

# Firmware Upgrade using RDKM XCONF Server

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## Pre-requisites

- The user must configure a local TFTP (Trivial File Transfer Protocol) or HTTP (Hypertext Transfer Protocol) server.
- Ensure that both the local HTTP/TFTP server and the device are on the same network

## Overview

This page details how to perform firmware upgrade using RDKM XConf Server.

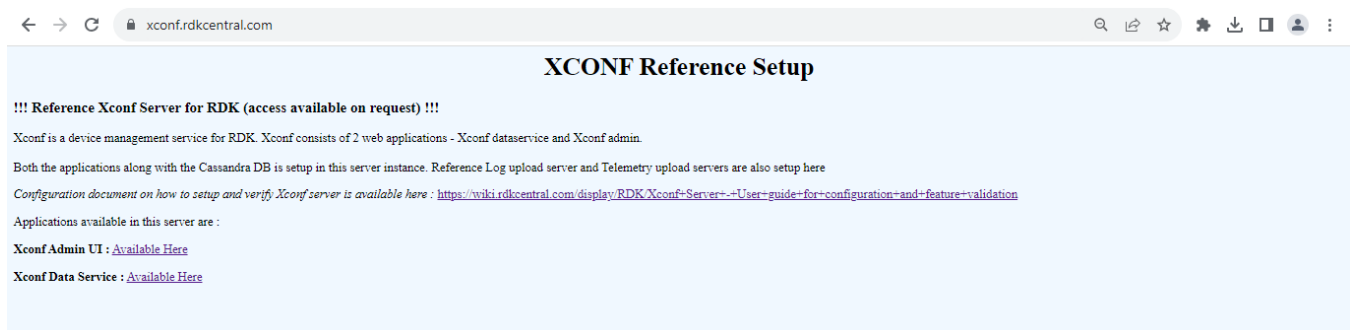
RDKM offers a reference XConf server that is publicly accessible at the URL [XConf.rdkcentral.com](https://xconf.rdkcentral.com). Users have the option either use this XConf server or can create their own.

If you are interested in setting up a custom XConf server, please visit the page <https://wiki.rdkcentral.com/display/RDK/Xconf+Server+-+User+guide+for+configuration+and+feature+validation> for detailed instructions on installation and a usage guide.

The primary focus of this page is to guide you through the process of firmware upgrade using the RDKM XConf server [XConf.rdkcentral.com](https://xconf.rdkcentral.com).

User would be able to see two options in the landing page

1. XConf Admin UI
2. XConf Data service



User can configure firmware rules, configurations, Telemetry settings, RFC settings etc in the admin UI. While dataservice, currently tells the XConf version information - Which version is used, when was it updated lastly and the commit informations etc.

## Configure the device in XConf Server

In order to configure the device information user needs to login to XConf admin UI . For getting the access details, refer this page [XConf Reference Setup Credentials](#) and fill the information in admin UI and press login button.

Please enter your **NT** credentials

**Username:**

admin

**Password:**

.....

Login

Once logged in, Users need to do basic configuration like setting up the environment, Creating the model information, Saves the mac Lists, IP Lists. These configurations are required for all device management features like RFC, Firmware upgrade, Telemetry etc.

## Common Configurations

### Create Environment

- Select **Environments** option within **Common** list to enter Environment page.
- After entered Environments page press create button to add your device environment detail.
- Give ID and Description to setup Environment for your device and save those details in XConf server

XConf

Common ▾ Firmware ▾ DCM ▾ Telemetry ▾ Settings ▾ RFC ▾ Tools ▾ Changes ▾

Environment

Id

RPI\_XCONF\_UPGRADE

Description

RPI\_FIRMWARE\_UPGRADE\_VERIFY

Save

Cancel

### Create Model

- Select **Models** option within **Common** list to enter Model page.

- After entered Models page press create button to add your device model detail.
- Give ID and Description to setup Model for your device and save those details in XConf server.

