M4IP

MICROPHONE PROCESSING BLADE

TECHNICAL MANUAL

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MANUAL

Wheatstone Corporation
May 2013

M4IP Microphone Processing BLADE

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Attention!

Federal Communications Commission (FCC) Compliance Notice:
Radio Frequency Notice

    NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful inter-ference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

⚠️   **This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take appropriate measures.**

    This equipment must be installed and wired properly in order to assure compliance with FCC regulations.

    Caution! *Any modifications not expressly approved in writing by Wheatstone could void the user's authority to operate this equipment.*

     READ ME!

Attention!

M4ip Blade

Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. This equipment must be installed and operated in a dry location free from dripping or splashing liquids. No objects filled with liquid (such as beverage containers and the like) shall be placed on or near the unit.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Unplug this apparatus during lightning storms or when unused for long periods of time.
13. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into an apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
14. DISCONNECTING DEVICE FROM MAINS – Main power cord plug is the disconnecting device. The power plug of an installed unit must remain readily accessible/operable at all times.

⚠ **WARNING!**

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

C ⓊL US

LISTED

(PRODUCT IDENTITY)
8D48

READ ME!

M4IP Technical Manual

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General Information

Chapter Contents

General Information

Introduction

The M4IP Microphone Processing BLADE is the newest member of Wheatstone's WheatNet-IP Intelligent Network family. Two devices in one package, it's a complete WheatNet-IP BLADE with four microphone inputs, four high quality microphone processors, and both digital and analog outputs.

WheatNet-IP BLADEs are the Swiss Army knife of IP audio routing, with local audio inputs and outputs, logic ports, built in router control, mixing, meters, monitoring, and a host of other functions. BLADEs can operate as stand alone devices or be linked via gigabit Ethernet as part of an IP audio network. As a member of the WheatNet-IP BLADE family, the BLADE functionality of the M4IP is described in detail in the *Wheatnet-IP Audio Over IP Network* manual supplied with the unit. In the *Wheatnet-IP Audio Over IP Network* manual you'll learn how to set up the device ID and IP address, and learn how to use all of the BLADE features built into it.

The Vorsis Embedded™ processing features of the M4IP are unique to the M4IP and deserve their own documentation, hence this manual. Please use this manual to learn all about the processing capabilities of the M4IP and how to control it with the included Windows-based GUI application.

The Wheatstone M4IP hosts four discrete, very high quality microphone processors, and each of the microphone processing channels is equipped with the following features:

- Super quiet, high dynamic range microphone preamplifiers;
- Low noise audio outputs via analog, AES3 digital, and Wheatnet-IP;
- Selectable high and low pass filters;
- Phase rotator for smooth processing of live voice;
- Selectable 180 degree absolute phase inversion;
- Selectable phantom power;
- Equalizer with two Baxandall style shelving EQ sections and two parametric EQ sections;
- Selectable final peak limiter with look ahead function;
- Full complement of factory processing presets;
- On-board storage for up to 80 total presets.

M4IP's flexibility allows each processor to share a library of up to 80 presets stored on the BLADE hardware. Several dozen "Factory" presets are supplied with the unit and provide good starting points which have been tuned for a variety of needs. Presets stored on any M4IP may be shared with any other M4IP on the network.

Preset Transitions

As with all Vorsis Embedded™ Wheatstone audio processors, changing from one preset to another doesn't abruptly change the audio, nor are clicks and pops generated during those transitions. Rather, preset changes "segue" from the current preset to the new preset, morphing into the new preset's sound over approximately one second.

While some prefer hearing radical, easy to identify changes whenever a new preset is recalled, this is usually the least desired behavior in actual on air use. Since that mode is the most important mode – it's what an audience hears – we designed preset changing to be as unobtrusive as possible for those listeners.

Installing the M4IP BLADE

The M4IP is designed to be mounted in an industry standard 19" equipment rack, and requires one rack unit (1.75 inches) of vertical space. The M4IP BLADE has a depth of 13-1/4" behind the rack rails (including chassis connectors). An additional five inches of space is required for wiring cables to pass through. The chassis has a width of 17-3/8". Space needed in front of rack rails is 3/4". Ideally, four screws should be used to mount the unit. If only two screws are being used they <u>must</u> be used in the bottom holes in order to provide proper support.

Though the M4IP does not add much heat load to the rack that it is installed in, good engineering practice suggests that it should never be mounted directly above a large source of heat such as a power supply or RF amplifier. Strong electromagnetic fields should also be avoided, considering that the M4IP contains four very sensitive microphone preamplifiers.

Energizing the M4IP BLADE

Once it has been installed in the rack, the M4IP may be energized by connecting the factory supplied power cord to a source of AC power. For long term reliability, there is no power switch on the M4IP (rarely used switches are notoriously unreliable).

M4IP Quick Setup Wizard
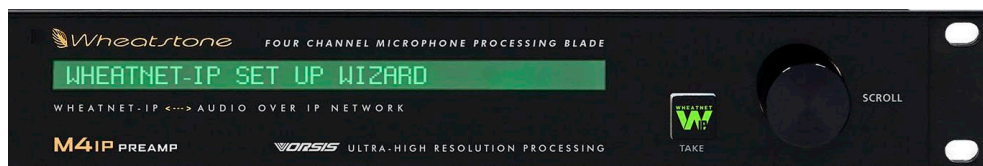
As shipped from the factory, the M4IP will start up initially in "System Wizard" mode. That's where you tell the BLADE what you want it to do by means of the front panel encoder and switch.

BLADE ID

Once power is applied the M4IP Quick Setup wizard will start automatically, assuming this is a first-time startup, and the front panel display should read as follows.

Rotate the encoder knob to the desired BLADE ID and press the TAKE button.

Consideration should be given to the ID selection as no two BLADEs in the system may have the same ID. The ID should be chosen based on system topology and should reflect how the system will ultimately be configured.

Wheatstone recommends assigning ID "1" to the first BLADE you power up on the network, ID "2" to the second, etc. The numbers have no real significance, only that they must be unique.

IP Address

Based on the BLADE ID selected the wizard will recommend an IP address. The default IP address will be in the 192.168.87.XXX scheme. Press the TAKE button if this address is correct for your network scheme and the wizard will automatically advance to "Signal Setup" section.

Consult the manual or Wheatstone Support if you cannot accept this IP Address.

To change the M4IP's default IP address rotate the front panel knob through following steps.

```
BLADE...
    NETWORK...
        CHANGE NETWORK SETTINGS...
            IP ADDRESS: 192.168.87.123
```
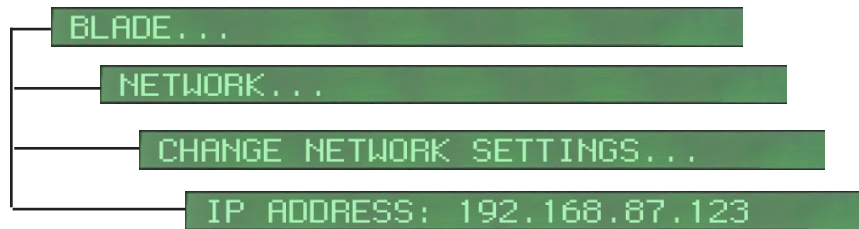
To apply changes the M4IP unit must be rebooted.

