P O W E R U N I T
843953

INSTRUCTION AND MAINTENANCE MANUAL

Supplied for use with

Equipment Serial No(s).....

Made on Order No.....19/21,090.....

Customer's Order No.....3455.....

REAE

PYE T.V.T. LTD.
CAMBRIDGE
ENGLAND

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C O N T E N T S

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SECTION 1 - GENERAL DESCRIPTION

1.1 INTRODUCTION

This power unit is a conventional bridge rectifier with capacity smoothing, and transistorised control and smoothing circuits.

The unit is designed to provide a B supply for transistorised equipments. The output which is 16V nominal is stabilised and smoothed by means of a series regulator and a smoothing circuit.

Overload protection is provided. A short circuit or a high current at the output will result in the series regulator becoming "high impedance", thus providing adequate protection for both the power unit and external circuits.

A standard frame will house two of these units and occupies 7 inches (17·8 cm) of vertical space in a standard 19 inch (48 cm) rack. When the unit is used separately a receptacle plate is supplied for mounting on the frame.

The a.c. input and d.c. output are automatically connected when the unit is slid into the frame. When fully inserted the unit is locked into position by two spring catches. To remove the unit, these catches which are located within the handles should be raised, and with one movement the unit may be disengaged and withdrawn from the receptacle frame.

1.2 SPECIFICATION

A.C. Supply	85-135 and 170-250 volts a.c. 47-70 c/s.
D.C. Output	16V nominal, 0-15A. Output may be adjusted to precise voltage at required output load.
Output Impedance	Less than 0·2 ohms.
Supply Protection	Fast action automatic cut-out.
Dimensions	Height .. .. 5·7 inches (15 cm). Width .. .. 8·5 " (22 cm). *Depth .. .. 9·5 " (24 cm). *Includes plugs and handles.
Weight	24 lb. (11 kg).

Part Number 843953

NOTE: 843953/02 is not wired for remote "Reset" operation and is not interchangeable with 843953/00 and /01.

Accessories

Standard Frame	749087
Vertical Screen	435629
* Receptacle Plate	750187
Extension Test Jig	847006/00 (for use with 843953/00 and /01)
Extension Test Jig	847006/01 (for use with 843953/02)

* Supplied with unit.

SECTION 2 - INITIAL INSTALLATION, SETTING-UP AND OPERATING

2.1 General

Before despatch from the factory the unit is tested to ensure it complies with the specification, and the ADJUST CUT-OUT control is set so that output current in excess of 17A will cut off the power unit. A setting-up procedure so that the unit can be set for smaller loads is included in the following instructions.

2.2 Initial Installation

Before connnecting the unit to the a.c. supply:-

(a) Check the unit for damage in transit.

(b) Adjust the transformer taps to match the a.c. supply voltage. The connection for 85 - 135V is indicated by black markings, and for 170-250V by red markings.

(c) Check fuses FS1 and FS2 are in circuit. For values see circuit diagram.

(d) Ensure connector at the rear of the frame is wired correctly and that the polarity of the output leads are correct.

(e) Check that there is no short circuit across the connector output.

(f) Ensure the unit is adequately ventilated.

(g) A double-pole switch to carry the load current should be connected between the power unit output and the load.

(h) Ensure power unit A.C. switch and load switch are OFF.

(i) Connect Extension Test Jig 847006 (see section 2.3 (b)), or plug unit into frame and connect an ammeter to indicate the load current.

(j) Switch on a.c. supply to frame.

(k) Switch on power unit A.C. switch.
Press RESET button.

(l) Switch on load, and check the ammeter reading is not excessive for the load.

(m) To check operation of cut-out and Adjust Output Volts see section 2.3.

2.3 Setting-Up

(a) Ensure power unit A.C. switch and load switch are OFF, and that the normal load is connected.

(b) To gain access to preset controls ADJUST CUT-OUT and SET OUTPUT VOLTS withdraw unit from its frame and plug in the Extension Test Jig 847006. Connect voltmeter and ammeter to the terminals on the jig (see Figure 4).

(c) Switch on a.c. supply to the frame and power unit A.C. switch.

(d) Rotate ADJUST CUT-OUT fully anti-clockwise and press RESET button. The indicator lamp will light showing there is power on PL1.

(e) Switch on load.

(f) Adjust SET OUTPUT VOLTS as required.

(g) Rotate ADJUST CUT-OUT clockwise until power unit cuts out (indicator lamp OFF).

(h) Switch off load.
Rotate ADJUST CUT-OUT a few degrees anti-clockwise and press RESET button and the power unit output will be restored (indicator lamp ON).

(i) Now switch on load. If indicator lamp is extinguished repeat (h).

(j) Momentarily short circuit the power unit output to verify that the cut-out is operational. Press the RESET button and the output will be restored.

(k) Switch off a.c. supply to the frame, switch off power unit A.C. and load switches; remove the extension test jig, and plug power unit into its frame. The unit is now ready for use.

2.4 To Adjust SET OUTPUT VOLTS only

(a) Ensure a.c. supply to frame is switched off, and that power unit A.C. and load switches are OFF.

(b) Connect extension test jig with a voltmeter, and ammeter or link.

(c) Switch on a.c. supply to frame and power unit A.C. switch. Press RESET button.

(d) Switch on load.

(e) Now adjust SET OUTPUT VOLTS to provide the voltage required.

(f) As for 2.3. (k).

