



Connect Plus Upgrade

September 2011
Version 1.0



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 9000 Controller User Guide

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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	Author	Description
1.0	02-Sep-2011	Motorola Solutions	Initial document version

1.3 Definitions and Acronyms

- CCH - Control Channel
- CFS - Charge For Software
- Data Apps - Third party data applications
- MOL - Motorola Online
- N/A - Not Applicable
- OB - Option Board
- PCR - Professional and Commercial Radio
- PC - Personal Computer
- Products - CPS, Subscribers, Repeaters and Data Apps
- RDAC - Repeater Diagnostics, Alarms and Control
- 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, R1.1 shall be fully backward compatible with the prior release (1.0A/B); i.e. all system features introduced in R1.0A/B shall be supported in R1.1.

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 affect more than one product. This table is not intended to list a 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 discontinued in the release.

System Release	Feature	Data Applications				XRC 9000 Controller	Network Manager	MOTOTRBO CPS	Connect Plus CPS	Repeater	Subscriber	
		Location		Text Messaging							Radio	OB
		Server	Client	Server	Client							
1.0												
1.0A/B	Emergency	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	
	Talk Group Scan	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	
1.1	20 Site Support	No	No	No	No	Yes	Yes	No	Yes	No	Yes	
	Centralized NM with Fault Management	No	No	No	No	Yes	Yes	Yes	No	Yes	No	
	Site Restriction	No	No	No	No	Yes	Yes	No	Yes	No	Yes	
	Controller Hang Time Adjust	No	No	No	No	Yes	Yes	Yes	No	Yes	No	
	CCH Rollover	No	No	No	No	Yes	Yes	No	No	No	Yes	
	Targeted OTA Codeplug Transfer	No	No	No	No	Yes	Yes	No	Yes	No	Yes	
	Redundant Controller	No	No	No	No	Yes	Yes	No	No	No	No	
	Deskset Console	No	No	No	No	No	No	No	Yes	No	Yes	

XRT 9000 Support	No	No	No	No	Yes	Yes	No	No	No	No	No
Man Down ¹	No	No	No	No	No	No	No	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 uploading² the firmware file to the controller, enabling the firmware and rebooting the controller.

Table 2 provides a list of software versions for Connect Plus system components for the latest System Release.

System Release	Network Manager	NM Connection Tool	XRC 9000 Controller	XRT 9000 Config Tool	XRT 9000 Gateway	MOTOTRBO CPS	Connect Plus CPS	Repeater	Subscriber	
									Radio	OB
1.0A	R01.01.81	R01.01.25	R1.0.90	N/A	N/A	6.0 Build 244	R01.01.077	R01.07.00	R01.07.00	R1.2.44
1.1	R01.10.99	R01.10.66	R01.01.147	R01.10.35.78	R1.1.49.142	6.7 Build 327	R01.10.123	R01.08.10	R01.08.10	R01.03.67

Table 2 Current Released Versions

¹ *Man Down* is a CFS feature that can be purchased and enabled separately (refer to Table 4).

² 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.

4 Backward Compatibility Exceptions

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

4.1 Release 1.0A/B

The initial release of Connect Plus software did not support Emergency features. For sites and/or networks that upgrade from the initial Connect Plus release to a release supporting Emergency, it is important to be aware of the following:

- If a Connect Plus SU sends a Call Request for Emergency to a controller with initial release software, the XRC 9000 interprets it as an invalid Call Request and responds accordingly. The Source radio displays “*Invalid Target ID*” and sounds a denial tone. Afterwards, the radio returns to idle.
- If a Connect Plus SU with initial release software decodes a controller message with the Emergency flag, the message will not be understood or processed by the Connect Plus SU. The SU ignores the message and continues to monitor the Control Channel waiting for messages it recognizes. It will not move to the trunk-to timeslot, and the radio user will not hear audio for the call. If the 1.0 radio attempts to transmit on this Group ID while the Emergency Call is active, it displays “*Group is active*” plays the PTT Denial Tone.

Due to the above, it is critical that the upgrade process (from a Connect Plus release not supporting Emergency to a Connect Plus release that supports Emergency) be accomplished as quickly as possible.

4.2 Release 1.1

The following features introduced in Release 1.1 may cause unexpected behavior in subscribers that have not been upgraded to this release.

