

The Cutting Edge



Soudution 757 De-Emphasis Preamplifier

Product of the Year!

Jonathan Valin and Andre Jennings

It is not often in high-end audio that you come across a product that establishes a brand-new component category—and sounds spectacular doing so. The \$85k Soudution 757 de-emphasis preamplifier is such a one.

Physically, it looks very much like the (superb) phonostage it replaces, the 755—a smooth, spare, Bauhaus-handsome aluminum box with a rectangular LED window in the center of its front panel (to display input, volume, and menu choices) and three round pushbuttons to its left (for power, mute, and programming). On closer examination, you will see that its control layout is slightly different than that of the 755 (e.g., it has a single knob for setting volume and menu-option browsing/selection, instead of the separate knobs previously used for each task). And the menu itself has different offerings, including, among several new and exciting choices, six different mc/mm LP equalization curves—for those of you who listen to monos engineered before the RIAA era. However, it is the 757's unprecedented functionality that sets it apart from its competitors—and puts it in a category of its own.

The 757 is not just a world-class moving-coil/moving-magnet phonostage with superbly accurate ($\pm 0.05\text{dB}/20\text{Hz}$ – 200kHz) magnetic equalization; it is also an optical equalizer with a wideband transimpedance amplifier that EQs (again with $\pm 0.05\text{dB}/20\text{Hz}$ – 200kHz granularity), boosts, and converts to

voltage the output current of DS Audio cartridges; in addition, it is a head amp for tape players (with IEC and NAB equalization and a calibration network that allows for EQ compensations for tape-head misalignment or irregularity). To top all this off, the 757 is a functional analog preamplifier, using the same output circuitry and distributed local SMPSEs found in Soudution's reference 727 linestage. For considerably more detail on the 757's remarkable design, see my interview with Soudution's CEO and Chief Engineer Cyrill Hammer, printed below.

As far as I know, there has never been anything else like the 757—at least in the modern stereo era. Of course, this incredible versatility—which permits the true analog lov-

er to bypass purchasing a linestage or a Grand Master EQ (or other comparable optical EQ unit)—wouldn't amount to a hill of beans (in this world) if the thing didn't sound great. Guess what? It sounds great. And I mean *really* great. And it does so with *every* source connected to it. I haven't yet heard Cyrill Hammer's newest amplifier, the 717, but unless (or maybe, until) it proves to be a doozy, I can't think of another component he has created that outdoes this one. In short, it is an engineering masterpiece.

How does the 757 handle so many different equalization and gain tasks at the same time? As Cyrill explains in the sidebar, Soudution started by dividing chores between two separate input circuits: one for magnetic sources that generate very low voltages (such as mc phono cartridges and tape decks); and the other for optical sources that generate relatively large amounts of current (such as the DS Audio cartridges). Both input circuits are dual mono (the left and right channels have their own massively shielded, phys-

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ically isolated PCBs and are thus completely separated from one another and from interference caused by the AC sections of the preamp). Soudution says that this layout allows for “much better channel separation (>100dB) than previous models.”

Once eq'd, signals are then fed to a Class A output stage that is virtually the same as the one found in Soudution's fabulous 727. As I explained in my review of Cyrill's new linestage, this output circuit is, in and of itself, a remarkable creation. It boasts incredibly high bandwidth (20MHz, -3dB)—to eliminate phase shifts that muddle amplitudes and tonalities—and incredibly low distortion—so low, in fact, that it cannot be measured. As in the 727 linestage, gain is handled by high-speed, ultra-low-noise operational amplifiers, which together with relay-switched high-precision metal-foil resistors form an 80-step (1dB/step) control unit. Each channel has its own gain circuitry, allowing for balance adjustment via the appropriate menu option.

That menu—accessed by pushing the front-panel Program button, rotating the volume control knob through the options for each of the three inputs listed on the display screen, and then depressing the volume knob to make selections—also allows you to high-pass filter the bass below 20Hz, invert polarity, choose stereo or mono output, select the type of magnetic system (moving coil, moving magnet, tape) used on Inputs 1 and 2, limit the maximum gain on Inputs 1, 2, and 3 (mc, 80dB; mm, 60dB; tape, 70dB; oc, 120dB), choose de-emphasis curves for Inputs 1, 2, and 3 (RIAA, Decca, Columbia, Teldec, London, NARTB for mm/mc/optical cartridges and a variety of IEC/CCIR and NAB curves for tapes); select impedance for mc cartridges on Input 1 (10 ohms to 1000 ohms); set capacitance for mm cartridges on Input 1 (0 to 750pF); activate the power supply for optical cartridges on Input 3; lift the ground in XLR interconnects on each input; set the brightness of the display; and call up many other functions.

