



# 527 Compressor/Limiter

## Operator's Manual



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# API 527 Compressor

## Features

- Feed-forward or feed-back compression
- Hard or soft knee compression
- Patented **THRUST**® switch for frequency dependent side chain control
- Continuously variable detented THRESHOLD control
- Continuously variable detented ATTACK and RELEASE controls
- Continuously variable detented OUTput level control
- Continuously variable detented RATIO control
- 10 segment gain reduction (GR) meter
- Side chain input
- LINK switch for multiple unit interdependent compression linking (stereo compression)
- COMP BYPASS switch with hard relay bypass when in the "Out" position
- Audio circuit uses the 2510 and 2520 discrete op-amps



## **API 527 Compressor**

*The API 527 Compressor takes its place alongside the family of API VCA based compressors, the 225L and the 2500 Stereo Bus Compressor. Anyone familiar with those units will immediately be at home with the 527.*

*Features common to the line like "feed forward" (NEW) and "feed back" (OLD) gain reduction methods selectable on the front panel, provide a choice of "that old way", or "the new way" of compression, for the highest level of flexibility in signal gain control. The "old way" or Feed-Back method is what most of the classic compressors used for the gain control circuit. The "new way" gain reduction is more typical of the newer VCA type compressors that rely on RMS detectors for the gain control voltage.*

*There is a "SOFT"/"HARD" KNEE switch for an "over-easy" type compression resulting in a very natural, uncompressed sound or a typical sharp knee type that lends itself to a much more severe limiting effect.*

*The patented **THRUST**® function can be switched in and out via the front panel as well, applying a high pass filter before the RMS detector circuit that preserves that punchy bottom end.*

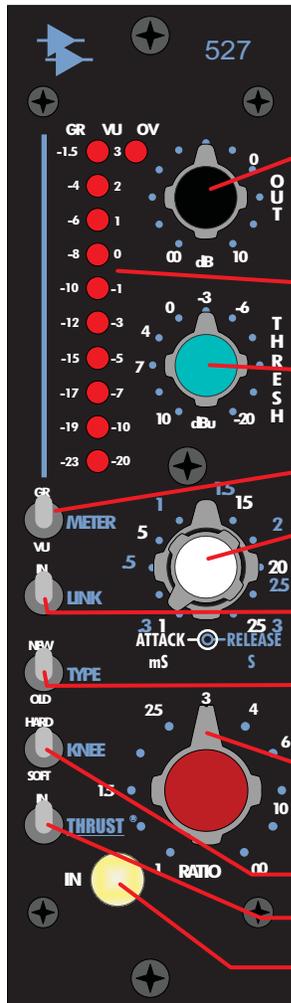
*The 527 Compressor sections of two or more can be linked together via a DC link allowing multiple units to be combined for stereo and multichannel applications.*

*The output level remains fairly constant regardless of the threshold or ratio control, much like the "more/less" Ceiling control on the API 525 Compressor. This allows for live adjustments without any noticeable gain changes in the program level.*

*The 527 Compressor makes use of the 2510 and 2520 discrete op-amps and exhibits the reliability, long life, and signature sound which are characteristic of API products.*

# Compressor Controls

## API 527 Compressor



**OUT** - Continuously variable 31 position detented output level pot

**METER** - 10 segment LED meter shows gain reduction or audio level

**THRESHOLD** - Continuously variable 31 position detented control

**METER SWITCH** - Selects gain reduction or audio level

**ATTACK/RELEASE** - Continuously variable 31 position detented controls

**LINK** - Selects linking of multiple units for stereo

**TYPE** - Selects Feed-Back (OLD) or Feed-Forward (NEW) Compression

**RATIO** - Continuously variable 31 position control

**KNEE** - Selects Hard or Soft knee

**THRUST** - Inserts the Thrust Filter in the RMS detector

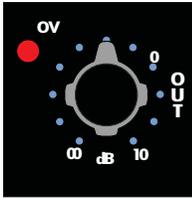
**IN** - Inserts the 527 into the audio path

The 527 Compressor provides a comprehensive suite of controls:

- **OUT**: Output level adjust
- **THRESHOLD**: The level at which compression begins
- **ATTACK**: The time it takes for the compressor to respond
- **RELEASE**: The time it takes the compressor to return to unity gain
- **RATIO**: The amount of compression applied above the threshold
- **TYPE**: NEW or OLD detection path topology
- **KNEE**: The characteristic of the response curve at the onset of compression.
- **THRUST®**: Patented circuit that inserts a high-pass filter before the RMS detector
- **GR Meter (GAIN REDUCTION)**: 10 LED gain reduction meter
- **LINK**: Activates the DC LINK for stereo/multichannel processing with other 527 units
- **IN**: Inserts or completely removes the 527 Compressor from the audio path (when not pressed)

# API 527 Compressor

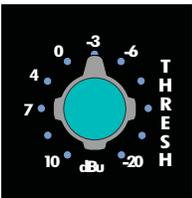
## OUT



OUT: Sets the output level of the 527

- Continuously variable 31 position control

## THRESHOLD



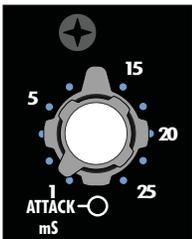
THRESHOLD: Sets the level at which compression begins

- Continuously variable between +10dBu and -20dBu
- Detented 31 position rotary pot for easy recall
- Turning clockwise results in more Compression

## ATTACK and RELEASE



Attack and Release times are fully variable on the 527 Compressor and share a dual-concentric potentiometer for control. Attack time is adjusted using the outer ring of the pot and Release time is adjusted using the inner knob.



ATTACK: Sets the time it takes the compressor to react when the level exceeds the set THRESHOLD

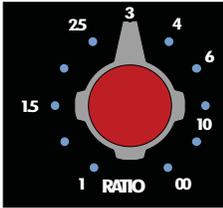
- Continuously variable between 1 and 25 ms (milliseconds)
- Detented 31 position rotary pot for easy recall



RELEASE: Sets the time it takes the compressor to recover to unity gain after the level falls below the set THRESHOLD

- Continuously variable between .3 and 3 seconds (S)
- Detented 31 position rotary pot for easy recall

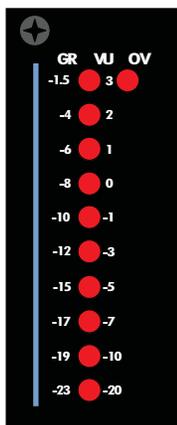
## RATIO



RATIO: Sets the ratio of input vs. output levels for signals that exceed the set THRESHOLD

- Continuously variable between 1:1 and infinity (hard Limiting)
- A Ratio of 10:1 or greater is generally considered to be a limiter
- Detented rotary pot for easy recall

## METERING - Gain Reduction



A gain reduction (GR) meter is provided to indicate the amount of compression being applied when the METER switch is in the GR position.

When no gain reduction is being applied, **all LED's are lit** on the Gain Reduction meter (GR). When compression occurs, the corresponding LED's extinguish to indicate the amount of gain reduction. The following gain reduction increments are provided:

- -1.5 dB
- -4 dB
- -6 dB
- -8 dB
- -10 dB
- -12 dB
- -15 dB
- -17 dB
- -19 dB
- -23 dB



# API 527 Compressor

## METERING - Output Level



An **OUT**put level meter is provided to indicate the 527's output in VU when the METER switch is in the VU position.

The audio output increments provided are:

- +3 dB
- +2 dB
- +1 dB
- 0 dB **Note:** 0Vu = +4dBu
- -1 dB
- -3 dB
- -5 dB
- -7 dB
- -10 dB
- -20 dB

In addition, a PEAK (OV) LED is provided that will illuminate at +27 dBu.



## LINK



LINK: The LINK switch activates the DC control voltage summing with other units.

### IMPORTANT NOTE!

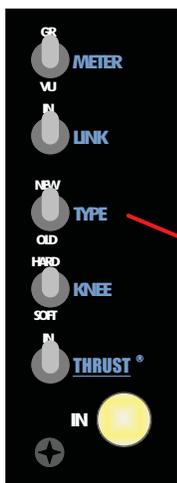
The Link function of the 527 does **NOT** operate as other master/slave linked compressor pairs do, where the master unit's controls become the master control for both units while the slave unit's controls are disabled.

