FACHZEITSCHRIFT FÜR PROFESSIONELLE AUDIOTECHNIK

05 2025

K 30603

48. JAHRGANG · NR. 521

# studio magazin


REPRINT

**REPRINT:** CHAMELEON LABS 7603 & 7721


BY FRITZ FEY, PHOTOS & MEASUREMENTS: FRIEDEMANN KOOTZ

# FOR SERIOUS EARS ONLY

## CHAMELEON LABS 7603/7603 XMOD CHANNEL STRIPS & 7721 STEREO VCA COMPRESSOR

**Classic studio hardware presumes experience and some prior knowledge. Its operating concepts won't always immediately click, especially not for those who rarely venture beyond factory presets. So, a word of caution: what we're dealing with here are three analog thoroughbreds of professional studio technology, built by pros for pros. The two channel strips with EQ, 7603 and 7603 XMOD (for "extended modification"), are identical except for the Carnhill transformers on the XMOD's input and output stages. Even so, we felt it's worth highlighting the sonic difference introduced by that modified circuit. How big is that difference? I won't spoil it just yet. The third unit is a VCA compressor straight from the textbook: it controls with precision yet adds a hefty dose of mojo or magic, albeit in a somewhat unusual way, which we'll unpack shortly. It also behaves a bit like a spirited, hard-to-tame racehorse that can bolt on you – finding the sweet spot for different applications isn't trivial. A deeper understanding of what's happening inside the box helps, which is why we think this tool belongs in the hands of well-trained engineers.**

Chameleon Labs' story has a touch of a rollercoaster ride to it. Founded in the early 2000s by Seattle sound tinkerers Garth Hedin and Brian Cornfield, who had operated since the '90s under the Pacific Pro Audio flag and today offer pro audio products and services under the 'Lift AV' name, the brand was acquired by Marcelo Vercelli in 2014. He streamlined the lineup and focused entirely on high-quality 19-inch analog studio equipment. The mandate: keep it affordable while delivering robust build quality, professional specs, and a distinctive sound. Vercelli builds on 30+ years in audio, with stints as engineer and/or product manager at brands like Mackie, Monster Cable, Event Electronics, Ocean Way Studios, inMusic Brands, KV2 Audio, and RCF. In early 2023, Audio Alchemist, represented by Marek Stycos, who also owns Dangerous Music, came aboard as the new owner. Stycos now serves as President of Chameleon Labs, strengthening the company with financial and marketing muscle, while Vercelli remains closely involved on the engineering side. The philosophy hasn't changed: high quality at attainable prices. All three devices on test follow in the footsteps of classic studio gear and offer a broad range of functions and tones. Each one embraces analog's advantages in a digital world, where outboard is still indispensable in the signal chain, or earns its rack space with an unmistakable sound.

## 7603 (XMOD) Microphone Preamp & EQ

With the 7603, Chameleon Labs introduces a microphone preamplifier with an integrated inductor equalizer that clearly references the great British studio classics. The EQ – a three-band design with switchable center frequencies – offers musically voiced corrections that remain controlled and natural even with substantial boosts or cuts. These inductor filters really come into their own on vocals and acoustic instruments and are strongly reminiscent of the Neve 1073 combo. A practical detail is the switchable microphone input impedance, which can markedly influence spectral balance, especially with ribbon or moving-coil dynamic mics. The 7603 also provides a Hi-Z instrument input, making the preamp equally suitable as a DI for bass or guitar recordings.

Let's take a close look at the front panel and its controls. Everything described here also applies to the 7603 XMOD, which differs from the "standard" model only in its internals. Starting at the left are several of the series' signature toggle switches: mic/line input selection, impedance (300 or 1,200 ohms), and the on/off switch for the instrument input. To the right sits the gain control with dual mic/line scaling. Further right is another bank of toggle switches, this time for EQ in/


out (including the high-pass), polarity invert, and phantom power. The high-pass is engaged together with the EQ but has its own "Off" position; available corner frequencies are 40, 80, 160, and 320 Hz. The EQ's Q-factor is factory-set and fixed (see bench tests), and the three bands provide switchable frequencies with continuously variable ±15 dB cut/boost. Low band: 35, 60, 110, and 220 Hz. Mid band: 350, 700, 1,600, 3,200, 4,800, and 7,200 Hz. High band: 3.4, 4.9, 7, 12, and 16 kHz. Each frequency selector also has an "Off" position so that individual bands can be removed from the signal path. An output-level control (–60 to +10 dB) follows, accompanied by a small, illuminated VU that remains legible despite its size. The final toggle group determines whether the VU displays input or output level and lets you scale the VU meter range. Above both sits the power switch – in the same miniature format as the others, but still laudable: you can power the unit without having to reach behind the rack. The rear panel is as expected: IEC mains, Mic In, Line In, and Line Out. And no, the instrument input hasn't been forgotten. It's sensibly placed up front at the far left, a ¼-inch jack beneath the company logo.