Sample Rate

The WheatNet-IP system operates at 44.1kHz or 48kHz sample rates. Here you will select the default sample rate at which the system will operate. It is a good idea to pick a sample rate that your entire facility will adopt and stick with it. If 3rd party gear is operating at a different sample rate the WheatNet-IP system is capable of receiving inputs from 32kHz up to 96kHz and will up or down convert accordingly to the WheatNet-IP sample rate.

Signal Setup

Now that the Network Setup is complete the wizard will assist with creating audio signals if desired. The WheatNet-IP unit is equipped with signal templates to aid in quick setup. These templates are standard signal setups that may be a good starting point, depending on the application. The M4IP has three template layouts. Choose from *Custom*, *Stereo I/O*, and *Mono I/O* templates.

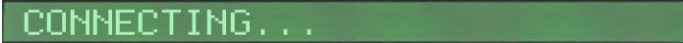**Custom** template creates no signals. Instead the user will create the signals using the Navigator GUI.

Stereo I/O template creates four Mono Inputs and eight Stereo Outputs. Signal names are assigned based on the BLADE ID and will have a "BLxx_yy" naming convention, where "xx" is the BLADE ID and "yy" is source 01 through 04 or destination 01 through 08.

Mono I/O template creates four Mono Inputs and sixteen Mono Outputs. Signal names are assigned based on the BLADE ID and will have a "BLxx_yy" naming convention, where "xx" is the BLADE ID and "yy" is source 01 through 04 or destination 01 through 16.

To select a template rotate the encoder knob to the desired template and press TAKE.

Connection Status

After completing the setup process the BLADE will attempt to join the network. During this process a "Connecting..." message will appear on the display.

CONNECTING...

Once the BLADE has successfully joined the network the front panel will display:

WHEATNET-IP

To access the Main Menu rotate the encoder and select the desired option by pressing TAKE.

Things To Look For In The Wizard

If an online BLADE is detected with the same ID the wizard will display the following

"IP ALREADY IN USE! VERIFY SETUP"

This message will be displayed until the user acknowledges by pressing the TAKE button. The wizard will then start over. Simply change the BLADE ID to a unique ID and advance through the options.

If replacing a failed BLADE on the network and you wish to assume the identity of the failed BLADE, select the ID previously used. This will place the new BLADE on the network in a default configuration. Once online you may restore the previous configuration from a backup copy using the WheatNet-IP Navigator GUI or the BLADE Web Interface. For more information on backing up and restoring BLADE configuration please refer to the WheatNet-IP Navigator GUI section of the *Wheatnet-IP Audio Over IP Network* manual.

M4IP Configuration

Note that some of the parameters listed below will automatically be created based on the M4IP ID number you enter.

Important! Before you plug the M4IP into the Network, set a unique M4IP ID.

The following parameters must be configured on a M4IP.

- BLADE ID number – a unique device number must be selected and entered by the user on each M4IP in order to uniquely identify the M4IP in the system.
- IP addressing – all WheatNet-IP devices use dynamic IP addressing based on their BLADE ID number. Each device is given an IP address in the 192.168.87.xxx scheme, starting at .101 for the box with BLADE ID 1 and so on.
- You can override the automatic setup and have full control over IP addressing.
- Subnet Mask – the default 255.255.255.0 subnet mask will work in most systems. This allows for 254 devices on the audio network.

• Gateways – gateways may be employed for remote access and routing purposes.

• Ports – The system uses the following TCP/IP Ports - See Table Below:

PORT	PURPOSE
80	HTTP-Web Configuration Interface
23000	Telnet to Play Service
50000	GUI Connect
50100	Metronome Multicast Stream
51000	Web/XML Multicast Stream
52000	Announce Channel Multicast Stream
52001	Logged Channel Multicast Stream
52002	Meter Multicast Stream
55776	Automation Control Interface
60000	Surface Channel

The M4IP appears in Navigator in two different ways depending on which Output Mode has been selected during initial setup. In its Stereo Mode the M4IP has four sources and eight stereo destinations (it is a full Wheatnet-IP BLADE, after all).

In its Mono Output mode the M4IP still has four sources, but will now have sixteen individual mono Destinations. In either Mode these Destinations may be routed as desired within the Navigator environment.

M4IP Audio Processing Overview

The following block diagrams show the internal structure of the M4IP Processing BLADE.
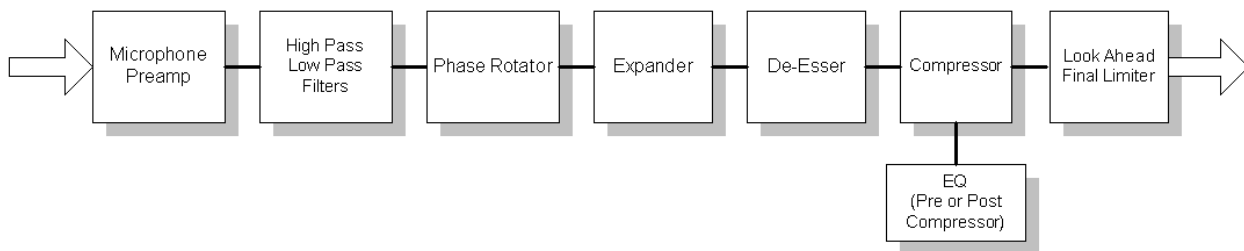
NOTE: EQ may be placed pre or post AGC/Compressor

I/O Connections

All input, output, Ethernet, control and power connections are made on the rear of the M4IP.

The four XLR female connectors are the microphone-level inputs.

The audio output connections are via DB-25 or RJ-45 connectors on the rear of the unit, and the two types of connectors are electrically in parallel.

There are two RJ-45 connectors associated with networking, one Gigabit port and one 100BaseT port. Only the Gigabit port is currently supported.

Refer to the Chapter 1 of the *Wheatnet-IP Audio Over IP Network* manual for detailed wiring information.

Cable Considerations

The AES Digital output connections should be made with high quality digital audio cable. Typical AES/EBU cable has low capacitance per foot (pF/ft) and a nominal impedance of 110 ohms.

Avoid using run-of-the-mill analog audio cable for AES digital signals because this type of cable may have an impedance of 60 ohms or less and can cause problems in medium length cable runs and severe signal recovery issues on long runs. Like in the RF world, using the proper impedance cable is critical to obtaining the best and most reliable performance. Check with your favorite cable manufacturer to ensure that the cable you have chosen will work for you.