2.5. Normal Operation

(a) Ensure that the load switch is OFF.

(b) Switch on power unit a.c. switch and press RESET button (indicator lamp ON).

(c) Switch on load. If cut-out operates (indicator lamp OFF) when load is switched on the load is taking excessive current. Check for a fault.

Note

The design of the protection ciruit is such that in the event of the a.c. supply being interrupted it is necessary to, first, switch off the load, then press the RESET button, and switch on the load, in that order.

These switches must also be operated as detailed above, whenever the protection circuit has acted, in order to restore the output volts.

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SECTION 3 - TECHNICAL DESCRIPTION

3.1 POWER UNIT AND SERIES REGULATOR

The power unit section is a conventional bridge rectifier with capacity smoothing. The transformer supplying the bridge may be adjusted for a.c. input voltages in the ranges 85-135 and 170-250 volts.

The output from the rectifier is fed to a bank of six parallel, series regulator transistors VT3-8. These transistors are fitted to a finned heat sink assembly which may be hinged down for inspection. The assembly is hinged by removing the top right-hand screws (looking at front of unit) from both front and rear of the unit. Access to the regulator transistors may be made more easily by removal of four screws holding the two halves of the assembly together.

To ensure substantially equal currents in the six transistors, equalising resistors are connected in the base and emitter circuits, R3-14 and R15-20.

The regulator transistors are connected for base control. The control potentials are applied to the base via an emitter follower super-alpha pair VT1 and VT2. This arrangement presents a high impedance to control potentials.

3.2 AUTOMATIC CUT-OUT

The automatic cut-out VT9 and VT10, is to protect the supply from overload due to short circuits and partial short circuits.

The ADJUST CUT-OUT control can be set to suit particular output current requirements (see section 2.3.).

When the unit is first switched on the regulation transistors VT3-8 are in a non-conducting condition. In this condition a very low voltage appears across the output PL1, and therefore stabiliser diodes MR5 and MR6 are inactive. At this stage VT9 is conducting and VT10 non-conducting, the potentiometer action of R24 and R29 (ADJUST CUT-OUT) being sufficient to ensure this action. To switch the supply on to the output the green push-button RESET on the front panel must be pressed and released. This will cause a cumulative action to occur.
NOTE: Some versions have connections for a remote RESET button.

An additional potential will be applied to the base of V10 from the surge current into C4 via R29. The resulting decrease in potential at the collector of V10 will result in a lower potential being applied to the base of VT11 which will make the collector of VT12 more negative. As the collector of V12 is directly coupled to the base of VT1, VT2 will draw more current through R21 and make the regulation

transistor bases more negative. This negative voltage is sufficient to enable the regulator transistors to pass the required load current, thus giving an output at PL1.

The voltage at PL1 will cause potentials to be developed across the Zener diodes MR5 and MR6, and a potential will appear at the base of VT10 sufficient to hold the conducting condition in VT10.

The setting of R29 ADJUST CUT-OUT, will govern the hold-in characteristics of VT10, this being a control of the potential from the stabiliser MR5, R28 and the potential divider formed by R23, R24 and R29.

In the event of a short circuit at PL1 the potential will fall, and when the Zener diode voltages drop below a critical voltage, a sharp fall in potential will occur at the base of VT10, at this point the multivibrator will automatically flip to its natural condition, VT9 conducting, VT10 non-conducting. The resultant action will be the regulator transistors become "high impedance", and the potential will be removed from PL1.

3.3 OUTPUT CONTROL

This circuit comprises VT11 and VT12 and controls the series regulator resistance in the working range.

The SET OUTPUT VOLTS control is for adjusting the output volts to suit the load.

In addition to amplifying the overriding control potentials from VT9 and VT10, the output voltage is sampled via the stabiliser MR6 and R32 SET OUTPUT VOLTS; the exact proportion of the output voltage being determined by R32. The sampled potential is applied to the base of VT11 the first transistor of a super-alpha pair, and the output is taken from the collector of VT12 and applied to the base of the regulator amplifier VT1.

The action is that any variation in output potential is developed across R32 and applied to the base of VT11, resulting in a change in conductivity of the transistors VT3-8 to effect a cancellation of the change of voltage at the output, a substantially constant output is therefore obtained over the rated range. The exact voltage at which the control occurs is determined by the portion of the output used for control, according to the setting of R32 SET OUTPUT VOLTS.

3.4 A.C. SMOOTHING

This circuit comprises VT13 and VT14. It is a conventional a.c. coupled amplifier and is fed with signals from the output at PL1. Any cyclic variations or other small variations on the output are amplified by VT13 and VT14 (VT14 being an emitter follower), the output from this amplifier is then fed to the base of VT1 to cause a cancellation of the variations at the output by modification of the conductivity of the regulating transistors.

SECTION 4 - MAINTENANCE

4.1 GENERAL

To obtain access to components including capacitors, the left hand panels may be hinged down in a similar manner to the heat sink assembly (see Section 3.1).

Care should be taken when re-assembling a dismantled unit that all insulating bushes and fittings are used. Also, in positions where nylon screws are used that these are replaced in their original positions.

When re-assembling the heat sink ensure that the base and emitter connections, and the resistors R15-R20 do not make contact with the fins of the heat sink.

4.2 ADDITIONAL INFORMATION

Further general information is contained in the following appendices:

(a) Maintenance Precautions for Semiconductor Units.

(b) Unit Mounting and Wiring Techniques.

