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# **RAM-9000 Cellular RTU Series IndustrialPro™ Routers (SN and RAM Series)**

Release Notes  
Through Version 3.22 / 4.22

October 2015

# IndustrialPro™ Routers (SN/RAM Series)

## Release Notes

### CHANGE HISTORY

Version	Date	Description
3.22	October 14, 2015	Release 3.22
3.21	July 15, 2015	Release 3.21
3.20	February 17, 2015	Release 3.20
3.19	December 2, 2014	Release 3.19 – Added Note 3 in regards to SVM firmware updates
3.19	October 20, 2014	Release 3.19
3.18	July 29, 2014	Release 3.18
3.17	April 21, 2014	Release 3.17
3.16	January 31, 2014	Release 3.16
3.14	July 2, 2013	Release 3.14 – Recommended Stable for EnterprisePro
3.13	December 20, 2012	Release 3.13
3.12	October 16, 2012	Release 3.12
3.11	June 22, 2012	Release 3.11
3.10	January 13, 2012	Release 3.10
3.09	June 24, 2011	Release 3.09
3.08	March 16, 2011	Release 3.08
3.07	January 11, 2011	Release 3.07
3.06	October 12, 2010	Release 3.06
3.05	October 5, 2010	Release 3.05
3.04	May 8, 2010	Release 3.04 – Pre Release

Note: Version 4.xx image filenames contain “g25” and are intended for LTE units only. Please refer to the Reflashing Guide for additional information.

Version	Date	Description
4.22	October 14, 2015	SN/RAM Release 4.22 – LTE / G25 / RAM9K and Wi-Fi
4.21	July 15, 2015	SN/RAM Release 4.21 – LTE / G25 / RAM9K and Wi-Fi
4.20	February 17, 2015	SN/RAM Release 4.20 – LTE / G25 / RAM9K and Wi-Fi
4.19	December 2, 2014	SN/RAM Release 4.19 – Added Note 3 in regards to SVM firmware updates
4.19	October 20, 2014	SN/RAM Release 4.19 – LTE / G25 / RAM9K and Wi-Fi
4.18	August 22, 2014	Documentation Update – Category 24 note.
4.18	July 29, 2014	SN/RAM Release 4.18 – LTE / G25 / RAM9K and Wi-Fi
4.17	April 21, 2014	SN/RAM Release 4.17 – LTE / G25 / RAM9K
4.16	January 31, 2014	SN/RAM Release 4.16 – LTE / G25
4.15	Oct 16, 2013	SN/RAM Release 4.15 – LTE / G25 – Wired Router 6021 Only
4.14	July 2, 2013	SN/RAM Release 4.14 – LTE / G25
4.13	January 3, 2013	SN/RAM Release 4.13 – LTE / G25
4.01	November 30, 2012	SN/RAM Release 4.01 – LTE / G25
4.00	October 22, 2012	SN/RAM Release 4.00 – LTE / G25



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## Sixnet Wireless Firmware Release 3.22 / 4.22

- Release Date: 10/14/2015

### New Features

- [MS-1124] - RAM9000 devices now support retaining I/O values across power loss events. Available on Tags page.
- [MS-1129] - Crimson Connect Service - Integrate easy configuration for managing a Crimson based HMI/DSP through a cellular interface.
- [MS-1399] - GRE Tunnels now allow a dynamic DNS endpoint. Remote IP will be re-resolved every 5 minutes.
- [MS-1427] - Support for -EU (Europe) 6900/9900 units. (Also supporting future -JP (Japan) versions).
- [MS-1446] - Event Expressions can support Tag Names in logical operations. Surround Tag names with \$ characters, like \$AI2\$
- [MS-1468] - Event Variable Setpoints will allow an event setpoint to be retrieved from an IODB register location. This is available for Event types: Deviation High/Low, In Band, and Out of Band.
- [MS-1480] - Event Action messages (SMS, SVM) can include current values from IODB by specifying the appropriate \$TagName\$
- [MS-1519] - Event Action types now include email alerts. Configure email client at Services->Email Client.

### Improvements

- [MS-1148] - Upgraded OpenVPN to version 2.3.8
- [MS-1155] - Changing IPv6 addresses on Wired Router WAN interfaces will properly update IPv6 RA packets to LAN.
- [MS-1164] - Copy/Duplicate button added to some tables to facilitate adding many similar items, such as Events and Modbus IO Xfers.
- [MS-1184] - Common Functions now allows installable user actions for selectable commands in Event Actions, Ping Alive, IP Fallback, and others. SDK and Expert Mode.
- [MS-1247] - HTTP Compression makes webpage loading use less data.
- [MS-1274] - When editing or creating new Modbus IO Xfers, automatic tag creation is now an option.
- [MS-1298] - Main Status screen improved clarity for interface "up" being just configured or Link status.
- [MS-1381] - Updates to Status->Network->Interfaces for unified display of switch information (6x21 models).
- [MS-1395] - GPS GeoFence allows SVM Notification to be disabled (default is enabled). New option in advanced mode, "Notify SVM Server".
- [MS-1414] - New system statistics and status fields available in IODB, including additional cellular connection information for 69xx/99xx model types. See User Guide Appendix B.
- [MS-1444] - When LTE connections are made, the signal LEDs and Main Status page signal strength will reflect RSRP/RSRQ values instead of RSSI only.
- [MS-1452] - Modbus I/O Transfer Scan Enable Address is now displayed as Modbus address, rather than zero based native address.
- [MS-1464] - OpenSSL upgraded to version 1.0.2d. TLS 1.2 now supported for HTTPS and other encapsulations.



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- [MS-1494] - Events: SMS Action will queue one active message and one inactive message, per event.
- [MS-1499] - Warnings alert the user if competing time synchronization is attempted (from Cellular and NTP simultaneously)
- [MS-1500] - Updated default encryption ciphers for stronger selections in https handling.
- [MS-1501] - Firewall Rules now have a Label field. This allows customer naming of rules to identify intent and purpose. Optional.
- [MS-1509] - Firewall apply speedup 20-30% for large redirect rule lists.
- [MS-1510] - Syslog records web user login attempts.
- [MS-1511] - Cellular connected technology indicated on the main page is more reliable for 69xx and 99xx type units. Verizon EVDO is now indicated for 3G.
- [MS-1543] - LTE connections will update the LED patterns based on RSRP and RSRQ, instead of only RSSI.
- [MS-1581] - Ping Alive will wait longer after any module reconnect before attempting connection tests; minimum of 5 minutes.