- Control Channel Rollover – When the Option Board loses the current site due to control channel rollover, the legacy Option Board will proceed to search for another site instead of searching for other candidate control channels for the current site. In addition, the Control Channel Rollover *due to RF interference* is only available with MOTOTRBO System Release 1.8 repeaters.
- Site Restriction – When a legacy Option Board (1.0/1.0A firmware) receives the “*Site Access Denied*” registration response, it will not understand this response. It will keep trying to register with the site, and the controller will keep sending the “*Site Access Denied*” response. This will continue until the OB has exhausted its number of attempts (6 for normal registrations), and then it will search for a different site. If no other site is available, the process above starts over. User documentation and training state that radios with 1.0/1.0A Option Board firmware should not have any sites restricted on the user record. All sites should be allowed on the user record (which is the default setting) until the Option Board is upgraded to firmware that supports the Site Restriction feature.
- Targeted OTA Codeplug Transfer – Subscribers with legacy Option Board firmware cannot be targeted for OTA codeplug transfer. If the system administrator attempts to

create an OTA codeplug transfer session through the Network Manager, it will result in immediate failure. For this feature, another Connect Plus CPS codeplug file format has been introduced in this release (file extension **.efc**). Such codeplug files cannot be written to subscribers with legacy Option Boards.

- Call Hang Times – If any network repeater still has firmware prior to MOTOTRBO Release 1.8, then the Call Hang times set by the Network Manager must be configured to match the Call Hang times configured into the repeater with MOTOTRBO CPS (per call type). When all network repeaters have been upgraded to MOTOTRBO System Release 1.8 firmware, the repeater will use the Network Manager-configured values when it has a link with the XRC 9000. The repeater will use the MOTOTRBO CPS-configured values when it doesn't have a link with the XRC 9000.

