



Aprisa **SR+**



Software Release Notes

Version 1.2.6

July 2014

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1. Introduction

This release note details the functionality and key features supported in this 1.2.6 release.

Introduction

The previous Aprisa SR+ software version release relevant to this release is:

Software Version	Release Date
1.2.5	16 th May 2014

This release of Aprisa SR+ software is:

Software Version	Release Date
1.2.6	8 th July 2014

This document covers the major changes, product enhancements, new functionality, and bug fixes since Aprisa SR+ software version 1.2.5.

2. Released Files

Release Files

The following is a list of files released for Aprisa SR+ Software Version 1.2.6

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

3. Product Features

The Aprisa SR+ product release version 1.2.6 has the following features. For more information, see the Aprisa SR+ User Manual 1.2.6.

Frequency Bands

Five frequency band products software selectable over the entire frequency band:

VHF 220	215-240 MHz	FCC / IC compliance
UHF 320	320-400 MHz	ETSI compliance
UHF 400	400-470 MHz	ETSI / FCC / IC compliance
UHF 450	450-520 MHz	ETSI / FCC compliance
UHF 928	928-960 MHz	FCC / IC compliance

Channel Sizes

Software selectable channel sizes of 12.5, 25 kHz and 50 kHz.

Gross Radio Capacity

Maximum gross radio capacity with 12.5 kHz and 25 kHz channel sizes:

12.5 kHz	60 kbit/s (ETSI)
25 kHz	120 kbit/s (ETSI)

Software selectable channel size of 50 kHz for 220 / 928 MHz FCC / IC bands and 320 MHz ETSI band for Austria.

The maximum gross radio capacity for a 50 kHz channel size is:

ETSI	240 kbit/s (320 MHz band for Austria)
FCC / IC	216 kbit/s

Compliance

ETSI compliance for the 320 MHz band
 ETSI / FCC / IC compliance for the 400 MHz band.
 FCC / IC compliance for the 220 MHz band
 FCC compliance for the 928 MHz band part 101.
 Also RoHS, WEEE and HazLoc class 1 div 2.

Operating Mode

Operating modes of base, base-repeater, repeater and remote stations.

RF Operation

One or two frequency half duplex RF operation which eliminates the need for external duplexers. With the dual antenna port option, an external duplexer can be used for filtering.

Channel Access Modes

Channel access modes of Access Request (AR) and Listen Before Send (LBS) / CSMA for radio channel management.

AR channel access has higher channel efficiency than LBS in a spontaneous message scheme (report by exception).

MHSB 1+1 Protected Station

The Aprisa SR+ 1+1 MHSB Protected Station (PS) supports:

- Operating modes of Base, Base-repeater, Repeater and Remote station
 - Protection types of Monitored Hot-standby and redundant
 - Ethernet / IP mode: Bridge or Router modes both with Virtual IP support for smooth fail switchover
 - Multiple Antenna and Duplexer options: single antenna with / without a duplexer and dual antenna with / without a duplexer (dual or single TNC port)
 - Active and standby RF ports monitored in 'monitor hot-standby' protection type
-

Adaptive Coding Modulation and Forward Error Correction

Adaptive Coding Modulation (ACM) which maximizes the use of the RF path to provide the highest radio capacity available.

ACM automatically adjusts the modulation coding and FEC code rate in the remote to base direction of transmission over the defined modulation range based on the signal quality and / or errored packets for each individual remote radio.

When the RF path is healthy (no fading), modulation coding is increased and the FEC code rate is decreased to maximize the data capacity.

If the RF path quality degrades, modulation coding is decreased and the FEC code rate is increased for maximum robustness to maintain path connectivity.

ACM can be disabled and fixed modulations of 64 QAM, 16 QAM or QPSK used with Min / Max FEC per modulation.

OTA Data Encryption

OTA data encryption using Advanced Encryption Standard (AES) 128, 192 or 256.

OTA Data Authentication

OTA data authentication and data integrity using Cipher Block Chaining Message Authentication Code (CBC-MAC) using Advanced Encryption Standard (AES) 128, 192 or 256.

OTA Data Compression

Ethernet and serial payload compression to increase the narrow band radio capacity.

