
GOLY
ANALOG COLOURING DEVICES
STEREO DYNAMIC ASYMMETRICAL EQUALIZER

The Circuit

The first stage of the Stereo Dynamic Asymmetrical Equalizer consists of a peak/bell filter, which will operate in the Low Mid or Low frequency spectrum, depending on the setting.

The second stage, with the filters in series, consists of a peak/bell filter, which will operate in the High Mid/High frequency spectrum, depending on the setting.

While the filter design in itself bears no resemblance to the design of the Dynamic Shelving Filters in the GOLY DSEQ, the basic mechanics of the side chains are the same on the two units.

The dynamic sections on each filter will let you vary the attack and release times, as well as the dynamic hold, while the soft/hard switch takes you from a low, soft knee ratio, useful for subtle sculpting, to a higher, harder knee ratio, with a high end roll off on the side chain, for a bit more bite and grab.

The Philosophy

The DAQ was originally conceived to complement the DSQ, and since it is the younger sibling, it is hard to describe it in a vacuum.

The older sister, the DSEQ, has a very peculiar and pleasing distortion characteristic, which lends itself to broad strokes of tonal shaping, tape like emulations, and it will let you push your loudness curves a little farther than you would usually be able to go, due to the dynamic hold.

The DAQ fills in the gaps. It is a much cleaner design in terms of sonics, and while it can easily do broader strokes, the design and interface is tilted towards surgical types of tonal shaping, which are virtually impossible to achieve on the DSQ.

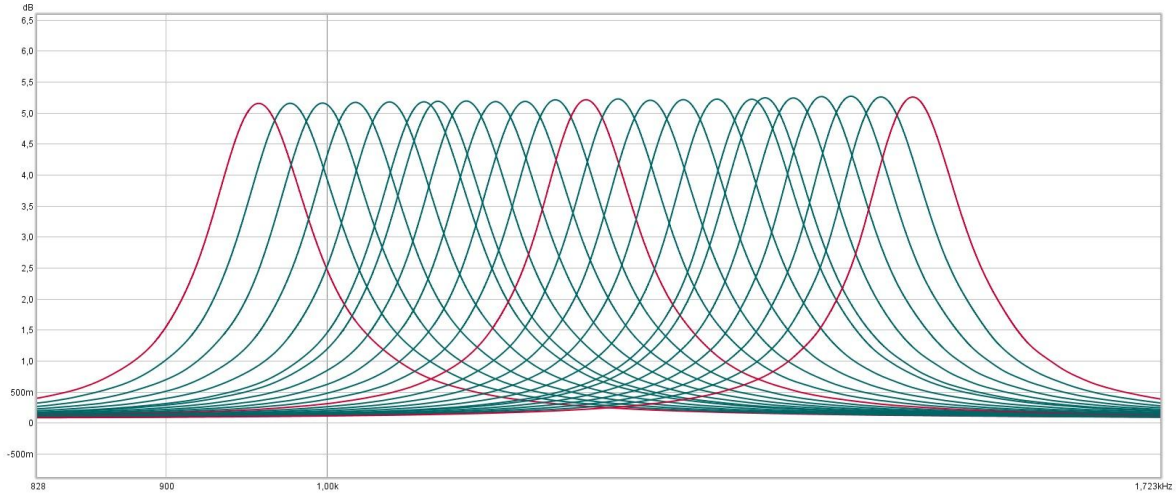
During the development of the DAQ, the feedback from the engineers listening and commenting turned out some really interesting features and controls, and with a “more is more” approach (The DSQ had a “less is more” approach”), there was a high degree of implementation, which will be covered on the coming pages.

LM/HM Frequency

The use of switches for frequency selection on mastering grade devices represents a trade-off. You get channel matching, precision and easy recall, but you lose the resolution you would have with a potentiometer.

While working with the DAQ, I contemplated ways of overcoming this trade-off, and came up with the solution of using dual concentric switches to stack the frequency selection. Changing the setting on the top of the switch (red) will take you through the frequencies marked on the panel, and switching the bottom of the stack (blue) fills in the gaps.

The result is a resolution of of 11x 11 = 121 steps per band!



