

J. E. SUGDEN

# C51 CONTROL UNIT AND A51 POWER AMPLIFIER INSTRUCTION LEAFLET

## SPECIFICATION - C51

(All levels quoted  $\pm 1$ dB unless otherwise stated).

Rated output to Power Amplifier 600mV  
Maximum output 1.5V  
Output to Tape Recorder 150mV from disc input correctly loaded, direct connection radio and auxiliary

## Input sensitivities and Impedances

Magnetic cartridge 2.5mV into 68K equalised to R.I.A.A. through plug in input adaptor to special input.  
Ceramic cartridge 250 microvolts basic equalised to R.I.A.A. sensitivity 2.5mV into 68K (can be equalised to suit special requirements).  
Special 150mV into 250K flat response

Radio  
Tape  
Auxiliary

## Overload Capabilities

25dB on disc input is infinite on radio, aux. and tape inputs.  
Aux, disc, also with 20dB (10x) overload with appropriate setting of volume control—better than 0.1% (mainly second harmonic) at a rated output (0.25% at 1.5 volts output).

Frequency response (relative to 1 kHz. flat or relative to R.I.A.A. as appropriate)  
Signal to noise ratio (30 phons weighting)  
Interchannel crosstalk

## Control Knobs

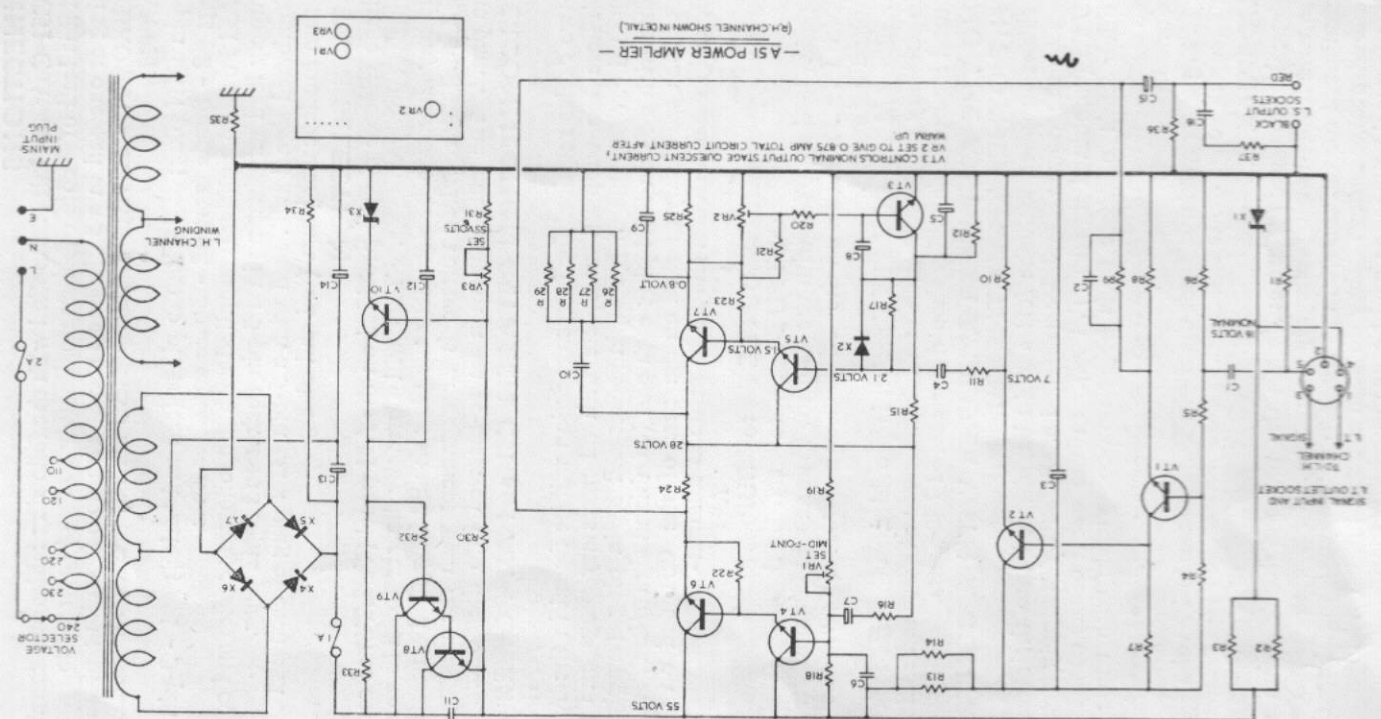
Bass  $\pm 14$ dB at 40Hz  
Treble  $\pm 10$ dB at 10kHz  
Volume Logarithmic (Channel balance  $\pm 1$ dB maintained to 50dB attenuation)  
Balance  $\pm 6$ dB for 180° rotation, either channel eliminated at limits of rotation.