On the back panel of the 757, you'll find three pairs of RCA and two pairs of XLR inputs with accompanying grounding

posts—Inputs 1 and 2 designed for use with voltage sources (mc cartridges and tape decks, respectively) and Input 3 with current sources (optical cartridges). The 757 also has three pairs of outputs (two XLR, one RCA) for connection to your amplifier, linestage, or powered subwoofer.

Time to talk sonics.

Because he's got more tape decks than I do (or anyone else I know does) and uses more mc's than me, I've asked my friend Andre Jennings to comment on the sound of the 757's magnetic de-emphasis stage (see Sidebar 1), with the understanding that I've listened at some length to the unit with mc's and tape decks, both at my home and at Andre's, and completely agree with his findings. I will concentrate on the 757's overall performance and then focus on its sound with DS Audio optical cartridges.

Perhaps it is the extremely high bandwidth and unmeasurably low noise of their near-identical output stages, along with the exceptional-

ly precise equalization and distortion-free gain of the dual-mono magnetic and optical input stages (noise density <-170dBV and common mode rejection >100dB), but the 757 has the same sonic virtues as its companion linestage, the award-winning Soudution 727. To wit, it presents parts and wholes with unusual realism.

I've been circling around this subject of parts and wholes for several issues now, trying to get a firmer grasp on what I've been hearing with Soudution's new preamplification, Vitus' Class A amplification, Greg Beron's, Christophe Martinez's, and Kostas Mextaxas' tape decks, MBL's 101 X-Treme MKII loudspeakers, Kalista's Dream-Play XC CD/SACD player and streamer, MBL's Cadenza C41 streaming DAC, and DS Audio's optical transducers. As reviewers and readers, we find it convenient to break things down into categories (i.e., detail, timbre, dynamics, durations, soundstaging, imaging, etc.), as if such things existed independently of



The Cutting Edge Soudation 757 De-Emphasis Preamplifier

Specs & Pricing

Mains: 100–240V (50–60Hz)

Power consumption: < 0.5W standby; 60W in operation

Inputs: 2x mx, mm, or tape head (RCA & XLR); 1x DS audio optical (RCA)

Input impedance: Moving coil: 10 ohms–1000 ohms; moving magnet: 47k ohms and 0–750pF; tape head: 20k ohms–100k ohms and 0–750pF

Accuracy of deemphasis (20Hz–200kHz): ±0.05dB

Frequency response (–3 dB to deemph): 0Hz–2MHz

THD: Not measurable

Spot noise (input related): <–170dBV/√Hz

Common mode rejection ratio (CMRR): >100dB

Channel separation: >100dB

Gain (max): –40dB to +80dB for mc; –40dB to +60dB for mm; –40dB to +70dB for tape; –40dB to +120dB for optical

Phono eq: RIAA, Decca, Columbia, London, Teldec, NARTB

Tape eq: IEC2–30ips, IEC1–15ips, IEC1–7.5ips, NAB–15ips

Outputs: 2x balanced (XLR); 1x unbalanced (RCA)

Output impedance: 0.8 ohms balanced (XLR); 0.4 ohms unbalanced (RCA)

Output voltage max: 16Vpp balanced (XLR); 8Vpp unbalanced (RCA)

Output current max: 0.5A

Dimensions: 480 x 167 x 450mm

Weight: Approx. 30 kg

Price: \$85,000

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JV's Reference System

Loudspeakers: MBL 101 X-Treme MKII, Magico S3 2023, Magnepan LRS+, 1.7i, and 30.7

Subwoofers: JL Audio Gotham (pair), Magico S Sub (pair)

Linestage preamps: Soudation 727, MBL 6010 D, Siltech SAGA System C1, Vitus Audio SL-103, JMF Audio PRS 1.5

Phonostage preamps: Soudation 757, DS Audio Grand Master EQ

Power amplifiers: Vitus Audio SM-103 Mk.II, JMF Audio HQS 7001, Soudation 711, MBL 9008 A, Siltech SAGA System V1/P1, Odyssey Audio Stratos

