

# VS300

## LOW POWER FM TRANSMITTER

### OPERATIONS AND MAINTENANCE MANUAL

Document: VS300-LPFM-OPS-MAINT

Issue: 0.1 2011-03-11

Status: Preliminary





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The comparisons and other information provided in this document have been prepared in good faith based on publicly available information. The reader is encouraged to consult the respective manufacturer's most recent published data for verification.

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Section 1 - Intentionally removed

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## RELEASE CONTROL RECORD

Issue	Date	Reason
0.1	2011-03-11	Initial manual release of VS300 LPFM product (NARF64A and NARF64A/01)





## ABOUT THIS MANUAL

This manual provides technical information needed when operating, maintaining and troubleshooting an VS300 transmitter. This manual is intended for use by transmitter operators and field technicians.

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## USING THIS MANUAL

If you are responsible for configuring or operating a transmitter, see [Section 2, “Operating the transmitter”](#) on page 2-1 and [Section 3, “Using the event log”](#) on page 3-1.

If you are performing scheduled maintenance, or planning your maintenance schedule, see [Section 3, “Routine maintenance”](#) on page 3-1.

If you are performing non-standard maintenance such as a software upgrade, see [Section 4, “Non-standard maintenance”](#) on page 4-1.

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## PERFORMING PROCEDURES

When using procedures in this manual, perform each step in sequence.

- If you are asked to **see** another section of this manual, or another document, refer to that section or document for additional information, then continue the procedure.
- If you are asked to **go** to another step within the procedure, jump directly to that step without performing the intervening steps.
- If you are asked to **go** to another section or document, stop the procedure and perform the tasks described in the other section or document.
- If you are asked to **check a voltage**, use a digital voltmeter and test the voltage relative to ground (unless otherwise instructed).
- If you are asked to **check a signal**, use an oscilloscope and test the signal relative to ground (unless otherwise instructed).



**CAUTION: FAILURE TO COMPLY WITH RECOMMENDATIONS MAY VOID YOUR MANUFACTURER'S WARRANTY. FOR MORE INFORMATION, REVIEW YOUR WARRANTY DOCUMENTS.**

*Tip: When you have completed a task or a step, put a checkmark beside the step number.*

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## TECHNICAL SUPPORT

Nautel offers technical support to customers over the Internet and by telephone. Nautel's customer support team will answer your questions and work with you to identify and resolve problems.

For 24-hour technical support, call toll free at 1.877.628.8353 (in USA and Canada only) or call 1.902.823.5100 (international) or find us on the Internet at <http://www.nautel.com>.

For parts and tools information, see “Parts and tools” on page 9-1 of the *VS300 Pre-Installation Manual*.

For extended warranty information, see “Pre-installation assistance” on page 10-1 of the *VS300 Pre-Installation Manual*.

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## VS300 TRANSMITTER MANUALS

The VS300 documentation suite includes the following documents:

**VS300 PRE-INSTALLATION MANUAL, VS300-PREINST.** Provides instructions and reference information needed when planning and preparing for the installation of a VS300 transmitter.

**NAUTEL SITE PROTECTION MANUAL.** Provides detailed information about protecting your site from lightning-related hazards.

**VS300 INSTALLATION MANUAL, VS300-INST.** Provides instructions and reference information needed when installing a VS300 transmitter.

**VS300 OPERATING AND MAINTENANCE MANUAL, VS300-OPS-MAINT.** Provides instructions for operating, maintaining and troubleshooting a VS300 transmitter. It also provides reference information needed when performing diagnostic procedures.

**VS300 TROUBLESHOOTING MANUAL, VS300-TROUBLE.** Provides detailed technical information about the VS300 transmitter, including electrical schematics and mechanical drawings.

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## NAUTEL WEBSITE / ONLINE RESOURCES

The Nautel website provides useful resources to keep you up to date on your VS300.

### NAUTEL USER GROUP (NUG)

The website includes a special section that customers can log into in order to access the Nautel customer newsletter, product manuals, frequently asked questions (FAQ), information sheets, and information about field upgrades.

### DOCUMENTATION: ONLINE AND PRINTED

The website's NUG section provides online access to all the documentation for your VS300. Documentation is provided in Acrobat (PDF) format. You can use the documentation online or print the sections that you need.

#### When using online documents:

- Click on blue text (hyperlinks) to jump to a related section, or to get additional information (e.g., view a term's definition).
- To search a document to find keywords, use **Find** in Acrobat Reader's **Edit** menu.
- To quickly find a specific section, click the section in the PDF file's **Bookmarks** list.

#### When using printed documents:

- To find a specific term, go to the *List of Terms* section near the end of the manual.



## ABOUT SAFETY

All Nautek transmitters are designed to meet the requirements of *EN60215, Safety Requirements for Radio Transmitters*.

The philosophy of *EN60215* is that the removal of any cover or panel that can only be opened using a tool is a maintenance activity, and that any person performing a maintenance activity is expected to be trained for that activity. Under *EN60215*, it is assumed that trained personnel will be knowledgeable and will take precautions such as removing all power to the transmitter before accessing its components.

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## ELECTRICAL HAZARDS

To remove power from the transmitter, switch off and lock out the ac power.



### **DANGER - HIGH VOLTAGE**

Indicates dangerous voltage (in excess of 72 volts), capable of causing a fatal electrical shock, are present on or near parts bearing this label.



**WARNING: IT IS NOT ENOUGH TO SWITCH OFF RF POWER. THE POWER LINE IS STILL CONNECTED. DISCONNECT AND LOCK OUT THE UPSTREAM SUPPLY BEFORE SERVICING.**

After turning off the ac power, always perform a measurement to confirm that the power is off before touching anything within the transmitter. If the wrong breaker was opened, the equipment will be live.



**WARNING: DO NOT USE AN ORDINARY MULTIMETER TO CHECK FOR VOLTAGE, SINCE IT MAY HAVE BEEN LEFT INADVERTENTLY ON THE AMP (A) RANGE, TRIGGERING A SHORT AND AN ARC BLAST THAT COULD RESULT IN SEVERE BURNS AND EVEN DEATH.**

Use only a non-contact voltage probe or a safety voltmeter (available from vendors such as Fluke, Ideal, and Teagam).

Use a proper lockout procedure to ensure that another worker cannot accidentally reapply power while you are performing maintenance on any part of the transmitter or site.

## LIGHTNING HAZARDS

Before opening the transmitter and touching internal parts, remove and solidly ground the antenna connection.



**WARNING: IT IS NOT ENOUGH TO GROUND THE ANTENNA TERMINAL WITH THE ANTENNA STILL CONNECTED. EVEN A SMALL IMPEDANCE IN THE GROUND STRAP WILL RESULT IN LETHAL VOLTAGES DURING A LIGHTNING STRIKE.**

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## RF HAZARDS

A serious RF hazard and very high voltages exist in the vicinity of the antenna and its networks during normal operations.

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## TOXIC HAZARDS

Some devices used in this equipment contain beryllium oxide ceramic, which is non-hazardous during normal device operation and under normal device failure conditions. These devices are specifically identified with “(BeO)” in the *Description* column of the *Troubleshooting Manual’s* parts list(s).

Do not cut, crush or grind devices because the resulting dust may be hazardous if inhaled. Unserviceable devices should be disposed of as harmful waste.

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## PHYSICAL HAZARDS



### **DANGER - MOVING BLADES**

Fan blades can cause injury. Lock out power before removing safety features.

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## OTHER HAZARDS

Ensure that appropriate fire alarms and fire extinguishers are available. Extinguishers must be suitable for use on electrical fires.

Many other site safety risks exist. It is beyond the scope of this manual to identify all the risks and procedures.

## SAFETY PRECAUTIONS

This section provides very important information about protecting the safety of personnel and equipment:

- Personal safety - see [page xv](#)
- Site safety - see [page xvi](#)
- Equipment safety - see [page xviii](#)

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## PERSONAL SAFETY

### TRAINING

The training of any personnel who will have physical access to the site or the transmitter is very important. Personnel must be familiar with the transmitter, so that they can avoid physical danger, and be aware of hazards to themselves and the equipment.

Nautel offers a number of training courses covering the basic fundamentals of RF systems and transmitters, and the operation and maintenance of the transmitter. For more information about available courses and schedules, go to the Nautel website at <http://www.nautel.com/Training.aspx>, or ask your Nautel sales representative.

### SITE ORIENTATION

When you give personnel access to the transmitter site (e.g., hiring new personnel, or giving access keys to personnel), perform a site orientation to ensure that they are familiar with the site, on-site procedures, and on-site hazards. Cover the following topics:

- Securing the site (locking doors and fences) to prevent unauthorized access
- How and when to call for technical support or emergency assistance
- Areas of the site and pieces of equipment that are *off limits*

### VOLTAGE AWARENESS

Ensure that all personnel that are able to access areas with high voltage circuits or high field strengths are aware of the hazards associated with high voltage. Cover the following topics:

- High voltage or high field strength areas where caution is required
- Physical risks of electric shock
- Risks for personnel with pacemakers or other medical implants
- Induced voltages in high field strength areas
- On-site risks during thunderstorms and lightning strikes
- Operation of safety interlocks (if installed)

### FIRST AID

Nautel does not offer first aid training, since the hazards associated with high voltage and RF energy are not specific to the transmitter. However, the customer should provide first aid training to all personnel who have access to the transmitter site. First aid training should include CPR, care of burns, artificial respiration, and defibrillation if specific equipment is available on-site.

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## SITE SAFETY

### CONTROLLING ACCESS

Transmitters and antennas generate and carry dangerous voltages that can be harmful or fatal. It is very important that you control access to the site and its equipment. To secure your transmitter site, use:

- Locking steel or security doors to prevent casual access
- A perimeter fence to keep trespassers away from the antenna system and feedline
- “No Trespassing” signs
- An alarm system



### MARKING HAZARDS

Place warning signs close to any hazardous areas or systems (e.g., the feedline or the antenna system). Make the signs large enough that they cannot be missed. Provide signage in all languages used in the region. These signs are intended not only for authorized personnel, but also for emergency responders or accidental trespassers.

### QUALIFYING SITE PERSONNEL

Make sure that personnel who have access to the site are qualified to work around electronics and high voltage systems.

### AC POWER PROTECTION

You should take steps to protect equipment from surges (over-voltage spikes) on the ac power lines. Surges may occur during thunderstorms, or because of malfunctions in the electrical distribution grid. Surge suppressors and ac power conditioners can prevent serious damage to your on-site equipment, including the transmitter.

### RF PROTECTION

Transmitters and their antenna systems create intense radio frequency fields at the transmitter site, particularly near the feedline, antenna and tower. At some sites, these fields may cause biological effects, including the heating of body tissues. Intense fields can also create dangerous high voltages on ungrounded, conductive surfaces and objects. At certain points where high voltage conductors come close to grounded conductors (e.g., at feedline junctions or on the tower), dangerous electrical arcing or flashovers can occur. It is very important that you take the following steps to prevent damage to equipment or personnel due to RF fields:

- Use safety interlocks to de-energize transmitters if personnel open doors or panels accessing high field areas
- Place warning signs in any locations where high fields can occur
- Train personnel about the short-term and long-term hazards of RF radiation
- Physically block access to the area around the antenna system, feedline and tower
- Ground all exposed conductive surfaces or objects in high field areas

The RF connection to the transmitter output can be a serious safety hazard. Connect a 50  $\Omega$  test load during installation and commissioning. It is recommended that a switch be used to automatically connect the transmitter to the antenna system without human contact with the transmitting conductors.

### SAFETY INTERLOCKS

The transmitter contains an electrical interlock, which is an external circuit that turns off the RF output if any of its switches are opened.

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## EQUIPMENT SAFETY

### ELECTROSTATIC PROTECTION

The transmitter's systems are very rugged and resistant to damage. However, it is possible for damage to occur because of high voltage electrostatic discharges during servicing. Train all service personnel to ground themselves to bleed off any static charge before opening the transmitter or touching any exposed components. Provide a grounding wand or known ground (e.g., a grounded metal table) that personnel can use to discharge themselves.

### SURGE PROTECTION

Surge protection is recommended for your entire site. However, even if you do not use a surge protector on the service entrance to the site, you should install a surge protector in the transmitter's ac power feed to prevent over-voltage from entering the transmitter.

### LIGHTNING PROTECTION

The transmitter is designed to resist lightning strike damage. However, intense or repeated strikes could damage the transmitter. We recommend that you install lightning suppression on the antenna, tower and feedline to reduce the effect of lightning strikes on the transmitter itself (and to protect the rest of your site equipment and your personnel). For detailed information about lightning protection, see the *Nautel Site Preparation Manual*, available from your Nautel sales agent, or online from the Nautel website.

### PHYSICAL PROTECTION

Consider physical hazards to equipment at your site, including the transmitter. Ensure that equipment is protected from weather (e.g., rain or flooding), even during extreme weather events. Place equipment so that it is not in the path of swinging doors or high-traffic areas. Do not allow wheeled items like office chairs or tables with wheels in the transmitter room, as these may damage equipment if accidentally pushed or knocked over. Do not place the transmitter under water pipes, drains, or sprinklers. Keep any equipment that generates heat, like the transmitter, away from flammable materials like ceiling panels, cubicle dividers, and curtains.

# SECTION 1:

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## SECTION 2: OPERATING THE TRANSMITTER

This section provides information about operating the VS300 transmitter:

- [User interface - see page 2-7](#)
  - [Front panel UI - see page 2-7](#)
    - [Turning RF on and off - see page 2-8](#)
    - [Saving settings - see page 2-8](#)
  - [Advanced user interface - see page 2-12](#)
- [Logging in to the AUI - see page 2-14](#)
- [Menu page - see page 2-16](#)
- [Viewing transmitter log - see page 2-18](#)
  - [Managing the log - see page 2-19](#)
- [Viewing tool menu panels - see page 2-25](#)
- [Viewing real-time meters - see page 2-32](#)
- [Setting time and date - see page 2-35](#)
- [Managing presets - see page 2-37](#)
- [Setting local/remote control - see page 2-57](#)
- [Resetting alarms - see page 2-57](#)
- [Viewing transmitter status - see page 2-58](#)
- [Setting user accounts - see page 2-59](#)
  - [Setting user role - see page 2-60](#)
  - [Editing account information - see page 2-60](#)
- [Software configuration - see page 2-62](#)
  - [Network setup - see page 2-64](#)
  - [Upgrading software - see page 2-68](#)
  - [Email configuration - see page 2-69](#)
  - [Notifications - see page 2-70](#)
  - [Upload files - see page 2-72](#)
  - [Audio player - see page 2-73](#)

- Changing hardware settings - see page 2-77
  - Configuring ARM watchdog - see page 2-78
  - Calibrating exciter TCXO - see page 2-79
  - Calibrating audio inputs - see page 2-81
  - Configuring RF drive source - see page 2-83
    - Connecting an external analog exciter - see page 2-83
  - ARM reset - see page 2-84
  - OS recovery - see page 2-84
- Configuring remote inputs and outputs - see page 2-86
- Setting pilot sample level - see page 2-92
- Front panel display settings - see page 2-93
- Configure test signal generator - see page 2-95
- Setting station ID parameters - see page 2-97
- Using an external 10 MHz input - see page 2-99

FRONT PANEL UI

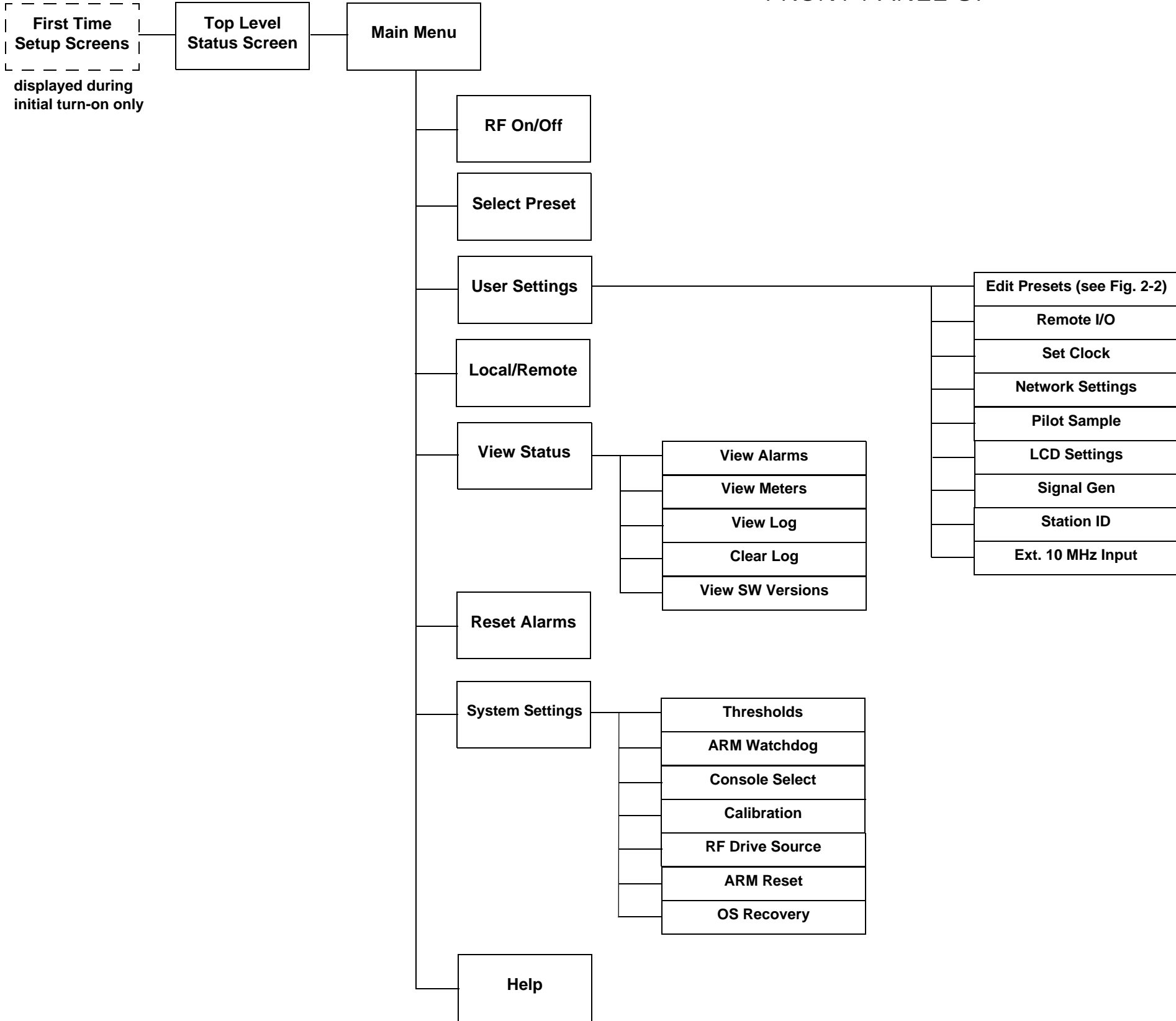


Figure 2-1: VS Transmitter Front Panel Display Menu Tree (Sheet 1 of 2)

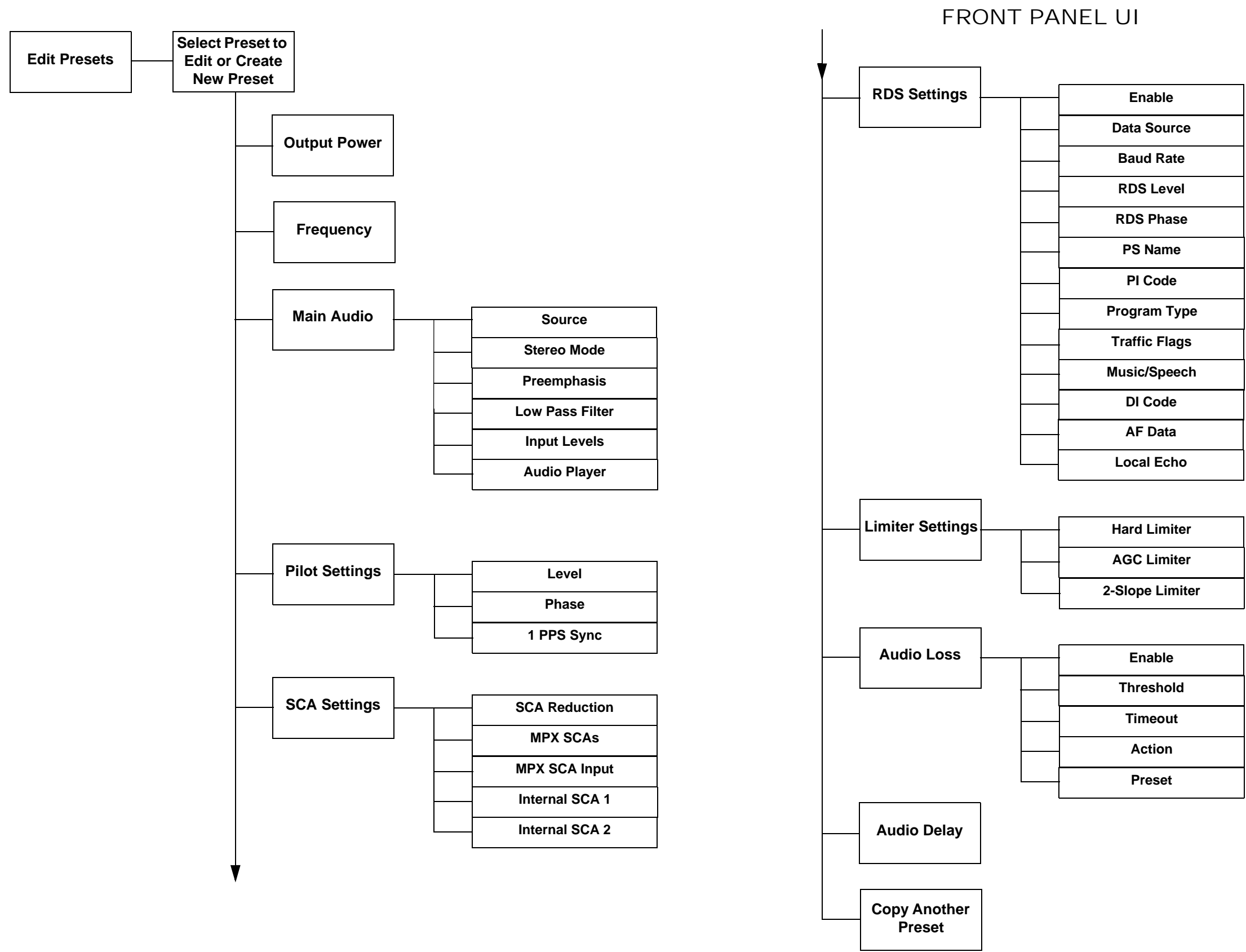


Figure 2-2: VS Transmitter Front Panel Display Menu Tree - Edit Presets (Sheet 2 of 2)



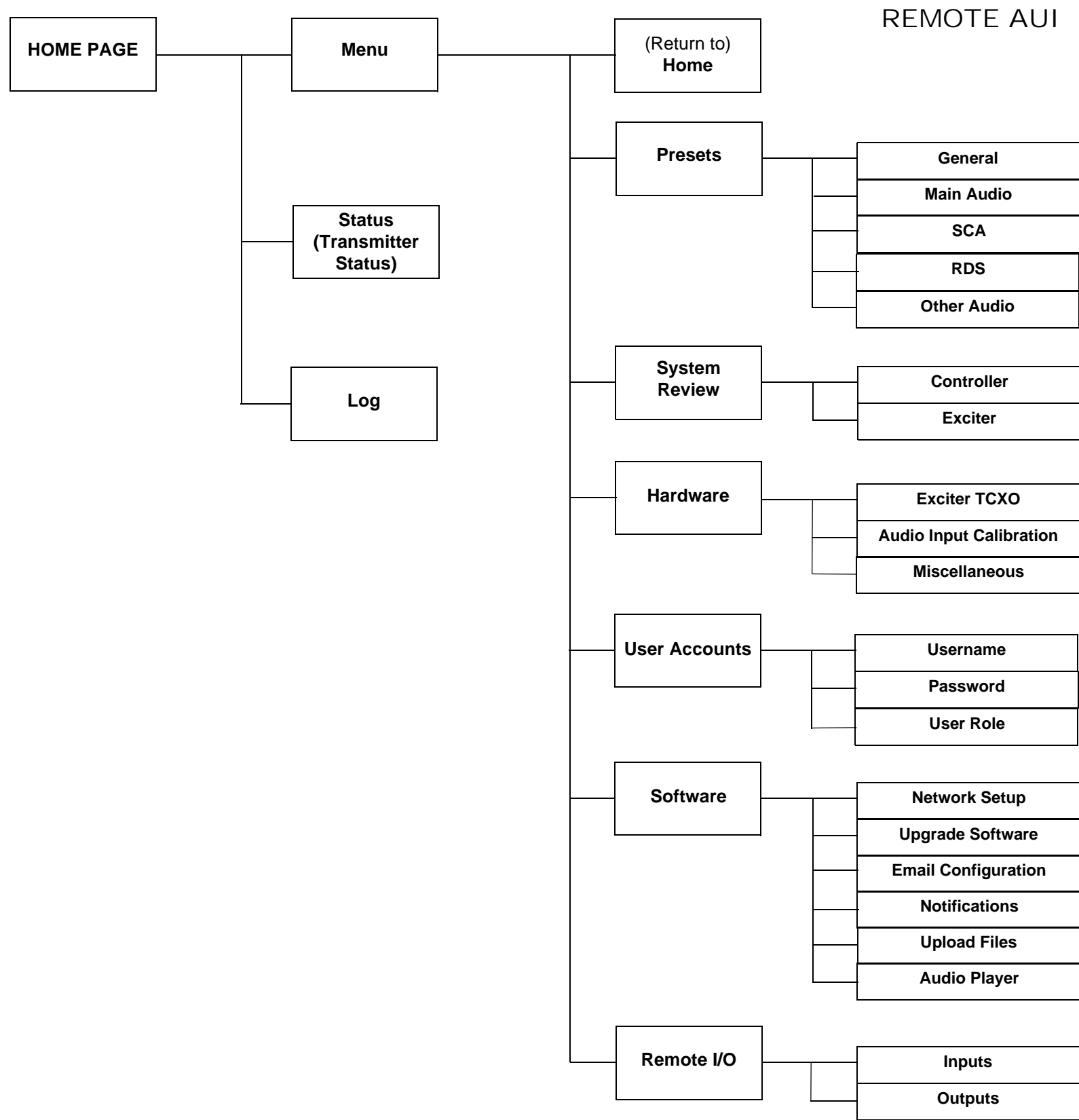


Figure 2-3: VS Transmitter AUI Flow Diagram

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## USER INTERFACE

The user can interface with the VS300 using one of two methods:

- Locally, using the front panel display and navigational buttons (see “[Front panel UI](#)”).
- Remotely, via a LAN connection, using the advanced user interface (AUI) pages (see “[Advanced user interface](#)” on page 2-12)

See the complete menu hierarchy illustrated in Figures 2.1 and 2.2 (for the local front panel menu) and Figure 2.3 (for the remote AUI menu). When a user interfacing function can be performed from both the front panel display and the remote AUI, both are described in this section.

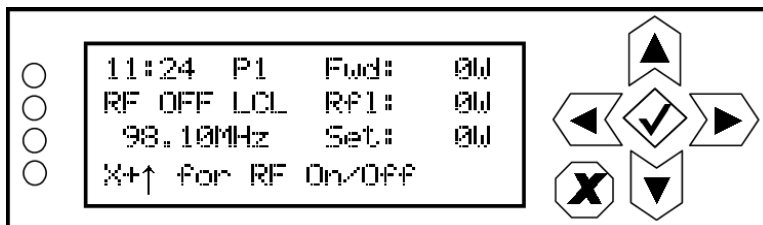
### FRONT PANEL UI

The front panel UI is a 4 x 20 character LCD display (see [Figure 2.5](#)). The UI can be controlled by its adjacent keypad. The UI contains a menu-based series of pages that serve specific functions. Similar interfacing, as well as more advanced functionality, is available on the remotely accessed AUI (see “[Front panel UI screens](#)” on page 2-9).

#### LCD DISPLAY

This display shows all the UI screens. The display’s top level screen, used for viewing purposes only, is shown in [Figure 2.4](#).

