



Nautel Software Bulletin

November 6, 2015

Nautel NX Series V4.5.1 Release Notes

Nautel strongly recommends that customers upgrade to NX version 4.3.2 or higher as soon as possible.

Important notes:

1. As of NX version 4.4, Engine IBOC signal settings have been moved from the system settings page to the Digital Settings page of the preset, allowing Engine settings to be changed when changing presets. **This means that every existing IBOC preset will have to be edited to have the correct IBOC settings AFTER upgrading the software.** It is recommended that the Engine settings on the System Settings page be recorded BEFORE performing the software upgrade, as they will not be visible on the AUI after upgrading the software.
2. Any NX Combiner customers must upgrade to NXC software version 4.2.1 or higher before upgrading to NX software version 4.4 or higher.

This release fixes a small AUI issue where Low Forward Power Threshold labels were displaying incorrectly.

The most significant improvements with previous versions include:

Version 4.5 – Released October 9, 2015

NX software version 4.5 introduces support for the newest low power NX transmitter, the NX5.

NX SW 4.5 is only officially supported for NX5 and NX10 transmitters.

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Nautel Software Bulletin

November 6, 2015

Other changes include:

- Resolved an issue where the transmitter would take over a day to recover from a high temperature foldback condition. Recovery time is now approximately one hour.
- In the NX AUI under Presets -> Audio Loss -> Action, the option that was previously labeled as "None" was changed to "Alarm Only" to indicate the actual behaviour.
- Updated "Local/Remote" labels in the remote I/O settings to be "Remote Enabled" to indicate actual functionality.
- The following exciter alarms were removed in the NX SW 4.4 release, and have now also been hidden in the remote outputs list:
 - No Audio
 - Muted Analog SRC
 - Muted Digital SRC
- The Call Sign/ID field is now editable when the transmitter is in local-only mode.
- Random value are no longer displayed in the forward power field in the AUI's top banner during an exciter changeover.
- The Apply and Cancel buttons now activate correctly in the User Settings -> SNMP Configuration screen on the AUI.
- The correct control options are now displayed in the AUI for the "Max Power Lockout" remote output.
- The correct control options are now displayed in the AUI for the "Reset" remote input.
- A progress bar has been added while the AUI is loading.
- Updated bash shell to address the linux Shellshocker security vulnerability.
- Updated various alarm names in the NX10's local user interface to be more intuitive.

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Nautel Software Bulletin

November 6, 2015

- Resolved an issue where the DRM spectrum was being improperly filtered after changing presets.
- Added SNMP capability for the NX5 and NX10.
- Resolved an issue on the NX10 where the front panel LEDs would occasionally indicate that an alarm is present when in fact there is no alarm present.
- Updated the software for the NX5 and NX10 to allow the transmitter to run with only 50% of the power modules installed.
- Updated various alarm parameters in the AUI to be more intuitive.
- The AUI should now display the software version after performing an OS recovery.

Version 4.4 – Released July 6, 2015

NX software version 4.4 introduces support for the newest low power NX transmitter, the NX10.

NX SW 4.4 is only officially supported for NX10 transmitters.

Other changes include:

- Resolved an issue with the Max Power Lockout remote input where the setting the control option to "Active High, Set" caused the remote input to behave as if the control option had been set to "Active Low, Set".
- The following exciter alarms were redundant and have been removed:
 - IBOC Frame Sync Missing
 - No Audio
 - Muted Analog SRC
 - Muted Digital SRC
 - No Signal to Transmit
- The following exciter alarms have been renamed and/or re-purposed:

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Nautel Software Bulletin

November 6, 2015

- Side A Input Loss becomes AM Input Loss (now will show the status of the AM source, rather than any particular input)
- Side B Input Loss becomes Digital Input Loss (now will show the status of the DRM or IBOC source)
- No Analog AES Lock becomes No AES1 Lock (now always shows the lock status on AES1)
- No Digital AES Lock becomes No AES2 Lock (now always shows the lock status on AES2)
- No Serial IQ Stream becomes No IBOC Data (now will only show the alarm if IBOC is the I2S source)
- Resolved an issue where an Exgine event that should have been named "Exgine Server State" appeared as a hexadecimal number.
- Presets can now be renamed when they are used by other components (i.e. the scheduler).
- Improved the IBOC demodulation process by correcting a scaling error on the PIDS carriers and improving compatibility with MDCL.
- In System Settings -> Exciter Clock Calibration, the "Sync Type" field has been eliminated, and the "Sync Source" options have been simplified to None, GPS Sync Card, 10 MHz Sync Input and Combiner.
- Resolved an issue where the scheduler would not change presets after recovering from a power outage if the outage occurred during the time at which the preset change was scheduled to occur.
- In previous software releases, if multiple remote inputs are active at the same time that are each configured to select a different max power lockout level, the selection on the lowest numbered input is the max power lockout that would be activated. This behaviour has been changed such that the lowest power lockout will be activated, minimizing the possibility of over-driving antenna networks when conflicting controls are active.