## 7721 Stereo VCA Compressor

Chameleon Labs' 7721 is an analog stereo VCA compressor in a Class A/B topology that clearly takes its cues from classic 1970s mix bus processors while adding modern refinements. At first glance, it's obvious this is a practical tool for precision work. The control surface pairs a familiar layout with extended options: a variable sidechain high-pass filter, selectable detection characteristic (Peak or RMS), and switchable soft- or hard-knee behavior. Threshold, Attack, Release, and Ratio ranges cover everything from subtle compression to audible activity. Metering is equally practical: a toggle switch sets the compact VU to input, output, or gain reduction.

Let's look at the control panel more closely: while the toggle switch density is lower than on the channel strips, the switch section is unassuming but substantial. Alongside compressor in/out, you can choose a soft or hard knee, engage or bypass the sidechain, and select Peak or RMS detection. Together with the knee setting, this largely determines the compressor's character. A blue LED near the relevant switch indicates when the compressor is bypassed; two red LEDs indicate overload at the input and output. The switchable sidechain high-pass filter (24 dB/oct) sits in the detector path and defines the 7721's sensitivity to low-frequency content. You can choose five corner frequencies: 20, 60, 90, 130, and 200 Hz. To the right are the classic controls for threshold, attack (0.1–30 ms), release (0.1–1.5 s), and ratio (1.5:1 to 10:1). Next come a wet/dry mix for parallel compression and an output-level control (–60 to +15 dB). A five-position selector assigns the VU meter to the left or right signal of the input or output, or gain reduction. The 7721 also puts its power switch on the front panel. Round back, you'll find stereo XLR I/O plus a sidechain input for feeding an external audio key signal to control the compressor's behavior.

## Measurements 7603 & 7603 (XMOD)

Now, we're ready for our bench tests of the Chameleon Labs 7603 and 7603 XMOD. We recently had another classic channel strip with preamp, filters, and equalizers on test: the Harrison 32. If you like, pick up the previous issue and compare the three devices. We begin our measurements with the Audio Precision APx555, as usual, starting with the basic parameters on the mic input measured against the European-standard 200-ohm load. Gain depends on the switchable input impedance, which can be set to 1,200 ohms or 300 ohms. At 1,200 ohms, the adaptation to our 200-ohm norm load is 1:6, below the rule-of-thumb 1:10 figure, but clearly still within voltage bridging, which is standard practice in audio and what modern mics and devices are generally designed for. At 300 ohms, the ratio is 1:1.5, close to impedance matching. Whether that's technically sensible, we'll leave aside, because anything goes if it sounds good. So we'll investigate the technical parameters in both modes. In the 1,200-ohm setting, the minimum gain is 16.3 dB and maximum is 66 dB; switched to 300 ohms, the minimum gain is 21.6 dB and maximum is 71.4 dB. The two variants differ only within normal unit tolerances.

With no pad on board, the maximum mic input level is +3 dBu (1,200 ohms) and –2.5 dBu (300 ohms). At those points, the THD ratio reaches 0.5% and rises steeply beyond. The maximum output level is +26.3 dBu; at these maxima, the standard model usually measures about

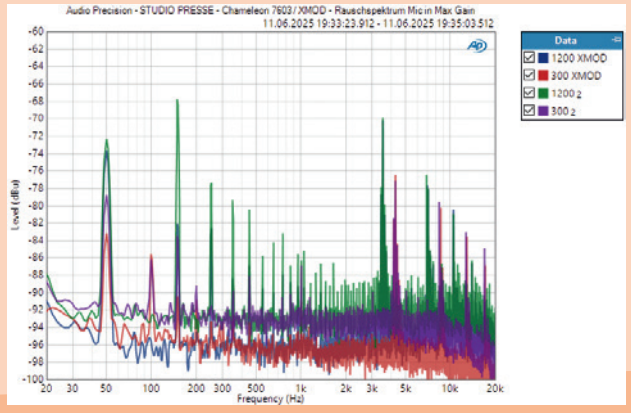



Diagram 1: 7603 — Noise spectra of the preamps at different impedances

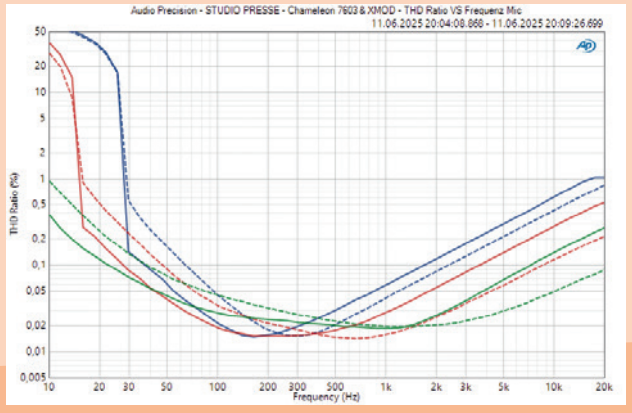



Diagram 2: THD ratio vs. frequency at –1 dBrG (blue), –7 dBrG (red), and –14 dBrG (green); 7603 XMOD (solid) and 7603 (dashed)

