3: OPERATIONS & MAINTENANCE MANUAL

GV30N TRANSMITTER

PARTIAL MANUAL - ONLY UPDATED SECTIONS PROVIDED

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making digital broadcasting work

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RELEASE CONTROL RECORD

ISSUE	DATE	REASON
4.0	2024-04-12	Supports software GV SW 6.0.0.

SECTION 3.2: OPERATING THE TRANSMITTER

This section provides information about operating the GV30N transmitter:

User Interface Options

The user can interface with the GV30N using one of four methods:

- Locally, using the 17-inch front panel touch screen AUI (Advanced User Interface) (see Advanced User Interface (AUI), on page 3.2.9).
- Locally, using the controller module's front panel display and its navigational buttons (see Controller Front Panel UI (User Interface), on page 3.2.114) and the RF On, RF Off and Local/Remote control push-buttons (see Controller Pushbuttons, on page 3.2.116).This interface is considered a backup to the local AUI.
- Remotely, via a LAN connection, using the Advanced User Interface (AUI) pages (same as local AUI interface).
- Remotely, via remote input/output (I/O) wiring connected to the controller (A4) or the remote interface PWB (A16) (see the GV30N Pre-installation Manual for I/O details).

See the complete menu hierarchy illustrated in Figure 3.2.1 (for the local/remote AUI menu) and Figure 3.2.2 and Figure 3.2.3 (for the controller UI menu). When a user interfacing function can be performed from both the AUI and the controller UI, both are described in this section.

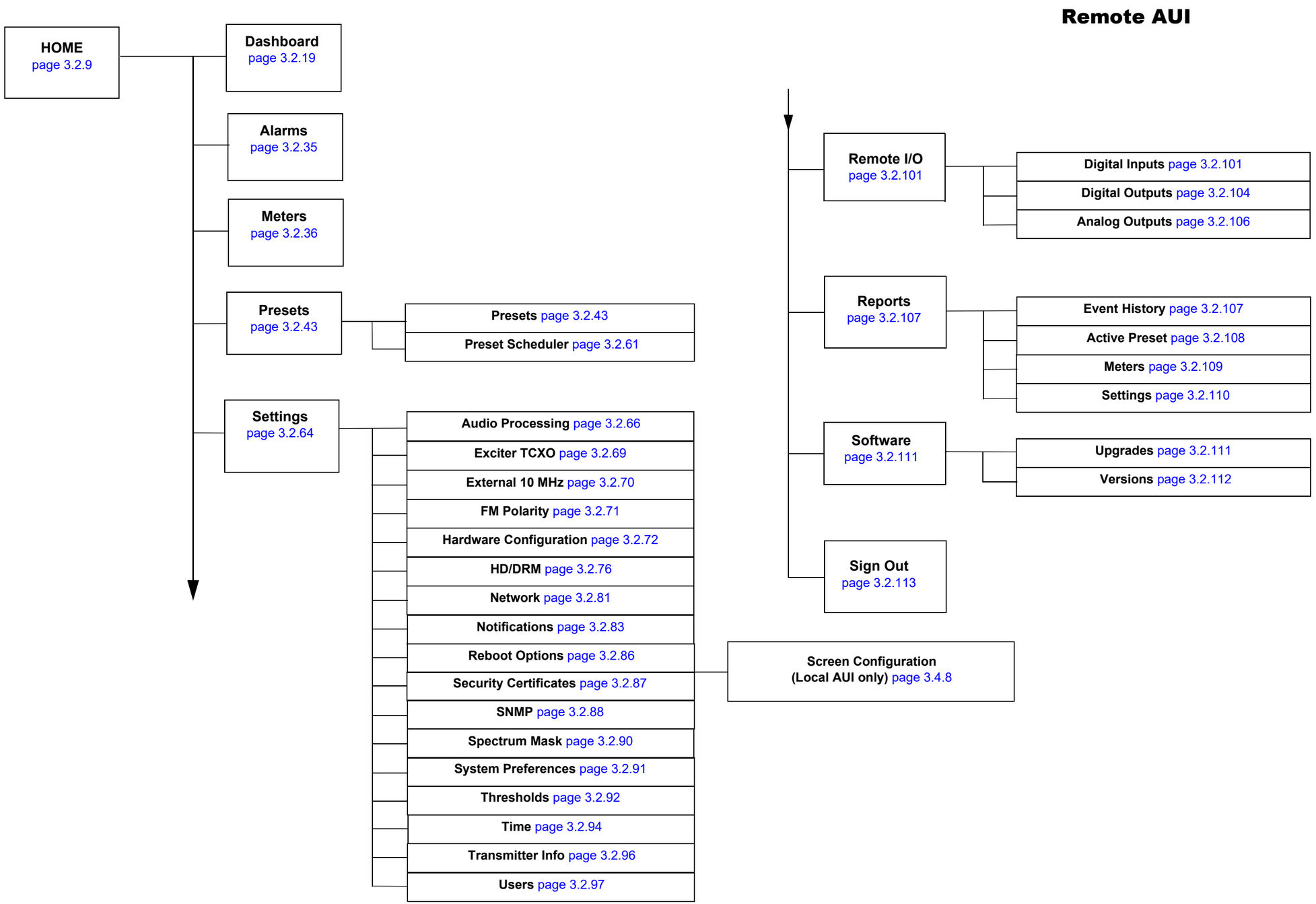


Figure 3.2.1: GV Transmitter AUI Flow Diagram

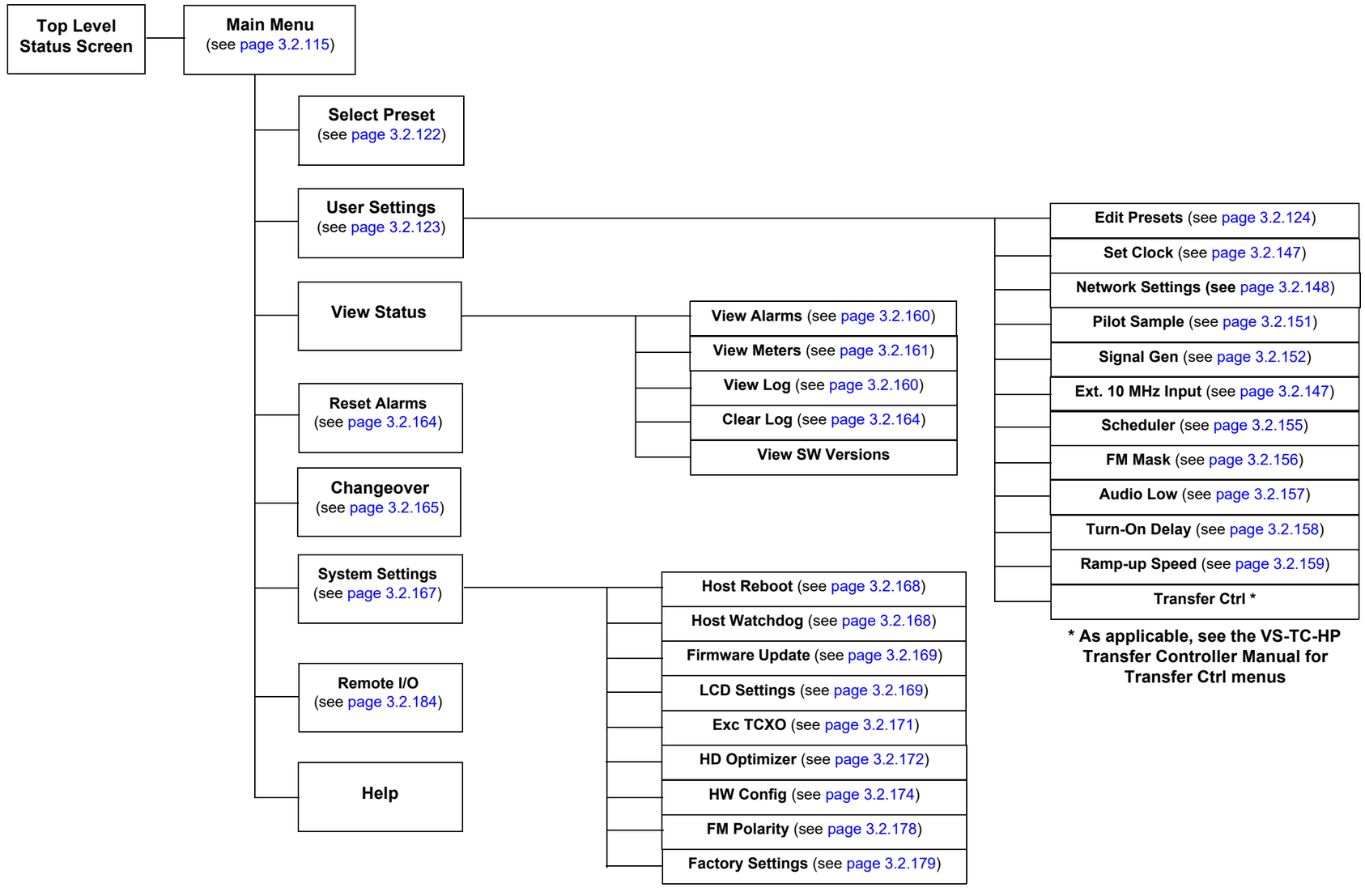


Figure 3.2.2: GV Transmitter - Controller UI Menu Tree (Sheet 1 of 2)

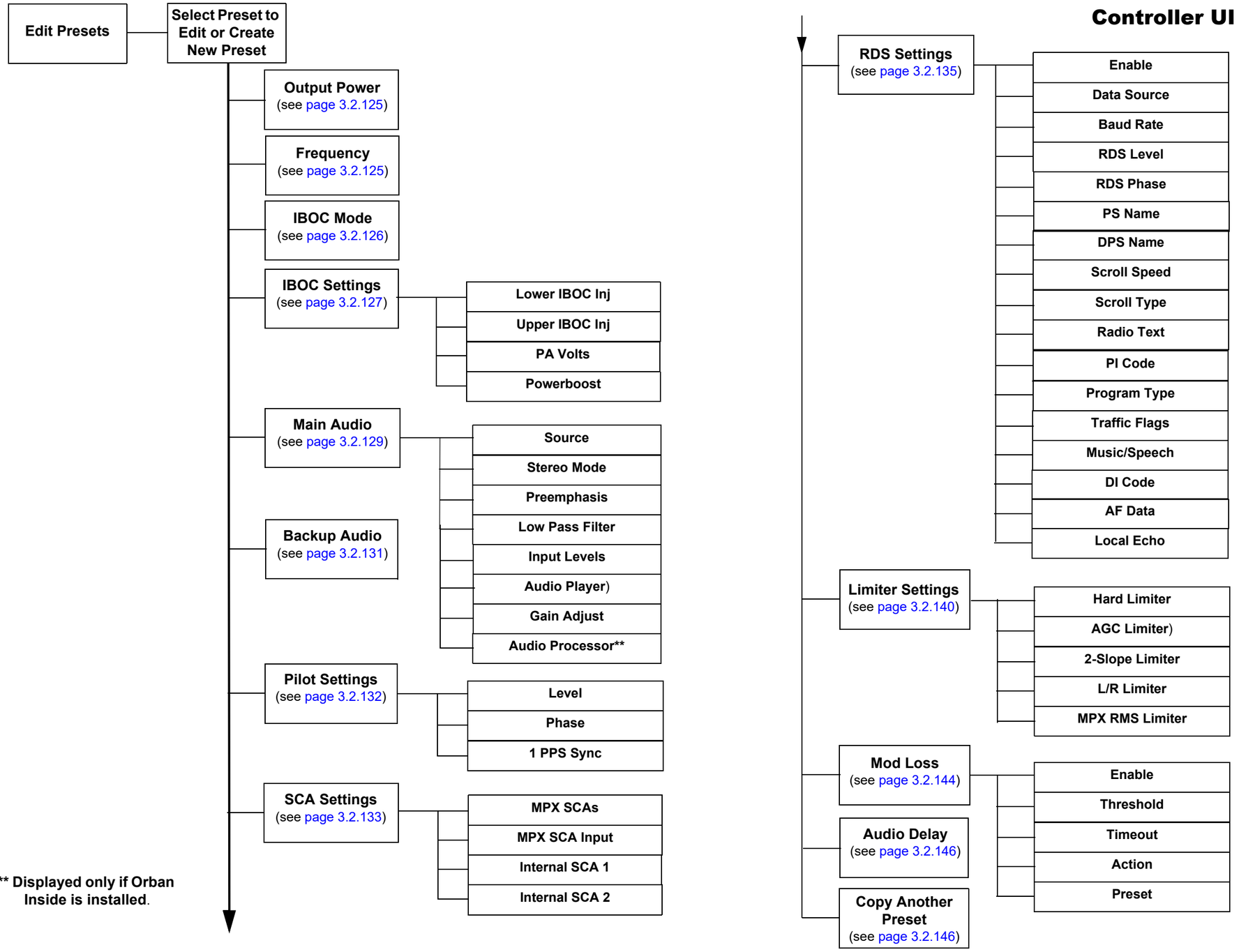


Figure 3.2.3: GV Transmitter - Controller UI Menu Tree - Edit Presets (Sheet 2 of 2)

Advanced User Interface (AUI)

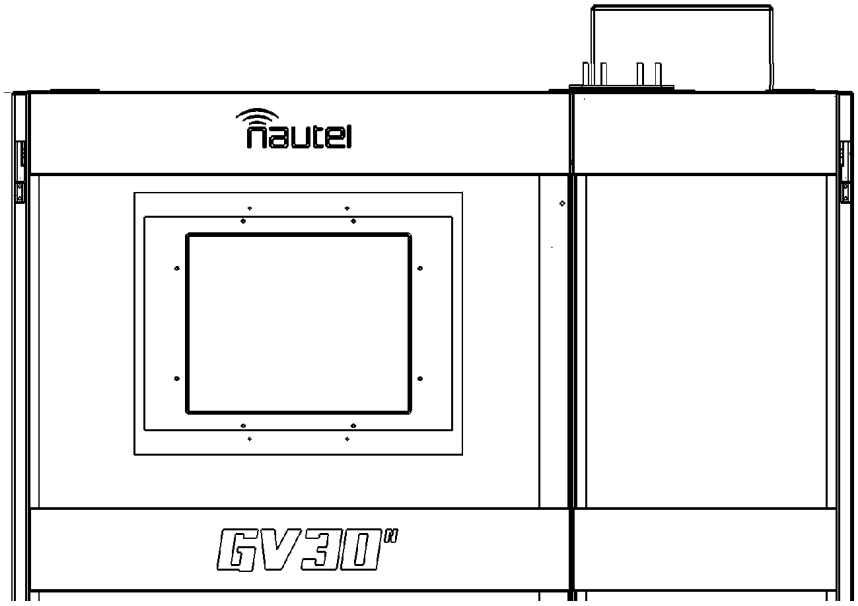
The GV30N has an Advanced User Interface (AUI) that is displayed on a 17-inch, colour LCD screen mounted on the front of the transmitter (see Figure 3.2.4). You can access the AUI:

- locally via the touch screen, or
- remotely using a PC and a web browser, directly or through a switch or network - via the controller module's (A4) rear panel LAN connection or the remote interface PWB's (A16) LAN connection (J1), behind the front door.

NOTE: It is recommended the browser history be cleared before viewing the remote AUI.

This section includes the following topics:

Figure 3.2.4: GV30N AUI



Logging into the AUI

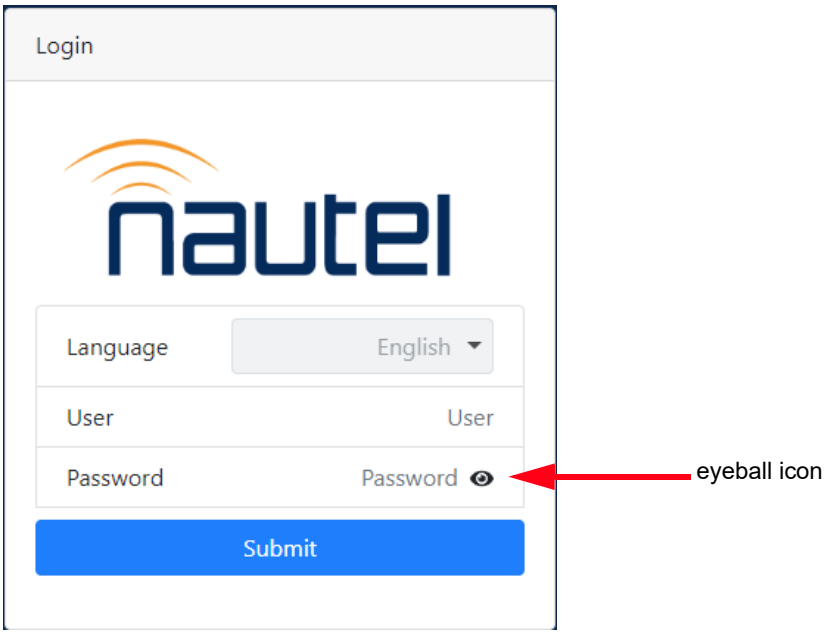
The transmitter's AUI provides a means to restrict local and remote access to transmitter control functions to authorized users only. Users can create accounts that can be pre-defined to set access restriction from view-only (no control), full control (all permissions), custom (select permissions) and administrative control.

Remote Access

To access the transmitter's AUI remotely, perform the following steps:

1. Configure your network settings (see Network, on page 3.2.81).
2. On your router or firewall software, open ports 3501 (3501 is factory default; use corresponding other port if changed) and 80 and close (restrict access to) all other ports. If you are using RDS data, open port 7005. If you are using SNMP, open ports 161 (Agent) or 162 (Traps).
3. When properly configured as noted above, the login menu (see Figure 3.2.5) will appear in your web browser when the IP address is accessed. Your IP address and any login messages appear in a box at the top, beside the logo.
4. If the login menu does not appear, then the IP address is incorrect, however, if you enter the login credentials and press submit and you get an error, then your login is incorrect. Consult the documentation for the User Accounts page (Users on page 3.2.97).

Figure 3.2.5: AUI Login Menu



5. Log in to the AUI by entering the appropriate parameters in the login window.

- In the Language field (if applicable), press the down-arrow to review a drop-down menu displaying the available language options, and select one.
- In the User field, there are two logins available: Admin and Viewer.
- In the Password field, enter the password. If using Admin, the default password is change_me. If using Viewer, the default password is blank. Click on the eyeball icon to see the characters of the password.

NOTE: The Nautel AUI is factory configured with a default login username and password. Nautel recommends that you change the password to improve overall system security (see Set or Change the Password, on page 3.2.99).

- Press Submit to accept your login parameters and display the AUI home page. Note: The opening screen (the Home page) will have the layout from the previous login session.

NOTE: If you do not have a user account, it must be set up by an existing user with proper permissions. See Setting Permissions, on page 3.2.98.

NOTE: If no login attempt is made after 60 seconds, a timeout feature will be activated and the web browser will be need to be refreshed or the Retry button pressed (appears on AUI window after timeout) in order to attempt another login.

Local Access

When properly configured, (but without auto login selected) the login menu will appear on the transmitter 17-inch LCD touchscreen. Log into the AUI by entering the appropriate parameters in the login window.

- In the Language field, press the down-arrow to review a drop-down menu displaying the available language options, and select one.
- In the User field, enter the username. Default is "Nautel".
- In the Password field, enter the password. Default is blank.
- Press Submit to accept your login parameters and display the AUI home page (Figure 3.2.7 on page 3.2.17). Note: The opening screen (the Home page) will have the layout from the previous login session.
- If auto login is set, the AUI will appear automatically without the required previous steps.

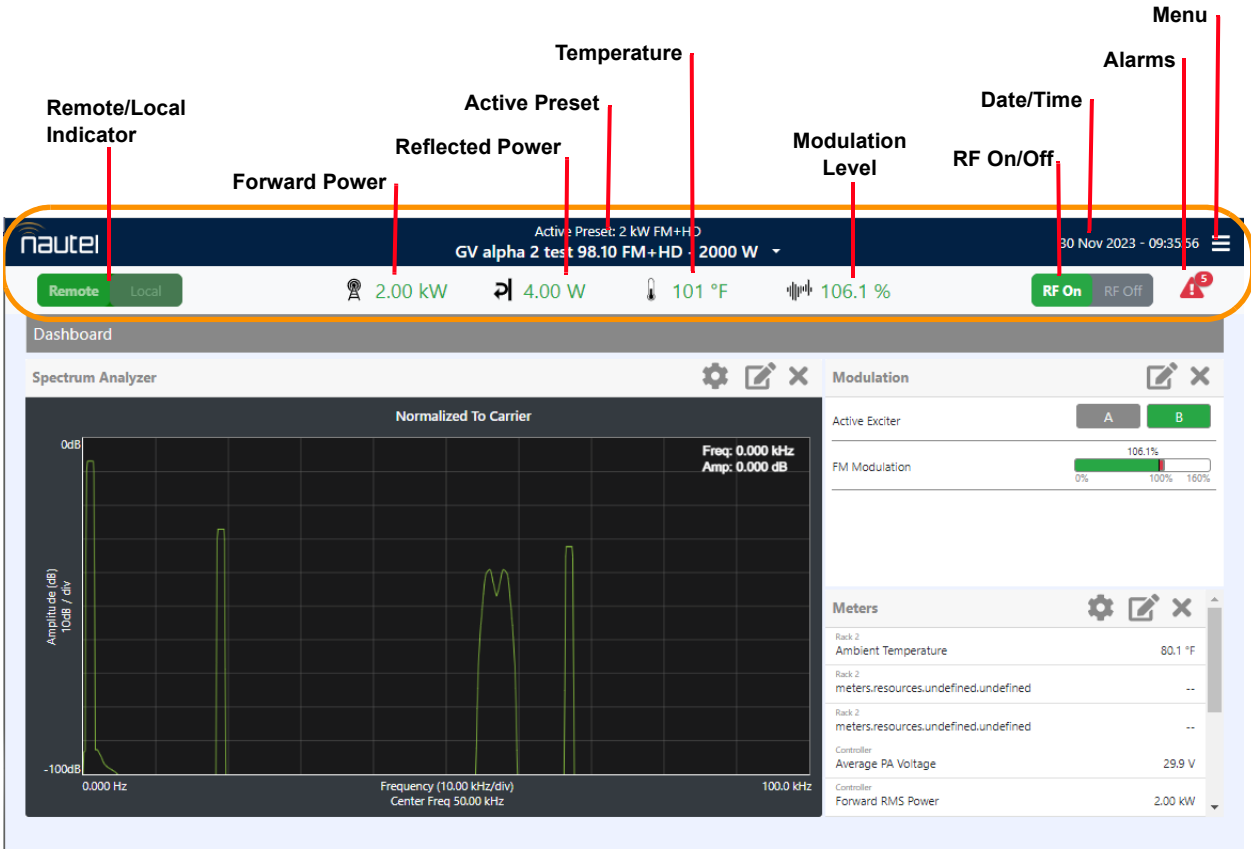
Advanced User Interface

To access the remote AUI, you need a device with an HTML5 capable web browser that is connected to the GV30N - directly or through a switch - via its rear panel LAN connection (A1J8A). The AUI has a wide range of features, including:

- Dashboard (see 3.2.21)
- Alarms (see 3.2.35)
- Meters (see 3.2.36)
- Presets (see 3.2.43)
- Settings (see 3.2.64)
- Remote I/O (see 3.2.101)
- Reports (see 3.2.107)
- Software (see 3.2.111)

Each AUI page provides information about a specific transmitter function. All navigation through the AUI pages begins on the main screen (or Dashboard), shown in Figure 3.2.6 on page 3.2.13.

Figure 3.2.6: Using the AUI (Dashboard Page shown)



Display Area - displays user selected data and instrument panels

- denotes status banner displayed on all AUI pages

The top banner is permanent on all AUI pages and includes:

- Nautel Logo: From any page, click the Nautel logo to return to the Dashboard page.
- Remote/Local: Buttons that determine the location of the operational control of the transmitter. The button that is highlighted green indicates the current setting. If Local is selected, only local control of the transmitter is possible. To change the local/remote status from the controller front panel display, see AUI Menu page on page 3.2.17.

NOTE: Local changes can always be made while Remote access is enabled/disabled using the controller front panel's REMOTE button.

- Forward Power: Displays the current forward power level of the transmitter.
- Reflected Power: Displays the current reflected power level of the transmitter.
- Active Preset: Displays the name of the active preset (e.g., Preset 1), call sign, carrier frequency in MHz, mode (e.g., FM), and power set point. Click the down arrow to see other available presets and initiate a preset change (see Managing Presets - Using the AUI on page 3.2.43).
- Temperature: Displays the current temperature of the Controller's heatsink.
- Modulation: Displays the current modulation percentage of the transmitter.
- RF On/Off: Buttons that determine the on/off status of the transmitter's RF power stage. The button that is highlighted green indicates the current setting. Click RF On to enable the transmitter's RF power stage. Click RF Off to disable the transmitter's RF power stage.
- Date & Time: Displays day, month, year and current time. To set the time, see Time on page 3.2.94.
- Active Alarms: Displays the critical-level alarms (red bell, with number) and maintenance-level alarms (amber warning, with number) that are currently active on the transmitter. Click on either symbol to go to the Alarms page (see Alarms on page 3.2.35), which provides details for current alarms as well as an option to view alarm history. When a critical-level alarm is being reported, the transmitter is in an 'off-air' state. When a maintenance-level alarm is being reported, the transmitter may still be 'on-air', but possibly at reduced power. When the transmitter is operating normally, no alarm symbols will display.
- Menu: Click to display further operations options, which allows navigation to various other pages (see AUI Menu page on page 3.2.17). Note: when Menu is selected, the three horizontal lines change to three vertical lines.

AUI Pages

Table 3.2.1 defines the available AUI pages.

Table 3.2.1: AUI Pages

AUI Page	Function	Page
Dashboard	Present critical data and instruments.	3.2.17
Panel Selector	Choose data and instrument panels for Dashboard.	3.2.19
Menu	Page navigation and AUI logout (see Menu options below).	3.2.34
Menu - Alarms	View active faults.	3.2.35
Menu - Meters	View Exciter and Controller meter lists.	3.2.36
Menu - Presets	Activate, create, and edit presets. Define and manage calendar-based preset schedule.	3.2.43
Menu - Settings	Manage all transmitter settings and options (see Settings options below).	3.2.64
Menu - Settings - Audio Processing	Select and modify Orban Audio Processing presets.	3.2.66
Menu - Settings - Exciter TCXO Calibration	Calibrate the 10 MHz Int-Ext Offset and set the TCXO Offset value.	3.2.69
Menu - Settings - External 10 MHz	Enable or disable the use of an external 10 MHz signal.	3.2.70
Menu - Settings - FM Polarity	Set the polarity for FM deviation; positive modulation signal yields positive frequency deviation or negative modulating signal yields positive frequency deviation.	3.2.71
Menu - Settings - Hardware Configuration	Configure the transmitter for any installed hardware that has optional variations (e.g., quantity of exciters or LVPS modules, fan speed) or is non-standard (e.g., UPS or audio processor).	3.2.72
Menu - Settings - HD/DRM	Configure HD/DRM settings.	3.2.76
Menu - Settings - Network	View network information status.	3.2.81
Menu - Settings - Notifications	Configure alarm notifications and email setup.	3.2.83

Table 3.2.1: AUI Pages

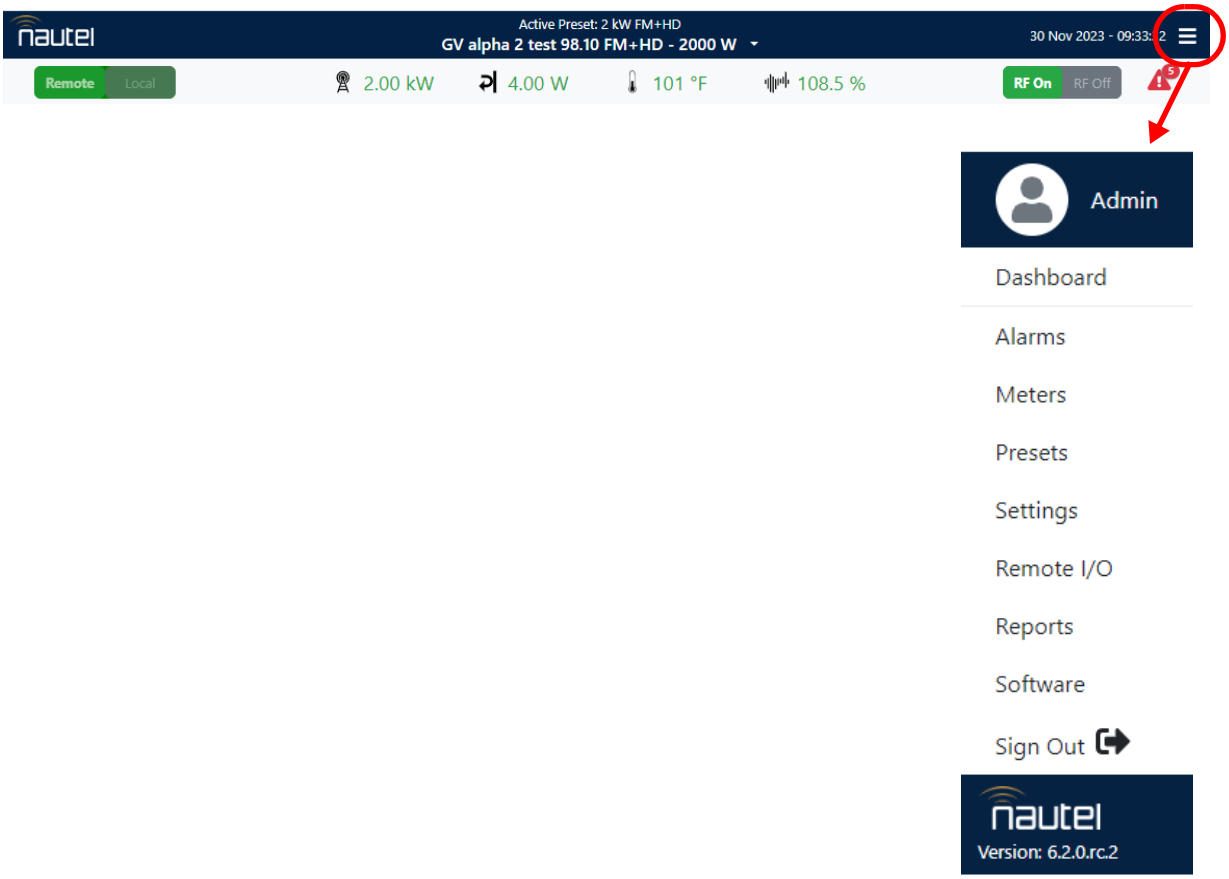
AUI Page	Function	Page
Menu - Settings - Reboot Options	Select Reboot Host, Active or Standby Exciter.	3.2.86
Menu - Settings - Screen Configuration (Local AUI only)	Select Enable Screen Saver and Timeout or perform a Touchscreen Calibration.	3.4.8
Menu - Settings - Security Certificates	Provides an option for enhanced security by uploading a security certificate.	3.2.87
Menu - Settings - SNMP	SNMP agent and traps configuration: enables notifications using a MIB browser and an alternative remote control and access.	3.2.88
Menu - Settings - Spectrum Mask	Select Spectrum mask type: FCC, ETSI or none.	3.2.90
Menu - Settings - System Preferences	Select temperature display: Celsius or Fahrenheit.	3.2.91
Menu - Settings - Thresholds	Set the main audio low and Low Forward Power trip levels.	3.2.92
Menu - Settings - Time	Select NTP, UTC, and set date, time, country and time zone.	3.2.94
Menu - Settings - Transmitter Info	View and enter transmitter name and serial number.	3.2.96
Menu - Settings - Users	Create and edit user accounts and permissions.	3.2.97
Menu - Remote I/O	Define remote inputs and outputs, monitor analog outputs.	3.2.101
Menu - Reports	View and download reports on transmitter operation: event history, active preset, meters, and settings.	3.2.107
Menu - Software - Upgrades	Select and manage installable software.	3.2.111
Menu - Software - Versions	View installed software versions and licenses.	3.2.112
Menu - Sign Out	Sign out of the AUI session.	3.2.113

AUI Menu page

NOTE: Any menu item or feature in the Remote AUI that is grayed out is not available or is disabled.

From the AUI's top banner, click the Menu button to view the Menu page (see Figure 3.2.7). From this page, you can select one of the following sub-menus:

Figure 3.2.7: Main Menu Page



- Select Alarms to view, download or reset any current alarms (see Alarms - see page 3.2.35.
- Select Meters to view real time meters, selectable for Exciter (or HD Exciter), Power Module, Controller or Rack (see Meters - see page 3.2.36.
- Select Presets to view, load or edit available presets, create new presets, or to view, create or edit a preset schedule (see Presets - see page 3.2.43).

- Select Settings to access a sub-menu of settings options, including:
  - * Audio Processing (see Audio Processing - see page 3.2.66)
  - Exciter TCXO (see Exciter TCXO - see page 3.2.69)
  - External 10 MHz (see External 10 MHz - see page 3.2.70)
  - FM Polarity (see FM Polarity - see page 3.2.71)
  - Hardware Configuration (see Hardware Configuration - see page 3.2.72)
  - * HD/DRM (see HD/DRM - see page 3.2.76)
  - Network (see Network - see page 3.2.81)
  - Notifications (see Notifications - see page 3.2.83)
  - Reboot Options (see Reboot Options - see page 3.2.86)
  - Screen Configuration (see Screen Configuration (Local AUI only) - see page 3.2.87
  - Security Certificates (see Security Certificates - see page 3.2.87)
  - SNMP (see SNMP - see page 3.2.88)
  - Spectrum Mask (see Spectrum Mask - see page 3.2.90)
  - System Preferences (see System Preferences - see page 3.2.91)
  - Thresholds (see Thresholds - see page 3.2.92)
  - Time (see Time - see page 3.2.94)
  - Transmitter Info (see Transmitter Info - see page 3.2.96)
  - Users (see Users - see page 3.2.97)

NOTE: * - If not installed on your transmitter, this option is shown greyed out and cannot be accessed.

- Select Reports to view or download the Alarm History (see Reports - see page 3.2.107).
- Select Software to view software versions or perform a software upgrade (see Software - see page 3.2.111).
- Select Sign Out to log out of the AUI session and return to the login menu. See Software Versions - see page 3.2.112. To log in again, use your remote PC's keyboard to enter your Username and Password, then click the Submit button. If you do not have a user account, see AUI Pages - see page 3.2.15.

