

EXPORTER PLUS

TECHNICAL INSTRUCTION MANUAL

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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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RELEASE CONTROL RECORD

Issue	Date	Reason
0.01	2008-10-15	Initial release of manual
0.02	2008-10-29	Incorporated Engineering review changes
0.03	2008-11-28	Added electrical schematic to Troubleshooting section
0.04	2009-01-27	Incorporated Customer Service review changes
0.05	2009-02-19	Incorporated upgrades for software version 1.2.1
0.06	2009-03-10	Sections 1 - 5: Incorporated various minor changes
0.07	2009-07-02	Page 1-5: changed "route add 10.10.10.2" to "route add 10.10.10.0".
0.08	2009-08-10	Incorporated upgrades for software version 1.3.0.

ABOUT THIS MANUAL

This manual provides information about installing, operating and troubleshooting an Exporter Plus. This manual is intended for use by field technicians and site managers.

USING THIS MANUAL

Read the task list provided in [Section 2, “Pre-installation tasks” on page 2-1](#). The task list describes the preparations you must make prior to receiving and installing the Exporter Plus.

Later sections of this manual provide reference information regarding physical, cooling, LAN, and synchronization requirements.

FEATURES OF THIS MANUAL

This manual contains a number of useful features:

ONLINE (PDF FILES)

- Click on blue text (hyperlinks) to jump to a related section or get additional information (for example, to view a definition of a term).
- 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.

PRINTED

- To find a specific term, go to [Section 11, “List of terms” on page 11-1](#).
-

ONLINE RESOURCES

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

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.

ONLINE DOCUMENTATION

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

SECTION 1: DESCRIPTION

This section provides a description of the Exporter Plus and its associated digital radio system.

- [Overview](#)
- [Location - see page 1-3](#)
- [Managing network traffic - see page 1-4](#)
- [Diversity delay - see page 1-5](#)
- [Physical requirements - see page 1-9](#)
- [Cooling requirements - see page 1-10](#)

OVERVIEW

Refer to [Figure 1.1](#) and [Figure 1.2 on page 1-2](#).

The Exporter Plus represents the latest in HD Radio Exporter technology. It has the same functionality as an Exporter, but in a smaller, more reliable and convenient package. The Exporter Plus accepts AES/EBU-format audio from an audio processor. In FM systems, the Exporter Plus will also accept program service data (PSD) for the main program service (MPS) audio and **Advanced Application Service** data from an Importer via the Ethernet port. The MPS audio is coded and merged with PSD and Importer data to create a single data stream that is delivered to the FM exciter, also over the Ethernet port.

A secondary function of the Exporter Plus is to provide a delayed copy of the MPS audio. The delayed MPS will become the analog component of the hybrid broadcast. The delay is necessary for smooth blending between the digital MPS audio and analog MPS audio in areas of poor reception. As a result, the Exporter Plus requires two MPS audio feeds, one of which is simply delayed, and the other which is coded for eventual transmission on the IBOC carriers. In an FM system, the delayed MPS audio is output as 44.1 kHz AES/EBU. In an AM system, the delayed MPS audio is part of the IP data stream. See [“Managing network traffic” on page 1-4](#) for more information.

The Exporter Plus provides an AES/EBU output on the back panel and a headphone jack on the front panel for monitoring of the audio content.

The Exporter Plus front panel has a convenient user interface consisting of an LCD graphic display, keypad and LEDs to indicate operational status. All connections are made to the back panel.

Figure 1.1: Exporter Plus in an FM HD radio system

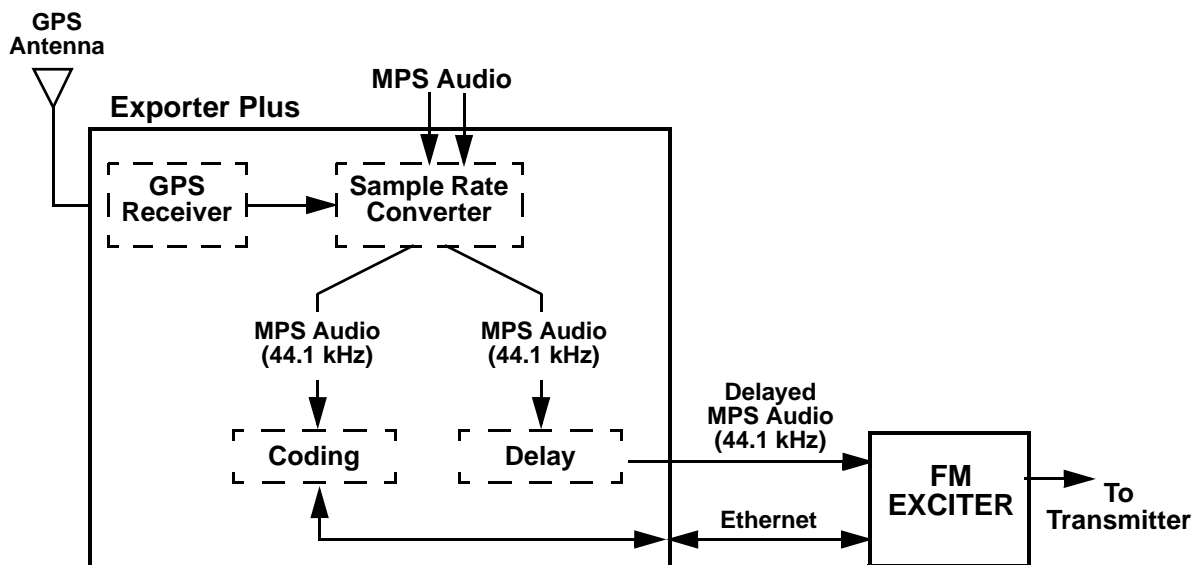
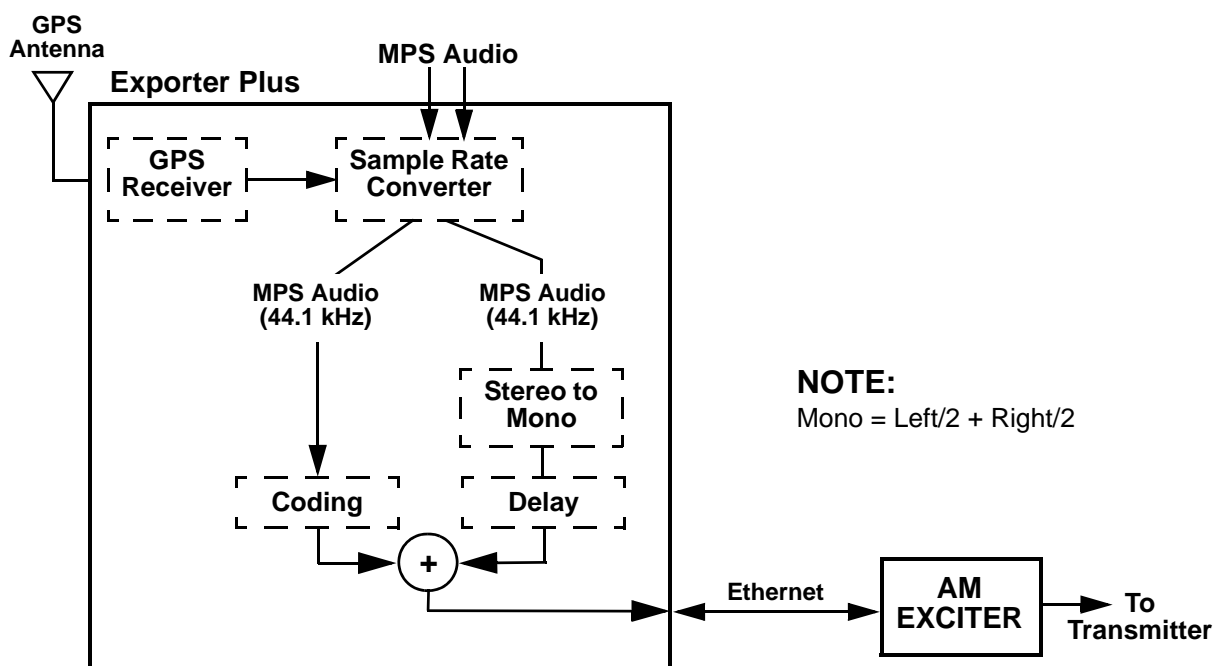


Figure 1.2: Exporter Plus in an AM HD radio system



Note: Other common system components, such as Ethernet switches and audio processors, are not shown. They are described later. [Figure 1.1](#) and [Figure 1.2](#) are based on a combined IBOC system.

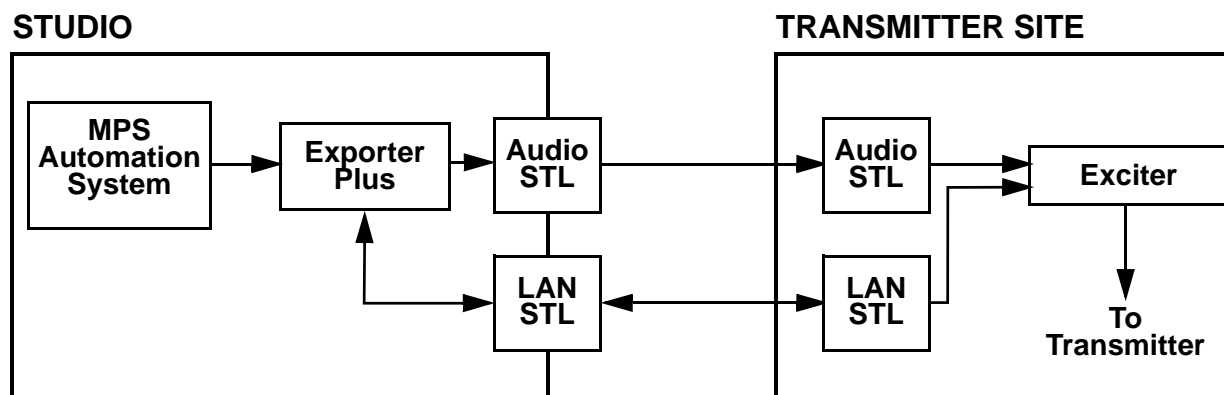
LOCATION

BROADCAST STUDIO

For FM systems, the intended location of the Exporter Plus is at the broadcast studio, as illustrated in [Figure 1.3](#). This configuration requires that there be a LAN STL between the studio and transmitter site to deliver the IBOC data from the Exporter Plus to the FM Exciter. The LAN STL must have a bandwidth of approximately 150 kbs. However, since the IBOC data contains audio information that cannot tolerate excessive delay, a bandwidth exceeding 150 kbs is recommended.

For AM systems, it is possible to use the Exporter Plus at the studio, however this may be impractical due to AM's need for higher IBOC data rates (because IBOC data includes analog audio) and because any network packet loss will affect both analog and IBOC transmission.

Figure 1.3: Exporter Plus at Studio

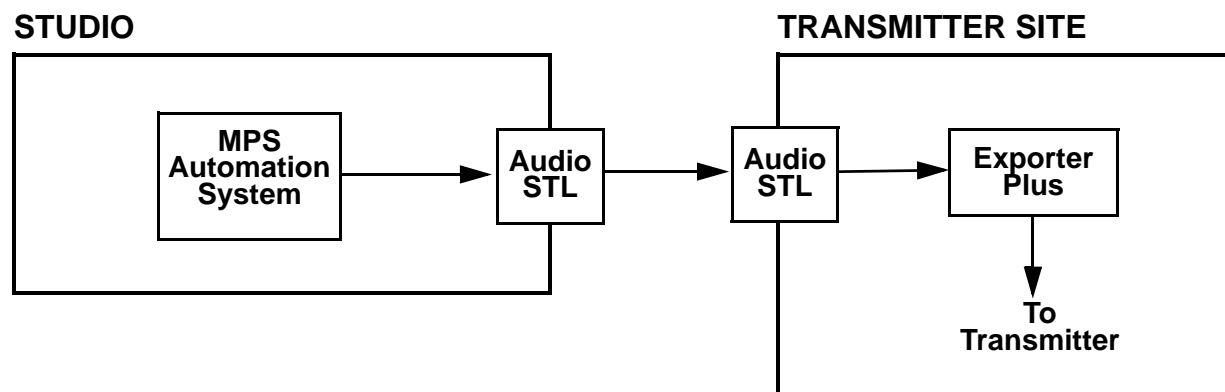


Note: [Figure 1.3](#) is based on a low-level FIR (finite impulse response) IBOC system.

TRANSMITTER SITE

It is possible to place the Exporter Plus at the transmitter site, thus eliminating the need for a LAN STL (see [Figure 1.3](#)). For reasons described above, it may be most practical for AM systems to follow this configuration. All that is required is that MPS audio be sent to the transmitter site, no differently than would be required with a non-IBOC installation. If there is no LAN connection between the studio and transmitter site, then it is not possible to implement MPS PSD, or monitor the status of the Exporter Plus.

Figure 1.4: Exporter Plus at Transmitter Site

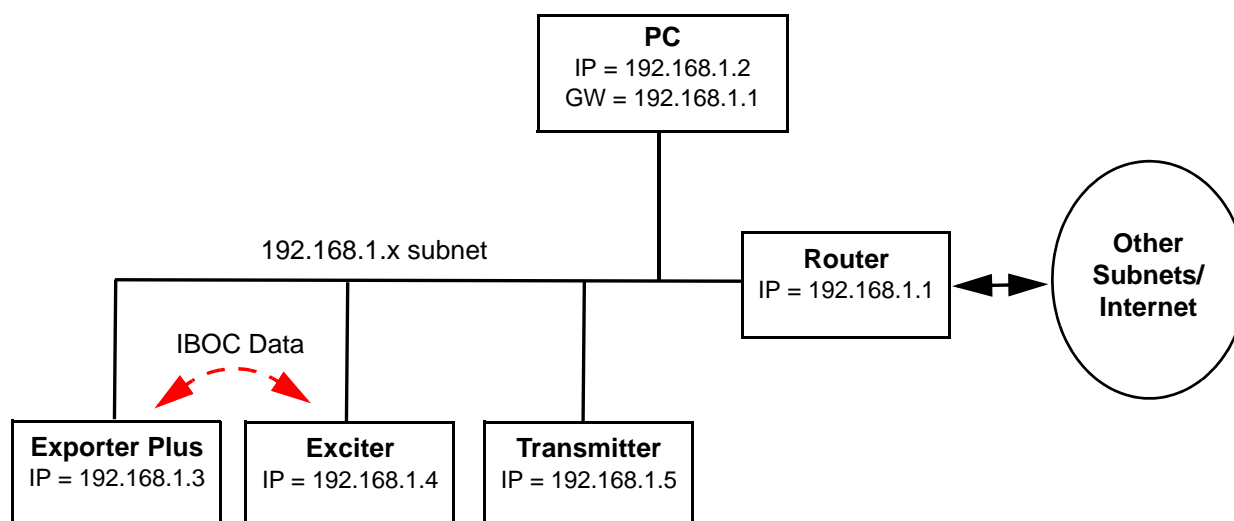


MANAGING NETWORK TRAFFIC

SINGLE SUBNET

The simplest network that the Exporter Plus can support is one configured as a single subnet (see [Figure 1.5](#)). The PC user can browse to the Internet or to the web interface of the exciter, Exporter Plus or transmitter.

Figure 1.5: Single Subnet Network

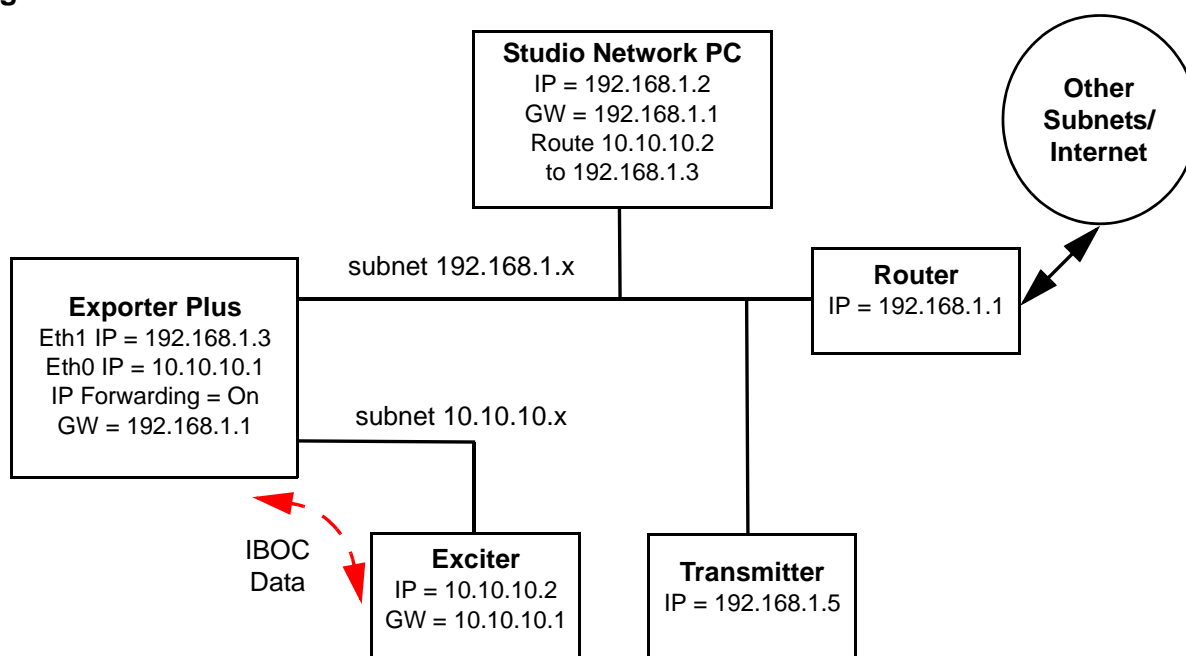


In this case, only one Ethernet port (**ETH0**) on the Exporter Plus requires configuration and IP forwarding is not required. If access to devices on other subnets is not necessary, then gateway address configuration is also not required.

MULTIPLE SUBNETS

The Exporter Plus has dual Ethernet ports that can be used to isolate IBOC data from other network IP traffic. The potential problem is that IBOC data is a streaming format with embedded timing information which can be degraded if flowing through a busy local area network. Consider the network configuration in [Figure 1.6](#).

Figure 1.6: Dual Subnet Network



A user on the Studio Network PC will want the ability to browse both the Internet (192.168.1.x subnet) and equipment on the 10.10.10.x subnet. In order to do this the Studio Network PC needs several gateways - one for the Internet router and one for the 10.10.10.x subnet. Typical PC configuration allows for a single gateway, however it is possible to modify the PC routing table to assign gateway addresses to specific IP addresses.

[Figure 1.7 on page 1-6](#) shows the command **route table** and describes how to add the exciter IP address to the routing table of the Studio Network PC. Using the example equipment configuration and IP addresses shown in [Figure 1.6](#), the command to add a static IP route would be:

```
- route add 10.10.10.2 mask 255.255.255.0 192.168.1.3
```

To make the static route persistent, you can use the “-p” option when adding routes.

To confirm that you have added the route correctly, use the command **route print**. [Figure 1.8 on page 1-7](#) shows the command **route print** which displays the content of the route table.

Figure 1.7: PC Route Table Command

```

C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
C:\>route table
Manipulates network routing tables.
ROUTE [-f] [-p] [command [destination]
      [MASK netmask] [gateway] [METRIC metric] [IF interface]
-f      Clears the routing tables of all gateway entries. If this is
used in conjunction with one of the commands, the tables are
cleared prior to running the command.
-p      When used with the ADD command, makes a route persistent across
boots of the system. By default, routes are not preserved
when the system is restarted. Ignored for all other commands,
which always affect the appropriate persistent routes. This
option is not supported in Windows 95.
command One of these:
      PRINT   Prints a route
      ADD     Adds a route
      DELETE  Deletes a route
      CHANGE  Modifies an existing route
destination Specifies the host.
MASK         Specifies that the next parameter is the 'netmask' value.
netmask      Specifies a subnet mask value for this route entry.
            If not specified, it defaults to 255.255.255.255.
gateway      Specifies gateway.
interface    the interface number for the specified route.
METRIC       specifies the metric, ie. cost for the destination.

All symbolic names used for destination are looked up in the network database
file NETWORKS. The symbolic names for gateway are looked up in the host name
database file HOSTS.

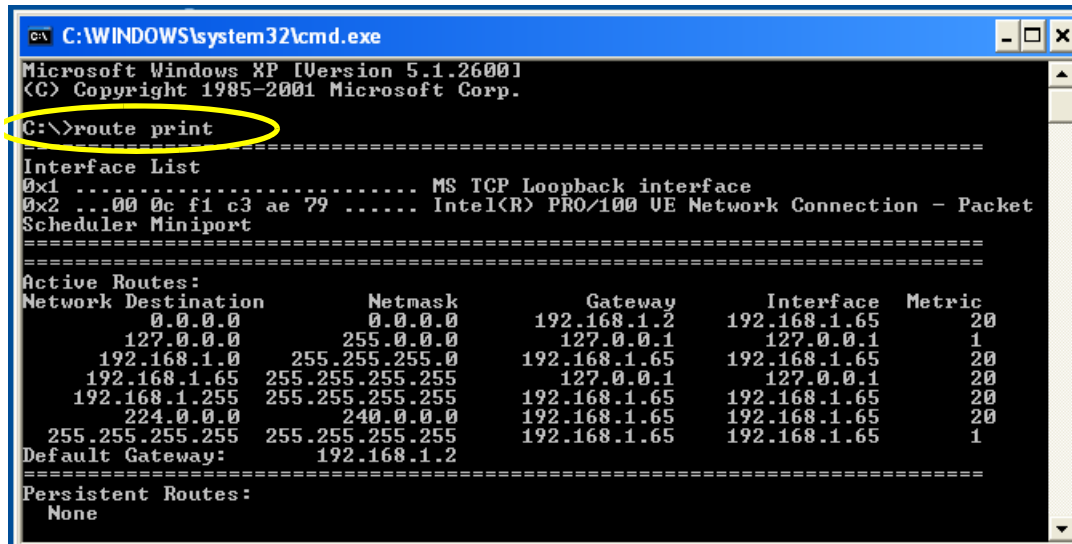
If the command is PRINT or DELETE, Destination or gateway can be a wildcard,
(wildcard is specified as a star '*'), or the gateway argument may be omitted.

If Dest contains a * or ?, it is treated as a shell pattern, and only
matching destination routes are printed. The '*' matches any string,
and '?' matches any one char. Examples: 157.*.1, 157.*, 127.*, *224*.
Diagnostic Notes:
Invalid MASK generates an error, that is when (DEST & MASK) != DEST.
Example> route ADD 157.0.0.0 MASK 155.0.0.0 157.55.80.1 IF 1
The route addition failed: The specified mask parameter is invalid.
(Destination & Mask) != Destination.

Examples:
> route PRINT
> route ADD 157.0.0.0 MASK 255.0.0.0 157.55.80.1 METRIC 3 IF 2
      destination^      ^mask      ^gateway      metric^      Interface^
      If IF is not given, it tries to find the best interface for a given
      gateway.
> route PRINT
> route PRINT 157*      .... Only prints those matching 157*
> route CHANGE 157.0.0.0 MASK 255.0.0.0 157.55.80.5 METRIC 2 IF 2
      CHANGE is used to modify gateway and/or metric only.
> route PRINT
> route DELETE 157.0.0.0
> route PRINT
C:\>route add 10.10.10.0 mask 255.255.255.0 192.168.1.3

