# IMPORTANT

## <u>NOTE</u>

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

PLEASE CONTACT NAUTEL FOR FURTHER ASSISTANCE SHOULD YOUR NV SERIES TRANSMITTER BE PART OF A SWITCHING COMBINED OR SWITCHLESS COMBINED SYSTEM CONFIGURATION.

# NV Series FM Transmitter - Software Upgrade

**IS13006A**

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# IS13006A NV Series FM Transmitter – Software Update Procedure
## INFORMATION SHEET

### 1.0 INTRODUCTION

The NV Series FM transmitter is a microprocessor controlled unit. Periodically, enhancements or improvements to the operating system are identified and made available. This then requires a software update. This information sheet describes the update procedure.

<u>**NOTE**</u>
*Upgrading the NV series transmitter software may introduce new AUI menu structures and features that were previously not available or described in the technical instructions manual.*

*Review the applicable Nautel Software Bulletin on* ftp://www3.nautel.com/ *to view the changes for specific software versions. Associated documentation (technical manuals, related Information Sheets, etc.) that will assist in operating with the new software are also found at this url.*

### 1.1 Equipment Affected
This procedure applies to NV series FM transmitters upgrading to NV 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 NV series FM transmitter.

### 1.3 Scheduling
This procedure may be implemented at the convenience of station maintenance personnel.

### 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 the duration of this procedure.

### 1.5 Special Tools/Test Equipment
Along with standard hand tools (screwdriver, nut driver, etc.) the following test equipment may be required. Review the procedure to determine which items apply.

- Laptop or local computer for direct connection or connection through a LAN with Windows and Internet Explorer Web browser.

- CAT5 Ethernet cable

- Software (**\*.tgz or \*.img** files).

- Compact flash card (Only needed if upgrading from pre 4.0 software. See section 2.1-a )

- USB computer mouse for calibrating the touch screen after the upgrade (only needed if upgrading from **pre-4.0** software)

## 2.0  DETERMINING YOUR SOFTWARE VERSION

There is a different upgrade procedure when upgrading from pre 4.0 software, so you will need to check your current software version.

a)  Via the advanced user interface (AUI) screen, go to **Menu** / **Software Configuration** / **Upgrade Software** (**Menu / System Settings / Upgrade Software** in newer software). Select the latest **\*.tgz** file from the boot image list (should highlight in blue) and press **About** (**Details** in newer software).

b)  This can take a minute and will compare the \*.tgz file selected with the software currently installed on the transmitter. Any software versions that do not match will be highlighted in Red. If there are no red rows present, then the software installed matches the \*.tgz file selected and that is the current software version.

c)  If there are any red rows present, the software does not match. If that is the case, record the software version for *AUI*, *Server*, *Controller*, *Exciter* and *RF Modules* and contact customer support to verify your software version.

### 2.1 Acquiring the Upgrade Files

Check the software bulletin at ftp://www3.nautel.com/NV_Series
for the most recent software revision.

(a)  If upgrading from Pre **4.0** software, a new compact flash card is required to complete the upgrade. You can order a compact flash card from Nautel (which contains upgrade file) or purchase your own, download the appropriate **\*.img** file, and burn the compact flash card yourself using the information sheet IS13004 (found on the software bulletin under the latest software version).

(b)  If upgrading from software version 4.0 or later, download the \*tgz file for the latest software version to your computer.

## 3.0  PRE 4.0 SOFTWARE UPGRADE

The rest of this information sheet will be split into two parts. Section **4** and **5** will cover the upgrade procedure for transmitters upgrading from pre **4.0** software and section **6** and section **7** will cover software upgrades from version 4.0 or higher. Section **8** must be completed for **all** software upgrades.

### 4.0 CONFIGURATION CHANGE
### (Required when upgrading from pre-4.0 software)

For transmitters received with NV software version **2.3** or previous, perform the following procedures:

- *RF Drive Sample Calibration* (refer to step 4.1)
- *Exciter HD Calibration* (refer to step 4.2)

For transmitters that were received with NV software version **2.6**, perform only:

- *RF Drive Sample Calibration* (see step 4.1)

### NOTE

*Operate the transmitter in FM mode at the assigned power level for at least 15-20 minutes prior to making measurements or adjustments. This will allow the transmitter to warm-up, when adjustments should be made, versus when the transmitter is cold.*

### 4.1 RF Drive Sample Calibration

(a) With RF off, go to the AUI **Menu** / **Hardware Configuration** / **Scaling** screen. Select "RF Drive Power" from the pull-down menu, and change the scale factor to 1.000. Press the **Apply** button (Note the original value in your records).

(b) Operate the transmitter (*RF On*) in an FM mode preset at the licensed analog power level (or rated power), with exciter A as active.

