TEAC UD-507 DAC/Preamp

70 Years of Innovation

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The first thing most audiophiles think of when they hear "TEAC" is tape decks. TEAC developed a well-deserved reputation for both consumer and professional tape machines that has lasted to this day. And while TEAC, founded in 1953, no longer specializes in analog tape recorders, they are still producing a complete line of consumer audio gear, including DAC/preamplifiers. The UD-507 is the latest DAC/pre from TEAC. It represents TEAC's current thinking on what it takes to create an affordable reference-level DAC.

My experience with TEAC dates back to my college days when I acquired a TEAC 1200-U tape deck. I used it to record many live Boston Symphony broadcasts via WCRB, and live rock converts from WBCN. At some point, I relinquished the 1200U in favor of an Advent model 200 cassette recorder. That unit was built for Advent by Nakamichi. It was a dog, soon replaced by the Advent model 201, which was built by Wollensak. My model 200 spent so much time at Advent's repair facility in Cambridge, Massachusetts, that I made a special deal with the service manager to expedite the repairs.

In the mid 90s, I acquired several complete TEAC H-300 and H-500 systems for ridiculously small sums from Ubid, which was an online liquidator. The H series included integrated amplifiers, tuners, tape decks, CD players, and CDR recorders. I had enough to make two complete systems, which after spending some time in my bedroom, were given to young relatives as starter systems (both of which are still up and running to this day). I kept a CDR recorder and H-500 amplifier (just in case), and they live on a shelf looking pretty. Unlike that Advent model 200, all the TEAC gear I've experienced has been rock-solid and reliable.

Given my past experience with TEAC gear I was eager to see how its current offerings stacked up. So, without further digressions, let's dive into the TEAC UD-507 DAC/preamplifier.

Technical Tour

At the beginning of 2024, Esoteric merged with its parent company, TEAC. This formalized a decade-old arrangement that trickled down some of Esoteric's high-performance expertise to the TEAC brand, while enhancing Esoteric with TEAC's manufacturing and marketing capabilities. Esoteric brought a multitude of new technology solutions to the TEAC line, the first of which is the DAC circuit itself. Unlike other brands who employ either a DAC chip from AKM or ESS or a ladder resistor array, the UD-507 has a unique delta-sigma modulator developed in-house and implemented in a field-programmable gate array (FPGA), a configurable integrated circuit that can be programmed to perform virtually any function. The UD-507 has two internal clocks, one at 44.1kHz and a second at 48kHz, as well provisions to accept a 10MHz signal from an external clock. The UD-507 DAC section also supports upsampling with 2x, 4x, and 8x options.

The UD-507's converter section is a dual-mono configuration, which continues throughout the analog section. It also supports a fully balanced signal chain from the DAC to the analog outputs. And even though it is in a ¾-sized rather than a full-sized chassis, the UD-57 includes two toroidal power transformers, one dedicated to the digital circuits and the other supporting the analog circuits.

The UD-507's volume control functions in the analog domain, employing something TEAC calls its "Quad volume control system." It employs four separate circuits, one for the left positive, one for the left negative, one for the right positive, and one for the right negative. Adjustment increments are 0.5dB. The UD-507's analog signal chain also employs TEAC HCLD2 (High Current Line Driver), which TEAC claims increases current transfer capabilities. Analog output can be directed to one of the headphone outputs or either the single-ended RCA or balanced XLR, but not both simultaneously.

The TEAC UD-507 includes a robust headphone amplifier capability. It supports not only XLR balanced headphones but also includes a Pentaconn and ¼" single-ended connections. Besides buffering the headphone circuit, the headphone amp employs something TEAC calls balanced/active grounding, which fixes the ground potential at 0 volts. TEAC claims the circuit can handle 600-ohm headphones without issues.

Formats supported by the UD-507 incude MQA, as well

as multiple Bluetooth codecs including LDAC, aptX DH, AAC, and SBC. DSD is also fully supported with capabilities up to 22.5MHz. All PCM formats are supported up to 384/32.

Vibration control in the TEAC UD-507 begins with its feet. TEAC's "Stressless Feet V2" use a gap between the plate and the foot that TEAC claims "thoroughly controls vibrations that affect sound quality." It's a tripod arrangement that appears quite floppy until placed on a surface. Both transformers also have their vibrations controlled via a floating structure separated from the base.

Ergonomics and Setup

I had initially planned to set up the UD-507 as a DAC/pre in my primary desktop reference system, which requires a preamplifier that can output both balanced XLR and single-ended RCA simultaneously. One of the features of the UD-507 that I mentioned earlier in the review is that it can output either RCA or XLR but not both. That put the kibosh on that scheme. While I understand TEAC's engineers' decision to choose this methodology because it would yield superior sonic results, the ergonomic downside is that for many prospective users the single-output option will reduce the unit's desirability.

