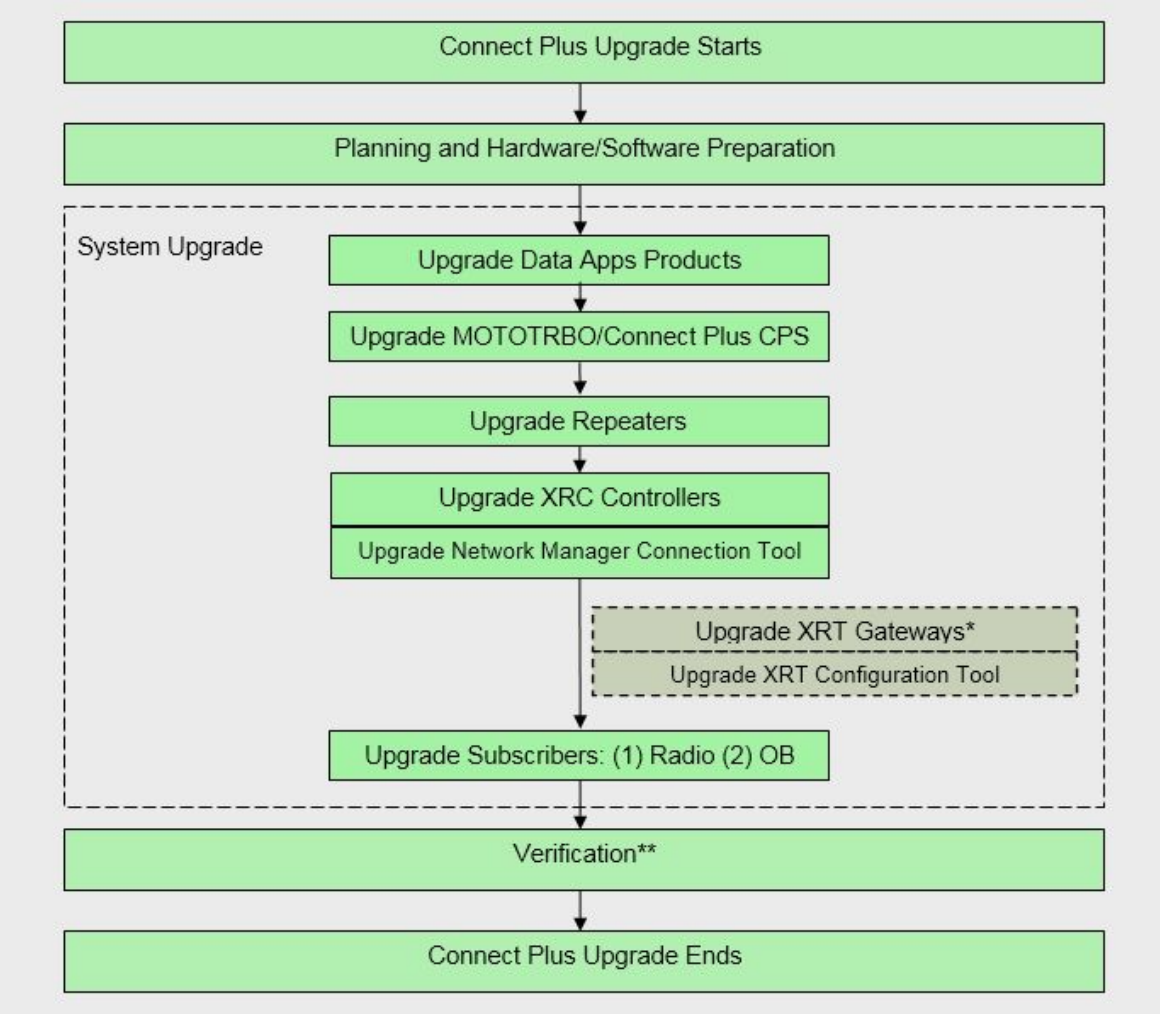


Figure 5-1 Connect Plus General Upgrade Sequence

* Optional system components that should be upgraded at the time when the XRC controllers are upgraded.

** Verification entails performing basic voice calls and exercising new as well as existing features on the upgraded system. On a multisite installation this process should involve multiple sites.

6 System Upgrade Procedure

While the upgrades are in progress, the sites will likely have service interruptions when networked calls are attempted. The individual site controllers may have to be rebooted multiple times, due to the new firmware load and any subsequent configuration adjustments that may be needed. Each controller reboot will interrupt ongoing local calls as well.

6.1 Upgrading to Release 1.1

Note: the content is this section has been retired.

6.2 Upgrading to Release 1.2

Note: the content is this section has been retired.

6.3 Upgrading to Release 1.2.3

In order to utilize ETCA in the Connect Plus System, the following system components must all be running the proper software/firmware version for Connect Plus System Release 1.2.3 (or newer):

- XRC 9000 Controller
- XRT 9000 Gateway (if installed)
- Repeater
- Radio
- Connect Plus Option Board
- Connect Plus Option Board CPS

All of these system components should be upgraded to the proper firmware/software version prior to enabling the ETCA feature with MOTOTRBO Connect Plus Option Board CPS.

The ETCA feature defaults to *off* (*disabled*) in the Connect Plus Option Board codeplug. Since ETCA must be enabled via Connect Plus CPS programming (as described below), there will likely be a migration period where some radios are enabled for ETCA operation and some are not. It is important to understand the following caveats and recommendations regarding this migration period:

1. The mixed mode environment (where some radios are enabled for ETCA and some are not) should be viewed as a temporary condition of the migration period, not a long-term system configuration.
    a. ETCA works best when all radios participating in the voice call are enabled for the feature. When a radio is **not** enabled for ETCA, it does not check to verify that its traffic channel key-up is accepted by

the system before it starts to transmit voice. This can result in two or more radios transmitting voice at the same time during Call Hang Time. In this event, more than one radio may provide the talk permit tone and start transmitting digital voice until the radio user releases PTT. If one of the radios has a significantly stronger signal into the repeater, it may capture the receiver and be heard by most call recipients. Meanwhile the other radio(s) that keyed-up will continue to transmit, but will not be heard. It is possible that all radios will continue to transmit, but none will be heard due to the RF contention of the transmitting radios. The receiving radios may play garbled audio through the speaker, or the radio user may hear silence. It is also possible that the repeater may interpret the RF contention as interference or co-channel usage, causing both timeslots of the repeater to be unusable for a period of time.

b. Other voice call anomalies may possibly be observed during the migration period as a result of mixed mode operation.
c. Because of the above, it is important is enable ETCA for all call participants as soon as possible.