### Bug Fixes

- [MS-1019] - SVM Client Config updates will synchronize to GUI Screen display also.
- [MS-1298] - IPSec LeftID/RightID fields can now have %variables (like %fromcert).
- [MS-1381] - Corrects WAN/LAN (eth0/eth1) link status reporting for all switch separation modes (6x21 and 6021).
- [MS-1434] - Remove chatter of wireless byte counts on wired router logs. (6021)
- [MS-1479] - Signal OpenVPN only on IP changes, rather than IP renewals.
- [MS-1482] - Fixed an issue of coordinating Wi-Fi and eth1 addresses when disabling Wi-Fi (9x31 only).
- [MS-1482] - Reduced the size of gatherstats by excluding older GPS logs.
- [MS-1483] - Modbus config handling couldn't load some combinations of multiple serial ports simultaneously.
- [MS-1492] - GPS Fixed Location mode (manual entry) always reported 0 on 3.21.
- [MS-1512] - Fixed sending SMS messages reliably on Verizon when connected to LTE IMS. 99xx-VZ and 69xx-VZ units only.
- [MS-1527] - When disabling Wi-Fi, eth1 could be left in an odd state until reconfigured and rebooted. Fixed.
- [MS-1573] - GPS points would not update for External mode in 3.21/4.21.
- [WS-182] - Changing the default firewall whitelist to a non /0 CIDR entry would invalidate IPv6 rules.



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## Sixnet Wireless Firmware Release 3.21 / 4.21

- Release Date: 07/15/2015

### New Features

- [MS-1055] - Event Expressions - Logical equations to combine the power of multiple events
- [MS-1257] - Cellular Carrier firmware switching for 6900/9900 model series

### Improvements

- [MS-1047] - Updated Openswan from v2.6.38 to v2.6.42 on G25 devices (4.xx firmware)
- [MS-1147] - New lighttpd webserver version: 1.4.35. Various security Updates. Addresses [CVE-2012-5533](#).
- [MS-1176] - IPSec Certificates now support a passphrase protected certificate.
- [MS-1197] - Cellular Speed preference lockdown labels updated, and LTE lockdown supported for 6700/6900 and 9700/9900 units.
- [MS-1133] - Web UI Improvements. Intelligent display for select drop-downs in events page.
- [MS-1239] - Traffic capture error messages in live stream mode.
- [MS-1222] - Cellular info fields added for SVMv3 - PLMN, RSRP, RSRQ, SIM ID, IMSI. Requires SVM 3.0.7 or later for display in SVM.
- [MS-1224] - Easy Add buttons for common event requests - Reboot notification, Out of temperature range, and Data Usage Alerts.
- [MS-1232] - Previously, if port 2022 was redirected to port 22, then BOTH ports were accessible from the outside world. Now, when packets arrive at port 22 they will be allowed if they were previously redirected from 2022, but not originally destined for 22. If packets are still desired at port 22, an additional rule would be required (such as SSH Allow on the general settings, or a specific ALLOW rule).
- [MS-1248] - setisp script updated to help fix 3G cellular modems that are unresponsive.
- [MS-1261] - Cert Manager now allows filetypes to have the extension of .cer and .cert
- [MS-1283] - Force APN option for LTE Units. Two modes are available: 'ONCE' (new default) and 'ALWAYS' (old default). 'ONCE' will write the APN one time to the device each time the configuration is applied. 'ALWAYS' will force the current APN from the config every time the device is booted, or when needed. Verizon units may be able to automatically update their APN, and 'ONCE' will not overwrite this update. When upgrading a unit and preserving configs, 'ALWAYS' will automatically be selected if previously absent. This addresses ticket #61520
- [MS-1312] - Events now shows an event log to track timestamped changes in event conditions. This can be useful to track if your event is transitioning, but you might not be observing your action occur.
- [MS-1315] - GPS GeoFence status items added to IO DB\_Status and System Status Tags. (See Appendix B in the User Guide)



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- [MS-1325] - New GPS Buttons allow GeoFence lockdown control from GUI screen, not just SVM. GeoFence engine status now reporting status explicitly.
- [MS-1326] - User tags separated from onboard I/O and status-linked tags for display.
- [MS-1328] - New SNMP options, Location and Contact fields.
- [MS-1328] - New Fixed GPS coordinates can be specified. This allows a specified (fixed) location to be defined for a unit that will override onboard GPS, or provide a location when no GPS is available.
- [MS-1372] - SMS Message Configuration Update for Crimson linkage and SMS handling to external processes on port 1000. Multiple SMS messages may be sent rapidly by using an EOT (0x04) character at the end of each message. Without the EOT character, normal inter-SMS message timeout still applies.
- [MS-1394] - When exporting the system configuration (Admin->Configuration Manager, Export), the filename will automatically be unique per unit and timestamp. Right clicking to "Save As..." will allow user custom renaming.