Managing and Displaying Dashboard Panels

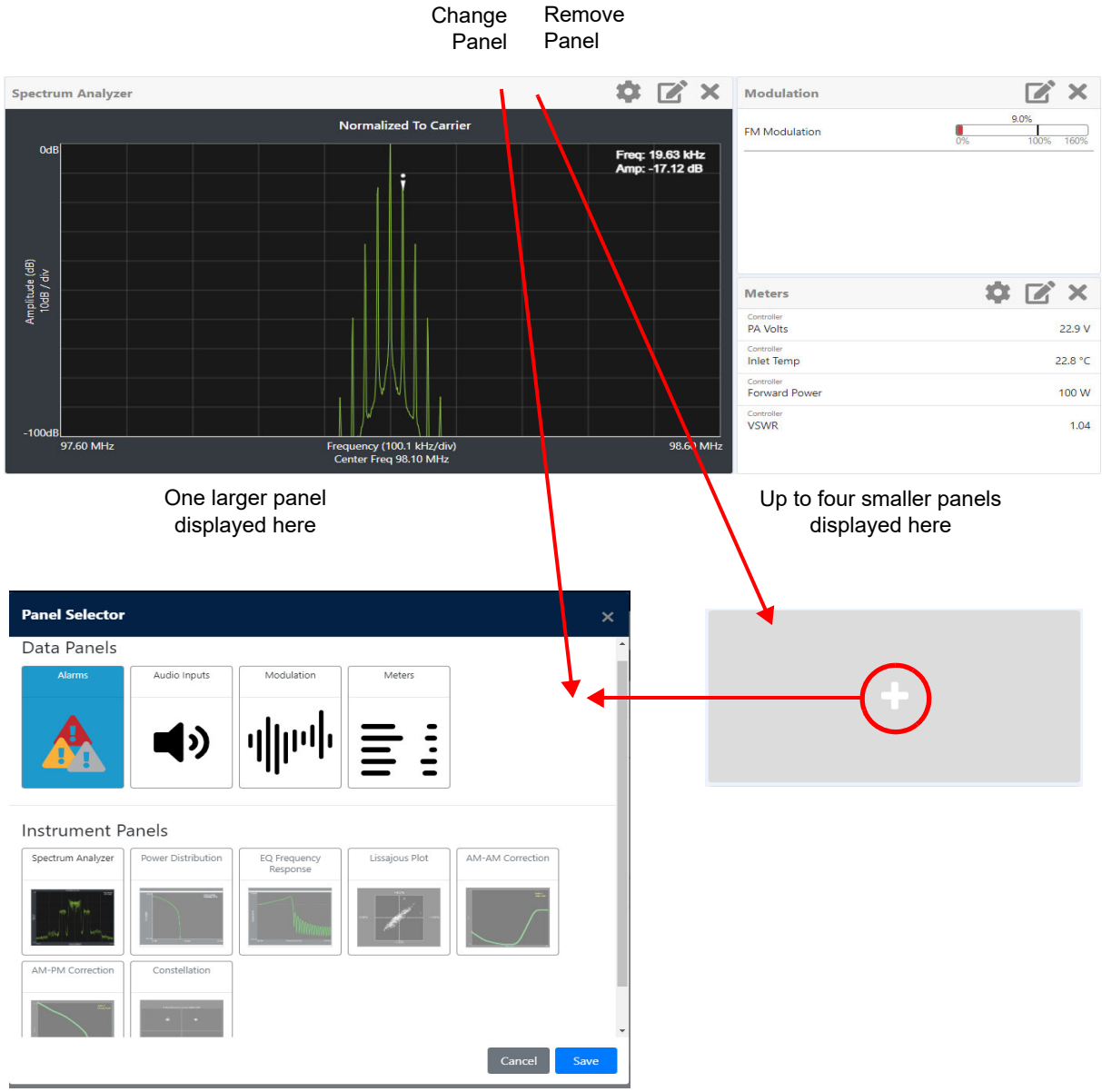
This section includes the following topics:

The AUI provides up to five measurement/status related tools, or panels, that you can select to display on the AUI's Dashboard (see Figure 3.2.8 on page 3.2.20).

Up to five panels can be displayed at one time, a larger panel on the left-hand side of the Dashboard and four smaller panels on the right-hand side.

To view all the panel options, select the Change Panel (edit) icon in the top, right corner of any displayed panel. You can also remove a panel by clicking the Remove Panel (X) icon in its top, right corner, then replace it by clicking the + symbol to see the panel options. See Figure 3.2.8 on page 3.2.20 for a more detailed view of the panel options.

Figure 3.2.8: Panels displayed on Dashboard

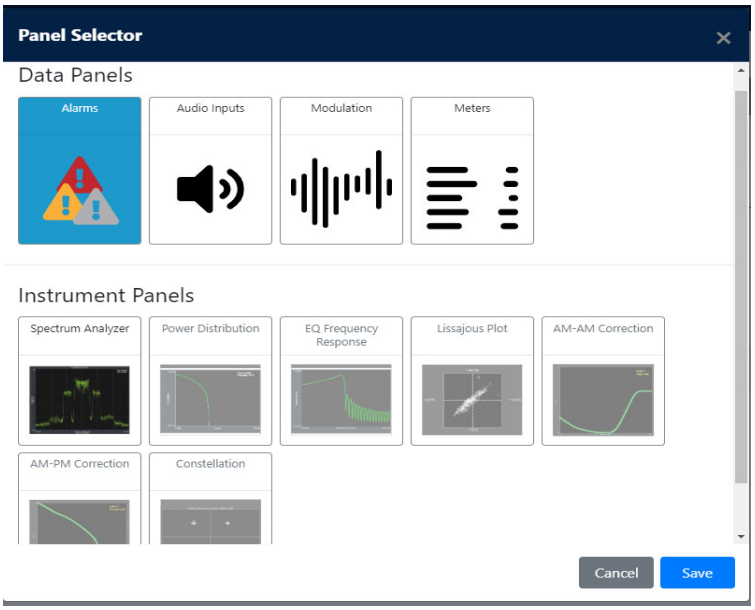


Describing Dashboard Panel Options

Click on the desired panel to display it. See Table 3.2.2 on page 3.2.22 for a description of each panel, noting there are two types - Data Panels and Instrument Panels. Data Panels display read-only measurement data. Instrument Panels display graphical information with varying levels of cursor interactivity, depending on the panel. See Figure 3.2.9.

The Reference column of Table 3.2.2 on page 3.2.22 includes a section to find more detail for each panel.

Figure 3.2.9: Panel Options



NOTE: If HD is not enabled, the following Instrument Panels will be greyed out:

- Power Distribution
- AM-AM Correction
- AM-PM Correction

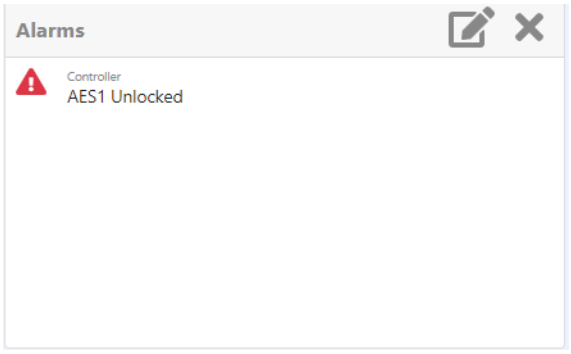
Table 3.2.2: Dashboard Panels

Panel	Description	Page
Alarms	Active transmitter alarms listing.	3.2.23
Audio Inputs	Graphic meters for audio inputs.	3.2.23
Modulation	Active exciter indicator and graphic modulation meter.	3.2.24
Meters	Customizable transmitter meter list.	3.2.24
Spectrum Analyzer	Graphical instrument that visualizes RF output.	3.2.26
Power Distribution	Graphical instrument that displays a CCDF plot that indicates the probability of exceeding a given power level, based on the average power level. Aids in determining peak power capability.	3.2.28
EQ Frequency Response	Graphical instrument that displays the frequency response of the modulator's EQ filter.	3.2.29
Lissajous Plot	Graphical instrument that displays a Lissajous figure that represents the relationship between two applicable channels (either L and R or I and Q).	3.2.30
AM-AM Correction	Graphical instrument that displays the amplitude compensation being applied to the magnitude signal.	3.2.31
AM-PM Correction	Graphical instrument that displays the phase compensation being applied to the phase signal.	3.2.32

Alarms

See Figure 3.2.10. Displays active transmitter alarms, including critical alarms (red) and warning alarms (amber). A scroll bar will display, as required. The alarms listed in this panel should match the number of critical and warning alarms shown in the top banner of the AUI. Go to the Menu - Alarms page for alarm details (see Alarms on page 3.2.35).

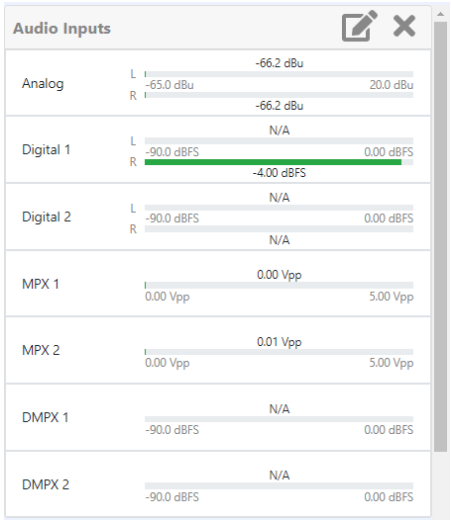
Figure 3.2.10: Alarms Panel



Audio Inputs

See Figure 3.2.11. Displays preset audio inputs and monitor the levels relative to the input level defined in the active preset. Each audio input has a line that displays the current level (green bar), its peak level (black dot and shown numerically) and its full-scale value. If the input's level exceeds the full-scale value, the current level bar colour changes to red.

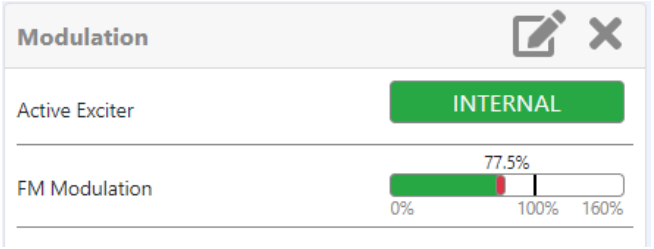
Figure 3.2.11: Audio Inputs Panel



Modulation

See Figure 3.2.12. Displays the active exciter's status (internal or external) and FM modulation level for the current preset. The current modulation level is displayed as follows: (green bar), its peak level (black line and shown numerically) and its full-scale value (typically 100%). If the input's modulation exceeds the full-scale value, the bar colour changes to red.

Figure 3.2.12: Modulation Panel



Dashboard Meters

See Figure 3.2.13. Displays a customizable list of transmitter meters, including a scroll bar. Select a meter by clicking the box adjacent to the meter parameter, a blue check mark will indicate it is selected and click Save to display the parameters on the Dashboard. See Figure 3.2.14 on page 3.2.25.

Figure 3.2.13: Dashboard Meters Panel

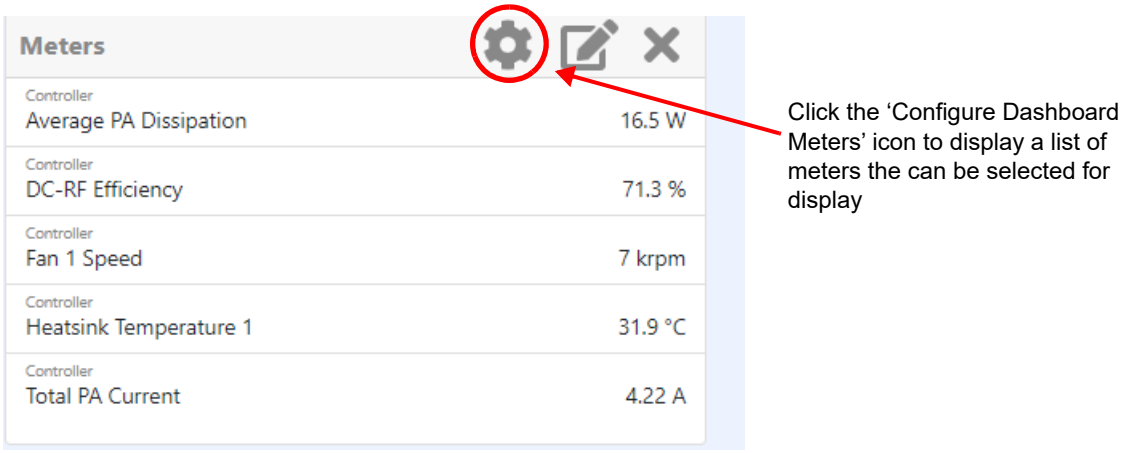
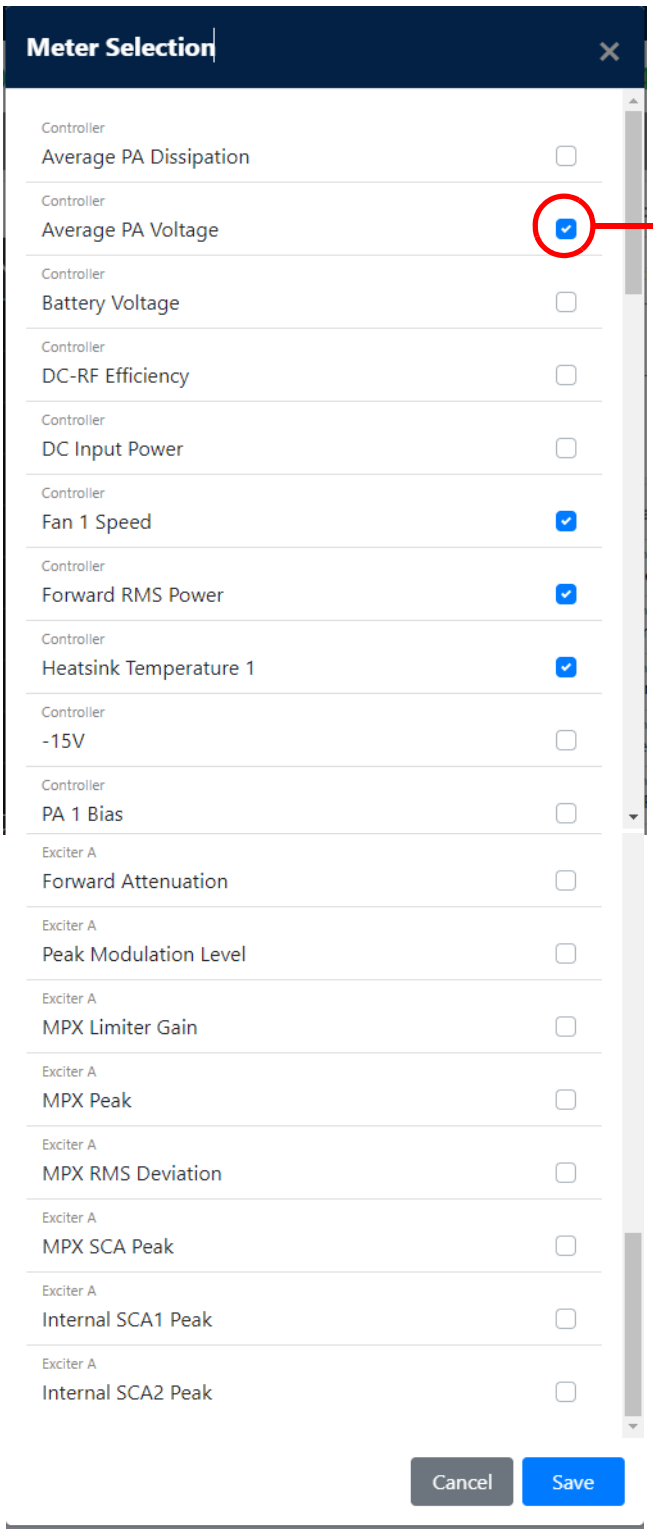


Figure 3.2.14: Dashboard Meters Selection

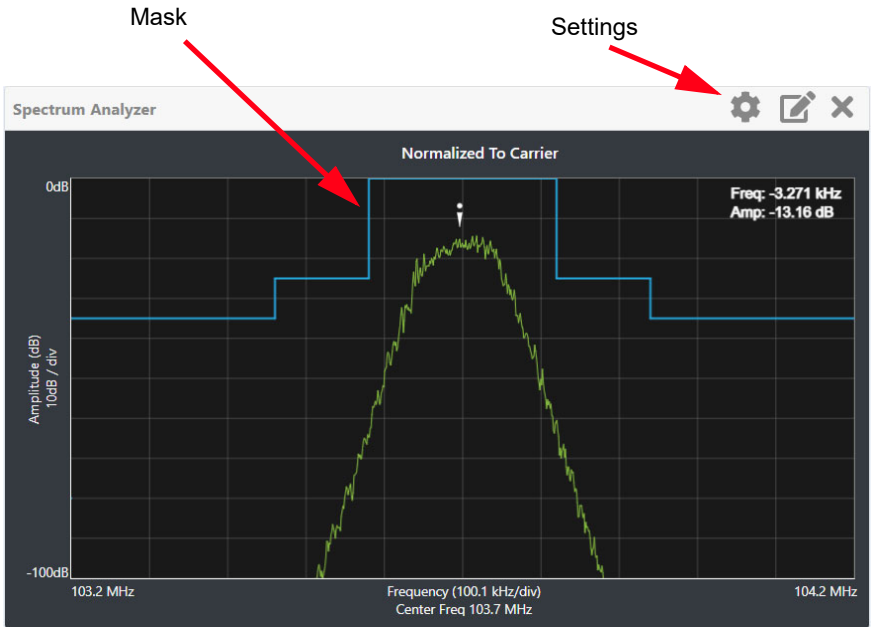


Check the 'box' icon to display meters on the Dashboard

Spectrum Analyzer

See Figure 3.2.15. The carrier level is normalized to its unmodulated carrier level at 0 dB. The graph center is always at the carrier frequency, as defined by the active preset's frequency.

Figure 3.2.15: Spectrum Analyzer Panel



Masks are shown based on transmission mode and are defined by the latest versions of the following standards:

- IBOC: NRSC-5
- European Standard: ETSI EN 302 018-2
- FCC CFR 47, Part 73.317 and IC BETS-6e

Refer Spectrum Mask, on page 3.2.90 to set the mask type.

NOTE: While very accurate, the spectrum analyzer may display artifacts (spurs) as some operating carrier frequencies that are a function of the analyzer and are not actually present on the output of the transmitter. If these spurious emissions are observed on the spectrum analyzer, Nautel recommends that a calibrated, external spectrum analyzer be used to verify the presence of spurs.

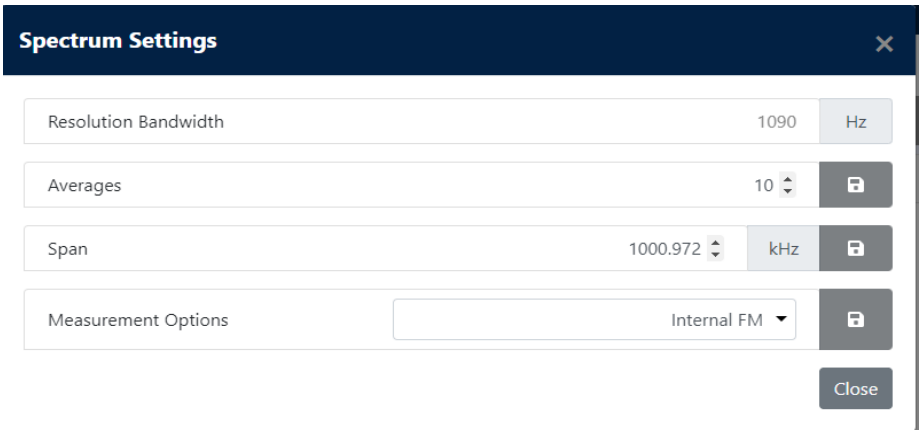
Click the panel to display a cursor on the nearest peak on the spectrum. The cursor position (frequency and amplitude) is noted in the upper, right-hand corner of the panel.

Click and hold the left mouse button and move the cursor to make fine adjustments.

Click the "Settings" button to gain access to spectrum settings (see Figure 3.2.16) such as:

- Resolution Bandwidth: determines the FFT bin size or the smallest frequency that can be resolved. Allowable range is 75 - 10,000 Hz. Default setting is 1000 Hz.
- Averages: determines the number of averages that the analyzer performs per sweep. Press the Clear Averaging button to restart the averaging process. Allowable range is 0 - 100 kHz. Default setting is 19.
- Span: determines the start and stop frequencies of the analyzer with the carrier frequency always at the center. Allowable range is 10 - 1200 kHz. Default setting is 1000 kHz.
- Measurement Options: determines the source of the spectrum plot that is being displayed. Selecting Internal (FM) uses the exciter's RF signal, before being equalized (if applicable). FM spectrum analyzer bandwidth is defaulted to 1 MHz, but can be increased to 1.2 MHz. Selecting MPX bandwidth displays the entire composite baseband signal (100 kHz wide). For VS-HD systems, selecting Internal (Hybrid) displays the signal that will be produced by the exciter and selecting TX Output/External displays the exciter's RF sample feedback to display the transmitter's RF output spectrum.

Figure 3.2.16: Spectrum Settings



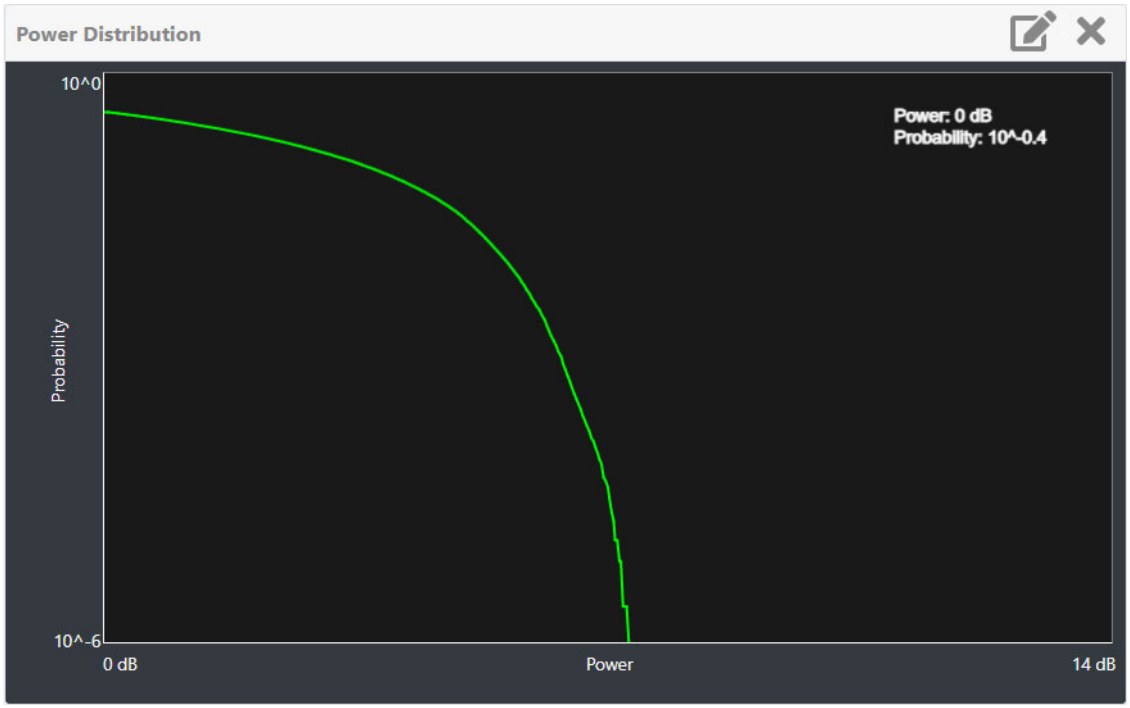
NOTE: The FM spectrum analyzer displays the ideal spectrum generated by the DSP. It is not necessarily the same as the spectrum seen at the RF output.

Power Distribution

See Figure 3.2.17. The exciter measures the relative power levels of the signal and determines the probability of exceeding a given power level, relative to the average power. The data is plotted in the Power Distribution Plot as a CCDF (complementary cumulative distribution function). The x-axis displays the relative power level in dB, with the reference representing the average power. The average power is 0 db. The y-axis displays the probability of exceeding that power level. This plot can be used to assess the distribution of a given signal, and provides an indication of the amount of peak power capability required from the transmitter in order to prevent peak clipping/distortion of the output signal.

Click on the panel to display a cursor in the approximate area. The cursor position (Power and Probability) is noted in the upper, right-hand corner of the panel. Select other areas of the panel to provide a coarse adjustment of the cursor position.

Figure 3.2.17: Power Distribution Panel



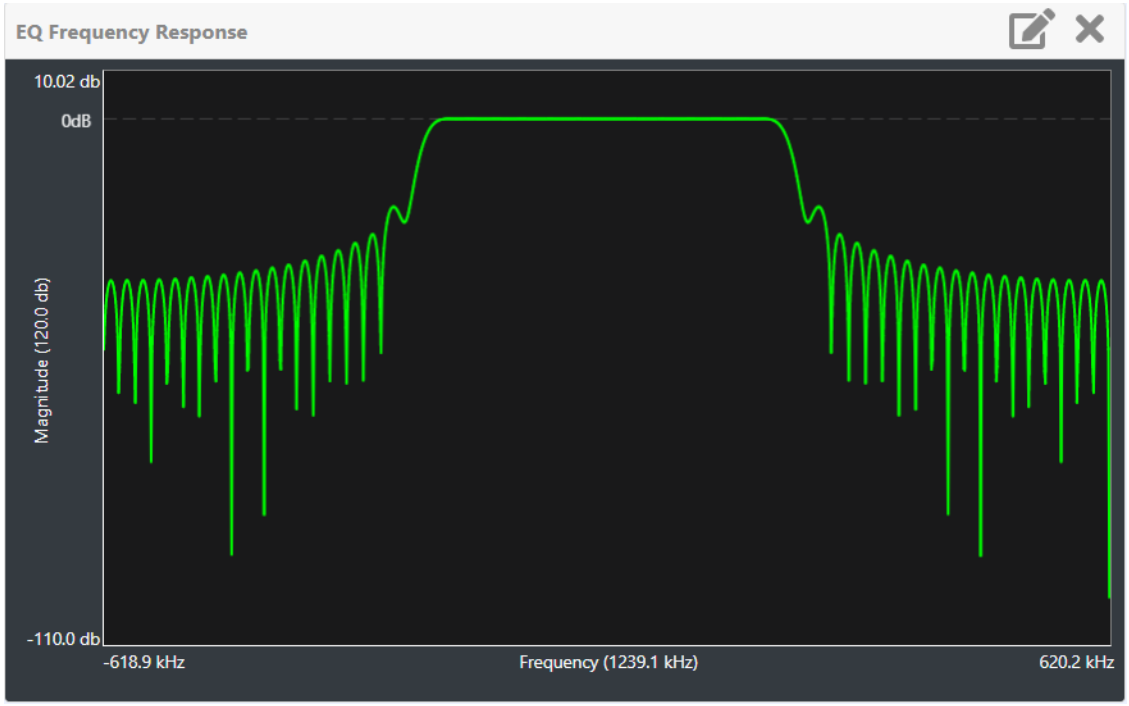
EQ Frequency Response

See Figure 3.2.18. This panel displays the frequency response of the exciter's EQ filter. The panel displays the gain of the filter with respect to the magnitude and frequency of the modulating signal. A dashed line is displayed at the 0 dB level.

This tool is useful for installations featuring filter coefficients loaded to compensate for a channel combiner response.

Click on the panel to display a cursor in the approximate area. The cursor position (Frequency and Magnitude) is noted in the upper, right-hand corner of the panel. Select other areas of the panel to provide a coarse adjustment of the cursor position.

Figure 3.2.18: EQ Frequency Response Panel

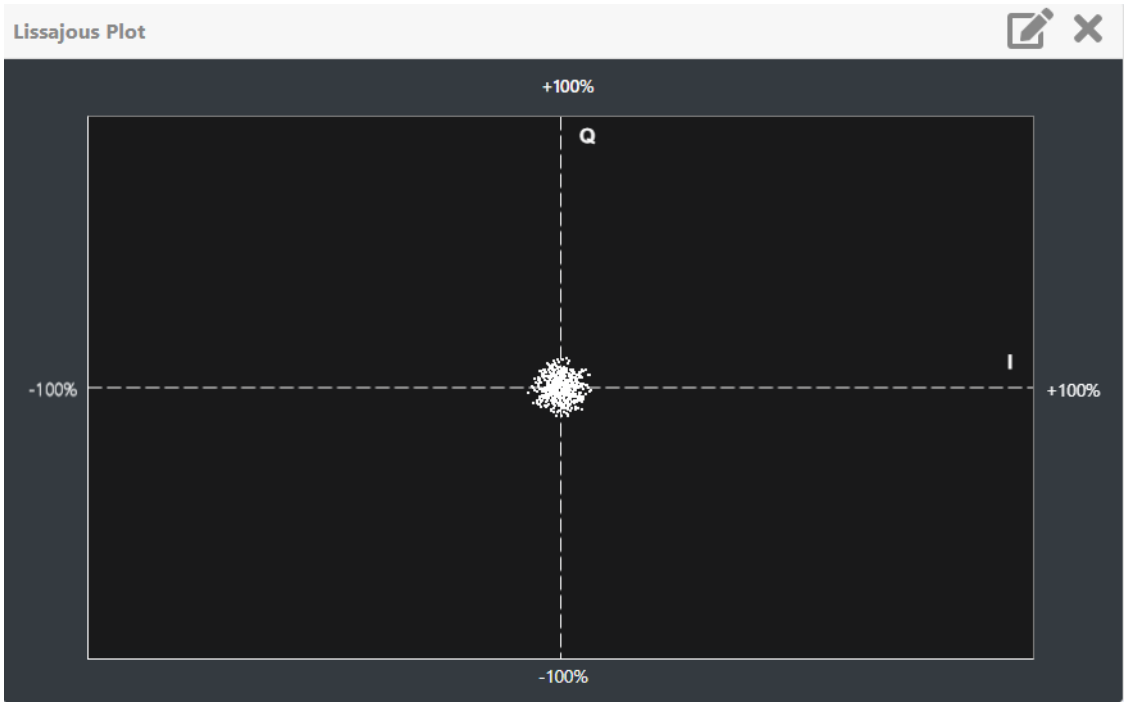


Lissajous Plot

See Figure 3.2.19. This panel displays a Lissajous plot that represents either left and right audio content or a representation of the FM modulated signal (I and Q). I and Q will be automatically selected when using MPX as the main audio source. Left and right audio content is displayed for all other audio sources.

The plot consists of a group of sequential samples to allow signal analysis. In L and R mode, the L+R portion of the signal tends to dominate the plot, resulting in the majority of samples appearing in the lower, left and upper, right quadrants. In I and Q mode, signals that are of equal frequency and 90 degrees out-of-phase result in a circular display.

Figure 3.2.19: Lissajous Plot Panel



L & R mode shown for reference

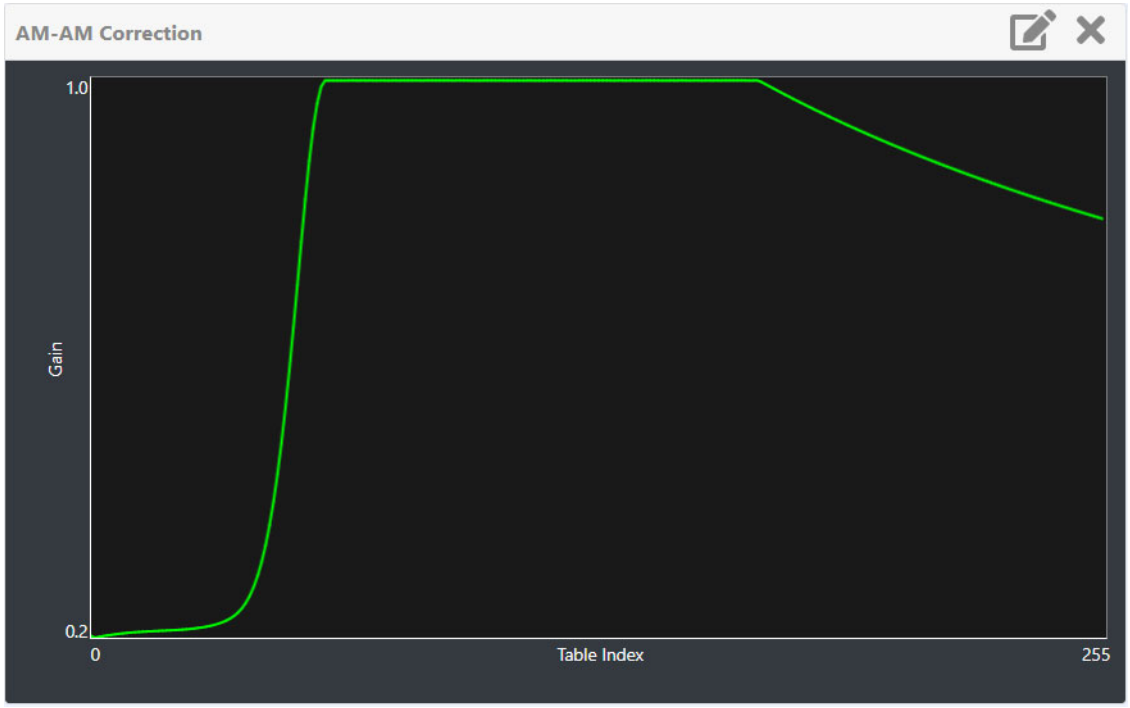
AM-AM Correction

See Figure 3.2.20. This panel displays the amplitude correction being applied to the RF drive signal in order to compensate for the transmitter amplitude (gain) response, which is non-linear. The x-axis represents the signal amplitude and the y-axis represents the gain correction applied for a given amplitude value. A look up table (LUT) index value of 0 represents low transmitter output power (RF drive). A LUT index value of 255 represents the maximum transmitter output power (RF drive).

The LUT curve can show that at low transmitter output power, more RF drive power is required to correct for low final stage amplifier gain - the curve sharply increases as it drops to 0 table value. (This low gain can also be overcome using additional bias, however pre-correction is more efficient.) Equally, the curve could also increase sharply at the top end of the table, suggesting that high RF drive power (gain) is required to connect for low gain at final stage amplifiers (PA compression peak limiting). It is technically the inverse of the transmitter's power amplifier gain response. Click or

Click on the panel to display a cursor in the approximate area. The cursor position (Index and Gain) is noted in the upper, right-hand corner of the panel. Select other areas of the panel to provide a coarse adjustment of the cursor position.

