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May 7, 2004	DRN 22622	• New document. Replaces FMP-115201-E01. Updated software version from 5.8 to 6.x; added steps and cautions to the upgrade procedure.

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FIELD MODIFICATION PROCEDURE

Product to Modify

Upgrade Constellation SPU Controller software to version 6.x, and update the CAN controller chip software in the field replaceable units.

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Purpose

This document explains how to update Constellation's field replaceable units (FRUs, also referred to as "cards") and install the version 6.x upgrade. This upgrade will ensure continuous high reliability for Constellation radios by addressing a memory discharge problem on a batch of CAN controller chips.

Some CAN controller chips, common to most of Constellation's FRUs, were found to have the potential to gradually lose their memory content, resulting in "card absent" alarms.

If you have not experienced this problem, the new CAN software will prevent it by periodically refreshing the memory cells on chips that have not exhibited this condition. If you have experienced this problem, the update process will identify which cards need to be replaced.

The version 6.x update is not required for high-capacity (155 Mbit/s) Constellation radios, and all Constellation radios shipped after July 2002. However, it is recommended because it contains enhancements for improved reliability.

Description

SPU Controller Software

The Constellation SPU Controller software version 6.x includes two independent programs: the Run Time code for the SPU Controller (which does not contain a CAN controller chip), and a special software utility which updates the CAN controller chips residing on other cards.

Card (FRU) Software

The software version in the cards is different from the radio's SPU Controller software version. The card application software that resides in the CAN Controller chips with version 1.0, 2.0, 2.1, or 2.2 will be updated when the "Update Cards" command is sent from the keypad.

Cards with application software version 2.3 and above already contain the solution to the CAN memory issue and will be bypassed during the Update Cards execution.

Technical Support

Harris has set up a toll-free technical support number specifically for issues related to this upgrade:

1-866-766-2651

Call this number to clarify questions about this procedure, arrange delivery of the software, coordinate your targeted update period with Customer Service, or request overnight delivery of a unit if your main and spare cards are faulty.

Planning Tips

Planning Service Outage

This upgrade procedure will interrupt traffic for 35 seconds per radio (41 seconds for the 8T MUX). Also, radio protection is temporarily disabled until the upgrade is complete. Plan the updates accordingly.

Schedule the updates for times when the least amount of radio signal interference is expected. Avoid conditions where path fading can occur, such as dawn or dusk.

Planning Update Duration

To estimate the duration of the updates, take the following factors into account:

- Number of operators
- Travel time to each equipment site
- Maintenance window duration

For planning purposes, estimate that one operator can upgrade three sites per 10-hour day.

When updates are started on a particular network or region with a common spares/maintenance center, the updates should proceed uninterrupted until all the radios have been updated.

Planning the Update Sequence

The operator can be located at any site and initiate updates remotely through the keypad. However, it is recommended that the operator be either on site, or in short traveling distance to the site being updated in case a faulty card needs to be replaced.

Refer to page 11 for a sample network update sequence.

Materials Required

Before you begin the upgrade procedure, make sure the following items are available:

- Software version 6.x CD with card update utility
- A complete set of FRU spares:
  - Transmitter (appropriate option)
  - Receiver (appropriate option)
  - Power Supply
  - Modem (appropriate model and option)
  - HLM (appropriate option)
  - SPU Controller
  - Service Channel
  - M12 (quantity of 3)
- FarScan computer
- Handheld keypad
- Service outage plan
- Scheduled maintenance window
- Site update sequence
- Scheduled field technicians

Task Overview

This document only contains an overview of the steps required to install the version 6.x update. Please refer to the *Constellation Instruction Manual* (part number IMN-112871-E11), Chapter 9, for details on how to update the software. (The manual is also available on the Harris Premier web site at https://premier.harris.com/microwave. Go to New Downloads section > Constellation. Registration is free.)

New Alarms Will Appear

A System Minor alarm, "CARD(S) NOT UPDATED," will appear on the keypad after downloading and running version 6.x. This indicates that there are one or more cards in the radio that require new software to prevent gradual memory loss in the CAN controller chips.

FarScan (database 29) commands 1 and 99 will show "CARD(S) NOT UPDATED." In the StarView MIB (version 3.0.02), the alarm object is "alarmSystemCardsNotUpdated."

