



*Aprisa* **FE**



# Software Release Notes

Version 1.5.0

July 2015

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## 1. Introduction

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### Introduction

The previous Aprisa FE software version release relevant to this release is:

Software Version	Release Date
1.4.0	16 <sup>th</sup> April 2015

This release of Aprisa FE software is:

Software Version	Release Date
1.5.0	10 <sup>th</sup> July 2015

This document covers the major changes, product enhancements, new functionality, and bug fixes since Aprisa FE software version 1.4.0.

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## 2. Released Files

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### Release Files

The following is a list of files released for Aprisa FE Software Version 1.5.0

File Name	File Type	File Function
asrapp	Upgrade App Code	Used to initiate radio software upgrade
asrboot	Bootloader	Used to initiate radio software startup
asrmain	Application Code	Main radio system software
asrrootfs	Root File System	Catalog of system files
asrver	Version File	Release build version
version.txt	Public Version File	Release information

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### 3. Product Features

The Aprisa FE product release version 1.5.0 has the following features. For more information, see the Aprisa FE User Manual 1.5.0.

<b>Frequency Bands</b>	<p>Four frequency band products software selectable over the entire frequency band:</p> <table border="0"> <tr> <td>UHF 320</td> <td>320-400 MHz</td> </tr> <tr> <td>UHF 400</td> <td>400-470 MHz</td> </tr> <tr> <td>UHF 450</td> <td>450-520 MHz</td> </tr> <tr> <td>UHF 928</td> <td>928-960 MHz</td> </tr> </table>	UHF 320	320-400 MHz	UHF 400	400-470 MHz	UHF 450	450-520 MHz	UHF 928	928-960 MHz
UHF 320	320-400 MHz								
UHF 400	400-470 MHz								
UHF 450	450-520 MHz								
UHF 928	928-960 MHz								
<b>Channel Sizes</b>	Software selectable channel sizes of 12.5 kHz, 25 kHz and 50 kHz.								
<b>Gross Radio Capacity</b>	<p>Maximum gross radio capacity with 12.5 kHz, 25 kHz and 50 kHz channel sizes:</p> <table border="0"> <tr> <td>12.5 kHz</td> <td>60 kbit/s</td> </tr> <tr> <td>25 kHz</td> <td>120 kbit/s</td> </tr> <tr> <td>50 kHz</td> <td>240 kbit/s</td> </tr> </table>	12.5 kHz	60 kbit/s	25 kHz	120 kbit/s	50 kHz	240 kbit/s		
12.5 kHz	60 kbit/s								
25 kHz	120 kbit/s								
50 kHz	240 kbit/s								
<b>RF Operation</b>	Two frequency full duplex transmission mode with internal or external duplexer product options supplied in two depths of chassis.								
<b>Adaptive Coding Modulation and Forward Error Correction</b>	<p>Adaptive Coding Modulation (ACM) which maximizes the use of the RF path to provide the highest radio capacity available.</p> <p>ACM automatically adjusts the modulation coding and FEC code rate of transmission over the defined modulation range based on the signal quality and / or errored packets for each individual remote radio.</p> <p>When the RF path is healthy (no fading), modulation coding is increased and the FEC code rate is decreased to maximize the data capacity.</p> <p>If the RF path quality degrades, modulation coding is decreased and the FEC code rate is increased for maximum robustness to maintain path connectivity.</p> <p>ACM can be disabled and fixed modulations of 64 QAM, 16 QAM or QPSK used with Min / Max FEC per modulation.</p>								
<b>OTA Data Encryption</b>	OTA data encryption using Advanced Encryption Standard (AES) 128, 192 or 256.								
<b>OTA Data Authentication and Integrity</b>	OTA data authentication and data integrity using Cipher Block Chaining Message Authentication Code (CBC-MAC) using Advanced Encryption Standard (AES) 128, 192 or 256.								