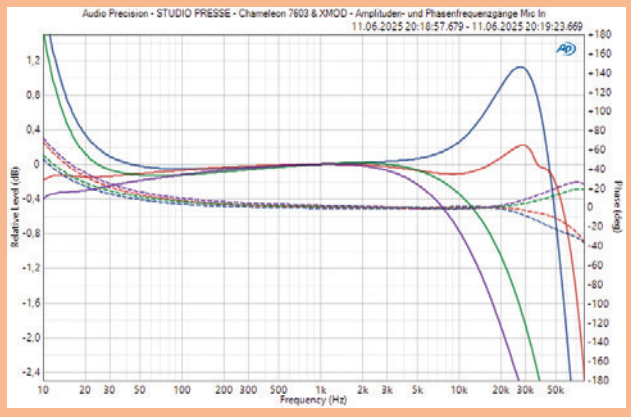



Diagram 3: Amplitude (solid) and phase (dashed) responses: 7603 XMOD 1,200 ohm (blue) and 300 ohm (green); 7603 1,200 ohm (red) and 300 ohm (violet)

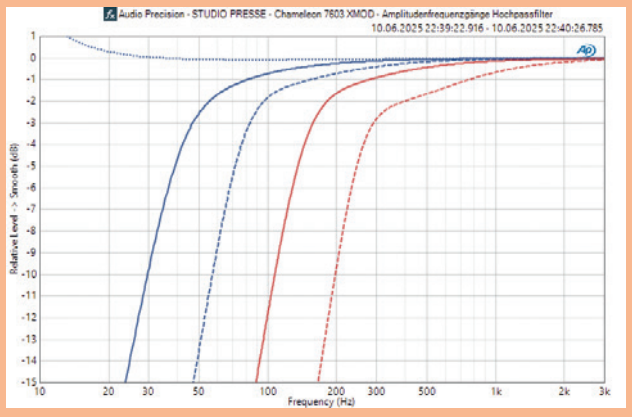



Diagram 4: 7603 — All high-pass filter settings

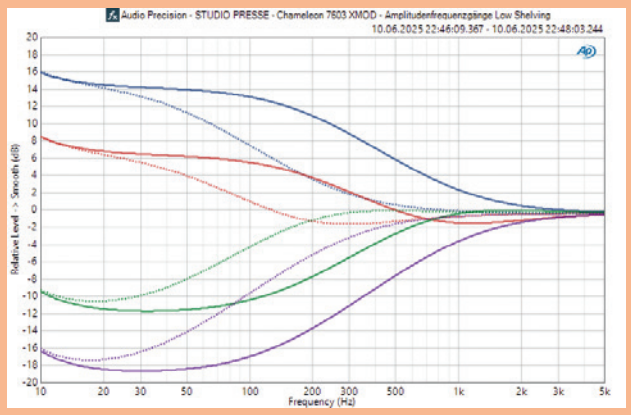



Diagram 5: 7603 — Low-shelf filter at 9 o'clock, 3 o'clock, and both end stops

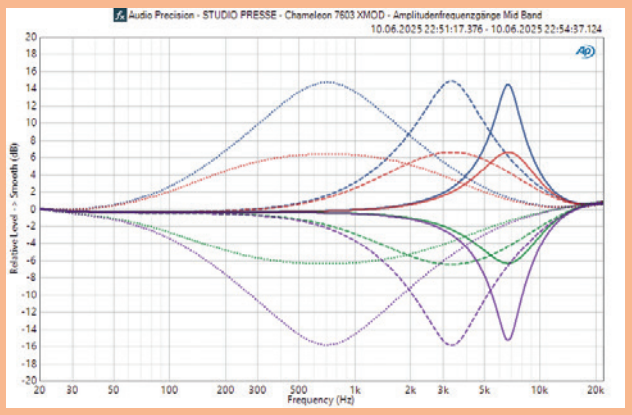



Diagram 6: 7603 — Mid peak filter at three center frequencies, at 9 o'clock, 3 o'clock, and both end stops

