VORSIS®
ULTRA-HIGH RESOLUTION PROCESSING

M-SERIES
DIGITAL MIC/VOICE PROCESSORS
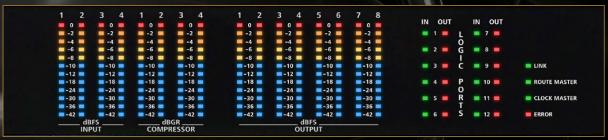
DIGITAL MIC/VOICE PROCESSOR M-1

DE-ESSER
− 20 18 16 14 12 10 8 6 4

COMPRESSOR
− 20 18 16 14 12 10 8 6 4

EXPANDER
− 20 18 16 14 12 10 8 6 4

50
40
35
25
2

TERS

240 630 1K
160 2.8K
80 4.5K
35 9.5K 35
20 Hz 20K 40
45
50
55
60 −dB 10
15
20
25 mS 50
30
65
FREQ
RELEASE
IN
THRES

140 190 250
95 310
85 370
65 440
30 mS 500
.2 mS 1S
34 30 26 22 18 14
38
42
46
50 −dB 10
ATTACK
RELEASE
IN
THRES

20 48 80
10 190
5 350
2.5 700
140 250 340
85 440
65 650
45 800
33 1.0S 3.5
26 2.6
22 1.9
18 1.4
14
4.5 6
8.5
10.5
15
1 20
RATIO

16 20 24
12 28
8 32
4 36
0 +dB 42
48
54
60 −dB 6
DEPTH
IN
THRES

260 400 550
180 800
120 1S
80 2S
24 30 mS 3S
18
12
6
CLOSE

EQ PRE
EQ IN

2-CHANNEL DIGITAL MIC/VOICE PROCESSOR M-2

−40 −38 −36 −34 −32 −30 −28 −26 −24 −22 −20 −16 −12 −8 −2 0 dBFS
1 ▮ CLIP

INPUTS

2 ▮ CLIP
−40 −38 −36 −34 −32 −30 −28 −26 −24 −22 −20 −16 −12 −8 −2 0 dBFS

−40 −38 −36 −34 −32 −30 −28 −26 −24 −22 −20 −16 −12 −8 −2 0 dBFS
1 ▮ LIMIT

OUTPUTS

2 ▮ LIMIT
−40 −38 −36 −34 −32 −30 −28 −26 −24 −22 −20 −16 −12 −8 −2 0 dBFS

4-CHANNEL DIGITAL MIC/VOICE PROCESSOR BLADE M-4IP

INPUT — dBFS
COMP — dBGR
OUTPUT — dBFS

GIGABIT LINK
ALARM
WHEATNET OK
INPUT METERS
OUTPUT METERS
SYSTEM MASTER
CLOCK MASTER
44.1K
48K
SNAKE MODE
GPIO
ERROR

4-CHANNEL DIGITAL MIC/VOICE PROCESSOR BLADE-3 M-4IP3

INPUT — dBFS
COMPRESSOR — dBGR
OUTPUT — dBFS

IN OUT   IN OUT
1   L   7
2   O   8
3   G   9   LINK
4   I   10   ROUTE MASTER
5   C   11   CLOCK MASTER
6   P   12   ERROR
     O
     R
     T
     S

Wheatstone
BROADCAST AUDIO PERFECTIONISTS®

Wheatstone Processing

Whether it's a single voice or every piece of audio in your facility, Wheatstone believes that you should have the power to shape your OWN sound – one with a completely unique sonic signature that's your sound, not the one created by a processor manufacturer.

To achieve this goal Wheatstone has developed Vorsis Ultra-High Resolution Processing technology to provide completely clean, high quality 'draw you in' sound that even the best ears in the business love to hear. This proven Vorsis technology is embedded in every Wheatstone processor to create the cleanest sound, as loud as you want it.

We think Wheatstone's Vorsis Ultra-High Resolution Processing is the best you'll ever use. But don't take our word for it. Try it out. We CAN guarantee you'll be happy you did!

