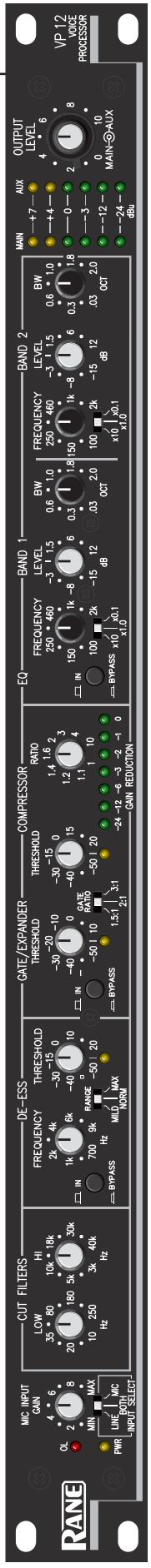
VP 12

VOICE PROCESSOR



IMPORTANT SAFETY INSTRUCTIONS

For the continued safety of yourself and others we recommend that you read the following safety and installation instructions. Keep this document in a safe location for future reference. Please heed all warnings and follow all instructions.

Do ***not*** use this equipment in a location where it might become wet. Clean only with a damp cloth.

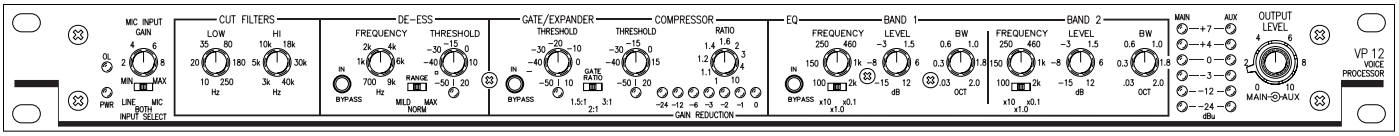
This equipment may be installed in an industry standard equipment rack. We recommend that all mounting holes be used, providing the best physical support. The equipment may be used as a table top device, although stacking of the equipment is dangerous and not recommended.

Do not directly block any of the ventilation openings. If rackmounting, please provide adequate ventilation. Equipment may be located directly above or below this unit, but note that some equipment (like large power amplifiers) may cause an unacceptable amount of hum or may generate too much heat and degrade the performance of this equipment.

Protect the power cord and plug from damage caused by being walked on or pinched. Protect the line cord, where it exits the unit, from excessive strain. Only use attachments and accessories specified by Rane.

Unplug this equipment during lightning storms or when unused for long periods of time.

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 damage, spilled liquid, fallen objects into an opened chassis, exposure to rain or moisture, a dropped unit, or abnormal operation.



QUICK START

Even if you don't like to read manuals, read this part. We'll make it quick and painless. We promise.

Turn down (fully counterclockwise) the **MIC INPUT GAIN** and both **MAIN** and **AUX OUTPUT LEVEL** controls. Set the **LOW CUT FILTER** to **10** (fully CCW) and the **HI CUT FILTER** to **40k** (fully CW). Depress all **BYPASS** switches on the front panel.

If you are using a mic, connect it to the **MIC IN** jack located on the rear of the unit. If your mic requires phantom power, press the rear panel **48V PHANTOM POWER** switch. If you are using a line level source (like the output of a wireless mic receiver), connect its output to either the ¼" TRS jack or the screw terminals located on the rear of the unit labeled **LINE/ EXPAND IN**. Leave all jumpers located on the long screw terminal patch strip in the original factory shipped position. These positions guarantee you access to all the features of the VP 12.

Connect the Outputs of the VP 12 to your mixer board or recorder. The switch located directly next to the XLR **MAIN OUT** jack converts the **MAIN OUTs** to either a **MIC** or **LINE** level output, depending on your driving requirements. The **AUX OUT** of the VP 12 is only *line level*.