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Nautel Software Bulletin

November 6, 2015

- Improved transmitter recovery from SWR shutbacks such that the transmitter recovers to 70% of full power in 100 to 200 ms rather than 1 to 2 seconds.
- Added a combined "+15V Fail" alarm to the rack interface. See the updated troubleshooting manual for a full description of this alarm's functionality.
- Added a "Host Network Down" alarm to the transmitter controller. See the updated troubleshooting manual for a full description of this alarm's functionality.
- The following alarms became redundant when summary alarms were added in NX SW 4.0.1, and have been deleted:
 - Controller: Power Module Fault
 - Controller: LVPS Fault
 - Rack: Power Module Fault
 - Rack: LVPS FaultIf these alarms were being used in Remote I/O, SNMP or Email Notifications, the appropriate summary alarms should be used instead.
- Added "Host Not Booted" and "Host Not Responding" alarms to the transmitter controller. See the updated troubleshooting manual for a full description of this alarm's functionality.
- Added a combined "+48V Fail" alarm to the rack interface. See the updated troubleshooting manual for a full description of this alarm's functionality.
- Added additional support for IBOC MA-3 operation. The IQ scale factor will now be automatically adjusted between MA-1 and MA-3 modes of operation, and the IBOC mask shown on the spectrum analyzer will change automatically.
- Resolved an issue where the control options for the Max Power Lockout remote inputs were displayed incorrectly.

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Nautel Software Bulletin

November 6, 2015

- Resolved an issue where the selected control option for remote input 1 would be displayed incorrectly when the page was initially loaded.
- Added a decimal place to the Magnitude and Modulation meters.
- The precision of the Rack DC Current Meter has increased to 1 decimal place. Existing SNMP software which monitors this meter needs to be adjusted accordingly.
- Changes 'Playlist' and 'Playlist Manger' names to 'Audio Player' on the AUI.
- In the Time Setup page, the correct number of days is now associated with the selected month.
- Resolved an issue where the output power would drop when the AM source was changed in the preset.
- Resolved an issue where re-enabling a disabled module while the transmitter is RF ON could cause the transmitter output power to overshoot the setpoint.

Version 4.3.2 – Released March 17, 2015

This version resolves a significant issue where having more than 26 presets could prevent transmitter control via the AUI.

Other changes include:

- Improved Phone Home's automated alarm reconciliation functionality.
- Removed several unnecessary fields in the Remote I/O screens.

Version 4.3.1 – Released September 23, 2014

- Resolved an issue where Remote Outputs could become permanently inaccessible.

Version 4.3 – Released August 15, 2014

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Nautel Software Bulletin

November 6, 2015

The biggest change in version 4.3 is a change in Nautel's philosophy surrounding local vs. remote operation. Rather than control being limited to remote or local operation, local operation is now always available; remote operation can be toggled. See **Local-Remote Functionality.pdf** (also available on the FTP site) for further details.

Other changes include:

- Eliminated spurious "Rack Not Responding" alarms for racks not physically present in the system.
- Resolved an issue where multiple B+ shutback alarms would be generated when making significant power level changes.
- Added level-sensitive remote I/O triggers for preset selection and power limit selection.

Version 4.2.1 – Released April 25, 2014

- Resolved a connection issue with the Phone Home service.

Version 4.2 – Released April 10, 2014

NX SW 4.2 sees the introduction of Nautel Phone Home to the NX family of products. See **PhoneHomeOperation.pdf** (also available on the FTP site) for further details on activating this feature.

- Resolved an issue where a "Rectifier Fan Fail" alarm would not cause a change in the color of the AUI's "STATUS" button.
- Updated the IBOC MA-1 mask as per the new NRSC-5-C standard.
- Added the ability to adjust the gain applied when EAMC is enabled.
- The AUI will no longer allow a software upgrade while RF is ON.
- Remote IO power adjustment behaviour has been modified. NX now supports both edge and level triggers, and the increment/decrement step size has been changed to 1% of TX nameplate power. NOTE: Any

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Nautel Software Bulletin

November 6, 2015

customers using this feature will need to double-check their remote IO power adjustment settings.

