

# **VORSIS Application Note**

**AN2008-08**

## **Upgrading the VP8 To Software Version 1.5.0**

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**Four Mode Operation**  
*(FM / AM / FM-HD / AM-HD)*

October 2008 - J. Keith

Wheatstone Corporation © 2008 All Rights Reserved  
600 Industrial Drive New Bern, NC 28562 USA 252-638-7000

[www.vorsis.com](http://www.vorsis.com)  
[techsupport@wheatstone.com](mailto:techsupport@wheatstone.com)

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## Background

Vorsis VP8 Audio Processors were introduced at the April 2008 NAB as the *first* multi-mode audio processor designed for the broadcast industry. At that time we'd completed work on the FM and AM operating modes but released only the FM mode. In early September we introduced Version 1.5.0 software which updated the VP8 to two modes and made the improved version of the AM mode fully operational.

## What's in Version 1.5.0?

The release of software Version 1.5.0 brings the next two VP8 operating modes, FM-HD and AM-HD on line. Both modes benefit greatly from specially designed processing algorithms that have been specifically optimized to intimately interoperate with the two different versions of the iBiquity HD Radio codec.

The release of Version 1.5.0 also includes an improved main clipper for smoother handling of vocal sibilance and high frequency transients and without giving up detail and sheen.

Also in Version 1.5.0 we've completely revamped the way that the VP8's presets and its operating modes interact; presets are now mode-based.

What mode-based means is that whenever a processing preset is saved, that preset is encoded to be associated with the operating mode that created it. If you later take a preset associated with a different mode than the VP8 is currently running, the VP8 will ask for permission to change modes in order to run that preset. If you agree to the mode change the VP8 will switch modes, load the DSP code for that mode, load the DSP parameter settings for the preset you chose, and then run it.

This plan works well... *until* that is you've created a preset whose basic sound texture you'd like to clone across one or more VP8 operating modes. Without a way to do otherwise, whenever you would have changed the VP8's preset to one associated with a different mode, you would have lost the settings for the mode you had just left and would have needed to start over and recreate that preset's sound from scratch.

To circumvent this issue we've created a "Discard Mode" option which appears any time you try to *take* a preset that is *not* associated with the *current* mode. 'Discard Mode' allows you to ignore the mode that a preset was created with and

instead of changing modes to run it, remain locked in the *current* mode and just load the control settings from that preset that will run in the current mode.

This is possible because even though different DSP code and processing algorithms run in each of the VP8's six modes, *presets* are designed to hold the settings for *all* of the modes even if certain settings cannot be used in a particular mode.

For instance, the presets for the codec-based modes also have storage for the operating values associated with the FM stereo generator even though that DSP code is not used or even running in those modes. That's why the file size for individual VP8 presets is larger in the later version of software.

Translation: a preset saved for FM also has settings stored for the other five modes. We did this to make the cloning of presets across modes easier for a customer. Otherwise (and because of internal architectural things) it would have been *impossible* to change modes and not lose important settings that you may have wanted to keep!

Each VP8 preset is encrypted using a 128 bit keyed symmetric block Feistel cipher. We use this preset encryption on all Vorsi audio processors except the M1 and HDP3. The 128 bit cipher encryption is present so that future preset security enhancements may be implemented if desired.

## The VP8 Upgrade Process Overview

Note that it is not necessary to update a VP8 incrementally - a single or dual-mode VP8 can be upgraded directly to a four-mode version without having to first upgrade it to an intermediate version.

Updating a VP8 consists of the following general steps, noting that a reboot\*\* of VP8 is *required* at the end of the procedure in order to bring the new software and all of its new features online:

- ✓ Downloading the new software and presets;
- ✓ Documenting your current VP8 IP addresses;
- ✓ Removing a previous version of VP8 GUI software;
- ✓ Installing the new VP8 Version 1.5.0 GUI software;
- ✓ Configuring the GUI for your VP8 device(s);
- ✓ Connecting the GUI to the VP8(s);
- ✓ Downloading the Version 1.5.0 software to the VP8;
- ✓ Rebooting the unit to bring the new version online;
- ✓ Unlocking and deleting the original Factory Presets;
- ✓ Installing the new Factory Preset package;
- ✓ Relocking the new Factory Presets - recommended!

