FM-531HD

HIGH DEFINITION AUDIO PROCESSOR

VORSIS®

ULTRA HIGH RESOLUTION PROCESSING

OFFICIAL WHEATSTONE TOOLS TO RULE RADIO NOW

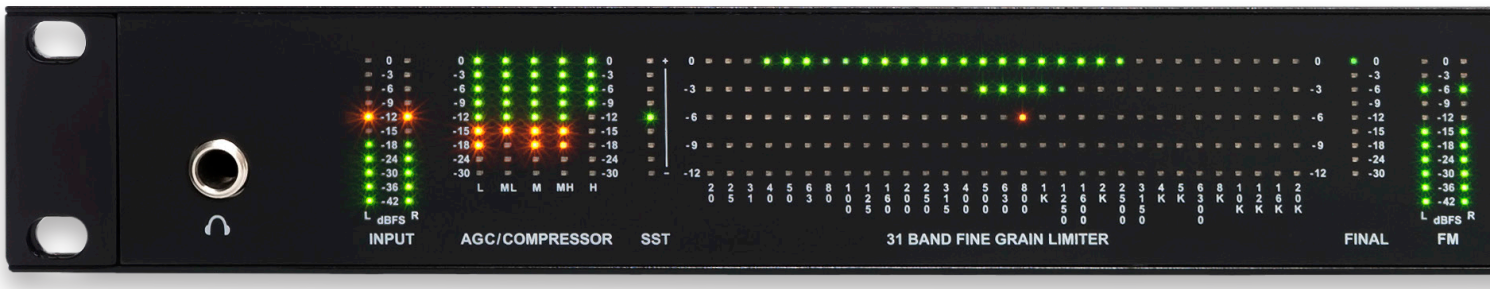
RULE RADIO NOW™

Wheatstone

FM-531HD

HIGH DEFINITION AUDIO PROCESSOR

"Your Sweet Spot Technology AGC has the most invisible gain correction that I have EVER heard in ANY on-air processor. Listeners have been calling to compliment us on the improvement in our on-air sound."



FM-531HD

HIGH DEFINITION AUDIO PROCESSOR

Our FM-531HD is a 1RU on-air processor for FM/HD use. Packaged in a compact, 1RU form factor, this processor brings the multiband precision of our flagship AirAura® processor to a budget-friendly price point. Its Vorsis Ultra High Resolution processing technology delivers superb on-air sound that's loud, yet detailed.

Features include a distortion-managed final clipper for squeaky-clean audio, smart stereo enhancement, bass management for deep, yet clean bass, and Sweet Spot Technology for consistent sound regardless of density variations in the source material.

Distortion-Managed Final Clipper
The technology utilized in our FM-531HD final peak clipper does not generate the objectionable aliasing and intermodulation distortions commonly associated with less-complex clipper technology.

Similar in certain ways to our acclaimed 31-band 'Fine Grain' limiter (a Vorsis exclusive), the FM-531HD utilizes high resolution distortion recognition algorithms to discern audio from distortion. The fine-grained selectivity afforded by this technology is the best way to sense and truly mitigate distortion. Other technologies can only make a "best guess" at separating desirable audio components from undesirable distortion products.

By analyzing the audio and the distortion products created during peak control, the FM-531HD removes distortion products and other artifacts that a listener might find objectionable. It is highly adept at minimizing intermodulation distortion, especially close-spaced difference frequency intermodulation products in the midrange frequencies where human hearing is the most sensitive.

"Fine Grain" Processing
"Fine Grain" processing overcomes the limitations of peak limiters in other on-air processors. Using 31 limiter bands selected according to ISO standard 1/3 octave center frequencies the FM-531HD limiters (one for FM, one for HD) perform precision spectral energy control without generating additional density or artifacts usually associated with peak limiters having fewer bands. Operating according to accepted principles of human psychoacoustics, the action of the Stealth Limiter™ goes completely unnoticed by the ear. Because of the need for very shallow limiting in each band, there are absolutely no 'swishing' artifacts and no unnatural density buildup; just increased on-air loudness, detail, and "listenability" of the station's programming.

VORSIS®

ULTRA-HIGH RESOLUTION PROCESSING

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.

To get there, it required taking a completely fresh approach to processing. Vorsis Dynamics Control (AGC and compression) employs multiband AGC with SST™ to ensure consistent spectral balance. Its Multiband Compressor works with the AGC to provide unprecedented dynamics control.

