

NOW

ANOTHER MILESTONE IN AUDIO ENGINEERING

BY

LEAK



STEREO 30

TRANSISTOR INTEGRATED AMPLIFIER

Styled by NOEL HARING ASSOCIATES for enhanced appearance in your home.

Designed by HAROLD J. LEAK to give you
OPTIMUM MUSICAL RESULTS from:—

Records . . .	<i>Stereo and Mono</i>
Tape . . .	<i>Stereo and Mono</i>
Radio . . .	<i>Stereo and Mono</i>
Microphone . . .	<i>Stereo and Mono</i>

STEREO REPRODUCTION

The impact of listening to first-rate stereo reproduction on the great majority of listeners is profound. There is an astonishing sense of realism and an absence of listening fatigue. The overall impression is of greatly enhanced enjoyment, to such an extent that the majority of listeners declare loss of interest in normal single channel (mono) reproduction.

Stereo is not new to communications engineers. H. J. Leak carried out his first stereo microphone transmission (with D. W. Turpin) in 1931, and the famous Philadelphia-Washington relay by Bell Telephone Laboratories in 1933 proved the feasibility of stereo sound as we recognise it today.

What is new about stereo is its availability to the general public by means of gramophone (phonograph) and tape records, and via the increasing use of stereophonic radio.

In this leaflet we describe stereo apparatus in a manner acceptable to the professional communications engineer and to the music-lover seeking the highest available standard of sound reproduction. The information contained herein is factual but, of necessity, brief.

USE OF TRANSISTORS

Reprinted from *WIRELESS WORLD* Editorial May, 1963

HIGH-QUALITY TRANSISTOR AMPLIFIERS

FIFTEEN years ago, when the first phase of point-contact transistors were demonstrating, if somewhat noisily, their capability of small-signal amplification, it seemed unlikely that in the foreseeable future they would challenge valves for a place in high-quality audio amplifiers, though their possibilities in other directions were soon apparent. The transistor portable with its all too obviously non-linear response and noisy background has done little to encourage belief that the junction transistor of the second phase would be any more successful. Indeed, the transistor set has created a prejudice against the transistor among some sections of the audio fraternity which will need active argument and demonstration to remove.

That this prejudice is without foundation there can no longer be any doubt. Last autumn, during his presidential address to the British Sound

Recording Association, H. J. Leak demonstrated a prototype high-quality transistor amplifier which gave results indistinguishable from those of his valve amplifiers

At present transistors cost more than valves but it does not necessarily follow that transistor amplifiers must be correspondingly more expensive. In valve amplifiers there is an output transformer which can be omitted when we use transistors.

People sometimes ask why there is any necessity to change to transistors. The elimination of the output transformer is, in our view, sufficient reason now that solutions of the problem of linearity in the response of the rest of the transistor circuit have been found. As additional bonuses we get smaller size, cooler running and the prospect of longer life.

“The imminent obsolescence of the valve in home high fidelity equipment” was the major subject of H. J. Leak’s presidential address to the B.S.R.A. referred to above. For power outputs of up to 15 watts per channel the valve can no longer compete with the transistor.

Compared with its equivalent valve amplifier the “Stereo 30” gives results which are indistinguishable and it offers these important advantages :—

It is 48% of the weight.

It is 43% of the volume.

It is 89% of the price.

It has greater reliability (estimated to be 500% better) because the heat rise within the case is negligible (12° F) and because the maximum voltage is less than 50.

How can the valve possibly survive in view of the above comparisons ?

FUNCTION

The function of an ordinary mono amplifier is to accept the tiny electrical signals from the input device (pickup, tape head, tuner, or microphone) and to build them up to a magnitude capable of operating a loudspeaker system, and to achieve this with negligible distortions.

The Leak "Stereo 30" amplifier is simply two identical mono amplifiers electronically separate, but physically combined. This amplifier reproduces stereophonically and monophonically from records, tape, radio and microphone, using any pickup, any tape head, any tuner and any microphone available in the world. This comprehensiveness gives two important advantages. First, you can use the finest pickups and microphones available in the world: this is not the case with cheaper low-gain amplifiers. Second, when reproducing from tape you can do so directly from the tape head, thus saving the cost of amplifiers built into the tape mechanism.

The "Stereo 30" functions electronically to the highest standards obtainable by present techniques—to the performance standards demanded by communications engineers for broadcasting and recording*. This is proven by the engineering specifications given on pages 4 to 6. There is nothing we can add to the circuitry or the price to improve the fidelity of reproduction obtainable from the "Stereo 30". The features which make for ease and pleasure of handling are discussed below.

APPEARANCE

The appearance is of elegant and functional simplicity whether the unit is used free-standing or whether it is cabinet mounted when the front panel will blend with any wood. The decor is black, silver and grey.