The above steps should be followed for each VP8 that you wish to upgrade.

\*\* During reboot of the VP8 audio output will be interrupted while the new software code is being loaded and operating parameters initialized.

## Downloading the New Software and Presets

Using your web browser, download the following files from the VP8 Vorsis Product Support folder located at:

<ftp://ftp.vorsis.com/VorsisSupport/>

- ✓ **VP8GuiSetup\_1\_5\_0.exe** (in the GUI Software/VP8 folder).
- ✓ **VP8\_Factory\_04A.pkg** (in the GUI Software/VP8 folder).
- ✓ **Unlock.zip** (in the PresetLockUtility folder).

## Documenting Your Current VP8 IP addresses

Before removing the existing VP8 GUI software it is advisable to first document the IP addresses of devices that were configured in the previous application. Do this by opening the existing VP8 application, clicking on the Devices button, and then *carefully* making note of the device names and associated IP address entries listed in the popup box. You do not need to be Online to a VP8 to gather this information.

## Removing a previous version of VP8 GUI software

The Vorsis GUI software does not install any important entries into the Windows registry, so simply locating and deleting the entire folder where the original GUI was installed is sufficient to remove it.

Unless otherwise specified at installation time, Vorsis VP8 software is installed into:

**C:\Program Files\Vorsis\VP8**

Please also ensure that any desktop shortcuts to the GUI software are removed as they will no longer work once the previous software version is removed!

## Installing the new VP8 Version 1.5.0 GUI software

Next install the new GUI software by clicking on the **VP8GuiSetup\_1\_5\_0.exe** executable file. When the dialog appears about our license agreement, click the "I Agree" button to proceed.

When the Installation Options dialog appears ensure that the checkboxes for the following are all checked:

- ✓ VP8 GUI
- ✓ Start Menu Shortcuts
- ✓ Skins
- ✓ Processor Upgrade Binaries

Then click Next to continue.

When the GUI installer asks for the Destination Folder either allow it to install into its default location or use the Browse button to point the installer to the folder where you would like the application to be installed. After installation is complete there will be a Start Menu item for VP8 under the Vorsis program name.

Once this is done you should copy the following files that you downloaded to the folder where the VP8 GUI has been installed:

**Unlock.zip** - Please unzip this file into the "VP8" folder where the VP8 application has been installed. The executable file for the FactoryLock utility must reside within the VP8's application folder in order to work correctly!

**VP8\_Factory\_04A.pkg** - This is the Factory Preset package for the four-mode VP8.

### **Configuring the GUI for your VP8 device(s)**

Vorsis VP8 devices are configured by first starting the GUI application and then clicking on the Devices button on the right side of the GUI.

When the Devices dialog opens use the “Add” button to open the dialog where you will enter the IP address of your new VP8 or the addresses of existing VP8’s that you documented in previous steps.

If configuring the GUI for a single VP8 be sure to highlight the device and then click the “Select” button when you’re finished configuring it to tell the GUI that this is the device that you wish to connect to next.

### **Connecting the GUI to the VP8(s)**

Once the VP8 device has been selected and the PC is connected to the VP8 via an Ethernet cable or Ethernet switch (a crossover cable is NOT required!), ensure that the VP8 is powered up and has fully booted.

Then click the button next to the Status indicator at the top of the GUI to put the GUI online with the VP8.

When the Status shows “Online” you are ready to proceed with the software upgrade.

## Downloading the Version 1.5.0 software to the VP8

Right click in the upper portion of the GUI (where the controls are) and a drop down menu will appear. Under the "Hardware" section is a selection called "Update" - please select it.

- ✓ A Windows dialog will appear showing the folder where the GUI is installed. Inside the folder is a file called "**vp8\_1\_5\_0.vbn**" which is the update file that once downloaded to the VP8 will upgrade it to a four mode processor.
- ✓ Select this file and click "OK".
- ✓ A "Verify Download" dialog will appear showing the various versions of DSP, FPGA, and Application code to be downloaded and you should click "Yes" to proceed.