Protection Will Be Temporarily Disabled

Executing a card update will disable protection for that radio for the duration of the update process. Traffic will continue to pass through whatever cards are online, but there will be no switching because of the update.

If an alarm condition appears during the update process, no protection switching will occur until the process is complete and the SPU Controller reboots. If the alarm condition is still present when the SPU has fully rebooted, then the system will take whatever protection actions it is configured to perform.

Unmanaged Cards Will not be Updated

Cards that are present in a system, but not used by that system's current configuration, will not be updated even if their software version is 1.0, 2.0, 2.1, or 2.2. The “CARD(S) NOT UPDATED” keypad alarm will not appear on these cards.

For example, if Transmitter A2 is present, but the system is configured as unprotected, the alarm will not be reported for that card, even if its software version is 1.0, 2.0, 2.1, or 2.2. The card will not be updated when the Card Update control is executed.

Network Update Methods

The upgrade can be installed locally (one radio at a time), or by hop (the radios at both ends of the hop). The update controls can also be executed through local or remote login. This provides some flexibility to optimize the technician’s travel time between sites.

Hop Upgrade

A HOP Card update will update the cards of the radios in the hop simultaneously. The advantage of this is that the traffic interruption is only 35 seconds for all of the radios in the hop, instead of 35 seconds per radio.

If one of the radios in the hop contains a failed card, that radio will not be updated.

In Figure 1, a keypad is connected locally or remotely to the Repeater. When the Repeater is updated, Terminal 1 (West) and Terminal 2 (East) will be updated simultaneously, and total traffic interruption is only 35 seconds.

Figure 1 Upgrade over a hop containing a repeater

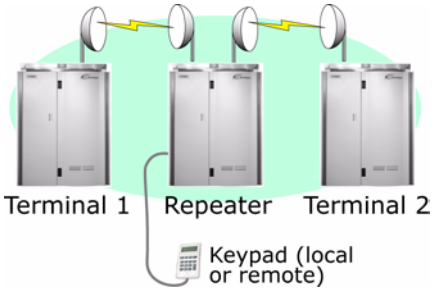
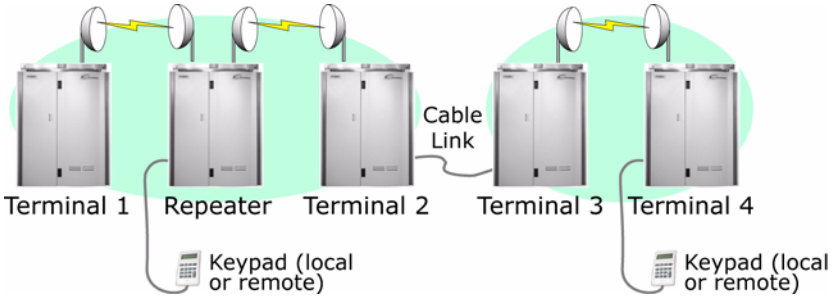


Figure 2 shows five radios in a hop. However, because two of the radios are connected by a cable link, only the equipment in the same radio links will be simultaneously updated. In this case, Terminal 1, Repeater, and Terminal 2 would be updated simultaneously. For Terminals 3 and 4 (in their own radio link), the update procedure would have to be repeated.

Figure 2 Upgrade over a hop containing a cable link



Local Upgrade

A local upgrade only updates the cards of the target radio. This method is used in situations where a hop update is not possible, such as when one of the radios in the radio link contains failed cards.

If the upgrade is done locally on a repeater, only the repeater will be updated.

