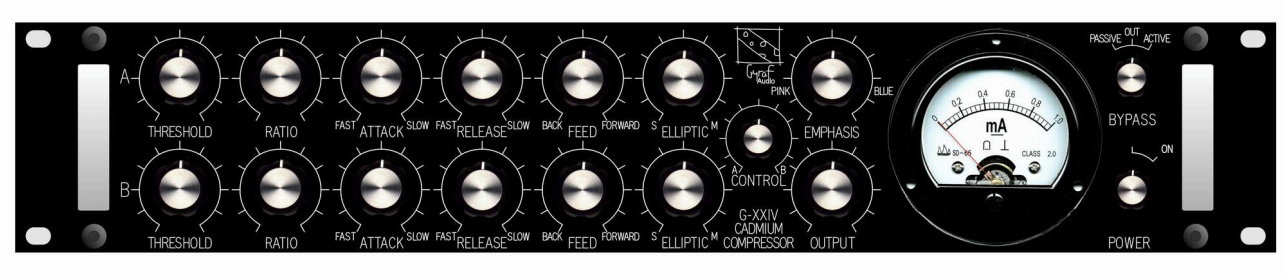
Gyratec XXIV Cadmium Compressor



Gyraf Audio Gyratec XXIV "Passive/Aggressive" Cadmium Compressor.

Preliminary user manual, 12. March 2017.

The Gyratec 24 Passive/Aggressive is an optical compressor based on re-thinking large parts of the traditional compression concept.

First of all: It's passive. Really. In passive mode, your audio will only pass through one resistor, one audio transformer, one opto cell, and the output level potentiometer. kept this simple in order to mess minimally with your material.

This of course comes at a cost: The input/output impedance requirements for interfacing to the G24 are quite strict, but no worries: At the "**Bypass**" switch, we've added one further step: **"Active"**, which switches in a very-high-grade unity-gain buffer that will drive even the most difficult load (G21's anyone?). Solid state, yes - and invisible (to our ears anyway).

In Use

The G24 works as follows: The unit is configured to work in M/S/Stereo, with one-knob-for-stereo-control. This means that you never need to fiddle two knobs to get decent stereo tracking. In production we aim at 0.2dB or better tracking in sensible setting scenarios.

For a start, we are looking at some traditional controls: **"Ratio"** and **"Threshold"** controls the steepness and the on-set-point of the compression, **"Attack"** and **"Release"** dials in the timing you wish. As always in our compressor designs, the controls has very wide ranges, going from near-nothing to too much. This concludes the traditional part of the circuit.

So what is this M/S/Stereo? Actually, the G24 is just a M/S compressor, enabling individual gain-control of the **M**id and **S**ide components of the signal processed. But we provided the unit with a continuously variable fade from M through to S compression (the control knob named "**Elliptic**") - when centred it sets equal amount of gain reduction for M and S components, the resulting compression will equal traditional stereo (LR) compression. Off course you may want to tweak this control a little or a lot to either side, quite often it makes sense to compress different in M and S.

Did I just claim it to be a M/S compressor? That is an unfortunate over-simplification: **It's actually TWO MS compressors**. Yes, your audio material is still only touched by the previously mentioned handful of passive components - but we simply added an additional side chain controlling the *same* optical cells as the first side chain.

Adding this does in effect constitute adding one full compressor. Like: If you like the gain riding of a slow timing, low ratio and low threshold compressor, and on top of that a fast, limiting-like transient control. Set the two sidechain channels to the control aspects you want, and blend them: The **"Control"** potentiometer fades continuously between the settings of the A and B channel.

Variable Feed

Aah, but now there's a problem rising: How do we know which compressor comes first? It's quite important to keep the order of compressors, as compressing in one order can give very different results than the other way around.

To solve this, we added the **"Feed"** control: This knob allows you to set the two channels individually to either "feed-forward" or "feed-back" mode. "Feed-forward" means that this compressor "comes first" i.e. ignores tracking the gain reduction of the other (and self), whereas "Feed-back" puts this compressor last, reacting to both what the other did and the gain-change it applied itself.

As you may know, the subjective quality of compression is altered quite a lot depending on the feedback or feed-forward architecture: For now, let's just oversimplify and say that feedback is rock'n'roll, where feed-forward is about that jazz. As always, please do not take my word for it - use your ears..!

Rather disturbingly and counter-intuitively, both channels can come "first" or "last" at the same time - and because we made these controls continuous, you can even dial in a setting somewhere in-between before and after each other(!!).

For situations where you want a slightly emphasized frequency-domain sidechain function, the **"Emphasis"** control applies a slight tonal shaping to the sidechain control of both channel A and B, making it more sensitive to high-frequency content when turned towards **"Pink"**, and more low-frequency-sensitive when turned **"Blue"**.

Centred, this control exhibits traditional linear response (this filter is actually pasted from a G23 Linear Tilt filter), and at it's extreme settings it adds and/or subtracts a maximum of ca. 1dB/Octave across the spectrum.

