

Quad ESL loudspeaker

A truly legendary design, Quad's ESL was the first full-range electrostatic speaker to be made available to the home hi-fi buff. But how does it measure up today?

Review: **John Howes** Lab: **Keith Howard**

While in the UK at least, Quad is the brand most associated with electrostatic loudspeakers, designs based on the electrostatic principle were being manufactured in other parts of the world as early as the 1920s.

By the 1950s, with developments in new materials and techniques, several new electrostatic designs emerged, with American Arthur Janszen introducing a high frequency electrostatic speaker in 1953 after being granted a patent.

Wireless World published articles by Quad's Peter Walker in its May, June and August issues of 1955 entitled 'Wide Range Electrostatic Loudspeakers'. These articles covered the practical and theoretical aspects of making a full range electrostatic speaker. Also in 1955, Peter Walker demonstrated two different prototypes of his electrostatics at the annual BSRA exhibition. One of these designs with further refinements was shown to the

Physical Society in the following March, which led to the first public demonstration given at the 1956 Audio Fair.

Also demonstrating a full range electrostatic design were Goodmans, and Harold Leak, who showed a hybrid design. The Leak model used a 15in bass unit, which crossed over to a curved electrostatic panel at 1.5kHz.

Although this speaker is listed in the *1956 Hi-Fi Year Book*, it seems it never went into production.

WORLD FIRST

Both Leak and Goodmans decided not to carry on with their electrostatic designs, which gave Quad the opportunity to introduce the world's first full-range electrostatic speaker. Due credit must be given to Peter Walker for the huge amount of pioneering work involved and the brave decision to make it a commercial product.

When first introduced, a single ESL would have set you back £52, compared

QUAD Electrostatic loudspeaker

Quad electrostatic loudspeaker specification

Maximum output: 20 watts into 8Ω in free space (20W referred to 1000Ω in normal use frequency range 500 to 10kHz, 100W referred to 1000Ω impedance in range 100-10kHz)

Bandwidth: 20Hz - 20kHz, Phase of alternation: Atmospheric to 100dB/sec

Distortion: Harmonically 10% horizontal, 15° vertical

Impedance: 20 Ω (100 Ω in range 400 Hz to 1 kHz)

AC voltage: 100-240 or 200-240 volts, 50/60 Hz

Front grille: Expanded aluminium, 30mm or 38mm

Dimensions: 410mm (height), 300mm (width), 275mm (depth)

There is no known method of measuring the performance of a loudspeaker in practical terms. Impedance specifications and other data are not suitable for a listening test and are comparative measurements using music and speech material is strongly recommended.

The speaker is enclosed within a specially made grille with perforated metal and fabric and is not suitable for use in a normal domestic living conditions. The speaker is designed for use in rooms with a fabric finish.

It is easier for the ear to hear the difference in quality than this. This speaker is used only with a Quad amplifier or one specifically designed for this type of loudspeaker.

ABOVE: 'It remains the standard by which all others are judged' proclaims this advert for the Quad ESL from the early 1970s

Hi Fi YEAR BOOK STEREO EDITION

For the closest approach to the original sound

PICKUPS • AMPLIFIERS • SPEAKERS • MOTORS • TUNERS • TAPE RECORDERS

10%

Hi Fi YEAR BOOK SPECIAL TAPE EDITION

QUAD for the closest approach to the original sound

THE NEW QUAD 22 CONTROL UNIT

PICKUPS • AMPLIFIERS • SPEAKERS • MOTORS • TUNERS • TAPE RECORDERS

10%

ABOVE: Adverts featuring the ESL speaker on the covers of the 1958 and 1959 *Hi-Fi Year Book*; the company changed its name to Quad in 1983 – it was previously the Acoustical Manufacturing Co Ltd

with a Lowther Acousta with PM6 driver at £37.18s.0d or a Tannoy York with a 12in dual concentric at £63! In the early years of manufacture, demand was far greater than supply. Quoting from an April 1958 Audio Fair press release from Quad:

'Since the electrostatic loudspeaker became available for sale, earlier expectations as to the enthusiasm with which it would be received in the homes of music lovers, and the resultant demand, have been considerably exceeded, with the result that our planned output for 1958 has now been fully absorbed by orders already received.'

TWO SIDES TO THE STORY

The original ESL – later dubbed the ESL-57 to differentiate it from later iterations – weighed in at 35lb (around 16kg) and measured 31x34½x10½in (hwd). Frequency response was a claimed 45Hz-18kHz while dispersion was said to be approximately 70° in the horizontal plane and 15° in the vertical. Mains

consumption was given at 6W. As constructed, the ELS is a double source, the diaphragm radiating from both faces (at least at low frequencies). When frequency response curves are taken in free air conditions, it shows the speaker to have a figure-of-eight polar characteristic at low frequencies and cardioid at high frequencies.