Instead, I installed the UD-507 in my main reference system as a dedicated fixed-output DAC. When the UD-507 was used as a DAC, the unit's remote got very little use after initial setup. It did come in handy when I wanted to utilize the UD-507's upsampling capabilities. With it, I could remain in the listening position when I switched sampling rates. Roon users will find that the UD-507's upsampling features are somewhat redundant since they can do all that and more inside the Roon application.

Setup proceeded without issues. Once I connected the UD-507 to an Ethernet-wired Raspberry Pi4B via the Pi's USB output, my Roon Core immediately recognized the UD-507. Playback was instantaneous and without issues. The UD-507's fixed output via balanced XLR had enough gain to allow me to utilize the Schiit Freya S preamp in passive mode, where it acted as a buffered volume control with no gain. The Freya S was connected via its balanced outputs to an Orchard Audio Starkrimson Ultra stereo amplifier, Pass 150.8 amp, or a pair of Fosi V3 monoblock amplifiers. The single-ended RCA connection from the Freya went to a pair of JL Audio Fathom f112 subwoofers. Loudspeakers used were my longtime reference, Spatial Audio X-2 loudspeakers.

The display on the UD-507 is easy to see when the device is used within arm's reach. When I was more than 10 feet away, it became difficult to read. The remote control's range was impressive. At more than 25 feet away, it had no response issues. Also, the angle of acceptance was excellent, exceeding 120 degrees.

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Sound

Since TEAC opted to employ its own proprietary DAC circuitry, there is the potential for the UD-507 to have a different, perhaps even unique, sonic signature due it its distinctive digital circuitry. Fortunately, the internal design decisions did not result in a presentation that was non-linear, less accurate, or less neutral than what I've heard from my reference DACs over the years.

While many audiophiles assume that each particular DAC technology has its own unique sonic attributes, and on paper DACs' specifications can vary, I have not found ESS, AKM, and FPGA DAC topologies to be sonically different enough to be readily identified by listening. To my ears the analog and power-supply implementations around a DAC chip can have a greater effect on the final sound than the chip itself.

My current reference DAC during the review period was a Topping D90SE. After matching levels, which required turning down the Topping by several dB, I ran A/B comparisons using Roon's grouping feature. Both DACs were connected to a Raspberry Pi4B which was hardwired to my Ethernet. One nice feature of a Raspberry Pi 4B when configured as a Roon endpoint is that it will support more than one DAC simultaneously, so both were on the same signal chain, which is ideal for a level-playing-field comparison.

While I do not use an ABX comparator, I could do quasi-blind tests when I employ the Schiit Freya S preamplifier in passive mode. Since the Freya S has absolutely no switching noise, I could go from DAC to DAC without interruption or any hint the change had occurred, once levels were critically matched. It was easy to forget which DAC was A and which DAC was B, unless I looked over at the Freya S front panel. Also, I often had to look to see if the Freya had switched, since the switchover was virtually silent.

I performed matched-level comparisons over a month-long period. Never once could I find any "tells" that could determine which DAC I was listening to. In every sonic parameter these two DACs produced what I would have to call identical results! They both sounded extremely transparent with little in the way of additive or subtractive colorations or personality. Both also had superb image specificity and dimensional

characteristics. On my own recordings I could hear the spatial relationships between instruments clearly without any truncation or expansion.

Since the TEAC UD-507 supports headphones, I tried a range of different phones during several listening sessions. You have three connection options on the UD-507's front panel: XLR balanced, ¼" single-ended, and balanced Pentaconn. With my most difficult-to-drive headphones, the Beyer Dynamic DT-990 600 ohm, even the ¼" single-ended output had more than adequate drive. When I maxed out my high-volume limit, I still had 11.5dB left before peak output. With the Dan Clark Stealth headphones connected to the balanced XLR connection, I had even more headroom, with my max limit reaching 15dB left on the volume dial. Finally, I tried my most sensitive custom in-ear, the Empire Ears Zeus, I did hear some amount of base-level noise in the form of hum. While at normal listening levels it was almost imperceptible, it was still present.

The Sound With a TEAC GG-10M-X External Clock Added

About a month into the review TEAC unveiled its GG-10M-X external clock for the 500 series ($1999). Using an OCXO (oven-controlled crystal oscillator), the GG-10M-X offers a frequency precision of plus or minus 0.1ppm. Its 0.5Vrms clock signal is available via one of four BNC connections, so it can clock four components simultaneously. When initially turned on, it takes approximately two minutes for the GG-10M-X to achieve stable operating temperature for the OCXO, during which it consumes 15.4W. After the initial warm-up, the GG-10M-X settles down to only 10W power usage.

I connected the GG-10M-X to the UD-507 with a two-meter BNC-terminated generic digital cable sourced from Amazon, after I discovered that the GG-10M-X came without any cables besides an AC cord. The GG-10M-X owner's manual stressed *not* using any AC cables except the one supplied. I discovered why when I tried to use a premium AC cable and found the AC connection would not work because the prongs in the TEAC are set deeper and require hardware that allows the AC cable's barrel to sit deeper into the GG-10M-X chassis. I found that many premium AC cables, with their larger barrels, would not fit. But the supplied cable fit just fine, so I used it.