4.3 VOLTAGE ANALYSIS

A Standard 20kΩ/volt testmeter may be used to make routine maintenance checks (see section 4.2 (a)). The following specimen voltage analysis represents average figures, but individual units may vary slightly due to usual manufacturing tolerances. However, any wide divergence between a measured value and the nominal figure given should be investigated.

Circuit conditions: Off load, SET OUTPUT VOLTS and ADJUST CUT-OUT fully anti-clockwise. RESET pressed. Meter used Avometer 8.

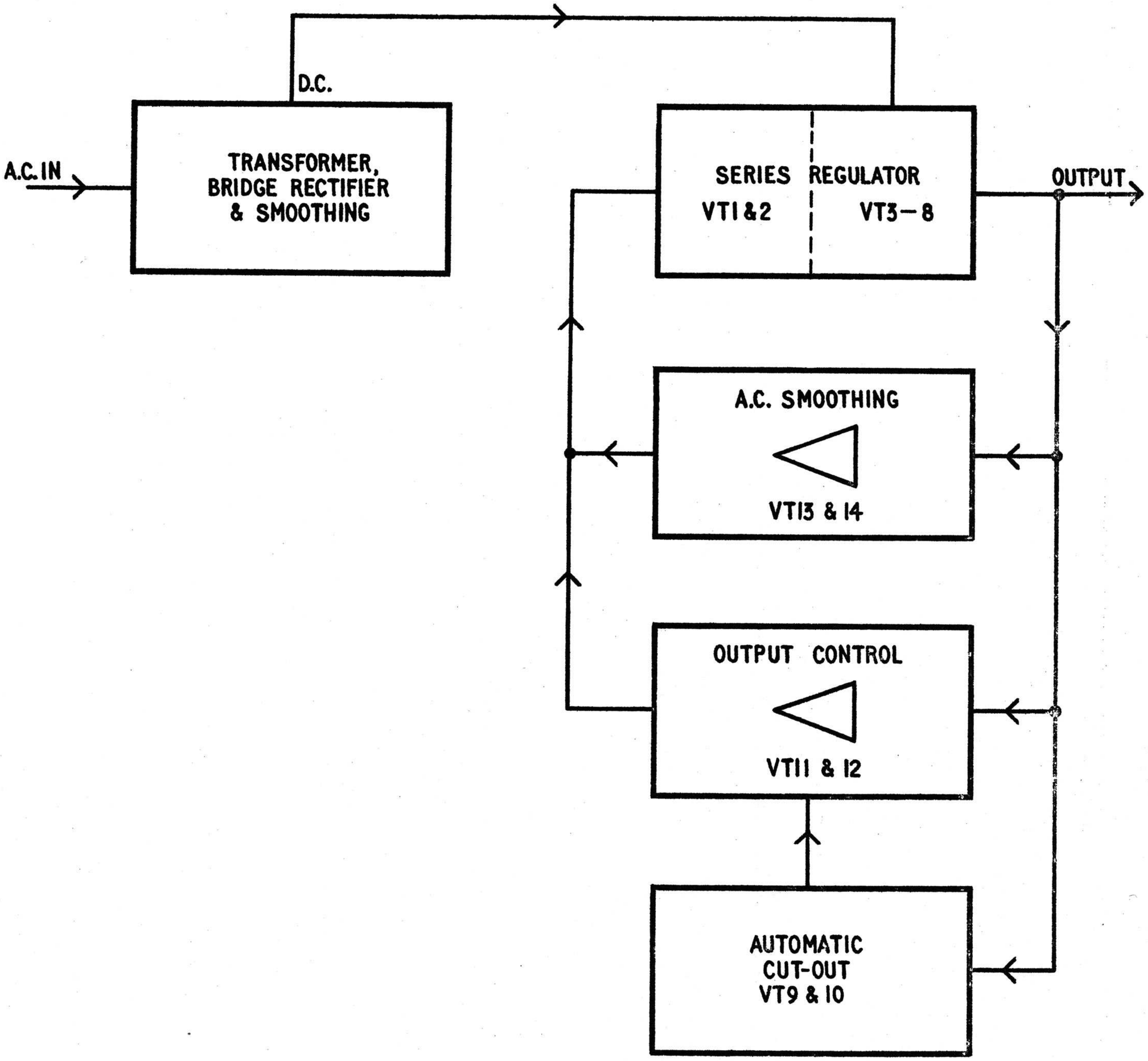
Transistor	Pin	Meter Range in Volts	Reading in Volts Relative to B+
VT1 - VT8	c	25	-24
	b	"	-16·3
	e	"	-16·3
VT9	c	"	-13·7
	b	2·5	- 0·1
	e	"	0
VT10	c	"	- 0·1
	b	"	- 0·98
	e	"	0
VT11	c	25	-16·3
	b	2.5	- 1·05
	e	"	- 0·63
VT12	c	25	-16·3
	b	2·5	- 0·63
	e	"	- 0·4
VT13	c	25	-10·5
	b	2·5	- 2·15
	e	"	- 1·8
VT14	c	25	-17·8
	b	10	- 3·8
	e	"	- 3·4

c = collector b = base e = emitter

PARTS LIST FOR
16V 15A POWER UNIT
(Part No. 843953)