The Vorsis Bass Management System (VBMS) extracts and reveals nuances in the program to deliver pristine, deep, distortion-free bass over the air. No other processor delivers bass this bold and clean.

Vorsis' Superior Stereo Enhancement is integral to the processing and creates a smear-free perception of a wider sound field in the cleanest possible way. Just stunning.

Our limiting and clipping are, bar none, the finest you'll ever use. Up to 31-bands ensure surgical precision and the ability to have the cleanest, loudest signal on the dial.

Vorsis' presets are also some of the finest in the world. You may never need to tweak them, but if you do, our Graphical User Interface, whether via the front panel or accessed by a PC, gives you an intuitive toolset that'll make you feel right at home.

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!

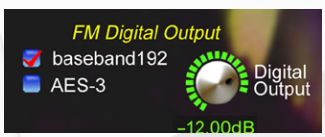
Sweet Spot Technology
Sweet Spot Technology (SST) has been designed by Vorsis to manage the behavior of the multiband AGC as program content density changes, something a typical broadband AGC simply cannot do. It effortlessly handles transitions between the hyper-compressed recordings of today and those of the past that have considerably more dynamic range. SST achieves uncannily natural-sounding consistency in both on-air loudness and spectral balance regardless of density variations in the incoming source material.

Vorsis Bass Management System - v2.0
The Vorsis Bass Management System (VBMS) enhances deep bass and impact without affecting the cleanliness of mid and high frequency content. Bass detail and the clarity of higher frequency audio are enhanced by this powerful, innovative algorithm. With VBMS' 'Texture' and 'Sub' controls, on-air bass has never sounded so good and so deep and natural.

Exclusive Multipath Limiter
Exclusive to the Wheatstone line of audio processors is the Multipath Limiter. This single user control can help mitigate the audible effects of multipath as well as reduce receiver-induced stereo blend by limiting the amount of L-R as a percentage of L+R for a more consistent and predictable sound.

Smart Stereo Enhancement
Stereo enhancement is a standard feature on all Vorsis on-air processors and utilizes a Vorsis technology: Smart Stereo Enhancement. Operating in the sum and difference domain and utilizing specialized spectral management algorithms, it provides a smooth, natural, wide listening experience without triggering multipath effects. It delivers an extremely stable 'on-air' stereo image that's exciting to listen to. Users have reported hearing, for the very first time, artistically important nuances in familiar music that could not be heard when that material was processed by other on-air processors.

Wheatstone® baseband192
Wheatstone® baseband192 digitizes the entire multiplex spectrum up to and including the RDS, doing away with an analog composite interface between processing and transmission.

