

REL

Studio III

SUBWOOFER

Larry Greenhill

DESCRIPTION Super "Acoustic Resistive Matrix" (ARM)-loaded, powered subwoofer. Inputs: 2 line-level, unbalanced (RCA) phono inputs with 0dB and +12dB sensitivities, 1 line-level, balanced XLR input, 2 speaker-level inputs using Neutrik Speakon connectors, one balanced, one unbalanced. No signal-sensing auto on/off. Drive-units: two downward-firing, long-excursion, heavy-duty 10" paper-cone woofers made by Volt. Crossover: low-pass filter (defeatable) using REL Active Bass Control (ABC) in 24 semitone increments, 22–96Hz, 12dB/octave slope; no high-pass filter option. Switchable phase: 0° or 180°. Amplifier output power: 500W RMS. Frequency response: 9–100Hz, ±6dB. Total harmonic distortion: not specified. Accessories included: detachable power cord, 35' (10m) signal cable.

DIMENSIONS 26.7" (685mm) W by 24" (617mm) H by 22.1" (567mm) D. Internal volume: 110 liters. Net weight: 205 lbs (93kg).

FINISHES Black oak, cherry, rosenut, walnut.

SERIAL NUMBER OF UNIT REVIEWED 301479.

PRICE \$8995. Approximate number of dealers: 100. Warranty: 3 years parts & labor.

MANUFACTURER REL Acoustics Ltd., North Road, Bridgend Industrial Estate, Bridgend CF31 3TP, England, UK. Tel: (44) (0) 1656-766093. Fax: (44) (0) 1656-766093. Web: www.rel.net. US distributor: Sumiko Audio, 2431 Fifth Street, Berkeley, CA 94710. Tel: (510) 843-4500. Fax: (510) 843-7120. Web: www.sumikoaudio.net.



REL Studio III subwoofer

Makers of powered subwoofers fall into two camps: those that fit a high-powered amplifier and a single, large woofer into a relatively small, unobtrusive enclosure; and those that build two or more 10" woofers and an amp of moderate power into a larger, heavier enclosure.

REL Acoustics Ltd. is of the latter persuasion. Led by Richard Lord, the Welsh firm has dedicated its considerable engineering talents and facilities to creating dedicated bass loudspeakers. Beginning with Lord's Stadium series in 1992, REL has produced cost-no-object subwoofers designed to reproduce both bass and what Lord calls "sub-bass" — the lowest musical fundamentals of percussion instruments and pipe organs, as well as nonmusical acoustic cues as to the size and shape of the recording venue. REL's focus on sub-bass has resulted in subwoofers that deliver a signal well below the output of most full-range speakers, preventing reinforcement of room modes or upper-bass prominences in the satellite speaker that can lead

to “one-note” bass output.

Determined to experience sub-bass in my listening room, I arranged with REL's US importer, Sumiko Audio, to audition their largest subwoofer, the Studio III. It wasn't only that desire that led me to select this “supercar” of subs, but Sumiko's assertion that I *needed* this \$9000 beast to generate sub-bass in my large listening room.¹

The Studio III is 27" tall by 24" wide by 22" deep, and, at 205 lbs, heavier than any other subwoofer I've auditioned. Its massive, rectangular enclosure is finished in a cherry veneer, with a top-panel inlay of tempered glass laid over black felt. The rigid cabinet is multiply braced and made of 30mm-thick MDF. Two downward-firing 10" woofers, sourced from UK manufacturer Volt, are loaded with what REL calls a “Super Acoustic Resistive Matrix” (ARM), a folded transmission line ending in a downward-firing port, that provides bass response down to 9Hz. The enclosure is raised from the floor by four brass feet.

The Studio III has one input channel. While the subwoofer can be driven by line-level signals, either via one of a pair of RCA jacks with different sensitivities, labeled “0dB” and “+12dB,” or via a balanced XLR jack, the setup instructions strongly recommend that the owner feed the Studio III from the output terminals of the power amplifier that drives the main speakers. This is via gas-tight Neutrik Speakon connectors, one unbalanced for use with conventional amplifiers, the other balanced for use with amplifiers having a bridged output stage. The high input impedance (100k ohms) of the Studio III's input prevents it from loading the amplifier.

