

GRAMOPHONE has been monitoring the progress of The Acoustical Manufacturing Company and its more recent partnering concern Quad Electroacoustics since its inception in 1936. Products have been reviewed as and when they have appeared and a number of articles about the company itself have appeared over the years. Notable among these have been John Gilbert's profile in the March 1972 issue, our "21 Years On" article in March 1978 and an interview with Peter Walker, the man behind the company, by John Borwick in September 1981. The occasion of Quad's half-century is a cause for special celebration, naturally, and we are pleased to contribute the following up-to-date resumé of its achievements.

Hardware considerations

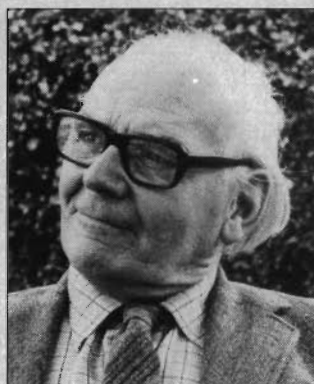
Peter Walker's first awareness of audio came when he was just six years old, when his parents used to listen to concerts via the telephone with an instrument called an Electrophone. Then, in 1922 the BBC started its 'wireless' transmissions, and four years later, at the age of just ten, Peter was one among the crowd of enthusiasts who struggled to put together a Cossor Melodymaker, the first of many such endeavours for him which included the construction of any number of 'crystal sets' which he sold to classmates. Throughout his schooling, at Oundle in Northants, it was tacitly assumed that he would enter his father's hardware business, which he did, but it was quickly realized then that his flair for making things, to be creative, would inevitably be suppressed in that line of work and so he left to pursue his growing interest in electronics. Short periods working with EMI, GEC and Trix Electrical, were supplemented by part-time study at the London Polytechnic and at home, and on May 26th, 1936 he started The Acoustical Manufacturing Company with the help of £200 from his father.

QUAD

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by
IVOR HUMPHREYS



Peter J. Walker

Peter's first successful product was a 30 Watt battery-powered amplifier which was intended for public address applications. As he puts it, "An order was an occasion for celebration" to start with, but gradually business began to pick up helped by an encouraging review of his new C25 amplifier in *Wireless World*. (August 1940). The War intervened and Acoustical's manufacturing capability was adapted to fulfil the demands for sound installations in factories – to supply set-ups for the "Music While You Work" era. Their own premises were bombed in 1941 and it was decided then to move to Huntingdon where they have remained. The 'professional' slant to the business continued after the war with, among other projects, a contract to supply sound systems for some 300 cinemas up and down the country.

In addition to their public address amplifiers, Acoustical made a small 12-Watt design known as the QA12/P ("Quality Amplifier, 12 Watts with Preamplifier") which began to sell for use in the home. This was in effect the grandfather of all subsequent Quad products and it coincided with the beginning of the hi-fi era as we know it today. It was with this amplifier that the famous variable high fre-

quency filter, which has been a hallmark of Quad designs, appeared. Its successors, the Quad II control unit/Quad II power amplifier also incorporated pushbutton selection of a variety of different record equalization characteristics and had separate pre/power amplifier modules. The stereo version of the control unit, the Quad 22, appeared in 1959 and a multiplex decoder for the partnering FM tuner that they had been marketing was released in 1964.

Highly charged

Amplifiers apart, Peter Walker's major interest in audio had been to do with loudspeakers. Fired with enthusiasm early on after attending lectures on electroacoustics by Dr N. W. McLachlan (who had introduced the moving-coil speaker to Britain from Rice-Kellog in the USA) and getting to know Paul Voigt (famous particularly for his horn-loaded corner loudspeakers) at his studio workshop in Sydenham, Peter had spent more and more time in the development of various kinds of transducer. Acoustical's Corner-Ribbon Loudspeaker was introduced in 1949; it combined a conventional moving-coil 12-inch bass driver with