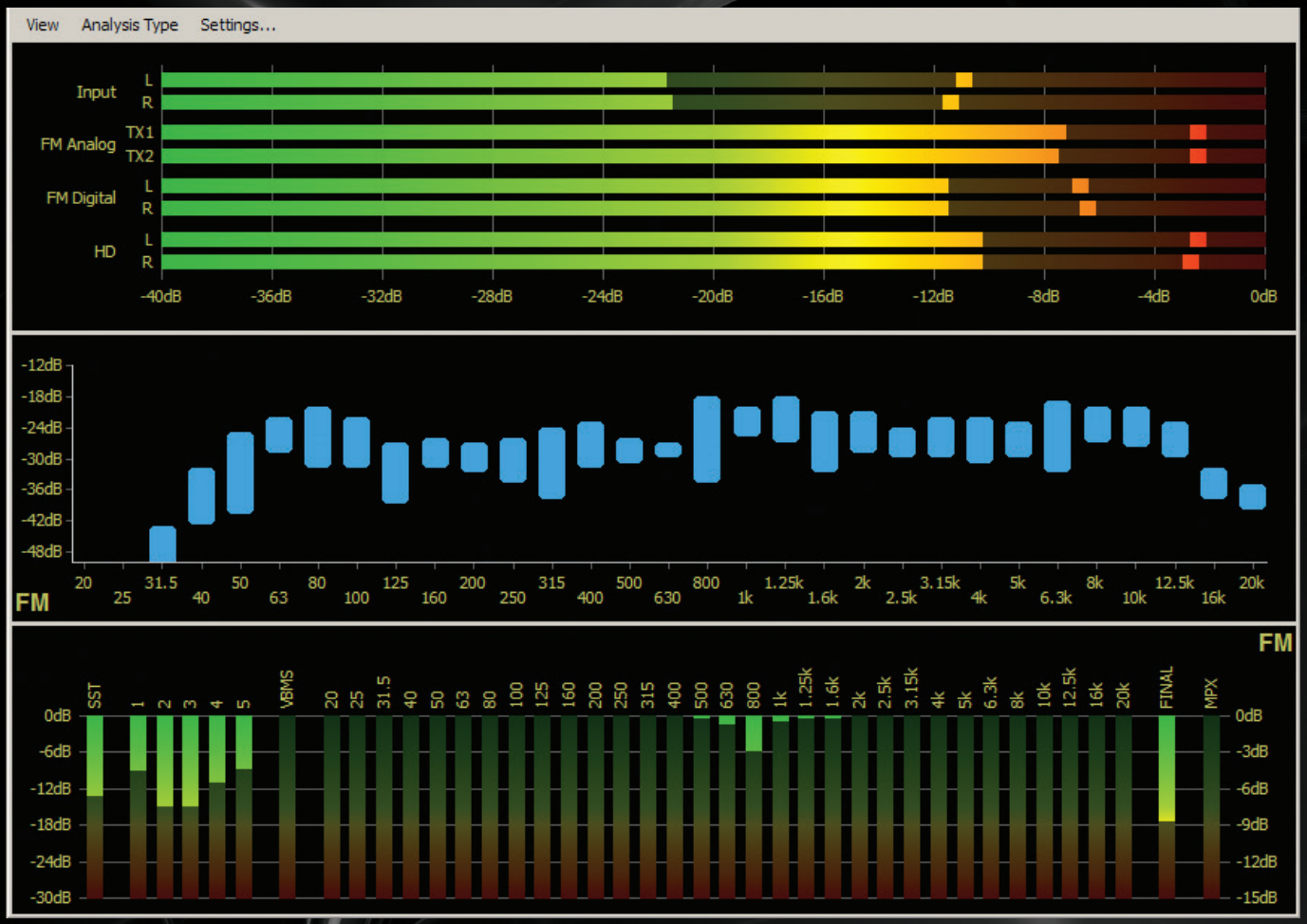


A single AES/EBU cable carries the digitized signal between the FM-531HD and any FM transmitter equipped with a digital baseband input, bypassing the need for multiplexing in the exciter and eliminating the resulting signal overshoot and its associated loudness tradeoff. The baseband192 interface is a standard feature in Wheatstone FM-531HD, AirAuraX3, and VP-8IP audio processors.

- Distortion-managed final clipper for squeaky clean audio
- 31-band limiting for precision spectral energy control without generating additional artifacts typically associated with fewer bands
- Exclusive SST technology for sound consistency regardless of density variations in the incoming source material
- Bass management technology for deep bass without affecting the cleanliness of mid and high frequency program
- Exclusive Multipath Limiter for mitigating the effects of multipath
- Smart stereo enhancement for extremely stable 'on-air' stereo image that's exciting to listen to
- Audio Processing Guru® GUI included standard
- Five band phase linear adjustable crossover feeding a five band AGC
- Exclusive 31-band limiter technology
- Exclusive VBMS™ (Vorsis Bass Management System)
- Selectable FM peak control via oversampled lookahead limiter or distortion masked clipper
- Four band full parametric equalizer
- Variable high pass filter
- Voice phase rotator
- AES3 digital input accepts 32kHz - 96kHz
- AES3 digital output automatically synchronizes to AES3 digital input
- WheatNet-IP compatible
- Wheatstone® baseband192 built in for digital link to transmitter

FM-531HD Graphical User Interface Software

With our Audio Processing Guru® GUI software, deep editing and statistical analysis for FM-531HD make using it an exceptionally rich experience. Far more than pretty lights, these detailed graphic displays provide you with visual analyses of audio functions. This provides a level of editing sophistication never before seen in our industry. It's also pretty durned cool....

