

# IMPORTANT

## NOTE

THE ENCLOSED INFORMATION SHEET WILL NOT APPLY TO NAUTEL NX SERIES TRANSMITTERS THAT ARE INCLUDED AS PART OF A COMBINED SYSTEM CONFIGURATION.

PLEASE CONTACT NAUTEL FOR FURTHER ASSISTANCE SHOULD YOUR NX SERIES TRANSMITTER BE PART OF A COMBINED SYSTEM CONFIGURATION.





# NX Series AM Transmitters Software Upgrade

(to NX SW 4.0 and higher)

**IS13005A**

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# IS13005A NX Series AM Transmitter Software Upgrade (to NX SW 4.0 and higher) INFORMATION SHEET

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## 1 INTRODUCTION

The NX series AM transmitter is a microprocessor controlled unit. Periodically, enhancements or improvements to the operating system are identified and made available. This requires a software update.

### NOTE

*Upgrading your software introduces new AUI menu structures and features that were previously not available or described in your manual.*

*Review the applicable software release notes on <ftp://www3.nautel.com/> to view the changes for your specific software version (e.g., [ftp://www3.nautel.com/NX\\_Series/NX\\_Ver4.0.1/](ftp://www3.nautel.com/NX_Series/NX_Ver4.0.1/)). You can also find associated documents (technical manuals and related Information Sheets) that will assist in operating with the new software.*

### 1.1 Equipment Affected

This procedure applies to NX series AM transmitters upgrading to NX software version 4.0 or higher.

### 1.2 Responsibility for Implementation of Procedure

This procedure should be carried out by qualified station maintenance personnel who are familiar with the NX series AM transmitter.

### 1.3 Scheduling

This procedure may be implemented at the convenience of station maintenance personnel. Review the applicable software release notes to determine the urgency of the update.

### 1.4 Manpower Requirements

It is estimated that implementing this modification will require 30 minutes to complete. Note that it is necessary for the transmitter to be placed in an off-air status for a portion of this procedure.

### 1.5 Special Tools/Test Equipment

Along with standard hand tools (screwdriver, nut driver, etc.), the following items may be required. Review the procedure to determine which items apply.

- Laptop (i.e., local computer for direct connection) or Network computer with Windows and Internet Explorer Web browser
- CAT5 Ethernet Cable
- Compact flash card: This is available from Nautel to upgrade to NX SW 4.0 or higher from an older version. You can also re-image your existing card as detailed in an Information Sheet available from Nautel.
- Software for transmitter (\*.tgz) file (to upgrade from NX SW 4.0 to 4.x)
- USB mouse (may be required if a new or re-imaged compact flash card is used)



## 2 PRELIMINARY CHECKS

- (a) Determine the current software revision installed. Using the Advanced User Interface (AUI) screen, go to either **Menu ► Software Configuration ► Upgrade Subsystem Software** (for older SW versions) or to **Menu ► System Settings ► Upgrade Software** (for newer SW versions) and note the software version indicated in the current version field.
- 1.x or 2.x, you require a compact flash card. Contact Nautel for instructions to order a new flash card or create your own by re-imaging your existing flash card. To re-image your existing flash card, go to [ftp://www3.nautel.com/NX\\_Series/](ftp://www3.nautel.com/NX_Series/) and open the latest NX software version folder (e.g., NX\_Ver4.3.2/). Perform the compact flash card burning procedure detailed in Information Sheet IS13004A.
  - 4.x, contact Nautel for the most recent “Downloadable” software revision, or go to [ftp://www3.nautel.com/NX\\_Series/](ftp://www3.nautel.com/NX_Series/), open the latest NX software version folder (e.g., NX\_Ver4.3.2/) and download the \*.tgz file to a computer.
- (b) Review and record all other transmitter settings. Nautel recommends you use a remote PC to take screen shots of all AUI pages that contain user-adjustable settings. Pay particular attention to the following settings, which may change during the software upgrade:
- Audio input level settings (not calibration)
  - Pre-correction settings
  - Engine settings (see Engine NOTE below)
  - Exciter clock synchronization settings
  - Exciter changeover settings

