542 RANGE

Section 5 POWER SUPPLIES

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542 RANGE

INTERNAL POWER SUPPLY MODULE

34613

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ILLUSTRATIONS

FOLD OUT PAGE 4 FOR REFERENCE TO FRONT PANEL LAYOUT

INTERNAL POWER SUPPLY MODULE 34613

INTRODUCTION

1. The 34613 Internal Power Supply Module contains a system of re-chargeable nickel-cadmium cells which, in the fully charged state, are capable of maintaining optimum performance for a period of 4 hours or more.

The circuit diagram is shown on ET20250 and the module front panel, containing all associated controls and 'dc check' meter on Dwg. No. ML34513.

The module provides +15 volts dc only and does not provide phantom powering.

The purpose and function of the controls are as follows and should be read in conjunction with the circuit diagram.

ON-OFF

2. This is a two position master control switch located in the lower position on the panel.

(a) **OFF**
With the switch lever set to the **OFF** position the +15 volt dc supplies from the external or internal systems are isolated from the console.

(b) **ON**
With the switch lever set to **ON**, indicated by a white dot, the ±15 volts dc supply to the console circuits is provided by internal or external systems depending on the selected position of the **INT-EXT** switch.

INT-EXT

3. This is a two position switch occupying the centre position and operating in conjunction with the master **ON-OFF** switch set to **ON.**

(a) EXT(External)
With the switch lever set to 'ext' the internal batteries are disconnected from the console circuits and the ±15 volts dc supply is provided by the External Power Supply Unit.

The 'dc check' meter indicates the dc supply level provided by the external supply and the indication will settle and remain constant above the changeover point on the scale.

(b) INT (Internal)
With the switch lever set to 'int' indicated by a white dot, and the 'charge' switch set to **OFF** (up) again showing a white dot, the ±15 volts dc supply from the external psu is disconnected and is provided by the internal battery system.

Unless the cells are fully discharged the 'dc check' meter will indicate near full scale deflection.

(i) When the cells are fully charged they are capable of maintaining full operational performance for a period of 4 hours or more. During this time the cells will gradually discharge and the meter indication will gradually decrease to the changeover point on the scale.

(ii) When the cells are not fully charged the meter indication will rapidly decrease from near f.s.d. towards the changeover point on the scale at a rate dependent on the charge state of the cells.

In either of the above cases when the meter indication reaches the changeover point on the scale the cells should be re-charged.

CHARGE

4. The two position 'charge' switch occupies the uppermost position on the panel.

When the switch lever is set to the 'charge' position (down), the internal batteries are disconnected from the console circuits and are charged from the constant current supply from the External Power Supply Unit when connected.

(i) Normal Charge Rate

Under the above conditions the internal batteries will fully charge over a period of 14 hours. The charging procedure can be carried out simultaneously with the console operating from the external power supply unit and in this mode of operation the 'dc check' meter indicates the ±15 volts dc level provided by the external p.s.u.

B

POWER SUPPLY 33643

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ILLUSTRATIONS

33643 POWER SUPPLY UNIT

INTRODUCTION

Power supply 33643 is a compact, rugged unit suitable either for use as a portable unit or for 19" rack mounting.

33643 provides the following outputs:

±15V at 1A for console circuitry

+48V at 100mA for phantom powering of microphones

120mA constant current source for battery charging

IMPORTANT

A mains voltage selector enables the unit to be used with supply voltages of between 90 and 265V at 45 to 65 Hz frequency - covering all territories.

THE VOLTAGE SELECTOR MUST BE SET TO SUIT THE LOCAL SUPPLY VOLTAGE

Safety Note: Changes to the voltage selector cannot be made without first removing the 2A fuse housed within the selector. See Fig. 1, Page 5.

Two 7-way output sockets are provided:

For type 5422, 5422-R, 5432 and 5442 consoles, connection is made to either socket using the output lead (PL77022) supplied with each 33643 unit.

The high output capability of the power supply enables a further lead to be connected to provide the second input required on 12 and 16 channel consoles type 5452 and 5462. The additional lead is supplied with the console.