Quad recommended in its instruction manual that the speaker should not be positioned closer than 2ft to any parallel wall or 3ft from any corner.

When the speaker was released it was radically different from any other design available. It was certainly controversial – you either loved it or hated it! I'm sure many arguments started over not just its looks but its room placement.

VARIATIONS ON A THEME

In early 1970s America, Mark Levinson introduced his 'HQD' reference speaker system. This behemoth consisted of a pair of stacked ESLs with additional Decca ribbon tweeters and massive cabinets housing 24in Hartley woofers. These were fed from dedicated electronic crossovers and amplification. With a price tag of \$20-30k, I wonder how many of these systems were sold?

Another interesting variation employing re-housed ESLs, marketed some 20 years earlier, was the Braun LE1 from Germany. Even by today's standards these look very modern compared to the standard version.

Several different dedicated stands and subwoofers have also been marketed over the years with promises to enhance the sound quality of the ESL. The Gradient sub

from Switzerland was endorsed and distributed by Quad itself. The most ambitious stands to emerge so far are the recent solid granite designs by Carl Beckwith [see picture, p112]. These weigh 48kg apiece and allow the ESLs to give of their full potential (see www.eslinspiration.com).

'Walker's little wonder' as it was fondly known, became a legend

in its own lifetime and the company won many awards for the design. Over an incredible 28 years of production, between 1957 and 1985, no fewer than 54,000 ESLs were sold

worldwide – a sure testament to both the popularity and longevity of the speaker.

STACKS OF FUN

I have used Quad ESLs in my home system on several occasions, including a stacked pair. Their uncoloured and transparent sound is a breath of fresh air compared

No fewer than 54,000 ESLs were sold worldwide'



ABOVE: Radically different to rival speaker designs when released in 1957, the ESL was later refined, with the ESL-63 appearing in 1981 which in turn gave birth to the ESL-988 and ESL-989 of 2000 and ESL-2805 and ESL-2905 of 2006



ABOVE RIGHT: ESL brochure sets out specific amplifier requirements; the speaker cable used 'can be of the calibre of standard lighting flex for lengths up to 20-30 feet'

LEFT: Introductory pages from original user manual describe the optimum listening position for 'good musical balance'

with the majority of standard cabinet designs. Personally I found the gains in bass extension and soundstaging from a stacked pair very worthwhile. On the downside is their physical size and the demands they make when it comes to positioning.

The late Alastair Robertson-Aikman, managing director of SME, was a serious ESL fan, using them in his legendary music room. He had four stacked ESLs per channel and employed two more stacked banks of three for the rear channels. After visiting the music room, Donald Aldous wrote in the September 1977 issue of *Hi-Fi News*:

'I found that the overall stereo image and the reproduced ambience offered a degree of realism greater than anything I have heard so far.'

KEN KESSLER LISTENS

Every year, I make a point of firing up my Quad ESLs. It's a ritual I liken to re-readings of *Fear & Loathing In Las Vegas* and stopping at McDonald's the day after ☺

LAB REPORT

QUAD ESL (Vintage)

As one of the twin bass panels in one of the speakers supplied for testing was non-functional, the sensitivities quoted in the test table below are for the other, fully operational speaker rather than the usual pair average. The pink noise sensitivity of 86dB is on the low side in a modern context, and the 84.8dB 'music shaped' figure, which reflects the excess output in the top octave, is lower still. Apart from the high treble excess the on-axis frequency response trend is flat, albeit with quite large ripples [see Graph 1, below]. These add up to high frequency response errors of $\pm 7.3\text{dB}$ and $\pm 7.5\text{dB}$ respectively, 200Hz to 20kHz, although these figures are significantly reduced if the upper limit is set at 10kHz.

Pair matching error is also large at $\pm 5.0\text{dB}$, principally because output from the treble panels differed markedly above 3.5kHz. Electrostatics present a signal-dependent load at low frequencies but the ESL still ranks as a very tough amp load. The minimum modulus of 1.6ohm occurs at the very top end of the measurement range, while the combination of low modulus and high phase angle results in a minimum EPDR (equivalent peak dissipation resistance) of 0.4ohm at 20Hz.