### NOTE

*Refer to the applicable software release notes for special notes or any additional settings that may have changed or require special attention.*

### ENGINE NOTE

*If the transmitter being upgraded uses any presets with overall mode set to IBOC or IBOC+AM, it is necessary that you record Engine settings **BEFORE** performing the upgrade; otherwise this information **WILL BE LOST**. See Appendix A for instructions*

### NOTE

*If a new compact flash card was received or the existing card was re-imaged, such as in the case of upgrading to from a pre-4.0 SW version to 4.x, go to paragraph 3. If a compact flash card was not received, such as in the case of upgrading from SW version 4.0 to a newer 4.x, go to paragraph 5.*



### 3 RECORDING SETTINGS BEFORE REMOVING FLASH CARD

There are various settings and logged data that will not be saved in your transmitter when you remove your flash card. Nautel recommends that you record these settings and logged data, as desired, before removing your flash card so that you may re-enter them after re-imaging a new flash card. The following AUI pages apply (refer to the NX Operations and Maintenance Manual, if necessary, to navigate to these pages):

- Logs
- User Accounts
- Network Setup
- Email Configuration
- Audio Input Level
- Notifications
- SNMP Configuration (new MIB file is required to use SNMP)
- Scheduler

#### NOTE

*When you unplug the single-board computer's (SBC) power connector, some non-critical transmitter functions - such as local AUI, remote AUI, SNMP and email notifications - are temporarily disabled.*

### 4 COMPACT FLASH CARD SWAP

If a new compact flash card was received with the upgrade \*.tgz file, proceed as follows:

- (a) From the transmitter AUI, record your current network settings (IP address, Subnet Mask, Default Gateway). To view the current settings go to **Menu ► Software Configuration ► Network Setup** (for pre-4.x SW versions) or to **Menu ► User Settings ► Network Setup** (for 4.x or newer SW versions).
- (b) Unplug the single board computer (SBC) power connector P8 – located behind a cover on the rear of the door (use 7-mm nut-driver – M4 hardware).
- (c) Remove the current compact flash card – bottom edge of SBC. Note orientation of card.
- (d) Install new card (noting orientation) and plug in SBC power connector P8.
- (e) The AUI should boot up and the transmitter login screen should appear (or the main screen – depending if *Auto Login* was enabled for the active user).
- (f) The Update Software screen should be present. Using a USB mouse to navigate, flash the transmitter by selecting “Start Upgrade”.
- (g) Proceed to paragraph 6 (c).



## 5 TRANSFERRING UPGRADE FILE

The following steps assume either a network connection to the transmitter **OR** a direct connection to the transmitter. If the intention is to use a computer directly connected to the transmitter proceed to paragraph 5.1b. Otherwise, proceed to paragraph 5.1a.

### 5.1a Network Configuration/Setup

- (a) From the transmitter AUI, go to **Menu ► User Settings ► Network Setup** and record the transmitters IP address. Proceed to paragraph 5.3.

### 5.1b Direct Connection

- (a) From the transmitter AUI, go to **Menu ► User Settings ► Network Setup**.

- (b) Select '*Static IP*' and set as follows:

IP Address:       **10.10.10.2**  
Subnet Mask:     **255.255.255.0**  
Default Gateway: **192.168.1.2**

Press **Apply**.

- (c) Place the transmitter into **Remote** control.

### 5.2 Computer IP Setup

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

- (a) Use a CAT5 Ethernet cable to connect your computer's Ethernet port to the transmitter's Ethernet port (J1 on the AUI).
- (b) On your computer, go to **Start Menu ► Control Panel ► Network Connections ► Local Area Network**.
- (c) In the Local Area Network Status, open the **General** tab and choose **Properties**. Scroll down and highlight **Internet Protocol (TCP/IP)**. Choose **Properties**.
- (d) In the *Internet Protocol (TCP/IP) Properties* window, select **Use the following IP address**.
- (e) Enter the following settings:  
IP Address:       **10.10.10.1**  
Subnet Mask:     **255.255.255.0**  
Default Gateway: **192.168.1.2**
- (f) In the *Internet Protocol (TCP/IP) Properties* window, select **OK**.
- (g) In the *Local Area Connection Properties* window, select **OK**.
- (h) In the *Local Area Connection Status* window, select **Close**.
- (i) Close the *Network Connections* window.