CIRCUIT DESCRIPTION

Refer to: ET10239 33643 PSU Circuit Diagram - Page 6
EX10932 BA932 Regulator Board Circuit Diagram - Page 7

The three transformer outputs are rectified and smoothed before entering the BA932 regulator board. This consists of three separate circuits providing the different outputs:

Constant Current Source

The zener voltage minus V_{BE} of TR1 appears across R2. This results in a constant current through the resistor, and hence through the battery, of 120mA.

48V Supply

The 48V regulator is formed by TR4, TR5, IC2 and associated components. TR4 is the series pass transistor. TR5 compares the divided down output voltage with the reference voltage of IC2.

IC1, TR2, R3 and R4 provide a constant current that is shared between the base of TR4 and the collector of TR5.

TR3, TR6 and R5 - 7 limit the output current to 130mA.

SCR1, D3 and R11 - 13 provide overvoltage protection. The crowbar is activated at 56V, causing the current limit to operate.

C1 is included for stability and C6 prevents spikes on the output from firing the overvoltage thyristor.

+15V Supply

Linear regulators IC3 and IC4 and associated components provide $\pm$15V with foldback limiting.

SCR2, D5 and R16 - 18 comprise the overvoltage crowbar circuit. The crowbar is activated at 36V causing the current limit to operate.

D6 and D7 are to hold the output rails within $\pm$0.6V if the positive and negative rails are shorted together, either accidentally or by the crowbar. This prevents the negative rail from becoming positive enough, or the positive rail from becoming negative enough to damage the components in the console.

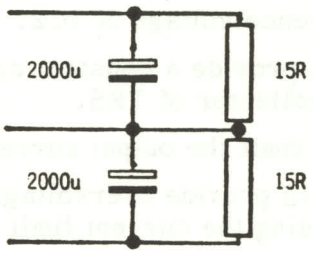
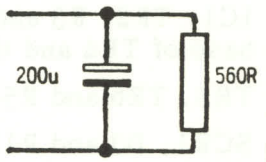
SPECIFICATION

Input

The power supply voltage selector is adjustable for 100, 120, 140, 200, 220 or 240 volts. Mains variations of ±10% about the selected input can be tolerated within the temperature range 0°C to 55°C. The unit may therefore be used with any voltage within the ranges 90 to 130V and 200 to 265V at mains frequency 45 to 65Hz.

Outputs

The three fully independent outputs have the following specification within the ambient temperature range 0°C to 55°C:

	±15V	48V
voltage tolerance (all outputs fully loaded)	±0.75V	+1.7V -2.3V
output current	1A	100mA
a.c. component 5Hz to 300kHz all outputs loaded (constant current source load = 220R)	1.8mV rms load: 	300uV rms load: 
over voltage protection	36V between o/p's	56V
short circuit protection	foldback current limiting within I.C. regulators	constant current limiting at 130mA
connections to chassis	0V connected to chassis of PSU by removable link	fully floating
fuse	2A QB FU12002 (2 0ff)	160mA QB FU12006

Outputs continued

	120mA Constant Current Source
Current tolerance	±10mA
Connections to chassis	fully floating
Fuse	160mA QB FU12006

Loads presented by consoles and microphones

	±15V typical quiescent current with maximum no. of modules in circuit	48V maximum current* with full complement of capacitor microphones
5422, 5432 and 5442 8 channel consoles	280mA	32mA
5452/12 and 5462/12 12 channel consoles	380mA	48mA
5452 and 5462 16 channel consoles	500mA	64mA

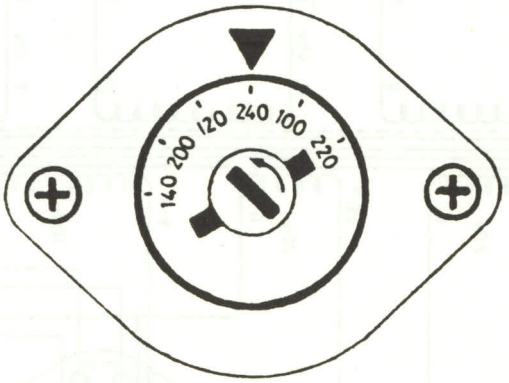
* Figures based on worst case capacitor microphones which draw 4mA each.