2. To the greatest degree possible, radios that share common Talk Groups should be enabled for ETCA at the same time (or as close to the same time as possible). For example, consider the case where the radios are divided into two sets of users: Radios 1-25 use Talk Group A and radios 26-50 use Talk Group B. In this example, it is recommended to fully migrate one set of Talk Group members (either A or B) prior to starting on the other.

When upgrading XRC 9000 and XRT 9000 firmware from a pre-ETCA version (R1.2.1 or earlier) to a version supporting ETCA (beginning with R1.2.3), all network sites should be upgraded as quickly as possible. This rule should be followed even if there is no plan to utilize ETCA in the Connect Plus subscriber radio. Due to changes in the controller's arbitration logic, a XRC 9000 (or XRT 9000) with pre-ETCA firmware might possibly choose a different "arbitration winner" than a XRC 9000 (or XRT 9000) with firmware supporting ETCA. This may cause different audio to be heard at different sites.

6.4 Upgrading to Release 1.3

It is assumed that the Connect Plus system components – controllers, repeaters and radios – are operating with the corresponding released **1.2.x** firmware (refer to Table 2).

6.4.1 MOTOTRBO Repeaters

Upgrade the MOTOTRBO repeaters with the released firmware using the new MOTOTRBO CPS. The repeater upgrade can only be performed with tethered (wired) MOTOTRBO CPS connection. Note that Release 1.3 has introduced the *Remote Repeater Programming* feature for the XPR 8400 and MTR3000 repeaters, so after upgrading the controllers any subsequent repeater upgrades or codeplug provisioning can be performed remotely. After upgrading all the repeaters at the first site, basic talkgroup voice calls should be performed with *legacy* subscribers registered to that site – the purpose is to verify that radios with R1.2 provisioning can still initiate and participate in voice conversations.

6.4.2 XRC 9000 Controllers

Upgrade the site controllers with the released firmware using the Network Manager. Controller upgrade packages can be ordered through MOL using part number **HKVN4221A**. Firmware files are custom built for each controller based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRC 9000 serial number.

- It is **highly recommended** to defer any changes to the user registry until the entire network is upgraded. This includes subscriber to subscriber enable/disable commands.
- Avoid using the site status screen when an XRC 9000 is still running the legacy firmware with the 1.3 Network Manager. It is recommended that a PC[8] be available that has **not** been upgraded to the 1.3 Network Manager Connection Tool until after all the sites have been upgraded in case it is necessary to view the site status of a legacy site.
- Keep subscriber to subscriber text messages to a minimum until the entire network is upgraded.

After upgrading and configuring the first controller, basic talkgroup voice calls should be performed with *legacy* subscribers registered to that site – the purpose is to verify that radios with legacy provisioning can still initiate and participate in voice conversations.

Note: When there is a primary and secondary XRC 9000 on the site, upgrade the Inactive controller first, wait 5 minutes, and then upgrade the Active controller.

While connected to the upgraded controller with the Network Manager, examine the Site Configuration screen to ensure all features and setting are configured as expected.

6.4.3 MOTOTRBO Subscribers

After the Connect Plus infrastructure has been configured, the MOTOTRBO radios should be upgraded and reprogrammed in the following order.

1. **Read** the Option Board codeplug using the **current version** of Connect Plus CPS and save it as backup archive. Perform this step for each Option Board codeplug that needs to be archived.
2. **Uninstall** the current Connect Plus CPS.
3. **Install** the **new version** of Connect Plus Option Board CPS.
4. **Flash** Connect Plus Option Board – the new **OB firmware** will be loaded automatically
5. **Read** the OB codeplug and make any changes, if necessary
6. **Write** the OB codeplug.
    - **Important Note**: the legacy Option Board codeplug retrieved and archived in step **1** (above) **must not** be written into the upgraded Option Board.

[8] As the latest Network Manager is automatically downloaded and installed when the *Network Manager Connection Tool* detects a newer version, do not use this PC to connect to a site running R1.3 firmware.

7. **Read** the OB frequency file and add the new sites, if applicable
8. **Write** the OB frequency file
9. **Read** the radio codeplug using MOTOTRBO CPS and save it as backup archive
10. **Update** the radio with the new **main radio firmware**
11. **Read** the radio codeplug and make any changes, if necessary
12. **Write** the radio codeplug

It is important to note the following in regards to the Connect Plus subscriber upgrades:

- The main radio board upgrade can only be performed with tethered (wired) MOTOTRBO CPS connection. This upgrade is necessary to support the Connect Plus 1.3 features.
- The Option Board (OB) upgrade can be performed either with tethered (wired) Connect Plus CPS connection or over the air using the Network Manager *Over-the-Air File Transfer*[9]. The OB upgrade is necessary to support the Connect Plus 1.3 features.

If expanding sites on an existing Connect Plus network the subscriber frequency file must be updated to include the new sites. This can be done with an OTA session after the Option Boards have been upgraded to R1.3 firmware.

Refer to section “Exceptions for Release 1.3” for any backward compatibility exceptions.

Table 5 lists part numbers for Connect Plus subscriber licenses per region.