Connectors

All connections other than AC power are made thru rear panel XLR, DB-25, and RJ-45 connectors. The XLR female connectors are the microphone-level inputs while the DB-25 and RJ-45 connectors are for outputs. The DB-25 crimp style connector pins will accept wire sizes 22 through 28 AWG. For the RJ-45 audio connections Wheatstone recommends using XLR to RJ-45 adapters at the destination end of the circuit and to provide a proper strain relief for those adapters. Obviously using RJ-45 to XLR adapters can also be done on the back of the BLADE, too, but doing it this way might make things a bit crowded.

The digital output signals are in AES3 format and will be at 44.1kHz or 48kHz as selected by the front panel and/or by the system if M4IP is part of a Wheatnet-IP system.

M4IP GUI

Chapter Contents

M4IP GUI

Supplied with every MP4IP processor is our Windows-based GUI. This user interface contains all user controls and each processor instance has its own GUI "tab" where all of the controls for that instance are located.

Installing the GUI Software

The GUI software is provided on a software CD shipped with the product and, once installed, grants easy access to the MP4IP's vast sound processing capabilities. Installing the software is easily done using the following procedure:

- Insert the MP4IP software CD into a Windows computer;
- Click the Start button;
- Click the Run option;
- Click the Browse option;
- Browse *My Computer* to locate the CDROM device and double click it;
- When the contents of the CDROM drive appears, locate the *M4_x_x_x.exe* file, where the x's represent the current GUI version number. Double click it to start the GUI installation;
- Follow the on screen instructions to complete GUI installation.

M4IP GUI Overview

Upper Controls Area – Levels and Dynamics Processing

In the upper portion of the GUI are the controls for adjusting the Input and Output Gains and Dynamics Processing.
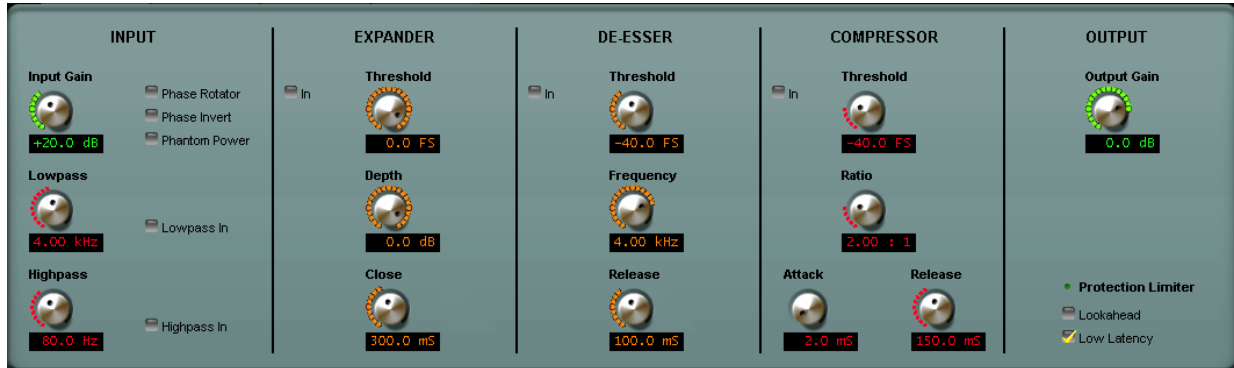
Lower Controls Area – Metering, Equalization and Sidebar Buttons

In the lower portion of the GUI are the Input and Output meters and the graphical area where the equalization may be adjusted.
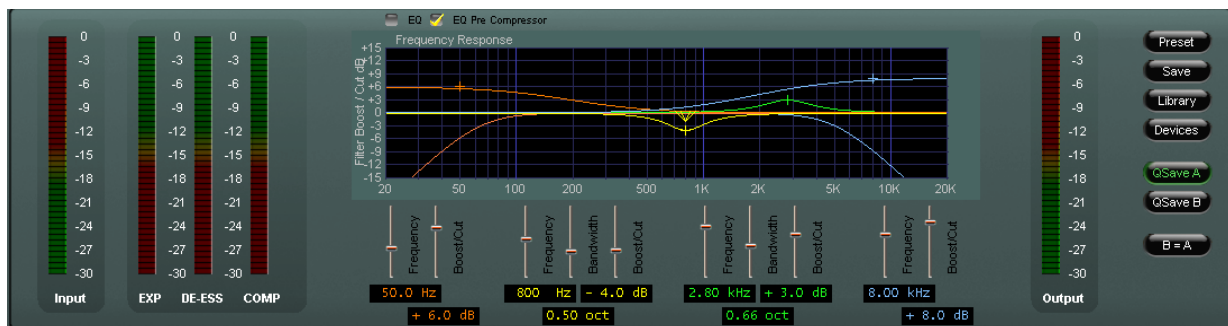
Each section of the GUI will be explained next and, where applicable, graphic examples of the area being explained will be shown next to the text so that constant reference back to this page will not be necessary.

Configuring the M4IP TCP/IP Address*

Once the GUI has been installed on the host PC it must be configured before it can connect to and control the MP4IP processor. Note also that as shipped, the factory default IP address of the MP4IP is **192.168.87.101**. This address can be viewed and/or changed from the front panel if necessary, remembering that rebooting the BLADE will be necessary if the IP address and/or the BLADE number are changed.

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* NOTE: TCP port 55902 <u>must</u> be open in any switch or router configuration in order to permit network traffic between MP4IP and the controlling GUI.

Next, start the MP4IP GUI software and use the following procedure to configure it to be able to connect and control the MP4IP processor.

On the right hand side of the GUI, click on the *Devices* button, then click the *Add…* button; the *Edit Device* dialog will open.
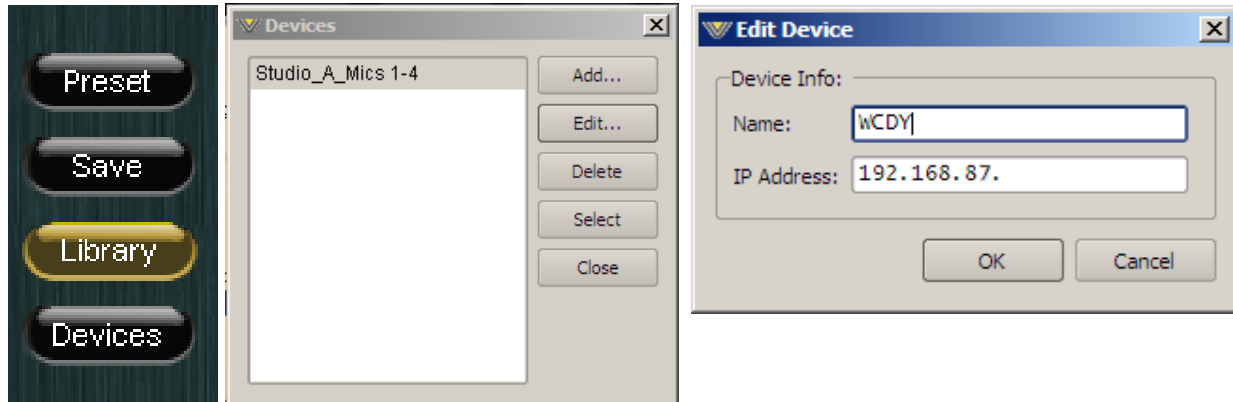
Insert a name for the MP4IP. This is the name that will be displayed at the top of the GUI to inform the user which processor the GUI is currently connected to.