Fig.1

MAINS INPUT VOLTAGE SELECTOR

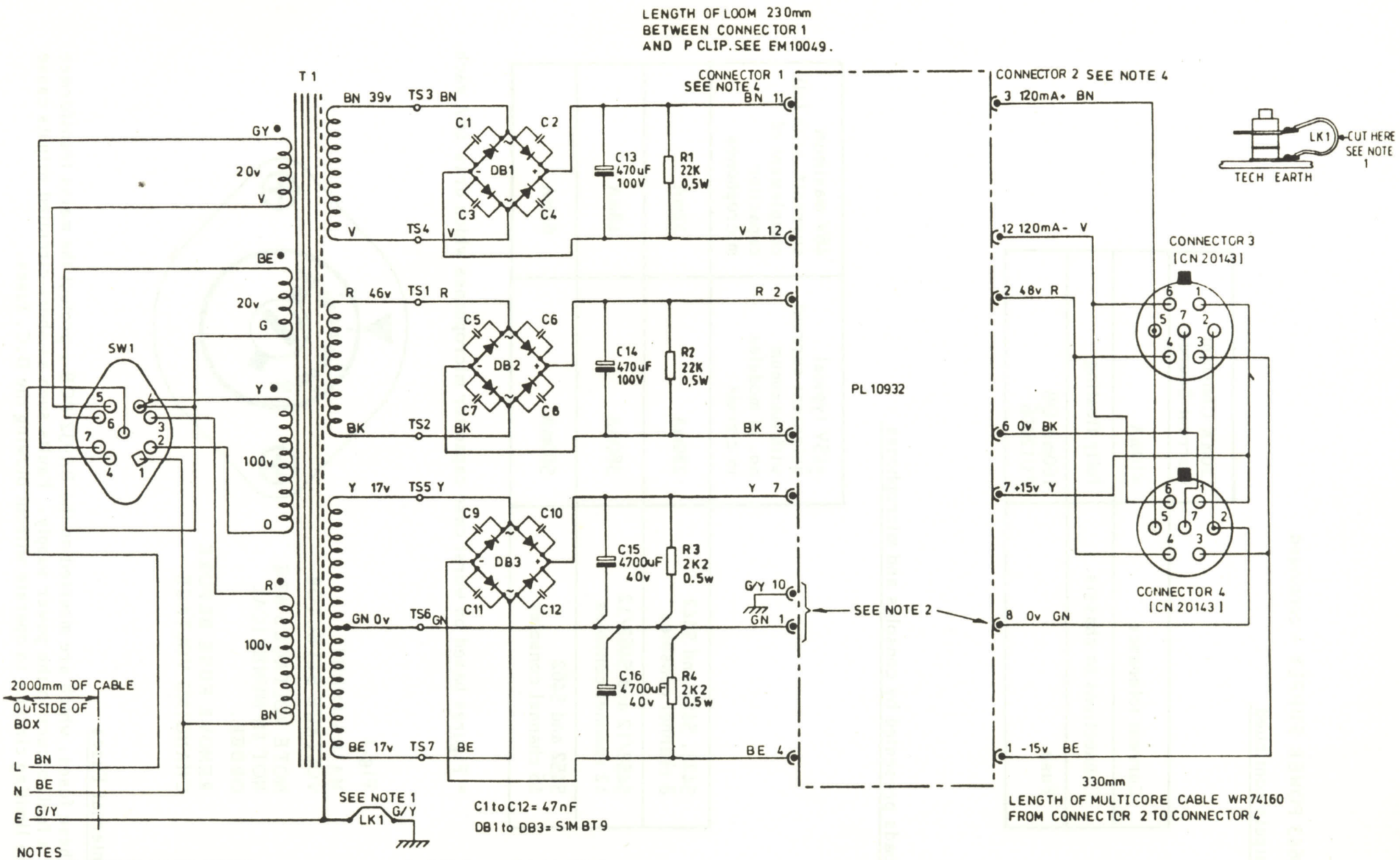
NOTE VOLTAGES ARE NOT IN NUMERICAL ORDER.

REMOVE FUSE BEFORE CHANGING VOLTAGE



Internal Fuses

These fuses, which are mounted on the BA932 PCB , protect the mains transformer if a fault occurs in the power supply. Faults such as short-circuited outputs cause the limiting circuits to operate without blowing the D.C. fuses.