KEK

Enhanced Key Encryption Key (KEK) based on RFC 3394, for secure Over The Air Re-keying (OTAR) of encryption keys

Header Compression

Ethernet header and IP/TCP/UDP ROHC header compression to increase the narrow band radio capacity.

Antenna Port Options

Software selectable dual / single antenna port options (dual antenna port for external duplexers or filters using dual frequency).

Data Interface Port Options	<p>Multiple data interface port options for combinations of Ethernet and RS-232 serial for a total of four interface ports i.e. port options of 2E2S, 3E1S or 4E0S, where E=Ethernet, S=Serial port.</p> <p>Optional: Additional RS-232 / RS-485 port via USB converter.</p>
Pseudo Peer to Peer	<p>Pseudo peer to peer communication between remote stations through base-repeater or repeater stations.</p>
Terminal Server	<p>Terminal server operation for transporting RS-232 / RS-485 traffic over IP or Ethernet.</p>
L3 Router Mode	<p>L3 Router mode with standard static IP route for simple routing network integration.</p>
L2 Bridge Mode	<p>L2 Bridge mode with VLAN aware for standard Industrial LAN integration.</p>
VLAN Support	<p>IEEE 802.1Q VLAN support with single and double VLAN tagged and add/remove VLAN manipulation to adapt to the appropriate RTU / PLCs.</p>
QoS Support	<p>QoS support using IEEE 802.1p VLAN priority bits to prioritize and handle the VLAN / traffic types.</p>
L2/3/4 Filtering	<p>L2/3/4 filtering for blocking security attacks and blocking unwanted traffic avoiding narrow band radio network overload.</p>
Hardware Alarm Inputs / Outputs	<p>Two hardware alarm inputs and two hardware alarm outputs mappable to any radio alarm event.</p>
SCADA Protocol Support	<p>Transparent to all common SCADA protocols; e.g. Modbus, IEC 60870-5-101/104, DNP3 or similar.</p>
SuperVisor Web Management	<p>SuperVisor web management support for element and sub-network (base-repeater-remotes) management.</p>
Secure SuperVisor	<p>HTTPS secure SuperVisor web access management using SSL secure protocol.</p>

SNMP and NMS	SNMPv1/2/3 MIB supports for 4RF NMS SNMP manager or third party NMS SNMP agent network management.
SNMP Security	SNMPv1/2/3 encryption and authentication using HMAC-MD5 or HMAC-SHA for secure NMS / SNMP access and management transactions.
SNTP	Simple Network Time Protocol (SNTP) for accurate wide radio network time and date.
Multi Repeater	Multi repeater, where the Network Radius = 1 (i.e. the multi repeater is in the first hop from the base station) in AR and LBS channel access mode.
Daisy Chain	Daisy chain used for daisy chain repeaters when remote stations are very far from base station coverage. Daisy chain repeaters can only be used in LBS channel access mode.
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.
Software Upgrades	Over-the-air software distribution and upgrades.
Multiple Management Session Detection	A 'Multiple Management Sessions popup' to show if there is more than one user logged into the same radio.
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.

4. Software Enhancements

4.1. Major Enhancements

MAC Performance Improvement

The implementation of the Access Request Media Access Control (MAC) has been improved to provide increased throughput and efficiency in the base to remote direction of traffic.

4.2. Minor Enhancements

Modem Mode

The SuperVisor > Radio > Radio Setup Modem Mode definitions have been changed in software version 1.2.6.

The Modem Mode option list is dependent on the radio Hardware Variant purchased:

HW Variant	Option	Channel Sizes
136 MHz	Mode A (FCC / IC)	15 and 30 kHz
	Mode B (ETSI)	12.5 and 25 kHz
220 MHz	Mode A (FCC / IC)	12.5, 15, 25 and 50 kHz
320 MHz	Mode A (ETSI / ACMA)	12.5, 20, 25 and 50 kHz
400 MHz	Mode A (ETSI / ACMA)	12.5, 20 and 25 kHz
	Mode B (FCC / IC)	12.5 and 25 kHz
450 MHz	Mode A (ETSI / ACMA)	12.5 and 25 kHz
	Mode B (FCC)	12.5 and 25 kHz
896 MHz	Mode A (FCC / IC)	12.5, 25 and 50 kHz
	Mode B (FCC Part 24)	12.5, 25 and 50 kHz
	Mode C (IC RSS-134)	12.5, 25 and 50 kHz
928 MHz	Mode A (FCC)	12.5, 25 and 50 kHz
	Mode B (IC)	12.5, 25 and 50 kHz
	Mode C (FCC Part 24)	12.5, 25 and 50 kHz
	Mode D (IC RSS-134)	12.5, 25 and 50 kHz