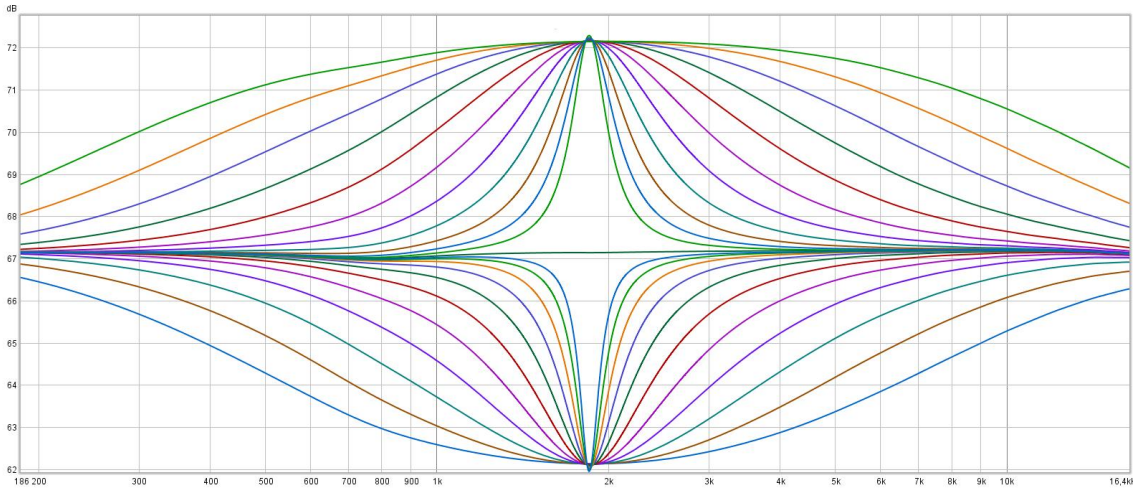
In addition to that, each band lets you switch to an aux band. Low mid switches to Low, High mid switches to High, giving you a total of 4 bands, covering the audio spectrum with a resolution of 484 settings

Q

The A in DAQ stands for asymmetrical, and what is asymmetrical - is the Q!

The graph below represents the 11 Q positions at full boost and cut, and if you look carefully, you will notice, the boost are broader. This made practical sense in terms of how the DAQ was used in general, but in specific applications, where dynamics hold the gain around 0dB, the difference while the processing dances around the juncture is really magical.

The Q values given on the DAQ interface were measured at the -3dB point on full boost for reference (and rounded off for the panel). The, broadest go into the 4-6 octave range, which means, you can do extremely wide processing. I recommend you experiment, getting the two bands to interact as separate, (almost) full band compression devices, working in tandem.



Side Chain Emphasis

If you keep the side chain emphasis off, the side chain will function as usual. If you engage it, it will emphasise the selected frequency, with a choice between a narrow and a wide Q setting.

The frequency range of the Side chain is covered by a two layer switch, exactly like the band frequency selection switches, but to keep it flexible (i.e. we may want to emphasise a L frequency, while working in the LM band), the ranges are static for the LM/L and HM/H ranges respectively.

...and to avoid “working blind”, or only listening for the effect of it, while you are dialing in the emphasis, you can hold in the side chain emphasis listen function in the center section.

Please note: The Side Chain EQ topology is identical to the signal path, but there is a range of support circuitry that was not included for fidelity, the range is a bit stretched in terms of optimal noise performance,, and the spectrum is narrowed and manipulated a bit to accomodate for the HM/LM processing respectively. This means, the fidelity is considerably lower. You should keep this in mind, if you want to use the SC listen function creatively, or hold it in for processing.

Decomp

On an electronics design level, what the decomp does, is to take an inverted mult of the amount of low mid dynamic hold triggered, and inject it into the high mid side chain for triggering.

On a practical level, it makes overly compressed and flat mixes come alive in a very surprising and musical manner, probably because it plays of the program material itself.

It took a lot of consideration, whether to add it to the final design, or leave it out, because it is such an odd feature control-wise. You need to have the low end dynamic hold chewing on something to inject anything into the decomp.

In the end, the smiles were just too wide to leave it out.

Easter Egg! There is a way to control the level of it, but you will lose the use of the LM band. If you don't engage the LM band, you can still use the LM dynamic hold as a decomp level control with the decomp in.

Attack

The attack time of the dynamic processing. Note that the + setting is twice as fast as the second step, and that the - twice as slow as the second last step.

Since this is a frequency split processing device, the fastest timing differs between the two bands, and the higher shelving dynamic band can be set faster without unpleasant distortion occurring, while there is simply a physical limit for the low band (as with a full bandwidth processing device).

Release

The release time of the dynamic processing. Note that the + setting is twice as fast as the second step, and that the - is twice as slow as the second last step.

Soft/Hard

- Soft setting is a very low (1:1.25) ratio/very soft knee ratio.
- Hard setting is a medium (1:5.5) ratio/medium soft knee ratio, with a subtle roll-off in the side chain.

Labelled soft/hard, because the change in settings affects the behaviour beyond the scope of just the ratio, and hopefully inspires a different mindset and approach.

Dynamic Hold

Adjusts the (reverse) threshold for the dynamic hold on the respective bands. Like the frequency selects, there is a coarse adjustment on the tip of the dual, concentric switch controls, and a fine adjustment on the ring. I recommend keeping the fine tuning set to 12 o'clock, while doing the rough adjustment, then work from there.

The split of this function was done to accommodate the need for finer control, while keeping it on a switch, rather than use a potentiometer. The range of the finer tuning corresponds to about 2 steps on the wider range.

