Groove Tubes™

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Vipre™

Variable
Impedance
Preamp

Vipre

White Paper

The benefits of variable impedance,
rise-times and component-level engineering

GROOVE TUBES CUSTOM SHOP PRODUCTS

GROOVE TUBES LLC

The Groove Tubes Vipre

A general description

The Groove Tubes Vipre is an all-tube, variable-impedance microphone preamplifier with selectable rise-time and VU meter ranges. It features extremely high bandwidth, low inter-stage feedback, very high gain, enormous dynamic range and graceful overload characteristics.

- All-tube audio path – NO semiconductors, transistors, ICs or electrolytic caps anywhere in the signal path.
- Eight Groove Tube compliment:
  4 x 6922 (6DJ8) – preamp and rise-time circuitry
  1 x 12AT7 – output driver and rise-time circuitry
  1 x GT6205 – instrument input preamplification
  2 x 6AQ5 – Class A push/pull output
- Switch-selectable fully-floating differential input and fully-floating differential output.
- Switch-selectable variable-impedance input, stepped between 300-, 600-, 1200- and 2400-ohm taps off high-performance, custom-wound input transformers.
- Switch-selectable rise-times.
- Precise and repeatable gain settings, in 5dB and 1dB increments from 15dB to 75dB.
- Precision audio metering facilities with expanded and peak views on a true VU meter.
- Robust one watt (+30dBm) output.
- Massive energy storage (>60 joules) in the high-tension power supply.
- DC-to-daylight bandwidth (4Hz >100kHz).
- Hand-wired point-to-point connections using highest possible quality components and wires.
- Custom-built ceramic deck attenuators.
- Superior and stable audio performance under the widest range of preamplifier applications.
- Classic design – inside and out.

Multiple personalities

Experienced recordists know about the wide variety of sound character and “personality” found in the critical selection of both microphones and preamps.

Many recording facilities own large assortments of mics and preamps in order to be better prepared for the needs of various artists and groups. And for good reason. The more tonal variations a facility can provide, the more diverse and desirable their clientele. The choice of microphone and preamp are primarily responsible for these variations.

Experience has shown that most of these sonic differences can be attributed to slight variations in equalization, speed of response, available bandwidth and residual distortion. These changes have, until now, been addressed in quite heavy-handed ways, such as providing EQ in a preamplifer, or resorting to ‘tube distortion’ as a desired effect. The Groove Tubes Vipre, however, provides an unparalleled means of controlling the interaction and responsiveness of both the microphone and preamp.

Ohm-mazing discoveries!

Early in the annals of professional audio, microphones and microphone preamplifiers were often made by the same company, and the output and input impedance between the mic and preamp were matched to provide the best possible audio quality. Those days are long gone now, and most condenser microphones send a 200-250-ohm load into an input about ten times the impedance – roughly 2000-3000 ohms.

Altering the load against which the microphone has to push fundamentally alters the tone and character of the output signal.

At the core of the Vipre is a multi-tap high-performance input transformer, with four distinct positions: 300-, 600-, 1200- and 2400-ohms. This changes the working impedance or loading of a given microphone and can strongly influence the sound qualities by the cumulative effects of small differences.

These differences vary from microphone to microphone, but all mics respond quite audibly when the preamplifier input impedance is altered. This control feature opens a much larger sonic window to each microphone, and provides the ability to magnify certain attractive tonal shifts in the way it responds to impedance changes.

Vintage microphones are especially sensitive to load terminations, as impedance matching was the norm in early broadcast and recording facilities.

Ribbon microphones, for example, are sought after for their smooth tonal properties. When properly terminated or loaded with 300-ohms, the tonal characteristics change, and the sound seems to "bloom" in a way most people have never heard.

The equalization changes slightly as well, with the entire spectrum from about 100Hz to 15kHz taking on a very slight tilt, typically around -1dB at the low end, and around +1dB at the upper registers. Very slight when looking at individual frequencies, but the cumulative effect over the whole spectrum is unmistakable.

This kind of variation would be almost impossible to recreate with any kind of equalizer, unless the principle of a simple, uncluttered signal path is abandoned altogether.

Moreover, a balanced-bridged or transformerless input is provided, bypassing the variable-impedance input transformer altogether for a completely different sonic character.

An instrument input is also provided on the front panel for easy access, and can be padded by -20dB to accommodate the stronger output signals from active instrument electronics.

Slow – curves ahead

By providing a rise-time control, the recording engineer has the ability to slow down the signal path electronics as he sees fit. FAST preserves the full percussive and forward qualities of the source, while SLOW helps tame overly aggressive sound qualities and "rounds out" or "smooths" the material.

No less than five distinct rise-time settings ranging from a quick six volts per microsecond, to a tame .75 volts per microsecond (reminiscent of more classic preamps) are instantly available from any input selected.

While subtle, these settings can significantly influence the tonal characteristics of the recording.

All-tube – not "also-tube"

Only a few of the mic preamplifiers on the market today can be described as all-tube from input to output. Cost constraints almost invariably lead to hybridized designs and certain sonic compromises.

However, experience has shown that a low-parts-count simple circuit can produce sonically pleasing results. Creating a symmetrically arranged mirror-image circuit configuration further enhances this uncomplicated approach.

By employing a fully-differential, Class A push/pull design, the Vipre keeps its inherently simple circuit philosophy and performance while significantly increasing signal-to-noise ratio and dynamic range.

This approach both reduces power supply induced noise and lowers distortion. The result is a microphone preamplifier which has "DC-to-daylight" performance characteristics – with the ability to convey great detail while remaining nearly free of typically unwanted sonic imprints.