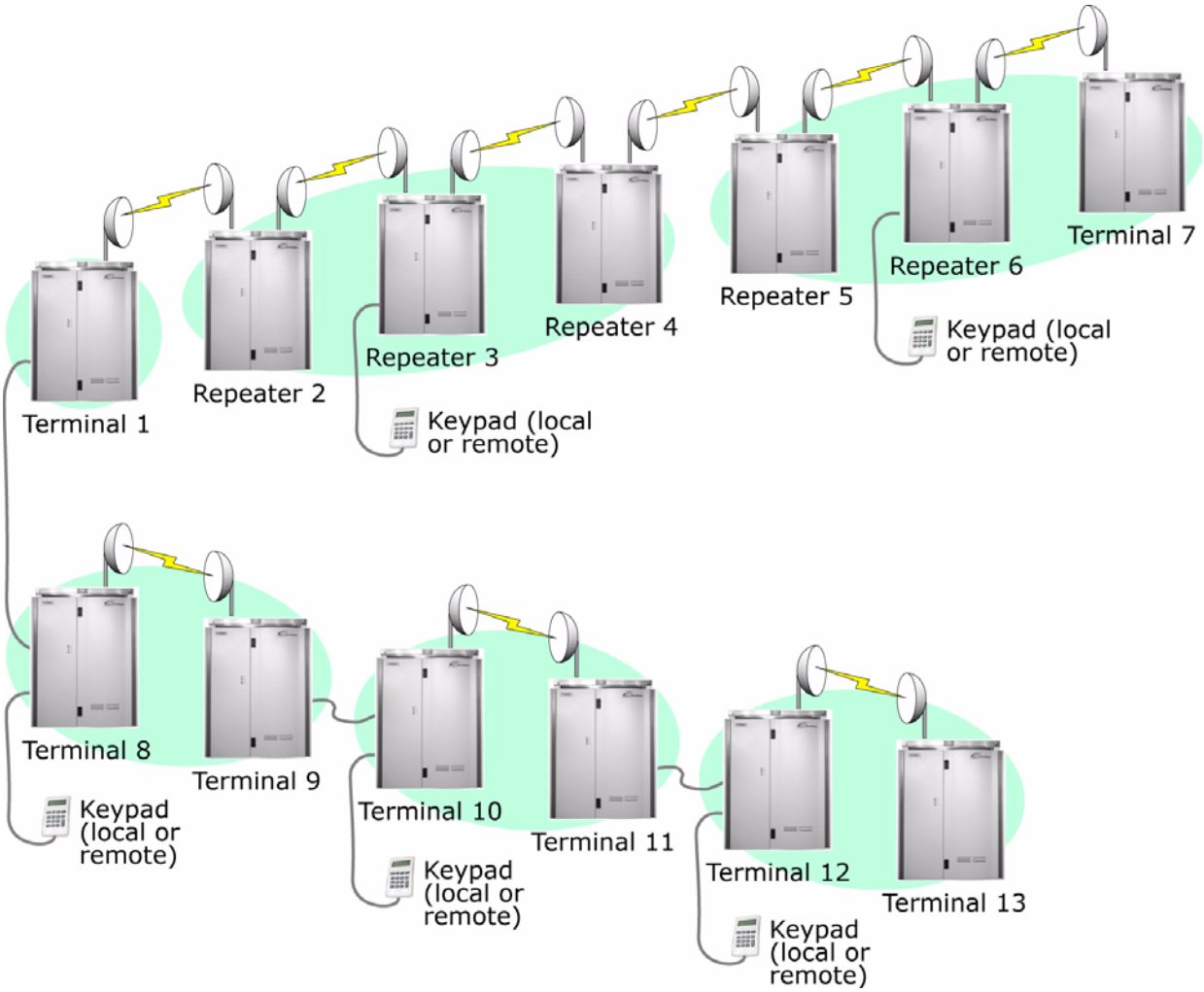
During the local upgrade, traffic will be interrupted at both the local and coordinating sites for 35 seconds, whether the coordinating site has been updated or not.

Example of a Network Upgrade

To minimize the time it takes to update an entire network, and the associated traffic disruption, first update the hop farthest away from the main radio site. Then, update the next farthest hop, gradually working back to update the main radio site. Be careful not to block access to branching lines.

The following diagram shows an example network and how it should be updated.

Figure 3 Sample network



The operator, located at Terminal 1, should remotely log-on and execute hop updates on radios in the following order:

1. Start by remotely logging on to Terminal 12 and execute a hop update on that terminal. This will update Terminals 12 and 13.
2. Log on to Terminal 10 and execute a hop update on that terminal. This will update Terminals 10 and 11.
3. Log on to Terminal 8 and execute a hop update on that terminal. This will update Terminals 8 and 9.
4. Log on to Repeater 6 and execute a hop update on that repeater. This will update Repeaters 5, 6 and 7.
5. Log on to Repeater 3 and execute a hop update on that repeater. This will update Repeaters 2, 3 and 4.

Executing a hop update on Repeater 3 will not update Terminal 8 because Terminal 8 is connected to Repeater 3 by cables, not by a radio link.