M-1 mic/voice processor

experience YOUR voice enhanced by great processing

The M1 is a flexible digital microphone processor. It offers unlimited presets, security and networkability in an all-digital framework, with parameters that are easy to set up. Either from the front panel, or from the GUI - all parameters of the M1 can be controlled to give each voice talent his or her own personal sound at the press of a button.

The M1 microphone processor is equipped with a Super-Quiet (SQ) microphone preamplifier featuring an extremely low noise floor, very wide dynamic range, faithfully accurate transient response, and ruler flat frequency response. Operating in harmony with high quality 24-bit A/D converters and a 96kHz base sample rate, the M1 adds absolutely no undesired coloration to the signal and faithfully preserves the sound of any microphone and talent combination.

The features on the M1 include four-band parametric EQ, high- and low-pass filters, de-esser and expander and of course, our proprietary Vorsis dynamics processing. The unit comes loaded with factory designed presets, and designing your own is easy, thanks to features such as "Quick Save" and 'Quick Compare" that allow you to toggle back and forth between different presets as you adjust them. From one GUI, an entire group of M1's can be controlled, making multiple microphone processor management easy.
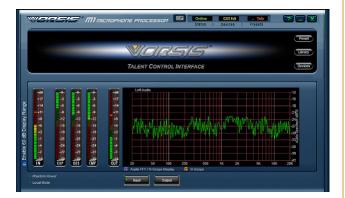
Wheatstone-designed EQ
Very high quality parametric and shelving equalization is available to sweeten the sound of any microphone as desired without adding noise or undesirable artifacts to the signal.

Wheatstone-designed Dynamics Control
A high performance de-esser and a smooth sounding, very low distortion compressor/limiter dynamics control section round out the M1's offerings to create powerful and authoritative presence on production or on-air microphones.

- Control of all audio parameters

- Intuitive PC graphical user interface (GUI)

- High quality, low noise microphone preamp

- Phantom power

- Metering: In/Out, de-esser, compression, expansion

- Password based security

- 44.1, 48 or 96 kHz AES3 output sample rates

- Mic or line level out, selectable from rear panel

- 24-bit A/D, D/A converters

- Preset storage/recall via GUI

- Variable frequency de-esser

- Voice phase rotator

- Adjustable compression

- Downward expansion

- EQ: two-band parametric plus variable high and low shelving

- Tunable high and low pass filters

- FFT voice energy display via GUI

- Quick save/compare function

- TCP/IP Ethernet remote control

- Takes up only one rack space

- Front panel controls can be locked out via rear dipswitch

Wheatstone Talent Control Interface and GUI

Voice talent can activate his or her own personal sound at the press of a button using the Talent Control Interface, a special GUI designed for preset recall only. The Wheatstone Talent Control Interface software can reside on an air studio/control room PC and gives talent the ability to recall presets from any Wheatstone microphone processor without allowing processing adjustments. It also offers a high-resolution display of input and output levels as well as an FFT display of the talent's voice either pre or post processing.

All parameters of the M1 are adjustable using the included Windows-based GUI which can control as many as 254 M-1 devices (see page 10).

M-1 BLOCK DIAGRAM

EQ switchable pre or post compressor

MIC PREAMP → ASYMMETRY FILTER → HIGH- AND LOW-PASS FILTERS → DOWNWARD EXPANDER → DE-ESSER → SHELVING & PARAMETRIC EQUALIZER → COMPRESSOR → SHELVING & PARAMETRIC EQUALIZER → OUTPUT → ANALOG / AES3 DIGITAL

M-2 dual-channel mic/voice processor
double your pleasure by processing two voices at once

The M2 is a dual-channel DSP-based voice processor. The M2 is able to operate in completely independent dual channel mode or, at the touch of a button, M/S mode for professional stereo recording applications.

The M2 microphone processor is equipped with twin, matched Super-Quiet (SQ) microphone preamplifiers featuring extremely low noise floor, very wide dynamic range, faithfully accurate transient response, and ruler flat frequency response. Operating in harmony with high quality 24-bit A/D converters and a 96kHz base sample rate, the M2 adds absolutely no undesired coloration to the signal and faithfully preserves the sound of any microphone and talent combination. It features twin high-bandwidth, very low noise microphone preamplifiers, a four-section equalizer with high and low shelving EQ and two bands of fully parametric EQ, high and low pass filters, de-esser and expander functions.