**Figure 2.4: Top Level Screen**



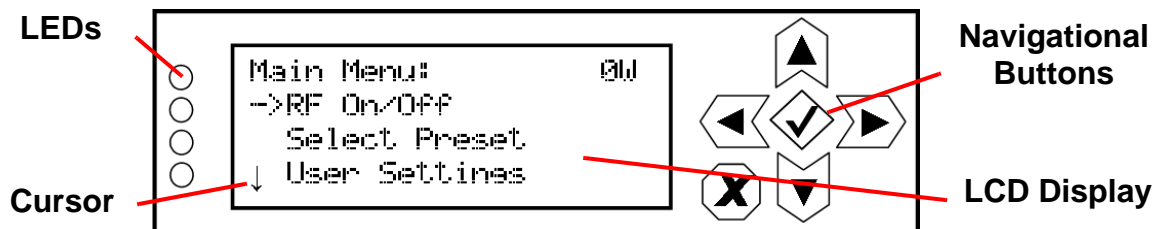
The top level screen displays the following information:

- Line 1: current time, active preset (P#) and the transmitter’s actual forward power.
- Line 2: RF operating status (ON or OFF), the local (LCL) or remote (RMT) control status and the transmitter’s reflected power level.
- Line 3: operating frequency and the desired power setpoint.
- Line 4: instructions to turn the transmitter’s RF power stage on or off.

## MAIN MENU

This main menu is the starting point for navigating through the UI screens. See [Table 2.1 on page 2-9](#) for a list of screens and their basic functions.

**Figure 2.5: Main Menu**



## NAVIGATIONAL BUTTONS

There are six push-buttons on the right-hand side of the LCD display that allow navigation through the UI pages, as well as modifying selected settings.

- Up and down - on menu and list screens, moves cursor up and down through the associated page; on edit screens, increases and decreases the value of a parameter being modified.
- Left - on menu and list screens, exits to the next higher level screen; on edit screens, moves the editing cursor left, as applicable.
- Right - on menu and list screen, goes to the next lower level screen; on edit screens, moves the editing cursor right, as applicable.
- Checkmark - on menu screens, goes to the next lower level screen; on edit screens, acts as an “accept” or “save” function; in some cases the display will prompt its use.
- X - on menu and list screens, exits to the next higher level screen; on edit screens, acts as a “cancel” function; in some cases the display will prompt its use.

## TURNING RF ON AND OFF

From any UI screen, pressing X and the up arrow simultaneously, toggles the RF on/off status. You can also use the **Main Menu -> RF On/Off** screen to toggle the status.

## SAVING SETTINGS

Many of the UI screens allow for modifying a selected setting. Use the checkmark button to save a change. Use the X button to cancel a change and revert back to the previously stored value.

## LEDs

There are four LEDs on the left-hand side of the LCD display that provide the operational status of various sections of the transmitter - **Exciter, Power Amplifier, Output Network** and **Power Supply** (see [Figure 2.5 on page 2-8](#)). The LEDs can glow green, amber or red. Typically, green indicates normal operation, amber indicates a warning, and red indicates a fault or error. Refer to the Troubleshooting section for more detailed information on LED status.

## FRONT PANEL UI SCREENS

Table 2.1 defines the available front panel display screens.

**Table 2.1: Front Panel UI Screens**

UI Screen	Function	See Page
First Time Setup Screens	Guides the user through initial setup of the transmitter. Provides prompts to set frequency, output power and audio input. Refer to the <i>VS Series Quick Start Guide</i> , provided in the transmitter's packing box, for details.	VS Series Quick-Start Guide
Main Menu	Choose options and navigate to other screens.	<a href="#">page 2-8</a>
Select Preset	Select and activate a user-defined preset.	<a href="#">page 2-40</a>
User Settings	Edit various transmitter user settings (see other User Settings options in this table).	-
User Settings - Edit Presets	Edit various parameters for a user-defined preset (see the following rows for all Edit Presets options).	<a href="#">page 2-40</a>
User Settings - Edit Presets - Output Power	Edit the selected preset's output power.	<a href="#">page 2-42</a>
User Settings - Edit Presets - Frequency	Edit the selected preset's operating frequency.	<a href="#">page 2-42</a>
User Settings - Edit Presets - Main Audio	Edit the selected preset's main audio characteristics such as source, stereo mode, pre-emphasis and low pass filtering.	<a href="#">page 2-42</a>
User Settings - Edit Presets - Audio Inputs	Edit the selected preset's audio input type.	<a href="#">page 2-38</a>
User Settings - Edit Presets - Pilot Settings	Edit the selected preset's pilot settings such as level, phase and 1 PPS synchronization.	<a href="#">page 2-45</a>
User Settings - Edit Presets - SCA Settings	Edit the selected preset's SCA settings such as SCA reduction, MPX SCAs, MPX SCA input and internal SCA (1 and 2) generator characteristics.	<a href="#">page 2-46</a>
User Settings - Edit Presets - RDS Settings	Edit the selected preset's RDS settings such as enable/disable, data source, baud rate, level, phase, program type, alternate frequency data, etc.	<a href="#">page 2-48</a>
User Settings - Edit Presets - Limiter Settings	Edit the selected preset's limiter settings. Limiter types include hard limiter, AGC limiter or 2-slope limiter.	<a href="#">page 2-52</a>

**Table 2.1: Front Panel UI Screens**

<b>UI Screen</b>	<b>Function</b>	<b>See Page</b>
User Settings - Edit Presets - Audio Loss	Edit the selected preset's audio loss functionality, such as enable/disable, setting threshold, setting timeout period, setting resulting action and selecting a backup preset.	<a href="#">page 2-54</a>
User Settings - Edit Presets - Audio Delay	Edit the selected preset's audio delay.	<a href="#">page 2-56</a>
User Settings - Edit Presets - Copy Another Preset	Copy the selected preset's settings to another preset.	<a href="#">page 2-56</a>
User Settings - Remote I/O	Configure the remote inputs and outputs for the transmitter.	<a href="#">page 2-86</a>
User Settings - Set Clock	Set precise time and date.	<a href="#">page 2-36</a>
User Settings - Network Settings	View and/or set network information such as MAC address (view only), DHCP on/off status, IP address, netmask and gateway.	<a href="#">page 2-64</a>
User Settings - Pilot Sample	Set the pilot sample level for the rear panel BNC connector.	<a href="#">page 2-92</a>
User Settings - LCD Settings	Set the front panel display's contrast, backlight and timeout.	<a href="#">page 2-93</a>
User Settings - Signal Gen	Enable/disable and setup the internal signal generator.	<a href="#">page 2-95</a>
User Settings - Station ID	Set station ID parameters for re-broadcasting primary information as a secondary station.	<a href="#">page 2-97</a>
User Settings - Ext. 10 MHz Inp	Enable/disable the use of an external 10 MHz signal.	<a href="#">page 2-100</a>
Local/Remote	Select local or remote control of the transmitter.	<a href="#">page 2-57</a>
View Status	View various transmitter parameters (see other View Status options in this table).	-
View Status - View Alarms	View all active transmitter alarms.	<a href="#">page 2-24</a>
View Status - View Meters	View the levels of various transmitter parameters, including forward power, reflected power, PA voltage, PA current and low level dc supply voltages.	<a href="#">page 2-34</a>
View Status - View Log	View the transmitter's events log, including alarms, commands, etc.	<a href="#">page 2-24</a>

**Table 2.1: Front Panel UI Screens**

UI Screen	Function	See Page
View Status - Clear Log	Clear the transmitter's events log.	<a href="#">page 2-24</a>
View Status - View SW Versions	View the versions of software installed on the transmitter.	-
Reset Alarms	Initiate an attempt to reset all alarms controlled by latched protection circuits.	<a href="#">page 2-57</a>
System Settings	Edit various transmitter system settings (see other System Settings options in this table).	-
System Settings - Thresholds	Factory set; no user adjustments required.	-
System Settings - ARM Watchdog	Enable, disable or force a reset of the ARM watchdog feature.	<a href="#">page 2-78</a>
System Settings - Console Select	Factory set; no user adjustments required	-
System Settings - Calibration	Set calibration values or run calibration routines for various parameters (e.g., TCXO offset, forward/reflected power, program input levels, etc.).	<a href="#">page 2-79</a>
System Settings - RF Drive Source	Select either internal or external exciter.	<a href="#">page 2-83</a>
System Settings - ARM Reset	Initiate a reset of the exciter/control PWB's ARM processor	<a href="#">page 2-84</a>
System Settings - OS Recovery	Initiate a recovery reset of the operating system in the event of a failed software upgrade.	<a href="#">page 2-85</a>

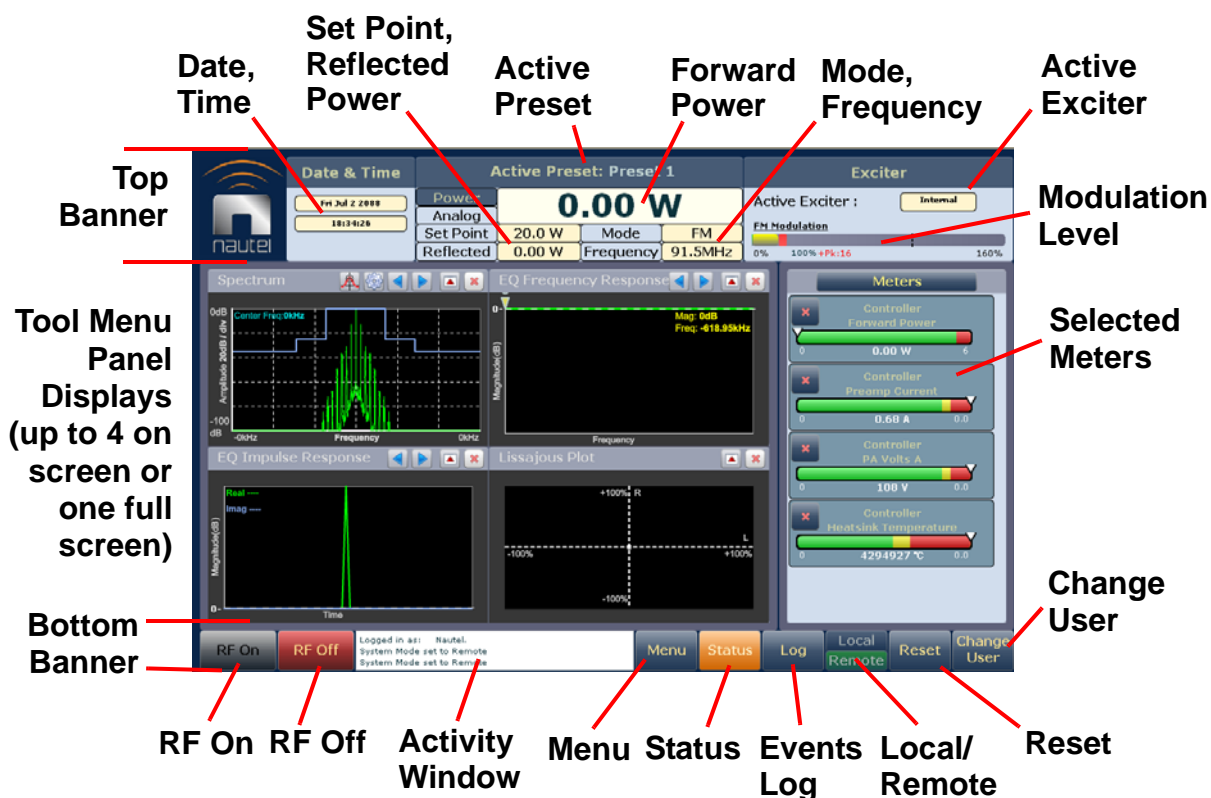
## ADVANCED USER INTERFACE

The VS300's advanced user interface (AUI) (see [Figure 2.6](#)) is available via remote connection only. To access the AUI, you need a PC (and a web browser) that is connected to the VS300 - directly or through a switch - via its rear panel LAN connection (A1J8A). The AUI has a wide range of displays, including:

- Tool menu panels (spectrum analyzer, signal constellation, Lissajous plot, etc.)
- Real-time meters
- Detailed transmitter status and events log
- Presets
- Hardware configuration
- User accounts
- Software configuration
- Remote input/output configuration

Each AUI page provides information about a specific transmitter function. All navigation through the AUI pages begins on the main screen (or Home page), shown in [Figure 2.6](#).

**Figure 2.6: Using the AUI (Home page shown)**



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

**Nautel Logo:** From any AUI page, click the Nautel logo to return to the Home page.

**Date & Time:** Displays day, month, year and current time. Click on date or time to shortcut to the **Set Time and Date** window (see [Setting time and date on page 2-35](#)).

**Active Preset:** Displays the name of the active preset, power set point based on the active preset, current forward power and reflected power levels, as well as the operating mode and carrier frequency.

**Active Exciter:** Displays the active exciter (internal or external) and the FM modulation, with rms (yellow) and peak (red) values.

The bottom banner is also permanent on all AUI pages and includes:

**RF On:** Click to enable the transmitter's RF power stage.

**RF Off:** Click to disable the transmitter's RF power stage.

**Activity Window:** Displays various messages to reflect specific user interface commands, such as RF on/off, local/remote control, or reset.

**Menu:** Click to open the **Menu** page, which allows navigation to various other pages (see [Menu page on page 2-16](#)).

**Status:** Click to shortcut to the **Transmitter Status** page (see [Viewing transmitter status on page 2-35](#)), which provides current alarm and status details for the transmitter. When the **Status** button is red, one or more alarms of severity level 10 is currently being reported, and the transmitter is in an 'off-air' state. When the **Status** button is orange, one or more alarms of severity level 5 (but none of severity level 10) is currently being reported, but the transmitter is still 'on-air', possibly at reduced power. When the **Status** button is green, the transmitter is operating normally. In this case, there are no alarms being reported, or there is one or more alarms of severity level 1 (but none of severity level 5 or 10). This page is also available through the Menu page.

**Log:** Click to shortcut to the **Transmitter Log** page, which displays historical alarm and status records for the transmitter (see [Viewing transmitter log on page 2-18](#)).



**Local/Remote:** Displays the operational control status of the transmitter. Click the desired button to select local or remote. If **Local** is highlighted, remote users cannot change any settings. Similarly, if **Remote** is highlighted, local users cannot change the transmitter status, except for **RF Off** and **Local/Remote**. To change the local/remote status from the front panel display, see [“Setting local/remote control” on page 2-57](#)

**Reset:** Resets protection circuits and power supplies that were inhibited, but are now alarm-free. To initiate an alarm reset from the front panel display, see [“Resetting alarms” on page 2-57](#)

**Change User:** Click to display a login menu. Using your remote keyboard, enter your Username and Password, then click **OK**. If you do not have a user account, see [“Setting user accounts” on page 2-59](#).

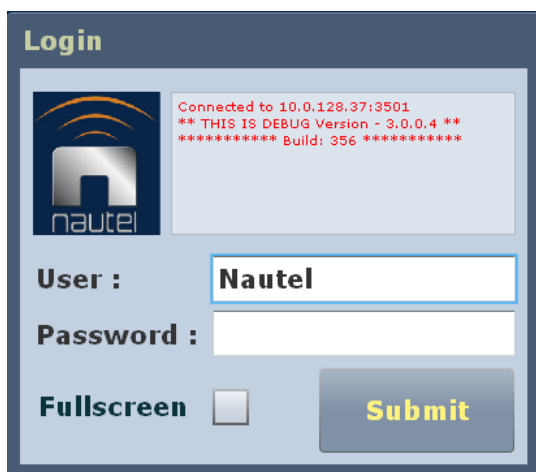
The displays between the top and bottom menus, contains user selected pages. These pages provide access to a variety of AUI functions such as transmitter status and hardware settings. The following paragraphs describes how to use these pages.

## LOGGING IN TO THE AUI

The transmitter’s remote AUI provides a means to restrict access of transmitter control functions to authorized users only.

To access the AUI using a web browser, you must configure your network settings (see [“Network setup” on page 2-64](#)). On the computer being used to remotely access the AUI, enter the VS300’s IP address into the Internet browser’s address bar and then log in to the AUI application via the login menu (see [Figure 2.6](#)).

**Figure 2.6: AUI Login Menu**



The screenshot shows a web browser window titled "Login". On the left is the Nautel logo. The main content area displays the following text in red: "Connected to 10.0.128.37:3501", "\*\* THIS IS DEBUG Version - 3.0.0.4 \*\*", and "\*\*\*\*\* Build: 356 \*\*\*\*\*". Below this text are two input fields: "User :" with the value "Nautel" and "Password :". At the bottom left is a "Fullscreen" checkbox, and at the bottom right is a "Submit" button.

Enter your User name (default is “Nautel”) and Password (default is blank), then click **Submit**. If you do not have a user account, see [“Setting user accounts” on page 2-59](#).

## AUI PAGES

Table 2.2 defines the available AUI pages.

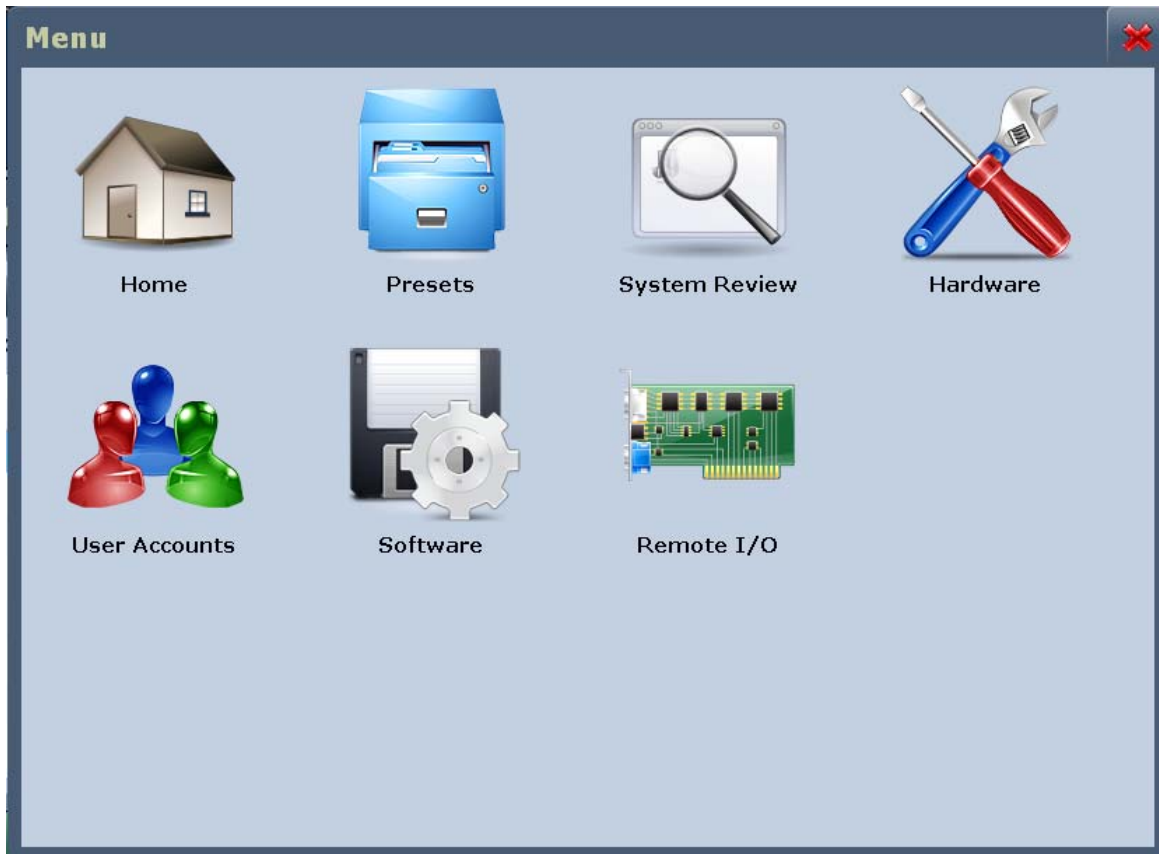
**Table 2.2: AUI Pages**

<b>AUI Page</b>	<b>Function</b>	<b>See Page</b>
Home	View meters, tool menu panels, choose options and navigate to other pages.	<a href="#">page 2-12</a>
Menu	Choose options and navigate to other pages.	<a href="#">page 2-16</a>
Log	View and analyze transmitter events .	<a href="#">page 2-18</a>
Tool Menu	Choose tool menu panel options.	<a href="#">page 2-25</a>
System Review	Choose meters for display.	<a href="#">page 2-32</a>
Set Time & Date	Set precise time and date.	<a href="#">page 2-35</a>
Presets	Activate and edit user-defined presets.	<a href="#">page 2-37</a>
Transmitter Status	View transmitter's current active faults and operational status.	<a href="#">page 2-58</a>
User Accounts	Set user permission rights and define user account information.	<a href="#">page 2-59</a>
Software	Calibrate and refresh the AUI screen, restart the server, set network information, perform software upgrades and configure email and alarm notification parameters.	<a href="#">page 2-62</a>
Hardware	Define system configuration and set/calibrate transmitter parameters and thresholds.	<a href="#">page 2-79</a>
Remote I/O	Define remote digital inputs and outputs.	<a href="#">page 2-86</a>

## MENU PAGE

From the home page, click the **Menu** button to view the **Menu** page (see [Figure 2.7](#)). From this page, you can select one of the following sub-menus:

**Figure 2.7: Menu Page**



Select **Home** to return to the home page (see [Figure 2.6 on page 2-12](#)).

Select **Presets** to load, edit, or save presets (see [“Managing presets” on page 2-37](#)).

Select **System Review** to view the meters of various parameters relating to the controller, exciter, power supplies and RF components (see [“Viewing real-time meters” on page 2-32](#)).

Select **Hardware** to access pages that allow system configuration, setting/calibrating transmitter parameters and thresholds, setting IBOC parameters and storing LUT data to active exciter (see [“Changing hardware settings” on page 2-64](#)).

Select **User Accounts** to access a page that displays a list of users with access to the AUI and, depending on permission level, allows editing of user accounts (see [“Setting user accounts” on page 2-59](#)).

Select **Software** to access a page that provides help with performing network configuration, software upgrades, email configuration, alarm notifications, uploading files, audio player setup and livewire setup (see [“Software configuration” on page 2-62](#)).

Select **Remote I/O** to access a page that allows assignation of remote digital inputs and digital outputs (see [“Configuring remote inputs and outputs” on page 2-82](#)).

## VIEWING TRANSMITTER LOG

You can view transmitter log information using the remote AUI (see “Using the AUI”) or using the local front panel display (see “Using the front panel” on page 2-24).

### USING THE AUI

You can view the VS300’s events log using the AUI’s [Log page](#) - see [Figure 2.8](#). This page shows a configurable log of all transmitter events. To view the [Log page](#), click the **Log** button in the bottom banner of any AUI screen.

**Figure 2.8: Log page**

The screenshot displays the VS300 Transmitter Log page. At the top, there is a status bar with the following information:

- Date & Time:** Thu Mar 22 2012, 14:25:33
- Active Preset:** Preset 1
- Exciter:** Internal

Below the status bar, there is a section for transmitter parameters:

- Power:** 0.00 W
- Analog:** 100 W
- Set Point:** 0.00 W
- Reflected:** 0.00 W
- Mode:** FM
- Frequency:** 95.3MHz

The main section is titled **Transmitter Log** and contains a **Log Manager** button. Below this, it shows **104 Matches Sorted by "Time of Event"** (Page 1/2). The log entries are as follows:

Device	Event	State	Severity	Time of Event
Controller	Residual PA Volts Present	🔴	!	16:10:45 02/18/2010
Controller	Discharging PA Volts	🟢	!	16:10:45 02/18/2010
Controller	Residual PA Volts Present	🟢	!	16:10:45 02/18/2010
Controller	Transmitter RF Off	🟢	!	16:10:45 02/18/2010
Controller	Transmitter RF Off	🔴	!	16:02:27 02/18/2010
Controller	Composite Audio Low	🔴	!	15:59:05 02/18/2010
Controller	Composite Audio Low	🟢	!	15:58:06 02/18/2010
Controller	Discharging PA Volts	🔴	!	15:37:34 02/18/2010

At the bottom of the screen, there is a banner with the following controls:

- RF On / RF Off** (Red button)
- Logged in as: Nautel. System Mode set to Remote. System Mode set to Remote.
- Menu** (Green button)
- Status** (Green button)
- Log** (Blue button)
- Local Remote** (Green button)
- Reset** (Blue button)
- Change User** (Blue button)

The main screen displays a chronological listing of events. Depending on the selections made in the **Log Manager** screen (see “Managing the log” on page 2-12), the events displayed may be filtered by the originating device (Controller, Exciter or All), and the time of occurrence.

Refer to the *VS300 Troubleshooting Manual* to cross-reference the alarm name to possible causes and troubleshooting tips.

The number of log matches displayed is shown below the **Log Manager** button (e.g., 104 Matches Sorted by “Time of Event”). You can scroll through the list using the scroll bar or the up and down arrow buttons to the right of the scroll bar. When there are more than 100 matches in the list, a **Page #/#** tab will appear to allow viewing of further listings. In this case, click on **Page #/#**, select the desired page from the **Select Page** window, then click **OK** to view that page or **Cancel** to return to the **Transmitter Log** page. The columns in the display indicate specific information about the event:

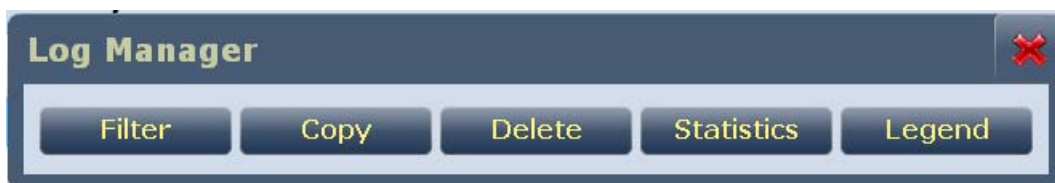
- **Device** indicates the origin device of the event (Controller, Exciter or All).
- **Event** indicates the event name.
- **State** indicates whether the event is active (red bell) or cleared (green checkmark) and in some cases, indicates whether the RF was turned on or off (see **Legend** under **Log Manager**, [Figure 2.14 on page 2-23](#)).
- **Severity** indicates how the event affects transmitter operation [a single orange ! indicates low severity (RF output not affected); a single red ! indicates medium severity (RF output is reduced); three red ! indicates high severity (RF output is inhibited)].
- **Time of Event** indicates the time and date that the event that occurred.

With an event highlighted, click the **i** button on the right-hand side of the display to view that specific event’s details (see [“Event Information page” on page 2-17](#)). This page is similar to the **Transmitter Status** page (see [“Transmitter Status page” on page 2-58](#)), except that it is a snapshot taken at the exact time at which the event occurred. The **Alarms** tab lists all events that were active at the time of the selected event, by name and severity [1 = low (RF output not affected), 5 = medium (RF output is reduced), 10 = high (RF output is inhibited)]. The **Meters** tab allows selection of various metered parameters to view for troubleshooting purposes. You can also select a time span (between 1 second and 24 hours) when viewing **Meters**. The time of the event is always the centre point of the time span (e.g., if you select a timespan of **10 Minutes**, then the meter indications will span from 5 minutes before the event to 5 minutes after the event).

## MANAGING THE LOG

You can manage the VS300 AUI’s events log by clicking on the **Log Manager** button (see [Figure 2.9](#)). This screen provides options to perform various event monitoring operations such as filtering, copying, deletion and statistical analysis. Click **X** to close this window.

**Figure 2.9: Log Manager options**



## FILTER

You can filter transmitter events based on their origin or date by clicking the **Filter** button in the log manager (see [Filter - Select Logs](#) - see [Figure 2.10](#)).

Click the **Device Type** drop-down arrow, and select the desired device type to filter events based on the type selected. Click the **OK** button or the **Cancel** button when done.

- **All** - displays all transmitter events
- **Controller** - displays controller events only
- **Exciter** - displays exciter events only

Click the **Filter by Date Range** checkbox to filter events based on a specific date and time range, and the device type selected. Click the **OK** button or the **Cancel** button when done.

Click the **Cancel** button or **X** to close this window and discard changes.

**Figure 2.10: Filter - Select Logs**

**Select Logs** [X]

**Device Type** All

**Filter by Date Range**

**From:** Mar 22 2010 14 : 35

**To:** Mar 22 2010 14 : 35

OK Cancel

## COPY

You can create a copy of all the logs in the selected list (copied to the remote user's computer clipboard) by clicking on the **Copy** button in the log manager (see [Copy Logs - see Figure 2.11](#)). You can paste the tab-delimited text copy of the logs into a text editing program such as Word, Excel, Notepad, etc. Click **X** to close this window.

**Figure 2.11: Copy Logs**



## DELETE

You can delete all events or a selection of events by clicking on the **Delete** button in the log manager (see [Delete Logs - see Figure 2.12](#)).

Click the **Delete All Events** checkbox and click **OK** to delete all events.

Click the **Delete Old Events** checkbox to allow deletion of events that occurred prior to (**Older than**) a specified date and time. Use the up and down arrows to select the date and time and click **OK** to delete the specified events.

Click the **Cancel** button or **X** to close this window and discard changes.

**Figure 2.12: Delete Logs**





## STATISTICS

You can view statistical information on the events being displayed by clicking on the **Statistics** button in the log manager (see [Log Statistics](#) - see [Figure 2.13](#)).