Why use the amplifier output as a source? First, REL believes that the subwoofer should get its signal from the exact source driving the main speakers, for best integration with the

¹ Wes Phillips reviewed the Studio III's predecessor, the Studio II, for *Stereophile* in July 1998. His report is available in our free on-line archives at www.stereophile.com/loudspeakerreviews/956. —Ed.



The REL Studio III bottom panel showing two driver grill covers and one port.

audio system. Second, the Studio III's sub-bass range eliminates the need for a high-pass filter to roll off the main speakers.

The Studio III's controls were not intuitively clear at first glance; reading the three pages of instructions definitely helped. On the left is a column of three rotary controls. The top one, High Level, controls the volume of the signal entering either of the Speakon connectors from the main

more knobs, which together tune the low-pass filter in 24 half-tone steps between 22 and 96Hz. The bottom control, labeled Coarse, controls the low-pass filter in four steps (A, B, C, D), from 22 to 96Hz. Above that is the Fine control, which provides six steps between each pair of Coarse positions.

Setup

Do *not* attempt to set up the Studio III alone—it's far heavier than it looks. Two Sumiko installers, Patrick Butler and Allan Hagggar, traveled to my listening room to install the big REL.

They had all the desired criteria: youth, intelligence, physical strength, and lengthy experience with and respect for REL subwoofers. Together, they lifted the Studio III off my garage floor, carried it carefully into my house, up the stairs, and into my listening room. Patrick—taller, more fastidiously dressed, more precise in diction—orchestrated the physical installation. Allan—more casually dressed, more poetic—provided a

SUMIKO TRAINS DEALERS ACROSS THE US TO INSTALL AND TUNE REL SUBWOOFERS; ANY BUYER OF A NEW STUDIO III WOULD GET THE SAME ASSISTANCE IN DELIVERY AND SETUP THAT I DID.

amplifier terminals. The middle knob controls the volume of the line-level inputs from the two RCA jacks. The bottom knob, Mode, controls phase and the option of switching the Studio III between standard sub-bass operation and using both sub-bass and wider-range subwoofer operation, depending on the processor and the source material. (In Mode 2, for example, the main speakers are set to Full-Range and drive the Studio III's high-level input, while the surround processor's line-level LFE signal is taken to the low-level input. This allows the REL both to extend the main speakers' bass response and handle a film soundtrack's sub-bass sound effects.)

On the right of these three are two

lengthy description of how to accomplish the subwoofer's fine-tuning and room-matching.

The second reason that installing a REL Studio III is no solo task is the degree to which the sub must be tuned to one's listening room. A minimum of two people are needed: one to listen, the other to set the controls on the Studio III's service panel. This Patrick and Allan did. In fact, Sumiko trains dealers across the US to install and tune REL subwoofers; any buyer of a new Studio III would get the same assistance in delivery and setup that I did.

The Studio III was initially positioned in the corner behind my right-channel Quad ESL-989 loudspeaker. The Quads were left sitting 5' from

the front wall, 8' apart, 3' 9" from the side walls, and slightly toed-in. My listening chair was 10' away. The Quads were near one short wall of my lightly damped, rectangular listening room (26' long by 13' wide by 12' high). Behind the listening chair, the other end of the room opens into a 25' by 15' kitchen.

Blessedly for my listening-room floor, the instructions recommend against using the supplied spikes. REL claims that the Studio III works best if the drivers and port are close to the floor, where they can produce a high-pressure zone. The Studio III sat on its brass feet.