EASE OF INSTALLATION

Very great care has also been given to this consideration; we do not expect you to be a mechanic, electrician, wireman, solderer and cabinet-maker. There is a growing tendency to follow the practice in the U.S.A., where auxiliary equipment (turntables, pickups, radio tuners and tape decks) is supplied complete with cables and standard plugs which you simply plug into the appropriate sockets on the "Stereo 30". With such apparatus you can make all your connections for a complete equipment and have music within 10 minutes.

If the amplifier is to be mounted in a cabinet we impress upon you that this takes less time and requires less skill than with any other pre-amplifier of which we have cognisance. An oblong cut-out is required, which takes about 10 minutes. The rough edges of the cut-out are hidden by the front panel, and the amplifier is secured to the cabinet within 30 seconds by means of the metal cover and wing-screw (see illustration above).

In view of the care which we ourselves take, we consider it fair comment to point out that many pre-amplifiers are styled to look well on a dealer's shelf. Some of these require several hours expert cabinet finishing before they can be mounted, and, furthermore, it is sometimes obligatory to remove part of the decoration which contributed to the original attractiveness.

* LEAK amplifiers are the choice of professional engineers such as the B.B.C. (over 500 delivered), the South African Broadcasting Corporation (600), ITV and many other Commonwealth and overseas broadcasting and TV systems, who use them for transmitting and/or monitoring (quality checking) the broadcasts to which you listen. Also, many of the gramophone records you buy are cut via LEAK amplifiers.

EASE OF OPERATION

A skilled electronic engineer has no advantage whatsoever over the layman in getting the best from the "Stereo 30". Though comprehensive and flexible, it was created by the world's best-known amplifier designer specifically for the use and enjoyment of the music-lover at home, for his wife and for his children. Simple-to-follow operating instructions are enclosed with the pre-amplifier, and five minutes practice will give you easy mastery.

All controls are of the single knob, dual-ganged, close-tolerance type, which give much greater ease of handling than the cheaper twin knob, dual-concentric, un-ganged type.

CIRCUITRY

The two identical circuits are designated "L" (for the left-hand input signal) and "R" (for the right-hand input signal). Each circuit uses a low-noise, low-distortion 3-stage feedback tone control pre-amplifier section. The first two stages are used to give record and tape compensation by the use of frequency selective negative feedback. Note particularly that we use a high input impedance (47,000 ohms) on the pickup input because the performance of all modern stereo pickups is seriously degraded, both in frequency response and stereo separation, by the use of a low input impedance. This fact appears to be as yet unappreciated, but it is of the utmost importance.

The third stage embodies feedback tone control circuits which give continuously variable control of both bass and treble frequencies, plus the famous Leak "Varislope" filter circuitry.

The output from each pre-amplifier section feeds into a 6-transistor, 4-stage power amplifier. We have designed the power amplifier in a directly-coupled, transformerless, push-pull configuration with over 60dB of negative feedback, thereby reducing all forms of distortion to vanishing point.

Heavy DC negative feedback in conjunction with thermistor devices ensure that the high specifications are always maintained at extremely low and high temperatures.

SPECIFICATION, FACILITIES, AND PERFORMANCE

TRANSISTORS :

2-AC107, 4-GET113, 2-OC44, 2-AF118, 2-GET538,
2-AC127Z, 4-AD140.

DIODES AND THERMISTORS :

2-20AS, 2-VA1055, 2-VA1039.

POWER OUTPUT :

10 watts per channel into a 15 ohm load (IHFM music rating).

15 watts per channel into a 4 ohm load (IHFM music rating).

TOTAL HARMONIC DISTORTION :

0.1% for 8 watts output per channel at 1,000 c/s into a 15 ohm load (IHFM).

DAMPING FACTOR :

60 measured at 1,000 c/s.

POWER SUPPLY :

110V, 117V, 130V, 210V, 230V, 250V : 40-60 c/s.

CONSUMPTION : 40 watts.

FACILITIES ON THE REAR PANEL :

(1) Outlets for tape recording marked "Record" permit recording from records, tape, radio or microphone. The normal output level is 125mV but a switch is fitted to reduce

this output to 12.5mV and enable the "Record" sockets to be connected to the high sensitivity inputs on the tape recorder.

(2) Standard international type co-axial plugs and sockets are provided for all input and tape outlet connections.

(3) Switches are provided for the adjustment of level of the input signals from pickup, tuner, tape amp and microphone.

