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Copland CTA407

With solid-state and tube/transistor hybrid models in its range, Copland returns to its roots with an all-analogue, all-valve integrated that supports aftermarket tube upgrades
 Review: Mark Craven Lab: Paul Miller

By Copland's own reckoning, its noughties-era CTA405 integrated amplifier [HFN Aug '07] was an 'object of desire for audiophiles worldwide'. Now, some 16 years later, it has taken the idea of that model and considerably overhauled it – the £6500 CTA407 is both recognisably a descendant of the '405 and also markedly different.

How so? Well, the 40 LEDs along the front are a clue, as these give a visual indication of the operational status of the amplifier's quartet of power tubes. They're related to a new automatic tube biasing and diagnostic system – the CTA405 offered manual biasing only – and Copland says this platform, while compromising the simplicity of its typical approach, yields the CTA407 an impressive degree of flexibility.

LET'S ROLL

Successor model to the CTA405 it may be, but CTA407 buyers are perhaps more likely to compare it to the more recent, but now discontinued, CTA408 [HFN Apr '19]. That model was one of the first to employ KT150 power tubes, four combining for a rated output of 2x75W. Supplied here, however, are four Electro-Harmonix 6550s, resulting in a lower 2x50W figure [see PM's Lab Report, p59]. These can be swapped for any tube in the KT (Kinkless Tetrode) family, says Copland, making the CTA407 something of a tube roller's paradise.

However, the nominal output power does not increase with the beefier variants of these tubes. As chief designer Ole Møller explains, 'output power is primarily defined by the output transformer load impedance and the system supply voltage'. So, using a bigger tube like the KT150 will not give more power into 8ohm but will yield more current to support its output into lower, tougher loudspeaker loads.

RIGHT: A pair of 12BH7 and single ECC83 triodes form the input, line-driver/phase-splitter [bottom left] feeding pairs of 6550 beam tetrodes [middle]. The toroidal PSU transformer [top right] is 'standard' but toroidal audio output transformers [top left] are uncommon

The CTA407 is also unusual in employing high-bandwidth toroidal rather than conventional iron-core output transformers. This is an approach that has also been adopted in the past by the likes of Poland's Fezz Audio, but it's a first for the Danish company, and made possible by the auto bias system. Says Møller, 'The imprecision of manual push-pull bias adjustment can result in DC saturation of the core. With the introduction of ultra-precise auto bias calibration, the DC currents in the push-pull output transformer can now be perfectly cancelled'.

Available in a single black/silver two-tone finish, the CTA407 is all-analogue, with no digital connectivity/DAC stage onboard. Instead, it has generous connectivity on

unbalanced RCA terminals – four line-level ins, a tape loop, and a phono stage input.

PRETTY HOT

This last connection is designed for both MM and high-output (over 0.3mV) MC cartridges and operates with a fixed gain of 40dB. Meanwhile, speaker terminals are marked for both 4ohm and 8ohm loads [see PM's boxout, p57].

Described as a 'compact solution', the CTA407 is only svelte when viewed against the chunkier CTA408 – it's a full-width design and some 420mm deep.

Furthermore, because its tubes (the four 6550s, plus two 12BH7s and one ECC83 in the input/driver stage) are all enclosed within its ventilated chassis, it measures

'The collage of instruments spread wide and deep'



LEFT: Precision-milled rotaries select source and volume with the IR 'eye' and input LEDs in a centre dial. Tube biasing and status is indicated by blue/green/red LEDs set into a black skirt

215mm high front-to-back, and will need more space than that to deal with heat management. That said, it looks achingly pretty. The front panel will be familiar to brand fans as it has the symmetrical arrangement of controls, with a central nest of LEDs signifying the selected source, from earlier models. A dial on the left of the fascia handles input switching, while to the right can be found the volume control, which is motorised for use with the partnering RC-102A remote [see p59].

Back to those front-panel LEDs. After power on, the CTA407 takes around 30 seconds to 'boot up'. The LEDs will then illuminate, two blue ones showing the tubes are receiving a current, and then a third green one reporting the correct bias point has been reached. During music playback, depending on the demands put

on the amplifier, six further orange LEDs may flicker on and off. A final red LED will come on when the maximum output has been reached and will stay on if the amp enters protection mode. I didn't 'see red' during my audition but did enjoy watching those orange LEDs sparking into life during dynamic music moments. Don't want to be distracted? A button on the front of the CTA407 turns all but the green LEDs off.

METAL GURU

I won't call the CTA407 the little engine that could, as it's not little, but the power on offer here, and the weight and drive brought to music, is impressive. This isn't a model destined solely for easy-to-drive, high-sensitivity speakers, and it combines its punch and scale of sound with believable tones, rich bass, and

smooth highs that don't mask fine detail. The Copland CTA407's performance is as luxurious as its fascia is smart.