Instead, when each of the 527s' Link switches are pressed, they will contribute their control signals to be **SUMMED** into the common Link bus and each of their front panel controls will affect the compression of any other linked 527's audio signal. Units that have the link switch in the OUT position are unaffected. Setting the Link switch to the "IN" position connects the 527's compression DC side chain circuitry to a DC summing bus on the 500 series module motherboard. This allows for any number of 527 compressors to "LINK" their side chain signals into a common control bus for tasks such as maintaining stereo image or surround image during compression, or affecting one audio signal with another's dynamic characteristics. Front panel controls that affect the DC side chain signal (and therefore the compression parameters of ALL linked units), include the Threshold, Attack, Release, Hard/Soft, New/Old, Thrust and Ratio controls. Adjusting **ANY** of these controls will affect the signal that will be sent out and summed with the Link switch, and the dynamics that affect all linked 527's.

The DC link bus exists in the Luchbox and is tied from channel to channel with zero ohm jumpers that can be clipped out if desired, to limit the ability to link channels. The 500V rack and 1608 console have solder pads that one can connect with insulated wire to create the DC Link bus.

# API 527 Compressor

## COMPRESSION TYPE



The 527 Compressor can be set to operate in two circuit topologies:

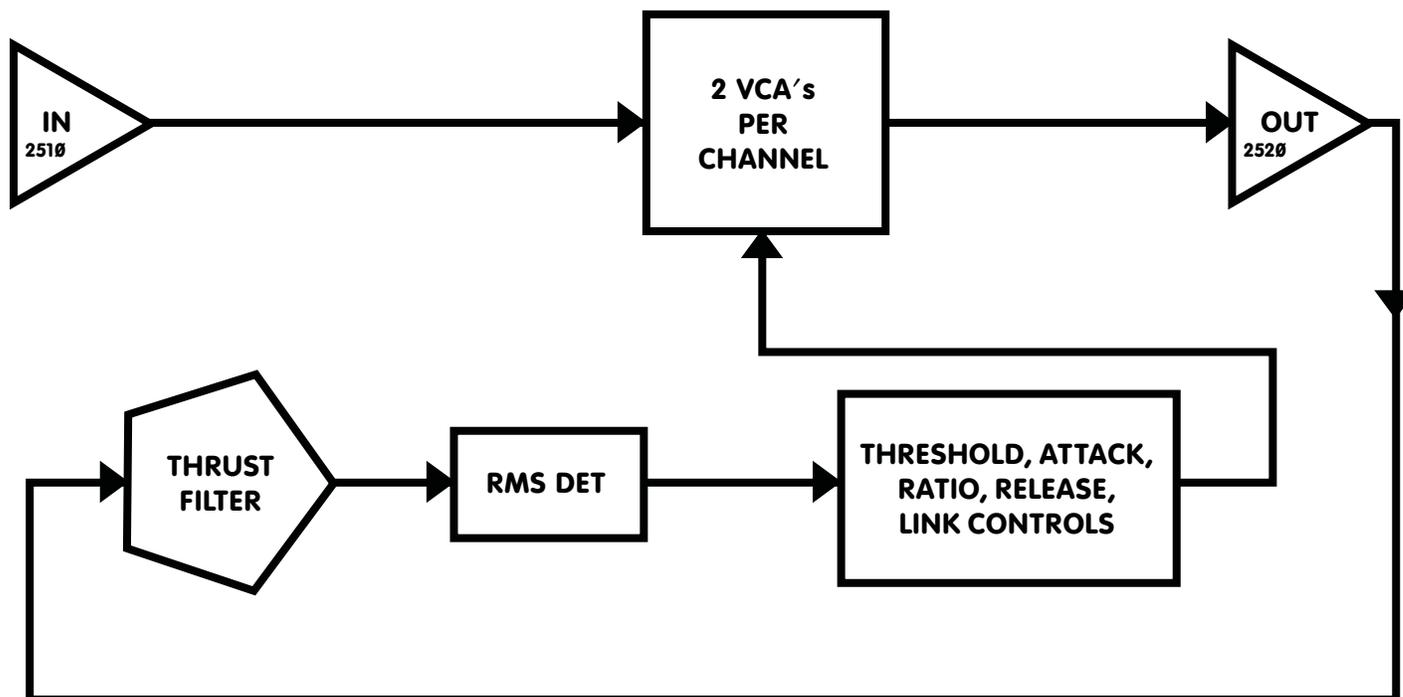
- OLD: Feed-Back topology: The RMS detector receives the signal from after the VCA
- NEW: Feed-Forward topology: The RMS detector receives the signal from before the VCA

The compressor circuit topology is selected using the TYPE switch.

## OLD: Feed-Back Compression

In a feed-back compressor, the RMS detector gets its signal from the output of the gain reduction device (VCA). This is how older API 525, 1176 type, and 660 type compressors work. This yields a smoother, softer, more transparent sound.