## Push buttons to select

Inputs  
Rumble Filter  
High frequency filter  
H.F. Filter Slope  
Function  
Quiet

Power  
Size  
Weight  
Mounting

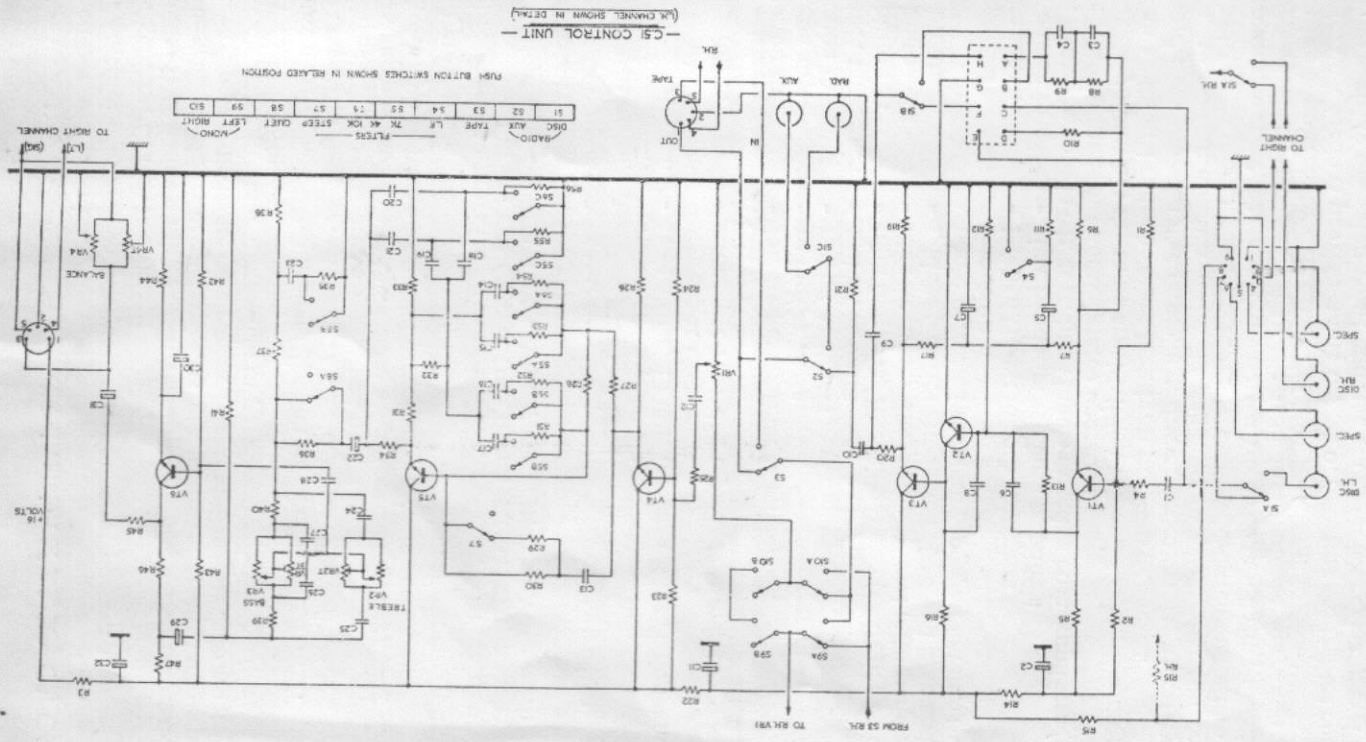
DISC—RADIO—AUXILIARY—SPECIAL—TAPE  
12dB per octave below 30Hz.  
Out. 4kHz 7kHz 10kHz  
Gradual 6dB per octave, Steep 18dB per octave  
Mono, Stereo, Input Left Input Right.  
16dB at 1kHz, response corrected according to equal loudness curve  
16 volts at 13mA., obtained from A51 Power Amplifier  
11" x 3 3/4" x 6 3/8" (280 x 95 x 170mm).  
6 lbs. 3 oz. (2.9 Kg).  
Free standing or panel mounting with clamps supplied