Power Trip's 'Executioner's Tax (Swing Of The Axe)' [Nightmare Logic; Southern Lord LORD236] is not the most eloquently recorded piece of music, favouring a heavy reverb that makes the thrash metal riffing and vocalist Riley Gale somewhat indistinct, but it has a potent bottom end that Copland's amplifier dug into with surprising vehemence. The breakdown at the song's mid-point, with its resonant, chest-thumping drums, was all the evidence needed that this amp can rock.

A similar, but slicker, experience came from Metallica's 'Lux Aeterna' [72 Seasons; Blackened BLCKND055-2], where the furiously paced rhythm section and attacking guitar sounded huge and lively. The production here is polished in a way the Power Trip album isn't, and it gave the CTA407 more scope to show off a clear, ear-friendly approach to high frequencies.

FRANTIC FIDELITY

I might argue that such music is a waste of this amplifier's talents, though. The appeal of the CTA407 also lies in its delicacy, and ability to render all manner of instruments in a lifelike manner. Playing Billy Joel's 'Travelin' Prayer' [Piano Man, Mobile Fidelity Sound Lab; 88.2kHz/24-bit], I was struck by the detail of the bassline, but more so by the rich texture and open sound of the piano chords. As the track builds, with banjo, percussion, violin and vocals, the mass of the music was well conveyed, without smear or thickening up. It's a piece of frantic playing and dynamic swings, and the CTA407's speed of delivery and power reserves was up to the challenge.

This amp likes to play loud. Pink Floyd's 'Comfortably Numb', recorded for *Is There Anybody Out There: The Wall Live 1980-81* [EMI 5235622], powered from Perlisten's S5t speakers [full review in HFN ↗

TAP DANCING

Almost all valve amps employ a transformer to step-down the high voltage / high impedance output of their power tubes – 6550s in this instance – to better match the lower impedance and higher current demand of the attached loudspeaker. Copland offers 8ohm and 4ohm output taps conceived to 'match' nominal 8 and 4ohm loudspeaker loads, respectively, even though almost no speakers provide such a 'flat' impedance. Instead the load swings up and down with frequency as the various reactive components of crossover and drivers come into play – the system response rising with increasing speaker impedance and falling with decreasing impedance.

I mention ARC's recently reviewed I/50 integrated in my Lab Report [see p59] as it shares the same tube and 50W specification as the CTA407, but differences in the output impedance of their '8ohm' taps are helpful in illustrating why two ostensibly similar tube amps can sound different with your (reviewer's) choice of loudspeaker. Through bass and midrange, the 8ohm taps of both the CTA407 and I/50 show a fairly flat output impedance of 0.75ohm and 0.9ohm, respectively. As a result both amplifiers react comparably to different loudspeaker loads up to about 8kHz. At higher frequencies, however, the I/50's output impedance starts to rise more swiftly than in the CTA407 – 2.6ohm vs. 0.8ohm / 10kHz and 6.2ohm vs. 1.0ohm / 20kHz, for example. The Perlisten S5t floorstanders mentioned by Mark in this review dip from 7ohm at 6kHz to 3ohm at 15-20kHz so the I/50's high treble roll-off would be more marked at -6dB/20kHz relative to the Copland/Perlisten pairing. The result? Copland's CTA407 will likely deliver a more consistent sound with different partnering loudspeakers. PM

COPLAND CTA407



ABOVE: The MM/MC phono input is joined by a tape loop, four line ins and pairs of 4mm speaker terminals connected to 8ohm and 4ohm output transformer taps

Dec '23] with a fulsome quality to the synth notes and bass guitar, and with the level up high and those LEDs flickering orange the weight and scale of the performance was superb. Gilmour's famous guitar solo, played here through a barrage of effects, was smooth and fluid.

FULL MOON

But something else I love about the CTA407: even at polite listening levels, a sense of its dynamic power and detail comes through. Sure, it will induce bigger grins with the volume cranked, as you can appreciate the potency of its power tubes, but a 'background music' session with The Police's *Every Breath You Take - The Classics* [A&M Records; 88.2kHz/24-bit] still had me cocking an ear to appreciate drums in 'Invisible Sun', and the supple bass of 'Walking On The Moon'.

Indeed, the CTA407's handling of lower frequencies might just be the icing on this Danish pastry. The amp showed extension and control over the deliberate bass thumps in Nelly's 'Country Grammar' [Universal Records; 44.1kHz/16-bit], and an even better grasp of upper bass/low mid details, as revealed by the left hand of pianist Susan Tomes on Beethoven's 'Archduke' [...*The*

Complete Music For Piano Trio, Hyperion; 44.1kHz/16-bit]. This piece was also rendered with excellent dynamics, which evoked the hard presses of keys and the urgent flurries of strings.

LEFT: Copland's chrome-edged RC-102A system remote caters for its legacy CD player and, for the CTA407 amp, offers standby and volume plus input selection



The CTA407's skill at unpicking detail and finding the leading edge on instruments, without veering into 'analytical' territory, gave this superb recording an in-the room feel. But for an even more dramatic demonstration of its full set of abilities - from soundstaging to tonality - look no further than Miles Davis' reference-quality *Bitches Brew* [Legacy 88985474622]. A perennial fave, 'Miles Runs The Voodoo Down', became a collage of instruments spread wide and deep, blasts of trumpet a counterpoint to quieter, smoother tones of a soprano saxophone stage-right.

