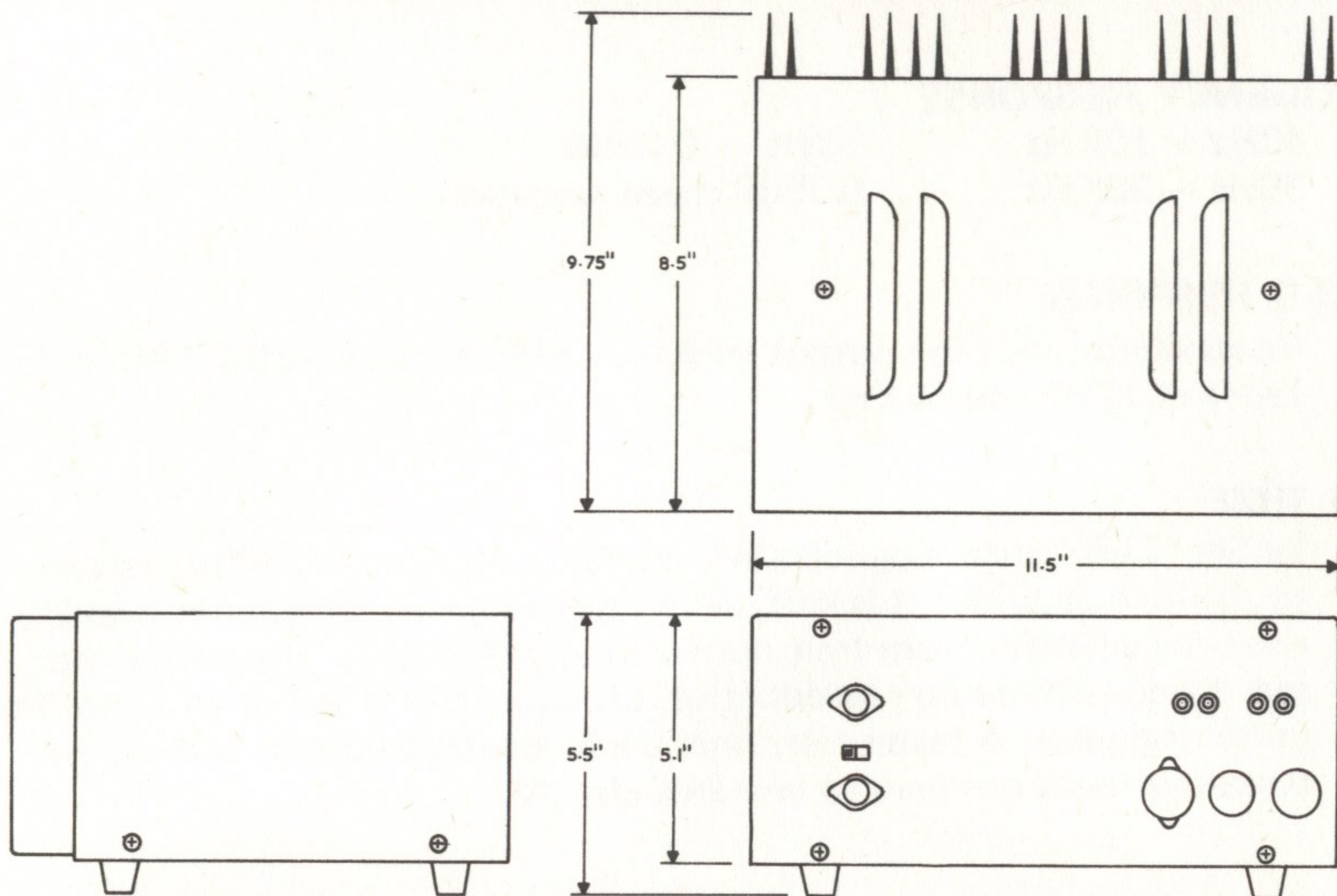


# P51 MONO/STEREO POWER AMPLIFIER



## POWER OUTPUT AT CLIPPING LEVEL

Stereo operation

8 ohm loads 50W RMS one channel 45W RMS per channel both channels operating.

16 ohm loads 40W RMS one channel 35W RMS per channel both channels operating.

4 ohm loads 50W RMS one channel 50W RMS per channel both channels operating.

Mono operation

8 ohm loads 100W RMS

16 ohm loads 70W RMS

## HARMONIC DISTORTION

Immediately prior to clipping.

8 ohm loads typically .05%

16 ohm loads less than .05%

4 ohm loads less than .1%

with reducing power the distortion levels fall progressively. There is no "come back" significant of cross over distortion at a lower power level. The distortion products are predominantly 2nd, 3rd and 4th harmonic with negligible higher order products associated with dissonance and listening fatigue.

## VOLTAGE GAIN

Approximately 32, channel balance within 0.5dB.

## INPUT SENSITIVITY

Depends upon load condition (e.g. 4 ohms, 8 ohms, etc.). but is of the order of 0.5 volt.

## INPUT IMPEDANCE

300K ohms.