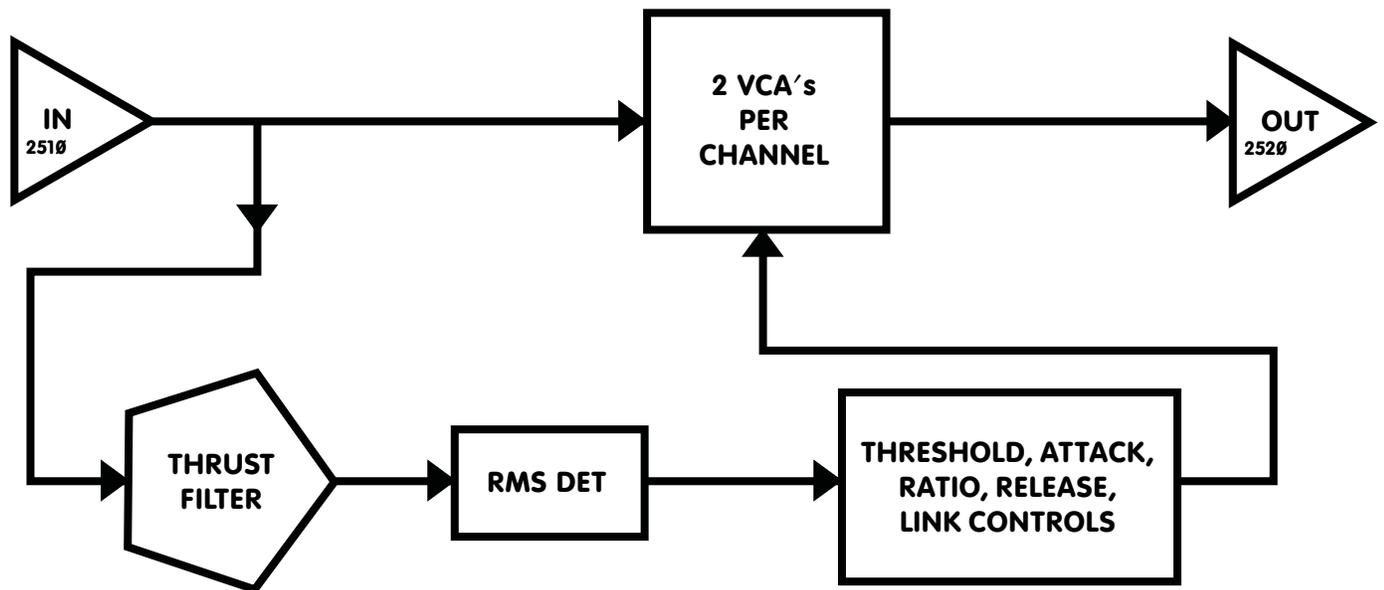
### **"OLD" or FEED BACK type COMPRESSION**



## NEW: Feed-Forward Compression

In a feed-forward compressor, the RMS detector normally gets its signal from a split of the input signal. With this method, the RMS detector sends a signal to the VCA that is an exact ratio of the desired compression set by the RATIO control. This is how many new VCA based compressors work. This can yield more aggressive compression and a harder, more affected sound.

### "NEW" or FEED FORWARD type COMPRESSION



## KNEE



Knee determines the 527 Compressor's response curve at the onset of compression.

The 527 Compressor has two (2) knee settings that control how the compressor transitions into compression:

SOFT: Rounded response curve

HARD: Sharp response curve

The knee of the compressor is selected using the KNEE switch.