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<a href="#">OTA Data Compression</a>	Ethernet payload compression to increase the narrow band radio capacity.
<a href="#">Header Compression</a>	Ethernet header and IP/TCP/UDP ROCH header compression to increase the narrow band radio capacity.
<a href="#">Chassis Options</a>	<p>The standard Aprisa FE chassis has a depth of 300 mm and can mount the 320 MHz and 400 MHz duplexers externally.</p> <p>The full depth Aprisa FE chassis has a depth of 440 mm and can accommodate the 320 MHz and 400 MHz duplexers internally.</p>
<a href="#">Ethernet Data Interface Ports</a>	Four Ethernet interface ports.
<a href="#">L3 Router Mode</a>	L3 Router mode with standard static IP route for simple routing network integration.
<a href="#">L2 Bridge Mode</a>	L2 Bridge mode with VLAN aware for standard Industrial LAN integration.
<a href="#">VLAN Support</a>	IEEE 802.1Q VLAN support with single and double VLAN tagged and add/remove VLAN manipulation to adapt to the appropriate RTU / PLCs.
<a href="#">QoS Support</a>	QoS support using IEEE 802.1p VLAN priority bits to prioritize and handle the VLAN / traffic types.
<a href="#">L2/3/4 Filtering</a>	L2/3/4 filtering for blocking security attacks and blocking unwanted traffic avoiding narrow band radio network overload.
<a href="#">Hardware Alarm Inputs / Outputs</a>	Two hardware alarm inputs and two hardware alarm outputs mappable to any radio alarm event.
<a href="#">SCADA Protocol Support</a>	Transparent to all common SCADA protocols; e.g. Modbus, IEC 60870-5-101/104, DNP3 or similar.
<a href="#">SuperVisor Web Management</a>	SuperVisor web management support for element management.

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[Secure  
SuperVisor](#)

HTTPS secure SuperVisor web access management using SSL secure protocol.

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[SNMP and NMS](#)

SNMPv1/2/3 MIB supports for 4RF NMS SNMP manager or third party NMS SNMP agent network management.

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[SNMP Security](#)

SNMPv1/2/3 encryption and authentication using HMAC-MD5 or HMAC-SHA for secure NMS / SNMP access and management transactions.

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[SNTP](#)

Simple Network Time Protocol (SNTP) for accurate wide radio network time and date.

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[Alarm and Event  
Parameter  
Logging](#)

Alarm event parameters can be configured for all alarm events. All active alarms for configured alarm events will be displayed on the SuperVisor Parameters page. The last 1500 events are stored in the radio and the complete event list can be downloaded to flash drive via the radio USB host port.

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[Software  
Upgrades](#)

Over-the-air software distribution and upgrades.

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### Multiple Management Session Detection

A 'Multiple Management Sessions popup' to show if there is more than one user logged into the same radio.

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### Frequency Tracking

A 'Frequency Tracking' setting which enables the receiver to track any frequency drift in the transmitter to maintain optimum SNR and radio link performance over the full temperature range.

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### QoS using Traffic Priority and Traffic Classification

Enhanced QoS (Quality of Service) mechanism to allow users to prioritize traffic per port, packet, protocol, and application etc. using most of the L2/3/4 header fields. To implement this, the radio supports the following QoS capabilities:

- VLAN and IP Traffic Priority mapping - to allow different priority schemes between corporate and radio networks with different network capacities. The radio provides:
  - Priority mapping between external / corporate VLAN priority (per IEEE 802.1p) networks and the radio internal priority network in bridge mode.
  - Priority mapping between external / corporate IP DSCP priority (DiffServ Code Point, per RFC 2474/5) networks and the radio internal priority network in router mode.
- Traffic Classification profiles are based on classification rules. A profile can be set to a particular VLAN ID and CoS / priority or only to CoS / priority to provide the appropriate QoS treatment. Each profile can be related a specific traffic type, protocol or application in the radio network.

For example SCADA traffic, management traffic, FTP traffic, each can have its own profile built with a set of classification rules. A profile can be built using multiple classification rules such as: port, VLAN ID, DSCP, MAC/IP address, TCP/UDP port to identify and classify the specific traffic type in order to provide the appropriate QoS treatment.

The radio supports traffic classification profiles / rules for both bridge and router modes.

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### Diagnostics and Performance Monitoring

Diagnostic and performance monitoring parameters to support a major subset of RMON I (per RFC 2819) performance monitoring parameters on a per port basis. A subset of RMON II (RFC 4502) has been added to bridge mode using the L2 MAC address learning / aging table and the ARP table, in addition to the existing routing table in router mode.

The Monitored Parameters has menu level items of:

- Monitoring > Terminal
- Monitoring > Ethernet
- Monitoring > Radio
- Monitoring > User Selected
- Monitoring > TCP Connections
- Monitoring > Routing Table
- Monitoring > Address Tables

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### File Transfer For Configuration Settings And Log Files

File transfer save to and restore from PC or USB flash drive of configuration and log files.