I T E M	PYE PART NUMBER	MANUFACTURER	T Y P E
5.1 RESISTORS			
0·1 ohms	679029	Pye	
2 " 10% ¼W	674569	Erie	RMA9
10 " 10% ½W	677500	Dubilier	BTT
100 " 5% ½W	677324	"	BTT
120 " " "	677326	"	"
390 " " "	677338	"	"
820 " " "	677346	"	"
1k " " "	677348	"	"
1·5k " " "	677352	"	"
3·3k " " "	677360	"	"
4·7k " " "	677364	"	"
8·2k " " "	677370	"	"
12k " " "	677374	"	"
39k " " "	677386	"	"
47k " " "	677388	"	"
470k " " "	677412	"	"
5.2 CAPACITORS			
0·01µF 125V	653600	Mullard	C296AA/A10K
0·1 " "	653606	"	" /A100K
0·22 " "	653608	"	" /A220K
10 " 16V	680307	"	C426AM/E10
64 " 25V	680318	"	" /F64
100 " 4V	680316	"	" /B100
100 " 16V	680319	"	" /E100
160 " 10V	680320	"	" /D160
400 " 6V	680097	Plessey	CE1328
10k " 50V	680132	"	CE1340/8
5.3 MISCELLANEOUS			
Fuse 3A	701407	Bulgin	F129
Fuse Clip	700673	"	893
Transformer, Mains	772215	Pye	B8918
Potentiometer 100 ohms ½W	811720	Plessey-Linear 3/8" slot/spindle	MH2
" 470 " ½W	811721	Plessey-Linear 3/8" slot/spindle	MH2
Switch D.P.D.T. 3A. 250V	830124	N.S.F.	8373/K6
" Pushbutton	831066	Londex	RAF1/1001/ GREEN

I T E M	PYE PART NUMBER	MANUFACTURER	T Y P E
Lampholder	FL. 01013	Bulgin	D737/INS/WHITE
Lamp 28V 0·04A	709111	Atlas (Thorn)	995-9118
Socket 16-way	724153	Amphenol	26-190-16
Plug 16-way	724101	"	26-159-16
Connector Block 12-way	701746	Klippon	TKS 12/2.5
Feed Thru' Insulator	711872	Edison Swan Poly Tag	PT1
Terminal Stud D.E.	716530	Belling and Lee	R1090
" " S.E.	716531	"	R1089
Diode OAZ 202	721600	Mullard	--
Rectifier 25HB20 c/w lugs.	723071	International Rect. Co.	--
Zener Diode QZ15	723072	"	--
Transistor 2G221	865343	Texas Instruments	--
" OC24	865359	Mullard (c/w accessories)	--
" OC202	865369	Mullard	--



SIMPLIFIED BLOCK DIAGRAM

FIGURE 1

D.T.P. 1649

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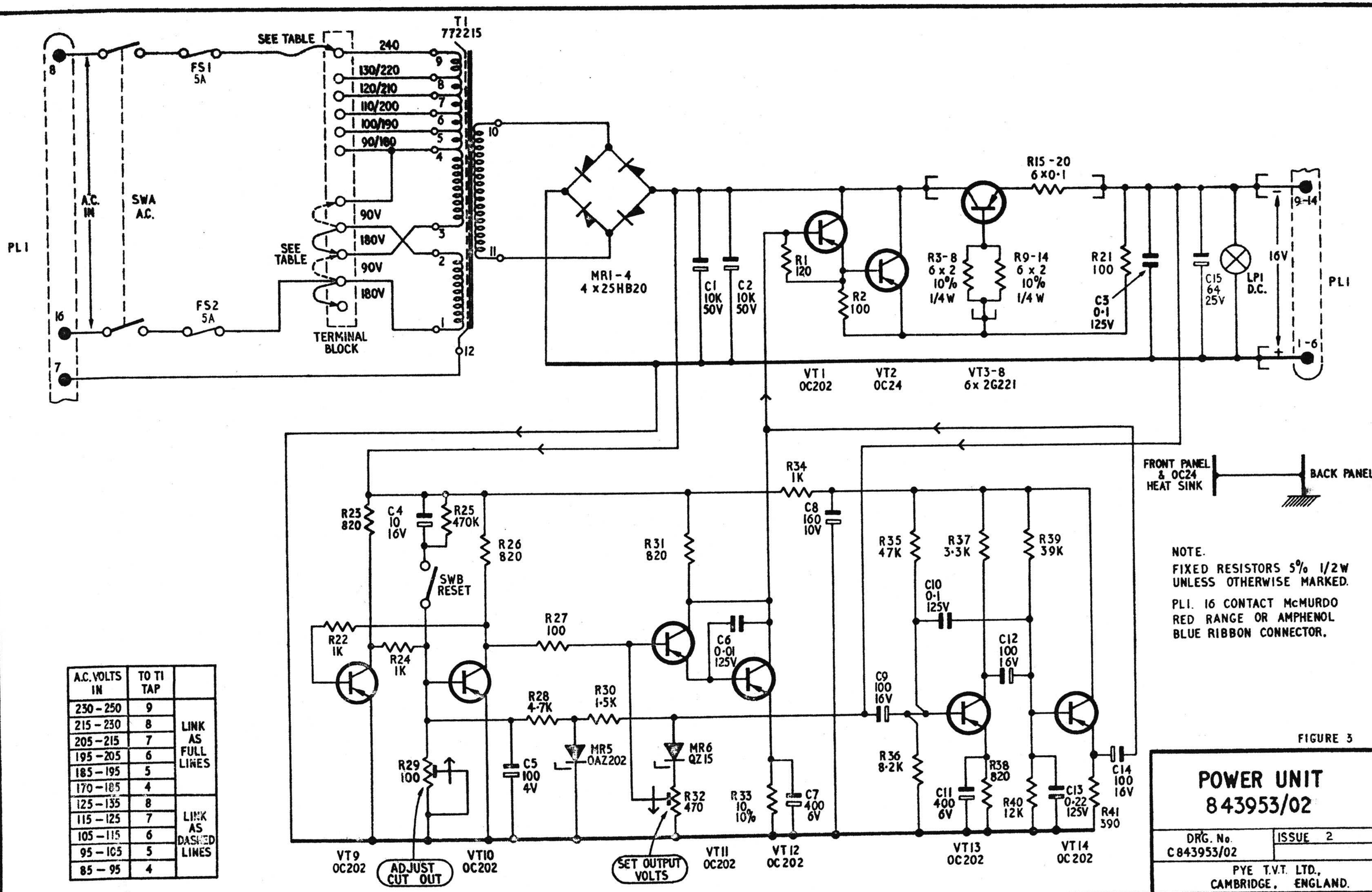