```

Figure 1.8: PC Route Print Command



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
C:\>route print
=====
Interface List
0x1 ..... MS TCP Loopback interface
0x2 ...00 0c f1 c3 ae 79 ..... Intel(R) PRO/100 VE Network Connection - Packet
Scheduler Miniport
=====
Active Routes:
Network Destination    Netmask          Gateway         Interface      Metric
0.0.0.0                0.0.0.0         192.168.1.2    192.168.1.65   20
127.0.0.0              255.0.0.0       127.0.0.1     127.0.0.1     1
192.168.1.0            255.255.255.0   192.168.1.65  192.168.1.65  20
192.168.1.65          255.255.255.255 127.0.0.1     127.0.0.1     20
192.168.1.255         255.255.255.255 192.168.1.65  192.168.1.65  20
224.0.0.0             240.0.0.0       192.168.1.65  192.168.1.65  20
255.255.255.255      255.255.255.255 192.168.1.65  192.168.1.65  1
Default Gateway:      192.168.1.2
=====
Persistent Routes:
None
```

DIVERSITY DELAY

A feature of any IBOC system is the receiver's ability to transition between analog and digital playout when digital signal reception is poor. Ideally this transition would be unnoticeable for the listener, so it is important that any delay caused by digital signal processing (approximately eight seconds) is matched on the analog signal. Furthermore, the audio levels should be the same. The Exporter Plus allows the user to adjust both of these parameters.

The diversity delay setpoint can be adjusted via the user interface (UI) (see [Setting delay period - see page 8-33](#)), or using remote inputs. Toggling the remote diversity delay increase input causes the diversity delay to increase by an amount established in the UI (see [Setting delay increment - see page 8-35](#)).

In some cases it is desirable to remove analog delay altogether, forcing the receiver to use only the analog reception. The need for this is prevalent during live programming, such as sporting events, where stadium listeners need the audio to closely align with the live action.

The Exporter Plus has provision for diversity delay ramping, which allows changing between the desired setpoint delay and no delay. The ramping function can change the delay over a pre-defined ramp rate (set through the UI), by continuously adding (ramp up) or deleting (ramp down) audio samples. If the ramp rate is very short, there may be noticeable effects on the audio pitch. The amount of time taken to ramp diversity delay up or down is configured by setting the ramp rate. The ramp rate (see [Setting ramp rate - see page 8-34](#)) is set as a multiple of the diversity delay setpoint. For example, assuming a diversity delay setpoint of eight seconds (8 s), setting the ramp rate to:

- 1 results in a ramp interval equal to the diversity delay (8 s).
- 2 result in a ramp interval twice the diversity delay (16 s).
- 100 (recommended value) results in a ramp interval of 800 s.

PHYSICAL REQUIREMENTS

Figure 1.9: Exporter Plus



DIMENSIONS

The Exporter Plus is a rack-mountable unit with the following dimensions:

- **Height:** 1U, or 4.4 cm (1.75 inches)
- **Width:** 48.3 cm (19 inches)
- **Depth:** 63.5 cm (25 inches)

CLEARANCES

Ensure that the clearances at the front and the rear of the Exporter Plus's host cabinet allow sufficient room for easy installation and operation. Allow at least 1U (1.75 inches) of clearance above the Exporter Plus for adequate ventilation.



CAUTION:

Do not block the vents in the top cover or on the side of the Exporter Plus. This is especially important in higher ambient temperature environments.

WEIGHTS

The Exporter Plus weighs approximately 15 lbs (6.8 kg).

COOLING REQUIREMENTS

The maximum chassis temperature of the Exporter Plus must not exceed 40°C (104°F). To satisfy this requirement:

- Do not allow the Exporter Plus room ambient air temperature to exceed 40°C (104°F) at sea level. De-rate 3°C (5.4°F) per 500 m – or 2°C (3.6°F) per 1,000 feet – above sea level.

Example:

At 1,600 m (1 mile) above sea level, maximum ambient temperature should not exceed 30.4°C (87°F). Cooler temperatures are recommended, in order to improve the reliability of the Exporter Plus.

- If the Exporter Plus is used in high ambient temperature conditions, make sure that all of its ventilation holes are completely free of blockage.

SECTION 2: PRE-INSTALLATION TASKS

This section provides a list of tasks that you must perform prior to delivery and installation of the Exporter Plus.



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

PREPARING FOR INSTALLATION

To prepare for installation of an Exporter Plus, perform the following tasks:

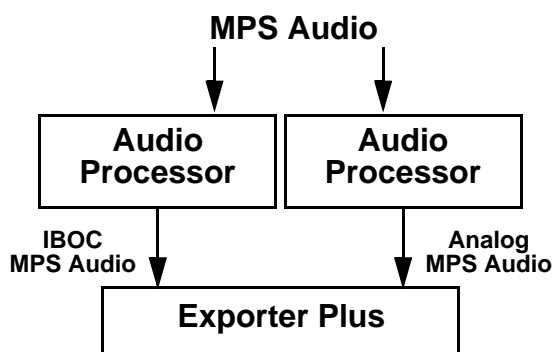
1. Select a location for the Exporter Plus in the studio or the transmitter site. For detailed information, see [“Selecting a location for the Exporter Plus” on page 2-2](#).
2. Prepare the network (LAN) connection between the Exporter Plus and the exciter. Consider the Exporter Plus's location and the amount of other networked equipment at the transmitter site.
3. Consult your network manager for IP address information for the Exporter Plus, exciter (Exgine), and gateway.
4. Order any accessories or optional equipment that you may need. See [Section 3, “Parts and tools” on page 3-1](#).
5. Train your station technicians and operators on the use of the Exporter Plus. For a list of available technical and user documents, see [“Online resources” on page xi](#) of this document. For information about Nautel training courses, go to the Nautel website at <http://www.nautel.com/Training.aspx>

SELECTING A LOCATION FOR THE EXPORTER PLUS

To ensure that the desired location for the Exporter Plus is suitable, perform the following tasks.

1. Ensure you have a cabinet and room space suitable for installing the Exporter Plus. Also, though it is not required, a UPS is recommended to avoid interrupts due to brown-out conditions. Refer to “[Exporter Plus at Transmitter Site](#)” on page 1-4 for dimensions and clearances.
2. In addition, it is normal to insert **MPS** audio processing on both of the **MPS** audio paths to the Exporter Plus. Since one path is for the **IBOC MPS** and the other is for analog **MPS**, audio processing requirements are different, requiring two audio processors ([Figure 2.1](#)).

Figure 2.1: GPS sync PWB audio processor connections



3. Ensure the Exporter Plus is near a standard 120 V ac power outlet.
4. The Exporter Plus contains a GPS receiver that must be connected to a GPS antenna ([Figure 2.2](#)) that has a clear view of the sky. The supplied GPS antenna cable is 50 feet long, and the cone-shaped antenna mounts on a user-supplied pole.

Figure 2.2: GPS Antenna and Cable



SECTION 3: PARTS AND TOOLS

This section describes parts associated with the Exporter Plus, and tools needed during installation and routine operation.

PARTS SUPPLIED BY NAUTEL

AC POWER CABLE

An ac power cable is included with the Exporter Plus.

DOCUMENTATION

This Technical Instruction Manual accompanies the Exporter Plus. Additionally, the documentation is provided online. See [“Online resources”](#) on page xi.

PARTS NOT SUPPLIED BY NAUTEL

Nautel does not supply some parts and materials required to complete installation. The parts you need vary with the installation requirements.

TOOLS FOR INSTALLATION

The tools you need during Exporter Plus installation include the following:

- Philips screwdrivers, sizes # 1 and # 2

SECTION 4: UNPACKING

To install an Exporter Plus, perform the following tasks:

1. Unpack the Exporter Plus from its shipping box.
2. Remove the Exporter Plus's top cover, then remove any packing material, particularly above the CPU. Make sure that there are no loose components, and that all connectors and PCI cards are properly seated.
3. See [Section 5, "Connecting the Exporter Plus" on page 5-1](#) to install the Exporter Plus and optional UPS at the studio or transmitter site in the cabinet space you have prepared.
4. **Do not** connect ac power to the Exporter Plus at this time.

SECTION 5: CONNECTING THE EXPORTER PLUS

This section describes the interconnection between the Exporter Plus, user-supplied audio processor(s), and UPS. Typical configurations are illustrated at the end of this section:

- Figure 5.2: Exporter Plus Connections - FM system
- Figure 5.3: Exporter Plus Connections - AM system (NX series)
- Figure 5.4: Exporter Plus Connections - AM system (XR, XL, NA series and J1000)

It is assumed that there will be user-supplied audio processing, on both the IBOC and Analog MPS Audio.

Make the following connections, also shown in the applicable Figure 5.2 (on page 5-3), 5.3 (on page 5-4) or 5.4 (on page 5-5).

- **Ac and UPS Power Connections**

Use standard 120 V ac 60 Hz line cords. One line cord (Nautel Part # JN25) is provided with the Exporter Plus.

- **Exporter Plus Audio Input Connections**

Use the XLR cables labeled W1 (digital) and W2 (analog), provided in the ancillary kit, to connect the audio processor output feeds to the Exporter Plus.

- **Exciter Link Ethernet Connection**

Use the CAT5 Ethernet cable labeled W4, provided in the ancillary kit.

- **Exporter Plus Analog Output Connection**

Use the XLR cable labeled W3, provided in the ancillary kit, to connect the Exporter Plus' analog out to the system exciter.

- **10 MHz Connection**

For FM systems only (when used): use the BNC cable labeled W6, provided in the ancillary kit, to connect the Exporter Plus' 10 MHz output to the system exciter, as applicable.

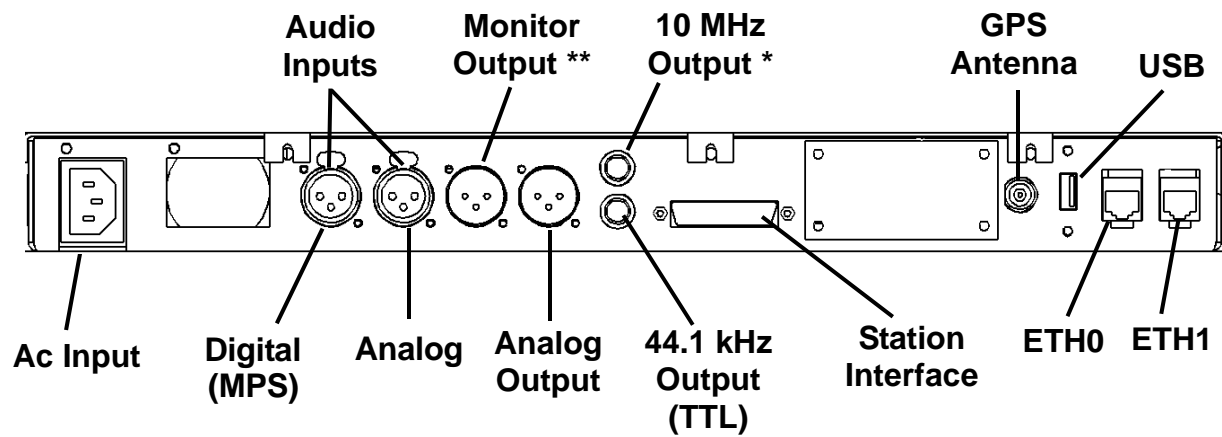
- **GPS Antenna**

Obtain the GPS antenna (Nautel Part # UD63) and GPS cable (Nautel Part # 198-5508 or Nautel Part # 198-3305-01) from the ancillary kit.

- **Remote Interface**

Use the DB25 STATION INTERFACE connector to connect remote inputs and outputs to the Exporter Plus (see [Section 7, "Remote interfacing" on page 7-1](#) for remote connection details).

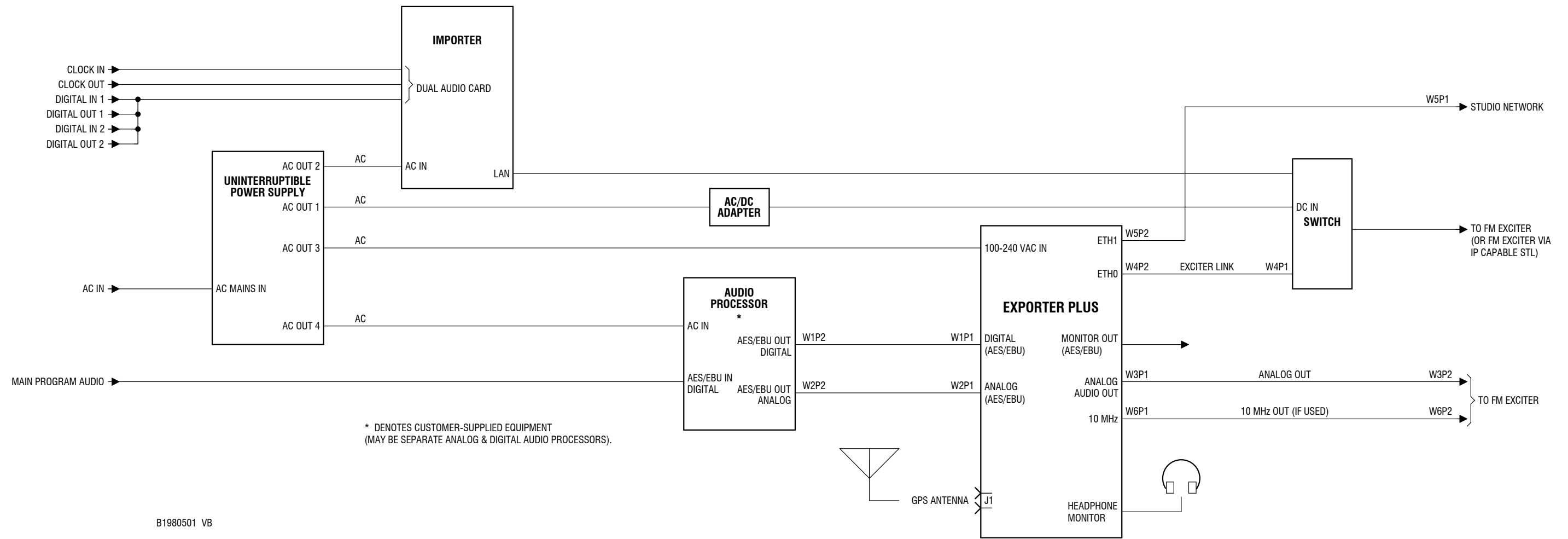
Figure 5.1: Exporter Plus: back panel



* - Not typically used. Normally, the 10 MHz is provided via ETH0.

** - User defined signal type; selected signal will also be provided on front panel headphone jack.

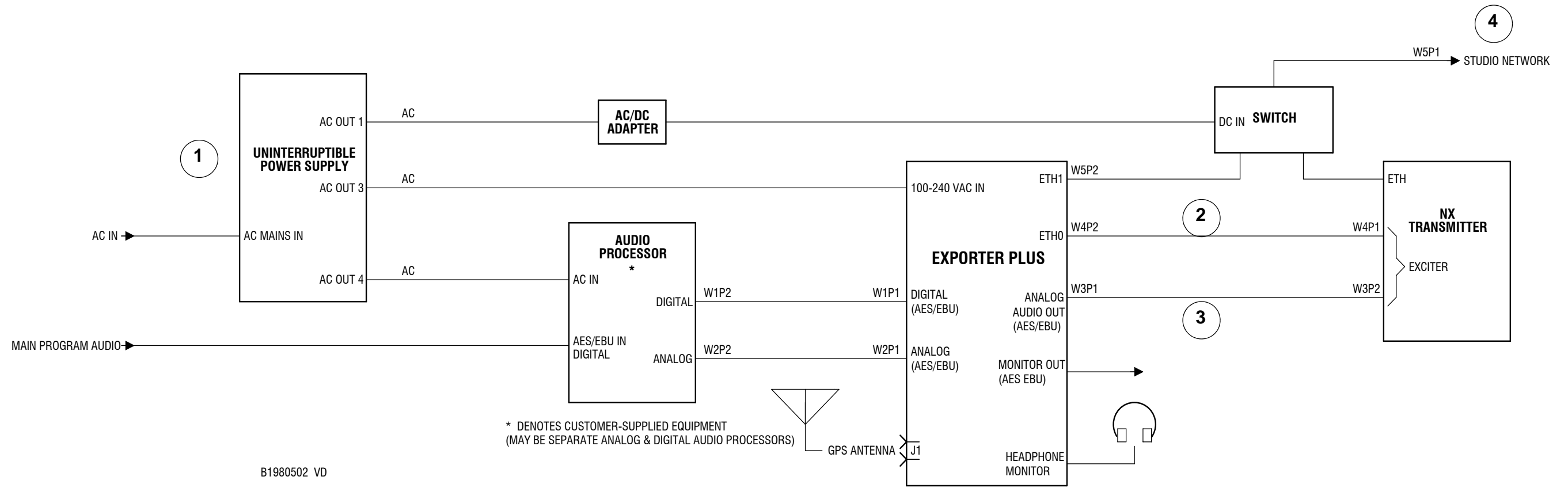
Figure 5.2 Exporter Plus Connections, FM systems



When connected as shown:

- Exporter plus, Importer and Exciter are on a separate subnet (ETH0) from the studio network (ETH1). This configuration can minimize interference to streaming IBOC IP traffic for studio network equipment. See [Managing network traffic](#) on [page 1-4](#) for more information.
- UPS is optional, but generally recommended to ensure fastest possible recovery from ac brown-out conditions.

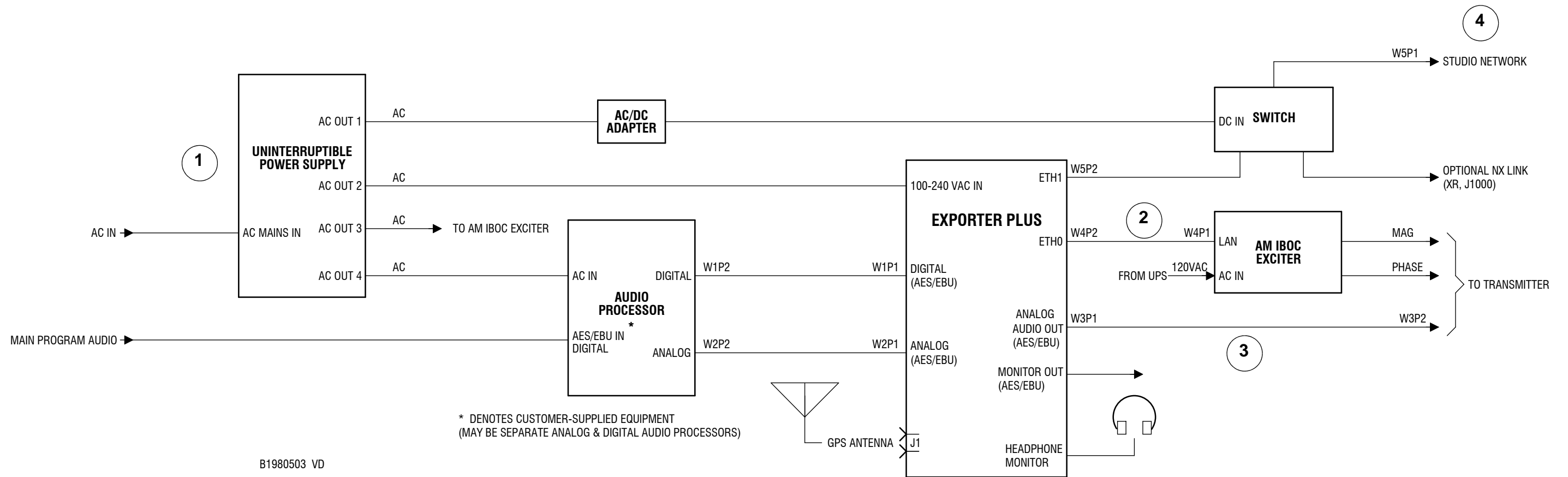
Figure 5.3 Exporter Plus Connections, AM system (NX Series)



1. UPS is optional, but generally recommended to ensure fastest possible recovery from ac brown-out conditions.
2. Analog audio to NX transmitter is used as a backup.
3. If transmission system is not co-located with studio, studio network connection is over an IP capable STL.

Figure 5.4 Exporter Plus Connections, AM system (XR, XL, NA* series and J1000)

* Upgrade may be required



1. UPS is optional, but generally recommended to ensure fastest possible recovery from ac brown-out conditions.
2. Analog audio to transmitter is used as a backup.
3. If transmission system is not co-located with studio, studio network connection is over an IP capable STL.

SECTION 6: QUICK SETUP PROCEDURE

This section provides information on setting up the Exporter Plus with the goal of being on-air with an IBOC signal.

- [Starting the Exporter Plus - see page 6-2](#)
- [Verifying operating mode - see page 6-3](#)
- [Setting time zone offset - see page 6-4](#)
- [Configuring the network - see page 6-5](#)
- [Configuring the exciter - see page 6-7](#)
- [Checking audio input levels - see page 6-8](#)
- [Checking GPS status - see page 6-9](#)
- [Checking LAN status - see page 6-10](#)
- [Setting Audio Diversity Delay - see page 6-11](#)
- [Setting/verifying station information - see page 6-12](#)



Note: Refer to Section 8, "Operating" on page 8-1 for a complete hierarchy of all user interface (UI) menu options as well more detailed information on any of the user interface pages referenced in this section.

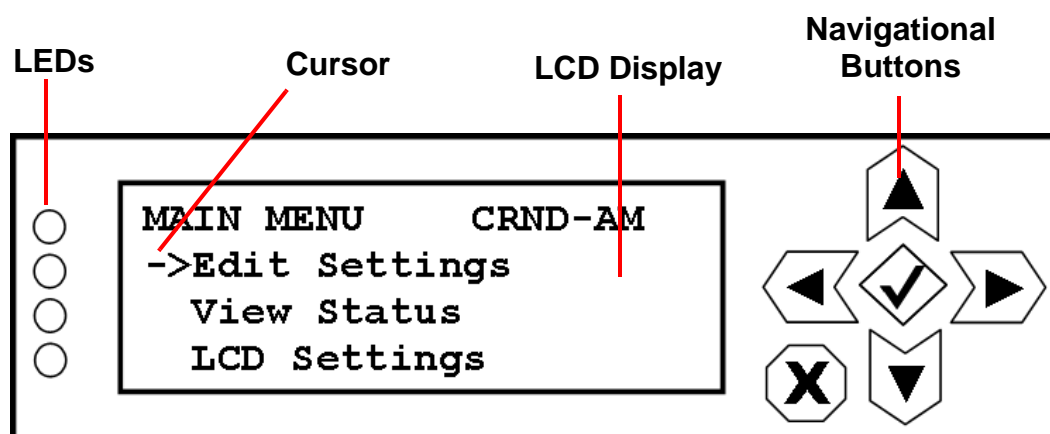
STARTING THE EXPORTER PLUS


Prior to starting this procedure, ensure that the IBOC carriers cannot be broadcast, either by muting the exciter, or by disconnecting the LAN connection from the Exporter Plus.

1. Turn on an audio processor (or audio processors) and verify that the audio is OK
2. Turn on the Exporter Plus using the front panel on/off switch.

The system will start up (for about 35 seconds). During initialization the **Status** LED on the left-hand side of the Exporter Plus' UI (see [Figure 6.1](#)) will be red and the other three LEDs will be amber. The LEDs will then flash for about 10 seconds before settling on their actual status.

Figure 6.1: Exporter Plus UI

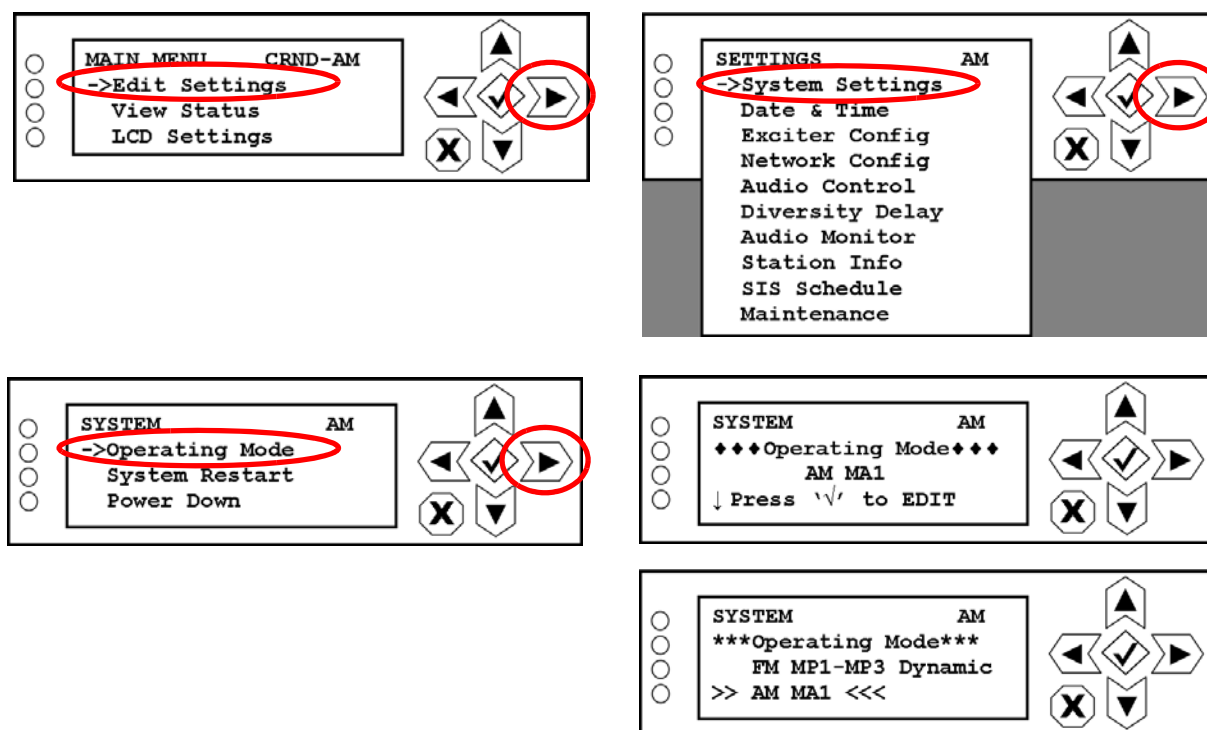


 *Note: Refer to [Section 8, "Operating" on page 8-1](#) for a complete hierarchy of all user interface (UI) menu options as well as more detailed information on any of the user interface pages referenced in this section.*

VERIFYING OPERATING MODE

The operating mode of the Exporter Plus is typically set at the factory. Verify the operating mode is set properly as follows:

Figure 6.2: Verifying Operating Mode



1. From the UI's Edit Settings - System Settings page, select Operating Mode (see [Figure 6.2](#)).
2. Verify the operating mode is set correctly:

For AM operation, select **AM MA1**

For FM operation, select **FM MP1-MP3**



Note: The Exporter Plus will restart after a mode change.

SETTING TIME ZONE OFFSET

Set the time zone offset as follows:


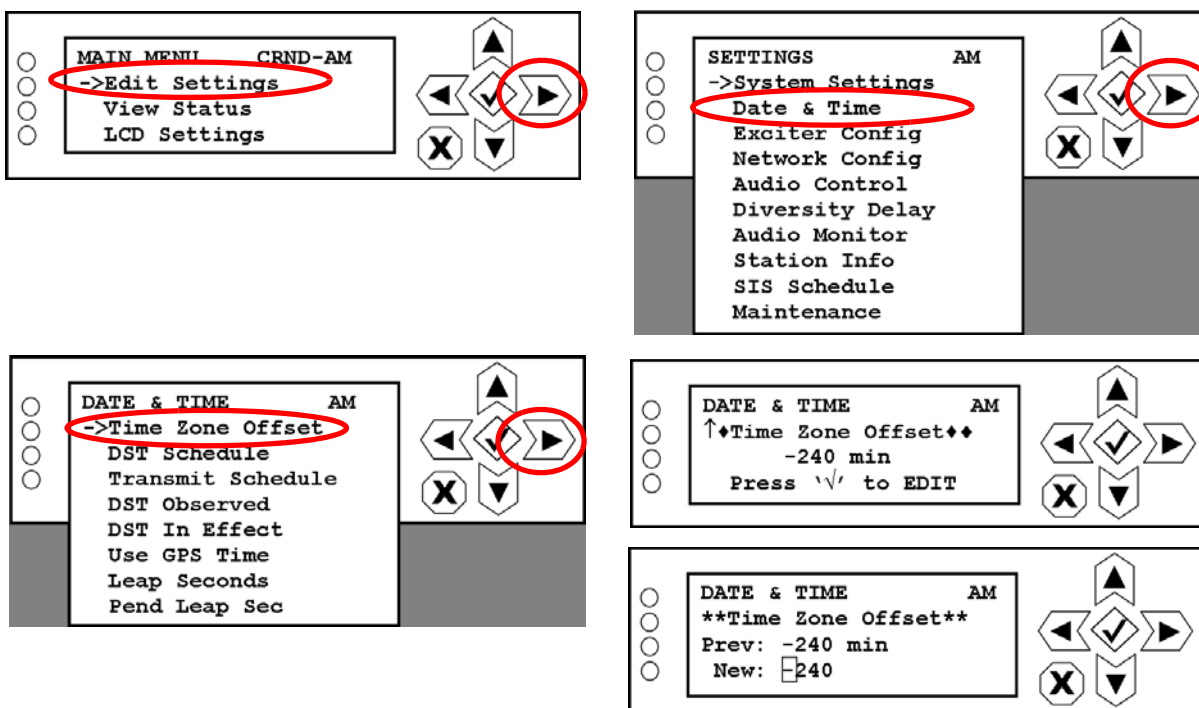
 *Note: Exporter Plus time is derived via the GPS system. If satellites are being received, time will be set accordingly.*

Figure 6.3: Setting Time Zone Offset



1. From the UI's Edit Settings - Date & Time page, select Time Zone Offset (see [Figure 6.3](#)).
2. Set your time zone offset, in minutes (e.g. Eastern standard time zone is -5 hours, or -300 minutes).

CONFIGURING THE NETWORK

Nautel recommends using separate subnets for ETH 0 and ETH 1 (see [Figure 1.6 on page 1-5](#)). IBOC data is sent from the Exporter Plus (via ETH 0) to the exciter, over a dedicated subnet, using a standard Ethernet connection. Also, supplying MPS program service data (title, artist, etc.) requires an Ethernet connection to the MPS automation system, on the primary subnet.

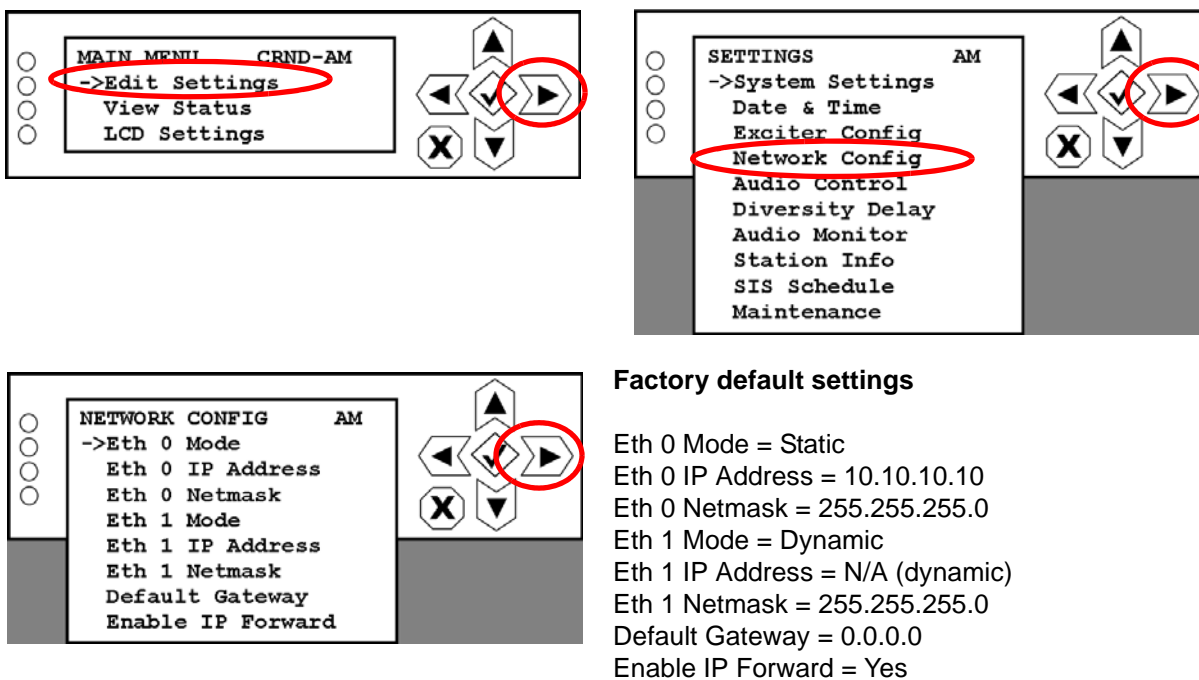
In order to communicate properly, each LAN component must have its own individual Ethernet address. Nautel Exporters, Importers and exciters are pre-configured and tested with compatible addresses prior to shipping. These addresses may be changed at the customer's installation site should it become necessary. Nautel presets the Network Config menu values as shown in [Figure 6.4](#).

NOTE: Before proceeding with IP address changes, you should verify with your network administrator that no other devices have been – or can be through DHCP – assigned the Exporter Plus' intended IP address. Consult with your network administrator to acquire acceptable IP and Netmask addresses.

Review the recommended system connections shown in Figures 5.2 through 5.4.

Configure the LAN as follows:

Figure 6.4: Network Configuration

**NOTES:**

Eth 0 is intended for Nautel use . Do not change IP addresses.

Eth 1 is intended for customer (external) use

To access external networks, set the Default Gateway IP for the IP of the customer supplied router.

1. Enter the UI's **Edit Settings - Network Config** page (see [Figure 6.4](#)).
2. Select the appropriate item from the **NETWORK CONFIG** list. If necessary, configure the mode, IP address and netmask for one or both Ethernet ports (0 and 1), as applicable, and the default gateway address. If changes are made, save each setting.
3. Set **Enable IP Forward** to **Yes** if both Ethernet ports are used.

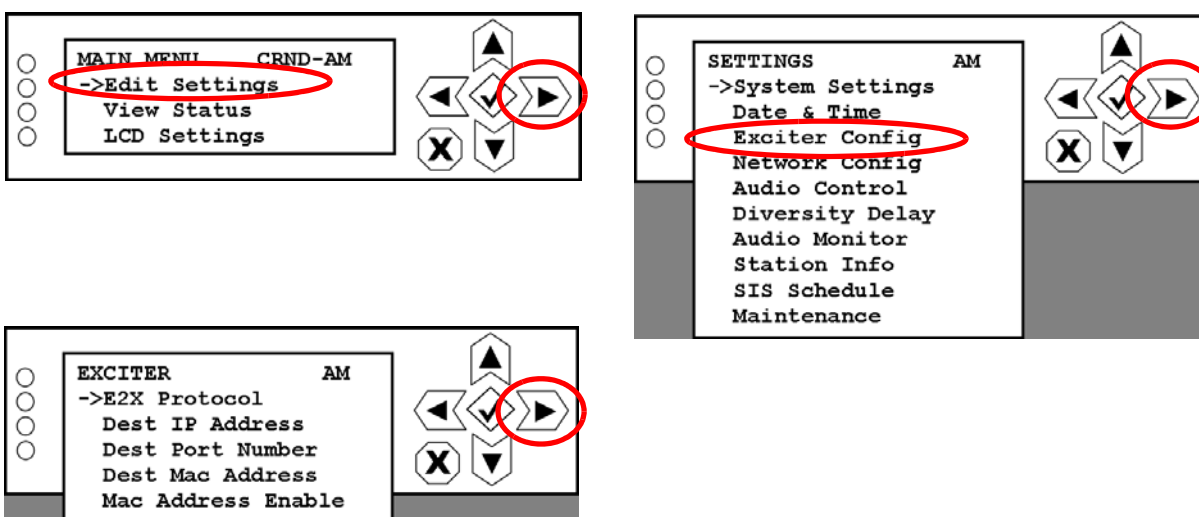
CONFIGURING THE EXCITER