—A51 POWER AMPLIFIER—  
(R.H. CHANNEL SHOWN IN DETAIL)



The right is reserved to change the specification or design without notice  
**J. E. Sugden & Co. Ltd., Bradford Road, Cleckheaton, Yorkshire**



AS1 COMPONENT LIST

Ref.	Value	Ref.	Value	Ref.	Value	Ref.	Value	Ref.	Value	Ref.	Value	Ref.	Value
R1	100K	R32	4.7K	C6	1	C7	10	R1	8.2M	R31	3.3K	VT1	BC109
R2	1M	R33	3.9K	C7	10	R2	4.7K	R2	4.7K	R32	2.7K	VT2	BFY52
R3	330	R34	2.2K	C8	47p	R3	4.7K	R3	4.7K	R33	2.7K	VT3	BC109
R4	1.2K	R35	1M	C9	1M	R4	470K	R4	470K	R34	10K	VT4	BFY52S
R5	47K	R36	10K	C10	10K	R5	4.7K	R5	4.7K	R35	100	VT5	BFY52S
R6	1.5K	R37	1.5K	C11	80	R6	4.7K	R6	4.7K	R37	1.0	VT7	2N4914
R7	8.2K	R38	6.8K	C12	1	R7	4.7K	R7	4.7K	R37	1.0	VT8	BD121 or
R8	1M	R39	18K	C13	18K	R8	47	R8	47	VR1	1K	VT8	BDY38
R9	75K (68K)	R40	18K	C14	3300p	R9	1.5K	R9	1.5K	VR1	1K	VT9	ZTX341
R10	75K (68K)	R41	47K	C15	4700p	R10	330	R10	330	VR2	1K	VT9	ZTX341
R11	2.2K	R42	47K	C16	1500p	R11	10	R11	10	VR3	1K	VT10	ZTX341
R12	470K	R43	220K	C17	2200p	R12	680	R12	680	C1	0.1	X1	BZY88 C16
R13	2M	R44	1.2K	C18	1500p	R13	3.3K	R13	3.3K	C2	2200p	X2	BAX13
R14	2.2K	R45	4.7K	C19	2200p	R14	3.3K	R14	3.3K	C2	2200p	X2	BZY88 C16
R15	10K	R46	4.7K	C20	6800p	R15	6.8K	R15	6.8K	C3	400	X3	BZY88 C16
R16	47K	R47	1K	C21	0.1	R16	10	R16	10	C4	400	X4	SJ103F
R17	27K	R51-	25	C22	25	R17	1.2K	R17	1.2K	C5	400	X5	SJ103F
R19	4.7K	56	8.2M	C23	25	R19	2.7K	R19	2.7K	C6	470p	X6	SJ103F
R20	8.2M	VR1	250K LOG	C24	0.1	R20	2.7K	R20	2.7K	C7	400	X7	SJ103F
R21	4.7K	VR2	50K	C25	0.1	R21	2.7K	R21	2.7K	C8	80		
R22	1.2K	VR2T	250K	C26	0.22	R22	2.7K	R22	2.7K	C9	4000		
R23	470K	VR3	250K	C27	0.22	R23	100	R23	100	C10	0.1		
R24	1M	VR3T	1M	C28	1	R24	100	R24	100	C11	0.1		
R25	1.2K	VR4	50K	C29	25	R25	0.7	R25	0.7	C12	10		
R26	4.7K	VR4T	250K	C30	80	R26	1.0	R26	1.0	C13	2500		
R27	10K	C1	0.22	C31	25	R27	10	R27	10	C14	2500		
R28	10K	C2	25	C32	1000	R28	10	R28	10	C15	2500		
R29	1.2K	C3	3600p	VT1-	BC109	R29	10	R29	10	C16	0.1		
R30	1M	C4	1000p	VT6		R30	10	R30	10				
R31	1K	C5	80										