Analog source: Clearaudio Master Innovation, Acoustic Signature Invictus Neo/T-9000 Neo, TW Acoustic Black Knight/TW Raven 10.5

Tape deck: United Home Audio Ultima Apollo, Metaxas & Sins Tourbillon and Papillon, Analog Audio Design TP-1000

Phono cartridges: DS Audio Grand Master EX, DS Audio Grand Master, DS Audio DS-W3, Clearaudio Goldfinger Statement v2.1, Air Tight Opus 1, Ortofon MC Anna, Ortofon MC A90

Digital source: MSB Reference DAC, Soudation 760, Berkeley Alpha DAC 2, Kalista Dream Play XC

Cable and interconnect: Synergistic Research Galileo SRX (2023), Crystal Cable Art Series da Vinci, Crystal Cable Ultimate Dream

Power cords: Crystal Cable Art Series da Vinci, Crystal Cable Ultimate Dream, Synergistic Research Galileo SRX 2023

Power conditioner: AudioQuest Niagara 5000 (two), Synergistic Research Galileo SX

Support systems: Critical Mass Systems MAXXUM and QXK equipment racks and amp stands

Room treatments: Synergistic Research Vibratron SX, Stein Music H2 Harmonizer system, Synergistic Research UEF Acoustic Panels/Atmosphere XL4/UEF Acoustic Dot system, Shakti Hallographs (6), Zanden Acoustic panels, A/V Room Services Metu acoustic panels and traps, ASC Tube Traps

Accessories: Audio Realignment Technologies (A.R.T.) electromagnetic treatment mats and clamps, DS Audio ES-001, DS Audio ION-001, SteinMusic Pi Carbon Signature record mat

one another. But the truth is that a collection of parts is not what we hear in real-life musicmaking. The parts are there, of course, and can be assessed on their own if we make a conscious effort to separate them out by ear. But what we actually hear is the way such parts integrate into wholes, within the resounding confines of a hall, studio, or club. It is this very integration—this sense of holism, of parts that are so intimately interconnected they don't exist independently and of the wholes they constitute being greater than the sum of these parts—that the Soudation 727 and 757 are so exceptionally good at reproducing.

Soudation puts a premium on preserving phase accuracy. It is the prime rationale for the unparalleled bandwidth (20MHz, –3dB) of the 727's and 757's output stages. Phase shifts have almost exactly the same effect on sounds that out-of-parallax images have on optics. Eliminating either reduces blur, increases density of color, expands dynamic range, and cements into place the shape, body, detail, and location of subjects, on their own and vis-à-vis each other and their environs.

What this exceptional phase accuracy results in with the 757 is sonic images of vocalists and instrumentalists that are so dense in timbre, so natural in duration, so supple in dynamic, so finely integrated in resolution, and so three-dimensional in presence that, on great recordings or tapes, you can almost visualize them. It's as if you switched from a 2k LED TV to a 4k OLED panel.

Take the MoFi reissue of *Sinatra at the Sands* (once

The Cutting Edge Solution 757 De-Emphasis Preamp

again). I've listened to this recording through almost every mc and optical cartridge I own (and, thanks to Greg Beron, I now have a 15ips production master of the album). While the tape remains sonically supreme, as it should, the presentation of the DS Audio Grand Master EX comes damn close to it when processed by the Grand Master EQ unit and the 727 lineage. Through the 757's optical input and state-of-the-art output stages, it comes even closer.

Whether it's the elimination of phasey imaging or the more precise equalization or the integral way the Solution incorporates details into wholes, Sinatra sounds so solidly "there" it is astounding. (Part of the reason that I love DS Audio oc's is that, with fine LPs, they come exceedingly close to the sound of a mastertape, which I consider the "absolute" reference.) Compared to the superb Grand Master EQ unit, the 757 makes Sinatra sound just that much more physically present—as if a very slightly atomized sonic image had been replaced by a fully organic one.

Of course, it's not just Sinatra who benefits from the 757's superior holism. Every one of the instruments in Count Basie's great band is also more solidly there, from Harry "Sweets" Edison's lead trumpet to Eddie "Lockjaw" Davis' tenor sax to Sonny Payne's drum kit to the Count's piano to Norman Keenan's phenomenal standup bass (Keenan also plays on *Belafonte at Carnegie Hall*). Every voice sounds less atomized, less sprayed from a bottle, and more organically connected to the instrument or vocalist generating it. It's a very holistic, very tape-like, very natural effect.