**XConf** Common Firmware DCM Telemetry Settings RFC Tools Changes

## Model

Id RPI\_XCONF\_UPGRADE

Description RPI firmware upgrade

Save Cancel

### Create Mac List

- Select **MAC Lists** option within **Common** list to enter MAC Lists page.
- After entered MAC Lists page press create button to add your device MAC detail.
- Give Name and Data to set MAC detail for your device and save those details in XConf server.

**XConf** Common Firmware DCM Telemetry Settings RFC Tools Changes Application admin 11/29/2023 10:45:51 UTC

## Editing MAC List

Choose File Browse

Name RPI\_XCONF\_UPGRADE

Data Please enter item

B8:27:EB:BB:D9:5E B8:27:EB:EE:8C:0B

Save Cancel

User also has the option to choose multiple mac address from a file. User can use a browse button on the right side of the UI to select the files which holds the mac addresses.

Note: All formats are not accepted here. each line holds only a single mac address

Eg :  
AA : AA : AA : AA : AA : AA  
BB : BB : BB : BB : BB : BB

- Press the Add '+' button
- Then press save

### Create IP Lists

- Select **IP Lists** option within **Common** list to enter IP Lists page.
- After entering IP Lists page press create button to add your device IP detail.
- Give Name and Data to set IP detail for your device and save those details in XConf server.

The screenshot shows the XConf web interface at the URL `xconf.rdkcentral.com:19093/admin/ux/#/namespacedlist/edit//CREATE/IP_LIST`. The top navigation bar includes the XConf logo and several menu items: Common, Firmware, DCM, Telemetry, Settings, RFC, Tools, and Changes. On the right, there is an 'Application' dropdown set to 'admin', a user icon, and a timestamp '11/29/2023 10:49:01 UTC'. The main heading is 'Add IP List'. Below this, there are two input fields: 'Name' with a placeholder 'Please enter Name' and 'Data' with a placeholder 'Please enter item' and a blue '+' button. At the bottom, there are 'Save' and 'Cancel' buttons. A 'Choose File' button and a 'Browse' button are also visible near the top right of the form area.

As our requirement is to perform firmware upgrade, User need to configure the information like which **Firmware version**, **From where to download the image and how(protocol) to download**.

There are 3 significant steps involved in the XConf firmware upgrade configuration:

**1. Firmware Config** – The firmware details can be configured here.

*Where* : Go to Firmware - > Firmware Configs -> Create.

*How* : Add your firmware details - File name ( Upgrading image name ), Version( Upgrading image version) and select your model name and save the details in XConf server.

### **Create Firmware Config**

Before configuring Firmware essentials, Ensure application type is stb.

- Select **Firmware Config** option within **Firmware** list to enter Firmware Configs page.
- After entered Firmware Configs page press create button to add your device firmware configuration detail.
- Give Description, File name ( Upgrading image name ), Version( Upgrading image name) and select your model name and save the details in XConf server.

Description:	RPI_xconf_testing		
File name:	rpi-genero-q-4b-client_rpi-nvst_202011011025.mof4a4c		
Version:	rpi-genero-q-4b-client_rpi-nvst_202011011025		

Model:

1318 REALTEK REFERENCE DEVICE	A_FIRMWARE_UPGRADE	AH210	AH210
AH210_AMLOGICREF1_MODEL	AH210_FW_MODEL	AH210_FW_UPGRADE	AH210_FREEMURAPPS
AMLOGIC	AMLOGIC_ROMM_C1	AP033	ARKRIS9HANN_AH210_ARMV7_ARM92_AT301
AT301-TV	AUSA-TEST1	AUTOMATICS_AMLOGIC	AUTOMATICS_REALTEK
AUTOMATICS_SKYWORTH_AMLOGIC	AX001A21	BALAJI_TELEMETRY	BLADE
			CERT_RPI_MODEL
CNF_MODEL_SERCOM	COGANTION_BB	COGANTION_RNV	DEMO_T3
			DEMO_SGC_DEV
DEV_STAT_TEST1	DEV_TEST1	DHA2032	DINSHI
			DMU-ENV
DMU-ENV	ENV13	F502	FAGT506-15
			FAGT5070_TNPL
			FWMPG_DEMO
			HARESHAH-RPI
HPIDA	HPIDA-DEV	HPID4	HPIDA
			HPID4N
			HPID4N-TEST1
			HYTEST
			JITHAN-HPID4N-MODEL
JITHAN_AH210_MODEL	LGSH_REALTEK_ROMM	MURAPPS-TEST2023	NEWTEST
			PLG
PP_MODEL	PSYANNA-RPI	PROG	QA
			QENVI
			QIMODEL
			R10
			R4
			RAGBERRY_FH
ROI	ROI-4	ROI-4_T	ROI-4_TEST1
			ROI-4_TEST2
			ROI-4_T3
			ROI-4_T4
			ROI-4_T5
			ROI-4_T6
			ROI-4_T7
			ROI-4_T8
			ROI-4_T9
			ROI-4_T10
			ROI-4_T11
			ROI-4_T12
			ROI-4_T13
			ROI-4_T14
			ROI-4_T15
			ROI-4_T16
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			ROI-4_T20
			ROI-4_T21
			ROI-4_T22
			ROI-4_T23
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			ROI-4_T38
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			ROI-4_T40
			ROI-4_T41
			ROI-4_T42
			ROI-4_T43
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			ROI-4_T76
			ROI-4_T77
			ROI-4_T78
			ROI-4_T79
			ROI-4_T80
			ROI-4_T81
			ROI-4_T82
			ROI

**2. Firmware rule – Rule** is to map your device to the configuration created.

Where : Go to Firmware -> FirmwareRule - > Create.

*How* : Select one of the default template like MAC\_RULE.

Enter name of the rule, build condition (you can add estbMacAddress i.e. )

select the firmware config from the drop down list to map it with the rule

## Create Firmware Rules

- Select **Firmware Rules** option within **Firmware** list to enter Firmware Rule page.
- After entered Firmware Rule page press **create** button to add your device firmware Rule detail.
- After entered firmware Rule page you can see list of default templates(ENV\_MODEL\_RULE, IP\_RULE, MAC\_RULE etc.)  
Note: If we need to create new custom template, go to **Firmware Firmware templates**. Enter the ID name. Select priority from the 'Priority' drop down menu. Add conditions. Once saved select the new template to create firmware rule
- Choose MAC\_RULE(any required template) in this list of Template to add your device MAC list in Firmware Configuration.
- After we select the required template, 'Add firmware Rule' page will be displayed. Here the build conditions will be present from the 'template' that we added and in addition to that we can add additional Build Conditions also.
- Add your device specific eStbMac under build condition option.

- Select your firmware config under Action option and save your Firmware rule in XConf server.

**PROPERTIES**

Name: RPI\_XCONF\_TESTING      Type: MAC\_RULE

**BUILD CONDITIONS**

eStbMac IN\_LIST RPI\_XCONF\_UPRAGE

AND OR ☐ not  IS

Please provide value for each condition in the rule:  
click condition, enter fixedArg value, then click Plus button to save that condition.  
Note: Key value in condition can't be modified. It's not allowed to add new conditions.

**ACTION**

Action Type: RULE

NoOp: false ☐

Firmware Config: RPI xconf testing

### 3. Download Location Filter – Here we can specify the download location URL and it's protocol.

There is a by default location available in 'Download Round Robin location filter', but admin can set up an alternative download location for hosting the firmware image using any local file server. To add alternative location for the device, we need to override it from firmware rules.