CS1 COMPONENT LIST



## USING THE C51 CONTROL UNIT WITH POWER AMPLIFIERS OTHER THAN THE A51

Power requirements for the C51 are:-

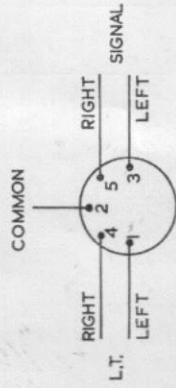
L.T. + 16 volts  $\pm$  5% @ 13 mA per channel.

Ripple voltage not greater than 50 millivolts peak to peak.

To avoid hum loops, the 16 volt supply should be isolated from earth, or the negative rail connected to earth through not less than 100 ohms. The negative rail is connected to earth inside the C51.

Connections should be made as follows:-

1. The mains lead supplied with the Control Unit should be connected to the MAINS INPUT socket on the C51, allowing switching via the volume control/on-off switch.
2. The signal and L.T. leads from the power amplifier should be connected to the 5-pin DIN plug supplied, which should be wired as illustrated viewing from the inside of the plug, i.e. at the solder pin end.
3. Power to the main amplifier may be taken from the MAINS OUTLET socket on the C51 Control Unit using the 3-pin plug supplied.



### INPUTS

All input sockets are clearly marked on the rear panel of the Control Unit, five inputs being available as follows:-  
SPECIAL DISC RADIO AUX (phono sockets) and TAPE (5-pin DIN socket).

The 5-pin DIN plug used for TAPE should be wired according to DIN standards as shown, viewing from the inside of the plug, i.e. at the solder tag end.

### EQUALISATION

It is possible to alter the feedback characteristic of the amplifier and hence the equalisation by means of modifying the linkage between the 8 pins (A to H) on the C51 printed circuit board, which are:

— Pin A	RIAA (2.5mV)
— Pin B	DISC
— Pin C	DIRECT INPUT
— Pin D	FLAT (2.5mV)
— Pin E	FEEDBACK INPUT
— Pin F	SPECIAL
— Pin G	GROUND
— Pin H	BOTH

The C51 is normally supplied equalised to RIAA on both inputs, i.e. A-H linked.

For RIAA on disc and flat response on special - link A-B and D-F

For flat response on disc and RIAA on special - link B-D and A-F

For flat response on both - link D-H

Virtually any equalisation characteristic required is possible, e.g. for tape head on SPECIAL, a suitable circuit is connected between E and F, probably also using ground connection G.

For other recording characteristics a modified version of R8, R9, C3, C4 is connected between E and B.

Full information is available on request for specific requirements.