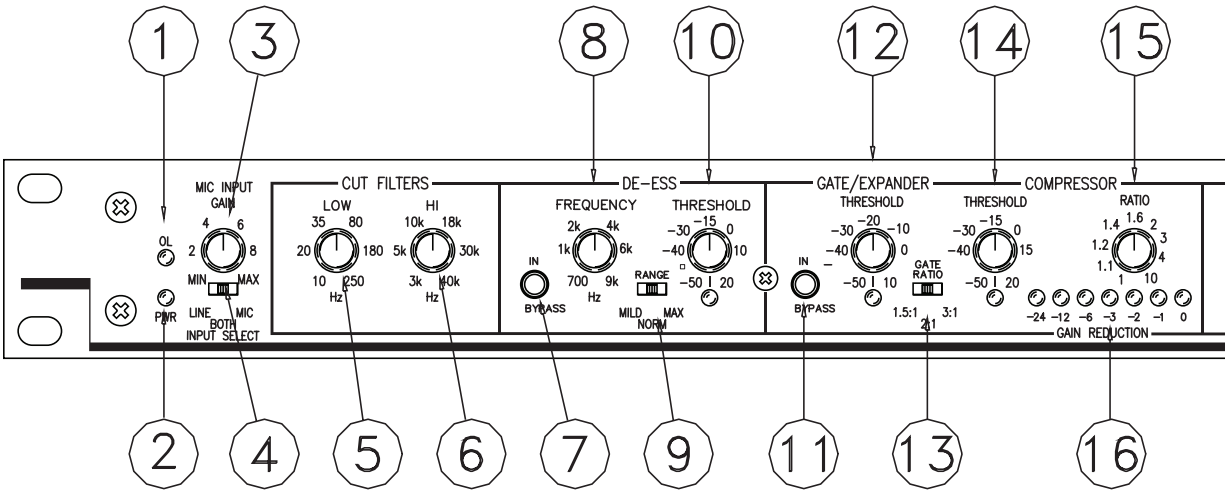
Plug the included power supply (see italics below) into the VP 12. The yellow **PWR** LED will illuminate if all is well. Now warn everyone else around, and yell into your mic the loudest sound you expect during your session or performance. While doing this adjust the **INPUT GAIN** control so that the loudest sounds will occasionally illuminate the **OL** LED. If you are using the **LINE IN**, adjust the output level of the previous device to occasionally illuminate the **OL** LED of the VP 12 when the loudest signal you expect to hear is present.

Adjust the VP 12 **OUTPUT LEVEL** controls to match the device you are driving. Now taking one processing section at a time, release its **BYPASS** switch and adjust the processing controls. Any number of processing sections may be **IN** or **BYPASSED** to isolate different parameters. For details on setting these properly see **OPERATING INSTRUCTIONS** on the last two pages.

Never connect anything except an approved Rane power supply to the thing that looks like a telephone jack on the rear of the VP 12. This is an AC input and requires special attention if you do not have an operational power supply EXACTLY like the one originally packed with your unit.

WEAR PARTS: This product contains no wear parts.

FRONT PANEL DESCRIPTION



① **OL (overload) indicator LED.** Illuminates (red) any time the signal is within 4 dB of overloading. Five locations are monitored. See the block diagram with the schematics elsewhere in this manual.

② **PWR (power) indicator LED.** Illuminates (yellow) when power is connected. Use only an approved RANE AC remote supply such as an RS 1 (included) or RAP 10.

③ **MIC INPUT GAIN control.** Increases mic input gain as it is rotated clockwise. It's range is 15 dB of gain at full CCW rotation to 60 dB at full CW rotation.

④ **MIC INPUT SELECT switch.** In the LINE position, the signal entering LINE/EXPAND IN is active. In the MIC position the signal entering the MIC IN is active. In the BOTH position both LINE and MIC signals are summed together. Level matching between LINE and MIC signals must be done *externally* in the SUM BOTH position.

⑤ **LOW CUT filter.** Defines the low cut-off frequency. In the full CCW position the LOW CUT filter is essentially out of the signal path.

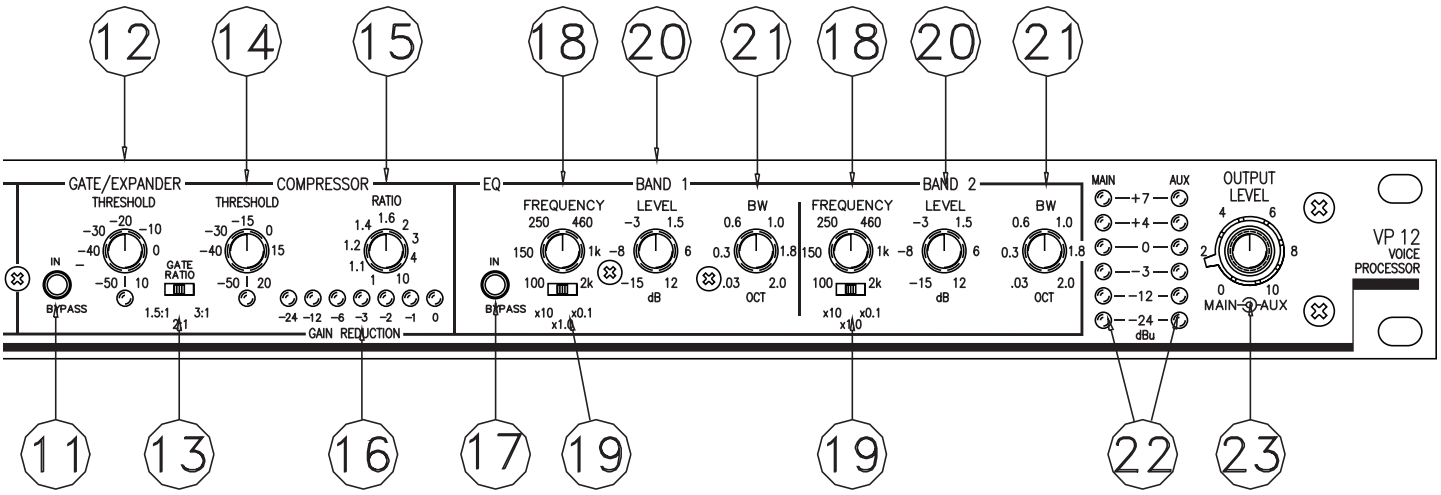
⑥ **HI CUT filter.** This control defines the high cut-off frequency. In the full CW position the HI CUT filter is essentially out of the signal path.

