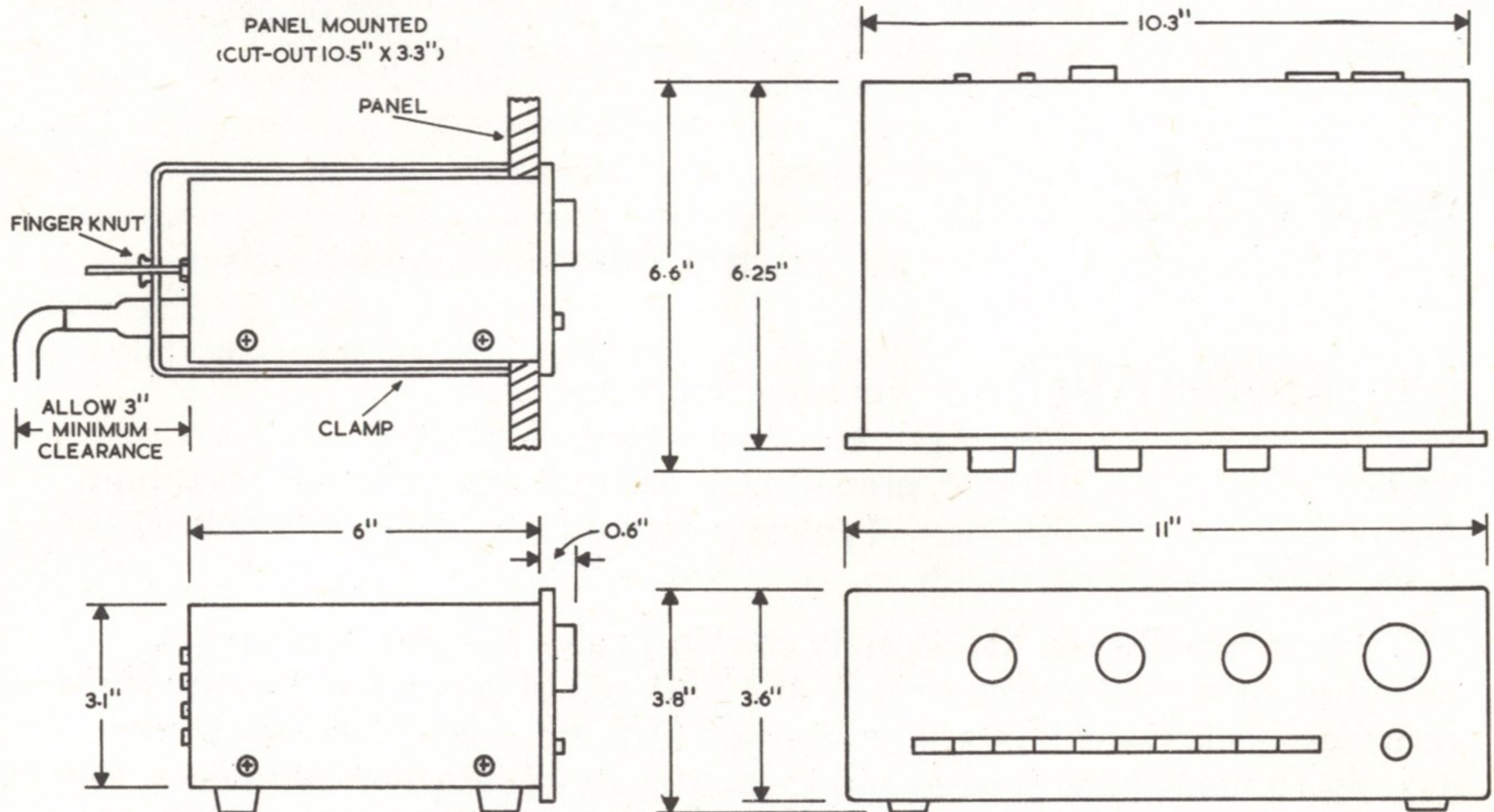


C51 CONTROL UNIT



OUTPUT

Normal Output
Maximum Output
Output Impedance
Connection

0.5V RMS
1.0V RMS
4.7K ohms
5 pin DIN socket also used for LT input

TAPE RECORDER OUTPUT

From the common 5 pin DIN socket on the rear panel used for tape record and replay and wired in accordance with DIN standards. The output is a direct connection from the radio and aux. inputs when selected or approximately 300mV at average modulation when the disc facility is in use and correctly loaded. The minimum presented impedance to the tape output should be 100K ohms. Recorders without a 'line' or 'aux.' input to suit may be fed through a standard adaptor link which is available.