Next enter the IP address of the MP4IP, keeping in mind that if the address has not been changed from the Factory Default, that IP address is **192.168.87.101**.

Click the *OK* button to close the dialog.

Highlight the newly configured device and click the *Select* button.

If there is a network connection between the GUI's host PC and the MP4IP processor, *and* the PC is configured to be on the *same* network subnet as the processor, the Online/Offline button at the top of the GUI just to the left of the Status indicator may be clicked to connect to the processor. The green status indicator inside the button will illuminate.

When the GUI is online to the processor and controlling it the Status window will display *ONLINE*.

IP Address Note: Unless special routing has been configured by the IT department the controlling PC *and* the MP4IP <u>must</u> be on the same network subnet. As an example, if the MP4IP has an IP address 192.168.87.1, then the PC's IP address must be configured to be *between* the addresses 192.168.87.1 and 192.168.87.254, noting that the MP4IP and the host PC cannot share the *same* IP address.

Once the GUI is online with the processor the GUI's controls become active and may be used for adjusting levels, taking presets, and tweaking the sound of processing.

Selecting the Processing Channel

Across the top of the GUI are four buttons which represent the four microphone processing channels of the MP4IP. The channel currently being viewed is shown by a yellow checkmark on the current tab. Later we'll describe how to customize the names that appear on the tabs.

Adjusting the Controls

Input Section

Input Gain

To achieve the best sound and performance from any audio processor the correct setting of the Input Gain is important. If the input gain is too low, the processing settings may not operate as they were designed and signal to noise performance can be degraded. Conversely, if input gain is too high, distortion can result on audio peaks.

Input gain is correct when the Input meter is just nudging -12dBFS on the Input meter scale. Operating the unit with input gains higher than -12dBFS increases the risk of distortion.

Phase Rotator

The purpose of a phase rotator is to make the electrical representation of the microphone signal more symmetrical. In doing this headroom is improved and processing which may take place after the M4IP is made easier. The phase rotator is essentially a time-domain function which works by adding a rotating phase vector to the input signal. While the frequency response remains ruler flat the changing phase response alters the wave shape of the audio in a manner that makes the positive and negative excursions of the signal more evenly distributed. With most audio waveforms the operation of the phase rotator is difficult to hear.

Phase Invert

The *Phase Invert* check box is useful for flipping the absolute phase of the microphone's input signal by 180 degrees. This feature is useful when multiple microphones are being used in the same room and can be used to optimize the combined phase response of those multiple microphones. The feature is also useful for flipping the signal phase of one microphone whose cabling is inadvertently wired out of phase from others in the same room.

Phantom Power

Some microphones require a source of DC power for their operation. When the *Phantom Power* check box is checked a DC power source of +48 volts is applied to the microphone's signal wires in common mode, with the cable shield forming the current return path to the phantom power supply circuit.

Highpass/Lowpass Filters

A High Pass Filter is used to reduce or remove infrasonic (very low frequency) signals from the audio that are not a part of the audio. Undesirable hum and rumble that manages to get into the microphone audio is an example of what the High Pass Filter can remove, and it is quite effective at reducing or removing such noises. Likewise the Low Pass filter is effective at reducing high frequency signals beyond the range of hearing that are not part of the "intentional" audio.
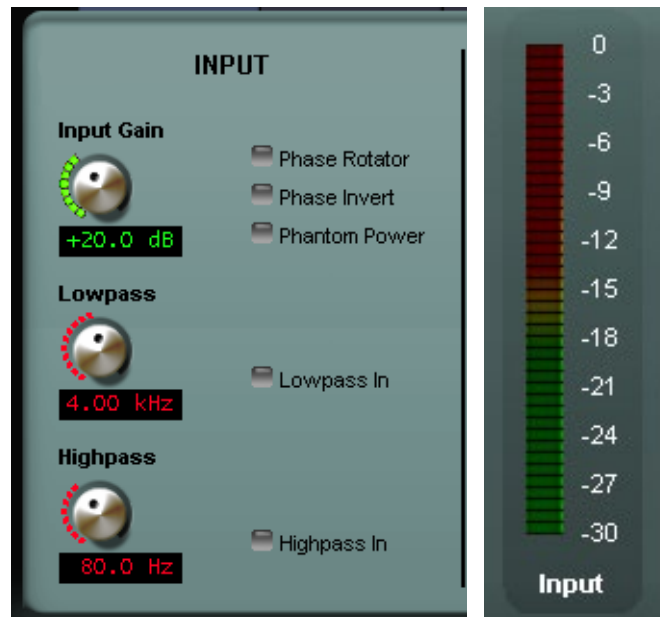
Expander

The Expander is useful for reducing background sounds during pauses in speech. It operates by reducing the microphone signal by a specified amount whenever the microphone signal falls below a certain level (the threshold).

In/Out

The Expander may be switched in or out of the signal chain by clicking on the *In* check box.

Threshold

The audio level at which the expander begins to reduce the level is called the threshold. When the level is above the set threshold the audio is not reduced and passes unmodified to the next processing section. When the audio falls below the threshold the audio is reduced by the number of dB set by the *Depth* control.

Depth

The *Depth* control adjusts how far the level should be reduced whenever the audio from the microphone falls below the setting of the *Threshold* control. While the *Depth* control can be set to cause extreme amounts of level reduction (to audio completely off if desired) it is best set by ear to be as unobtrusive as possible given the acoustical environment where the microphone is in use. The *Depth* settings most commonly used will be on the order of -12dB to -15dB. How quickly the expander reduces the audio level when it falls below the Threshold level is set by the *Close* control.

Close

The *Close* control sets how fast the expander reduces the gain when the audio level falls below threshold. This control, like most controls on any audio processor, is best set by ear with the following caveats;

Very fast settings (below 100mS) can make the expander operation sound choppy if the audio level is near threshold and the *Depth* control is set more than about -15dB.