A.C. VOLTS IN	TO TI TAP	
230 – 250	9	LINK AS FULL LINES
215 – 230	8	
205 – 215	7	
195 – 205	6	
185 – 195	5	
170 – 185	4	
125 – 135	8	LINK AS DASHED LINES
115 – 125	7	
105 – 115	6	
95 – 105	5	
85 – 95	4	

NOTE.

FIXED RESISTORS 5% 1/2W UNLESS OTHERWISE MARKED.

PL1. 16 CONTACT McMURDO RED RANGE OR AMPHENOL BLUE RIBBON CONNECTOR.

FIGURE 3

POWER UNIT 843953/02

DRG. No.	ISSUE
C843953/02	2

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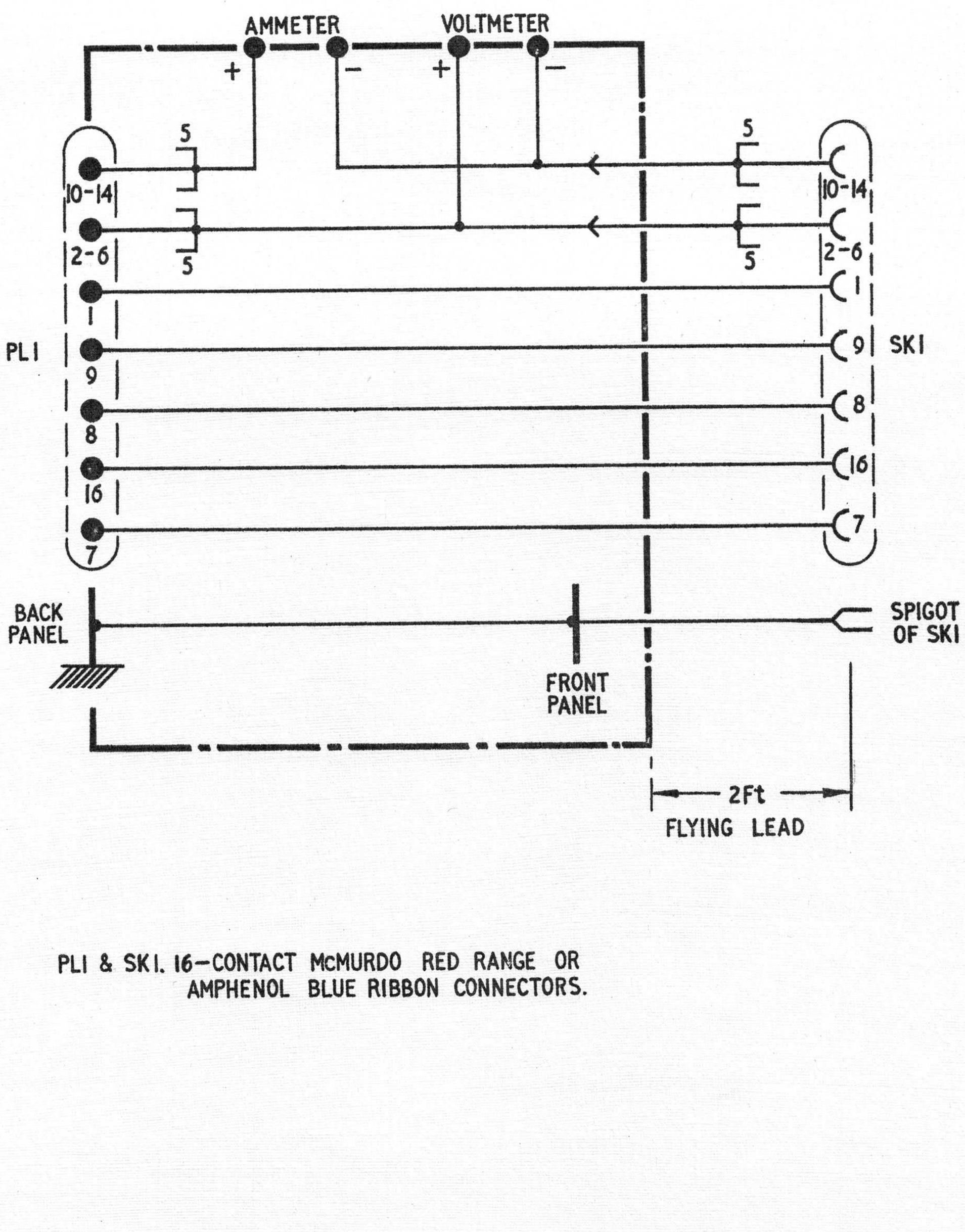

PL1 & SK1. 16—CONTACT McMURDO RED RANGE OR AMPHENOL BLUE RIBBON CONNECTORS.

