



Futurecom Systems Group, ULC

Over the Air Programming Via
Radio Management (RM-OTAP)
User Guide

for DVR-LX[®]/DVR/VRX1000

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Document Revisions

Rev	Date	Notes & References
0	2020-07-27	Initial Release
1	2020-08-07	Added DVR-LX®, RM-OTAP File Type Support
2	2020-10-14	Added Helpful Hints
2.1	2020-11-20	Updated DVR reference to VR, Updated support for FW-LMR
3	2020-02-24	Added Helpful Hints: FW Compatibility, Enhancements Clarification of license type support- now included RM-OTAP license
3.1	2020-08-18	Updated information about saving DCD files and bundling license
3.2	2021-10-13	Addition of How to Update VR ID, Replacing a VR, Overwriting Temporary Config/FW Update
4.1	2022-01-27	Feature License Notes information added

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1. Over the Air Programming via Radio Management

Over the Air Programming via Radio Management (**RM-OTAP**) provides the radio technicians the ability to program or upgrade the firmware/features of a DVR-LX®/DVR/VRX1000 (**VR**) without physically connecting the devices to a computer.



Figure 1 – No Physical Connection to VR

The RM-OTAP feature leverages off the APX™ Radio Management application. Firmware & configuration files are pushed to the VR via Mobile Subscriber Unit (**MSU**) through any of the following mediums:

1. Wi-Fi
2. P25 (LMR)
3. USB (or USB connected to LTE device/modem)

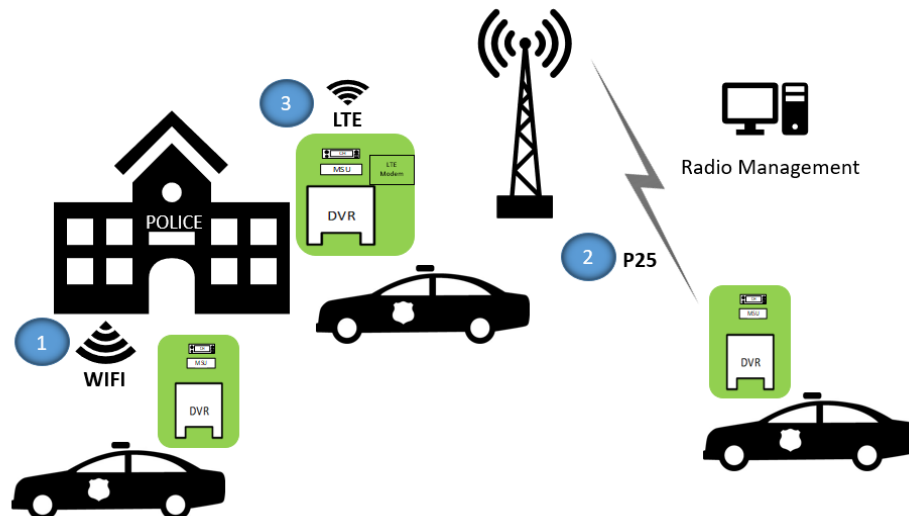


Figure 2 – Delivery Methods for RM-OTAP

RM-OTAP is a licensed feature and can be purchased at either time of order for the VR or purchased as a field upgrade. Please reference the Futurecom Ordering Guide by visiting [Futurecom > Support > Documentation-Software > DVRS-VRX1000](#)

2. Feature Requirements

Vehicular Repeater (**VR**): DVR-LX®, DVR and VRX1000

VR Configuration Tool: Tweaker 2.05 or later, FRC 1.0 or later
Radio Management (**RM**): R21.00.01 or later

VR Firmware: 1.60 or later
Mobile Firmware: R21.00.01 or later

VR Feature License: RM-OTAP
Mobile Feature License: DVRS MSU Operation

To verify which mobile models support firmware/configuration updates, see **RM-OTAP File Type Support**



HELPFUL HINT

When using RM-OTAP for firmware updates, please note that firmware compatibility is always enforced. Compatible MSU and VR firmware versions are bundled together in the MSU firmware. If MSU is updated with a specific firmware, compatible (bundled) VR firmware will be applied to the attached VR. For a list of VR-MSU firmware version bundles, please reference the Futurecom Compatibility Charts by visiting Futurecom > Support > Documentation-Software > DVRS-VRX1000



HELPFUL HINT

Do not mix RM-OTAP configuration with FRC configuration. RM-OTAP and FRC do not communicate and tracking configurations will be confusing. One method must be selected.