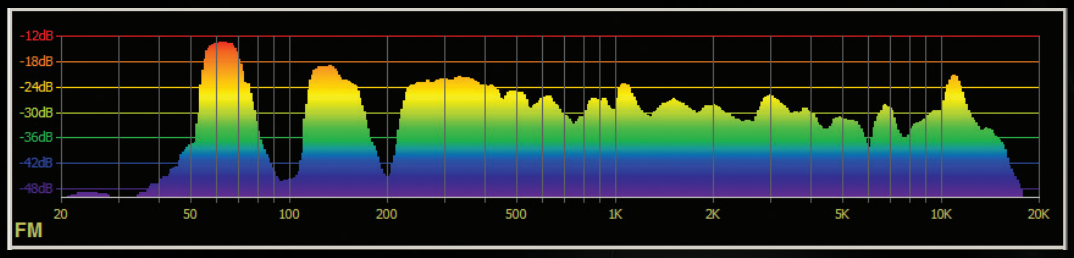


Multiple Functions Can Be Displayed Simultaneously

The top third of this screen shows the audio levels preset at the FM-531HD's inputs and outputs with sample accurate, true peak meters.

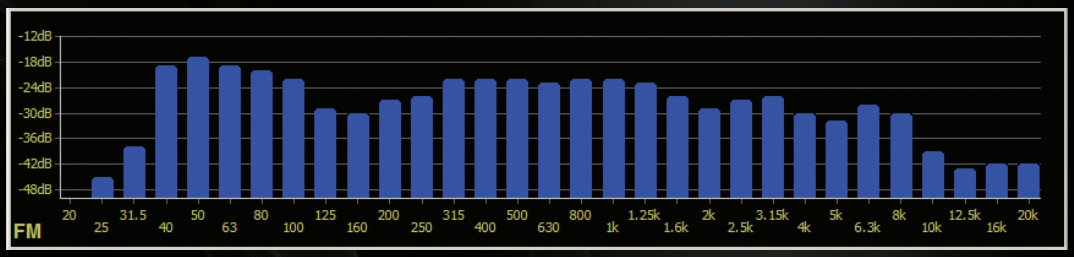
The center third of this screen is the Spectral Dynamic Range display. Measuring the audio output of each of the 31 band limiters, this screen shows the difference between the actual peak and RMS (loudness) levels in each band. The shorter the blue bar, the louder the audio in that part of the audio spectrum is to the ear.

The bottom third of this screen shows the gain reduction, or amount of processing, that is occurring in the SST, the five-band AGC, the 31 band limiters, and in final clipper. The display may be switched to show this information for either the FM or HD processing sections.



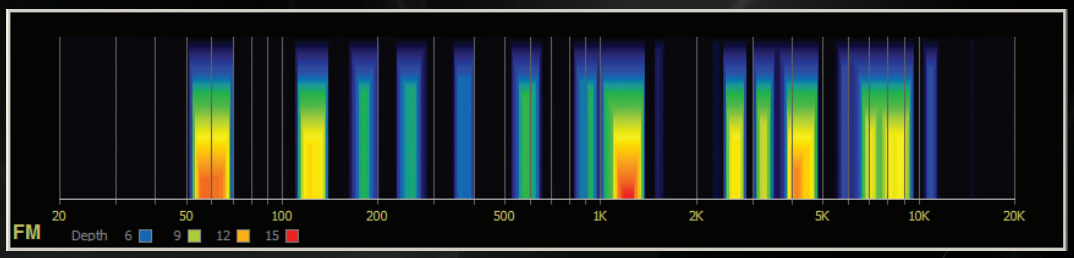
Fast Fourier Transform

This screen shows an FFT, or Fast Fourier Transform of the processed audio at the output of the entire processing chain. The FTT can be switched to show the output of the FM or HD processing paths.



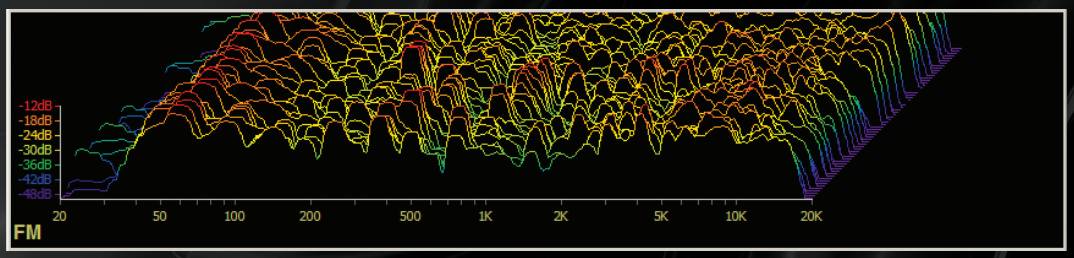
Energy vs Frequency

This screen is the Energy versus Frequency display. Measuring the output of the entire processing chain this display indicates the total relative loudness in various parts of the audio spectrum. The display may be switched to show the affects of processing for the FM or HD signal paths.