A download progress dialog will be displayed as the upgrade is transmitted to and stored within the VP8.

## Rebooting the unit to bring up the new version

When the software download has finished you will be prompted to reboot the VP8 and doing so will load in the new software and its features. Please do it when prompted (and please... not before!).

## Unlocking and deleting the original Factory Presets

NOTE: Because previous VP8 Factory presets didn't know anything about operating modes beyond FM or AM (depending on the software version previously in your VP8) they will load but *may* not work without you making some changes once you load the new software.

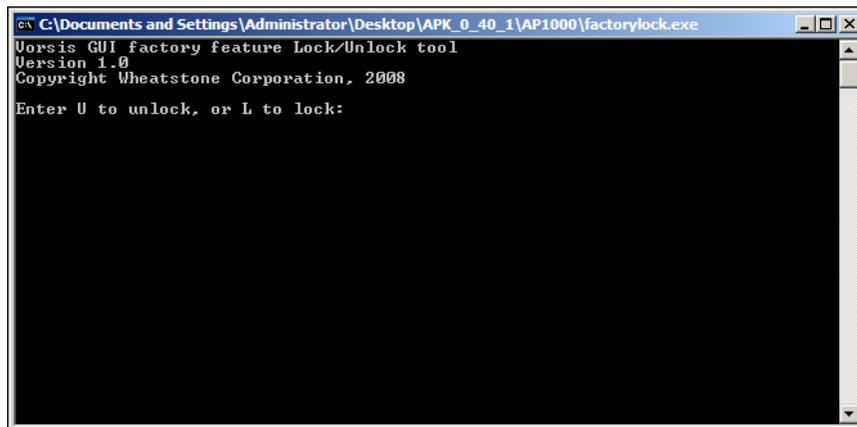
*Customer-created* presets should also work properly *after* some minor adjustments are made in the Lim/Clip Drive control located in the FM and AM mode's limiter screens. The AES Digital Output controls in each of the mode's Output configuration screens may also need to be touched up.

Once the VP8 software is updated we'll purge the old Factory Presets from the VP8 hardware. Then we'll install the new Factory Presets that specifically target the new VP8 operating modes and the firmware improvements made since the previous software was released.

In order to accomplish the updating of Factory Presets we need to use a special software utility called *FactoryLock.exe* that you were instructed to download in zip form (Unlock.zip) from <ftp.vorsis.com>.

## Using the FactoryLock.exe Tool

- ✓ If the GUI is currently running, you *must* exit it first because FactoryLock cannot patch the permissions level of the GUI program while it is running!
- ✓ Navigate to the folder where the Vorsis GUI is installed and open its folder.
- ✓ Locate the FactoryLock.exe file and double click it. Its command window will open as shown:



```
cmd C:\Documents and Settings\Administrator\Desktop\APK_0_40_1\AP1000\factorylock.exe
Vorsis GUI factory feature Lock/Unlock tool
Version 1.0
Copyright Wheatstone Corporation, 2008
Enter U to unlock, or L to lock:
```

- ✓ The command window will be prompting you for the input character associated with the action to take; “U” or “L”.
- ✓ Please enter a “U” at the prompt. This will instruct FactoryLock to grant Factory level unlock privileges to the VP8’s GUI.
- ✓ After the command has been input and the keyboard’s Enter key pressed the program will prompt you to press any key to exit the utility. When you do so, the command window will close.

## Using the New Privileges to Unlock Presets

The next time the GUI is run and the Presets menu is accessed it will have a new option available when a preset is right clicked from within the library window - Factory Lock Preset.

Whenever the “Factory Lock” option is available to the GUI it enables it to *Factory Lock* presets. Once this permission is enabled the GUI will also have rights to *unlock* Factory presets!