The signal path of the M2 may be operated as a dual channel microphone processor with completely independent channels or as an M/S pair for use in professional high-quality, crossed-microphone M/S recordings. Included in the M2 dual-channel voice processor is Wheatstone's smooth-sounding Vorsis dynamics processing, configurable to up to three bands of processing. Adjustable from anywhere on your network, the M2 offers the security of password protected TCP/IP-based remote control and no front panel controls.

Wheatstone-designed Equalization
Based on great-sounding designs built for Wheatstone's high performance professional audio applications, the M2's equalization section operates predictably and adds no noise, ringing, phasiness or other undesirable coloration to the sound.

Wheatstone-designed Dynamics Processing tools
A high performance and fully adjustable downward expander, de-esser, and smooth sounding broadband or multiband compressor and low distortion final limiter round out the M2 to create powerful and authoritative presence on production or on-air microphones.

Processing Presets
A variety of ready-to-use factory processing presets are provided, carefully tailored for different processing goals and formats. You can select a factory preset, confident that it will sound great just as it is. Or use a factory preset as a starting point and create a custom sound for each announcer, then save the new settings as a personalized user preset. In a facility with multiple microphone processors, presets saved in one unit can be easily copied to the others.
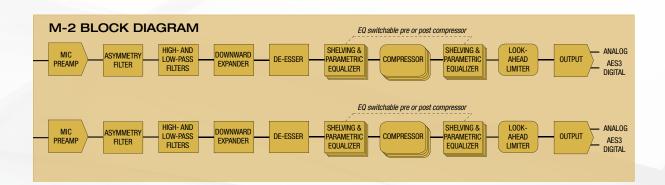
GAIN REDUCTION

1 EXP

2 EXP

-30 -28 -26 -24 -22 -20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 dB

VORSIS
ULTRA-HIGH
RESOLUTION
PROCESSING

- Extremely high performance microphone preamplifiers with 48V phantom power

- Two completely independent processing channels – may be operated as an M/S pair

- All digital, field proven Wheatstone-designed advanced processing algorithms

- Phase Rotator to correct asymmetrical voice waveforms

- High- and low-pass filters as well as an adjustable High-Q notch filter

- Fully adjustable downward expander

- Precision de-esser sibilance controller

- Four-bands of EQ: low-frequency shelving, two-band parametric, high-frequency shelving

- Compressor: broadband, two, or three bands

- Final precision peak limiter – can be defeated if desired

- TCP/IP-based remote control from anywhere via Vorsis Remote Control Software

- Talent Control Interface software for preset recall without processor control

- Password controlled access and control-less front panel for keeping settings secure

- Full metering of input and output levels and all signal processing

- FFT and oscilloscope displays of pre and post processing audio

- Requires only one rack space

Wheatstone Talent Control Interface and GUI

Voice talent can activate his or her own personal sound at the press of a button using the Talent Control Interface, a special GUI designed for preset recall only. The Wheatstone Talent Control Interface software can reside on an air studio/control room PC and gives talent the ability to recall presets from any Wheatstone microphone processor without allowing processing adjustments. It also offers a high-resolution display of input and output levels as well as an FFT display of the talent's voice either pre or post processing.
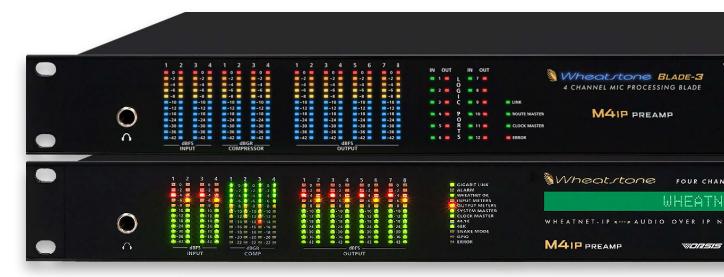
All parameters of the M2 are adjustable using the included Windows-based GUI which can control as many as 254 M-2 devices (see page 10).