HARMONIC DISTORTION

Less than 0.1% at normal output 1KHz and mainly second harmonic. There is no significant increase even on disc at 20dB overload with appropriate setting of the volume control.

FREQUENCY RESPONSE

± 0.5 dB 30Hz to 20KHz. Although the control unit is fitted with infinitely variable bass and treble controls the response is guaranteed to be correct on both channels with the controls in their central positions—there is no need for a 'cancel' switch.

INPUT SELECTION

By push on/push off push buttons. Two buttons select Disc (by disc button) Aux. or auxiliary input (by Aux. button) Radio (using both buttons in) or Special—the special input (using both buttons out). The tape input, which is also suitable for A-B monitoring on a 3 head recorder, is selected by the Tape button. This switch is "break before make" to prevent clicks or bleeps being applied to a recording when the monitoring facility is being used.

INPUT CONNECTIONS

By phono sockets on the rear panel except Tape which is 5 pin DIN.

INPUT SENSITIVITIES (referred to 0.5V output)

Disc	2.5mV presented impedance 47Kohms.
Radio	150mV, presented impedance 180Kohms at maximum
Aux.	volume. Typical presented impedance 220Kohms.
Tape	

The disc sensitivity was deliberately chosen to give the best operational condition of the volume control i.e at 12.00 to 2.00 o'clock using high grade cartridges such as the Shure V15, Stanton 681, etc. High level inputs feed directly to the volume control and thus offer an infinite overload figure, the disc input will accept an input of 55mV at 1KHz. Facility exists within the control unit to lower the input sensitivity for cartridges with high outputs, under these conditions the disc overload figure is automatically raised.

SIGNAL TO NOISE RATIO

(weighted to 30 phon equal loudness correction).

Disc input	75dB	measured with the input terminated
Aux., radio or tape inputs	85dB	and volume control at maximum.

DISC EQUALISATION

To B.S.1928 i.e. R.I.A.A. Equalisation of disc amplifier maintained over the frequency band ± 0.5 dB except at extreme L.F. where action of deliberate rumble filter roll off will not attenuate 30Hz more than 1.5dB. The equalisation of both the Disc and Special inputs can be easily varied by interchanging plug on links on the printed circuit board or connecting custom designed feedback networks between the pins provided. R.I.A.A. and flat curves are provided as standard but 78 disc, tape head, etc., can easily be provided for.

SPECIAL INPUT

The special input is a further low level input similar to the disc input (and can be used as a second disc input) enjoying the same facilities for adjustment of sensitivity and equalisation as the disc input. Its input also feeds via a 9 pin socket on the rear panel whereby standard or custom made plug in units may be used for compensation, attenuation, amplification, etc. A typical example is to compensate for the 'hole' in the frequency response of many moving magnet cartridges around 2 to 7 KHz. A standard adaptor is available for this purpose for one recommended cartridge—the Shure V15. An adaptor is also available removing the need for the 'power source' of the Miniconic cartridge.