- Go to **Firmware -> Firmware Rules -> Define Properties -> Create**
- A page will be displayed with options to select the template. Select '**DOWNLOAD\_LOCATION\_FILTER**' from the list
- In this 'firmware rule' page with type 'DOWNLOAD\_LOCATION\_FILTER', we can specify the firmwareDownloadProtocol and firmware location. This property will override the default value set from 'Download Round Robin location filter'.
- Add the firmwareDownloadProtocol and the local http/ftp location as the firmwareLocation in XConf server. (Make sure local server and STB are in same network)

## Add Firmware Rule

**PROPERTIES**

Name
Type
DOWNLOAD LOCATION FILTER

**BUILD CONDITION S**

ipAddress IN\_LIST  
OR eSimMac IN\_LIST  
OR eSimMac IS  
OR model IS  
AND OR not IS

Please provide value for each condition in the rule:  
click condition, enter fieldArg value, then click Plus button to save that condition.  
Note: Key value in condition can't be modified. It's not allowed to add new conditions.

**ACTION**

Action Type
DEFINE PROPERTIES

Bypass Filters
Select

Properties

Key	Value	ValidationTypes
ipv6FirmwareLocation		STRING
* firmwareLocation		STRING
* firmwareDownloadProtocol	http	STRING

\* - required field

Save
Cancel

By default, rebootImmediately flag will be false. If we need to perform reboot immediately after writing the image to other partition, User can configure REBOOT\_IMMEDIATELY\_FILTER

- Go to **Firmware -> Firmware Rules -> Define Properties -> Create**
- A page will be displayed with options to select the template. Select '**REBOOT\_IMMEDIATELY\_FILTER**' from the list
- In this 'firmware rule' page with type 'REBOOT\_IMMEDIATELY\_FILTER', we can specify the 'rebootImmediately' as true.

## Add Firmware Rule

**PROPERTIES**

Name

Type

REBOOT IMMEDIATELY FILTER

**BUILD CONDITION**

ipAddress IS 192.168.162.198

OR

ethMac IS 78:B2:13:2E:F3:20

AND

OR

☐ not

IS

Please provide value for each condition in the rule:  
click condition, enter fieldArg value, then click Plus button to save that condition.  
**Note:** Key value in condition can't be modified. It's not allowed to add new conditions.

**ACTION**

Action Type

DEFINE PROPERTIES

**Bypass Filters**

Select

**Properties**

Key	Value	ValidationTypes
* rebootImmediately	true	BOOLEAN

\* - required field

Save

Cancel

Now we have everything configured in the XCONF server side. we can validate in the XConf Firmware test page to see the configurations set.

## Verification using XConf firmware Test page

After creating the Firmware configs and Firmware rules, go to **Firmware->Test page** and give a parameter that will match the one of the rules that you have created. Then matched rule will be displayed like below.

# Firmware Test page

## Parameters

Enter context parameters like estbMac or env/model. Use toggle near plus sign to add predefined capabilities (RCDL, rebootDecoupled, supportsFullHttpUri). Hit 'Test with parameters' button to see results.

eStbMac

B8:27:EB:EE:8C:0B

+

Test With Parameters

## Context

```
{ "eStbMac": "B8:27:EB:EE:8C:0B", "applicationType": "stb", "time": "2023-01-19T13:16:00.000", "ipAddress": "1.1.1.1", "timeZone": "UTC" }
```

## Matched Rule

type:	MAC_RULE
name:	RPI_XCONF_TESTING
id:	5f507f02-f464-4cf8-9b6c-26e653f5f2e9
blocked:	false

