

Eksa

The topology is derived from Sontec, but the Q circuit is heavily modified and much more complex to attain independent behavior of noise and whole range gain, not depending on Q setting. (In Sontec the whole range changes when even one boost or dip is made, and this is worst at low Qs.)

When boosting or cutting maximum 8dB with Eksa, the whole range will have 0.28dB gain to the same direction. So, basically, if you boost all 5 ranges for 8dB, the result is 1.4dB of gain for all frequencies. In original Sontec topology noise gets worse at high Qs. In Eksa the noise is always proportional only to the bandwidth, and very low at most settings.

There are 24 discrete KNIF operational amplifiers. They use jfet inputs and outputs, and always work in class A. There are 2 op amps for the basic signal route, and 2 op amps for each band per channel. There are also DC servos for each band and the basic amps. The servos are tuned very low, so that their effect on audio range would be minimal. The time constants are more than one minute, and the servos use high quality OP amps and polypropylene caps to further improve the situation.

Features, not bugs

-Band noise is always at maximum even when the gain is set to zero. In order to keep noise minimum keep unused bands off.

-Band noise is worst at lowest frequencies of the band and in shelf position. The worst noise is caused by the 3rd range, set to minimum freq and shelf. This noise is about -80dBu, not that bad in fact. 1st and 2nd range's noise is imperceptible, not more than -96 dBu A-weighted. Basic noise with all bands off is about -104 dBu.

-If a band is set to max or min gain, it gets the max signal level into the filter circuits even if the band is Off, and can cause some distortion if there is a lot of energy on that band. So, keep it clean: do not leave the gains to high or low levels if the band is not actually in use. With music this will hardly ever be a problem, but with test signals it will cause some mild distortion.

The lowest few shelf positions on 3rd, 4th and 5th ranges are not ideal. Parasitic capacitances cause the higher end drop a bit. The worst is the lowest position on 3rd band, there 10kHz is already 1dB down at 8dB boost.

The X2 switch is not perfect. The scales change a bit. I have set it like this:

-When switched On, the range is exactly x2 the printed numbers, maximum is 2x4 dB.

-When Off, the low values are accurate, but the high values are bigger than printed. 2.5 dB is still fairly accurate, but 4 dB is already 4.7 dB actually.

Power supply

Always connect the power supply cable to EQ before switching the power supply On. Really. Doing the other way round may damage OP amps with a little bit of bad luck. I have not tested it though, for a good reason.

There is one extra XLR for power out. Currently it is just a dummy, nothing is connected to it. There is also a switch for separating the power out ground from safety ground. This possibility should not be needed in a properly wired studio. In case of some ground loop problems the switch can be set to Off. Note that if set to Off only the power supply chassis is safety grounded, and thus the EQ is floating.

Specifications

Frequencies & Q values

1 st band	2 nd band	3 rd band	4 th band	5 th band
14-229 Hz	58-910 Hz	256-4030 Hz	800-12600 Hz	1550-24400 Hz
0.5-5 + low shelf	0.5-5 + low shelf	0.5-5 + high shelf	0.5-5 + high shelf	0.5-5 + high shelf

Power consumption 30W

Maximum input and output level is 24 dBu. MS codecs, which use IC op amps (very high quality ADA4627-1) reduce the headroom with 1.5 dB.

Since everything is DC coupled (except the servos, and they are sloooooow) the frequency response is flat to sub sonic frequencies. Upper limit is -1dB @ 120kHz.

Basic distortion is too low to be measured with my Audio Precision portable system one, also into 600 Ohm load and up to the highest frequencies and highest levels.

Input impedance is 20kOhms. Since input topology is minimalistic, it does not offer stellar hum rejection. So, don't try to use Eksa with source 200 meters away in the next building.

Output impedance is 22+22 Ohms, quasi balanced. (meaning that signal is fed from pin 2 only, and pin 3 has the same impedance for proper hum rejection in balanced use, but no signal.)

Xtalk is -96dB at 1kHz and -90dB at 10kHz.

Of course all switches are Elma rotary switches. No potentiometers.

All OP amps (except in the MS matrix unless specified otherwise) are Knif, class A, jfet input, jfet output amps known for superb sound quality. There are DC servos for each band to keep any pops out when switching bands on/off.

All capacitors in the filter circuits are polypropylene, not polyester like in many lesser designs. This creates the punchiest bass and clearest treble possible without any smearing effects.

And of course the capacitors are switched locally on PCB with gold contact sub miniature relays. PCBs and their copper layers are extra thick.