

QUAD

Electrostatic Loudspeaker
Instruction Book

GUARANTEE

This loudspeaker is guaranteed against any defect in material and workmanship for a period of twelve months from the date of purchase.

Within this period we undertake to supply replacement parts free of charge provided that failure was not occasioned by misuse, accident or negligence. Labour and carriage costs are not covered unless by local agreement.

SERVICE

The Quad Loudspeaker requires no routine maintenance. If servicing is required the loudspeaker should be returned to the supplier, to the agent for the county of purchase or to the Acoustical Manufacturing Co. Ltd. A brief note should be enclosed giving your name and address plus the reason for returning it.

Quad Electrostatic Loudspeaker

THIS LOUDSPEAKER IS FUNDAMENTALLY DIFFERENT FROM OTHER LOUDSPEAKERS AND IT IS ESSENTIAL THAT THESE INSTRUCTIONS BE FOLLOWED IF PROPER PERFORMANCE IS TO BE OBTAINED.

THIS LOUDSPEAKER IS DESIGNED FOR OPERATION WITH STANDARD QUAD II, QUAD 303 POWER AMPLIFIERS OR QUAD 405 WITH LIMITERS AND IT IS ESSENTIAL FOR BOTH PROPER PERFORMANCE AND RELIABILITY THAT IT IS USED ONLY WITH THESE AMPLIFIERS OR ONE KNOWN TO BE SUITABLE.

ASSEMBLY

The Loudspeaker pack contains:

- The Loudspeaker
- 3 legs
- 12 screws
- 2 signal plugs
- 1 mains plug
- 1 Instruction Booklet

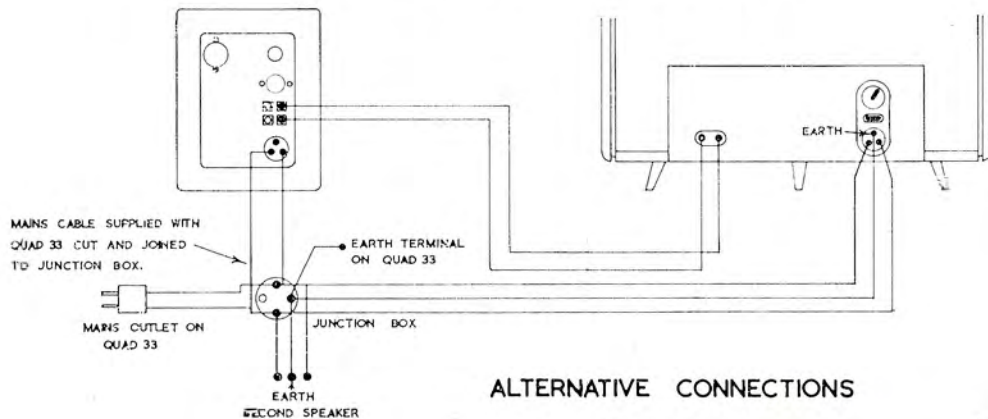
The legs are removed to avoid damage in transit, etc., and should be re-assembled before the loudspeaker is put into use. The three legs are not interchangeable. The one with the different off-set angle is the rear leg and when in position it should point towards the rear. The remaining two legs are slightly off-set right and left respectively. They should be mounted so that they point forward and slightly outward. Screws are provided for fixing and the operation does not involve dismantling any part of the loudspeaker. As the expanded metal front grille marks rather easily, it is recommended that care be exercised when laying the speaker down on its face.

CONNECTING

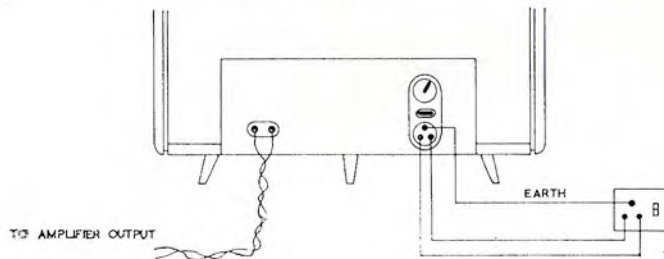
It is a good plan to connect temporary long leads to the speaker so that it may be moved round the listening room to find the optimum position for listening (see page 5).

Having set the voltage adjustment tapping to the appropriate voltage the AC mains and earth leads can be connected to the three pin socket provided. The three connections are

RECOMMENDED CONNECTIONS FOR AUTOMATIC SWITCHING



ALTERNATIVE CONNECTIONS



marked inside the cable end connector L, N and E, corresponding to live, neutral and earth respectively. The loudspeaker mains connector may be either round or square type, and since these are not interchangeable it is important to specify the type if you have to order a replacement.

As with any mains operated apparatus, the services of a competent electrician should be sought if there is any doubt.

LOUDSPEAKER PHASING

Each loudspeaker should be connected to its appropriate amplifier output so that the two pairs of wires are connected in the same way, to ensure that the speakers operate in phase. The input terminals are colour-coded to facilitate this.