FM-531HD Clipper Activity

This screen is the FM-531HD clipper activity display. Using a familiar color scheme similar to most weather radars, the A-Clip display shows how much work the FM-531HD clipper is doing to mask distortion and where in the audio spectrum it is doing this work. Just like weather radar, the more orange and reds there are in the image, the more 'active' FM-531HD's distortion manager is.



3D Plot

This screen is the 3D Plot display. This display shows the audio after processing, and as a function of loudness, frequency, and time. This provides the user with information about the audio that has just been processed and also how it behaved historically over the past few seconds.

FM-531HD Specifications

OVERALL SYSTEM
Headroom 20dB
Nominal Operating Level -20dBFS digital, +4dBu analog
Latency (FM Section) 15.4ms, analog in to analog out
14.2ms, AES in to AES out
Latency (HD/DAB Section) 11.2ms, analog in to analog out
12.6ms, AES in to AES out

ANALOG LINE INPUT
Type electronic differential, RFI suppressed
Input Impedance >10K ohm (bridging)
Optimum Source Impedance <1K ohm

DIGITAL LINE INPUT
Data Standard: AES3 (AES/EBU), two channel stereo

DIGITAL LINE OUTPUT
Data Standard: AES3 (AES/EBU), two channel stereo

DIGITAL LINE OUTPUT
Transmitter link (baseband 192)

WHEATNET-IP INPUT
Data Standard: WheatNet-IP, two-channel stereo.

INPUT FAILSAFE
Automatic failover to alternate audio input source if audio fails on primary input.

VOICE SYMMETRY PHASE ROTATOR
Makes voice waveforms more symmetrical to reduce processing distortion.

EQUALIZATION
Three separate four-band parametric equalizers:
EQ Set 1: pre or post 5-band AGC
EQ Set 2: post HD/DAB multi-band limiter
EQ Set 3: post FM multiband limiter

FIVE-BAND AGC/COMPRESSOR with ADVANCED SST™
AGC operates in sum/difference domain.
Exclusive Vorsis SST retunes the five band AGC/Compressor to maintain consistent program density as programming elements change.

31-BAND 'FINE GRAIN PROCESSING' MULTIBAND LIMITERS
One 31-band section is assigned to FM signal path
One 31-band section is assigned to HD signal path
FM section operating modes: Independent, Wide, and Timbral

VORSIS BASS MANAGEMENT SYSTEM (VBMS)™
VBMS-II intelligently minimizes bass induced intermodulation distortion and improves bass impact. 'VBMS Texture' control also permits fine tuning of how deep bass sounds on smaller loudspeakers. Bass Tools adds virtual subwoofer capabilities, extending a floor feel by intelligently enhancing frequencies in the 40-90Hz range.

FINAL CLIPPER
Advanced 'distortion aware' final peak controller intelligently manages processing artifacts to minimize or even eliminate audible processing and intermodulation distortion.

DSP-BASED STEREO GENERATOR
Stereo Width Limiter to automatically minimize multipath distortion
Dual SCA/RDS/RBDS Inputs
Dual Composite Multiplex outputs

LONG AND SHORT FORM PROGRAM SCHEDULER
Automatically changes presets daily, weekly, or as desired, including long-form 'once in the future' preset changes.

ACI (AUTOMATION CONTROL INTERFACE)
Responds to commands from program automation system via Ethernet connectivity. Commands from program automation can change presets or even modify individual processing adjustments without changing presets.

REMOTE CONTROL
Remote control is by dedicated Windows-based Graphical User Interface with connectivity via 100BaseT wired Ethernet.

GPI (GENERAL PURPOSE INPUT)
Eight optoisolated logic inputs are slaved to first eight preset storage locations.

ELECTRICAL REQUIREMENTS
90-240VAC, 50-60Hz, <100VA

PHYSICAL DIMENSIONS
19" wide, 1.75" high, 13.75" deep (16" with connectors)

SHIPPING WEIGHT
16 lbs

STANDARD ACCESSORIES
Operating Manual, Windows-based Audio Processing Guru® Control Software, 6' IEC power cable, CDROM containing manual in PDF form, Factory Default Preset Library.

GUI Pro Software, which allows unlimited access to every processing parameter, is available as a free download at wheatstone-processing.com.

Specifications and features subject to change without notice.

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