⑦ **DE-ESS BYPASS switch.** When this switch is *in* the DE-ESS function of the VP 12 is not functional and the DE-ESS controls will do nothing. DE-ESS is active in the *out* position.

⑧ **DE-ESS FREQUENCY.** This control determines the range of frequency that the DE-ESS circuit is sensitive to. In practice it is best to set this to the highest frequency that will provide the amount of DE-ESSING you require and no lower. The lower the frequency setting the less transparent the DE-ESSING function becomes.

⑨ **DE-ESS RATIO**. This three-position switch determines the rate at which the DE-ESS filter responds to expected sibilance. The NORM setting is best for most situations.

⑩ **DE-ESS THRESHOLD control and LED.** This control sets the signal level in dBu above which the DE-ESS function becomes active. When the LED is lit, the threshold has been exceeded and the DE-ESSER is doing its thing.



⑪ **GATE/EXPANDER and COMPRESSOR BYPASS switch.** When this switch is *in* the GATE/EXPANDER and COMPRESSOR functions are inactive and the corresponding controls do nothing. With the switch in the *out* position these circuits are active.

⑫ **GATE/EXPANDER THRESHOLD control and LED.** This sets the input level below which the GATE/EXPANDER function operates. The LED illuminates any time the signal falls below the threshold set by the control.

⑬ **GATE RATIO switch.** This switch determines the ratio to be applied to the GATE/EXPANDER function. Higher ratios mean steeper drop-off slopes, lower ratios are usually more transparent.

⑭ **COMPRESSOR THRESHOLD control and LED.** This determines the input level above which the compressor functions. Full CW rotation disables the COMPRESSOR entirely.This LED illuminates any time the signal exceeds the threshold set by the control.

⑮ **COMPRESSOR RATIO control.** This determines the slope of compression once the threshold has been exceeded. Full CCW rotation effectively disables the compressor.

⑯ **GAIN REDUCTION METER.** This seven-segment meter indicates the amount of signal reduction, below unity, applied to the audio signal by both the GATE/EXPANDER and COMPRESSOR. The GATE/EXPANDER & COMPRESSOR BYPASS switch has no effect on this meter, as it still shows gain reduction at current settings.

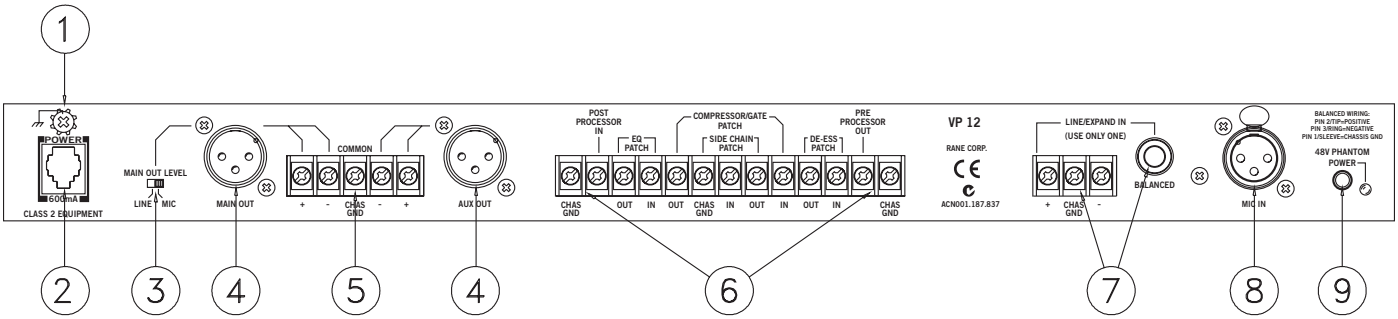
⑰ **EQ bypass switch.** When this switch is *in,* the EQ section is not functional and the corresponding controls do nothing. In the *out* position the EQ is active.

⑱ **EQ FREQUENCY control.** This determines the center frequency of the bandpass equalizer.

⑲ **EQ FREQUENCY RANGE switch.** This is a multiplier for the EQ FREQUENCY control. This allows each EQ to cover the full audio range and still provide excellent resolution with a single EQ FREQUENCY control.

⑳ **EQ LEVEL control.** This determines the amount of boost or cut applied to the audio signal. When this control is in the center detent, this band of EQ is has no effect on the signal path. When this control is in grounded center detent, the band of the EQ is out of the circuit.

REAR PANEL DESCRIPTION



① **GROUND connector.** Since the VP 12 is powered from a remote AC supply which does not carry chassis ground through to the grounding pin of the AC line cord, this screw has been provided in case your system does not have another earth grounding means such as through rack rails, etc. Its use or disuse should be determined by your specific application.