- ✓ Start the GUI and connect to the VP8.
- ✓ With the Preset Library dialog open and using usual ‘Windows’ techniques highlight all the Factory presets between position #9 and the highest numbered factory preset.
- ✓ While the presets are highlighted right click and select “Un-lock Preset”.
- ✓ Each preset will be unlocked in turn - they are unlocked from Factory Status when they no longer have a red padlock to the left of their names.

NOTE: If you ran FactoryLock.exe with the “U” option and then later discovered that the GUI does *not* have an option for Factory Lock, it simply means that FactoryLock.exe was *not* run from the same *folder* that the GUI you are running resides in!

## Deleting Factory Presets

Next, we will delete the old Factory Presets stored within the VP8 hardware.

Again, you must be online with the VP8 that is to be updated and also have the Library dialog open (by clicking on the Library button on the right side of the GUI).

You must also have already unlocked the presets to be deleted using the instructions in the previous step.

- ✓ Using usual Windows techniques again highlight all the presets between position #9 and the highest numbered Factory Preset.
- ✓ Right click again but now choose the “Delete” option. An “Are You Sure” dialog will open.
- ✓ Click “Yes” to continue.
- ✓ Each Factory preset will be deleted in turn, and when the process is finished there will be no longer be any Factory Presets on the VP8 hardware!

You will also probably notice that suddenly the scrolling preset window on the PC GUI and on the VP8 front panel are displaying “??????”.

This is because the presets have been removed from the hardware but the previous preset’s settings are still intact. At this point the VP8 doesn’t know what preset is running (even though it’s still running one!) because we stole its name when we deleted the stored presets on the hardware!

## Installing the new Factory Preset package

The process for installing new factory presets is as easy as deleting the old ones.

- ✓ With the GUI application running and connected to the VP8, open the Preset Library module.
- ✓ Highlight the Favorites folder in the upper right of the window and right click.
- ✓ Near the bottom of the options list is "Install Preset Package" - please select this option.
- ✓ A dialog will open asking for the location of the preset package. If you have carefully followed all of the instructions up to now the new **VP8\_Factory\_04A.pkg** preset package will be listed in the dialog window. If so, please select it and then click "Open".
- ✓ Once you do this the new preset package will be loaded into the PC GUI and into a new "VP8\_Factory\_04A" sub folder located under Favorites.
- ✓ Selecting and highlighting this new folder will cause the new factory presets to appear in the lower window.
- ✓ Use the mouse to grab the corner of the Preset Library dialog and drag it open so that you can see the *entire* list of presets.
- ✓ Each preset should have a red padlock beside it indicating that they were Factory Locked when the package was created.

Next we'll drag the new presets over from the PC to the VP8 hardware. We recommend using the following preset numbering convention:

VP8 Operating Mode	Preset Locations
Bypass**	Assigned to slot #9
FM Mode	Assigned to slots 10-20
AM Mode	Assigned to slots 21-28
FM-HD Mode	Assigned to slots 29-35
AM-HD Mode	Assigned to slots 36-42
MP3/AAC >48k Mode	Assigned to slots 44-47
MP3/AAC <48k Mode	Assigned to slots 48-52

See the graphic on the last page of this application note for how the new VP8\_Factory\_04A presets should appear once loaded into the VP8

Using the above convention the preset storage slots are utilized as follows:

- Slots 1 through 8 - User\*\* presets assigned to the 8 GPI hardware inputs;
- Slots 10 through 52 - Utilized for storage of Factory Presets;
- Slots 53 through 74 - Twenty two open slots for user\*\* presets;
- Slots 75, 76, 77, 78, 79, and 80 are used by the system to store the last preset used in a particular mode.

\*\* Total "user" preset storage availability is thirty (30) preset slots.

The preferred method for moving the new Factory presets into the VP8 hardware is to:

- ✓ Highlight the presets by their mode category (i.e., highlight all of the FM mode presets at one time).
- ✓ Grabbing the topmost preset of the highlighted category using the mouse, drag it over to the first numbered slot for that mode (i.e., "A QuickStart FM" would go into slot #10) and all presets greater than #10 should follow and fall into their correct slots.
- ✓ If you make a mistake simply delete the errant presets on the VP8 hardware (left) side of the Preset Library dialog and try again.