At the risk of sounding like a typical reviewer again, let me say something more about the 757's low bass, top treble, and midrange. Where the low bass of the Grand Master EQ unit allows for a larger number of roll-off options, it is, regardless of which eq you choose, very slightly less smooth, tight, dynamic, deep-reaching, and clearly defined in the bottom octaves than the Solution 757. (This outstanding low-end grip is apparent on all sources—and is typical of Solution preamps and amps.) On LP, Norman Keenan's bass fiddle, for example, has never before sounded so fixed in space (at the back of the stage), so clearly individuated, so dense in timbre and precise and unruffled in pitch as it does through the Grand Maser EX optical cartridge and the 757's optical input/output.

Part of this increase in clarity and realism has to do with the way

With the 757, you hear this aging and the undiminished energy and mature expressiveness of his delivery not as if they were isolate high-fidelity parts but as if they were coming from a nearly visible whole, from Frank Sinatra at 50.

the 757 images. Like the 727 lineage, the 757 de-emphasis unit condenses instrumental images. By this, I don't mean it miniaturizes them; it simply focuses them with cleaner outlines, greater body, increased color and texture, and superior rootedness in space. It leaves you in no doubt where instruments are located on the stage vis-a-vis the microphones, the venue walls, and the other instruments playing alongside them, even in large ensembles like Basie's band.

The 757 has the same effects in the top end. While not sounding overtly rolled-off, the 757 (with the Grand Master EX oc) has a simply phenomenal way of smooth-

ing down treble "roughness" (caused, perhaps, by bumpy little phase shifts). As a result, the top octaves of Basie's piano lose the occasional bit of glare they seem to develop with other phonostages on fortissimos, making them sound more continuously "of a piece" with the timbre of the piano's lower octaves.

Ditto in the midband with The Voice's voice. Sinatra was 50 years old when this album was taped in the Copa Room of The Sands. Fifty years is a lot of cigarettes and a lot of Jack Daniels. His baritone, though completely under control, no longer has the youthful range and buoyancy of the Bobby Soxer Sinatra. It has aged, like bourbon in charred oak barrels. And with the 757, you hear this aging and the undiminished energy and mature expressiveness of his delivery not as if they were isolate high-fidelity parts but as if they were coming from a nearly visible whole, from Frank Sinatra at 50.

Before I pass the baton to Andre, I'll conclude with this. As a long-time analog fan, I've listened to a great many phonostages in my life, several of them (like the 755) quite wonderful sounding. But I've never heard a phono preamp that betters this one. Its astonishing holism simply makes it more lifelike than its competition on all sources, and its versatility is currently unmatched by any other unit I'm familiar with. There is a reason why we gave the Solution 757 de-emphasis preamp our highest honor—the 2025 Overall Product of the Year award. Those of you who swear by analog sources won't find its like (or its better) anywhere else.



Andre Jennings on the 757's Tape and Moving-Coil Phono Sections

KNOWING SO MANY high-performance magnetic-tape playback machines have been produced in Switzerland, it only seems fitting to have a new external tape-head output deemphasis unit from Swiss manufacturer Soulution. The 757 De-Emphasis Preamplifier is a virtual "Swiss Army knife" of analog preamplification for moving-coil and moving-magnet cartridges, the newer DS Audio optical cartridges, and the legacy reproduction of magnetic reel-to-reel tape. The 757's magnetic-tape playback and mc phono-cartridge playback are the subjects of my brief observations in this sidebar.

The 757's ability to perform its core bread-and-butter duty of providing deemphasis via its mc phonostage is unquestionably excellent. The mc mode was evaluated with a cartridge valued at 1/100th the cost of the 757, as well as with a cartridge from another well-known mc manufacturer that is priced at the flagship level. Those cartridges are the overachieving new Hana SL MK II and the top-of-the-line Lyra Atlas Lambda SL. With the 757, it is easy to demonstrate that the Hana SL MK II scales favorably with the quality of accompanying analog playback accessories. Give the Hana SL MK II a better arm, table, and a phonostage of the Soulution 757's character, and the listener will be rewarded with much improved sound. With the 757, the cartridge sang beyond expectations for an affordable mc pickup. If one never identified this cartridge, even discerning listeners wouldn't ask what device was transcribing the groove, because the combination produced so much satisfaction and contentment with each LP played. That is until I made a direct comparison to the Atlas Lambda SL, which pushed sonics to an even higher level of realism and enjoyment. Not only did the 757 let a modest cartridge sing beyond expectations, but it also allowed the best-of-the-best MC cartridges to shine in a newer, brighter, deeper, richer, and more transparent light. Speaking in the words of a simple man with simple phrases: "Well done 757, well done."