Very slow settings (above about one second) can make the expander operation more obvious because of the tapering off of audio during a pause. We recommend starting with a setting of 300mS and then adjusting from there if necessary.
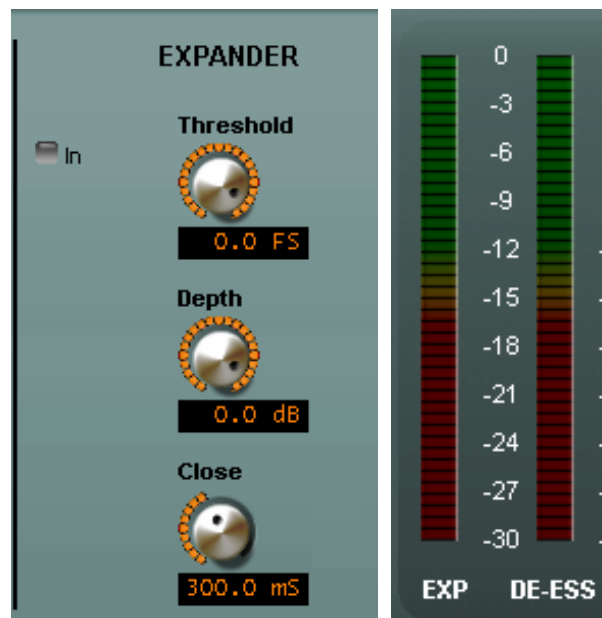
De-Esser

The purpose of the de-esser is to reduce sibilance (the "s" sounds) in voices when such sounds might cause a problem with intelligibility or with gear downstream. It operates by selectively reducing only those "s" sounds which occur above a chosen threshold and has no other effect on the audio signal.

In/Out

The De-Esser may be switched in or out of the signal chain by clicking on the *In* check box.

Threshold

The audio level at which the de-esser begins to reduce the effects of sibilance is called the threshold. When "s" sounds are above this threshold they are selectively reduced. Likewise, "s"sounds below this threshold are not modified.

Frequency

The audio frequency at which the de-esser is effective is set by the *Frequency* control. This control is best adjusted by ear to find the frequency at which the speaker's "s" sounds are most prominent. Most human's sibilance sounds fall in the 3.6kHz to 6.5kHz frequency range.

Release

After the de-esser has performed its work in reducing undesired "s" sounds the gain must be restored. How quickly the audio level is restored is controlled by the *Release* control. In general this control should be set at the fastest release time consistent with the most inaudible de-esser operation. Because of the variability in human voices the *Threshold*, *Frequency* and *Release* controls must be empirically adjusted for each announcer's vocal style.
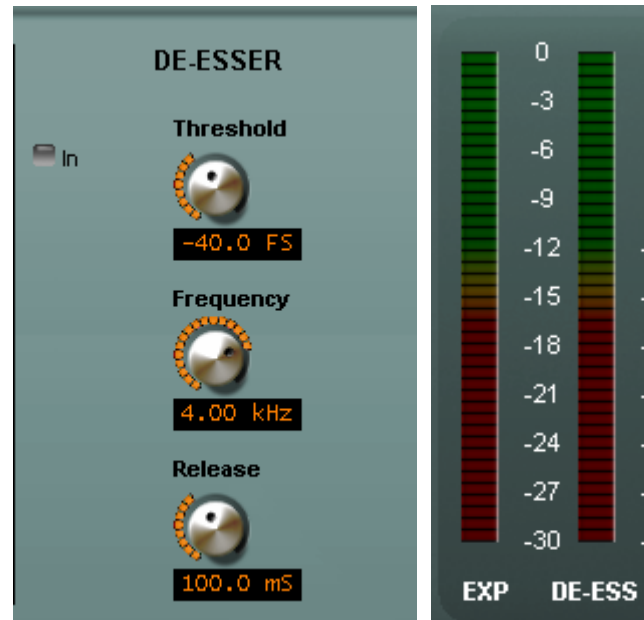
Compressor

The purpose of the compressor is to increase the average energy of voice which then makes it both louder and more consistent in level. It operates by selectively reducing the gain whenever the audio level has exceeded a set threshold and otherwise has no effect on the audio.

In/Out

The Compressor may be switched in or out of the signal chain by clicking on the *In* check box.

Threshold

The audio level at which the compressor begins to act to hold the audio level more constant is called the threshold. When audio levels are above this threshold they are restricted from increasing further by the compressor while signals below this threshold are not modified. How tightly the compressor controls the audio levels once the threshold has been reached is adjusted by the *Ratio* control.

Ratio

When the compressor detects increasing levels and begins to reduce the gain, the amount that it reduces gain as the level continues to increase is called the compression Ratio. When the ratio is 2:1 the output level will increase 1dB for every 2dB of input level increase. Likewise when the ratio is 20:1 it would take an input level increase of 20dB (ten times!) to cause the output level to increase just 1dB more.

The *Ratio* control is one of three compressor controls that have the greatest effect on the sound. Low ratios such as 2:1 are gentle and from a hearing standpoint are virtually undetectable while still doing a good job of reigning in level increases. Low ratios can work quite effectively even with very aggressive attack and release times without sounding "squashed."

On the other hand high ratios are very "controlling" and can therefore also be very audible, especially when attack and release times are set very fast. This may or may not create the desired effect.

Attack

When the audio level reaches the compression threshold the output level increase will get smaller as the input level continues to increase further. How fast this corrective action takes place is called the Attack time. Faster attack times will very aggressively manage increasing audio levels while slower ones will be gentler. Once the compressor has reduced the gain in order to keep the output from increasing it must restore normal gain again once the input level has fallen. How fast that restoration takes place is controlled by the *Release* control.

Release

After the audio level falls and the compressor no longer needs to reduce the gain, the gain must be allowed to come back up to where it previously was. How fast this occurs is a function of the *Release* control setting. Faster release times, while very
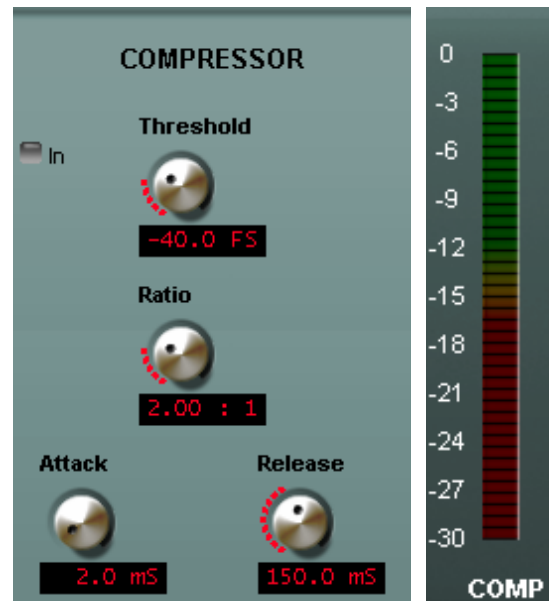
effective at quickly restoring normal levels, can be quite audible. Likewise very slow release times can be audible as well because they take too long to undo the compression.