### NOTE
*If any RF drive related alarms occur temporarily reduce the active FM Preset's Exciter Power setting – in the AUI's **Menu / Preset** screen – to half its current value (record the original value). Press the **Activate** button. Continue reducing this setting if these symptoms continue.*

(c) Go to the AUI **Menu** / **System Review** screen. Press the **i** button in the Controller line. Record the RF Drive Power.

(d) From the same AUI screen, press the **i** button in the Exciter A line. Record Exciter A's Forward Power.

(e) If exciter B is installed, manually change over to exciter B (using the AUI **Menu** / **Exciter Changeover** screen), then go to the AUI **Menu** / **System Review** screen. Press the **i** button in the Exciter B line. Record Exciter B's Forward Power.

(f) Calculate the average exciter forward power level between exciters A and B using the power levels recorded in steps (d) and (e). The transmitter's RF Drive Power reading will be re-calibrated to the average exciter forward power.

(g)  On the local UI go to **Menu** / **System settings** / **Calibration / RF Drive Cal**. Change the RF drive value using the up and down arrows until it matches the average exciter forward power calculated in step (f). Press the **Checkmark** button.

(h)  If the preset's *Exciter Power* setting was adjusted, set it back to the original value recorded in the note above. Press the **Activate** button. Repeat steps (b) through (g) until the "RF Drive Power" meter value matches the average exciter forward power calculated when the preset's *Exciter Power* setting is equal to its original value (if necessary, only reduce the setting by a smaller amount each subsequent time). Record the new Scale Factor.

(i)  If you will be running in FM+HD or HD mode proceed to *Exciter HD Calibration*; if not, select the desired preset or operating mode.  Note that for any FM+HD mode, the power level displayed in the AUI's Presets page is the desired analog power setting (TPO). The power reading at the top of the home page is also the analog portion of the FM+HD output.

(j)  The procedure is complete. Nautel recommends that you retain at the site the new RF Drive Power Scale Factor from step (h). Email the data to Nautel at the following email address (stating transmitter type and serial number) :

support@nautel.com

## 4.2 Exciter HD Calibration

### NOTE
*This calibration procedure addresses all IBOC modes (FM+HD and HD) of operation.*

*Prior to performing the NV software version 4.0 upgrade, it is recommended that Exgine cards be checked to ensure that Exgine software version 2.3 (or higher) is running. You can do this by putting the Exgine IP into your web browser. (Your computer must be on the same network as your HD data) The Exgine IP can be found under **Menu>Hardware Configuration>Exgine Interface**. If the Exgine card is not running Exgine software version 2.3 (or higher), an upgrade should be completed.*

(a)  Operate the transmitter (*RF On*) in an FM mode preset at the licensed analog power level (or rated power), with exciter A as active.

(b)  Go to the AUI **Menu** / **Hardware Configuration** / **HD Settings** screen.

(c)  Press the **Calibrate** button next to *Exciter HD Power Calibration*.

(d)  Almost immediately the Calibration Value shall change from a nominal 1.000 to a value typically near or between 0.900 and 1.100. Record the calibration value.

(e)  If exciter B is installed, manually change over to exciter B (using the AUI **Menu** / **Exciter Changeover** screen) and repeat steps (b) through (d). When complete, change over to exciter A (making it active again).

*Live changes between HD and FM+HD modes, made with any version of NAPE86 based
exciters (NAE104/NAE105) may cause a short interruption in HD carriers due to the
requirement to re-boot the exgine. This interruption does not occur on any version of NAPE79
based exciters (NAE100/NAE101).*

*Also NAPE79 based exciters do not support PowerBoost or asymmetrical sideband
functionality. Therefore it is possible to have a transmitter configured with one exciter that
supports these functions and one that does not.*

## 5.0 COMPACT FLASH CARD SWAP
### (Required when upgrading from pre-4.0 software)

Swap the current card with the new card as follows.

**NOTE**
*When changing flash cards, some user settings will be lost, including: user accounts, logs,
SNMP configuration, email configuration, time zone, Network settings, and notifications. It is
recommended that all User Settings be recorded prior to changing the flash card and checked
upon completion of the change.*

(a) From the transmitter AUI, go to **Menu**/ **Software Configuration** / **Network Setup**, and
record your current network settings (IP address, Subnet Mask, Default Gateway, etc).

**NOTE**
*Within NV software version 4.0, LUT (Look Up Tables) storage is no longer necessary. It is
recommended that any stored LUT information be removed prior to performing the upgrade.
Go to **Menu / Hardware Configuration / LUT Storage** and delete all stored LUT information.
You must also set the LUT Index value to flat in the preset menu.*

(b) Remove the cover located at the mid-rear of the transmitter front door. (use 7 mm nut-
driver – M4 hardware).