EXTENSION TEST JIG 847006/00&/01

FIGURE 4
ISSUE 1

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MAINTENANCE PRECAUTIONS

FOR

SEMICONDUCTOR UNITS

NOTE: Non-observance can lead to destruction of semiconductors.

SECTION 1. GENERAL ELECTRICAL PRECAUTIONS

1.1 CONTINUITY CHECKING

When using any type of meter to check continuity, it is essential to remember that some give a voltage which is sufficient to destroy certain low voltage semiconductors. This is most likely if the polarity of the test voltage is applied incorrectly. Therefore:

(a) Check the polarity of the test meter voltage.
(b) Check the voltage level and see that this is within the rating of the semiconductors.
(c) When checking wiring external to a unit, it is safer to unplug the unit (or units) whenever possible.
When it is required to check resistors, capacitors and other components it must be remembered that if these components are across the whole, or part, of a semiconductor device, the device itself may affect test meter readings. It is necessary in these cases to disconnect one end of the component being checked.
(d) When the potential at the test meter terminals exceeds the semiconductor ratings it will be advisable to disconnect one end of every component which it is necessary to check - but see also 1.2. below.

1.2 SOLDERING

When soldering is undertaken in semiconductor circuits, poor insulation on the iron can give a sufficient level of a.c. leakage to permanently damage semiconductors. It is advisable therefore to make a quick check with a meter between the bit of the iron and the circuit earth. Note: on some units this may not be the chassis. If a potential is present take one of the following steps:

(a) Repair earth on the iron, or get another.
(b) Remove unit's earth by unplugging where possible.
(c) Remove unit's earth by disconnecting temporarily, say at an equipment plug or terminal block.
(d) Fit a switch in the 'live' lead to the iron, and switch off before bit touches the components or wiring.
(e) Use a low voltage iron or one which can be earthed to the equipment (not to the main's earth).

Remember, these precautions also apply when soldering cableform wiring external to the unit.

Never solder with the B+ switched ON. This can lead to disastrous short circuits, e.g. across emitter resistor.

All semiconductors are temperature sensitive, even without the power ON. Therefore;

When soldering use a thermal shunt, e.g. long nosed cool pliers or similar shunt, between the iron and the device.

1.3 VOLTAGE ANALYSIS

When making a voltage analysis be more than normally careful to prevent undesired short circuits by test prods. These can ruin a transistor e.g. if across base and B-, or across emitter resistor. Crocodile clips are a very common cause of accidental short circuits.

1.4 DISCONNECTING SEMICONDUCTOR UNITS

Because high level transients can damage many types of semiconductor always switch off the power supplies before removing the unit or unplugging it. Even if transients are known to be of no importance it is still possible in unplugging to break say a bias line before the B+ and hence give rise to damage.

1.5 TEST POWER SUPPLIES

Where units of an equipment can be unplugged and removed from a rack or console, it is always preferable to use a jumper lead so that the unit may be plugged in to its normal power supply. Check the polarity on the jumper lead (see also 2.5). Where test power supplies must be used observe the following:

(a) Use a power unit with similar characteristics to the one in the equipment e.g. with low ripple, high stabilisation, transient suppression, etc.
(b) Set d.c. supply to nominal ±1V, or better, so that results are meaningful.
(c) Always check polarity before connecting any test supply.
(d) Heavy gauge wire is essential for low impedance B+ supplies, say 23/·0076.

1.6 TEST EQUIPMENT

It should be remembered that items of test equipment often contain capacitors which may be charged as a result of some previous test. This charge may be sufficient to damage semiconductors in the item under test. Therefore:

(a) Always connect test equipment earth wires first to the unit under test, then touch the other connecting lead to earth before connecting it into the unit to be tested.
(b) Observe this kind of precaution with capacitors, whether these are used for test purpose or as replacements, i.e. check that they are discharged.

Signal Generators, especially l.f.types, quite frequently give voltages which far exceed the semiconductor rating. Therefore:

Before connecting this class of instrument into a semiconductor circuit the output should be turned down to minimum and care taken that the output is not subsequently turned up above a safe level.

1.7 SEMICONDUCTOR POWER UNITS

Special components are usual in these units; all are low voltage items. Some are intolerant of overloads. Therefore in all maintenance and servicing operations ensure that incorrect conditions are not introduced e.g. if the mains transformer or its taps have to be changed the connections should be carefully checked to ensure that excess voltage is not applied.

1.8 HIGH VALUE CAPACITORS

High capacity condensers are common on all semiconductor units. Since semiconductor devices are intolerant of large transients, be careful not to charge or discharge high value capacitors through them, e.g. by short circuits when power has been recently applied, or by replacing a capacitor when the B+ is on.

Never discharge the many thousand µF condensers by short circuits in the unit.

1.9 EARTHING

On no account should the earthing system of multi-unit audio installations, video installations, or any others be altered. On transistorised equipment this is more than normally important due to the use of low impedance supplies and the risk of introducing hum and other forms of interference into low signal circuits. The unit circuit earth is not necessarily connected to the mains earth or chassis. Any added B+(earth) wiring should always be in very heavy cable (See 1.5 d.)