The Exporter Plus must be able to connect to an exciter. To perform this task, you must obtain the IP address and exciter link port number for the exciter. If the IP connection between the Exporter Plus and the exciter is unidirectional, then you will also need the MAC address of the exciter.

The selection of exciter link port number is somewhat arbitrary, but it must be set to the same value in both the Exporter Plus and the exciter (Exgine configuration setup). Nautel recommends a value of 9000.

Configure the network information for the exciter and Exgine, if necessary, as follows:

Figure 6.5: Exciter Configuration

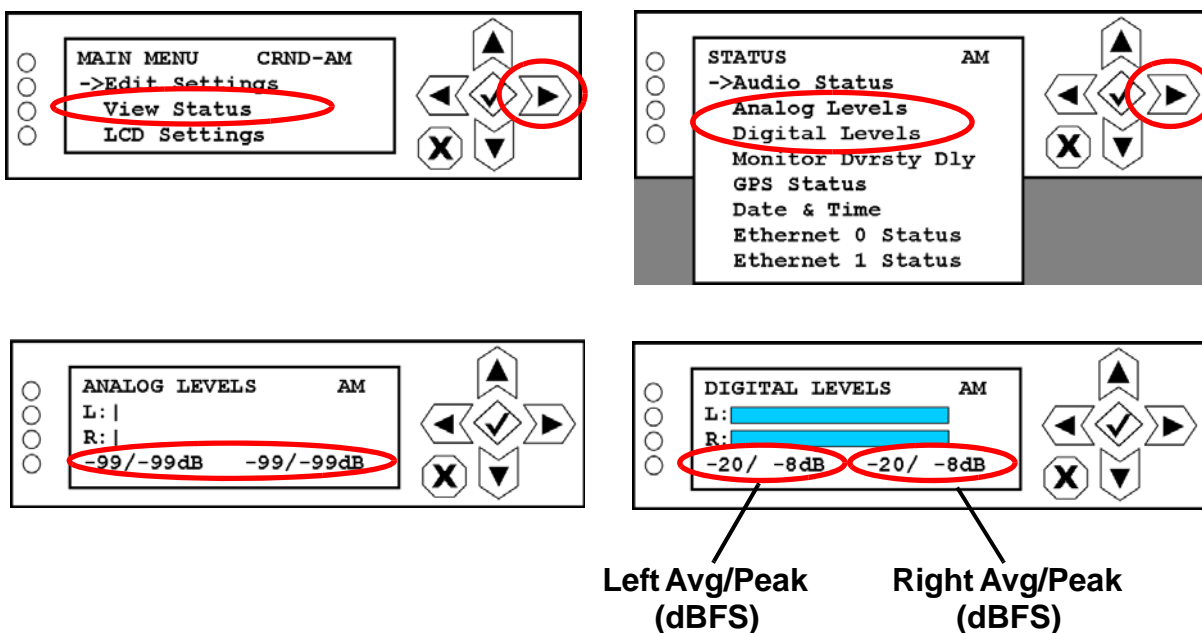


1. Enter the UI's **Edit Settings - Exciter Config** page (see [Figure 6.5](#)).
2. Select the appropriate item from the **EXCITER** list and configure the E2X protocol, IP address, port number and MAC address. It is only necessary to set MAC address if the network connection to the exciter is unidirectional, which is common with some types of digital STLs.
3. Set **MAC Address Enable** to **Yes** if MAC address configuration was required.

CHECKING AUDIO INPUT LEVELS

Check the analog and digital audio input levels as follows:

Figure 6.6: Checking Audio Input Levels

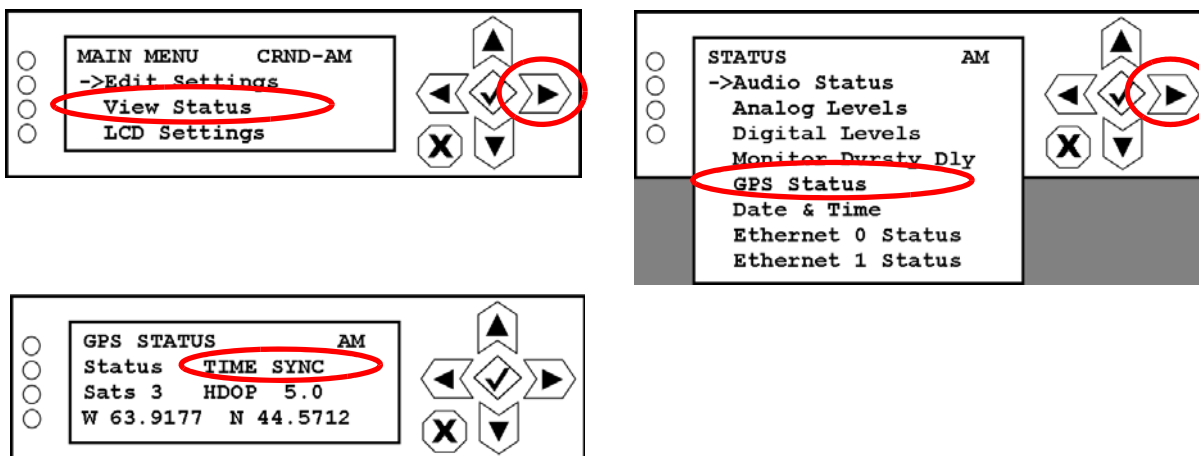


1. From the UI's **View Status** page, select either **Analog Levels** or **Digital Levels** (see [Figure 6.6](#)).
2. Verify that the audio levels are OK, noting the left and right channel levels are shown in bar display format, which includes average/peak value.

CHECKING GPS STATUS

Check the GPS status as follows:

Figure 6.7: Checking GPS Status

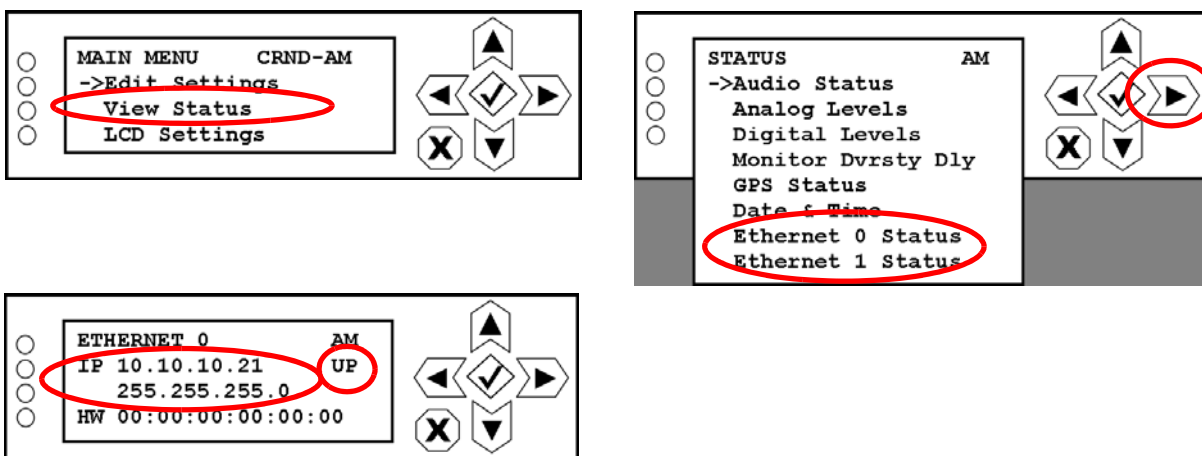


1. From the UI's **View Status** page, select **GPS Status** (see [Figure 6.7](#)).
2. Check that the **Status** line displays **TIME SYNC**, which indicates the Exporter Plus is locked to the GPS system. It may take up to 15 minutes after power up to reach this state.
3. Check that the number of satellites (**Sats**) is greater than 4.
4. Check that the **HDOP** value is 4 or less.
5. Refer to [Section 10, "Troubleshooting"](#) on page 10-1 if there is a problem.

CHECKING LAN STATUS

Check the network status (previously configured in “Configuring the network” on page 6-5) as follows:

Figure 6.8: Checking LAN Status



1. From the UI's **View Status** page, select either **Ethernet 0 Status** or **Ethernet 1 Status** (see [Figure 6.8](#)).
2. Verify the IP address and netmask address are correct. If **UP** is displayed, your network is connected.

Use a PC connected to the network to ‘ping’ the Exporter Plus IP addresses.

3. Refer to [Section 10, “Troubleshooting”](#) on page 10-1 if there is a problem.

SETTING AUDIO DIVERSITY DELAY

The analog audio **Diversity Delay** should be adjusted to ensure proper time alignment between the analog and digital audio. The analog delay is implemented in the analog audio path to compensate for the diversity and processing delays that are inherent to the digital audio path. This delay may be set in the Exporter Plus' **AUDIO > Analog Audio Diversity** menu, or in the exciter. Typically, the analog delay will be approximately eight seconds.

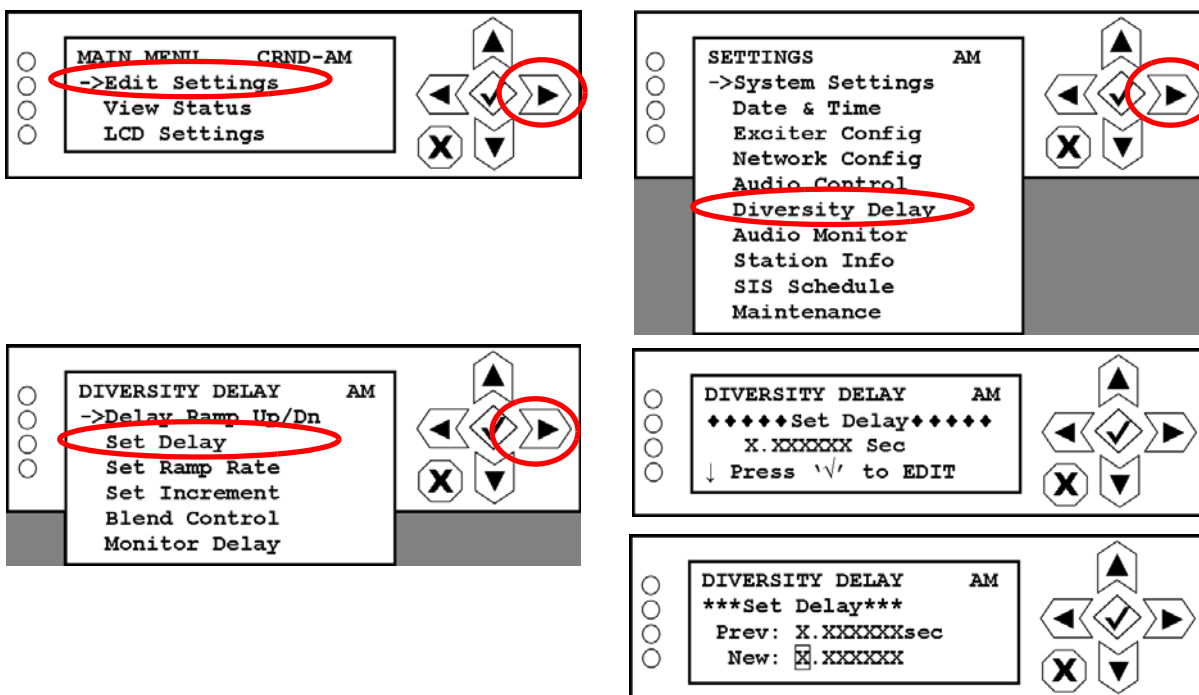
Due to functional differences between AM and FM systems, diversity delay setting is normally only required for FM systems. For AM systems, the delay configured at the factory should not require adjustment.

The diversity delay should be calibrated during the Exporter Plus/exciter installation. Thereafter, it may require adjustment after changes are made to any devices in the digital data path, or to audio processing. Changes made to the audio filtering may substantially affect the audio path timing.

Commercially-available HD monitors can be used for monitoring and adjusting the diversity delay. It is also possible to use commercial receivers if they support this type of measurement.

Set the diversity delay as follows:

Figure 6.9: Setting Diversity Delay

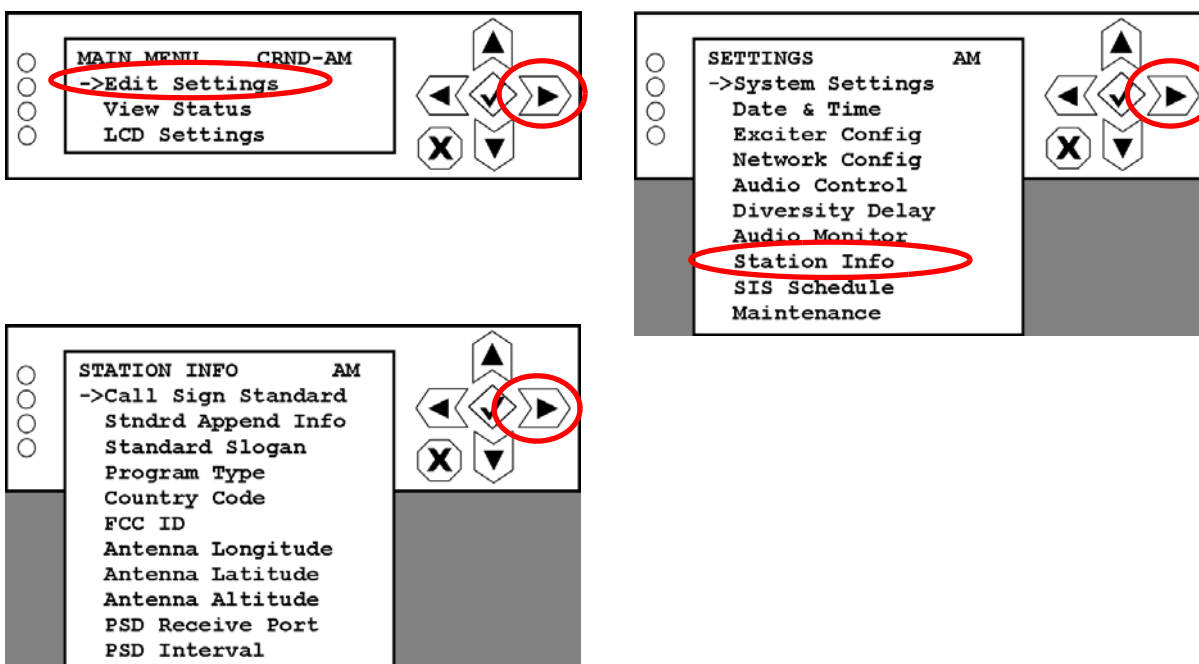


1. From the UI's **Edit Settings** page, select **Diversity Delay** (see [Figure 6.9 on page 6-11](#)).
2. Select **Set Delay** from the **DIVERSITY DELAY** list and follow the instructions on the UI pages to edit the delay value. Save the setting.
3. You can monitor the diversity delay setting using the **View Status > Monitor Dvrsty Dly** page.

SETTING/VERIFYING STATION INFORMATION

Set or verify station pertinent information such as call sign, slogan, FCC ID, country code and program (format) type as follows:

Figure 6.10: Station Information



1. Enter the UI's **Edit Settings - Station Info** page (see [Figure 6.10](#)).
2. Select the appropriate item from the **STATION INFO** list and configure the call sign, append info (displays -AM or -FM suffix after call sign), standard slogan, program type, country code (typically provided by Iqity), FCC ID (provided by the FCC), antenna location (longitude, latitude and altitude), PSD receive port and PSD interval.

SENDING THE IBOC DATA TO THE TRANSMITTER

Once the Exporter Plus configuration has been checked, it may be put online.

1. Undo the method used to disable the IBOC signal in [“Starting the Exporter Plus” on page 6-2](#).
 2. Turn on the Exporter Plus and check for alarms. Review the Troubleshooting section of this manual if any alarms cannot be cleared.
 3. If the exciter is not producing an IBOC signal, see Exciter Link in the Troubleshooting section to diagnose the fault.
-

REMOTE CONNECTION TO THE EXPORTER

Once the Exporter Plus software is up and running, you can connect to the Exporter Plus remotely from another computer on the same network via a web interface. See [Section 7, “Remote interfacing” on page 7-1](#).

SECTION 7: REMOTE INTERFACING

This section describes remote control and monitoring of the Exporter Plus. There are two methods available for remote interfacing:

- [Discrete wiring - Station Interface connector](#)
- [Network based control - Ethernet interface - see page 7-3](#)

DISCRETE WIRING - STATION INTERFACE CONNECTOR

The **STATION INTERFACE** connector (DB25) on the back of the Exporter Plus contains nine digital inputs. These inputs allow you to remotely control various operational characteristics of the Exporter Plus.

See [Table 7.1 on page 7-2](#) for a list of the digital inputs, interfacing logic levels, functional description, and **STATION INTERFACE** pin number.

If this method is used, install suitable wiring in a male DB25 connector and mate it to the **STATION INTERFACE** connector. Route the other end of the wires to the remote control/monitoring location.

Table 7.1: Station Interface Connector Digital Inputs

Signal	Direction (Level)	Function	Pin
Not Used	Input (Open/Ground)	-	1
Diversity Delay Ramp Up	Input (Open/Ground)	Ramps up diversity delay when ground is applied.	3
Diversity Delay Ramp Down	Input (Open/Ground)	Ramps down diversity delay when ground is applied.	4
Diversity Delay Increase	Input (Open/Ground)	Increases diversity delay by the amount set in the UI (see "Setting Delay Increment") when ground is applied.	5
Diversity Delay Decrease	Input (Open/Ground)	Decreases diversity delay by the amount set in the UI (see "Setting Delay Increment") when ground is applied.	6
Audio Bypass On/Off	Input (Open/Ground)	Bypasses analog audio when ground is applied.	7
Watchdog Disable	Input (Open/Ground)	Application watchdog is disabled when ground is applied.	11
Power On/Off	Input (Open/Ground)	Power switches off when ground is applied and on when changed from ground to open circuit.	12
1 PPS In	Input (3.3 V/Ground)	Passes through interface card to Exporter PCI card.	18
1PPS Out	Output (3.3 V/Ground)	Passes through interface card from Exporter PCI card.	10
Common	-	-	25

NETWORK BASED CONTROL - ETHERNET INTERFACE

All user interface functions on the Exporter Plus front panel are available through an Ethernet remote interface feature. This interface basically duplicates the front panel display using a text-based display on a PC.

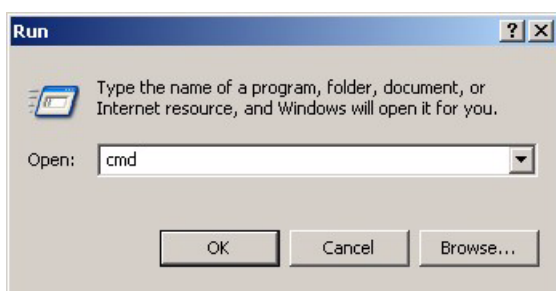
Set up the Ethernet interface as follows:



Note: Telnet (Telecommunication network) protocol is used as the basis for this type of interface. Telnet may be interfaced from any Terminal Emulation application that supports TCP/IP protocol and VT100 or XTerm emulation.

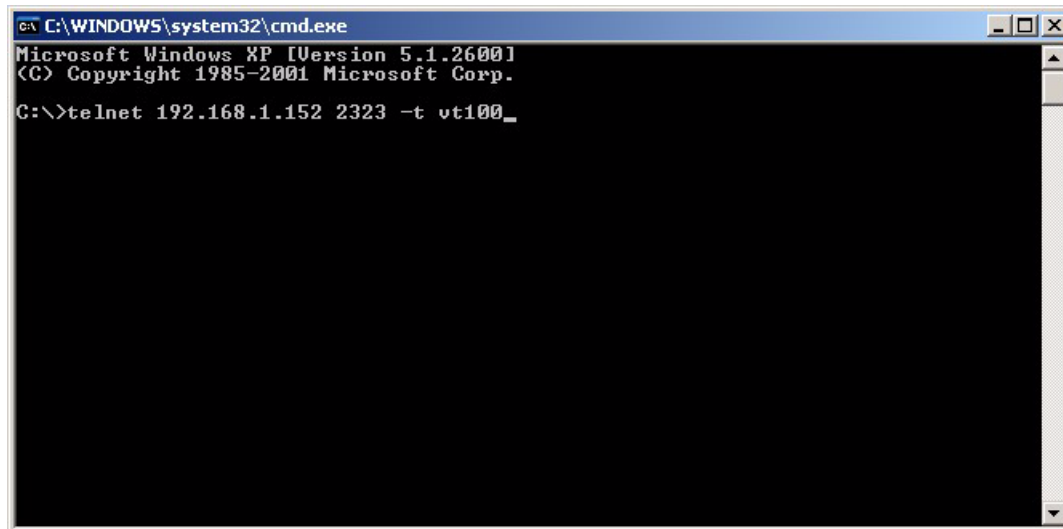
1. Log on to a PC on a network that can access the Exporter Plus. See [Figure 1.5 on page 1-4](#) or [Figure 1.6 on page 1-5](#) for examples.
2. From the **Start** menu on your PC's Windows desktop, select **Run...**, enter **cmd** in the **Open:** field and click **OK** (see [Figure 7.1](#)).

Figure 7.1: Windows Run Command

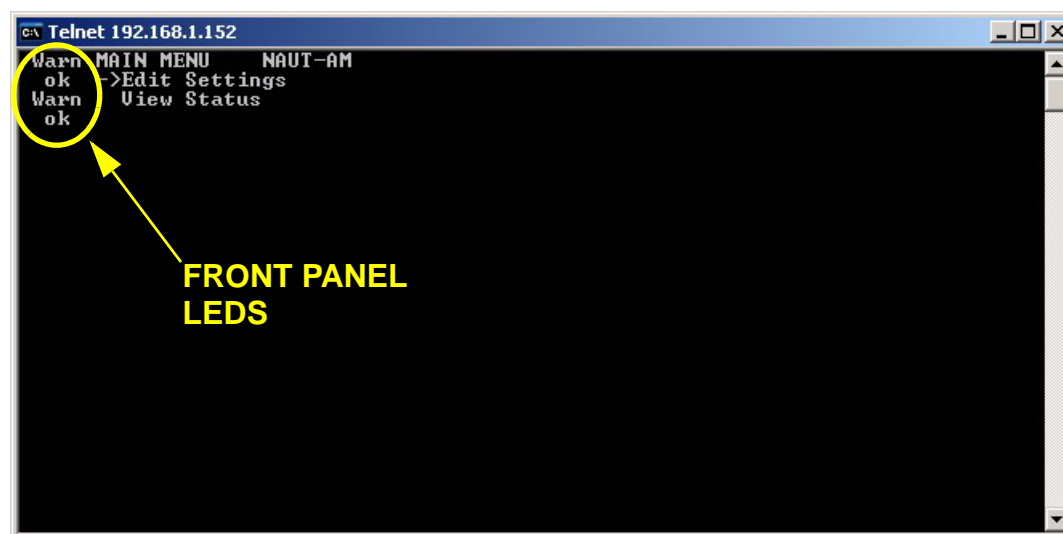


3. At the command prompt enter **telnet xxx.xxx.xxx.xxx 2323 -t vt100** (see [Figure 7.2 on page 7-4](#)). Note that:

xxx.xxx.xxx.xxx is the IP address of the Exporter Plus.
2323 is the Ethernet port number for the application.
-t vt100 sets the terminal emulation type.

Figure 7.2: Connecting to Exporter Plus

4. When a connection is established the remote user interface will appear (see [Figure 7.3](#)).

Figure 7.3: Remote User Interface

The user interface is controlled in exactly the same way as the front panel UI. On your PC's keyboard, use the up, down, left and right arrow keys to navigate. Use the **Enter** key instead of the checkmark (OK) button. Use the **Esc** key instead of the X (cancel) button.

Front panel LEDs are represented using text strings.

Err! = red; Warn = amber; ok = green.

SECTION 8: OPERATING

This section provides information about operating the Exporter Plus:

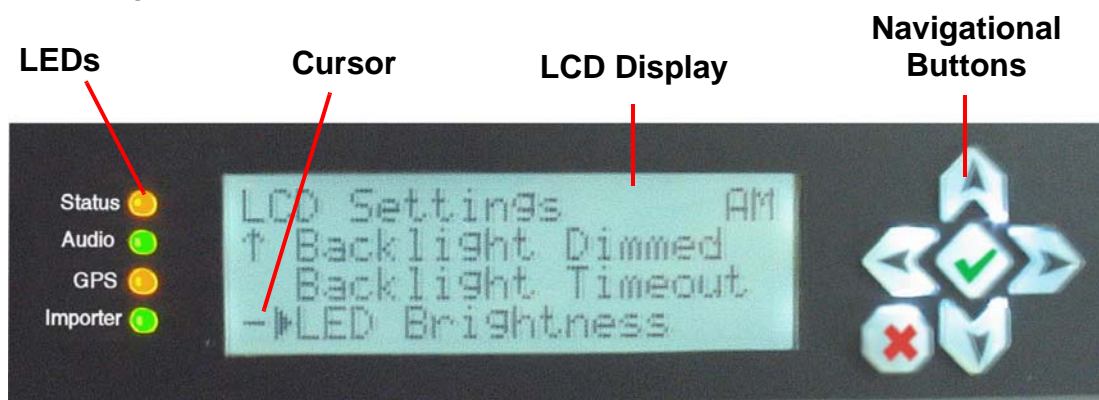
- [User interface - see page 8-2](#)
 - [LCD display - see page 8-2](#)
 - [Navigational buttons - see page 8-2](#)
 - [Saving settings - see page 8-5](#)
- [Main menu - see page 8-7](#)
- [Edit settings - see page 8-8](#)
 - [System settings - see page 8-9](#)
 - [Setting daylight saving time schedule - see page 8-14](#)
 - [Network configuration - see page 8-22](#)
 - [Audio control - see page 8-27](#)
 - [Diversity delay - see page 8-32](#)
 - [Audio monitor - see page 8-37](#)
 - [Station information - see page 8-42](#)
 - [SIS schedule - see page 8-50](#)
 - [Maintenance - see page 8-53](#)
 - [Software upgrade procedure on page 8-57](#)
- [View status - see page 8-58](#)
 - [Audio status - see page 8-59](#)
 - [Analog levels - see page 8-59](#)
 - [Digital levels - see page 8-60](#)
 - [Monitor diversity delay - see page 8-60](#)
 - [GPS status - see page 8-61](#)
 - [Date & time - see page 8-61](#)
 - [Ethernet port status - see page 8-62](#)
- [LCD settings - see page 8-63](#)
 - [Adjust LCD contrast - see page 8-64](#)
 - [Adjust normal backlight brightness - see page 8-64](#)
 - [Adjust dimmed backlight brightness - see page 8-65](#)
 - [Set backlight timeout period - see page 8-65](#)
 - [Adjust LED brightness - see page 8-66](#)

USER INTERFACE

The Exporter Plus' user interface (UI) is 4 x 20 character LCD display on the front panel (see [Figure 8.1](#)). The UI can be controlled by its adjacent keypad and is also available as a flash graphic on any web-interfaced PC or handheld device via the internal web server. The UI contains a menu-based series of pages that serve specific functions (see [Table 8.1 on page 8-6](#)).

See the complete menu hierarchy illustrated in [Figure 8.2](#) and [Figure 8.3](#).

Figure 8.1: Exporter Plus UI



LCD DISPLAY

This screen displays all the UI pages. See [Table 8.1 on page 8-6](#) for a list of menus and their basic functions.

NAVIGATIONAL BUTTONS

There are six push-buttons on the right-hand side of the LCD display that allow navigation through the UI pages.

- Up and down - move cursor up and down through the associated page
- Left - go to the next higher level menu screen, as applicable
- Right - go to the next lower level menu screen, as applicable
- Checkmark - acts as an “accept” function; display will prompt its use
- X - acts as a “cancel” function; display will prompt its use

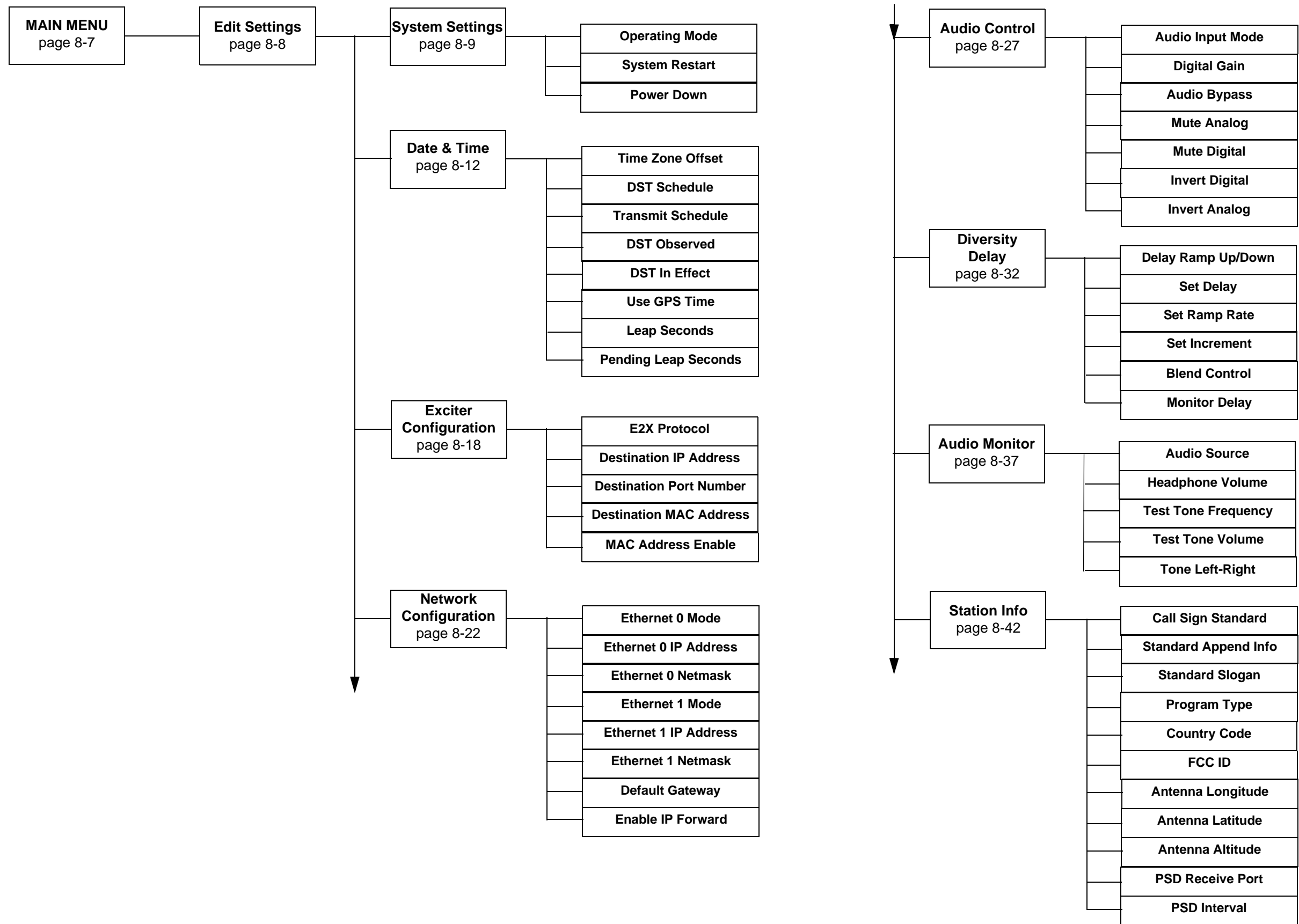


Figure 8-2: Exporter Plus UI Hierarchy (Sheet 1 of 2)

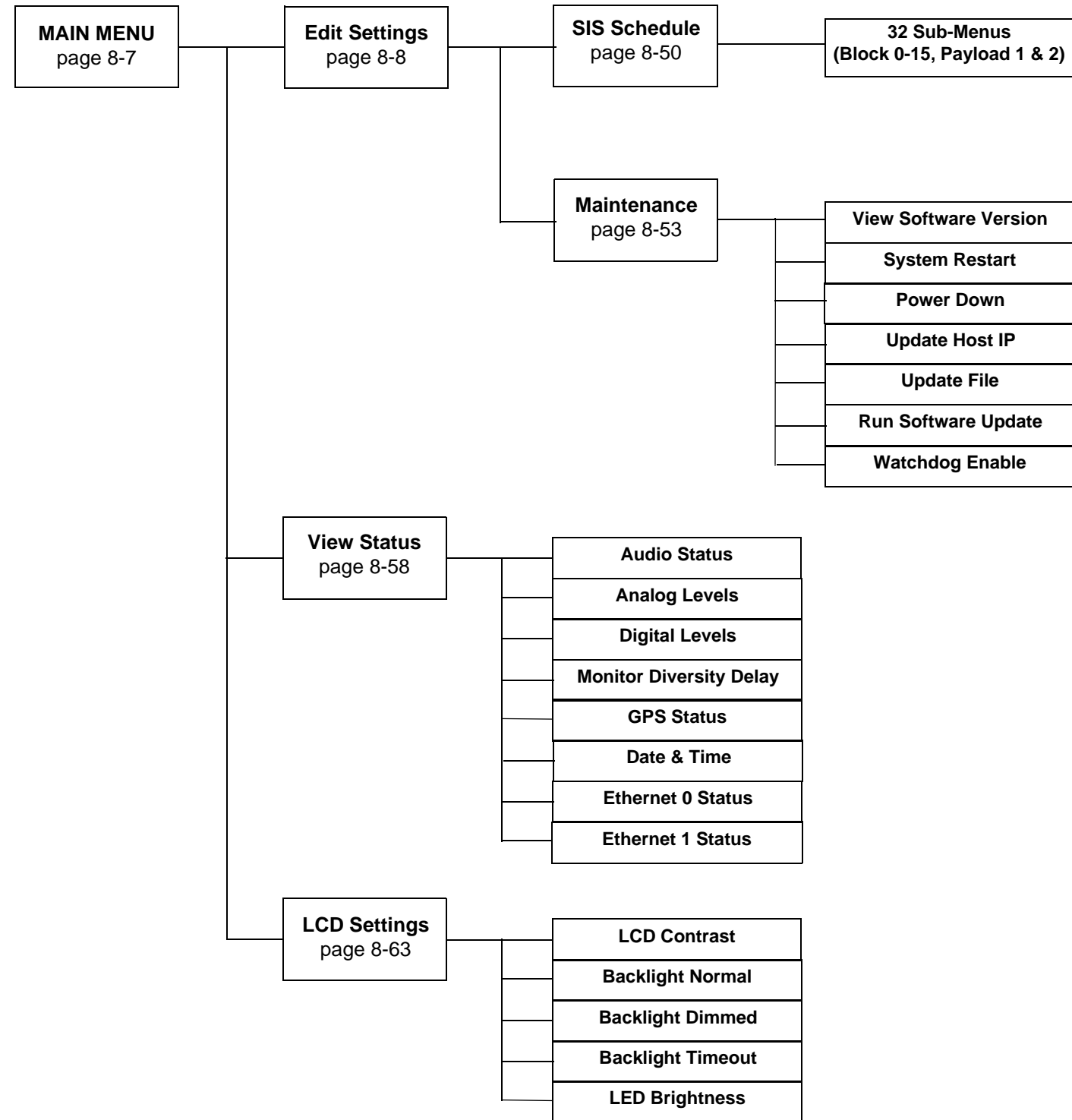
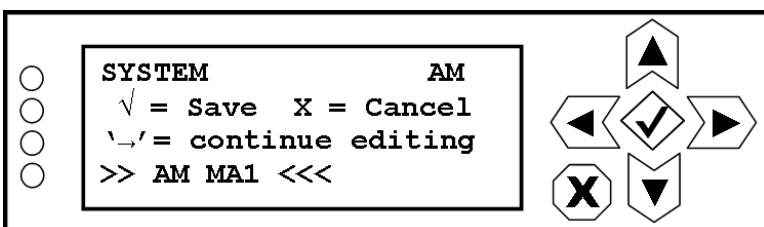


Figure 8-3: Exporter Plus UI Hierarchy (Sheet 2 of 2)

SAVING SETTINGS

Many of the UI screens allow for modifying a selected setting. When you accept a setting change in an editing screen, a save/cancel confirmation screen (see example in [Figure 8.4](#)) will appear. From this screen you have the option to **Save** (checkmark), **Cancel** (X) or **continue editing** (right button).

Figure 8.4: Save/Cancel Confirmation Screen



LEDs

There are four LEDs on the left-hand side of the LCD display that provide operational status. The LEDs can glow green, yellow or red. Typically, green indicates normal operation, yellow indicates a warning, and red indicates a fault or error.

Refer to the Troubleshooting section for more detailed information on LED status.

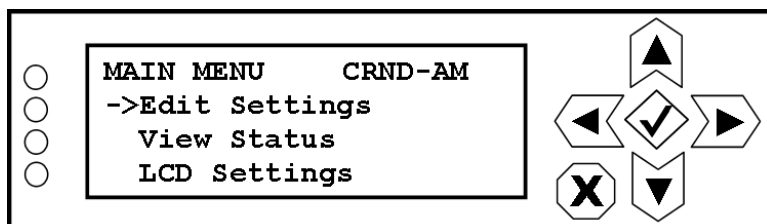
Table 8.1: UI Menus

UI Menu Name	Function	Page
MAIN MENU	Top level menu; allows entry to three sub-menus - Edit Settings, View Status and LCD Settings.	8-7
SETTINGS	Establish system settings, exciter and network parameters, audio input and monitor settings, diversity delay and station information.	8-8
Settings - SYSTEM	Set operating mode, perform a system restart or power down.	8-9
Settings - DATE & TIME	Set time zone offset, daylight savings time (DST) schedule and other DST settings, transmit schedule, use GPS time, and set leap seconds.	8-12
Settings - EXCITER	Set the exciter IP address and the exciter MAC address.	8-18
Settings - NETWORK	Set the network parameters (mode, IP address, netmask) for Ethernet ports 0 and 1 as well as the default gateway address.	8-22
Settings - AUDIO CONTROL	Set the audio input mode and digital gain; enable/disable audio bypass; mute the analog or digital input.	8-27
Settings - DIVERSITY DELAY	Set diversity delay parameters.	8-32
Settings - AUDIO MONITOR	Select the source of the audio being monitored.	8-37
Settings - STATION INFO	Set station pertinent information such as call sign, standard slogan, program type, country code, FCC ID, antenna location (latitude, longitude and altitude), PSD receive port and PSD interval.	8-42
Settings - SIS SCHEDULE	Set Station Information Service (SIS) schedule data.	8-50
Settings - MAINTENANCE	Perform software updates and enable a watchdog timer function.	8-53
STATUS	View status of audio, analog levels, digital levels, diversity delay setting, GPS status, date and time and Ethernet ports 0 and 1.	8-58
LCD SETTINGS	Set LCD contrast, brightness and backlight.	8-63

MAIN MENU

All navigation through the UI menus begins on the MAIN MENU shown in [Figure 8.5](#).

Figure 8.5: Main Menu



This menu has three sub-menu options:

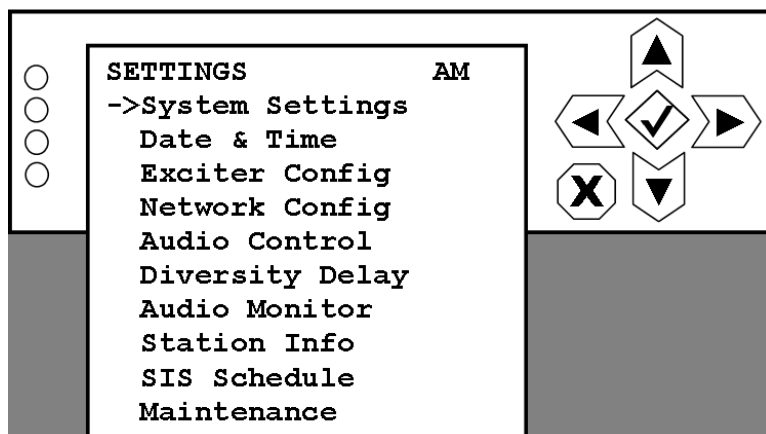
- **Edit Settings** - allows access to all configurable parameters and settings for the Exporter Plus (see [Edit settings on page 8-8](#)).
- **View Status** - allows monitoring of Exporter Plus status, including audio type and levels, diversity delay setting, GPS status, date and time, and Ethernet port status (see [View status on page 8-58](#)).
- **LCD Settings** - allows adjustment of the LCD display's contrast, brightness and backlight settings (see [LCD settings on page 8-63](#)).

Use the up and down buttons to move the cursor to the desired option and then press the right button to open the selected menu.

EDIT SETTINGS

You can configure various parameters of the Exporter Plus in the **SETTINGS** menu (see [Figure 8.6](#)).

Figure 8.6: Edit Settings Menu



This menu has eight sub-menu options:

- **System Settings** - allows access to AM/FM IBOC mode for the Exporter Plus (see [“System settings”](#) on page 8-9).
- **Date & Time** - allows setting of time zone offset, daylight savings time schedule, usage of GPS time, and leap seconds (see [“Date & time”](#) on page 8-12).
- **Exciter Config** - allows setting of E2X protocol, destination IP address, port and MAC address for the downstream exciter (see [“Exciter configuration”](#) on page 8-18).