(c) Unplug the single board computer's (SBC) power connector P8.

(d) Remove the current compact flash card on the bottom edge of the SBC. Note the
orientation of the card.

(e) Install the new card, (noting orientation) plug in the SBC power connector P8 and re-
install cover removed in step (b).

(f) The AUI will boot up and prompt you to run the upgrade routine to complete the upgrade
process.

(g) Once the transmitter has completed the upgrade routine and rebooted the login screen
should appear (or the main screen – depending if *Auto Login* was enabled for the active
user). After the AUI logs in, connect the mouse to the USB port on the bottom of the
SBC.

(h) At this point the AUI touch screen must be recalibrated. Perform calibration by navigating
to **Menu/System Settings/Screen configuration** and run the screen calibration routine.
Press the **Touch screen Calibration** button and touch cross-hairs to complete the task.

(i) Skip to section **7(e)**.

## 6.0  POST VERSION 4.0 SOFTWARE UPGRADE.

### 6.1 Transmitter IP Configuration

#### NOTE
*If you already have the remote AUI configured, proceed to step 6.3.*

(a)  From the transmitter AUI, go to **Menu/ Software Configuration** / **Network Setup**.

(b)  Record your current network settings (IP address, Subnet Mask, Default Gateway).

(c)  If connecting to the transmitter directly with a laptop, 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**.

(d)  Set the transmitter for **Remote** control.

### 6.2 Laptop IP Setup

**For Windows XP**

(a)  On the laptop, go to **Start Menu** / **Control Panel** / **Network Connections** / **Local Area Network**.

(b)  In the Local Area Network Status, open the **General** tab and choose **Properties**. Scroll down and highlight **Internet Protocol (TCP/IP)**. Choose **Properties**.

(c)  In the *Internet Protocol (TCP/IP) Properties* window, select **Use the following IP address**.

(d)  Enter the following settings:

IP Address:　　　 **10.10.10.1**
Subnet Mask:　　 **255.255.255.0**
Default Gateway: **Blank**

(e)  In the *Internet Protocol (TCP/IP) Properties* window, select **OK**.

(f)  In the *Local Area Connection Properties* window, select **OK**.

(g)  In the *Local Area Connection Status* window, select **Close**.

(h)  Close the *Network Connections* window.

**For Windows 7**

(a)  On the laptop, go to **Start Menu** and type **Network Connections** and press enter. In Network Connections, open L**ocal Area Connection**.

(b)  In the Local Area Network Status, open the **General** tab and choose **Properties**. Scroll down and highlight **Internet Protocol Version 4 (TCP/IPv4)**. Choose **Properties**.

(c)  In the *Internet Protocol Version 4 (TCP/IP4) Properties* window, select **Use the following IP address**.

(d)  Enter the following settings:

| | |
|---|---|
| IP Address: | **10.10.10.1** |
| Subnet Mask: | **255.255.255.0** |
| Default Gateway: | **Blank** |

(e)  In the *Internet Protocol Version 4 (TCP/IP4) Properties* window, select **OK**.

(f)  In the *Local Area Connection Properties* window, select **OK**.

(g)  In the *Local Area Connection Status* window, select **Close**.

(h)  Close the *Network Connections* window.


## 6.3 Transferring Upgrade Files

(a)  Login to the remote AUI on your computer by typing the transmitter IP address into the address bar of Internet explorer. The transmitters IP address was recorded in step 6.1(b) or use **10.10.10.2** if you are directly connected to the transmitter.

(b)  Navigate to **Menu** / **System Settings** / **Upgrade Software**. Click **Manage files** and navigate to the where you saved the **\*.tgz** file on you downloaded in step **2.1**. Select the **\*.tgz** file and click upload.

## 7.0  FLASHING TRANSMITTER WITH UPGRADE SOFTWARE

(a)  Turn the transmitter off by pressing **RF OFF**.

(b)  Set the transmitter for **Local** control. Perform the following steps locally (in front of the transmitter AUI).

(c)  Go to **Menu / Software Configuration / Upgrade Software (***Menu / System Settings / Upgrade Software** in 4.0 or later software***)** screen and select the update **\*.tgz** file from the boot image list (should highlight in blue) and press **Begin Flash** (**Start Upgrade** in 4.0 or later software)**.**

(d)  After a successful upgrade, the transmitter will automatically reboot. If any alarms are present after the reboot, press the reset button to clear them.

(e)  This completes the software upgrade. Restore the former network settings on the transmitter by going to **Menu** / **User Settings** / **Network Setup**, and set the network settings (IP address, Subnet Mask, Default Gateway) recorded in step **6.1 (b).**

(f)  Repeat step **2.0** to determine if the current version is the same as the upgrade version – this confirms the upgrade was successful.