Once all the new Factory presets are loaded onto the VP8 hardware we recommend relocking them to protect them from inadvertent deletion or writing over. To do this:

- ✓ Use Windows techniques to again highlight all the presets on the VP8 hardware side of the Preset Library dialog.
- ✓ Once highlighted, right click and select "Factory Lock Preset".
- ✓ Once this is done, each of the presets will be factory locked in turn until the process completes. A preset is Factory Locked when there is a red padlock displayed to the left of its name.

### **Important FM Mode Note**

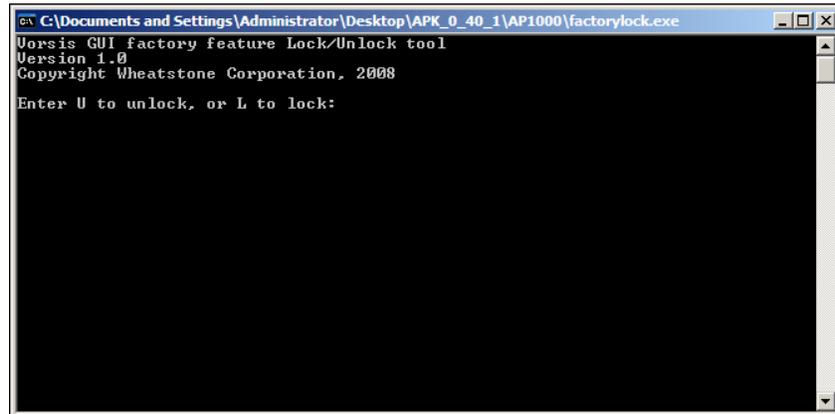
**Note that after this software upgrade it is a good idea to review the FM mode's FM Limiter screen to ensure that the pre-emphasis (Emphasis) selection is set according to your needs.**

\*\* The Bypass preset is normally associated with Mode 1 (FM) but may be mode-locked to any mode as desired.

## Disable the Factory Unlock/Lock

NOTE: This step is very highly recommended!

Close the Preset Library dialog and exit the GUI application. Navigate to the folder where the new VP8 GUI is installed and double-click the FactoryLock.exe file again. The following dialog will open:



Please enter “L” and hit enter. Then hit enter again to exit the FactoryLock dialog. This sets the GUI’s permissions back to user level protecting Factory presets from inadvertent overwriting or deletion.

## Why Relock the Factory Presets?

We *strongly* recommend that Factory Presets be relocked after being updated to ensure that you always have a safe place to return to in the event your adjustments get “way out in the weeds” and you simply need a sane place to return to.

*Don't say we didn't warn you!*

Note that you can also use the FactoryLock utility to “Factory Lock” your own presets using the procedure we just outlined. This is a handy feature for consultants or situations where it might be desired to limit what presets exist in a VP8 to be recalled.

YES... a VP8 could in fact have just ONE preset!

## New Features in VP8 Version 1.5.0

### Improved Clipper

In modes associated with “clipper” use, i.e., FM and AM, users will find that the VP8’s main clipper algorithm is much improved. This will allow greater freedom in adjusting Lim/Clip Drive more aggressively in the FM and AM limiter menus before incurring a distortion penalty when tuning for maximum loudness. High frequencies will be cleaner and smoother, and artifacts associated with vocal sibilance will be noticeably improved. Most users will find that they can adjust the Lim/Clip Drive more aggressively now if desired.

### Digital Output Levels

The behavior of the AES3 Digital Audio output controls of the VP8 have been segregated according to mode to allow users to set the Digital Output Level independently for each mode. Calibration was also changed to permit finer adjustment (0.05dB steps). Note that these controls are calibrated in dBFS (decibels referenced to full scale digital) meaning that a setting of -3.0dB allows peak output levels to achieve -3.0dBFS and no higher.