- **Network Config** - allows configuration of the Exporter Plus Ethernet ports 0 and 1, such as mode, IP and netmask as well as the associated gateway address (see [“Network configuration”](#) on page 8-22).
- **Audio Control** - allows access to various audio controls such as adjusting the digital gain, bypassing the analog audio and muting the analog or digital input, (see [“Audio control”](#) on page 8-27).
- **Diversity Delay** - allows setting of analog diversity delay parameters such as delay, ramp direction, ramp rate and blend control (see [“Diversity delay”](#) on page 8-32).
- **Audio Monitor** - allows for headphone monitoring of the analog or digital inputs or of an internally generated test tone (see [“Audio monitor”](#) on page 8-37).

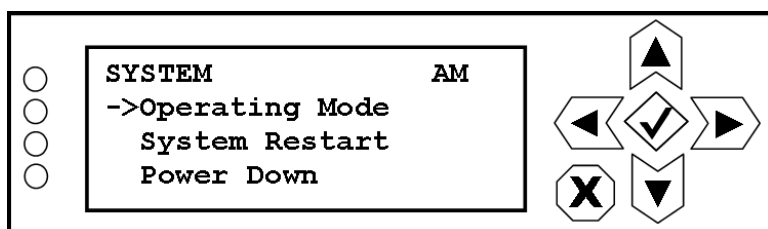
- **Station Info** - allows setting of station pertinent information such as call sign, slogan, program type, country code, FCC ID, antenna location, PSD receive port (see “[Station information](#)” on page 8-42).
- **SIS Schedule** - allows setting of Station Information Service (SIS) schedule data (see “[SIS schedule](#)” on page 8-50).
- **Maintenance** - allows access to functions that aid in performing software upgrades (see “[Maintenance](#)” on page 8-53).

Use the up and down buttons to move the cursor to the desired option and then press the right button to open the selected menu.

SYSTEM SETTINGS

From the **SYSTEM** menu (see [Figure 8.7](#)) you can configure the operating mode of the Exporter Plus, perform a system restart or power down, or set the time zone offset for your region.

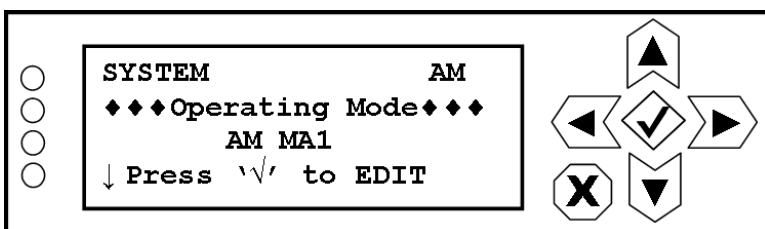
Figure 8.7: System Settings Menu



CHANGING OPERATING MODE

When you select **Operating Mode** from the **SYSTEM** menu (see [Figure 8.8](#)) you can configure the operating mode of the Exporter Plus. For AM systems, only MA1 mode is supported. For FM systems, only MP1 - MP3 mode is supported.

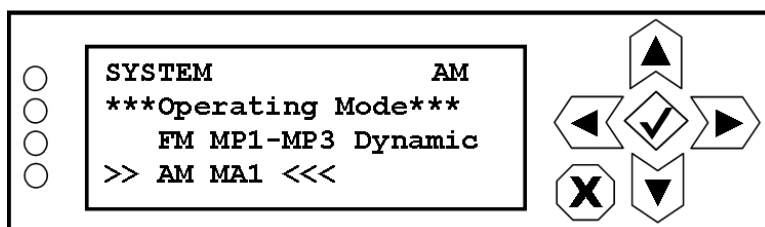
Figure 8.8: Operating Mode Screen



To change the operating mode of the Exporter Plus, press the checkmark (accept) button to enter the screen shown in [Figure 8.9 on page 8-10](#).

Use the up and down buttons to highlight the desired mode. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

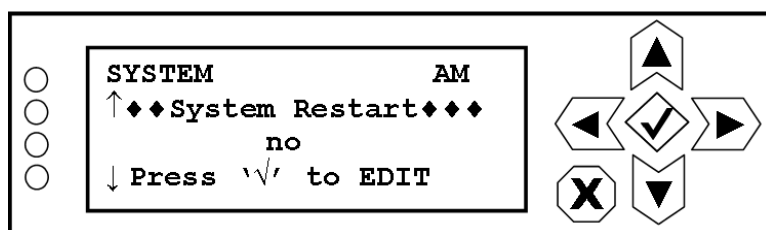
Figure 8.9: Operating Mode Editing Screen



INITIATING A SYSTEM RESTART

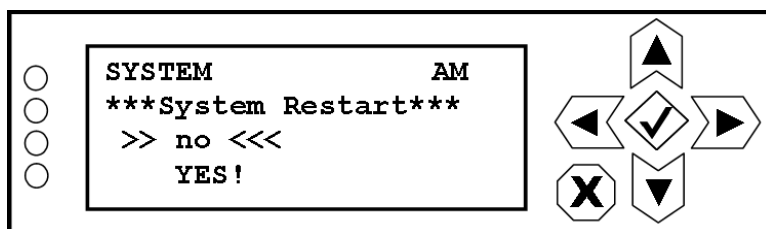
When you select **System Restart** from the **SYSTEM** menu (see [Figure 8.10](#)) you can initiate a system restart for the Exporter Plus.

Figure 8.10: System Restart Screen



To change the system restart status, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.11](#).

Figure 8.11: System Restart Editing Screen

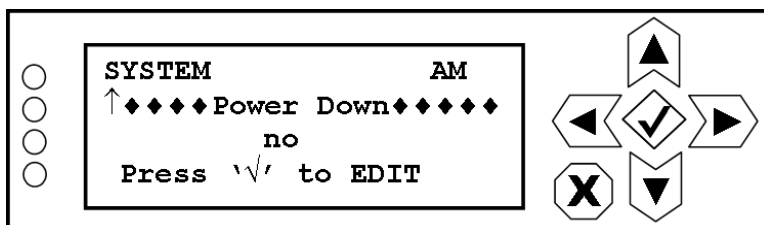


Use the up and down buttons to highlight **YES!** or **no**. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired. Selecting **YES!** initiates an immediate system restart. Upon restart of the Exporter Plus, the system restart status automatically changes to **no**.

INITIATING A POWER DOWN

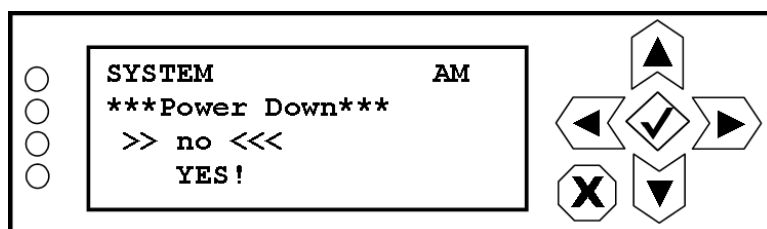
When you select **Power Down** from the **SYSTEM** menu (see [Figure 8.12](#)) you can initiate a system shutdown for the Exporter Plus.

Figure 8.12: Power Down Screen



To change the power down status, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.13](#).

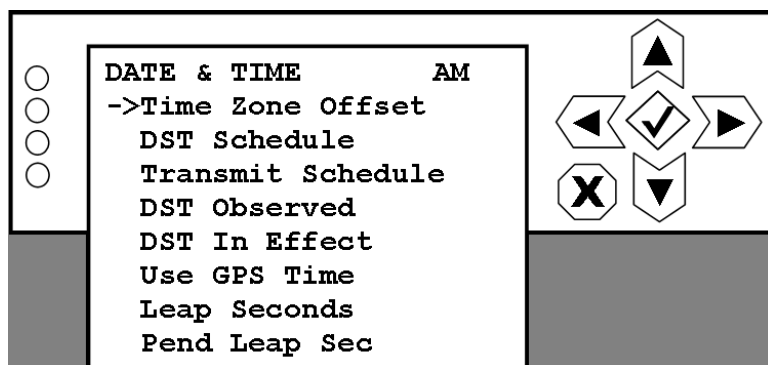
Figure 8.13: Power Down Editing Screen



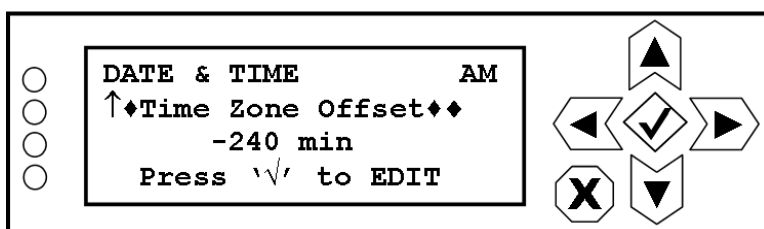
Use the up and down buttons to highlight **YES!** or **no**. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired. Selecting **YES!** initiates an immediate power down. After powering up the Exporter Plus, the power down status automatically changes to **no**.

DATE & TIME

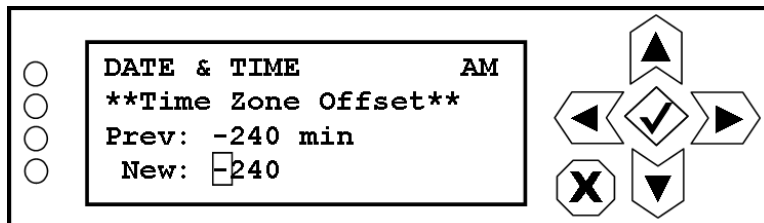
From the **SYSTEM** menu (see [Figure 8.7](#)) you can configure the operating mode of the Exporter Plus, perform a system restart or power down, or set the time zone offset for your region.

Figure 8.14: Date & Time Menu**SETTING TIME ZONE OFFSET**

Set the time zone offset for your region by selecting **Time Zone Offset** from the **DATE & TIME** menu (see [Figure 8.14](#)).

Figure 8.15: Time Zone Offset Screen

To change the time zone offset press the checkmark (accept) button to enter the editing screen shown in [Figure 8.16](#).

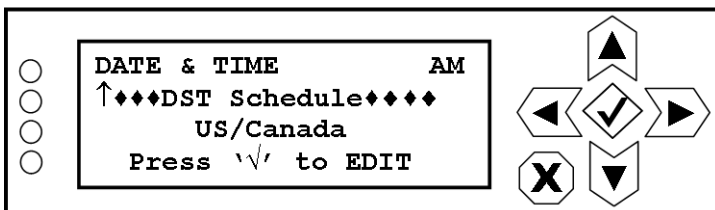
Figure 8.16: Time Zone Offset Editing Screen

Use the right and left buttons to highlight the + or - or desired digit in the time zone offset, then use the up and down buttons to change the digit as desired. The time zone offset is entered in minutes. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING DAYLIGHT SAVING TIME SCHEDULE

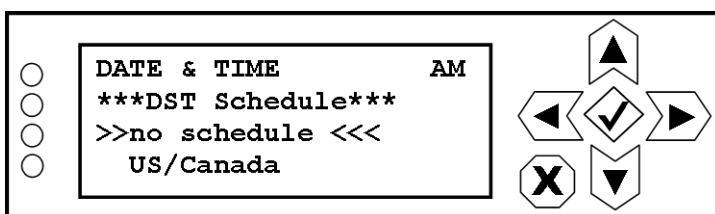
Set the daylight savings time (DST) schedule for your region - as applicable - by selecting DST Schedule from the DATE & TIME menu (see [Figure 8.17](#)).

Figure 8.17: DST Schedule Screen



To change the DST schedule press the checkmark (accept) button to enter the editing screen shown in [Figure 8.18](#).

Figure 8.18: DST Schedule Editing Screen

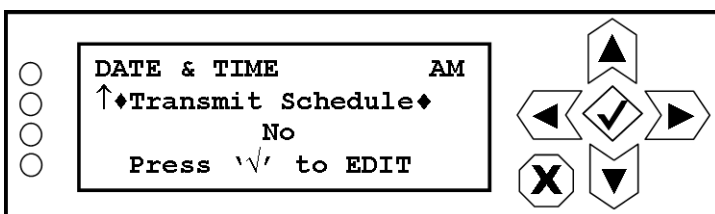


Use the up and down buttons to highlight **no schedule**, **US/Canada** or **Europe**. Selecting **no schedule** requires the receiver to revert to using its internally programmed schedule. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

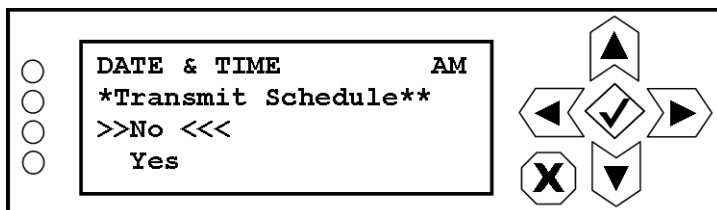
SETTING THE TRANSMIT SCHEDULE FEATURE

When you select Transmit Schedule from the DATE & TIME menu (see [Figure 8.19](#)) you can enable or disable the transmit schedule feature.

Figure 8.19: Transmit Schedule Screen



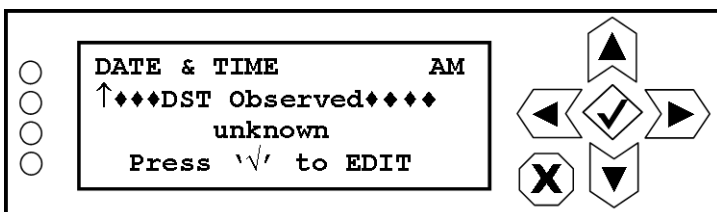
To change the power down status, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.20](#).

Figure 8.20: Transmit Schedule Editing Screen

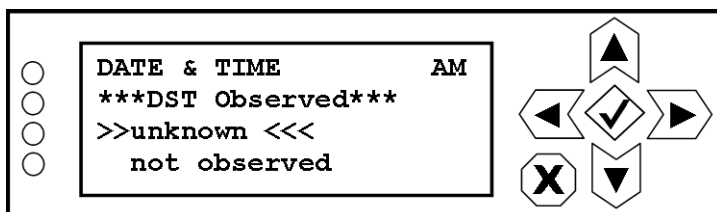
Use the up and down buttons to highlight **Yes** or **No**. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired. Selecting **Yes** enables the transmit schedule feature. Selecting **No** disables the transmit schedule feature, which has the same effect as setting **DST Schedule** to **no schedule**.

SETTING DAYLIGHT SAVING TIME OBSERVATION

Set whether daylight savings time (DST) is observed at the broadcast transmitter's location by selecting **DST Observed** from the **DATE & TIME** menu (see [Figure 8.21](#)).

Figure 8.21: DST Observed Screen

To change the DST schedule press the checkmark (accept) button to enter the editing screen shown in [Figure 8.22](#).

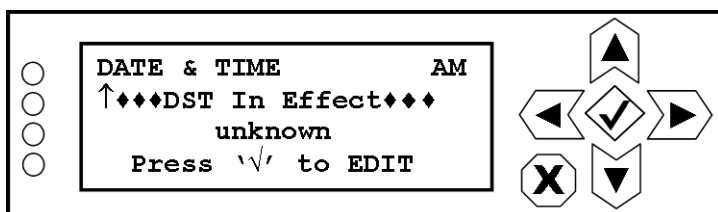
Figure 8.22: DST Observed Editing Screen

Use the up and down buttons to highlight **unknown**, **not observed** or **observed**. Selecting **unknown** forces the receiver to use its own DST configuration. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING DAYLIGHT SAVING TIME IN EFFECT STATUS

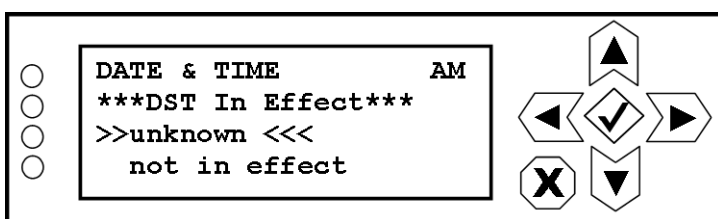
Set the effective status of daylight savings time (DST) at the broadcast transmitter's location by selecting **DST In Effect** from the **DATE & TIME** menu (see [Figure 8.23](#)).

Figure 8.23: DST In Effect Screen



To change the DST effective status press the checkmark (accept) button to enter the editing screen shown in [Figure 8.24](#).

Figure 8.24: DST In Effect Editing Screen

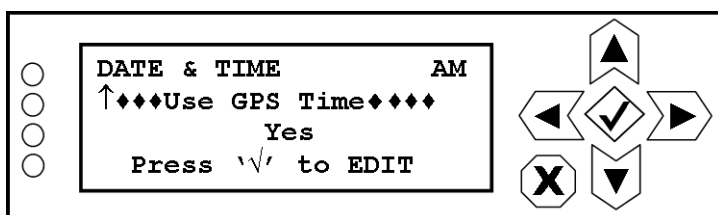


Use the up and down buttons to highlight **unknown**, **not in effect**, **in effect**, or **automatic**. Selecting **unknown** forces the associated receiver to use its own DST configuration. Selecting **not in effect** or **in effect** allows for a specific configuration that must be user adjusted, as necessary. Selecting **automatic** allows the Exporter Plus to use a pre-configured schedule (e.g., US or Europe). Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired

SETTING THE USE OF GPS TIME

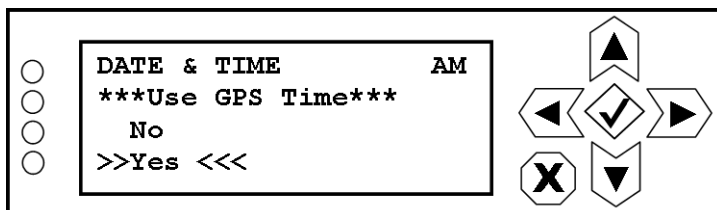
When you select **Use GPS Time** from the **DATE & TIME** menu (see [Figure 8.25](#)) you can enable or disable the use of GPS time.

Figure 8.25: Use GPS Time Screen



To change the GPS time status, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.26](#).

Figure 8.26: Use GPS Time Editing Screen

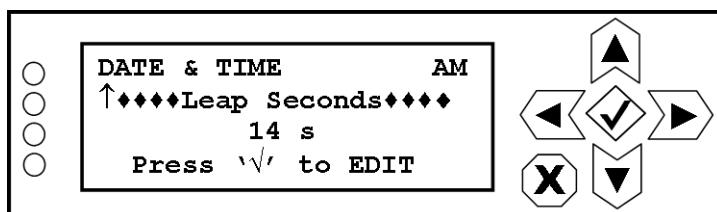


Use the up and down buttons to highlight **Yes** or **No**. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired. Selecting **Yes** enables the use of GPS time. Selecting **No** disables the use of GPS time and bases the transmitted time entirely on the Exporter Plus' system clock.

SETTING LEAP SECONDS

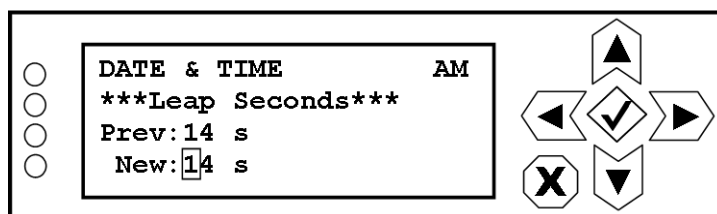
HD Radio transmits GPS time. To convert to UTC (Coordinated Universal Time) requires a leap seconds setting (see <http://www.iers.org/> for more information). Enter the leap second adjustment for the time setting by selecting **Leap Seconds** from the **DATE & TIME** menu (see [Figure 8.27](#)).

Figure 8.27: Leap Seconds Screen



To change the leap seconds value press the checkmark (accept) button to enter the editing screen shown in [Figure 8.28](#).

Figure 8.28: Leap Seconds Editing Screen

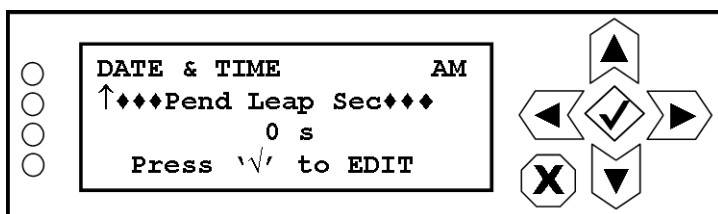


Use the right and left buttons to highlight the desired digit in the leap seconds, then use the up and down buttons to change the digit as desired. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING PENDING LEAP SECONDS

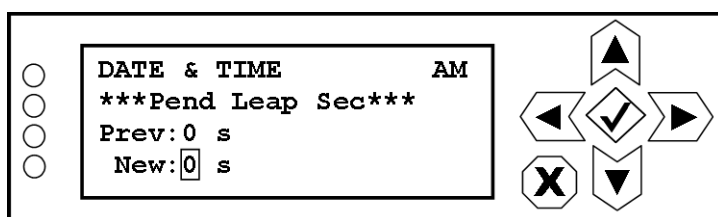
Enter the pending leap second adjustment for the time setting by selecting **Pend Leap Sec** from the **DATE & TIME** menu (see [Figure 8.29](#)).

Figure 8.29: Pending Leap Seconds Screen



To change the pending leap seconds value press the checkmark (accept) button to enter the editing screen shown in [Figure 8.30](#).

Figure 8.30: Pending Leap Seconds Editing Screen

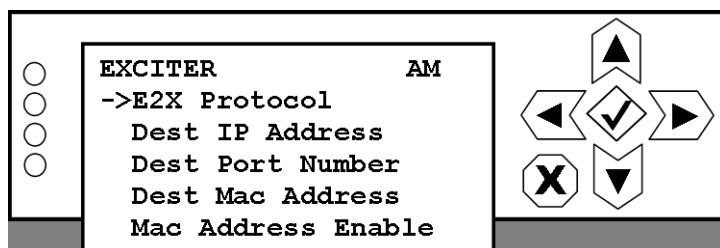


Use the right and left buttons to highlight the desired digit in the pending leap seconds, then use the up and down buttons to to change the digit as desired. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

EXCITER CONFIGURATION

The Exporter Plus must be able to connect to an Exgine, which is usually part of an exciter. From the **EXCITER** menu (see [Figure 8.31](#)) you can configure the E2X protocol, IP address, port number and MAC address of the exciter Ethernet port.

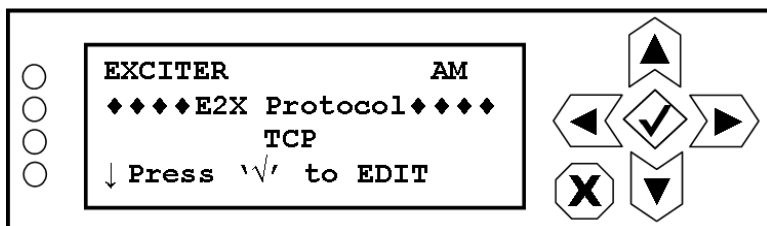
Figure 8.31: Exciter Configuration Menu



SETTING E2X PROTOCOL

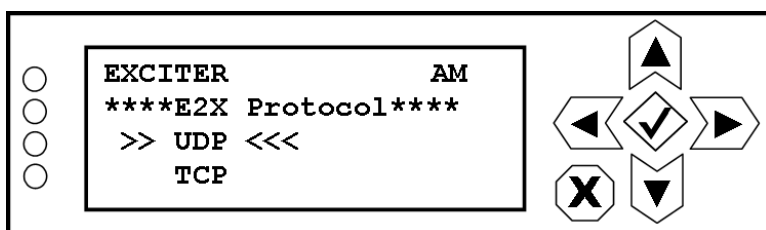
When you select E2X Protocol from the EXCITER menu (see [Figure 8.32](#)) you can edit the E2X protocol used by the exciter.

Figure 8.32: E2X Protocol Screen



To change the E2X protocol, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.33](#).

Figure 8.33: E2X Protocol Editing Screen

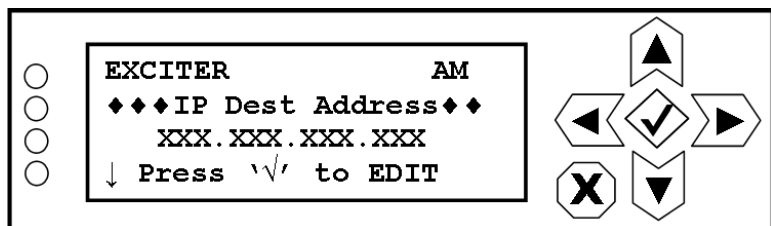


Use the up and down buttons to highlight UDP or TCP. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

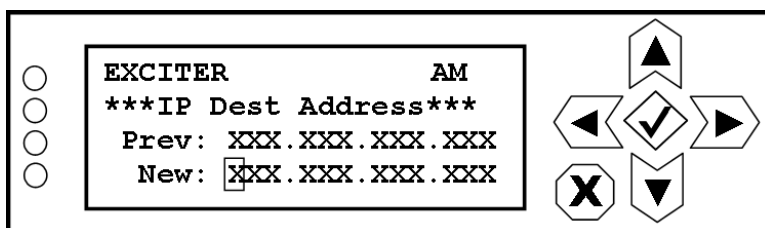
SETTING DESTINATION IP ADDRESS

When you select Dest IP Address from the EXCITER menu (see [Figure 8.34](#)) you can edit the IP address of the exciter.

Figure 8.34: Destination IP Address Screen



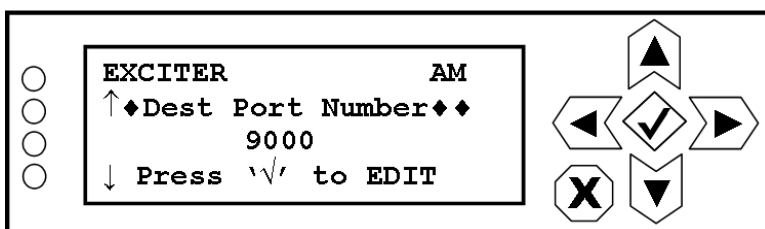
To change the destination IP address, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.35](#).

Figure 8.35: Destination IP Address Editing Screen

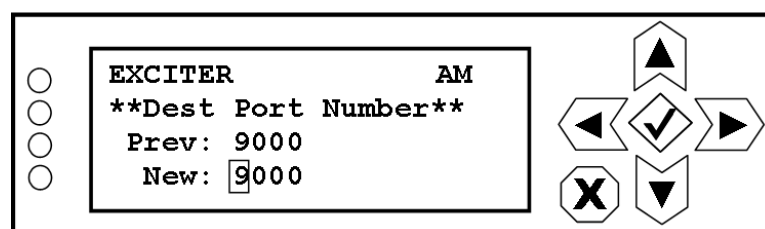
Use the right and left buttons to highlight the desired digit in the new address, then use the up and down buttons to increase or decrease the value of the highlighted digit. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING DESTINATION PORT NUMBER

When you select **Dest Port Number** from the EXCITER menu (see [Figure 8.36](#)) you can edit the destination port of the exciter.

Figure 8.36: Destination Port Number Screen

To change the destination port, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.37](#).

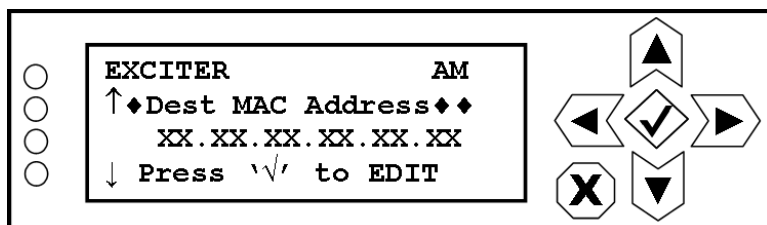
Figure 8.37: Destination Port Number Editing Screen

Use the right and left buttons to highlight the desired digit in the new port number, then use the up and down buttons to increase or decrease the value of the highlighted digit. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING DESTINATION MAC ADDRESS

When you select **Dest MAC Address** from the **EXCITER** menu (see [Figure 8.38](#)) you can edit the Exgine MAC address of the exciter. It is only necessary to set MAC address if the network connection to the exciter is unidirectional, which is common with some types of digital STLs.

Figure 8.38: Destination MAC Address Screen



To change the destination MAC address, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.39](#).


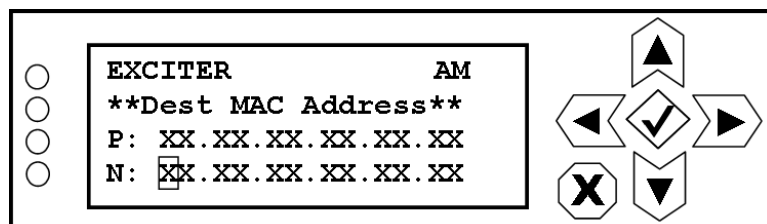
 *Note: Refer to the associate exciter's manual to determine its MAC address.*

Figure 8.39: Destination MAC Address Editing Screen



Use the right and left buttons to highlight the desired digit in the new address, then use the up and down buttons to increase or decrease the value of the highlighted digit. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

ENABLE/DISABLE MAC ADDRESS

When you select **MAC Address Enable** from the **EXCITER** menu (see [Figure 8.40](#)) you can enable or disable the Exgine MAC address of the exciter.


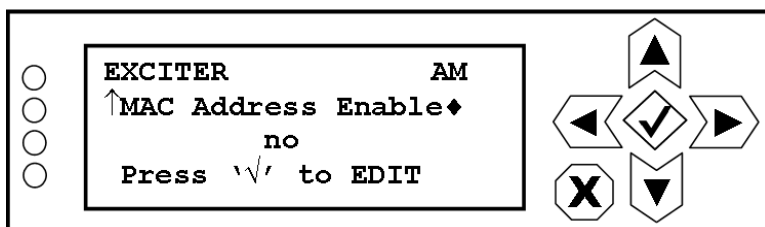
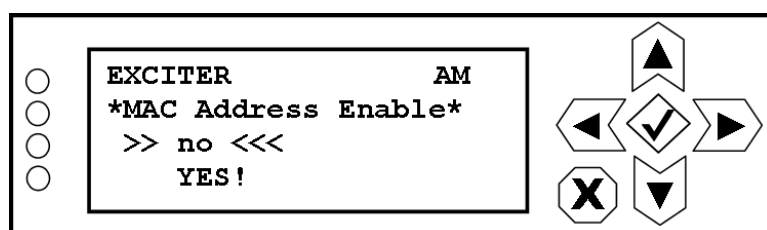
 *Note: Enable only if the MAC address configuration is required. The exciter must be located on the ETH0 network to use this feature.*

Figure 8.40: MAC Address Enable Screen

To change the MAC address enable status, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.41](#).

Figure 8.41: MAC Address Enable Editing Screen

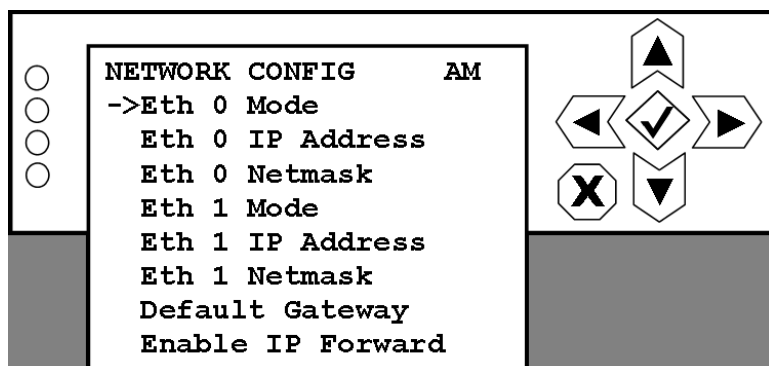
Use the up and down buttons to highlight **YES!** or **no**. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired. Selecting **YES!** enables communication with the previously set destination MAC address [Setting destination MAC address on page 8-21](#).

NETWORK CONFIGURATION

From the **NETWORK CONFIG** menu (see [Figure 8.42](#)) you can configure one or two Ethernet ports and a gateway, as applicable.

There are two Ethernet ports (0 and 1), which have their own settings. If both are enabled, ensure they are on separate subnets. It is possible, but not recommended, to use DHCP to configure each Ethernet port. It is also recommended that you enable the IP forwarding feature if both Ethernet ports are used so that other IP traffic can move between the subnets.

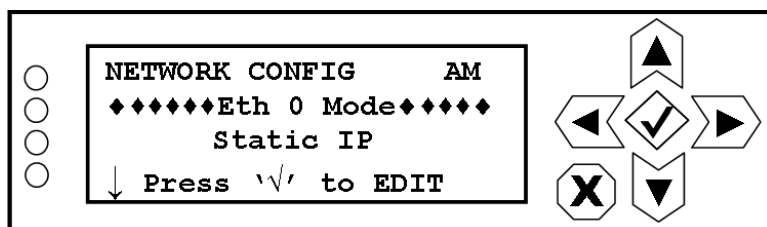
Figure 8.42: Network Configuration Menu



SETTING ETHERNET 0 OR 1 MODE

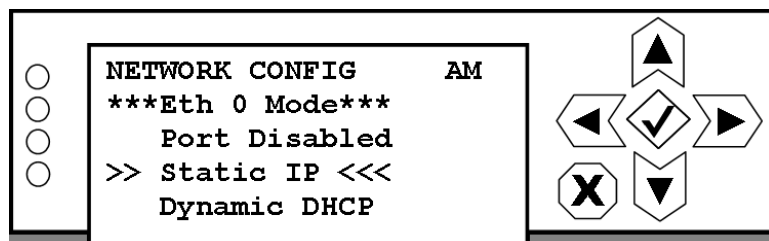
When you select Eth 0 Mode or Eth 1 Mode from the NETWORK CONFIG menu (see [Figure 8.43](#)) you can set the mode of either Ethernet port.

Figure 8.43: Ethernet 0 or 1 Mode Screen



To change the Ethernet port mode, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.44](#).

Figure 8.44: Ethernet 0 or 1 Mode Editing Screen

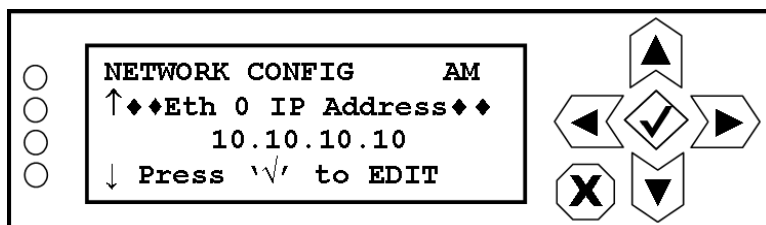


Use the up and down buttons to highlight the desired mode (Port Disabled, Static IP or Dynamic DHCP). Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4](#) on page 8-5). Save or cancel as desired.

SETTING ETHERNET 0 OR 1 IP ADDRESS

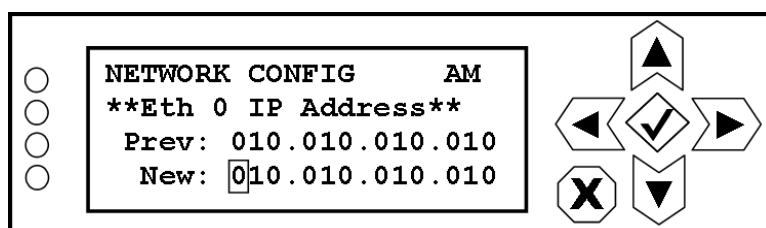
When you select **Eth 0 IP Address** or **Eth 1 IP Address** from the **NETWORK CONFIG** menu (see [Figure 8.45](#)) you can set the IP address associated with either Ethernet port.

Figure 8.45: Ethernet 0 or 1 IP Address Screen



To change the Ethernet port IP address, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.46](#).

Figure 8.46: Ethernet 0 or 1 IP Address Editing Screen

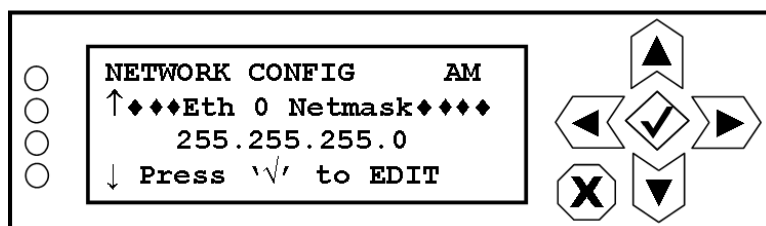


Use the right and left buttons to highlight the desired digit in the new address, then use the up and down buttons to increase or decrease the value of the highlighted digit. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

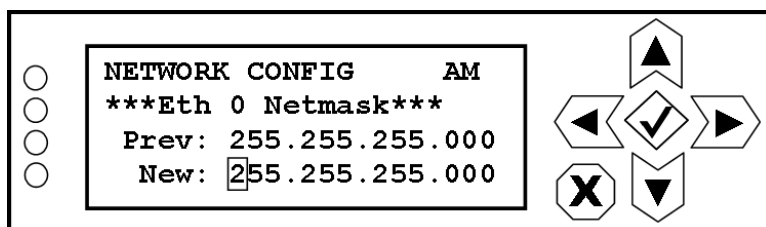
SETTING ETHERNET 0 OR 1 NETMASK

When you select **Eth 0 Netmask** or **Eth 1 Netmask** from the **NETWORK CONFIG** menu (see [Figure 8.47](#)) you can set the netmask address associated with either Ethernet port.