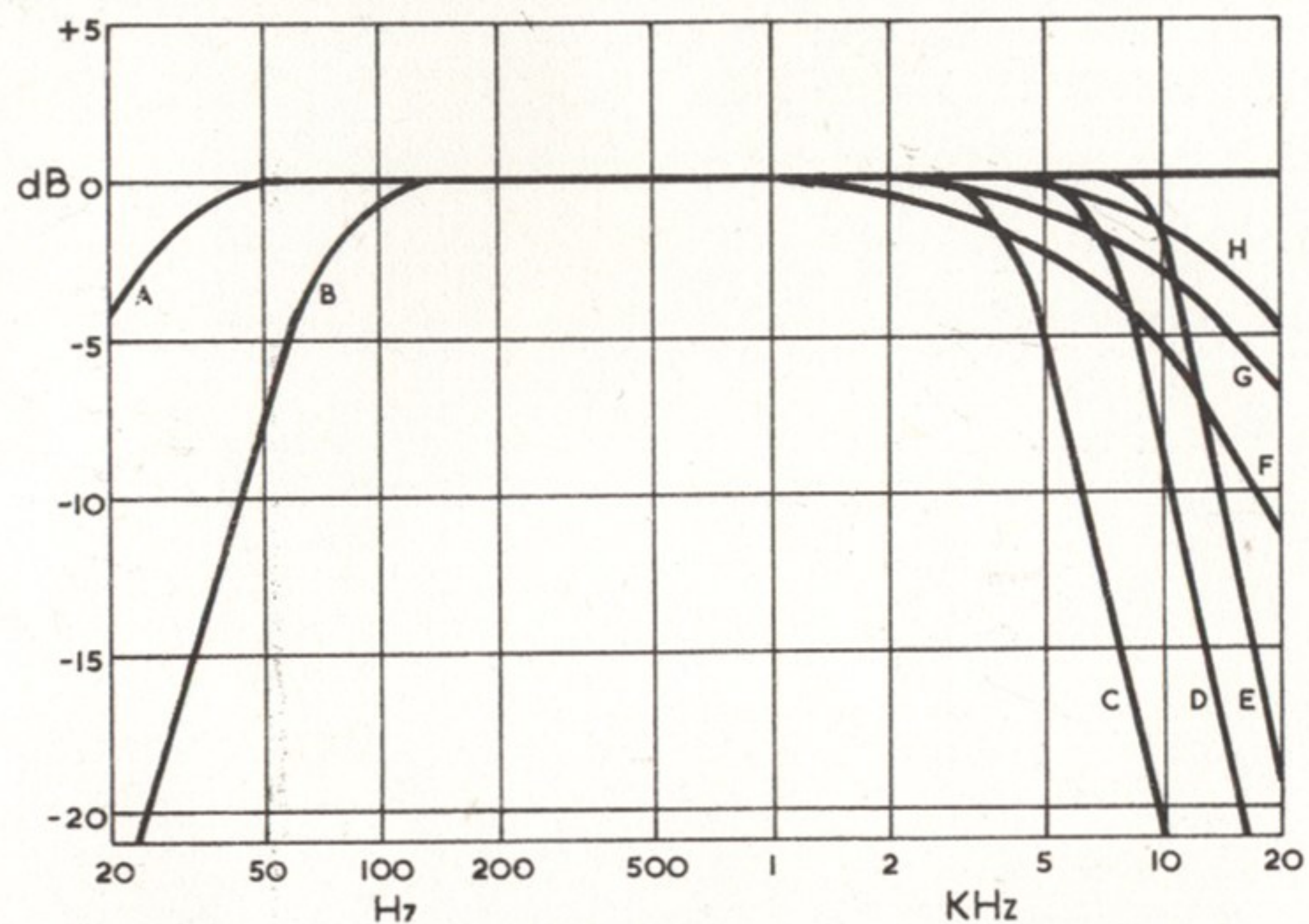
FUNCTION CONTROLS

By two push on/push off buttons to select (a) normal stereo; (b) left input only fed to both outputs; (c) right input only fed to both outputs; (d) left and right inputs mixed and fed to both outputs i.e. mono.