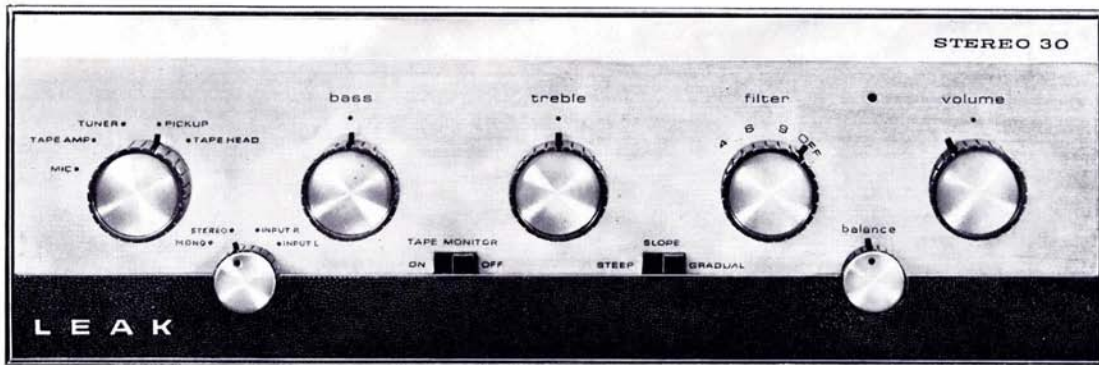
(4) A 13 ft. (4 metres) power supply cable is fitted to the "Stereo 30" to facilitate connection to the domestic power supply.

(5) A voltage selector is fitted which allows the "Stereo 30" to be connected to power supplies in the range of 110 to 250V, 40 to 60 c/s.

(6) Standard 1½" fuses for both A.C. and D.C. circuits give maximum protection under fault conditions.

(7) A double socket marked "A.C. Outlets" is fitted as a convenient source of power supply for gramophone motors, etc. The power from these sockets is not fused but is controlled by the switch incorporated in the volume control. Corresponding plugs with 6 ft. (2 metres) cable are supplied with the amplifier.

(8) Non-reversible loudspeaker plugs and sockets for each channel permit loudspeakers of any impedance from 4 to 15 ohms to be connected to the "Stereo 30".



The sensitivities shown below give full power output at 1,000 c/s into a 15 ohm load with tone controls at 12 o'clock and the volume control at maximum. When using a 4 ohm load the sensitivities will be twice as high for the same power output.

INPUT SELECTOR :

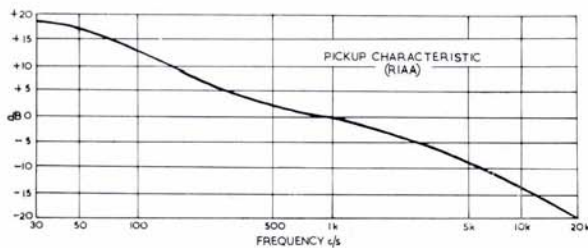
A five position switch allows the choice of inputs from :

PICKUP, stereo and mono.

Sensitivity—3.5mV at 47k ohms using PICKUP 1 input sockets, or 20mV at 33k ohms, or 60mV at 100k ohms using PICKUP 2 input sockets.

Selected by switched input attenuator fitted on the rear panel.

Characteristic, RIAA, the world standard for stereo and mono records, see graph below.



TAPE HEAD, stereo and mono.

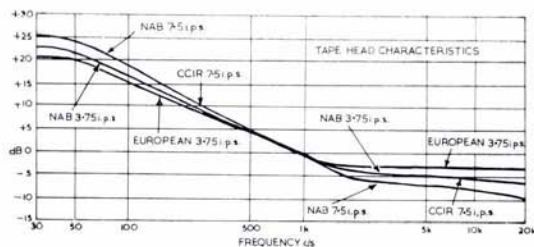
Sensitivity—3mV at 47k ohms.

Characteristics :

- NAB 7½ i.p.s. with tone controls at 12 o'clock.
- NAB 3¾ i.p.s. bass at 11 o'clock treble at 2 o'clock.
- CCIR 7½ i.p.s. bass at 12 o'clock treble at 2 o'clock.
- EUROPEAN 3¾ i.p.s. bass at 10 o'clock treble at 3 o'clock.

See graph below.

With moderately priced heads, properly aligned, the playback response will be level within ±1dB from 50 to 10,000 c/s using the above settings. This can usually be extended from 40 to 15,000 c/s using the best heads, accurately aligned, and with slight manipulation of the tone controls.



TUNER, stereo and mono.

Sensitivity—100mV at 100k ohms, or
500mV at 50k ohms.

Selected by switched input attenuator fitted on the rear panel.

Characteristic, flat ±1dB 30 c/s to 20 kc/s.

TAPE AMP, stereo and mono.

Sensitivity—125mV at 50k ohms, or
250mV at 100k ohms.

Selected by switched input attenuator fitted on the rear panel.

For (1) The output from equalised tape reproducers.

- (2) Any radio tuner unit.
- (3) TV sound receiver, or
- (4) Any other "flat" input.

Characteristic, flat ±1dB 30 c/s to 20 kc/s.