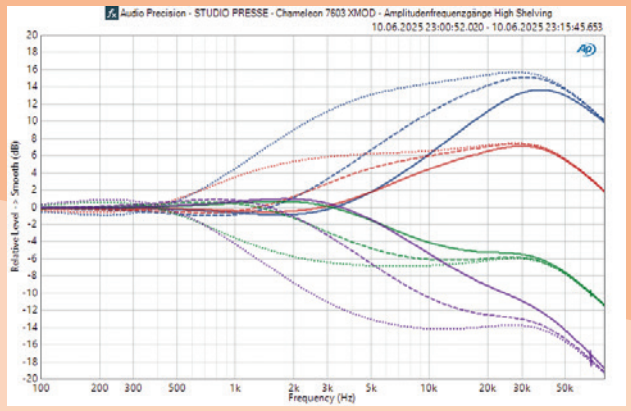



Diagram 7: 7603 — High-shelf filter at 9 o'clock, 3 o'clock, and both end stops

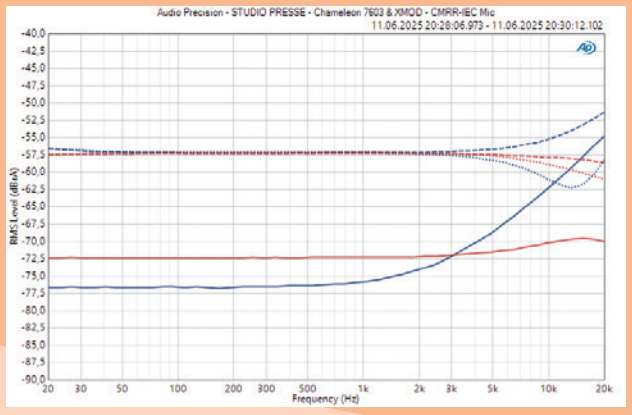



Diagram 8: CMRR—7603 (red) and 7603 XMOD (blue); top trace indicates the good result

0.1 dB lower, hardly significant. Unweighted RMS noise (20 Hz–20 kHz) at full gain is -56 dBu (1,200 ohms) and -53.6 dBu (300 ohms) for the 7603 XMOD, and –59.3 dBu (1,200 ohms) and -56.8 dBu (300 ohms) for the 7603. So the standard version is slightly quieter. This time, we dedicate the quasi-peak comparators to the memory of their co-inventor Gerhard Steinke; the ITU-R BS.468-4 figures indicate a slight tonal component at –43.8 dBu XMOD/–47.3 dBu (1,200 ohms) and –41.6 dBu XMOD/–44.6 dBu (300 ohms). Diagram 1 shows the noise spectra for both readings, where that tonal component appears more pronounced than expected – note we adjusted the scale for visibility.

From this, we compute an equivalent input noise (EIN) of 122 dB XMOD/125.3 dB (1,200 ohms) and 125 dB XMOD/128.2 dB (300 ohms). Do note, however, that without proper voltage bridging, EIN says little; the 300-ohms figure is therefore more anecdotal. The 1,200-ohms EIN lands in a good quality range. With minimum gain, the maximum dynamic range reaches 112 dB XMOD/117.2 dB for both impedance settings. Because the XMOD uses three transformers, we naturally looked at their influence on the distortion behavior: Diagram 2 plots the THD ratio vs. frequency at 1 dB below full scale (–1 dBrG), –7 dBrG, and –13 dBrG at 1,200 ohms. Interestingly, the standard model distorts slightly more than the XMOD version. The amplitude and phase responses for both impedance settings and both models appear in Diagram 3. Here we find more pronounced differences, both between the two units and, as expected, between impedance settings.

The high-pass filter's available cutoff frequencies are documented in Diagram 4; the slope is 12 dB/oct. Diagram 5 shows the low-shelving curves (two center frequencies) at maximum boost/cut and at approximate 3-o'clock and 9-o'clock middle positions; Diagram 6 does the same for the bell EQ in the mids, and Diagram 7 for the high shelf. Finally, Diagram 8 shows the common-mode rejection ratio (CMRR) at maximum gain and full scale, with good results in both versions.