*Note:*

*Only the events subject to the user-defined filtering parameters will be displayed on the Log Statistics screen.*

The **Log Statistics** screen indicates the Total Events (number of occurrences) and the time and date of the Earliest Event and the Latest Event. You can scroll through the list using the scroll bar (if applicable) or the up and down arrow buttons to the right of the scroll bar. The columns in the display indicate specific information about the events:

- **Device** indicates the origin device of the event (Controller, Exciter or All).
- **Event** indicates the event name.
- **Severity** indicates how the event affects transmitter operation [a single orange ! indicates low severity (RF output not affected); a single red ! indicates medium severity (RF output is reduced); three red ! indicates high severity (RF output is inhibited)].
- **# Events** indicates the number of occurrences of that event during the filtered period.
- **Earliest** indicates the time and date of the first event, within the filtered period.
- **Latest** indicates the time and date of the latest event, within the filtered period.

Click X to close this window.

**Figure 2.13: Log Statistics**

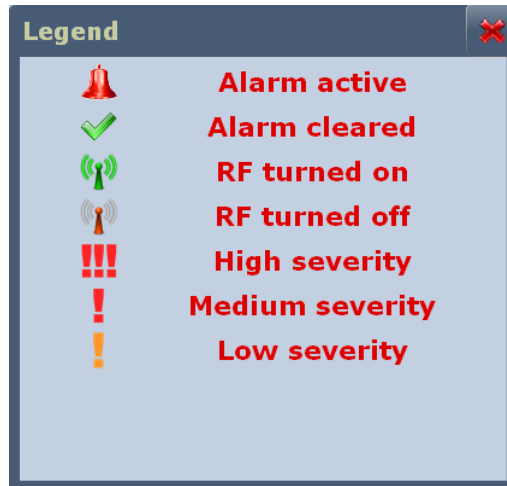
Log Statistics						
<b>Total Events</b>		<b>104</b>				
<b>Earliest Event</b>		<b>14:43:39 02/18/2010</b>				
<b>Latest Event</b>		<b>16:10:45 02/18/2010</b>				
Device	Event	Severity	# Events	Earliest	Latest	
Controller	External Interlock Open	!	66	15:05:14 02/18/2010	15:36:01 02/18/2010	▲
Controller	SWR Shutback	!	2	14:43:39 02/18/2010	14:43:39 02/18/2010	▲
Controller	PA Volts A Fail	!	2	15:34:53 02/18/2010	15:34:53 02/18/2010	▲
Controller	Composite Audio Low	!	6	15:09:14 02/18/2010	15:59:05 02/18/2010	▲
Controller	No Internal 10MHz	!	2	14:43:39 02/18/2010	14:43:41 02/18/2010	▲
Controller	Rebooted Exciter	!	2	14:43:39 02/18/2010	14:43:44 02/18/2010	▲
Controller	Transmitter RF Off	!	5	14:43:39 02/18/2010	16:10:45 02/18/2010	▲
Controller	Residual PA Volts Present	!	10	15:05:14 02/18/2010	16:10:45 02/18/2010	▲
Controller	Discharging PA Volts	!	9	15:05:14 02/18/2010	16:10:45 02/18/2010	▲
						▲
						▲
						▲

**LEGEND**

Click on the **Legend** button in the log manager (see [Figure 2.14](#)) to display a legend that describes the meaning of the symbols shown in the **State** and **Severity** columns of the **Log** page.

Click X to close this window.

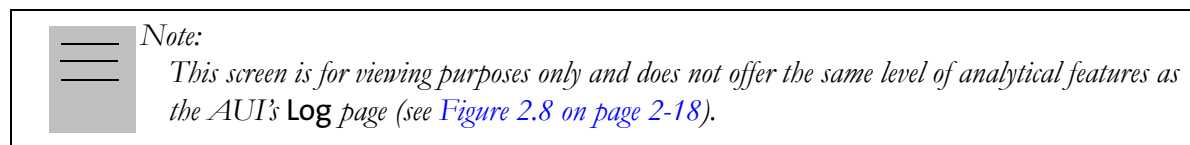
**Figure 2.14: Log Manager - Legend**



Use the **Reset** button at the bottom of any AUI 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. See [“Reset:”](#) on page 2-14.

## USING THE FRONT PANEL

When you select **View Status -> Alarms** or **View Status -> View Log** from the **Main Menu** (see [Figure 2.15](#)), you can view various active or logged events, respectively, of the VS300. These parameters are displayed on multiple pages of **Meters** screens.



**Figure 2.15: View Alarms and View Logs Screens**



The **View Alarms** screen displays only alarms that are currently active. Older alarms that have cleared may still be present in the **View Events** screen.

Use the up and down buttons to scroll through the list of alarms or events.

Refer to the *VS300 Troubleshooting Manual* to cross-reference the alarm name to possible causes and troubleshooting tips.

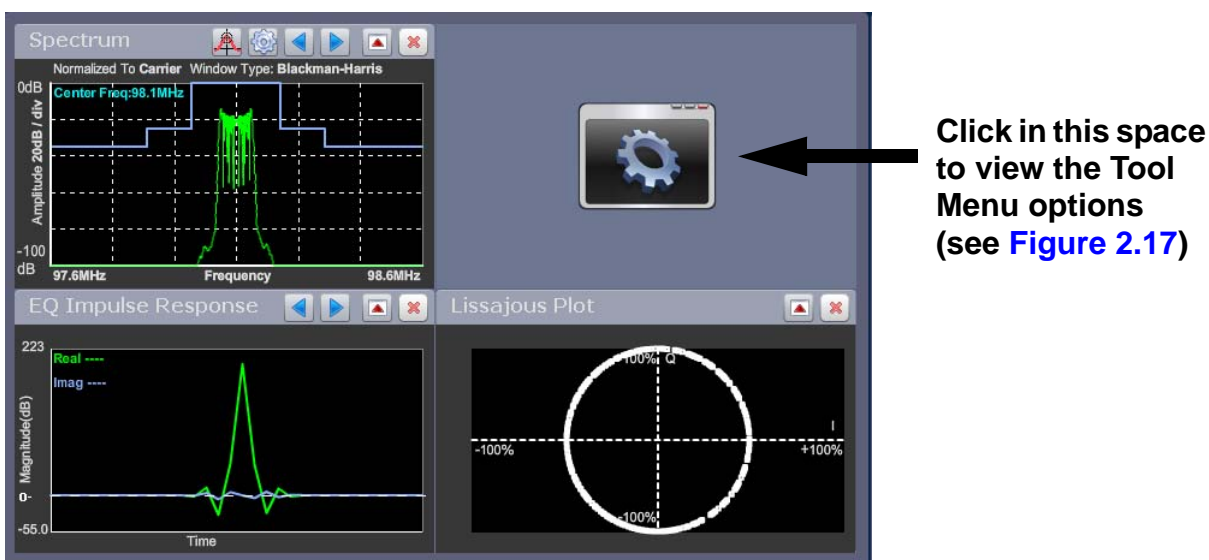
When you select **Clear Log** from the **View Status** menu, you will delete all logged events.

Use the **Reset Alarms** command in the front panel UI's **Main Menu -> Reset 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. See [“Resetting alarms” on page 2-57](#).

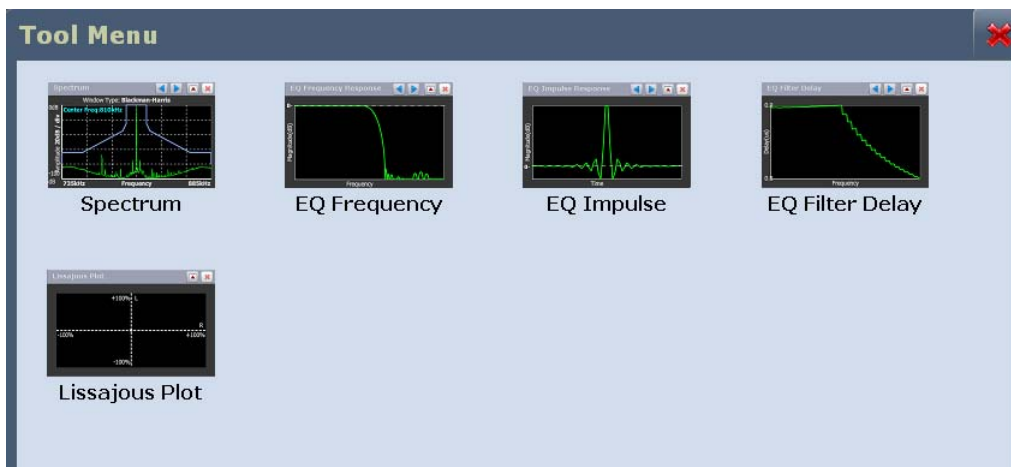
## VIEWING TOOL MENU PANELS

The VS300 AUI provides five tool menu panels that you can choose to display on the AUI home page (see [Figure 2.16](#)). Up to four tool menu panels can be displayed at one time, including a spectrum analyzer. To view all the tool menu options (see [Figure 2.17](#)), close one of the existing tool menu panels on the **Home** page by clicking **X** in the top, right corner of the tool menu panel, and then click anywhere in the blank space (see [Figure 2.16](#)).

**Figure 2.16: Tool Menus on Home page**



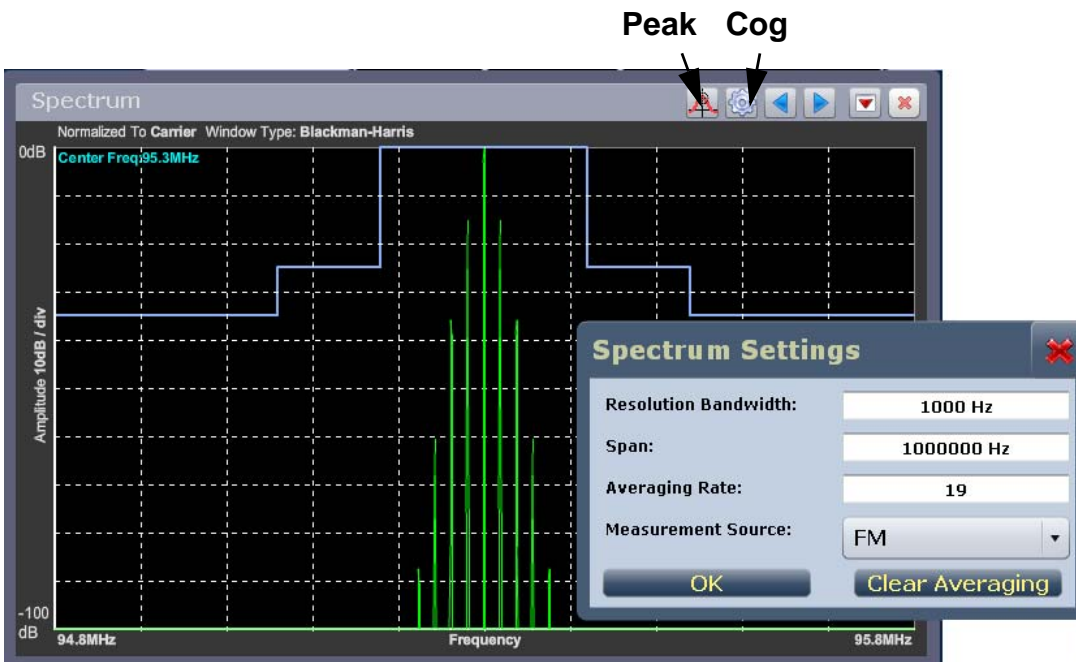
**Figure 2.17: Tool Menu Options**



Click on the desired tool menu panel to display it. See [Table 2.3 on page 2-26](#) for a description of each tool menu panel.

**Table 2.3: Tool Menu Panels**

<b>Tool Menu</b>	<b>Description</b>	<b>Reference</b>
Spectrum Analyzer	Displays a spectrum analyzer, capable of monitoring various RF sections of the transmitter, including the RF output.	See <a href="#">page 2-27</a>
EQ Frequency	Displays the frequency response of the modulator's EQ filter.	See <a href="#">page 2-28</a>
EQ Impulse	Displays the impulse response of the modulator's EQ filter.	See <a href="#">page 2-29</a>
EQ Filter Delay	Displays the delay of the modulator's EQ filter across its bandwidth	See <a href="#">page 2-30</a>
Lissajous Plot	Displays a Lissajous figure that represents the relationship between the two applicable channels (either L and R or I and Q).	See <a href="#">page 2-31</a>

**Figure 2.18: Spectrum Analyzer**

## SPECTRUM ANALYZER

See [Figure 2.18](#). The carrier level is normalized to its unmodulated carrier level at 0 dB. Graph center is always at the carrier frequency.

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

Use the left and right buttons to make fine adjustments to the cursor position.

Use the up or down button to maximize (if minimized) or minimize (if maximized) the panel size.

Use the “peak” button to place the cursor on the next successive peak in the spectrum.

Use the “cog” button to gain access to spectrum settings (see [Figure 2.18](#)) such as resolution bandwidth, span, averaging rate and the actual measurement source (FM or MPX) that is being displayed. Click **OK** to save changes or **X** to discard changes and close the window.



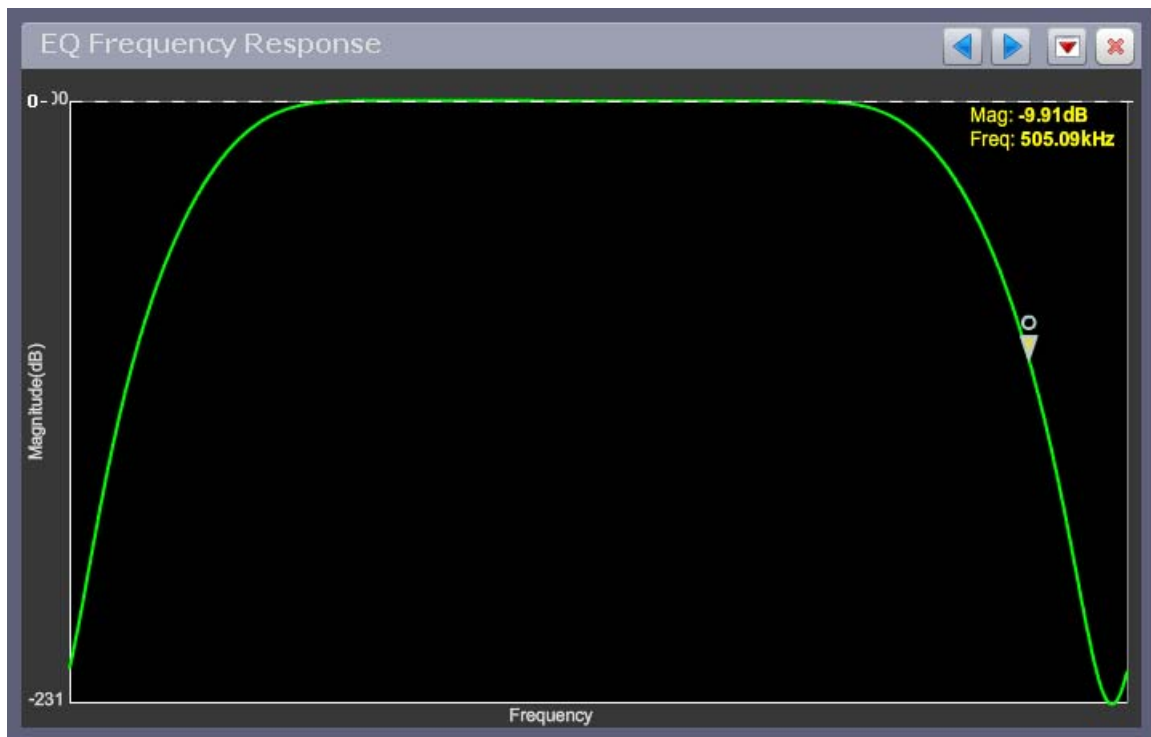
*Note:*

*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.*

## EQUALIZER SCREENS

The VS300's exciter includes a fixed equalizer to optimize audio performance. There are three menus available in the tool panel - **EQ Frequency**, **EQ Impulse Response** and **EQ Filter Delay**. Coefficients are selected based on your channel frequency. All frequencies shown are relative to the channel frequency.

**Figure 2.19: EQ Frequency**



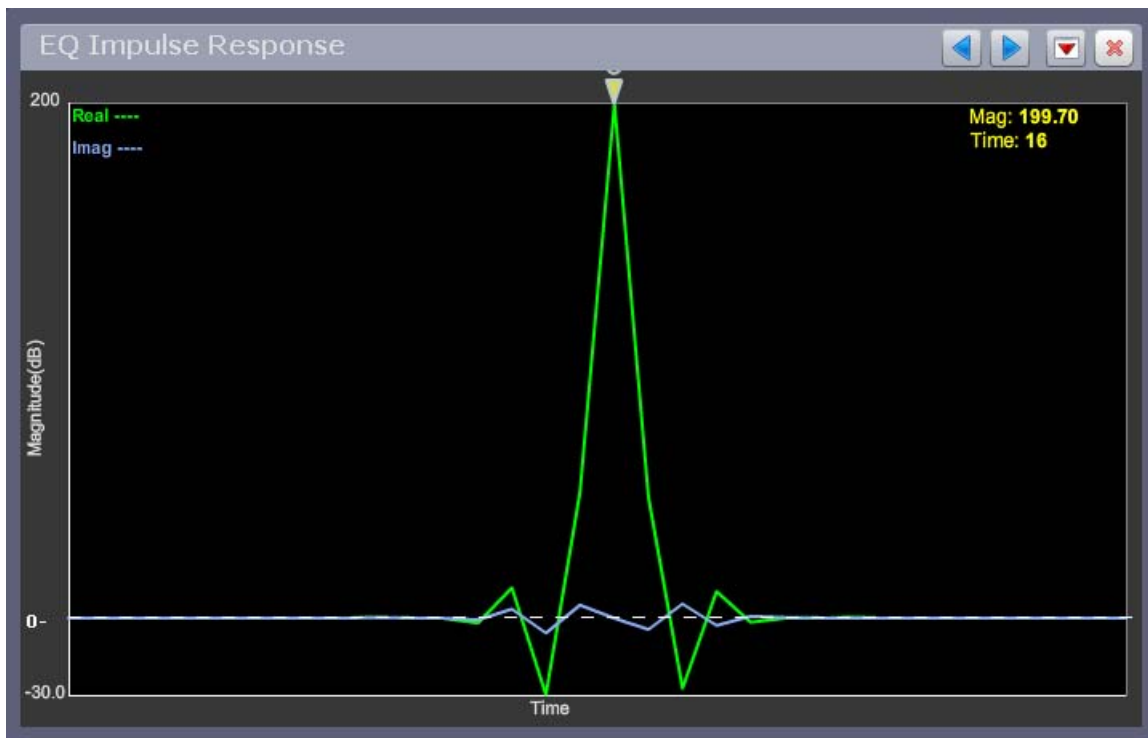
### EQ FREQUENCY

See [Figure 2.19](#). This panel displays the frequency response of the modulator's EQ filter.

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

Use the left and right buttons to make fine adjustments to the cursor position.

Use the up or down button to maximize (if it was minimized) or minimize (if it was maximized) the panel size.

**Figure 2.20: EQ Impulse**

### EQ IMPULSE RESPONSE

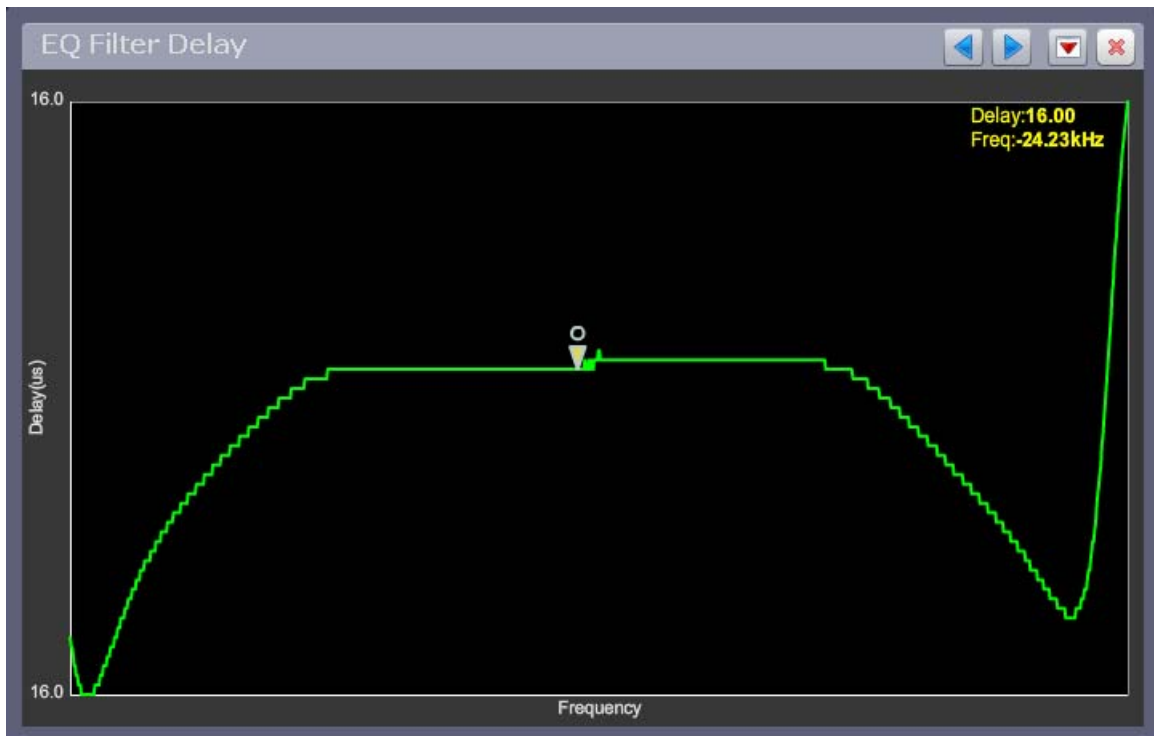
See [Figure 2.20](#). This panel displays the impulse response of the modulator's EQ filter.

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

Use the left and right buttons to make fine adjustments to the cursor position.

Use the up or down button to maximize (if it was minimized) or minimize (if it was maximized) the panel size.



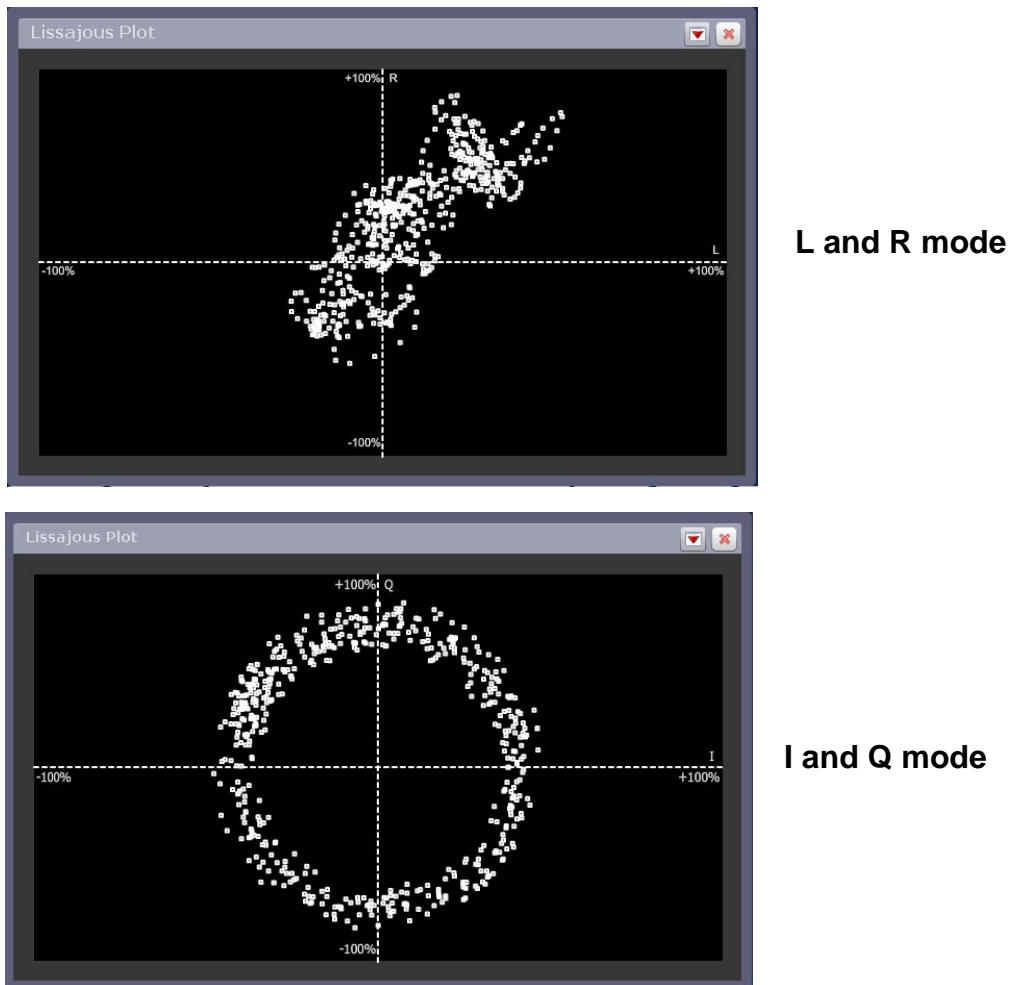
**Figure 2.21: EQ Filter Delay****EQ FILTER DELAY**

See [Figure 2.21](#). This panel displays the delay of the modulator's EQ filter across its bandwidth.

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

Use the left and right buttons to make fine adjustments to the cursor position.

Use the up or down button to maximize (if it was minimized) or minimize (if it was maximized) the panel size.

**Figure 2.22: Lissajous Plots**

## LISSAJOUS PLOT

See [Figure 2.22](#). 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.

Use the up or down button to maximize (if it was minimized) or minimize (if it was maximized) the panel size.

## VIEWING REAL-TIME METERS

You can view meters using the remote AUI (see “Using the AUI”) or using the local front panel display (see “Using the front panel” on page 2-34).

### USING THE AUI

The VS300’s AUI can display many metered parameters on the right hand side of its home page. To view all the meter options, click the **Meters** button on the right-hand side of the AUI. This opens the System Review page (see Figure 2.23).

**Figure 2.23: System Review page (Meter Options)**

The screenshot displays the 'System Review' page for the VS300 transmitter. At the top, it shows the date and time (Tue Apr 27 2010, 14:46:42), the preset (Preset 1 - 50W), and the active exciter (Internal). The main display area is divided into 'Transmitter Layout' and 'Relevant Meters'. The 'Transmitter Layout' section has 'Controller' selected, indicated by a blue diamond and an information button. The 'Relevant Meters' list includes parameters like Forward Power, Reflected Power, Preamp Current, PA 1 Current, PA Temp, and various supply voltages. A red arrow points from the 'Controller' sub-system to the 'PA Temp' meter, which is also highlighted in the 'Meters' section on the right. The 'Meters' section shows four meters: Controller Forward Power (0.00 W), Controller Preamp Current (0.00 A), Controller PA Temp (29.7 °C), and Exciter Analog Left Peak (-81.6 dBu). The bottom of the page features a status bar with 'RF On/Off', login information, and navigation buttons like 'Menu', 'Status', 'Log', 'Local Remote', 'Reset', and 'Change User'.

Click the appropriate transmitter sub-system from the Transmitter Layout list to view the Relevant Meters for that sub-system. The Transmitter Layout list contains **Controller** and **Exciter** sub-systems.