You may have noticed that we have not recommended settings for the Compressor's Threshold, Ratio, Attack, and Release controls and may be wondering why. The reason is that in virtually 100% of the applications those controls are adjusted by ear to get the intended result. While our presets will give some very good 'starting points' for the majority of applications, if one wanted to just "roll his own" from the get-go we would suggest the following starting points, assuming of course that the compressor is switched in:

>Threshold…………about -45dB.
>
>Ratio………………about 2:1.
>
>Attack……………..about 6.0mS.
>
>Release……………about 130mS.

Output

The Output section includes an *Output Gain* control and *Lookahead* and *Low Latency* check boxes for enabling the Protection Limiter. When the Protection Limiter is not in use the M4IP is in its "low latency" mode with a throughput delay of 1.72 milliseconds. When the Protection Limiter is enabled the throughput delay increases to 2.80 milliseconds.

The Protection Limiter is usually only used when one wishes to operate the output level in a manner that results in signal levels near 0dBFS. Rather than allowing clipping to occur in the M4IP or in a downstream device, the Protection Limiter constricts the peak level to no more than -3dBFS which is considered generally safe for the majority of applications.

The Protection Limiter's operating parameters automatically adjust themselves in the presence of audio. No user controls other than *Lookahead* and *Low Latency* (non-lookahead) are needed or provided.

Equalization

The M4IP is equipped with a four section equalizer. The first and fourth sections function as true Baxandall shelving sections which are quite useful for providing overall boost or cut of low and/or high frequencies.

The second and third sections function as full parametric equalizers whose operating frequency, gain boost or cut, and bandwidth may be individually adjusted. The two parametric sections are useful for very selectively boosting or cutting a narrow range of frequencies and can be used for such things as compensating for room and microphone environment resonances.
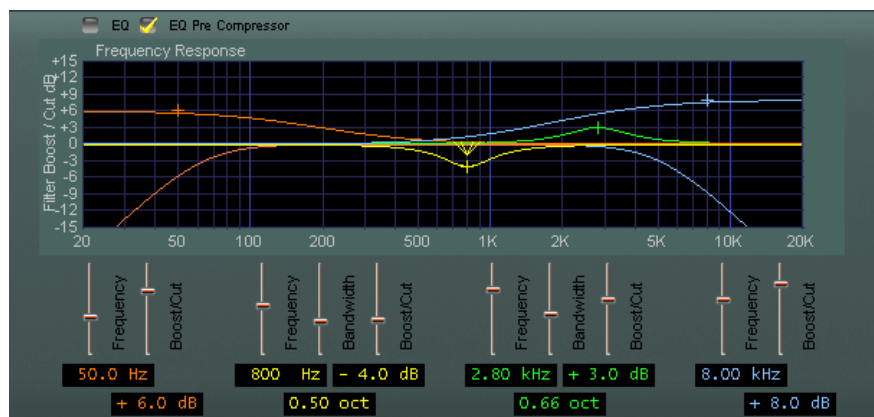
Taking Presets

The M4IP is equipped with various Factory Presets and we recommend listening to each preset with your chosen microphone to find the one that best meets your needs. Select the preset closest to the desired sound texture and use the controls of the M4IP GUI to further "dial it in" if necessary.
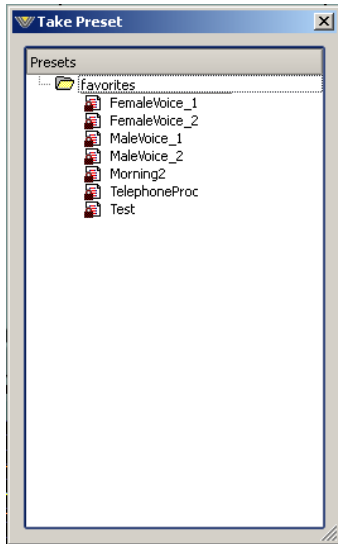
When the GUI's Preset button is pressed a dialog will open (see left) with a list of the presets currently stored on the M4IP hardware. Presets are put into use by double-clicking them. Note that the presets in the list are shared between the four processors inside the M4IP – *every* preset is available to every processing channel. The same preset can also be used on multiple channels at the same time. Likewise, any user preset that has been created for one processing channel may be used on any other processing channel.

New presets are frequently added to our Wheatstone Processing website for customers to download. New presets can easily be installed into any M4IP via the GUI's built-in Preset Management feature.

Additional Notes on Network to GUI Connectivity

M4IP utilizes both TCP/IP and UDP to communicate with the remote GUI. The TCP/IP protocol utilizes Port 55902 and the first available UDP port in the range of 60001 to 60010 during communications sessions.

TCP/IP – The TCP protocol is used for controlling the M4IP and reporting its control settings back to the GUI because TCP repairs any transmission errors that might have occurred on the network. Using TCP for this function guarantees that the M4IP controls *always* do exactly what the GUI tells them to do, and that the control settings seen on the GUI are in perfect agreement with what the M4IP hardware *thinks* they are.

UDP – Metering between the M4IP and the GUI works differently. For this task we chose the UDP protocol, a simple data transmission model without any hand-shaking to drive the meters. We used UDP for metering because of its very low overhead and because we don't mind if an occasional meter data packet (or a bunch of meter packets) gets lost on the network. Metering data is updated frequently so a missed metering packet here or there has an inconsequential effect on the visual appearance and no impact whatsoever on the sound.

Sidebar Section

To the right of the Output bargraph meter is a vertical row of seven special buttons. Each button has been designed as an entry point into a dialog designed to help the end user get the most functionality out of the product.

Preset

When the *Preset* button is left-clicked, a Windows style dialog opens. Note that the GUI must be online to the processor in order for the window to display the list of presets currently installed on the M4IP hardware.
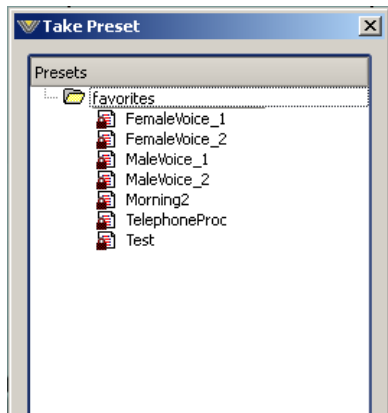
The folder called **M4IP** represents the hardware itself and the presets stored there. Other folders, **favorites**, **Factory Presets**, etc. are only seen within the Library dialog, covered later. The appearance of the window that opens when the Preset button is pressed is shown here.

Here, the presets stored on the hardware itself are visible, and any preset may be selected and placed into use by simply double-clicking on it. Note that each of the four processors on board the M4IP are completely independent – one processing instance has no idea what presets may be running on another processing instance.

It is important to remember to save any preset deemed important before taking another preset because unsaved settings will be lost when the new preset is loaded. There is no prior warning dialog!