Figure 3.2.20: AM-AM Correction Panel

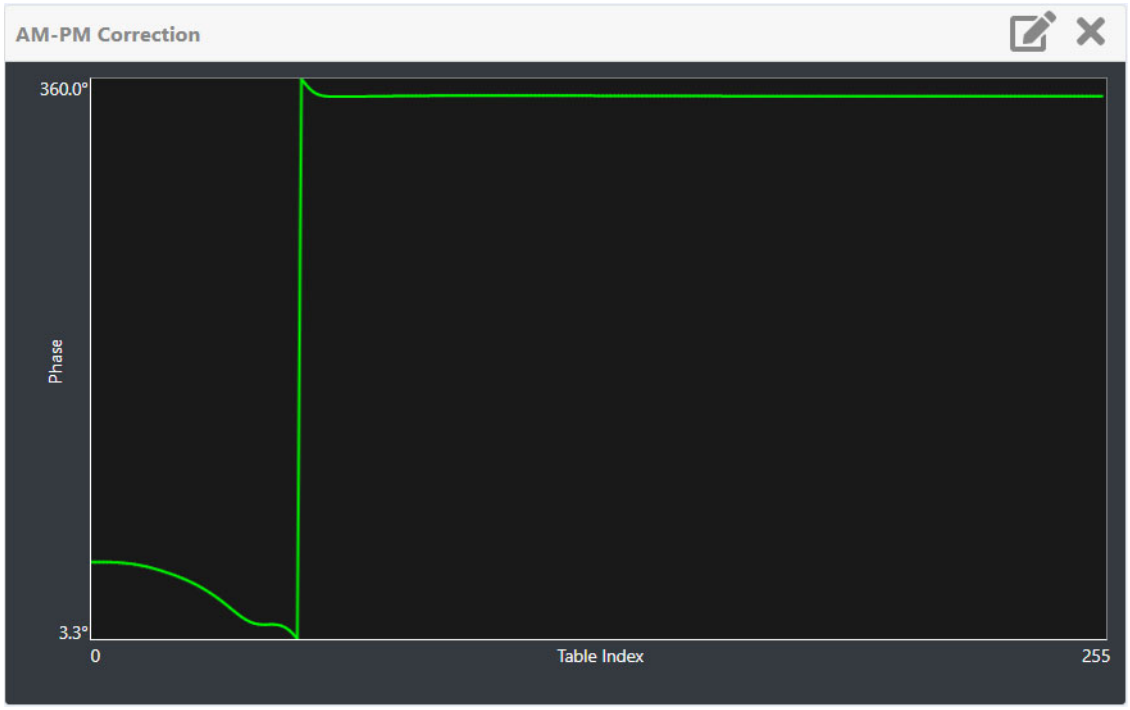


AM-PM Correction

This panel displays the phase correction being applied to the RF drive signal in order to compensate for the transmitter's (exciter +PA stage) phase non-linearity versus the output power. For example, in Figure 3.2.21, the transmitter output power is low, so the curve in the plot shows positive phase correction. Inversely, a negative phase correction will be displayed in the plot given high output power levels. This correction is represented on the plot via the x-axis (table index value of between 0-255). The y-axis represents the phase shift correction applied for a given amplitude value.

Click on the panel to display a cursor in the approximate area. The cursor position (Index and Phase) is noted in the upper, right-hand corner of the panel. Select other areas of the panel to provide a coarse adjustment of the cursor position.

Figure 3.2.21: AM-PM Correction Panel



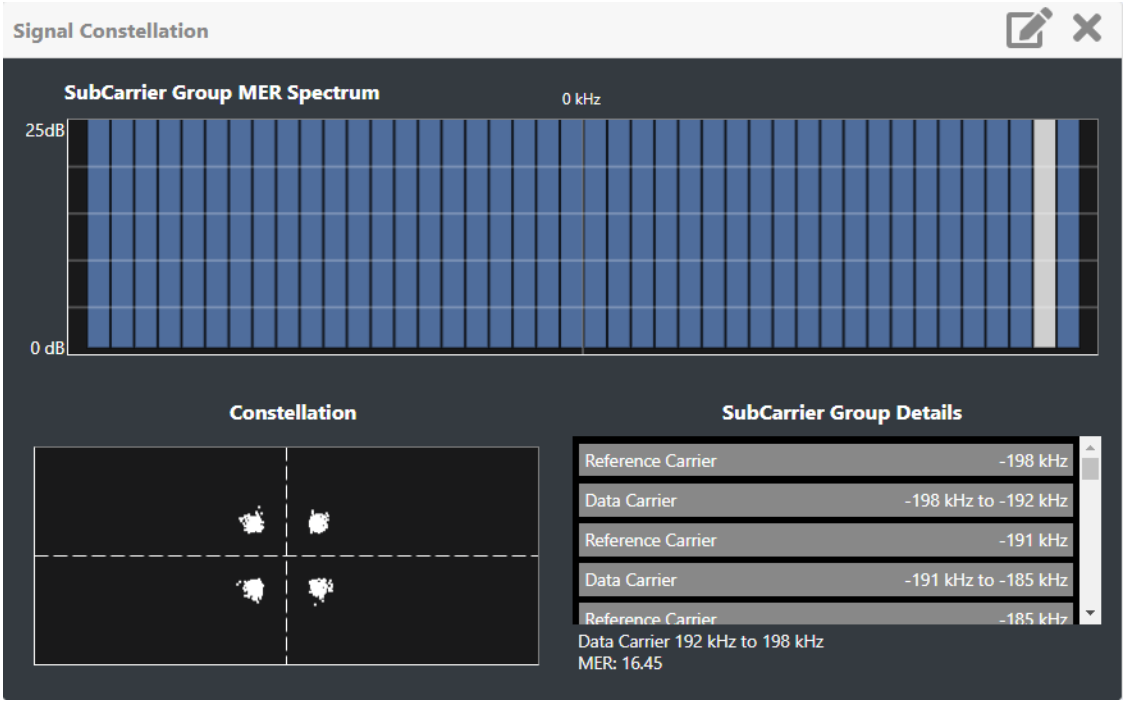
Constellation

See Figure 3.2.22. The exciter constantly measures the transmitter signal and performs basic demodulation of the digital carriers. The Constellation panel displays the phase and amplitude of the symbols being modulated within an OFDM sub-carrier as dots on a cartesian graph. There are separate screens for each sub-carrier. Typically, the dots will be grouped together around the ideal data points. When the transmitter is on, the signal constellation display is representative of the transmitter output. When the transmitter is off, the display is representative of the forward path that will be transmitted.

Sub-carrier group details is shown in the lower, right section of the screen. Displayed information includes the sub-carrier group name, the bandwidth that the selected carrier group occupies and the modulation error ratio (MER) for the selected carrier group. MER quantifies the performance of the transmitted digital signal as the ratio between the RMS power of the ideal signal and the RMS power of the received signal's error vector. A higher MER value is characteristic of a smaller error, and therefore a higher quality signal. There is a NRSC minimum requirement of a MER value of no less than 14 dB.

Use the scroll bar to select a higher or lower sub-carrier for viewing. Some sub-carriers are for timing and synchronization. Others are modulated with data/content. Use the maximize or minimize buttons as required.

Figure 3.2.22: Constellation Panel

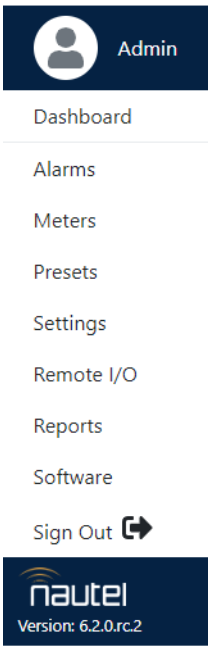


AUI Main Menu

The Main Menu contains the following features (see Figure 3.2.23):

- Dashboard
- Alarms (see 3.2.35)
- Meters (see 3.2.36)
- Presets (see 3.2.43)
- Settings (see 3.2.64)
- Remote I/O (see 3.2.101)
- Reports (see 3.2.107)
- Software (see 3.2.111)
- Sign Out (see 3.2.113)

Figure 3.2.23: Main Menu

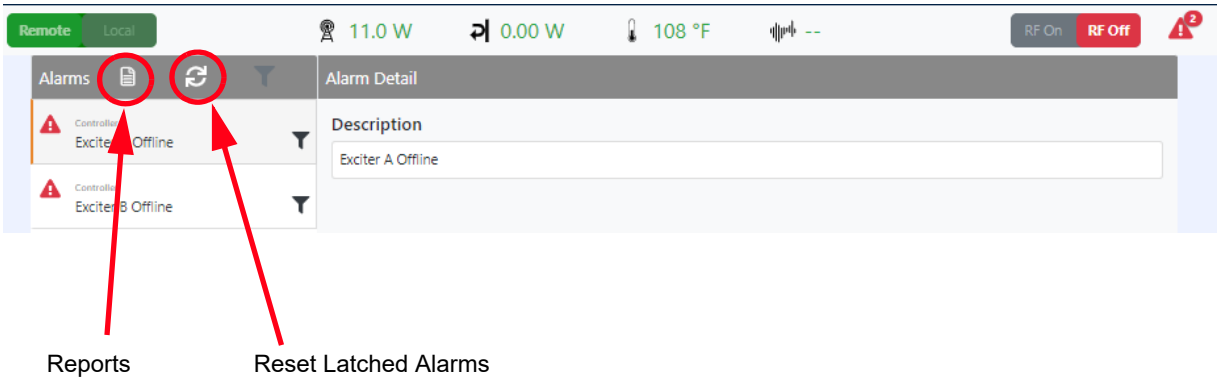


Alarms

You can view the GV30N's operational status using the AUI's Alarm page. This page shows current active alarms to aid in fault diagnosis. To view, click the Alarms button in the AUI's main menu. See Figure 3.2.24.

You can also use the controller front panel UI to view active alarms (see View Status on page 3.2.160).

Figure 3.2.24: Alarms page



The Alarms page displays all active transmitter alarms. Alarms are listed by their host device (Controller Exciter A, Rack, etc.), alarm name and severity level [an orange ! indicates low severity/maintenance required (RF output not affected); a red ! indicates critical severity (RF output is reduced/inhibited)]. Refer to the GV30N Troubleshooting Manual for detailed information on alarm details such as root cause and troubleshooting tips.

Click the Reset Latched Alarms icon at the top, left of the Alarms screen to attempt to clear any latching alarms that are holding the transmitter in an "off-air" state. If the offending alarm has cleared, the transmitter should resume operation.

Click the Reports button at the top, left of the Alarms screen to go to the Reports screen where the user can see or download the event history. See Reports on page 3.2.107.

Meters

The meters displayed in the AUI represents the active meters selected for the associated sub-sections and displays a real-time value.

Select the Meters page and select one of the following transmitter sub-sections:

- HD Exciter - see Figure 3.2.25 on page 3.2.37 and Figure 3.2.26 on page 3.2.38
- Power Module - see Figure 3.2.27 on page 3.2.39 and Figure 3.2.28 on page 3.2.40
- Controller - see Figure 3.2.29 on page 3.2.41 and Figure 3.2.30 on page 3.2.42
- Rack - see Figure 3.2.31 on page 3.2.42

Meters can also be added to the Dashboard as a display panel. See Dashboard Meters on page 3.2.24.

You can also view meters using the controller front panel UI (see View Meters on page 3.2.161).

NOTE: Meter values get updated typically every one or two seconds.

Figure 3.2.25: Meters - HD Exciter Page (1 of 2)

Meter Detail

Meter Name	HD Exciter A
-15 V (V)	-15.3
+1.2 V (V)	1.19
+1.8V (V)	1.82
+3.3 V (V)	3.26
+5 V A (V)	4.84
+5 V B (V)	5.02
+15 V (V)	14.9
10 MHz Delta (ppm)	N/A
AGC Limiter Gain (%)	100
Analog Left Peak (dBu)	-85.7
Analog Right Peak (dBu)	-84.5
Battery Voltage (V)	N/A
Current Filter Tilt (dB/MHz)	0.45
DAC Gain (%)	91.1
Data MER LSB (dB)	N/A
Data MER USB (dB)	N/A
Deviation Peak (%)	19.0
Digital 1 Left Peak (dBFS)	-90.0
Digital 1 Right Peak (dBFS)	-90.0
Digital 2 Left Peak (dBFS)	-90.0
Digital 2 Right Peak (dBFS)	-90.0
Fan RPM (rpm)	5760
Fan Voltage (V)	38.8
Forward Attenuation (dB)	16.0
Forward Power (W)	258
Internal SCA1 Peak (dBu)	-83.7
Internal SCA2 Peak (dBu)	-83.7
IPA Volts (V)	38.6
LVPS Input Voltage (V)	38.7
Mask Delta (dB)	-58.2

Figure 3.2.26: Meters - HD Exciter Page (2 of 2)

MPX Limiter Gain (%)	100
MPX Peak (Vpp)	0.00
MPX RMS Deviation (%)	7.66
MPX SCA PEAK (Vpp)	N/A
PA Bias Voltage (V)	3.11
PA Dissipation (W)	164
PA Temp (°C)	39.0
PA Volts (V)	38.6
Pre-Amp Bias Voltage (V)	3.09
Pre-Amp Current (mA)	122
PWB Temperature (°C)	55.9
Reference MER LSB (dB)	N/A
Reference MER USB (dB)	N/A
Reflected Power (W)	5.51
Reverse Attenuation (dB)	7.00
Total Forward RMS Power (kW)	18.7
Total PA Current (A)	10.8
VSWR	1.34

Figure 3.2.27: Meters - Power Module Page (1 of 2)

Meter Detail

Meter Name	PM1	PM2	PM3	PM4	PM5	PM6
Bias Voltage 1 (V)	2.82	2.82	2.80	2.82	2.86	2.82
Bias Voltage 2 (V)	3.00	2.84	2.86	2.90	2.84	2.82
Bias Voltage 3 (V)	2.86	2.86	2.86	2.90	2.86	2.77
Bias Voltage 4 (V)	2.82	2.84	2.86	2.86	2.82	2.82
Fan 1 Speed (rpm)	4710	4680	4890	4890	4890	4860
Fan 2 Speed (rpm)	4710	4620	4680	4590	4620	4650
Fan 3 Speed (rpm)	4590	4650	4530	4710	4680	4620
Fan 4 Speed (rpm)	4560	4560	4620	4740	4680	4590
Fan 5 Speed (rpm)	4680	4650	4650	4659	4620	4590
Fan 6 Speed (rpm)	4800	4680	4740	4830	4650	4710
Fan Voltage (V)	30.2	30.4	30.2	30.2	30.3	30.3
Final Stage Reject Power (W)	39.0	36.0	38.0	14.0	15.0	13.0
Heatsink Temperature (°C)	Value Not Set	Value Not Set	Value Not Set	Value Not Set	Value Not Set	Value No
IPA Forward Power (W)	30.4	24.0	21.7	25.3	25.1	25.8
PA 1 Current (A)	22.6	15.1	20.5	16.7	20.2	17.7
PA 2 Current (A)	23.1	15.5	20.4	16.7	20.0	18.0
Heatsink Temperature (°C)	Value Not Set	Value Not Set	Value Not Set	Value Not Set	Value Not Set	Value No
IPA Forward Power (W)	30.4	23.9	21.7	25.3	25.1	25.7
PA 1 Current (A)	22.6	15.1	20.5	16.7	20.2	17.7
PA 2 Current (A)	23.1	15.5	20.4	16.7	20.0	18.0
PA 3 Current (A)	16.0	22.7	17.5	21.0	17.5	20.6
PA 4 Current (A)	14.7	22.6	16.6	20.3	17.4	19.5
PA Voltage A (V)	38.5	38.3	38.3	38.1	38.1	38.2
PA Voltage B (V)	38.5	38.3	38.3	38.1	38.2	38.2
PS A Control Voltage (V)	38.8	38.8	38.8	38.8	38.8	38.8
PS A Current (A)	38.2	37.3	37.7	37.3	37.1	37.5
PS A Fan Speed (rpm)	13088	11720	12784	11392	12864	11536
PS A Input Current (A)	7.48	7.44	7.64	7.49	7.04	7.38
PS A Runtime (h)	2942.00	2553.00	2556.00	2550.00	3319.00	2548.00
PS A Temperature (°C)	70.0	69.0	70.0	69.0	71.0	69.0
PS A Voltage (V)	38.8	38.7	38.8	38.8	38.7	38.8

Figure 3.2.28: Meters - Power Module Page (2 of 2)

PS B Control Voltage (V)	38.8	38.8	38.8	38.8	38.8	38.8
PS B Current (A)	37.2	37.5	36.6	36.9	36.8	37.1
PS B Fan Speed (rpm)	14128	13472	12864	11504	12784	11136
PS B Input Current (A)	7.72	7.43	7.28	6.88	7.25	7.18
PS B Runtime (h)	3631.00	24181.0	3610.00	2916.00	3277.00	7184.00
PS B Temperature (°C)	72.0	71.0	70.0	69.0	71.0	69.0
PS B Voltage (V)	38.6	38.6	38.6	38.7	38.8	38.7

Figure 3.2.29: Meters - Controller Page (1 of 2)

Meter Detail

Meter Name	Controller
+1.2 V (V)	1.19
+1.8 V (V)	1.83
+3.3 VDC (V)	3.34
+5 VDC (V)	4.91
+12 V A (V)	12.2
+12 V B (V)	11.9
+15 V (V)	15.0
5kW Reject 1-2 Power (W)	8.00
5kW Reject 3-4 Power (W)	11.0
5kW Reject 5-6 Power (W)	5.00
5kW Reject 7-8 Power (W)	12.0
5kW Reject Fan 1 Speed (rpm)	0.00
5kW Reject Fan 2 Speed (rpm)	0.00
5kW Reject Fan 3 Speed (rpm)	0.00
10kW Reject 1-4 Power (W)	11.0
10kW Reject 5-8 Power (W)	7.00
10kW Reject Fan 1 Speed (rpm)	0.00
10kW Reject Fan 2 Speed (rpm)	0.00
20kW Reject 1-8 Power (W)	1.00
Analog Forward Power (kW)	19.9
Average Active PA Power (W)	684
Average PA Dissipation (W)	48.0
Average PA Voltage (V)	38.3
Battery Voltage (V)	3.24
DC Input Power (kW)	23.4
DC-RF Efficiency (%)	85.0
Digital Forward Power (kW)	0.00
Fan 1 Speed (rpm)	0
Final Reject Fan 1 Speed (rpm)	0.00
Final Reject Fan 2 Speed (rpm)	0.00
Final Stage Reject Power (W)	253

Figure 3.2.30: Meters - Controller Page (2 of 2)

Forward RMS Power (W)	19912
LVPS Input Voltage (V)	39.3
PWB Temperature (°C)	42.0
Reflected Power (W)	35.0
RF Drive (W)	286
RF Output Return Loss (dB)	27.6
Splitter Fan 1 Speed (rpm)	0.00
Total Forward RMS Power (kW)	19.9
Total PA Current (A)	611
VSWR	1.09

Figure 3.2.31: Meters - Rack Page

Meter Detail

Meter Name	Rack 1	Rack 2
+3.3 V (V)	3.28	3.37
+5 V (V)	4.97	5.02
+15 V (V)	15.0	14.9
Ambient Temperature (°C)	28.6	29.5
LVPS Input Voltage (V)	39.1	39.2
Reject Fan Voltage (V)	0.70	0.70

NOTE: Number of racks varies with transmitter model (GV20 shown for reference)

Presets

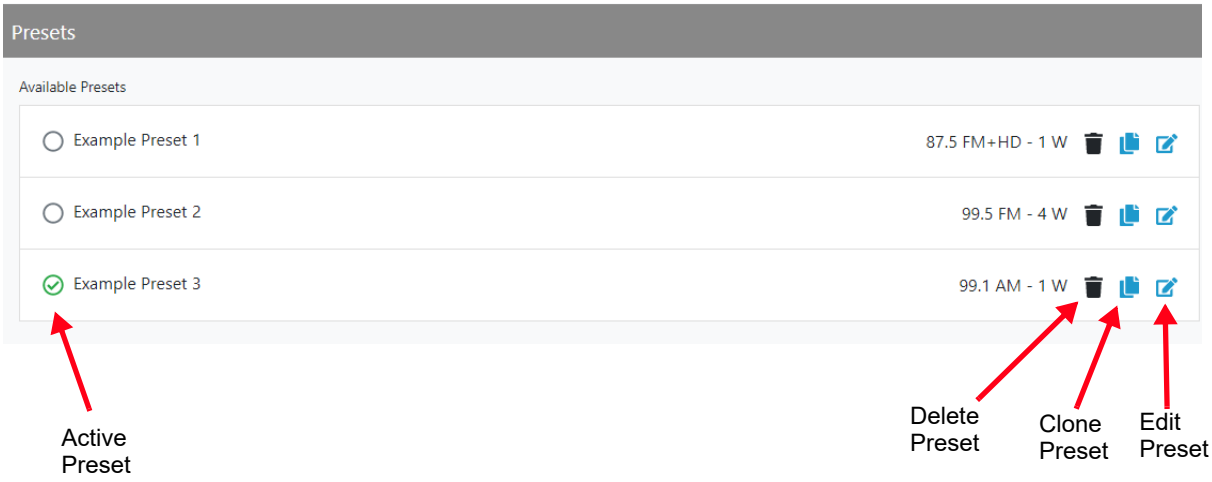
This section includes the following subjects:

Presets contain operational data (power, frequency, mode, program inputs) for the transmitter. You can create and manage presets using the remote AUI (see Managing Presets - Using the AUI).

Managing Presets - Using the AUI

The Presets page (see Figure 3.2.32) allows you to create up to 62 operating presets or edit existing presets. To view the Presets page, select Presets from the Dashboard menu or click on the Active Preset in the top banner. Many preset settings available on the remote AUI are also available on the controller front panel UI. In this case, if you change a preset setting on the remote AUI, it will also be reflected on the controller front panel UI, and vice versa.

Figure 3.2.32: Presets page



Activating presets using the AUI

There are two ways to activate a preset using the AUI:

- Click the Active Preset section in the top banner of any AUI page
- Enter the Presets page from the Dashboard.

Both methods will indicate the current active preset, by a green check mark next to its radio button (e.g., Daytime, see Figure 3.2.32 on page 3.2.43). If the current preset is not the desired one, click the radio button of the desired preset in the Available Presets list, or create a new preset or clicking the Clone Preset button and edit the preset.

If you select an alternate active preset, a confirmation prompt will appear. Select Close to cancel or Continue to activate the selected preset. Press the Delete button to delete the selected preset. Users cannot delete the current "active" (operational) preset or any preset that is referenced in the Remote I/O menu as either a remote input or output. Those links in the Remote I/O menu must be deleted before the associated preset can be deleted. Press Cancel to return to the Presets page.

Editing or creating presets using the AUI

When a presets page is opened from the main menu, the operational settings of the transmitter are displayed. They define the current operational state of the transmitter. Operational settings can be edited and then immediately activated by pressing the Save button.

To edit a saved preset, you must load that preset from the Presets page (see Figure 3.2.32 on page 3.2.43). If the edited preset was active before it was edited, saving the preset will update the preset, but the operational settings will not change. To update the operation of the transmitter, re-activate the preset through the top banner or Presets menu.

NOTE: When editing saved User presets, the best practice is to load a preset that is close to the desired configuration and then adjust its settings for the exact configuration.

In the Presets screen or top banner (see Figure 3.2.32 on page 3.2.43), a green checkmark appears next to the preset name to indicate which is the active preset.

When changes are complete, press the Save button. If you are creating a new preset, you can also enter a new name (e.g., Preset 4 - IBOC) in the preset window before clicking the Save button.

Parameters that can be edited are discussed in detail below.

To remove a preset, select it and press the Delete button.

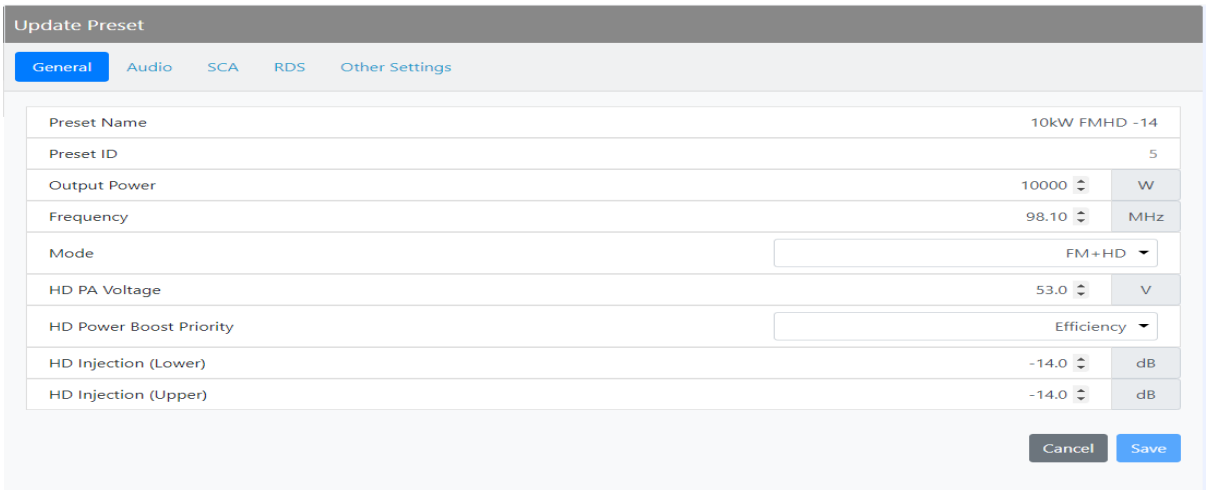
NOTE: If the Delete icon is greyed out, the preset cannot be deleted as it is either used by another preset, the scheduler, or Remote I/O. A preset can also not be deleted if it is the only preset.

To ignore any changes, press Cancel to return to the Presets screen.

General

See Figure 3.2.33.

Figure 3.2.33: General page



- Preset Name: This field identifies the name of the current preset. Users must load a preset to directly edit this field.
- Preset ID: This field identifies the ID of the preset (ie., Preset 1).
- Output Power: Sets the output power level (in kW). Use the up and down arrows to adjust the power level. Output power limits are a function of the transmitter mode of operation (see Table 1-1 of the Pre-Installation Manual for RF output power ratings for this transmitter).
- Frequency: Set value. Valid frequencies are between 87.00 and 108.00 MHz.
- Mode: Set the overall transmission mode. Available options are:
  - FM: an analog only mode, transmits a carrier, frequency modulated with audio.
  - HD: all digital mode; this mode transmits the upper and lower digital sidebands of OFDM IBOC carriers. HD transmitter is typically high-level combined (coupler or spatial) with a paired FM only transmitter. This mode requires additional hardware.
  - FM+HD: also known as hybrid/simulcast or low-level combined, this mode transmits the analog carrier (FM modulated) and the upper and lower digital sidebands of OFDM IBOC carriers. This mode requires additional hardware.
- DRM-FM: transmits a DRM OFDM signal using the I/Q stream from a DRM modulator connected to the desired AES input. This mode requires additional hardware.

NOTE: Settings on the Presets tabs are shown/hidden based on the chosen settings. Not all settings are available in all modes.

Mode - additional calibration settings:

- HD Power Boost Priority: for FM+HD mode only. Select either MER (modulation error ratio or signal quality; default setting) or Efficiency.
  - Selecting Efficiency maximizes the aggressiveness of Nautel's HD PowerBoost process, an advanced peak-to-average power ratio reduction algorithm that prioritizes efficiency and power capability when reducing the peak-to-average power ratio, while ensuring that the MER of the transmitted HD signal meets transmission requirements.
  - Selecting MER minimizes the aggressiveness of the HD PowerBoost function and makes maximizing MER the priority. Transmitter efficiency and power capability will be reduced as a result.
- IBOC Injection (Lower): for FM+HD and HD modes, enter value, in dB, between -20 and -10 dB for the IBOC injection level of the lower sideband of digital carriers. This value determines the relationship between the digital carriers power and the analog carrier power. Example: -20 dB indicates that the total RMS power of the digital carriers will be 1/100 of the total RMS power of the analog carrier. -10 dB indicates that the total RMS power of the digital carriers will be 1/10 of the total RMS power of the analog carrier.
- IBOC Injection (Upper): for FM+HD and HD modes, enter value, in dB, between -20 and -10 dB for the IBOC injection level of the lower sideband of digital carriers. This value determines the relationship between the digital carriers power and the analog carrier power. Example: -20 dB indicates that the total RMS power of the digital carriers will be 1/100 of the total RMS power of the analog carrier. -10 dB indicates that the total RMS power of the digital carriers will be 1/10 of the total RMS power of the analog carrier.

NOTE: The actual digital sideband power is 3 dB less than that indicated in the upper or lower IBOC Injection fields; i.e. if -20 dBc is entered in the upper and lower IBOC Injection fields, the upper and lower digital sideband power levels are actually -23 dBc; this way, when added, the resultant total digital power level is -20 dBc.

For symmetrical sideband transmission: if -14 dBc IBOC Injection level is desired (total digital power of upper + lower sidebands is 4% of analog carrier power), set the upper and lower IBOC Injection levels to -14 dBc.

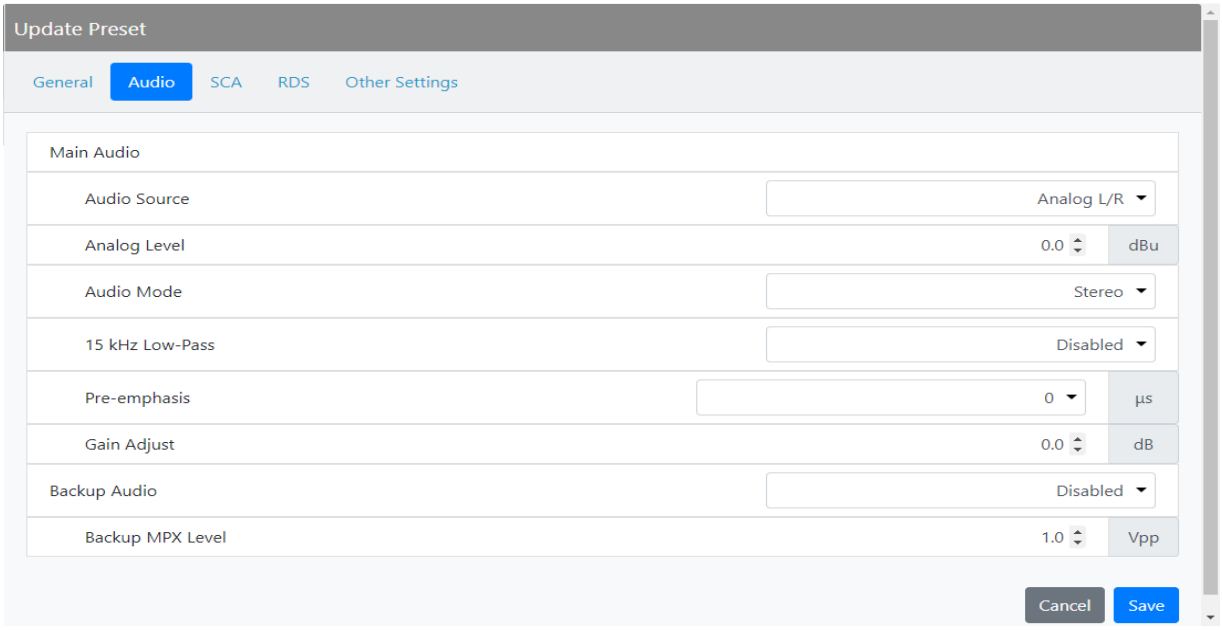
For asymmetrical sideband transmission, consider that the actual sideband power level is 3 dB less than that shown. For example, if the upper digital sideband IBOC Injection level is entered as -14 dBc, the actual power level will be -17 dBc. This is equally true for the lower digital sideband.

NOTE: The preferred option to maximize IBOC performance is by using the HD Optimizer feature (see *Spectrum Efficiency Optimizer, on page 3.2.80*). In this case, leave PA Volts setting at its default value (53.0 V).

Main Audio

See Figure 3.2.34.

Figure 3.2.34: Main Audio page



- Audio Source: Select from Analog L/R, MPX, AES EBU, Audio Player to AES2 or MPX over AES.
- Analog Level: applies to Analog Left/Right source only; enter value between -12 and +12 dBu, which represents the input voltage level that yields 100% modulation (Default is 0.0 dBu).
- MPX Level: applies to MPX source only. Set this parameter level in Vpp (typically 3.5 Vpp - 100% modulation value). The allowable range for this setting is between 1-5 Vpp.
- Digital Level: applies to MPX Over AES, AES/EBU 1 and Audio Player -> AES 2 sources only; enter value between -25.5 and 0 dBFS, with a typical setting of -4 dBFS (100% modulation value).
- Audio Mode: applies to Analog Left/Right, AES/EBU 1 and Audio Player -> AES 2 sources only; select Mono L, Mono R, Mono L+R or Stereo (selecting Stereo applies a 19 kHz pilot).
- Gain Adjust: applies to Analog Left/Right, AES/EBU 1 and Audio Player -> AES 2 sources only; allowable range is -20 to 10 dB. This configuration setting will increase the incoming signal level and yield a proportional increase in % modulation.
- Preemphasis: applies to Analog Left/Right, AES/EBU 1 and Audio Player -> AES 2 audio sources only; select 0 us, 25 us, 50 us or 75 us.
- 15 kHz Lowpass: applies to Analog Left/Right, AES/EBU 1 and Audio Player -> AES 2 audio sources only; select Enabled (applies 15 kHz low-pass filter to audio input) or Disabled.

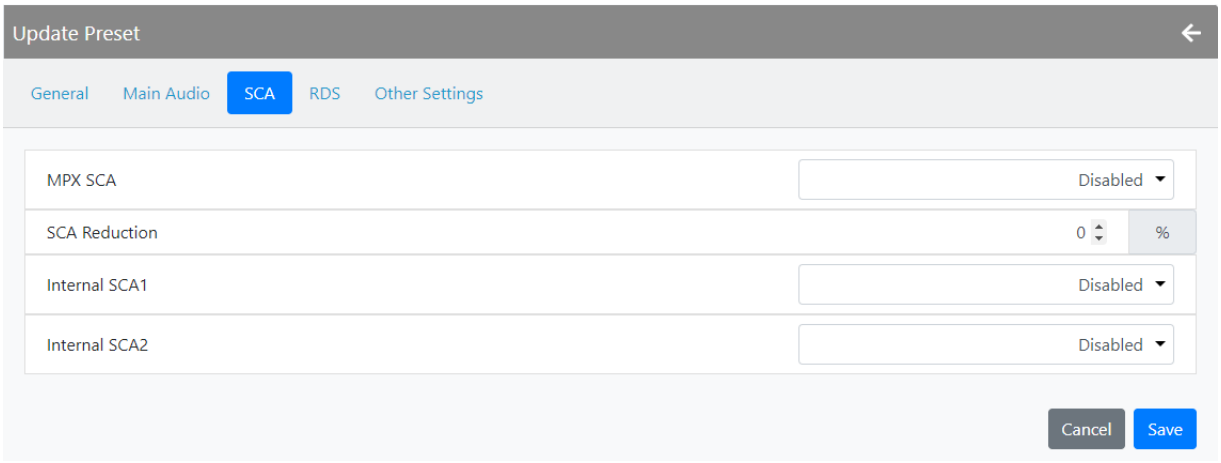
- Backup Audio: When you set Backup Audio to Enabled, you can select a backup Audio Source and edit various parameters for the backup audio similarly to the main audio described above. The backup audio source, if enabled and present, will replace the main audio source if the main audio level is less than its user-determined trip threshold (see Presets, on page 3.2.43). The main audio source will be restored as the active source if it returns and is present for at least one second.

NOTE: AES2 may not be used as a backup source for AES1 when the internal exciter is used.