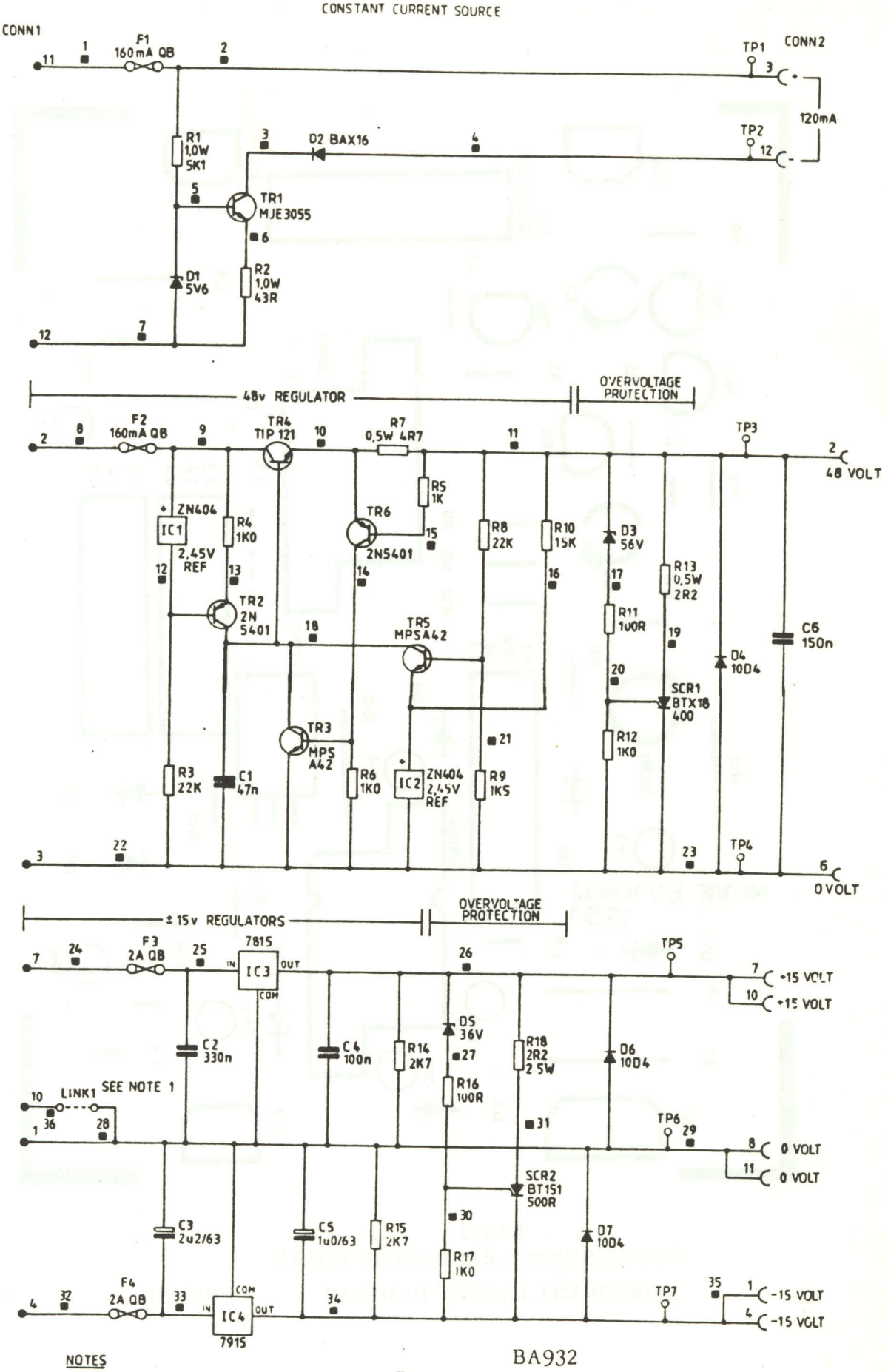
NOTES

1. THIS LINK IS ALWAYS FITTED IT MAY BE REMOVED IN SYSTEMS WHERE THE EARTH POINT IS IN REMOTE EQUIPMENT
2. 0v CONNECTED TO CHASSIS VIA LINK ON PL10932
3. FOR MECHANICAL ASSY SEE EM10049
4. CONNECTOR INSERTS CRIMPED ONTO WIRES BEFORE INSERTING INTO SHELL
5. SLEEVE ALL MAINS WIRING
6. ALL WIRING, EXCEPT WHERE OTHERWISE STATED, IS 16/0,2mm.