## Measurements 7721 Stereo VCA Compressor

We continue with the 7721 VCA compressor; all measurements were taken with the compressor engaged. The maximum input level without compression is +13 dBu, and even with the gentlest settings, the transfer curve starts to tilt above that. Maximum input level under minimal compression is +20.8 dBu, yielding +19 dBu at the output. With make-up applied, the maximum output level tops out at +21.2 dBu, just slightly higher. The unweighted RMS noise (20 Hz–20 kHz) with the amplifier at unity is encouragingly low with 92.5 dBu. That yields a maximum uncompressed dynamic range of 105.5 dB and a maximum compressed output dynamic range of 112.3 dB. The ITU-R BS.468-4 quasi-peak value is –81.4 dBu; so no meaningful mains-related interference is expected. Diagram 9 fully confirms this. Moving forward, we have amplitude and phase responses without compression shown in Diagram 10. Diagrams 11 and 12 present families of compression ratios in hard- and soft-knee modes, respectively. Diagram 13 illustrates the sidechain filter's effect: with gain reduction set to exactly –6 dB, you can clearly see compression drop back to 0 dB below the filter frequency (at +6 dBu input). This plot is purely illustrative; real-world signals are always broadband. It's also interesting to observe the changes in THD ratio under compression. Diagram 14 shows this as a function of frequency, plotted at 0, 3, and 6 dB of gain reduction. The compression notably raises distortion in the low-frequency range. At equal gain reduction, we found no difference between hard- and soft-knee in this regard. Distortion onset is step-like and begins even before compression actually sets in, regardless of the level range. We also didn't see higher distortion at higher amounts of gain reduction. It's therefore a relatively static phenomenon, one that naturally leaves its imprint on the unit's "sound." We complete our bench tests with attack (Diagram 15) and release (Diagram 16): the stated time constants on the device shouldn't be taken too literally; they primarily serve recallability. Both attack and release are perfectly linear, as the curves show.

## Listening & Hands-On

I should preface this by the following: for their 1U dimensions, the Chameleon Labs units are unusually heavy. That should not fool me into premature judgment on sound quality, but it does set certain expectations. I first installed both preamps, the 7603 and its XMOD sibling, and "switched" by physically repatching mic input and line output each time. I hardly had to lean on auditory memory; the sonic differences were very obvious. My microphone was an MG U75, which I've proudly owned for many years. Given that both devices are transformer-coupled, I was surprised by how fresh, neutral, and clear the 7603 with its factory transformers sounded. The EQ's mid band can be applied far more generously here than on the Carnhill-equipped XMOD, which can present very restrained mids while projecting a decidedly forward presence. XMOD sounds soft, creamy-silvery, warm, and thick. It's hard not to think of a certain Mr. Neve's invention, even if the XMOD carries a touch less "weight" in terms of low-frequency energy and comes across a shade more present. Still, this is a genuine vintage tone you only get from transformers like these. The original 1073 used Marinair transformers; UK-based Carnhill Transformers has long supplied reproductions based on the original Marinair specifications on request. By contrast, the 7603 with factory transformers is the clearly more modern voice, with a

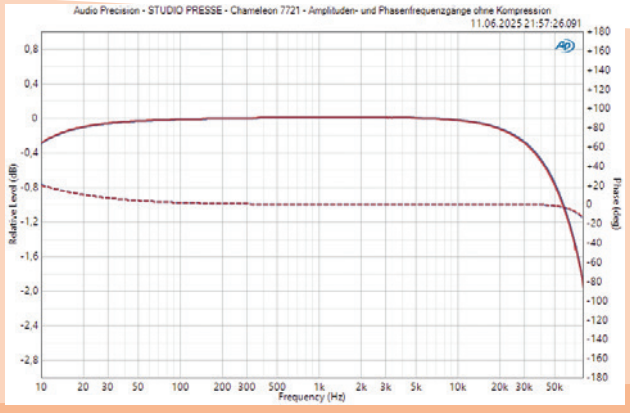



Diagram 9: 7721 — Amplitude (solid) and phase (dashed) responses without compression