### Bug Fixes

- [MS-1157] - Fixed static routes that would not apply to Wi-Fi connected interfaces.
- [MS-1203] - PRL Region settings will now change for MC7700 based units.
- [MS-1238] - IODB Status displayed wrong input power voltage for some 6000 series units (AO:1062-1063).
- [MS-1242] - Upgraded to latest OpenSSL version 0.9.8zg. FREAK Vulnerability additionally patched. Addresses tickets: [Ticket #65599](#), #65600
- [MS-1245] - Fixed RAM9K I/O Config to allow Counters for Digital Inputs when No Filtering was enabled.
- [MS-1249] - Fixed gwlnx expert mode startup: Unable to start without a reboot.
- [MS-1249] - Fixed RAM6K I/O Config page errors for updating current I/O status values.
- [MS-1275] - Upgraded to latest unzip 6.0 + patches to address vulnerabilities CVE\_2014-8139, CVE\_2014-8140, CVE\_2014-8141. Addresses ticket: #65598
- [MS-1280] - Wi-Fi allowed AES only in mixed mode. AES is now allowed in WPA2 only mode as well.
- [MS-1290] - Prevent running misconfigured Ping Alive 2 options from expert mode.
- [MS-1310] - IODB Status displayed wrong link status for some interfaces (AO:1310,1320,1340).
- [MS-1311] - Event types could not select some DI and DO values as data sources.
- [MS-1314] - Fixed potential corruption of config.xml with double closing tags. Symptom: Modbus section was "unable to run xsltproc" on Apply.
- [MS-1333] - Fixed syslog "Match Case" checkbox.
- [MS-1372] - DNP3 bugs fixed to allow unsolicited updates.
- [MS-1384] - Fixed a long standing issue with Serial IP application running improperly in 8E1 mode.
- [MS-1408] - Wireless Uptime was not reported to SVM correctly for LTE units.



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## Sixnet Wireless Firmware Release 3.20 / 4.20

- Release Date: 02/17/2015

### New Features

- [MS-20] - User Tags available for all IO registers and config reference.
- [MS-42] - New Event engine allows custom user events to alter IO, send SMS alerts, or take other actions.
- [MS-486] - Onboard Network Traffic Capture control (wireshark/tcpdump compatible)
- [MS-819] - Calibration Wizard for Onboard Analog Inputs on RAM-9000 products
- [MS-1060] - IPV6 support - Routing from Cellular or Ethernet WAN to Local LAN

### Improvements

- [MS-822] - Improved load time of onboard GUI with optimized javascript libraries and methods.
- [MS-896] - Added user custom name field to GRE tunnels.
- [MS-936] - Added tag input to Modbus transfers for selecting local registers
- [MS-968] - After changing the APN, time to update status display with new value is reduced.
- [MS-993] - Gatherstats lists files for download, and allows access to previous automated snapshots.  
The two step process improves downloading timeouts for slow links.
- [MS-1109] - Tables have up/down buttons for sorting elements.
- [MS-1010] - Tables can be sorted, ascending and descending, by column preference
- [MS-1021] - Implemented streaming mechanism for real-time page updates (syslog, ping, tcpdump)
- [MS-1023] - Improved gatherstats speed by conditionally including IPsec details
- [MS-1032] - Added restart all IPsec tunnels as Failure Command to GUI Ping Alive Configuration.
- [MS-1064] - Added Cellular UpTime to SNMP RED-LION-RAM-MIB.
- [MS-1065] - Added Cellular UpTime to onboard IODB Status.
- [MS-1079] - Unlocking Modbus/RAM feature will change the model number prefix from SN- to RAM-
- [MS-1094] - SVM Client now reports patches (updates.txt) to SVM Server.
- [MS-1095] - SVM page can trigger immediate manual check-in
- [MS-1114] - SVM Client default is now HTTPS

### Bug Fixes

- [MS-1003] - Fixed PingAlive could stall if underlying interface had certain errors.
- [MS-1046] - Fixed reporting IPsec tunnel up/down status for mismatched phase 1 and phase 2 states.
- [MS-1061] - Fixed E362 sync with IPsec restarting after certain signal loss conditions (67xx-VZ).
- [MS-1063] - Fixed the MIB-2 sysUpTime (OID: 1.3.6.1.2.1.1.3) with more accurate system up time.
- [MS-1082] - Fixed E362 arp issue causing loss of traffic to certain IPs (67xx-VZ).
- [MS-1088] - Fixed DNP3 data link layer 'Use Local Station Number as This Station DNP Address' option.
- [MS-1093] - ntpd (only available in expert mode) updated to latest v4.2.8, per VU#852879



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- [MS-1101] - Fixed Setting APN at startup on MC7700 modules
- [MS-1111] - Firewall UDP Redirects allow any UDP Source port.
- [MS-1118] - Fixed DNP3 linkage to firewall update when changing the TCP/UDP port number on the DNP3 Physical Link Layer.
- [MS-1119] - Updated OpenSSL libs to version 0.9.8zd per advisory detailed at <https://www.us-cert.gov/ncas/current-activity/2015/01/08/OpenSSL-Patches-Eight-Vulnerabilities>
- [MS-1149] - Fixed for advisory CVE--2014-019  
<http://web.nvd.nist.gov/view/vuln/detail?vulnId=CVE-2014-0196>
- [MS-1157] - Static routes fixed for Wi-Fi Bridges (9x31)
- [MS-1158] - Fixed WAN LED turns off after sending SMS message
- [MS-1162] - Fixed DHCP renew on MC7700s when signal switches between same family types (i.e. HSPA to HSPA+)
- [MS-1166] - Fixed Cell connection uptime can sometimes appear older than the system uptime
- [MS-1179] - Prevented duplicate interface information reported to SVM for eth and lo.



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## Sixnet Wireless Firmware Release 3.19 / 4.19

- Release Date: 10/20/2014

### New Features

- [MS-898] - Improved LTE Speeds for 67xx and 97xx models using wwan interface. \*Note 1
- [MS-763] - Users can upload custom HTTPS Certificates.
- [MS-959] - Bash 3.2 updated. Shellshock prevention for CVE -2014-6271 and CVE -2014-7169.