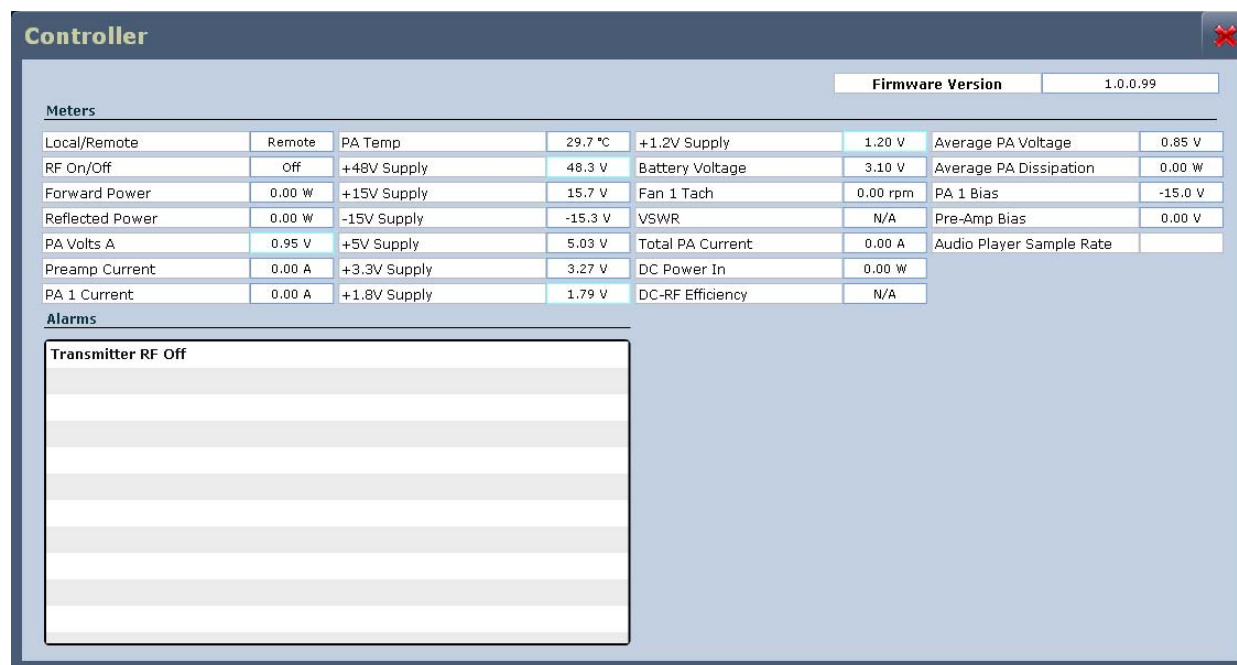
Click on the check-box next to the desired parameter in the Relevant Meters list to select it for display in the Meters section of the AUI home page. If necessary, use the scroll bar on the right side of the page to find the desired meter.

Each meter is a colour-coded bar with minimum and maximum values. The meter’s current value is indicated by an arrow on the colour-coded bar, as well as a displayed value below the meter. A parameter value in the green section of a meter bar indicates the parameter is within the range for normal operation. A parameter value in the yellow section (as applicable) of a meter bar indicates the parameter is still within an operational range, but is approaching design limitations. A parameter value in the red section of a meter bar indicates the parameter is outside normal operating conditions.

To delete a meter from the home page, click the **X** in the upper, left corner of the meter’s box in the Meters section or de-select the check-box in the Relevant Meters list.

To view detailed info on a specific transmitter sub-system (e.g., Controller), select the desired sub-system and then click on the **i** (information) button to the right of the sub-system name (see [Figure 2.24](#)).


**Figure 2.24: Detailed Sub-System Information (Controller shown)**



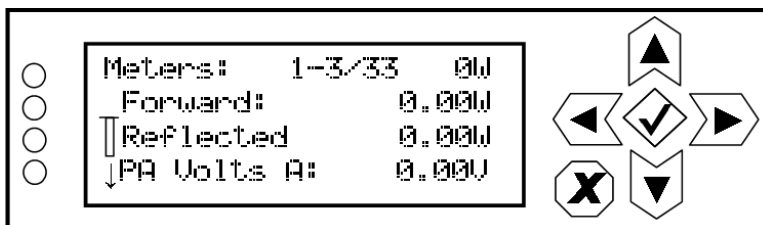
This screen displays the status of the selected sub-system, as well as real-time meter values. The Alarms section shows all active alarms pertaining to the sub-system.

**USING THE FRONT PANEL**

When you select **View Status -> View Meters** from the **Main Menu** (see [Figure 2.25](#)) you can view various metered parameters of the VS300. These parameters are displayed as a list on the **View Meters** screen.

 *Note:*  
 This screen is for viewing purposes only and does not offer the same level of analytical features as the AUI's **System Review** page (see [Figure 2.23](#) on page 2-32).

**Figure 2.25: View Meters Screen**



Use the up and down buttons to scroll through the following list of metered parameters:

Forward (forward power)	+1.8V	Dig L
Reflected (reflected power)	+1.2V	Dig R
PA Volts A	Battery	MPX SCA
Preamp Curr	Fan 1	Peak Mod
PA1 Curr	TCXO	MPX RMS
Heatsink Temp	Ext 10 MHz	VSWR
+48V	Bal L	delta 10 MHz
+15V	Bal R	DC Power In
-15V	MPX	DC-RF Eff
+5V	Int SCA1	Avg PA Diss
+3.3V	Int SCA2	

---

## SETTING TIME AND DATE

The VS300's internal clock uses a backup battery, and therefore maintains an accurate time and date, even during power outages. The time and date needs to be set when the transmitter is first installed, or after a power outage if the backup battery has failed.

You can set the time and date using the remote AUI (see [“Using the AUI”](#)) or using the local front panel display (see [“Using the front panel”](#) on page 2-36).

### USING THE AUI

You can remotely set the VS300's time and date from the AUI's [Set Time & Date page](#) - see [Figure 2.26](#). To view the [Set Time & Date page](#), click on the time or date in the upper, left corner of any AUI page.

**Figure 2.26: Set Time & Date page**



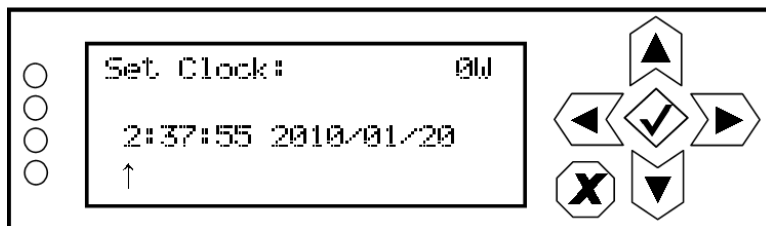
The [Set Time & Date page](#) contains editable fields for the date (month, day and year) and time (hours, minutes and seconds). The clock is displayed in 24-hour format.

Use the up and down buttons to increase or decrease the desired value in the specific field. Click the **OK** button to accept changes or click the **Cancel** button or **X** to discard changes and close the window.

### USING THE FRONT PANEL

When you select **User Settings** -> **Set Clock** from the **Main Menu** menu (see [Figure 2.27](#)) you can set the current time and date. The time appears on the top line of the top level screen (see [Figure 2.4](#) on page 2-7).

**Figure 2.27: Set Clock screen**



To change the time or date, use the right and left arrow buttons to move the cursor to the desired field (hours, minutes, seconds, year, month, day), and use the up and down arrow buttons to increase or decrease the value of the selected field as desired. When complete, press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.

## MANAGING PRESETS

Presets contain operational data (power level, frequency, mode, program input characteristics) for the transmitter. You can create presets and manage their various settings.

You can manage presets using the remote AUI (see “Using the AUI”) or using the local front panel display (see “Using the front panel” on page 2-40).

### USING THE AUI

The **Presets** page (see [Figure 2.28](#)) allows you to create up to 63 operating presets or edit existing presets. To view the **Presets** page, select **Presets** from the **Menu** options or double-click in the Power section of the top banner.

**Figure 2.28: Presets page (General tab shown)**

**DOUBLE-CLICK IN  
THIS SECTION**

The screenshot displays the transmitter's control interface. At the top, the 'Date & Time' section shows 'Sun Mar 25 2012' and '13:16:49'. The 'Active Preset: Preset 1' section shows 'Power' at '0.00 W', 'Set Point' at '50.0 W', 'Reflected' at '0.00 W', 'Mode' at 'FM', and 'Frequency' at '95.3MHz'. The 'Exciter' section shows 'Active Exciter: Internal' and an 'FM Modulation' meter ranging from 0% to 160% with a current reading of '+Pk:102'. Below this is a 'Presets: Preset 1' window with tabs for 'General', 'Bias', 'Main Audio', 'SCA', 'RDS', and 'Other Audio'. The 'General' tab is selected, showing 'Output Power' (50.00 W), 'Frequency' (95.30 MHz), and 'Mode' (FM). A left sidebar contains buttons for 'Apply', 'Reload', 'Load', 'Save', and 'Export'. The bottom status bar shows 'RF On' and 'RF Off' buttons, along with a status message: 'System Mode set to Remote', 'RF Off received.', and 'RF Off received.'. Other buttons include 'Menu', 'Status', 'Log', 'Local Remote', 'Reset', and 'Change User'.



**LOADING PRESETS.** When you first enter the **Presets** page, the current preset is displayed. If the current preset is not the preset you want to work with, use the **Load** button on the left side of the **Presets** page to call up a window containing a list of alternate presets.

Select the desired preset and click the **Load** button to view or enable editing of the preset. Click the **Delete** button to delete the selected preset. Click the **Cancel** button or **X** to close this window.

**APPLYING PRESETS.** Click the **Apply** button to enable the preset as the transmitter's active preset.

**RELOADING PRESETS.** Click the **Reload** button to load the saved values in the selected preset, overwriting any temporarily edited values.

**EDITING OR CREATING PRESETS.** To change the settings for a selected preset, or to establish settings for a new preset, change the value in the desired tab(s) and field(s) by entering new values or selecting from the drop-down menus, as appropriate. When you edit a field in an existing preset, note that an asterisk appears at the beginning of the preset name in the top, left corner. When changes are complete, click the **Save** button and then click the Save Preset window's **Save** button. If you are creating a new preset, you can also enter a new name (e.g., Preset 4 - MPX) in the preset window before clicking the **Save** button. Click the **X** button to discard changes and return to the home page. Parameters that can be edited are:

**General tab:**

- Output Power (enter value in W)
- Frequency (enter value in MHz)
- Mode [temporarily disabled; defaulted to FM (analog) mode]

**Main Audio tab:**

- Audio Source (select Left/Right/Mono, MPX, Primary Digital or Secondary Digital)

For Left/Right/Mono:

- Analog Level (enter value in dBu)
- Audio Mode (select Mono L, Mono R or Stereo)
- 15kHz Lowpass (select On or Off)
- Preemphasis (select 0 us, 25 us, 50 us or 75 us)

For MPX:

- MPX Level (enter value in Vpp)

For Primary Digital or Secondary Digital:

- Secondary Source (select Playlist); displayed for Secondary Digital only
- Digital Level (enter value in dBFS)
- Audio Mode (select Mono L, Mono R or Stereo)
- 15kHz Lowpass (select On or Off)
- Preemphasis (select 0 us, 25 us, 50 us or 75 us)

**SCA tab:**

- MPX SCA (select Enabled or Disabled). If Enabled, enter:
  - Input Level (enter value in Vpp)
- SCA Reduction (enter percentage)
- Internal SCA1 or SCA2 (select Enabled or Disabled). If Enabled, enter:
  - Injection Level (enter percentage)
  - Frequency (enter value in kHz)
  - Input Level (enter value in dBu)
  - 7.5kHz Lowpass Filter (select Yes or No)
  - Preemphasis (select 0 us, 50 us, 75 us or 150 us)
  - Mode (select FM or DSB-SC)

**RDS tab:**

- RDS (select Enabled or Disabled). If Enabled, enter:
  - Data Source (select Internal, Ext. ASCII, Ext. UECP, ASCII Over IP, or UECP Over IP)
  - RDS Local Echo(select Enabled or Disabled); displayed for Ext. ASCII source only
  - Injection Level (enter percentage)
  - Phase (enter value in degrees)
  - Baud Rate (select 75, 150, 300, 60, 1200, 2400, 4800, 9600, 19200, 38400 or 57600 bps); displayed for Ext. UECP and Ext. ASCII sources only
  - PI Code (hex) (enter value)
  - PS Code (enter value)
  - PTY (select from various program choices)
  - PTYN (enter value)
  - Music/Speech (select Music or Speech)
  - Traffic Info (select None, TA, TP or TA+TP)
  - Artificial Head (select Yes or No)
  - Compression Flag (select Yes or No)
  - Dynamic (select Yes or No)
  - Stereo (select Yes or No)
  - Alt. Frequencies (select None or 1 through 6)
  - Alt. Freq. 1 through 6 (enter frequency in MHz)

**Other Audio tab:**

- Pilot Level (enter percentage)
- Pilot 1 PPS Sync (select On or Off). If On, enter:
  - Pilot Sync Phase (enter value in degrees)
- Audio Delay (select Yes or No). If Yes, enter:
  - Audio Delay (enter value in ms)
- Audio Loss Timeout (select Yes or No). If Yes, enter:
  - Action (None, Inhibit or Change Preset)
  - Timeout Minutes (enter value in minutes)
  - Timeout Seconds (enter value in seconds)
  - Threshold (enter percentage)
- Hard Limiter (select Yes or No). If Yes, enter:
  - Hard Limit (enter percentage)

- AGC Limiter (select Enabled or Disabled). If Enabled, enter:
  - AGC Limit (enter percentage)
  - Time Constant (enter value in ms)
- Two Slope Limiter (select Enabled or Disabled). If Enabled, enter:
  - Threshold (enter percentage)
  - Gain (enter percentage)

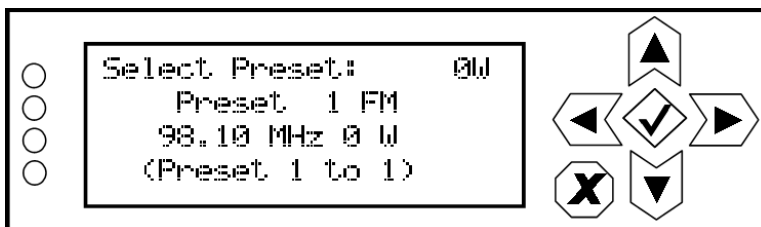
**SAVING PRESETS.** Click the **Save** button to save preset information.

## USING THE FRONT PANEL

### SELECTING THE ACTIVE PRESET

When you choose **Select Preset** from the **Main Menu** (see [Figure 2.29](#)) you can select the active preset for transmitter operation.

**Figure 2.29: Select Preset screen**

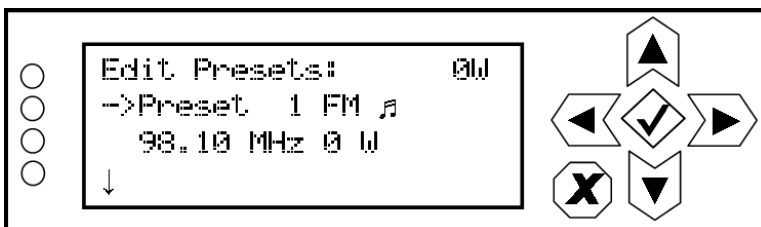


Use the up and down buttons to scroll through the existing presets. Press the accept (checkmark) button to enable the preset as the transmitter's active preset. Press the cancel (X) button to return to the previous menu.

### EDITING OR CREATING PRESETS

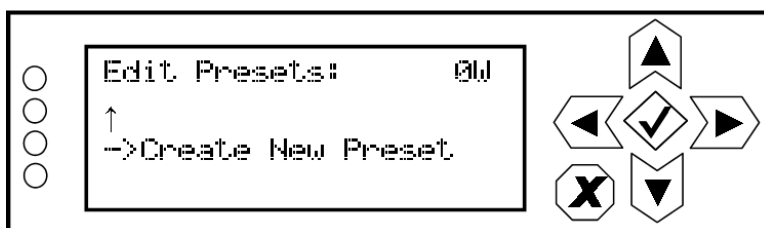
When you select **User Settings -> Edit Presets** from the **Main Menu** (see [Figure 2.30](#)) you can create up to 63 operating presets or edit existing presets.

**Figure 2.30: Edit Preset screen**

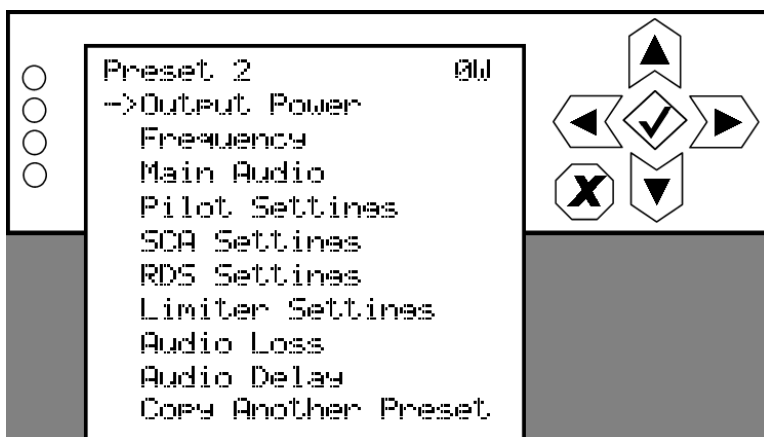


Use the up and down buttons to scroll through the existing presets, or scroll to the bottom of the list to **Create New Preset** (see [Figure 2.31](#)). Press the accept (checkmark) button to enter the editing menu for that preset (see [Figure 2.32 on page 2-41](#)). Press the cancel (X) button to return to the previous menu. When you create a new preset, the next available preset number is assigned (e.g., Preset 5).

**Figure 2.31: Create New Preset screen**

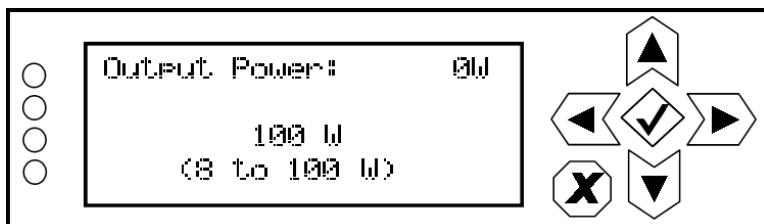


**Figure 2.32: Preset Editing menu**

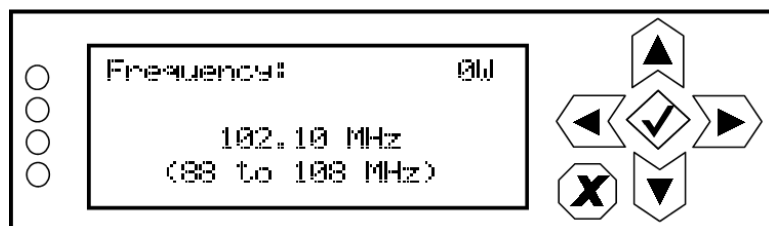


Within the Preset Editing menu, use the up and down buttons to scroll through the options and press the accept (checkmark) button to enter the selected editing menu/screen. Press the cancel (X) button to return to the previous menu. Parameters that can be edited are:

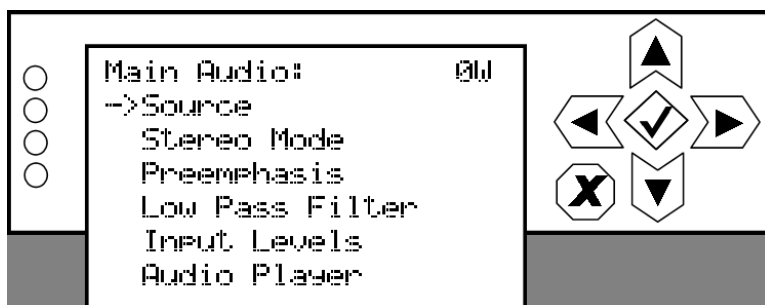
**OUTPUT POWER.** See [Figure 2.33](#). Use the up and down buttons to edit the output power (in 1 W increments, up to a maximum of 100 W), then press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.

**Figure 2.33: Output Power screen**

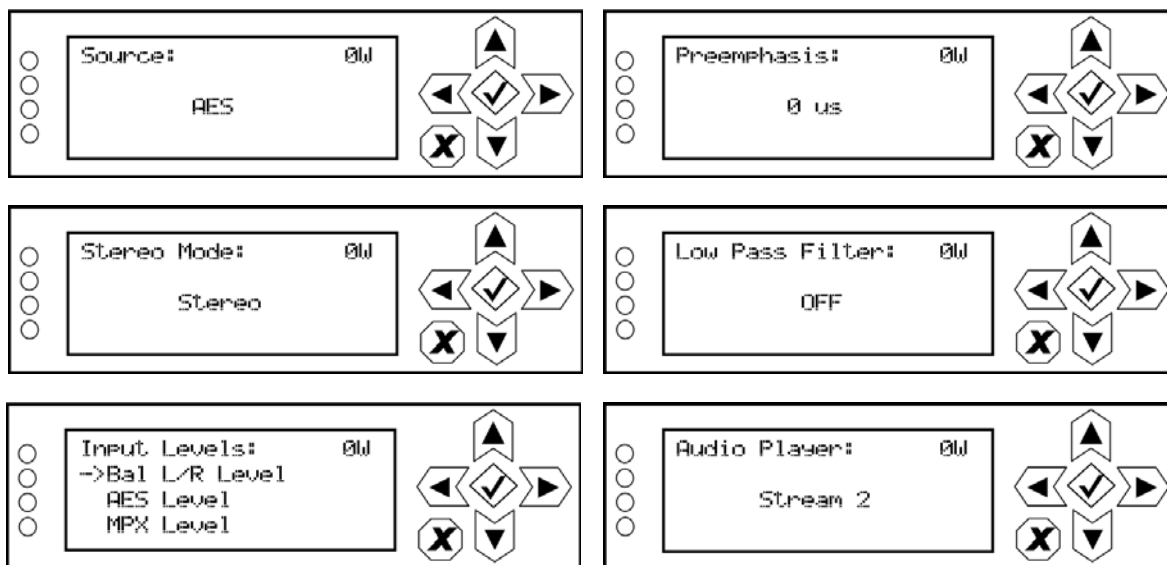
**FREQUENCY.** See [Figure 2.34](#). Use the up and down buttons to edit the output power (in 0.01 MHz increments), then press the accept (checkmark) button to save the change. Press the cancel (X) button to return to the previous menu.

**Figure 2.34: Frequency screen**

**MAIN AUDIO.** When you select **Main Audio** from the **Preset** editing options screen, you can edit various main audio parameters (see [Figure 2.35](#)).

**Figure 2.35: Main Audio menu**

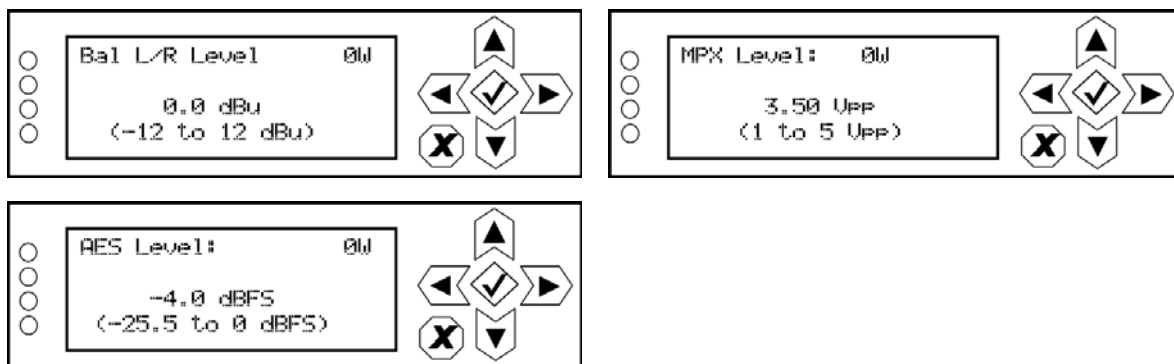
Use the up and down buttons to scroll through the main audio menu options, then press the accept (checkmark) or right arrow button to enter the selected editing screen. [Figure 2.36](#) shows the editing screens for the **Main Audio** menu. Press the cancel (X) button to discard changes and return to the previous menu.

**Figure 2.36: Main Audio editing screens**

- **Source:** Use the up and down buttons to locate the desired audio source - **AES**, **MPX**, **Analog L/R** or **Audio Player**, then press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.
- **Stereo Mode:** Use the up and down buttons to locate the desired stereo mode - **Stereo**, **Right Mono**, **Left Mono** or **L+R Mono** then press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.
- **Preemphasis:** Use the up and down buttons to locate the desired preemphasis characteristic - **0 us**, **25 us**, **50 us** or **75 us**, then press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.
- **Low Pass Filter:** Use the up and down buttons to toggle between **ON** or **OFF**, then press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.
- **Input Levels:** Use the up and down buttons to move the cursor to the desired audio input and then press the right button to enable editing of the parameter. [Figure 2.37 on page 2-44](#) shows all the editing screens for the **Input Levels** sub-menu. Within any of the editing screens, use the up and down buttons to edit a parameter value, noting the minimum and maximum limitations indicated at the bottom of the display. When complete, press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.

- **Audio Player:** Use the up and down buttons to select **File Playlist** or **Stream 1** through **Stream 255**, then press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.

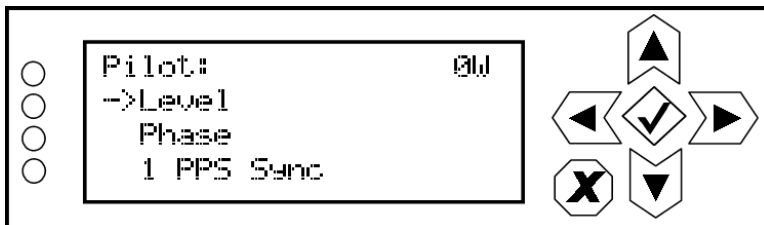
**Figure 2.37: Input Levels editing screens**



- **Bal L/R Level:** Select a level between -12 and 12 dBu.
- **MPX Level:** Select a level between 1 and 5 V peak-to-peak.
- **AES Level:** Select a level between -255 and 0 dBFS.

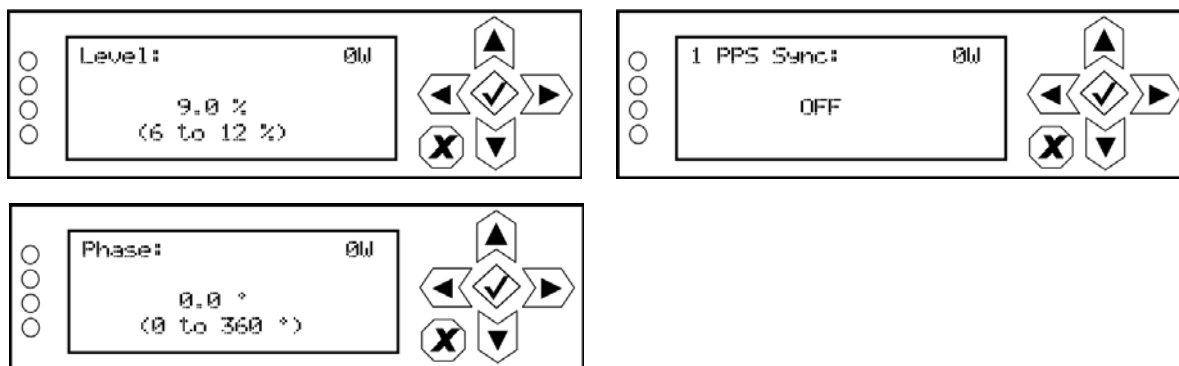
**PILOT SETTINGS.** When you select **Pilot Settings** from the **Preset** editing options screen, you can edit the settings of the pilot signal (see [Figure 2.38](#)).

**Figure 2.38: Pilot Settings menu**



Use the up and down buttons to move the cursor to the desired pilot setting and then press the right button to enable editing of the parameter. [Figure 2.39](#) shows all the editing screens for the **Pilot Settings** menu. Within any of the editing screens, use the up and down buttons to edit or toggle a parameter value, noting the minimum and maximum limitations indicated at the bottom of the display. When complete, press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.

**Figure 2.39: Pilot Settings editing screens**

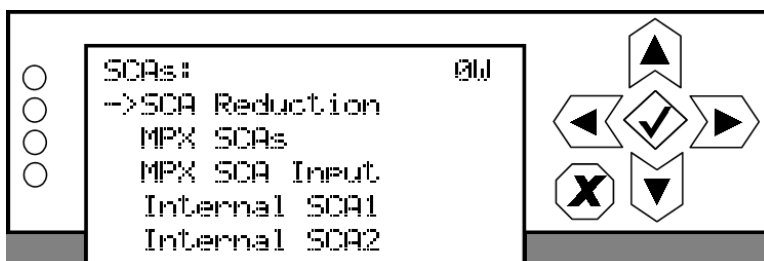


- **Level:** Select a level between 6 and 12%.
- **Phase:** Select a phase angle between 0 and 360 degrees.
- **1 PPS Sync:** Select ON or OFF.