HELPFUL HINT

After the initial launch of RM-OTAP support for the VR, there have been subsequent enhancements to improve the user experience. Please see below to determine what capability was introduced and when.

RM VERSION	DESCRIPTION
R21.00.01 (Initial Launch)	User is always required to link a dcd file with a mobile radio template when using Radio Management. a. With RM-OTAP feature license- linked dcd file is applied to the VR. b. Without RM-OTAP feature license- linked dcd file is not applied to the VR.
R21.40.00	User no longer needs to link a dcd file when working with mobile firmware prior to R21.00.01. Manage->Templates->DVRS Files field, select "None" (see Section 4.3)
R23.00.00	User no longer needs to link a dcd file when they do not have RM-OTAP feature license for VR (regardless of mobile firmware). Manage->Templates->DVRS Files field, select "None" (see Section 4.3)
R23.00.00	User can apply an RM-OTAP license to a VR using RM.
R26.00.00	Support added for VR ID only change in SR2021.4

3. VR Firmware Update

When updating the MSU firmware, there is no user action required to update the VR firmware. The VR firmware update software (**DFB**) is bundled with the MSU firmware and will automatically update the VR firmware during an MSU firmware update. Please refer to Motorola Radio Management Training if you have questions regarding an MSU update.

<https://learning.motorolasolutions.com/>

4. VR Configuration Update

A VR configuration update using RM-OTAP is a four-step procedure:

Step 1: Creating a DCD file from Tweaker/FRC

- Creation of New File
- Modify an Existing File
- Bundling with License File

Step 2: Importing DCD File in RM server

Step 3: Linking the imported DCD file to an MSU template

Step 4: Selecting the template to write to MSU

4.1 Creating a DCD File

To create a DCD file, there are two options: create a new file or modify an existing file.

NOTE: Remember to follow programming sequence outlined in VR Programming Guidelines to ensure the MSU and VR are synchronized.



HELPFUL HINT

It is always recommended to save each DCD file to enable future configuration changes for a particular VR(s).

Creation of New File

1. Establish communications with VR
2. Read the VR: select **Repeater** → **Load Data from APX Repeater (F2)**
3. Make configuration changes (as needed) for this new DCD file
4. Save the data as DCD: select **File** → **DCD Files** → **Save DCD File**
5. Enter data into Save window and click SAVE
6. Enter data into DCD Options window and click OK (Serial numbers are optional)

Configuration Data Name: Filename displayed after importing into Radio Management (max 23 alphanumeric chars)

Description: Additional text to clarify content; displayed in Preview File Header section in Open File window (max 1024 alphanumeric chars)

Load TXT File: Command button that loads an external file that contains a list of the serial numbers. All data imported will be placed into the List of Serial Numbers field

List of Serial Numbers: List of serial numbers of the repeaters that this DCD file should apply to. If left BLANK, this DCD file will be applicable to all repeaters (max 65000 alphanumeric characters)

Encryption: If custom encryption is used, loading the DCD file in FRC will require the custom password to be entered (min 4, max 12 characters)

Bundle License File: Command button that selects a License File to be bundled to the DCD. The text field next to the button displays the License File to be bundled.

Modify an Existing File

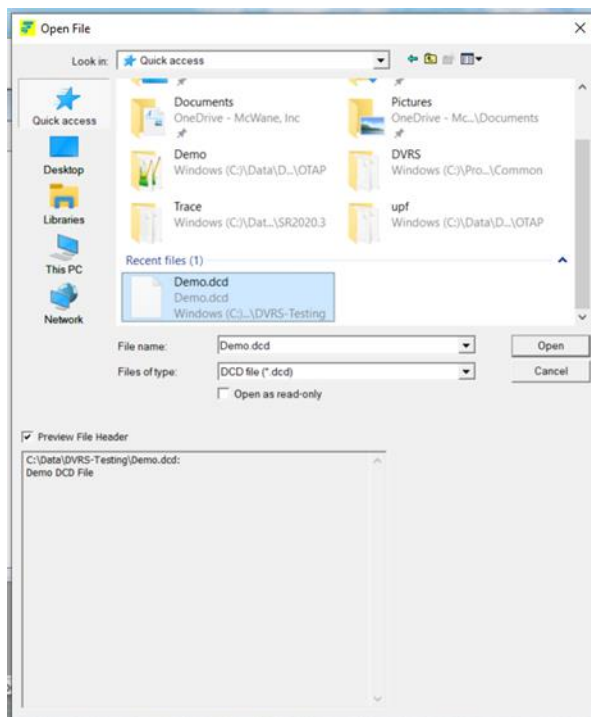
NOTE: DPD files are not meant to be used for this purpose- only DCD files may be modified to create another DCD file.