Part Number	Description
HKLN4457A	NA Subscriber Connect Plus option
HKVN4069A	EM Subscriber Connect Plus option
HKVN4042A	LA Subscriber Connect Plus option
82012604001	AP Subscriber Connect Plus upgrade

Table 5 Connect Plus Subscriber License

6.4.4 XRT 9000 Gateway

Upgrade the XRT 9000 Gateway with the released firmware using the Configuration Tool. Upgrade packages can be ordered through MOL using part number **HKVN4222A**. Firmware files are custom built for each gateway based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRT 9000 serial number.

- The process starts with using the **Configuration Tool** to connect to the XRT 9000. After connecting to the device a backup should be performed (*Settings Backup & Restore Utility*).

[9] The “*Enable OTA File Transfer*” option in the OB codeplug must be enabled for the OB to accept the OTA File Transfer.

- Obtain the new firmware file and place it in a known location on the PC being used to communicate with XRT 9000. Firmware files are custom built for each XRT 9000 based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRT 9000 serial number.
- Upload the Firmware File using the Configuration Tool.
- Issue the command to "upgrade" to the uploaded Firmware File. This causes XRT 9000 to reboot.

6.5 Upgrading to Release 1.4

It is assumed that the Connect Plus system components – controllers, repeaters and radios – are operating with the corresponding released **1.3** firmware (refer to Table 2).

6.5.1 MOTOTRBO Repeaters

Upgrade the MOTOTRBO repeaters with the released firmware using the new MOTOTRBO CPS. The repeater upgrade can be performed either with tethered (wired) MOTOTRBO CPS connection or through the *Remote Repeater Upgrade* procedure introduced in R1.3. Note that only XPR 8400 and MTR3000 repeaters can be upgraded remotely. After upgrading all the repeaters at the first site, basic talkgroup voice calls should be performed with *legacy* subscribers registered to that site – the purpose is to verify that radios with R1.3 provisioning can still initiate and participate in voice conversations.

6.5.2 XRC 9000 Controllers

Upgrade the site controllers with the released firmware using the Network Manager. Controller upgrade packages can be ordered through MOL using part number **HKVN4228A**. Firmware files are custom built for each controller based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRC 9000 serial number.

- It is **highly recommended** to defer any changes to the user registry until the entire network is upgraded. This includes subscriber to subscriber enable/disable commands.
- Avoid using the site status screen when an XRC 9000 is still running the legacy firmware with the 1.4 Network Manager. It is recommended that a PC[10] be available that has **not** been upgraded to the 1.4 Network Manager Connection Tool until after all the sites have been upgraded in case it is necessary to view the site status of a legacy site.
- Keep subscriber to subscriber text messages to a minimum until the entire network is upgraded.

After upgrading and configuring the first controller, basic talkgroup voice calls should be performed with *legacy* subscribers registered to that site – the purpose is to verify that radios with legacy provisioning can still initiate and participate in voice conversations.

[10] As the latest Network Manager is automatically downloaded and installed when the *Network Manager Connection Tool* detects a newer version, do not use this PC to connect to a site running R1.4 firmware.

Note: When there is a primary and secondary XRC 9000 on the site, upgrade the Inactive controller first, wait 5 minutes, and then upgrade the Active controller.

While connected to the upgraded controller with the Network Manager, examine the Site Configuration screen to ensure all features and setting are configured as expected.

After completing the upgrade for all site controllers, it is highly recommended to launch the **User Health Tool** (through the Network Manager's menu option *Site Control User Health Tool*) and verify that the User Registry is synchronized across all sites.

6.5.3 MOTOTRBO Subscribers

After the Connect Plus infrastructure has been configured, the MOTOTRBO radios should be upgraded and reprogrammed in the following order.

1. **Read** the Option Board codeplug using the **current version** of Connect Plus CPS and save it as backup archive. Perform this step for each Option Board codeplug that needs to be archived.
2. **Uninstall** the current Connect Plus CPS.
3. **Install** the **new version** of Connect Plus Option Board CPS.
4. **Flash** Connect Plus Option Board – the new **OB firmware** will be loaded automatically
5. **Read** the OB codeplug and make any changes, if necessary
6. **Write** the OB codeplug.
    - **Important Note**: the legacy Option Board codeplug retrieved and archived in step **1** (above) **must not** be written into the upgraded Option Board.
7. **Read** the OB frequency file and add the new sites, if applicable
8. **Write** the OB frequency file
9. **Read** the radio codeplug using MOTOTRBO CPS and save it as backup archive
10. **Update** the radio with the new **main radio firmware**
11. **Read** the radio codeplug and make any changes, if necessary
12. **Write** the radio codeplug

It is important to note the following in regards to the Connect Plus subscriber upgrades:

- The main radio board upgrade can only be performed with tethered (wired) MOTOTRBO CPS connection. This upgrade is necessary to support the Connect Plus 1.4 features.
- The Option Board (OB) upgrade can be performed either with tethered (wired) Connect Plus CPS connection or over the air using the Network Manager *Over-the-Air File Transfer*[11]. The OB upgrade is necessary to support the Connect Plus 1.4 features.

If expanding sites on an existing Connect Plus network the subscriber frequency file must be updated to include the new sites. This can be done with an OTA session after the Option Boards have been upgraded to R1.4 firmware.

Refer to section "Exceptions for Release 1.4" for any backward compatibility exceptions.

Table 6 lists part numbers for Connect Plus subscriber licenses per region.

[11] The "*Enable OTA File Transfer*" option in the OB codeplug must be enabled for the OB to accept the OTA File Transfer.

Part Number	Description
HKLN4457A	NA Subscriber Connect Plus option
HKVN4069A	EM Subscriber Connect Plus option
HKVN4042A	LA Subscriber Connect Plus option
82012604001	AP Subscriber Connect Plus upgrade

Table 6 Connect Plus Subscriber License

6.5.4 XRT 9000 Gateway

Upgrade the XRT 9000 Gateway with the released firmware using the Configuration Tool. Upgrade packages can be ordered through MOL using part number **HKVN4229A**. Firmware files are custom built for each gateway based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRT 9000 serial number.