### 5.3 Transfer Software Upgrade File to Transmitter

- (a) Using your computer, open an Internet Web browsing program and type in the IP address listed in the appropriate Network Configuration paragraph (5.1a or 5.1b) in the address bar and press enter. The transmitter login screen should appear.
- (b) At the transmitter login screen enter:  
User: Nautel or \*\*\*\*  
Password: *none* (default) or \*\*\*\*  
\*\*\*\* denotes user assigned password and user name.
- (c) Navigate through the AUI to **Menu ► System Settings ► Upgrade Software** and press **Browse**. Locate the software update \*.tgz file and press **Upload** to load the file into the transmitter boot image list.

### 6 FLASHING THE TRANSMITTER WITH UPGRADE SOFTWARE

- (a) Ensure the transmitter is in **Local** control and RF Power is **Off**. Perform the following steps locally (in front of the transmitter AUI).
- (b) Go to the AUI **Menu ► System Settings ► Upgrade Software** screen and select the update \*.tgz file from the boot image list (should highlight in blue) and press **Start Upgrade**.
- (c) If the upgrade progress stalls for more than five minutes, cycle the main ac breaker and repeat step (b).

#### CAUTION

*Note the red warning text at the top of the AUI screen – do not leave this page until after the flash process is complete.*

- (d) Once the upgrade has completed, the AUI will automatically reboot. This completes the software upgrade. Restore the former network settings on the transmitter and laptop as required.

#### NOTE

*After upgrading your software, the location of certain settings may have changed. Refer to the latest version of the NX Operations and Maintenance Manual, available electronically (PDF) with the Software Bulletin, to navigate the new AUI menus.*

#### NOTE

*Make sure to clear the cache of every web browser used to remotely connect to the transmitter's AUI to ensure that the remote AUI displays correctly after the software upgrade.*

- (e) If the CF card was replaced, login to the AUI and perform a touch screen calibration in the appropriate AUI page (e.g., for SW version 4.x, the touch screen calibration is in **System Settings ► Screen Configuration**). Refer to the NX Operations and Maintenance manual, if necessary. You will need to plug in the USB mouse to navigate to the touch screen calibration page, then use your finger to touch the targets.



- (f) Login to the AUI (if necessary) and repeat step 2 (a) to verify that the current version is the same as the upgrade version. Select the upgrade **tgz** file and press '**Details**', verify all component versions match between '**Installed Version**' and '**Selected Upgrade**' columns, and are all green or grey. This confirms the upgrade was successful.
- (g) Review all transmitter settings and compare with those recorded in step 2 (b) as well as paragraph 3, if the CF card was replaced. Verify all settings are as desired.

NOTE

*If the transmitter being upgraded uses any presets with overall mode set to IBOC or IBOC+AM, it is necessary at this point to add Engine settings to each of these presets. See Appendix A, step (d) for instructions.*

- (h) If upgrading from a SW version prior to 4.0. go to the **Menu / Factory Settings / PDM Settings** page and ensure **PDM Phase Configuration** is set for 9 Phase PDM.
- (i) Verify the **Scheduler** page settings are as expected. If not, configure the **Scheduler** page, as per the settings recorded in paragraph 3.
- (j) It is possible that an EEPROM Failure: Remotes alarm or EEPROM Failure: Schedule alarm may occur after the upgrade. Reset the alarm as follows:
- For an EEPROM Failure: Remotes alarm, select Remote I/O from the AUI's Menu. Change the Channel setting for Remote Input 1 to Reset. Press **Apply**, then change the Channel setting back to RF On/Off and press **Apply** again. The alarm should clear.
  - For an EEPROM Failure: Schedule alarm, select Scheduler from the AUI's Menu and press **New**. Select a preset from the drop down menu, and press **Save**. Highlight the new Rule and press **Delete**. The alarm should clear.