### INPUT COMPENSATION

This facility is available on the SPECIAL input and supplies correct matching for certain cartridges or microphones etc. through an adaptor on the rear panel. Standard adaptors are currently available for the following:

Ceramic cartridge (Connoisseur SCU2 in particular)

Shure V.15 II cartridge

Miniconic cartridge

Microphone 2.5mV

Microphone 25mV

A D.C. Source

is available at the special adaptor socket for supplying those cartridges which require an external power supply (Miniconic).

require equalisation to "flat" on SPECIAL

Remove A-H link, connect A-B and D-F

RIAA is retained on DISC

### OPERATION

Control facilities are provided by means of four knobs and ten push buttons on the front panel of the C51 Control Unit. From left to right the knobs are: BASS - TREBLE - BALANCE - VOLUME - VOLUME with ON/OFF switch

Push buttons:

DISC button in

AUX button in

DISC & AUX buttons in

DISC & AUX buttons out

TAPE button in

L.F. button in

7K button in

10K button in

7K & 10K buttons in

STEEP button in

STEEP button out

QUIET button in

#### Inputs

- selects disc input for magnetic cartridge

- selects auxiliary input

- selects radio (stereo or mono)

- selects special input (see also Equalisation and Input Compensation)

- selects pre-recorded tape or tape monitor

#### Filters

- low frequency filter (rumble)

- roll off at 7kHz

- roll off at 10kHz

- roll off at 4kHz

- high frequency filter slope steep (18dB per octave)

- high frequency filter slope gradual (6dB per octave)

- mid frequencies attenuated 16dB at 1 kHz and response corrected according to equal loudness curve

#### Function

- left hand input to both amplifiers

- right hand input to both amplifiers

- left & right inputs mixed to both amplifiers (mono)

- left & right buttons out normal stereo operation

The auxiliary input has the same sensitivity as the radio input, allowing the use of an additional tuner or other high level programme source.

To record from programme sources, e.g. disc or radio, it is necessary to depress those input buttons normally required to select that source (as described above). The selected input is automatically connected to the tape recorder output socket. If the output from the monitoring circuit on the tape recorder is connected to the tape input of the amplifier, A-B monitoring is possible by depressing the TAPE button.

The FILTER sections provide a fine degree of high frequency filter control with both variable operating point and rate of cut-off (slope) being available. This enables surface noise and high frequency distortion present in poor programme material to be removed without affecting the harmonic range.



## SPECIFICATION—A51

(all levels quoted  $\pm 1$ dB) unless otherwise stated).

Power output : 25 watts RMS per channel (50 watts RMS both channels simultaneous operation) at clipping level into 12 ohm load

Total harmonic distortion (measured at 1kHz into 15 ohms) At 20 watts RMS per channel—typically 0.5% At 1 watt RMS per channel—better than 0.01%

Frequency and power response  $\pm 0.5$ dB 30Hz—20kHz

Rise time:  $\pm 1.0$ dB 20Hz—30kHz

Signal to noise ratio 5 microseconds

(10Kohm source) 90dB

Sensitivity: 600 millivolts

Input impedance: 200K ohms

Output impedance: 0.25 ohms

Load stability: Unconditional

Power consumption: 100 watts

Size:  $13\frac{1}{2}'' \times 8\frac{1}{2}'' \times 10''$  (343 x 216 x 254 mm)

Weight: 22 lbs (10 Kg)

## INSTALLATION

The C51 Control Unit is suitable for use either free standing on a shelf or for mounting in a cabinet (vertical or horizontal position).

When shelf mounting, the four screws in the base should be removed and the small feet supplied substituted, utilising the screws taken from the base.

It is advisable to fit one foot at a time leaving the remaining screws intact in order to prevent any undue movement of the base panel.