M-2 BLOCK DIAGRAM

EQ switchable pre or post compressor

MIC PREAMP → ASYMMETRY FILTER → HIGH- AND LOW-PASS FILTERS → DOWNWARD EXPANDER → DE-ESSER → SHELVING & PARAMETRIC EQUALIZER → COMPRESSOR → SHELVING & PARAMETRIC EQUALIZER → LOOK-AHEAD LIMITER → OUTPUT → ANALOG AES3 DIGITAL

EQ switchable pre or post compressor

MIC PREAMP → ASYMMETRY FILTER → HIGH- AND LOW-PASS FILTERS → DOWNWARD EXPANDER → DE-ESSER → SHELVING & PARAMETRIC EQUALIZER → COMPRESSOR → SHELVING & PARAMETRIC EQUALIZER → LOOK-AHEAD LIMITER → OUTPUT → ANALOG AES3 DIGITAL

M4-IP(3) 4-channel mic/voice preamp/processor
dramatic Vorsis sound improvement in a full-function WheatNet-IP BLADE or BLADE-3

Available as an original BLADE (M4-IP) or as a new BLADE-3 (M4-IP3), this is a one rack unit with four completely independent DSP-based high quality voice/mic processors that are available standalone from the unit or accessible from anywhere in your WheatNet-IP network.

The M4-IP Microphone Processor BLADE combines four high-quality microphone preamps, four channels of Vorsis Embedded microphone processing, and a WheatNet-IP BLADE interface, allowing you to place four microphone inputs anywhere in your WheatNet-IP Intelligent Network (although it also works just fine as a standalone processor). The preamps and processors are accessed and controlled from any point on the network via its Windows-based GUI.

The M4-IP is a great way to maximize your investment in on-air talent by combining four mic processors into a single rack space, accessible from anywhere.

The M4-IP microphone processor is equipped with four matched Super-Quiet (SQ) microphone preamplifiers featuring an extremely low noise floor, very wide dynamic range, faithfully accurate transient response, and ruler flat frequency response. Operating in harmony with high quality 24-bit A/D converters and a 96kHz base sample rate, the M4-IP adds absolutely no undesired coloration to the signal and faithfully preserves the sound of any microphone and talent combination. It also features a four-section equalizer with high and low shelving EQ and two bands of fully parametric EQ, high and low pass filters, and de-esser and expander functions.

The signal path of the M4-IP includes four completely independent channels of Wheatstone's smooth-sounding Vorsis dynamics processing. Adjustable from anywhere on your network, the M4-IP offers the security of password protected TCP/IP-based remote control and no front panel controls.

Wheatstone-designed Equalization
Based on great-sounding designs built for Wheatstone's other high performance professional audio applications, the M4-IP's equalization section operates predictably and adds no noise, ringing, phasiness or other undesirable coloration to the sound.

Wheatstone-designed Dynamics Processing tools
A high performance and fully adjustable downward expander, de-esser, and smooth sounding broadband compressor and selectable low distortion final look-ahead limiter round out the M4-IP to create powerful and authoritative presence to production or on-air microphones.

Processing Presets
A variety of ready-to-use factory processing presets are provided, carefully tailored for different processing goals and formats. You can select a factory preset, confident that it will sound great just as it is. Or use a factory preset as a starting point and create a custom sound for each announcer, then save the new settings as a personalized user preset. In a facility with multiple microphone processors, presets saved in one unit can be easily copied to the others.

WheatNet-IP Native
The M4-IP is a WheatNet-IP BLADE which gives it a great deal of additional functionality. All Wheatstone's BLADEs are single rack-space interfaces that talk directly to WheatNet-IP control surfaces, other BLADEs and compatible third-party equipment. They contain features such as router control, logic control, gain control, two 8-channel utility mixers, silence detection and switching (among other things).

