

AUDIO AUXILIARY UNIT
TYPE 3992/00
(PART NO. 843992/00)

INSTRUCTION AND MAINTENANCE MANUAL
PART ONE

Supplied for use with
Equipment Serial No(s) _____

Made on Order No. _____

Customer's Order No. _____

UJAU

PYE T.V.T. LTD.
CAMBRIDGE
ENGLAND

PUBLICATION 2093

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PART TWO

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SECTION 1 - GENERAL DESCRIPTION

1.1 INTRODUCTION

The Audio Auxiliary Unit is a compact desk unit designed to be used in a mobile control room, and to operate adjacent to, and in conjunction with, a producer's control unit, and an audio mixing unit.

A 15-line telephone manual exchange is provided at the rear of the control panel. This is incorporated in a jackfield giving facilities for connection to external G.P.O. lines. Cross-patching may be performed by the use of the self-retracting jack leads to internal audio and talkback circuits, including a battery maintained telephone circuit with a power unit to maintain the accumulators at full charge. The telephone handset is conveniently located on the desk.

The senior television engineer's talkback microphone is mounted on the desk, the amplifiers and relays used in the talkback system are housed in the desk. Power units, together with their associated relays, are fitted into the desk pedestal. These provide d.c. at 16V and at 24V respectively to the audio mixing unit, and to amplifiers etc. in the audio auxiliary unit.

Various talkback systems, operated by controls on the producer's control unit, the commentator's units, the audio mixing unit, and on the audio auxiliary unit itself, are routed into, out of, and through the audio auxiliary unit, the routes providing comprehensive talkback between the staff associated with the operation of the unit and programme.

Cooling on the unit is by the operation of two motor driven fans, this ensuring adequate air flow around the semiconductor units.

A number of standard units, such as power units, audio amplifiers etc., are mounted in the audio auxiliary unit. These units are the subjects of separate manuals, and are listed in Section 6.9 of this manual for convenient reference.

A cable schedule, giving details of the interconnection of the audio auxiliary unit with its associated units, will be found in Section 1.3.

A jackfield schedule is provided in Section 5.6.

1.2 CONSTRUCTION

The auxiliary audio unit is robustly constructed, and is designed to give the maximum operational facilities in the limited area available in a mobile control room.

The telephone indicator panel, jackfield, telephone handset, operational controls, and indicator lamps are mounted on a compact control panel which forms part of the desk top, all items being within easy reach of the operator.

The power units and amplifiers are located in special compartments in the desk pedestal (except for the loudspeaking telephone compressor unit which is mounted under the desk top). These units are of the plug-in type. Automatic connection to the associated circuits is made on insertion in the compartment. The connection is made by plugs on the back of each unit, the plugs mating with sockets on the receptacle plate of the compartment. When correctly inserted the units are held in position by a spring catch.

1.3 CABLE SCHEDULE

UNIT	SOCKET		CABLE			PLUG		UNIT
	No.	No. of Pins	No.	Code SK PL	Type	No.	No. of Pins	
A.M.U.	28	28		L L	6038	28	28	Audio Auxiliary Unit
A.M.U.	35	28		Q Q	6038	35	28	" " "
Aud. Aux. Unit	43	4		D D	6109	43	4	A.M.U.
A.C. IN					AG21223	46	4	Audio Auxiliary Unit
Aud. Aux. Unit	47	4						A.C. OUT
Emerg. Supply					AG21228	48	6	Aud. Aux. Unit
Aud. Aux. Unit	49	28		L L	6038	49	28	P.D.U.
P.D.U.	51	12			6105	51	12	Aud. Aux. Unit
A.A.U.	52	28		Q Q	6038	52	28	P.D.U.
"	53	3			AG21224			F.T.P. (Comm 1)
"	54	3			AG21224			" (Comm 2)
F.T.P. (Tele Lines)					A 5983	55	28	A.A.U.
" " "					A 5983	56	28	"
A.A.U.	57	3			6152	57	3	Mon. L.S.
"	58	20		Q Q	6108	58	20	P.D.U.
T.B. Jet Box					6108	59	20	A.A.U.
A.M.U.	64	28		F F	6038	64	28	A.A.U.
A.A.U.	67	20		W	AG21230			F.T.P. (Euro-vision etc.)
"	72	28		A	AG21211			F.T.P. (MCR 1/C)
"	77	4		A A	6109	77	4	A.M.U.
A.M.U.	78	20		V	6108	78	20	A.A.U.