Version 4.1.1 – Released October 3, 2013

- Resolved some SNMP-related issues by more closely adhering to the SNMP spec.
- Resolved a frequency display issue with the Smith chart.
- Improved the feedback on the Power Module summary page.
- Resolved an issue where the Exciter Synchronization page would not auto-refresh after synchronization is complete.
- Resolved an issue where RF Monitor Gain was not being applied to both exciters.
- Fixed some consistency issues with Apply button activation.

Version 4.1 – Released August 16, 2013

- This release includes the addition of IBOC MA-3 (all-digital) mode compatibility. In the Preset screen, when IBOC is selected as the Overall Mode, it is now possible to set the "IBOC Service Mode" under the Digital Settings tab as MA-1 or MA-3. Note that IBOC MA-3 compatibility also requires an Engine and Exporter Plus firmware update, and possibly requires capturing additional pre-correction curves. Please contact Nautel customer service if you are interested in running your NX transmitter in this mode.
- This release fixes an issue where the transmitter would overshoot its Set Point when recovering from a loss of I/Q over AES signal when running in DRM modes.
- This release includes logging of SWR protection ON/OFF changes.
- In this release, the nuisance alarm "Exciter External Changeover Fault" will no longer be displayed.
- This release resolves an issue where the Exciter's Carrier Impedance measurement possibly displayed an incorrect value when operating in DRM modes.
- This release resolves an issue where the available Control options for changing presets using the digital remote inputs were incorrect.
- This release resolves an issue where the severity of the Low Forward Power Thresholds was set to high, turning the Status button red. As this does not indicate an off-air condition, the alarm will now have severity medium, turning the Status button yellow.

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Nautel Software Bulletin

November 6, 2015

- This release includes the addition of the ability to offset an incoming DRM signal by up to +/- 10 kHz before it is transmitted.
- This release resolves an issue where the graphic meters that can be added to the right side of the home screen on the remote AUI would not scale properly when the remote AUI window was re-sized.
- This release resolves an issue where the Power Distribution Plot data would overshoot the maximum x-axis value when running high peak-to-average signals.
- This release resolves the issue of being able to change the system time, even when NTP is enabled.
- This release includes the addition of functionality that improves the pre-correction implementation for 18/20 kHz DRM and All-digital IBOC (MA-3) configurations.
- Translations are disabled in this release as they are incomplete. Translations will be re-enabled at a later date, once updated.
- This release resolves an issue where the sensitivity of the Pwr Inc/Dec buttons on the NX control PWB effectively prevented changing the transmitters power Set Point. This functionality has now been changed such that holding the button down will change the power set point in steps of 5% of the rated power of the transmitter every 0.5 second, and tapping the button will change the power set point in steps of 100W or 1 kW, depending on the transmitter type.
- This release resolves an issue where the "High Power Lockout" setting shown in the "Copy to Clipboard" version of the log is displayed as one spot lower than the actual setting (i.e. if High Power Lockout 4 was selected, High Power Lockout 3 would be shown in the text log). This cannot be fixed for SNMP due to backwards compatibility requirements.
- Users can now only modify NTP servers when NTP is NOT enabled.
- This release resolves an issue where some audio files would not appear in the playlist file list if their extensions were not lower case.

Version 4.0.2 – Released February 28, 2013

General

- In this release, the mask shown on the spectrum analyzer in 'Analog AM' transmission mode has been