Figure 8.47: Ethernet 0 or 1 Netmask Screen



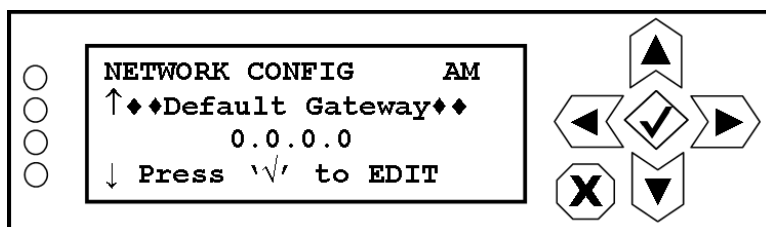
To change the Ethernet port netmask address, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.48](#).

Figure 8.48: Ethernet 0 or 1 Netmask Editing Screen

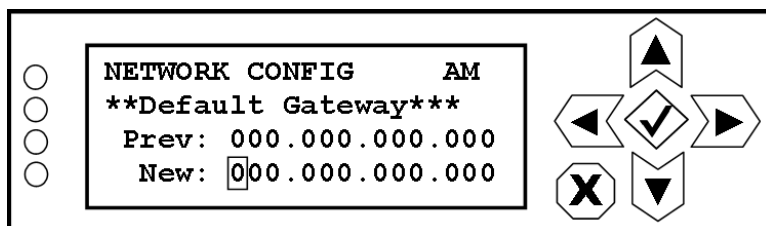
Use the right and left buttons to highlight the desired digit in the new address, then use the up and down buttons to increase or decrease the value of the highlighted digit. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING DEFAULT GATEWAY

When you select **Default Gateway** from the **NETWORK CONFIG** menu (see [Figure 8.49](#)) you can set the default gateway address associated with the Ethernet ports. The gateway can be configured to use DHCP by setting its IP address to 0.0.0.0.

Figure 8.49: Default Gateway Screen

To change the default gateway address, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.50](#).

Figure 8.50: Default Gateway Editing Screen

Use the right and left buttons to highlight the desired digit in the new address, then use the up and down buttons to increase or decrease the value of the highlighted digit. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

ENABLE/DISABLE IP FORWARDING

When you select **Enable IP Forward** from the **NETWORK** menu (see [Figure 8.51](#)) you can enable or disable IP forwarding. IP forwarding allows IP traffic received by the Exporter Plus on either Ethernet port (but not destined for the Exporter Plus) to be copied to the other Ethernet port.


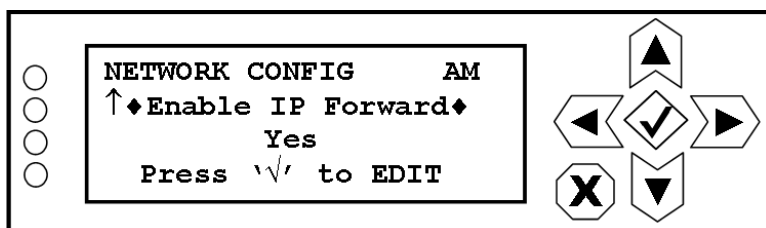
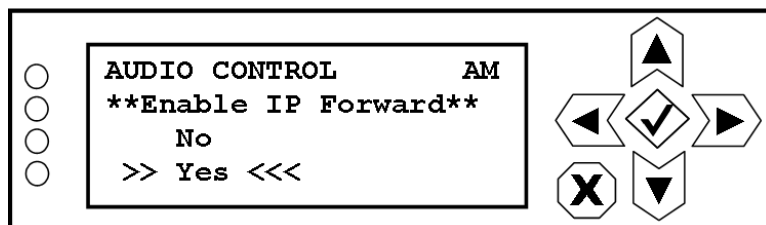
 *Note: IP forwarding is only relevant if both Ethernet ports are in use. It is generally recommended that you enable IP forwarding.*

Figure 8.51: Enable IP Forwarding Screen



To change the IP forwarding enable status, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.52](#).

Figure 8.52: Enable IP Forwarding Editing Screen

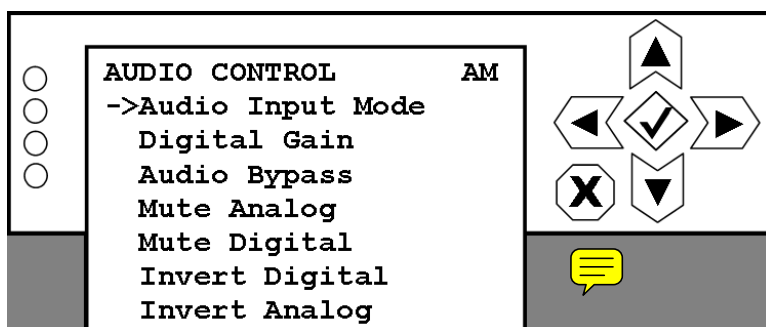


Use the up and down buttons to highlight **Yes** or **no**. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired. Selecting **Yes** enables IP forwarding.

AUDIO CONTROL

From the **AUDIO CONTROL** menu (see [Figure 8.53](#)) you can choose to bypass analog audio (analog input connected directly to analog output via relay), mute or invert either of the audio inputs, or use one audio input for both analog and digital feeds.

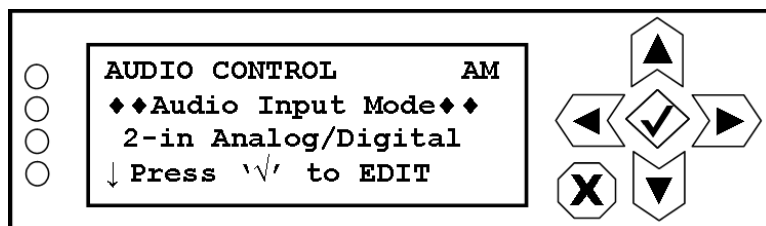
Figure 8.53: Audio Control Menu



SETTING AUDIO INPUT MODE

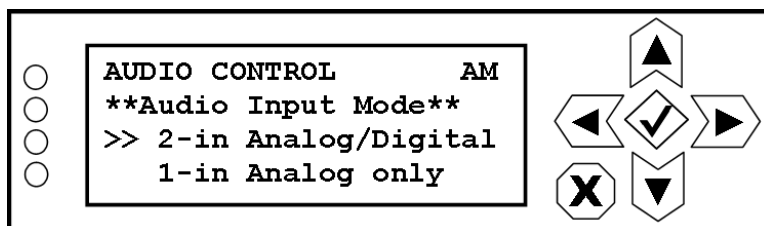
When you select **Audio Input Mode** from the **AUDIO CONTROL** menu (see [Figure 8.54](#)) you can configure the Exporter Plus to use a single audio input (analog) for both analog and digital audio or use separate analog and digital inputs.

Figure 8.54: Audio Input Mode Screen



To change the audio input mode, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.55](#).

Figure 8.55: Audio Input Mode Editing Screen



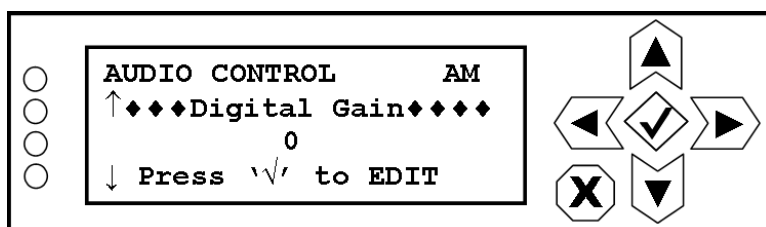
Use the up and down buttons to highlight the desired mode (2-in Analog/Digital or 1-in Analog only). Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.



SETTING DIGITAL GAIN

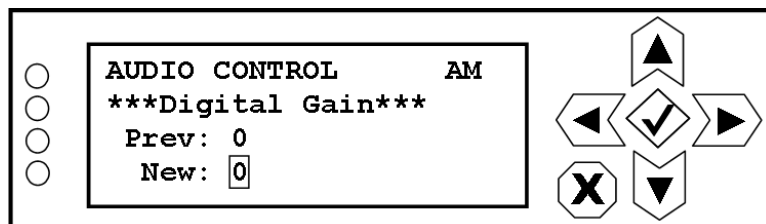
When you select **Digital Gain** from the **AUDIO CONTROL** menu (see [Figure 8.56](#)) you can adjust the HD1 audio gain broadcasted to IBOC receivers. This feature can be used to balance analog and digital levels in a receiver, making blending more seamless.

Figure 8.56: Digital Gain Screen



To adjust the digital gain, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.57](#).

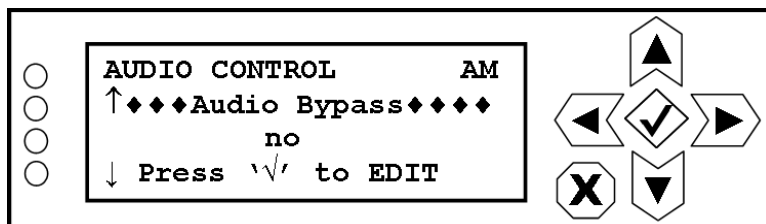
Figure 8.57: Digital Gain Editing Screen



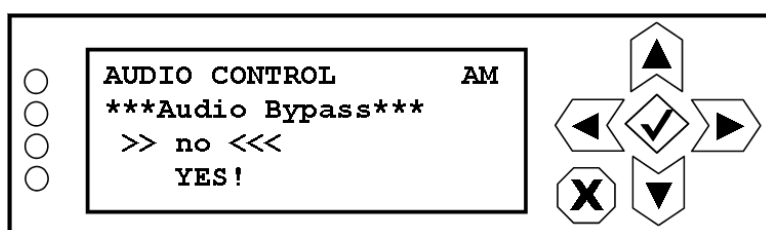
Use the up and down buttons to increase and decrease the new digital gain setting (between -8 and +7 dB). Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

ENABLE/DISABLE AUDIO BYPASS

When you select **Audio Bypass** from the **AUDIO CONTROL** menu (see [Figure 8.58](#)) you can enable or disable audio bypassing. Enabling audio bypass causes the analog audio input to be connected directly to the analog audio output. This feature is provided for test or fault recovery purposes.

Figure 8.58: Audio Bypass Screen

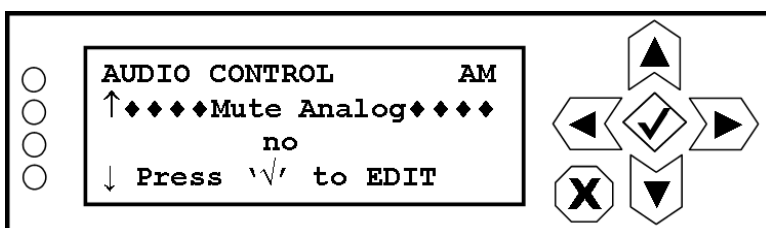
To change the audio bypass enable status, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.59 on page 8-29](#).

Figure 8.59: Audio Bypass Editing Screen

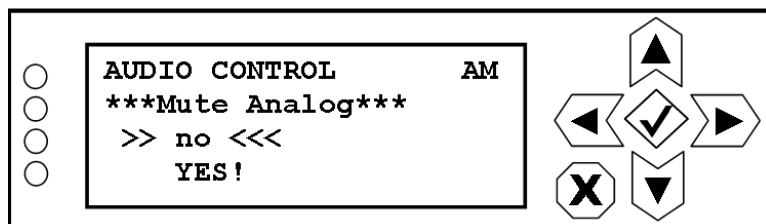
Use the up and down buttons to highlight YES! or no. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired. Selecting YES! bypasses the analog audio and connects the audio input directly to the analog output.

MUTING ANALOG INPUT

When you select Mute Analog from the AUDIO CONTROL menu (see [Figure 8.60](#)) you can set the mute status for the analog input.

Figure 8.60: Mute Analog Screen

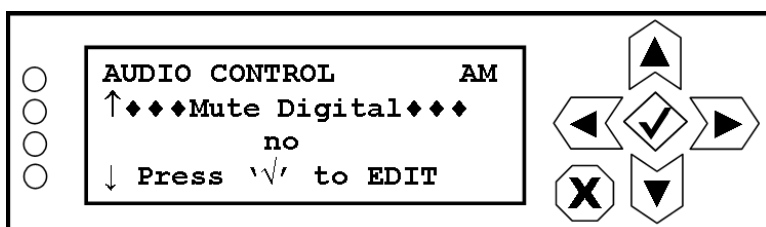
To change the analog muting status, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.61](#).

Figure 8.61: Mute Analog Editing Screen

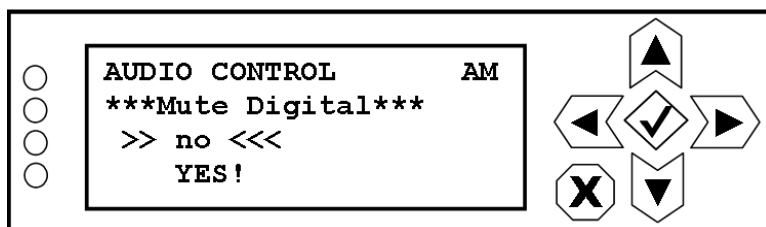
Use the up and down buttons to highlight YES! or no. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired. Selecting YES! mutes the analog audio input.

MUTING DIGITAL INPUT

When you select Mute Digital from the AUDIO CONTROL menu (see [Figure 8.62](#)) you can set the mute status for the digital input.

Figure 8.62: Mute Digital Screen

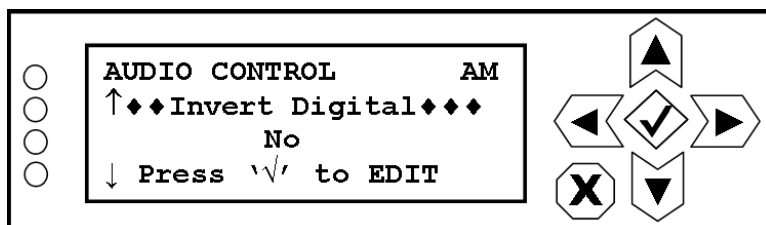
To change the digital muting status, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.63](#).

Figure 8.63: Mute Digital Editing Screen

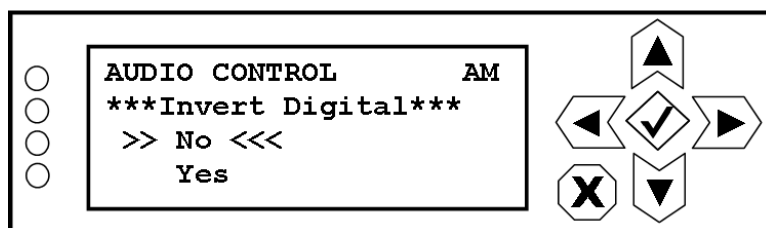
Use the up and down buttons to highlight YES! or no. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired. Selecting YES! mutes the digital audio input.

INVERTING DIGITAL INPUT

When you select **Invert Digital** from the **AUDIO CONTROL** menu (see [Figure 8.64](#)) you can perform a phase inversion on the digital audio input stream.

Figure 8.64: Invert Digital Screen

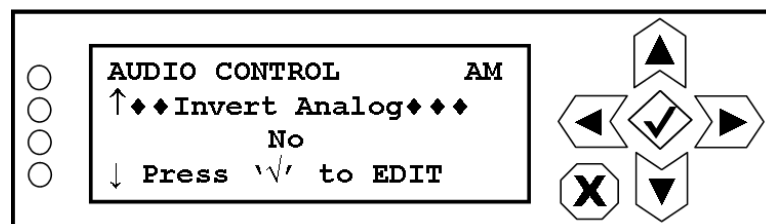
To change the digital inversion status, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.65](#).

Figure 8.65: Invert Digital Editing Screen

Use the up and down buttons to highlight **Yes** or **No**. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired. Selecting **Yes** inverts the phase of the digital audio input.

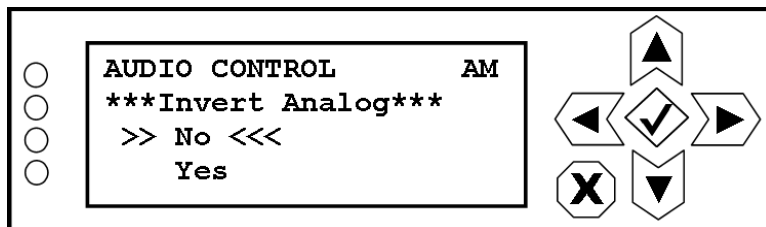
INVERTING ANALOG INPUT

When you select **Invert Analog** from the **AUDIO CONTROL** menu (see [Figure 8.64](#)) you can perform a phase inversion on the analog audio input stream.

Figure 8.66: Invert Audio Screen

To change the analog inversion status, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.67](#).

Figure 8.67: Invert Analog Editing Screen

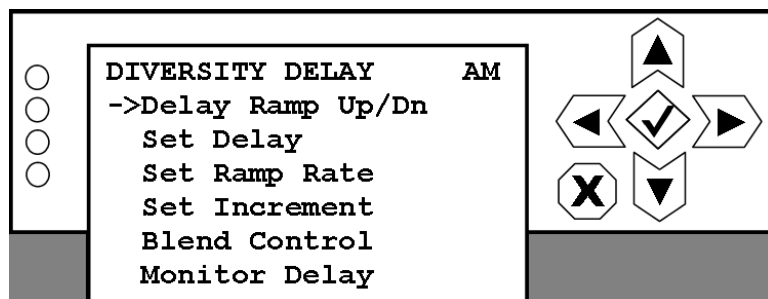


Use the up and down buttons to highlight **Yes** or **No**. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired. Selecting **Yes** inverts the phase of the analog audio input.

DIVERSITY DELAY

From the DIVERSITY DELAY menu (see [Figure 8.68](#)) you can set various diversity delay parameters.

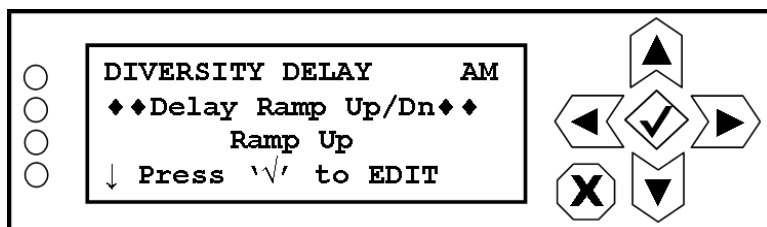
Figure 8.68: Diversity Delay Menu



SETTING DELAY RAMP UP/DOWN

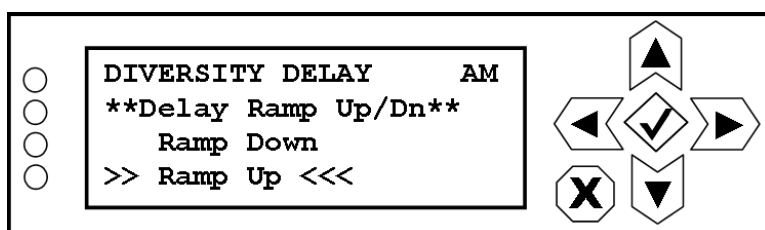
Selecting **Delay Ramp Up/Dn** from the DIVERSITY DELAY menu (see [Figure 8.69](#)) will cause the Exporter Plus to change the diversity delay from its required setting to 0 (ramp down) or from 0 to its required setting (ramp up). The ramp up and down functions are also available on pins 3 and 4, respectively, of the remote control inputs.

Figure 8.69: Delay Ramp Up/Down Screen



To change the ramping, press the checkmark (accept) button to enter the editing screen shown in Figure 8.70.

Figure 8.70: Delay Ramp Up/Down Editing Screen



Use the up and down buttons to highlight the desired ramping type (Ramp Up or Ramp Down). Press the accept or cancel button to enter the Save/Cancel screen (see Figure 8.4 on page 8-5). Save or cancel as desired.

SETTING DELAY PERIOD

When you select **Set Delay** from the **DIVERSITY DELAY** menu (see Figure 8.71) you can set the diversity delay for the analog audio.


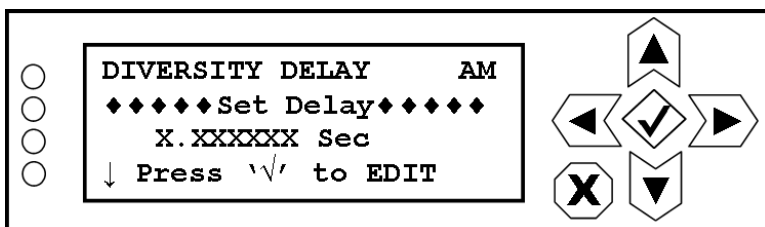
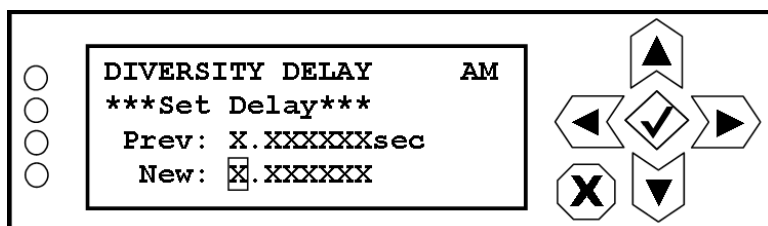
 *Note: For AM systems, the diversity delay should not require adjustment, however it may be required if the audio input timing is not balanced.*

Figure 8.71: Set Delay Screen



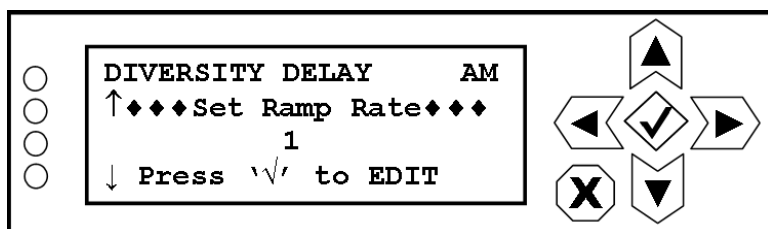
To set the diversity delay, press the checkmark (accept) button to enter the editing screen shown in Figure 8.72.

Figure 8.72: Set Delay Editing Screen

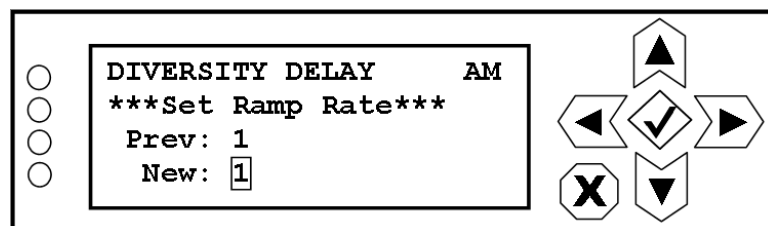
Use the right and left buttons to highlight the desired digit in the new delay value, then use the up and down buttons to increase or decrease the value of the highlighted digit. You can set the diversity delay between 0 and 20 seconds. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING RAMP RATE

When you select **Set Ramp Rate** from the **DIVERSITY DELAY** menu (see [Figure 8.73](#)) you can set the length of time diversity delay transitions selected in [Setting delay ramp up/down - see page 8-32](#).

Figure 8.73: Set Ramp Rate Screen

To set the ramp rate, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.74](#).

Figure 8.74: Set Ramp Rate Editing Screen

Use the up and down buttons to increase or decrease the value of the ramp rate. The ramp rate is defined as a multiple of the diversity delay. See [“Overview” on page 1-1](#) for additional information.

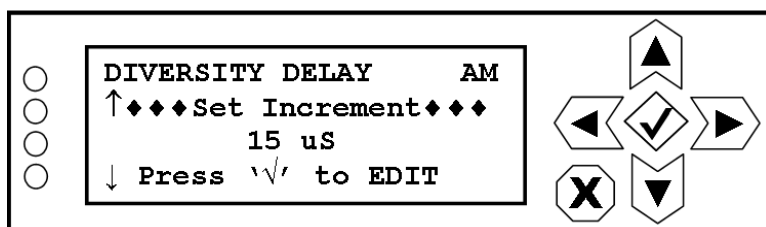
Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING DELAY INCREMENT

The Exporter Plus has remote inputs that, when asserted, allow for an increment or decrement in the preset diversity delay period. When you select **Set Increment** from the **DIVERSITY DELAY** menu (see [Figure 8.75](#)) you can set this increment value.

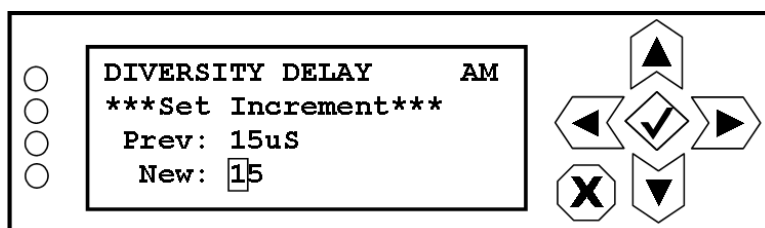
Each assertion of the remote increment input will increase the diversity delay by the increment setting. Each assertion of the remote decrement input will decrease the diversity delay by the increment setting.

Figure 8.75: Set Increment Screen



To set the diversity delay increment, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.76](#).

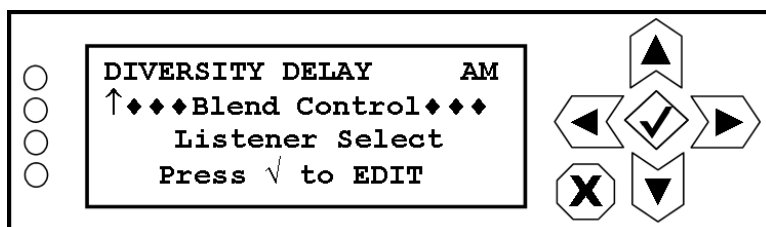
Figure 8.76: Set Increment Editing Screen



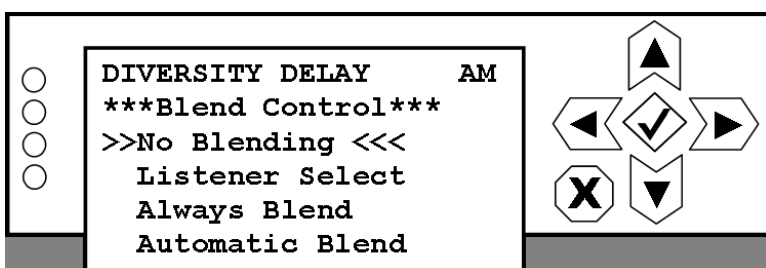
Use the right and left buttons to highlight the desired digit in the new increment value, then use the up and down buttons to increase or decrease the value of the highlighted digit. You can set the delay increment between 0 and 999 microseconds. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING BLEND CONTROL

When you select **Blend Control** from the **DIVERSITY DELAY** menu (see [Figure 8.77 on page 8-36](#)) you can set the blend behaviour that is broadcast to receivers.

Figure 8.77: Blend Control Screen

To change the blend control setting, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.78](#).

Figure 8.78: Blend Control Editing Screen

Use the up and down buttons to highlight the desired blend control:

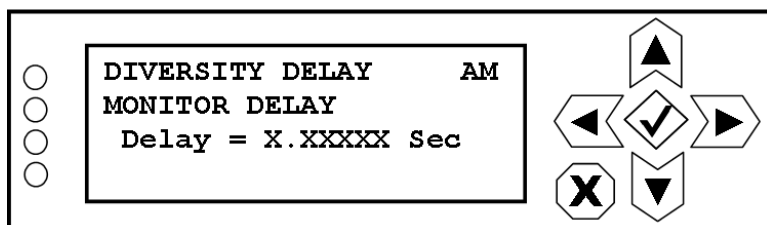
- **No Blending:** Commands receivers to only provide digital audio (or silence if digital reception is poor).
- **Listener Select:** Commands receivers to allow user to select between analog or digital audio payout. This mode may be used when broadcasting live events and diversity delay is set to zero. Some receivers will force reception to analog.
- **Always Blend** (standard setting): Commands receivers to blend to analog payout if digital reception is poor, regardless of whether the analog audio is aligned with the digital audio.
- **Automatic Blend:** Commands receivers to blend to analog payout if digital reception is poor and the analog audio is aligned with the digital audio. Only use this setting if diversity delay of the analog audio is handled by the Exporter Plus.

Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

MONITORING DIVERSITY DELAY

When you select **Monitor Delay** from the **DIVERSITY DELAY** menu (see [Figure 8.79](#)) you can view the actual diversity delay being applied to the analog audio.

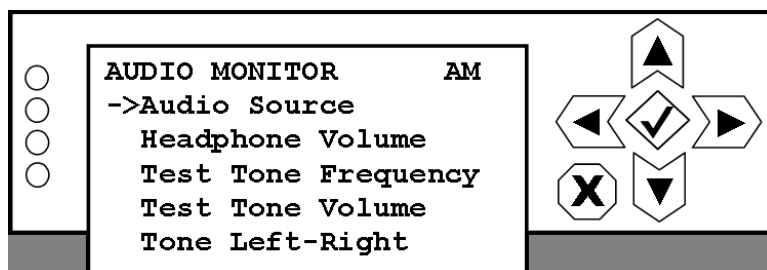
Figure 8.79: Monitor Delay Screen



AUDIO MONITOR

From the **AUDIO MONITOR** menu (see [Figure 8.80](#)) you can configure audio being monitored at the front panel headphone jack and rear panel monitor output. This menu also provides selection of internally generated audio signals for test purposes. To use a test tone, select it as an audio source and then connect the monitor output to either the analog or digital audio input.

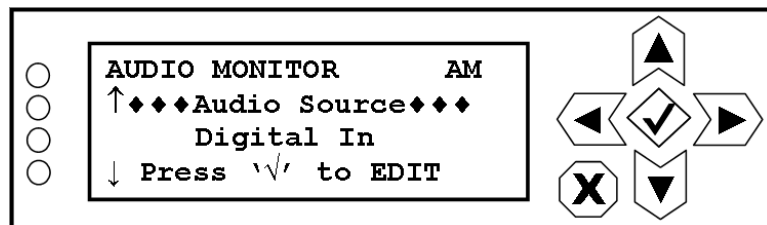
Figure 8.80: Audio Monitor Menu



SETTING AUDIO SOURCE FOR HEADPHONE JACK

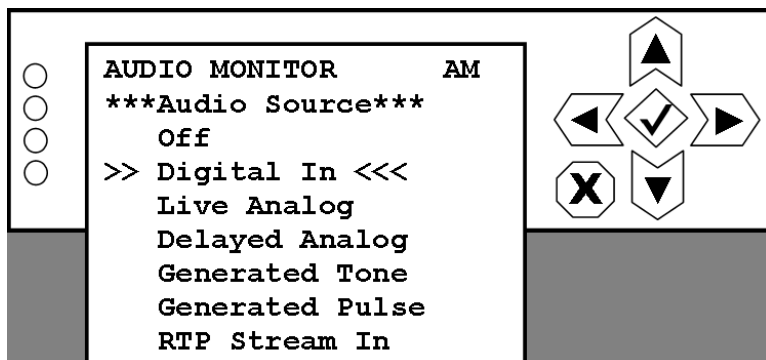
When you select **Audio Source** from the **AUDIO MONITOR** menu (see [Figure 8.81](#)) you can select the type of audio source being monitored at the front panel headphone jack and rear panel monitor output.

Figure 8.81: Audio Source Screen



To change the audio source type, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.82](#).

Figure 8.82: Audio Source Editing Screen

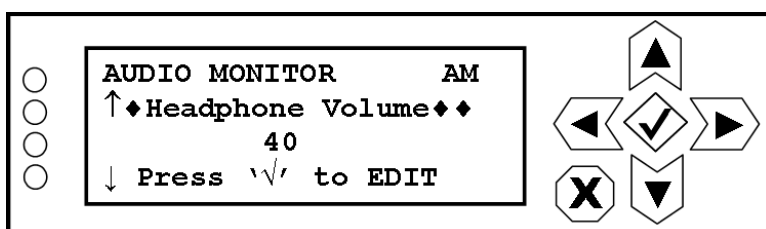


Use the up and down buttons to highlight the desired audio source (**Digital In**, **Live Analog**, **Delayed Analog**, **Generated Tone**, **Generated Pulse** or **RTP Stream In**). You can adjust the volume of the signal applied to the headphone jack (see [“Adjusting headphone volume”](#) on page 8-38). If you select **Generated Tone** or **Generated Pulse** as the audio source, you can also set the test tone frequency (see [“Setting test tone frequency”](#) on page 8-39) and its left-right content (see [“Setting test tone left-right content”](#) on page 8-41). Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4](#) on page 8-5). Save or cancel as desired.

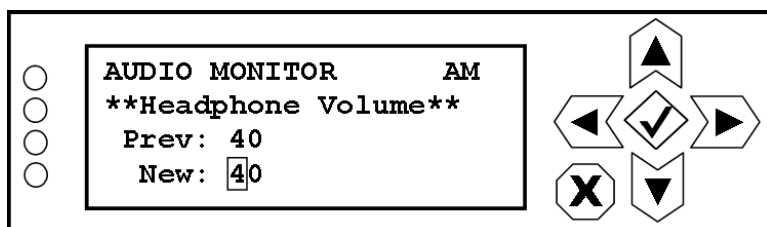
ADJUSTING HEADPHONE VOLUME

When you select **Headphone Volume** from the **AUDIO MONITOR** menu (see [Figure 8.83](#)) you can adjust the volume of the audio source being monitored at the front panel headphone jack.

Figure 8.83: Headphone Volume Screen



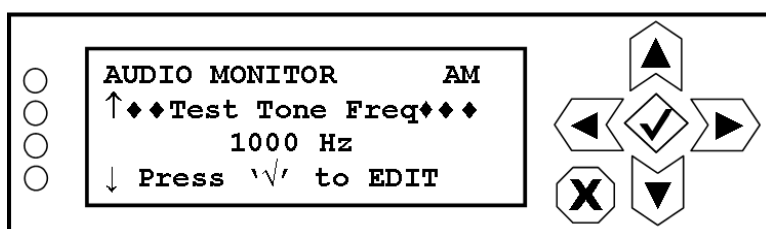
To adjust the headphone volume, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.84](#) on page 8-39.

Figure 8.84: Headphone Volume Editing Screen

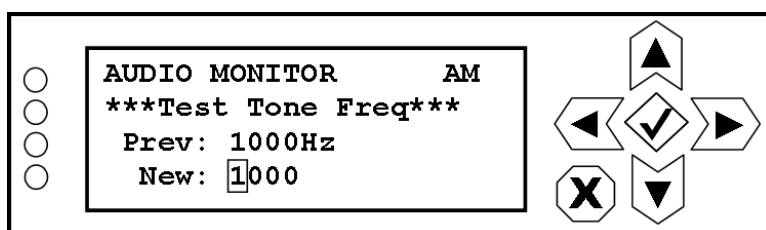
Use the right and left buttons to highlight the desired digit in the new headphone volume value, then use the up and down buttons to increase or decrease the value of the highlighted digit. You can adjust the volume between 0 and 100%. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING TEST TONE FREQUENCY

When you select **Test Tone Frequency** from the **AUDIO MONITOR** menu (see [Figure 8.85](#)) you can set the frequency of the internally generated test tone.

Figure 8.85: Test Tone Frequency Screen

To adjust the test tone frequency, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.86](#).

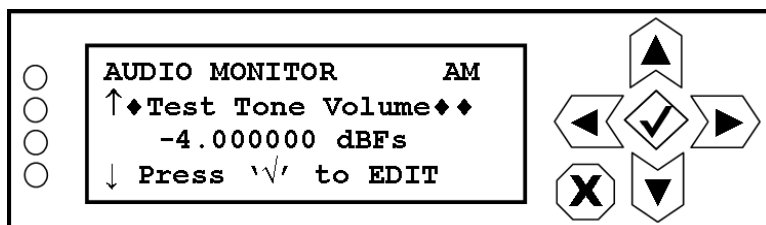
Figure 8.86: Test Tone Frequency Editing Screen

Use the right and left buttons to highlight the desired digit in the new test tone frequency, then use the up and down buttons to increase or decrease the value of the highlighted digit. You can adjust the test tone frequency between 50 Hz and 10,000 Hz. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

ADJUSTING TEST TONE VOLUME

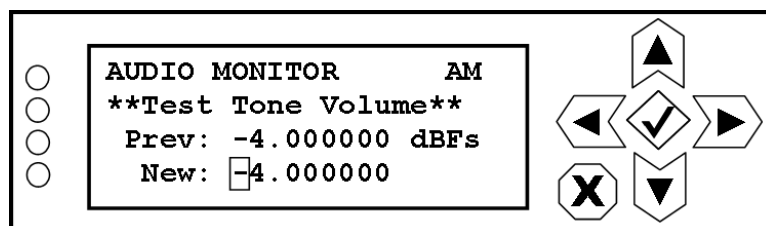
When you select **Test Tone Volume** from the **AUDIO MONITOR** menu (see [Figure 8.87](#)) you can adjust the volume of the internal test tone being generated for monitoring.

Figure 8.87: Test Tone Volume Screen



To adjust the test tone volume, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.88](#).

Figure 8.88: Test Tone Volume Editing Screen

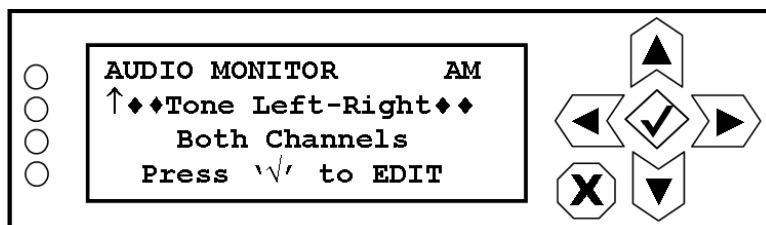