SuperVisor > Maintenance > Advanced contains a Maintenance Files section which can save / restore to / from PC or USB flash drive the following file types:

- Configuration Settings
- Event History Log
- Configuration Script

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### Scheduled Software Activation

Scheduled software upgrade activation with two types of activation methods for base / master station activation and for all remote stations:

- Now
- Date and Time

The radio SNMP management interface supports the management of the scheduled software activation via the existing SWMANAGER-MIB interface.

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### SNMPv3 Authentication Passphrase

SNMP management interface support for SNMPv3 Authentication Passphrase change via the SNMPv3 secure management protocol (not via SuperVisor).

When viewing / managing the details of the users via SNMPv3, the standard SNMP-USER-BASED-SM-MIB interface is used. This interface can be used to change the SNMPv3 Authentication Passphrase of the users.

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### SNMPv3 Context Addressing

SNMP management interface support for SNMPv3 Context Addressing.

The SNMPv3 context addressing allows the user to use a secure SNMPv3 management while boosting the NMS performance when using the SNMPv3 context addressing.

A NMS (Network Management System) can access any remote radio directly by using its IP address or via base / master station SNMPv3 context addressing. The SNMPv3 context addressing can compress the SNMPv3 management traffic OTA (Over The Air) to remote station up to 90% relative to direct OTA SNMPv3 access to remote station, avoiding the radio narrow bandwidth traffic loading.

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### Gateway Router Mode / New Router Mode

The existing Ethernet Operating Mode of 'Router Mode' name has been changed to 'Gateway Router Mode'. In this mode, the Ethernet interfaces have the same IP address.

A new mode 'Router Mode' has been added. In this mode, each Ethernet interface has a different IP address and subnet. See Aprisa SR+ User Manual 1.5.0 for more details.

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### New Monitored Parameter History Log

Trends logging history for Monitored Parameter data in tabular form.

Monitored parameter data is accumulated into 2 sets:

- 15 minutes of data, for 96 readings for the last 24 hours
  - 24 hours of data, for 31 readings for the last 31 days.
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<a href="#">Enhanced Full Duplex Repeater MAC Scheme</a>	<p>Full Duplex MAC scheme for repeater configurations operating to a full duplex base station which allows packets to start repeater egress before the entire packet has been received into the repeater.</p> <p>This scheme reduces latency on long packets through a repeater and improves performance in Overlapping Coverage mode.</p>
<a href="#">Enhanced Network and Repeater Segmentation</a>	<p>The network segmentation feature improves the network performance in repeater overlapping coverage mode.</p> <p>To allow this new MAC scheme to operate, two new RF Network Detail parameters have been added; Base Station ID and Repeater Network Segment ID.</p> <p>The base station ID setting must be the same for all radio in a network.</p> <p>The repeater segment ID uses different values per repeater branch (and it's related remotes) in order to segregate between repeater branches and their respective remote radios thus avoiding the overlapping coverage of remote radios seeing two repeaters or base stations, thus significantly improving network performance.</p>
<a href="#">New Enhanced Noise Rejection Mode</a>	<p>Enhanced Noise Rejection Mode which improves co-channel interference performance at strong receiver signal levels. Both radios must use the same setting i.e. enabled or disabled.</p>
<a href="#">RADIUS Security</a>	<p>RADIUS security to provide centralized Authentication, Authorization, and Accounting management for users.</p>
<a href="#">Managing User Accounts by SNMP</a>	<p>Managing user accounts via SNMPv1/2/3 is now available in addition to the SuperVisor web manager. The following capabilities can now be controlled via the Aprisa FE SNMP interface:</p> <ul style="list-style-type: none"><li>• Creating a new user (user name, password and user privilege)</li><li>• Editing the details of a current user: User Password and User Privilege (user group)</li><li>• Deleting a current user</li></ul> <p>Note: for security reasons, it is recommended for the user to select under the 'security &gt; setup' the 'protocol security setting' section the SNMPv3 with authentication and/or encryption setting in order to avoid insecure access with SNMPv1/v2 that can allow any unauthorized user to create, delete or edit user accounts.</p>
<a href="#">Enhanced HTTPS Certification Using ECC 256 Key</a>	<p>A HTTPS website's certificate provides identification of the web server. The Aprisa SR+ HTTPS web server certificate was using RSA 1024 key, which will no longer be supported by most web browsers, so has been replaced by ECC 256 key.</p> <p>ECC 256 key is faster and more efficient, creating stronger keys with a shorter key than RSA (RSA 3072 key equivalent).</p> <p>Note: HTTPS over Internet Explorer (IE) on Windows XP will no longer work (XP doesn't support ECC 256 key). IE on windows OS newer than XP will work fine.</p>

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## 4. Software Enhancements

### 4.1. Major Enhancements

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None

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### 4.2. Minor Enhancements

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None

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## 5. Software Bug Fixes

### 5.1. Major Bug Fixes

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None

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### 5.2. Minor Bug Fixes

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#### [RADIUS Parameter Change Bug](#)

Previously, if the RADIUS accounting server parameters were changed, intermittently RADIUS accounting was disabled.