SCA

See Figure 3.2.35.

Figure 3.2.35: SCA page



NOTE: Check your local broadcast regulatory body's guidelines for allowable modulation depth with SCAs or RDS enabled.

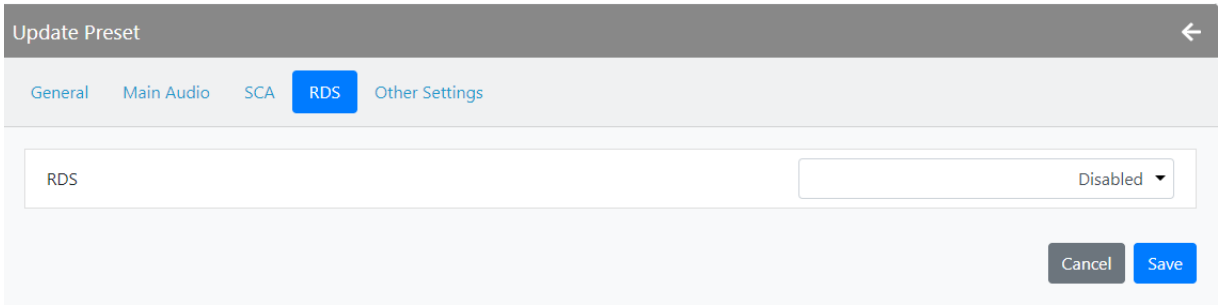
- MPX SCA: Connector (J7:A for SCA1, J7:B for SCA2) for use with an externally generated SCA; select Enabled or Disabled. When enabled, all the selections listed below are active.
  - Input Level: signal level that represents 10% modulation. Enter a value between 1 and 5 V p-p (typically 3.50 Vpp).
- SCA Reduction: Attenuation applied to the SCA input; set between 0 and 20% (used to reduce the modulation level of the main audio when SCAs are enabled; typically, for every 2% of SCA modulation, the main audio modulation must be reduced by 1%).

- Internal SCA1/2: Enable or disable the appropriate internal SCA (SCA1 or SCA2). When enabled, the settings listed below are active for the associated SCA signal (1 or 2).
  - SCA1 or SCA2 Mode: select FM (frequency modulated sub-carrier, typical) or DSB-SC (double side band suppressed carrier).
  - SCA1 or SCA 2 Input Level: enter value between -12 and +12 dBu, which represents the input voltage level that yields 10% modulation (typically 0.0 dBu).
  - SCA1 or SCA2 Injection Level: enter value between 0 and 20% (typically 10%); this level is added to the composite baseband signal.
  - SCA1 or SCA2 Frequency: enter value between 20 and 100 kHz (typically set to 67 kHz or 92 kHz).
  - SCA1 or SCA2 Preemphasis: select 0 us, 50 us, 75 us or 150 us.
  - SCA1 or SCA2 Lowpass Filter: select Enabled (applies 7.5 kHz low-pass filter to audio input) or Disabled.

RDS

For RDS operation, an external unit or software can send data to the exciter, serially or over IP. The exciter generates the RBDS/RDS carrier and injects the data; externally generated, or alternatively, the Presets page offer a means to configure internally generated data. See Figure 3.2.36.

Figure 3.2.36: RDS page (shown disabled)



Refer to RDS Remote Protocol, on page 3.2.54 for information on using the ASCII protocol to remotely configure RDS settings and to observe the strings supported by Nautel.

NOTE: The UECP protocol is fully supported.

NOTE: The differences between RDS (European) and RBDS (North American) are not part of this manual. Presets created using the GV5/GV3.5 are compatible with either type.

- RDS: Select Enabled or Disabled (default is Disabled). When enabled, all of the selections below are active and the View RDS Demod option appears, which allows monitoring of the demodulated RDS content applied to internally generated RDS carrier:

NOTE: When using the internal data source, you must correctly enter all RDS fields - specifically PI Code or PS Name - to ensure proper reception of RDS information.

- Data Source: Select Internal, Ext_ASCII, UECP, IP_ASCII or IP_UECP.

NOTE: For ASCII over IP data or UECP over IP data, send RDS information to the IP address of the GV5/GV3.5, port 7005.

- Radio Text: Most RDS radios can receive short messages that may include information about the presenter, station or program you are listening to (e.g., a web address for the station). You can enter radio text up to 64 characters in length. Information is displayed on the receiver based on the receiver configuration and capability (e.g., maximum number of characters on the screen). Default is blank.

- Traffic Info: Select None, TA (Traffic Announcement), TP (Traffic Programme) or TA+TP. The receiver can often be set to pay special attention to this flag and, for example, stop the tape/pause the CD or re-tune to receive a traffic bulletin. The TP flag is used (set to 1) to allow the user to find only those stations that regularly broadcast traffic bulletins whereas the TA flag is used (set to 1) to signal an actual traffic bulletin in progress. These flags are set to 0 if they are not being used for traffic information. Default is None.
- Baud Rate: (displayed only when Data Source is ASCII over Serial or UECP over Serial): Select 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115,200 bps (default is 19200). Does not apply to the Internal data source.
- Stereo: (bit 0 of DI, see NOTE below): select Stereo or Mono. This selection is a decoder identification operating mode flag. Default is Mono.

NOTE: Artificial Head, Compression Flag, Dynamic PTY and Stereo are part of the DI (Decoder Information) data (see UI editing screens on Figure 3.2.99 on page 3.2.136. RDS Data is provided as a single-digit hex input between 0 and F, that encodes the flags for the four settings as a 4-bit code. For example: hex number 3 is bit-represented by 0011, from bit 3 on the left to bit 0 on the right. This number is decoded to mean Stereo = Yes/Stereo (bit 0 = 1), Artificial Head = Yes/Enabled (bit 1 = 1), Compression = No/Disabled (bit 2 = 0) and Dynamic PTY = No/Static (bit 3 = 0).

- Scrolling Type: Select the type of scrolling to be used by the receiver - Word or Character. Word scrolling displays and transitions a maximum of 8 characters of the Scrolling PS Name at a time. Character scrolling still displays a maximum of 8 characters; however, transitions by one character of the Scrolling PS Name at a time. In both cases, transitions occur at the speed defined by the Scrolling Enable/Speed selection (Slow or Fast). The default selection is Word.
- Scrolling Enable/Speed: Determines the scrolling speed of the Scrolling PS Name. Select Off (disabled), Slow (transitions every 10 s) or Fast (transitions every 3 s). Default is Off.
- Scrolling PS Name: If used, enter up to 64 characters for the PS name that will scroll (if enabled) at the speed selected in the Scrolling Enable/Speed field. Information is displayed on the receiver based on transmitter configuration; however, is limited to 8 characters maximum. Default is blank.

NOTE: Words are defined by the spaces in the Scrolling PS Name. Words that exceed 8 characters will scroll each character until the entire word is displayed, then continue with the next word.

- Injection Level: Enter value between 0 and 10% (default is 5%). This level is added to the composite baseband signal.
- Alternate Frequencies: Select None or 1 through 25. This allows a receiver to re-tune to a different frequency providing the same station information (i.e., using translators or repeaters) when the first signal becomes too weak. This is often utilized in car stereo systems. Default is None.
- Phase: enter value in degrees between 0 and 360 (default is 0.0 degrees).

- Artificial Head (bit 1 of DI, see NOTE below): select Enabled or Disabled. This selection is a decoder identification operating mode flag. Default is Disabled.
- Compression Flag (bit 2 of DI, see NOTE below): Select Enabled or Disabled. This selection is a decoder identification operating mode flag. Default is Disabled.
- RDS Local Echo (displayed only when Data Source is ASCII over Serial). Select Enabled or Disabled (default is Disabled). When Enabled, the exciter RDS port transceiver will echo all inputs and controls received back to the terminal.
- PTY: this coding of up to 32 (0 to 31) pre-defined programme types allows users to find similiar programming by genre. Default is 0: NONE/NONE.
- PTYN (programme type name): This field can be used for detailed description of the PTY by 8 digits. Example: if the PTY is 4 (Sport) a PTYN like "Football" could be transmitted. The PTYN is intended for displaying additional information only cannot be used for automatic station tuning like the PTY. The PTYN is optional. Default is blank.
- Dynamic PTY (bit 3 of DI, see NOTE below): Select Dynamic or Static. This selection is a decoder identification operating mode flag. Default is Static.

NOTE: Artificial Head, Compression Flag, Dynamic PTY and Stereo are part of the DI (Decoder Information) data (see UI editing screens on Figure 3.2.99 on page 3.2.136. RDS Data is provided as a single-digit hex input between 0 and F, that encodes the flags for the four settings as a 4-bit code. For example: hex number 3 is bit-represented by 0011, from bit 3 on the left to bit 0 on the right. This number is decoded to mean Stereo = Yes/Stereo (bit 0 = 1), Artificial Head = Yes/Enabled (bit 1 = 1), Compression = No/Disabled (bit 2 = 0) and Dynamic PTY = No/Static (bit 3 = 0).

- PI Code (hex) (Program Identification code): Enter four hex digits that represent the station call sign (e.g., PI=1AE5); this unique code is used to identify a broadcast station. Each station gets assigned a specific code with a country identifying prefix. In the USA the code is determined by applying a formula to the station's call sign (see www.nrscstandards.org). In Canada the code is determined using the Spectrum Management and Telecommunications tool found at www.ic.gc.ca. Contact your local broadcast regulatory body for details on determining your unique PI Code.
- PS Name (programme service name): This is simply a maximum 8-character "tagline" static display that represents the call letters or station identity name. Most RDS capable receivers display this information and, if the station is stored in the receiver's presets, will cache this information with the frequency and other details associated with that preset. Default is blank.
- Music/Speech: Select Music or Speech. Default is Speech.

RDS Remote Protocol. The following information is intended to assist users with remote RDS settings using the ASCII protocol. ASCII over IP does not provide exciter responses.

Assigning Settings: To assign a value to a setting, send the setting name, the equal sign (=) and the desired value. If the setting is valid, the exciter responds "OK". If the setting is invalid, the exciter responds "NO".

```
Examples: PI=1248     //set the PI code to 0x1248
      OK          // exciter responds with OK
      TA=2        // set the traffic announcement to 2 (bad command; only values 0 or 1 allowed)
      NO          // exciter responds with NO
```

Querying Settings: To determine the current value of a setting, type the setting name with a question mark (?) instead of an equal sign (=).

```
Examples: PI?           //query the current PI code
      1248        // exciter responds with "1248", the current PI code
```

Other Considerations:

Initial Values and Preset Changes

On startup, or when the RDS settings in the active preset differ from the last ones loaded, the preset's initial RDS settings (PS, PI, PTY, PTYN, RT, AF, etc.) will be loaded. If there is an active data source (UECP or ASCII via serial or IP), these settings may be updated externally.

The RDS settings from the preset will only be loaded again if they change, otherwise the working set from the external data source will continue to be used. This allows unrelated preset changes to adjust other settings without affecting RDS functionality.

Real Time Clock

The exciter/control PWB has a battery-backed real-time clock that keeps track of the time and date. It is possible the exciter's RDS generator could broadcast the incorrect time and date if this is not set correctly, so the broadcast of time must be enabled via ASCII or UECP each time the system is powered up. Until it is enabled, the time will not be broadcast again after a power failure.

TCP Usage

Use TCP port 7005. This is not user configurable. To use RDS over IP, the connection must be opened before each command.

List of Settings: Table 3.2.3 lists the RDS settings supported by Nautel, including descriptions and examples.

NOTE: Remote setting of the RDS baud rate is not supported.

Table 3.2.3: Supported ASCII Settings for RDS

Setting	Name	Description/Example
PI=	Program Identification	Four hex digits representing the station call sign. Consult the RDS/RBDS specification for more information. Example: PI=1AE5
PS=	Program Service	Maximum 8-character ASCII “tagline” string describing the radio station. Example: PS=Q104-FM
PTY=	Program TYpe	Number, from 0 to 31, describing the station format. Example: PTY=24
PTYN=	Program TYpe Name	8-character ASCII string, also describing the station format. Example: PTYN=JAZZ24-7
TP=	Traffic Program	Set to 1 if the current program sometimes carries traffic information, otherwise set to 0. Example: TP=1
TA=	Traffic Announcement	Set to 1 if the current program is currently broadcasting a traffic announcement, otherwise set to 0. Example: TA=0 NOTE: Timeout of the TA flag is not implemented, so the RDS data source should ensure this flag is properly cleared.
AF1= ... AF25=	Alternative Frequency	If the station broadcasts on more than one frequency using translators or repeaters, these are typically set to each of the frequencies used in the broadcast network. Sample calculation for 98.5 MHz: (98.5-87.8) x 10 = 107 Example: AF1=107 NOTE: there is no method to disable AFs in this protocol.

Table 3.2.3: Supported ASCII Settings for RDS

Setting	Name	Description/Example
DI=	Decoder Information	Single hex digit, range 0-9 and A-F (case insensitive) that encodes the flags Stereo(1)/Mono(0) - bit 0; Artificial Head (Yes=1, No=0) - Bit 1; Compression (Yes=1, No=0) - Bit 2; and Dynamic (Yes=1, No=0) - Bit 3 Example: DI=3 (Stereo, Artifical Head=Yes, Compression=No, Dynamic=No)
MS=	Music/Speech	Typically set to 1 if the station broadcasts music, otherwise set to 0. Example: MS=1
TEXT=	Radio Text	Accepts a 1 through 64 character ASCII string, displayed on receivers that support RDS radio text. Example: TEXT=Tears for Fears - Shout (1985)
ECHO=	Echo on/off	If set to 1, the RDS encoder will echo back characters that are sent to it. If set to 0, the encoder will only send responses. Example: ECHO=1
DATE=	Current UTC date	Format is strictly YYYY-MM-DD. Sets the current UTC date for 4A date/time broadcasts. This is a non-volatile setting. Example: DATE=2016-04-04
TIME=	Current UTC time	Format is strictly HH:MM:SS, 24-hour format. Sets the current UTC time for 4A date/time broadcasts. This is a non-volatile setting. Example: TIME=17:23:05
UTC=	UTC time zone offset	Range is 0 to 24, 32 to 56. Sets the current time zone. To calculate this value, multiply the time offset by 2 and add 32 if the time offset is negative. For Newfoundland (UTC-3.5), 3.5 x 2 = 7, and add 32 (since the time zone is negative) to yield 39. This is a non-volatile setting. Example: UTC=39
CT=	4A date/time enable	If set to 1, the exciter will broadcast a 4A RDS packet on the edge of every minute with the currently set UTC time/date. This is a volatile setting. Example: CT=1

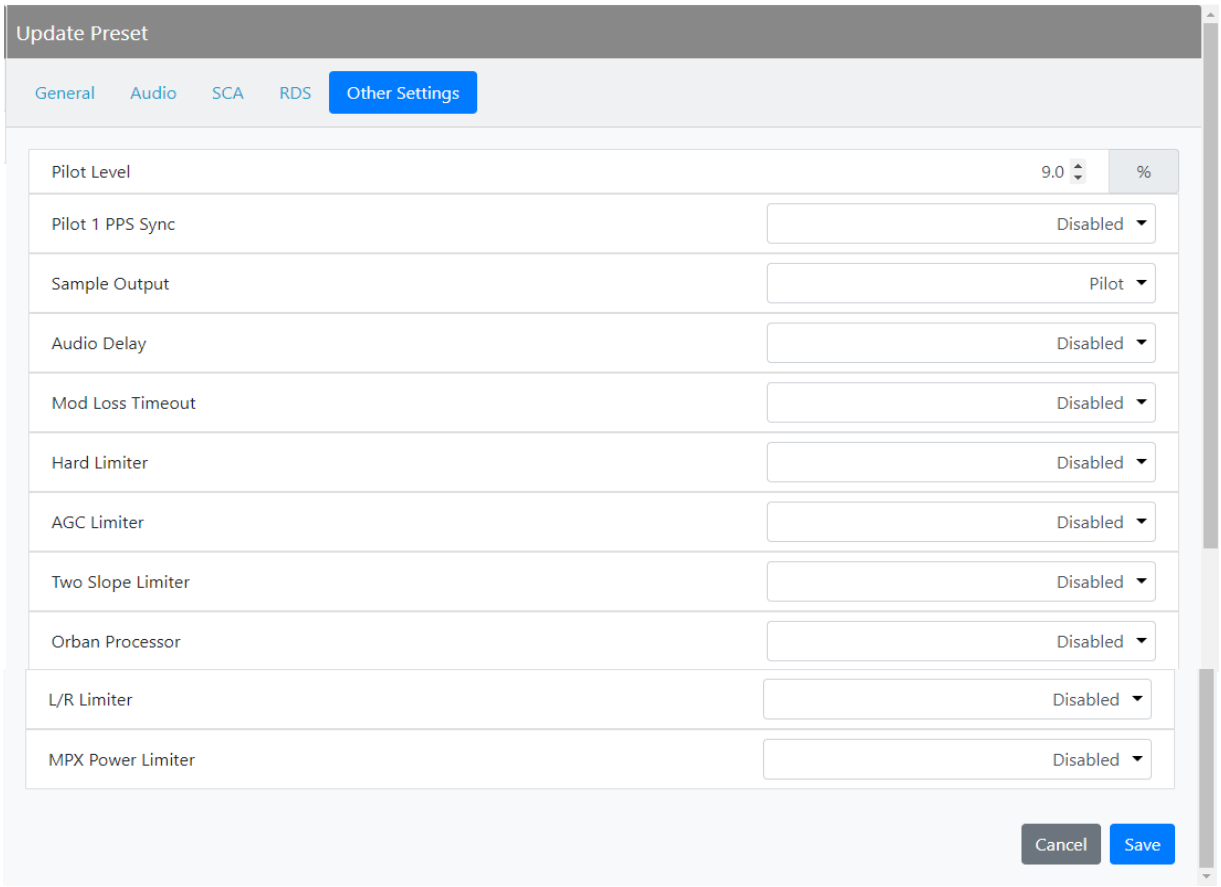
Table 3.2.3: Supported ASCII Settings for RDS

Setting	Name	Description/Example
DPS=	Dynamic Program Service (scrolling command)	64-character ASCII string typically describing the radio station. Example: DPS=Q104-FM The Home of Rock N Roll
DPSR=	Dynamic Program Service Rate (scrolling command)	Number, from 0 to 2, describing the scrolling rate. 0 is off (default); the PS= command is displayed when DPSR=0 is used. 1 is slow; the DPS string will scroll at a rate of approximately 10 s. 2 is fast; the DPS string will scroll at a rate of approximately 3 s. Example: DPSR=2
DPSM=	Dynamic Program Service Mode (scrolling command)	Number, 0 or 1, describing the scrolling mode. 0 is word-scrolling; the DPS string will scroll word by word, or multiple words when they fit. 1 is character-scrolling; the DPS string will scroll character by character. Example: DPSM=0
REV not available for ASCII over IP	Software Version (special command)	Typing this command (no = or ?) returns the current RDS encoder software version. Example: REV // issue version command Nautel NVE RDS Encoder V1.0 // exciter response

Other Settings

See Figure 3.2.37.

Figure 3.2.37: Other Settings page



- Orban Processor: select Enabled or Disabled. If Enabled, enter:
  - Orban Preset: select one of the 27 Orban presets from the dropdown menu.

- Mod (Modulation) Loss Timeout: select Enabled or Disabled. If Enabled, enter:
  - Action: None (alarm only, no resulting action), Inhibit (inhibits the RF output and fans until the audio returns) or Change Preset (changes the active preset).
  - Mod Loss Preset: displayed only if Action is set to Change Preset. Select the preset from the drop down list that will activate upon the loss of a modulating signal, post the timeout period.
  - Mod Loss Timeout Minutes: sets the delay, in minutes, between modulation loss detection and the resulting action. Enter a value in the allowable range of 0 and 255 minutes.
  - Mod Loss Timeout Seconds: sets the delay, in seconds, between modulation loss detection and the resulting action. Enter a value in the allowable range of 0 and 59.9 seconds.
  - Mod Loss Threshold: sets the threshold for modulation loss detection. Enter a value in the allowable range of 0 and 100% (default is 0%).
- Pilot 1 PPS Sync: select Enabled or Disabled. If Enabled, enter:
  - Pilot Sync Phase: (enter value between 0 and 360 degrees; typically 0 degrees)
- Pilot Level: enter value between 6 and 12% (typically 9%); this level is added to the composite baseband
- MPX Power Limiter: If Enabled, enter MPX RMS Limit. This limit allows the broadcast signal to remain in compliance with the MPX power limits as suggested in ITU-R BS.412-9. While the limiter will keep the transmitter in compliance, it is recommended that adjustment to the processing be made in such a way to minimize the reductions performed by the limiter. Otherwise the signal will not take advantage of the peak modulation capability available.
  - MPX RMS Limit: enter value between -12 and 12 dBr (default is 0 dBr)

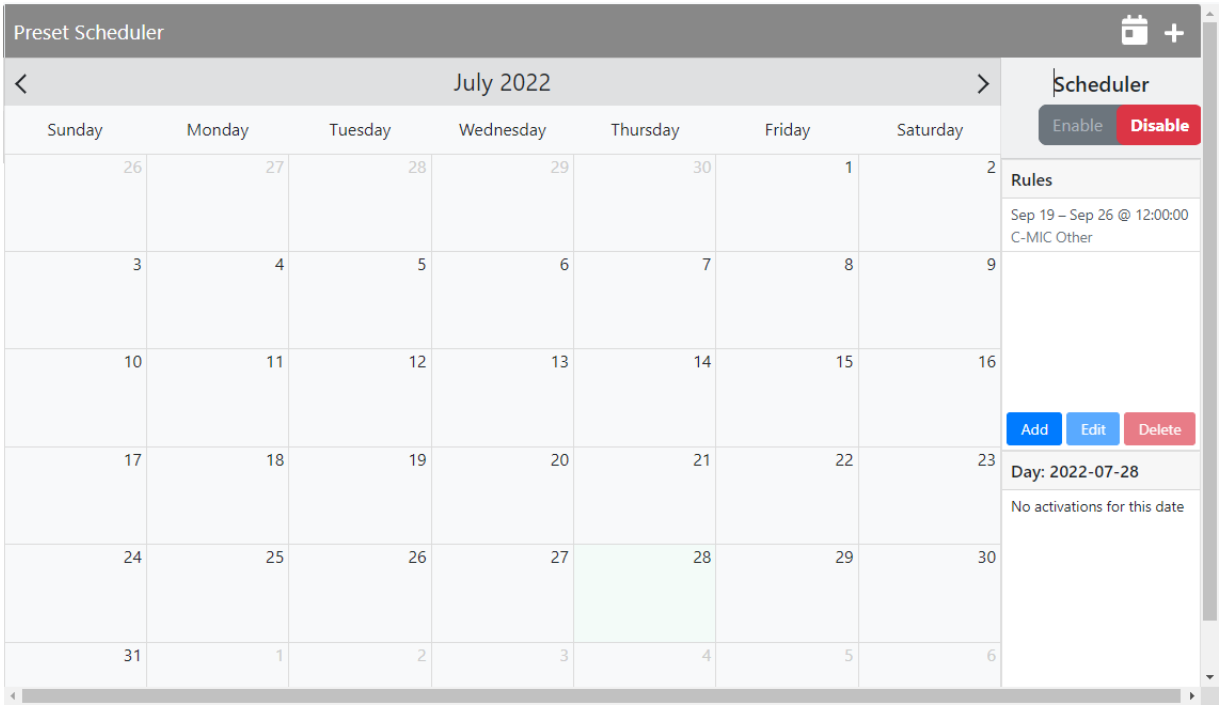
NOTE: MPX RMS is displayed as a percentage (%) on the meters screen. The percentage (%) equivalent for the dBr range shown above are 4.5% (-12 dBr) to 71.3% (12 dBr); default is 17.9% (0 dBr).

- L/R Limiter: This look-ahead limiter can be applied to the signal immediately before the stereo generator in the exciter. It has a fixed attack-time (and corresponding delay) of approximately 1 s. It can be configured to reduce the signal, if the gain setting is 0 dB or less, or can be used to perform an AGC function and boost quiet sections of the audio if a positive gain setting is used. If Enabled, enter the following parameters:
  - L/R Hold Time: enter value between 0 and 60 s (default is 5 s)
  - L/R Decay Time: enter value between 0 and 60 s (default is 5 s)
  - L/R Max Gain: enter value between -30 and 30 dB (default is 12 dB)
- Two Slope Limiter: If Enabled, when the modulation level exceeds the Threshold, the gain of the audio input will instantly change according to the gain percentage setting (percentage of the initial gain, which is below the threshold). The input signal is distorted by the audio gain change.
  - Two Slope Threshold: enter value between 0 and 160% (default is 160%)
  - Gain: enter value between 0 and 100% (default is 50%)
- AGC Limiter: If Enabled, when the modulation level exceeds the AGC Limit, the gain of the audio input will instantly decrease in order to reduce the modulation level below the AGC limit threshold. Recovery from this audio gain reduction is dependent on the Time Constant delay (fast attack, slow recovery). The input signal is briefly distorted by the audio gain reduction when the threshold is exceeded. Select Enabled or Disabled. If Enabled, enter:
  - AGC Limit: enter value between 0 and 160% (default is 120%)
  - AGC Time Constant: enter value between 0 and 1000 ms (default is 300 ms)
- Hard Limiter: If enabled, the modulation level will be limited (audio signal clipped or distorted) if it exceeds the hard limit threshold. Select Enabled or Disabled. If Enabled, enter:
  - Hard Limit Value: enter value between 0 and 160% (default is 160%)
- Audio Delay: Used to time align the receiver output of decoded analog and digital audio signals. Select Enabled or Disabled. If Enabled, enter:
  - Audio Delay Value: enter value between 0 and 12,000 ms (default is 0)

Scheduler

You can program a preset schedule for the transmitter. Select Preset Scheduler from the Settings page in the Dashboard menu (see Figure 3.2.38) to set the dates and times at which presets take effect. You can define up to 63 different schedule rules. The Scheduler can also be set using the controller front panel UI (see Enabling the Scheduler on page 3.2.155).

Figure 3.2.38: Scheduler page



The Scheduler page displays a monthly calendar (e.g., September 2020). Use the < and > buttons to navigate between months.

By clicking on a specific date in the monthly calendar displays the Edit Rule page which contains the Timeframe, Days of the Week, and Time parameters, as applicable, for that day.

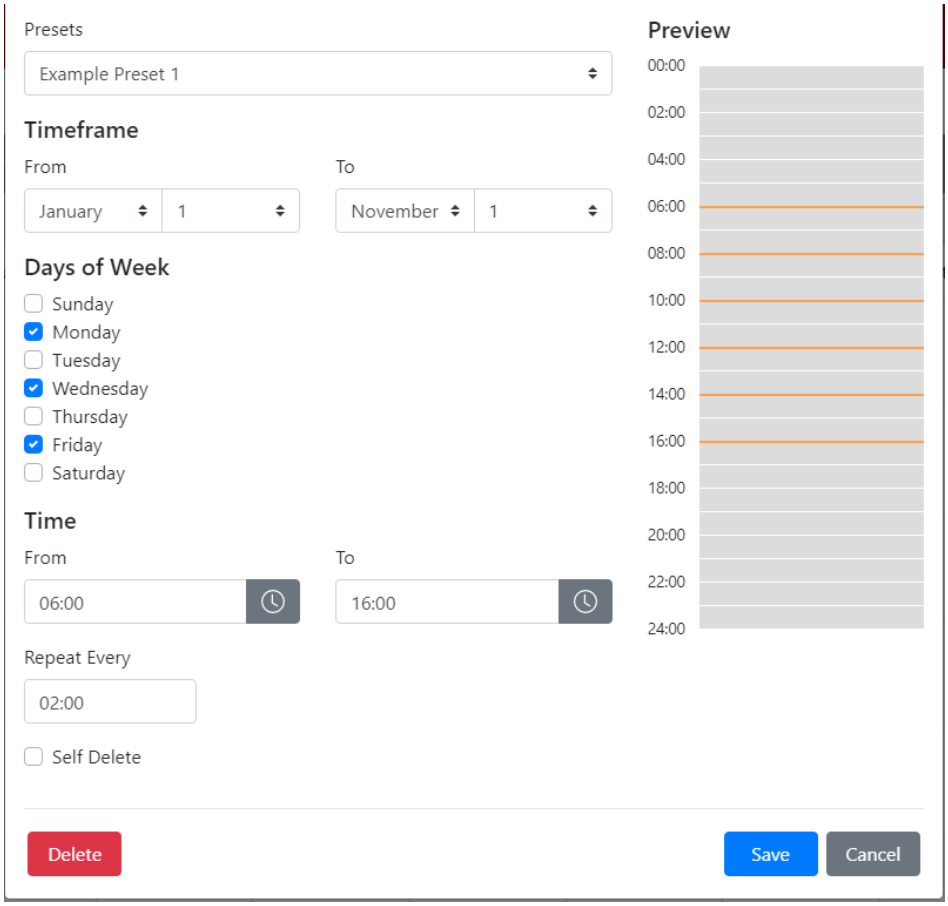
When in the Edit Rule list, you have the option to edit or delete an existing rule, or to create a new rule. Click the New or Edit button to display the Rule Explorer window (see Figure 3.2.39 on page 3.2.63). Click Delete to remove a rule from the list.

Use the Edit Rule window as follows:

- Use the drop-down menu to select the preset (e.g., Current Settings) for the rule. The preset's power, mode and frequency are displayed below the preset.
- In the Timeframe section, set the start (From:) and end (To:) dates for the rule. Start to end dates must be less than one year apart.
- In the Days of the Week section, select the days of the week on which the rule will apply.
- In the Time section, set the start (From:) and end (To:) times (hours and minutes) for the rule. Use the Repeat: field to establish a repeating cycle for the rule (e.g., every 24 hours).
- Unless you edit other rules first, you cannot select a date that occurs before the start of the previous rule or after the start of the following rule.
- Click the Save button to store the rule in the scheduler, the Cancel button to return to the Scheduler page or the Delete button to delete the rule.

When Scheduler: OFF appears, the transmitter will stop following the schedule and the active preset will be the preset that was operating when the scheduler was disabled.

Figure 3.2.39: Edit Rule page

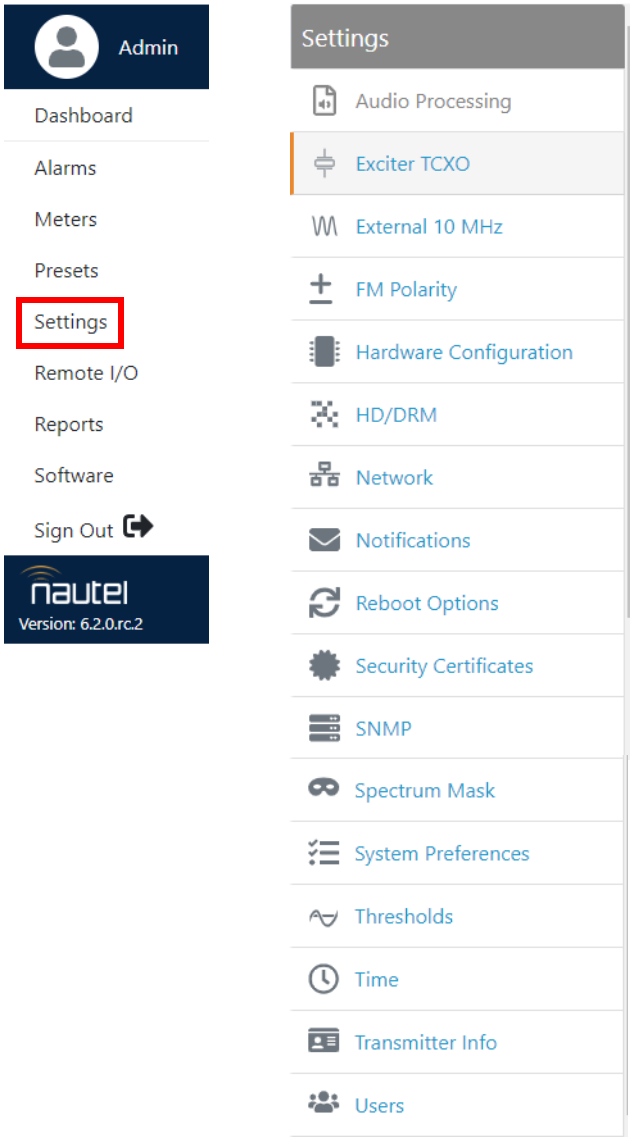


Settings

The Settings menu (see Figure 3.2.40 on page 3.2.65) contains the following features:

- Audio Processing (see Audio Processing - see page 3.2.66)
- Exciter TCXO (see Exciter TCXO - see page 3.2.69)
- External 10 MHz (see External 10 MHz - see page 3.2.70)
- FM Polarity (see FM Polarity - see page 3.2.71)
- Hardware Configuration (see Hardware Configuration - see page 3.2.72)
- HD/DRM (see HD/DRM - see page 3.2.76)
- Network (see Network - see page 3.2.81)
- Notifications (see Notifications - see page 3.2.83)
- Reboot Options (see Reboot Options - see page 3.2.86)
- Screen Configuration (Local AUI only) (see Screen Configuration (Local AUI only) - see page 3.2.87)
- Security Certificates (see Security Certificates - see page 3.2.87)
- SNMP (see SNMP - see page 3.2.88)
- Spectrum Mask (see Spectrum Mask - see page 3.2.90)
- System Preferences (see System Preferences - see page 3.2.91)
- Thresholds (see Thresholds - see page 3.2.92)
- Time (see Time - see page 3.2.94)
- Transmitter Info (see Transmitter Info - see page 3.2.96)
- Users (see Users - see page 3.2.97)

Figure 3.2.40: Main Menu - Settings



NOTE: For consistency, the Settings menu is the same for all transmitter series. If a transmitter does not have a feature installed or enabled, such as Audio Processing, that menu option is greyed out in the Settings list.

Audio Processing

This section describes how to configure and operate the Orban Audio Processor in your transmitter. There are 29 different Orban presets available. You can interface with audio processor functionality locally, using the controller front panel UI or the remote AUI. The extent of the features available depends on which interface is used.

Select an Orban audio processor preset using either the remote AUI (see Orban Enabling - Using the Remote AUI) or the controller front panel UI (see Orban Audio Processor on page 3.2.188).