For the next step, Patrick Butler took the Studio III's twinned 10m pair of input cables and pulled them apart so that one of each of the two leads could go to the Mark Levinson ML-2 monoblock sitting behind each Quad. He stripped the insulation off the bare ends and connected them to the same terminals used by the spade lugs in my PSC speaker cable: red output cable to red speaker terminal, black output cable to black speaker terminal. (For differential amplifiers such as the Krell FPB 600C, the black wire is attached to chassis ground, not to Krell's black speaker terminal.) The other end of the two long cables were terminated in a Speakon connector plugged into the Studio III's unbalanced input. [Taken literally, this would result in mono sound as each amplifier would be connected to both speakers. I imagine that there is a relatively high-value series resistor in each cable taken from the REL's high-level input to the two amplifiers to keep the channels isolated from one another upstream of the subwoofer.—Ed.]

Phase optimization was next. Playing the *Sneakers* soundtrack (CD, Columbia CK 53146), Allan Haggard set the low-pass filter at 40Hz so there would be definite overlap between the Quads and the subwoofer, and the system volume to High. When he switched the phase control on the Mode switch, I could easily hear that the 0° position was louder than the 180° setting.

Then Haggard began jamming the sub into the corner and slowly pulling it out on the diagonal, equidistant from the side and front walls. At a point about 6" from room corner to enclosure corner, the drum beat from

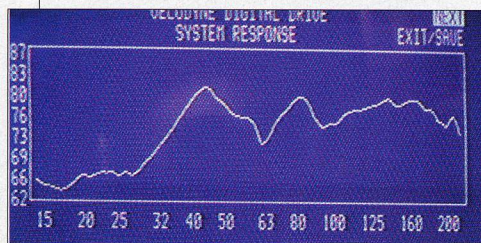


Fig.1 Quad ESL-989, no subwoofer, in-room response (25dB vertical range).

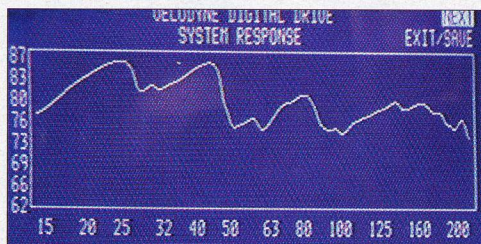


Fig.2 Quad ESL-989 with REL Studio III, in-room response (25dB vertical range).

"Cosmos, Old Friend," from the *Sneakers* soundtrack, sounded more solid, heavy, and loud than it had before. That was where the subwoofer was left.

THE REL HAD ALL THE ACOUSTIC **MUSCLE NEEDED** TO PRODUCE DEEP, TUNEFUL BASS IN MY LARGE **LISTENING ROOM** WHILE MOVING LOTS OF AIR.

Haggard switched the low-pass filter to the bottom of its range, 22Hz, then slowly advanced the Studio III's gain control until the bass-drum beat was solid and clear. Advancing it further made the drum sound more diffuse, with an image unrealistically large. Setting the gain lower restored the image to a more natural size. Next, the optimal crossover filter point was identified by advancing the Coarse control through its four steps. Again, the drum sounded muffled, swollen, and distorted when the Coarse control was advanced from "A" to any of the higher settings. The same procedure was then used for the Fine control. To my ears, this logical process of elimination identified 27Hz as the optimal low-pass filter setting for the Studio III in my room.

Measuring

To determine the frequency response of the expert Sumiko setup, I placed

the Velodyne DD-18's room-calibration microphone on the back of my listening chair at my seated ear height of 37". I then used the Velodyne DD-18's signal generator, microphone, and onscreen spectrum analyzer to measure the response of the combination of Quad ESL-989s and REL Studio III at my listening position. (To measure the room response, I shut off the Velodyne DD-18's own woofer by setting its volume to "0." I ran an interconnect from the DD-18's Video Out jack to the Video In jack of the 13" TV set I used to display the DD-18's System Response screen. The DD-18's internal signal generator delivered a line-level sweep of the 20–200Hz range every three seconds, this fed to my preamplifier for driving my overall audio system.)

Without the sub (fig.1), the frequency response of the Quads showed a dip at 60Hz and a peak at 40Hz, with rapidly declining response below 40Hz. When the

Studio III was switched in (fig.2), the frequency response was extended down to 20Hz, with a peak at 40Hz and another one at 25Hz. The response below 40Hz was elevated several dB above the response above 40Hz, probably as a compensation for the natural rolloff in sensitivity of the human ear in that range when the REL was tuned by ear.