5. Hardware Enhancements

5.1. Major Enhancements

None

5.2. Minor Enhancements

None

6. Known Issues

None

7. Software Bug Fixes

7.1. Major Bug Fixes

None

7.2. Minor Bug Fixes

Monitored Parameter Not Indicating

Previously, the 'Last Sample RX CRC Error' monitored parameter did not indicate RX CRC errors correctly.

In software version 1.2.6, this bug has been corrected.

Issue # 3277

Alarms Not Being Raised

Previously, the 'RSSI threshold', 'Rx CRC errors' and 'RF no receive data' were not raised when configured as alarm events using SuperVisor > Events > Events Setup.

In software version 1.2.6, this bug has been corrected.

Issue # 3272

[Login Password Bug](#)

Previously, SuperVisor login passwords containing a '+' or a '%' could be setup without error but when a user attempted to login with that password, SuperVisor responded with an 'Invalid credentials' message.

In software version 1.2.6, this bug has been corrected.

A password can be 8 to 32 printable characters but cannot contain a tab.

Issue # 3266

8. Radio Software Upgrade

Upgrade Type

A software upgrade can be performed on a single radio or an entire Aprisa SR+ network. If you have an existing network of Aprisa SR+ radios, follow the procedure 'Network Software Upgrade'.

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

See the Aprisa SR+ User Manual 1.2.6 for more information.

8.1. Network Software Upgrade

File Transfer Method

This process allows customers to upgrade their Aprisa SR+ network from the central base station location without the need for visiting remote sites.

The Software Pack is loaded into the base station with the file transfer process and distributed via the radio link to all remote stations.

When all remote stations receive the Software Pack version, the software can be remotely activated on all remote stations.

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 base station (see SuperVisor > Software > File Transfer).
 4. Remove the USB flash drive from the Host Port .
 5. Distribute the software to the entire network of remote radios (see SuperVisor > Software > Remote Distribution).
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Note: The distribution of software to remote stations 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'.

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

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 base station radio (see SuperVisor > Software > Manager).
 8. When the base station restarts with the new software, rediscover the nodes (see SuperVisor > Maintenance > Advanced > Discover Nodes).
 9. Check that all remote radios are now running on the new software (see SuperVisor > Network Table).
-