- The process starts with using the **Configuration Tool** to connect to the XRT 9000. After connecting to the device a backup should be performed (*Settings* *Backup & Restore Utility*).
- Obtain the new firmware file and place it in a known location on the PC being used to communicate with XRT 9000. Firmware files are custom built for each XRT 9000 based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRT 9000 serial number.
- Upload the Firmware File using the Configuration Tool.
- Issue the command to “upgrade” to the uploaded Firmware File. This causes XRT 9000 to reboot.

6.6 Upgrading to Release 1.4A/B

It is assumed that the Connect Plus system components – controllers, repeaters and radios – are operating with the corresponding released **1.4** firmware (refer to Table 2).

6.6.1 MOTOTRBO Repeaters

The repeater upgrade should only be performed with tethered (wired) MOTOTRBO CPS connection, because beginning with this system release, the repeater operates in exclusive Connect Plus mode, which is not enabled in the codeplug by default. The following upgrade steps must be performed for each repeater using MOTOTRBO CPS:

- Upgrade the repeater with the corresponding firmware
- Read the repeater codeplug
- Enable the **System Controller Mode** under the corresponding digital (Connect Plus) channel
    - Note: The **IP Site Connect** parameter must be set to None.

- Write the codeplug back to the repeater

After upgrading all the repeaters at the first site, basic talkgroup voice calls should be performed with *legacy* subscribers registered to that site – the purpose is to verify that radios with R1.3/R1.4 provisioning can still initiate and participate in voice conversations.

6.6.2 XRC Controllers

The **XRC 9000** controller firmware has not changed between system releases R1.4 and R1.4A/B. For instructions on upgrading from R1.3, refer to section 6.5.2.

6.6.3 MOTOTRBO Subscribers

After the Connect Plus infrastructure has been configured, the MOTOTRBO radios should be upgraded and reprogrammed in the following order.

1. **Read** the Option Board codeplug using the **current version** of Connect Plus CPS and save it as backup archive. Perform this step for each Option Board codeplug that needs to be archived.
2. **Uninstall** the current Connect Plus CPS.
3. **Install** the **new version** of Connect Plus Option Board CPS.
4. **Flash** Connect Plus Option Board – the new **OB firmware** will be loaded automatically
5. **Read** the OB codeplug and make any changes, if necessary
6. **Write** the OB codeplug.
    - **Important Note**: the legacy Option Board codeplug retrieved and archived in step **1** (above) **must not** be written into the upgraded Option Board.
7. **Read** the OB frequency file and add the new sites, if applicable
8. **Write** the OB frequency file
9. **Read** the radio codeplug using MOTOTRBO CPS and save it as backup archive
10. **Update** the radio with the new **main radio firmware**
11. **Read** the radio codeplug and make any changes, if necessary
12. **Write** the radio codeplug

It is important to note the following in regards to the Connect Plus subscriber upgrades:

- The main radio board upgrade can only be performed with tethered (wired) MOTOTRBO CPS connection. This upgrade is necessary to support the Connect Plus 1.4A/B features.
- The Option Board (OB) upgrade can be performed either with tethered (wired) Connect Plus CPS connection or over the air using the Network Manager *Over-the-Air File Transfer*[12]. The OB upgrade is necessary to support the Connect Plus 1.4A/B features.

If expanding sites on an existing Connect Plus network the subscriber frequency file must be updated to include the new sites. This can be done with an OTA session after the Option Boards have been upgraded to R1.4A/B firmware.

[12] The "*Enable OTA File Transfer*" option in the OB codeplug must be enabled for the OB to accept the OTA File Transfer.

Refer to section “Exceptions for Release 1.4A/B” for any backward compatibility exceptions.

Table 7 lists part numbers for Connect Plus subscriber licenses per region.

Part Number	Description
HKLN4457A	NA Subscriber Connect Plus option
HKVN4069A	EM Subscriber Connect Plus option
HKVN4042A	LA Subscriber Connect Plus option
82012604001	AP Subscriber Connect Plus upgrade

Table 7 Connect Plus Subscriber License

6.6.4 XRT Gateway

Upgrade the XRT Gateway with the released firmware using the Configuration Tool. Upgrade packages can be ordered through MOL using part number **HKVN4229A** for existing XRT 9000 deployments. Firmware files are custom built for each gateway based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRT serial number.

- The process starts with using the **Configuration Tool** to connect to the XRT. After connecting to the device a backup should be performed (*Settings Backup & Restore Utility*).
- Obtain the new firmware file and place it in a known location on the PC being used to communicate with XRT. Firmware files are custom built for each XRT based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRT serial number.
- Upload the Firmware File using the Configuration Tool.
- Issue the command to “upgrade” to the uploaded Firmware File. This causes XRT to reboot.

If the XRT Gateway is deployed with Avtec console system, the following parameters should be adjusted for enhanced system performance:

- In Console Configuration: under Console⇒Interconnections
  - Increase **Round-trip Message Wait Timeout** value to 2200 ms.
- In VPGate Configuration: under Connect Plus Driver, for each Endpoint
  - Increase **PTT Response Wait Time** value to 2200 ms.

Furthermore, if the XRT Gateway is utilized as a wireline voice gateway (e.g. with Avtec console), the following XRT parameter should be changed:

- Group Call Hang Time:
  - Should be longer by 200 ms compared to the same parameter value set in the XRC controller. For example, if the XRC Group Call Hang Time is 3000 ms, the XRT value should be 3200 ms.

6.7 Upgrading to Release 1.5.X

It is assumed that the Connect Plus system components – controllers, repeaters and radios – are operating with the corresponding released **1.4/A/B** firmware (refer to Table 2). The difference between system release **R1.5.1** and **R1.5.2** is only the XRC firmware version number.