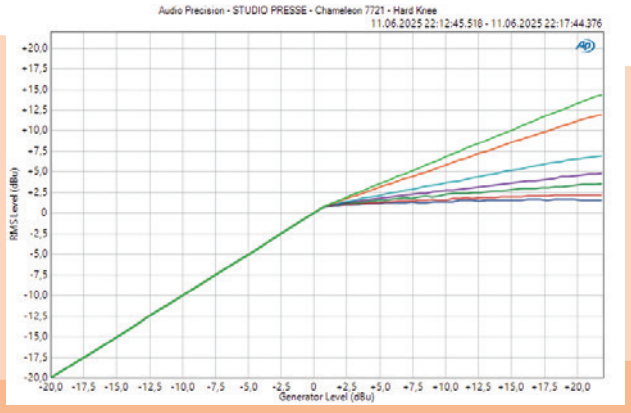



Diagram 10: 7721 — Hard-knee mode, all marked ratios at both end stops

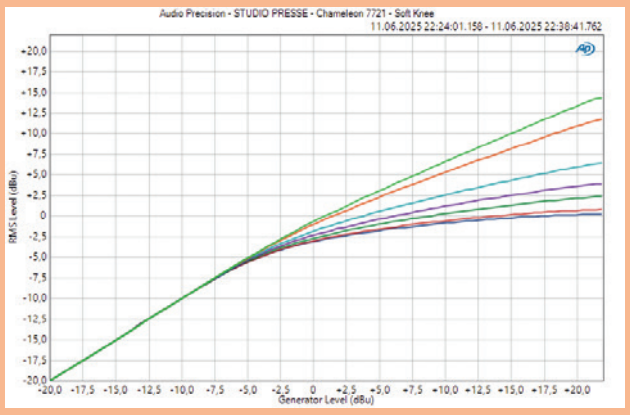



Diagram 11: 7721 — Soft-knee mode, all marked ratios at both end stops

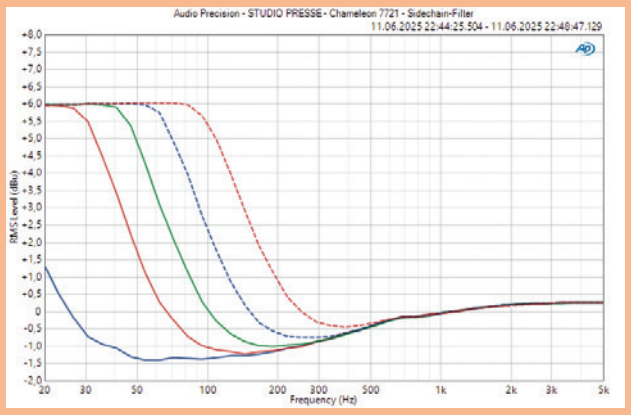



Diagram 12: 7721 — Illustration of sidechain high-pass; blue solid curve = no filtering

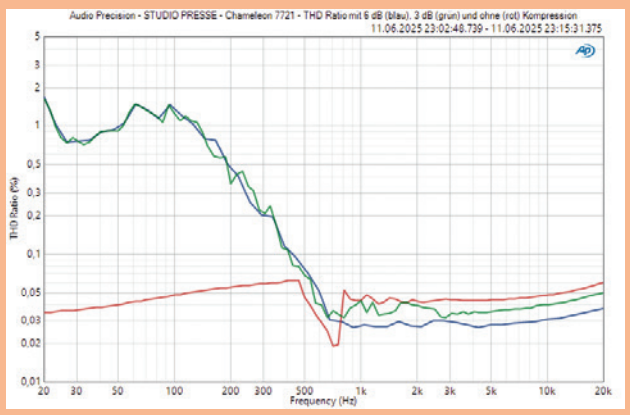



Diagram 13: 7721 — THD ratio with 6 dB (blue), 3 dB (green), and no (red) gain reduction