If there is any doubt about the way in which the loudspeakers are connected, their phasing may be checked by playing a mono disc over both channels, when the sound should appear to emanate from a point midway between them. If this is indefinite the connections to either of the loudspeakers, but not both, should be reversed. Correctly connected the loudspeakers will give a definite centre sound source accompanied by a more full-bodied sound in the tenor and bass registers.

SWITCHING ON

The indicator lamp above the mains plug should glow upon switching on, and the loudspeaker will be reasonably well charged within about half a minute.

Although the Quad electrostatic loudspeaker starts to charge immediately it is switched on, it takes some minutes before it is fully charged and the balance of sound is correct.

We recommend that in most installations the loudspeakers are connected direct to the mains supply and left switched on continuously.

The power supply does not deteriorate under these conditions and the consumption is negligible.

ROOM POSITION

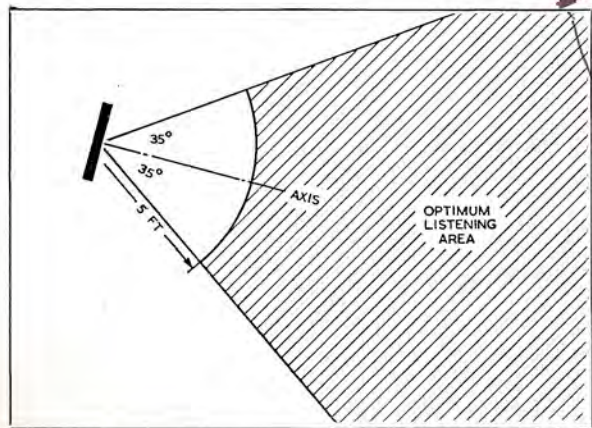
With any type of loudspeaker the room will affect the performance quite considerably. This effect will be less with the QUAD Electrostatic than with most other types of speaker but care taken initially in finding the most suitable position in the room is always worthwhile.

As a general guide, radiation of the sound waves from both front and rear of the speaker should be restricted as little as possible, while corners and positions close to and parallel with walls should be avoided. A corner position is often necessary for other types of loudspeakers because it accentuates the low frequencies but such a position for the QUAD will both reduce the bass seriously and cause deterioration at middle frequencies due to standing waves.

If the loudspeaker has to be close to a wall, however, it should be stood at an angle so that reflections from the wall are not returned trapped. For example one end of the speaker could almost touch the wall provided the other end were say two feet away from it.

The best position may now be found experimentally and should be that which gives the best perspective.

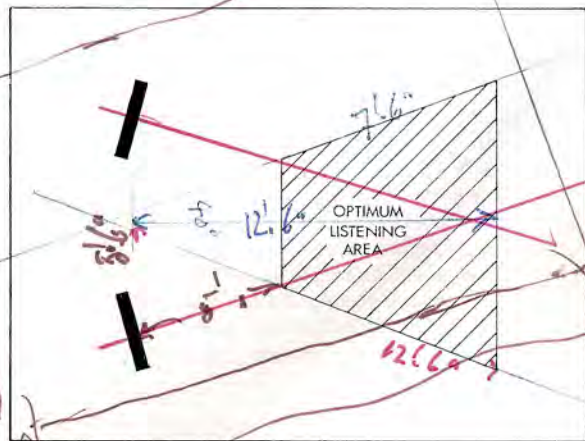
The objective on a concert programme is that the loudspeaker should appear as an open window beyond which lies the Concert Hall. The "closeness" of the orchestra is dependent upon the acoustics and microphone placing at the transmitting end. With modern studio practice the window should appear to open into a position about halfway down an idealised Concert Hall (front row—dress circle). Of course, in these tests for optimum perspective, the volume



HORIZONTAL DISPERSION

level must be adjusted with care so that the intensity is commensurate with the perspective as broadcast or recorded (see page 7).

It is practically impossible to predict which positions in a room are likely to be best and two symmetrical positions in an apparently symmetrical room do not necessarily give similar results. The ideal stereo arrangement is shown, but time spent in trying the loudspeakers in all possible positions is usually very well worth while.



STEREO

THE LOUDSPEAKER AND THE CONTROL UNIT

At first thought it would appear that the purpose of a volume control is solely to enable the listener to have the music loud or soft according to his whim. Whilst it, of course, fills this requirement, it has a further purpose—that of adjusting the intensity of sound so that it is correctly related to the perspective as recorded or broadcast.

If a voice is picked up close to a microphone in a very absorbent studio, then on reproduction that voice will take up a position at the centre of, and in the plane of the loudspeaker. For natural sound, therefore, the loudspeaker should radiate similar power to that of the original voice. If on the other hand the voice is picked up some way from the microphone in a more live studio, then the voice on reproduction will take up a position through the loudspeaker and a considerable distance behind it. It is clear that the power required for the loudspeaker for natural sound is now very much less than in the first case. The *position* or *perspective* of the reproduced sound is fixed at the studio end and there is little that can be done at the listening end to alter it. It follows that the volume setting for natural sound is to a large extent fixed at the studio end.