### Improvements

- [MS-731] - Extra checks are in place in IPT and the main firewall to avoid stale IP's to leak on LTE connections.
- [MS-815] - Data usage statistics (vnstat) added to IODB (RAM models only).
- [MS-872] - Improved initial speed of module detection.
- [MS-913] - Wi-Fi and eth1 clarity updates for IP Configuration (RAM-9x31)
- [MS-915] - SNMP Fields for traffic monitoring (vnstat) expanded with numeric and string fields. Updates for accuracy as well.
- [MS-917] - Updated gatherconfigs with greater clarity for including gwlnx protocol engine items.
- [MS-930] - DNS Masq triggered less often to reduce data usage.
- [MS-938] - Serial IP validation updates. Empty AT Command initialization could generate false errors. Flow Control indicated changed status when unchanged.
- [MS-946] - Additional checks for locked up modules earlier in driver detection. Faster recovery especially for 6800 series.
- [MS-949] - Reflashing updates \*Note 2
- [MS-949] - Centralized cellular stats for better consistency between pages, specifically for display of dynamic statistics such as RSSI
- [MS-966] - IPsec adds route blackholes to prevent inaccurate conn-tracking between reconnect attempts.
- [MS-980] - Removed dhcprelay and zebra routing (BGP, OSPF, RIP from 3.19)
- [MS-987] - OpenSSL Upgraded to version 0.9.8zc
- [MS-1002] - Additional observation for 5728 module driver lockup under high load.



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### Bug Fixes

- [WS-71] - Fixed: IPSec would not start properly in 4.18 due to IPv6 interference. 3.18 was unaffected.
- [MS-880] - Fixed validation in IPSec "Remote Public IP" field.  
This now accepts valid IP Addresses, hostnames or "%any".
- [MS-880] - Fixed validation error on PPPoE "Use Custom DNS" option.
- [MS-904] - Fixed: Page load error on firewall pages, when the firewall was disabled.
- [MS-904] - Enabling/Disabling SNProxy would cause temporary disruption in access to GUI settings.
- [MS-907] - Fixed: Enable monitoring wwan0 from vnstat.
- [MS-941] - Sprint Updates - Provisioning, HFA/OMA 5 retry limit.
- [MS-942] - Prevent erroneous module date reports in the year 2029.
- [MS-944] - Fixes to status\_iodb timing of some field updates; vnstat content updated.
- [MS-948] - Sprint Datalink configuration fix.
- [MS-938] - IP Fallback Test IP Update, If the Test IP field has a valid IP Address, use that instead of the default gateway if available.
- [MS-1003] - PingAlive Idle mode fix for spurious syslog messages and possible loop.

### Notes

- Note 1 - 67xx and 97xx unit families will be automatically upgraded to use the higher speed wwan0 interface instead of ppp0. You may need to update custom firewall rules. To revert to ppp method, see Network->Cellular->Config, Advanced Options.
- Note 2 - Reflashing stability improved. When upgrading to 3.19/4.19 from previous versions, please first install the update package snpat20141003\_reflashing\_tools.zip
- Note 3 - SVM 2.4.3 or later is required to push firmware 3.19/4.19 to remote units. Please contact [support@redlion.net](mailto:support@redlion.net) for assistance.



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## Sixnet Wireless Firmware Release 3.18 / 4.18

- Release Date: 07/29/2014

### New Features

- Support for new RAM-9x31 model types, with Wi-Fi
- [MS-463] - Recent cellular connection/disconnection status logs now available in Network->Cellular->Status.
- [MS-703] - GUI color highlighting points out changes for unsubmitted fields.
- [MS-718] - Daily gatherstats saved to storage for later retrieval. Historical logs survive reboots.
- [MS-721] - scriptcontrol architecture added to create and run perl scripts on-device
- [MS-754] - SerialIP now supports Primary and Secondary destinations via the IP Destinations screen. This allows fallback IP destinations when a Primary connection is unavailable (only in 2-way communication mode).
- [MS-773] - Added periodic Job Control (Allows Auto-Reboot and custom jobs).
- [MS-783] - IODB is now populated with numerous system statistics with new Status Module.
- [MS-799] - DC-HSPA Category 24 prevented in MC7700 firmware 3.5.20.3AP or older.

### Improvements

- [WS-59] - SerialIP update to modem emulator section for asserting and de-asserting RING indicator PIN (BT6K) and many improvements to overall connection hand-shaking.
- [MS-468] - System log follows current set locality for all processes
- [MS-589] - Webserver now uses lighttpd v1.4.31
- [MS-624] - Reflashing time improved by 5%.
- [MS-629] - Extended IO section added to onboard XML Lib.
- [MS-704] - GUI navigation bar is dynamically defined / more responsive
- [MS-705] - GUI can update model profile without a refresh, when accessing at the same IP address
- [MS-765] - APN length max increased from 20 to 104 characters
- [MS-769] - Improved Access Settings link to server - passwords validated in js and redirection improved
- [MS-775] - Firewall limits SSH/Telnet connection attempts to prevent repetitious attacks.
- [MS-792] - HTTPS Certificate dynamically generated on device
- [MS-802] - Updated OpenSSL to v0.9.8za
- [MS-805] - Updated DMP to VIPR v1.1 (Wired Router only)



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### Bug Fixes

- [MS-726] - Test I/O - Onboard IO updated with Relays
- [MS-752] - Fixed the Dynamic DNS service type selections to properly populate the server address and server request path fields based on service type. Also removed tzo and gnudip from Service Types allowed.
- [MS-766] - Fixed VNstat restarting when timesync issues cause problems recording.
- [MS-767] - Added protection to disallow initiated I/O transfers for serial port acting as Modbus ASCII Slave or Modbus RTU Slave.
- [MS-767] - Modified the navPage computed model match to exclude the sentry and wired router units for switch control configuration screen.
- [MS-767] - Updated and corrected digital in, digital out, analog in and digital counter addressing in Test I/O for RAM-6k units.
- [MS-767] - Improved DNP3 objects with auto re-fresh function.
- [MS-767] - Updated whitelist changes to repopulate already loaded screens.
- [MS-767] - Fixed the duplicate whitelist name on Firewall General Settings.
- [MS-794] - Improved, cleaner power-down sequence for all module types.
- [MS-804] - SIM unlock fixed. SIM status should now report when a SIM is locked with a CPIN rather than reporting 'Unknown'
- [MS-810] - Fixed Modbus Serial problem (RS-232 and RS-485). Data could stop transmitting.
- [MS-868] - Fixed chance of Verizon LTE packets leaking on certain IP changes.