The 757's direct tape head input deemphasis features adjustable overall gain setting, five playback EQ/speed selections, head impedance loading, and an expert tape-head calibration feature. The overall gain setting for tape playback ranges from 20dB to 70dB: the user can set a startup gain for the selected input as well as a maximum gain setting. The tape playback speed and EQ selections include 7.5ips NAB, 7.5ips IEC1/CCIR, 15ips IEC1/CCIR, 15ips NAB, and 30ips AES/IEC2. The direct tape-head loading option (somewhat similar to mc cartridge loading) allows the user to select values from 20k–100k ohms depending on the characteristics of the connected tape head. If the user is familiar with tape playback EQ-calibration on studio decks using calibration tapes/tones, the process for the 757's tape head calibration is similar. The 757 has a built-in A/D converter that is active during the calibration process to show the user, on the front-panel display, when the signal levels

from an appropriate calibration tape are correctly set. The manual outlines the tape-head calibration procedure in a straightforward, comprehensive, step-by-step manner. Once set, the calibrated offset values for the selected tape head connected to Input 1 or 2 are stored and used for all tape EQ settings (firmware version 1.9.0).

In order to use the 757's input in tape mode, you need to have a tape playback head that can be directly wired out via a set of RCA or XLR interconnects to the selected input of the deemphasis unit. I own several reel-to-reel tape decks (studio master recorders and consumer units). For this evaluation, I chose to use one of my studio decks (configured with the playback head wired out for external tape EQ/deemphasis usage). As a secondary test, I briefly used one of my 15ips-capable consumer decks as well. Both tape decks used in this evaluation have excellent servo-controlled tape transports. With either tape deck wired for direct head out, the 757 performed admirably once calibrated to the specific tape head of the connected device.