**If you have any questions or require additional assistance, please contact Nautel's Customer Service Department at:**

**Telephone: 1-902-823-5100**

**Email: support@nautel.com**



# APPENDIX A

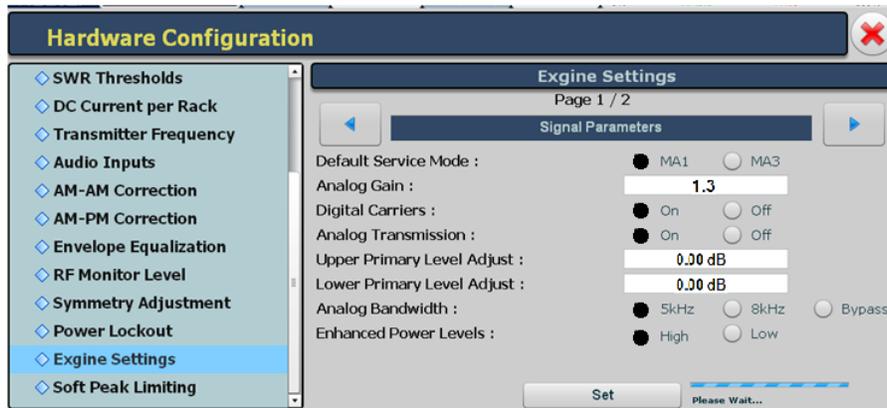
## SETTING OR MIGRATING ENGINE SETTINGS FOR NX SW 4.4 OR HIGHER

This procedure is intended to be used by NX IBOC customers when setting up the digital settings in the transmitter preset with NX software version 4.4 or higher. Prior to this software release, Engine settings were all contained within the User Settings menu of the transmitter's AUI, and were applied regardless of the operating preset. NX 4.4 software adds the capability to set these within the transmitter preset, opening the possibility that they can be reconfigured simply by selecting a new preset.

- (a) Before performing the software upgrade, navigate to the AUI's Engine Settings page in the current software. For NX SW 4.x, go to **Main Menu / User Settings / Engine Settings**. For older versions of software, the Engine Settings page may be found in the **Main Menu / Hardware Configuration** section of the AUI (see Figure 1 for examples).



Software version 4.x (including Mode and Tuning tabs)



Older versions of software

Figure 1: Examples of Engine Settings pages

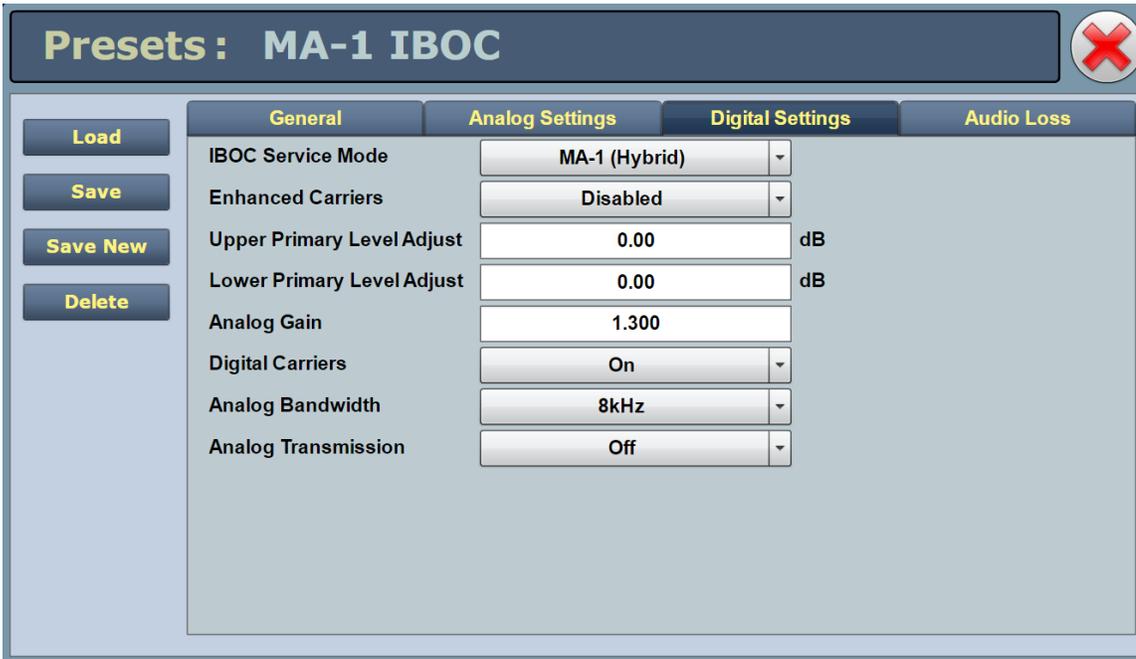
- (b) Record or take a screenshot of the settings on the Engine Settings page's **Mode** and **Tuning** tabs. Following the upgrade to NX 4.4 software, these settings will be controlled through the transmitter preset and will no longer be accessible on the Engine Settings page.
- (c) Perform the software upgrade described in the main body of this document.