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November 6, 2015

- updated to meet the NRSC-2-B specification
- In this release, it is no longer important which AES input is used for analog or digital transmissions. For this reason, the AES inputs have been renamed as follows:
 - 'Analog AES' becomes 'AES 1'
 - 'Digital AES' becomes 'AES 2'
- This release includes the ability to use SNMP traps. A trap is an unsolicited message sent by an SNMP agent when an alarm changes state (turns on or off). The message is an SNMP packet that can be interpreted and displayed by an SNMP client application.
- This release includes the addition of summary alarms, which can be used to drive individual remote outputs on the remote I/O interface. Summary alarms are used to capture multiple alarm conditions with a single remote output. For example, the 'High Reflected Power Summary' alarm will occur when one or more of the following alarms are preset: 'SWR Shutback', 'SWR Foldback', 'Cutback'.
- This release includes the addition of remote AUI connection timeout. If a connection to the remote AUI is not used for more than 30 minutes, that user will be disconnected, which will open up a slot for another user to log in. The maximum number of logged in users is 10.
- In this release, additional permissions functionality has been added to user accounts control. It is now possible to selectively choose if a user can activate/modify presets, adjust power levels, manage power lockouts, delete logs, and turn RF on/off.
- In this release, the 'Menu' in the AUI has been reorganized into the following groups: Presets, Factory Settings, System Settings, Pre-correction Settings, User Accounts, Changeover, User Settings, Remote I/O, Scheduler and Playlist. For more information on each option, see the updated operations section of the NX manual.
- This release includes the addition of two configurable low forward power thresholds. These thresholds are adjustable from 0 to 90% of the setpoint. When the output power is below a threshold, a corresponding alarm will be triggered.
- As of this release, Mag Phase delay is now an offset with a default value of 0, as opposed to an absolute number. Previous modifications to the Mag Phase delay will be automatically converted.
- Dual GPS synchronization cards are no longer supported with this release.

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November 6, 2015

- This release includes the ability to direct the transmitter to take action on audio loss, after a specified delay (similar to what is implemented in NV and VS).
- This release includes the addition of the ability to adjust the maximum compression (in dB) when running DCC. The maximum DCC compression defines the maximum reduction in carrier power that will be seen with a given algorithm, and the DCC curve is adjusted accordingly.
- This release resolves an issue where the transmitter would shutback on SWR events, but never enter the cutback routine. See NX manual for more information on cutback.
- This release resolves an issue where logs would be tagged one hour in advance of the actual time due to daylight savings settings.
- This release resolves some issues around user accounts including preventing a user from deleting the account they are logged into and allowing administrators to change their own passwords.
- This release resolves an issue where it was not possible to copy the logs to the clipboard.
- This release includes a major overhaul of the NX scheduler. Instead of being event driven, the scheduler is now rule driven. Each rule can be created with any start/end date/time, and allows each event to be repeated on a defined interval. The maximum number of rules that can be added to the scheduler is now 144. See the updated operations section of the NX manual for more information on using the scheduler.
- This release includes the addition of support for TLS secured SMTP servers. This allows the use of a web mail service as the outgoing email server for the transmitter .
- This release includes major updates to the operating system and AUI code base, and has undergone extensive verification testing. It is expected that all software related AUI lockup issues are resolved. Please contact Nautel if any problems are experienced with this release.
- In this release, preset functionality has been completely overhauled to create consistency between product lines. New functionality is as follows:
 - The active preset is shown in the top banner. Presets are activated by choosing the desired preset from the drop-down menu in the top banner.
 - When the presets page is opened from the menu, the 'Current Settings' of the transmitter are displayed, which define the current operational state of the transmitter. 'Current Settings' can be adjusted and then immediately activated by pressing the 'Save' button.

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November 6, 2015

- To adjust a saved preset, that preset must be loaded from the Presets page. If the adjusted preset was active before it was changed, saving the preset will update the preset, but the 'Current Settings' will remain unchanged. In order to update the operation of the transmitter, the preset must be re-activated through the top banner.
-
- An asterisk next to the preset name in the top banner indicates the 'Current Settings' have changed from the last loaded preset. 'Current Settings' are not saved through a power cycle; when recovering from an AC power loss event, the transmitter will load the preset that was last activated.
- On the presets page, an asterisk next to the preset name in the header indicates there are unsaved changes to the preset.

See the updated NX transmitter operations manual for illustrated information on operating presets.

- This release includes the ability to indicate an 'Invalid Preset' condition with a digital output on the remote I/O. This condition indicates that an unsaved change has been made to a preset, changing the current settings of the transmitter. This is the same condition that adds an asterisk to the beginning of the active preset name in the top banner of the AUI.
- This release includes improvements to preset management, where presets cannot be deleted if they are currently active, used in the scheduler, used as an audio loss fallback preset or used in the remote I/O.
- In this release, the presets page in the AUI has been divided into four tabs: 'General', 'Analog Settings', 'Digital Settings' and 'Audio Loss'. The 'Analog Settings' and 'Digital Settings' tabs are populated according to the selected transmission mode. See the updated operations section of the NX manual for a detailed description of each tab.
- This release includes the ability to copy pre-correction settings from one exciter to the other. The settings that can be copied include the AM-AM curves, AM-PM curves, equalization curves and configurations.
- This release includes the addition of the ability to link pre-correction settings to presets through a mechanism called 'Configurations'. A configuration is created in the Pre-correction Settings menu and includes settings for Mag-Phase delay, B+ setpoint, AM-AM curve, AM-PM curve and equalization curve.