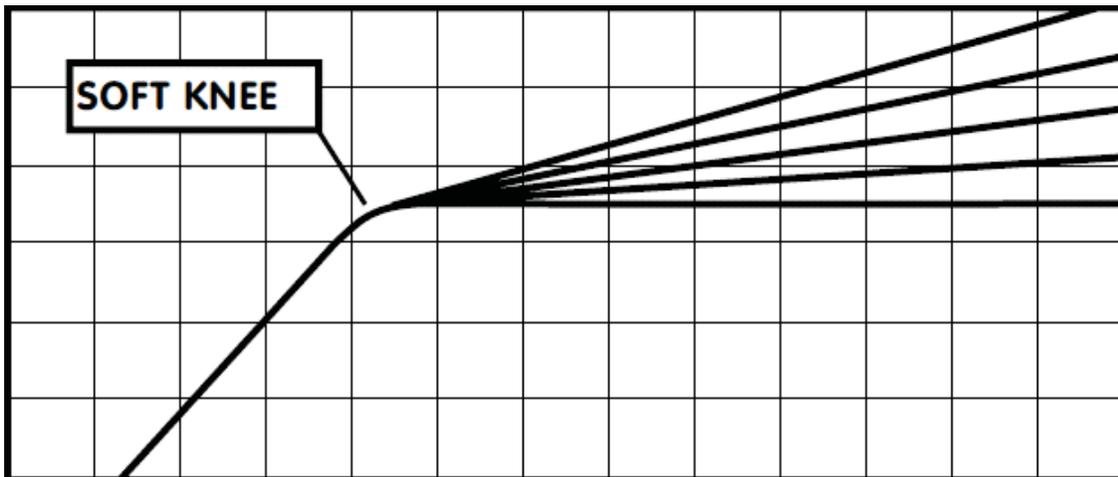
# API 527 Compressor

## KNEE

### Soft Knee Compression

SOFT: Rounded response curve

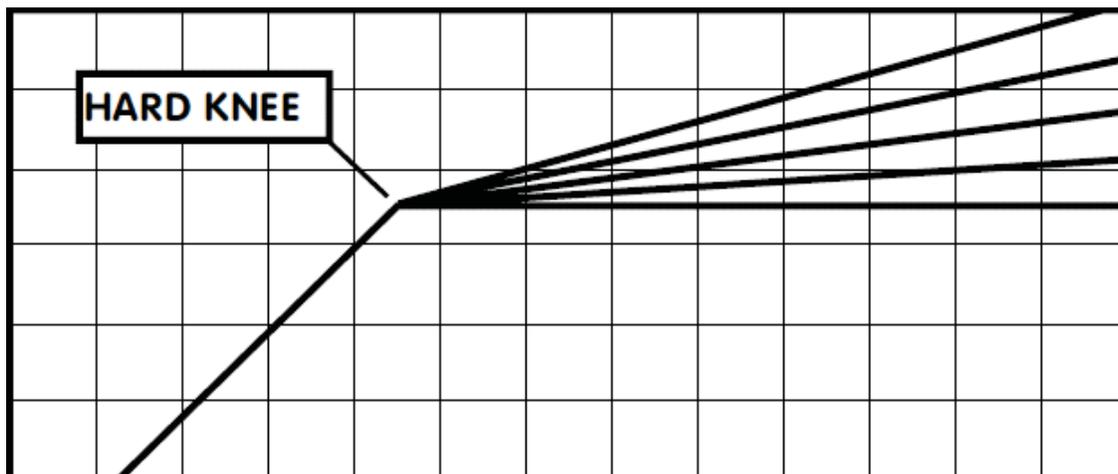
- Gradual onset of compression (fade-in up to the set ratio)
- Similar to an "over-easy" type knee
- Generally considered more transparent



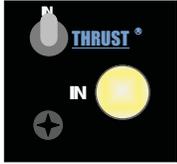
### Hard Knee Compression

HARD: Sharp response curve

- Immediate onset of compression (sudden transition to set ratio)
- More aggressive and noticeable