Recommended System Upgrade Sequence

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

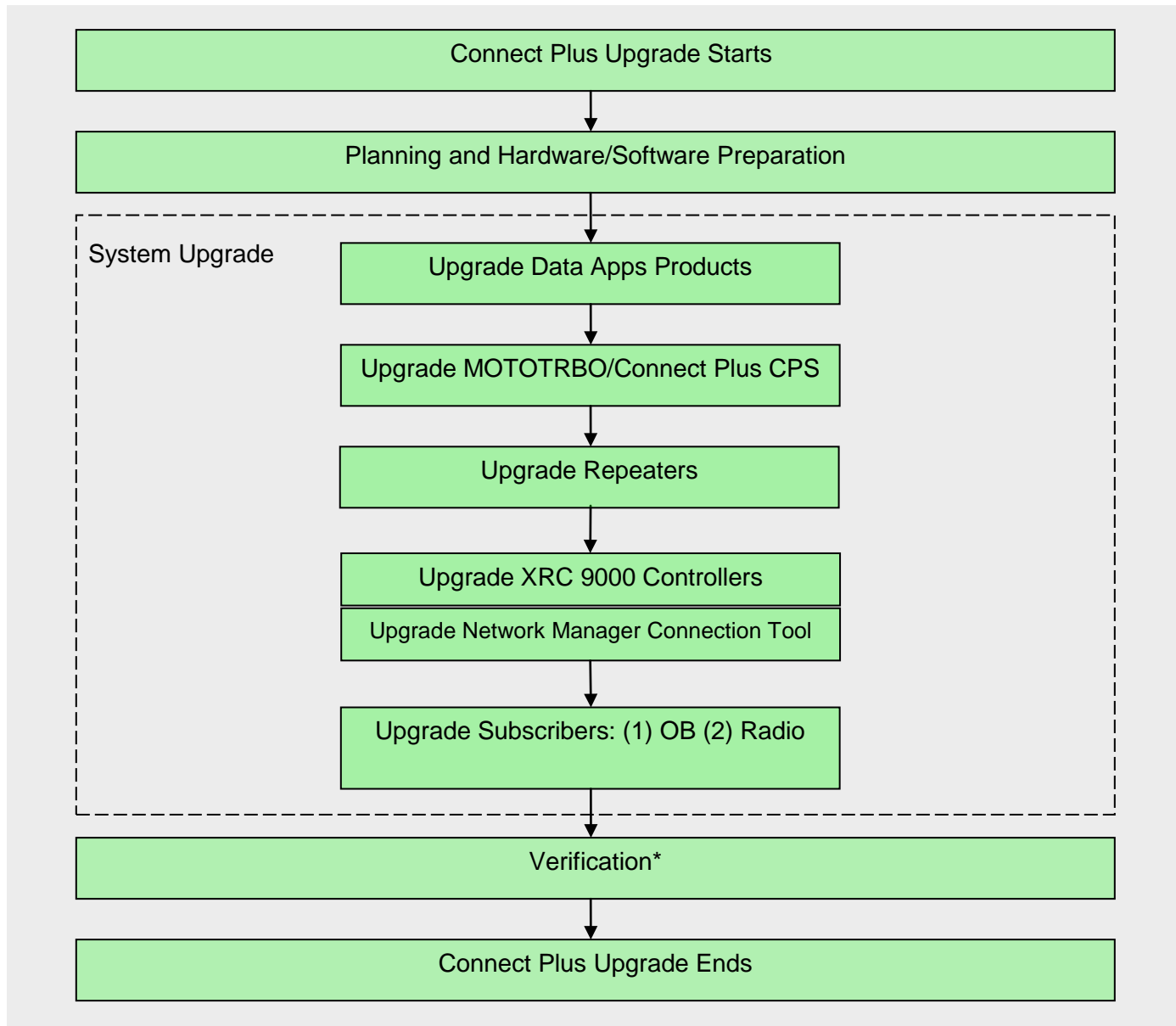


Figure 4-1 Connect Plus General Upgrade Sequence

* 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.

5 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, which will interrupt ongoing local calls as well.

5.1 Upgrading to Release 1.1

It is assumed that the Connect Plus system components – controllers, repeaters and radios – are operating with the corresponding released **1.0A** firmware (refer to Table 2).

5.1.1 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. 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 R1.0A provisioning can still initiate and participate in voice conversations.

5.1.2 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 **TT2391A**. 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.
- **During the upgrade process**, some subscriber to subscriber text messages may be delayed or even lost.
- Avoid using the site status screen when an XRC 9000 is still running the 1.0A firmware with the 1.1 Network Manager. It is recommended that a PC³ be available that has not been upgraded to the 1.1 Network Manager Connection Tool until after all the sites have been upgraded in case it is necessary to view the site status of a 1.0A site.

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 R1.0A provisioning can still initiate and participate in voice conversations.

The following steps are required when multiple 1.0A Connect Plus systems will be interconnected into a single Connect Plus **1.1** network. After installing the new firmware in the controllers a “backup and restore” operation should be performed.

- Select a controller with most user records – this will be the “master” database that will be archived, and then deployed to all other controllers.
- Enter the missing user records and talkgroups that are configured in the other controllers into the selected controller.
- Create a controller database backup (archive).
- Deploy the archived database into the other controllers.
- Reassign the controller Site ID, where applicable, according to the new site numbering.
- Update the multisite table in every controller using the Network Manager.

³ 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 R1.1 firmware.

Refer to [5] – section “Configuring the XRC 9000” – for the parameters that may need to be adjusted after the upgrade. These are under the Network Manager’s *Settings->Configuration* menu option.

5.1.3 MOTOTRBO Subscribers

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

- i. **Read** the Option Board codeplug using Connect Plus CPS and save it as backup archive
- ii. **Flash** Connect Plus Option Board – the new **OB firmware** will be loaded automatically
- iii. **Read** the OB codeplug and make any changes, if necessary
- iv. **Write** the OB codeplug
- v. **Read** the OB frequency file and add the new sites, if applicable
- vi. **Write** the OB frequency file
- vii. **Read** the radio codeplug using MOTOTRBO CPS and save it as backup archive
- viii. **Update** the radio with the new **main radio firmware**
- ix. **Read** the radio codeplug and make any changed, if necessary
- x. **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 1.1 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*⁴. The OB upgrade is necessary to support the Connect Plus 1.1 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 R1.1 firmware.

Refer to section “Release 1.1” for any backward compatibility exceptions.

Table 3 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 3 Connect Plus Subscriber License

⁴ The “*Enable OTA File Transfer*” switch in the OB codeplug must be enabled for the OB to accept the OTA File Transfer.

Table 4 lists part numbers for Connect Plus “Man Down” feature licenses per region.

Part Number	Description
HKVN4072A	NA Subscriber Connect Plus Man Down option
HKVN4073A	EM Subscriber Connect Plus Man Down option
HKVN4075A	LA Subscriber Connect Plus Man Down option
82012619001	AP Subscriber Connect Plus Man Down option

Table 4 Connect Plus “Man Down” Feature License

5.1.4 XRT 9000 Gateway

Prior to Release 1.1, the **XRT 9000** Gateway was known as ECHO – a device not offered or supported by Motorola Solutions. For system installations with such devices the following upgrade procedure should be followed.

- The process starts with using the **ECHO Connector** to connect to the ECHO. After connecting to the ECHO 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 ECHO. Firmware files are custom built for each ECHO based on serial number. Ensure that the serial number embedded in the firmware file name corresponds to the ECHO serial number.
- Upload the ECHO Firmware File using the ECHO Connector.
- Issue the command to “upgrade” to the uploaded Firmware File. This causes ECHO to reboot.
- After completing the firmware upload and upgrade the ECHO Connector should be uninstalled from the computer. The **XRT 9000 Configuration Tool** needs to be installed in order to connect to the XRT 9000.