Use the right and left buttons to highlight the desired digit in the new test tone volume value, then use the up and down buttons to increase or decrease the value (in dBFs) of the highlighted digit. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING TEST TONE LEFT-RIGHT CONTENT

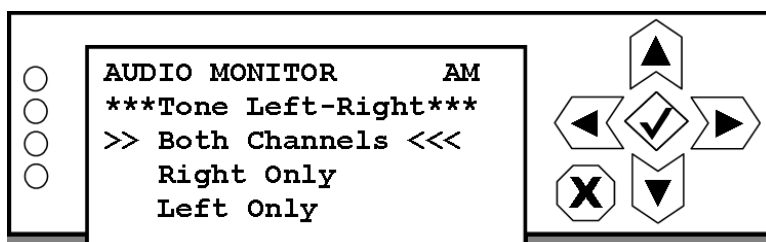
When you select **Tone Left-Right** from the **AUDIO MONITOR** menu (see [Figure 8.89](#)) you can define whether the test tone is on both left and right channels, left only or right only.

Figure 8.89: Tone Left-Right Screen



To change the test tone's left-right channel content, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.90](#).

Figure 8.90: Tone Left-Right Editing Screen

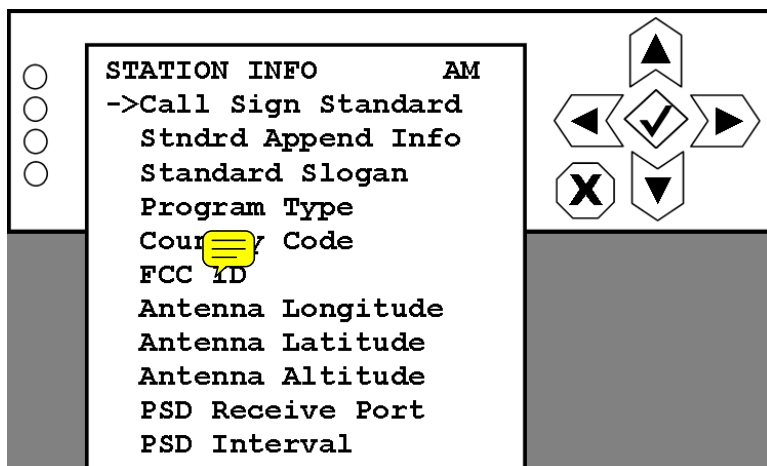


Use the up and down buttons to highlight the desired channel content (**Both Channels (L+R)**, **Right Only** or **Left Only**). Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4](#) on page 8-5). Save or cancel as desired.

STATION INFORMATION

From the STATION INFO menu (see [Figure 8.91](#)) you can configure station pertinent information such as country code, FCC ID (supplied by FCC), call sign, call sign append and station slogan.

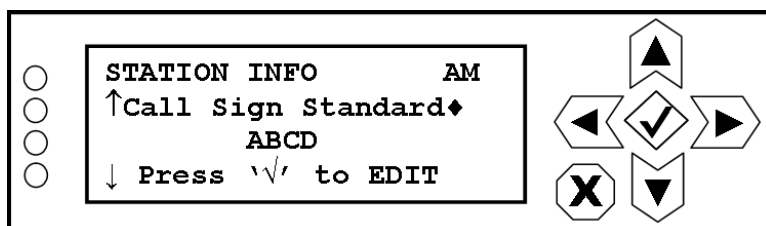
Figure 8.91: Station Info Menu



SETTING STANDARD CALL SIGN

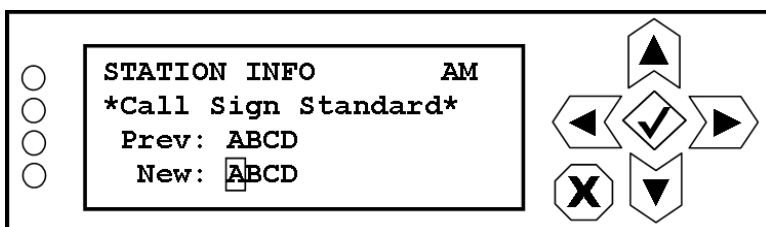
When you select Call Sign Standard from the STATION INFO menu (see [Figure 8.92](#)) you can select your standard call sign.

Figure 8.92: Call Sign Screen



To change the call sign, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.93](#).

Figure 8.93: Call Sign Editing Screen

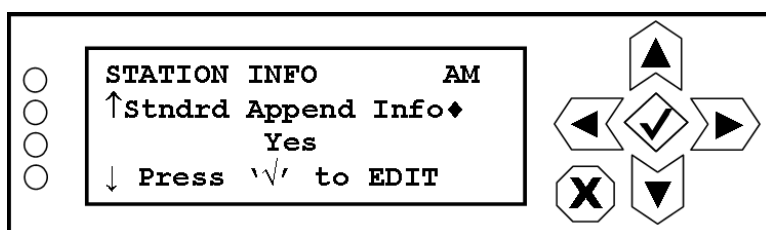


Use the right and left buttons to highlight the desired character in the new call sign, then use the up and down buttons to change the character as desired. Only standard, 4-character call signs are supported. The call sign will be displayed on the top line of the **MAIN MENU** of the UI. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

ENABLING CALL SIGN APPEND INFORMATION

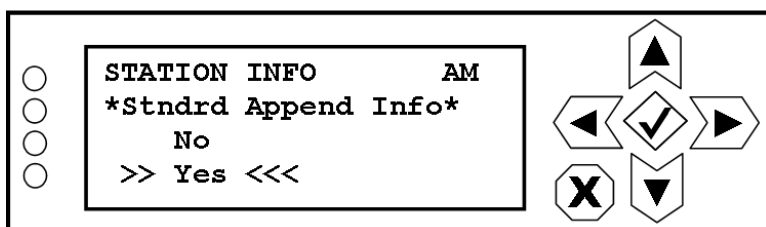
When you select **Standard Append Info** from the **STATION INFO** menu (see [Figure 8.94](#)) you can select your standard append information. This simply consists of enabling or disabling the appropriate characters '-FM' or '-AM' as an appendix to the end of the call sign.

Figure 8.94: Append Info Screen



To change the enable/disable status of the append information, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.95](#).

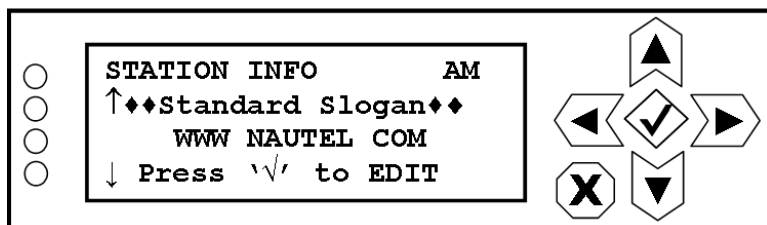
Figure 8.95: Append Info Editing Screen



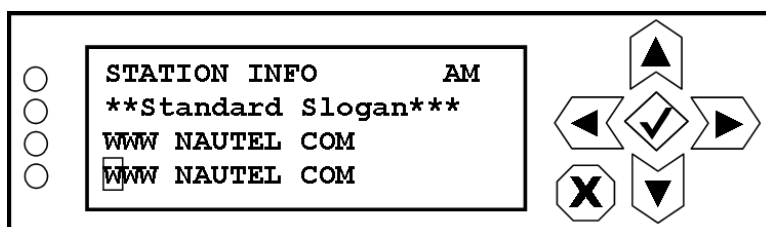
Use the up and down buttons to highlight **Yes** or **No**. Selecting **Yes** enables the append information. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING STANDARD SLOGAN

When you select **Standard Slogan** from the **STATION INFO** menu (see [Figure 8.96 on page 8-44](#)) you can create/edit your standard slogan, which can be displayed by some IBOC receivers.

Figure 8.96: Standard Slogan Screen

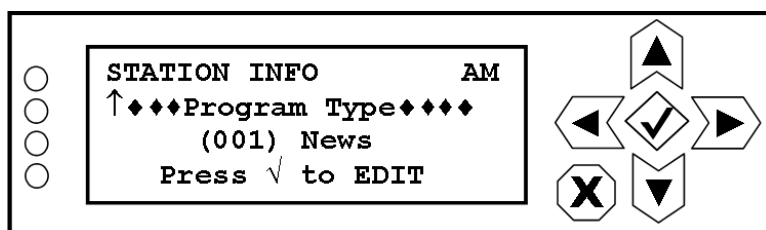
To change the standard slogan, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.97](#).

Figure 8.97: Standard Slogan Editing Screen

Use the right and left buttons to highlight the desired character in the new slogan, then use the up and down buttons to change the character as desired. Only standard, 20-character slogans are supported (typically, station web addresses or station format are used as slogans). Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

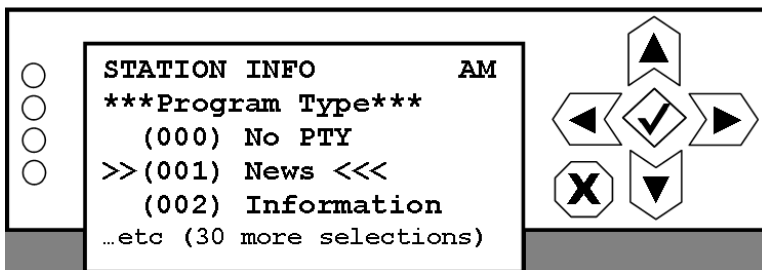
SETTING PROGRAM TYPE

When you select **Program Type** from the **STATION INFO** menu (see [Figure 8.98](#)) you can select your station's program type.

Figure 8.98: Program Type Screen

To change the program type, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.99 on page 8-45](#).

Figure 8.99: Program Type Editing Screen

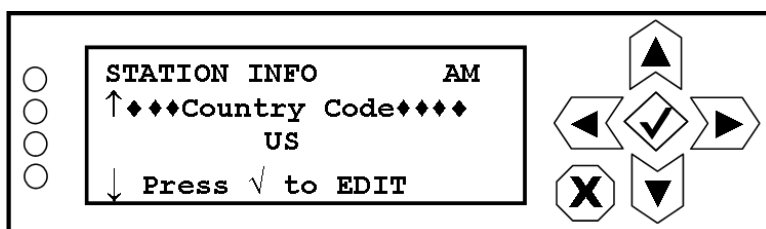


Use the up and down buttons to change the program type (32 possible selections including No PTY, News, Information, Sports, Talk, Rock, etc.) as desired. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING COUNTRY CODE

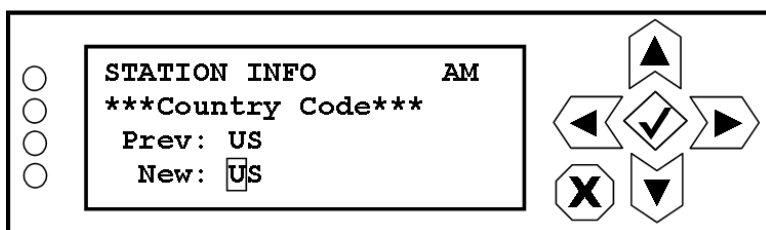
When you select **Country Code** from the **STATION INFO** menu (see [Figure 8.100](#)) you can select your country code, as provided by Ibiqity.

 **Figure 8.100: Country Code Screen**



To change the country code, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.101](#).

Figure 8.101: Country Code Editing Screen

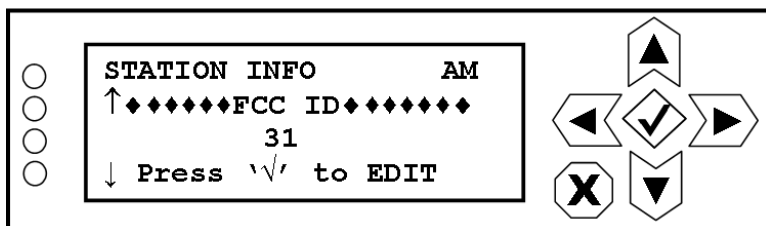


Use the right and left buttons to highlight the desired character in the new country code, then use the up and down buttons to to change the character as desired. Use the appropriate 2-character country codes specified by ISO 3166-1-alpha-2. Typically, this code will be factory set. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING FCC ID

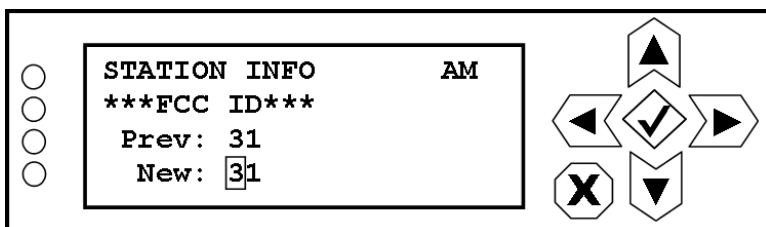
When you select FCC ID from the STATION INFO menu (see [Figure 8.102](#)) you can select your FCC ID, as provided by the FCC.

Figure 8.102: FCC ID Screen



To change the FCC ID, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.103](#).

Figure 8.103: FCC ID Editing Screen

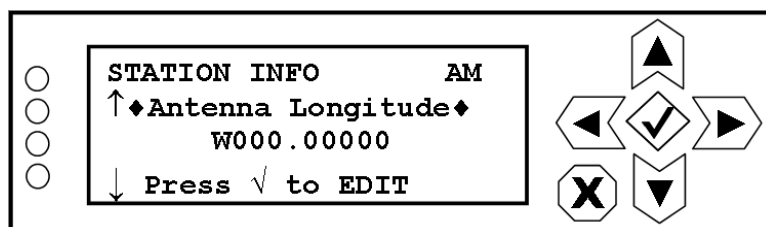


Use the right and left buttons to highlight the desired digit in the new FCC ID value, then use the up and down buttons to increase or decrease the value as desired. Typically, this value will be provided to you by the FCC. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

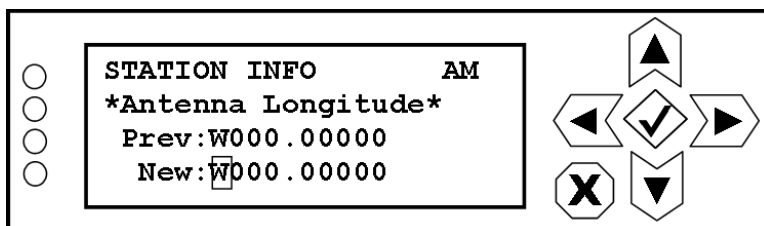
SETTING ANTENNA LONGITUDE

When you select Antenna Longitude from the STATION INFO menu (see [Figure 8.104](#)) you can enter the longitude coordinate for your antenna.

Figure 8.104: Antenna Longitude Screen



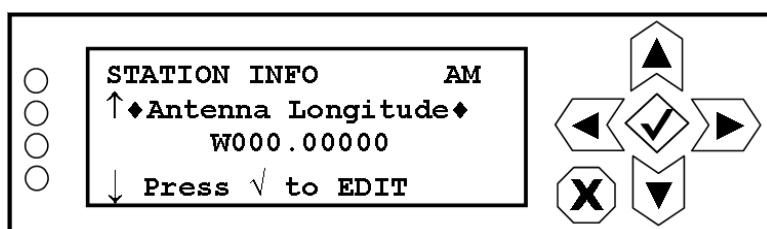
To change the antenna longitude setting, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.105 on page 8-47](#).

Figure 8.105: Antenna Longitude Editing Screen

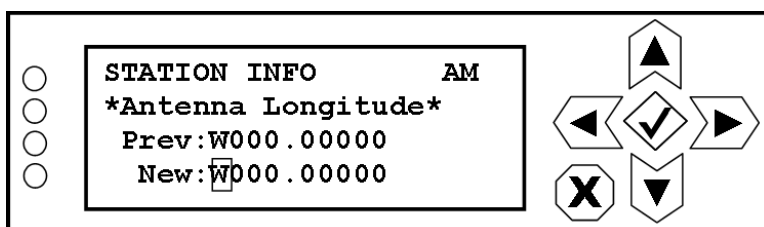
Use the right and left buttons to highlight the desired E (east), W (west) or numeric character in the new longitude coordinate, then use the up and down buttons to change the character as desired. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING ANTENNA LATITUDE

When you select **Antenna Latitude** from the **STATION INFO** menu (see [Figure 8.106](#)) you can enter the latitude coordinate for your antenna.

Figure 8.106: Antenna Latitude Screen

To change the antenna latitude setting, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.107](#).

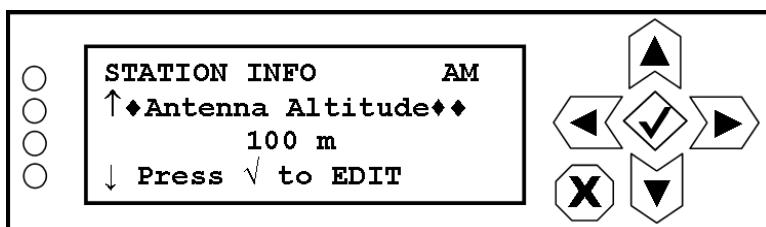
Figure 8.107: Antenna Latitude Editing Screen

Use the right and left buttons to highlight the desired N (north), S (south) or numeric character in the new latitude coordinate, then use the up and down buttons to change the character as desired. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING ANTENNA ALTITUDE

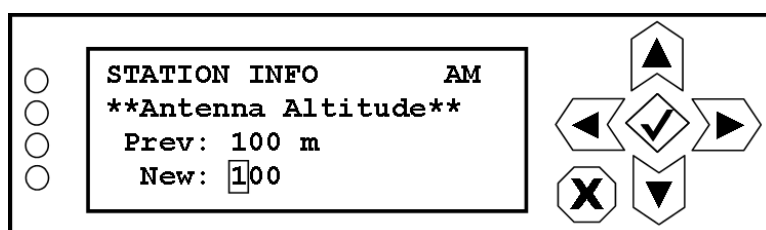
When you select **Antenna Altitude** from the **STATION INFO** menu (see [Figure 8.108](#)) you can enter the latitude coordinate for your antenna.

Figure 8.108: Antenna Altitude Screen



To change the antenna altitude setting, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.109](#).

Figure 8.109: Antenna Altitude Editing Screen

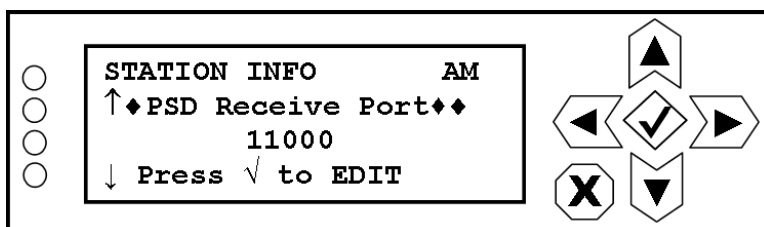


Use the right and left buttons to highlight the desired digit in the new antenna altitude value, then use the up and down buttons to increase or decrease the value as desired. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

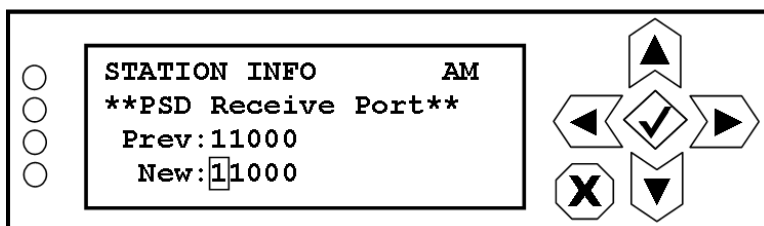
SETTING PSD RECEIVE PORT

When you select **PSD Receive Port** from the **STATION INFO** menu (see [Figure 8.110](#)) you can set the PSD receive port number.

Figure 8.110: PSD Receive Port Screen



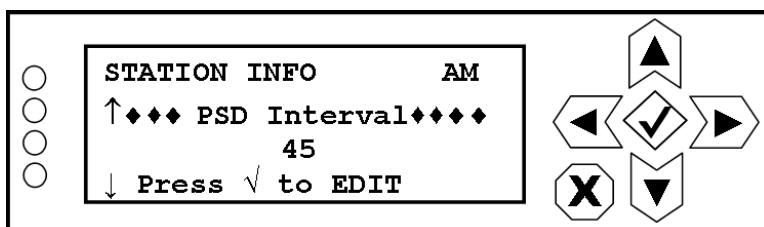
To change the PSD receive port, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.111 on page 8-49](#).

Figure 8.111: PSD Receive Port Editing Screen

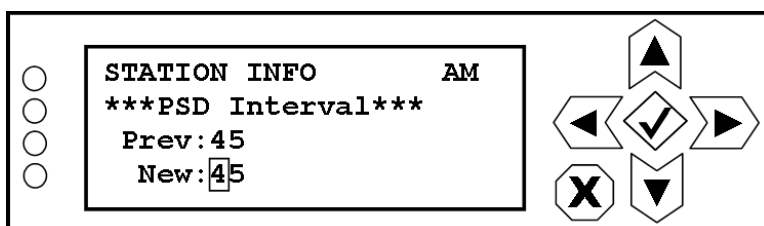
Use the right and left buttons to highlight the desired digit in the new PSD receive port value, then use the up and down buttons to increase or decrease the value as desired. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SETTING PSD INTERVAL

When you select PSD Interval from the STATION INFO menu (see [Figure 8.112](#)) you can set the PSD interval.

Figure 8.112: PSD Interval Screen

To change the PSD interval, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.113](#).

Figure 8.113: PSD Interval Editing Screen

Use the right and left buttons to highlight the desired digit in the new PSD interval value, then use the up and down buttons to increase or decrease the value as desired. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SIS SCHEDULE

The Station Information Service (SIS) provides broadcast station identification and control information. SIS is transmitted in a series of SIS Protocol Data Units (PDUs). SIS consists of a number of messages used by the receiver to quickly identify all of the services being broadcast by your HD station, such as station ID, call sign, station location and service messages. HD stations send out a 1 frame (made up of 32 payloads) SIS message every 1.5 seconds. These messages are independent of PSD, audio or data services

From the **SIS Schedule** menu (see [Figure 8.114](#)) you can define up to 16 blocks (0 through 15), each containing up to two payloads, depending on the length (in bits) of the information selected.


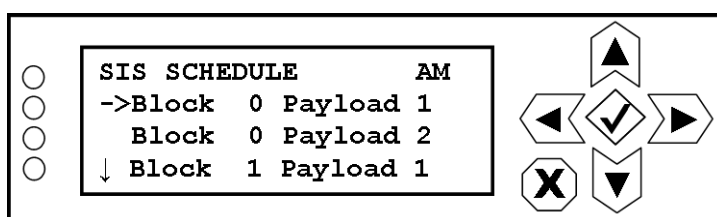
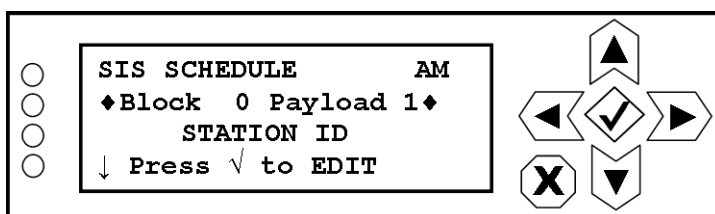
 *Note: When used in AM transmitter systems, the Exporter Plus' SIS schedule uses only the first eight blocks (16 payloads).*

Figure 8.114: SIS Schedule Menu



When you select one of the Block # Payload # items from the **SIS SCHEDULE** menu, you can view that block/payload's screen (see [Figure 8.115](#)), which displays the selected message (e.g., **STATION ID**).

Figure 8.115: Block/Payload Screen



To change an SIS message, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.116](#) on page 8-51.


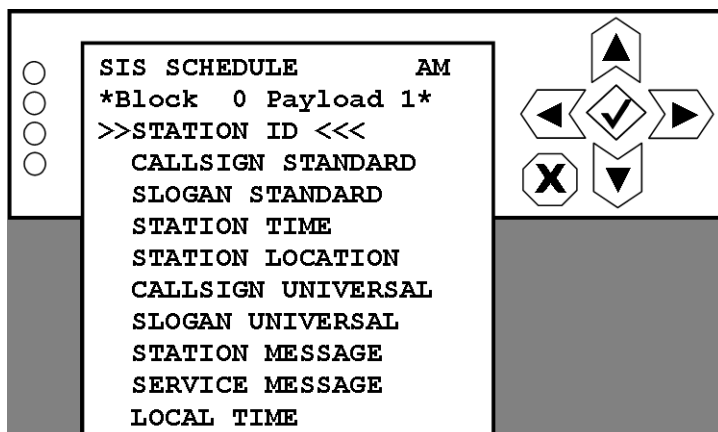
 *Note: The SIS schedule should not require adjustment. The Exporter Plus is factory set according to the defaults shown in [Table 8.2](#) on page 8-52.*

Figure 8.116: Block/Payload Editing Screen



Use the up and down buttons to highlight the desired SIS message, then press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired, noting the following:

- The **SERVICE MESSAGE** payload may reside in Payload 1 or Payload 2.
- The **SERVICE MESSAGE** payload may not reside in the same Block as **STATION MESSAGE**, **SLOGAN STANDARD**, **CALLSIGN UNIVERSAL** or **STATION ID**.



*Note: Entering an invalid combination of payloads for a given block will reset both payloads in the block to a valid combination (Payload 1 = **CALLSIGN STANDARD**, Payload 2 = **empty**)*

- **LOCAL TIME** should be included in at least one payload. The **LOCAL TIME** payload does not send the actual time; it sends the following information:
 - Leap Second Offset
 - Time to next Leap Second Offset
 - Local time zone
 - An indicator of the DST (daylight savings time) schedule (e.g., US, Europe, etc.)
 - DST Local Deployment Indicator
 - DST National Deployment Indicator

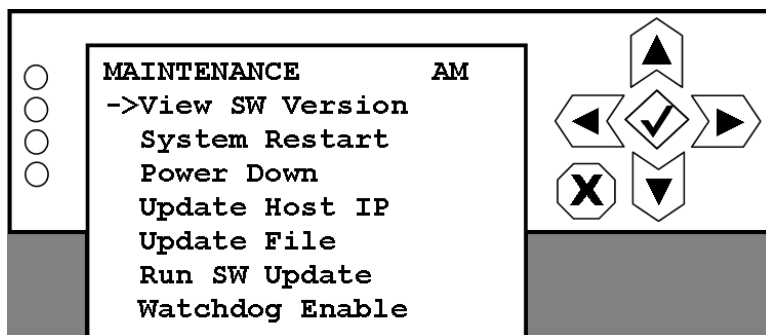
Table 8.2: Default Payload Configuration

Block	Default Payload 1	Default Payload 2
0	Callsign Standard	Station ID
1	Slogan Standard	Empty
2	Callsign Standard	Empty
3	Slogan Standard	Empty
4	Slogan Standard	Empty
5	Callsign Standard	Station Location
6	Callsign Standard	Empty
7	Callsign Standard	Station Location
8	Slogan Standard	Empty
9	Slogan Standard	Empty
10	Slogan Standard	Empty
11	Callsign Standard	Station Location
12	Callsign Standard	Empty
13	Callsign Standard	Empty
14	Callsign Standard	Station Location
15	Callsign Standard	Empty

MAINTENANCE

From the **MAINTENANCE** menu (see [Figure 8.117](#)) you can perform various tasks associated with software upgrades. To perform a software upgrade, see [Software upgrade procedure on page 8-57](#).

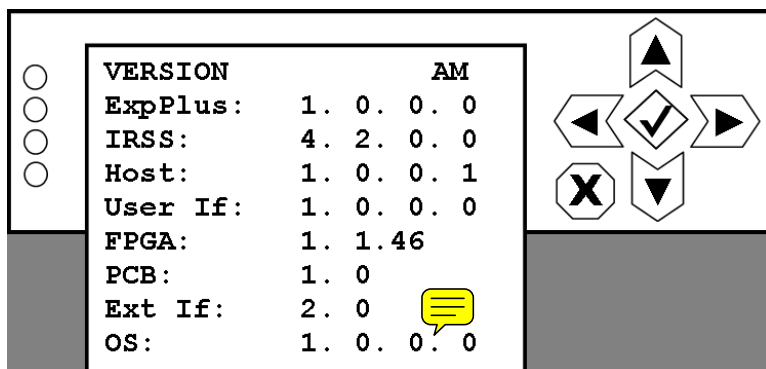
Figure 8.117: Maintenance Menu



VIEWING SOFTWARE VERSION

When you select **View SW Version** from the **MAINTENANCE** menu (see [Figure 8.118](#)) you can view the software versions for the Exporter Plus, the IRSS (Ibiquity proprietary software release number) and other system components.

Figure 8.118: View Software Version Screen



INITIATING A SYSTEM RESTART OR POWER DOWN

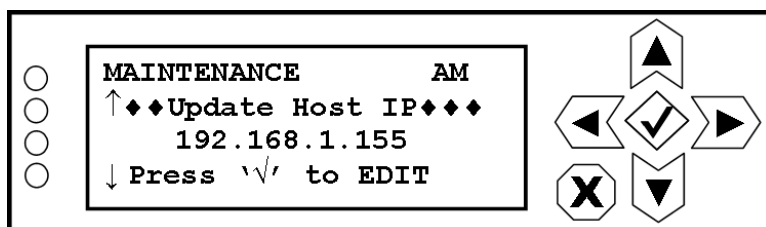
When you select **System Restart** or **Power Down** from the **MAINTENANCE** menu, you can perform a system restart or a power down of the Exporter Plus. These functions are identical to those described in the **SYSTEM** menu (see [Initiating a system restart on page 8-10](#) or [Initiating a power down on page 8-12](#)).

UPDATE HOST IP

A software upgrade is done remotely using TFTP, which means that the local TFTP client communicates with a TFTP server to download a file containing the upgrade components (i.e., executables). For this reason, there must be a TFTP server operating on the host equipment and you must set the IP address of the host equipment for the TFTP client in the Exporter Plus.

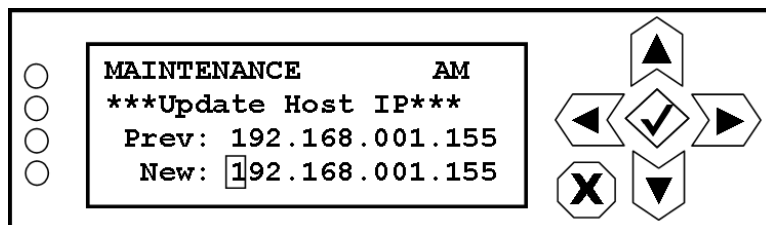
When you select **Update Host IP** from the **MAINTENANCE** menu (see [Figure 8.119](#)), you can edit/create the host equipment's IP address.

Figure 8.119: Update Host IP Screen



To change the host IP address, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.120](#).

Figure 8.120: Update Host IP Editing Screen

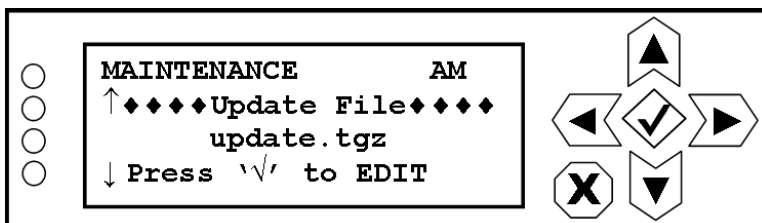


Use the right and left buttons to highlight the desired digit in the new address, then use the up and down buttons to increase or decrease the value of the highlighted digit. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

UPDATE FILE

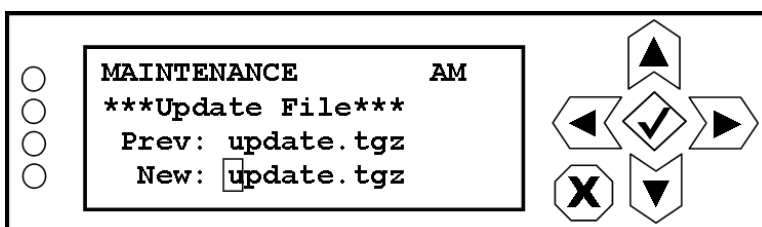
When you select **Update File** from the **MAINTENANCE** menu (see [Figure 8.121](#)), you can specify the name of the file to download for the software upgrade.

Figure 8.121: Update File Screen



To change the update file name, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.122](#).

Figure 8.122: Update File Editing Screen



Use the right and left buttons to highlight the desired character in the new update file name, then use the up and down buttons to change the character as desired. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

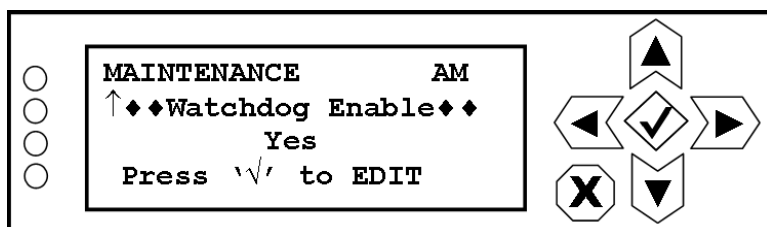
RUN SOFTWARE UPDATE

When you select **Run SW Update** from the **MAINTENANCE** menu, the software update will begin.

WATCHDOG ENABLE

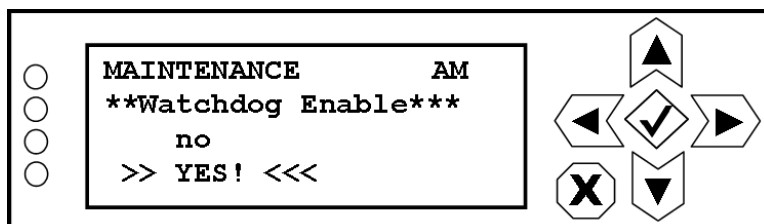
When you select **Watchdog Enable** from the **MAINTENANCE** menu (see [Figure 8.123](#)) you can enable or disable the watchdog timer. When enabled, a watchdog event will occur if application communication stops for more than five seconds. This event causes the Exporter Plus power to cycle (turn off, then on). Disabling the watchdog timer is required if the application needs to be shutdown for maintenance purposes.

Figure 8.123: Watchdog Enable Screen



To change the watchdog enable/disable status, press the checkmark (accept) button to enter the editing screen shown in [Figure 8.124](#).

Figure 8.124: Watchdog Enable Editing Screen



Use the up and down buttons to highlight **Yes** or **No**. Selecting **Yes** enables the watchdog timer. Press the accept or cancel button to enter the Save/Cancel screen (see [Figure 8.4 on page 8-5](#)). Save or cancel as desired.

SOFTWARE UPGRADE PROCEDURE

Exporter Plus software is easy to update using the pages available in the UI's **MAINTENANCE** menu.

An update can be performed over an Ethernet connection using TFTP. This requires that a TFTP server be installed on the same Ethernet subnet as the Exporter Plus. Various TFTP server implementations are available for Windows. SolarWinds Network Management provides a free TFTP server at:

http://www.solarwinds.net/Tools/Free_tools_TFTP_Server/