② **REMOTE AC POWER input.** The VP 12 is supplied from the factory with a Model RS 1 Remote Power Supply suitable for connection to this input jack. The power requirements of the VP 12 call for an 18-24 volt AC center-tapped transformer only. *This is not a telephone jack. Never use a power supply with your VP 12 other than the one supplied or an exact replacement obtained from or approved by Rane Corporation.* Using any other type of supply may damage the unit and void the warranty. Two years parts and labor is worth safeguarding, don't you think? A three year warranty is available by completing and mailing in the warranty card, before something goes wrong.

③ **MAIN OUT LEVEL switch.** Sets the output level for the MAIN output, LINE or MIC level.

④ **MAIN and AUX OUTPUT XLR jacks.** Are fully balanced outputs, controlled by the front panel OUTPUT LEVEL. Pin 2 is positive, pin 3 is negative and pin 1 is chassis ground. When driving high impedance loads, both screw terminals and XLR jacks can be used at the same time.

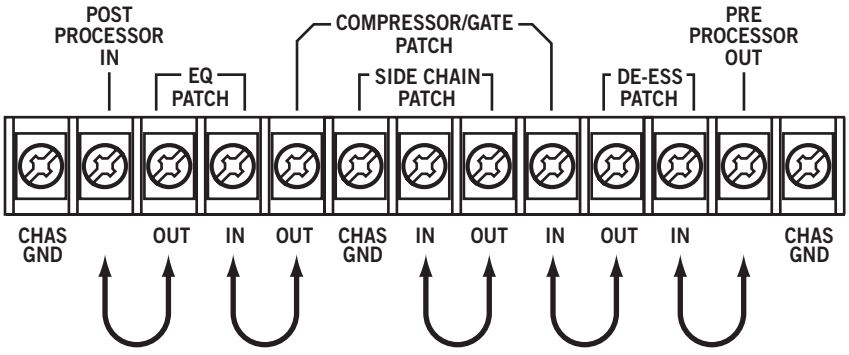
⑤ **MAIN and AUX screw terminal outputs.** Deliver the same outputs as the XLR connectors above.

⑥ **Screw terminal patch strip.** Configured from the factory with all functions active, in the same order as the front panel. These terminals allow the disabling or re-arranging of functions. This also allows a function block, such as the EQ, to patch into and out of the VP 12 to an external processor or mixing channel. The factory jumper positions are illustrated below.

⑦ **LINE/EXPAND IN screw terminals and ¼" TRS jack.** This is a line level balanced input. Tip is positive, ring is negative and sleeve is chassis ground. *Do not* use both screw terminals and the ¼" TRS jack simultaneously. They do not sum.

⑧ **MIC input.** A fully balanced Mic level input. Pin 2 is positive, pin 3 is negative and pin 1 is chassis ground.

⑨ **48V PHANTOM POWER switch and LED.** When this switch is *in*, 48 VDC is fed to the MIC IN jack and the LED is lit.



VP 12 Factory Jumper Positions

VP 12 CONNECTION

When connecting the VP 12 to other components in your system *leave the power supply for last.* This gives you a chance to make mistakes and correct them before any damage is done to your fragile speakers and nerves.

The MIC input of the VP 12 is balanced and accepts a standard XLR cable from the MIC of your choice. As with all Rane products and AES standards, pin 2 is used for "hot" or "+" polarity, pin 3 is "return" or "–" and pin 1 is chassis ground. If you are not using PHANTOM POWER you may use either pin 1 or case for shield ground on the VP 12 input. However, if you are using PHANTOM POWER, pin 1 must be shield grounded to provide a complete electrical circuit.

The LINE/EXPAND input of the VP 12 is also balanced, as a TRS jack or screw terminals. Choose one, these do not sum. The tip is "+", the ring is "–", and the sleeve is chassis ground. Unbalanced wiring such as a standard ¼" TS plug may also work, but with possible compromises in level adjustments.

Outputs on the VP 12 are fully balanced. As expected, pin 2 is "hot" or "+", pin 3 is "return" or "–" and pin 1 is chassis ground. If unbalanced operation is required then simply connect to the "+" and ground connections on the screw terminals, or leave pin 3 unconnected on the XLR output connectors.

Refer to the RaneNote "Sound System Interconnection" included with this manual for further information on wiring.

OPERATING INSTRUCTIONS

As with any piece of gear that includes this many features, you can quite easily mess up the sound that you really meant to improve. The features of the VP 12 are arranged in an order from the factory, if followed, can make setting up properly an easy operation. It is easier to start with all BYPASS switches in the *in* position, and add one process at a time. If a particular processing section does nothing to improve the sound, BYPASS it!

INPUT SECTION

If you are using the MIC input only, set the front panel switch to the MIC position. When setting up the MIC input section, always take as much gain as possible right at the input. Therefore, the highest level audio from the MIC INPUT should just barely light the OL LED. We call this tickling the overload. This may be illegal in your jurisdiction so please check your local authorities. If only the LINE/EXPAND input is to be used, set the front panel switch to LINE. Adjust the output level on the previous device to just light the OL LED of the VP 12 when receiving the largest signal you expect. Make sure that the previous device is not being overloaded by checking its OL sensor. To use both the MIC input and LINE/EXPAND input, set up each input as described above, then set the INPUT SELECT switch to sum BOTH. Verify no OL condition exists with the loudest signal fed to both inputs simultaneously.