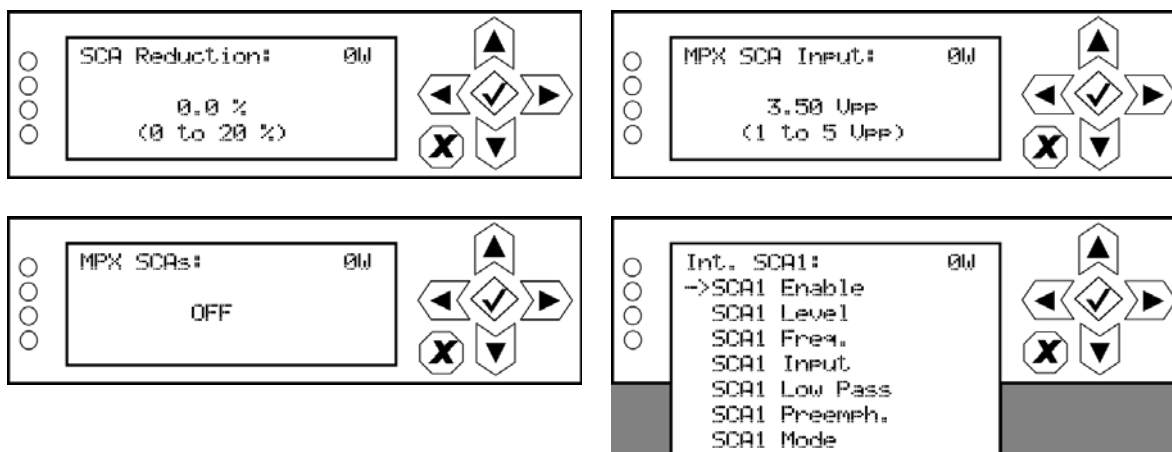
**SCA SETTINGS.** When you select **SCA Settings** from the **Preset** editing options screen, you can edit various SCA parameters (see [Figure 2.40](#)).

**Figure 2.40: SCA Settings menu**



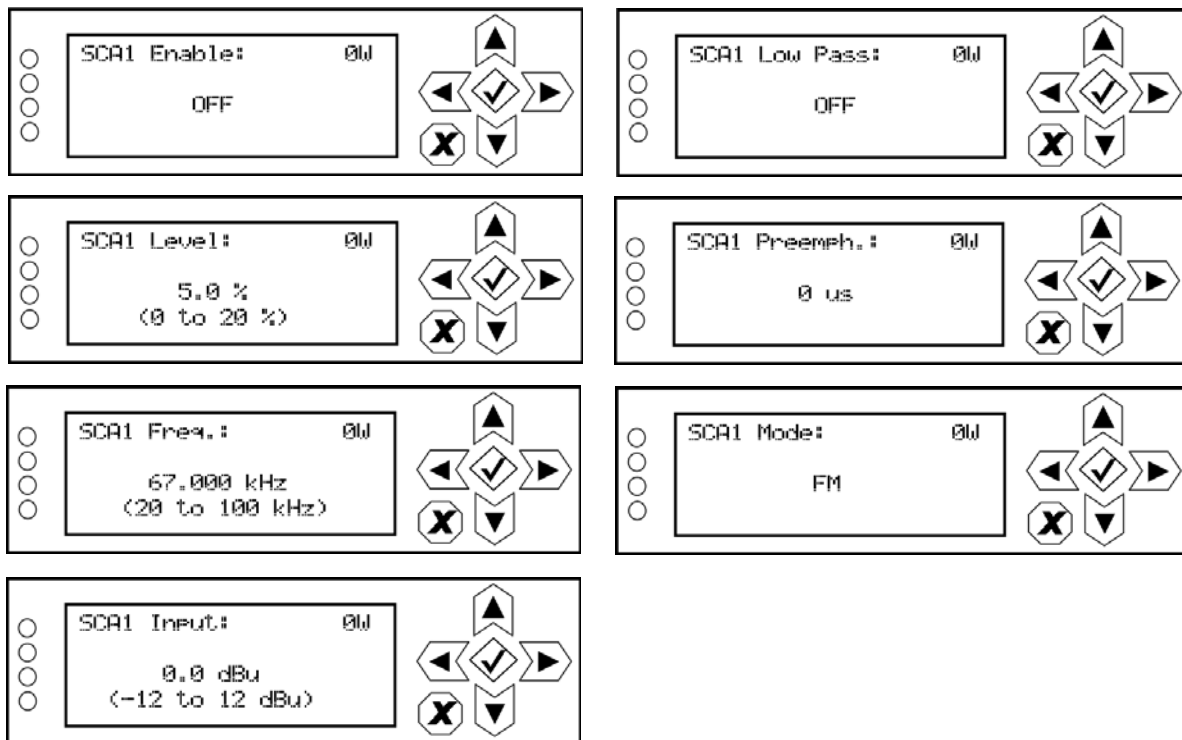
Use the up and down buttons to move the cursor to the desired SCA setting and then press the right button to enable editing of the parameter. [Figure 2.41](#) shows all the editing screens for the **SCA Settings** menu. Within any of the editing screens, use the up and down buttons to edit or toggle a parameter value, noting the minimum and maximum limitations indicated at the bottom of the display. When complete, press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu. If you select Internal SCA1 or Internal SCA2, there is a sub-menu that contains additional SCA settings (see [Figure 2.42 on page 2-47](#)).

**Figure 2.41: SCA Settings editing screens**



- **SCA Reduction:** Select a value between 0 and 20%.
- **MPX SCAs:** Select ON or OFF.
- **MPX SCA Input:** Select a level between 1 and 5 V peak-to-peak (of MPX SCAs is ON).
- Int. SCA1 or Int. SCA2 (see [Figure 2.42 on page 2-47](#)).

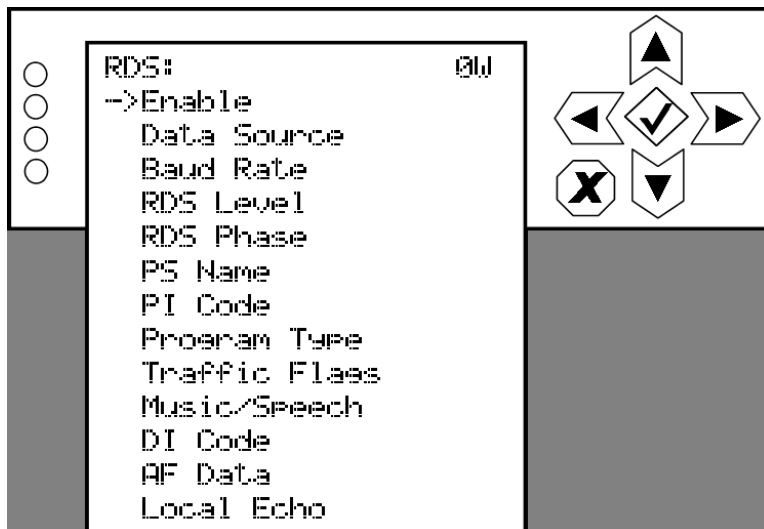
Figure 2.42: Internal SCA1 and SCA2 editing screens



- **SCA Enable:** Select ON or OFF.
- **SCA Level:** Select a level between 0 and 20%.
- **SCA Freq:** Select a frequency between 20 and 100 kHz.
- **SCA Input:** Select a level between -12 and 12 dBu.
- **SCA Low Pass:** Select ON or OFF.
- **SCA Preemph:** Select the desired pre-emphasis characteristic - 0 us, 50 us, 75 us or 150 us.
- **SCA Mode:** Select FM or DSB-SC.

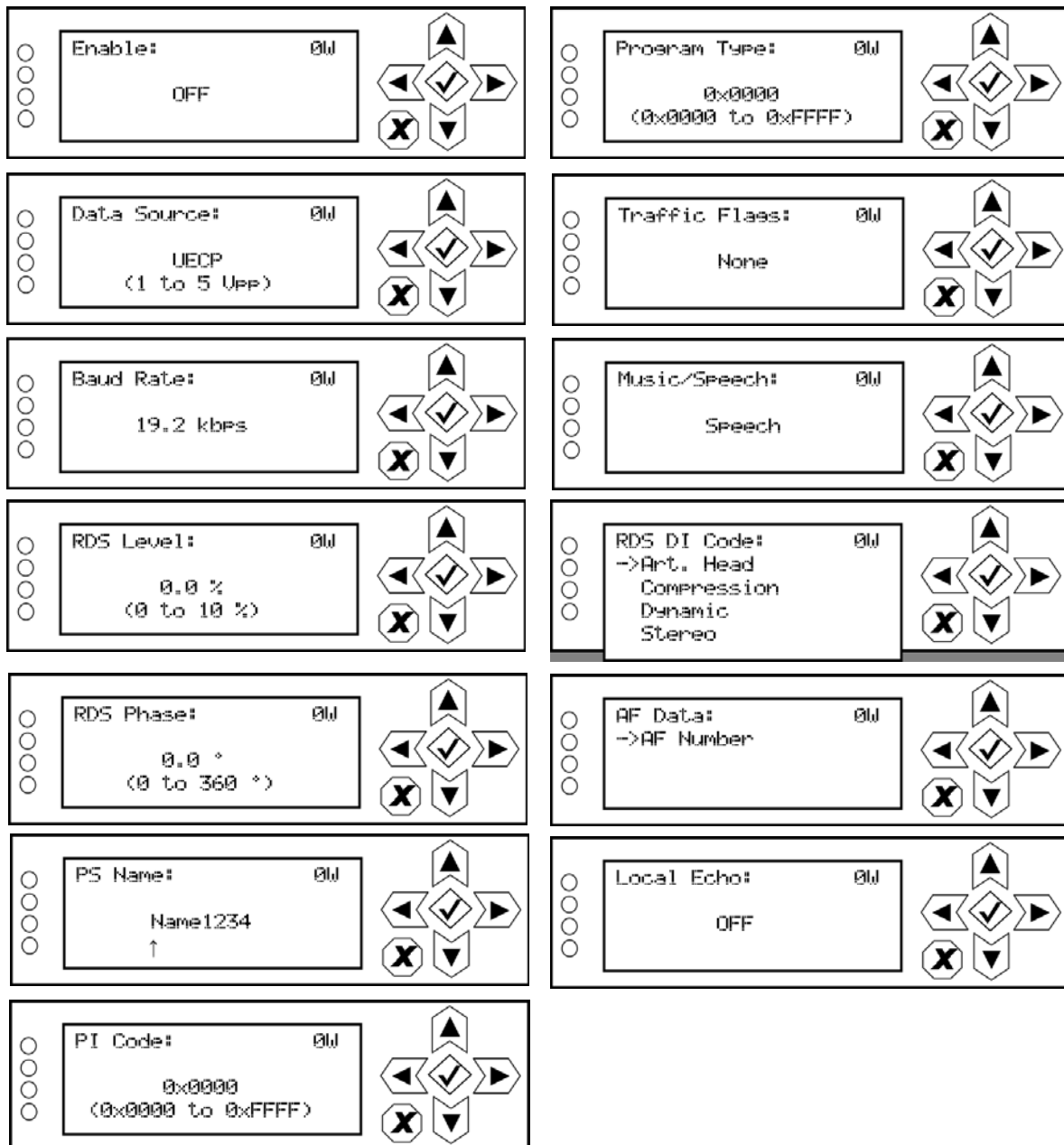
**RDS SETTINGS.** When you select **RDS Settings** from the **Preset** editing options screen, you can edit various RDS parameters (see [Figure 2.43](#)).

**Figure 2.43: RDS Settings menu**



Use the up and down buttons to move the cursor to the desired RDS setting and then press the right button to enable editing of the parameter. [Figure 2.44 on page 2-49](#) shows all the editing screens for the **RDS Settings** menu. Within any of the editing screens, use the arrow buttons to edit or toggle a parameter value, noting the minimum and maximum limitations indicated at the bottom of the display (as applicable). When complete, press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu. If you select **DI Code** (see [Figure 2.45 on page 2-50](#)) or **AF Data** (see [Figure 2.46 on page 2-51](#)), there are associated sub-menus that contain additional setting options .

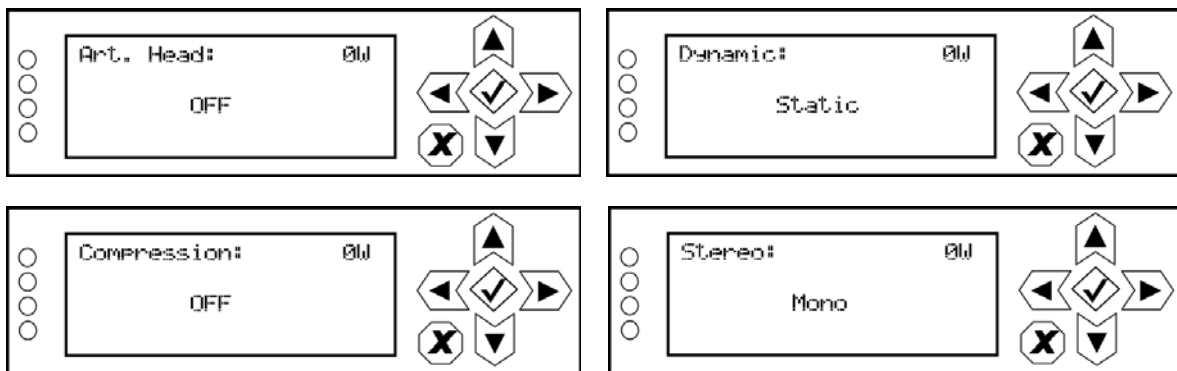
Figure 2.44: RDS Settings editing screens



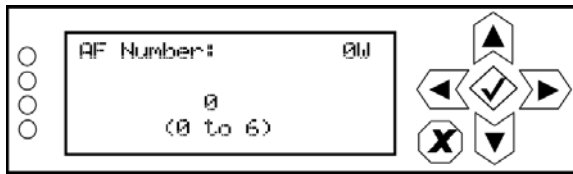
- **Enable:** Select ON or OFF.
- **Data Source:** Select Internal, Ext. ASCII, Ext. UECP, ASCII Over IP, or UECP Over IP.
- **Baud Rate:** Select 150 bps, 300 bps, 600 bps, 1.2 kbps, 2.4 kbps, 4.8 kbps, 9.6 kbps, 19.2 kbps, 38.4 kbps, 57.6 kbps or 115.2 kbps.

- **RDS Level:** Select a value between 0 and 10%.
- **RDS Phase:** Select a value between 0 and 360 degrees.
- **PS Name:** Enter an 8-character name. Use the right and left arrows to move the cursor to the desired character. Use the up and down arrows to edit the character.
- **PI Code:** Enter a hex value between 0x0000 and 0xFFFF.
- **Program Type:** Select the program type from various choices.
- **Traffic Flags:** Select None, TA/TP, TP or TA.
- **Music/Speech:** Select Music or Speech.
- **DI Code:** See [Figure 2.45](#).
- **AF Data:** See [Figure 2.46 on page 2-51](#).
- **Local Echo:** Select ON or OFF.

**Figure 2.45: DI Code editing screens**



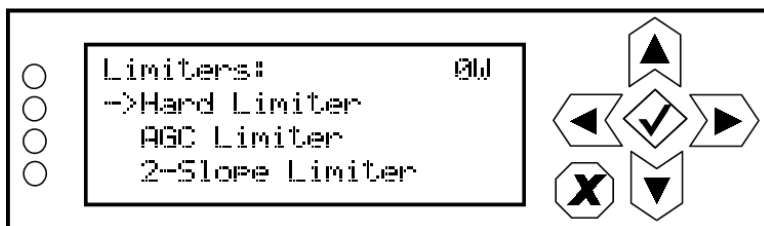
- **Art. (Artificial) Head:** Select ON or OFF.
- **Compression:** Select ON or OFF.
- **Dynamic:** Select Dynamic or Static.
- **Stereo:** Select Stereo or Mono.

**Figure 2.46: AF Data editing screen**

- **AF Number:** Select the number of alternate frequencies (between 0 and 6).

**LIMITER SETTINGS.** When you select **Limiter Settings** from the **Preset** editing options screen, you can edit various limiter parameters (see [Figure 2.47](#)).

**Figure 2.47: Limiter Settings menu**

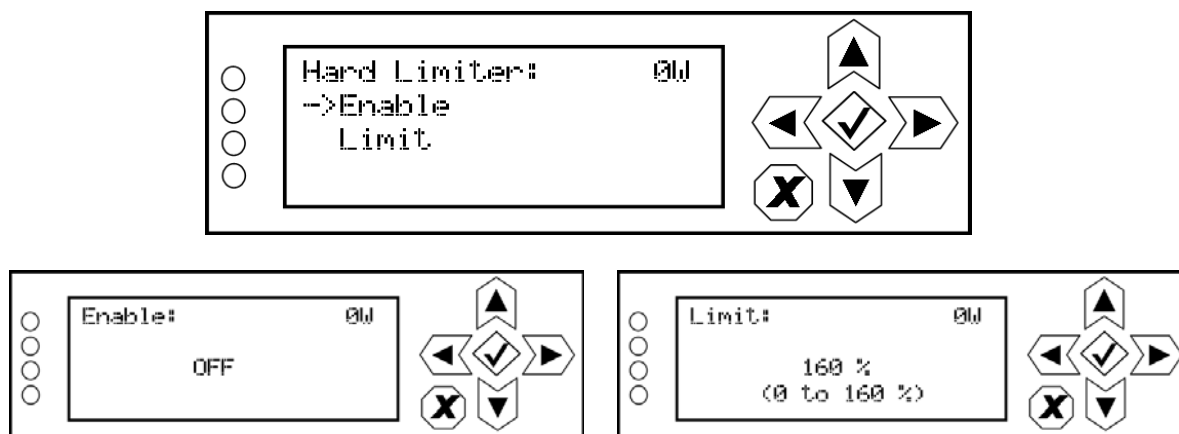


Use the up and down buttons to move the cursor to the desired limiter and then press the right button to enter the associated sub-menu for:

- **Hard Limiter** (see [Figure 2.48](#))
- **AGC Limiter** (see [Figure 2.44 on page 2-49](#))
- **2-Slope Limiter** (see [Figure 2.44 on page 2-49](#)).

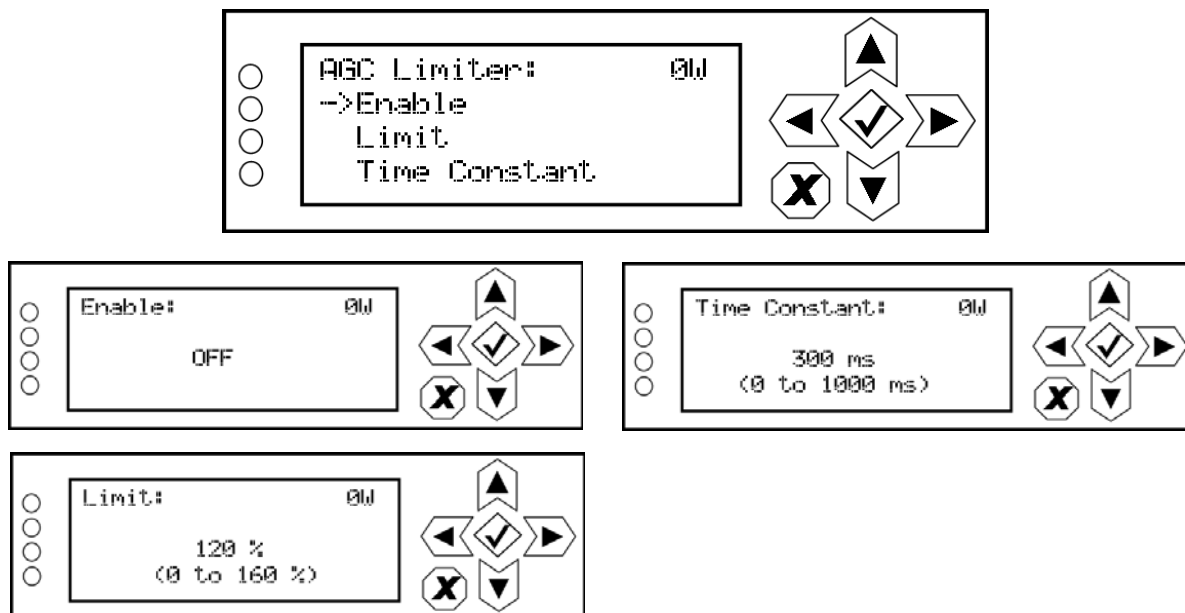
Within a sub-menu, use the up and down buttons to move the cursor to the desired limiter setting and then press the right button to enter the associated editing screen. Within any of the editing screens, use the arrow buttons to edit or toggle a parameter value, noting the minimum and maximum limitations indicated at the bottom of the display (as applicable). When complete, press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.

**Figure 2.48: Hard Limiter sub-menu and editing screens**



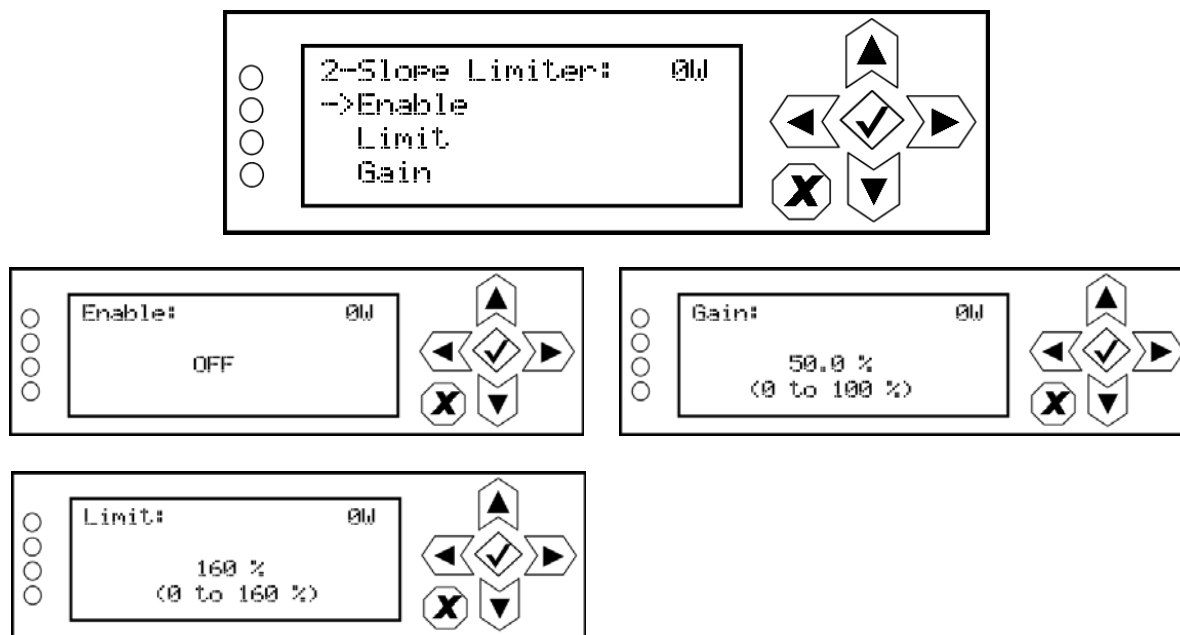
- **Enable:** Select ON or OFF.
- **Limit:** Select a value between 0 and 160%.

**Figure 2.49: AGC Limiter sub-menu and editing screens**



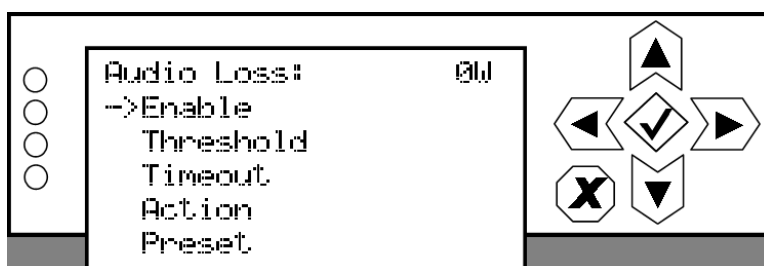
- **Enable:** Select ON or OFF.
- **Limit:** Select a value between 0 and 160%.
- **Time Constant:** Select a value between 0 and 100 ms.



**Figure 2.50: 2-Slope Limiter sub-menu and editing screens**

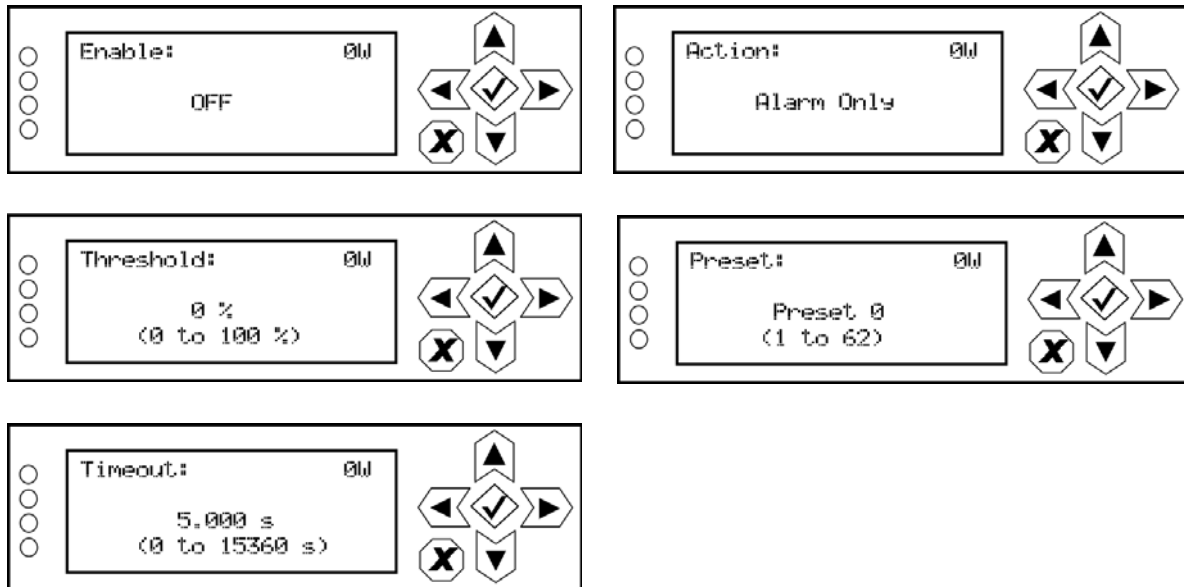
- **Enable:** Select ON or OFF.
- **Limit:** Select a value between 0 and 160%.
- **Gain:** Select a value between 0 and 100 %.

**AUDIO LOSS.** When you select **Audio Loss** from the **Preset** editing options screen, you can edit the parameters related to an audio loss (see [Figure 2.51](#)).

**Figure 2.51: Audio Loss menu**

Use the up and down buttons to move the cursor to the desired audio loss menu item and then press the right button to enable editing of the item. Figure 2.52 shows all the editing screens for the **Audio Loss** menu. Within any of the editing screens, use the up and down buttons to edit a parameter value, noting the minimum and maximum limitations indicated at the bottom of the display (as applicable). When complete, press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.

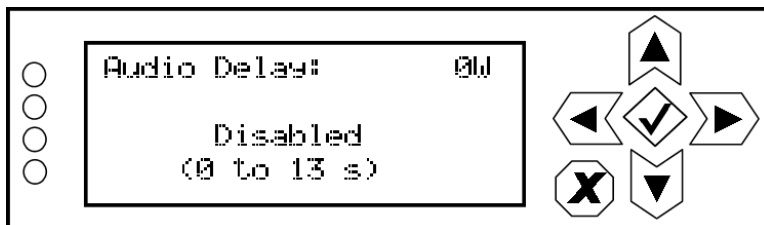
**Figure 2.52: Audio Loss editing screens**



- **Enable:** Determines whether the audio loss feature is used. Select ON or OFF.
- **Threshold:** Sets the audio threshold below which the transmitter will take action. Select a value between 0 and 100%.
- **Timeout:** Sets the time period of low audio (based on the threshold setting) after which the transmitter will take action. Select a value between 0 and 15360 seconds (256 minutes).
- **Action:** Determines the action taken by the transmitter when the audio has been below the threshold for the timeout period. Select Alarm Only, Switch Preset or RF Inhibit.
- **Preset:** Determines the preset that becomes active after an audio loss if the audio loss action is set to Switch Preset.

**AUDIO DELAY.** When you select **Audio Delay** from the **Preset** editing options screen, you can edit or disable the audio delay period (see [Figure 2.53](#)).

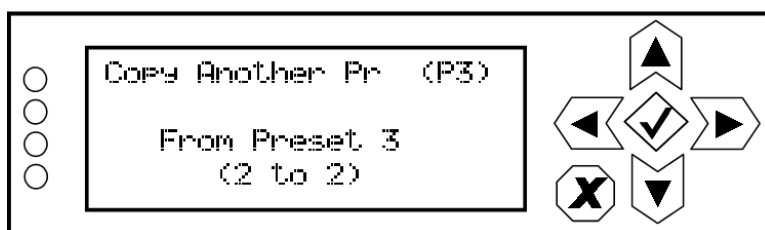
**Figure 2.53: Audio Delay menu**



Use the up and down buttons to change the audio delay setting between disabled and any time period between 0 and 13 seconds, then press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.

**COPY ANOTHER PRESET.** When you select **Copy Another Preset** from the **Preset** editing options screen, you can copy the settings from another preset into the preset that is being edited (see [Figure 2.54](#)). Note the preset being edited is displayed in parentheses [e.g., (P3)].

**Figure 2.54: Copy Another Preset Screen**



Use the up and down buttons to select the preset (see available presets in parentheses on the bottom line of the display) that you wish to copy to the selected preset for editing. Press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.