Listening

The REL Studio III gave a slight emphasis to the subwoofer spectrum of 25–40Hz. During my listening sessions, I was more aware of the bass than I'd expected to be—bass that had a softer, airier quality than I've heard from some other subwoofers. This may have been a result of the lack of a high-pass filter. Yet it was able to produce deep, tuneful bass in my large listening room while moving lots of air. The synthesizer that provides the powerful underpinning

of "Assault on Ryan's House," from the *Patriot Games* soundtrack (CD, RCA 66051-2), can be difficult for subwoofers. The REL Studio III's bass remained clean, deep, and solid, with no spurious noises to indicate that the woofer was in distress. There was no disparity between the speed of the Quads' midrange/upper bass and the REL's deep bass.

The Studio III delivered the punch and drive inherent in percussive bass. The concussive drum whack at the end of John Williams' *Liberty Fanfare*, on David Wilson's *Winds of War and Peace* (CD, Wilson Audiophile WCD-8823), had a snap and punch not heard from most other subwoofers. (The REL IIP's downward-firing drive-units probably use the wooden floor of my listening room as a soundboard. For example, the Velodyne ULD-18, which has a single downward-firing woofer, delivered the same percussive snap and floor flex on this bass-drum passage.) Michael Arnpol's introduction on double bass on "Use Me," from Patricia Barber's *Companion* (CD, Premonition/Blue Note 5 22963 2), had all the pace, snap, and drive anyone could want.

On the other hand, the REL Studio III did not "improve" what was on the recording. The churning electric bass, drums, and synthesizer intro of "Deeper Wells," from Emmylou Harris' *Spyboy* (CD, Eminent EM 25001 2), is intentionally distorted and blurred. True to the music, the REL Studio III faithfully reproduced the murky, seething muck as Harris' voice soared above, clear and unperturbed.

The Studio III allowed me to pick out subtle shifts in bass content. "Caravan Moves Out," from Philip Glass's soundtrack for *Kundun* (CD, Nonesuch 79460-2), evokes the plodding, swaying, glacially slow pace of the caravan through changes in the pitches of the deep synthesizer notes, powerfully churning Tibetan horns, and double bass. The REL handled this with aplomb. In "The Carnotaur Attack," from the *Dinosaur* soundtrack (CD, Walt Disney 50086



The REL Studio III service panel.

06727), the Studio III reproduced the deep, thunderous, massive synthesizer notes that subtly change pitch to heighten tension and suspense. I heard the characteristic percussive pulse of Charlie Haden's standup bass in his duet with Alice Coltrane on "For Turiya," from *Closeness* (CD, A&M SP-710). And David Hudson's didgeridoo buzzed and throbbed powerfully in the opening minutes of "Rainforest Wonder," from *Didgeridoo Spirit* (CD, Indigenous Australia IA2003 D).

The REL Studio III revealed the sonic traits of different ranks of organ pipes. There was the deep, rumbling,

but solid pedal note that ends the selection from Elgar's *The Dream of Gerontius* on *Stereophile's Test CD 2* (Stereophile STPH004); the slightly fluttering deep organ note on "Lord, Make Me an Instrument," from Rutter's *Requiem* (CD, Reference RR-38DD); and the mix of fluttering, airy bass notes with solid pulses from the dif-

ferent pedal ranks during *Gnomus*, from Jean Guillou's transcription for organ of Mussorgsky's *Pictures at an Exhibition* (CD, Dorian DOR-90117).

I heard a similar matrix of fluttering bass and solidity from organist Virgil Fox's performance of Bach's Toccata and Fugue in D Minor, on the direct-to-disc, white-vinyl recording of his *The Fox Touch* (LP, Crystal Clear CCS-7001). And the Studio III's low-frequency pitch definition explained why I was able to distinguish the dense, foggy, otherworldly notes of the Tibetan temple horns, synthesizer, and the deeply echoing, dreamlike chant of the Gyuto Monks in "Sand Mandala," from Glass's *Kundun*.