6.7.1 MOTOTRBO Repeaters

The repeater upgrade should only be performed with tethered (wired) MOTOTRBO CPS connection, because beginning with this system release, the repeater operates in exclusive Connect Plus mode, which is not enabled in the codeplug by default. The following upgrade steps must be performed for each repeater using MOTOTRBO CPS:

- Upgrade the repeater with the corresponding firmware
- Read the repeater codeplug
- Enable the **System Controller Mode** under the corresponding digital (Connect Plus) channel
    - Note: The **IP Site Connect** parameter must be set to None.
- Write the codeplug back to the repeater

If the System Controller Mode is already enabled, the repeater upgrade can be performed either with tethered (wired) MOTOTRBO CPS connection or through the *Remote Repeater Upgrade* procedure. Note that only XPR 8400 and MTR3000 repeaters can be upgraded remotely.

After upgrading all the repeaters at the first site, basic talkgroup voice calls should be performed with *legacy* subscribers registered to that site – the purpose is to verify that radios with R1.4/A/B provisioning can still initiate and participate in voice conversations.

6.7.2 XRC Controllers

Upgrade the site controllers with the released firmware using the Network Manager. Controller upgrade packages can be ordered through MOL using part number **HKVN4262A**. Firmware files are custom built for each controller based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRC serial number.

- It is **highly recommended** to defer any changes to the user registry until the entire network is upgraded. This includes subscriber to subscriber enable/disable commands.

- Avoid using the site status screen when an XRC is still running the legacy firmware with the 1.5.X Network Manager. It is recommended that a PC[13] be available that has **not** been upgraded to the 1.5.X Network Manager Connection Tool until after all the sites have been upgraded in case it is necessary to view the site status of a legacy site.
- Keep subscriber to subscriber text messages to a minimum until the entire network is upgraded.

After upgrading and configuring the first controller, basic talkgroup voice calls should be performed with *legacy* subscribers registered to that site – the purpose is to verify that radios with legacy provisioning can still initiate and participate in voice conversations.

Note: When there is a primary and secondary XRC on the site, upgrade the Inactive controller first, wait 5 minutes, and then upgrade the Active controller.

While connected to the upgraded controller with the Network Manager, examine the Site Configuration screen to ensure all features and setting are configured as expected.

After completing the upgrade for all site controllers, it is highly recommended to launch the **User Health Tool** (through the Network Manager's menu option *Site Control* *User Health Tool*) and verify that the User Registry is synchronized across all sites.

6.7.3 MOTOTRBO Subscribers

After the Connect Plus infrastructure has been configured, the MOTOTRBO radios should be upgraded and reprogrammed in the following order.

1. **Read** the Option Board codeplug using the **current version** of Connect Plus CPS and save it as backup archive. Perform this step for each Option Board codeplug that needs to be archived.
2. **Uninstall** the current Connect Plus CPS.
3. **Install** the **new version** of Connect Plus Option Board CPS.
4. **Flash** Connect Plus Option Board – the new **OB firmware** will be loaded automatically
5. **Read** the OB codeplug and make any changes, if necessary
6. **Write** the OB codeplug.
    - **Important Note**: the legacy Option Board codeplug retrieved and archived in step **1** (above) **must not** be written into the upgraded Option Board.
7. **Read** the OB frequency file and add the new sites, if applicable
8. **Write** the OB frequency file
9. **Read** the radio codeplug using MOTOTRBO CPS and save it as backup archive
10. **Update** the radio with the new **main radio firmware**
11. **Read** the radio codeplug and make any changes, if necessary
12. **Write** the radio codeplug

It is important to note the following in regards to the Connect Plus subscriber upgrades:

- The main radio board upgrade can only be performed with tethered (wired) MOTOTRBO CPS connection. This upgrade is necessary to support the Connect Plus 1.4/A/B features.

[13] As the latest Network Manager is automatically downloaded and installed when the *Network Manager Connection Tool* detects a newer version, do not use this PC to connect to a site running R1.5.X firmware.

- The Option Board (OB) upgrade can be performed either with tethered (wired) Connect Plus CPS connection or over the air using the Network Manager *Over-the-Air File Transfer*[14]. The OB upgrade is necessary to support the Connect Plus 1.4/A/B features.

If expanding sites on an existing Connect Plus network the subscriber frequency file must be updated to include the new sites. This can be done with an OTA session after the Option Boards have been upgraded to R1.4/A/B firmware.

Refer to section "Exceptions for Release 1.5.X" for any backward compatibility exceptions.

Table 8 lists part numbers for Connect Plus subscriber licenses per region.

Part Number	Description
HKLN4457A	NA Subscriber Connect Plus option
HKVN4069A	EM Subscriber Connect Plus option
HKVN4042A	LA Subscriber Connect Plus option
82012604001	AP Subscriber Connect Plus upgrade

Table 8 Connect Plus Subscriber License

6.7.4 XRT Gateway

Upgrade the XRT Gateway with the released firmware using the Configuration Tool. Upgrade packages can be ordered through MOL using part number **HKVN4263A** for existing XRT deployments. Firmware files are custom built for each gateway based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRT serial number.

- The process starts with using the **Configuration Tool** to connect to the XRT. After connecting to the device a backup should be performed (*Settings Backup & Restore Utility*).
- Obtain the new firmware file and place it in a known location on the PC being used to communicate with XRT. Firmware files are custom built for each XRT based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRT serial number.
- Upload the Firmware File using the Configuration Tool.
- Issue the command to "upgrade" to the uploaded Firmware File. This causes XRT to reboot.

Using "XRT Properties Change File" (*.npf), the license for the number of Talk Paths can be changed to accommodate the system capacity need. The file has to be installed on the XRT using the XRT Configuration Tool and selecting *Site ControlàUploadàXRT Properties Change File*.

[14] The "*Enable OTA File Transfer*" option in the OB codeplug must be enabled for the OB to accept the OTA File Transfer.