No pain in the gain

In order to maintain a fully floated and balanced signal path throughout the entire circuit, there are no potentiometers on the front panel. Instead, gain controls consist of ceramic deck rotary switch assemblies arranged for discrete step attenuation, providing repeatability, economy, ultra-wide control range and superior accuracy.

The Vipre's step attenuators are built to have greater than 1.0% interstage matching at any and all chosen settings, and extra effort has been expended to frequency-compensate the 5dB coarse gain attenuator, eliminating the typical bandwidth-robbing effects of parasitic circuit and wiring capacitance.

The Groove Tubes Vipre boasts an impressive 75dB of available gain, with 5dB COARSE (20dB to 70dB) and 1dB FINE (+/- 5dB, centered at 0) step attenuators. These very-high-accuracy step attenuators preserve the balanced integrity of the signal path, which ultimately translates to better noise, distortion and dynamic range specifications.

A preamp with a VU

To watch over all of this signal manipulation capability, the Vipre has been fitted with a genuine VU meter for signal observation.

The VU meter has been in use for over 60 years, and has that “old comfortable pair of shoes” feel for many users. However, its principal limitation has been its inability to show any signal information below -20dB, and the deleterious effects of placing a rectifier feeding a meter movement across the output signal line.

Both of these obstacles have been overcome by the employment of an amplified VU meter driver circuit, with five separate types of VU response.

In addition to the standard view of -20dB to +4dB, the meter driver gives the user the ability to switch to an "expanded view," allowing for -60dB to +9dB response.

Three additional settings place 0dB VU at +10dB, +20dB and +30dB, giving more of a “peak response” for higher gain applications. These custom settings provide metering far beyond a conventional VU, allowing observation of weak acoustic signals (such as traffic or air conditioning rumble) to be spotted and eliminated before recording.

Caution! High voltage!

The use of high voltage at high speed is pushed to full advantage in the Vipre amplifier stages. Equivalent input noise is below -129dBm (“A”-weighted, 600-ohm input shorted), while maximum output level at onset of soft clipping is +30dBm (one watt into 600 ohms). Clipping is noted by two lamps just below the VU meter, amber at -3dB below clipping, and red upon CLIP.

In the unlikely event that the Vipre should be driven into clipping, its onset is slow and the characteristics are soft. Low feedback amp stages keep clipping recovery times short, as there is very little loss-of-feedback overdrive induced by soft clipping at any given stage.

Furthermore, the clipping maintains its moderate behavior due to all gain stages operating in push/pull Class A mode. The sum of the bias and audio currents that flow though each push-pull stage is held constant at all times. None of the audio currents can escape, meaning the balanced design is free from undesirable bilateral interaction with other stages or the power supply.

Presiding over the delivery of energy to the Groove Tubes Vipre's circuitry is the power supply. Often an afterthought in audio equipment, the Vipre's power supply is designed with massive energy storage in mind. Over 60 joules of energy reserve ensure that the high-level stages get adequate power, while filtering rectifier hum down to inaudible levels.

Note that most 100-watt hi-fi stereo power amplifiers have less energy storage than does the one-watt-output Vipre. This high energy reserve gives an unshakeable foundation to the low-frequency end of the audio spectrum, while keeping the supply design very simple and robust – and far less costly and complicated than an actively regulated power supply.

Other goodies

The Groove Tubes Vipre also features accoutrements and ergonomic touches like polarity reverse – a true high-pass filter (which gently reduces gain below 100Hz at 4dB per octave, rather than a harsh 12dB curve often used for low cut) – +48V phantom power – a relayed mute switch for silent starts and mic changes – a B+ standby switch – and ample lamps for status reading even in dimly-lit studio environments.

The classic knobs and vintage appearance further underscore the Vipre's design as a deliberate throwback to the days when the focus was on quality of operation, durability and functionality.

It’s like having 50 of the world’s finest all-tube preamps...

With three distinct audio inputs (XLR, TRS and instrument), four impedance selections, a transformerless bridging input setting, and five rise-time variations, the Vipre can be set for over 50 different tonal variations - all without ever requiring EQ or other signal-degrading devices to achieve them.

Imagine having 50 of the world's finest ALL-TUBE preamplifiers available to you at any time, all in one unit!

For the discriminating collector of microphones, or the serious recordist, the Groove Tubes Vipre represents huge leaps in subtle tonal sculpturing based on proven, accepted and reliable methods - all without resorting to electronic trickery.

Technology that won't go out-of-date

Moreover, the Vipre is mature technology, meaning that its design will never be outdated as the digital format wars rage on.

No matter what the industry accepts as the next recording standard in the next five, 10 or 20 years, rest assured Vipre will remain as a functional analog anachronism in the digital age.

Groove Tubes Vipre

Tech specs

Rear panel inputs

XLR In – Balanced
600 ohms +8dBm max in

XLR TRS – Balanced
Nominal 25K +28dBm max in

Front panel instrument input

XLR – Unbalanced
47K
200mv at +75 dB gain (max gain)

Rear panel outputs

XLR Out – Balanced
600 ohms +30 dBM, 1khz max

XLR TRS – Balanced
600 ohms +30dBM

RCA
-10dbV = +4dBM at XLR Out
1K ohms

Distortion – THD at 1kHz

Input with transformer at +4dBM
output at XLR
<.025% at 45dB gain

Equivalent input noise (EIN)

-129dBu
(600-ohm source, "A"-weighted)

Frequency response

4Hz - >100kHz
(-1.5dB at 100kHz)

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