SECTION 2 - INSTALLATION

2.1 INITIAL INSTALLATION

When the audio auxiliary unit is supplied as part of a mobile control room the installation will have been completed at the factory, and all connections to associated apparatus made. Acceptance trials will have established the correctness of the installation, and consequently, no further installation work is required.

2.2 REMOVAL

Provision has been made for the audio auxiliary unit to be removed very simply, as follows:-

Ensure that the unit is isolated from all mains and emergency supplies by the normal switching arrangements, and disconnect all cables feeding into the unit.

Remove all detachable units from the desk and store safely.

Remove the two 'pip' pins from the rear mounting plate, stable the pins for safe keeping in the holes provided in the frame, and slide the unit about two inches in the direction of the operator's position. The unit is now free to be removed.

SECTION 3 - SWITCHING-ON

3.1 CAUTIONARY NOTE

Before switching-on any equipment in the audio auxiliary unit, ensure that a.c. mains are correctly connected to all the units using an a.c. mains supply. Ensure that the input tapplings on the voltage selector plate of the autotransformer unit is adjusted to agree with the mains supply to be used.

Emergency supplies to give both 24V d.c., and 16V d.c. also should be connected.

Inter-unit connections should also be checked for correctness.

3.1.1 External Switching

Switch on the control room main breaker which feeds a.c. to the audio auxiliary unit, and switch on both the 16V and 24V d.c. emergency supplies.

3.1.2 Internal Switching

Ensure that the autotransformer unit is switched off, and check that the incoming voltage is correct.

Switch on the autotransformer unit and note that the meter indicates 240V (nominal).

Switch on all the power units, and ensure that the B-switch on the audio mixing unit is in the outwards position (i.e. OFF).

Press the green reset buttons on the 16V power units, and ensure that the power unit display screens on the audio mixing unit are correctly indicating the availability of the supplies.

Switch on the B-switch on the audio mixing unit.

Switch on all mains operated units.

3.1.3 Warming-Up Period

Before bringing any of the equipment into use, allow a period of at least ten minutes to elapse after switching-on.

This will enable the equipment to reach its optimum working conditions.

SECTION 4 - DESCRIPTION AND OPERATION

4.1 CONTROL PANEL

The audio auxiliary unit is the desk from which the senior television engineer of the control unit normally operates. Facilities are provided on the unit to enable the engineer to communicate quickly to all points under his supervision, and telephone communication, both local and remote, is made possible by the small manual telephone exchange fitted to the desk unit.

Incoming calls to the exchange will cause the line-call indicator to drop, a red light to glow in the Buzz/Cut button, and a buzzer to sound. Insertion of a jackplug into the indicated jack will cancel all calling indicators. The buzzer may be muted by pushing down the Cut/Buzz switch, this will continue to glow to indicate an unanswered call.

The engineer will answer calls by patching his telephone to the appropriate jack.

4.2 TALKBACK

Talkback is by microphone, telephone handset, or telephone headset, and may be switched to a loudspeaker, or fed to the respective talkback circuits.

A battery maintained telephone is provided. This has its own power unit which provides a 6V d.c. continuous charge to four nickel-cadmium accumulators (DEAC CELLS).

4.3 AMPLIFIERS

Various amplifiers are used in the talkback system, the senior television engineer's microphone amplifier, the loudspeaking telephone amplifier, the production talkback distribution amplifier, the lighting engineer's microphone amplifier, the producer's microphone amplifier and the producer's assistant's microphone amplifier. These are described in separate manuals. A compressor unit is used to supply automatic gain control to the loudspeaking telephone amplifier,

4.4 INDICATORS

Indicator lamps on the panel light under conditions as follows:

GENLOCK. SYNC. COINC. This is an indicator lamp which is illuminated by a signal from the sync coincidence detector, and when lit, tells the engineer that the local and remote video synchronising pulses are now in phase and ready for changeover.

CUT PROG SOUND. This is a push-button which glows green when pushed, and indicates that the programme sound is cut from all

vision and camera staff.

CUT BUZZ/CALL. This is a push-button which, glows red to indicate that an incoming telephone call awaits attention. When the button is pushed the buzzer is muted.

4.5 OPERATION

For convenience, the description of the operation of this unit has been divided into two sections. The two sections are SWITCH OPERATION and RELAY OPERATION. Details of the individual working of each switch and each relay are given in the respective sub-sections.