## 8.0  POST UPGRADE OPERATION

Due to changes in software when upgrading from pre 4.0 to post 4.0 software, some operational settings should be modified. All presets and calibration settings are preserved except for those detailed below.

### 8.1 Clearing saved browser information
Most web browsers will save information from sites visited in order to load them faster. You will need to clear this information so that the AUI can be loaded from scratch. To do this, clear the cache and cookies from your web browser.

### 8.2 PowerBoost Functionality
PowerBoost enabled presets will not automatically have PowerBoost enabled after the upgrade to version 4.0 software. PowerBoost functionality must now be user enabled via the following path: **Menu / Presets / General / Mode / FM+HD / HD PowerBoost (**see Figure 1 on page 9).
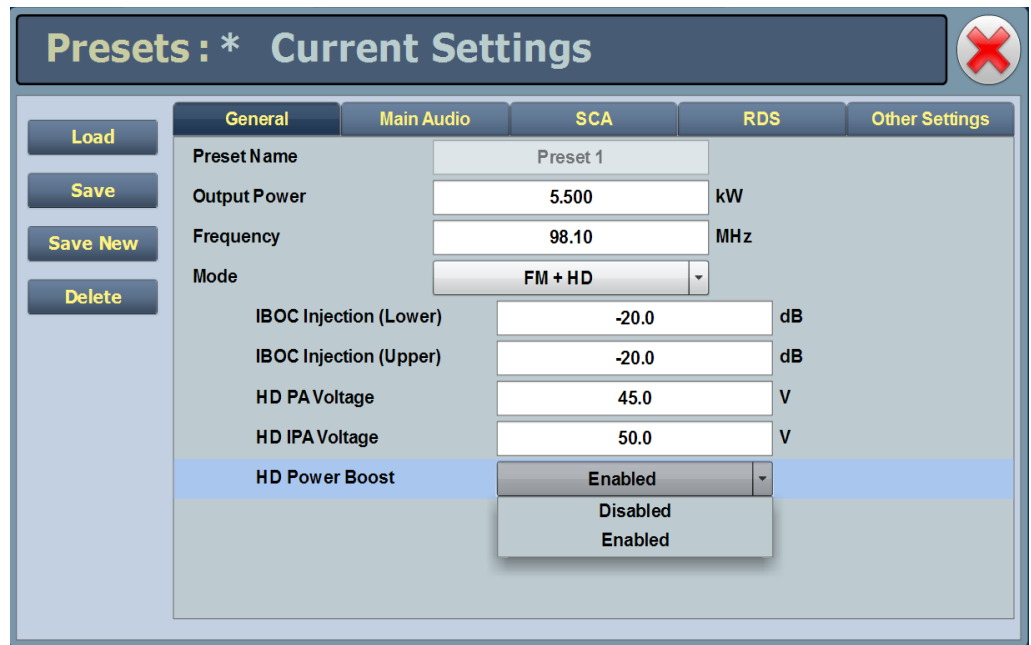
**Figure 1: Enabling PowerBoost**

## 8.3 Asymmetrical Sidebands

With the introduction of asymmetrical sidebands, there are now two injection field values that must be set (upper and lower), instead of just one. All customers, (even those with symmetrical sidebands) will need to ensure that both fields are set correctly. Otherwise, a sideband discrepancy (one sideband at -20 dBc may occur regardless of what the other sideband field is set to.

### NOTE

*NAPE79 based exciters do not support PowerBoost or asymmetrical sideband functionality. Therefore it is possible to have a transmitter configured with one exciter that supports these functions and one that does not.*

## 8.4 Post Upgrade Checks

There are also, new settings within the 4.0 software upgrade (as well as pre-existing AUI settings) that should be configured/checked upon completion of the upgrade. These include:

1. Screen Saver Timeout
2. Audio Low Thresholds
3. FM Mode Spectrum Mask
4. NTP enable/disable
5. Call Sign/ID
6. Turn On Delay
7. FM Polarity
8. Remote Analog Outputs

## 8.5 AUI Watchdog

It should also be noted that the AUI watchdog is no longer adjustable via the AUI after the software version 4.0 upgrade has been completed.

## 8.6 IPA Power Setpoint (Analog Mode Only)

Another change found in the software version 4.0 upgrade is that the IPA Power setpoint is no longer associated with a preset but is now a default system setting (110 W at 98 MHz). Therefore, when operating the transmitter in Analog mode, it is recommended that the IPA Power setpoint value being used prior to the software 4.0 upgrade be noted. This will act as a valuable troubleshooting reference point should the transmitter experience any start-up difficulties and the IPA Power setpoint value need to be adjusted.