This problem has been corrected in software version 1.5.0.  
Issue #3834

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#### [RADIUS Acct- Delay-Time Value Bug](#)

Previously, the RADIUS Acct-Delay-Time value was always '0' in the second packet request sent. The Acct-Delay-Time is the number of seconds that have passed between the event and the current attempt to send the record.

This problem has been corrected in software version 1.5.0.  
Issue #3828

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#### [Ping Response Following a Reboot Bug](#)

Previously, following a remote radio reboot, pings were not responded to until after a few minutes. This problem was caused by ARP table resolution.

This problem has been corrected in software version 1.5.0.  
Issue #3810

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#### [Ping Causing Remote Radio Reboot Bug](#)

Previously, continuous pings to the remote radio intermittently caused the remote radio to reboot. This problem was caused by a memory corruption bug from fragmented IP packets.

This problem has been corrected in software version 1.5.0.  
Issue #3769

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## 6. Radio Software Upgrade

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### Upgrade Type

A software upgrade can be performed on a single Aprisa FE radio or an Aprisa FE link.

If you have an existing Aprisa FE link, follow the procedure 'Link Software Upgrade'.

If you have a single Aprisa FE radio requiring upgrade, follow the procedure 'Single Radio Upgrade'.

See the Aprisa FE User Manual 1.5.0 for more information.

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## 6.1. Link Software Upgrade

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### File Transfer Method

This process allows customers to upgrade an Aprisa FE link from the local radio location without the need for visiting the remote site.

The Software Pack is loaded into the local radio with the file transfer process and distributed via the radio link to the remote radio.

When the remote radio receives the Software Pack version, the software can be remotely activated on the remote radio.

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### Process Steps

1. Unzip the software pack in to the root directory of a USB flash drive.
  2. Insert the USB flash drive into the host port .
  3. Using File Transfer, load the software pack into the local radio (see SuperVisor > Software > File Transfer).
  4. Remove the USB flash drive from the host port .
  5. Distribute the software to the remote radio (see SuperVisor > Software > Remote Distribution).
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**Note:** The distribution of software to the remote radio does not stop customer traffic from being transferred. However, due to the volume of traffic, the software distribution process may affect customer traffic.

Software distribution traffic is classified as ‘management traffic’ but does not use the Ethernet management priority setting. Software distribution traffic priority has a fixed priority setting of ‘very low’.

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6. Activate the software on the remote radio (see SuperVisor > Software > Remote Activation).
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**Note:** When the new software activates on the remote radio, all link communication from the local radio to the remote radio will be lost. The local radio will attempt to re-establish connectivity to the remote radio for the new version verification but this will fail. However, when the new software activates on the remote radio, the remote radio will reboot automatically and link communication will restore when the local radio software is activated.

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When the Remote Activation process gets to the ‘Remote Radios On New Version’ step, don’t wait for this to complete but proceed to step 7

7. Activate the software on the local radio (see SuperVisor > Software > Manager).
  8. When the local radio restarts with the new software, rediscover the nodes (see SuperVisor > Maintenance > Advanced > Discover Nodes).
  9. Check that the remote radio is now running on the new software (see SuperVisor > Remote > Software > Summary).
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## 6.2. Single Radio Upgrade