### Sixnet Wireless Firmware Release 3.17 / 4.17

- Release Date: 04/21/2014

#### New Features

- Support for new RAM-9000 model types
- New I/O Control and Configuration pages.
- [MS-421] - Test I/O - Onboard IO button will easily load default registers.
- [MS-445] - Implement data usage logging, enabled by default. Status->Network->Traffic.
- [MS-583] - RS485 Support on Automation Configuration Screens (Modbus, DNP3, etc).
- [MS-623] - New User 'rlcuser' added for CLI/SDK.
- [MS-695] - IO DB Perl Library for custom SDK Scripts (iodbplib.pl/iomgr.pl).
- [WS-55] - USB Dev Access: Sixnet custom Windows driver no longer required. Standard RNDIS Network device for recognition on all platforms.

#### Improvements

- [MS-307] - Add GUI reconnect loop after reflash.
- [MS-484] - Syslog size now dynamic for units with more memory. 'slog' follows rotation.
- [MS-562] - Cleanup display of Traffic (vnstat) reports.
- [MS-567] - Update eth0/eth1 name to eth0(WAN) / eth1(LAN) for clarity across products.
- [MS-570] - Improve Firewall General Settings Configuration Screen Layout.
- [MS-591] - Improve SMS Sending error detection with MC8705.
- [MS-612] - Upgrade management of stale screen data - Color coding and warning messages when aged data is viewed.
- [MS-614] - Update Firewall to allow custom Redirect rules to apply before General Settings or Allow rules.
- [MS-615] - SVM Client: Current APN sent to server.
- [MS-616] - Unit status information is saved across reboots in /storage/
- [MS-642] - Perl xml\_lib updated for RAM-9000 Extended IO.
- [MS-647] - Reflashing boot time improved by 1-2 minutes, depending on model.
- [MS-651] - Reflashing improvements, also bundled into an upgrade package for previous versions to improve performance and reliability during upgrades.
- [MS-652] - Add notice to user when recovering from XML config corruption to last good state.
- [MS-653] - SVM Client: Queued check-ins set to max of 25; Default check-in intervals lengthened.
- [MS-653] - SVM Client: Authorization error not treated like a connection error for alternate interval or switching to secondary.
- [MS-653] - SVM Client: Default mode changed to: Secondary, only if Primary unavailable.
- [MS-660] - New core GPS Engine, gpsd.
- [MS-681] - All I/O Config, Modbus, and Test I/O Screens have been normalized to one-based Modbus addressing.



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- [MS-696] - IPTransparency will preserve configured aliases and static routes defined for alternate access methods.
- [MS-709] - Misc GUI Updates and Improvements in browser caching, display bugs, and presentation.
- [WS-50] - Serial IP: Dial IP option to handle '/' in AT Commands.
- [WS-53] - Serial IP: Dial IP option to handle X0 and X1 in AT Commands.



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### Bug Fixes

- [MS-611] - Access Settings page allowed invalid characters and didn't redirect properly between http and https.
- [MS-632] - Fixed: E362 Occasionally reports 0 for RSSI.
- [MS-637] - Fixed: Timesync error on tower connection.
- [MS-673] - Cellular Watcher Script bug - MC8705/MC8790 special lockup case detected in 30 seconds, rather than 15 minutes.
- [MS-697] - Controlling cellular timesync option fixed across all chipsets.
- [MS-657] - Fixed GUI DHCP Server Setup page.
- [MS-649] - Fixed System Configuration Import of config.xml.
- [MS-677] - Fixed: Modbus I/O transfers could stop randomly if queued messages are out of sync.
- [MS-702] - Fixed: Import of ioctl XML section would not properly startup RAM6K IO until 'Apply' was run.



### Sixnet Wireless Firmware Release 3.16 / 4.16

- Release Date: 01/31/2014

#### New Features

- New GUI available for all SN/RAM Products.
- DMP Release 0.2.1 part of WR package for RAM-6021.
- vnStat traffic monitor and data usage logger available in Expert Mode

#### Enhancements

- Firewall layout and help improved.
- IE8 Basic compatibility fixes
- Address Space Randomization enable for all cases. Improves security.
- IP Transparency will only bounce the Ethernet interface when a cellular IP change is detected.
- Default firewall MASQ rules updated for NAT+PAT support. Previously, specific private subnets were declared. The newer preferred method will use 0.0.0.0 to enable MASQ on all connections attempted. This improves cellular uptime when an internal network is misconfigured, and improves connection tracking across different dynamic cellular IPs for subsequent connections.
- Modbus default register locations for LONG (5000) and FLOAT (7000) types now matches Sixnet IPm defaults.
- Enhanced cellular chipset monitor – Additional tests to determine if a cellular subsystem is functioning properly.
- Additional Module provisioning information available (See Provisioning Tab)
- CSQ Historical Log expanded to contain more signal data at snapshots
- SIM Carrier codes read and decoded for better GUI display.
- VZW LTE Connection's netmask updated to /32.
- VZW LTE MTU now adjustable.
- Increased syslog storage to 3MB for LTE units.
- Ethernet switch - fixed port 5's always on LED. Affects SN/RAM-6721
- OpenSwan IPSEC on LTE units allows weak and no encryption options to be specified for backwards compatibility. Allows DH Group 1 to operate.
- Kernel NAND updates for more robust filesystem usage (3.16 only). Prevents "bootlock"
- Sprint 3G modules have Location reporting disabled. Reduces data usage. Affects SN/RAM-66xx-SP.
- DMP 0.2.1: N-Tron Devices supported for all functions: 708FX2, 708TX, 709FX, 710FX2, 711FX3, 716FX2, 716TX, 7012FX2, 7018FX2, 7018TX, 7026TX
- DMP 0.2.1: N-Tron Devices supported for all functions except downgrade: 708M12, 712FX4, 714FX6, 716M12, 7010TX, 7900, 7506GX2

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### Bug Fixes

- Monitor added for rare USB line error that could require an early reset.
- VZW LTE Fallback to 3G reliability greatly improved.
- VZW LTE Time-sync could be off by UTC vs local time. Fixed.
- VZW LTE Module tower loss detection was delayed. Reconnection is faster.
- VZW LTE could report very inaccurate connection uptimes.
- VZW LTE could stop reporting signal strength on the front panel LED.
- RSSI and ECIO consistently reported as negative values across modules.
- HSPA/LTE modules perform faster initial connect to towers after module lockup.
- SNMP could stop replying to certain IPs.
- SNMP could report wrong ECIO values (abnormally high).
- Improved handling for MC8705 at boot time. Affects certain SN/RAM 68XX models only.
- Gatherstats/configs will capture openvpn information.
- Better handling for Wired Router factory reset defaults. Affects RAM-6021.