Instructions for cabinet mounting are as follows :-

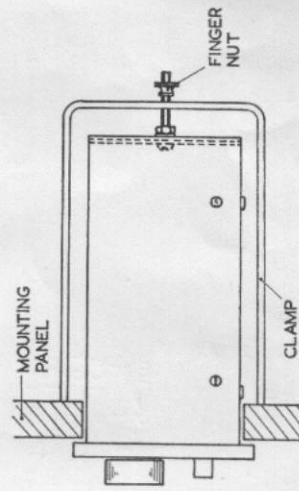
1. Cut aperture in panel  $10\frac{7}{8}'' \times 3\frac{1}{4}''$ .
2. Remove the outer cover by unscrewing the four chrome securing screws located at the sides.
3. Insert the  $4BA \times 1\frac{1}{4}''$  screws provided into the two central holes in the rear flanges so the screws project rearwards. Secure firmly by means of the spring washers and nuts provided.

4. Replace the cover.

5. Insert the control unit through the aperture in the mounting panel.

6. Place the U shaped clamps over the projecting screws at each end and tighten up against the inside of the mounting panel with the knurled finger nuts provided.

The A51 Power Amplifier will normally be sited in the bottom of the equipment cabinet, and preferably as remote as possible from the pick-up cartridge and control unit to minimise picking up stray hum from the mains transformer. Adequate ventilation must be allowed and care taken not to obstruct the heat sinks on the sides of the amplifier



## CONNECTIONS

The C51 Control Unit is supplied with the following cables and connectors:  
1 - Mains lead of 3 core cable approximately 10 ft. (3 metres) long, terminating at one end in a 3 pin line socket. The colour coding of this lead is BROWN - LIVE; BLUE - NEUTRAL; GREEN/YELLOW - EARTH.

1 - 5-pin DIN plug; 8 - Phono plugs (red and white); 1 - 3-pin mains plug; 2 - Spade tags; 2 - Spare equaliser links.

The A51 Power Amplifier is supplied with the following cables and connectors:

1 - Supply lead terminating in a 3-pin socket and 3-pin plug.

1 - Combined signal/L.T. lead with a 5-pin DIN plug at each end

4 - 4 mm loudspeaker plugs (red and black)

## VOLTAGE SELECTION

A voltage selector plug is provided on the A51 panel (VOLTS) to cope with all normal supply voltages. This will normally be set for 240 volts, but should any alteration be necessary the plug should be pulled outwards and rotated until the required voltage is in alignment with the arrow marked on the panel. The plug may then be re-inserted into the socket.

## INTERCONNECTION BETWEEN C51 and A51 POWER AMPLIFIER

The two cables required for interconnection will be found in the A51 carton. These are supplied complete with all necessary plugs and sockets attached, i.e. one cable with a 3-pin socket and 3-pin plug (supply lead), and one with a 5-pin DIN plug each end (combined signal/L.T. lead).

Connections are clearly marked on the rear of the C51 and on the A51 panel, and interconnection should be made as follows:-

A51

MAINS OUTLET to SUPPLY

OUTPUT to INPUTS

The mains lead supplied with the Control Unit should be connected to the MAINS INPUT socket on the C51, allowing switching via the volume control/on-off switch.

An auxiliary MAINS OUTLET socket is provided on the C51 for connecting to ancillary equipment such as a turntable or self-powered radio tuner. The total load on this outlet should not exceed 150 watts.

## USING THE A51 POWER AMPLIFIER WITH A CONTROL UNIT OTHER THAN THE C51

The cables supplied with the A51 should be plugged into their respective sockets on the power amplifier panel, i.e. SUPPLY (supply lead) and INPUTS (combined signal/L.T. lead). In the event of the connectors on the other ends of these leads being non-compatible with those on the chosen control unit, they will have to be removed and the correct types substituted.

The L.T. power available from the 5 pin DIN socket is 16 volts @ 20mA each channel, zener diode stabilised.

## LOUDSPEAKERS

Loudspeaker connections are made via the red and black 4 mm sockets. Mains twin flex (14/0076 preferably colour coded for ease of phasing) is recommended for the connecting wire. Do not connect together the two black loudspeaker sockets—they do both connect to "earth" internally but further external connection could cause instability loops.