### 6.2.1. Single Radio Upgrade File Transfer Method

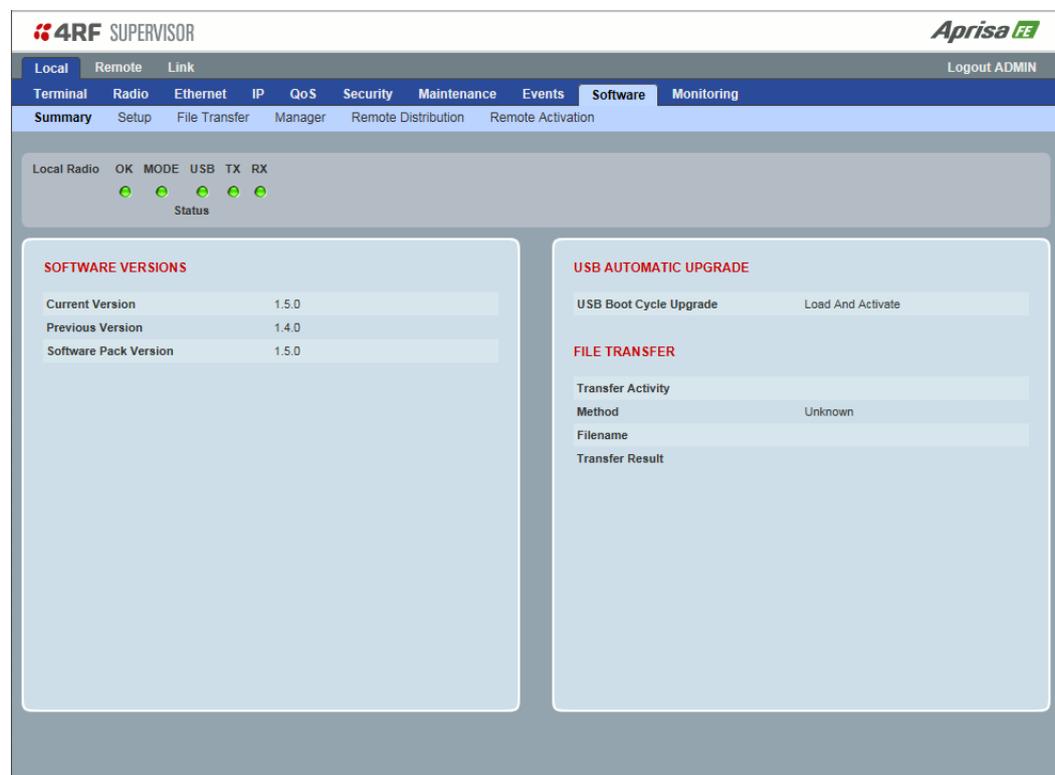
#### File Transfer Method

This process allows customers to upgrade a single Aprisa FE radio.

The Software Pack is loaded into the radio with the file transfer process and activated.

#### Process Steps

1. Unzip the software pack in to the root directory of a USB flash drive.
2. Insert the USB flash drive into the host port .
3. Using File Transfer, load the software pack into the radio (see SuperVisor > Software > File Transfer).
4. Remove the USB flash drive from the host port .
5. Activate the software on the radio (see SuperVisor > Software > Manager). This can take up to a few minutes.
6. The new software version can be verified with SuperVisor > Software > Summary Current Version.



**4RF SUPERVISOR** **Aprisa FE**

Local Remote Link Logout ADMIN

Terminal Radio Ethernet IP QoS Security Maintenance Events **Software** Monitoring

Summary Setup File Transfer Manager Remote Distribution Remote Activation

Local Radio OK MODE USB TX RX  
  
 Status

SOFTWARE VERSIONS	
Current Version	1.5.0
Previous Version	1.4.0
Software Pack Version	1.5.0

**USB AUTOMATIC UPGRADE**

USB Boot Cycle Upgrade

**FILE TRANSFER**

Transfer Activity

Method

Filename

Transfer Result

#### Upgrade Did Not Start

If the upgrade process did not start, the Aprisa FE could already be operating on the version of software on the USB flash drive. This will be indicated by flashing display panel OK LED and then the OK, MODE and USB will light steady green.

If any display panel LED flashes red or is steady red during the upgrade process, it indicates that the upgrade has failed. This could be caused by incorrect files on the USB flash drive or a radio hardware failure.

## 6.2.2. Single Radio Upgrade Boot Method

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### Method

The Aprisa FE radio software is upgraded simply by plugging a USB flash drive containing the new software into the USB A host port  on the Aprisa FE front panel and power cycling the radio.

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### Procedure

To minimize disruption of link traffic and prevent your radios from being rendered inoperative, please follow the procedures described in this section together with any additional information or instructions supplied with the upgrade package.

The radio software must be identical on both radios in the Aprisa FE link.

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### Process Steps

1. Check that the SuperVisor USB Boot Upgrade setting is set to 'Load and Activate' (see SuperVisor > Software > Setup).
  2. Unzip the software release files in to the root directory of a USB flash drive.
  3. Power off the Aprisa FE and insert the USB flash drive into the host port .
  4. Power on the Aprisa FE.
  5. The software upgrade process is complete when the OK LED flashes green. This can take about 2 minutes.
  6. Remove the USB flash drive from the host port .
  7. Power cycle the Aprisa FE.
- 

### Upgrade Did Not Start

If the USB boot upgrade process did not start, the Aprisa FE could already be operating on the version of software on the USB flash drive. This will be indicated by flashing display panel OK LED and then the OK, MODE and USB will light steady green.