---

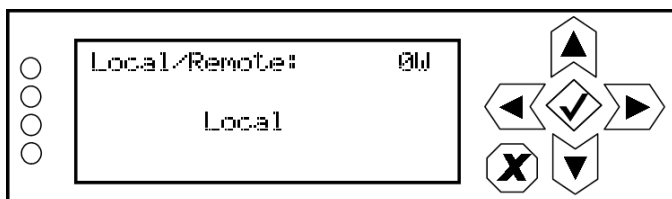
## SETTING LOCAL/REMOTE CONTROL

You can set the transmitter's local/remote control using the remote AUI's **Local/Remote** button (see [“Local/Remote:” on page 2-14](#)) or using the local front panel display (see [“Using the front panel”](#)).

### USING THE FRONT PANEL

When you select **Local/Remote** from the **Main Menu**, you can set the local/remote operating control for the VS300 (see [Figure 2.55 on page 2-57](#)).

**Figure 2.55: Local/Remote Selection Screen**



Use the up and down buttons to toggle between **Local** and **Remote**. Press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.

---

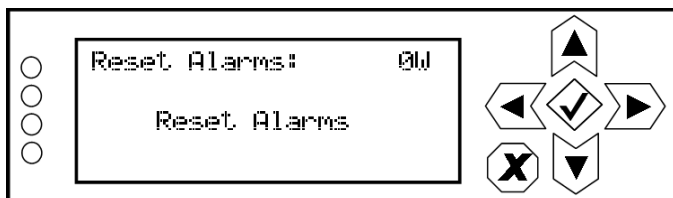
## RESETTING ALARMS

You can attempt to reset any latching transmitter alarms that are holding the transmitter in an “off-air” state using the remote AUI's **Reset** button (see [“Reset:” on page 2-14](#)) or using the local front panel display (see [“Using the front panel”](#)).

### USING THE FRONT PANEL

When you select **Reset Alarms** from the **Main Menu**, you can attempt to reset latched protection circuits in the VS300 (see [Figure 2.56](#)). If the alarm condition has been cleared, the alarm indication on the **View Alarms** screen should disappear.

**Figure 2.56: Reset Alarms Screen**



Use the up and down buttons to toggle between **Reset Alarms** and **Cancel**. Press the accept (checkmark) button to save the change. Press the cancel (X) button to return to the previous menu.

## VIEWING TRANSMITTER STATUS

You can view the VS300's operational status using the AUI's [Transmitter Status page](#) - see [Figure 2.57](#). This page shows current active alarms and status to aid in fault diagnosis. To view the [Transmitter Status page](#), select **Transmitter Status** from the **Menu** options.

**Figure 2.57: Transmitter Status page**

The screenshot shows the 'Transmitter Status' page with the following data:

Device	Alarm	Level
Exciter	+15V Fault	5
Exciter	+5V Fault	1
Exciter	Low Backup Battery	1
Exciter	Analog Left Input Low	5
Exciter	Analog Right Input Low	5

Additional parameters shown include: Power: 0.00 W, Set Point: 20.0 W, Mode: FM, Frequency: 91.5MHz, and Active Exciter: Internal.


Click the **X** to close this page and return to the home page.

The left-hand section of the **Transmitter Status** displays tabs that list all transmitter alarms and meters (as selected). Alarms are listed by their host device (Controller or Exciter), alarm name and severity level [1 = low (RF output not affected), 5 = medium (RF output is reduced), 10 = high (RF output is inhibited)].


Click an item in the **Alarms** or **Meters** tab to display its details on the right-hand section. For the **Alarms** tab, details include a description of the alarm and help text (e.g., troubleshooting tips). For the **Meters** tab, click **Show Meter List** to display a list of selectable meters. Select the desired real-time meters to display on the left-hand side of the screen to assist in troubleshooting. Meter colour coding is identical to that described in [“Viewing real-time meters” on page 2-32](#).

Click the **Reset** button at the bottom of any AUI screen to attempt to clear any latching alarms that are holding the transmitter in an “off-air” state (see [“Reset:” on page 2-14](#)). If the offending alarm has cleared, the transmitter should resume operation.

## SETTING USER ACCOUNTS

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

Depending on user permission rights, you can set up accounts to allow certain users to access and control features of the AUI using the [User Accounts page](#) - see [Figure 2.58](#). To view the **User Accounts** page, select **User Accounts** from the **Menu** options. Click **X** in the upper, right corner to close this page, discard changes and return to the home page.

 *Note:*  
 Depending on the permission level assigned to a given user, some features shown in [Figure 2.58](#) may not be displayed or available.

The VS300 contains a default user account when it leaves the factory. This account appears as *Nautel (Auto)* in the List of Users and has Super User permission level. The default Username is “Nautel”. The default Password is blank. It is recommended that this account be deleted once the desired user account(s) is (are) created (see “[First-time login](#)” on page 2-61).

**Figure 2.58: User Accounts page**



## SETTING USER ROLE

There are three levels of role that can be assigned to users, each with their own specific functionality. All users have permission to change their own username and password, but are otherwise limited to the following functions:

- **Read Only:** Can monitor equipment data only. No administrative or control functions.
- **Read/Write:** Can monitor and control equipment. No administrative functions.
- **Super User:** Can perform all functions. Super User is the only permission level that allows addition, removal or modification of users.

## EDITING ACCOUNT INFORMATION

If you have Super User permission level, you can edit any user account.

**EDITING AN EXISTING ACCOUNT.** To edit an existing user account, click on the desired user in the List of Users on the left side of the User Accounts panel. The Settings for that user will be displayed on the right-hand side of the User Accounts panel. You can edit the Username, Password, User Role (see “[Setting user role](#)”) and Permissions.

**CHANGING THE PASSWORD.** To change your password, click **Change Password**. A menu appears that prompts you to enter the old password, 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.

**CHANGING PERMISSIONS.** To change permissions to specific functions, click **Change Permissions**. A menu appears that contains five selectable items - Presets, Hardware Configuration, Software Configuration, Remote I/O and Clear Log. Check the items for which you are allowing edit permission. Click the **OK** button to accept changes or the **Cancel** button to discard changes and exit this menu.

**ADDING AN ACCOUNT.** To add a new user account, click **Add New User**. Enter the username, click the **OK** button to accept, then set the account information in the Settings section. Click the **Cancel** button or **X** to discard changes and exit this menu.

**REMOVING AN ACCOUNT.** To remove a user account, select the desired user from the List of Users and click the **Remove User** button. A verification prompt will appear. Click the **OK** button to accept changes or the **Cancel** button to discard changes and exit this menu.

To save your changes, click **Apply**.

## FIRST-TIME LOGIN

When you enter the **User Accounts** page for the first time, it is recommended you create an account and then delete the default Nautel account, as follows:

1. Login to the AUI using the default Username (“Nautel”) and Password (blank).
2. Set up your own Super User account, with your desired Username and Password.
3. Logout of the AUI, then login to your new Super User account.
4. Delete the Nautel (Auto) account.



## SOFTWARE CONFIGURATION



*Note:*

*Unless otherwise noted, the following functions are only available via remote connection to the AUI.*

You can perform software upgrades to the AUI or transmitter, or perform various restarts or resets using the [Software Configuration page](#) - see [Figure 2.59](#). To view the [Software Configuration page](#), select **Software Configuration** from the **Menu** options. Click **X** in the upper, right corner to close this page and return to the home page. The following options are available:

**Figure 2.59: Software Configuration page**

- **Network Setup:** The AUI allows viewing of network parameters. Configuration of these parameters is done locally, using the front panel UI (see [“Network setup” on page 2-64](#)).
- **Upgrade Software:** Allows for uploading software upgrade files for various transmitter sub-systems (e.g., Controller, Exciter, etc.) (see [“Upgrading software” on page 2-68](#)).

- **Email Configuration:** Allows configuration of email parameters (e.g., server name, port number, etc.) (see [“Email configuration”](#) on page 2-69).
- **Notifications:** Allows configuration of email notifications to be sent for user-selected alarm occurrences (see [“Notifications”](#) on page 2-70).
- **Upload Files:** Allows uploading of audio files and software upgrade files (see [“Upload files”](#) on page 2-72).
- **Audio Player:** Allows configuration of an audio player to play audio files, Shoutcast audio streams or Livewire audio streams (see [“Audio player”](#) on page 2-73).

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## NETWORK SETUP

Network settings are configured using the local front panel display (see [“Using the front panel”](#)). Once you have established an IP address, you can login remotely and view (but not change) these settings using the remote AUI (see [“Using the AUI”](#)).

### DETERMINING DHCP SETTING

One of the main decisions in configuring the network connection on your VS300 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.

When DHCP is set to **ON** (default from factory), IP addresses are assigned automatically. 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 front panel. In this case, DHCP should be set to **OFF**.

### USING THE FRONT PANEL

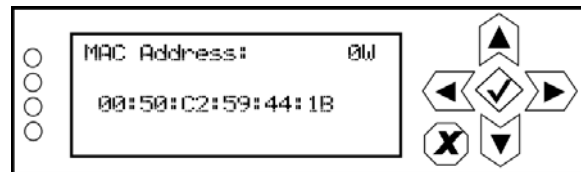
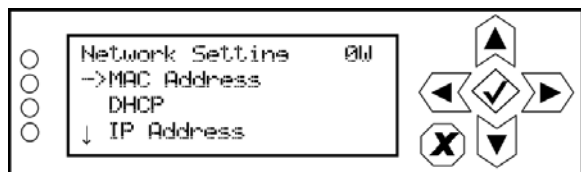
From the front panel, in local mode, you can set or change network settings. To view the **Network Settings** screen, select **User Settings -> Network Settings** from the **Main Menu**. See [Figure 2.60 on page 2-65](#). Configure the network as follows:

Use the up and down buttons to move the cursor to the desired parameter and then press the right button to enable editing of the setting. Within any of the editing screens, use the left and right buttons to select a character for editing and then use the up and down buttons to edit a setting. Press the accept (checkmark) button to save the change. Press the cancel (X) button to discard changes and return to the previous menu.

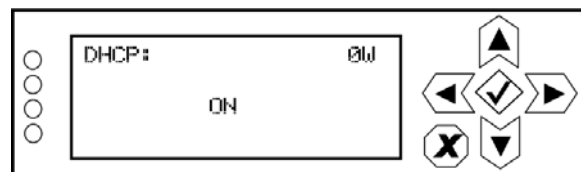
- **MAC Address:** Set during factory testing; cannot be modified.
- Set DHCP to **ON** or **OFF** (see [“Determining DHCP setting”](#)).
- If DHCP was set to **OFF** enter the **IP Address, Netmask, Gateway, Nameserver 1** and **Nameserver 2** (gateway and nameservers are optional). A nameserver (also called a DNS) translates a host name (e.g., mail.nautel.com) to an IP address such as in configuring email (see [“Email configuration” on page 2-69](#)).

If you are using a laptop to connect to the VS300, see [“Connecting a laptop directly to the transmitter” on page 2-66](#).

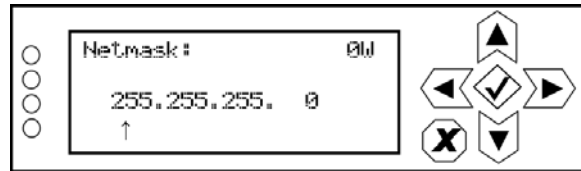
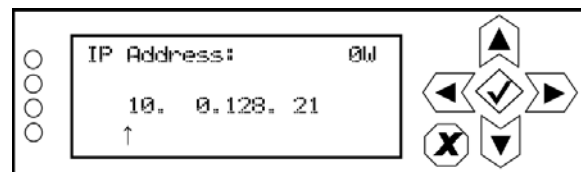
**Figure 2.60: Network Settings screen**



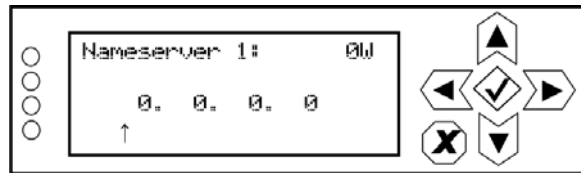
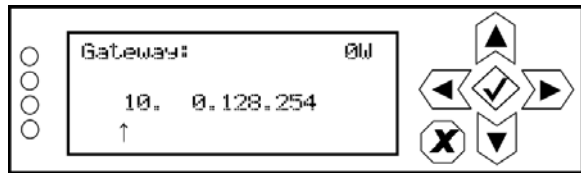
Set during factory testing; cannot be modified



Set to ON if your network has a DHCP server. Automatically assigns IP, netmask, gateway and nameservers. Set to OFF if you do not have a DHCP server or if you wish to assign static addresses.



Typical netmask address shown. Consult with your network administrator.



Specify a nameserver (or DNS) to enable the use of host names. If no nameserver is entered, only direct IP addresses can be used to configure the email server and any live streams such as Livewire or Shoutcast.

**All addresses shown are for reference purposes only**

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### CONNECTING A LAPTOP DIRECTLY TO THE TRANSMITTER

If connecting to the VS300 directly with a laptop, you must set a static IP address on the VS300 and your laptop.

1. From the front panel UI's **Main Menu**, go to **User Settings/Network Settings** and set the IP address as follows:
  - DHCP: OFF
  - IP Address: 10.10.10.2
  - Netmask: 255.255.255.0
2. Set the transmitter for **Remote** control.



*Note:*

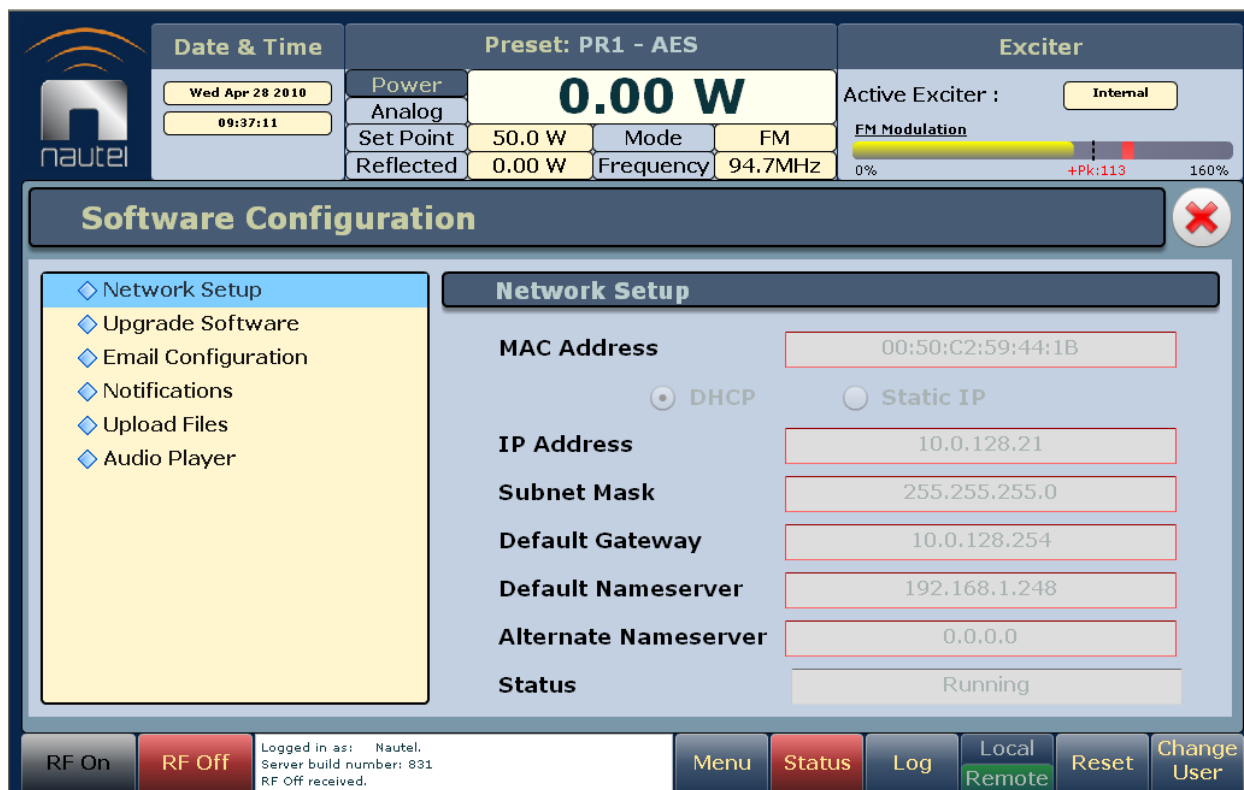
*The following steps assume the operating system is Windows XP. Adapt as required for computers with different operating systems.*

3. On the laptop, go to **Start Menu/Control Panel/Network Connections/Local Area Network**.
4. In the Local Area Network Status, open the **General** tab and choose **Properties**. Scroll down and highlight **Internet Protocol (TCP/IP)**. Choose **Properties**.
5. In the *Internet Protocol (TCP/IP) Properties* window, select **Use the following IP address**.
6. Enter the following settings:
  - IP Address: 10.10.10.1
  - Subnet Mask: 255.255.255.0
  - Default Gateway: 192.168.1.2
7. In the *Internet Protocol (TCP/IP) Properties* window, select **OK**.
8. In the *Local Area Connection Properties* window, select **OK**.
9. In the *Local Area Connection Status* window, select **Close**.
10. Close the *Network Connections* window.

**USING THE AUI**

By entering the VS300’s established IP address into an Internet browser’s address bar, and then logging into the AUI, you can view the network parameters configured through the front panel UI using the [Network Setup page](#) - see [Figure 2.61](#). You cannot modify parameters from this page.

**Figure 2.61: Network Setup page**



**All addresses shown are for reference purposes only**

## UPGRADING SOFTWARE

See [Figure 2.62](#).

**Figure 2.62: Upgrade Software page**

To upgrade a transmitter subsystem's software, see “[Upgrading software](#)” in Section 4, “[Non-standard maintenance](#)” on page 4-1 of this manual.



**CAUTION:**

If you are upgrading from a software version prior to V1.2, the ARM Watchdog feature must be DISABLED during the software upgrade process. Failure to observe this may result in a non-operational transmitter that will require a full operating system recovery. Refer to “[Configuring ARM watchdog](#)” on page 2-78 for details on disabling the ARM watchdog feature.

## EMAIL CONFIGURATION

Email configuration (see [Figure 2.63](#)) is required if the notification feature is used (see “Notifications” on page 2-70).

**Figure 2.63: Email Configuration page**

To configure the email feature, perform the following steps:

1. Enter the four fields, noting the following:
  - **Server Name:** In order to enter a server name (e.g., mail.nautel.com), at least one nameserver IP address must be entered (see “Network setup” on page 2-64).
  - **Port Number:** Enter the addressing information used to identify the senders and receivers of messages. Typically set to 25 for SMTP systems.
  - **Client Name:** Set to a name that associates to the transmitter such as station identification (e.g., NV40\_WXYZ). This name will be included in notification emails.
  - **Sender Name:** Enter as a standard email address (e.g., xxxxxxxx@yyyyy.zzz).
2. When complete click **Apply** or click **Undo** to restore the previous setting. Use the **Test** button to enter an email address to test your settings. Click the **OK** button to run the test or the **Cancel** button to return to the **Email Configuration** page.



## NOTIFICATIONS

The notifications feature (see [Figure 2.64](#)) provides a means for the transmitter to issue emails triggered by user defined alarm events.

**Figure 2.64: Notifications page**

The screenshot displays the Nautel VS300 transmitter web interface. At the top, there is a navigation bar with three main sections: **Date & Time** (showing Wed Apr 28 2010 and 09:45:36), **Preset: PR1 - AES**, and **Exciter** (set to Internal). Below the navigation bar is a table of transmitter parameters:

Power	<b>0.00 W</b>		
Analog		Mode	FM
Set Point	50.0 W	Frequency	94.7MHz
Reflected	0.00 W		

To the right of the table is an **Exciter** section with an **Active Exciter :** dropdown set to **Internal** and an **FM Modulation** progress bar ranging from 0% to 160%, currently showing a red bar at approximately 111% (+Pk:111).

Below the parameter table is a **Software Configuration** section with a sidebar menu containing: Network Setup, Upgrade Software, Email Configuration, **Notifications** (highlighted), Upload Files, and Audio Player. The main content area of this section is titled **Notifications** and contains a list with one entry: **AES LOW**. Below the list are three buttons: **Add**, **Update**, and **Delete**.

At the bottom of the interface is a status bar with **RF On** and **RF Off** buttons, login information (Logged in as: Nautel, Server build number: 831, RF Off received.), and a row of control buttons: **Menu**, **Status**, **Log**, **Local Remote**, **Reset**, and **Change User**.

To configure the notifications feature, perform the following steps:

1. Pre-existing notifications are displayed in the Notifications list. Click **Add** to create a new item for notification, click **Update** (after highlighting an existing item) to edit an existing item or click **Delete** to erase an item.
2. When you click **Add** or **Update**, the screen in [Figure 2.65](#) will appear. This screen allows you to add or edit a **Notification Name**, **Recipient Email**, and define the alarm list by device type (Exciter or Controller). 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.
3. When complete click the **OK** button to accept changes or the **Cancel** button to discard changes and return to the **Notifications** page.

Figure 2.65: Notifications adding/updating page

**Notifications**

**Notification Name** Power Supply Fault

**Recipient Email** vs@nautel.com

**Device Type** Controller

**Available Alarms**

- All Power Amplifiers Inactive
- ARM Network Down
- Cutback Active
- Discharging PA Volts
- External Interlock Open
- Fan 1 Fail
- Fan 2 Fail
- Fan 3 Fail

**Selected Alarms**

- +1.2V Supply Fail
- +1.8V Supply Fail
- +15V Supply Fail
- +3.3V Supply Fail
- +48V Supply Fail
- +5V Supply Fail
- 15V Supply Fail

OK Cancel

## UPLOAD FILES


See [Figure 2.66](#).

**Figure 2.66: Upload Files page**

Using the **Audio Files** tab, you can upload audio files with either **.mp3** or **.wav** extensions.

Audio files are stored on a USB drive plugged into the **USB-A (A1J8B)** or **USB-B (A1J8C)** connector on the rear of the transmitter. The USB drive must be formatted with a FAT32 file system.

Use the **Browse** button to locate a file and then click **Upload** to upload the file. To remove a file from the USB drive, select a file from the list and click **Delete**. Before removing a USB drive from the rear of the transmitter, click the **Unmount** button.



**CAUTION:**  
Failure to click the Unmount button before removing a mounted USB drive may result in lost or corrupt files.

Using the **Upgrade Files** tab, you can upload Nautel supplied software upgrade files that contain a **.tgz** extension. Use the **Browse** button to locate a file and then click **Upload** to upload the file. To remove a file, select a file from the list and click **Delete**.

## AUDIO PLAYER

The built-in audio player (see [Figure 2.67](#)) can use a file playlist, Livewire or Shoutcast as an audio source. These sources must be configured before they can be used. This section describes how to configure audio player sources. The **Audio Player** page has three selectable tabs:

- [Playlist](#)
- [Files](#) - see page 2-74
- [Streams](#) - see page 2-75

**Figure 2.67: Audio Player page - Playlist tab**

The screenshot displays the Nautel Audio Player web interface. At the top, there's a status bar with the following information:

- Date & Time:** Wed Apr 28 2010 09:50:29
- Preset:** PR1 - AES
- Power:** 0.00 W
- Exciter:** Internal
- Active Exciter:** Internal
- FM Modulation:** 0% to 160% (with a red bar indicating +Pk:119)

Below the status bar is a **Software Configuration** section with a sidebar menu containing:

- Network Setup
- Upgrade Software
- Email Configuration
- Notifications
- Upload Files
- Audio Player** (selected)

The main content area is titled **Audio Player** and has three tabs: **Playlist**, **Files**, and **Streams**. The **Playlist** tab is active, showing a table with the following data:

Sequence	Name
1	/mnt/usb/Collective_Soul_-_The_World_I_Know.mp3
2	/mnt/usb/Jumper.wav

Control buttons for the playlist items are **Remove**, **Move Up**, and **Move Down**. A **Save** button is located at the bottom of the playlist area.

At the bottom of the interface, there's a footer bar with the following elements:

- RF On** / **RF Off** (currently Off)
- Logged in as: Nautel. Server build number: 831. RF Off received.
- Menu** / **Status** / **Log** / **Local Remote** / **Reset** / **Change User**

### PLAYLIST

The **Playlist** tab (see [Figure 2.67](#)) displays the audio files and sequence that currently make up the playlist. Only audio files that are supported (e.g., .wav or .mp3 files) will be played. Also, you must activate a preset that has **Playlist** selected in the **Main Audio** -> **Secondary Digital** -> **Secondary Source** in the Presets menu.

Use the **Move Up** and **Move Down** buttons on the right-hand side of the display to change the playlist sequence.

Use the **Remove** button to delete audio files from the playlist.

Use the **Save** button to save the new configuration whenever a change is made to the file playlist. If the playlist is currently playing, changes will not take effect until the playlist is started again.

**Figure 2.68: Audio Player page - Files tab**

## FILES

The **Files** tab (see [Figure 2.68](#)) is used for adding audio files to the playlist. Audio files must be stored on a USB device plugged into the **USB-A (A1J8B)** or **USB-B (A1J8C)** connector on the rear of the transmitter; they are not stored in the transmitter. Only the audio files stored in the root directory of the most recently connected USB device appear on the playlist. The list will be empty if no USB device is connected.

Click the **Refresh** button to force an update of the playlist.

The audio player supports only one USB device at a time. If multiple USB devices are connected, only the most recently connected USB is recognized as the active USB drive. If multiple USB devices are connected and one is removed, both devices are unmounted.

To add an audio file to the playlist, select the file(s) from the list and click the **Add to Playlist** button.

Figure 2.69: Audio Player page - Streams tab

**Date & Time**  
Wed Apr 28 2010  
09:53:34

**Preset: PR1 - AES**

**Exciter**  
Active Exciter : Internal  
FM Modulation: 0% to 160% (+Pk:110)

**Power**  
0.00 W

**Set Point** 50.0 W    **Mode** FM  
**Reflected** 0.00 W    **Frequency** 94.7MHz

**Software Configuration**

- Network Setup
- Upgrade Software
- Email Configuration
- Notifications
- Upload Files
- Audio Player**

**Audio Player**

Playlist    Files    **Streams**

ID	Name	Type	Details
1	Nautel Shoutcast	Shoutcast	10.0.128.1:8080
19	Radio Nigel	Shoutcast	http://yp.shoutcast.co
20	Big R Radio	Shoutcast	http://classic.shoutcas
51	nine	Livewire	Channel 9
52	two	Livewire	Channel 2

Buttons: Add... Delete

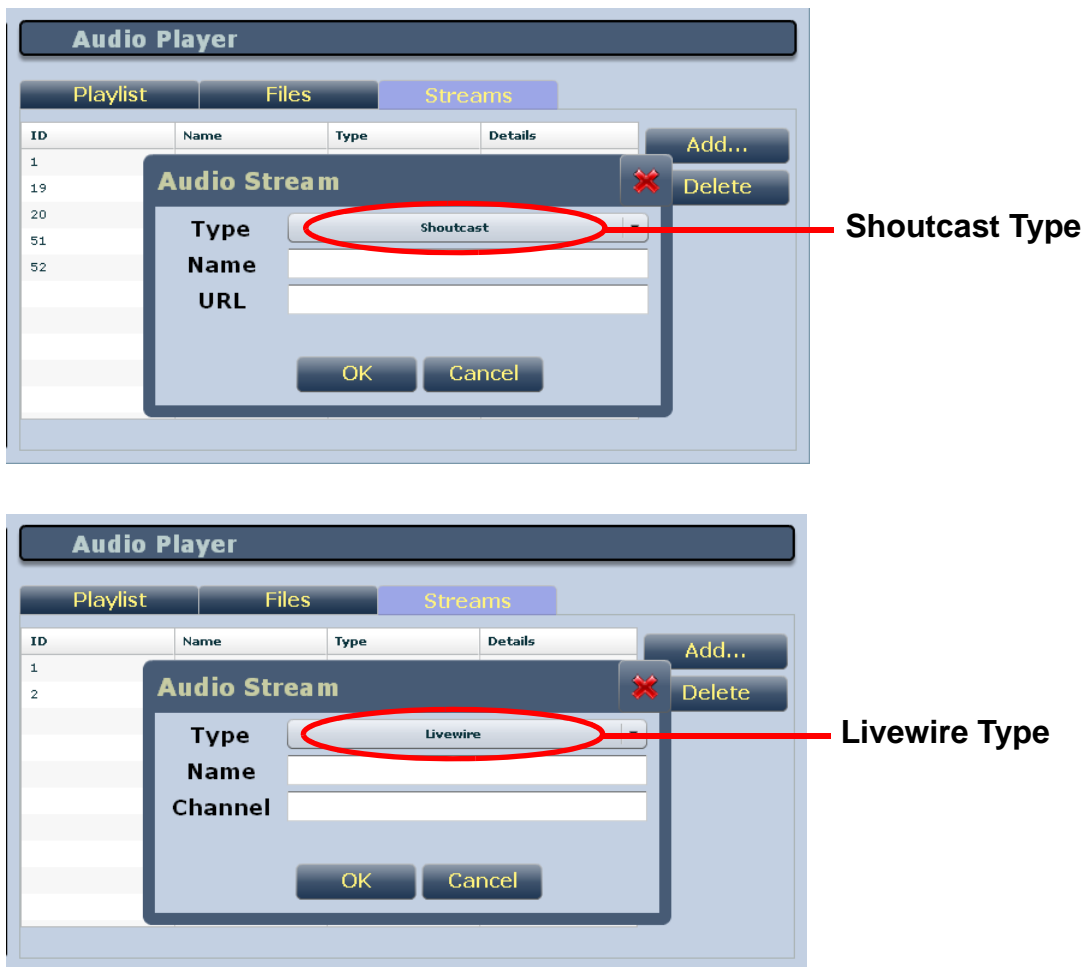
Bottom Bar: RF On RF Off Logged in as: Nautel. Server build number: 831. RF Off received. Menu Status Log Local Remote Reset Change User

## STREAMS

The VS300 is capable of playing audio streams in either Shoutcast or Livewire format.