6. Log on (or return) to Terminal 1 and execute a local update on that terminal.

Procedure

This update will result in traffic interruption. Please read through the steps before you begin the procedure to familiarize yourself with the sequence. Make sure you have all the necessary equipment on hand before you begin.

All cards not needed for the current configuration must be removed from the system before starting the card update process.

Cards not needed by the current configuration will not be listed in the keypad's STATUS > INVENTORY menu.

1. Determine which cards need to be updated. Use FarScan Command 7 (on the keypad, select STATUS > INVENTORY) to view each card's resident software version.
   Cards with software version 1.0, 2.0, 2.1, or 2.2 will be updated. Cards with version 2.3 and above already have the CAN memory fix, and will be bypassed during the update.
2. Upload the version 6.x software to the SPU Controllers in the network. (See the *Constellation Instruction Manual*, Chapter 9). Only update those radios that will be upgraded the same or next day.
3. Use FarScan or the keypad to make sure there are no pre-existing alarms in the radio hop, other than "CARD(S) NOT UPDATED." (Refer to the *Constellation Instruction Manual* and *Quick Reference Card*.)

Proceeding with the card update while other alarms are present can cause an unplanned traffic outage. Resolve the alarm before continuing.

4. If there are no alarms at all, STOP and continue to step 8.

5. Use the keypad to execute the card update. Do the following:

   a. Log in to the target radio (local or remote).

   b. Enter the CONTROL > ALTERNATE S/W menu. Verify that the running SPU Controller software is version 6.x. If it is, continue with step c. If it isn't, repeat step 2.

   c. Simultaneously press the **F1** and **F3** keys. The keypad display will read:

      ```
      WARNING: These items
      may disrupt traffic
      up to 35s each site
      OK     EXIT
      ```

   d. Press **F3** (OK) to enter the Update Control menu:

      ```
      NOTE: MayHitTraffic
      UPDATE CARDS LOCAL
      UPDATE CARDS HOP
      ```

      Select the local or hop update. (See *Network Update Methods* on page 10 for a description.)

6. A series of status messages will be displayed on the keypad as the update process is carried out. For details, refer to *Update Status Message Sequence* on page 17.

7. When the update is complete, there should be no alarms. If there is a CARD ABSENT or CARD(S) NOT UPDATED alarm, replace the cards.

   If one of the updated cards shows an alarm, and you don't have a spare, call Harris Customer Support at **1-866-766-2651** to request an advance exchange RMA for immediate overnight delivery.

8. Use the keypad to reboot the SPU Controller. Enter CONFIGURATION > NETWORK MANAGEMENT > REBOOT SYSTEM. Select YES. After the reboot is complete, check the card protection switching.

9. Proceed through the network according to the original update plan, repeating step 1 through step 7 until the entire network has been updated.

10. Update all spares, test racks and uninstalled equipment. See *Updating Spares and Other Inactive Cards* below.

Updating Spares and Other Inactive Cards

1. Remove the working card and install the spare or inactive card.
2. Repeat step 5 (page 15) on the local radio to update the card.

If the CARD ABSENT alarm appears, return the faulty card to Harris for repair.

M12 Cards

When updating a spare M12 card, a 35-second traffic disruption on the tributaries carried by this card can not be avoided. If possible, update the spare M12 card in an offline rack, or in a radio with lesser priority traffic.

Power Supply, HLM and Modem Cards

If you have a protected system, force traffic through the same-type cards that have already been updated, then update the offline spares.

Transmitter and Receiver Assemblies

To update spare transmitter and receiver assemblies, remove the offline transmitter or receiver, and replace it with the spare unit. It is not necessary to install a multiplier filter or connect the cables, and you can ignore the resulting alarms during the upgrade. After you upgrade the spare assemblies, remove them and reinstall the original units. Be sure to reconnect the cables.

Update Status Message Sequence

A sequence of status messages will be displayed on the local keypad (and on the remote keypad if someone is already logged on to the radio when the update starts).

Executing a card update will disable protection for that radio for the duration of the update process. Traffic will continue to pass through whatever cards are online, but there will be no switching because of the update.