- Four extremely high performance microphone preamplifiers with 48V phantom power
- Four completely independent processing channels
- Four stereo analog line level outputs
- Four stereo AES outputs
- All digital, field proven Wheatstone-designed advanced processing algorithms
- Phase Rotator to correct asymmetrical voice waveforms
- High- and low-pass filters
- Fully adjustable downward expander
- Precision de-esser sibilance controller
- Four-bands of EQ: low-frequency shelving, two-band parametric, high-frequency shelving
- Broadband compressor
- Final precision peak limiter – can be defeated if desired for lower latency
- TCP/IP-based remote control from anywhere via M4-IP Remote Control Software
- Talent Control Interface software for preset recall without processor control
- Password controlled GUI access
- Front panel metering of input and output levels
- WheatNet-IP BLADE with full BLADE features including:
  — 12 Universal Logic ports (GPIO)
  — Front panel headphone jack
  — Front panel LED bargraph metering
  — Built-in routing control
  — Two built-in 8-channel utility mixers
  — Gigabit Ethernet
  — Silence sensing can be applied to any output
- BLADE-3 option adds AES67 compatibility, front panel logic indicators, LIO/SLIO logging, aliases, associated connections, dual OLED displays, clock/sync indicators and more

Wheatstone Talent Control Interface and GUI

Voice talent can activate his or her own personal sound at the press of a button using the Talent Control Interface, a special GUI designed for preset recall only. The Wheatstone Talent Control Interface software can reside on an air studio/control room PC and gives talent the ability to recall presets from any Wheatstone microphone processor without allowing processing adjustments.

All parameters of the M4-IP are controlled using the included Windows-based GUI (see page 10).

the bigger picture

our GUIs give you the tools needed to dig in and OWN the sound of your voice

M-1 & M-2 Control Software

The Vorsis Control Software – separate versions for each of the voice processors – loads on an external PC. You can connect the PC directly to the processor, or linstall the processor on your station's Ethernet LAN and access it from anywhere in your network (or remotely over VPN).

With Vorsis Control Software no adjustment is more than two mouse clicks away. And unlike other processors, every processing control is available and labeled for exactly what it does, giving you ultimate power to create your ideal sound.

The remote control screen is divided into an upper control area and a lower dynamic section that includes real-time display of gain reduction as well as a frequency-domain graph that shows the spectral characteristics of your audio. Every screen also includes accurate metering of input and output peak and average levels. Tabs across the top of the GUI software allow immediate access to each section of the processing - parametric EQ, de-esser, filters, compressor and downward expander.

M4-IP Control Software

For the M4-IP, the control screen has tabs for each of its four channels, making it exceptionally quick and easy to set up each of your announcers and see the differences in the settings.

You have control over parametric EQ, de-esser, filters, compressor and downward expander. There are also high and low pass filters and an overall output limiter (so you are ready if a screamer steps behind the mic.

M4-IP's Vorsis Control Software runs on an external PC and can be controlled remotely from anywhere there is an internet connection.

the nitty gritty
specifications and other little things that make the difference

FACTORY PRESETS

Factory presets are pre-installed and write protected. New factory presets can be downloaded from the Wheatstone-Processing.com web site and installed via the Windows-based GUI software.

USER PRESETS

M-1: unlimited preset storage on the host PC

M-2: storage for 80 presets in on-board non-volatile memory, unlimited storage on host PC.

M-4: storage for 80 presets in on-board non-volatile memory, unlimited storage on host PC.

AUDIO INPUTS

Microphone XLR-F connector (one on M-1, two on M-2, four on M-4)

Electronic differential	>2KΩ (bridging)
Optimum source impedance	200Ω
Phantom Power	48VDC, switchable on/off
Gain	-10dB to +70dB in 1dB steps
Frequency response	±0.2dB 20Hz-20KHz
Equivalent input noise (EIN)	-128dBu
THD+N	<0.03%, 20Hz-20kHz, -50dBu input
SMPTE DIM	0.00007%

AUDIO OUTPUTS

Mic or line level output selectable (M-1 only)

Line-level output (M-2 and M-4 only)

Digital XLR-M connector (one on M-1, two on M-2)

Two RJ45 to StudioHub standard (M-2 and M-4 only)

Reference Level: 0VU=-20dBFS

Output Sample Rates:
M-1: 44.1 kHz, 48 kHz and 96 kHz
M-2: 48 kHz fixed
M-4: 44.1kHz or 48kHz