FILTER CONTROLS

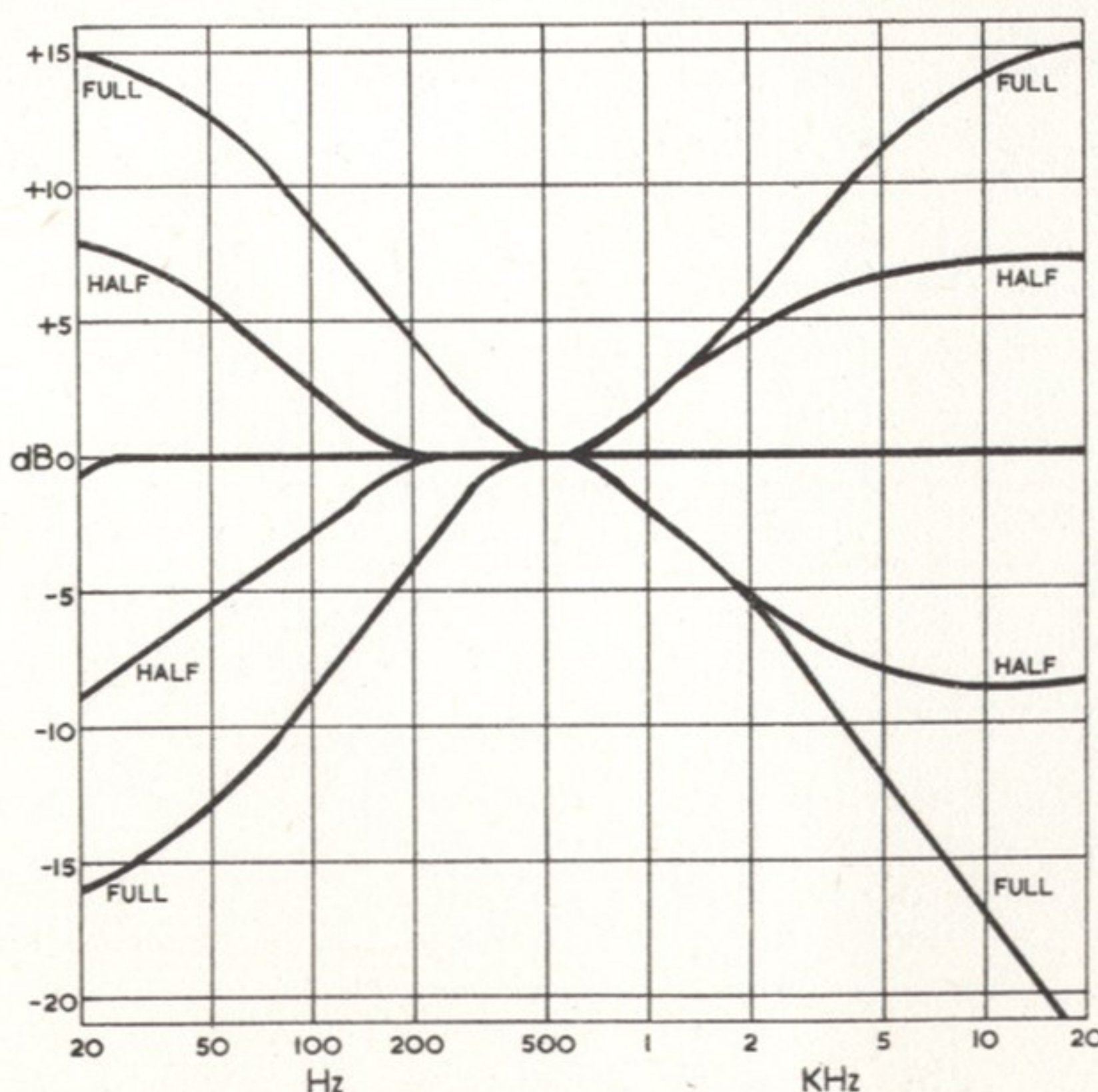
Push on/push off buttons select the filter facilities which consist of an L.F. filter operating on the disc input below 70Hz with a terminal slope of 12dB per octave and an H.F. filter with a choice of 3 turnover frequencies—4, 7 and 10KHz with a choice of steep or gradual slope—18 or 6dB per octave. The action of these filters together with the effect of the inbuilt rumble roll off of the disc amplifier is shown in the curves below.