Similarly, Kula Shaker's 'Mystical Machine Gun', from their 1999 album *Peasants, Pigs And Astronauts* [Columbia 493142 2], mixes Eastern musical influences with standard alt rock guitar, and a well-organised soundfield with drums set far back. There's a smorgasbord of different tones and textures to be enjoyed here, from Crispian Mills' sneering vocals to the keyboard effects. Kula Shaker were once described as a 'joke band' by a UK newspaper, but there was nothing laughable about the CTA407's performance when tasked with serving up this track. What was it that Copland said about an 'object of desire'? ☺

HI-FI NEWS VERDICT

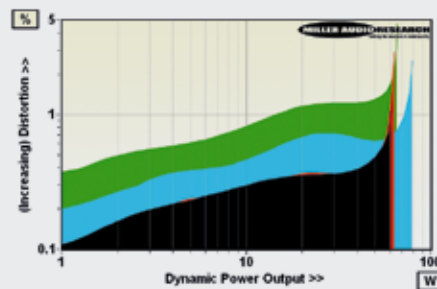
An all-analogue integrated tube amplifier with some thoroughly modern technology under the hood, Copland's new CTA407 is worthy of its top-flight status within the boutique brand's catalogue. It's operationally slick, beautifully finished and sounds, for want of a better word, lush - smooth, natural and refined, but powerful and dynamic too. Tube rollers will also appreciate the flexibility of its auto-bias.

Sound Quality: 88%

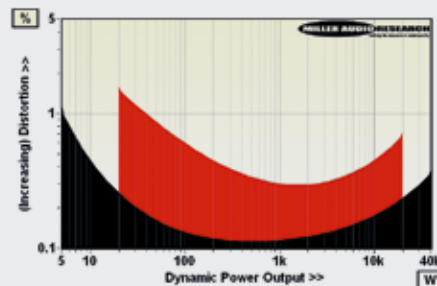


Copland suggests that 'a pair of 6550s in push-pull can deliver more than 100W of audio power' which is exactly what VAC achieves in its Sigma i200 [HFN Aug '21], even though most hi-fi applications will settle on a 50W specification for a pair of 6550s or KT88s in ultralinear configuration. That's the case here just as it is for the 6550s used in Audio Research's competing I/50 integrated tube amp [HFN Oct '22]. Power output meets Copland's 50W rating at 2x53W and 2x54W into 8 and 4ohm loads via the 8 and 4ohm taps, respectively, and there's a hint of headroom under dynamic conditions where 62W, 62W, 79W and 65W is achievable into 8ohm (8ohm tap) and 4, 2 and 1ohm [all 4ohm tap; see Graph 1]. With a maximum current delivery of 8.06A (10msec/1ohm at <1% THD) the CTA407 is capable, but clearly best partnered with sensitive speakers.

While the amplifier's power profile (and power consumption) is not dissimilar to that measured with the I/50, the CTA407's linearity versus power and frequency is arguably better controlled, resulting in a flatter response (-0.25dB/20kHz vs. -2.9dB/20kHz) and lower HF THD (0.7% vs. 3.2%/20kHz, all re. 10W). Like most tube amps, the CTA407's general distortion trend is higher at low bass frequencies (1.5%/20Hz, re. 10W) despite the novel toroidal output transformers [see Graph 2, below] while also increasing gently with level from 0.12%/1W, 0.3%/10W up to 0.4% at the rated 50W (all 1kHz into 8ohm). Overall gain is high at +41dB - a minimum of +20dB would be required to raise the rated 50W output with a modern 2V line-level source like a CD player or DAC - but noise is low and the A-wtd S/N ratio a very generous 90.5dB (re. 0dBW). PM



ABOVE: Dynamic power output versus distortion into 8ohm (black trace), 4ohm (red), 2ohm (blue) and 1ohm (green) speaker loads. Max. current is 8.06A



ABOVE: Distortion versus frequency versus power output (1W/8ohm, black and 10W/8ohm, red)

HI-FI NEWS SPECIFICATIONS

Power output (<1% THD, 8/4ohm)	53W (8ohm tap) / 54W (4ohm)
Dynamic power (<1% THD, 8/4/2/1ohm)	62W / 62W / 79W / 65W
Output imp. (20Hz-20kHz/100kHz)	0.745-1.02ohm / 1.67ohm
Freq. resp. (20Hz-20kHz/100kHz)	-0.0dB to -0.25dB / -4.6dB
Input sensitivity (for 0dBW/50W)	25mV / 185mV
A-wtd S/N ratio (re. 0dBW/50W)	90.5dB / 107.5dB
Distortion (20Hz-20kHz, 10W/8ohm)	0.29-1.5%
Power consumption (Idle/Rated o/p)	160W / 277W (1W standby)
Dimensions (WHD, with ears) / Weight	435x215x420mm / 20kg