6.8 Upgrading to Release 1.6

It is assumed that the Connect Plus system components – controllers, repeaters and radios – are operating with the corresponding released **1.5.X** firmware (refer to Table 2).

6.8.1 MOTOTRBO Repeaters

The following upgrade steps must be performed for each repeater using MOTOTRBO CPS:

- Upgrade the repeater with the corresponding firmware
- Read the repeater codeplug
- *Ensure* the **System Controller Mode** is enabled under the corresponding digital (Connect Plus) channel
    - Note: The **IP Site Connect** parameter must be set to None.
- Write the codeplug back to the repeater

If the System Controller Mode is already enabled, the repeater upgrade can be performed either with tethered (wired) MOTOTRBO CPS connection or through the *Remote Repeater Upgrade* procedure. Note that only XPR 8400 and MTR3000 repeaters can be upgraded remotely.

After upgrading all the repeaters at the first site, basic talkgroup voice calls should be performed with *legacy* (pre-R1.6) subscribers registered at that site – the purpose is to verify that radios with existing provisioning can still initiate and participate in voice conversations.

6.8.2 XRC Controllers

If the system has been configured in a way that multiple sites listed in the MultiSite table have been disconnected for a long time or have not been physically deployed, it is recommended to read the **FSB10958** document and follow the procedure for running the "Connect Plus Controller Service Tool".

Upgrade the site controllers with the released firmware using the Network Manager. Controller upgrade packages can be ordered through MOL using part number **HKVN4294A**. If upgrading a Single-Site XRC to Multi-Site XRC a separate license, with part number **HKVN4303A**, is required. Firmware files are custom built for each controller based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRC serial number. The controllers where any third-party applications are connected to should be upgraded first.

- It is **highly recommended** to defer any changes to the user registry until the entire network is upgraded. This includes subscriber to subscriber enable/disable commands.
- Avoid using the site status screen when an XRC is still running the legacy firmware with the R1.6 Network Manager. It is recommended that a PC[15] be available that has **not** been upgraded to the R1.6 Network

[15] As the latest Network Manager is automatically downloaded and installed when the *Network Manager Connection Tool* detects a newer version, do not use this PC to connect to a site running the new firmware.

Manager Connection Tool until after all the sites have been upgraded in case it is necessary to view the site status of a legacy site.

- Keep subscriber to subscriber text messages to a minimum until the entire network is upgraded.

The following sequence should be followed during the XRC upgrades.

1. Using the current NM Connection Tool and NM, upload XRC F/W to the first site.
2. Upgrade the firmware.
3. Disconnect NM and install the latest NM Connection Tool.
4. Connect to the recently upgraded site to download the latest NM.
5. Continue to upgrade the rest of the sites.

After upgrading and configuring the first controller, basic talkgroup voice calls should be performed with *legacy* subscribers registered to that site – the purpose is to verify that radios with legacy provisioning can still initiate and participate in voice conversations.

Note: When there is a primary and secondary XRC on the site, upgrade the Inactive controller first, wait 5 minutes, and then upgrade the Active controller.

While connected to the upgraded controller with the Network Manager, examine the Site Configuration screen to ensure all features and setting are configured as expected.

After completing the upgrade for all site controllers, it is highly recommended to launch the **User Health Tool** (through the Network Manager's menu option *Site Control User Health Tool*) and verify that the User Registry is synchronized across all sites.

The FGPS feature requires separate license. Table 9 lists part numbers for Connect Plus FGPS licenses per region.

Part Number	Description
HKVN4290A	NA Fast GPS Report Channel License
HKVN4291A	EM Fast GPS Report Channel License
HKVN4292A	LA Fast GPS Report Channel License
HKVN4293A	AP Fast GPS Report Channel License

Table 9 Connect Plus FGPS License

6.8.3 MOTOTRBO Subscribers

After the Connect Plus infrastructure has been configured, the MOTOTRBO radios should be upgraded and reprogrammed in the following order.

1. **Read** the radio codeplug using MOTOTRBO CPS and save it as backup archive.
2. **Update** the radio with the new **main radio firmware**.
3. **Read** the radio codeplug and make any changes, if necessary.
4. **Write** the radio codeplug.
5. **Read** the Option Board codeplug using the **current version** of Connect Plus CPS and save it as backup archive. Perform this step for each Option Board codeplug that needs to be archived.
6. **Uninstall** the current Connect Plus CPS.
7. **Install** the **new version** of Connect Plus Option Board CPS.
8. **Flash** Connect Plus Option Board – the new **OB firmware** will be loaded automatically.
9. **Read** the OB codeplug and make any changes, if necessary.
10. **Write** the OB codeplug.
    - **Important Note**: the legacy Option Board codeplug retrieved and archived in step 5 (above) **must not** be written into the upgraded Option Board.
11. **Read** the OB frequency file and add the new sites, if applicable.
12. **Write** the OB frequency file.

Note: During firmware upgrade, the user must not manually power down the radio – turning off the unit before the upgrade process has completed may cause an unrecoverable firmware corruption.

It is important to note the following in regards to the Connect Plus subscriber upgrades:

- The main radio board upgrade can only be performed with tethered (wired) MOTOTRBO CPS connection. This upgrade is necessary to support the new Connect Plus features.
- The Option Board (OB) upgrade can be performed either with tethered (wired) Connect Plus CPS connection or over the air using the Network Manager *Over-the-Air File Transfer*[16]. The OB upgrade is necessary to support the new Connect Plus features.

If expanding sites on an existing Connect Plus network the subscriber frequency file must be updated to include the new sites. This can be done with an OTA session after the Option Boards have been upgraded to new firmware.

Refer to section “Exceptions for Release 1.6” for any backward compatibility exceptions.

Table 10 lists part numbers for Connect Plus subscriber licenses per region.