NOTE: This section contains frequent reference to Orban's Optimod-FM 5500 Digital Audio Processor Operating Manual (see the link below). The equipment covered in the 5500 manual uses the same Orban audio processor as in your transmitter. The 5500 manual provides detailed information on the audio processor's functionality. If a discrepancy exists between the operational instructions in the Orban manual and this document, the latter shall prevail as this document is specific to operation with an GV5/GV3.5 transmitter. View the Orban Optimod-FM 5500 Digital Audio Processor Operating Manual online at:

http://www.orban-europe.com/downloads/5500/Documentation/5500_1.2_Operating_Manual.pdf

(the version number referenced in this URL is controlled by a third party and is subject to change)

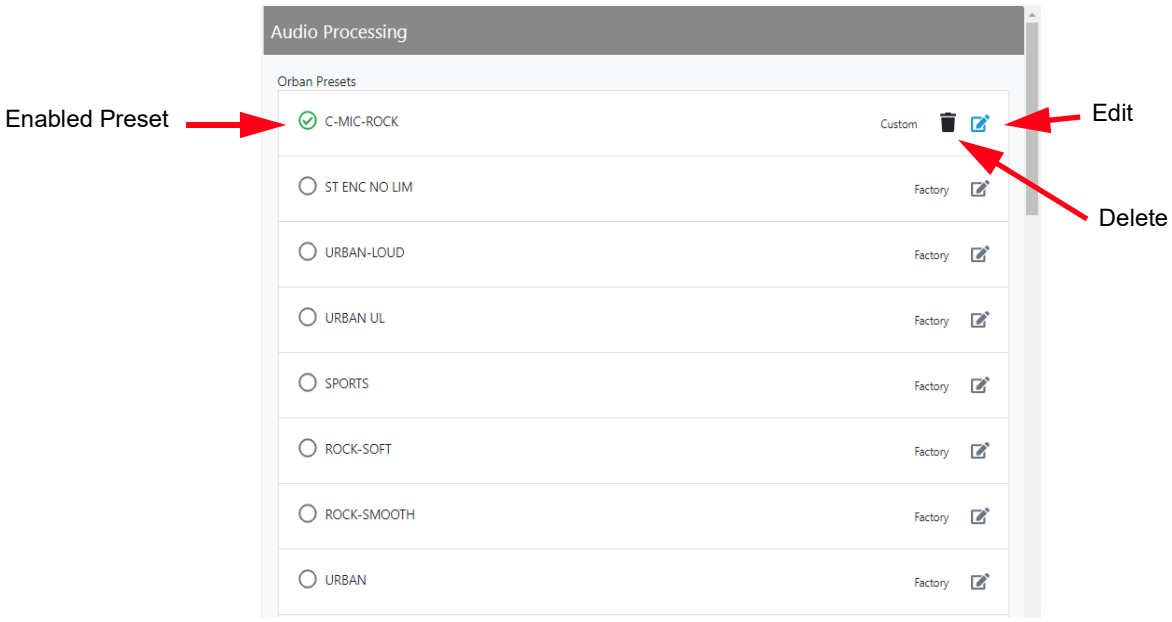
Orban Enabling - Using the Remote AUI

In the Settings -> Audio Processing page, select the desired Orban Preset by clicking the circle to the left of the preset name, a green checkmark will indicate that the preset is enabled. See Figure 3.2.41 on page 3.2.67).

There are two types of Orban audio processor presets: Factory presets and Custom presets. Factory presets cannot be modified. When a factory preset control is changed, a new preset is automatically created. This preset's default name will be the same as the Orban preset with an asterisk (*) prefix (e.g., * EXTREME). Modified presets should be saved to a new name, otherwise they will be overwritten by any edits made to subsequent presets. A saved preset will display as a Custom preset in the Load or Save screens. Custom presets can be modified.

NOTE: When creating a name for a custom preset, the '_' is an invalid character.

Figure 3.2.41: Settings - Audio Processing



By clicking the Edit button, you can change the various settings for the active preset. See Figure 3.2.42 on page 3.2.68.

The Audio Processing selections include:

Less More, Stereo Enhancer, AGC, EQ, Final Clipping, 2Band, 2Band Distortion, Multiband, Compressors, Bandmix, Multiband Distortion, and UL Distortion. Refer to the Operation section of the Orban Optimod 5500 manual for detailed information on these meters.

To activate any changes in the Audio Processor page, the following options apply:

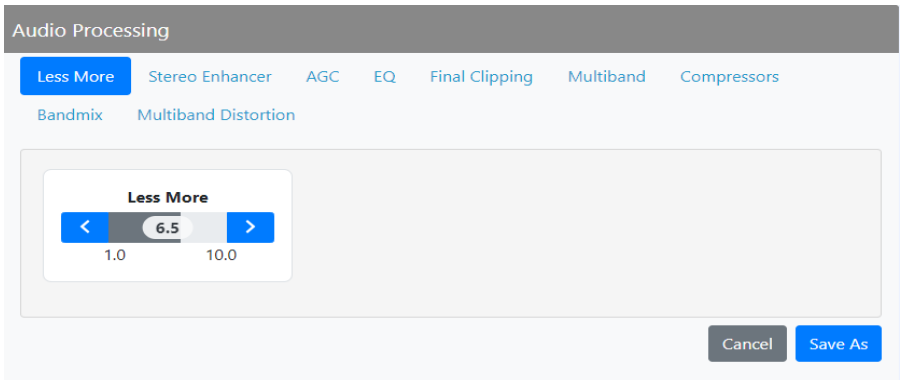
- for Factory presets - Save As or Cancel
- for Custom presets - Save, Save As and Cancel

When creating a new preset, you must enter a new name in the Save Preset window before clicking the Save As button. Click Cancel to discard changes and return to the Audio Processor page.

NOTE: Selecting an Orban preset locally will cause the remote AUI to also reflect the change. The same occurs on the controller front panel UI when remotely selecting a preset. To create a new Orban Audio Processor Preset, see Selecting an Orban Audio Processor Preset on page 3.2.192.

NOTE: The Audio Processor page contains nine tabbed sections that allow managing of Orban presets. These tabbed pages (see Figure 3.2.42) illustrate the many parameters associated with an Orban preset. Detailed descriptions are not included in this document. Refer to the Orban Optimod 5500 manual for more information on setting these parameters.

Figure 3.2.42: Audio Processing - Edit



WARNING!

When you open the Audio Processor page while the transmitter is on and Orban is enabled, the active preset in the Orban audio processor is loaded by default. Loading another Orban preset causes that preset to become active, Make sure you understand the impact that a preset change will have on your broadcast.

Exciter TCXO

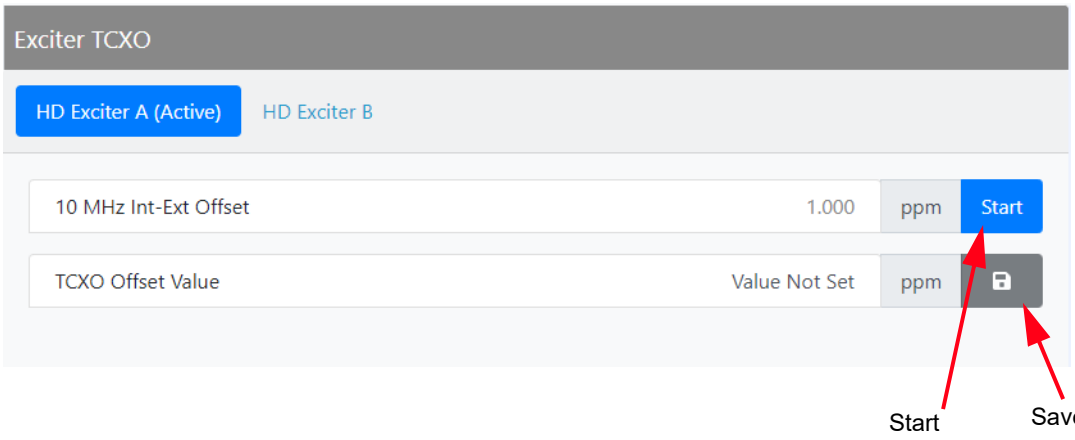
You can calibrate the internal clock reference to an external 10 MHz clock (e.g. GPS synchronized 10 MHz clock) or manually enter an offset value using the remote AUI.

NOTE: You can also adjust the exciter TCXO offset value and run a TCXO calibration from the controller UI (see Exciter TCXO, on page 3.2.171).

NOTE: During calibration, the external 10 MHz clock should be connected to the EXT 10 MHz IN (A1J4B) BNC connector on the rear of the transmitter or to the 10 MHz IN (W2J1) BNC connector on the rear of the optional exciter.

To view the AUI's Exciter TCXO screen (see Figure 3.2.43), select Exciter TCXO from the Settings menu.

Figure 3.2.43: Settings - Exciter TCXO Calibration



Once this external 10 MHz clock reference is connected, the 10 MHz Int-Ext Offset field will display the difference between the internal and external frequencies (in ppm). Users can press the Start button to automatically calibrate the internal TCXO to the external reference source; equally, they can manually enter the measured internal-external offset value into the TCXO Offset Value field and press Save.

If no external high precision 10 MHz clock reference is connected, but the actual transmitter carrier frequency is being measured with a calibrated external frequency counter, operators can manually offset the internal TCXO by entering the appropriate ppm difference in the 10 MHz Int-Ext Offset. For example, if the frequency of the transmitter is 1 ppm too high, then a positive 1 ppm should be entered in the TCXO Offset Value field in order to compensate. Similarly, if the transmitter frequency is too low, enter a negative ppm value. After an adjustment is made, press Start.

To calibrate another exciter, switch to that exciter and repeat the calibration.

External 10 MHz

You can configure the GV30N to accept an external 10 MHz input using the AUI or using the controller UI (see External 10 MHz Input, on page 3.2.154).

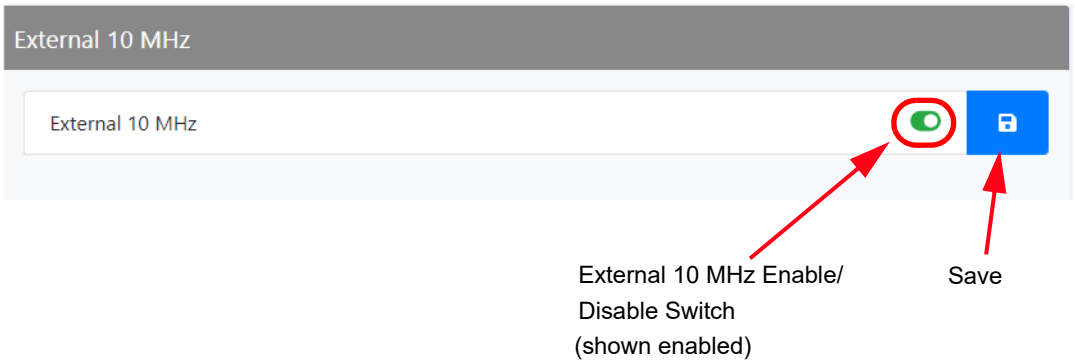
NOTE: You can also adjust the exciter TCXO offset value and run a TCXO calibration from the controller UI (see Exciter TCXO, on page 3.2.171).

This setting allows the user to mask the associated 10 MHz alarm from appearing in the Event History page if it isn't being used. If an external 10 MHz source is being used, an alarm will be activated on the Event History page should the external signal be lost.

NOTE: The exciter will automatically use an external 10 MHz reference signal if connected, no matter the state of this parameter.

To enable the External 10 MHz input on the AUI's External 10 MHz page (see Figure 3.2.44), slide the External 10 MHz Enable/Disable switch to the right and click Save.

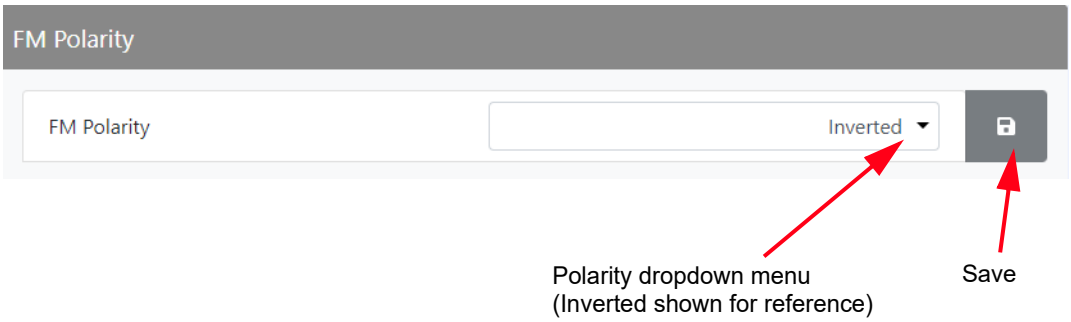
Figure 3.2.44: Settings - External 10 MHz



FM Polarity

The FM Polarity page (see Figure 3.2.45) allows the user to invert the polarity of the frequency modulation (i.e., positive going modulation signal yields positive deviation; or positive going modulation yields negative deviation). Options are Normal or Inverted. Select from the dropdown menu and click the Save button to enable the changes.

Figure 3.2.45: Settings - FM Polarity

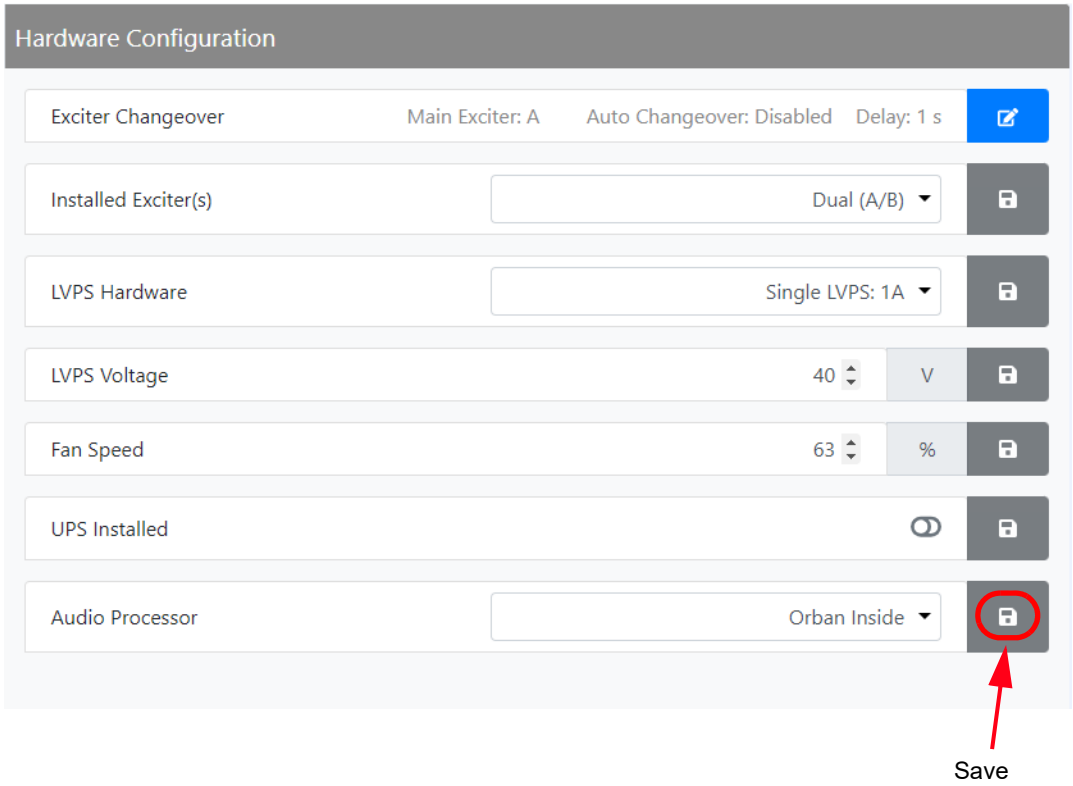


Hardware Configuration

The Hardware Configuration page allows the user to configure the transmitter for any installed hardware that has optional variations (e.g., quantity of exciters or LVPS modules, fan speed) or is non-standard (e.g., UPS or audio processor). See Figure 3.2.46.

NOTE: These settings are established at the factory based on the configuration that existed at time of shipping. Changes to these setting are only necessary if hardware is added or removed by the user.

Figure 3.2.46: Settings - Hardware Configuration



This menu has seven sub-menu options:

Exciter Changeover

When dual exciters are installed and configured, the user can set the changeover parameters. The parameters are:

- Main Exciter (A or B)
- Auto Changeover (enabled or disabled)
- Delay (in seconds)

Installed Exciter(s)

You can configure the transmitter for the number of installed exciters. If you have upgraded your transmitter to dual exciters, you may have already been prompted to change this configuration. Use the dropdown menu to select the appropriate exciter configuration - Exciter (A) or Dual Exciter (A/B). Press the Save button to save the change.

LVPS Hardware

You can configure the transmitter for the number of installed LVPS modules. If you have upgraded your transmitter to dual LVPS modules, you may have already been prompted to change this configuration.

Use the dropdown menu to select the appropriate LVPS configuration - Single LVPS: 1A, Single LVPS: 1B, Dual LVPS: 1A/1B, 3 LVPS: 1A/B & 2A, or 4 LVPS: 1A/B & 2A/B. Press the Save button to save the change.

LVPS Voltage

You can set the default LVPS voltage. The user can set the LVPS voltage to any value between 40 and 53 V, in 0.01 V steps) during normal operation. Under fault conditions, if the LVPS voltage requires an increase, the control system automatically increases the LVPS voltage, then decreases it back to the set value when the fault condition clears. This setting should not require adjustment.

Use the up and down buttons to select a voltage between 40 and 53 V (in 0.01 V steps). The default setting is 48 V. Press the Save button to save the change.

Fan Speed

The transmitter control function automatically adjusts fan speed to ensure adequate cooling based on all operating conditions. As a result this setting should not require adjustment. Increasing the fan speed will allow for cooler transmitter operation, but will also decrease efficiency and increase acoustic noise levels.

You can set the default speed of the transmitter's cooling fans. Under fault conditions, the control system determines if an increase or decrease in fan speed is required and automatically adjusts the fan speed.

Use the up and down buttons to select a value between 63 and 100%. The default setting is 100%, which corresponds to approximately 48 V for the related fan voltage. Press the Save button to save the change.

> **CAUTION!** Reducing Fan Speed will increase operating temperatures for critical components, reducing life expectancy.

NOTE: A 20% reduction in fan speed can yield up to 5 dB improvement in acoustic noise from the transmitter, as well as decrease power consumption (i.e., utility costs) and extend the operating life of the cooling fans.

UPS Installed

You can configure the transmitter for the installation of the UPS interface kit, which allows operation with an external, user-provided UPS. If you have upgraded your transmitter with the UPS interface, you may have already been prompted to change this configuration.

Slide the toggle switch to the right (will turn green) to enable the UPS. Press the Save button to save the change.

Audio Processor

If an Orban Audio Processor is installed, the transmitter must be configured to recognize it.

NOTE: Configuring the Orban audio processor locally will cause the AUI to display an Orban Inside setting. The same occurs on the controller UI when configuring via the AUI.

Use the dropdown menu to select the appropriate configuration - None or Orban Inside. Press the Save button to save the change. Reboot the transmitter by switching the ac power off and then on. This will ensure the transmitter properly detects the Orban Inside card upon recovery.

HD/DRM

NOTE: If HD/DRM is not enabled, it will be greyed out in the Settings menu.

The HD/DRM Settings page allows the user to configure the transmitter for HD operation. The HD/DRM Settings page is divided up into three sub-sections, which are:

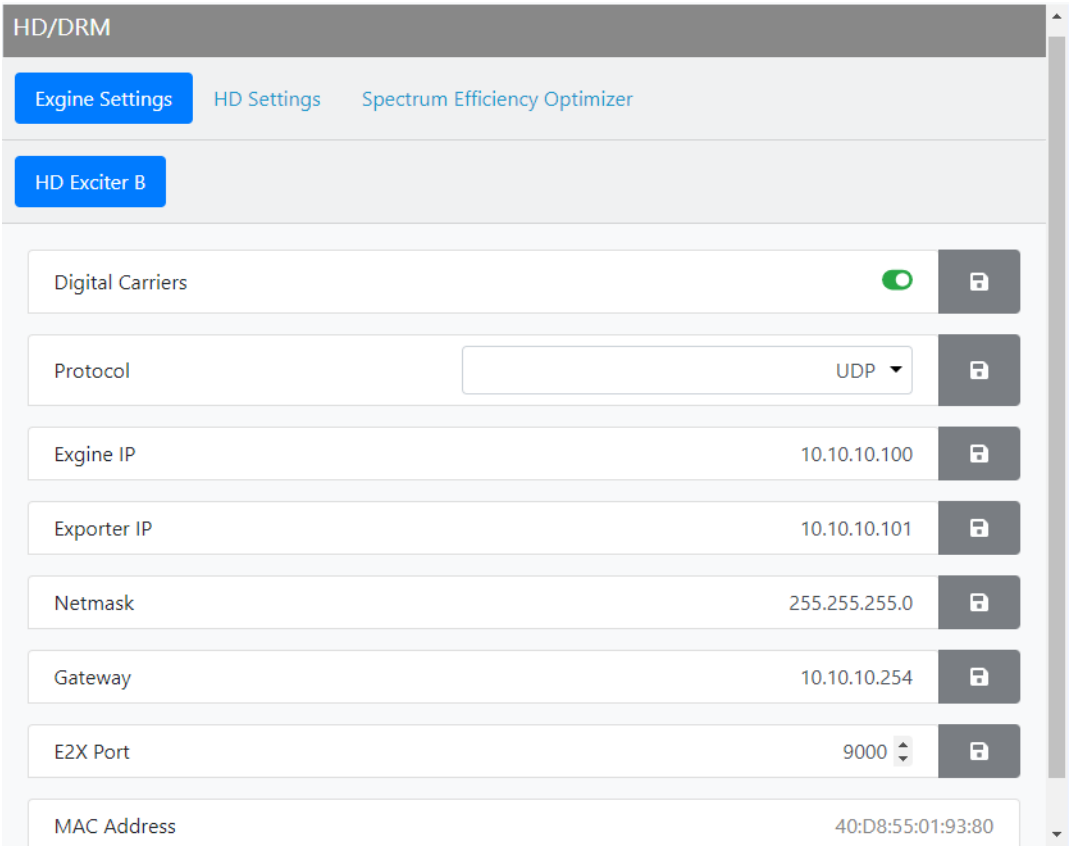
- Exgine Settings (see Exgine Settings)
- HD Settings (see HD Settings on page 3.2.78)
- Spectrum Efficiency Optimizer (see Spectrum Efficiency Optimizer on page 3.2.80)

Exgine Settings

The Exgine Settings page allows users to configure the Exgine for HD operation. See Figure 3.2.47 on page 3.2.77. Configure the Exgine Settings as follows:

1. Enable Digital Carriers by sliding the Icon to the right (turns green) and click Save.
2. Select the protocol to be used from the dropdown menu, either UDP or TCP and click the Save. Match this setting to the Exporter configuration.
3. Enter the Exgine IP address and click Save. If no Gateway is used or assigned, enter 0.0.0.0
4. Enter the Exporter IP address and click Save. This is the address of the interface where the data stream is originating. It is used to filter E2X traffic in case multiple Exporters are used in broadcast mode on a single LAN. 0.0.0.0 is also a valid configuration.
5. Enter the Netmask IP address and click Save.
6. Enter the Gateway IP address and click Save.
7. Enter the E2X Port address and click Save. The Exgine expects E2X on port 9000, some non-Nautel users utilize port 11000.
8. Mac Address - displays a number that serves as a unique network adapter identifier. This is set by the manufacturer and is displayed for informational purposes only. It may be necessary to use this number to allow the AUI to access your network.

Figure 3.2.47: Settings - HD/DRM - Exgine Settings



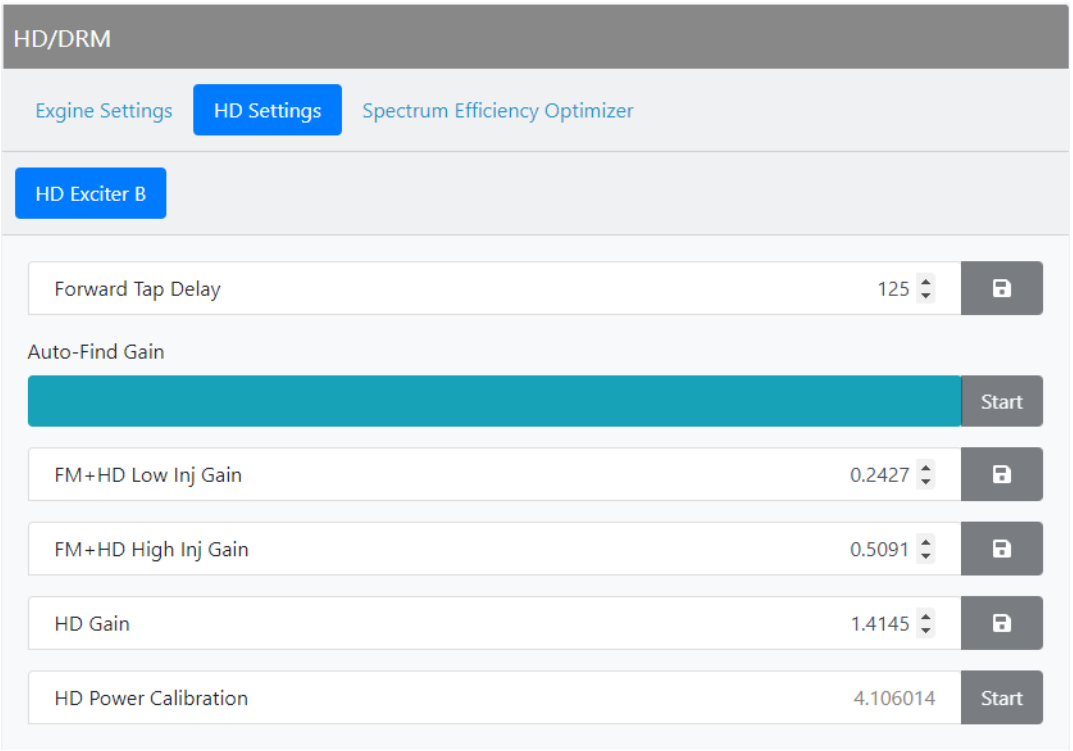
HD Settings

The HD Settings page allows users to establish Forward Tap Delay, FM+HD Low Inj Gain, FM+HD High Inj Gain and HD Gain levels. It also allows for an HD Power Calibration. Changes applied to the active exciter (A or B) only. To calibrate the other exciter, switch to the other exciter and repeat the change. See Figure 3.2.48 on page 3.2.79.

Configure the HD Settings as follows:

- Forward Tap Delay - Displays the time delay (in unit taps) between the forward path signal from the exciter and the reverse path signal into the exciter, fed back from the output of the transmitter. This value is factory set (to synchronize the phase of the forward and reverse signals so that pre-correction can operate properly) and should not require any adjustment in the field. Select the number using the arrow keys and press the Save button.
- Auto-Find Gain - Press the Start button to automatically find the optimized gain while the transmitter is RF On and in the applicable preset mode/injection level. Press the Start button to initiate.
- FM+HD Low Inj Gain - Applicable for FM+HD mode only (at -20 dBc to -15.1 dBc injection levels) and represents the starting/default gain applied to the forward path signal within the exciter at initial turn on/ramp-up. Select the gain using the arrow keys and press the Save button.
- FM+HD High Inj Gain - Applicable for FM+HD mode only (at -15 dBc to -10 dBc injection level) and represents the starting/default gain applied to the forward path signal within the exciter at initial turn on/ramp-up.Select the gain using the arrow keys and press the Save button.
- HD Gain - Applicable for HD mode only and represents the starting/default gain applied to the forward path signal within the exciter at initial turn on/ramp-up. Select the gain using the arrow keys and press the Save button.
- HD Power Calibration - This calibration occurs at the factory and should not require any adjustment in the field. This calibration is performed in FM mode. Press the Save button to initiate.

Figure 3.2.48: Settings - HD/DRM - HD Settings

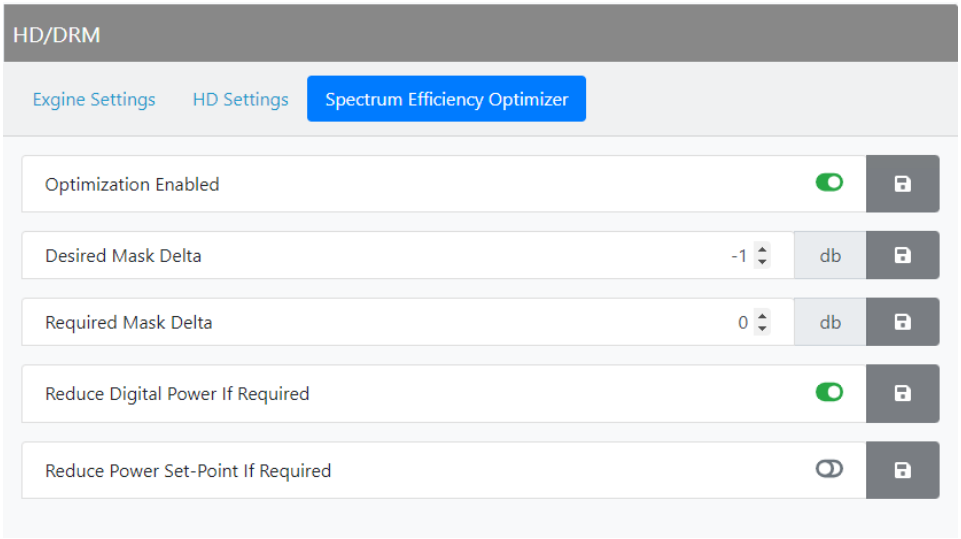


Spectrum Efficiency Optimizer

The Spectrum Efficiency Optimizer page allows the user to optimize the transmitter's spectrum and/or efficiency. See Figure 3.2.49. To optimize the HD operation, adjust the following parameters:

- Optimization Enabled - Slide the icon to the right and click Save. Enabling allows the optimizer to adjust the PA voltage setting to maximize efficiency based on the transmitter output spectrum. Depending on other settings in this section, it may require other actions to maintain the transmitter's compliance.
- Desired Mask Delta - Set the desired clearance (between -10 dB and 0 dB) from the spectral mask and click the Save button. The default setting is -1 dB, which will maintain a 1 dB clearance from the mask for maximum efficiency. This settings will not cause any reduction in output power.
- Required Mask Delta - Sets the value (between -10 db and 10 dB) that is considered to be absolutely required. Click the Save button. If this level is exceeded, the digital power from the transmitter will be reduced if the PA voltage is at maximum. If the spectral mask still cannot be met and the setting for it is enabled, the transmitter power set-point will be reduced.
- Reduce Digital Power If Required: Slide the icon to the right and click Save. Enabling allows a reduction in injection level (digital power) if the spectrum mask requires it.
- Reduce Power Set-Point If Required: Slide the icon to the right and click Save. Enabling allows a reduction in the transmitter power set-point if the spectrum mask requires it.

Figure 3.2.49: Settings - HD/DRM - Spectrum Efficiency Optimizer



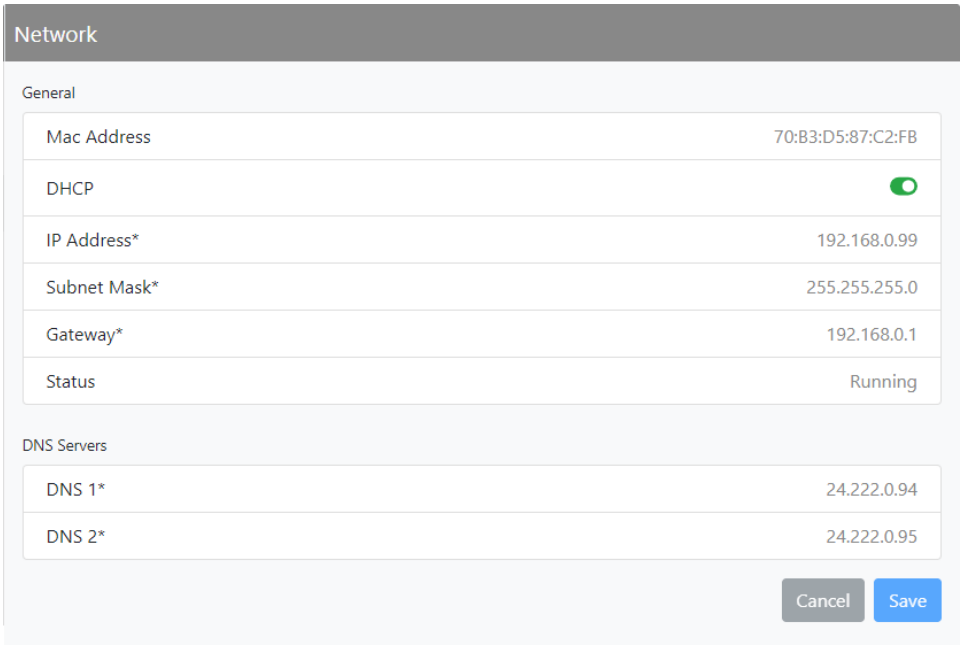
Network

> **CAUTION!**
>
> When connecting to a Nautel transmitter, we support both HTTP and HTTPS protocols. If using HTTP, the data traffic is not encrypted, meaning your username/password could be compromised. For security reasons, Nautel recommends using HTTPS whenever possible.

You can configure network settings using the remote AUI (see Figure 3.2.50). If you change a network setting on the controller UI, it will also be reflected on the remote AUI, and vice versa.

NOTE: Nautel recommends that network settings be entered/vetted by a qualified Network Administrator. If parameters are changed and the AUI is reset, record the new values (or see the local controller UI) to ensure you can log in after changes are made.

Figure 3.2.50: Settings - Network



All IP addresses shown are for reference purposes only

Determining DHCP Setting

One of the main decisions in configuring the network connection on your GV30N transmitter is whether you set DHCP to ON or OFF. If you are connecting to a network, consult with a network administrator before connecting the transmitter to your network to determine whether to enable (turn ON) or disable (turn OFF) the DHCP setting.

NOTE: DHCP can only be set from on/off from the controller front panel UI.

When DHCP is set to ON (default from factory), IP addresses are assigned automatically by the network server. In order for this feature to function properly, you must have a network-viewable DHCP server on your network.

If a DHCP server is not present, you (or your network administrator) must provide static addresses for IP, netmask, gateway and nameservers (gateway and nameservers are optional). You must enter them manually using the transmitter's controller front panel. In this case, DHCP should be set to OFF.

NOTE: A nameserver: (also called a DNS) translates a host name (e.g., mail.nautel.com) to an IP address such as in configuring email (see Network on page 3.2.81 and Email Server on page 3.2.85).

Network Setup - Using the AUI

NOTE: The following settings should be entered/vetted by a qualified Network Administrator.

By entering the GV30N's established IP address into an Internet browser's address bar, and then logging into the AUI, you can view and edit the network parameters (see Figure 3.2.50 on page 3.2.81). You must have remote control enabled to edit network settings using the remote AUI. The MAC Address and Status fields are read-only; they cannot be edited. You must disable DHCP (as shown in Figure 3.2.50 on page 3.2.81) to be able to edit the IP Address, Subnet Mask and Gateway fields. If DHCP is enabled, these fields will be assigned automatically. The DNS1 and DNS2 nameserver fields can be edited regardless of the DHCP setting.