The Studio III also conveyed ambience cues, enhanced the Quads' imaging and portrayal of space, and increased the dynamic range of my entire system. The ML-2s and Quads played passages of wide dynamic range without noticeable clipping, the soundstage widened and deepened, transparency increased, and there was considerably more three-dimensionality to the sound, with clearer positioning of instruments. This effect was independent of the music's bass content. Take the hot percussion solo in "Nardis," from Patricia Barber's *Café Blue* (CD, Premonition/Blue Note 21810 2). Piano is on the right, double bass in the center behind the piano, snare drum at center, cymbals at extreme right; Barber's voice became more three-dimensional when the Studio III was engaged, filling out what had been a two-dimensional voice floating between the Quads.

When I closed my eyes, Mary Gauthier's voice on "Long Way to Fall," from *Filth and Fire* (CD, Signature Sound SIG 1273), sounded eerily like a three-dimensional person in the room

ASSOCIATED EQUIPMENT

ANALOG SOURCE Linn Sodek-Lingo turntable, Ittok tonearm, Spectral moving-coil cartridge.

DIGITAL SOURCES Krell KRC-28 CD player, Sony SCD-C555ES SACD/CD multichannel player.

FM TUNERS Day-Sequiera Classic, McIntosh MR-78, Sony ST-5000.

PREAMPLIFICATION Mark Levinson ML-7 preamp with L3A MC phono cards, Duntech MX-10 head amp, Margulis phono section, Krell KCT preamp.

POWER AMPLIFIERS Mark Levinson ML-2 monoblocks & No.334, Krell FPB 600C.

LOUDSPEAKERS Quad ESL-989; James EMB-1200 and Velodyne DD-18 subwoofers.

CABLES Interconnect: Red Rose Silver Ones, Krell CAST, Levinson Silver single-ended, Bryston balanced. Speaker: Mark Levinson HFC 10, Pure Silver Cable (PSC) R50 biwire double ribbon, Ultralink Excelsior 6N OFHC, Coincident Speaker Technology CST 1.

—Larry Greenhill

with me. The soundstage widened and deepened significantly when I played Yoshihisa Taira's "Hierophonie V," from *The Kroumata Percussion Ensemble* (CD, BIS CD-232). Each percussion instrument—maracas, claves, woodchimes, bongos, congas, cowbells, gongs, woodblocks—could be heard unambiguously coming from a different place in the soundfield.

The deepest bass reproduced by the REL did not seem to come from the subwoofer. That may have been related to the Studio III's low-pass filter point of 27Hz—well below that of any other sub I've auditioned. The blips that exploded out of Morton Subotnik's *Wild Bull*, for synthesizer (LP, Nonesuch H-71208), and the surging, pulsing bass drum and timpani in Stravinsky's *The Rite of Spring*, as played by the Minnesota Orchestra under Eiji Oue (CD, Reference RR-70CD), seemed to emanate from a point midway between the Quads, not from the REL itself.

Conclusion

The REL Studio III subwoofer has solid build quality, can produce massive bass, and has impressive pitch definition. And well it should have—its price of \$9000 is twice that of the Velodyne DD-18 that I reviewed in June. In addition, the REL Studio III has several other sonic characteristics on my subwoofer wish list: the abilities to play the deepest bass notes in music and to move huge amounts of air.

Its sub-bass reproduction is perhaps the Studio III's strongest suit. It reveals low-frequency acoustic cues that depict the venue in which the recording was made. It increased the Quad ESL-989's dynamic range and widened and deepened its soundstage. For those who own Quad ESL-989s, auditioning the Studio III is a must.

Other than its high price, did the Studio III have any limitations? The Studio III lacks a high-pass filter, so it won't roll off the satellite speakers which may mean a boost in the system's upper bass response, as happened around 40Hz in my room. Finally, to get the best results it must be installed and tuned to your room by the dealer.

But the REL Studio III can play the deepest bass notes and reproduce the almost subsonic ambience cues of the recording's acoustic space. Because of this, I highly recommend the REL Studio III. ■