CUT FILTERS

Cut filters can improve the signal to noise performance of your equipment. For example, rolling off some of the low end by adjusting the LOW CUT FILTER gets rid of the noise caused by wind blowing across your MIC. Or if previous equipment is less than perfect when it comes to high frequency hiss, roll it off by adjusting the HI CUT FILTER.

DE-ESSER

The DE-ESSER can be somewhat tricky to set up but here are some helpful hints. The DE-ESSER can be set for multiple people with moderate control, or if one person **sp**eak**s** with **s**ome na**st**y **s**ibilan**c**e, the DE-ESSER offers even more control. To get started, set the DE-ESSER controls for a frequency of 6 kHz, RATIO of NORM, and a THRESHOLD of -30. Make sure the BYPASS switch is *out*. Now speak the sibilance mantra, "Silly Sally (or Sam depending on your gender bias) sells sea shells by the sea shore", into the mic. While saying this (over and over until those listening make terrible threats) look at the front of the VP 12 and monitor the DE-ESS THRESHOLD LED. The DE-ESSER does nothing until that LED lights up. Notice the sound quality coming out of your system when the LED is on. Your mission is to adjust the controls so that sibilance is controlled, but does not degrade the sound quality. All frequencies above the setting on the FREQUENCY control are being level monitored. A setting of 9 kHz is for very light DE-ESSING, 700 Hz is for extreme DE-ESSING. The RATIO switch sets the amount of band limiting for a given signal level above the threshold. The THRESHOLD control establishes the signal level point that must be exceeded before DE-ESSING occurs. A setting of 20 defeats the DE-ESSING function.

GATE/EXPANDER and COMPRESSOR

A noise GATE (sometimes referred to as a downward expander) extends the dynamic range of the signal by effectively lowering the noise floor. All signals that are lower in level than the setting on the GATE/EXPANDER THRESHOLD control are attenutated at the selected ratio. When the RATIO switch is set for 1.5:1, a 1 dB reduction in input level results in a 1.5 dB reduction in output level. For a 2:1 setting, a the same 1 dB input level reduction results in a 2 dB reduction in output level.

A good place to start with the GATE/EXPANDER is to insure the BYPASS switch is *out*. Set the THRESHOLD control to about -40 and the ratio to 1.5:1. Now apply the smallest signal that you want to be processed by subsequent stages. An example would be to talk softly into the MIC input. While talking, notice that the THRESHOLD LED goes off and the GAIN REDUCTION METER shows no gain reduction — this is good. If the threshold LED stays on when talking softly, then turn the THRESHOLD control CCW. The THRESHOLD control is properly set when the lowest level signal to process makes the THRESHOLD LED go *off,* and when that low signal is removed the THRESHOLD LED comes back *on,* and the GAIN REDUCTION meter shows gain reduction. Set the GATE RATIO switch for the lowest ratio that provides the amount of control desired. A setting of 1.5:1 allows for gentle gain reduction below the threshold while a setting of 3:1 is more detectable. For minimum effect set the GATE RATIO switch to 1.5:1 and set the THRESHOLD for -50.

The Compressor is familiar to anyone who has used Rane's darn cool DC 24 DYNAMIC CONTROLLER. While the GATE/EXPANDER controls those signals lower in level than your threshold setting, the COMPRESSOR controls those signals above your COMPRESSOR THRESHOLD setting. Once again, make sure that the BYPASS switch is *out*. Set the COMPRESSOR THRESHOLD control to 20 and the COMPRESSOR RATIO to about 1.6:1. Now apply the largest signal to be unaffected by the COMPRESSOR. This establishes the highest signal level that will not be affected by the compressor circuit. Adjust the THRESHOLD control CCW while talking loudly or yelling. Stop adjusting the THRESHOLD control when the THRESHOLD LED comes *on*. This is a good starting point. A setting of 20 on the COMPRESSOR THRESHOLD removes it's effectiveness. The RATIO control sets the severity of compression. A setting of 1:1 means no compressing (even if the threshold LED is on), while a setting of 10:1 is very much like a limiter, and will result in only a 1 dB increase in output level for a 10 dB increase in input level.

EQUALIZER

If you have used Rane's PE 17 equalizer, then the EQ in the VP 12 will look familiar. Adjust the FREQUENCY control to the desired frequency, adjust the BW control for a range of frequencies, and then adjust the LEVEL to either boost or cut. For simple tone contours all you need to do is adjust the BW control to a larger number like 2.0, and now you have affected a broad range of frequencies. BW is measured in octaves, and each doubling or halving of a frequency equals one octave. Adjusting the FREQUENCY range switch selects multiples of the FREQUENCY control, allowing each band to cover the full 20 Hz to 20 kHz range while maintaining resolution of the FREQUENCY control.