Most switches and relays are interconnected with other units, e.g. the producer's desk unit, or the audio mixing unit, or both, and the functions of the switch or relay should be considered with respect to these conditions.

4.5.1 Switch Operation

SWA CUT BUZZ

This push-button is located on the desk panel to the left of the microphone base. The button controls the buzzer and is illuminated (Red) when a call comes into the telephone exchange. If the engineer is not able to answer the call but wishes to mute the buzzer, pressure on the switch will cut the buzzer, but the lamp will remain lighted.

SWB COMMENTATORS

SWB is situated on the right hand side of the desk immediately above the telephone cradle. The switch is labelled COMM. 1. NORM. COMM. 2.

In the NORM position of the switch the telephone is connected to JK3E on the manual exchange. If the switch is set to either side the respective COMM TELE circuit to the producer is broken into and the outgoing line dropped.

SWC

This switch is formed by the telephone rest. Lifting the telephone from its cradle causes SWC to break the line from SWB to the telephone bell, stops the ringing and energises the microphone.

SWD RING

This is a push-button switch located on the desk just above the telephone handset.

When SWD is depressed the ringing generator is connected to the JF3E in place of the senior engineer's telephone.

SWE CUT PROGRAMME SOUND

This is an illuminated push button switch which is located on the left hand side of the desk. When the switch is depressed the programme sound is disconnected from the camera talkback system, and the switch is illuminated green to indicate that condition. A second push on the switch will restore the sound and extinguish the light.

SWF MUTE

This switch is one of a row of keyswitches located on the desk just above the telephone handset. When the switch is set to MUTE it causes RLG to be energised and cuts off the signal to the L.S. TELE loudspeaker on the producer's desk.

SWG CUE LS.1

SWG is a five position rotary switch mounted near the middle of the desk. It connects one of the five signal sources inscribed around the switch via a relay (RLR) to a 'cueing' loudspeaker unit remote from the mobile control room.

If a microphone near the loudspeaker requires to be brought into service the fader interlock selector CUE L.S.1 on the audio mixing unit is set to the required channel, and provided the main fader and the appropriate group faders are off the bottom stop, the loudspeaker is muted to prevent howl-back.

SWH CUE L.S.2

SWH provides an additional channel to perform the same functions as SWC. It works in conjunction with RLS and the FADER INTERLOCK CUE LS2 selector on the audio mixing unit.

SWJ REPLY

This keyswitch is one of a group labelled L.S. TELE. In the normal position SWJ makes the senior television engineer's microphone amplifier available to other talkback circuits.

When SWJ is set to REPLY the senior television engineer's microphone amplifier is disconnected from other circuits and connected to the L.S. TELE amplifier input. RLH is energised, RLH 1/2 and 3/4 close and route the senior engineer's reply via the L.S. TELE amplifier to JF4F.

SWK T.B. MIC

This is a keyswitch located on the desk just above the telephone handset.

When SWK is set to 'ON' the output of the senior telephone engineer's microphone amplifier is connected to the input of the production talkback distribution amplifier for further distribution.

SWL TRANSFER TO HEADPHONES

This is a keyswitch situated on the desk in the group labelled L.S. TELE.

In the normal position of SWL programme sound from the forward termination panel is fed to the senior television engineer's headset jack (JK16) via R77.

Operation of SWL will transfer talkback from the loud-speaker input to the senior television engineer's headset jack (JK16) in place of programme sound. The jack is located on the front of the desk pedestal underneath the script table.

SWM A.G.C. ON

This switch is on of the group labelled L.S. TELE.

When the switch is operated a sample of the output of the L.S. TELE amplifier is fed to the control signal input of the compressor unit for automatic gain control to be applied. For this to be fully effective the L.S. TELE amplifier gain (Input 2) should be kept at maximum.

Automatic gain control cannot be applied when SWJ is in the REPLY position.

R77 HEADPHONE LEVEL CONTROLS

The control labelled PROG SOUND / L.S. TELE. (R77 on the circuit diagram), is used for controlling the amplitude of programme sound or L.S. TELE talkback made available at the tip of JK16, and is normally fed to one earpiece of the senior television engineer's headset.