- A — disc (RIAA) input
- B — L.F. filter
- C — 4KHz filter—steep
- D — 7KHz filter—steep
- E — 10KHz filter—steep
- F — 4KHz filter—gradual
- G — 7KHz filter—gradual
- H — 10KHz filter—gradual



CONTROL KNOBS

- Volume** Logarithmic, channel balance maintained within 1dB to 50dB attenuation.
- Balance** $\pm 90^\circ$ rotation provides 6dB variation of left/right balance. Further rotation progressively turns off completely the opposite channel.
- Bass and Treble** Continuously variable controls 'hinging' at 500Hz provide maximum boost and cut figures of 15dB at the limits of the frequency band in accordance with the curves shown.



Frequency response via auxiliary input also showing affect of bass and treble controls at half and full positions of boost and cut.

QUIET CONTROL

Attenuates mid frequencies by 16dB but lower frequencies to a less extent in accordance with the subjective equal loudness curves of the ear. This facility where normal volume is set and then "quiet" selected is to be preferred to the so called "loudness" compensation of a volume control which has no relevance to the absolute value of the incoming signal level.

CIRCUIT CONFIGURATION

The high level inputs—auxiliary tape and radio are fed via the selector switches and volume control to an emitter follower circuit using a specially selected low noise BC109 transistor which in turn feeds an active filter circuit for the HF filter operations. The signal can then be fed via the Quiet attenuator or directly to the output stage around which is a feedback network which can be made frequency conscious by operation of the bass and treble controls. The input selections can also select the output of the low level amplifier which is a "ring of three" feedback amplifier the feedback network of which can be made frequency conscious when for instance RIAA equalisation is required and when the LF filter is selected.

As all high level signals pass via the volume control there can be no overload difficulty in the high level amplifier. The low level amplifier also incorporates DC feedback to stabilise the operating points to ensure the wide overload margin is maintained. The first transistor of the low level amplifier is also specially selected for noise performance. This noise selection not only includes measuring a noise figure by instruments but also a subjective listening test—even low noise measurements may not reveal a transistor which produces objectionable "spluttering" noises.

Considerable attention has been paid to coupling time constants, to ensure LF and HF stability together with a full audio pass band but rejection of frequencies outside this band which contribute nothing to listening enjoyment but can introduce complications to power amplifier and loudspeaker performance. It is the attention to this sort of detail which sets J.E. Sugden audio equipment on a new plane of user satisfaction.