Part Number	Description
HKLN4457A	NA Subscriber Connect Plus option
HKVN4069A	EM Subscriber Connect Plus option
HKVN4042A	LA Subscriber Connect Plus option
82012604001	AP Subscriber Connect Plus upgrade

Table 10 Connect Plus Subscriber License

[16] The “*Enable OTA File Transfer*” option in the OB codeplug must be enabled for the OB to accept the OTA File Transfer.

6.8.4 XRT Gateway

Upgrade the XRT Gateway with the released firmware using the Configuration Tool. Upgrade packages can be ordered through MOL using part number **HKVN4295A** for existing XRT deployments. Firmware files are custom built for each gateway based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRT serial number.

- The process starts with using the **Configuration Tool** to connect to the XRT. After connecting to the device a backup should be performed (*Settings Backup & Restore Utility*).
- Obtain the new firmware file and place it in a known location on the PC being used to communicate with XRT. Firmware files are custom built for each XRT based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the XRT serial number.
- Upload the Firmware File using the Configuration Tool.
- Issue the command to “upgrade” to the uploaded Firmware File. This causes XRT to reboot.

A separate license is required for number of active XRT talk paths allowed. Table 11 lists part numbers for the Connect Plus XRT talk path licenses per region.

Part Number	Description
HKVN4305A	NA Connect Plus Talk Path 10-PACK
HKVN4306A	NA Connect Plus Talk Path 100-PACK
HKVN4307A	LA Connect Plus Talk Path 10-PACK
HKVN4308A	LA Connect Plus Talk Path 100-PACK
HKVN4309A	EM Connect Plus Talk Path 10-PACK
HKVN4310A	EM Connect Plus Talk Path 100-PACK
HKVN4311A	AP Connect Plus Talk Path 10-PACK
HKVN4312A	AP Connect Plus Talk Path 100-PACK

Table 11 Connect Plus XRT Talk Path Licenses

6.9 Upgrading to Release 1.7 (2.6.X)

It is assumed that the Connect Plus system components – controllers, repeaters and radios – are operating with the corresponding released **1.6** firmware (refer to Table 2).

6.9.1 MOTOTRBO Repeaters

The following upgrade steps must be performed for each repeater using MOTOTRBO CPS:

- Upgrade the repeater with the corresponding firmware
- Read the repeater codeplug
- *Ensure* the **System Controller Mode** is enabled under the corresponding digital (Connect Plus) channel
    - Note: The **IP Site Connect** parameter must be set to None.
- Write the codeplug back to the repeater

If the System Controller Mode is already enabled, the repeater upgrade can be performed either with tethered (wired) MOTOTRBO CPS connection or through the *Remote Repeater Upgrade* procedure. Note that only the following repeaters can be upgraded remotely:

- XPR 8400
- MTR3000
- SLR 5000
- SLR 8000

After upgrading all the repeaters at the first site, basic talkgroup voice calls should be performed with *legacy* (pre-R1.7) subscribers registered at that site – the purpose is to verify that radios with existing provisioning can still initiate and participate in voice conversations.

6.9.2 XRC Controllers

Upgrade the site controllers with the released firmware using the Network Manager. Controller upgrade packages can be ordered through Motorola Online - https://businessonline.motorolasolutions.com/. It is mandatory to upgrade the XRC to release R1.6 before upgrading it to R1.7. The controllers where any third-party applications are connected to should be upgraded first.

- It is **highly recommended** to defer any changes to the user registry until the entire network is upgraded. This includes subscriber to subscriber enable/disable commands.
- Avoid using the site status screen when an XRC is still running the legacy firmware with the R1.7 Network Manager. It is recommended that a PC[17] be available that has **not** been upgraded to the R1.7 Network Manager Connection Tool until after all the sites have been upgraded in case it is necessary to view the site status of a legacy site.
- Keep subscriber to subscriber text messages to a minimum until the entire network is upgraded.
- Upon restoring users from a backup, it may be some time (depends upon the User Registry size) for the site to reboot after a restore. Consequently, do not attempt to reboot or power cycle the controller for 10 minutes after a restore to allow all the UR records to be written to the internal disk storage.

[17] As the latest Network Manager is automatically downloaded and installed when the *Network Manager Connection Tool* detects a newer version, do not use this PC to connect to a site running the new firmware.

- The User Health Tool, available through the Network Manager, works only when the XRC (and XRT) firmware versions are the same, which includes the major and minor versions. For example, R02.60.001 will **not** synchronize with R02.60.002.
- Downgrading to legacy firmware is **strongly discouraged**, as loss of data – such as Configuration, UR records, User Role settings, Multisite Table entries – will occur if any changes were made before the downgrade. This includes the case when the data is restored with the "Backup & Restore Utility".
- If the controller has gone through multiple upgrades, it is recommended to remove the old firmware image files to free up internal disk space.

The following sequence should be followed during the XRC upgrades.

1. Using the current NM Connection Tool and NM, upload XRC F/W to the first site.
2. Upgrade the firmware.
3. Disconnect NM and install the latest NM Connection Tool.
4. Connect to the recently upgraded site to download the latest NM.
5. Continue to upgrade the rest of the sites.

After upgrading and configuring the first controller, basic talkgroup voice calls should be performed with *legacy* subscribers registered to that site – the purpose is to verify that radios with legacy provisioning can still initiate and participate in voice conversations.

Note: When there is a primary and secondary XRC on the site, upgrade the Inactive controller first, wait 5 minutes, and then upgrade the Active controller.

While connected to the upgraded controller with the Network Manager, examine the Site Configuration screen to ensure all features and setting are configured as expected.

After completing the upgrade for all site controllers, it is highly recommended to launch the **User Health Tool** (through the Network Manager's menu option *Site Control User Health Tool*) and verify that the User Registry is synchronized across all sites.

The FGPS feature requires separate license. Table 8 lists part numbers for Connect Plus FGPS licenses per region.