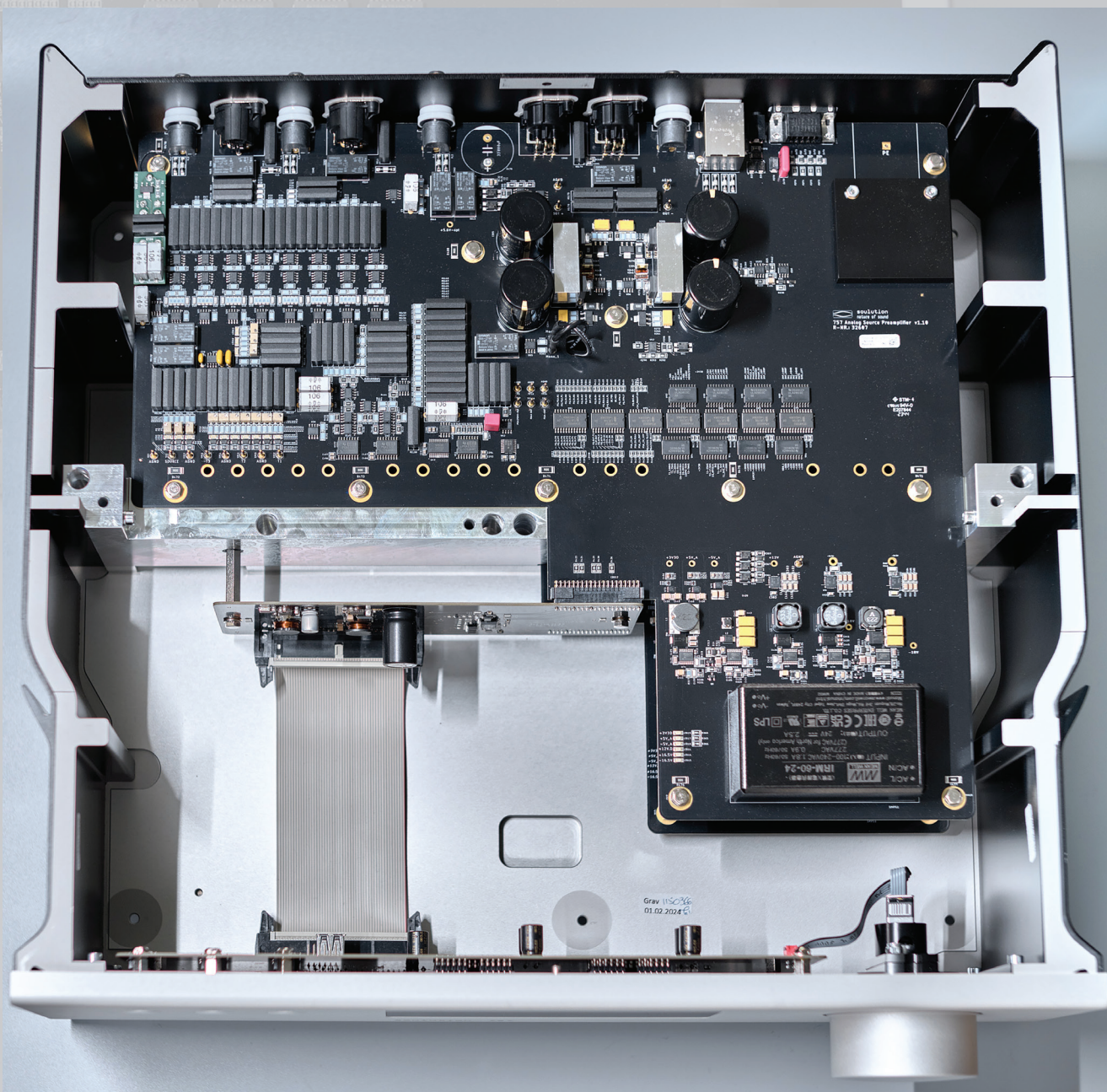
The 757's transparency to sources was shown when playing Jerome Sabbagh's *Heart* album on 15ips reel-to-reel tape. This all-analog album was recorded at Power Station in NYC direct to two-track ½" tape at 30ips on a custom Ampex 351 tube tape deck. The consumer reel of *Heart* is duplicated from the original 30ips ½" mastertape and transferred to 15ips ¼" two-track with IEC1 playback equalization. The artists were recorded in the same room at the Power Station with Jerome Sabbagh on saxophone in the left channel, Al Foster on drums in the right channel, and Joe Martin on bass, centered between the channels behind the other musicians. This direct copy of the mastertape provided an excellent illustration of the 757's ability to reveal the subtleties of recordings. On "Lead The Way," the trio performs a freely played improvisational piece that lets you hear (because of the recording technique) the sound of Sabbagh's sax from reed, body, and bell, as he dynamically breathes through the instrument to create his timbral style, including a nice extent of pianissimo-to-forte note transition. In the opposite channel, Al Foster displays improvisational mastery of his classic cymbal-work, fully engaging you with the harmonious tones of cymbal and bell-like sounds hovering underneath his rhythmic strikes. Joe Martin's centered bass steadfastly sets the foundation of this track and keeps timing throughout. Captured by my tape deck's Flux Magnetics reproduce/playback head directly wired out to the 757, this improvisation's flowing rhythm was played back with all its magic intact.

On a much grander musical scale, listening to the Liszt *Hungarian Rhapsody No. 2* from the famous Stokowski *Rhapsodies* (RCA LSC-2471/Analogue Productions Ultra Tape) tape yielded majestic soundstaging, dynamics, air, spaciousness, speed, depth, and all the additional cues that allowed the 757 to close in on the near-realism, the wonderful illusion of being at the performance, that this recording is capable of producing. From the first notes, it was obvious that all these "closer-to-the-event" sonic features were there for the ear to feast on. Given that this tape rendition was taken from a new mixdown of the original 3-track

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master also adds to the closer-to-real feeling one gets from tape playback. The 757 made it clear that this tape has an advantage over the previous LPs, all the way up to and including the Classic Records reissues. If one wants a reason to explore tape, the Solution 757 deemphasis unit and a 15ips reel of this RCA gem will surely fill the bill. The double dose of 15ips and 30ips tape's generational advantage over the typical LP, combined with the freshness of this particular performance played back using the 757's direct tape-head output deemphasis EQ for 15ips IEC1, was a memorable experience.

I greatly enjoyed my time spent experiencing the 757 tape replay and mc duties. Its direct tape head deemphasis capability is unique for a product that includes an mc/mm phonostage and optical cartridge equalization. The 757's multi-input, multi-analog source (phonostage, tape repro, and optical cartridge EQ) playback potential can serve as the hub for the three-headed analog-sourced system. If Solution's 757 is not the analog source de-emphasis version of a "Swiss Army knife," I don't know what is.