The UD-507 menu allows the clocks to be switched on the fly so comparisons were instantaneous without clicks or pauses in the music.

External digital clocks' primary purpose is to permit multiple digital devices to share the same clock signal. This shared clock allows these devices to be accurately synchronized. This is critical for high-quality audio/video production. Because of this need, external clocks have been available for many years. Some engineers, in some systems, found that using a clock improved sound quality. Other engineers, using different equipment, found no sonic improvements after many tests. One reviewer surmised that the reason the more accurate clock's sonic advantages were negated was by the distance the clock was from the DAC chip, while the internal clock chip is often located next to the DAC chip on most DAC boards. Having read both sides of this discussion, I was eager to hear for myself in the OCXO clock would improve the UD-507's sonic presentation, which to my ears was already excellent.

After multiple listening sessions on multiple days, I could not hear any sonic differences when the GG-10M-X was employed versus the UD-507's own internal clock. The UD-507 menu allows the clocks to be switched on the fly, so comparisons were instantaneous without clicks or pauses in the music.

Near the end of the review period, I acquired a Gustard A26 DAC ($1499), which uses the latest AKM chipset combo and also has provisions to accept an external clock. So, I connected the TEAC GG-10M-X clock to the A26 via another 2-meter BNC digital cable. A nice feature of the Gustard A-16 was that I could switch from internal to external clocks on-the-fly via the Gustard remote. After several listening sessions on multiple days, I could not reliably tell the internal from the external clock on the Gustard A26. My conclusion was the internal clocks on both the UD-507 and A26 are fine, and unless you need to synch your DAC with a video device, you may find, as I did, there is little need to add the GG-10M-X to your signal chain.

Of course, I compared the Gustard A-26 to the TEAC UD-507. I connected them so that each got their clock signal from the GG-10M-X. The TEAC was connected to a Raspberry Pi4B hardwired to my Ethernet while the Gustard was connected to the Ethernet via its own Ethernet port. I ganged both DACs together via Roon's ganging feature, so that they would both receive the same signal at the exact same time.

Matching output levels required lowering the Gustard's level by 6dB (as delineated on its volume reading) since it has a maximum fixed output of 5V as opposed to the TEAC's output of 4V. Once I matched levels, I could not reliably tell

Specs & Pricing

Type: DAC/preamp/headphone amplifier
Inputs: USB, SDIF coaxial, TosLink, Bluetooth, 10MHz clock
Formats supported: Linear PCM 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz, 192kHz, 352.8kHz, 384kHz 16-bit, 24-bit, 32-bit DSD 2.8MHz, 5.6MHz, 11.2MHz, 22.5MHz
Output: Balanced and unbalanced, fixed or variable
Dimensions: 11½" x 3⅜" x 9⅞"
Weight: 4.9 kg (10 7/8 lbs.)
Price: $2099

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one DAC's feed from the other. Both produced reference-level results from my own recorded music files. I was especially impressed by these DACs ability to place instruments precisely in the soundstage. On my recording of Mr. Sun playing "Danny Barnes," there's a point where the musicians make very brief exclamations at the end of one particular solo. Both DACs preserved the slight separation in space between the two voices clearly.

Summary

Digital to analog converters, especially chip-based DACs, have progressed so far and so fast that if you're the kind of audiophile who demands state-of-the-art specifications, you know that some extremely inexpensive DACs, such as the Topping E-30II, have specs that rival or beat almost everything else, regardless of price or internal technology. But the sound? I've read about disappointed audiophile's experiences where superior digital specifications didn't relate directly to better sound. Why? I think it's simply because the DAC and the digital section of any digital-to-analog device is merely a small part of the whole design. And while it has become relatively easy and inexpensive to build an excellent digital section for a DAC, the same is not true for the analog sections. In the analog world you do get greater sonic returns when better, lower-distortion circuitry is employed. I've heard for myself how much more expensive op-amps can improve the sonics of a basic DAC output section or a driver in a Class D power amplifier. A custom-designed analog circuit with dedicated power supply, such as you find in the UD-507, can be a substantial sonic step up from even a premium op-amp used in a basic one, and is one of the primary reasons that flagship-level DACs sound as good as they do.

Circling back to the TEAC UD-507, I found that for me it produced reference-level sonics. On my own live concert recordings, the UD-507 delivered all the detail, depth, and harmonic complexity captured on the masters. Ergonomically, it is certainly fully featured. With both headphone and line-level outputs, the UD-507 can accommodate either a desktop or room-based system, as either a variable-output digital preamplifier or fixed-output DAC. Quibbles? My principle ergonomic issue is the UD-507's inability to output both XLR and RCA line-level simultaneously, but for many potential users this may not be an issue.

TEAC has made an excellent DAC in the UD-507. This isn't just another collection of off-the-shelf parts but rather a product that incorporates novel technologies, reflecting TEAC's 70-year history of audio innovation. tas