### Sixnet Wireless Firmware Release 4.15

- Release Date: 10/16/2013
- Targeted for RAM-6021 Wired Router only.

#### New Features

- New GUI Redesign.
- Previous GUI available through Classic View link.
- Addition of EZ Config Wizard.
- Updated Ethernet driver to support higher throughput.
- DMP N-Tron manager available.

#### Enhancements

- Improved reflashing for LTE and WR units, and larger image sizes.
- Modbus IO XFER mapping clarity improved. Long and Float types correctly displayed.
- Test IO screen has improved responsiveness.

#### Bug Fixes

- Onboard IO error of “STBUSCTL\_GET\_REG\_ALLOC ioctl() failed” could be seen on some LTE (4.xx) units.
- SerialIP will reinitialize the serial port more aggressively to avoid locked serial incidents.
- Policy routing updated to avoid return path problems on local USB connections.

### Sixnet Wireless Firmware Release 3.14 / 4.14

- Release Date: 07/02/2013

#### New Features

- Analog In functions enabled for SN-67xx units.
- RAM units will not reboot for cellular subsystem restarts. This is now isolated.

#### Enhancements

- Additional chipset statistics available in cardstats display.
- Automation functions highlighted in separate menu.
- Updates to USB Reset procedure on R3000 family products.
- PPP Dial-on-Demand (DoD) noted in main status screen.

#### Bug Fixes

- DNP3 auto restart improvements.
- Modbus I/O Transfer default mode changed to Wait4Reply instead of RapidFire.
- SN-67xx model serial port errors resolved.
- SplitLan mode stability improvements for RAM-6621 and 6821
- SNMP response fixed for network info on NAT IP ranges.
- Non-specific NAT/MASQ entries will use no IP rather than 0.0.0.0 for source IP ranges. This will create dynamic rules, rather than static rules for Firewall Masquerading.
- PPPoE MTU fixed to follow changeable Ethernet MTU.
- JBM XML Lib fully updated for current features.
- GatherConfigs now includes the openvpn directory.

### Sixnet Wireless Firmware Release 3.13 / 4.13

- Release Date: 12/20/2012

#### New Features

- RAM Models: DNP3 Slave Support Added
- RAM Models: Firewall linkage to DNP3 listening socket added.
- RAM Models: New Digital Input counter option.

#### Enhancements

- RAM Models: Test I/O Screens updated with better column readability.
- Full SNMP MIB-II added for SN/RAM, updating limited MIB-II
- ECIO fields added for 67xx models, Verizon LTE (E362)
- Module temperature reporting added to cardstats values
- Reflashing method now scans for new NAND bad blocks before updating firmware.
- SixView Manager client now exchanges Unit XML Config file with SVM v2.2
- Boot time improved. Now 13% faster.

#### Aircard/RF Module Support

- MC7700 Support for Bell Mobility, AT&T, and Rogers

#### Bugfixes

- SNProxy - Fix for custom user generation.
- SNMP will no longer rewrite private IP octets, stalling snmpwalk operations in IPT mode.
- Restores udev boot speed improvements when reflashing from older versions and saving configs.
- 68xx-HSPA models reported 2G signal strength when in 3G service. Proper RSSI now reported.
- SerialIP UDP Broadcaster fix - return path IP could change based on sequence of recv packets.

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## Sixnet Wireless Firmware Release 3.12

- Release Date: 10/16/2012

### New Features

- RAM Models: WAN/LAN division on 6x21 models allow wired/cell WAN fail-over
- RAM Models: Test I/O Screens for monitoring and updating internal register variables.
- RAM Models: New Digital Input counter option.
- New model RAM-6021 supported for wired WAN/LAN routing and firewall.
- New firewall option: Ranged NAT 1-1 to provide large scale network remapping
- Multicast Routing supported with Expert mode options for mrouted, pimd, igmpoxy, and smcroute.
- SMS interface available for SDK applications (All models except 6400 series)
- SNProxy - webserver proxy to provide optimized HTTPS encapsulation to HTTP devices protected behind the firewall.
- Firewall FTP deep packet inspection available to dynamically coordinate a protected FTP Server.

### Enhancements

- Improved GUI Speed with 10-50% improvements for most screens.
- Improved boot time speed for SN/RAM models.
- Improved Cellular statistics available with connected carrier PLMN ID (HSPA).
- DHCP Server Leases view to observe client's connected.
- DHCP Server MAC address fixed association now supported.
- Updated Zebra Advanced routing utilities to latest Quagga version 0.99.21
- Added Contrack table display
- SNMP fields added for LTE Cellular options.

### Aircard/RF Module Support

- MC8705 Support available for HSPA+ modules

### Bugfixes

- Hardware flow control added to SerialIP options.
- Custom firewall rules appear immediately after a reflashing first bootup.
- RAM6K: HWIO Control for onboard Digital Out (DO) fixed.
- Fixed IPSec Server mode, when setup without Peer IDs would not match PSK.
- Fixed R3120 Wifi Open Network mode (no encryption option).
- Deleting a firewall ACL Whitelist while still assigned will revert to the default ACL.
- Improved handling of internal module detection, if USB host is out of sync at boot time.