CONSTRUCTION

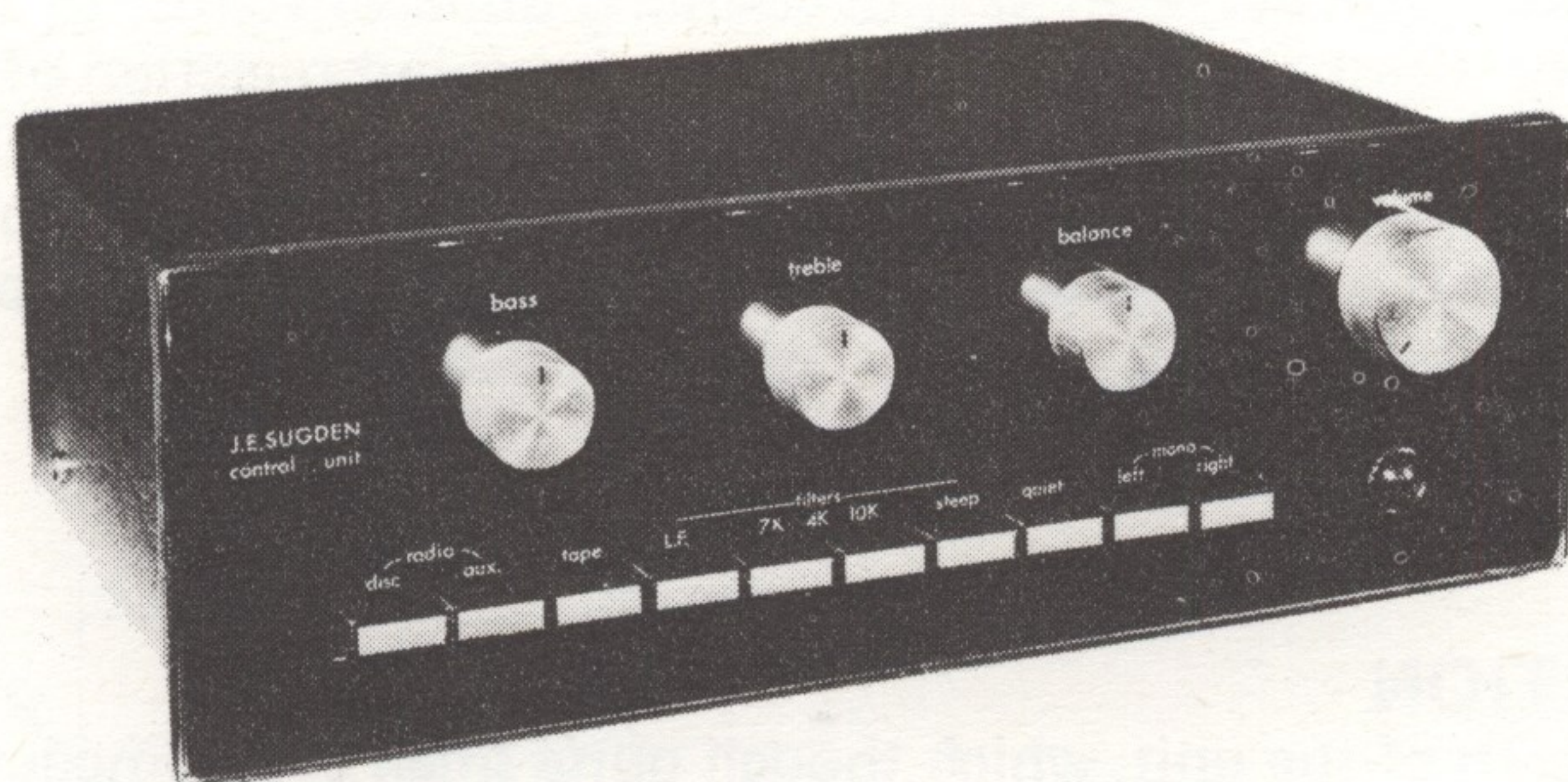
The basic strength of the unit, which though quite small and compact is never the less solid and durable, is obtained from the front panel assembly which consists of a 16 SWG steel plate surrounded by a brass angle. All the controls are attached to this plate as are two side members and the back panel all of which again are pressed or formed from 16 SWG cold reduced mild steel. The bottom section, formed from 18 SWG mild steel, is attached to the side members resulting in a rigid structure. Four brackets are attached to the side members to carry the two printed circuit boards. The various connectors, sockets, etc. are carried by the back panel to which is also attached an angle piece along its length for strengthening purposes. Two studs can be fitted to the back panel for use with the U-shaped mounting clamps for panel mounting. If it is required to use the control unit free standing four plastic feet may be attached using the four screws securing the bottom plate to the main chassis. A cover formed from PVC clad aluminium completes the construction and is secured at the sides with spire screws into floating spire nuts.

FINISH

All the ferrous metalwork including screws, nuts and washers except the front and back panels is finished in zinc plate and chromate passivated for maximum corrosion resistance. The front and back panels are heavily chromium plated and the brass angle (which forms a most excellent base for the chromium plate) is polished to a high degree. Within the angle but covering the front panel plate is fitted an anodized aluminium fascia carrying the control identification etc. The anodizing is dyed black leaving the lettering silver. A brushed aluminium fascia is also available with black lettering. The rear panel has connector identification screen printed onto it using a durable epoxy ink. The aluminium top and sides cover is surfaced in black PVC embossed with a leather cloth effect. The push buttons are hard black plastic with brushed aluminium inserts and the control knobs have spun aluminium cappings.

GENERAL

Dimensions	11" x 3.6" x 6.8"	28cms x 10cms x 17cms.
Weight	6.2lbs.	2.9Kgm.
Accessories supplied	8 colour coded phono plugs 1 5 pin DIN plug. 1 Mains outlet connector plug 1 Mains input cable complete with connector fitted. 2 earth connection spade tags.	
Power supply required	16 to 18 volts positive at 6.5 mA each channel.	



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