33643 POWER SUPPLY CIRCUIT DIAGRAM

ET 10239

33643 Iss 1 1981



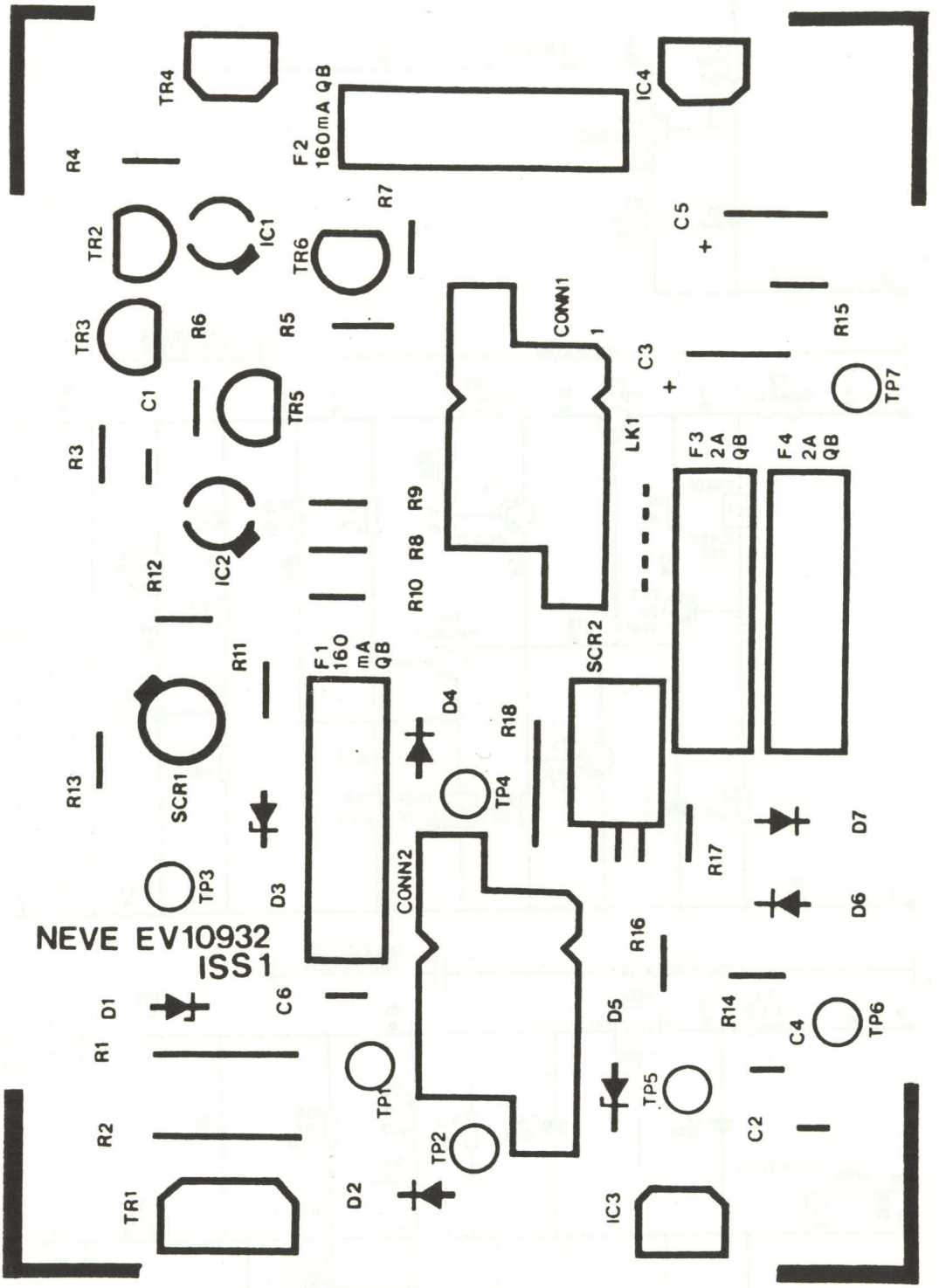
NOTES

1) UNIT SUPPLIED WITH LINK 1 FITTED
REMOVE TO FLOAT 0v FROM CHASSIS

2) ■ REPRESENTS PRODUCTION ATE TEST POINT

BA932
POWER SUPPLY REGULATOR BOARD
CIRCUIT DIAGRAM EX10932

33643 Iss 1 1981



BA932
POWER SUPPLY REGULATOR BOARD
COMPONENT LAYOUT DIAGRAM EW10932

PARTS LIST - 33643
POWER SUPPLY

Part No.	Description	Qty	Ref.
CA20471	Capacitor Mullard 47n 160V	12	C1-C12
CA64709	Capacitor RS 470u 100V	2	C13,14
CA74701	Capacitor ITT 4700u 40V	2	C15,16
CN20243	12-Way QM Cable Mounting Shell	2	Conn 1,2
CN10006	QM Insert Pins Size 20	7	for above
CN20011	QM Insert Sockets Size 20	8	"
CN20143	7-way fixed Tuchel (DIN) socket	2	Conn 3,4
DD10603	Diode Bridge S1M BT9	3	DB1 - 3
FE10211	Handle	1	
FE10008	Feet	4	
FU14402	Fuse 20 x 5mm 2A HRC SB 250V AC	1	for volt. selector
PL10932	Regulator Board Assembly	1	SEE SEP. PARTS LIST
PL77022 *	7-Way DC Output Cable Assembly	1	
RB002K2	Resistor 2K2 0.5W	2	R3,4
RB022K0	Resistor 22K 0.5W	2	R1,2
TF14013	Transformer VT24832	1	T1
TF19201	Voltage Selector/Fuse Holder	1	SW1

*Additional cable assembly supplied with consoles 5452 and 5462

PARTS LIST - BA932
REGULATOR BOARD

Part No.	Description	Qty	Ref.
CA20472	Capacitor Siemans 47nF	1	C1
CA21003	Capacitor Siemans 100nF	1	C4
CA23302	Capacitor Siemans 330nF	1	C2