eStbMac IN\_LIST RPI\_XCONF\_UPRAGE

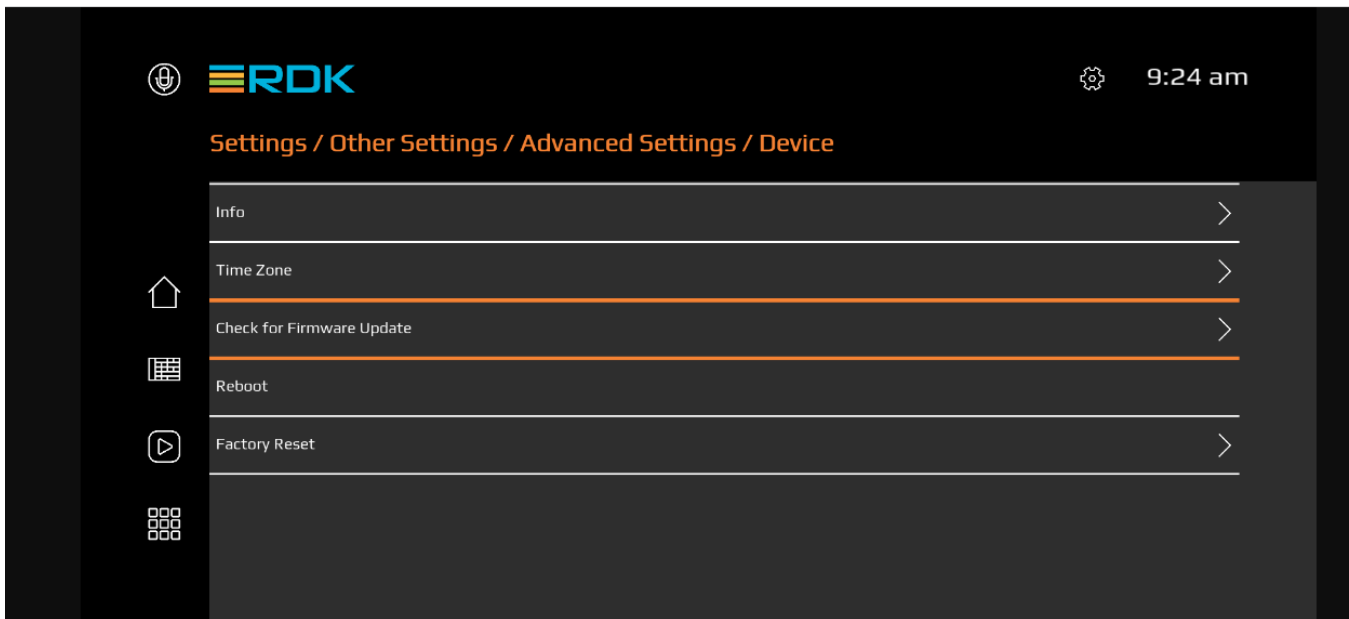
## Firmware Config

description:	RPI xconf testing
id:	d263fd35-5893-4f3f-8a4a-c24301d55ec0
firmwareDownloadProtocol:	http
firmwareFilename:	rdk-generic-ip-stb-client_rdk-next_20230116141625.rootfs.wic
firmwareVersion:	rdk-generic-ip-stb-client_rdk-next_20230116141625
rebootImmediately:	false
supportedModelIds:	["RPI_XCONF_UPGRADE"]