### Sixnet Wireless Firmware Release 3.11

- Release Date: 6/22/2012

#### Release Summary

- I/O ports integrated for RAM usage with Modbus and SDK (BT-6000)
- DHCP Relay capabilities added
- GRE Tunnel limit now 99
- DVR Capture code (TransSniff) integrated into GUI
- Serial IP now has UDP Broadcaster (Multi-Unicast).
- Added PMTU control and MTU settings per interface.
- Added detailed switch status information (BT-6x21)
- Modbus I/O Transfer update interval maximum increased to 9999 seconds.
- DHCP Server can target specific IPs to specific MAC Addresses
- Default SVM Client check-in interval 6hrs, and error retry at 4hrs.
- SDK Interface and methods improved

#### Aircard Support

- Verizon LTE 4G, Novatel USB551L (Improved)
- T-Mobile ZTE Rocket 4G
- AT&T LTE - Momentum 4G (Sierra 313U)
- Bell LTE - Turbo Stick 4G (Ovation U679)
- Rogers LTE - Rocket Stick 4G (Sierra 330U)
- Telus LTE - Ovation MC679 4G

#### Bugfixes

- SN/RAM-68xx, Driver upgrade. Improves occasional small packet loss.
- R3000 would occasionally fail to start reflashing. ROM detection more reliable.
- SerialIP (gwlnx) UDP Header bug fixed.
- SerialIP display of IP/Ports corrected for "2Way" mode.
- OpenVPN clears connection tracking correctly
- Fixed - Certificate Manager could lose SSL certs when upgrading firmware.
- Fixed - RAM-6000 could corrupt firewall when upgrading from 3.09 to 3.10.
- Cellular CURRENT\_RSSI reported uniformly across additional aircards for SNMP reporting.
- Fixed - Modbus Remote Stations did not display correctly over 8 entries.
- Fixed - Modbus serial port usage could collide with SerialIP usage of same port.
- Fixed - VRRP Interval parameter now setup properly.
- Improved browser display of Cellular Provisioning pages.
- Fixed - %any usage in IPsec PSK for VPN Server mode.



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## Sixnet Wireless Firmware Release 3.10

- Release Date: 1/13/2012

### Release Summary

- Openssh 5.9p1 security update
- Improved GUI load times
- Improved Config Import performance and operation
- Improved Firewall loading and applying performance
- DHCP Lease status available in Expert Mode
- Ping Alive supports multiple hosts in Expert Mode
- Expanded GRE tunnel support to 99 tunnels
- Added support for MC5728 EVDO modules, Verizon and Sprint
- Improved handling of SIM unlock PINs
- Added DHCP-Relay capabilities
- Added support for embedded Novatel LTE E362 Verizon module

### Modbus

- Integrated Modbus listening port into firewall options
- Improved Register address display in IO Transfers
- Fixed wrong labels for Discrete Input and Discrete Output
- Default Send Mode for RS232 is now Wait4Reply
- RS232 Mode fixed and uses LED correctly
- Improved expert mode handling of .xml files

### Serial IP

- GUI support for integrated configuration of all options
- Full serial port support for 2-wire to full RS-232 signaling
- Optional AT Command interpretation for Modem Emulation
- AT Commands support "dialing" an IP address/port
- Supports fixed size packets of serial data stream to IP packets
- Network connections support TCP and UDP
- TCP Server and Client modes supported
- Broadcasting supported to multiple network endpoints (TCP and UDP)
- Multi-mode support for simultaneous TCP Server and Client

### Aircard Support for:

- Verizon LTE 4G, Novatel USB551L
- T-Mobile, Jet 2.0 (Huawei E182E)
- Generic HSPA/Claro, ZTE MF626
- Generic HSPA, Nokia CS-18
- Generic HSPA, Sierra Wireless 310U, 312U and 320U



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### Bugfixes

- Upgraded DHCP Client for SN/RAM functionality
- CLI User for Modbus fixed after upgrading firmware
- Fixed sporadic blank page in Sprint Provisioning page
- Fixed firewall duplicate whitelist entries
- Fixed firewall handling of ICMP packets on IPsec interfaces
- Fixed early reboot with misconfigured SIM settings
- Fixed RS232 front panel LED display when UART in use
- Fixed IPsec Aggressive mode
- Fixed allowing longer passwords for user accounts
- Added reset of conntrack tables on OpenVPN connection start/stop
- Fixed SIM usage for newer SIMs on SN/RAM-64xx series
- Changed USB Network mode to disable default gateway



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## Sixnet Wireless Firmware Release 3.09

- Release Date: 6/24/2011

### Release Summary

- Added support for ModBus protocol (RAM edition only)
- Added IO DB kernel module for storage of register information (Industrial Pro Plus Only)
- Added Command Line Interface for ModBus Configuration (Industrial Pro Plus Only)
- Added Base Station ID and GPS Lat/Long coordinates to Sixview Manager Check-In information
- Added Support for SN/BT units push button reset to factory default, if held for 3 sec. on power-up.
- Added leftsourceip option to IPsec tunnels.
- Updated contact information on Web Interface
- Updated OpenSSL Libraries to latest version 0.9.8r
- Optimized Web Interface to decrease GUI page load times
- Lightbar v1.45 - fix for Wireless DoD mode (double strobe)
- Added integration between gwlnx protocol converter and GUI engine to improve screen load times.
- Updated Status screen display for IP Transparency mode
- Added Private IP option to IP Transparency mode to pass more local addresses to the world.
- Added vsftp to expert mode
- Added ntpd to expert mode
- Updated OpenVPN to v2.1.4
- Changed default SixViewManager ports from 48080 to 18080
- Changed default SixViewManager servers to  
server1.sixviewmanager.com/server2.sixviewmanager.com
- Added Status screen display of wireless/cellular uptime.
- Detection Support for the Vodafone/Huawei K4505 GSM cellular modem

### Bugfixes

- Corrected IPSEC configuration of "Road Warrior Mode" to function properly when Remote IP address is empty/unknown
- Fixed firewall parsing of Filter Rules section to allow multiple filters on a interface pair.
- Fixed firewall General Setting IPsec Allow option to allow IPsec interfaces to be untrusted/external interfaces.
- Fixed firewall IPsec option to allow Filter Rules to restrict traffic on internal IPsec connections.
- Fixed OOB raw mode to ignore all combinations with ~ chars during TCP mode.
- System Startup date will be Jan 1, 2011 if clock is before 2011.