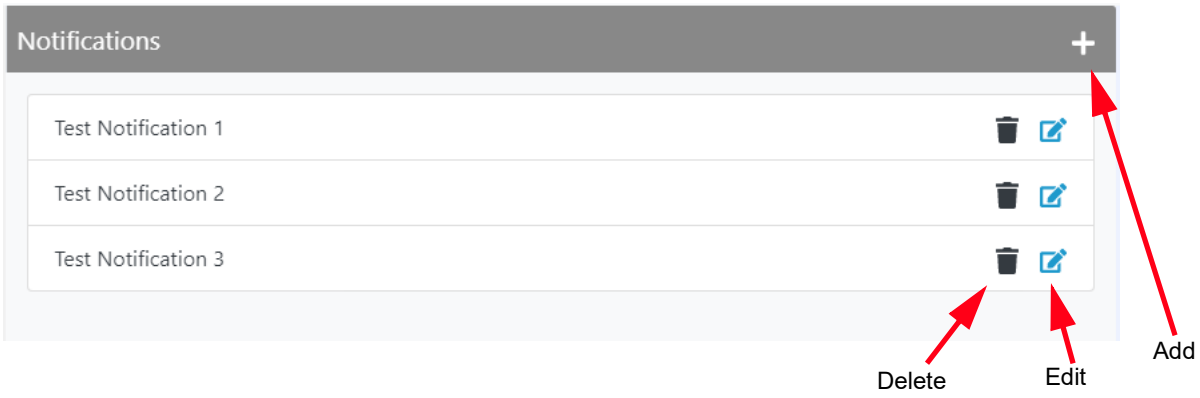
The Status field identifies the status of the network.

- RUNNING: transmitter is connected to a network and is functioning properly.
- NOT RUNNING: transmitter is not connected or is not functioning properly. When in this state, remote AUI access is not possible.

Notifications

The Notifications feature (see Figure 3.2.51) provides a means for the transmitter to issue emails or texts (SMS messages) triggered by user defined alarm events. If you use this feature, you must also configure an email (see Email Server on page 3.2.85).

Figure 3.2.51: Settings - Notifications



To configure the notifications feature, perform the following steps:

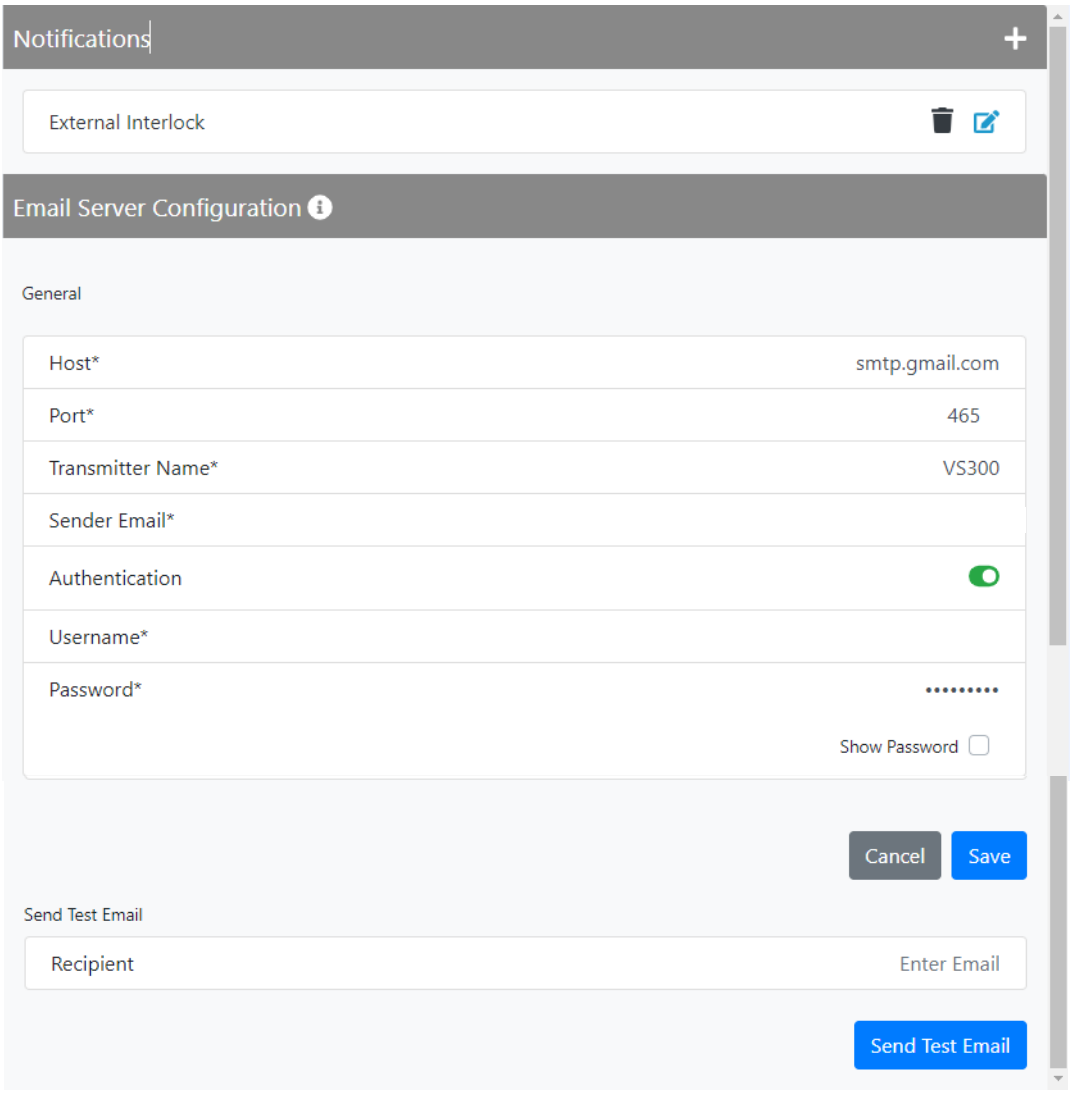
1. Pre-existing notifications are displayed in the Notifications list (e.g., "Audio Loss"). Click Add to create a new item for notification, click Edit (after highlighting an existing item) to edit an existing item or click Delete to erase an item.

2. When you click Add or Edit, the screen in Figure 3.2.52 on page 3.2.84 will appear. This screen allows you to add or edit a Notification Name, Recipient Email(s) (use a semi-colon to separate multiple email addresses, as applicable), and define the alarm list by Device type. Add or remove alarms by moving them (using the > and < arrow buttons) from the Available Alarms list to the Selected Alarms list. An email is issued when any alarm in the Selected Alarms list is active.

   Text (SMS) Messaging: In the Recipient Email field, you can enter a standard email address to initiate an email or you can enter a mobile phone number and SMS gateway to initiate a text (SMS message). The email-to-SMS text format is mobilenumber@ mobile_gateway (e.g., 5551234567@txt.bell.ca). Check with your mobile carrier to determine the proper gateway address for your area.

3. When complete click the Send Test Notification button to send a test email to the associated email address. Click Save to accept changes or the Cancel button to discard changes and return to the Notifications page.

Figure 3.2.52: Notifications/Email Server Configuration Page



Authentication enabled for reference purposes only

All IP addresses shown are for reference purposes only

Email Server

Email Server (see Figure 3.2.52 on page 3.2.84) allows you to configure email parameters (e.g., email server and port number), and is required if the notification feature is used.

NOTE: Nautel recommends that the following settings be entered/vetted by a qualified Network Administrator.

From the Notifications menu, the Email Server fields must be completed to configure the email feature. Perform the following steps (see Figure 3.2.52 on page 3.2.84):

Enter the following five parameter fields:

- Host: In order to enter a server name (e.g., mail.nautel.com), at least one nameserver IP address must be entered.
- Port Number: This logical connection end point uses a number to identify the type of process to which an internet or other network message is to be forwarded to when it arrives at a server. Typically, this is set to 25 for unencrypted SMTP systems and 843 for encrypted email.
- Transmitter Name: Set to a name that associates to the transmitter such as station identification (e.g., VS_WXYZ). This name will be included in notification emails.
- Sender Email Address: Enter as a standard email address (e.g., a@b.com). This will be the sender address that notification email recipients will see. Free web based email service accounts (Gmail, Hotmail, Yahoo mail etc.) are acceptable here.
- Authentication: If your email server requires authentication to send emails, click the check box and enter the appropriate Username and Password to allow this. If the check box is not selected, the Username and Password fields do not appear.

NOTE: The transmitter will automatically handle encryption if the associated mail server requires it.

When complete click Save to store these settings. Enter a recipient email address in the Send Test Email section and click the Send Test Email button to test your settings. Click the Save button to run the test or the Cancel button to return to the Notifications page.

Reboot Options

The Reboot Options page allows users to select the reboot various devices throughout the transmitter. See Figure 3.2.53.

There are three reboot options to choose from:

- Reboot Host (SBC)
- Reboot Active Exciter
- Reboot Standby Exciter

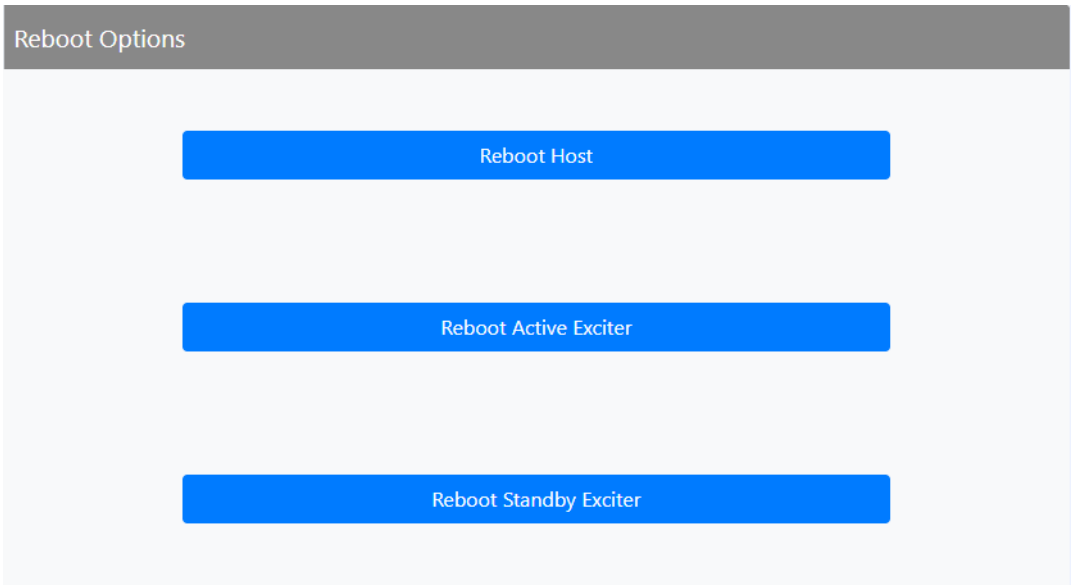
Click the desired option to initiate a reboot of that device.

A Reboot Host allows the user to force a host (SBC) reset to the AUI.

Rebooting the Active Exciter will cause a brief interruption in transmitter operation. Rebooting the Standby Exciter is only applicable for dual exciter systems.

NOTE: For a Host Reset, all users that are remotely connected (logged in) will be disconnected (logged out).

Figure 3.2.53: Settings - Reboot Options



Screen Configuration (Local AUI only)

The Screen Configuration page allows users to enable a Screen Saver for the front panel display and perform a touchscreen calibration.

Refer to Non-standard maintenance - see page 3.4.1 for detailed information on these features.

Security Certificates

The AUI supports HTTPS connections and to take advantage of this, the user must either use a free or purchased Security Certificate.

Security uses public and private keys to ensure that the site is verified that is what it purports to be and therefore safe.

For most users there is no need to add a Security Certificate, as the connection to the transmitter is controlled by the customer's network architecture, however, it is available for organizations that wish to take extra precautions.

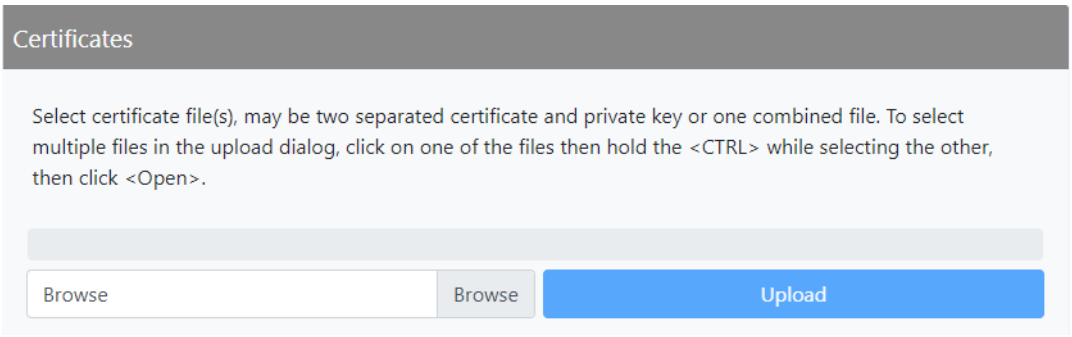
Security Certificates are uploaded to the transmitter via the Settings > Security Certificates menu.

Purchased certificates are provided by Certificate Authorities:

https://en.wikipedia.org/wiki/Certificate_authority

Click the Browse button to search for the certificate and press Upload to activate. See Figure 3.2.54.

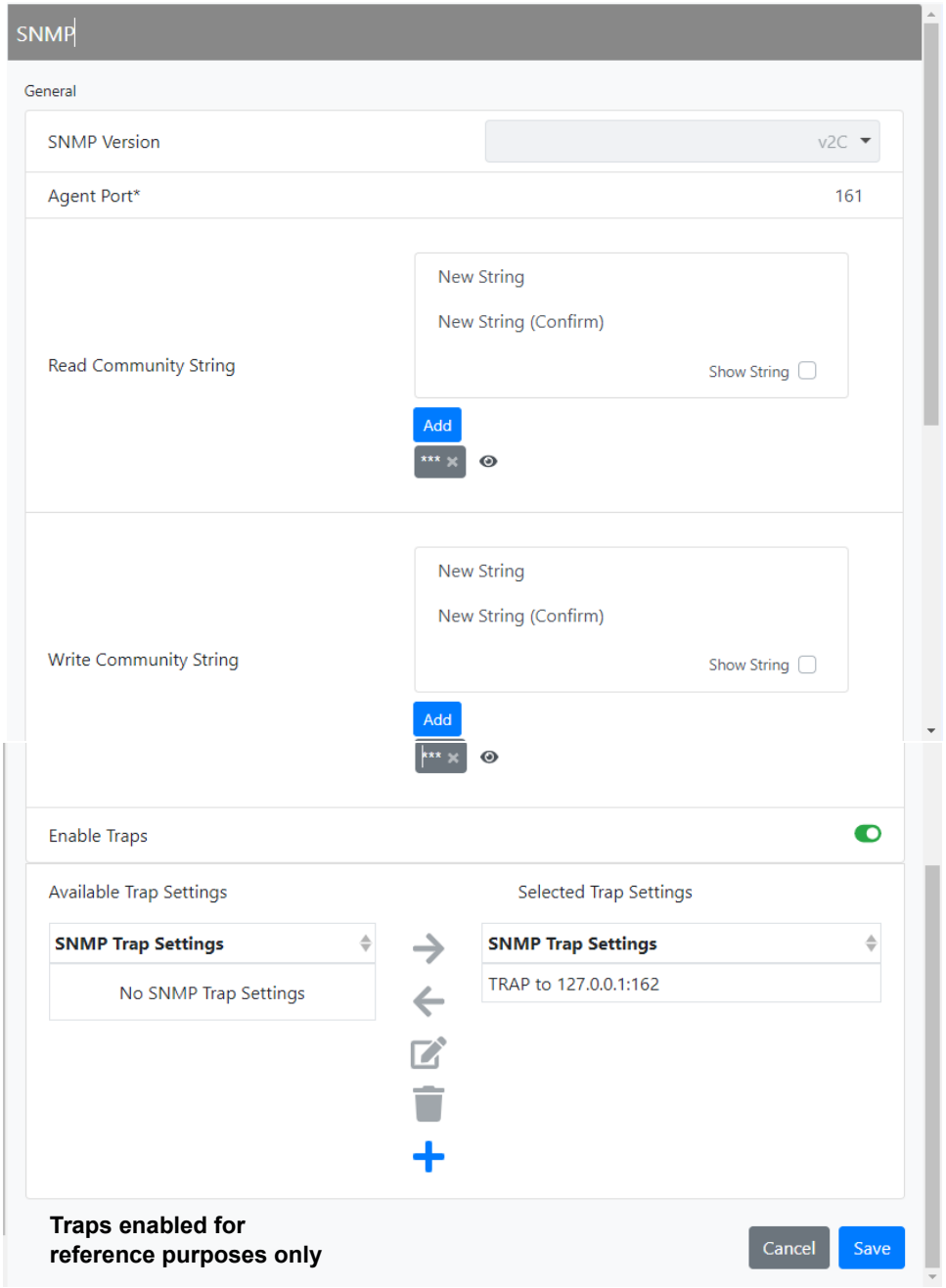
Figure 3.2.54: Settings - Security Certificates



SNMP

The SNMP configuration page provides a user with a means to configure the SNMP agent and the associated traps (see Figure 3.2.55).

Figure 3.2.55: Settings - SNMP



Configure the SNMP agent as follows:

1. Enter the first five fields, noting the following:
   - Agent Port: Enter the UDP port where the SNMP agent checks for requests. The default setting is 161. If your transmitter is behind a firewall, you must open this port to use SNMP.
   - Read Community String: Enter the password for the SNMP client application to allow acquisition of channel values. Provide confirmation of this password by re-entering it in the Confirm field.
   - Write Community String: Enter the password for the SNMP client application to allow changing of channel values. Provide confirmation of this password by re-entering it in the Confirm field.
2. Select Enable Traps to allow the SNMP agent to send trap notifications, and to display two additional fields associated with traps. Enter the two additional fields as follows:
   - Trap Receiver IP: Enter the IP address of the computer to which the SNMP agent will send trap notifications. The computer must be running an SNMP application that is configured to receive traps. The SNMP agent will send trap notifications to only one recipient.
   - Trap Receiver Port: Enter the UDP port where the SNMP agent will send traps. The default setting is 162.
3. When complete press Save or press the Cancel to restore the previous settings.

NOTE: Check the Read Community and Write Community passwords after a software upgrade. Some upgrades will clear passwords and require them to be reset.

Spectrum Mask

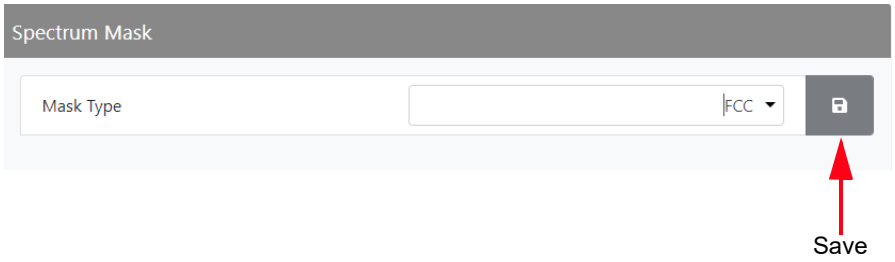
The Spectrum Mask page allows users to select the appropriate FM mask standard being used by the Dashboard spectrum analyzer. See Figure 3.2.56. Use the Mask Type dropdown menu to select the desired mask (factory setting is FCC). Press the Save button to enable the mask.

There are three mask options to choose from:

- FCC
- ETSI
- None

NOTE: Selecting the spectrum mask standard applies only to FM mode of operation. For other modes of operation (e.g., FM+HD, HD, DRM), the spectrum mask is automatically applied.

Figure 3.2.56: Settings - Spectrum Mask

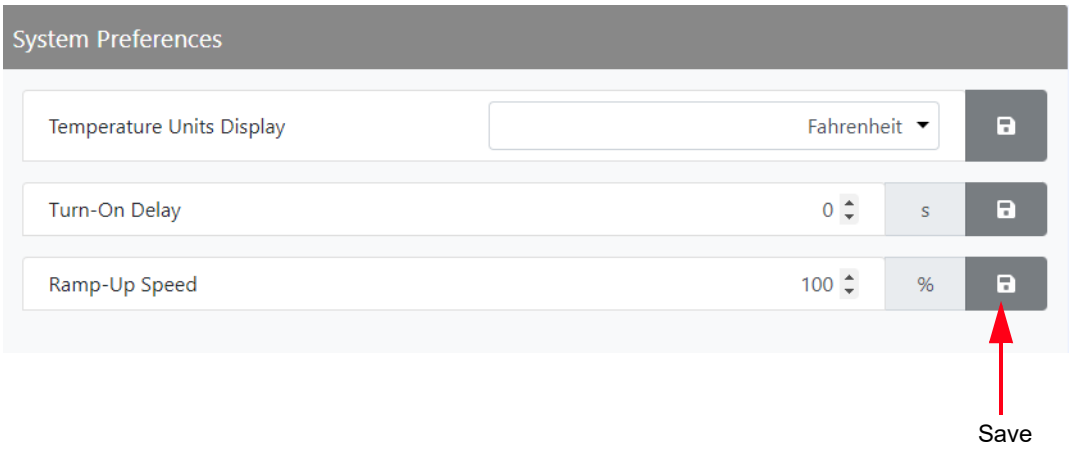


System Preferences

The System Preferences page allows the user to display the Temperature units in either Celsius or Fahrenheit. See Figure 3.2.57.

Select from the drop-down menu and click the Save icon to save the changes.

Figure 3.2.57: Settings - System Preferences



NOTE: Temperature units selection (e.g. Celsius or Fahrenheit) will be the same for all login sessions or multiple users. If the units are changed in one login session, they will be changed for all open sessions and all users.

Thresholds

You can set thresholds for the main audio and SCA sources (trip level and timeout) using the remote AUI. These thresholds determine the limit for an associated low audio power alarm to be activated.

If you change a setting on the remote AUI, it will also change on the controller front panel UI, and vice versa.

Audio Low Thresholds

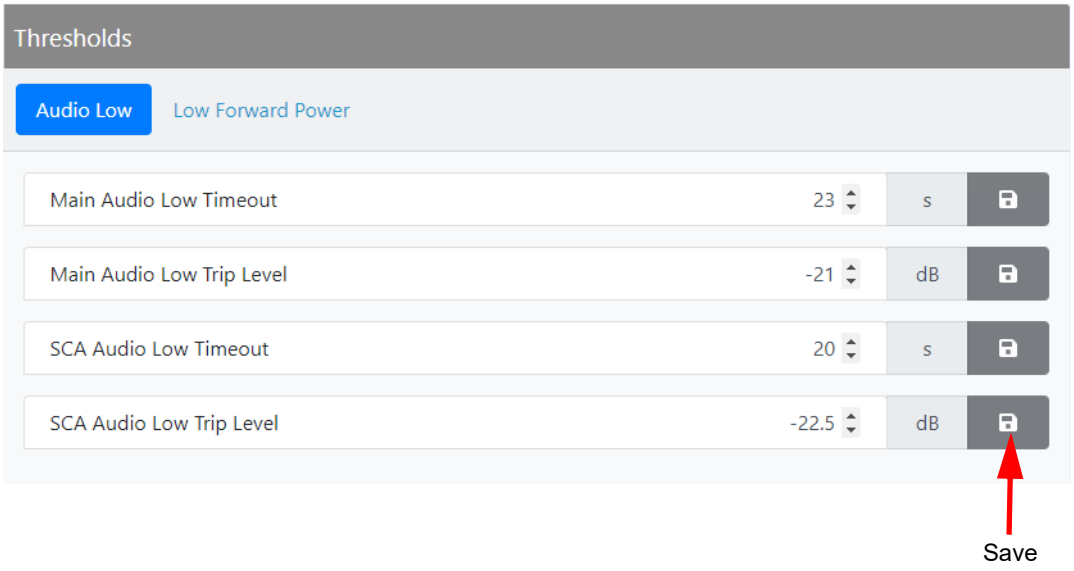
The AUI's Audio Low Thresholds page (see Figure 3.2.58) displays a screen that allows for setting of the low trip level and timeout delay for the main audio and SCA audio low thresholds.

If the applicable audio source (main or SCA) level falls below the Trip Level setting (default is -22.5 dB) for longer than the Timeout setting (default is 20 s), an alarm will activate in the Alarms page.

When the audio source level increases above the Trip Level, the alarm will clear. To disable the low audio alarm, set the associated Trip Level to -100 dB. Press Save button to save the change.

Use the up and down arrows to change the Trip Level or Timeout and click the Save button.

Figure 3.2.58: Settings - Thresholds - Audio Low

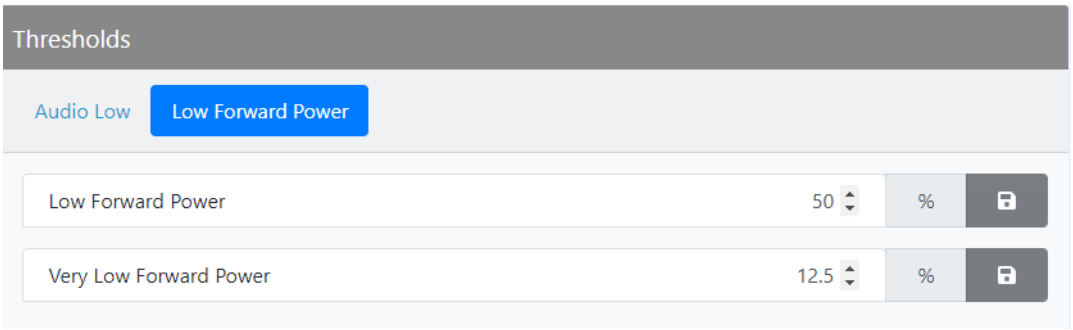


Low Forward Power Thresholds

Use the up and down buttons to move the cursor to the desired line item and click the Save icon to save the changes. Select a threshold between 0 and 100% (in 0.5% increments), that corresponds to a percentage of rated power. See Figure 3.2.59.

The default setting for Low Forward Power is 50% (equivalent to 3 dB power reduction).
The default setting for Very Low Forward Power is 12.5% (equivalent to 9 dB power reduction).

Figure 3.2.59: Settings - Thresholds - Low Forward Power



Time

The GV30N's internal clock uses a backup battery, and therefore maintains an accurate date and time, even during power outages. The date and time needs to be set when the transmitter is first installed, or after a power outage if the backup battery has failed.

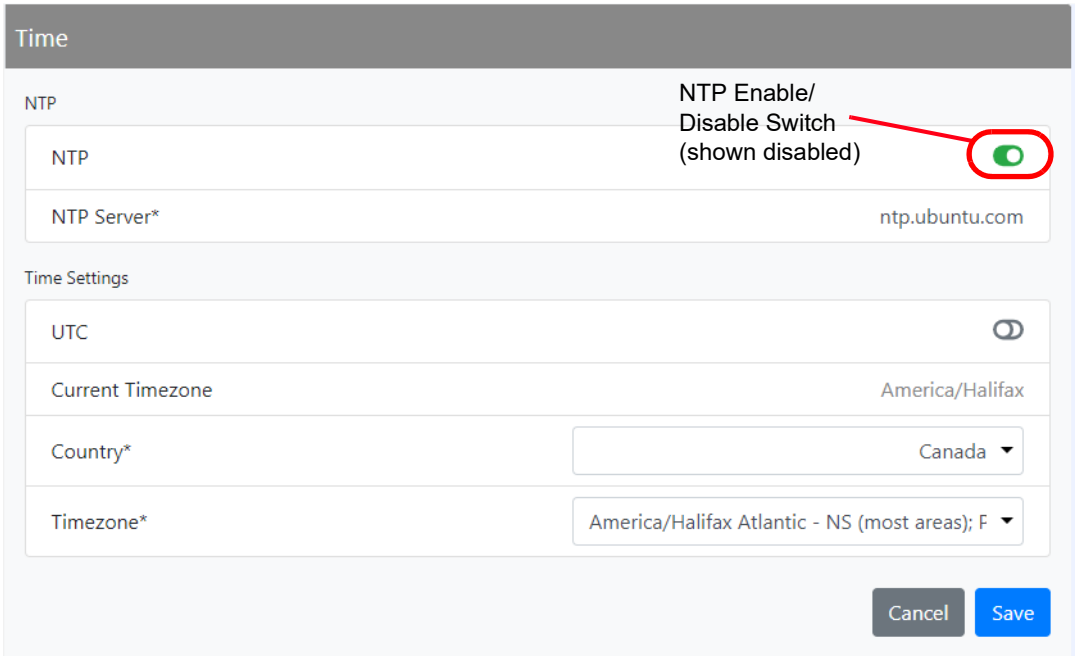
If the NTP feature is enabled (see Figure 3.2.60), the clock will set automatically and cannot be manually adjusted.

You can set the date and time using the remote AUI (see Setting the Clock - Using the AUI). If you change the clock setting on the controller front panel UI, it will also be reflected on the remote AUI, and vice versa.

Setting the Clock - Using the AUI

You can remotely set the GV30N's time and date by selecting Time from the Settings menu. See Figure 3.2.60).

Figure 3.2.60: Settings - Time



The Time option allows users to set the exact time and date information as well as regional and timezone settings for a transmitter location.

Procedure to set up the time and date:

1. Select the Time option from the Settings page.
2. Enter the following location parameters:
   - Country - select the appropriate country from the drop-down menu.
   - Timezone - select the appropriate timezone based on Country selection.
3. Enter Time and Date parameters and press Save. Press Cancel to discard changes. Please note that Time and Date cannot be set via this menu if NTP is enabled (see Figure 3.2.60 on page 3.2.94).
   - Date - select values from the calendar icon for Day, Month, and Year.
   - Time - select values from the clock icon for hours (24-hour clock) and minutes (up to 60). You can click Now to set the clock to the current time.

NOTE: Changes cannot be made via this menu if NT P is enabled. Disable NTP, make the required changes in the Time menu, then re-enable NTP.

NOTE: Ensure the proper Timezone is selected to observe Daylight Savings time (DST).

NTP servers

You can configure an NTP (Network Time Protocol) server to allow clock synchronization with all computers on the same network as the transmitter.

NOTE: The accuracy of the NTP synchronization is related to the distance to the server, therefore Nautel recommends you choose servers in the same country as the equipment. If this is not possible, attempt to connect to servers from the same continent.

NOTE: The NTP clock synchronization polling interval varies between 64 and 1024 seconds. To minimize network traffic, the interval will change depending on how much error is accumulated between polling events and will be increased if the remote NTP server becomes unreachable. The polling interval is also randomized slightly to avoid the situation where a large number of requests are always arriving at the NTP server at the same time.

Enabling NTP

Enable the NTP function by moving the NTP toggle switch to the right (displays green). Disable by moving the NTP toggle switch to the left. When NTP is disabled, the Current Timezone fields (Country and Zone, as applicable) are also displayed (see Setting the Clock - Using the AUI). Click the Save button to activate any change.

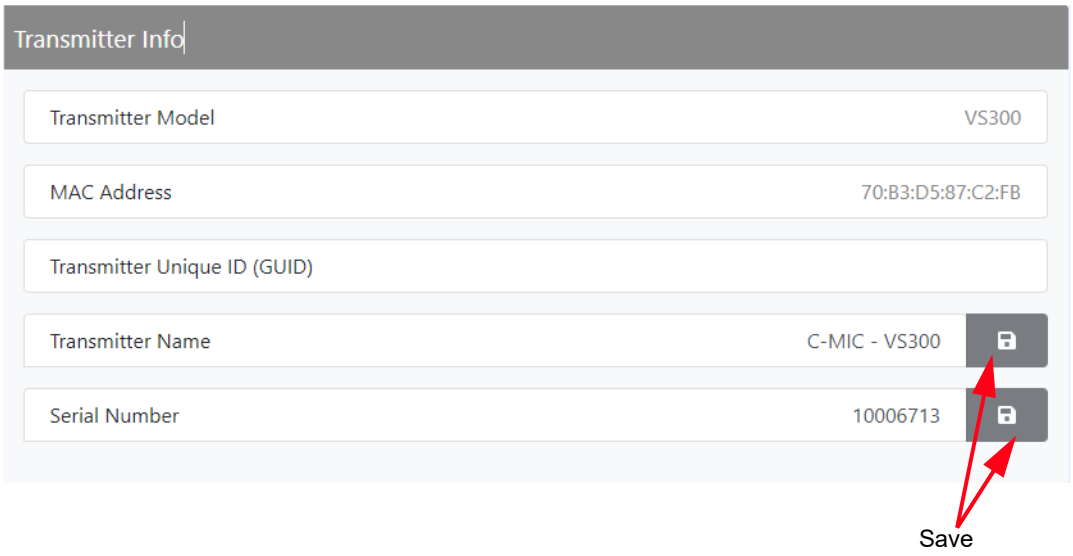
Transmitter Info

NOTE: Nautel recommends adding a Transmitter Name and Serial Number to the Transmitter Info section. This will provide easy transmitter identification when using the remote AUI.

The Transmitter Info page allows the user with a means to name the transmitter as a simple identifier. See Figure 3.2.61. Enter the information to be used as follows (Transmitter Name, Serial Number).

Click the Transmitter Name or Serial Number bar to enter a new name or serial number or edit a previous one and press the Save button to save the changes.

Figure 3.2.61: Settings - Transmitter Info



Users

NOTE: This function is only available via remote connection to the AUI.

The Users menu (see Figure 3.2.62) allows a user with the proper permissions to create accounts to allow certain users to access and control features of the AUI, and receive notifications when critical-level or maintenance-level alarms occur. To view this menu, select Users from the Settings menu.

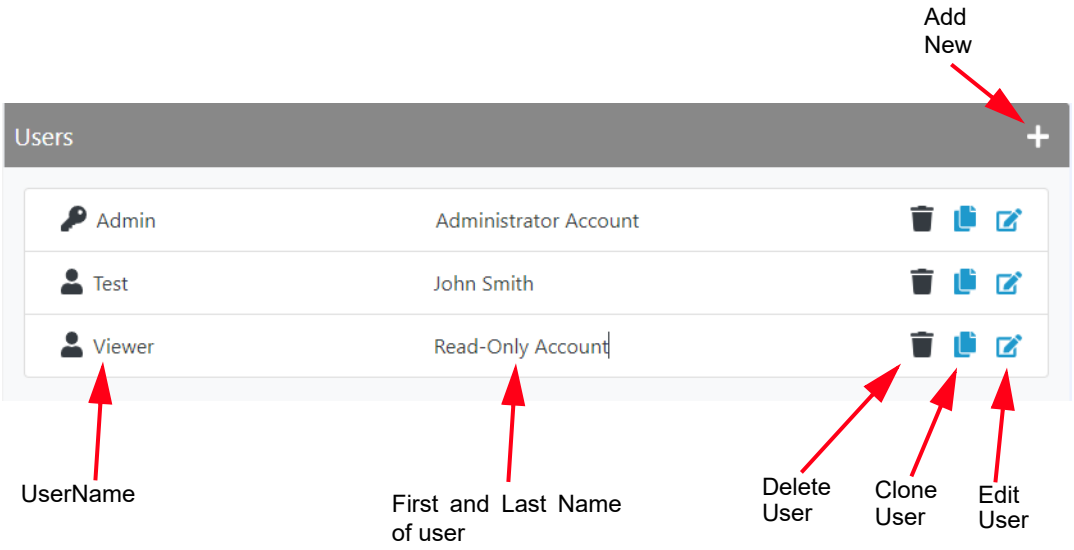
NOTE: Depending on the permission level assigned to a given user, some features shown in Figure 3.2.63 on page 3.2.99 may not be displayed or available.