1. Select **File** → **DCD Files** → **Load DCD File**

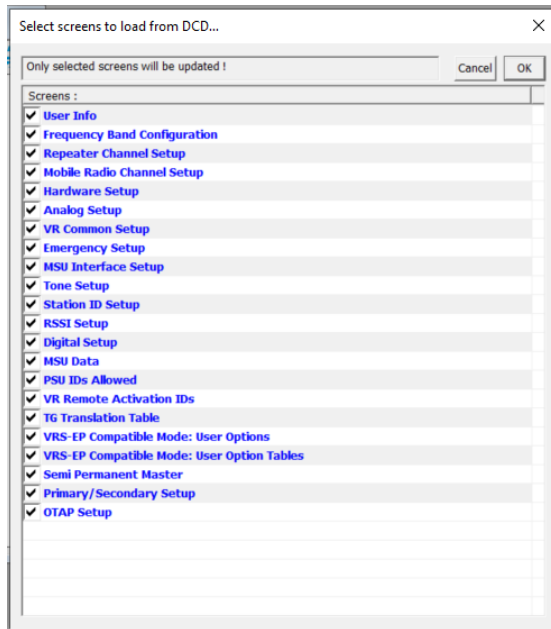


2. Click Continue.
3. Specify the DCD file location and name then click Open.

NOTE: If original DCD file was saved with a description, it will be displayed in the Preview File Header section.



4. Unselect any screens with data that is not desired to be loaded and then click OK.



5. Make configuration changes for this new DCD file.
6. Save the data as DCD: select **File** → **DCD Files** → **Save DCD File**
7. Enter data into Save window and click SAVE
8. Enter data into DCD Options window and click OK (Serial numbers are optional)
 - Refer to Step 6 in Creation of New File

License File Application

All feature license files, including the RM-OTAP license file, may be sent using RM-OTAP by bundling with a DCD file.

A license file is bundled in as part of creation or modification of a DCD file.
See **Bundle License File** (DCD Options window, bottom left)

DCD Options

Configuration Data Name: _____ Description: _____

List the serial numbers of the repeaters you wish to allow this DCD file to be applied to. Leave the list empty to allow this DCD file to be applied to all repeaters.

Separate serial numbers with special characters , ; | or newlines.

Serial numbers should be written either as a single value (eg: 12345678) or as a range (eg: 1234000-1235000). The list below can contain a mixture of individual values and ranges.

Load TXT File

Encryption
 Default Custom
Password: _____
Confirm: _____

Bundle License File No License File bundled

OK Cancel



HELPFUL HINT

Older versions of Tweaker/FRC have a separate menu option for saving DCD files with license: select **File** → **DCD Files** → **Save DCD File with License**

Bundling License to Template Files

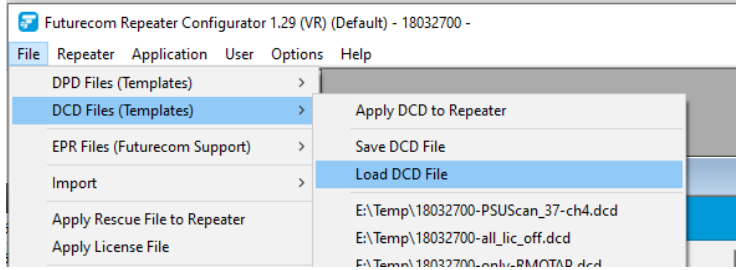
User can bundle a license file to template file. This can be delivered to a single repeater or fleet of repeaters via Radio Manager. Any repeater's S/N that matches a S/N in the bundled license file will have that feature enabled and take in the configurations in the corresponding template file.