Studio monitoring is usually carried out at a reasonable level and the whole aim is to produce listening as from a

favourable seat in the Concert Hall. Adjusting the volume control to a level to give this correct acoustic perspective will produce the most natural reproduction. The level is usually such that it is quite possible to speak to a person sitting next to the listener without raising the voice or turning down the sound level—as indeed this is possible in the Concert Hall.

Raising the level to “bring the orchestra into the room” or turning it down to a low background will both distort the perspective, although this may have to be tolerated on certain occasions. It should be pointed out that no amount of tone control or loudness control can affect the perspective, although these effects can be used to produce a new sound which although quite unlike the original is sometimes found acceptable.

Popular music is often recorded or transmitted with close microphone technique and would therefore tend to require reproduction at higher levels. It is in fact generally monitored at a higher level. There are a number of other factors which have a strong bearing on optimum listening levels but it is outside the scope of this handbook to deal with these adequately. It will be realised that the volume control setting should receive careful attention and it can be emphasised that much listening is spoilt due to insufficient care on this point.

Radio on V.H.F.

With the QUAD Electrostatic Loudspeaker used with B.B.C. broadcasts, it is recommended that no tone controls or filters be used, and they may be conveniently switched out of circuit by using the CANCEL position on the Control Unit. The greatest care is taken during transmission and only rarely can this quality be improved at the listening end.

It can be argued that some broadcasts are inferior in quality and that these can be improved by judicious use of tone control. Whilst this is true, such broadcasts are usually confined to those where the subject matter and not the quality is important.

Gramophone Records

The reproduction of gramophone records is a matter of compromise if the best performance is to be obtained.

There are many makes of records and almost without exception a programme is fed through various variable tone controls during the making of the record in order to obtain the effect which the manufacturer considers desirable. It is therefore understandable that there will be considerable variation in tonal balance among the recordings offered to the public. (This variation in balance is not to be confused with the recording characteristic, which is fully corrected in QUAD control units when the Disc pushbutton is pressed).

Musical balance should be adjusted if required by means of the treble and bass controls, referring to CANCEL to ensure that any adjustments are truly an improvement. Few modern recordings will require more than plus or minus 2 on bass or treble controls and the best recordings should require no adjustment at all.

Virtually all recordings, even the latest and best, will require some degree of filtering for the best possible quality. This is no reflection on the recordings themselves but is an inherent feature of the disc system of reproduction.

The higher the frequency the less easily can the stylus trace the groove, hence tracing distortions (and noise) increase. As the frequency increases, therefore, the ratio of musical content to unwanted sound reduces. Minimum distortion is obtained when the filter slope corresponds to the slope of the distortion rise. This will vary with the type of musical content and the recording level.

With the best recording the filter should be set to 10K and with the slope initially at level, the slope control should be rotated until the reproduction is clean yet without sacrificing any other aspect of quality. The optimum will usually be found somewhere between LEVEL and 15. With many good modern recordings the same procedure should be applied with the filter set to 7 K.

Older recordings and 78 r.p.m. recordings will usually require the filter at 5 K with more severe settings of the filter slope.

The filter controls are very carefully designed and their correct use is important in obtaining a satisfactory musical sound.

STEREO REPRODUCTION

The loudspeaker is symmetrically designed so that all frequencies have the same line or point source. This arrangement is the ideal one for stereo reproduction.

Proper stereo should produce a complete picture of the orchestra and concert hall acoustics *evenly* spaced over the area between the loudspeakers. Failure to achieve this objective can be due to unsatisfactory recording technique or unfortunate room reflections. The loudspeakers should be moved to find the best positions. In difficult rooms optimum result may sometimes be obtained by directing the speakers inwards.

AMPLIFIER REQUIREMENTS

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Other amplifiers if they are properly regulated (not more than 33 peak volts with any load) are unlikely to cause damage to the loudspeaker, although they may not necessarily provide the correct performance because of the very strict stability requirements.

In many cases the amplifier manufacturer can indicate the suitability of his product but we regret that we cannot accept responsibility for damage caused by the use of unsuitable amplifiers.

SPECIFICATION

2 metres on axis in free space 93 dB referred to
·0002 dynes/cm² in frequency range
50 Hz-10 kHz.

**MAXIMUM
OUTPUT**

100 dB referred to ·0002 dynes/cm²
in range 70 Hz-7 kHz.

Total integrated radiation equivalent to 95 phons
in enclosures up to 150 cubic metres
with average reverberation.

BANDWIDTH

45 Hz-18 kHz. Rate of attenuation outside band—
asymptotic to 18 dB/8ve.

DISPERSION

Approximately 70° Horizontal 15° Vertical.

IMPEDANCE

30-15 ohm in range 40 Hz-8 kHz falling above
8 kHz.

**AC POWER
CONSUMPTION**

Negligible.

**AC VOLTAGE
RANGE**

100-120, 200-250 volts 50-60 Hz.

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