8.2. Single Radio Upgrade

8.2.1. Single Radio Upgrade File Transfer Method

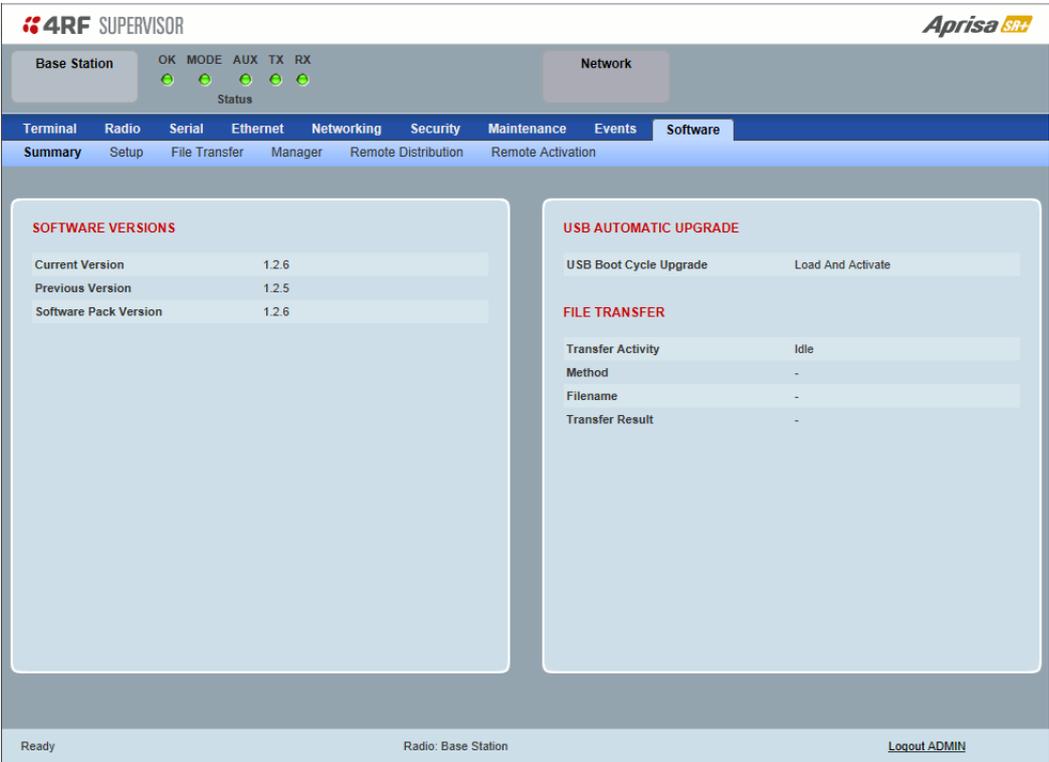
File Transfer Method

This process allows customers to upgrade a single Aprisa SR+ 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 verified with SuperVisor > Software > Summary Current Version.



The screenshot shows the 4RF SUPERVISOR web interface for an Aprisa SR+ radio. The top navigation bar includes 'Terminal', 'Radio', 'Serial', 'Ethernet', 'Networking', 'Security', 'Maintenance', 'Events', and 'Software'. The 'Software' section is selected, showing a sub-menu with 'Summary', 'Setup', 'File Transfer', 'Manager', 'Remote Distribution', and 'Remote Activation'. The main content area is divided into two panels. The left panel, titled 'SOFTWARE VERSIONS', displays a table with the following data:

Version Type	Version
Current Version	1.2.6
Previous Version	1.2.5
Software Pack Version	1.2.6

The right panel, titled 'FILE TRANSFER', shows a table with the following data:

Transfer Activity	Status
Method	-
Filename	-
Transfer Result	-

At the bottom of the interface, there is a status bar with 'Ready', 'Radio: Base Station', and a 'Logout ADMIN' link.

Upgrade Did Not Start

If the upgrade process did not start, the Aprisa SR+ 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 AUX 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.

8.2.2. Single Radio Upgrade Boot Method

Method

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

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 all radios in the Aprisa SR+ network.

Process Steps

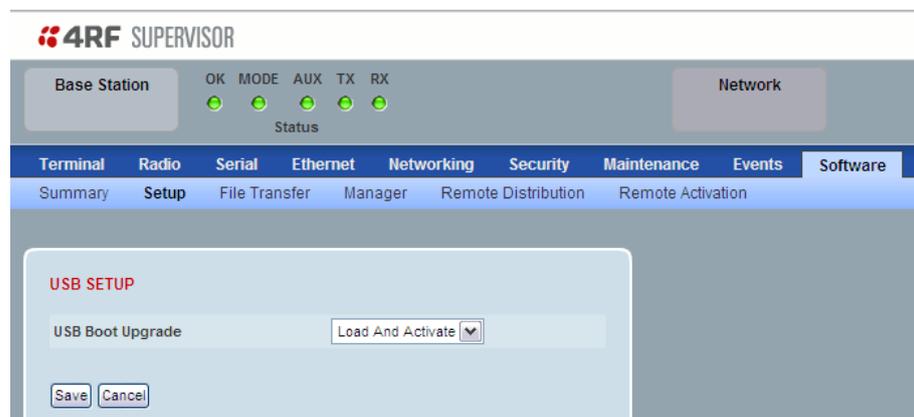
1. Check that the SuperVisor USB Boot Upgrade setting is set to 'Load and Activate' (see SuperVisor > Software > Setup).
2. Unzip the software release files in to the root directory of a USB flash drive.
3. Power off the Aprisa SR+ and insert the USB flash drive into the Host Port .
4. Power on the Aprisa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

Upgrade Did Not Start

If the USB boot upgrade process did not start, the Aprisa SR+ 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 AUX will light steady green.