Preview License Info Bundled to (DCD) Template File

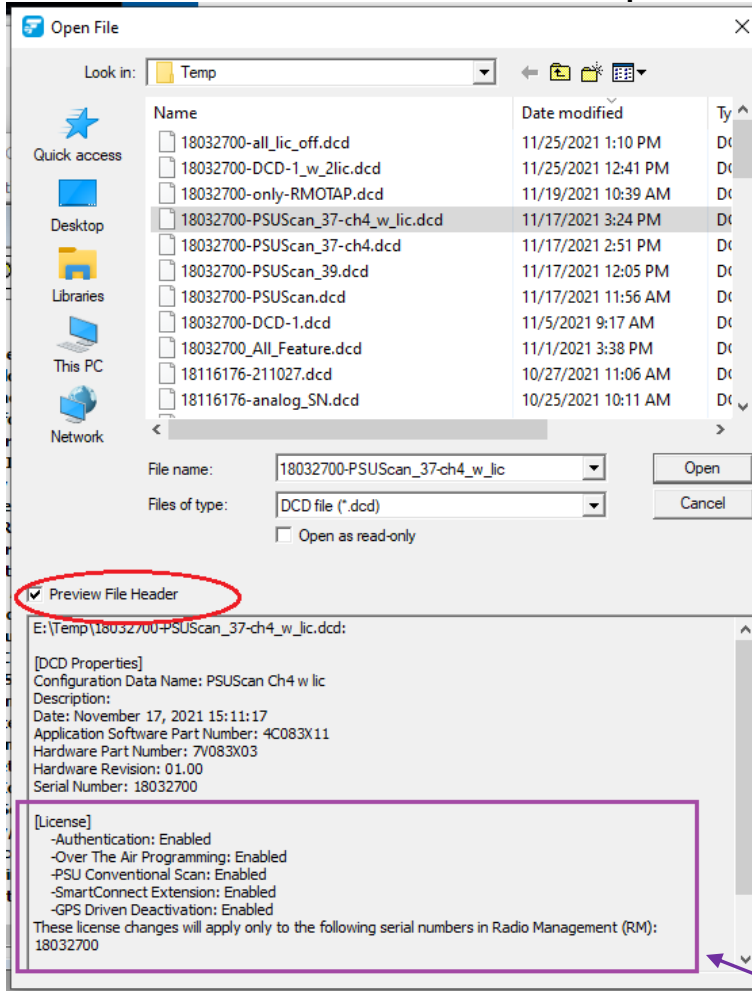
User can **bundle** a license file to DCD file for deployment via Radio Management. FRC shows preview of info prior to loading the DCD file

Procedures:

1. Select File → DCD Files (Templates) → Load DCD File



2. Enable checkbox Preview File Header in the Open File dialog window

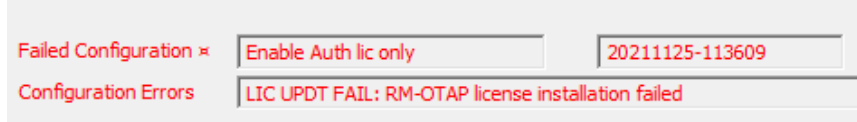


3. License enabled & corresponding S/N are shown (see purple box above)

Applying License to Repeater via Radio Manager

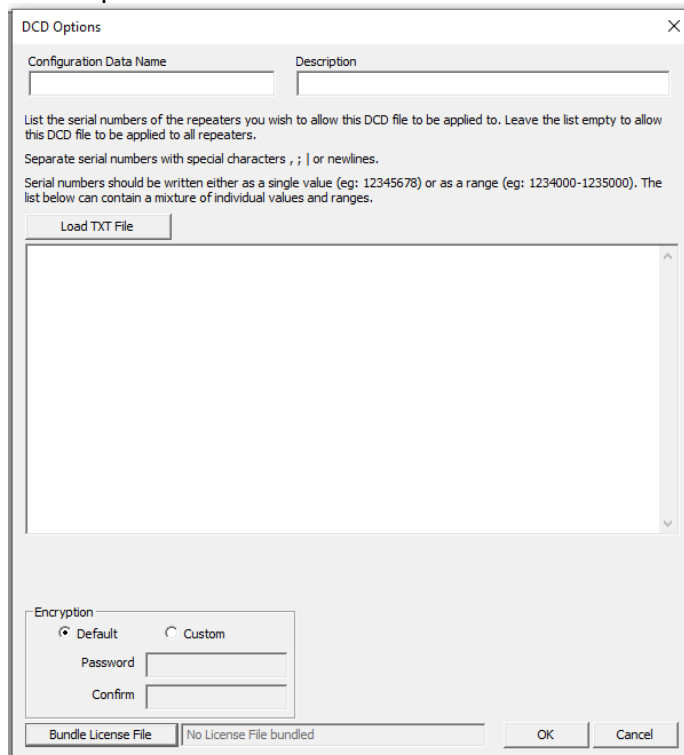
In general, repeater must have RM-OTAP license already enabled for it to support DCD updates from Radio Manager. One exception is that user can enable RM-OTAP license when using a bundled license file together with a DCD file update.

Note: cannot update another feature license via RM without RM-OTAP license already enabled or included in the bundled license file



Procedures:

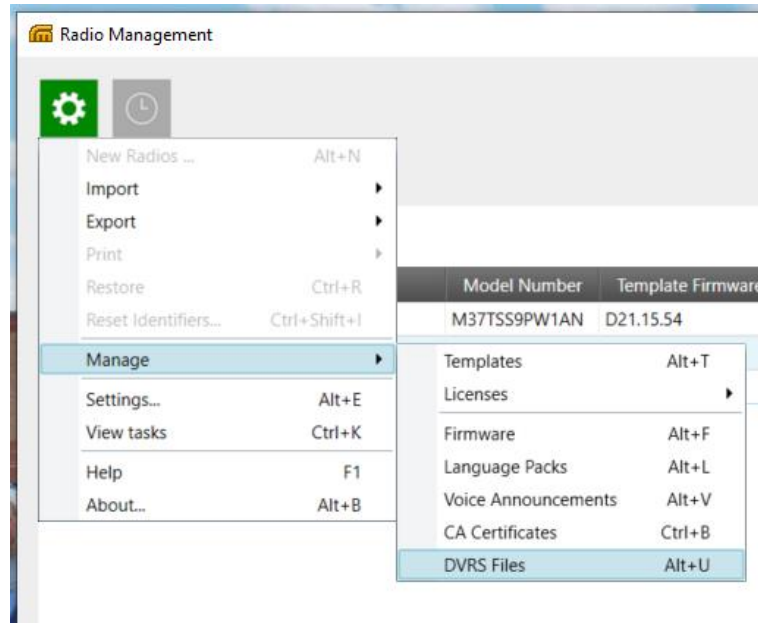
1. Create a DCD file on FRC with bundled license file
 - a) Select **File** → **DCD Files (Templates)** → **Save DCD File**
 - b) Follow prompt & specify DCD filename
 - c) Enter specifics about the DCD file



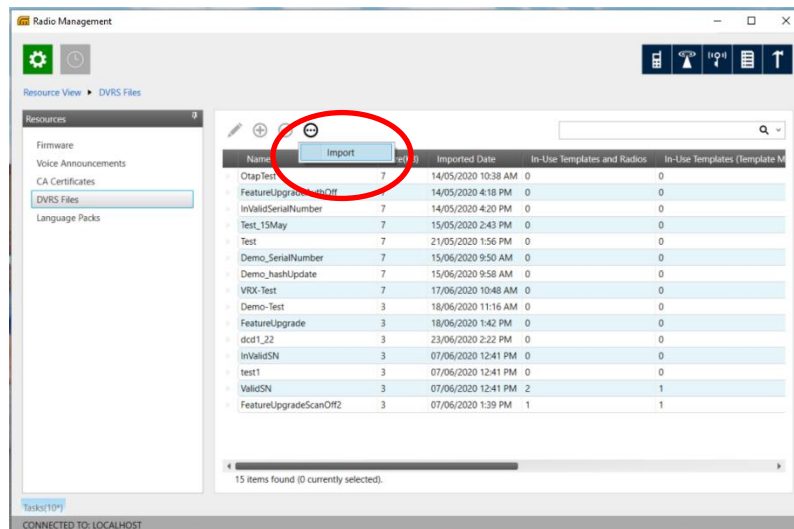
- d) Click **Bundle License File** to pick up the appropriate .upf file
2. Import the newly created DCD file into Radio Manager
 3. Link the DCD file to the mobile radio's corresponding Template
 4. Schedule a Write job on RM for the mobile radio to push the update
 5. MSU & Repeater will process the DCD update
 6. Feature licenses specified in the bundled license file will be applied