CA60011	Capacitor Mullard 1uF 63V	1	C5
CA60021	Capacitor Mullard 2u2 63V	1	C3
CA21502	Capacitor Siemans 150nF	1	C6
CN10242	12-Way QM Connector - Pin Contacts	1	Conn 1
CN20242	12-Way QM Connector - Skt Contacts	1	Conn 2
DD10001	Diode BAX16	1	D2
DD10000	Diode 10D4	3	D4,6,7
DD16801	Zener Diode 5V6 500mW	1	D1
DD18700	Zener Diode 36V 1.3W	1	D5
DD19200	Zener Diode 56V 1.3W	1	D3

PARTS LIST - REGULATOR BOARD continued

Part No.	Description	Qty.	Ref.
DD14001	Thyristor BTX18 - 400	1	SCR1
DD14500	Thyristor BT151 - 500R	1	SCR2
FU12006	Fuse 20 x 5mm 160mA QB	2	F1,2
FU12002	Fuse 20 x 5mm 2A QB	2	F3,4
FU18005	Fuse Clip	8	
IC20609	ZN404 2.45V Bandgap Ref.	2	IC1,2
IC20770	7815 +15V Regulator	1	IC3
IC20800	7915 -15V Regulator	1	IC4
RA100R0	Resistor 100R	2	R11,16
RA001K0	Resistor 1K	5	R4,5,6,12,17
RA001K5	Resistor 1K5	1	R9
RA015K0	Resistor 15K	1	R10
RA022K0	Resistor 22K	2	R3,8
RC043R0	Resistor 43R 1W	1	R2
RC005K1	Resistor 5K1 1W	1	R1
RG004R7	Resistor 4R7 0.5W	1	R7
RG002R2	Resistor 2R2 0.5W	1	R13
RJ002R2	Resistor 2R2 2.5W	1	R18
SA10200	Mounting Pad for SCR1	1	
SA10400	Mounting Pad for IC1,2, TR2,3,5&6	6	
SA10900	TO220 Mounting Kits for IC3,4, TR1&4	4	
TR17200	Transistor MPS-A42 NPN	2	TR3,5
TR13200	Transistor 2N5401 PNP	2	TR2,6
TR16800	Transistor MJE3055 NPN	1	TR1
TR17001	Darlington Pair TIP121	1	TR4

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