This prohibition applies equally to paths for lamp, relay and other similar circuit supplies which are kept separate from signal paths. In this case high ripple (or plain a.c.) voltage may be fed into the signal earth. The resulting earth currents can then be picked up in low level signal circuits and amplified.

1.10 TRANSISTOR TESTING

It is always advisable to use a test item designed specifically for testing semiconductors, since any other item may give misleading results, and may also damage the semiconductor device.

SECTION 2. MECHANICAL PRECAUTIONS

2.1 PAINT

The black paint covering on certain semiconductors is there to stop light from reaching the junction which is sensitive to electromagnetic radiation including regions centred on the frequency of visible light. In fitting and handling, this paint must not be damaged.

2.2 SEMICONDUCTOR LEADS

When replacing, or disconnecting for test, the lead should not be bent closer than 1·5mm with respect to the body since any bending closer than this may damage the seal.

2.3 POWER SEMICONDUCTORS

When replacing power semiconductors the mica insulating washers (if used) must not be damaged; nor may any other material be substituted since this will affect adversely the transfer of heat from the case to the heat sink.

A smear of silicone grease on the washer serves to prevent sticking and also to make a more intimate heat bond to the sink. No other type of grease should be used.

Fixings on power semiconductors should be well tightened since this again affects heat transfer.

With some devices the metal case may be connected to an internal electrode. In these cases care must be taken not to allow the case to touch the chassis, other components, or any nearby tags.

2.4 HEAT SINKS

On no account should the black matt finish be removed from heat sinks (or fins) since this can affect the power handling capacity by an amount varying up to as much as 30% depending on the type of component.

On many small semiconductors a clip is used to increase the power dissipation. Make sure, therefore, that when a device is replaced the same size of clip is used and that this makes close contact with the case.

2.5 FORCED COOLING

Where forced cooling is provided this must not be obstructed since this can affect the power handling capacity by as much as 200% or higher.

When servicing on a test bench, or on jumper leads, the equipment air supply should be simulated or damage may result.

SECTION 3 - STORAGE

3.1 R.F.RADIATION

When units or components are stored this should not be near any high-power r.f. radiation e.g. from transmitters, test installations, etc. Radiation of this type is harmful, especially in the 'S' and 'X-Band'.

3.2 RADIO-ACTIVE EFFECTS

Semiconductors are affected adversely by various radio-active radiations e.g. X-rays, gamma rays and neutrons. Keep them away from any quantity of radio-active valves e.g. T.R.cells and some gas tubes since these contain radio-active materials.

3.3 TEMPERATURE

Although temperature ranges for semiconductors are continually increasing it is still good practice to keep all stocks away from hot radiators etc. and equally, not to permit stocks to accidentally reach very low temperature conditions.

3.4 MAGNETS

Semiconductors should not be stored close to very strong magnets. There is no permanent effect on the semi-conductor material, but part of the device, i.e. the case, may become permanently magnetised and the field from this will then change the performance of the semi-conductor.

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UNIT MOUNTING AND WIRING TECHNIQUES

1. GENERAL

Plug-in units are housed in special frames which can accept different sizes of units (in mixed sizes) and can also provide individual unit screening facilities.

2. FIXING THE FRAME

Some frames are supplied permanently fixed into consoles, others are loose items for bolting into racks. When fixing the frame into any rack observe the following:

(a) Use the fibre washers (supplied with the fixing screws) so as to protect the paint on the front member of the frame.

(b) Do not obstruct the ventilation holes in the top and bottom plates of the frame.

(c) Units generating large amounts of heat should not be positioned immediately beneath the frame.

3. FIXING THE SCREENS

The types of screening plates available can fit into the frame so as to divide it vertically and horizontally as required, i.e. to give a mixture of compartment sizes. Fit these as follows:

(a) Insert vertical screens first by dropping the lugs into the slots provided in the frame and then by slightly bowing the screen allow the other lugs to spring into the opposite slots.

(b) Insert the horizontal screens in the same manner but with the lugs entering the slots in the vertical screens.

4. RECEPTACLE PLATE ASSEMBLY

When units are supplied to fit into the frame a back plate (appropriate to the size of the compartment) is supplied loose. This is complete with fixings and with the unit mating connector already in position. When fitting the plate observe the following:

(a) Ensure that the plate is mounted so as to give the correct pin alignment of the mating connector.

(b) Do not tighten the mating connector fixings; "floating" is deliberate to ensure easy alignment of the unit connector and the mating component.

5. WIRING CONNECTORS

WARNING If the particular unit being installed contains semi-conductors it should not be plugged in during the soldering operation. Similarly other units already in the equipment should be

unplugged if these contain semiconductors, but see the section entitled "Maintenance Precautions on Semiconductor Units".

When soldering new leads ensure attention to the following:

(a) Use stranded wire for all connections. Stiff wire will cancel the floating action of the connector and will be liable to fracture.

(b) Do not tightly stretch the leads, but leave just sufficient slack to reconnect if the lead should be accidentally broken away.

(c) Do not permit solder to run back along the conductor strands; this spoils the insulant and creates a danger of breakage at some later date.

(d) Programme leads (input and output) should be insulated, screened twin. Expose no more than approximately $\frac{1}{2}$ inch of lead from the screening braid in order to avoid unwanted pick-up. The screening on the output leads should not be finished in a pigtail; trim and cover with a sleeve. The screening on the output signal leads should be earthed at the remote end of the audio cable, NOT to a mains earth.