The Cutting Edge Soulution 757 De-Emphasis Preamp

Cyrill Hammer Talks to JV about the Soulution 757

JV: THE SOULUTION 757 is a uniquely versatile component—not just an mm/mc phonostage but an all-purpose de-emphasis unit that can also be used as an equalizer/preamp/power source with DS Audio optical cartridges and as a head amp with 7½, 15, and 30ips tape decks. I don't believe that there is another product currently on the market that handles all analog sources (save for strain-gauge carts) like this one does. What inspired you to make this great leap in utility?

CH: This actually evolved over time during the engineering phase of the 757. When we started work on it, our plan was to develop a direct replacement for the 755 phono preamplifier, incorporating new designs for the input stage, amplification section, output stage, and power supplies. Managing noise is one of the most important design considerations for a phono preamplifier. So, to make the best possible performance, we decided to make the gain variable in 1dB increments up to +80dB. For analog-only customers, this also eliminates the need for a preamplifier or volume attenuator. Being able to directly drive power amplifiers from the 757's variable gain stage creates the ideal shortest possible signal path and matches our philosophy of "Add nothing. Omit nothing."

Market feedback showed growing interest in non-RIAA de-emphasis curves for vinyl playback, so we set that as a goal for the 757. Our first design used a network of more than 40 relays per channel to implement our primary de-emphasis functions for just RIAA playback! We then realized we could incorporate user-selectable non-RIAA de-emphasis curves for a marginal cost by adding just a few additional relays and resistors.

Concurrently, we observed rising interest in playback from reel-to-reel tapes. Because the NAB and IEC de-emphasis curves are so closely related to vinyl curves, we realized that we could add tape amplification and de-emphasis to the 757 by adding a few more components.

Also, your positive reviews of the DS Audio optical cartridges led us to look more closely at this new and innovative design, as well. Integrating this technology in the 757 was not straightforward, since these cartridges need to be powered and require a different form of de-emphasis than what magnetic systems require. After detailed examination of the technology (courtesy of DS Audio), we realized our final design for the 757's customizable and programmable circuit boards, which implement de-emphasis curves for all optical and magnetic systems, including optical, mm, mc, and tape, and the 757 was born.

Does the 757 use the same input/output stages and power supplies as the 727 lineage? If not, how does it differ?

The input stages are more complex than those for the 727, since they need to interface with source systems that are very different. DS Audio optical cartridges output a current signal, so the optimal

choice for the input stage is a transimpedance amplifier stage, which converts the current signal into a voltage while providing gain. All magnetic systems (mc, mm, and tape) output a voltage signal, so a voltage amplification stage with gain is ideal. Given the significant differences between these two circuits, the 757 features two input stages: one for magnetic systems, such as mc/mm cartridges or tape heads, and then a dedicated input stage for DS Audio optical cartridges

The input circuits of phonostages usually combine a few functions, like buffering the input signal, providing gain, and also adding de-emphasis. The 757 is different, though. Both input stages (for the optical and magnetic systems) buffer the input signal and add gain, but they do not provide any de-emphasis. For the optical input we use a buffered passive transimpedance stage that offers 80dB of transimpedance gain and runs at 2MHz frequency bandwidth, which helps keep phase errors in the audio band to a minimum. The input stage for magnetic systems (mc, mm, and tape) is based on the 727's input stage (instrumentation amplifiers working in parallel) and provides 20dB of voltage gain with the same 2MHz frequency bandwidth. This instrumentation amplifier structure enables the maximization of common mode rejection while minimizing noise, offering a significant advantage in the context of analog playback. By reducing noise picked up between the cartridge or tape head and the input stage, this feature provides a substantial sonic benefit with the small input signals of magnetic systems.

Minimizing noise for all the different magnetic input systems is a significant task. For a single input stage to attain minimal voltage noise when the input stage is configured for mc cartridge and also



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attain minimal current noise for mm and tape sources is a challenge. It is not possible to achieve both optimization goals simultaneously with a single design. Consequently, high-performing phonostages usually have dedicated inputs for mm systems and dedicated inputs for mc systems. The 757's input stage is made up of two circuits that work together seamlessly. It can be configured to either work with the lowest input voltage noise for mc cartridges or with the lowest input current noise for mm cartridges or tape heads.