The control labelled M.C.T.B. controls the amplitude of mixed camera talkback made available at the ring of JK16 and is normally fed to the second earpiece of the senior television engineer's headset

4.5.2 Relay Operation

RLA and RLC

Operation of the CALL PROD switch by commentator 1 causes RLA to become energised. RLA3 opens and places R39 in series with the relay coil cutting the relaxation time of the relay to allow instant 'drop out' when the switch is released. RL1 closes and operates the buzzer on the producer's desk. RLA4

transfers the smoothing capacitor (C10) to -24V to prevent switching transients. RLA2 closes and energises RLC. RLC1 closes and latches RLC. RLC2 causes the COMM 1 lamp on the producer's desk to light. RLC is held until the producer (or assistant) breaks the circuit by setting SWC (or SWD) on the producer's desk to the COMM TELE position.

RLB and RLD

Operation of the CALL PROD switch by commentator 2 will cause RLB to operate as RLA, RLD to operate as RLC, and will cause the COMM 1 switch on the producer's desk to light.

RLE

RLE is controlled by SWD on the producer's desk. When the switch is set to COMM TELE, the relay is energised, RLE 1/2 changeover and cause the output from the producer's assistant's microphone amplifier to be changed from telephone circuit 'A' to telephone circuit 'B'.

RLF

This relay operates as RLE but is energised by SWC and controlled by the producer. When SWC is set to COMM TELE the relay causes the output from the producer's microphone amplifier to be changed from telephone circuit 'A' to telephone circuit 'B'.

RLG

RLG is controlled by SWF (MUTE L.S.) on the auxiliary audio unit. When SWF is moved to 'MUTE LS' RLG is energised, RLG 1-2 open and cut off the signal to the loudspeaker on the producer's desk. A dummy load is connected across the output of the L.S. TELE amplifier.

RLH

This relay is energised by the operation of any L.S. TELE REPLY key on both the auxiliary audio unit and the producer's desk. When a reply key is pressed RLH1/2 and RLH3/4 operate and reverse the loudspeaking telephone amplifier in the loudspeaking telephone line to JF4F on the jackfield.

RLJ and RLL

These relays are part of the power supply system, and when energised they enable power to be supplied to the required points in the system (including the audio mixing unit) from PUI, at the same time changing the operational indication of the indicator lamps on the audio mixing unit.

RLK and RLM

If any failure of PU1 occurs these relays operate automatically, and power is then supplied from PU2. The condition indicator lamp on the audio mixing unit is changed to indicate the relative condition.

RLN

In the event of a mains supply failure, or the failure of both power units supplying 16V, this relay will operate and cause a 16V supply to be connected from the emergency supply to the points fed by the power unit. RLN2 ensures that the 24V emergency supply is normally fed to the mains operated units in the event of a mains failure only.

RLO

This relay is energised by SWF (Rehearsal L.S.) on the producer's desk. When the relay is energised RLA 1/2 feed producer's talkback via the forward termination panel to an external loudspeaker (LSU1 or LSU2) and RLO 3/4 cut off the monitor loudspeaker in the mobile control vehicle to prevent howl-back.

RLP and RLQ

When commentator 1 operates the CUE SOUND MIXER key on the commentator's unit RLP becomes energised, RLP1 closes and the COMM 1 indicator on the audio mixing unit lights. A similar operation is performed by RLQ when commentator 2 operates the CUE SOUND MIXER key on his unit. This will cause the COMM 2 lamp on the audio mixing unit to become lighted. The relay coils are decoupled by C12 and C13 respectively to prevent chattering caused by the high outputs from the commentator's distribution amplifier.

RLR

The function of this relay is to automatically mute cue loudspeaker 1.

The operation of the relay is described in Section 4.5.1 under the sub-heading SWG CUE L.S.1.

RLS

This relay functions as RLR but is used in conjunction with SWH CUE L.S.2 on the audio auxiliary unit.

RLT and RLU

RLT is energised by an incoming ringing tone on the producer's line telephone circuit. RLT1 will close and

operate RLU. RLU latches in on RLUI (provided neither SWC or SWD on the producer's desk are set to LINE TELE) and will light the LINE TELE call lamps on the producer's desk. When the LINE TELE call lamps are lighted and SWC or SED, on the producer's desk, are set to LINE TELE, RLU is de-energised and 'drops out' cancelling the call signal and extinguishing the lamps.

RLV

This relay is energised from the emergency 24V supply by the switching-on of the autotransformer unit.

RLV 1/2 close and make the 24V emergency supply available, through the diode MR5, at the output of the 24V power unit.

RLV prevents drain on the emergency 24V supply when the equipment is otherwise switched off.

The diode MR5 prevents the power unit from charging the 24V emergency supply batteries; and being held at reverse bias by the normal 24V supply, isolates that supply from the emergency 24V supply.