The two bands are in series. This allows the two EQ sections to add together. For a serious notch, for instance, adjust both sets of controls to the same settings. Both LEVEL controls set at -15 dB deliver one serious -30 dB notch.

OUTPUT METER and LEVEL CONTROLS

The six segment output meter indicates the level coming out of the VP 12. It is calibrated in dBu and is referenced to a balanced output. If the output wiring is unbalanced, your actual output will be 6 dB lower than that shown on the meter.

The LEVEL controls utilize a concentric potentiometer to control two separate outputs or zones. The farthest out (inner) knob controls the MAIN OUTPUT and the farthest in (outer) knob controls the AUX OUTPUT.

Cut Filters

HI CUT FILTER

This control rolls the high frequencies off at a rate of 12 dB per octave. The frequency designator (3 kHz to 40 kHz) is the corner frequency at which the high end starts to roll off. Turned all the way clockwise, the high cut filter is essentially out of the circuit.

LOW CUT FILTER

This control rolls the low frequencies off at a rate of 12 dB per octave. The frequency designator (10 Hz to 250 Hz) is the corner frequency at which the low end starts to roll off. Turned all the way counterclockwise, the low cut filter is essentially out of the circuit.

De-esser

DE-ESS FREQUENCY

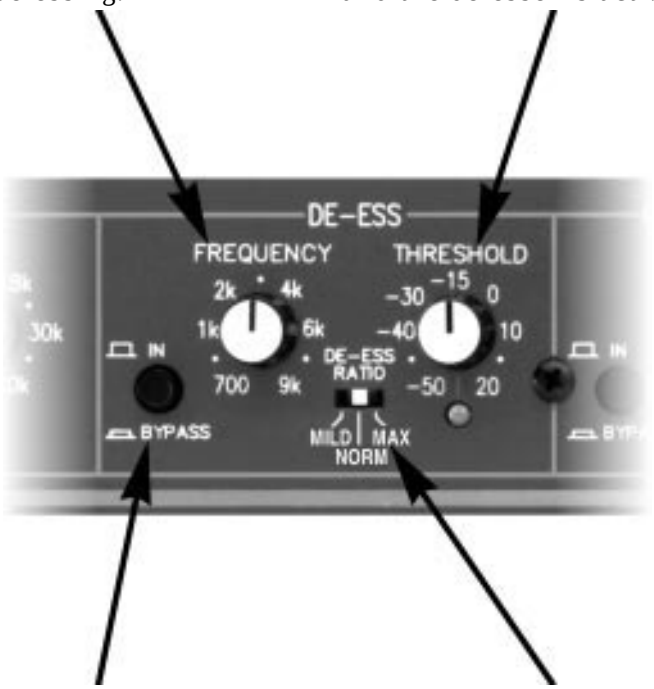
This control selects the upper range of frequencies that the de-esser circuit responds to. A setting of 700 Hz is for extreme de-essing, while 9 kHz provides very light de-essing.

BYPASS switch

This allows de-essing to be bypassed for easy comparison between de-essed and non-de-essed signal.

DE-ESS THRESHOLD

This control determines the level in dBu that the upper frequencies (as set by the FREQUENCY control) must exceed to activate de-essing. A setting of -50 de-esses everything, while at 20 no de-essing occurs. The THRESHOLD LED illuminates when the de-esser threshold has been reached and the de-esser is active.



DE-ESS RATIO switch

This sets the amont the sliding band filter will “slide” for a given amount of sibilance. The ratio settings are adjustable from MILD (a little de-essing), NORM (moderate de-essing), and MAX (heavy de-essing).

What is De-Essing?

In a nutshell, de-essing is nothing more than attenuation at specific frequencies. Sibilance (that annoying hi**ssss**ing of "ess" sounds that exhibits itself in some peoples' speech) manifests itself as an increased level, normally in the 3.5 kHz range. However, this frequency may vary from individual to individual, hence the de-esser frequency adjustment on the VP 12.

Large amounts of overall compression can actually accentuate sibilant sounds. This not only upsets the balance between high and low frequency speech components, but can drive the sound system into distortion.

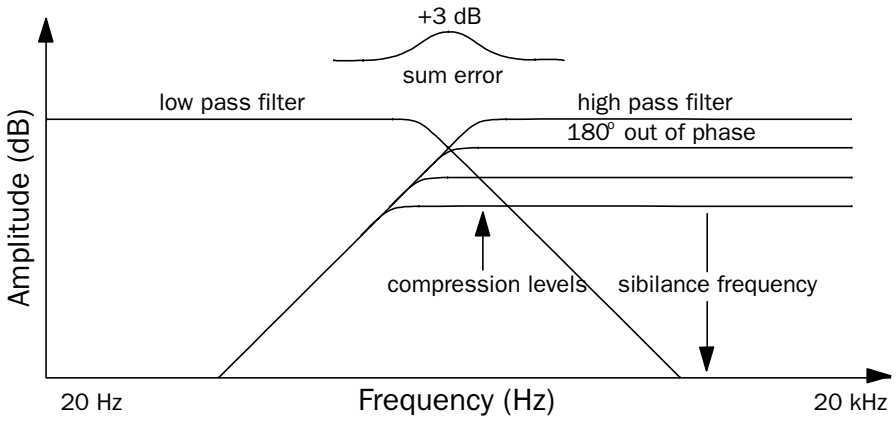
Therefore, the best approach to controlling sibilance is a circuit that is adjustable to engage at and above specific frequencies. The characteristics of sibilance demand a circuit with a fast attack time and slow release time to ensure a smooth inaudible transition between the gain-reducing state and the constant-gain condition.