Part Number	Description
HKVN4290A	NA Fast GPS Report Channel License
HKVN4291A	EM Fast GPS Report Channel License
HKVN4292A	LA Fast GPS Report Channel License
HKVN4293A	AP Fast GPS Report Channel License

Table 11 Connect Plus FGPS License

6.9.3 MOTOTRBO Subscribers

After the Connect Plus infrastructure has been configured, the MOTOTRBO radios should be upgraded and reprogrammed in the following order.

1. **Read** the radio codeplug using MOTOTRBO CPS and save it as backup archive.
2. **Update** the radio with the new **main radio firmware**.
3. **Read** the radio codeplug and make any changes, if necessary.
4. **Write** the radio codeplug.
5. **Read** the Option Board codeplug using the **current version** of Connect Plus CPS and save it as backup archive. Perform this step for each Option Board codeplug that needs to be archived.
6. **Uninstall** the current Connect Plus CPS.
7. **Install** the **new version** of Connect Plus Option Board CPS.
8. **Flash** Connect Plus Option Board – the new **OB firmware** will be loaded automatically.
9. **Read** the OB codeplug and make any changes, if necessary.
10. **Write** the OB codeplug.
    - **Important Note**: the legacy Option Board codeplug retrieved and archived in step 5 (above) **must not** be written into the upgraded Option Board.
11. **Read** the OB frequency file and add the new sites, if applicable.
12. **Write** the OB frequency file.

Note: During firmware upgrade, the user must not manually power down the radio – turning off the unit before the upgrade process has completed may cause an unrecoverable firmware corruption.

It is important to note the following in regards to the Connect Plus subscriber upgrades:

- The main radio board upgrade can only be performed with tethered (wired) MOTOTRBO CPS connection. This upgrade is necessary to support the new Connect Plus features.
- The Option Board (OB) upgrade can be performed either with tethered (wired) Connect Plus CPS connection or over the air using the Network Manager *Over-the-Air File Transfer*[18]. The OB upgrade is necessary to support the new Connect Plus features.

If expanding sites on an existing Connect Plus network the subscriber frequency file must be updated to include the new sites. This can be done with an OTA session after the Option Boards have been upgraded to new firmware.

Refer to section “Exceptions for Release 1.7/2.6” for any backward compatibility exceptions.

Table 9 lists part numbers for Connect Plus subscriber licenses per region.

Part Number	Description
HKLN4457A	NA Subscriber Connect Plus option
HKVN4069A	EM Subscriber Connect Plus option
HKVN4042A	LA Subscriber Connect Plus option

[18] The “*Enable OTA File Transfer*” option in the OB codeplug must be enabled for the OB to accept the OTA File Transfer.

82012604001	AP Subscriber Connect Plus upgrade

Table 12 Connect Plus Subscriber License

6.9.4 XRT Gateway

Upgrade the XRT Gateway with the released firmware using the Configuration Tool. Upgrade packages can be ordered through Motorola Online - https://businessonline.motorolasolutions.com/. It is mandatory to upgrade the XRT to release R1.6 before upgrading it to R1.7.

- The process starts with using the **Configuration Tool** to connect to the XRT. After connecting to the device a backup should be performed (*Settings* *Backup & Restore Utility*).
- Obtain the new firmware file and place it in a known location on the PC being used to communicate with XRT.
- Upload the Firmware File using the Configuration Tool.
- Issue the command to "upgrade" to the uploaded Firmware File. This causes XRT to reboot.

A separate license is required for number of active XRT talk paths allowed. Table 10 lists part numbers for the Connect Plus XRT talk path licenses per region.

Part Number	Description
HKVN4305A	NA Connect Plus Talk Path 10-PACK
HKVN4306A	NA Connect Plus Talk Path 100-PACK
HKVN4307A	LA Connect Plus Talk Path 10-PACK
HKVN4308A	LA Connect Plus Talk Path 100-PACK
HKVN4309A	EM Connect Plus Talk Path 10-PACK
HKVN4310A	EM Connect Plus Talk Path 100-PACK
HKVN4311A	AP Connect Plus Talk Path 10-PACK
HKVN4312A	AP Connect Plus Talk Path 100-PACK

Table 13 Connect Plus XRT Talk Path Licenses

6.9.5 XRI Telephone Interconnect Gateway

Upgrade the XRI Gateway with the released firmware using the Network Manager via TCP/IP connection[19] to the device. Upgrade packages can be ordered through Motorola Online - https://businessonline.motorolasolutions.com/.

[19] Upgrading to Release 1.7 (2.6) via the serial port is not supported and may cause unrecoverable malfunction, such that the XRI must be returned to the factory for re-imaging.

Note: XRI downgrade is not supported and not recommended, but if for some reason it is necessary to revert to prior XRI firmware build, the device must be physically returned to the factory.

The XRI requires a special Key Manager File, which needs to be uploaded to the device. If the XRI will be used with a SIP Digital Telephony Gateway (CUCM), the XRI must be enabled for either the **Connect Plus SIP-10** or the **Connect Plus SIP-20** Telephony feature prior to uploading the Key Manager File. If the XRI will be connecting to a SIP-to-PSTN device (SPA-8800), then no feature license is required, but the SIP Gateway Type and IP Addresses must be defined in the uploaded Key Manager File.

Collect the following information to enable the R1.7 XRI for operation.
1) Device Public Key - it is stored under Device Control ⇒ Key Manager ⇒ Device Public Key.
2) IP address of the SIP Gateway device or the SPA-8800 device(s).
3) SIP device manufacturer and model number.
4) XRI serial number – it is stored under Device Control ⇒ Firmware.

Send the collected information to the MSI customer service and receive the corresponding Key Manager File, which needs to be uploaded to the XRI.

The Connect Plus System Planner describes the process of obtaining a Key Manager File in more detail – refer to section "*2.20.1 Key Manager File and Feature License*" for this information.

Refer to section "Exceptions for Release 1.7/2.6" for any operational exceptions.