Refer to your TFTP server's software package for specific installation instructions. TFTP servers require a designated folder to act as the TFTP server's root directory (e.g., C:/TFTP-Root). Make sure that the TFTP server is configured to both receive and transmit files to avoid TFTP timeout conditions.

Perform a software update as follows:



Note: A software update resets all Exporter Plus settings to factory defaults. Make note of any settings being altered and re-enter them when the software update is complete.

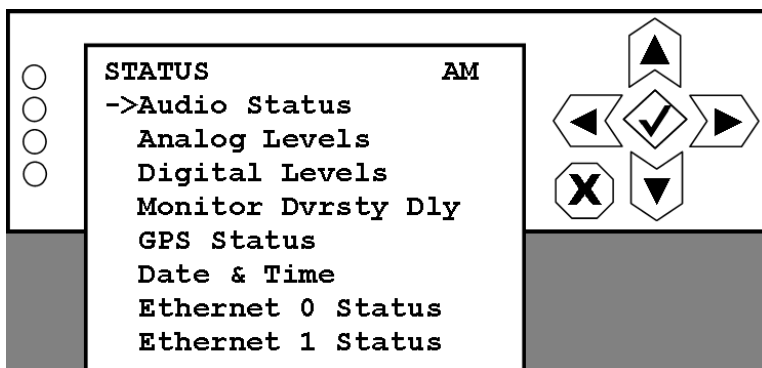
The following procedure shuts down the Exporter Plus software. Digital transmission is disabled during this procedure.

1. Connect the Windows PC with the TFTP server to the Ethernet and configure its IP address according to your Exporter Plus' subnet. Verify the connection by pinging the Exporter Plus' IP address.
2. Place the software update file in the root directory of the TFTP server.
3. In the **MAINTENANCE** menu's **Update File** screen, enter the software update file name (see [Update file on page 8-55](#)).
4. In the **MAINTENANCE** menu's **Update Host IP** screen, enter the IP address of the computer that is running the TFTP server (see [Update host IP on page 8-54](#)).
5. Select **Run SW Update** from the **MAINTENANCE** menu to proceed with the update. The UI will indicate the progress of the update and whether or not the file transfer and decompression is successful. You can review the installation log on the UI.
6. Select **System Restart** from the **MAINTENANCE** menu to restart the Exporter Plus and finalize the update.

VIEW STATUS

You can view various parameters of the Exporter Plus in the **STATUS** menu (see [Figure 8.125](#)).

Figure 8.125: View Status Menu



This menu has seven sub-menu options:

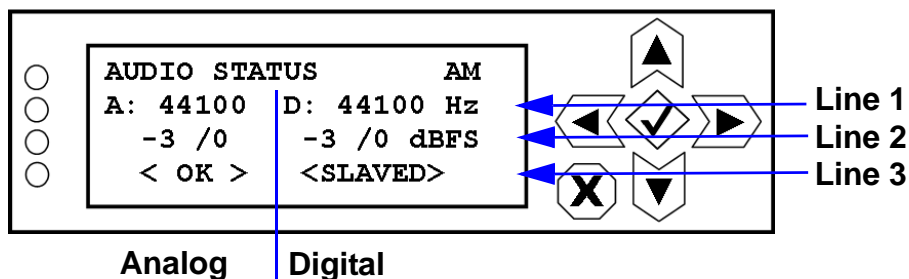
- **Audio Status** - displays status of analog and digital inputs (see [“Audio status”](#) on page 8-59).
- **Analog Levels** - displays left and right channel levels for the analog audio input (see [“Analog levels”](#) on page 8-59).
- **Digital Levels** - displays left and right channel levels for the digital audio input (see [“Digital levels”](#) on page 8-60).
- **Monitor Dvrsty Dly** - displays the current diversity delay (see [“Monitor diversity delay”](#) on page 8-60).
- **GPS Status** - displays the state of the GPS receiver, the number of detected satellites and positional information such as HDOP and latitude/longitude coordinates (see [“GPS status”](#) on page 8-61).
- **Date & Time** - displays the current date, time, time zone and GPS acquisition status.
- **Ethernet 0 Status** or **Ethernet 1 Status** - displays IP and netmask addresses for the Ethernet 0 port (see [“Ethernet port status”](#) on page 8-62).

Use the up and down buttons to move the cursor to the desired option and then press the right button to display the selected screen.

AUDIO STATUS

The AUDIO STATUS screen (see [Figure 8.126](#)) displays status of analog and digital inputs.

Figure 8.126: Audio Status Screen



Line 1: Displays lock status for analog and digital audio

- If no audio is present, displays UNLCK
- If audio is present, displays sample rate

Line 2: Displays average/peak level of audio input; displays SILENT for no input

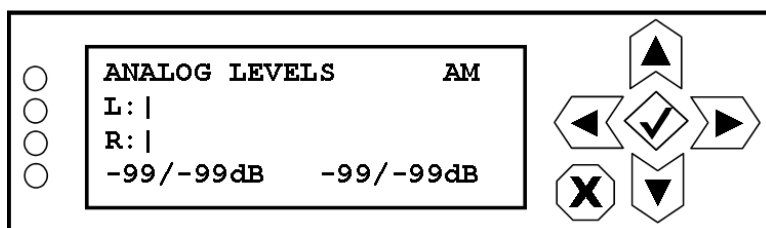
Line 3: Analog: OK, BYPASS (if bypass feature is on) or ERROR.

Digital: OK, SLAVED (if audio input is set to **Analog Only**, see [Setting audio input mode on page 8-27](#)) or ERROR.

ANALOG LEVELS

The ANALOG LEVELS screen (see [Figure 8.127](#)) displays left and right channel levels for the analog audio.

Figure 8.127: Analog Levels Screen



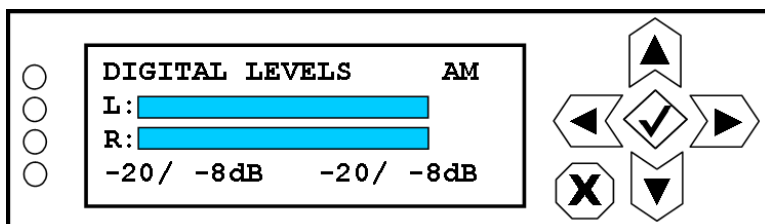
L: bar display of the left channel level (average/peak shown in dBFS at bottom, left of screen)

R: bar display of the right channel level (average/peak shown in dBFS at bottom, left of screen)

DIGITAL LEVELS

The DIGITAL LEVELS screen (see [Figure 8.128](#)) displays left and right channel levels for the digital audio.

Figure 8.128: Digital Levels Screen



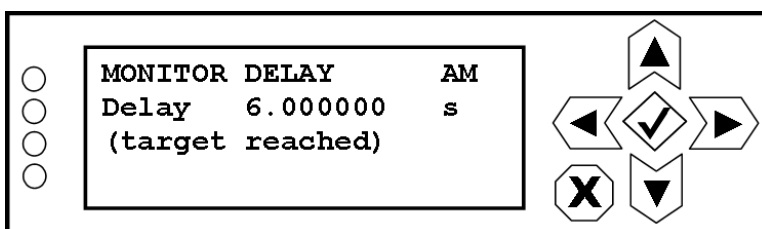
L: bar display of the left channel level (average/peak shown in dB at bottom, left of screen)

R: bar display of the right channel level (average/peak shown in dB at bottom, left of screen)

MONITOR DIVERSITY DELAY

The MONITOR DELAY screen (see [Figure 8.129](#)) displays the actual diversity delay applied to the analog audio.

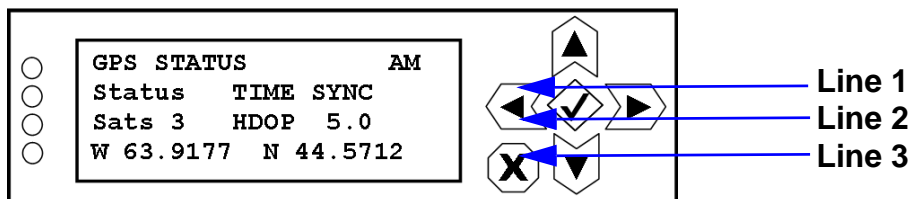
Figure 8.129: Monitor Diversity Delay Screen



GPS STATUS

The GPS STATUS screen (see [Figure 8.130](#)) displays the following information:

Figure 8.130: GPS Status Screen



Status: GPS ACQUIRE (no satellites detected), PLL ALIGN (occurs briefly, if 1 PPS OK), PLL UNLOCKED (pulling in), TIME SYNC (locked) or HOLDOVER (coasting; there was a GPS dropout, and the Exporter Plus is now using the internal 10 MHz).

Sats: Number of satellites detected

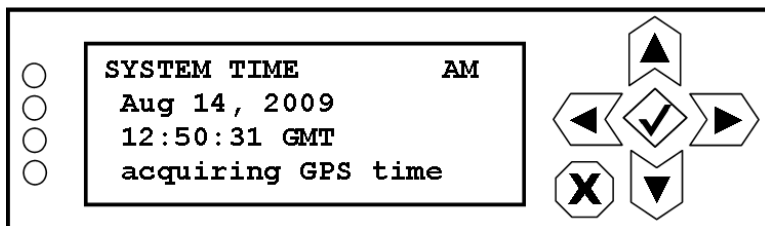
HDOP (Horizontal Dilution of Precision): indicates the accuracy of GPS horizontal positional fixes. A value less than 4.0 indicates good GPS signal reception. A value less than 1.0 indicates very accurate GPS signal reception.

Latitude and Longitude coordinates.

DATE & TIME

The SYSTEM TIME screen (see [Figure 8.131](#)) displays the following information:

Figure 8.131: System Time Screen



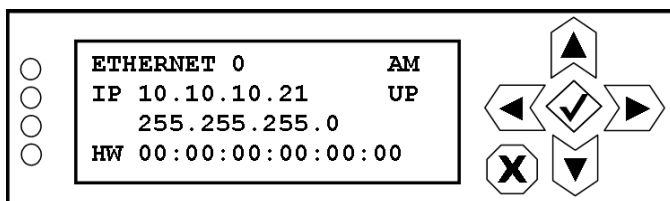
The bottom line of the display shows the GPS time status. There are three possible options for display:

- acquiring GPS time: attempting to acquire a GPS time reference
- GPS time locked: displayed time is from a GPS time reference
- time not GPS based: using system clock; not attempting to acquire GPS time reference.

ETHERNET PORT STATUS

The ETHERNET 0 or ETHERNET 1 screen (see [Figure 8.132](#)) displays the following information:

Figure 8.132: Ethernet Status Screens



IP: IP address established in [“Setting Ethernet 0 or 1 IP address”](#) on page 8-24. The line below the IP address is the netmask established in [“Setting Ethernet 0 or 1 netmask”](#) on page 8-24.

UP: indicates a network has been detected

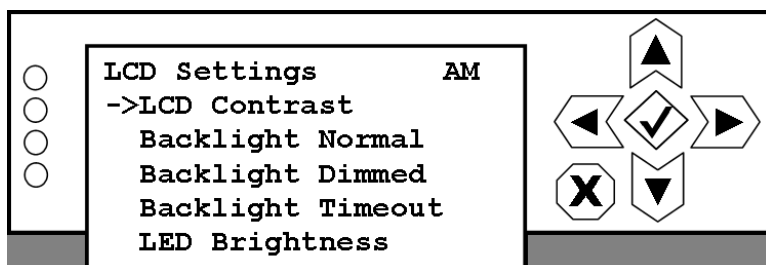
HW: displays the MAC address (if configured)

If an Ethernet port is not connected to another network device (e.g., switch), the status screen may display “link is down or disconnected”.

LCD SETTINGS

You can configure the LCD display's contrast, brightness and backlight settings using the LCD SETTINGS menu (see [Figure 8.133](#)).

Figure 8.133: LCD Settings Menu



This menu has five sub-menu options:

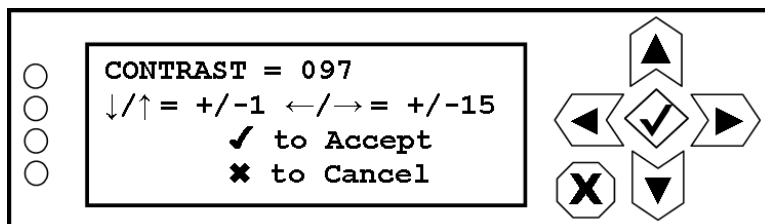
- **LCD Contrast** - sets the display contrast (see [“Adjust LCD contrast”](#) on page 8-64).
- **Backlight Normal** - sets the brightness of the display's backlight for normal navigational use (see [“Adjust normal backlight brightness”](#) on page 8-64).
- **Backlight Dimmed** - sets the brightness of the display's backlight during periods of non-use (see [“Adjust dimmed backlight brightness”](#) on page 8-65).
- **Backlight Timeout** - sets a time delay, after a period of non-use, that the brightness of the display's backlight will switch from normal to dimmed (see [“Set backlight timeout period”](#) on page 8-65).
- **LED Brightness** - sets the brightness level of the four LEDs at the left of the display (see [“Adjust LED brightness”](#) on page 8-66).

Use the up and down buttons to move the cursor to the desired option and then press the right button to open the selected menu.

ADJUST LCD CONTRAST

When you select **LCD Contrast** from the **LCD SETTINGS** menu (see [Figure 8.134](#)), you can change the contrast level of the LCD display.

Figure 8.134: LCD Contrast Screen



The current contrast value is displayed on the top line.

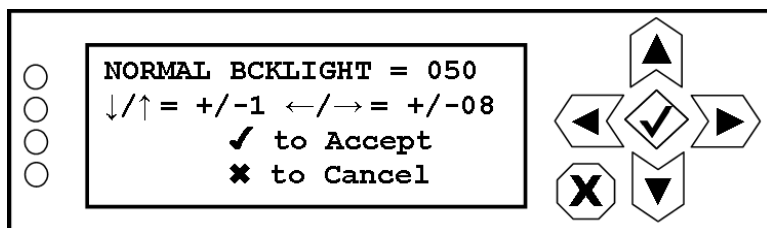
The up and down buttons provide a fine adjust, changing the contrast by a value of 1. The left and right buttons provide a coarse adjust, changing the contrast by a value of 15. Use the appropriate up/down or left/right buttons to change the contrast value as desired. The actual display contrast will change as you edit the value.

Press the checkmark to accept the change or press **X** to cancel.

ADJUST NORMAL BACKLIGHT BRIGHTNESS

When you select **Backlight Normal** from the **LCD SETTINGS** menu (see [Figure 8.135](#)), you can change the brightness level of the LCD display's backlight during normal use.

Figure 8.135: Backlight Normal Screen



The current normal backlight value is displayed on the top line.

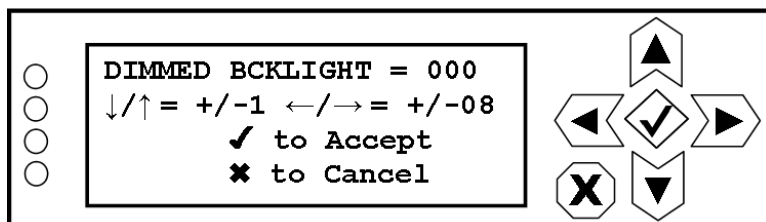
The up and down buttons provide a fine adjust, changing the backlight brightness by a value of 1. The left and right buttons provide a coarse adjust, changing the backlight brightness by a value of 8. Use the appropriate up/down or left/right buttons to change the backlight value as desired. The actual backlight brightness will change as you edit the value.

Press the checkmark to accept the change or press **X** to cancel.

ADJUST DIMMED BACKLIGHT BRIGHTNESS

When you select **Backlight Dimmed** from the LCD SETTINGS menu (see [Figure 8.136](#)), you can change the brightness level of the LCD display's backlight during a period of non-use.

Figure 8.136: Backlight Dimmed Screen



The current dimmed backlight value is displayed on the top line.

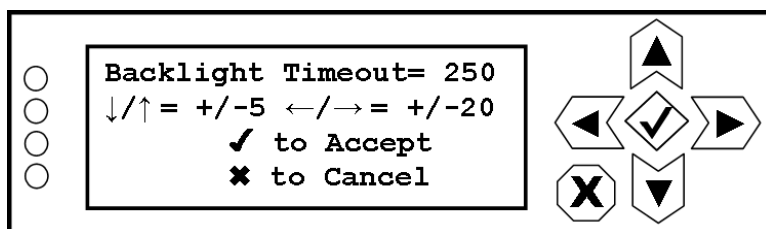
The up and down buttons provide a fine adjust, changing the backlight brightness by a value of 1. The left and right buttons provide a coarse adjust, changing the backlight brightness by a value of 8. Use the appropriate up/down or left/right buttons to change the backlight value as desired. The actual backlight brightness will change as you edit the value.

Press the checkmark to accept the change or press **X** to cancel.

SET BACKLIGHT TIMEOUT PERIOD

When you select **Backlight Timeout** from the LCD SETTINGS menu (see [Figure 8.137](#)), you can set the time delay, after a period of non-use, that the brightness of the display's backlight will switch from its normal setting to its dimmed setting.

Figure 8.137: Backlight Timeout Screen



The current backlight timeout (in seconds) is displayed on the top line.

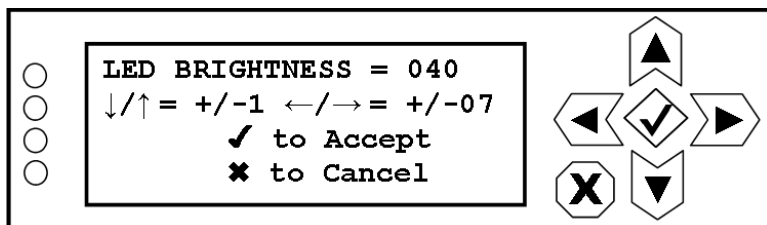
The up and down buttons provide a fine adjust, changing the backlight timeout by 5 s. The left and right buttons provide a coarse adjust, changing the backlight timeout by 20 s. Use the appropriate up/down or left/right buttons to change the backlight timeout as desired.

Press the checkmark to accept the change or press **X** to cancel.

ADJUST LED BRIGHTNESS

When you select **LED Brightness** from the **LCD SETTINGS** menu (see [Figure 8.138](#)), you can change the brightness level of the four LEDs on the left-hand side of the LCD display.

Figure 8.138: LED Brightness Screen



The current LED brightness value is displayed on the top line.

The up and down buttons provide a fine adjust, changing the backlight brightness by a value of 1. The left and right buttons provide a coarse adjust, changing the backlight brightness by a value of 8. Use the appropriate up/down or left/right buttons to change the backlight value as desired. The actual backlight brightness will change as you edit the value.

Press the checkmark to accept the change or press **X** to cancel.

SECTION 9: ROUTINE MAINTENANCE

This section provides instructions for performing routine maintenance on the Exporter Plus. This section includes the following topics:

- Checking the fans - see [page 9-1](#)
 - Cleaning the fan filter - see [page 9-1](#)
-

CHECKING THE FANS

The Exporter Plus contains two operational cooling fans (see [Figure 10.9 on page 10-12](#)). In order to maintain your Exporter Plus warranty and prevent premature component failures, check the fans periodically.

INTERVAL

- Every six months in typical environments.
- Every three months in dusty, humid or harsh environments.

PROCEDURE

Take the following steps to check the fans:

1. Remove the Exporter Plus's top cover. If possible, allow the Exporter Plus to continue normal operation.
2. Verify that the two cooling fans are turning at an acceptable speed and that there are no visible obstructions.
3. If you need to closely inspect a fan, clear an obstruction, or replace a fan, you must turn off the Exporter Plus. You should also remove the ac power connection at the back of the Exporter Plus.
4. When maintenance is complete, reinstall the Exporter Plus's top cover.

SECTION 10: TROUBLESHOOTING

The fastest way to determine the Exporter Plus's status is by viewing the front panel user interface (UI). The **View Status** menu of the LCD display can assist in diagnosing a fault as well as the four LEDs adjacent the display. When there are alarms, or the Exporter Plus is no longer operational, these LEDs will turn red. The Exporter Plus also allows for continuous remote monitoring via an Ethernet connection.

The features described above allow the user to determine the Exporter Plus's operational status at almost any time. In the event that the Exporter Plus becomes non-operational, some simple troubleshooting procedures can be followed to return it to operational status. This section outlines some common errors and warnings that may occur, along with the procedures to correct each problem.



Note: It is highly recommended that troubleshooting personnel be familiar with the operation of the Exporter Plus. Refer to the Operating section of this manual as an aid in troubleshooting.

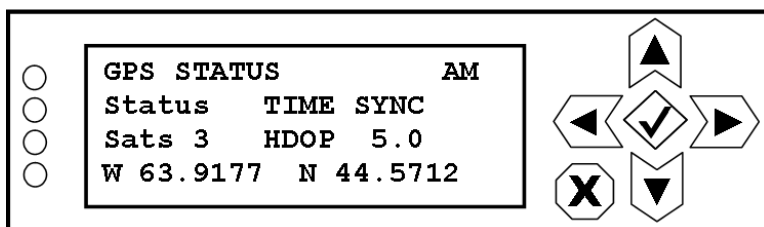
The following troubleshooting information is included in this section:

- [GPS related alarms - see page 10-2](#)
- [Network related alarms - see page 10-3](#)
- [System related alarms - see page 10-6](#)
- [LED indications - see page 10-7](#)
- [Audio related alarms - see page 10-9](#)
- [Checking cable connections - see page 10-10](#)
- [Parts information - see page 10-11](#)
- [Electrical schematic - see page 10-13](#)

GPS RELATED ALARMS

The **GPS STATUS** screen (see [GPS Status Screen - see page 10-2](#)) provides information on the quality of GPS reception (i.e., number of satellites detected and HDOP) and the frequency lock status.

Figure 10.1: GPS Status Screen



Frequency lock (**TIME SYNC** displayed) should be assured if the number of detected satellites (**Sats**) by the GPS receiver is three or more and if the **HDOP** value is 4 or less. These values will change as satellites move, but generally, if the antenna has a reasonably clear view of the sky, then the values should be at least as good as described above.

The **Status** line can display various text depending on the quality of GPS reception and the state of the Exporter Plus:

- **GPS ACQUIRE** indicates that no satellites are detected
- **PLL ALIGN** occurs briefly, if 1 PPS OK
- **PLL UNLOCKED** indicates pulling in
- **TIME SYNC** indicates a frequency lock
- **HOLDOVER** indicates the GPS receiver is coasting

When the Exporter Plus first boots up, the **Status** line indication should transition from **PLL UNLOCKED** to **TIME SYNC** fairly quickly (less than 15 minutes).

If **PLL ALIGN** is displayed for more than a few seconds, suspect a hardware fault.

If **PLL UNLOCKED** is displayed for more than 15 minutes and the **Sats** and **HDOP** values are acceptable, suspect a hardware fault.

If **HOLDOVER** is displayed, there is poor satellite reception. Attempt to minimize time in this state, possibly by repositioning the GPS antenna.

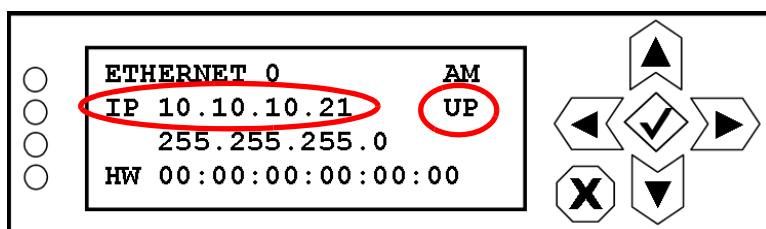
NETWORK RELATED ALARMS

There are several network related faults that can affect the operating status of the Exporter Plus.

CONFIGURATION

A configured Ethernet port that is properly connected to a LAN should display its IP address and the UP status on the appropriate View Status -> Ethernet Status screen (see [Figure 10.2](#)).

Figure 10.2: Ethernet Status Screen



1. If the status displays UP, but connection with a browser does not work, check the IP configuration and verify that each Ethernet port in use is connected to the proper subnet.
2. Use a PC connected to the network to 'ping' the Exporter Plus IP addresses (see [Figure 10.3](#)) to verify that the Exporter Plus is accessible.

Figure 10.3: Typical Ping Command

