# AAE Spring Reverb Driver/Parametric Equalizer

Alternative use: distortion unit, or low power valve amp for guitars etc.

The INPUT DRIVE control adjusts the signal that comes out of the input preamp. The input preamp stage has got two gain settings; a low about 15dbs, and a high of 36dbs.

In the low gain the unit can accept high signals coming from desks etc while in the high gain mode the unit works at low level signals i.e. from instruments or even high output microphones.

Studio line level signals of 0dBV (0.7V RMS approx.) at the input but with a GAIN SWITCH (1) set at high, the output will not clip but a certain amount of second harmonic distortion will be added to the input signal due to the characteristics of the 12AX7 triode. This amount will be proportional to the input signal level and obviously as any audio signal varies in amplitude; the amount of second harmonic distortion will vary proportionally. Subjectively speaking this adds a certain 'warmth' to the sound.

A solid state buffer drives two equalizers in parallel. This circuit supplies the high current drive necessary for the especially low input impedance ACTIVE THREE WAY EQUALIZER and the PARAMETRIC EQUALIZER.

Both equalizers can be set separately by switching the other one off. For instance, you can listen to the active three way equalizer by using SWITCH (4) to switch off the parametric equalizer. Similarly for instance, the three way active equalizer can be switched off by using SWITCH (2) while you listen to the parametric EQU. Then by switching them both on, the combined result of both equalizers can be heard. There may also be situations that one equalizer may not be needed hence SWITCHES (2) and (4).

The active three way equalizer has the approximately the following characteristics:

Table 1.

LOW: 40Hz ± 17dBs, 80Hz ± 13dBs, 100Hz ± 12dBs, 150Hz ± 8dBs

MID: 300Hz ± 4dBs, 500Hz ± 8dBs, 1kHz ± 10dBs, 2kHz ± 8dBs, 3kHz ± 7dBs
4kHz ± 6dBs

HIGH: 1kHz ± 4dBs, 2kHz ± 9dBs, 3kHz ± 11dBs, 5kHz ± 15dBs, 8kHz ± 19dBs,
20kHz ± 21dBs

There is some interaction between MIDRANGE and BASS controls and between MIDRANGE and TREBLE controls but hardly any between BASS and TREBLE controls. This is a hybrid stage using the triode section of the PCL86 valve as a voltage amplifier and a solid state signal current driver.

The second equalizer is a unique type of parametric using both sections of a 12AU7 valve and it works on the WIEN BRIDGE OSCILATOR principle.

A frequency can be selected by using the VARIABLE SHIFT control which will be boosted by a certain amount. The range of midrange frequencies to be selected by this control is split in two sections by SWITCH (3)

Table 2.
SWITCH (3) on LOW MID : 250Hz + 9dBs, 400Hz + 14dBs, 600Hz +19dBs, 800Hz + 22dBs, 900Hz + 23dBs

SWITCH (3) on HIGH MID : 400Hz + 10dBs, 600Hz + 14dBs, 800Hz +17dBs, 1kHz +20dbs, 1.3kHz + 24dBs, 1.7kHz + 27dBs

The amount of boost on each frequency can be adjusted by varying the BOOST control from 0 to the maximum values on Table 2. for each frequency. This control sets the amount of signal that is being fed to this equalizer.

A passive mixer then follows that combines the two equalizers. The whole **equalizer 'system'** can be very versatile once you get to know how to use it.

- It can introduce high boost at various midrange frequencies through the parametric but it can also attenuate the mids if necessary by the use of the normal three way equalizer.

- The three way equalizer can introduce high boost on the bass, a very interesting feature when the output drives a spring.

- It can emphasize harmonics generated on the preamp stage but it could also generate harmonics if either one of the equalizers are slightly overdriven.

- It can select signal frequencies plus harmonics to drive the output stage which will add its own coloration to the sound.

The OUTPUT DRIVE control adjusts the amount of signal that enters the power stage and it also controls how hard the spring is overdriven if necessary. By turning up this control and reducing the input drive gradually a different type of distortion may occur which will colorate the signal. This is an output type of overload valve distortion which occurs naturally when an amp is played very loud.

**The output can be switched to operate in three different modes (SWITCH 5) :**

TRIODE – Traditionally used in guitar amp spring reverb drivers and is the cleanest mode possible. It produces a balanced tone with good bottom end but lacks gain and power output. When overdriven it produces predominately low even harmonic distortion and it can sound very musical.

ULTRA-LINEAR (UL) - Here the output tube works between triode and pentode mode, produces more power, better treble and clarity. It's very versatile and possibly

the best mode of operation for all kinds of sound. When overdriven the distortion contains even but also odd harmonics of the low order type. So a combination of ‘warm’ and slightly edgy sound can result depending on the various control settings.

PENTODE – High gain and more power, it can also act as a treble booster, it produces more aggressive fast and hard sound, very good for percussion when driving a spring. Even with slight overdrive the distortion is a mixture of even and odd harmonic types. Very hard overdrive gives high order odd harmonics similar to a transistor. However, with low power drive settings it can sound very musical too, a bit like ultra-linear but with an edge.

When it comes to driving a spring at higher input drive/output drive setting you can create grungy, distorted reverbs by driving the spring so hard the signal distorts on its way into the spring; but the spring itself also distorts and this creates an interesting sound too. Be careful with this: too much overdriving may reduce the lifespan of the spring reverb because while the springs themselves are tough, they are driven by a delicate transducer coil (the little component attached to the springs at the input end) which can burn out if driven too hard for too long.