The audio player supports Shoutcast playlists and IP addresses for audio streams. For a Shoutcast playlist enter the URL for the station. For an audio stream, enter the IP address followed by a colon, then the port for that stream (e.g., 10.10.10.1:8080).

For Livewire, enter the channel that contains the desired audio.

**Figure 2.70: Adding Audio Streams**

**ADDING AN AUDIO STREAM.** Add a new audio stream as follows:

1. From the **Streams** tab (see [Figure 2.69 on page 2-75](#)), click the **Add...** button.
2. Use the drop-down menu to select the desired **Type** of audio stream - **Shoutcast** or **Livewire** (see [Figure 2.70](#)).
3. Enter the appropriate information for the audio server (Name and URL for Shoutcast; Name and Channel for Livewire). Make sure the VS300 can access the location.
4. Click **OK** to add the audio stream or click **Cancel** to discard changes.

---

## CHANGING HARDWARE SETTINGS



**WARNING: HARDWARE SETTINGS ARE ESTABLISHED AT THE FACTORY AND SHOULD NOT REQUIRE ANY ADJUSTMENT. MAKING CHANGES TO THESE SETTINGS MAY VOID YOUR WARRANTY. CONTACT NAUTEL BEFORE MAKING CHANGES.**

You can establish calibration values and fault thresholds for critical parameters of the VS300 using the remote AUI or using the local front panel display. The following options are available:

- [Configuring ARM watchdog - see page 2-78](#)
- [Calibrating exciter TCXO - see page 2-79](#)
- [Calibrating audio inputs - see page 2-81](#)
- [Configuring RF drive source - see page 2-83](#)
- [ARM reset - see page 2-84](#)
- [OS recovery - see page 2-84](#)



*Note:*

*Changing threshold values in the System Settings -> Thresholds menu and changing the console selection in the System Settings -> Console Select menu is not normally required, and should only be performed by trained personnel. Information on these sub-menus is not included in the manual. Contact Nautel for assistance.*



## CONFIGURING ARM WATCHDOG

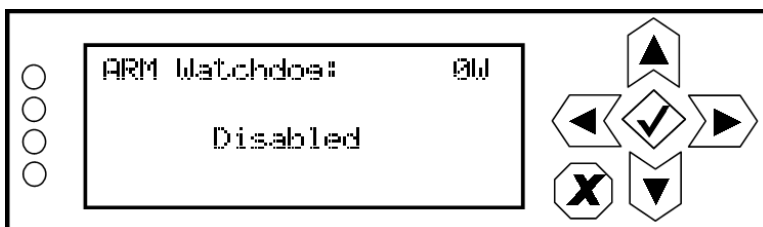


*Note:*

*ARM watchdog configuration is only available using the front panel display.*

From the front panel UI, you can enable or disable the ARM watchdog feature. This feature, when enabled, monitors communication between the ARM processor and the DSP processor on the exciter/control PWB. If communication is lost for more than 30 seconds, the transmitter will initiate an alarm and reboot the ARM. To view the **ARM Watchdog** screen, select **System Settings -> ARM Watchdog** from the **Main Menu** (see [Figure 2.71](#)).

**Figure 2.71: ARM Watchdog Screen**



Use the up and down buttons to toggle between **Enabled** and **Disabled**. Press the accept (checkmark) button to save the change. Press cancel (X) to discard changes and return to the previous menu.

## CALIBRATING EXCITER TCXO

You can calibrate the internal clock reference to an external 10 MHz clock using the remote AUI (see “Using the AUI”) or using the local front panel display (see “Using the front panel” on page 2-80).



**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 VS300.*

### USING THE AUI

To view the AUI’s Exciter TCXO screen (see Figure 2.72), select Hardware Configuration from the Menu options.

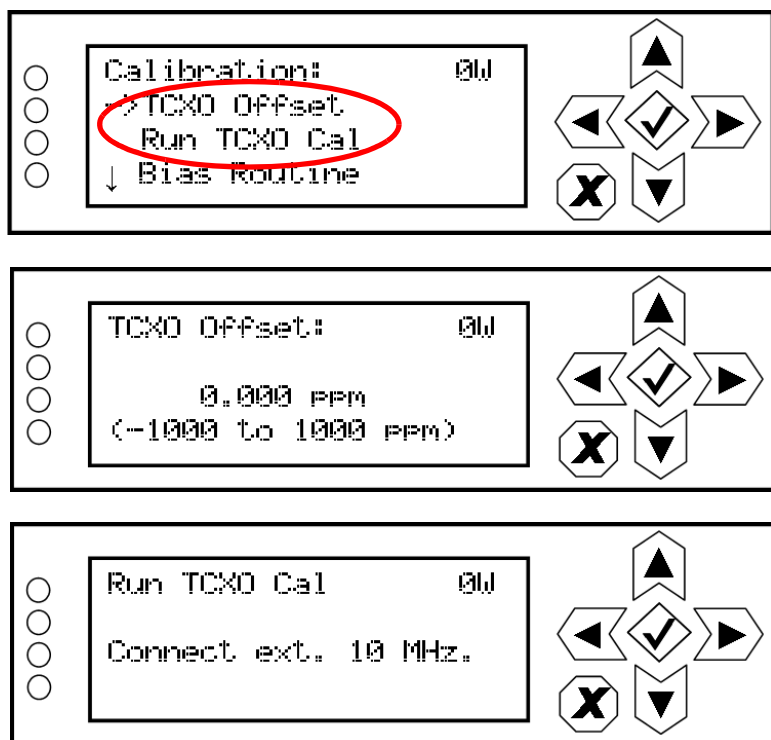
**Figure 2.72: AUI - Exciter TCXO calibration page**

To automatically calibrate the internal reference, click the **Start** button. The progress bar at the bottom of the page will indicate that the calibration is in progress or complete. The **TCXO Calibration Value** will appear when calibration is complete. Alternatively, if the required calibration value is known, you can enter it in the **TCXO Calibration Value** field and click the **Set** button.

### USING THE FRONT PANEL

To view the front panel's TCXO calibration screens (see [Figure 2.73](#)), select **System Settings -> Calibration** from the Main Menu.

**Figure 2.73: Front Panel - TCXO calibration screens**



Use the up or down arrow to place the cursor next to TCXO Offset, then press the accept (checkmark) button to enter the **TCXO Offset** screen. Use the up and down arrows to set the TCXO offset value (in ppm) for the external 10 MHz source. When complete, press the accept (checkmark) button to save the change. Press cancel (X) to discard changes and return to the previous menu.

From the calibration menu, press the down arrow to place the cursor next to Run TCXO Cal, then press the accept (checkmark) button to enter the **Run TCXO Cal** screen. The calibration routine will begin when the external 10 MHz source is connected.

## CALIBRATING AUDIO INPUTS

You can calibrate analog and MPX (composite) audio inputs using the remote AUI (see “Using the AUI”) or using the local front panel display (see “Using the front panel” on page 2-82).

### USING THE AUI

To view the AUI’s Audio Input Calibration screen (see Figure 2.74), select **Hardware Configuration** from the **Menu** options. The peak meter value of each applied audio input (analog left, analog right, MPX or MPX SCA) will be displayed. Enter the calibration value and click **Set** to save changes.

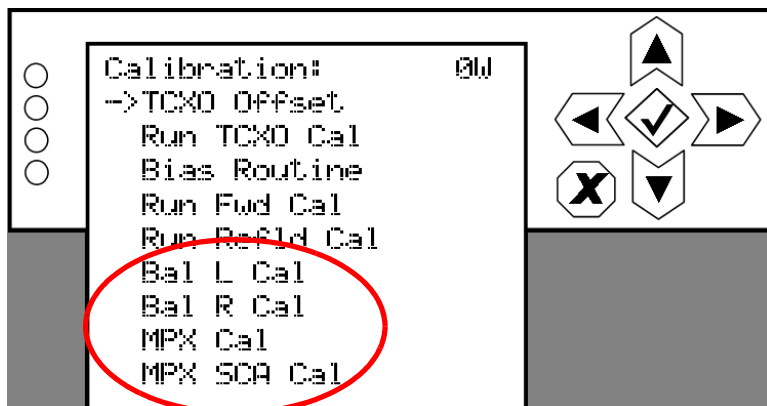
**Figure 2.74: Audio Input Calibration screen**

Parameter	Value	Cal Value	Action
Analog Left Peak	-81.4 dBu	0.00 dBu	Set
Analog Right Peak	-78.3 dBu	0.00 dBu	Set
MPX Peak	0.00 Vpp	0.00 Vpp	Set
MPX SCA Peak	0.00 Vpp	0.00 Vpp	Set

### USING THE FRONT PANEL

To view the front panel's audio input calibration screens (see [Figure 2.75](#)), select **System Settings -> Calibration** from the Main Menu.

**Figure 2.75: Front Panel - Audio Input calibration screens**



Use the up or down arrow to place the cursor next to the desired audio input calibration item (**Bal L Cal**, **Bal R Cal**, **MPX Cal** or **MPX SCA Cal**), then press the accept (checkmark) button to enter the selected audio input. Use the up and down arrows to set the new calibration value for the selected audio input. When complete, press the accept (checkmark) button to save the change. Press cancel (X) to discard changes and return to the previous menu.

**Note:**  
*Forward power (Run Fwd Cal) and reflected power (Run Refld Cal) calibrations are performed at the factory and should not require user adjustment. Contact Nautel for assistance, if necessary.*

## CONFIGURING RF DRIVE SOURCE

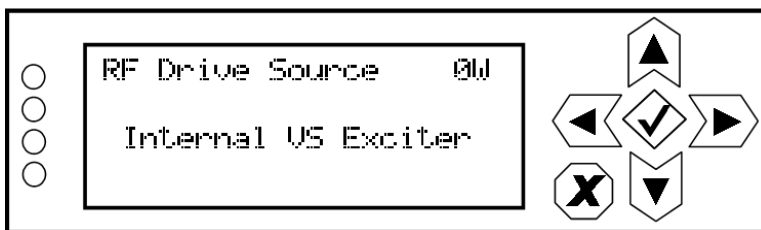


*Note:*

*Configuration of the RF drive source is only available using the front panel display.*

From the front panel UI, you can configure the source of the transmitter's RF drive (internal or external). To view the **RF Drive Source** screen, select **System Settings** -> **RF Drive Source** from the **Main Menu** (see [Figure 2.76](#)).

**Figure 2.76: RF Drive Source Menu**



Use the up and down buttons to toggle between **Internal VS Exciter** and **External Exciter**. Press the accept (checkmark) button to save the change. Press cancel (X) to discard changes and return to the previous menu. If you select **External Exciter**, proceed to [“Connecting an external analog exciter”](#) for connection details.

### CONNECTING AN EXTERNAL ANALOG EXCITER

Configure the transmitter for an external analog exciter as follows:

1. Change the RF drive source.
2. Turn off the transmitter, remove it from its host cabinet and place it on a suitable work surface.
3. Remove the top cover.
4. Disconnect W5P1 from A1J1 and connect it to J4 on the inside of the box.
5. Re-install the top cover and re-insert the transmitter in its host cabinet.
6. With a user-supplied CAT5 cable, connect a wire between A1J1-7 (RF mute) and the the RF mute input on the external exciter. Note: The RF mute signal from the VS300 is active low and will not function if the external exciter is not configured in the same way.

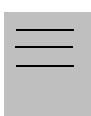
7. Connect the external exciter's RF output to **J4 (RF DRIVE IN)** on the rear panel of the VS300 through an attenuator such that the level out of the exciter at the desired setpoint converts to **+ 20 dBm**.

**CAUTION:**

The maximum input level is +23 dBm. Exceeding this level could cause unstable operation or damage to the VS300.

8. Turn on the transmitter and resume operation.

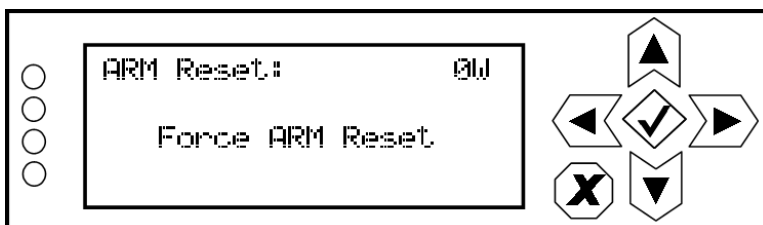
## ARM RESET

*Note:*

*An ARM reset is only available using the front panel display.*

From the front panel UI, you can reset the ARM on the exciter/control PWB. To view the **ARM Reset** screen, select **System Settings -> ARM Reset** from the **Main Menu** (see [Figure 2.77](#)).

**Figure 2.77: ARM Reset Screen**



Use the up and down buttons to toggle between **Force ARM Reset** and **Cancel**. Press the accept (checkmark) button to save the change. If a reset is selected, it will occur immediately. Select **Cancel** or press **X** to abort the reset and return to the previous menu.

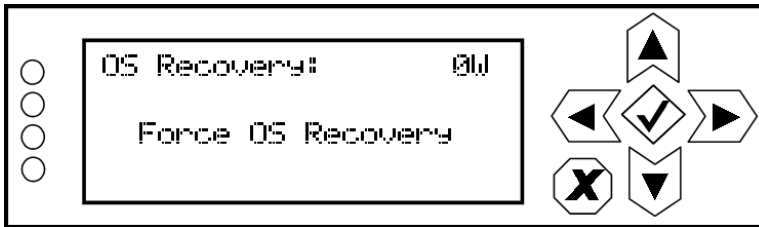
## OS RECOVERY

*Note:*

*An OS recovery reset can restore the transmitter's operating system. It should only be required if a problem occurs during a software upgrade*

*This feature is only available using the front panel display.*

From the front panel UI, you can perform a recovery reset of the operating system (OS). You will also need to install a flash drive, provided by Nautel, in one of the USB ports on the rear of the VS300. To view the **OS Recovery** screen, select **System Settings -> OS Recovery** from the **Main Menu** (see [Figure 2.78](#)).

**Figure 2.78: OS Recovery Screen**

Use the up and down buttons to toggle between **Force OS Recovery** and **Cancel**. Press the accept (checkmark) button to save the change. Select **Cancel** or press **X** to abort the recovery and return to the previous menu.



## CONFIGURING REMOTE INPUTS AND OUTPUTS



**Note:**

*This function is only available via remote connection to the AUI. However, you can view the status of remote inputs and outputs on the front panel display.*

You can define and configure your remote input/output interface for the transmitter using the [Remote I/O Page \(Inputs tab selected\)](#) - see [Figure 2.79](#). To view the **Remote I/O** page, select **Remote I/O** from the **Menu** options. Click **X** in the upper, right corner to close this page and return to the home page.

Refer also to the *VS300 Pre-installation Manual* for information on remote inputs and outputs and their factory default settings.

**Figure 2.79: Remote I/O Page (Inputs tab selected)**

The screenshot displays the transmitter's control interface. At the top, there are three main sections: **Date & Time** (Thu Mar 29 2012, 16:18:24), **Active Preset: Preset 1** (Power: 0.00 W, Analog, Set Point: 50.0 W, Reflected: 0.00 W, Mode: FM, Frequency: 95.3MHz), and **Exciter** (Active Exciter: Internal, FM Modulation: 0% to 160% with a +Pk:17 indicator). Below this is the **Remote I/O** section, which has a close button (X) in the top right. It features two tabs: **Inputs** (selected) and **Outputs**. The **Inputs** list includes Remote Input 1 through 6, Controller Reset, and Preset: Preset 1. The **Remote Input 1** configuration panel shows Channel: RF On/Off, Control: Falling Edge, Turn On, and Level: 1. At the bottom, there are buttons for RF On, RF Off, Menu, Status, Log, Local Remote, Reset, and Change User. A status message indicates 'RF On received. No email configuration set. RF Off received.'

Click the **Inputs** (see [“Digital inputs”](#) on page 2-87) or **Outputs** (see [“Digital outputs”](#) on page 2-89) tab to view or edit detail on the digital inputs or outputs.

## DIGITAL INPUTS

Using the Inputs tab (see [Figure 2.79 on page 2-86](#)), you can configure up to 10 digital 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 the remote/local status is set to remote. That setting can only be made by a local user using the front panel UI.

Nautel presets the digital inputs prior to shipping. See the *VS300 Pre-installation Manual* for details.

Select the desired digital input (1 through 10) from the list. The **Channel** and **Control** settings for the selected input, as well as the current logic level (1 or 0), are displayed on the right-hand side of the page. You can define the **Channel** and **Control** settings as follows:

### SELECT CHANNEL

You can configure digital inputs 1 through 10 for one of a variety of control inputs. Click the existing **Channel** bar to display the **Select a remote** window. From this window select one of the following options by clicking **Load**:

- **Not Assigned.** No effect on transmitter operation, regardless of logic level.
- **RF On/Off.** Same as clicking **RF On** (telling the system to provide RF power, if possible) or **RF Off** on the AUI.
- **Controller Reset.** Causes a system reset.
- **Inc/Dec RF Power.** Same as clicking **Increase** or **Decrease** on the AUI.
- **Preset: NAME.** Selects the associated preset (from a list of all pre-defined presets) as active.

### CONFIGURE CONTROL LOGIC

You can configure the active/inactive control logic for each of the 10 digital inputs. Click the existing **Logic** bar to display the applicable drop-down menu options, which may include:

- **Rising Edge Turn On/Reset.** Logic '1' (high or rising edge) activates the input (or causes a reset, as appropriate).
- **Falling Edge Turn On/Reset.** Logic '0' (low or trailing edge) activates the input (or causes a reset, as appropriate).
- **Rising Edge Turn Off.** Logic '1' (high or rising edge) de-activates the input.
- **Falling Edge Turn Off.** Logic '0' (low or trailing edge) de-activates the input.

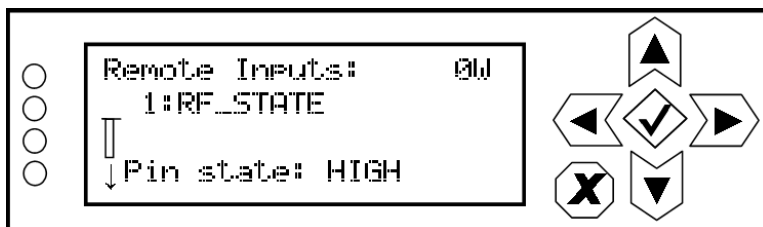
- **Falling Edge Toggle.** Logic '0' (low or trailing edge) de-activates the input; next logic '0' (low or trailing edge) activates the input.
- **Rising Edge Toggle.** Logic '1' (high or rising edge) activates the input; next logic '1' (high or rising edge) de-activates the input.
- **Rising Edge, Turn On. Falling Edge Turn Off.** Logic '1' (high or rising edge) activates the input; logic '0' (low or trailing edge) de-activates the input.
- **Falling Edge, Turn On. Rising Edge Turn Off.** Logic '0' (low or trailing edge) activates the input; logic '1' (high or rising edge) de-activates the input.
- **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.

Click **Apply** to activate changes. Click **Undo** to cancel changes.

#### VIEW DIGITAL INPUTS ON THE FRONT PANEL DISPLAY

To view the status of digital inputs 1 through 10 on the front panel display, select **User Settings -> Remote I/O -> Remote Inputs** from the **Main Menu** (see [Figure 2.80](#)).

**Figure 2.80: Remote Inputs Screen (Input 1 shown)**



Use the up and down buttons to scroll through the remote inputs. These inputs correspond to the remote inputs set through the remote AUI. The screen is for viewing purposes only. It contains the input number (1 through 10) and name, as well as the current logic state of the associated input pin. Press cancel (X) to return to the previous menu.

## DIGITAL OUTPUTS

Using the [Digital Outputs Page](#) - see [Figure 2.81](#), you can configure up to 16 digital outputs that indicate either the presence of various alarms or the status of operator controlled circuits.

Nautel presets the digital outputs prior to shipping. See the *VS300 Pre-installation Manual* for details.

**Figure 2.81: Digital Outputs Page**

The screenshot displays the 'Digital Outputs Page' interface. At the top, it shows system information: Date & Time (Thu Mar 29 2012, 16:20:49), Active Preset (Preset 1), and Exciter (Internal). A power display shows 0.00 W. Below this is the 'Remote I/O' configuration section. On the left, there is a list of inputs and outputs. The 'Remote Output 1' configuration is shown on the right, with settings for Channel (RF On/Off), Logic (Output Low When RF Off), and Level (1). At the bottom, there is a status bar with 'RF On' and 'RF Off' indicators, and navigation buttons: Menu, Status, Log, Remote, Reset, and Change User.

Select the desired digital output (1 through 16) from the list. The **Channel** and **Logic** settings for the selected output, as well as the current logic level (1 or 0), are displayed on the right-hand side of the page. You can define the **Channel** and **Logic** settings as follows:

### SELECT CHANNEL

You can configure digital outputs 1 through 16 to monitor a variety of alarm and status outputs. Click the existing **Channel** bar to display the **Select a remote** window. From this window, select one of the channels, then click **Load** to accept:

- **Not Assigned.** No alarm or status parameter is monitored.
- **Local/Remote.** The active logic level indicates the transmitter is in local control. The inactive logic level indicates the transmitter is in remote control.
- **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.
- **Preset Status (1-4 default).** The active preset's output will be indicated by a logic low. The remaining, non-active preset outputs will be open collector.
- **Various Alarms.** The active logic level indicates that the selected alarm is occurring. Any transmitter alarm can be selected as a digital output. Refer to the *VS300 Troubleshooting Manual* for a description of each alarm.

### CONFIGURE LOGIC

You can configure the active/inactive logic for each of the 16 digital outputs. Click the existing **Logic** bar to display the applicable drop-down menu options. For example, if the selected channel is **RF On/Off**, the drop-down options are:

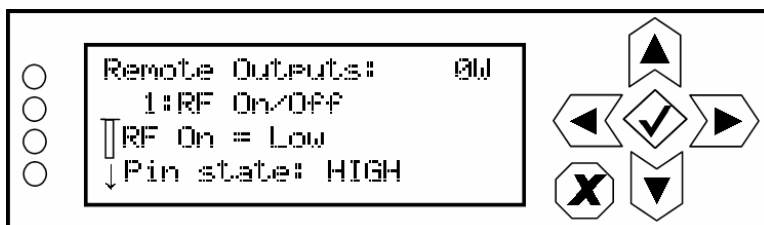
- **Output Low When Off.** Logic '0' (low) indicates the output is true (RF is off); Logic '1' (high) indicates the output is false (RF is on).
- **Output Low When On.** Logic '0' (low) indicates the output is true (RF is on); Logic '1' (high) indicates the output is false (RF is off).

Click **Apply** to activate changes. Click **Undo** to cancel changes.

### VIEW DIGITAL OUTPUTS ON THE FRONT PANEL DISPLAY

To view the status of digital outputs 1 through 16 on the front panel display, select **User Settings -> Remote I/O -> Remote Outputs** from the **Main Menu** (see [Figure 2.73](#)).

**Figure 2.82: Remote Outputs Screen (Output 1 shown)**



Use the up and down buttons to scroll through the remote outputs. These outputs correspond to the remote outputs set through the remote AUI. The screen is for viewing purposes only. It contains the output number (1 through 16) and name, a logic description of the output's active state (e.g., "RF On = Low" or "Active High") as well as the current logic state of the associated output pin. Press cancel (X) to return to the previous menu.

### ANALOG OUTPUTS

There are four analog outputs that can be remotely monitored. These outputs are factory defined and are not user configurable. Refer to the *VS300 Pre-Installation Manual* for a list of these analog outputs.

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## SETTING PILOT SAMPLE LEVEL

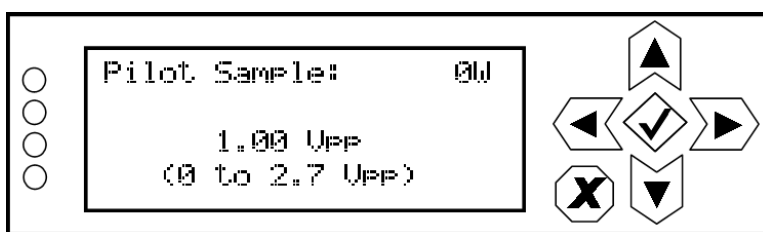


*Note:*

*Setting the pilot sample is only available using the front panel display.*

From the front panel, you can set the level of the pilot sample that is applied to the **PILOT SAMPLE OUT (A1J4A)** BNC connector on the rear of the VS300. To view the **Pilot Sample** screen, select **User Settings -> Pilot Sample** from the **Main Menu** (see [Figure 2.83](#)).

**Figure 2.83: Pilot Sample Screen**



Use the up and down buttons to edit the pilot sample level. Press the accept (checkmark) button to save the change. Press cancel (X) to discard changes and return to the previous menu.

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## FRONT PANEL DISPLAY SETTINGS

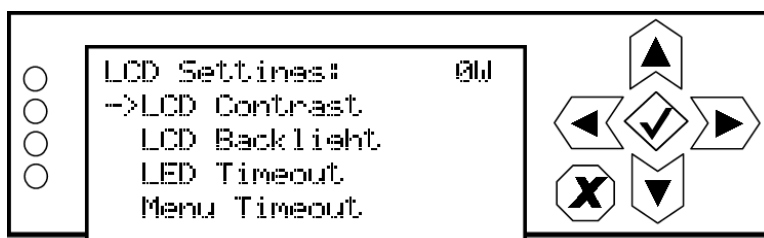


*Note:*

*Front panel display settings are only available using the front panel display.*

From the front panel, you can configure the LCD display's contrast, brightness and backlight settings. To view the **LCD Settings** screen, select **User Settings -> LCD Settings** from the **Main Menu** (see [Figure 2.84](#)).

**Figure 2.84: LCD Settings Menu**

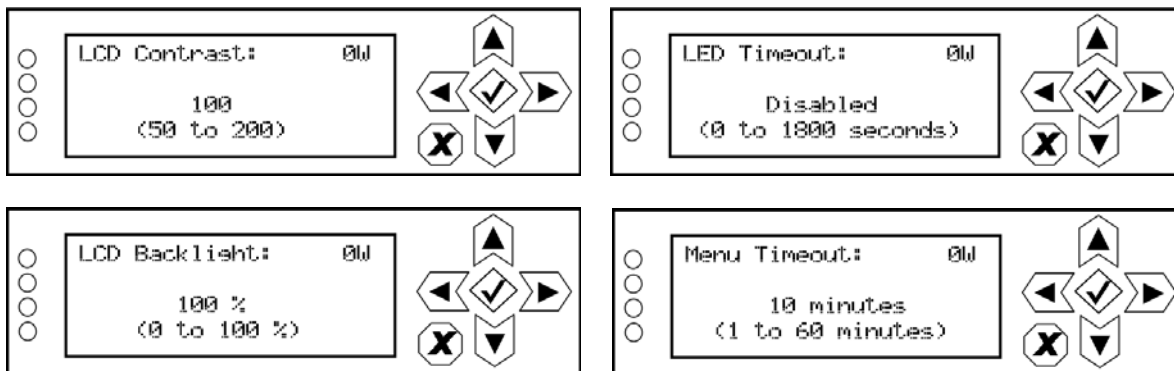


This menu has four sub-menu options:

- **LCD Contrast** - sets the display contrast.
- **LCD Backlight** - sets the brightness of the display's backlight during normal use.
- **LED Timeout** - sets a time delay, after a period of non-use, that the brightness of the display's backlight will dim. Can also be disabled.
- **Menu Timeout** - sets a time delay, after a period of non-use, that the front panel screen will revert back to the main menu.