### “Discard Mode” When Changing Presets - Cloning Presets

To enable quick and easy cloning of presets across modes we created the “Discard Mode” feature. This option appears as a choice within the preset take dialog whenever you try to take a preset that is *not* associated with the current operating mode.

When you take a preset associated with a different mode the VP8 will prompt you for approval to change modes in order to run that new preset.

The Discard Mode option overrides this - when that checkbox has been checked the VP8 will *not* ask you for permission to change modes in order to run *that* preset. What will happen instead is that the preset you asked for will recall all of the settings associated with it, but it will not actually change operating modes.

### *Discard Mode - The Upside...*

The “Discard Mode” makes it very easy to clone presets because all of the ‘up front’ operating parameters for things like the parametric equalizer and four-

band AGC will remain set just as you had them in the preset that you want to clone.

### *Discard Mode - The Downside...*

When you first recall a preset into the 'wrong mode', until you navigate to the limiter and output screens associated with that mode and get everything set the way you want it, the VP8's output might sound absolutely *nothing* like what you wanted.

To see how "Discard Mode" can be helpful consider the following scenario;

Suppose you have a nice sounding preset in the FM Mode called "Rock\_Soft\_FM". You're now operating in FM-HD mode but would like to recreate the same basic sound of your "Rock\_Soft\_FM" preset while in FM-HD mode and don't want to have to recreate the settings of the "Rock\_Soft\_FM" preset from scratch for the FH-HD Mode.

Here's how to do it:

- ✓ With the VP8 in its current (FM-HD mode according to our example above) and running its current preset, open the Presets dialog and select your "Rock\_Soft\_FM" preset.
- ✓ When the "Change Modes to Run this Preset?" dialog box pops up, click the No button.
- ✓ When the next dialog pops up about Discarding Modes, click Okay.
- ✓ The VP8's mode will now remain *locked* in FM-HD mode but the settings for your "Rock\_Soft\_FM" preset will be loaded - except for the ones in the back end limiting section which as we said above, you'll have to set to your liking the first time you do this.
- ✓ Make any desired tweaks to your preset.
- ✓ When you're pleased with the sound simply stay in the FM-HD mode and save the preset as "Rock\_Soft\_FMHD" (or whatever you wish to name it). That preset now *becomes* an FM-HD preset!

That's it! Your preset is cloned.

How did this work?

- ✓ Because we started with an already stored preset belonging to the FM mode, all of the settings in that preset up through the multiband AGC and prior to the limiters and output settings don't have to be re-entered again.
- ✓ Because the VP8 was then in its FM-HD mode when your "Rock\_Soft\_FMHD" preset was saved it will always now be associated with the FM-HD mode.
- ✓ Now when you take that "Rock\_Soft\_FMHD" preset in the future (and are in another mode) the VP8 will ask you if you wish to change to FM-HD mode in order to run that preset.