The GV30N contains two default user accounts when it leaves the factory. (Administrator and Viewer). See AUI Pages on page 3.2.15).

The Administrator default Username is "Admin" and password is "change_me". The Viewer default Username is "Viewer" and the password is blank (i.e., no password).

The Administrator account is able to perform all user functions, whereas the Viewer account only has visibility of the user functions.

Figure 3.2.62: Settings - Users



Setting Permissions

There are three user permissions, each with their own specific functionality. See Figure 3.2.63 on page 3.2.99. All users have permission to change their own name, email, language and password, after their account has been created, but are otherwise limited to the following functions:

- Edit Presets: Pre-defined user type. Allows the user to modify presets and change active preset. No administrative functions.
- RF Control: Pre-defined user type. Allows the user to turn the RF output on and off. No administrative functions.
- Administrator: Pre-defined user type. Can perform all functions. Administrator is the only permission level that allows addition, deletion or editing of users.

Click Save to activate the changes.

Adding/Editing Account Information

If the Permission user role is Administrator, you have permissions to edit any user account. Other roles are limited.

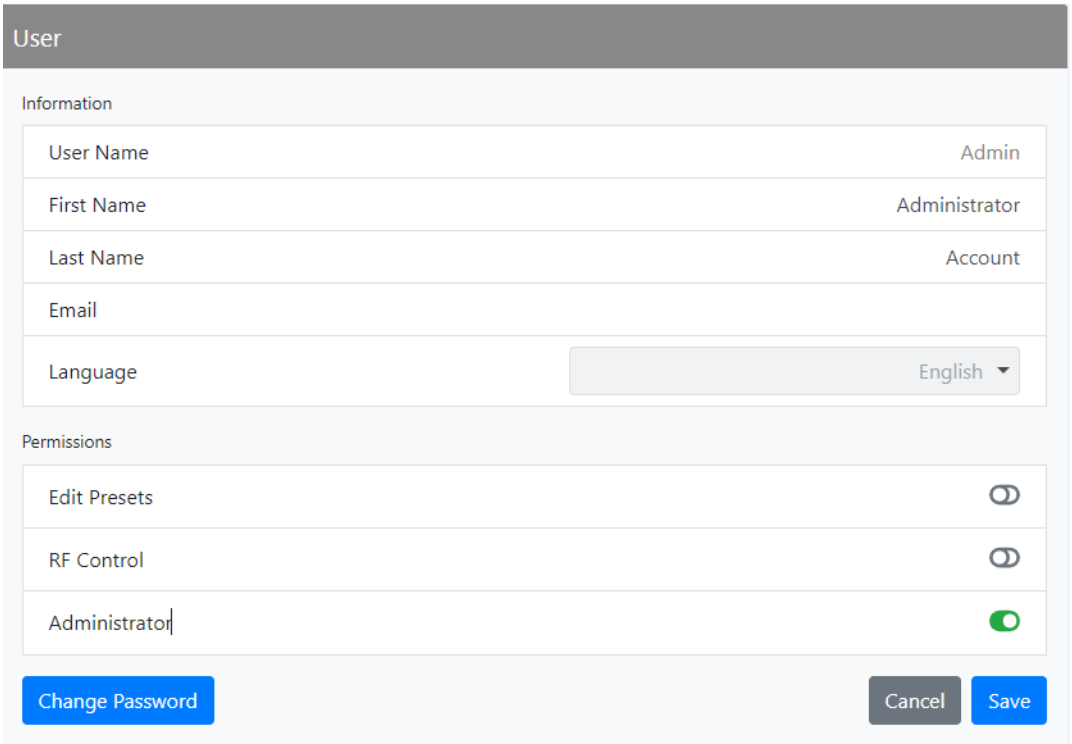
Add an Account

To add a user account, click the + symbol in Figure 3.2.62 on page 3.2.97. Enter the User Form (see Figure 3.2.63 on page 3.2.99) with user account information, including First Name, Last Name, Email, Language and Permissions. Click Save to accept. See also Set or Change the Password on page 3.2.99.

Edit an Account

To edit an existing user account, click the Edit User icon of the desired user in the Users list (see Figure 3.2.63 on page 3.2.99). The User Form for that user will be displayed. You can edit the Name, Email, Language, Permissions and Password (see Set or Change the Password on page 3.2.99). Click Save to accept.

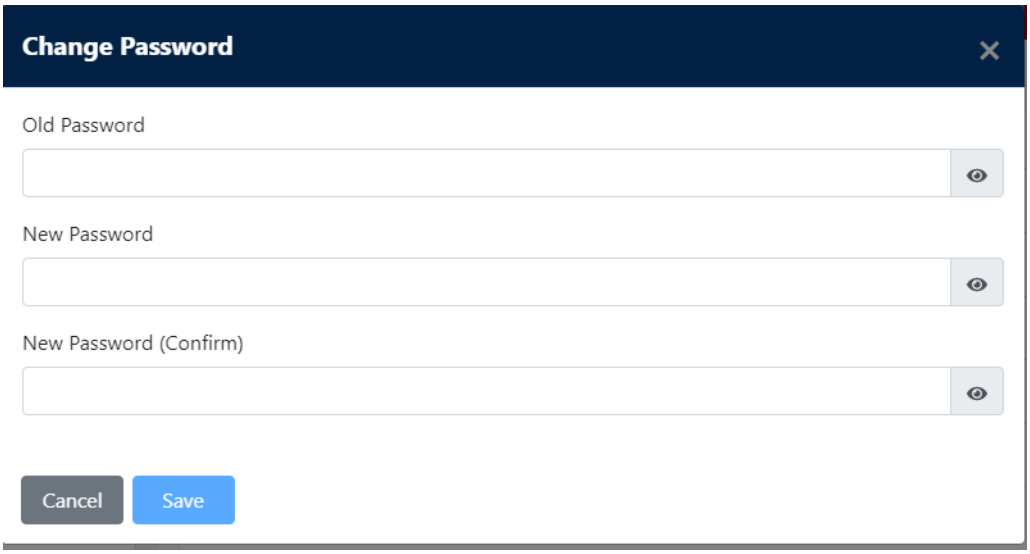
Figure 3.2.63: User Form Page



Set or Change the Password

To set or change your password, click Change Password at the bottom, left of the User Form screen. A menu appears (see Figure 3.2.64 on page 3.2.100) that prompts you to enter the old password (as applicable), new password and confirmation of the new password. Click the OK button to accept changes or the Cancel button to discard changes and exit this menu.

Figure 3.2.64: Changing Password



Delete an Account

To delete a user account, click the Delete User icon of the desired user in the Users list (see Figure 3.2.62 on page 3.2.97). Click Continue in the confirmation window to delete the user account or click Close to keep the user account and return to the Users list.

Remote I/O

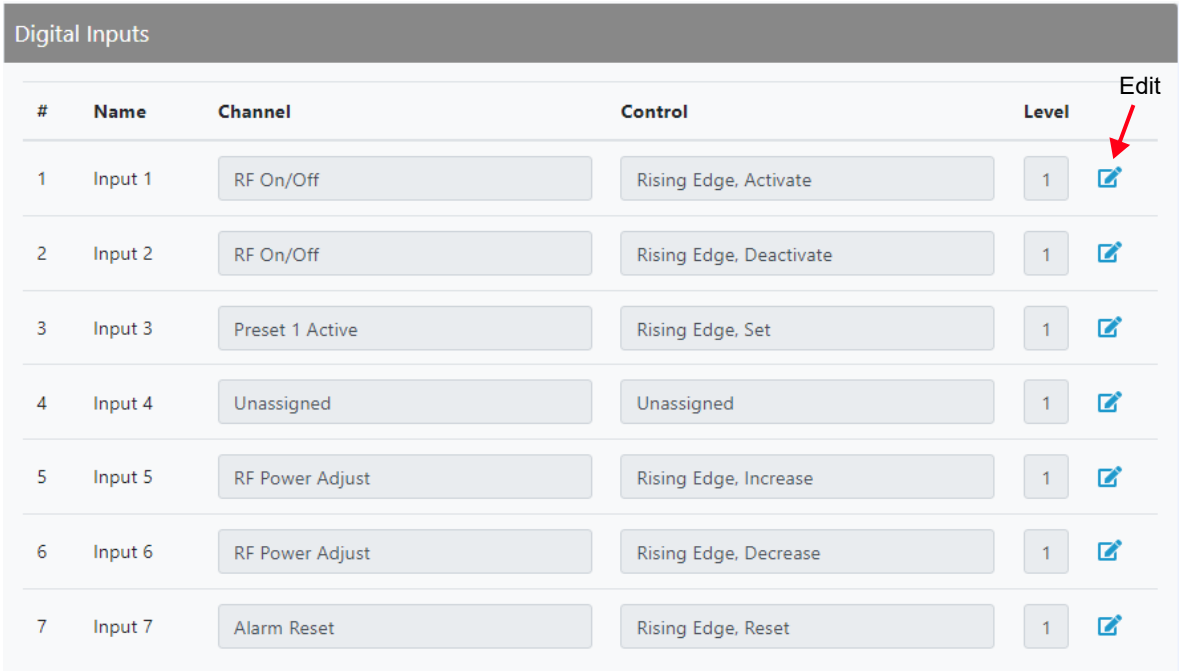
The Remote I/O page allows the user to configure the remote input/output interface for the transmitter. Refer also to the GV30N Installation Manual for information on remote inputs and outputs and their factory default settings.

- Digital Inputs (see Digital Inputs)
- Digital Outputs (see Digital Outputs on page 3.2.104)
- Analog Outputs (see Remote I/O Settings on page 3.2.184)

Digital Inputs

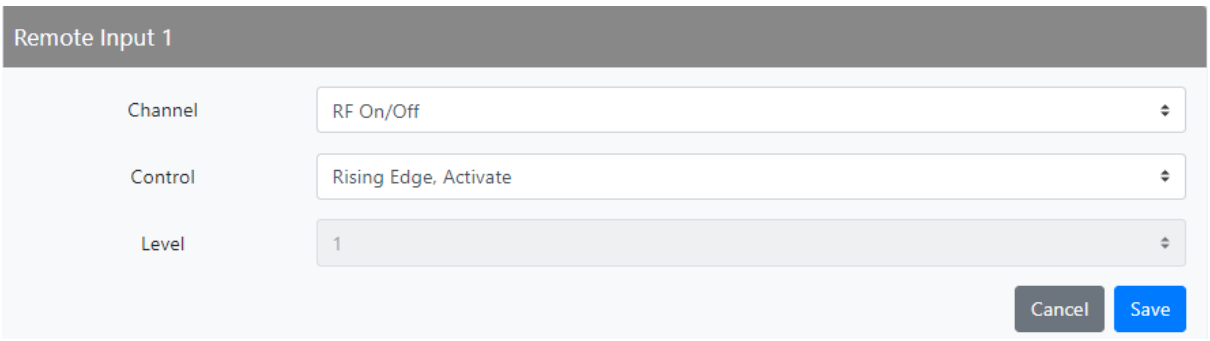
Using the Digital Inputs page (see Figure 3.2.65), you can configure up to seven inputs that allow you to remotely control various operational characteristics of the transmitter. Unless otherwise noted, these inputs are only accepted by the transmitter if remote control has been enabled. That setting can only be made by a local user using the controller front panel UI's REMOTE button (its LED is green when remote is enabled). Nautel sets remote input defaults prior to shipping. See the Installation Manual for details.

Figure 3.2.65: Remote I/O - Digital Inputs Page



The current settings for Input 1 through Input 7 are displayed, including the Channel and Control settings, as well as the current logic Level (1 or 0). You can edit Channel and Control settings by clicking the edit icon for the desired input. This displays the menu in Figure 3.2.66 on page 3.2.102.

Figure 3.2.66: Input Editing Menu



Select Input Channel

From the editing screen for remote input 1 through 7, you can configure the input for one of a variety of channel inputs. Click the Channel field's up/down arrows to display the following options:

- Unassigned. No effect on transmitter operation, regardless of logic level.
- RF On/Off. Same as pressing the RF On (telling the system to provide RF power, if possible) or the RF Off button on the FPUI. There are two inputs configured by default; one for Falling Edge, Activate and one for Falling Edge, Deactivate.
- Preset 1 Active: Selects preset 1 as active.
- Preset 2 Active: Selects preset 2 as active.
- RF Power Adjust. Activating these inputs will increment/decrement the current preset power level by 1% of the rated power. Holding the selection will increment/decrement the power level by 1% every 1/2 second. There are two inputs configured by default; one for Falling Edge, Increase and one for Falling Edge, Decrease. NOTE: If multiple power increase or decrease inputs are active, the lower number input takes precedence.
- Alarm Reset. Initiates an reset for latched alarms. Same as initiating an Alarms Reset from the controller front panel's main menu.

Click Save to activate changes. Click Cancel to cancel changes and return to the Remote Inputs screen. If you save a change to a remote input via the AUI, it will also be displayed on the controller front panel UI.

Configure Input Control Logic

From the editing screen for remote input 1 through 7, you can configure the input's active/inactive control logic. Click the Control field's up/down arrows to display the following options, noting the options differs for each Channel input:

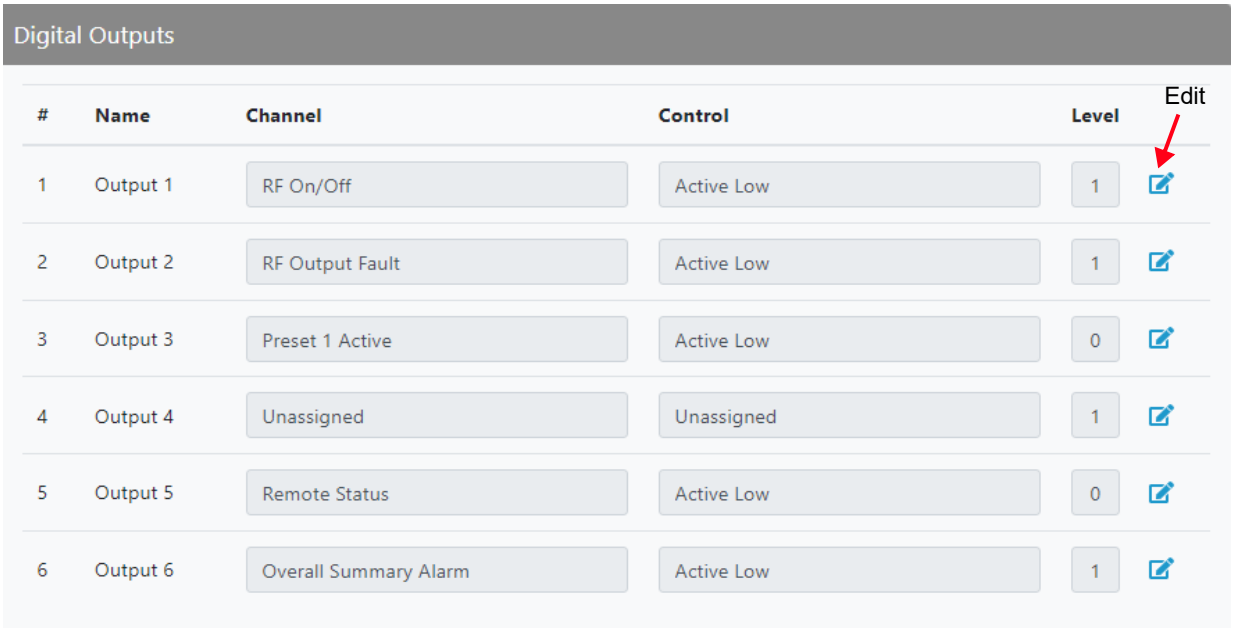
Channel	Control options	Description
Unassigned	Unassigned	No logic setting.
RF On/Off	Rising Edge, Activate	Logic '1' (high or rising edge) activates the input.
	Falling Edge, Activate	Logic '0' (low or trailing edge) activates the input.
	Rising Edge, Deactivate	Logic '1' (high or rising edge) de-activates the input.
	Falling Edge, Deactivate	Logic '0' (low or trailing edge) de-activates the input.
	Rising Edge, Toggle	Logic '1' (high or rising edge) activates the input; next logic '1' (high or rising edge) de-activates the input.
	Falling Edge, Toggle	Logic '0' (low or trailing edge) de-activates the input; next logic '0' (low or trailing edge) activates the input.
	Active High, Turn On. Active Low, Turn Off.	Logic '1' (high) causes an RF on. Logic '0' (low) causes an RF off.
	Active High, Turn Off. Active Low, Turn On.	Logic '1' (high) causes an RF off. Logic '0' (low) causes an RF on.
Preset 1/2 Active	Rising Edge, Set	Logic '1' (high or rising edge) selects the preset.
	Falling Edge, Set	Logic '0' (low or trailing edge) selects the preset.
	Active High, Activate	Logic '1' (high) activates the preset.
	Active Low, Activate	Logic '0' (low) activates the preset.
RF Power Adjust	Rising Edge, Increase	Logic '1' (high or rising edge) causes a power increase.
	Falling Edge, Increase	Logic '0' (low or trailing edge) causes a power increase.
	Rising Edge, Decrease	Logic '1' (high or rising edge) causes a power decrease.
	Falling Edge, Decrease	Logic '0' (low or trailing edge) causes a power decrease.
	Active High, Increase	Logic '1' (high) causes a power increase.
	Active Low, Increase	Logic '0' (low) causes a power increase.
	Active High, Decrease	Logic '1' (high) causes a power decrease.
	Active Low, Decrease	Logic '0' (low) causes a power decrease.
Alarm Reset	Rising Edge, Reset	Logic '1' (high or rising edge) causes a reset.
	Falling Edge, Reset	Logic '0' (low or trailing edge) causes a reset.

Click Save to activate changes. Click Cancel to cancel changes and return to the Remote Inputs screen.

Digital Outputs

Using the Digital Outputs page (see Figure 3.2.67), you can configure up to six outputs that indicate either the presence of various alarms or the status of operator controlled circuits. Nautel sets remote output defaults prior to shipping. See the Installation Manual for details.

Figure 3.2.67: Remote I/O - Digital Outputs Page



The current settings for Output 1 through Output 6 are displayed, including the Channel and Control settings, as well as the current logic Level (1 or 0). You can edit Channel and Control settings by clicking the edit icon for the desired output. This displays the menu in Figure 3.2.68 on page 3.2.104.

Figure 3.2.68: Output Editing Menu

Select Output Channel

From the editing screen for remote output 1 through 6, you can configure the output for one of a variety of channel outputs. Click the Channel field's up/down arrows to display the following options:

- Unassigned. No alarm or status parameter is monitored.
- RF On/Off. The active logic level indicates the transmitter's RF power stage is on (enabled). The inactive logic level indicates the transmitter's RF power stage is off.
- RF Output Fault. The active logic level indicates that an alarm is occurring that affects the RF output (power inhibition or power reduction).
- Preset 1 Active. Preset 1's output will be indicated by a logic low. The remaining, non-active preset outputs will be open collector.
- Preset 2 Active. Preset 2's output will be indicated by a logic low. The remaining, non-active preset outputs will be open collector.
- Remote Status. An active logic low level indicates remote control is enabled (i.e., local plus remote). The inactive logic level indicates remote control is disabled.
- Overall Summary Alarm. The active logic level indicates that an alarm is occurring. Any transmitter alarm can be selected as a remote output. Refer to the Troubleshooting Manual for a description of each alarm.

Click Save to activate changes. Click Cancel to cancel changes and return to the Remote Outputs screen. If you save a change to a remote output via the AUI, it will also be displayed on the FPUI.

Configure Output Logic

You can configure the active/inactive logic for each of the six remote outputs. Click the Control field's up/down arrows to display and select one of the following:

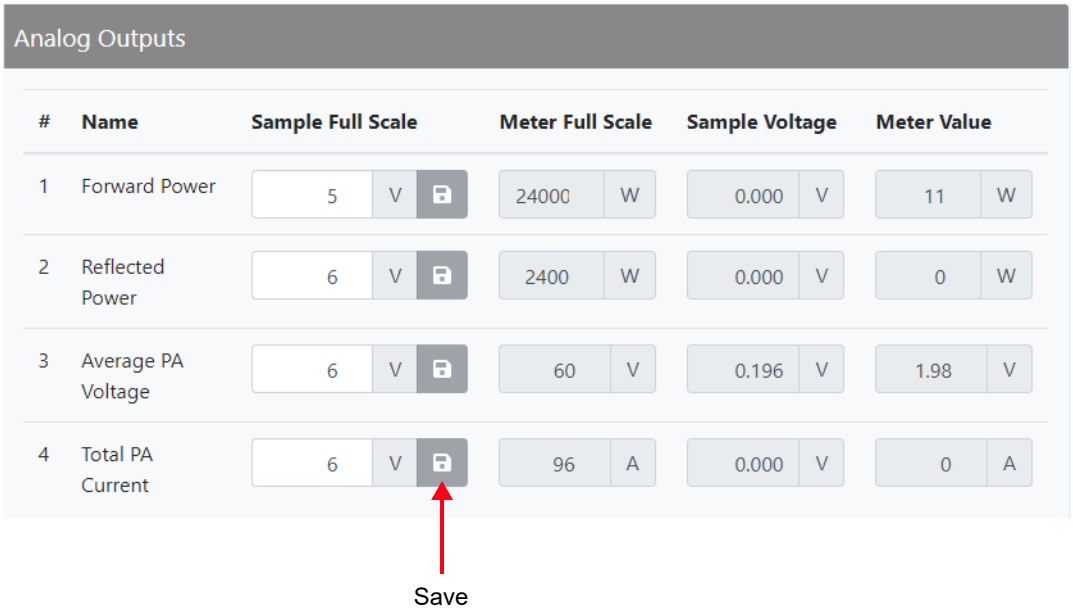
- Active Low. Logic '0' (low) indicates the output is true (e.g., RF is on); Logic '1' (high) indicates the output is false (e.g., RF is off).
- Active High. Logic '1' (high) indicates the output is true (e.g., RF is on); Logic '0' (low) indicates the output is false (e.g., RF is off).

Click Save to activate changes. Click Cancel to cancel changes and return to the Remote Outputs screen.

Analog Outputs

There are four analog outputs - forward power, reflected power, Average PA Voltage and Total PA Current - that can be remotely monitored. These outputs are factory defined parameters and cannot be changed to other parameters, however their scaling can be configured, using the Analog Outputs page (see Figure 3.2.69), to reflect the output voltage that yields a full-scale deflection.

Figure 3.2.69: Remote I/O - Analog Outputs Page



The values associated with each of these fixed meters are of a linear nature so that changes made to the Sample Full Scale field (allowable range is 1- 10 V, defaulted to 5 V) will be reflected in the other fields according to the following equation:

(Meter Value/Meter Full Scale) x Sample Full Scale = Sample Voltage

NOTE: The Sample Voltage reading reflects the value that can be measured at the associated remote analog output pin for the given Meter Value. See the Installation Manual for actual remote analog output pin assignments.

Set the Sample Full Scale field, as desired, and Click the associated save button to activate the change.

Reports

The Reports page allows the user to view and download transmitter events by the following criteria:

- Event History
- Active Preset
- Meters
- Settings

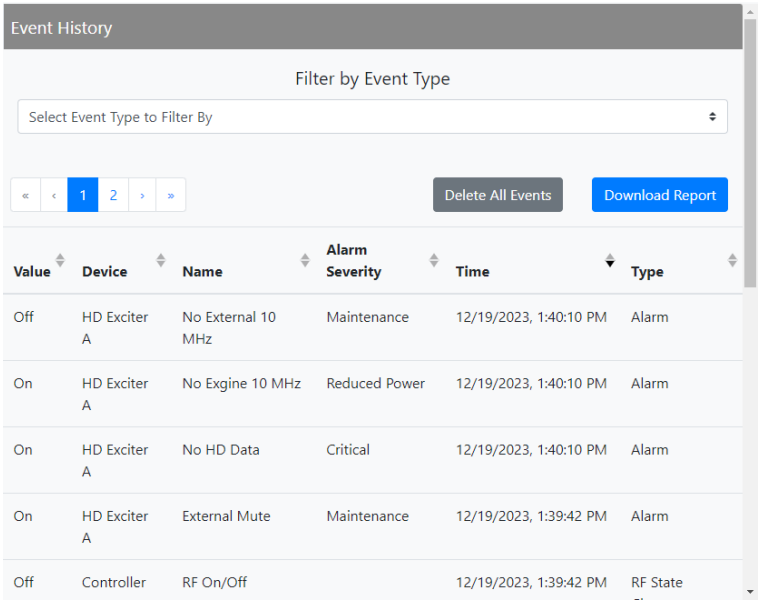
Event History

In the Event History report (see Figure 3.2.70 on page 3.2.107), the user can select the following criteria from the drop-down menu:

- Preset Change
- Power Change
- Freq Change
- Local Remote Change
- Alarm
- RF State Change

Press Refresh Events to provide a current list of alarms. Press Download Report to save an Excel Spreadsheet copy of the Event History to the computer/laptop connected.

Figure 3.2.70: Reports - Event History

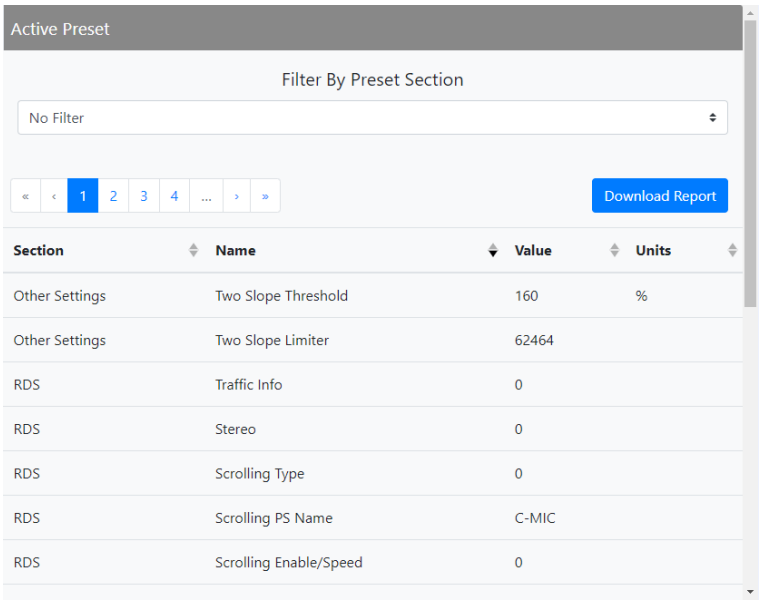


Active Preset

In the Active Preset report (see Figure 3.2.71 on page 3.2.108), the user can select the following criteria from the drop-down menu:

- No Filter
- RDS
- SCA
- Main Audio
- Other Settings
- General

Figure 3.2.71: Reports - Active Preset

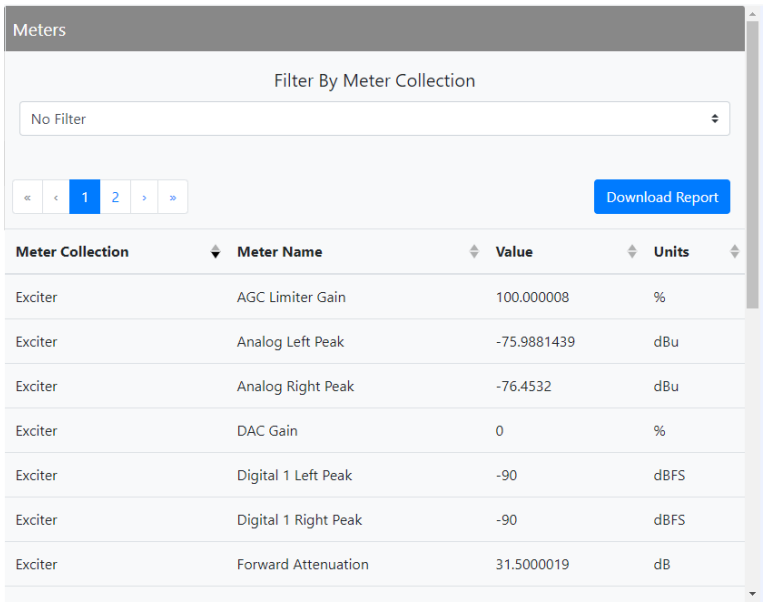


Meters

In the Meters report (see Figure 3.2.72 on page 3.2.109), the user can select the following criteria from the dropdown menu:

- No Filter
- Summary
- Transmitter
- Controller
- Exciter
- HD Exciter

Figure 3.2.72: Reports - Meters

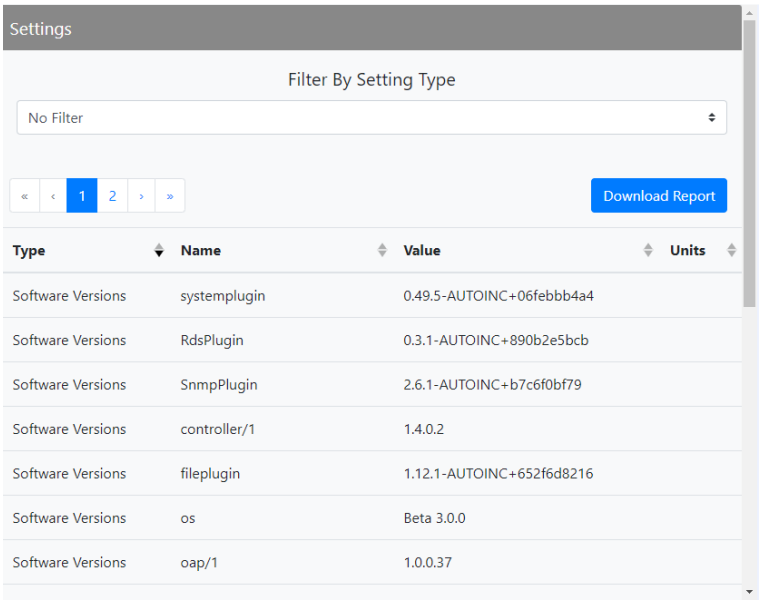


Settings

In the Settings report (see Figure 3.2.73 on page 3.2.110), the user can select the following criteria from the dropdown menu:

- No Filter
- General
- Software Versions
- Exciter Thresholds
- Active Preset

Figure 3.2.73: Reports - Settings



Software

The Software menu contains the following sub-menus:

- Software Upgrades (see Software Upgrades)
- Software Versions (see Software Versions on page 3.2.112)

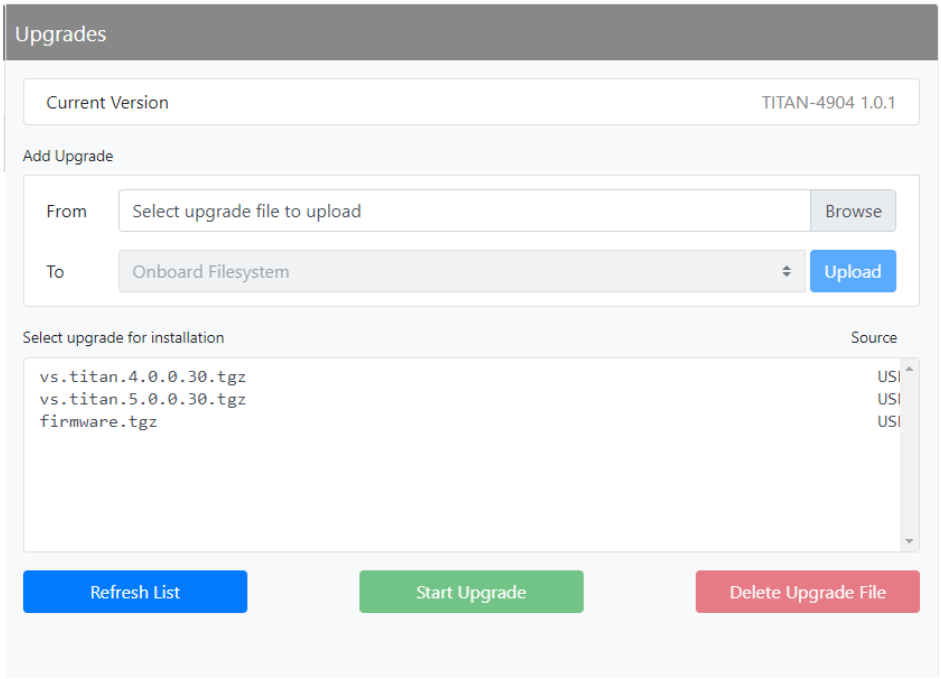
Software Upgrades

The AUI's Software Upgrades page (see Figure 3.2.74) in the Settings menu allows the user to manage the transmitter's software files (.tgz files) via remote connection. Navigate the page as described below. The display area shows all available software files.

The page consists of the following sections and buttons.

- Browse: allows the user to search for software files to upload.
- Upload: uploads the chosen file to the display area.
- Refresh List: refreshes all the available software files in the display area.
- Start Upgrade: initiates the software file selected to upgrade.
- Delete Upgrade file: deletes the selected software file from the display area.

