



 **RADFORD**

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PRE-AMPLIFIER CONTROL UNIT  
SC 24

POWER AMPLIFIERS  
P.A. 50, SPA 50

Radford Audio Ltd. Phone 0452 204

## Stereophonic Pre-amplifier

### Type SC 24

The SC 24 is a transistor stereophonic pre-amplifier. Using a wide range of facilities with outstanding performance it is intended for use with PA 50, SPA 50 and PA 100 power amplifiers but may be used with any power amplifier.

The unit is ideal for driving headphones as a power amplifier is incorporated independent of the power amplifier outputs, where headphones only are used it is necessary to have additional power amplifiers.

The outstanding characteristics of the amplifier are low standards in signal-to-noise ratio, low distortion, input handling capacity, transient performance and operating flexibility.

Total harmonic distortion does not exceed 0.01% for an output of 1V r.m.s., which rapidly decreases for lower inputs to a level below the amplifier inherent noise.

60 Volt transformers are used throughout to provide a high overload capacity to transients. On disc input the overload level is greater than 200mV and the inherent noise level is better than 70dB below 5mV r.m.s. input.

1% resistors and capacitors are used in the R.I.A.A. disc reproducing network to provide an error not exceeding 0.5dB, typically 0.25dB from the specified characteristic, B.S. 1329/1961.

Provision is made for any type of input transducer. Sensitivity on 'Disc' and 'Aux. 1' inputs is 2.0mV for 1.5W r.m.s. output. Aux. 1 may be used for disc with RIAA equalization, or flat, by changing a link on the plug-in disc module. Other inputs have a sensitivity of 60mV. Exceptional flexibility in use with transducers of different output levels is provided by individual pre-set controls as mounted on the rear panel for Disc, Aux. 1, Tape and Output, in addition to the left and right level, and master volume controls on the front panel.

An accurate tone control system is used which does not degrade performance in the zero position. A 1% audio square wave is unaffected. An additional facility is a resonance (R) or 'presence' control.

The presentation is a low form of a depth suitable for shelf mounting. The front fascia is of extruded aluminium section with end pieces to form a complete frame, it is fitted with an aluminium panel, also anodized eggshell finish and screen printed.

The change of function is effected by a push button switch of twelve positions which divides the styling presentation horizontally. This line is maintained by the matching button controls of the vertically operating slide ladders. The lower section of the panel below the switch is finished in a darker shade than the upper section. The frame surround is finished eggshell finish in a hand spray stove enamel.

Considerable attention has been given to reliability and ease of service. All components are to MIL specification where possible. The amplifier is constructed in modules and all active circuits are on plug-in type circuit boards. The controls in the sockets and on the circuit boards are hand electro gold plated. Circuit board wiring is immersion gold plated. A printed circuit motherboard in the receptacle base for the active circuit modules thus administering flexible wiring with its attendant variations in performance and stability.

The mother board is fitted direct to a chassis base on which the main transformer is mounted. The chassis base plate is secured to side members to which the front fascia and back panel are affixed. The back panel is fitted with input and output sockets, pre-set controls, mains switch, fuse and mains input voltage selector. The complete amplifier is enclosed in a wrap-around case fitted with rubber feet. A matching turner type TMT 4 will be available later.

### SC 24 Specifications

#### Main Input:

110V, 120V, 130V, 220V, 230V, 240V, 50-60Hz

Output Source (transistor): Approximately 150 ohms.

Variable 5-37V.

Line: 500 0.01% at 1V r.m.s. output below 20K Hz.

Time Response: (0.01% 30 mV, and 0.01% 230 mV, with and without ear piece).

Headphones (Link socket on front panel).

Mains Power: switched (fuse worked).

Mains Power: unswitched (fuse worked).

Signal-to-noise ratio: 70dB below 5mV at 1kHz.

Distortion: 0.01% below 500mV at 10kHz.

Overload: as per front panel.

Disc: 2.0mV sensitivity (RIAA).

Aux. 1: 2.0mV sensitivity (RIAA or flat).

Tape: 60mV sensitivity (flat characteristic).

Aux. 2: 50mV sensitivity (flat characteristic).

Output: 1.5W r.m.s. (10% THD).

Distortion: 0.01% below 500mV at 10kHz.

Overload: as per front panel.

Disc: 2.0mV at 100mV.

Aux. 1: 2.0mV at 100mV.

Aux. 2: 50mV at 100mV.

Tape: 60mV at 100mV.

Aux. 1: 2.0mV at 100mV.

Aux. 2: 50mV at 100mV.

Tape: 60mV at 100mV.

Aux. 1: 2.0mV at 100mV.