Balanced	110Ω AES-3 0VU=-20dBfs
Analog XLR-M connector	(one on M-1, two on M-2)
Electronically balanced	<10Ω source impedance
Optimum load impedance	>600Ω
Maximum output level	+24dBu

FILTERS

Asymmetry filter Phase rotator, 4th order allpass, switchable in/out

High-pass	24dB/octave Butterworth
Adjustable	20Hz-1kHz
Low-pass	24dB/octave Butterworth
Adjustable	1-20kHz
Notch (M-2 only)	Fixed bandwidth
Adjustable	20Hz-20kHz

DOWNWARD EXPANDER

Threshold Adjustable	-60dBFS to 0dBFS
Depth Adjustable	0-40dB
Close Adjustable	50ms-3s

DE-ESSER

Control	Recursive-style
Threshold Adjustable	-10dBFS to -60dBFS
Attack time (M-2 only)	Adjustable 0.1ms-100ms
Release time Adjustable	50ms-500ms
De-ess frequency Adjustable	20Hz-20kHz
Bandwidth (M-2 only)	Adjustable 0.15-4 octave

PARAMETRIC EQUALIZER

Routable	Pre or post compressor
Band 1	Shelving
Adjustable	20-200Hz
Boost/cut	±14dB
Bands 2 and 3	Parametric
Adjustable	20Hz-20kHz
Boost/cut	±14dB
Bandwidth	0.2-3.0 octave
Band 4	Shelving
Adjustable	2kH-20kHz
Boost/cut	±14dB

COMPRESSOR – M-1 and M-4

Control	Broadband
Threshold	-10dBFS to -50dBFS
Attack time	0.2ms-1s
Release time	33ms-1s
Ratio	1:1-20:1

COMPRESSORS – M-2

One, two, or three processing bands

Crossover frequencies:
Band 1-2 adjustable 20Hz-1kHz
Band 2-3 adjustable 1kHz-20kHz

Threshold	10 to -50dBFS
Attack time	0.2ms-1s
Release time	33ms-1s
Ratio	1:1-20:1

FINAL LIMITER (M-2 and M-4 only)

Control	Zero-overshoot look-ahead limiter
Threshold	-50 to -10dBFS (fixed at -6dBFS in M-4)
Attack	0-100ms (automatic in M-4)
Release	10ms-330ms (automatic in M-4)

LOGIC I/O, M-1 and M-2

Remote control	RJ45 connector (two on M-2)
For M-1 and M-2	Optional Wheatstone Announcer Panel or custom interface
Connections	ON, OFF, Cough, ON tally, OFF tally, power and ground
GPI input (M-2 only)	DB9 connector

Eight opto-isolated ports for external switching of presets (M-2 only)

LOGIC I/O, M-4

12 opto-isolated and fully configurable GPIO logic ports

CONTROL

M-1 and M-2	Ethernet 10-100BASE-T, RJ45 connector
M-4	1000BaseT Gigabit Ethernet

PHYSICAL - M-1

Dimensions	19"/48.3cm wide
	1.75"/4.5cm high
	10"/25.4cm deep
	(allow 3.25"/8.25cm for rear connectors)
Weight	8.1lbs/3.68kg
Shipping weight	13lbs/5.9kg
Power Requirements	90-260VAC, 50-60Hz, 24VA

PHYSICAL - M-2

Dimensions	19"/48.3cm wide
	1.75"/4.5cm high
	16"/40.6cm deep
	(allow 3.25"/8.25cm for rear connectors)
Weight	11.35lbs/5.16kg
Shipping weight	15lbs/6.8kg
Power	90-260VAC, 50-60Hz, 19VA

PHYSICAL - M-4

Dimensions	19"/48.3cm wide
	1.75"/4.5cm high
	13.25"/33.7cm deep
	(15.25"/38.7cm deep w/rear connectors)
Weight	10.35lbs/4.69kg
Shipping weight	14lbs/6.4kg
Power	90-120VAC, 50-60Hz, 22VA

Designed and built by
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