4.2 Importing DCD File in RM server

1. Using RM, in the Radio View, go to Settings-> Manage-> DVRS Files



2. From the DVRS Files screen, click Import (icon with three dots inside circle).



3. Select the DCD file previously saved from Tweaker/FRC and click open.
4. In the Job View, confirm the DCD file has imported successfully.

HELPFUL HINTS

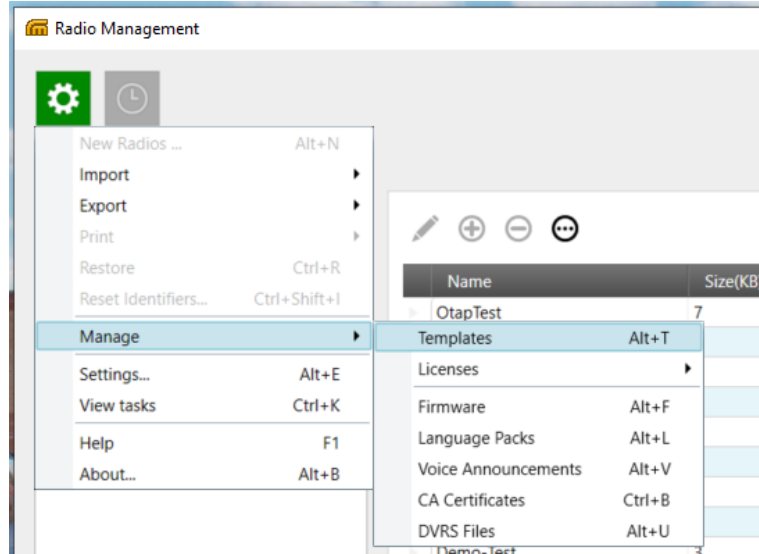


It is always recommended to use a new DCD file name. When reusing an existing DCD file name, delete first from DVRS Files view in Radio Management (pictured above) to ensure it will be properly imported.

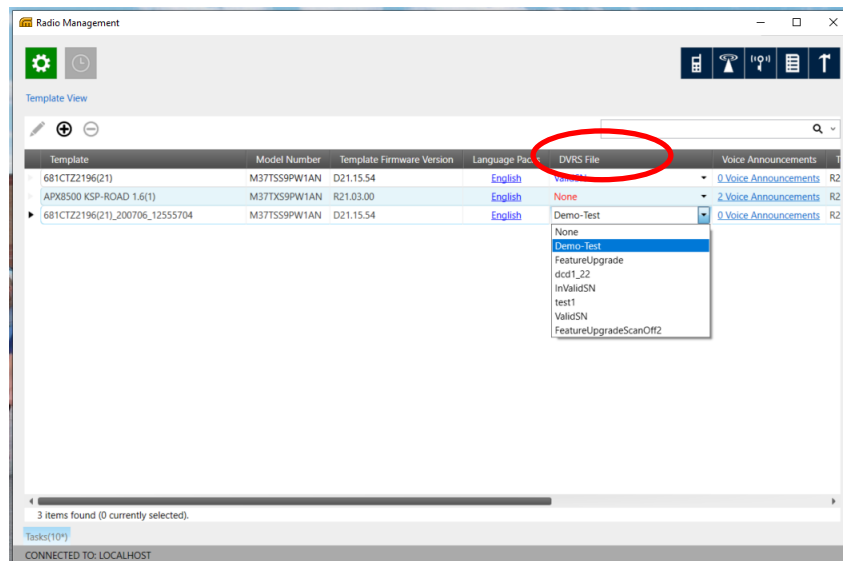
Also note that a DCD created prior to FRC 1.18 cannot be used.