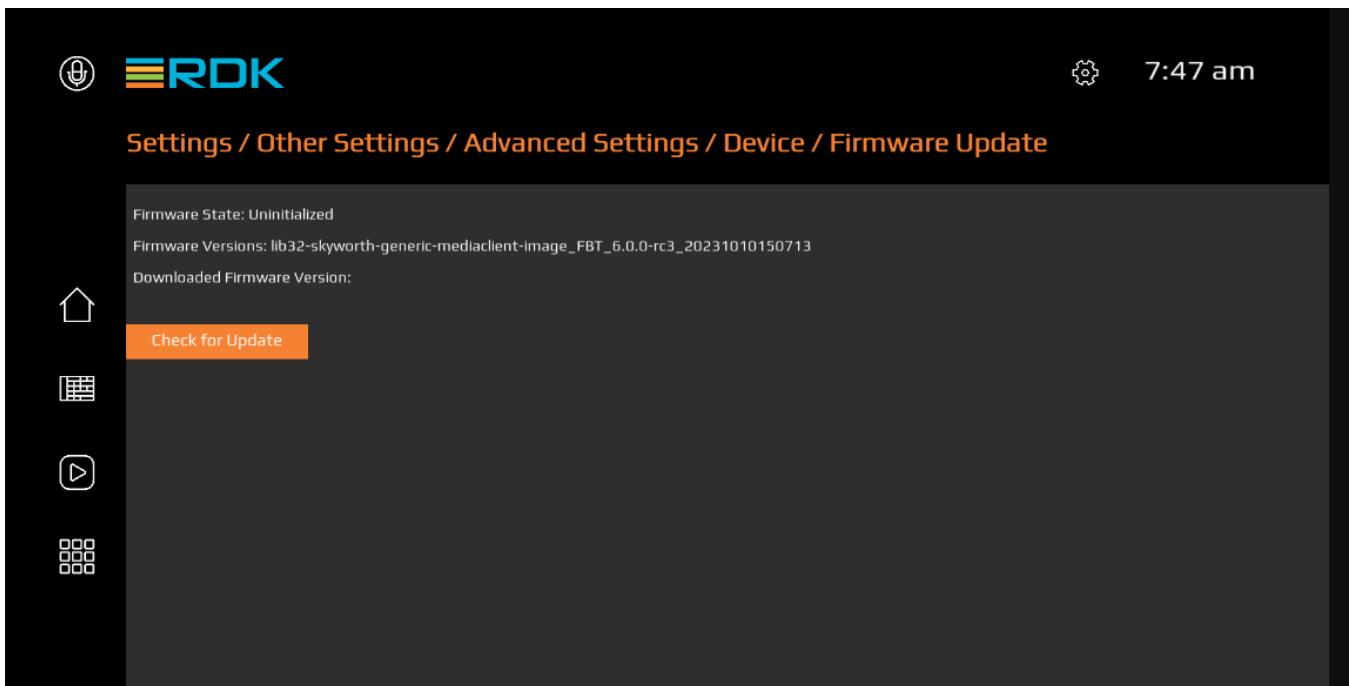
## Applied Filters

# How to perform the Firmware upgrade in STB

RDKUI provides the option to perform the firmware upgrade. User can go to **Settings->Other Settings->Advanced Settings-> Device -> Firmware Update**