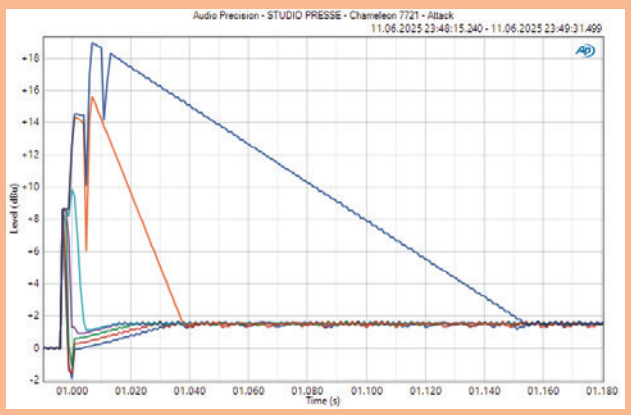



Diagram 14: 7721 — Various attack times

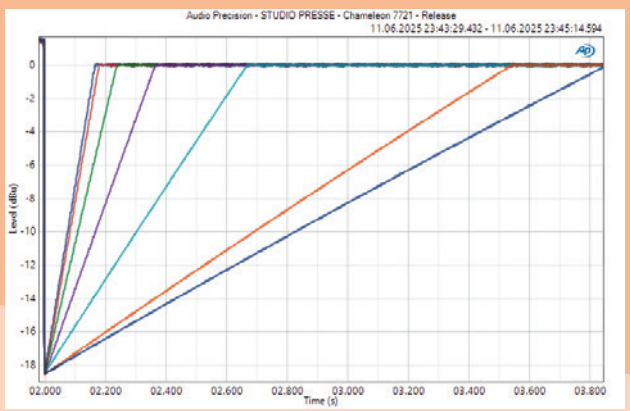



Diagram 15: 7721 — Various release times

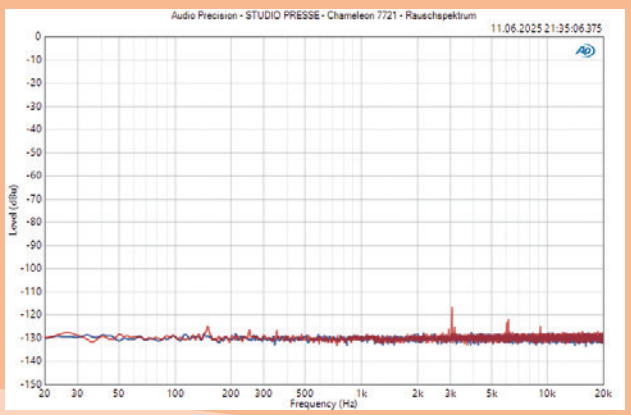
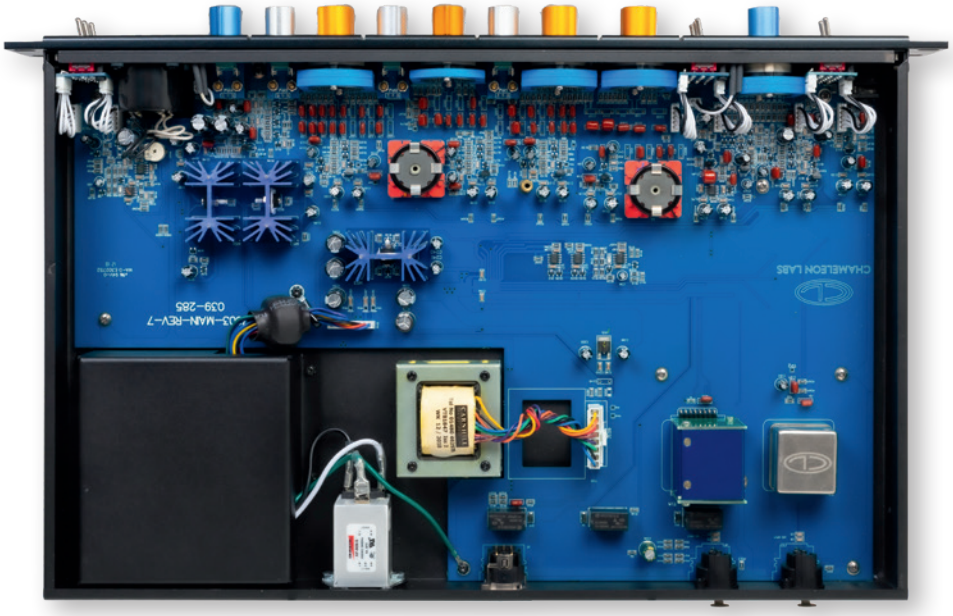



Diagram 16: 7721 — Noise spectrum



7603/7603 XMOD interior view

7721 interior view

very pronounced signature that also reacts more strongly to EQ. That pairing, an inductor EQ with a relatively neutral, natural-sounding preamp, has its own undeniable charm. I really liked the subtly saturated, musical picture it paints. The XMOD combo with the EQ, by comparison, comes across distinctly different. The lows have a weighty character, while the highs benefit from a beautiful shimmer and sparkle. Overall, the sound feels "politely reserved," yet on vocals, it creates a very intimate closeness. I couldn't pick one model over the other; it simply depends on what colors you already have at your disposal in your studio. The factory transformer version is truly more versatile because it colors less and can be steered in any direction. If, however, you tend to prefer that typical glaze, softness, and heft that a Neve 1073 delivers like no other, then you'll probably reach for the XMOD. As I said, I'm torn. We now jump to the 7721 stereo VCA compressor. I have a very specific idea of what a VCA compressor should do: I expect exact, almost surgical control with complete parameter access. The idealized model of a compressor, the kind you could use to demonstrate every facet of dynamics processing. Chameleon Labs, however, has bestowed its baby with a few traits that make it a little less predictable. First, there's no auto-timing, no program-dependent time constants. That requires reading the temporal structure of the signal and setting attack and release accordingly. How much do I want to spare or even spotlight transients (crucial on drums)? And how quickly should the gain reduction recover (often important for spatial impression and its emphasis)? The choice of Peak vs. RMS detection gives you another big lever; again, the decision needs to stem from the material in front of you. A typical practical scenario: it's very easy with the 7721 to slam a drum kit into the wall and then blend the result with the dry signal using the wet/dry control. That condenses the sound very effectively and, with a short release, accentuates depth and ambiance. With very fast attacks, you can give transients something like a "comet tail." But when you set out to process a full mix, a focused research process begins. I spent longer than usual on some songs looking for the sweet spot (hence the "spirited, hard-to-tame racehorse"). Once it locks in, the result is very convincing. What bothers me is the lack of a dedicated makeup gain control. The output level control remains active in bypass, which means you can't make a truly fair A/B. A practical quirk: level management is touchy. I saw the overload LEDs light up on input and output more often than I'd like. It's wise to calibrate your analog reference level when crossing domains. For ballads, soft knee plus RMS detection literally gave me weak knees. These settings let mixes breathe beautifully. With hard knee and peak detection, the 7721 turns into a scalpel for impressive signal control. But what creates this rich, warm, and thick sound? Friedemann and his bench tests set me on the right track: Distortion components (predominantly 2nd harmonic) are added shortly below the operating point (threshold), but only up to roughly 200 Hz. You can demonstrate this beautifully with a sine tone. It happens regardless of level management,