```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\>ping 192.168.1.98

Pinging 192.168.1.98 with 32 bytes of data:

Reply from 192.168.1.98: bytes=32 time<1ms TTL=128
Reply from 192.168.1.98: bytes=32 time<1ms TTL=128
Reply from 192.168.1.98: bytes=32 time<1ms TTL=128
Reply from 192.168.1.98: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.98:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

PROGRAM SERVICE DATA (PSD)

If the Exporter Plus does not seem to be accepting program service data (PSD) from an automation system, troubleshoot as follows:

1. Verify the destination IP address in the automation system matches the IP address of the Exporter Plus.
2. If the automation system is not on the same subnet as the Exporter Plus, verify that the automation system's routing table contains an entry for the Exporter Plus IP address.
3. Verify the PSD port number in the automation system is set to 11000.
4. Verify the automation system PSD generator supports IRSS 4.2.x and higher HD systems.

EXCITER LINK

The Exporter Plus will automatically generate IBOC data provided that the exciter IP address is not 0.0.0.0 and that audio is connected to the digital audio input (or to the analog input if configured to use only a single input).

1. If the exciter is not on the same subnet as the Exporter Plus, make sure that the Exporter Plus gateway is configured to the IP address of the local router to the exciter subnet.
2. Use a PC connected to the network to 'ping' the IP addresses of the exciter and Exporter Plus (see [Figure 10.3](#)) to verify that they are accessible.



Note: Make sure that the PC used for the 'ping' test has routes to the subnets being used.

3. Browse to the exciter (Exgine) web interface and check the following (see the associated exciter's manual for more detailed information on Exgine operation):
 - Verify the exciter link port number matches the port number configured in the Exporter Plus (see **Edit Setting -> Exciter Config -> Dest Port Number** screen). Check the port number in the Exgine's configuration screen (see example in [Figure 10.4 on page 10-5](#)).
 - Monitor the exciter link status to verify it is receiving IBOC data and that it is able to lock to the IBOC data (see example in [Figure 10.5 on page 10-6](#); **RUN** indicates normal operation).

Figure 10.4: Exciter Configuration Page

then select [Edit](#) current configuration file.



Current Configuration File:

```
#####
# Exgine System Configuration File
#####
fifoInitThreshold: 25 # Number of packets to buffer before transmission starts.
exgineNice: -15 # Exgine process priority (-20 highest / 20 lowest).
enableTimingRecovery: enabled # enable ethernet based timing recovery.
clockPacketRxOffset: 0 # Offset in 50 MHz cycles from when clock packet is received.
vcxoLowerLimit: -0.950000 # Minimum VCXO deviation from zero offset in PPM.
vcxoUpperLimit: 0.950000 # Maximum VCXO deviation from zero offset in PPM.
enetDpllWn: 0.000063 # Ethernet loop filter natural frequency.
enetDpllDf: 0.100000 # Ethernet loop filter damping factor.
enetDpllIIR: 0.000102 # Ethernet loop filter IIR constant.
gpsDpllWn: 0.030000 # GPS 10 MHz loop filter natural frequency.
gpsDpllDf: 0.200000 # GPS 10 MHz loop filter damping factor.
gpsDpllIIR: 0.031250 # GPS 10 MHz loop filter IIR constant.
startupPacketDelay: 32 # Number of clock packets before starting after sync is completed.
minSyncPackets: 128 # Number of clock packets that must be received at a minium before proceeding.
maxSyncPackets: 1800 # Number of clock packets after which we start transmitting.
syncOffsetAccuracy: 1000 # Offset criteria during startup synchronization (us).
syncSlopeAccuracy: 10 # Clock packet spacing criteria during startup synchronization (us).
syncMaxSlopeError: 5000 # Maximum amount of slope error in a window during startup (us).
syncMaxClockJitter: 250000 # Maximum amount of jitter before a clock packet is discarded (us).
retransmitWindow: 2 # Number of missing sequence numbers before issuing retransmit requests.
retransmitSpacing: 150000 # Max number of us between retransmission requests.
clockPacketMask: 65535 # Bit field indicating which clock packets to use in frame (bit 0 - packet 0).
clockLogSize: 4096 # Maximum number of clock packets being logged.
syncBurstWindow: 512 # Number of clock packets making up a burst window.
syncWindowSize: 32 # Initial number of clock packets in a window.
maxMissingPkts: 130 # Number of consecutively dropped packets until a connection is considered dropped (0-130).
configureEnet: enabled # Allow EXGINE to reconfigure the Ethernet interface (default 1).
requireFpInfo: disabled # Selects whether EXGINE waits for Front Panel packet or use this network config.
protocol: 0 # Exgine data stream protocol (0-unidirectional UDP 1-bidirectional TCP).
port: 9000 # Exgine data stream port.
ctrlPlaneMasterPort: 3630 # E2X Encap Control plane master receive port
ctrlPlaneSlavePort: 3631 # E2X Encap Control plane slave receive port
dataPlanePort: 3633 # E2X Encap Exgine's data plane port
allowAllE2XVersions: disabled # Disables E2X Encap. version check.
protocol: 0 # Exgine data stream protocol (0-unidirectional UDP 1-bidirectional TCP).
port: 8145 # Exgine data stream port
ctrlPlaneMasterPort: 3630 # Control plane master receive port
ctrlPlaneSlavePort: 3631 # Control plane slave receive port
dataPlanePort: 3632 # Exgine's data plane port
exgineIp: 192.168.1.29 # Exgine IP Address.
netmask: 255.255.255.0 # Exgine Netmask.
```

Figure 10.5: Exciter Link Status Page

Statistics	Status	Configuration	Maintenance
Exciter Server Version 2.0 (Sep 14 2007 - 08:36:39) Status Information:			
Exciter Operating Mode: FM Mode			
Server FSM State: RUN			
Exciter Link Interface Status:			
Connected: yes			
Segment port opened: yes			
Next sequence number: 127260			
Sequence number head: 1179			
Sequence number tail: 127260			
Packets on reorder buffer: 38			
Packets on free list: 4			
Packets available: yes			
FPGA Interface Status:			
FPGA Version: 0x0206			
Nominal buffer depth: 25.00 packets			
Current buffer depth: 22.00 packets			
Packets in FIFO: 5			
Samples in FPGA FIFO: 7715			
Available clocking: 10MHz off 1PPS off 0.673Hz on			
Active driven clock: VCXO			
DPLL State: enet dpll			
DPLL Time Alignment Error: 0.700 ms (-0.110 ms to 0.949 ms)			
Last DAC value: 31070 in sync			
Sync status: success			
Clock packet jitter: 0.636220 ms			
MPS Audio Status: disabled			

SYSTEM RELATED ALARMS

The Exporter Plus has a built-in self test that runs at start-up. If this self test fails, the UI display will indicate a DSP Hardware Fault. If this occurs, contact Nautel.

LED INDICATIONS

There are four LEDs on the left-hand side of the LCD display that provide operational status for the Exporter Plus (see [Figure 10.6](#)). The LEDs can glow green, yellow or red. Typically, green indicates normal operation, yellow indicates a warning, and red indicates a fault or error.


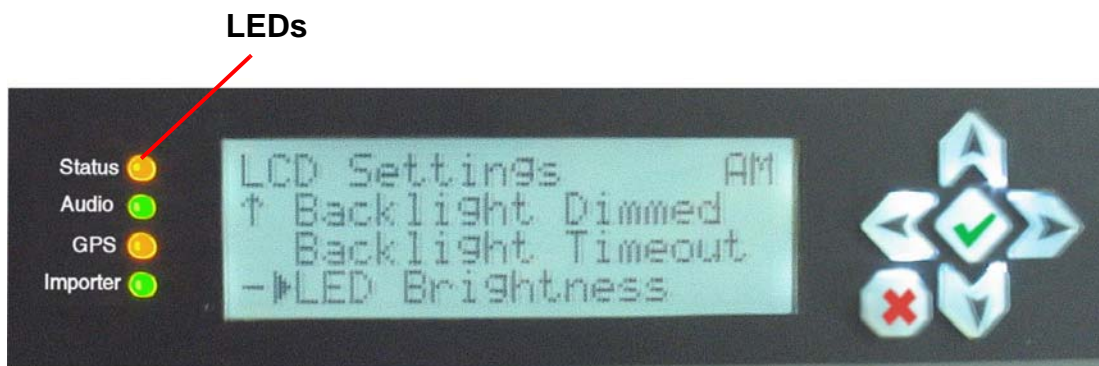
 *Note: An LED will flash for ten seconds when it changes state.*


Figure 10.6: Front Panel LEDs



[Table 10.1 on page 10-8](#) lists possible root causes for LEDs that are in a warning (yellow) or alarm (red) condition).

Table 10.1: LED Status and Root Causes

LED	Colour	Possible Root Causes
Status	Yellow	Audio bypass function is on (enabled). No GPS satellites are detected. 10 MHz PLL is not locked (i.e., not in Time Sync state)
	Red	Exporter Plus is booting up or shutting down.
Audio	Yellow	Analog audio delay is ramping up or ramping down. Silence detected on the audio input for more than 10 s.
	Red	Audio bypass function is on (enabled). Audio input SRC is not locked; may not be connected.
GPS	Yellow	No GPS satellites are detected. 10 MHz PLL is not locked (i.e., not in Time Sync state)
	Red	Non-recoverable 10 MHz PLL fault has occurred. GPS receiver not responding.
Importer	Yellow	PSD overflow fault. PSD message rate is too high.

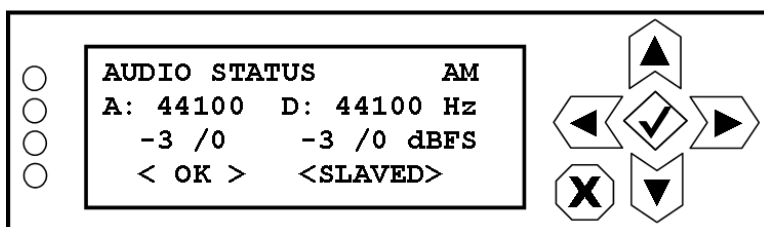
 *Note: When an LED changes status (colour), it will flash for approximately ten seconds before changing state.*

AUDIO RELATED ALARMS

There are several ways to check the audio inputs.

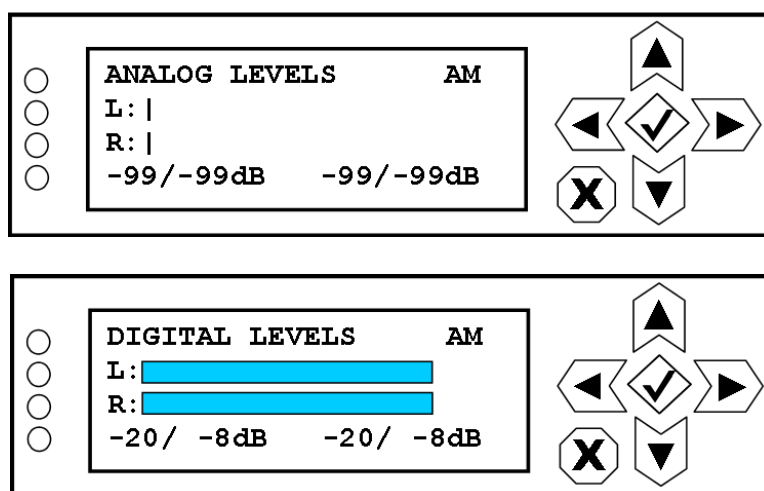
1. Use the **View Status -> Audio Status** screen (see [Figure 10.7](#)) to verify that the detected sample rate is correct and stable.

Figure 10.7: Audio Status Screen



2. Use the **View Status -> Analog Levels** or **Digital Levels** screen (see [Figure 10.8](#)) to verify that the audio levels are correct.

Figure 10.8: Audio Levels Screens



3. Use the back panel's **MONITOR OUT XLR** connector or the front panel headphone jack to verify audio content.

CHECKING CABLE CONNECTIONS

Verify that the Exporter Plus's internal cables are connected properly as follows:

1. Remove the Exporter Plus' top cover.
2. Inspect the cables and connections. If a connector is unseated or disconnected, ensure it is reconnected to its mate as identified in [Table 10.2](#). If necessary, see [Figure 10.9 on page 10-12](#) to identify the exporter's sub-assemblies.

Table 10.2: Connector Mating Information

Connector	Mate	Connector	Mate
P1	U4-H1	W2P2	U6
P2	U2-CN1	W4P1	U1-USB
P3	A1-J6	W5P1	U2-PW2
P4	U1-ATXCTL1	W5P2	U1-CPU12V
P5	A2-J14	W6P1	U1-USB0
P6	A2J7	W6P2	U12-J1
P7	U2-PW1	W7P1	A1J1
P9	A2J16	W4P1	U1-USB
P10	U1-JCOM1	W5P1	U2-PW2
P12	U1-FPANEL1	W5P2	U1-CPU12V
P14	A1J3	W6P1	U1-USB0
P15	A2J15	W6P2	U12-J1
W1P1	U1-LAN1	W7P1	A1-J1
W1P2	U5	B1P1	U1-CPUFAN
W2P1	U1-LAN2		

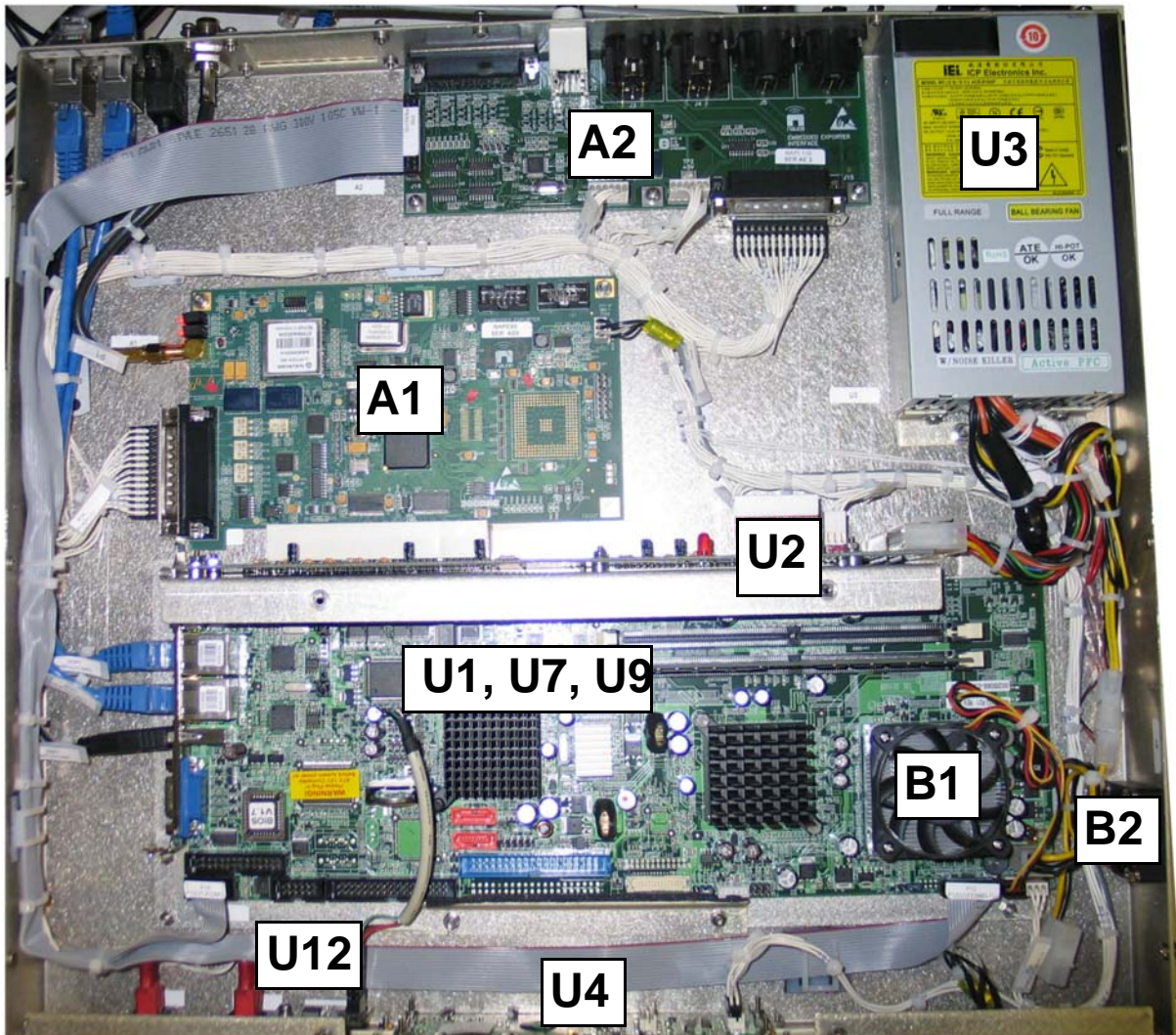
PARTS INFORMATION

For the purposes of identifying parts and possibly ordering replacements, the Exporter Plus' internal assemblies are identified in [Table 10.3](#) and [Figure 10.9 on page 10-12](#). The table provides the reference designation, a description, and the Nautel part number for each item. The figure shows the location of the major components.

Table 10.3: Exporter Plus Plus Parts List

Reference Designation	Description	Nautel Part #
A1	Embedded Exporter PCI Card	NAPE80
A2	Embedded Exporter Interface PWB	NAPI110
B1	Fan, 1RU, Celeron M, FCPGA, 1.6C/W	ZAP31
B2	Fan, DC, 12V, 35mm, 7CFM	ZA51
S1	Switch, Rocker, SPST, 15A	SD69
S2	Switch, MOM, Rocker, SPST, 15A	SD68
U1	SBC, PICMG 1.0, Socket 479	UA118
U2	PCB, 2-position PCI backplane, 1U	UA117
U3	Power Supply Mod	198-5518
U4	Display, 4 Line LCD, w Keypad, 5V RS232	UW101
U5	Connector, Coupler, RJ45, Feed-Thru, Shielded	JA76
U6	Connector, Coupler, RJ45, Feed-Thru, Shielded	JA76
U7	IC, CPU, Celeron M, FCPGA, 1.7GHzSL8MP	UB67
U8	Not Used	-
U9	Memory, 512M, 400MHz, DDR2, 667MHz	UX109
W7	GPS Antenna Cable Assembly	198-5508

Figure 10.9: Exporter Plus Sub-assemblies



SECTION 11: LIST OF TERMS

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

AAS. Advanced Application Services

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 of connector used in professional microphones). One cable carries both left- and right-channel audio data to the receiving device.

CAT-5. Short for Category 5. Network cabling that consists of four twisted pairs of copper wire terminated by RJ45 connectors.

EOC. Ensemble Operations Center.

EXGINE. An HD™ Radio component which resides in the exciter. The Exgine decodes the Exciter link data and produces the appropriate I/Q modulation.

GPS. The Global Positioning System is a system of satellites and receiving devices used to compute positions on the Earth.

GUI. Graphical User Interface

HD™ RADIO. High definition (HD) Radio is another term for In Band On Channel (IBOC) technology. HD Radio is a trademark of the Ibisquity Digital Corporation.

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

IRSS. Ibisquity Reference System Software.

LAN. Local Area Network.

MPS. Main Program Service

NE IBOC. Nautel's In-Band-On-Channel signal generator. See IBOC. Required for XR series IBOC installations.

PAD. Program-Associated Data.

SPS. Supplemental Program Service. Sometimes called SAC. In initial tests, NPR called this Tomorrow Radio.

STL. Studio-transmitter Link. A studio-transmitter link sends a radio station's audio signals from a broadcast studio to a transmitter located some distance away from the studio.

TFTP. Trivial File Transport Protocol.

TSL. Transmitter-studio Link. A transmitter-studio link returns data (e.g., monitoring information) from a transmitter site to a broadcast studio located some distance away from the transmitter.

UDP. User Datagram Protocol. A core internet protocol whereby programs on networked computers can send short messages between one another.

VNC. Virtual Network Client.

XLR. A 3-pin connector used for a balanced audio cable. Used in pro-audio equipment and AES/EBU digital audio.

EXPORTER PLUS

TECHNICAL INSTRUCTION MANUAL

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