The GR-meter

The GR-meter, whose job it is to indicate the amount of on-going gain reduction, requires a little explanation. Yes, it's calibrated in a simple traditional dB-scale, indicating how much

level is knocked off at any given time. But please observe, that as this compressor really reacts on the combined dual-L+R+M+S sidechains, we only have room for a simplified display of what actually goes on: **The meter indicates the sum of gain reduction in M+S**. This means that you can (in extreme situations) come across situations where you see indication of gain-reduction without actually hearing it: This occurs when you e.g. have a mono input and set your elliptic to "S" - in this case the meter would indicate all the stereo-width you are knocking off, only there's none of this in the first place, so you don't hear a difference.

Inputs/outputs are transformer balanced and floating - input impedance is some 600 - 2500 Ohms, depending on gain reduction amount. Output impedance is ca. 5K Ohms in "Passive" mode, and <50 Ohms in "Active". The input and output connectors are standard XLR jacks, pin 2 hot.

Technical:

This compressor is based on a fully passive signal chain - an array of closely-matched optical cells loading an audio transformer in M/S domain to alter gain.

This unit was originally intended for use with our analogue tape recorders, which means that the optimum operating levels are around that of +4dBu – and at this point you still have some 14dB up to the point where the unit starts to get tired, which happens around 15Vpp AC output – and then some before it starts sounding bad.

This means, however, that you should consider checking your levels if you’re running a modern-day DAW, which often comes factory set to extremely-high levels like +24 or +28 for 0dBfsd. Those kinds of levels are aimed at keeping a good safety-margin before running into digital-clip, but at the same time it’s common practice (for a good reason) to try getting as close to clip as possible.

A good level for use with the G24 (and for most analogue gear in general) is somewhere around +10dBu to +15dBu analogue for 0dBfsd (full scale digital)

The G24 audio path consists of ONLY one audio transformer, two resistors, the "Output" potentiometer, and the optical cell. All other parts, including the power supply, are for controlling and sidechain duties.

Contact Gyraf Audio for instructions on eventually replacing the optical cell, when the time comes where we have a suitable and legal alternative.

The Catch:

This is all too good to be true - where and when can I get a G24? Following the EU ban on Cadmium in electronics, we can't sell you the (CdS) gain reduction cell contained in this unit, as it

contains several hundred ug of cadmium. Almost one millionth of the (legal) amount in a single power tool battery. (Sic!)

However, we will lend you an optical cell until the time where a substitute material is found, **if** you promise to replace it with one we eventually send you, and then send the old cadmium-containing part back to us for safe and proper disposal. We must on all times be kept updated on the whereabouts of the unit: Should you decide to sell it, the new owner MUST fill the declaration form or send back the optical unit.

The replacement process is simple enough - it involves unscrewing the top lid of the unit, pulling out one plug and loosing two screws that holds the optical attenuator module. Then the new goes in in opposite order. If you're unsure about the process, just send the unit in, and we'll do it for you.

Please contact us to access the declaration form you need to fill out, sign and return prior to ordering the unit.

Note that customers in the US, outside of California, are allowed to fully own the unit. But only when shipped to an area where WEEE/ROHS does not (yet) cover.

Important notice:

Do not open this unit when powered, as there are high - potentially lethal - mains voltages present inside. Refer servicing to qualified personnel.

You can safely remove the four rubber feet if you wish to mount this unit in a tight rack - please save the feet AND screws for future use, do NOT use longer screws than the supplied M3x5. NOTE: The feet are the ONLY part that can safely be removed. Do not loosen any other screws!

This unit operates from 220-230V AC, consumes about 7W, and the mains fuse is a 315mA slow-blow type. For the US-version, marked “CE 115VAC”, the operating voltage is 110-120VAC, and the fuse is a 315mA Slow-blow (“T”) type. Inside unit there are two T160mA fuses, that will require qualified personnel to replace.

For further questions, comments and wishes, please contact Gyraf Audio:

e-mail: info@gyraf.dk
Web: www.gyraf.dk
Telephone: +45 5129 2769
Address: Gyraf Audio
Jægergårdsgade 154C
DK-8000 Aarhus C.
Denmark

Declaration of EU-accordance

I, the undersigned, hereby declare that the following device observes the protectional demands stated in the Council's directive 89/336/EEC about electromagnetic compatibility (EMC) and the Low Voltage Directive (LVD).

Identification of device

Category: Audio Compressor

Make: Gyraf Audio

Model/type: Gyratec XXIV Passive/Aggressive Compressor

Name and address of the undersigned:

Jakob Erland
Gyraf Audio
Jægergårdsgade 152, 02F
8000 Aarhus C.
Denmark

Standards founding this declaration:

EN 55013, EN 55020, EN 61000-3-2, EN 61000-4-2 and EN 60065.

Remarks:

The CE-mark only states accordance with the EMC-directive 89/336/EEC and the Low Voltage Directive, LVD. The optical cell included in the unit and lent to end user is believed to be outside of the scope of this declaration.

Århus, March 2017