An important concept to grasp is that the preset list is common to **all four** processing instances, so any preset that might need to be taken by any processing instance must either be stored here, or on the user's PC.

Save

In order to save a preset, simply press the *Save* button to open a Windows-style file save dialog. Note that the GUI must be online to the processor in order for presets to be saved. If the GUI is not online and the *Save* button is pressed, a warning dialog will appear.
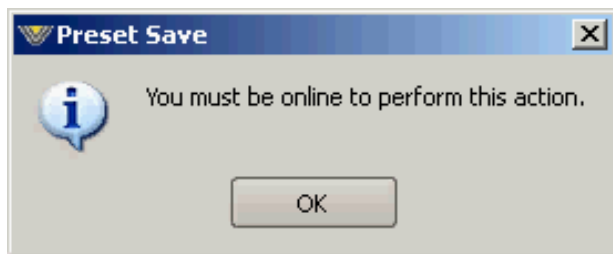
When saving a preset, and unless selected otherwise, the preset will be saved into the next available empty slot on the hardware. Alternatively, by nudging the preset number ("PRESET #") up or down, a preset may be saved in any preset location except one that has been locked. If a preset is saved into an unlocked location where a preset already exists, that preset will be overwritten with the new preset!

Library

When the *Library* button is clicked a three panel Windows-like dialog will appear. This dialog is divided down the center, and each side has a special purpose. The left hand side will display all of the presets currently stored on the hardware, and the right hand side shows the folders and presets currently stored on the user's PC where the GUI has been installed.

Simple Windows-style drag and drop mouse actions are utilized when moving presets back and forth between the PC and the hardware. Note that if the GUI is not online to the hardware, no presets will appear in the left hand pane simply because when the GUI is not online it has no way to retrieve the list.

The *Library* dialog is also the place where presets can be added and deleted from the PC or the hardware, or if desired, presets can even be locked on the hardware to prevent inadvertent changes or deletions.

Locking Presets – Presets that have been stored within the processor hardware may be locked by the user to prevent inadvertent overwriting, renaming, or deletion. This is accomplished by opening the *Preset Library* by clicking on the *Library* button in the GUI. Once the list of presets is open, the presets stored on the processor hardware are visible in the left pane. There are two ways to manage the lock status of user presets:
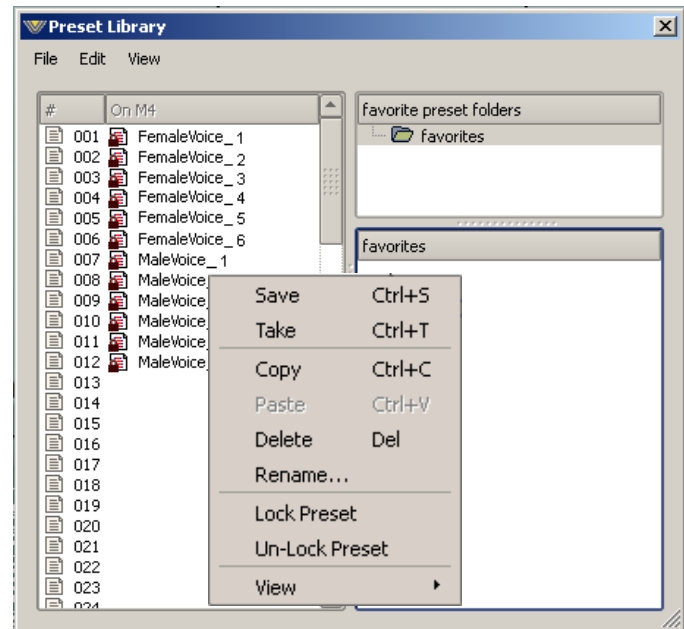
- The first method is by highlighting a preset (single left click) and then right clicking it to open a dialog box. Among the options are Lock Preset and Unlock Preset.
- The second method is by highlighting a preset as above, and then clicking the Edit option at the top of the *Preset Library* dialog box to reveal the Lock Preset/Unlock Preset options.

Note that these are user-level preset lock options and do not override the lock status of a preset that has been factory-locked!

How to View Preset Changes

It is possible to visually compare two different presets on the M4IP with a special feature called Preset Difference.

When the *Library* tab is opened, highlight any preset you'd like to compare with the current preset running on the processor. Then right click and select *View* and *Diff* from the sub-menu. You will see the window on the right open.

Any parameter that is listed with a RED background indicates a parameter that is difference between the preset running on the hardware and the preset that has been highlighted. Parameters which are not highlighted have the same values between the two presets.

Devices

Clicking on the *Devices* button opens up a list of M4IP devices known to the GUI. To connect to any M4IP processor, it must first be selected in the device dialog before the GUI will attempt to go online to it. By highlighting the desired M4IP's name and hitting Select, the GUI will then know that is the unit you wish to connect to the next time you press the GUI's Online button.

If the GUI was already online to another device at the time a new device is selected within the *Devices* dialog, the GUI will immediately try to connect to the new device as soon as the *Select* button has been pressed.
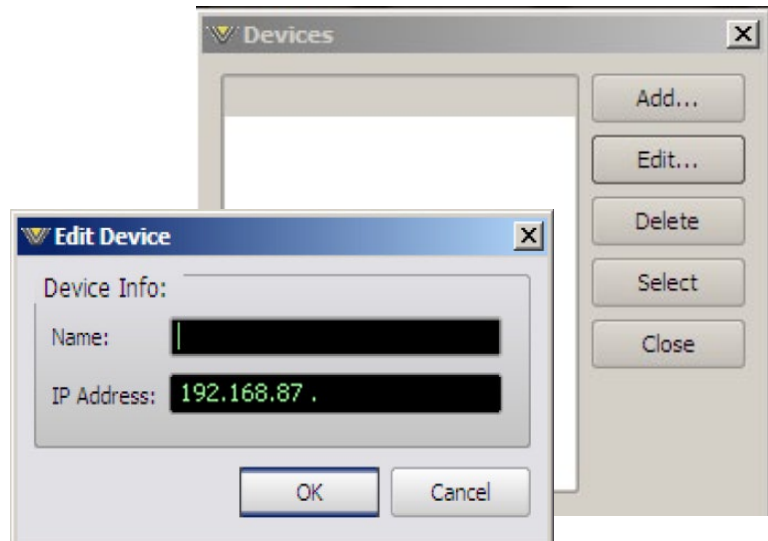
The first time the *Device* dialog is opened, no devices will be shown. Before the GUI can connect to any M4IP. The unit must first be made known to the GUI by using the *Edit Device* dialog.

When the *Edit Device* dialog is opened there is an opportunity to provide a custom name for the M4IP, and this name will be shown in the *Device* window at the top of the GUI. Once the IP Address of the M4IP has been entered the *Select* button should be pressed if that is the processor you wish to connect to, or if you are just adding a device for later, click the *OK* button to close the dialog.