Although the cumulative spectral decay waterfall [see Graph 2, below] doesn't look too bad, the extreme treble excess attenuates lower frequencies in the plot so the resonant modes visible at 4kHz and above are prominent. To obviate risk of sparking, no attempt was made to measure distortion at 100Hz but the 1kHz and 10kHz figures (0.1% or less) demonstrate the inherent linearity of the push-pull, constant charge electrostatic loudspeaker. KH



ABOVE: One of the latest and most ambitious mods to the ESL is the solid granite stand offered by Carl Beckwith of ESL-Inspiration. Weighing in at 48kg it aims to improve performance by adding mass. It comes at a price, though: £3800 a pair

a lavish meal, all three serving as reality checks. With the Quad session, it's because the original ESL, with a few caveats, remains one of the finest speakers of all time. It needs to be heard if one is to experience a true reference by which to judge other speakers.

IN THE HOT SEAT

Let's dispatch the caveats right away, for they are both well-known, and immediately apparent to modern listeners. The first is that the original ESL, while delightful and satisfying off-axis, really does define 'hot seat' in all its restrictive glory. A stereo pair will fill a room, but the ideal spot for stereo is a narrow slice at the point of an almost-equilateral triangle. Mind you, all true greats are optimised like this, so it's not really a demerit. Who cares what others hear when you're in the full-tilt audiophile zone?

As for the other caveats, they are concerns that prevent the ESL from being a viable speaker for those used to the robustness of recent designs. Bluntly, they don't go loud enough or deep enough for modern tastes

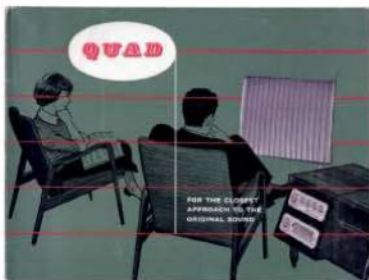
and – as a direct codicil to those not-inconsiderable issues – they are fragile enough to render casual usage a potentially costly challenge. Few are those who can rebuild a pair, and simply shipping them to Germany, for the best service this side of the Atlantic, ain't cheap.

Still, if you can live with the need for mains charging, positioning away from the walls and maximum levels and bass extension that may seem 'quaint', your rewards will be seamlessness, coherence, neutrality, transparency and scale that many speakers may emulate, but not offer all in the same package. You get an LS3/5A's imaging and midband, an Apogee's top-to-bottom consistency, the imaging of a Wilson and the silkiness of a Sonus faber. You will pinch yourself continually, reminding yourself that these speakers pre-date the Mini, and appeared around the same time as Elvis. ☺

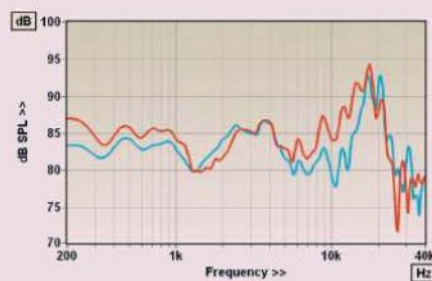
HI-FI NEWS VERDICT

While by modern standards not the trailblazer it once was, the ESL can still thrill with a sound that's open, airy, effortless and to many ears so downright addictive that good clean examples are highly sought after to this today. As the last authentic models to be made by Quad are from the 1980s, chances are that at some point servicing or even repair will be required, and the costs are not for the fainthearted. Still, this is one rewarding speaker.

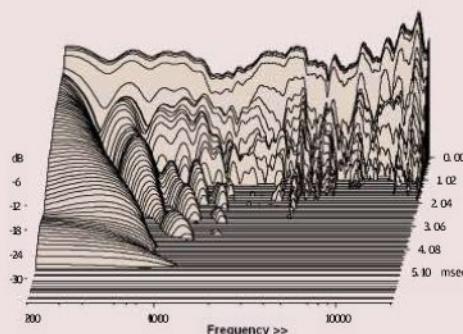
Sound Quality: 85%



ABOVE: 'For the closest approach to the original sound' – pre-stereo ad shows the ESL driven by mono Quad electronics



ABOVE: Both ESLs showed a rippled high frequency response, but one panel also had a higher output



ABOVE: The response ripples are also revealed as panel breakup modes by this cumulative decay plot

HI-FI NEWS SPECIFICATIONS

Sensitivity (SPL/1m/2.83Vrms – Mean/IEC/Music)	88.4/86.0/84.8dB
Impedance modulus min/max (20Hz–20kHz)	1.6ohm @ 20kHz 19.7ohm @ 239Hz
Impedance phase min/max (20Hz–20kHz)	-55° @ 10kHz 77° @ 59Hz
Pair matching (200Hz–20kHz)	$\pm 5.0\text{dB}$
LF/HF extension (-6dB ref 200Hz/10kHz)	- / 26.6kHz/>40kHz
THD 100Hz/1kHz/10kHz (for 90dB SPL/1m)	- / 0.1% / <0.1%
Dimensions (HWD)	780x880x300mm