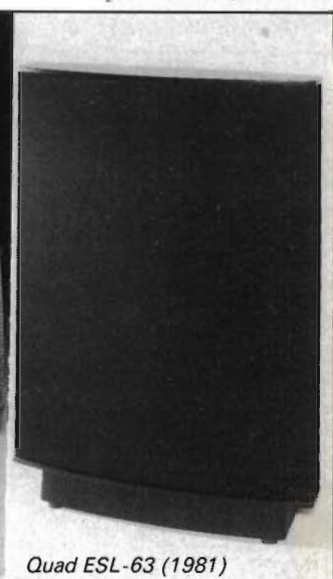
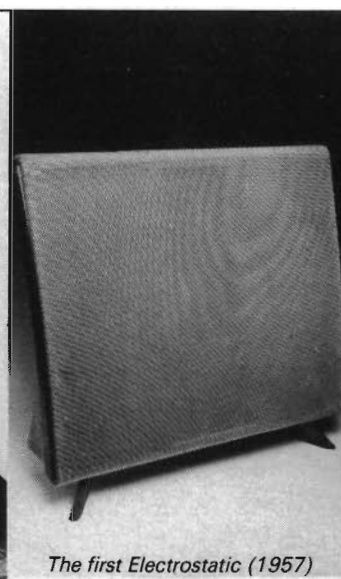
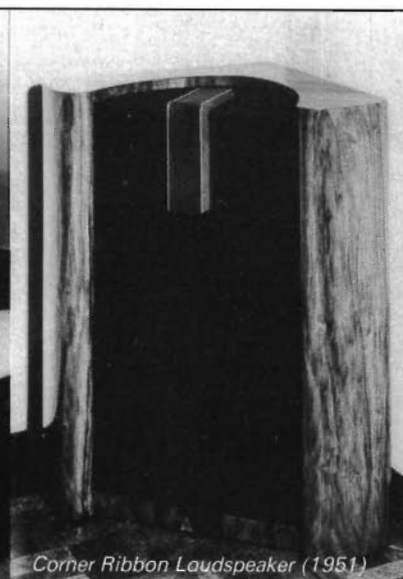
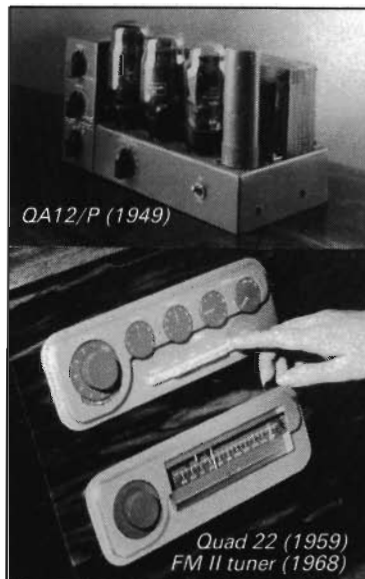
a ribbon tweeter and represented a significant step forward over most competing designs—indeed many of these CRLs are still in use. The ribbon unit gave an exceptional transparency to the sound and the MC driver a good bass response; what was lacking was a really satisfactory integration of the two.

Peter was convinced that the electrostatic principle offered the best overall solution to loudspeaker design, provided that the very substantial problems of making a viable, practical version could be overcome. The biggest problems had to do with available materials and the difficulties of handling the very high internal voltages required. With the amplifier business ticking over nicely he was able to devote most of his time to the project and by 1955 the first models were working in the laboratory. It wasn't, however, until the advent of the new plastics materials that manufacture of a full-range electrostatic loudspeaker on a commercial scale became feasible.

The Quad Electrostatic Loudspeaker (ELS) came on to the market in 1957 and very quickly came to represent the standard by which all other loudspeakers were judged. Unquestionably one of the great achievements in audio it stood the test of time like no other component before it (or since) and remained in production, virtually unchanged, for a scarcely credible 28 years. It was necessarily expensive and because of its size often impractical to house, the more so with the advent of stereo and the need to use two, but the sounds it made earned it almost universal acclaim and some 54,000 units were sold.

Solid-state

Many users were confused and not a little disconcerted when, at the dawn of the transistor era, no hint of a 'solid-state' amplifier was forthcoming from Acoustical. Their apparent tardiness was, of course, well founded, since the early transistors were rather 'slow' devices and until the original, mostly germanium,



types were superseded the job could still be done better by using valves. Problems of crossover distortion were not inconsiderable and the more graceful overload characteristics of valve circuits meant that many transistor 'equivalents' sounded distinctly harsh and edgy in comparison. It is the Quad approach to get a product right before it is released and not to 'tweak' it during production at the public's expense, so when the 33/303 pre/power combination was finally released in 1967 it was streets ahead of most of its competition. The extraordinary flexibility of the control unit—with its plug-in 'matching' circuit boards, switched and variable filters, tone controls and input facilities—together with technical innovations in the power amplifier—most notably the so-called "Triples" which overcame problems of thermal tracking in Class B operation—propelled it to the forefront of the high quality market. The 33 was (and remains to date) the best selling Quad product at 120,000 units in its 15-year production run. The 303 sold 94,000 by the time it was discontinued last year. Matching the 33 was a new stereo VHF tuner, the FM3, and there was also a professional mono power amplifier based on the 303 called the Quad 50.

It has never been a Quad policy to release new models simply to satisfy the dictates of fashion. Instead, products remain current for years and are subject to minor revisions here and there when some aspect of circuitry can be updated to useful effect or some new component confers significant production, and sometimes sonic, benefits. Quality, longevity and reliability are Quad hallmarks and the company is justly proud both of its very low failure rate and second-to-none after-sales service. Thus it was no less than eight years after the introduction of the 33/303 that a new power amplifier the 405 was introduced.

Current affairs

The 405 was announced with a paper to the 50th International Convention of the Audio Engineering

Society in 1975. At its heart is a new application of the so-called feed-forward technique which had been advocated by Harold Black many years previously. Jointly patented by Peter Walker and his then new assistant design engineer Michael Albinson, the 405 employs what was coined a "Current Dumping" circuit whereby most of the 'muscle' needed to drive the loudspeakers is provided by robust, relatively routine performance output transistors, which are under the control of a small, but very high performance Class A stage which 'fills in the gaps' completely so that the overall output is an exact copy of the input plus the requisite gain. Additional benefits are that no adjustments are needed either in manufacture or subsequently after years of use, or even after the fitting of a replacement component in the unlikely event of a failure. The circuit's innovations have caused much debate in academic circles during the ensuing decade and, inevitably, some imitation, both of which have brought nothing but credit to its inventors.