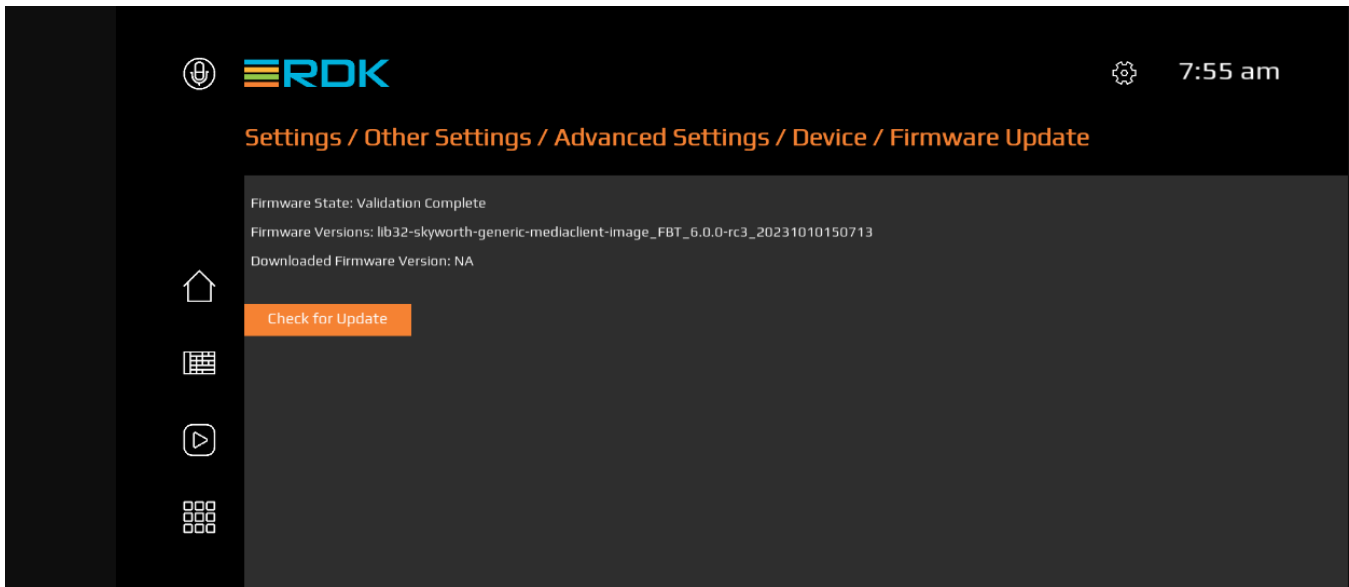


Select **Check for Update**

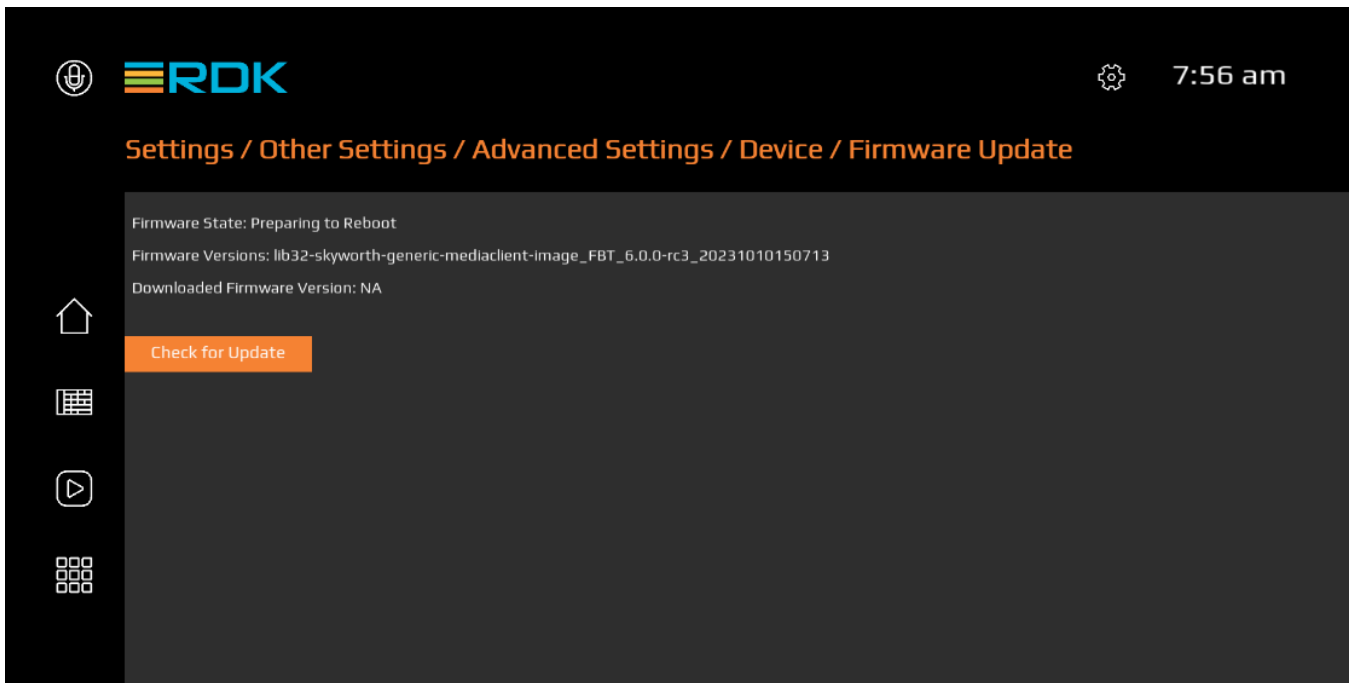


As this being the reference UI, Current implementation is using only the API calls not the Events of plugin and API is invoked only when a page transition is done. So we may need to go to the previous screen's in order to see the transitions

- **State indicates validation is completed**



- State indicates when preparing for reboot



STB will check for upgrade and downloads to the other partition and next time boots up with this image. If reboot immediately filter is set to true in the XConf server, STB will go for immediate reboot once the image write is successful in the other partition.