Through exhaustive testing of currently available de-esser circuits in other manufacturers' products, Rane found that most exhibit unwanted artifacts such as common compressor "pumping" and "breathing". Some exhibit 180° phase errors as well as uneven frequency responses (as much as +3 dB) at the de-esser corner frequency.

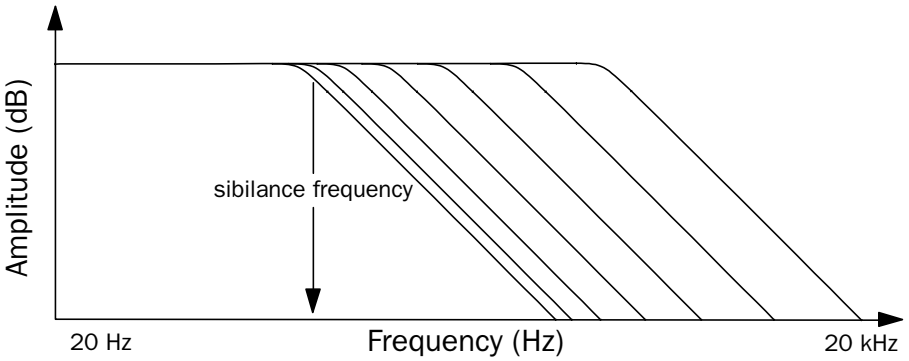
Deciding that there had to be a better way to accomplish sibilance control, the Rane engineering team designed and implemented a totally new circuit utilizing a revolutionary **adaptive servo controlled sliding band** circuit. Excellent buzz-words, but in simple English this means that instead of frequency dependent compression, we designed a sliding band filter that responds quickly and quietly.

The band pass filter, controlled by the de-esser FREQUENCY control, selects the frequencies above which sibilance resides, and since the filter is out of the signal path and in the detector path only, there are no summing or gain errors. The voltage controlled 6 dB per octave sliding band filter has an **adaptive ratio** that allows a quick response, but when it starts to attenuate the unwanted sibilance, the response slows down, providing a minimum of artifacts.

The graphs below visually demonstrate the new way versus the old way.



Other De-Esser Response



Rane De-Esser Response

Gate/Expander & Compressor

GATE/EXPANDER THRESHOLD

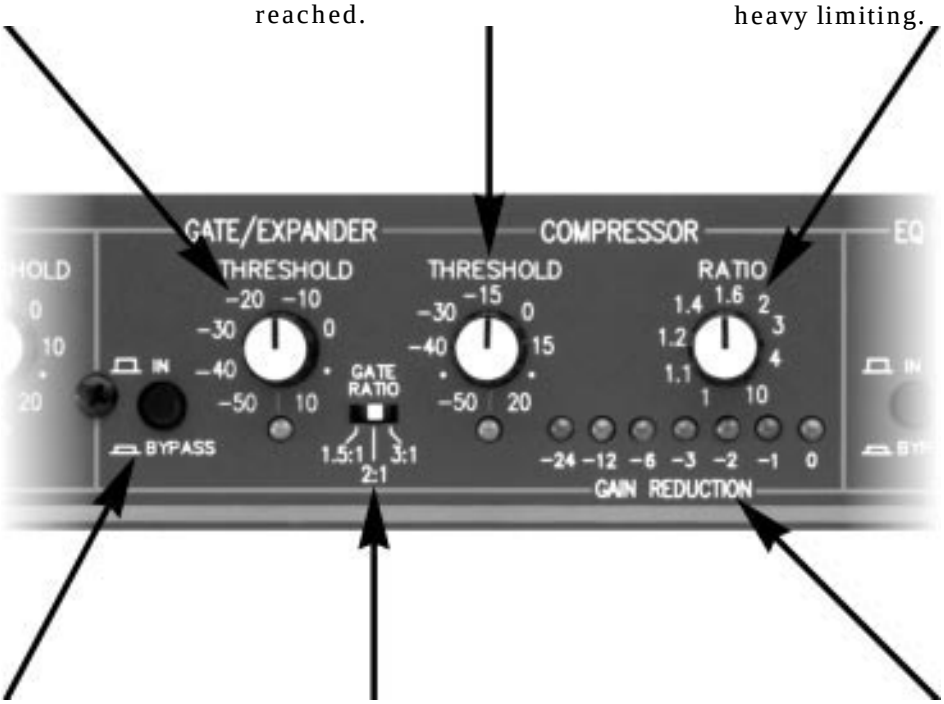
This control sets the point below which the output of the VP 12 is turned down or shut off, depending on the RATIO selected. The associated yellow LED indicates when the threshold has been reached.