In 1979 a new control unit, the Quad 44, was introduced. Predictably this brought more novelties, most notably in its revised approach to tone controls—"tilt" and "bass lift/step"—and input selection which was now managed with solid-state electronic switches which are not subject to the oxidation problems which often plague conventional mechanical switches after a time. The 44 also uses an arrangement of plug-in modules which give it extraordinary flexibility, including the capability of handling the now popular moving-coil pickup cartridges. The 44 was joined by a new VHF tuner, the FM4 in 1982, this incorporating a specially developed microprocessor to make it just about the easiest to use tuner on the market, with a level of performance limited to all intents and purposes only by the quality of the incoming signal.

A smaller, more domestically styled control unit, the 34, was introduced in 1982, this utilizing the same case and front panel casting as the FM4 tuner and offering simpler tone

control and filter functions. That year also saw a Mk. II version of the 405, which enabled it to drive the low impedance loads presented by recent, fashionable loudspeakers more effectively; and in 1984 two new 'professional' power amplifiers, the 510 mono and 520 stereo were introduced, these based on a refined version of the 405 circuit.

Introducing Fred

A new electrostatic loudspeaker was rumoured for several years before the ESL-63 finally appeared from under the strictest of wraps in 1981. The 63 of the model number actually refers to the year in which the design work was first begun. With a gestation period of more than 17 years it was to be expected that the new speaker would be something very special, and so it proved. Whereas the earlier model had separate high and low frequency panels, FRED, as it is affectionately known (for Full Range Electrostatic Doublet) has just one, thereby eliminating the need for a conventional crossover. The most far-reaching aspect of its design, though, is its arrangement of concentric annular electrodes and time delay circuitry, which together allow it to produce a sound pressure pattern which closely approximates to the theoretically ideal point source. The speaker exhibits no phase anomalies of any consequence, no frequency response problems, no directivity problems and, of course, none of the transient hangover problems which ultimately limit the performance potential of conventional moving-coil drivers. In short, the ESL-63 really has renewed the validity of the famous Quad claim to provide "The closest approach to the original sound".

Quad today

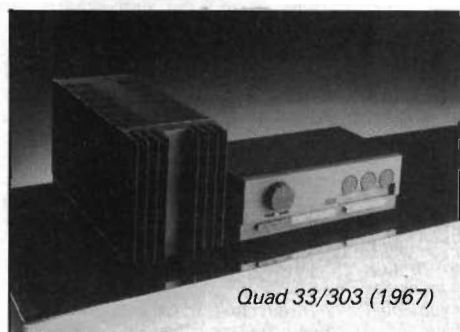
Earlier this year a new medium powered (70 Watts into 8 Ohms) domestic power amplifier was released. The 306 replaces the 303 and offers new refinements in construction and performance, again being based around a highly developed version of the 405 arrangement (see review in June, page 110). It

employs separate left/right power supplies, which takes the crosstalk performance to a new level (not that it was in any sense inadequate before!) and its 'noise floor' of some 105dB below signal level is exceptional by any standards. The traditional Quad characteristics of reliability and ruggedness naturally obtain.

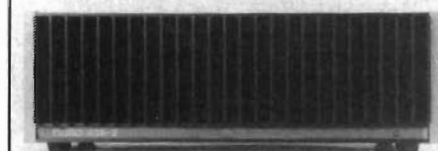
The latest Quad product, just about to be launched, is a high-powered domestic power amplifier called 606. This follows on from the ideas realized in the 306 but offers no less than 140 Watts steady-state (180 Watts, programme) per channel into 8 Ohms. Into 4 Ohms the output is a very hefty 250 Watts. Again separate power supplies are used. Thus with the 306, the 405-2 and this new 606, Quad are able to offer a fine sounding amplifier to suit a variety of power requirements.

All things considered

Quad currently employ some 140 people in their 30,000 sq. ft. Huntingdon factory. Exports account for approximately 65 per cent of their business, the major outlets being in Europe, Canada, the USA and Japan. About 10 per cent of their product goes to the professional market, to broadcast and recording studios throughout the world. Among the many honours bestowed upon them over the years have been Design Council Awards for the 33/303 and 405 amplifiers and a Queen's Award for Technological Achievement in 1978 (the only one so far awarded to a manufacturer of audio equipment). Five years beyond the normal retirement age Peter Walker still devotes much of his time and energy to design work with his team at Huntingdon. With an up-to-date range now finalized and future products no doubt materializing on the testbenches, he can look back on an astonishingly consistent and fulfilling career with great pride and the knowledge that under the marketing and management abilities of his son Ross (Managing Director, Quad Electroacoustics) the future should be both well served and secure.



Quad 33/303 (1967)



Quad 405-2 (1975/1982)



Quad 34, FM4 (1982 and 306 (1986)



Quad 44 (1979)



Quad 606 (1986)