Center Section

- LOW MID IN - Engages the Low mid processing band
- HIGH MID IN - Engages the High mid processing band
- LM SC listen - Low mid Side chain listening function
- HM SC listen - High mid side chain listening function
- Bypass All - Hard bypasses the unit (input is jumped to output), and flips the meters to 0, regardless of the gain setting.

Appendix

Calibration
Recall Sheet

Meter Calibration

- Turn on the unit, and leave it on for about 15 minutes to warm up.
- Set gain at 0, adjust internal ”bias” trimmer until needle sits on 0.
- Set gain at +5, adjust internal ”range” trimmer until needle sits on 5.

This can easily be done without the aid of a technician.

Reference/Control Voltage Calibration

For reference voltage adjustments, measure the +5/-5V points relative to the 0v point, clearly marked on the right side of the PCB, and adjust the respective trimmers correspondingly.

This can be done without the aid of a technician, if you are comfortable handling a voltmeter.

Gain Calibration

Low Mid

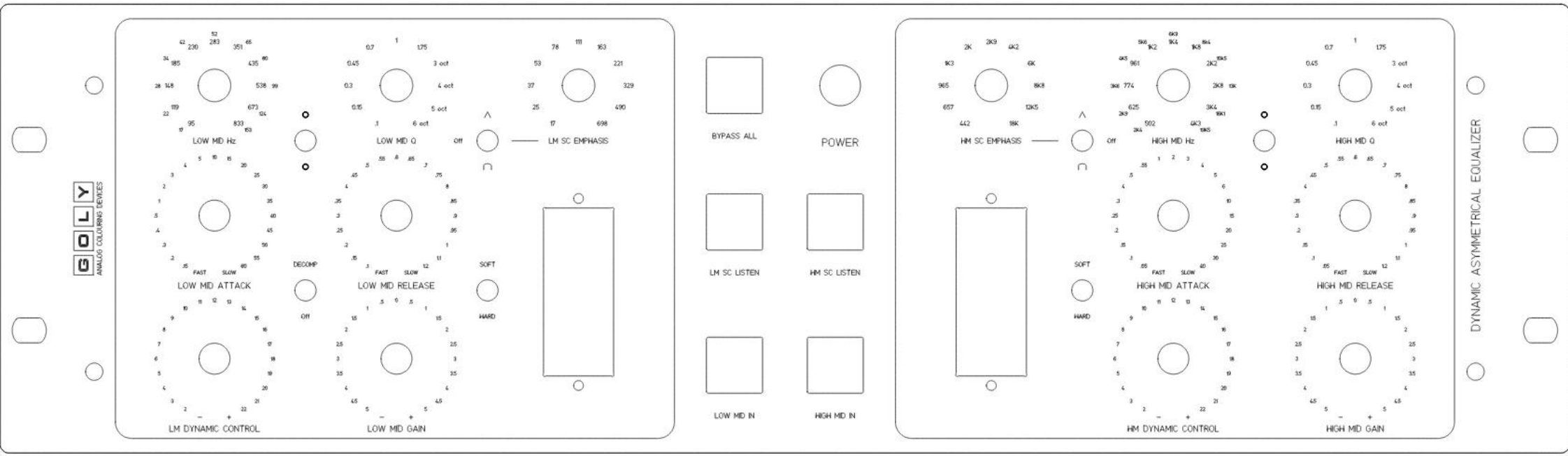
- Set Q to 1
- Set attack, release and dynamic hold full CCW
- Send a sine at 0dBU to the unit at 100Hz, set the band to low, adjust the frequency to 99Hz, and get a relative output reading of 0dBU
- Now, set the gain to 5 dB, and check your output reading, while you adjust the internal gain trim for a reading of 5 dBU.
- Roll the gain control back to -5 dB to check that the gain is symmetrical to a tolerance of 1% or better.

High Mid

- Set Q to 1
- Set attack, release and dynamic hold full CCW
- Send a sine at 0dBU to the unit at 1K, set the band to high mid, adjust the frequency to 961Hz, and get a relative output reading of 0dBU
- Now, set the gain to 5 dB, and check your output reading, while you adjust the internal gain trim for a reading of 5 dBU.
- Roll the gain control back to -5 dB to check that the gain is symmetrical to a tolerance of 1% or better.

RECALL SHEET

(download full size on website)



Info

Units are hand built by Gustav Goly in Odense, Denmark.

In the event of a problem with your Stereo Dynamic Asymmetrical Equalizer, unplug it, and contact your dealer, or GOLY direct for repairs.

Contact

Mail Info@goly.dk
Web www.goly.dk

Phone +45 53161601

I do not answer unscheduled calls, so please book a call by mail in advance, if you need to talk.

Your unit is serial #

Gustav Goly

Declaration of CE Conformity

The construction of this unit is in compliance with the standards and regulations of the European Community.