Quick Save (QSave)

The M4IP has a clever feature called QSave which allows the instant comparison of two different sets of processing tuning settings. It can also be used to compare the sound of a Factory preset to the modifications being made by a user without having to first save the user preset.

The *QSave A* and *QSave B* buttons are assigned to two temporary buffers inside the M4IP that hold all current processing settings as long as power is applied to the unit.

While *QSave A* is highlighted green any adjustments that you make to the controls are being saved to that temporary buffer. *QSave B* is another temporary buffer that operates just like *QSave A*. When a *QSave* button is active its green indicator is illuminated.

Though there are several ways to use the QSAVE feature, one popular way is to compare the sound of a factory preset to changes made to that preset by a user without

having to first save it as a user preset. To do this, follow these steps:

1. Recall the factory or user preset that you wish to adjust.
2. Ensure that QSave A is highlighted. If it is not, press its button to highlight it.
3. Press the *B=A* button. This will copy the contents of QSave buffer A to QSave buffer B; now the contents of both buffers are identical.
4. Change some settings on the M4IP; these settings will automatically be stored in the *QSave A* buffer.
5. Compare your changed settings to the recalled factory preset by pressing the *QSave B* button.
6. Compare those settings back to the factory preset by pressing QSave A.
7. When you are pleased with your changes you can commit them to a user preset by using the Save preset dialog that was covered previously.

The *QSave A* and *QSave B* buttons may also be used to compare the sound of two different sets of user settings. To do this:

1. Load the preset that you want to change, then make changes to it and press QSave A to save those settings to buffer QSave A.
2. Make additional changes as desired and then press QSave B to save the additional changes to buffer QSave B.
3. Now you can compare the two sets of settings by toggling back and forth between the *QSave A* and *QSave B* buttons.
4. When you are pleased with one set of settings and need more buffers for further tweaking, you can use the *A=B/B=A* button to make the two buffers the same and have one of them to use to start comparing from again.

Title Bar Section
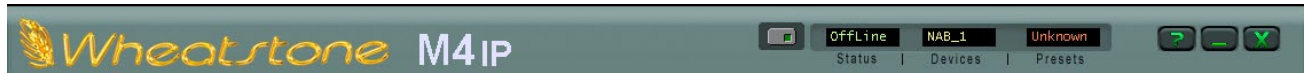
As was hinted at in the section of the manual pertaining to configuring and selecting devices, the M4IP GUI is capable of controlling hundreds of M4IP units on the same connected network.

Along the top edge of the M4IP GUI screen and between the "Wheatstone M4IP" product label on the left and the Windows About/Minimize/Exit icons on the right are four status indicators and controls for the management of devices and presets. The first is a small button with embedded green indicator. This button is used to put the GUI online to an M4IP device.

Status

When a connection is attempted, made, or disconnected the *Status* window will display the status of this action. When the display indicates *Offline* no connection to an M4IP device is being attempted.

When the Status window indicates *Trying* the GUI is in the process of establishing a connection to a remote M4IP device. As long as the status is *Trying*, full communications has not been established.

When the Status window indicates *Online*, the GUI is in command of the connected device.

Devices

This window indicates what device has been selected for control from within the Devices dialog covered earlier. If no device is displayed, or if it indicates *Unknown* then no device has been configured or selected in the Devices dialog.

Presets

This window shows the currently running processing preset. If the text is displayed in green, all parameters that were originally saved with the preset are still active and no changes have been made to any of the settings. If the text is displayed in orange, then one or more parameters in the current preset has been modified and the new settings have NOT yet been saved as a new preset. If the text is displayed in orange and a new preset is taken, any changes preset in the previous preset are lost forever. This may or may not be the desired action – be careful!

As covered earlier (page 2-13), it is possible to visually compare two different presets on the M4IP with a special feature called Preset Difference.

Double-clicking on the name brings up a *Preset Difference* – parameter-by-parameter, setting-by-setting – comparison list between the current M4IP settings and the recalled preset.

Any parameter that is listed with a RED background indicates a parameter that is different° between the preset running on the hardware and the preset that has been highlighted. Parameters which are not highlighted have the same values between the two presets.

Accessing Menu Options

Right clicking anywhere on the Wheatstone M4IP Control Panel will open a menu tree with access to the *File*, *Hardware*, and *Presets* choices. These choices then lead to sub-menus and dialog boxes that may also be accessed by clicking on other dedicated buttons on the main M4IP control panel. As with many Windows programs, there are multiple ways to access the menu trees – please feel free to go ahead and explore.

File Menu Items

The *File* menu tree may be accessed by right clicking anywhere on the main M4IP Control Panel.

About… – Brings up the About box to indicate the GUI software version.

Choose Skin… – Brings up the Choose Skin dialog box. "Skins" in our processors are GUI overlays which contain the look of the GUI itself.

Processor Labels… – This dialog allows you to customize the individual processing channel names as they appear on the tabs for each microphone channel like the example below.

Exit… – Closes the entire Pro GUI (not just the dialog window).
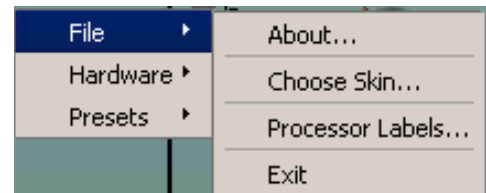
Hardware Menu Items

The *Hardware* menu tree may be accessed by right clicking anywhere on the main M4IP Control Panel. Please note that most of the hardware-related items cannot be reported unless the GUI is online to the hardware as that is where such data must come from!

Devices… – Opens the Devices dialog box which allows the creation, editing, selection, and deletion of Wheatstone processor devices that are known to the GUI.

On-Line Mode… – Toggles between ONLINE and OFFLINE modes. In offline mode the GUI is not connected to the processor but can still take presets to have their settings viewed, changed and saved back to the PC for later download to the hardware.

Login Password… – Opens the Passwords dialog box for creating and editing login passwords.

Version… – Displays the current software and firmware versions that are installed and running on the M4IP hardware, noting that the only time you can view the hardware versions from the GUI is if it is actually connected and online to the hardware.
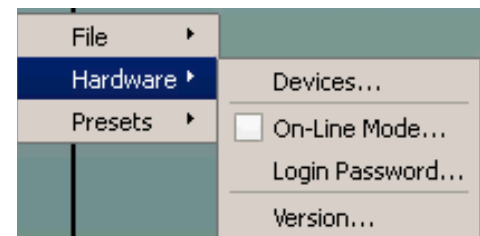
Presets Menu Items

The *Presets* menu tree may be accessed by right clicking anywhere on the main M4IP Control Panel.

Take... – Performs the same action as clicking the Preset button.

Save... – Performs the same action as clicking the Save button.

Library... – Performs the same action as clicking the Library button.