## OUTPUT IMPEDANCE

0.2 ohm in series with 2500 uF — provides a damping factor in excess of 30 : 1 with 8 ohm loads.



## SIGNAL TO NOISE RATIO

With 4K7 ohm source impedance greater than 90dB.

## FREQUENCY RESPONSE

40Hz — 10KHz + NIL — 0.25dB.  
30Hz — 20KHz 0.75dB mean deviation.

## POWER RESPONSE

At constant input the output level is — 3dB relative to 50W RMS at 1KHz at 12Hz and 35KHz.

## RISE TIME

7 $\mu$  Sec. This figure is deliberately chosen as one of the factors relating to the load stability. It is sufficiently less than the maximum possible rise time available from transducers (microphones, loudspeakers, etc.) associated with audio reproduction to render the effect of the amplifier quite negligible. A faster rise time in a feedback amplifier with unco-operative loads can lead to unstable effects.

## LOAD STABILITY

Unconditional — the amplifier is quite unaffected by reactive loads and is perfectly safe, and was designed for use, with electrostatic loudspeakers.

## CIRCUIT CONFIGURATION

A BC109 transistor and bootstrapped ZTX341 transistor form the initial voltage amplifier converting the input EMF to a high amplitude EMF approximately equivalent to the required output voltage. The voltage amplifier is followed by a bootstrapped BFY52 transistor medium power emitter follow stage operating into a resistive load. This circuit is followed by twin complementary pairs of output emitter followers with emitter coupled drivers. The NPN output transistor pair consists of a 2N3055 (Motorola) driven by a BD519 and the PNP output transistor pair consists of an MJ2955 (Motorola) driven by a BD520. This method has been found to produce a linear output even without feedback with negligible deviation of the crossover point thus resulting in a highly linear amplifier coupled with high stability due to only 30dB of negative feedback being required to produce final distortion figures at near maximum output of only 0.05%THD.

Each channel is treated as a separate entity and the only common circuit is the mains transformer primary. Instability loops have been found to occur in stereo power amplifiers using common HT supplies when driven from a common signal source (the usual condition for a self contained stereo pre-amplifier or control unit). In addition to the stereo amplifiers is a phase inverter stage which is brought into operation by the Stereo/Mono switch feeding the same input to one channel as is fed into the other but in reversed phase, thus producing a "push-pull" or balanced amplifier of twice the power output of one single channel. Interconnecting sockets and leads are provided such that when two P51 power amplifiers are used the two stereo channels are obtained without the user having to worry over interconnection problems.



## PROTECTION

Each output transistor has a current limiting circuit connected to it preventing it from drawing a current in excess of a prescribed safe maximum. In the event of such a current driven into a short circuit or excessively low load condition a normal cartridge fuse in each half of the amplifier is arranged to rupture thus preventing excessive dissipation of any part of the output stage for long enough to cause permanent damage.

## CONSTRUCTION

A rigid space frame is formed round a basic chassis carrying the huge mains transformer and six power smoothing and loudspeaker coupling capacitors. The front of the space frame is formed by the front panel which also carries the input and LT supply socket, the auxiliary socket, (for use in connecting to a second P51) the stereo/mono switch, the voltage selector, mains input connector and auxiliary mains outlet connector. A mains supply protection fuse is also fitted behind this front panel. The rear of the space frame is formed by four massive heatsinks (made from a special aluminium extrusion manufactured specially for J. E. Sugden by Alcan Booth Aluminium) rigidly attached to short steel tie members. The lower power transistors and other components are mounted on printed circuit boards attached to this rear construction with screws and nickle plated brass pillars. The sides of the space frame are made rigid and prevented from deformation by steel plates (one also bent to form a screen round the input socket) which carry auxiliary printed circuit panels such as the mono operation phase inverter and the high tension double bridge rectifier assemblies. The fore and aft members of the space frame are 3/8" square bright drawn mild steel drilled and tapped as appropriate to accommodate the various parts of the sub assemblies attached to them. The bottom plate is louvered for ventilation and carries the plastic supporting feet through which the bottom plate fastening screws are attached. This bottom plate besides providing cover and protection is the final item providing extreme rigidity to the basic space frame. The construction is almost identical to that used in our instrumentation and was very favourably commented upon in the trade press. A very simple top and sides cover formed from aluminium with front strengthening lip completes the construction.

## FINISH

The steel front panel is faced with an aluminium plate surfaced with matt white PVC upon which is screen printed the appropriate legend using a vinyl solvent ink. The legend is thus permanently printed on the front panel which may even be scrubbed with household "scouring cleaner" for cleaning purposes. The generous heat sinks are anodized and dyed matt black to provide a finish which both looks right and is right for the purpose involved — the efficient radiation of heat when the amplifier is driven to maximum power levels. All internal metal work, with the exception of various spacers etc. which are nickel plated brass, is formed or machined from mild steel and is zinc plated and chromate passivated for maximum corrosion resistance. The cover is of aluminium sheet surfaced in black PVC embossed with an aesthetically pleasing leather cloth effect. All screws, nuts, washers, etc. are zinc plated and chromate passivated except for the cover and front panel fixing screws which are heavily chromium plated.