4.3 Linking the Imported DCD file to an MSU template

1. To associate the DCD file with a specific MSU connected to the VR, navigate to Settings->Manage->Templates.



2. Select the MSU template and scroll to the right and locate the "DVRs File" column and select the DCD file from the drop-down menu.



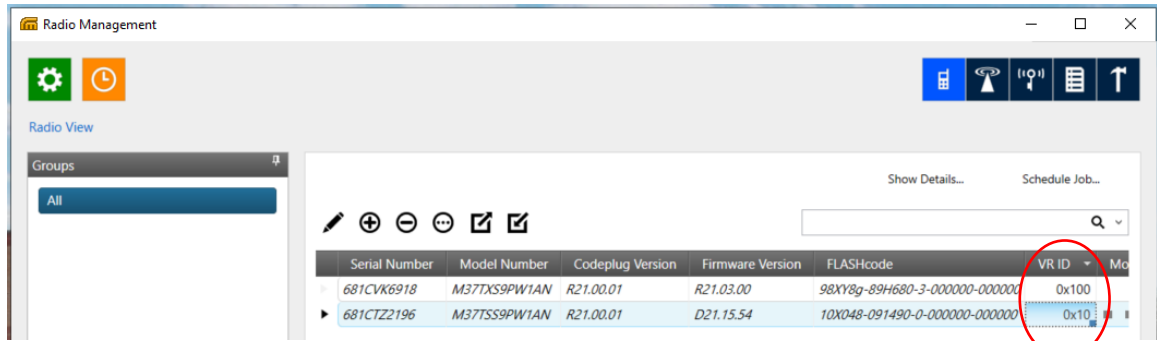
HELPFUL HINT

If DCD file does not appear as expected in the DVRs File drop down menu, one possible solution is to export mobile xml to FRC, save DCD, and import DCD into RM again.

4.4 Selecting the Template to Write to MSU

1. Before scheduling the job, in the Radio View, confirm the VR ID is correct in the "VR ID" column.

Note: The purpose of having the VR ID as a separate column for each radio is that the DCD is a template to be used for multiple radios and does not contain the VR ID.



HELPFUL HINT

VR ID- displayed in Hex- if you enter VR ID as decimal, it will automatically convert to hex.

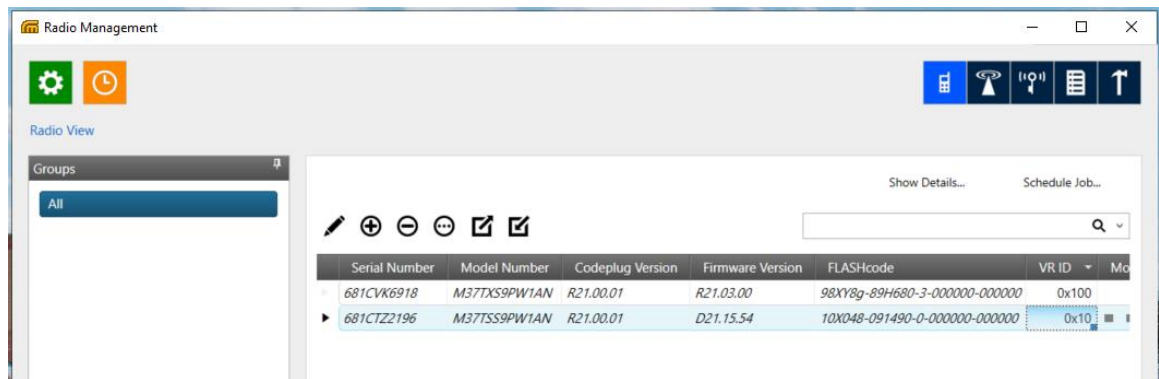


HELPFUL HINT

VR ID Change Only: To change the VR ID only, a DCD must still be attached to the job even if there are no configuration changes. An attempt to change the VR ID without an attached DCD will have no effect. If NONE is selected, RM will block with a pop-up error message and revert the VR ID.



2. Right click on the row and schedule a write job to complete the configuration update on the VR.



3. Proceed to Job View to see the status of the configuration update. Once it is shown as complete in the job status column, the MSU control head will display "Updating DVRS" and restart.