1. When the update process begins, the first message displayed on the keypad is:

   ```
   UPDATING CARDS:
   VERIFYING CHECKSUMS
   PLEASE WAIT...
   ```

   The checksum of the boot code is being verified in all cards containing software version 1.0, 2.0, 2.1, or 2.2.
   If at least one card failed checksum verification, the update process will be terminated and the following message will appear on the keypad:

   ```
   CAN'T UPDATE: REMOVE
   FAILED CARDS (SEE
   CARDS ABSENT ALARMS
   ```

   The keypad will display this message for about 10 seconds, then return to the CAN Update menu.
   To find which card failed checksum verification, go to ALARM/CARD ABSENT menu. Replace the failed card(s) and restart the update.

2. The second message that will be displayed on the keypad is as follows:

   ```
   UPDATING CARDS:
   PLEASE WAIT...
   READYING CARDS
   ```

The green LED will blink, and the 35-second traffic interruption will start sometime during this process.

3. The third message that will be displayed on the keypad is as follows:

```
UPDATING CARDS:
PLEASE WAIT...
UPDATE PART 1 OF 2
```

The red and green LEDs will blink. Traffic will be restored after 35 seconds of interruption, but the update process is not yet complete.

4. The fourth message that will be displayed on the keypad is:

```
UPDATING CARDS:
PLEASE WAIT...
UPDATE PART 2 OF 2
```

The keypad may display this message for about 12 minutes. The red and green LEDs will continue to blink.

During this time, traffic should not be affected. However, if an unexpected alarm occurs, the system will not be able to protect itself for approximately 14 minutes until normal protection goes into effect.

5. The fifth (final) keypad message that appears during a successful Update is:

```
CARD UPDATE SUCCESS:
REBOOTING SPU
PLEASE WAIT...
```

6. Manually reboot the SPU Controller one final time.

This message may stay on the keypad display while the SPU Controller Software reboots. The reboot may take about 2 minutes. After reboot, all affected cards (except those not part of the radio's configuration) should have been successfully updated and the traffic should be passing.

This message will disappear when the card update process is finished. Keypad control will be returned to you, protection will be re-enabled (if the radio is configured for protection), and the radio can be returned to normal operation.

Troubleshooting

The following tables contain troubleshooting information relating to the update. If your radio has alarms not related to this procedure, use the keypad or FarScan to determine the cause of the alarm. (Refer to the *Constellation Instruction Manual* and *Quick Reference Card*.) Resolve the alarm before continuing with the update.

Table 1 Keypad Error Messages/Alarms

Keypad Message / Alarm	Explanation	Course of Action
CARD ABSENT	This alarm may appear during or after downloading and running version 6.x. It indicates that a CAN controller chip is already at an advanced stage of memory loss.	Halt the update and replace the card with a spare. To avoid extended traffic interruption, proceed with the update after the new card has been installed.
FAILED CARD	Same as "CARD ABSENT" alarm. It can also occur after the CAN update has started, during checksum verification.	Replace the card. If the update is performed on a radio with this alarm, the routine will halt and traffic will not be affected. If the alarm appears after all failed cards have been replaced, reboot the SPU Controller and re-run the update.
CARD(S) NOT UPDATED	System minor alarm. This may appear if a non-updated spare was used to replace an updated card.	Run the update on the spare cards. See page 15.
LOGIN FAILED SITE ALREADY LOGGED	While the update is in process at a radio, remote login to that radio is denied until the update is complete.	Wait until the update has completed before remotely logging into that radio.

Table 2 General Troubleshooting

Problem	Explanation	Course of Action
The radio has some unexpected alarms.	The radio has an alarm that is not related to the update. Refer to the Quick Reference Card and Instruction Manual for details.	Do not update the radio until the alarm has been resolved.
Card doesn't function properly after update.	The card that was being updated was unplugged, reset, or turned off during the update.	Make sure the card is plugged in, seated securely and turned on, then repeat the update.
Several cards don't function properly after update.	The SPU Controller was unplugged, reset, or turned off during the update.	Make sure the SPU Controller is plugged in, seated securely and turned on, then repeat the update.
Only one radio was updated when a hop update was performed.	One of the radios in the hop contains a failed card. The advantage of having a 35-second simultaneous traffic interruption has been lost.	Replace the failed card and repeat the update process on the non-updated radio.
Power outage during card update.	The radio site lost electrical power during an update. The result is the same as an SPU Controller going offline. All of the cards being updated may not function properly.	Restore power and repeat the update process.
Flashing green and red LEDs.	During update, the red and green status LEDs on the cards will blink at various rates according to the stage of the update process. The LEDs will return to a normal state when the upgrade is complete.	Allow the update to continue.