(e) The screening pigtail of the input leads must go to the signal earth (normally B+ or the B+ busbar). Keep it short and sleeve it to prevent short circuits.

(f) Leads from B+ and B- should not be of smaller gauge than 14/.0076, preferably with thick wall insulation. The heavy gauge is needed in this application because of the low impedance of the power supply. This impedance must not be increased otherwise the stability of the power supply may suffer. For leads longer than 1 yard (1 m) the use of 23/.0076 is strongly advised.

6. DUMMY UNITS AND PANELS

If a frame is being installed then it should be remembered that different sizes of dummy units and back panels are available to fill vacant compartments in the frame. Where forced cooling is present in a rack (or console) these dummy units with their back panels serve not only to ensure a good presentation but also to ensure that the path of the cooling air stream is not diverted in a wasteful manner. On semi-conductor equipments this is of more than normal importance.

7. PARTS LIST

Rack Mounting Frame (19" rack)	749087
Vertical Screen	435629
Horizontal Screen	435630

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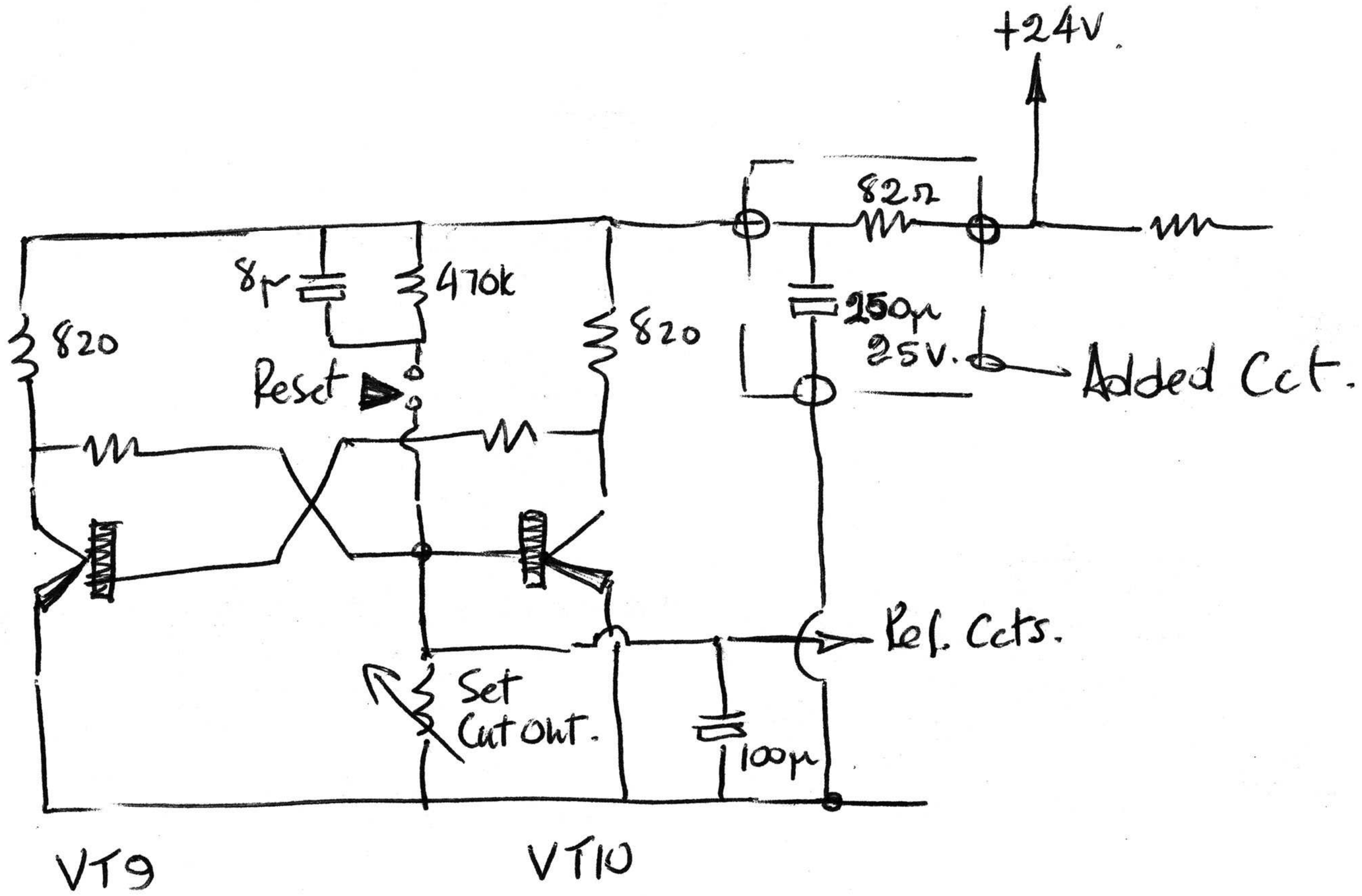
Modification to Improve Reset Action on PSU. 843953/01. (Ser. Nos. 41 & 46)



Reason for Mod. To smooth latching circuit H.T. supply to reduce feedback via H.T. rail from unregulated supply to latching circuit. To improve reset action when delivering high power loads.

Peter Hodges

30.1.72.