## CONTROLS AND CONNECTIONS

5 pin DIN socket  
5 pin DIN socket

Slide switch  
4 x 4mm colour  
coded sockets  
3 pin recessed Bulgin  
male connector  
3 pin Bulgin socket.  
5 position voltage  
selector.

Input and LT. outputs.  
Connection to second P51  
or alternative input.  
Mono/Stereo switching.

Loudspeaker connections.

Mains input.  
Mains outlet

## GENERAL

Maximum overall dimensions

11.5" x 5.5" x 9.8"  
29cm x 14cm x 25cm.  
20lbs. 9Kgm.

Weight

Power consumption.  
Power requirement.

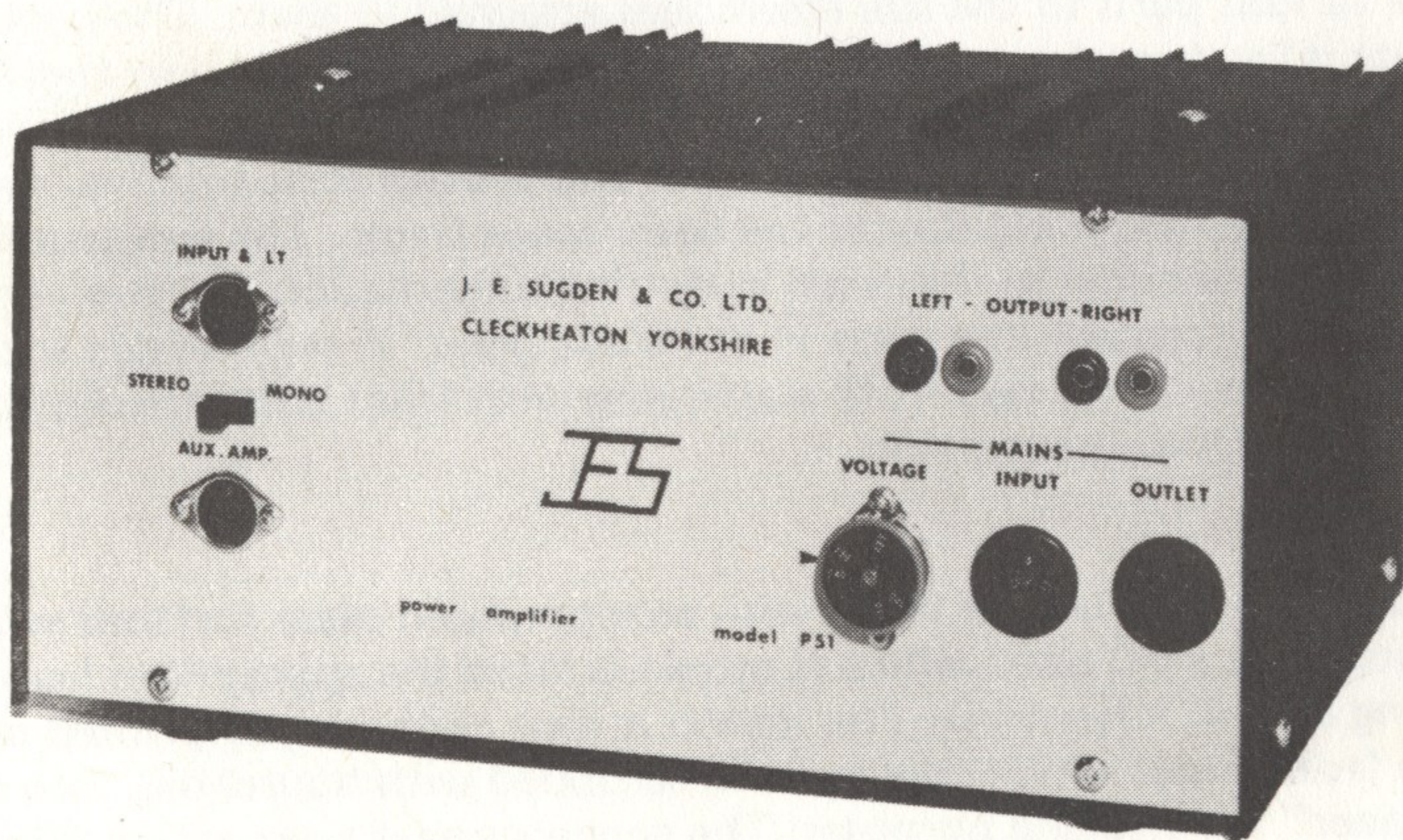
200 Watts maximum.  
110-120-220-230-240  
volts. A.C. 50/60Hz.

Accessories supplied

Mains cable with connector  
attached.

Control Unit signal and LT cable  
with connectors attached.

4 colour coded loudspeaker plugs.



**J. E. SUGDEN & CO. LTD., Carr Street, Cleckheaton, Yorkshire**  
Telephone: Cleckheaton (09762) 2501