### Sixnet Wireless Firmware Release 3.08

- Release Date: 3/16/2011

#### Release Summary

- Added robust connectivity handling for SixView Manager client
- Added user-level support for rewriting U-Boot environmental variables
- Additional SNMP variables for GSM carriers
- Optimized cron to handle date changes
- Added SNTP server support
- Added VSFTP for SDK use
- Updated DNS to allow more than one search host
- Added support for Sierra MC5725 provisioning
- Added support for Bell Mobility MC5727/MC5728 provisioning
- Added support for Cellcom MC5728 provisioning
- Added VRRP Status file for runtime statistics
- Added support for Cellular Roaming control from GAU
- Added GSM Provisioning capability to GAU, displays additional information
- Optimized support for Remote Reflashing for all models
- Added support for new aircards
  - AT&T USBConnect Shockwave HSPA+ USB modem
  - Verizon Pantech UML290 4G LTE USB modem (beta)

#### Bugfixes

- OpenSwan Ipsec Nat-T loop bug
- IPtrans's DHCPD fails when DHCPD already running
- IPSEC routes get out of order when default interface is reconfigured
- Fix jbmupdate gatherconfigs import behavior
- Modify PowerDownCellModem.pl to not kill all pppd processes
- IPIP tunnel page bugs
- Repaired GAU Menu option to include USB Port network configuration



### Sixnet Wireless Firmware Release 3.07

- Release Date: 1/11/2011

#### Release Summary

- Support for SN/BT-64xx models
- Improved support and help info for flashing low memory (32Meg BT) units, particularly through the GUI
- New modems supported:
  - Franklin U600
  - Improved ZTE MF668 support
  - Cinterion MC75
- IPSec VPN Server mode support
- IPSec VPN X.509 Certificate support
- SIM PIN Unlock support
- GSM/HSPA International RF Band selection
- IP Transparency Router Mode - Provides advanced routing features while presenting simple configuration for connected devices
- Additional Sixnet rebranding changes
- Ping Alive - Supports new options for connection testing

#### Bugfixes

- Fixed various GUI reflashing problems with low memory units
- rxidle value changed back to 150 from 0 in previous release
- DNSMasq updated to latest version which solves some DNS resolution problems
- CDC/ACM detection error solved which was preventing the device from recognizing certain modems on boot up
- VRRP Screen - handle multiple VRRP instances much better
- Network Interface VLAN settings simplified and streamlined



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## Sixnet Wireless Firmware Release 3.06

- Release Date: 10/12/2010

### Release Summary

- Improved support and help info for flashing low memory (32Meg BT) units, particularly through the GUI
- Improved support for preserving unit configuration across reflashing
- Improved provisioning support:
  - Added SIP option for Sprint and Verizon, required for Sprint LAC/LNS support.
  - Provisioning screen now updates page with progress of provisioning process and module status
  - Added Sprint datalink provisioning support for 250U (3G mode only).

### Bugfixes

- Fixed GUI reflashing problems with v3.05
- Fixed GUI Display issue for Verizon provisioning screen
- This release replaces v3.05



### Sixnet Wireless Firmware Release 3.05

- Release Date: 10/05/2010

#### Release Summary

- New aircards/modules supported:
  - o Sierra USB 308
  - o Sierra Aircard 503
- Sierra 250U (3G support only)
  - o ZTE MF668
  - o ZTE K3805-Z
  - o Option GlobeTrotter HSUPA
  - o Option ICON 542
  - o LG USB Connect Turbo
  - o Pantech UMW190
  - o <http://sixnet.com/content/aircard-86.cfm> for a complete list
- OpenSSL updated to version 0.9.8o, which fixes multiple security issues in previous versions
- Significantly improved bootup times due to modification to hotplug
- Smaller firmware image size
  - o Removed DHCP Relay.
- Support for PRL information in SixView Manager client updates
- Support for restoring a device configuration after a firmware update
- Supports firmware updates through SixView Manager
- New "Router Mode" option for IP transparency
  - o Will route traffic to the cellular network, bypassing NAT/PAT.
  - o Used with SIP mode for Sprint LAC/LNS
- Support for many VRRP instances (up to 10)
- IPSec now supports X.509 certificate
- VLAN configuration supported through GUI interface
- Default RxIdle changed to 0 to disable feature by default
- TCP Socket test added to Status options screen (uses telnet to probe remote ports)

#### Bugfixes

- Firewall configuration for Filter Rules fixed
- Connection Tracking bug found with gianfar ethernet driver on D-Series
- IP Fallback improvements to prevent leaking packets after switching interfaces.



### Sixnet Wireless Firmware Release 3.04

- Release Date: 7/19/2010

#### Release Summary

- New aircards/modules supported:
  - o Sierra 888 Compass GSM
  - o Sierra MC5725 embedded EVDO module
  - o Sierra USB 306 (Telus)
  - o Sierra USB 305 Lightning
  - o Huawei USB E182 GSM
  - o Huawei USB E168C CDMA
  - o C-motech (Franklin Wireless) Sprint U301 (3G mode only)
- Greatly improved support for VLAN configurations
- Adds serial TTY support for SN (BlueTree) models
- Adds firewall whitelisting support
- Adds support for Wifi models
- Adds support for USB ethernet device to SN (BlueTree) models
- Adds support for restoring device configuration after firmware upgrade
- Adds support for D005 4-port RS232 daughtercard
- Adds new "routing mode" option to IP transparency
- Adds SIP support for Sierra Sprint Aircards - Sprint LAC/LNS support
- Adds support for running multiple instances of VRRP
- Adds support for user access controls in the GAU
- Adds ECIO value reporting for Novatel modems
- GAU interface rebranded with Sixnet colors and logos

#### Bugfixes

- Fixed OpenSWAN bug: "waiting for ppp0 to become free. Usage count = -1"
- Fixed firewall redirect rules for local redirect
- Fixed GAU bug preventing entry of illegal XML characters (in password fields).