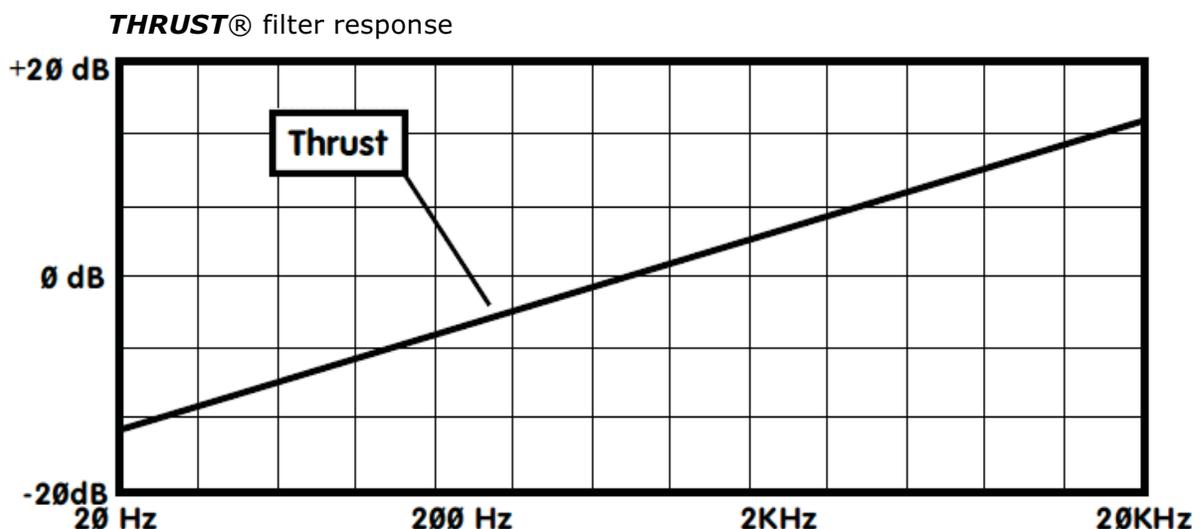


## **THRUST**®



The 527 Compressor includes API's patented **THRUST**® circuit that can be switched in or out as needed. This places the **THRUST**® filter before the RMS detector that decreases the compressor's reaction to low frequency content. The result is a noticeable increase of punch and low frequencies, but a uniformly compressed signal. It's the "little more punch" switch!

The patented **THRUST**® circuit has been used for many years in the famed API 2500 Stereo Compressor, ATI Paragon and Paragon II consoles, as well as the Pro-6 Input Strip. This circuit places a filter in front of the RMS detector with a slope of 10dB per decade (-3dB/8va), which is the inverse of the pink noise energy curve. In acoustics, the pink noise curve is used to equalize energy vs. frequency over the audio spectrum, as sound requires more low frequency energy than high frequency energy to sound correct to your ear. In Hi-fi equipment, a "LOUDNESS" contour is used to equalize the music at lower levels so it sounds correct. Even with this curve, there is still a substantial amount of low frequency information compared to high frequency information in the audio signal path. When that signal is fed into the RMS detector, the detector will process the signal into a DC control voltage based upon the those louder low frequencies, resulting in a control voltage that favors the low frequencies of the signal, causing pumping and a loss of punch. Sometimes, this is not desirable. By engaging the **THRUST**® switch, this inverse filter is placed in front of the RMS detector, evening out the energy by lowering the energy in the low frequencies and increasing the energy in the high frequencies, so each octave has the same energy instead of each octave having half the energy as the one lower. This creates a unique compression effect that still reduces the overall gain, but the sound is much more punchy and the signal actually sounds less compressed.



# API 527 Compressor

## IN/OUT Switch



IN: The In/OUT switch inserts or removes the 527 from the audio path via a relay bypass. When the switch is in the OUT position, a relay connects the audio Input to the Output – completely removing the 527 from the audio chain.

## **SPECIFICATIONS**

Input Impedance: High Level In 160K ohms  
Low Level In: 80K ohms  
Output Impedance: High Level Out 85 ohms  
Low Level Out: 50 ohms  
Nominal Operating Level: -2dBu or +4dBu  
Maximum Input Level: +26dBu  
Maximum Output Level: +26dBu  
Output Fader Control Gain: -Infinity to +10dB  
Attack Times: 1 millisecond to 25 milliseconds (typical)  
Release Times: 0.3 seconds to 3 seconds (typical)  
Compression Ratios: 1:1 to 1:Infinity  
Threshold Control Range: +10dBu to -20dBu

### Metering:

10 RED LED VU scale: -20VU to +3VU (positive illumination indicator)  
RED GR scale: -1.5dB to -23dB (negative illumination indicator)  
RED Overload LED: +27dBu (clipping)

THRUST® Filter Action: -10dB/Decade slope, unity @ 1kHz  
Frequency Response: +/- 1dB 20Hz - 20kHz  
Total Harmonic Distortion: < .2% THD, any level below clipping, any comp. setting  
Signal to Noise: Unweighted -100dB below clipping  
(+26dBu@0.1% distortion, no compression)

Power Requirements: +/- 15-18VDC @130mA

Conforms to Automated Processes, Inc. VPR Alliance size and connectorization layout specifications. This unit is made to install into the 500 Series frame VPR rack, lunchbox®, or any API console with 500 series slots.

Size: 1.5" X 5.25" X 7.5" Deep  
Size (Boxed for Shipping): 4.5" X 6.5" X 10"  
Actual Weight: 1.75 lbs.  
Shipping Weight: 2.15 lbs.



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