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Nautel Software Bulletin

November 6, 2015

Created configurations can then be called up in a preset, and be used to adjust these settings depending on the transmission mode setting of the transmitter. These settings will normally be generated at the factory, based on the desired modes of operation, and do not require adjustment in the field. See NX transmitter operations manual for more information on configurations and presets.

- This release includes the addition of the ability to synchronize the transmitter's clock using Network Time Protocol (NTP) once directed to a NTP server.
- In this release, power modules, previously referred to as 'Cubes' in the AUI, are now referred to as 'Power Modules' or abbreviated as 'PM' when necessary.
- In this release, the maximum number of alarms that can trigger a notification has been increased from 128 to 65535
- This release adds the ability to save the list of visible meters on the main screen of the AUI. A default list can also be set, defining the meters that appear after an ac cycle. Saved meter lists are also linked to user accounts, so the default list on a given account will appear when that account is accessed.
- This release includes improvements which provide feedback as to why actions cannot be performed. Indicated restrictions include local/remote mode, user permissions and setting ranges.
- In this release, 'DCC1' mode has been properly labeled in the Dynamic Carrier Control setting in presets.
- In this release, the pre-emphasis curve has been properly identified as being that defined in the NRSC-1 standard.
- This release resolves an issue where the transmitter output power would overshoot and cause power supply transients when switching between analog and DRM modes of transmission. In this release, the transmitter will shut down and ramp up to the desired power level when switching between these modes.
- In this release, set-point precision is now limited to a level that is reasonable for the transmitter type. NX25 & NX50 set-point precision is limited to 0.1 kW. NX100+ set-point precision is limited to 1kW
- This release includes the ability to add a name(i.e. a call-sign) to the top banner. This allows the transmitter to be uniquely identified when accessing multiple transmitters via remote AUI.
- This release includes the addition of an audio player that can be used as a backup audio source. Use of the audio player requires the purchase of a USB sound card available from Nautel. See the updated operations section of the NX manual for more information.

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- In this release, when a preset is selected with a 0W setpoint, the behaviour of the transmitter has been changed to essentially be the same as if the interlock has been opened. PDM is immediately inhibited, and after 10 seconds the transmitter will shut down. Once a preset is selected with a setpoint greater than 0W, the transmitter will turn on with the normal procedure.
- This release includes the ability to change the IP address port to which the transmitter is listening, which facilitates the use of port forwarding on the firewall/router at the transmitter site. This allows the transmitter to be set to listen to a specific port that is open in the firewall if it is different from the default. This also enables connections to multiple transmitters behind a single firewall. Note that the port number for external connections to the firewall and the port number the transmitter is mapped to MUST be the same.

IBOC Specific

- This release includes an update to the AM IBOC mask to meet the NRSC-5C specification, allowing for IBOC modes that turn off the tertiary carriers.
- This release includes the addition of the ability in IBOC mode to turn enhanced carriers on/off and change the PIDS power levels between high/low on the Exgine through the AUI.
- This release resolves an issue where erroneous Exgine alarms were being displayed.
- In this release, various Exgine alarms will now be displayed in the AUI to provide more information on the status of the Exgine. The added alarms include:
 - System Error - General fault summary alarm.
 - External 10MHz Lost - The external 10 MHz signal is not detected by the Exgine.
 - FIFO Underflow - The Exgine waveform FIFO is overflowing, likely due to clock drift between the Exporter and Exgine.
 - FIFO Overflow - The Exgine waveform FIFO is underflowing, likely due to clock drift between the Exporter and Exgine
 - Ethernet Link Down - The Exgine is not able to communicate with the Exporter.
 - Network Misconfigured - The current network settings are incorrect.
 - DPLL Unlocked-The VCXO in the 10 MHz PLL is being pulled beyond its +/- 1ppm limit.

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November 6, 2015

- AM/FM Mode Mismatched - Exporter/Exgine AM/FM mode misconfiguration.
- This release resolves an issue where the progress bar which was displayed when applying settings to the Exgine would never update.
- This release resolves an issue where if the transmission mode was switched from IBOC to Analog AM, the IBOC related I/Q alarm "Serial B Missing" would not clear.
- This release includes the ability to view the constellation and take real-time MER measurements of individual sub-carrier groups in the signal seen at the output of the transmitter when running in IBOC mode.

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