Aux. 2: 50mV at 100mV.

## Single Channel Power Amplifier

### Type PA 50

## Dual Channel Power Amplifier

### Type SPA 50

The PA 50 is a transistor power amplifier having a rated power output of 50 watts. The SPA 50 is a dual channel power amplifier, each channel having identical characteristics to the single channel power amplifier. The amplifiers were designed for normal reproduction but the exceptional performance in respect of harmonic and intermodulation distortion, transient response, and power bandwidth makes them suitable for laboratory and industrial uses.

A new level of 0.01% total harmonic distortion has been reached at the -30dB reference to the rated output. Distortion proportionally decreases with power output, and at low levels it cannot be measured, being below the inherent amplifier noise level. Approximately 80 watts (continuous tone rating) is available at one watt clipping level of 0.025% total distortion.

The presentation is a low form matching the S.C. 24 pre-amplifier, of a depth suitable for shelf mounting. The front fascia is of extruded aluminium section with end pieces to form a complete frame, it is fitted with an aluminium panel, above anodized eggshell finish and screen printed.

The output stage uses a true complementary symmetry arrangement with matching type NPN and PNP transistors to provide virtually zero 'crossover' distortion. Noise circuitry has been developed to provide high gain in the output stages and drive circuits with wide bandwidth permitting a large amount of feedback ensuring an extremely low overall distortion. The success of the circuitry and the device used is evidenced by the power bandwidth characteristic of 10Hz-2.5 MHz at the -30dB point. The voltage response and power response are identical over this bandwidth.

The complete amplifier is unconditionally stable with any form of output load of any impedance characteristic from short circuit to open circuit. Full protection by voltage and current limiting is incorporated in the amplifier itself in addition to high speed current protection in the power supply.

Under working conditions with practical input sources, the amplifier does not exhibit any undesirable inherent characteristics when driving any type of loadspeaker or load. Its near perfect performance makes it suitable for comparison testing of input sources, amplifiers and loudspeakers.

Considerable attention has been given to reliability and ease of service. All components are to MIL specification where possible. The amplifier is constructed in modules and all active circuits are on plug-in type circuit boards. The controls in the sockets and on the circuit boards are hand electro gold plated. Circuit board wiring is immersion gold plated. A printed circuit motherboard in the receptacle base for the active circuit modules thus administering flexible wiring with its attendant variations in performance and stability.

The mother board is fitted direct to a chassis base on which the main transformer and output transformer heat sinks are mounted. The power supply heat sink is mounted on the mother board. The chassis baseplate is secured in side members to which the front fascia and back panel are affixed. The back panel is fitted with input sockets, output terminals, mains fuse and mains input voltage selector. Fixings are provided in the back panel for XLR 3 sockets for the input. Video sockets are not provided a cover plate is fitted. The complete amplifier is enclosed in a wrap-around cover with ventilation slots in the bottom and perforations in the top. The base is fitted with rubber feet.

### Specification

Main Input:	110V, 120V, 130V, 220V, 230V, 240V, 50-60Hz
Output Matching Impedance:	4-16 ohms (100W line rated)
Output Power:	50 (two channel normal) (With 80 or 81 ohm relative load).
Distortion:	0.025% at clipping point.
THD at -30dB of 100mV:	0.01% at clipping point.
THD at -30dB of 100mV (Power Output):	0.01% at clipping point.
Low Impedance:	300-600 ohms (below 100mV unbalanced, load impedance optional, with 65.5 $\Omega$ termination).
High Impedance:	200-400 $\Omega$ r.m.s.
Low Impedance:	2.0mV at 100mV.
THD at -30dB of 100mV (Power Output):	0.01% at clipping point.
THD at -30dB of 100mV (Power Output):	0.01% at clipping point.
Input Sensitivity:	1.5mV (0.1W).
Inherent noise level:	0.01% below 500mV at 10kHz.
Functions (on front panel):	1. Mains On/Off. 2. Input high or low impedance (switches both inputs in 500 $\Omega$ ).
1. Mains On/Off.	
2. Input high or low impedance (switches both inputs in 500 $\Omega$ ).	
3. Loudspeaker (1, 2) On/Off (switches either give On/Off in SPA 50).	
Slide ladders:—	
4. Input level control. (Offset only to unbalanced mode).	
Size:	PA50 21.5 x 11.5 x 22 cm (8.5 x 4.5 x 8.75 in.) SPA50 21.5 x 11.5 x 22 cm (8.5 x 4.5 x 8.75 in.)
Weight:	PA50 2.5 kg (5.5 lb.) SPA50 3.5 kg (7.7 lb.)