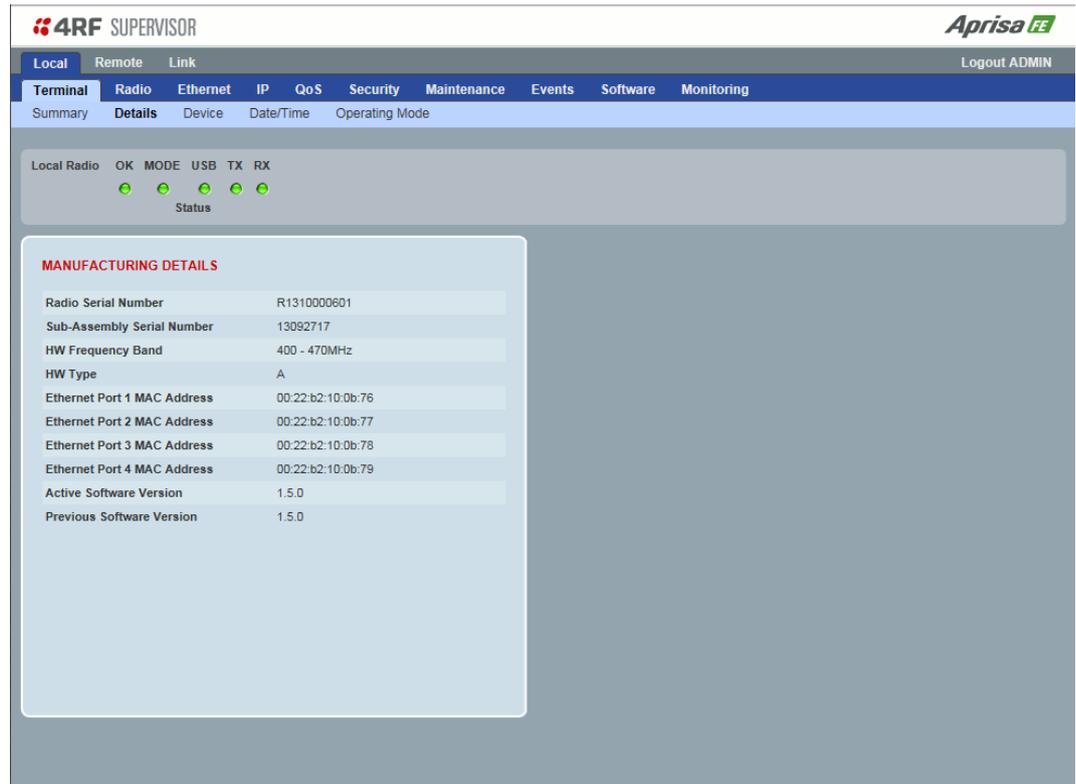
If any display panel LED flashes red or is steady red during the upgrade process, it indicates that the upgrade has failed. This could be caused by incorrect files on the USB flash drive or a radio hardware failure.

Check that the SuperVisor USB Boot Upgrade setting is set to 'Load and Activate'.



Check the Result

Login in to SuperVisor and select Terminal > Details to view the Active and Previous software versions.



The screenshot shows the 4RF SUPERVISOR web interface. At the top, there is a navigation bar with tabs for Local, Remote, and Link. Below this is a menu with options: Terminal, Radio, Ethernet, IP, QoS, Security, Maintenance, Events, Software, and Monitoring. Under the Terminal tab, there are sub-tabs: Summary, Details, Device, Date/Time, and Operating Mode. The main content area displays the status of a Local Radio with indicators for OK, MODE, USB, TX, and RX, all of which are green. Below this is a 'MANUFACTURING DETAILS' section with a table of information.

MANUFACTURING DETAILS	
Radio Serial Number	R1310000601
Sub-Assembly Serial Number	13092717
HW Frequency Band	400 - 470MHz
HW Type	A
Ethernet Port 1 MAC Address	00:22:b2:10:0b:76
Ethernet Port 2 MAC Address	00:22:b2:10:0b:77
Ethernet Port 3 MAC Address	00:22:b2:10:0b:78
Ethernet Port 4 MAC Address	00:22:b2:10:0b:79
Active Software Version	1.5.0
Previous Software Version	1.5.0