MICROPHONE, stereo and mono.

Sensitivity—3mV at 33k ohms, or
125mV at 150k ohms.

Selected by switched input attenuator fitted on the rear panel.

Characteristic, flat ±1dB 30 c/s to 20 kc/s.

FUNCTION CONTROL :

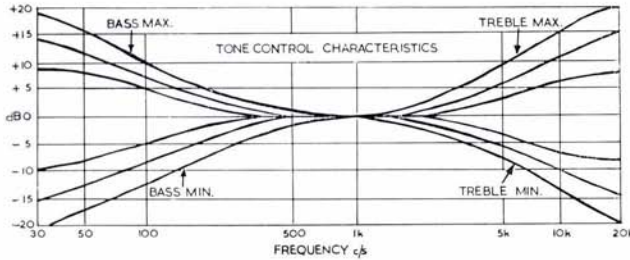
A four position switch allows the choice of :

- (1) MONO. This position parallels the "L" and "R" circuits enabling a stereo pickup to play LP records.
- (2) STEREO
- (3) INPUT R (mono, connects both amplifier channels to the "R" input device).
- (4) INPUT L (mono, connects both amplifier channels to the "L" input device).

Positions 3 and 4 enable you to reproduce mono signals through both the loudspeakers of a stereo system, from mono pickups, tape heads, tuners, microphones and tape reproducers.

BASS CONTROL :

Single knob, dual ganged, close tolerance, operative on both channels simultaneously. Continuously variable, plus or minus 16dB at 50 c/s. See graph below.

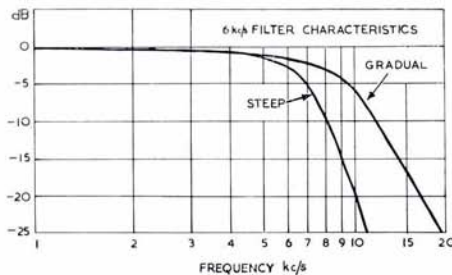


TREBLE CONTROL :

Single knob, dual ganged, close tolerance, operative on both channels simultaneously. Continuously variable, plus or minus 16dB at 14 kc/s. See graph above.

FILTER AND SLOPE CONTROLS :

The "Filter" knob can be used to give very comprehensive control of the treble frequencies. When the control is turned to "6" a filter is switched into circuit, the turnover frequency being 6 kc/s (i.e. the frequency at which the response falls 3dB). See graph below. Other turnover frequencies of 9 kc/s and 4 kc/s are also obtainable but to avoid confusion these are not shown on the graph. The "Slope" control varies the rate of attenuation above the turnover frequency from 12dB per octave ("Gradual") to 30dB per octave ("Steep"). The "Filter" and "Slope" controls together with the "Treble" control give an enormous range of high frequency attenuation which is very useful when reproducing music in which there is high distortion at high frequencies, for it is then possible to remove much of the offensiveness whilst losing a minimum of the musical content. The "Slope" control is inoperative when the "Filter" is at "OFF".



VOLUME CONTROL WITH ON/OFF SWITCH :

Single knob, dual-ganged, close-tolerance, operative on both channels simultaneously. The switch controls the power to the "Stereo 30", and any device (turntable, tuner, etc.) connected to the "A.C. Outlet" sockets.

BALANCE CONTROL :

Single knob, dual-ganged, close-tolerance. Any degree of balance may be obtained as either channel can be faded to zero output without affecting the other.

TAPE MONITOR SWITCH :

This switch permits instantaneous comparison between the original signal and the recorded signal (with tape recorders having a separate replay head and separate record and replay amplifiers).

PANEL LIGHT :

This is fitted as a visual reminder that the power supply is on when the lamp is alight.

CROSSTALK :

Between "L" and "R" channels, -50dB up to 1,000 c/s and -30dB at 10,000 c/s.

HUM AND NOISE :

66dB below full output on "Tuner" and "Tape Amp", and 52dB below full output on other inputs with tone controls at 12 o'clock and volume control at maximum. With the volume control turned to minimum the residual hum and noise is 80dB below full power output.

DIMENSIONS :

13" x 4 1/4" x 9" deep (33 x 11 x 23 cms.). The unit may be used free-standing (as on a table or bookcase), or it may be cabinet mounted on a panel of any thickness through a cut-out of 12 5/16" x 3 3/4" (31.8 x 9.5 cms.).

WEIGHT : 14 lbs. (6.4 kgs.).

PRICE : £49.10.0d.

H. J. LEAK & CO., LTD.

BRUNEL ROAD • WESTWAY FACTORY ESTATE • LONDON W.3

Telephone : SHEpherds Bush 1173 (Private Branch Exchange)

Telegrams : Inland : Sinusoidal, Ealux, London Foreign : Sinusoidal, London

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