While the noise performance requirements for the 757's output stage are somewhat less rigorous in comparison to those for the 727's output stage, the de-emphasis preamplifier utilizes the same output stage with 20MHz bandwidth, resulting in phase errors in the audio band that are nearly undetectable and unmeasurable.

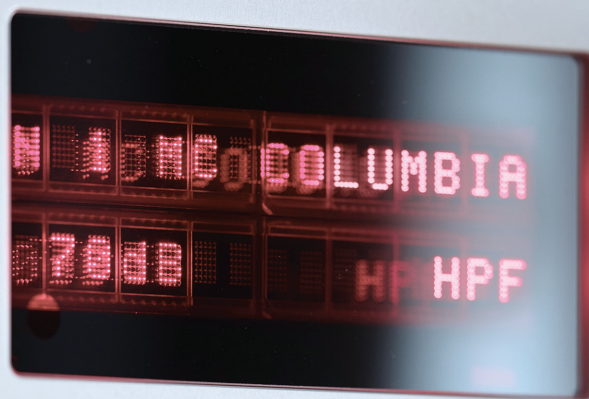
The 757 does use the same distributed power-supply technology implemented in the 727 preamplifier. The basis for the dual-mono power supply of the 757 de-emphasis preamplifier is a switched mode power supply (SMPS), which converts the mains voltage into an intermediate DC voltage. Highly efficient DC-to-DC converters and extremely low-noise and fast linear regulators generate the supply voltages needed to operate the 757. Local linear regulators are placed next to each current sink (op-amp, transistor, etc.). This ensures lowest noise levels on the analog supplies and shortest signal paths. Large filter capacitors, as typically used for "linear" power supplies with transformers and rectifiers, are no longer required.

How did you decide upon the equalization for DS optical cartridges and tape decks and, technically, what was involved in adding these features?

The decision was driven by the successful development of our configurable de-emphasis circuit design, which could produce the necessary curves for the magnetic and optical systems with much greater precision. Each time constant is equipped with a dedicated relay-switched network of resistors, which undergo calibration procedures during the 757 unit's assembly. This ensures that the resulting deviation from the specified de-emphasis curve remains minimal ($\pm 0.1\text{dB}$, 20Hz to 200kHz). Without a configurable de-emphasis circuit, it would have been a nightmare to integrate all these different systems into one product.

Adding support for the DS Audio optical cartridges required us to solve another challenge in order to minimize signal loss and noise or distortion. The input for the DS Audio optical cartridge must also supply the power for the LEDs within the cartridge and the necessary reverse bias voltages for the photo diodes. Any fluctuation in the supply voltage to the cartridge would result in immediate alteration to the brightness of the LEDs, which would then be perceived as input noise by the photo diodes. To not add noise or distortion on the optical cartridge input, it is essential to maintain a constant supply voltage that is unaffected by the music signal carried over the same circuit.

In order for the 757 to accurately support tape amplification and de-emphasis, we had to also add custom calibration capabilities. Magnetic tape heads are subject to a number of imperfections,



solution 757

such as omega losses, the gap effect, mirror resonances, and manufacturing tolerances. These parameters vary significantly, both between different tape heads and between the two channels of a single head. Manufacturers of tape decks will address these issues by either calibrating the electronics of the playback and record path to the specific tape head or offering users the option to calibrate the tape machine themselves. Otherwise, the frequency response and gain of the two channels will not be identical.

The tape deck itself will be unable to provide any form of calibration if the signal is taken directly from the tape head. Therefore, it is essential that the 757 de-emphasis preamplifier provide the calibration in order to support tape sources. The 757's calibration unit, bypassed for non-tape playback, includes a treble boost/drop stage (max $\pm 10\text{dB}$ adjustable in 0.1dB steps), a bass boost/drop stage (max $\pm 10\text{dB}$ adjustable in 0.1dB steps), as well as an RMS level meter for monitoring the output levels during the calibration process.

We began the development of 757 with a concept of it being a straightforward one-to-one replacement for the 755. However, to outperform the ultra-low noise and distortion levels of the 755, we knew we had to come up with a completely new design for both the gain and de-emphasis stages. Once we realized how our new concept for configurable de-emphasis could add support for optical cartridges and reel-to-reel tape, the 757 development became very interesting and a great learning experience. Although its development was challenging and took longer than we expected, it was fascinating to work closely with sources other than vinyl and create a new form of de-emphasis preamplifier. **CS**