parameter settings, and the operating point itself. As soon as you reach the operating point, low frequencies receive a kind of level-independent "warmth treatment." This is really interesting and highly effective because it leaves the mids and the highs unadulterated and allows them to retain their transparent clarity. To conclude, it has to be said that the 7721 is a very versatile, very good-sounding instrument that does, however, require some skills. As such, it is "for serious ears only", as the review title states. But therein lies the appeal of the unit: you can do almost anything with it, as long as you think carefully about what you want to achieve and truly understand how to use the parameters. I don't mean to step on anyone's toes, but you do need to know your stuff if you want to handle a tool like this properly. I hope that comes across as encouragement. We now jump to the 7721 stereo VCA compressor. I have a very specific idea of what a VCA compressor should do: I expect exact, almost surgical control with complete parameter access. The idealized model of a compressor, the kind you could use to demonstrate every facet of dynamics processing. Chameleon Labs, however, has bestowed its baby with a few traits that make it a little less predictable. First, there's no auto-timing, no program-dependent time constants. That requires reading the temporal structure of the signal and setting attack and release accordingly. How much do I want to spare or even spotlight transients (crucial on drums)? And how quickly should the gain reduction recover (often important for spatial impression and its emphasis)? The choice of Peak vs. RMS detection gives you another big lever; again, the decision needs to stem from the material in front of you. A typical practical scenario: it's very easy with the 7721 to slam a drum kit into the wall and then blend the result with the dry signal using the wet/dry control. That condenses the sound very effectively and, with a short release, accentuates depth and ambiance. With very fast attacks, you can give transients something like a "comet tail." But when you set out to process a full mix, a focused research process begins. I spent longer than usual on some songs looking for the sweet spot (hence the "spirited, hard-to-tame racehorse"). Once it locks in, the result is very convincing. What bothers me is the lack of a dedicated makeup gain control. The output level control remains active in bypass, which means you can't make a truly fair A/B. A practical quirk: level management is touchy. I saw the overload LEDs light up on input and output more often than I'd like. It's wise to calibrate your analog reference level when crossing domains. For ballads, soft knee plus RMS detection literally gave me weak knees. These settings let mixes breathe beautifully. With hard knee and peak detection, the 7721 turns into a scalpel for impressive signal control. But what creates this rich, warm, and thick sound? Friedemann and his bench tests set me on the right track: Distortion components (predominantly 2nd harmonic) are added shortly below the operating point (threshold), but only up to roughly 200 Hz. You can demonstrate this beautifully with a sine tone. It happens regardless of level management, parameter settings, and the operating point itself. As soon as you reach the operating point, low frequencies receive a kind of level-independent "warmth treatment." This is really interesting and highly effective because it leaves the mids and the highs unadulterated and allows them to retain their transparent clarity. To conclude, it has to be said that the 7721 is a very versatile, very good-sounding instrument that does, however, require some skills. As such, it is "for serious ears only", as the review title states. But therein lies the appeal of the unit: you can do almost anything with it, as long as you think carefully about what you want to achieve and truly understand how to use the parameters. I don't mean to step on anyone's toes, but you do need to know your stuff if you want to handle a tool like this properly. I hope that comes across as encouragement.

## Conclusions

We're dealing with three top-class devices that deliver absolutely serious build quality and performance for comparatively little money – alongside an extravagant, very musical and versatile sonic palette. German distributor MasteringWorks (based in Cologne) lists the standard 7603 at €1,432 incl. VAT. That's a genuinely attractive price for such a solidly-built, well-equipped channel strip with a standout EQ. The Carnhill-equipped XMOD version costs roughly €400 more at €1,860, which is very moderate for a Neve-style strip. Finally, the 7721 stereo VCA compressor slots in between at €1,674. Again, a terrific offer for a high-quality device at this level. To sum up: two exquisite channel strips with three-band inductor EQs, each with its own color, and a versatile VCA compressor with that certain something, all at extremely competitive prices. More of this, please! All three hail from the "other" America, currently scarcely visible in the media, yet still firmly rooted in our heads and hearts.