COMPRESSOR THRESHOLD

This control sets the point above which the gain is held in check. The associated red LED indicates when the threshold has been reached.

COMPRESSOR RATIO

Determines by how much the gain is held in check. Remember, higher ratios mean the compressor works harder, essentially turning it into a limiter. Ratios are expressed in X:1. A 1:1 ratio is no gain reduction, like being bypassed. A ratio of 10:1 means that for every 10 dB of signal over the threshold point, only 1 dB gets out—this is considered a limiter. A straight limiter is usually preset at 10:1 or higher; a compressor has a variable ratio that allows subtle compression to heavy limiting.



BYPASS switch

This switch allows gate/expansion and compression to be bypassed for easy comparison between processed and non-processed signal.

GATE RATIO switch

This switch determines how much the signal is turned down when the gate activates. For gating, effectively turn the signal off with a low GATE/EXPANDER THRESHOLD and high (3:1) GATE RATIO. For downward expanding, use a more moderate GATE/EXPANDER THRESHOLD setting and a low (1.5:1) GATE RATIO.

GAIN REDUCTION meter

This gives a visual indication of how much compression is going on. The metering is still active in the bypass mode. This allows adjustment of the compression section "on the fly" while in bypass to visually verify how different settings will affect the signal.

Parametric Equalizers

FREQUENCY control

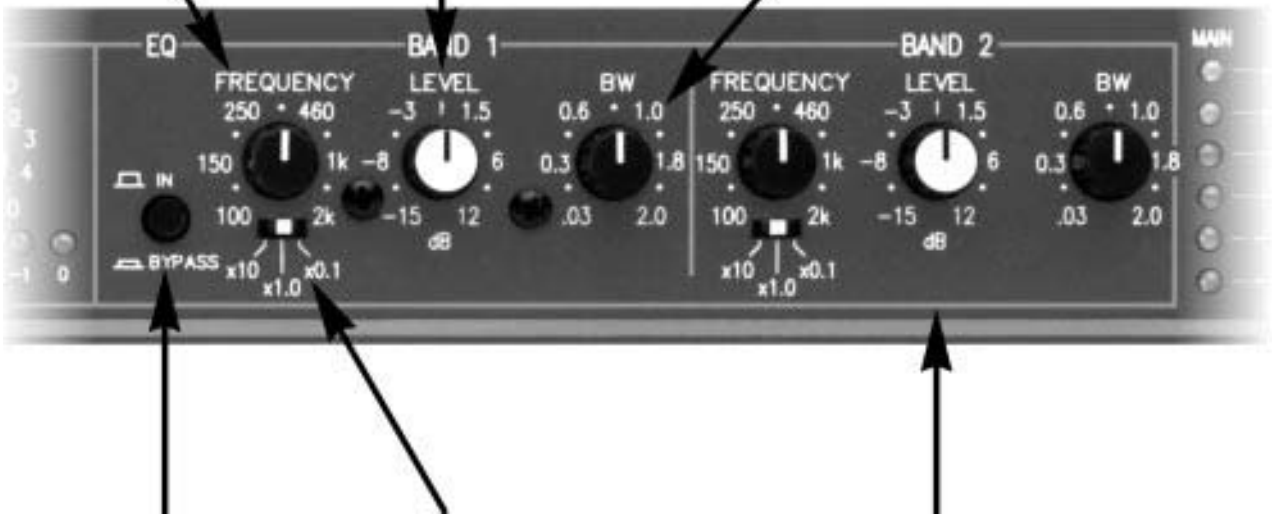
This selects the specific center frequency to be affected. This control works along with the select switch below it to provide full audio spectrum frequency range for each band.

LEVEL control

This allows between +12 dB of boost and -15 dB of cut at the center frequency.

BW control

BW stands for “bandwidth”. This allows selection of a skirt as narrow as .03 octave (feedback control) or as wide as 2.0 octaves (broad tonal shaping) around the center frequency.



BYPASS switch

This switch allows parametric equalizers to be bypassed for easy comparison between equalized and non-equalized signal.

FREQUENCY select switch

This ingenious little three-position switch allows you to select one of three frequency ranges, allowing the FREQUENCY control to cover the entire audio spectrum with greater resolution. The “x0.1” setting allows frequencies of 10 Hz to 200 Hz to be dialed in. The “x1.0” setting provides the 100 Hz to 2 kHz frequencies silkscreened on the front panel. The “x10” setting provides the frequencies of 1000 Hz (1 kHz) to 20 kHz.

BAND 2

The controls of this second parametric are the same as those found in BAND 1. Two bands allow for two separate frequencies to be modified. The two parametric bands are connected in series, so simply setting the filters to the same frequency can double the amount of boost or cut. Total cut for a single frequency can amount to -30 dB!