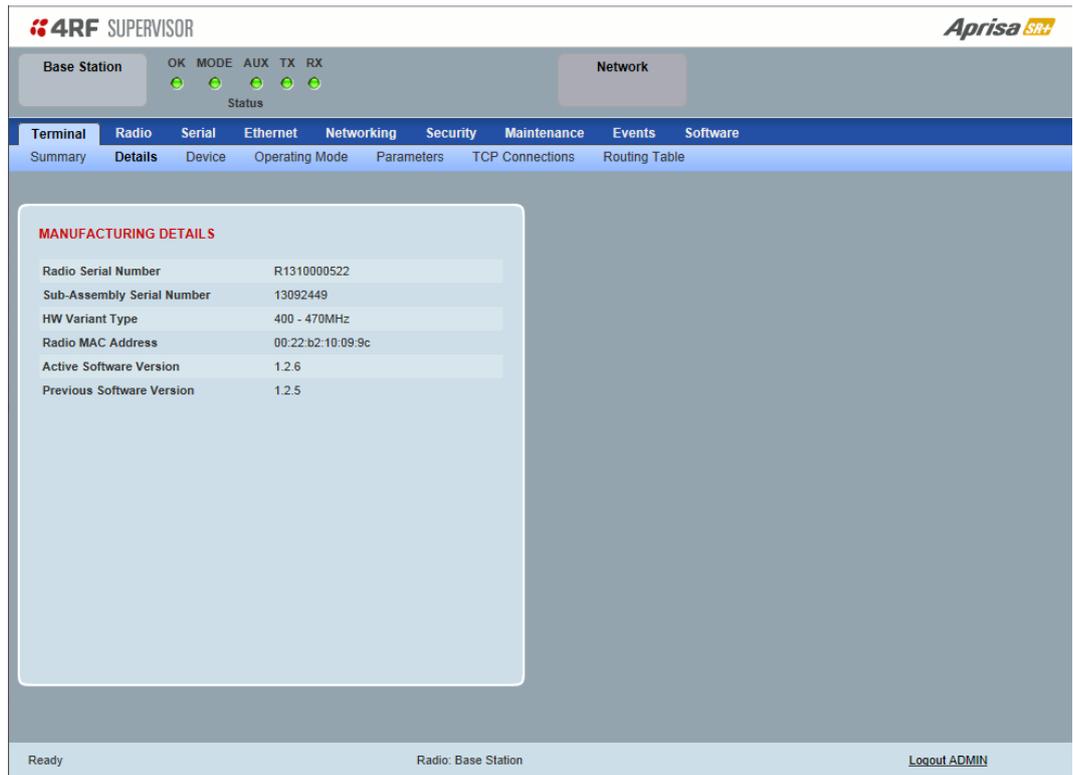
If any display panel LED flashes red or is steady red during the upgrade process, it indicates that the upgrade has failed. This could be caused by incorrect files on the USB flash drive or a radio hardware failure.

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 displays the 4RF SUPERVISOR web interface. At the top left, the '4RF SUPERVISOR' logo is visible. To its right, the 'Aprisa SR+' logo is present. Below the logos, there is a status bar with 'Base Station' and 'Network' buttons. The 'Base Station' button is active, and below it, five green indicator lights are shown, labeled 'OK', 'MODE', 'AUX', 'TX', and 'RX'. The 'Status' label is centered below these lights. A navigation menu is located below the status bar, with 'Terminal' selected. Under 'Terminal', there are sub-menus: 'Summary', 'Details', 'Device', 'Operating Mode', 'Parameters', 'TCP Connections', and 'Routing Table'. The 'Details' sub-menu is active. The main content area shows 'MANUFACTURING DETAILS' in red text. Below this, a table lists the following information:

Radio Serial Number	R1310000522
Sub-Assembly Serial Number	13092449
HW Variant Type	400 - 470MHz
Radio MAC Address	00:22:b2:10:09:9c
Active Software Version	1.2.6
Previous Software Version	1.2.5

At the bottom of the interface, there is a status bar with 'Ready' on the left, 'Radio: Base Station' in the center, and a 'Logout ADMIN' link on the right.