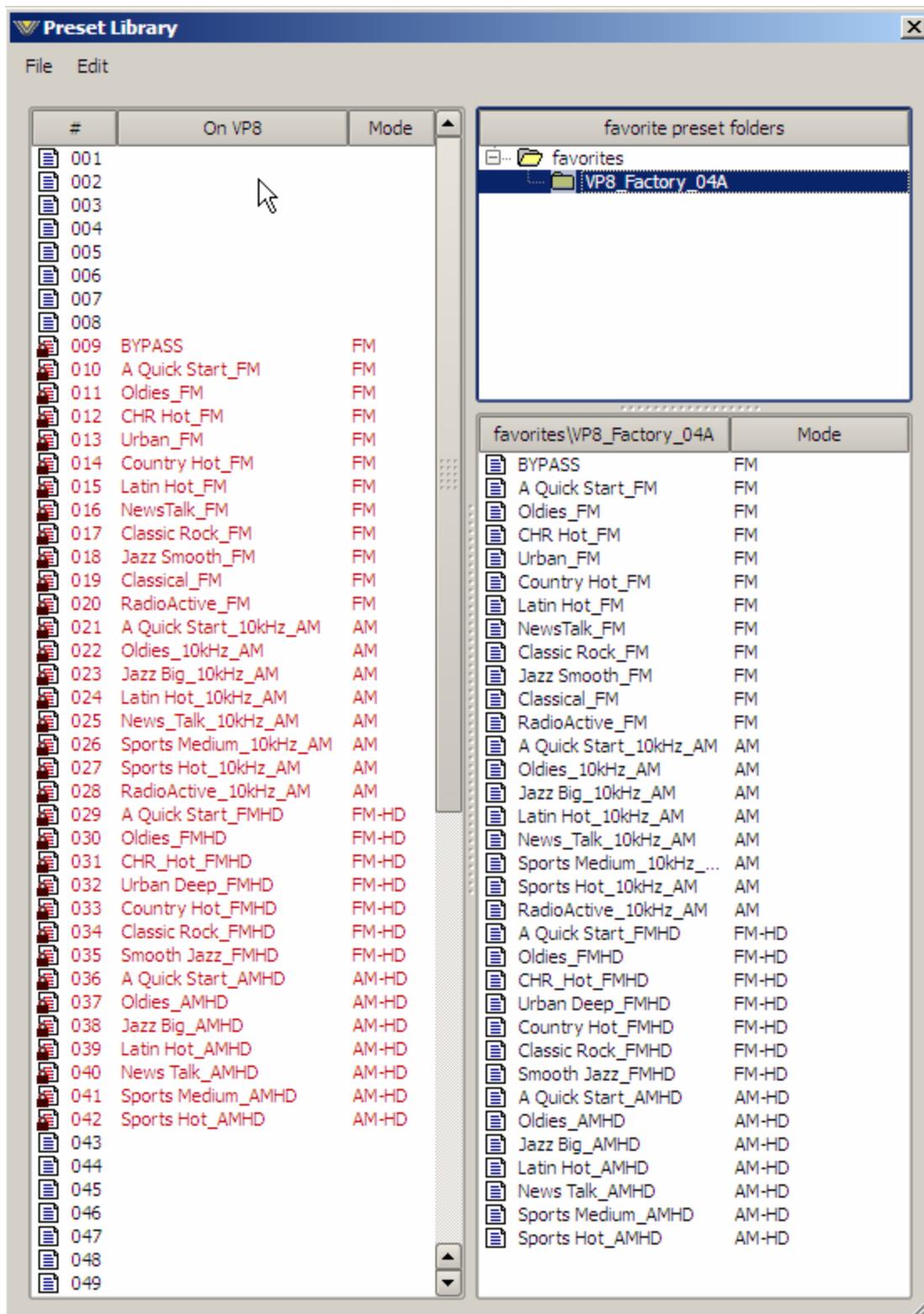
### Important notes about modes and presets...

- We have purposely not permitted mode changes from the VP8 front panel because of the completely different I/O requirements typically associated with each mode. In fact, you can only see presets associated with the current mode from the front panel selector window.
- If you simply change modes from the System menu and not by selecting a preset from a different mode, the system must know what preset to run in that mode. In this case it will be the last preset used in the selected mode.
- If there *is* no 'last used preset' yet for a mode the VP8 will prompt you to select the preset you wish to run in the new mode. If you do not select a preset, the mode will not change!
- Once a 'last used preset' exists for a mode that preset will load each time you select that mode. If you wish another preset to be the 'last used one' in a mode, simply select one once you're in that mode and the VP8 will remember it the next time you go back to that mode!
- We suggest naming presets using the convention used when the Factory preset were created. Each of those preset names ends with the name of the mode that they belong to. This is not mandatory, but is suggested in order to make it obvious which mode a preset belongs to just by looking at its name.

### VP8 Mode Changes

Method	Permitted	Not Permitted
<i>GPI Input</i>	✓	
<i>Automation*</i>	✓	
<i>Scheduler</i>		✓
<i>VP8 Front Panel</i>		✓

\* Please contact your program automation system's vendor for details on how to use your automation system to change VP8 operating modes.



How the new Factory\_04A presets should appear once loaded into the VP8 hardware.

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**252-638-7000**  
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