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## SETTING OR MIGRATING EXGINE SETTINGS FOR NX SW 4.4 OR HIGHER

- (d) Navigate to the preset editing screen and load an IBOC or IBOC + AM preset to set up the Exgine settings. Navigate to the **Digital Settings** tab. It should initially display as shown in Figure 2.



General	Analog Settings	Digital Settings	Audio Loss
IBOC Service Mode	MA-1 (Hybrid)		
Enhanced Carriers	Disabled		
Upper Primary Level Adjust	0.00	dB	
Lower Primary Level Adjust	0.00	dB	
Analog Gain	1.300		
Digital Carriers	On		
Analog Bandwidth	8kHz		
Analog Transmission	Off		

Figure 2: Initial Digital Settings page

### NOTE

Figure 2 shows the Digital Settings screen for an IBOC preset. For an IBOC+AM preset, the IBOC Service Mode, Analog Gain, Analog Bandwidth and Analog Transmission fields are not displayed.

- (e) Configure the settings in the **Digital Settings** tab to match the operating mode of the transmitter as follows:
- **IBOC Service Mode:** Set this to MA-1 (Hybrid). MA-3 is not compatible with analog receivers.
  - **Enhanced Carriers:** If the Mode tab's Enhanced Carriers setting recorded in step (b) was set to **Off**, set this to **Disabled**. Otherwise, set it to match the Enhanced Power Levels setting on the Mode tab prior to the upgrade. **NOTE:** This setting controls the power level of the secondary and tertiary digital carriers. By default these carriers are enabled but set to low power. Reduced interference can be obtained on the analog transmission by disabling these carriers at the expense of a reduced bit rate on the digital transmission.

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## SETTING OR MIGRATING EXGINE SETTINGS FOR NX SW 4.4 OR HIGHER

- Upper/Lower Primary Level Adjust: Enter these fields with the corresponding values from the Tuning tab recorded in step (b). **NOTE**: These settings control the adjustment of each sideband from the nominal level (default = 0 dB), and would normally be adjusted to compensate for the antenna response, or to reduce interference with a neighbouring station.
  - Analog Gain: Enter this field with the corresponding value from the Tuning tab recorded in step (b). **NOTE**: This setting controls the linear gain applied to the audio in the Exgine and is adjusted to obtain the correct modulation level (default = 1.00). For a -6 dBFS input, set Analog Gain to 2.00.
  - Digital Carriers: This setting controls whether the IBOC digital sidebands are enabled. This setting is normally set to **On** except in the case of troubleshooting or initial setup.
  - Analog Bandwidth: Set this to the corresponding value from the Mode tab setting recorded in step (b). **NOTE**: This setting controls the low pass filter that is applied to the analog audio in the Exgine. It can be safely be set to **Bypassed** if there is proper filtering applied by an audio processor to the audio signal before it is applied to the Exporter.
  - Analog Transmission: This setting controls whether the analog audio is allowed to modulate the transmitter through the Exgine. This setting is normally set to **On** except in the case of troubleshooting or initial setup. Setting it to **Off** will mute the audio for the analog transmission.
- (f) Save the preset with the new settings.
- (g) Repeat steps (d) through (f) for all other IBOC and IBOC+AM presets in the system.