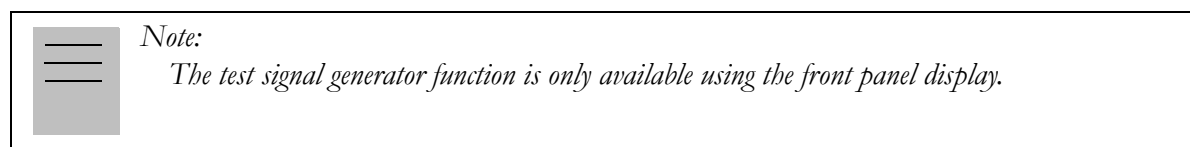
Use the up and down buttons to move the cursor to the desired display setting and then press the right button to enable editing of the setting. [Figure 2.85 on page 2-94](#) shows the editing screens for the **LCD Settings** menu. Within any of the editing screens, use the up and down buttons to edit a setting. Press the accept (checkmark) button to save the change. Press cancel (X) to discard changes and return to the previous menu.



**Figure 2.85: LCD Settings Editing Screens**

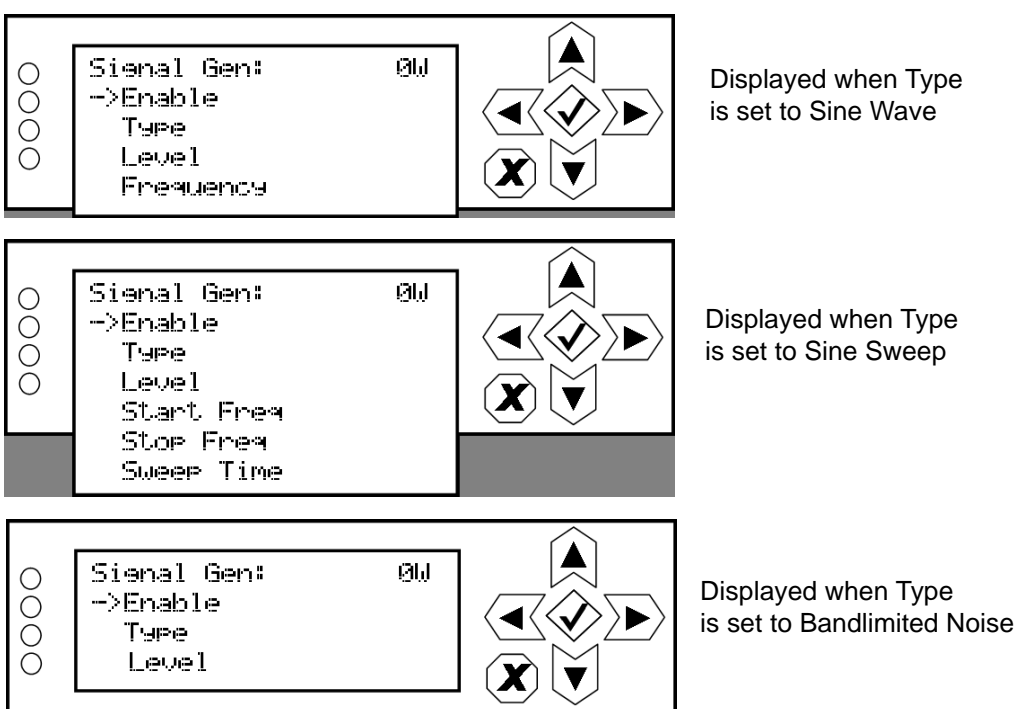
- **LCD Contrast:** Select a value between 50 (lighter contrast) and 200 (darker contrast).
- **LCD Backlight:** Select a value between 0 and 100%.
- **LED Timeout:** Select disabled (i.e., no timeout) or select a time period between 0 and 1800 seconds (30 minutes).
- **Menu Timeout:** Select a time period between 1 and 60 minutes.

## CONFIGURE TEST SIGNAL GENERATOR



From the front panel UI, you can configure the test signal generator output of the VS300. Note that a different menu will appear depending on the currently configured test signal type. To view the **Signal Gen** screen, select **User Settings -> Signal Gen** from the **Main Menu** (see [Figure 2.86](#)).

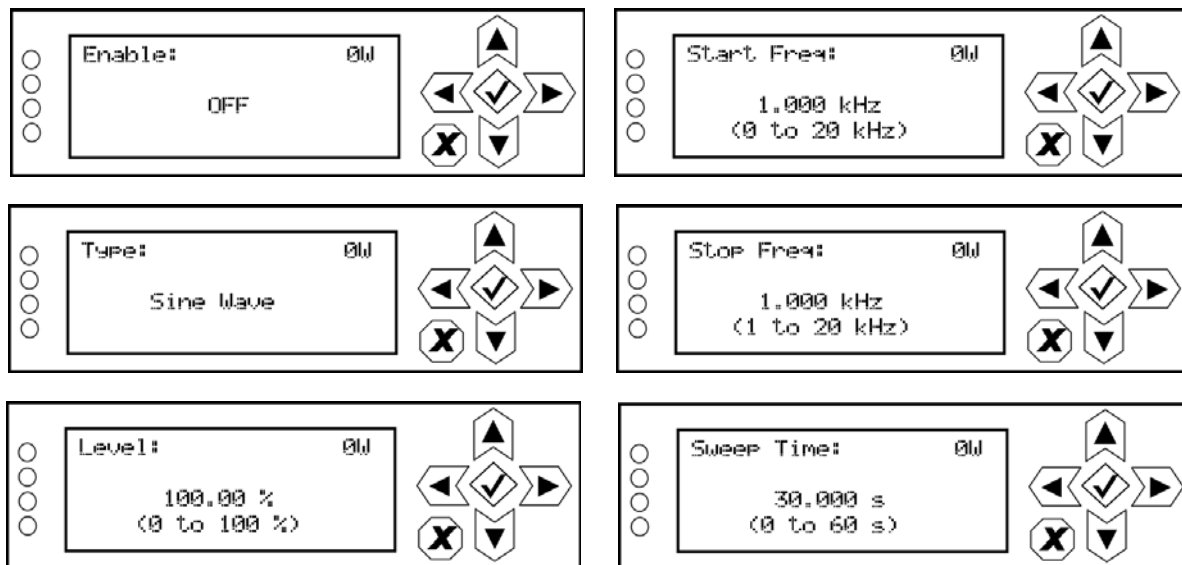
**Figure 2.86: Signal Generator Menus**



Use the up and down buttons to move the cursor to the desired line item and then press the right button to enable editing.

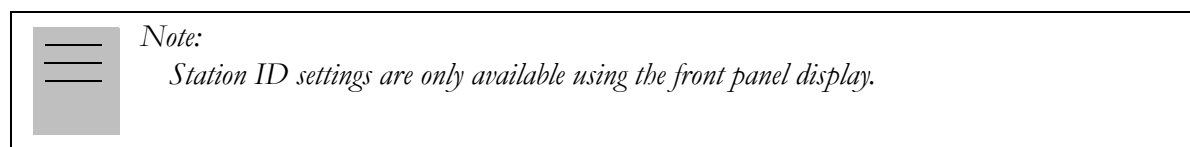
[Figure 2.87 on page 2-96](#) shows all possible editing screens for the **Signal Gen** menu. Within any of the editing screens, use the up and down buttons to edit the setting. Press the accept (checkmark) button to save the change. Press cancel (X) to discard changes and return to the previous menu.

Figure 2.87: Signal Generator Editing Screens



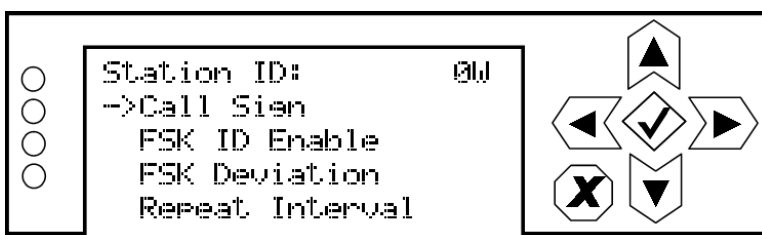
- **Enable:** Select ON or OFF.
- **Type:** Select None, Sine Wave, Sine Sweep or Bandlimited Noise.
- **Level:** Select a value between 0 and 100 %.
- **Start Freq:** When **Type** is set to Sine Sweep, select a start frequency between 0 and 20 kHz.
- **Stop Freq:** When **Type** is set to Sine Sweep, select a stop frequency between 1 and 20 kHz.
- **Sweep Time:** When **Type** is set to Sine Sweep, select a time between 0 and 60 seconds.

## SETTING STATION ID PARAMETERS



In certain applications, the VS300 may be used as a translator to re-broadcast primary information as a secondary station on an alternate frequency. To allow the secondary station to be identified, you can set station ID parameters such as call sign, FSK deviation and repeat interval. To view the **Station ID** screen, select **User Settings -> Station ID** from the **Main Menu** (see [Figure 2.88](#)).

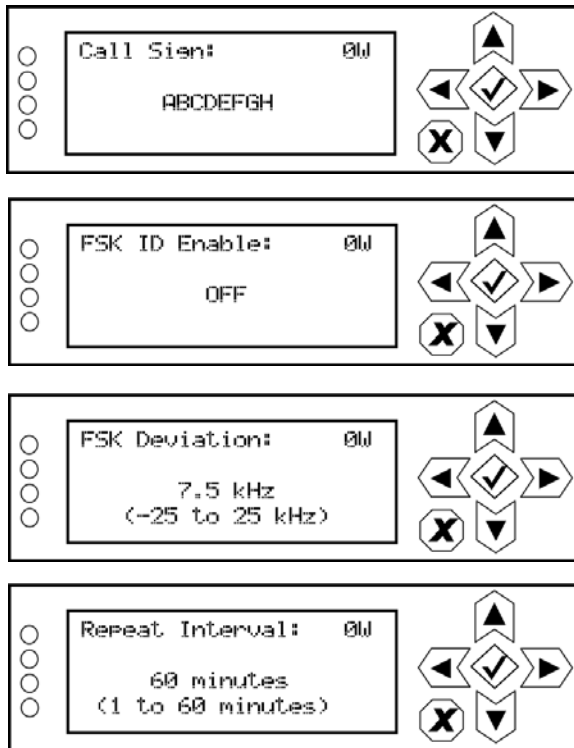
**Figure 2.88: Station ID Menu**



This menu has four sub-menu options:

- **Call Sign** - sets the station's call sign letters.
- **FSK ID Enable** - enables (ON) or disables (OFF) the station ID feature.
- **FSK Deviation** - sets the amount of carrier shift from the original carrier frequency. Select a value between -25 kHz and 25 kHz.
- **Repeat Interval** - determines how often the call sign is broadcast using FSK (recommended at least once per hour). Select a value between 1 and 60 minutes.

Use the up and down buttons to move the cursor to the desired display setting and then press the right button to enable editing of the setting. [Figure 2.89 on page 2-98](#) shows the editing screens for the **Station ID** menu. Within any of the editing screens, use the up and down buttons to edit a setting. In the **Call Sign** editing screen, use the left and right buttons to select a character for editing. Press the accept (checkmark) button to save the change. Press cancel (X) to discard changes and return to the previous menu.

**Figure 2.89: Station ID Editing Screens**

## USING AN EXTERNAL 10 MHz INPUT

You can configure the VS300 to accept an external 10 MHz input using the remote AUI (see “Using the AUI”) or using the local front panel display (see “Using the front panel” on page 2-100).

### USING THE AUI

You can view the selection buttons for the external 10 MHz input on the the AUI’s **Miscellaneous** screen (see [Figure 2.90](#)) by selecting **Hardware Configuration** from the **Menu** options. **True** and **False** buttons for **Use External 10MHz** will be displayed. Click **True** if you are using an external 10 MHz signal. Click **False** if not. Click **X** in the upper, right corner to close this page and return to the home page.

**Figure 2.90: Miscellaneous screen**

The screenshot displays the VS300 transmitter's interface. At the top, there is a header with the Nautel logo and several status sections:

- Date & Time:** Shows 'Thu Jul 8 2010' and '12:05:15'.
- Preset:** 'Preset 4 Nautel Shoutcast'.
- Exciter:** 'Active Exciter : Internal'.

Below the header, a table displays key parameters:

Power	<b>0.00 W</b>		
Analog		Mode	FM
Set Point	50.0 W	Frequency	98.1MHz
Reflected	0.00 W		

To the right of the table is an **FM Modulation** slider ranging from 0% to 160%, with a current value of +Pk:13.

The main area is titled **Hardware Configuration** and contains a sidebar menu with options: Exciter TCXO, Audio Input Calibration, and **Miscellaneous** (highlighted). The **Miscellaneous** screen shows the **Use External 10MHz** setting with two buttons: **True** (grey) and **False** (green).

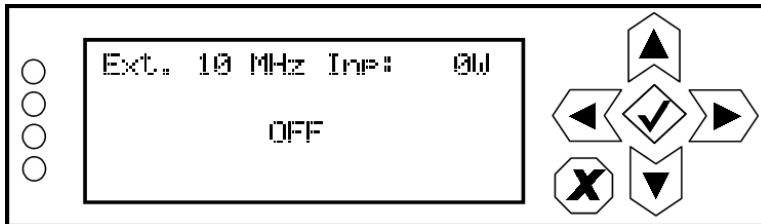
At the bottom, there is a navigation bar with buttons: **RF On**, **RF Off**, **Menu**, **Status**, **Log**, **Local Remote**, **Reset**, and **Change User**. A status message reads: 'Logged in as: Nautel. System Mode set to Local RF Off received.'

---

**USING THE FRONT PANEL**

To view the enable/disable screen for the external 10 MHz input (see [Figure 2.91](#)), select **User Settings** -> **Ext. 10 MHz Inp** from the **Main Menu**.

**Figure 2.91: Front Panel - External 10 MHz Input screen**



Use the up or down arrow to toggle between **ON** (using external 10 MHz input) and **OFF** (not using external 10 MHz input), then press the accept (checkmark) button to save the change. Press cancel (X) to discard changes and return to the previous menu.

---

## SECTION 3: ROUTINE MAINTENANCE

This section provides instructions for performing routine maintenance on the VS300 transmitter. This section includes the following topics:

- [Scheduled maintenance](#)
  - [Cleaning fan filters](#)
  - [Checking hardware - see page 3-2](#)
  - [Battery replacement - see page 3-2](#)
- [Performing on-air checks - see page 3-3](#)
- [Replacing the exciter/control PWB battery - see page 3-5](#)
- [Inspecting lightning protection systems - see page 3-6](#)

---

### SCHEDULED MAINTENANCE

Scheduled maintenance consists of performing a visual inspection of the VS300 at scheduled intervals. The recommended minimum time between scheduled maintenance visits is three months. Local operating and environmental conditions may dictate more frequent visits, while in remote sites, less frequent visits may be acceptable. Experience and system reliability will determine the most practical schedule for a specific installation.

### CLEANING FAN FILTERS

Clean the fan filters, noting there is one on each side of the transmitter. Gently remove the fan filter cover and guard, rinse the filters with water, then re-install the filters and guards. If a fan filter becomes damaged, replace it as soon as possible. You can order the filter from Nautel (part # HAS72) or obtain one from any local supplier of HVAC supplies.



*Note:*

*A site located in a dirty area using open-air cooling requires more extensive cleaning than a site located in a clean area using closed-air cooling.*



## CHECKING HARDWARE

All hardware must be checked at least once a year. Nautel recommends more frequent checking if the VS300 is subjected to above average thermal cycling, caused by turning the VS300 on and off.

- To prevent damaging the hardware, ensure that the proper size tools are used. In most cases, hardware is metric.
- A mounting surface or terminal that has changed colour indicates a loose hardware connection.

## BATTERY REPLACEMENT

The VS300's exciter/control PWB contains a battery backup circuit that allows the time and date to update during ac power failure. The battery should be replaced every 12 months. See [“Replacing the exciter/control PWB battery”](#) on page 3-5.

---

## PERFORMING ON-AIR CHECKS

You should check the on-air quality of the transmitter's signal periodically. This check can be done locally at the transmitter site, or remotely from another location in the transmitter's coverage area.

### INTERVAL

Every 12 months, or as required by law.

### PARTS AND TOOLS

- High-quality receiver, compatible with the modulation scheme used on the transmitter.

### PROCEDURE

1. Monitor the transmitter signal to identify any problems:
  - Use a high quality receiver to monitor audio quality.
  - Take a portable receiver to different locations in your coverage areas to identify any problems with the antenna pattern or areas of localized interference.
2. Obtain the *Proof of Performance* document that was completed during factory testing and provided with the transmitter. Use the front panel UI or the remote AUI to compare current transmitter meter readings with those in the *Proof of Performance* document and in [Table 3.1 on page 3-4](#), which shows expected meter readings at 88 MHz, 98 MHz and 108 MHz. When comparing data, use the frequency column closest to your operating frequency.



*Note:*

*Nautel completes the Proof of Performance document with the transmitter operating at 98 MHz, terminated into a precision 50 ohm load. Measurements made at other operating frequencies may not yield the same readings. The data in [Table 3.1 on page 3-4](#) is an example of measured meter values and is provided as a troubleshooting aid. Your front panel meter readings may not be exactly the same as shown, but if an out-of-tolerance condition exists, an alarm will be displayed.*

**Table 3.1: Expected Transmitter Meter Readings**

Meter Parameter (displayed on front panel UI or remote AUI)	Meter Value at ...		
	88 MHz	98 MHz	108 MHz
Forward (forward power)	100 W	100 W	100 W
Reflected (reflected power)	0.20 W	0.02 W	0.34 W
Preamp Curr	397 mA	505 mA	412 mA
PA1 Curr	5.4 A	5.8 A	5.7 A
PA V	22.8 V	22.2 V	24.9 V
Heatsink Temp	27°C	27°C	27°C
+48V	48 V	48.1 V	48.1 V
+15V	15.6 V	15.6 V	15.6 V
-15V	-15.4 V	-15.4 V	-15.4 V
+5V	5.01 V	5.01 V	5.01 V
+3.3V	3.28 V	3.28 V	3.29 V
+1.8V	1.78 V	1.82 V	1.83 V
+1.2V	1.20 V	1.20 V	1.20 V
Battery	3.00 V	3.00 V	3.00 V
Fan 1	6518 RPM	6517 RPM	6512 RPM
VSWR	1.10	1.02	1.11
Delta 10 MHz	N/A	N/A	N/A
Total PA Curr	5.4 A	5.8 A	5.7 A
DC Power In	124 W	131 W	144 W
DC-RF Eff	80.9 %	76.3 %	69.4 %
Avg PA Diss	24 W	31 W	44 W
PA1 Bias	0.00 V	0.00 V	0.00 V
Preamp Bias	2.80 V	2.80 V	2.80 V
Fwd Atten	0 dB	0 dB	0 dB
DAC Gain	100 %	100 %	100 %

## REPLACING THE EXCITER/CONTROL PWB BATTERY

Replace the battery on the exciter/control PWB (A1) once a year, or whenever the **Controller - Low Battery** alarm appears (on the front panel UI or via remote AUI). Chemical leakage from an old battery can cause damage. Also, the exciter/control PWB's microcontroller may not retain its settings if ac power is turned off while the backup battery power is low. The battery should be replaced while ac power is applied to the transmitter.

### INTERVAL

Every 12 months.

### PARTS AND TOOLS

Replacement battery: 3 V lithium coin cell, 20 mm (Nautel Part # BBLT01, Panasonic # CR2032).

### PROCEDURE

Perform the following steps to replace the battery:

1. Ensure ac power is being applied to the transmitter.
2. Gain access to the exciter/control PWB (A1) by removing the transmitter's top cover.
3. Replace battery BT1 on the exciter/control PWB. See Figures MD-1 and MD-2 in the mechanical drawings section at the end of the *VS300 Troubleshooting Manual* to locate the exciter/control PWB (A1) and its battery (BT1).
4. Re-install the transmitter's top cover.
5. Check for any alarms on the front panel UI or remote AUI. Battery related alarms should clear. (See [“Viewing transmitter status”](#) on page 2-58.)

## INSPECTING LIGHTNING PROTECTION SYSTEMS

You should inspect the lightning protection systems that are connected to your VS300 transmitter, ac power, RF feedline, antenna and tower periodically to ensure that your site, equipment and personnel are fully protected.

### INTERVAL

Every 6 months.

### PARTS AND TOOLS

Depends on your site, but may include a digital multimeter, ladder, binoculars, and continuity tester.

### PROCEDURE

Perform the following steps to test the lightning protection systems:

1. Test the continuity between ground available at your lightning arrestor and ground available on various pieces of equipment connected to the transmitter. Ensure that there is no resistance (near 0 ohms, accounting for multimeter test lead resistance).
2. Physically inspect the lightning arrestor to ensure that all connections are tight. Also look for any sign of scoring or burning (indications of possible damage from earlier lightning strikes).
3. Using binoculars, visually inspect the hardware on the tower. Look for charred, broken or frayed connections and corrosion.

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## SECTION 4: NON-STANDARD MAINTENANCE

This section provides instructions for performing non-standard maintenance on the VS300 transmitter. This section includes the following topics:

- [Upgrading software](#)

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### UPGRADING SOFTWARE

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

**CAUTION:**

If you are upgrading from a software version prior to V1.2, the ARM Watchdog feature must be DISABLED during the software upgrade process. Failure to observe this may result in a non-operational transmitter that will require a full operating system recovery. Refer to [“Configuring ARM watchdog” on page 2-78](#) for details on disabling the ARM watchdog feature.

### PARTS AND TOOLS

- Laptop (i.e., local computer for direct connection) or network computer with Windows and Internet Explorer Web browser
- CAT5 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) screen, go to **Menu/Software/Upgrade Software**. Select the \*.tgz file in the Select Upload File list (should highlight in blue) and click **Versions**. Note the current software revision for Audio Player, AUI, Server, SNMP Agent, Axia Livewire Module, Watchdog and Controller.
2. Contact Nautel for the most recent software revision and download \*.tgz file to a laptop or network location.

---

## TRANSFERRING UPGRADE FILE

The following steps assume either the laptop will be used to connect directly to the transmitter **OR** the transmitter and network computer are currently connected to the same network.

### TRANSMITTER IP CONFIGURATION

1. From the transmitter AUI, go to **Menu/Software/Network Setup**.
2. Record your current network settings (IP Address, Subnet Mask, Default Gateway).
3. If connecting to the transmitter directly with a laptop, you must set a static IP address. This can only be done via the front panel interface. From the front panel UI's **Main Menu**, go to **User Settings/Network Settings** and set the IP address as follows:
  - DHCP: OFF
  - IP Address: 10.10.10.2
  - Netmask: 255.255.255.0
4. Set the transmitter for **Remote** control.

### LAPTOP IP SETUP

The following steps assume the operating system is Windows XP. Adapt as required for computers with different operating systems.

1. On the laptop go to **Start Menu/Control Panel/Network Connections/Local Area Network**.
2. In the Local Area Network Status, open the **General** tab and choose **Properties**. Scroll down and highlight **Internet Protocol (TCP/IP)**. Choose **Properties**.
3. In the *Internet Protocol (TCP/IP) Properties* window, select **Use the following IP address**.
4. Enter the following settings:
  - IP Address: 10.10.10.1
  - Subnet Mask: 255.255.255.0
  - Default Gateway: 192.168.1.2
5. In the *Internet Protocol (TCP/IP) Properties* window, select **OK**.
6. In the *Local Area Connection Properties* window, select **OK**.

7. In the *Local Area Connection Status* window, select **Close**.
8. Close the *Network Connections* window.

### TRANSFER SOFTWARE UPGRADE FILE TO TRANSMITTER

1. If using a laptop, connect the laptop network interface card to the transmitter **LAN (A1J8A)** connector on the rear panel using a CAT5 Ethernet cable. Open Internet Explorer and search for 10.10.10.2. The transmitter login screen should appear.
2. If using a network computer, open Internet Explorer and search for the IP address recorded in [Step 2 of “Transmitter IP configuration” on page 4-2](#). The transmitter login screen should appear.
3. At the transmitter login screen enter:
  - User: “Nautel” or “\*\*\*\*”, where \*\*\*\* is the user assigned user name
  - Password: leave blank (default) or “\*\*\*\*”, where \*\*\*\* is the user assigned password
4. Navigate through the AUI to **Menu/Software/Upload Files**, select the upgrade files tab and press **Browse**. Locate the software update \*.tgz file stored on the laptop or network computer, and press **Upload** to load the file into the transmitter upload file list. Allow this operation to complete.

### INSTALLING NEW SOFTWARE

**CAUTION:**

If you are upgrading from a software version prior to V1.2, the ARM Watchdog feature must be **DISABLED** during the software upgrade process. Failure to observe this may result in a non-operational transmitter that will require a full operating system recovery. Refer to [“Configuring ARM watchdog” on page 2-78](#) for details on disabling the ARM watchdog feature.

1. Using the front panel UI, set the transmitter to **RF Off** and for **Remote** control. Perform the following steps remotely using the AUI on the laptop.
2. Go to the AUI **Menu/Software/Upgrade Software** screen and select the update \*.tgz file from the Select Upload Files list (should highlight in blue) and press **Start**.

**CAUTION:**

Do not leave this page until the flash process is complete.



3. After a successful load (status is 100% complete and a message indicates a successful load), cycle the ac power (turn off, then on) on the VS300.
4. This completes the software upgrade. Restore the former network settings on the transmitter and laptop as required (see [Step 2](#) of “[Transmitter IP configuration](#)” on page 4-2).
5. Login and repeat [Step 1](#) of “[Preliminary checks](#)” on page 4-1 to determine if the current version is the same as the upgrade version - this confirms the upgrade was successful.
6. If the upgrade was not successful, repeat [Step 1](#) through [Step 5](#). If still unsuccessful, contact Nautel.

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## SECTION 5: LIST OF TERMS

This section defines some of the terms that are used in Nautel documentation.

**AES-EBU.** Audio Engineering Society/European Broadcasting Union (AES/EBU) is the name of a digital audio transfer standard. The AES/EBU digital interface is usually implemented using 3-pin XLR connectors (the same type connector used in professional microphones). One cable carries both left-channel and right-channel audio data to the receiving device.

**ARM.** Advanced RISC (Reduced Instruction Set Computer) Machine. The specific ARM used in VS transmitters is ARM926, and is used for remote AUI functionality.

**AUI.** The Advanced User Interface is the web interface that allows for extensive control and monitoring of the transmitter.

**CUTBACK.** A reduction in RF output power, caused by the occurrence of multiple shutbacks within a pre-defined period.

**CYCLING AC POWER.** Turning off (disabling), then turning on (enabling) the ac power source.

**DHCP.** Dynamic Host Carrier Protocol.

**DSP.** Digital Signal Processing. Used for transmitter control and signal processing.

**EEPROM.** Electrically Erasable Programmable Read-Only Memory.

**FOLDBACK.** A reduction in RF output power, caused by adverse load conditions (high VSWR). No shutbacks or cutbacks have occurred.

**HD RADIO.** HD Radio is another term for In-Band-On-Channel (IBOC) technology. HD Radio is a trademark of iBiquity Digital Corporation.

**IBOC.** Nautel In-Band-On-Channel technology provides high quality digital audio over existing FM radio channels.

**INTERMEDIATE POWER AMPLIFIER (IPA).** Refers to circuitry within the transmitter that amplifies the exciter's RF output to a level sufficient to drive the final RF amplifiers.

**LATCHING ALARM.** An alarm that, while active, keeps the transmitter in an 'RF inhibited' state. This type of alarm (e.g., High SWR Shutdown) require a reset - via the front panel or remote AUI - to attempt to restore transmitter operation.

**LED.** Light Emitting Diode (also referred to as lamp).

**LUT.** Look-Up Table.

**MPX.** Refers to the multiplexed baseband signal. Also referred to as the composite signal.

**PRESET.** A setting that controls power level, frequency and audio parameters. The VS300 allows you to pre-program multiple presets.

**PWB.** Printed Wiring Board.

**SHUTBACK.** A complete, but temporary loss of RF output power, caused by any one of a variety of faults, including high VSWR, high reject load power, RF drive failure, or an open external interlock.

**SHUTDOWN.** A complete and permanent loss of RF output power. Typically follows repeated cutback, foldback or shutback events.

**SPI.** Serial Peripheral Interface. A synchronous serial data link standard that operates in full duplex mode. Devices communicate in master/slave mode where the master device initiates the data frame. Multiple slave devices are allowed with individual slave select (chip select) lines. Also referred to as a "four wire" serial bus.

**SURGE PROTECTION PANEL.** An electrical panel that protects equipment from electrical surges in the ac power supply, antenna or site ground caused by lightning strikes.

**VSWR.** Voltage standing wave ratio. This is an expression of the ratio of forward voltage to reverse voltage on the feedline and antenna system. An ideal VSWR of 1:1 provides maximum transmitter-antenna efficiency.



VS300

**OPERATIONS AND MAINTENANCE MANUAL**

Document: VS300-LPFM-OPS-MAINT

Issue: 0.1 2011-03-11

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