Figure 3.2.74: Software Upgrades



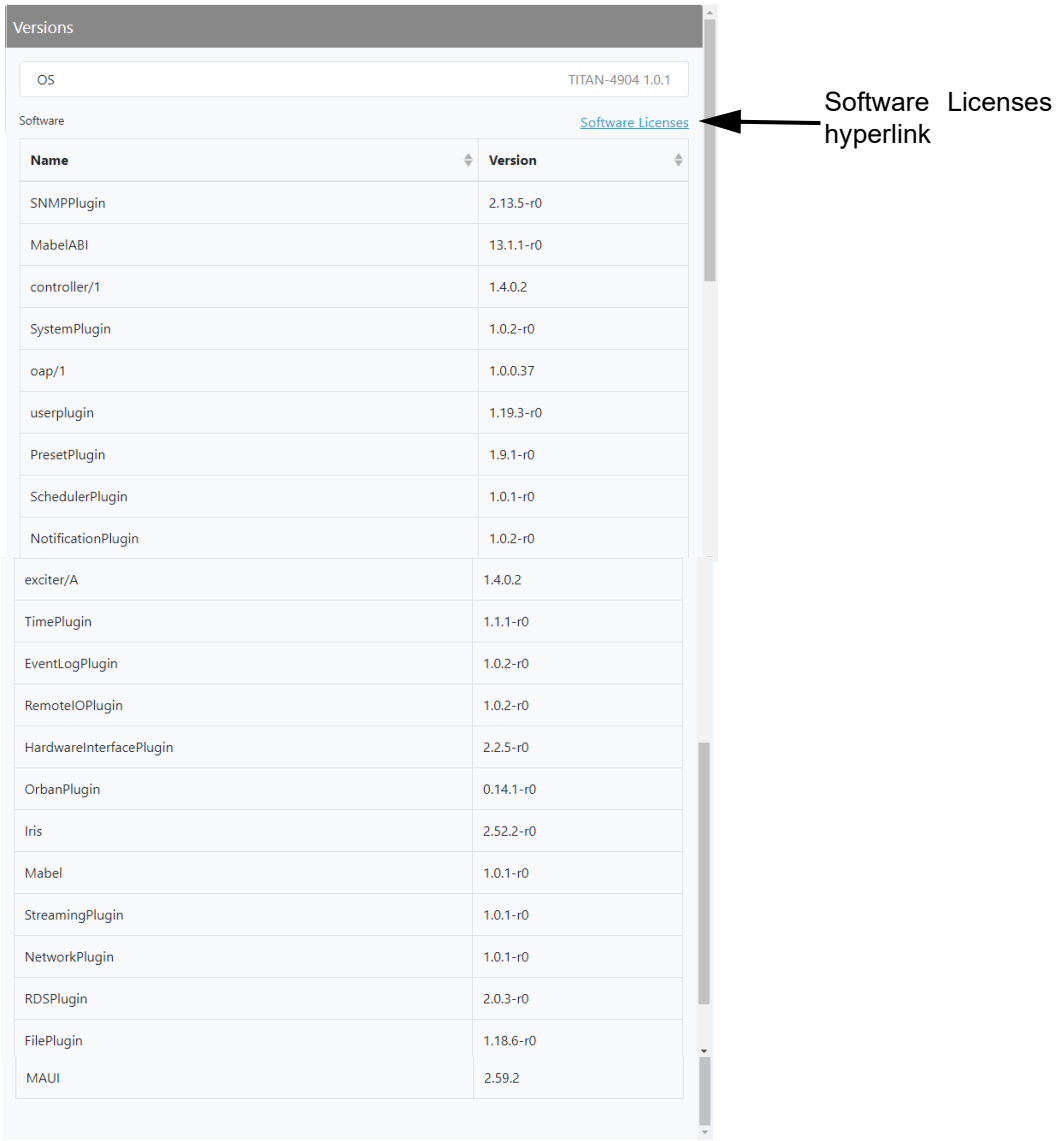
Software Versions

The AUI's Software Versions page (see Figure 3.2.75) in the Settings menu displays the Operating version and all it's associated plug-ins.

Plug-ins are referenced by Name and Version.

By clicking the Software Licenses hyperlink, the user is directed to Nautel's support website which provides a list of open source Nautel Software Licenses used by this product.

Figure 3.2.75: Software Versions

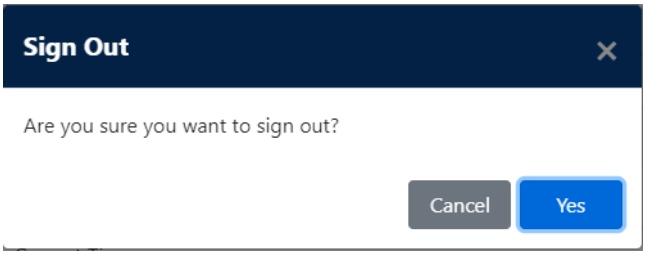


Sign Out

The Sign Out dialog (see Figure 3.2.76) allows the user to sign out of the AUI session.

Click OK to sign out or Cancel to return to the active session.

Figure 3.2.76: Sign out



SECTION 3.4: NON-STANDARD MAINTENANCE

This section provides instructions for performing non-standard maintenance on the GV30N transmitter. This section includes the following topics:

Upgrading Software

Periodically, enhancements or improvements to the operating system are identified and made available. Perform a software upgrade, as required, as follows:

NOTE: Nautel recommends you perform a software upgrade at the transmitter site.

NOTE: For port-forwarded transmitters, uploading of the .tgz file must occur locally or on the transmitter side of the router.

Parts and Tools

- Laptop (i.e., local computer for direct connection) or network computer with Windows and Web browser
- Cat5e Ethernet cable
- Upgrade software (*.tgz file), provided via email or web download

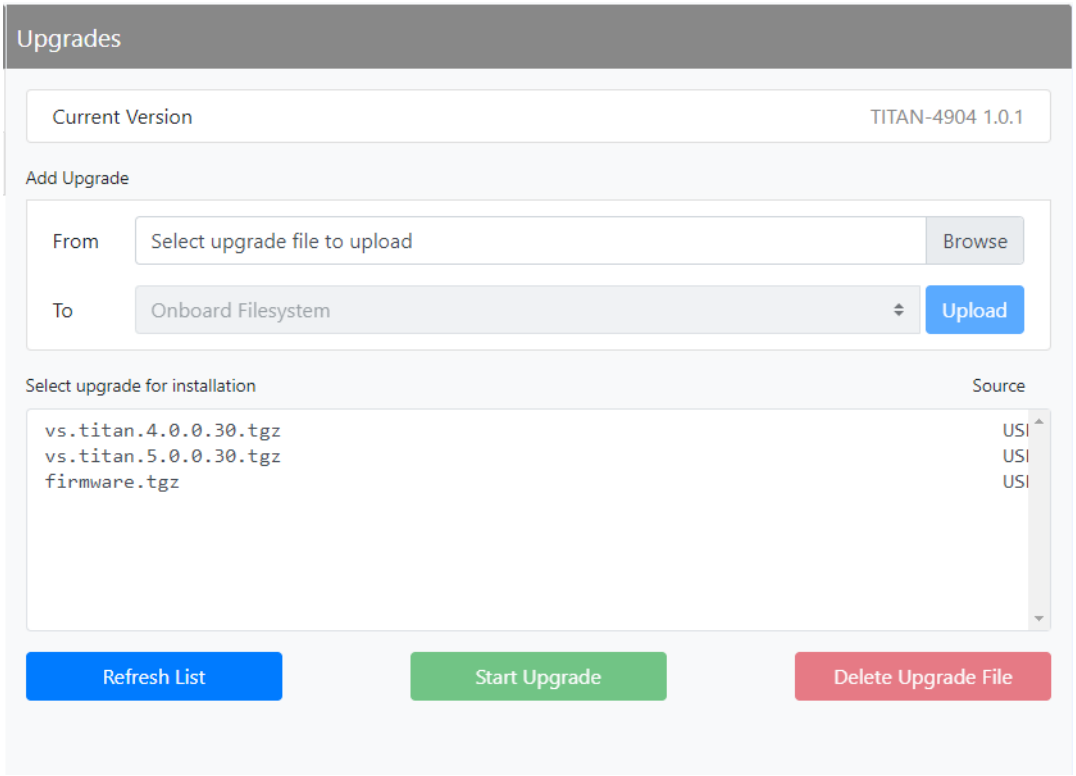
Preliminary Checks

1. Determine the current software revision installed via the advanced user interface (AUI). Select Menu/Software/Upgrades to view the current version.
2. Contact Nautel for the most recent software revision and download *.tgz file to a laptop or network location.
3. Maximize the SBC's disk space by deleting the old .tgz files. You can Browse, Upload, Refresh, Delete and Start Upgrade form this screen. See Figure 3.4.1 on page 3.4.2.

Software Upgrade via Remote AUI

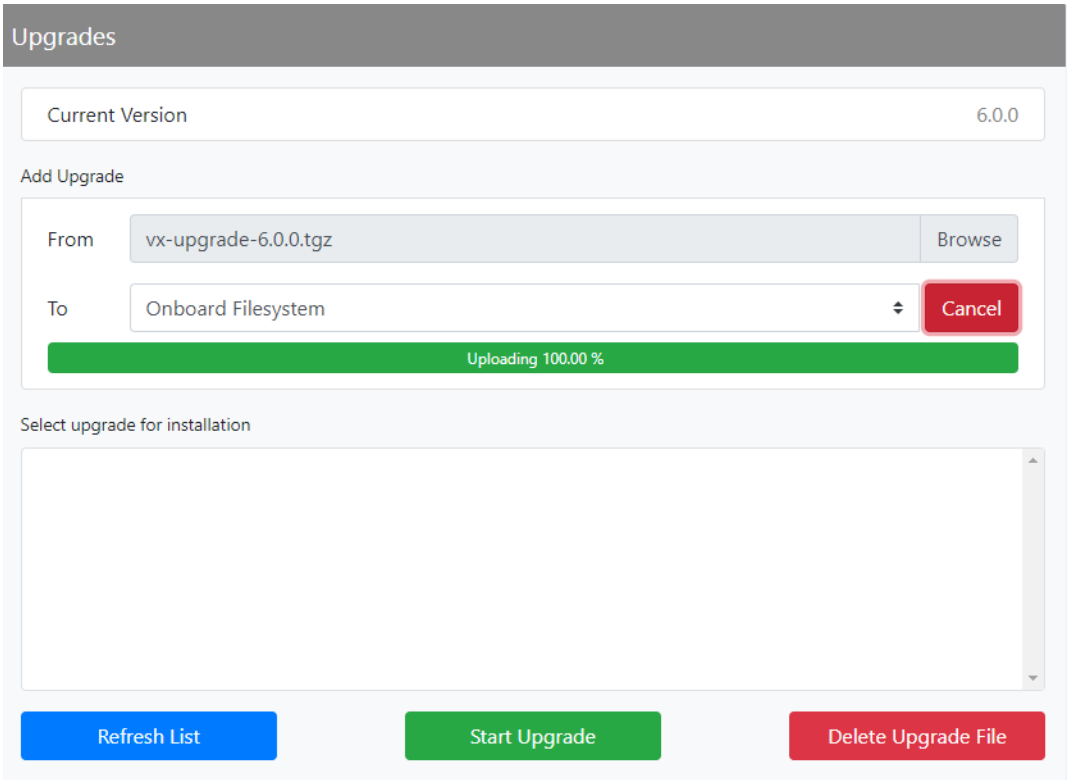
The Upgrades page (see Figure 3.4.1) in the Software menu allows for uploading a suite of software upgrade files (.tgz files) via remote connection. Navigate the page as described below to complete an upgrade.

Figure 3.4.1: Software - Upgrades



Select Browse to locate a .tgz file to upload to the transmitter and click Upload to save the file in the Select upgrade for installation field. A status bar will be displayed showing the percentage completed. See Figure 3.4.2 on page 3.4.3.

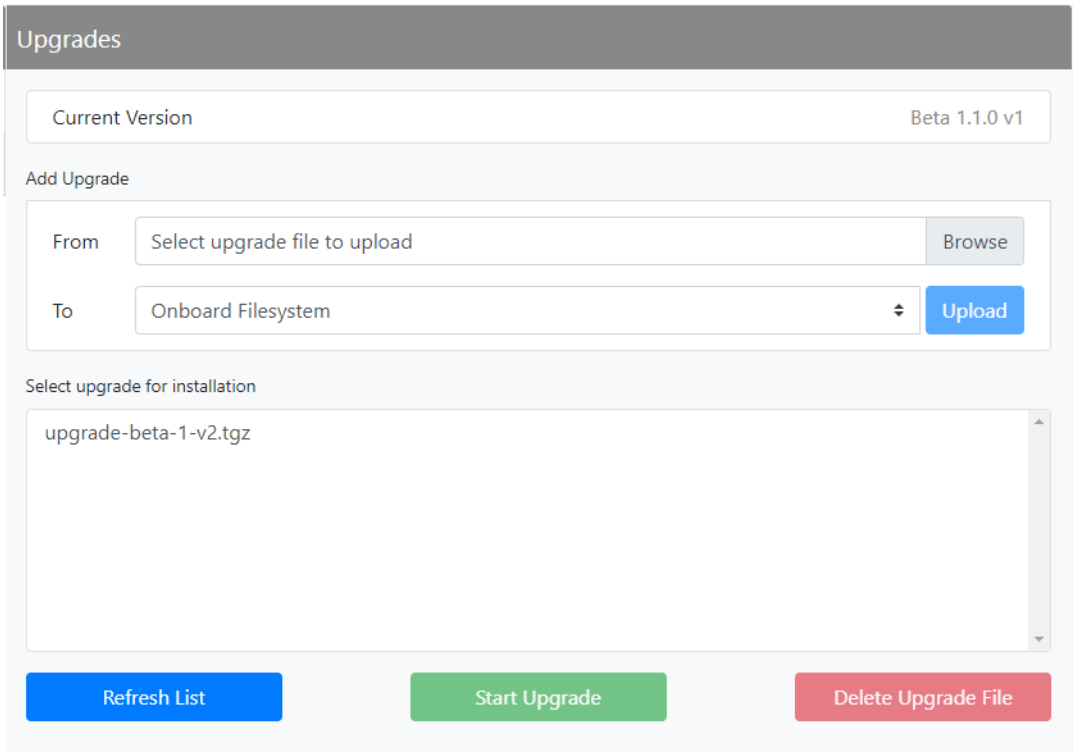
Figure 3.4.2: File Upload in Progress



.tgz file shown for reference, software upgrade file name will differ

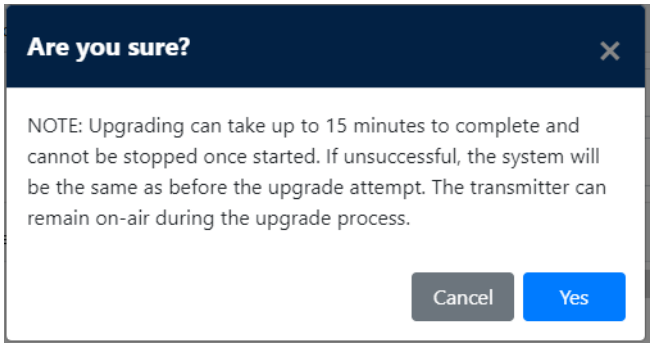
When the file is fully uploaded, the file will be displayed in the Select upgrade for installation field. See Figure 3.4.3 on page 3.4.4.

Figure 3.4.3: File Upload field Populated



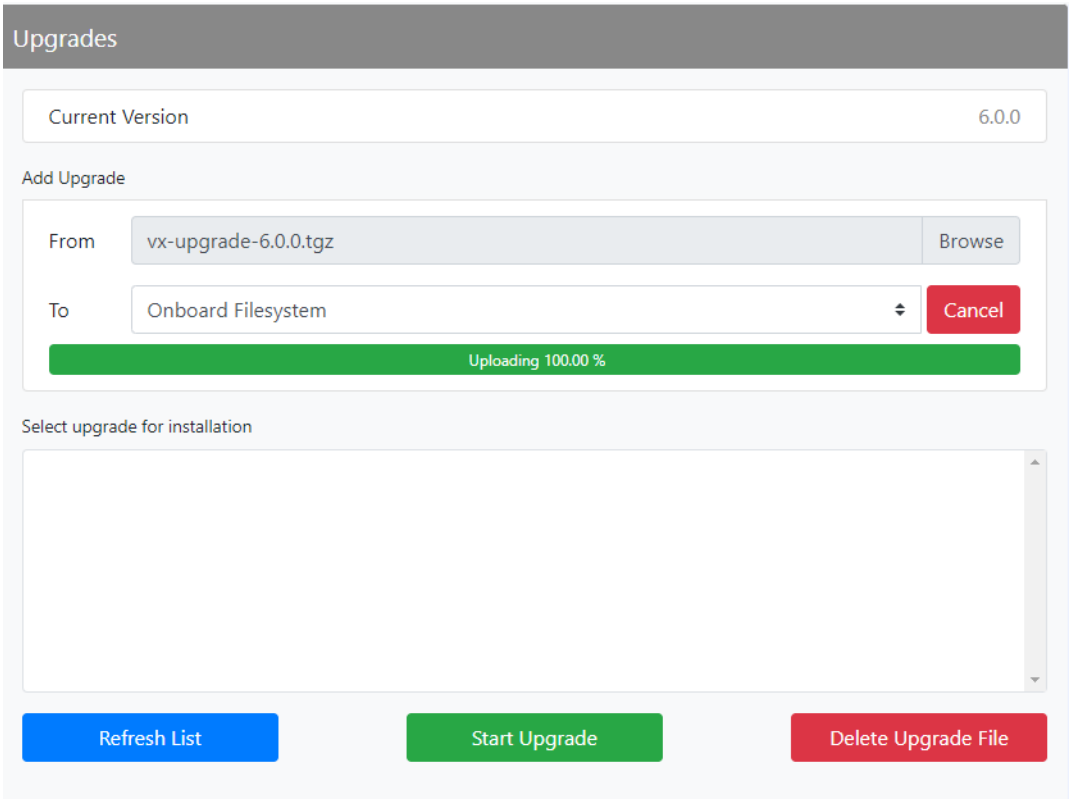
Select the upgrade file from the list and click Start Upgrade to initiate the software upgrade process. A warning will be displayed, indicating that the upgrade can take up to fifteen (15) minutes to complete and cannot be stopped once started. Also, the transmitter can remain in an on-air state during the upgrade. Press Yes to start the upgrade process or Cancel to not proceed with an upgrade. See Figure 3.4.4.

Figure 3.4.4: Upgrade Warning



A status bar will be displayed showing the percentage completed. See Figure 3.4.5 on page 3.4.5.

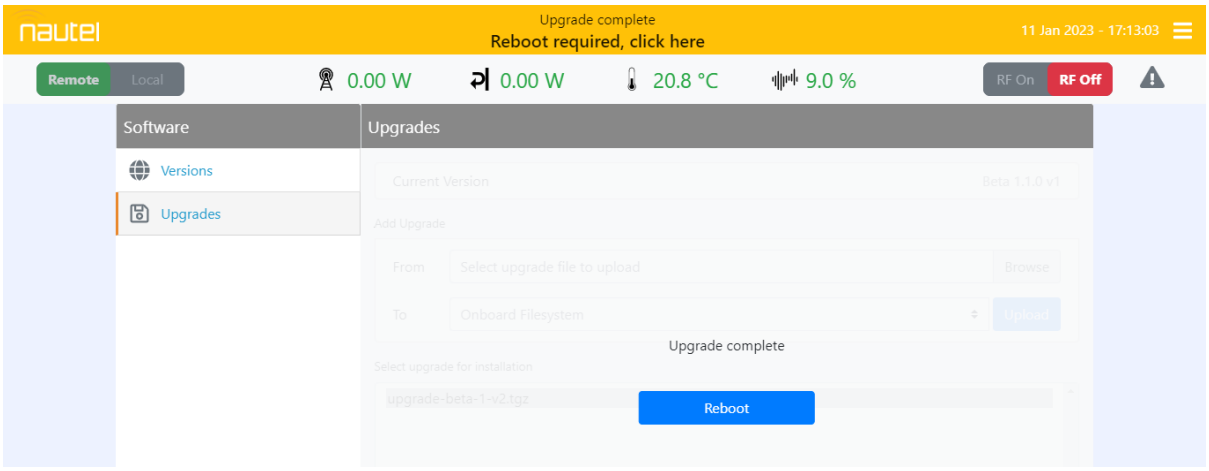
Figure 3.4.5: File Upgrade in Progress



A notification will be displayed if the upgrade was successful or has failed.

If the upgrade was successfully completed, the transmitter will require a reboot. Click the Reboot button or the link in the top banner to start the reboot process. See Figure 3.4.6 on page 3.4.6.

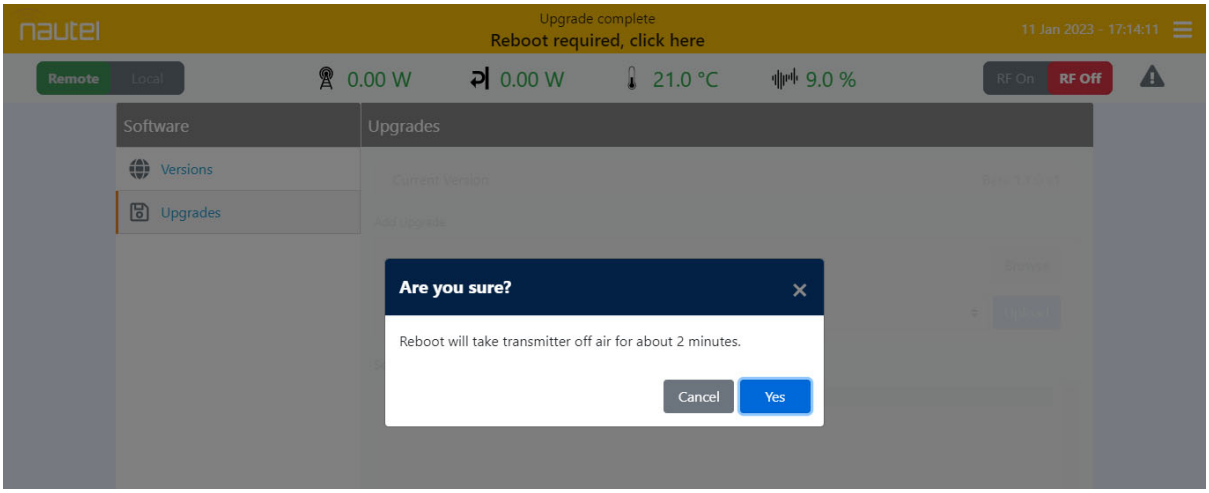
Figure 3.4.6: File Upgrade Complete/Reboot



A warning will be displayed, indicating that the transmitter will be off-air for up to two (2) minutes during a reboot. Press Yes to reboot that transmitter or Cancel to revert to the previous software. See Figure 3.4.7.

NOTE: If a firmware update is included in the update, RF off time may be extended depending on the transmitter model (larger models taking longer). Please **do not** AC cycle the transmitter until the internal SBC has rebooted and the AUI is accessible.

Figure 3.4.7: Reboot Warning



If the upgrade failed, the Operating System will remain unchanged and a pop-up screen will be displayed for the user to acknowledge the failed attempt.

Clicking on Refresh List will show the user all upgrade files currently available. To delete an upgrade file from the list, select the desired file and click Delete Upgrade File. See Figure 3.4.1 on page 3.4.2.

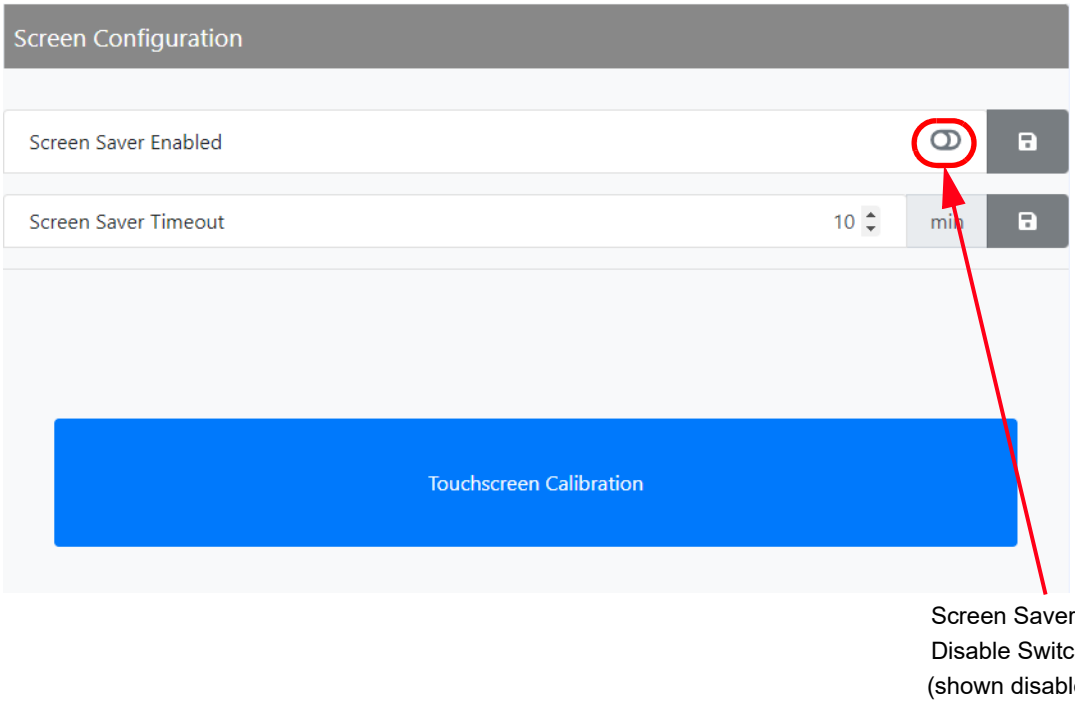
Once rebooted, you will have to log back into the transmitter, using your Username and Password. Refer to Logging into the AUI - see page 3.2.10.

Screen Configuration

NOTE! The Screen Configuration menu is only visible in Local mode.

The Screen Configuration page allows users to enable a Screen Saver and set the Screen Saver Timeout for the front panel display or perform a touchscreen calibration. See Figure 3.4.8.

Figure 3.4.8: Screen Configuration Screen



Enable the Screen Saver by sliding the Icon to the right (turns green) and click the Save button.

Use the up and down arrows to change the Screen Saver Timeout and click the Save button. The range is between 10 and 180 minutes.

Touchscreen Calibration

A touchscreen calibration will be required if the AUI or the controller's internal solid-state drive (SSD) has been replaced. To perform a touchscreen calibration, perform the following steps:

- plug a USB mouse into Single Board Computer (SBC).
- put the transmitter in local mode.
- using the mouse, select "Settings" then "Screen Configuration" from the main menu screen.
- select "Touchscreen Calibration".
- follow the on-screen prompts to calibrate the touchscreen by pressing on the X's where instructed to do so.

Changing the OS Password

The OS (operating system) password is a unique, factory set password that is recorded in the OS Password document provided with the transmitter. It should not be necessary to change this password unless there has been a network security breech and access to the transmitter is compromised.

To change the OS Password, you will need to remotely connect to a Linux computer using SSH. PuTTY is a common utility for Windows users (available at ftp://www3.nautel.com/Utilities/puTTy/putty.exe; if unable to open this link, use a search engine to find new URL), while Linux users can use 'ssh' from the command line. Change the OS password as follows:

1. Connect to the transmitter IP address using your selected SSH client.
2. Login with username root and the OS Password provided with your transmitter on the OS Password document.
3. At the prompt, type the command passwd. This is the Linux command to change your password.
4. Enter and confirm your new password.
5. Record your new password on the OS Password document provided with the transmitter. If you would like Nautel to track your password for support purposes, please email support@nautel.com with your new information.
6. Close the console window.

Configuring a Mod Loss Backup Preset

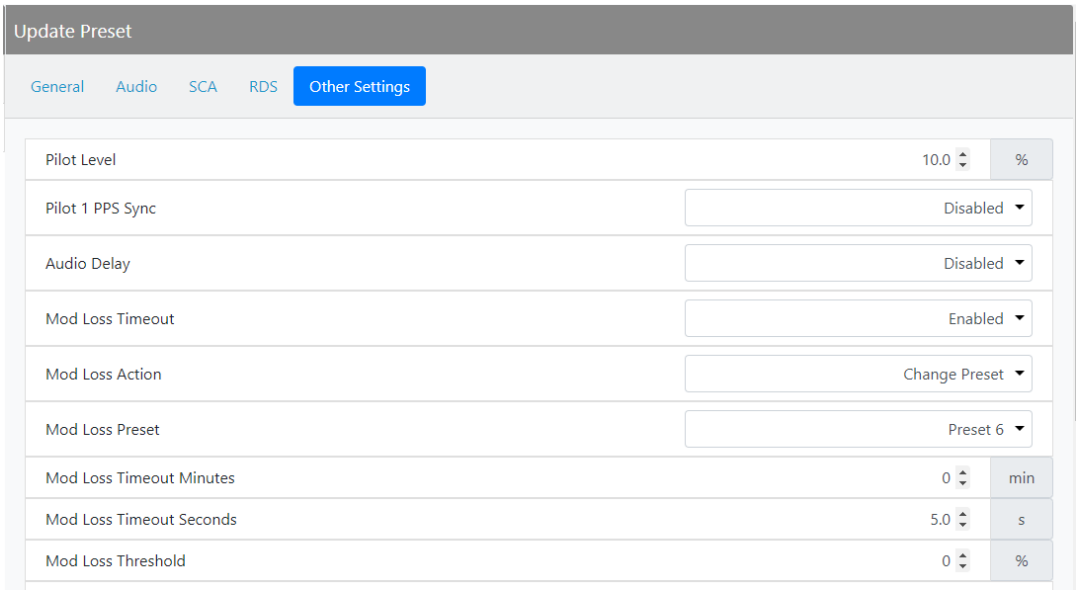
The GV30N contains an audio level detection circuit that can be used, when enabled, to allow switching to a secondary (backup) audio input source upon the loss of the primary source. Configure the desired transmitter preset to perform this function as follows (refer also to Section 2 of this manual for operating instructions of the AUI (local or remote) and controller UI (local) interfaces:

NOTE: You must configure a minimum of two presets to allow this feature to operate. One preset will act as the primary, or normal operating preset. The second preset will act as the secondary, or backup audio preset. Configure the backup audio preset first.

Configuring the Backup Audio Preset

1. Consider the following limitations when selecting a backup preset:
   - If the exciter has an Orban Inside installed and enabled, then only one AES source can be used for either the primary or backup source.
   - If MPX over AES is used for either the primary or backup, the other source cannot be AES (either primary or secondary).
   - If MPX SCAs are enabled, then audio backup cannot be used with MPX as either the main or backup source.
2. From the transmitter AUI, go to Presets/Other Settings and enable Mod Loss Timeout. See Figure 3.4.9 on page 3.4.12. When enabled, other parameters have to set. They are as follows (refer to Other Settings on page 3.2.58):
   - Mod Loss Action (Alarm Only, RF Inhibit and Change Preset)
   - Mod Loss Preset
   - Mod Loss Timeout (Minutes and Seconds)
   - Mod Loss Threshold (typically 10%)
3. Select a suitable preset to use as the backup audio preset.
4. Click the Save button.

Figure 3.4.9: Presets/Other Settings - Mod Loss Enabled

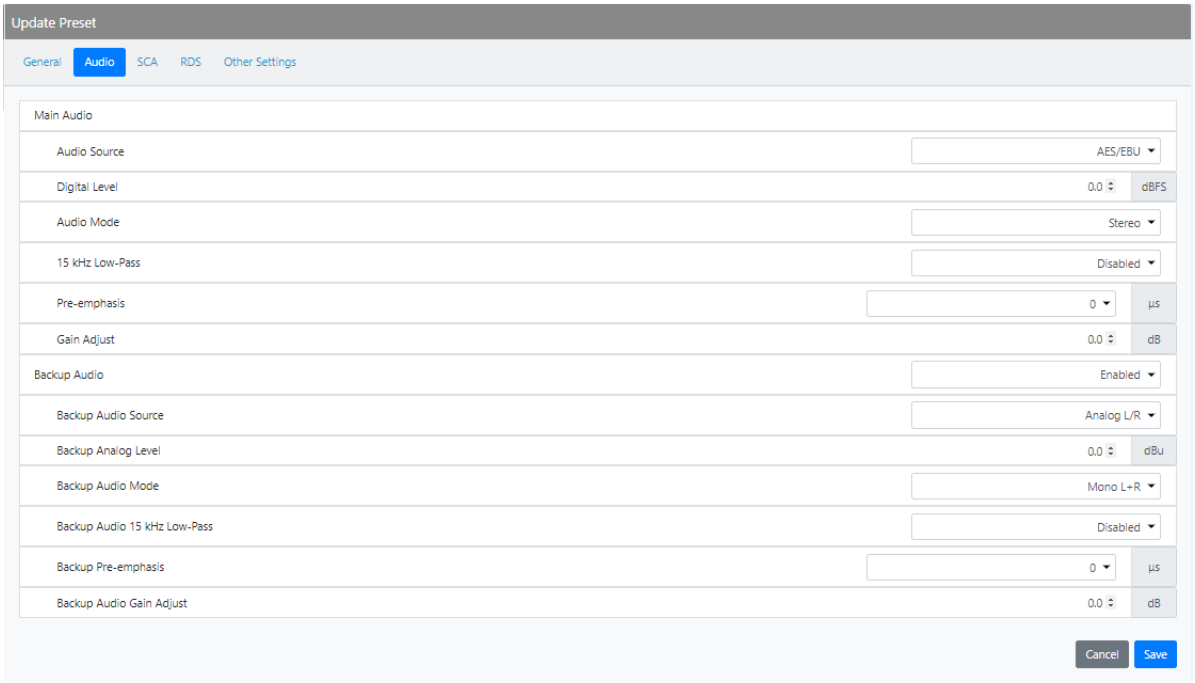


5. From the transmitter AUI, go to Presets/Audio and enable Backup Audio. See Figure 3.4.10 on page 3.4.13. When enabled, other parameters have to set. They are as follows (refer to Main Audio on page 3.2.47):
   - Backup Audio Source (Analog L/R, MPX, AES/EBU, Audio Player to AES2 and MPX over AES)
   - Backup Analog Level
   - Backup Audio Mode (Mono L+R, Mono L, Mono R and Stereo)
   - Backup Pre-emphasis (enabled or disabled)
   - Backup Audio Gain Adjust

NOTE: SCA, RDS and Pilot modulation levels are additive and contribute the audio level. If their combined levels exceed the audio loss threshold level, a preset change will not occur. Stations with audio content containing extended nulls or silent periods (e.g., classical music) should consider reducing the audio loss threshold or increasing the timeout period.

6. Click the Save button.

Figure 3.4.10: Backup Preset Main Audio Screen



Reducing Power Below Minimum Set-Point (Safe Tower Maintenance)

To safely perform antenna tower maintenance within the United States (as per FCC RFR) and Canada (as per Health Canada's Safety Code 6), the GV30N's RF output power must be reduced below the normal minimum set-point. To achieve this, RF power modules are inhibited (disabled), using their front panel ENABLE/DISABLE switch until the output power is below 600 W.

Table 3.4.1: Minimum power set-points for GV30N *operating modes*

Operating Mode	Minimum Power Set-Point (W)
FM (analog)	900
FM+HD (hybrid)	3000
HD (all digital)	1500

1. In the current preset, note the operating mode and the current RF output power set-point, then set the output power for the minimum power set-point (see Table 3.4.1).
2. Open the transmitter's front doors.
3. While monitoring the RF output power, set the ENABLE/DISABLE switch of RF power module 1 to the DISABLE (down) position. Continue disabling odd-number RF power modules (3, 5, etc.), and if necessary, even-number RF power modules (2, 4, etc.) until the RF output is less than 600 W. This inhibits the RF outputs of these modules and reduces the total power output (TPO) of the transmitter below 600 W.

NOTE: You can reduce power further below 600 W if desired, by disabling more RF power modules. If you are operating in FM+HD or HD mode and a Reverse Path Fault alarm occurs, stop disabling RF power modules and re-enable one of the disabled modules by setting the ENABLE/DISABLE switch to the ENABLE (up) position; the alarm should clear.

4. The transmitter output power is now below 600 W. Perform the remaining required site or antenna tower tasks - as per site operating procedures - to make tower make tower maintenance safe for personnel.
5. When maintenance is complete, restore RF output power to the previous level by setting the ENABLE/DISABLE switch of the disabled RF power modules to the ENABLE (up) position and then resetting the output power to the original level in Step 1. Close the transmitter's front doors.

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