4.5 How to Initiate Automatic Update for a Replacement VR

Prerequisite*:

- RM-OTAP must have been successfully used to send firmware and configuration to the VR being replaced
1. Remove old VR from installation.
 2. Prepare new VR by installing RM-OTAP license via FRC (See *License File Application*).
 3. Connect new VR to original MSU.
 4. Power up original MSU & new VR.
 - Observe DVRS Update
 - Firmware version bundled inside MSU will be pushed to VR
 - If MSU has previously saved configuration, that will be pushed to VR as well
 - VR ID is updated
 5. MSU will reset.

*If prerequisite is not met, refer to Section 4.5 ***Error! Reference source not found.***

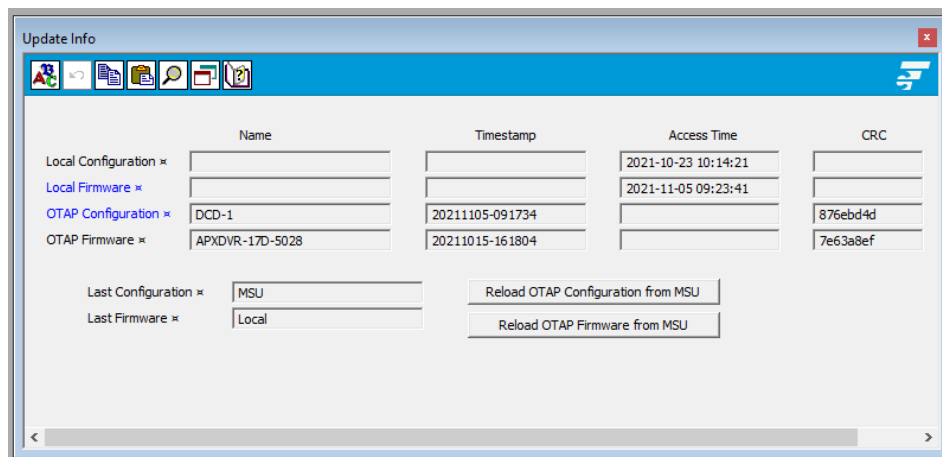
4.6 How to Overwrite a Temporary Configuration or Firmware Update for a VR

Prerequisites:

- RM-OTAP must have been successfully used to send firmware and configuration to the VR
- Firmware and/or configuration and/or VR ID have been updated using FRC after RM-OTAP was last used

To restore VR to last configuration and firmware sent using RM-OTAP:

1. Connect laptop to new VR via USB programming cable.
2. Launch FRC.
3. Go to **Update Info** screen.



- Click Reload OTAP Configuration from MSU button.
- Click Reload OTAP Firmware from MSU button.
4. Power down VR.
5. Power up MSU & VR.
 - Observe DVRS Update (applicable when swapping in new repeater with RM-OTAP license enabled).
Firmware version bundled inside MSU will be pushed to VR.
 - If MSU has previously saved configuration, that will be pushed to VR as well.
 - VR ID is updated.

5. Licensed Feature Upgrade

If a feature has been purchased from Futurecom (i.e. Authentication), a license file is provided by Futurecom. To bundle this file with a DCD, refer to Section 4.1 **License File Application**

6. RM-OTAP File Type Support

VR Configuration and License Files

VR Remote Configuration and License File Updates (RM R21.00.00)			
MSU Models (AN/BN)	Transport Method (RM to MSU)		
	USB	WiFi	P25 (LMR)
APX 7500AN APX 6500AN APX 4500AN APX 2500AN	Supported	Not Supported	Supported
APX 8500 APX 6500BN APX 4500BN APX 2500BN	Supported	Supported	Supported

VR Firmware

VR Remote Firmware Update (RM R21.00.00)			
MSU Models (AN/BN)	Transport Method (RM to MSU)		
	USB	WiFi	P25 (LMR)
APX 7500AN APX 6500AN APX 4500AN APX 2500AN	Not Supported	Not Supported	Not Supported
APX 8500 APX 6500BN APX 4500BN APX 2500BN	Supported	Supported	Supported

NOTE: Not all above model pairings are offered in all regions.

7. Contact Information



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