4.5.3 Power Unit Changeover System

The power supplies to the audio system are provided as follows:

- 16V d.c. - Power Units 1 and 2
- 24V d.c. - Power Unit 3

Separate 16V and 24V emergency supplies are provided from batteries.

Of the two 16V units number 1 is normally in use and number 2 is held as a standby supply ready for immediate changeover in case of failure of number 1.

After switching-on is complete relays in the changeover system become energised, RIM and RLL being energised by their respective power units RLM1 and RLL1 changeover and bring in RLJ via the B-switch on the audio mixing unit. RLJ1 changes over and causes the output of Power Unit 1 to be transferred from the dummy load (R40 and R41) to the power output distributing points, causing also the green lamp on PU1 indicator panel, located on the audio mixing unit, to be extinguished, and the amber lamp to light.

RLL and RIM being energised, the B-circuit from RLK is open. Power Unit 2 is then held in a standby condition and its output is fed into the dummy load (R42, R43). The green lamps of the relevant power unit indicator on the audio mixing unit light to indicate the operational condition.

RLN being de-energised, causes the relevant lamp on the audio mixing unit to be lighted, and the 16V emergency supply is held as a further standby. RLN2 connects the -24V from the emergency 24V supply to the ringing generator, the monitor loudspeaker amplifier, and the loudspeaking telephone amplifier in the event of a power failure.

If power unit 1 fails RLL1 changes over, the B-supply circuit from RLK is then closed, and the output of power unit 2 is transferred from the dummy load formed by R42 and R43 to the power output distribution points.

If both power units fail RLMI and RLL1 energise RLN, and the emergency 16V supply is then connected to the power output distribution points.

Re-insertion of either 16V supply will cause the changeover system to reverse with the same priorities of power supplies effective as described. Before the power units are switched on after repair or replacement, a suitable moment must be chosen to bring them into use as the B-switch on the audio mixing unit **MUST BE SWITCHED OFF** before the power units are reset. When power unit 1 is supplying the load power unit 2 may be installed and reset at any time.

The B-switch is earthed through the autotransformer unit, this arrangement preventing current drain from the emergency supply when the equipment is otherwise switched off.

SECTION 5 - MAINTENANCE

5.1 GENERAL

WARNING: Before commencing any checking, fault finding, or other maintenance work see the appendix 'Maintenance Precautions on Semiconductor Units'.

Maintenance information on the standard units embodied in the audio auxiliary unit is given in the individual manuals of the units concerned.

5.2 ACCESS TO COMPONENTS

Access to components in the audio auxiliary unit pedestal is gained by removing the back panel. This will expose the plug panel on which are mounted plugs, sockets, relays and fuses etc. The two captive screws holding the plug panel in position are located, one on each side, near the top of the panel. The screws should be unscrewed, and the panel may then be hinged forward to expose further components and wiring. If necessary, the side panel of the audio auxiliary unit may be removed.

The desk panel is hinged at the front, and secured at the back by clips. The clips should be removed, and the desk panel may then be hinged forward. Lidstays are provided to hold the desk unit open.

The amplifiers and power units in the front of the pedestal are withdrawn by lifting up the small catch in the handle area on the front of each unit and pulling the unit forward.

5.3 D.C. RESISTANCE OF WINDINGS

NOTE: All values are to a tolerance of $\pm 10\%$ unless otherwise stated.

T1	770710	Pins 1-2	218 ohms
		3-4	218 "
		5-6	206 "
		7-8	206 "
T3	771801	Pins 6-7	3.64 ohms
		1-4	975 "
T4 and T5	B9179	Pins 1-2	451 ohms
		5-6	506 "
T6	772167	Pins 1-4	45 ohms
		5-8	0.34 "
T7	B9283	Pins 1-2	26 ohms
		3-5	1.9 "

5.4 FANS

The fan motors are self lubricating and normally do not require maintenance in that respect.

It is essential that regular inspection be made to ensure that the fans are running freely, without vibration, and are free from excessive noise. The wiring should be periodically checked and the ducting inspected for leaks, and to ensure that the air supply is adequate and is freely circulating.

5.5 CABLES

The cables connecting the audio auxiliary unit with other units are firmly secured by plug and socket connectors at each end. Each mating plug and socket is identified by number. If the cables are removed care should be taken to replace them correctly, ensuring that the cables are free from strain when connected.

Unless unavoidable, cables should not be removed from the cable ducts.

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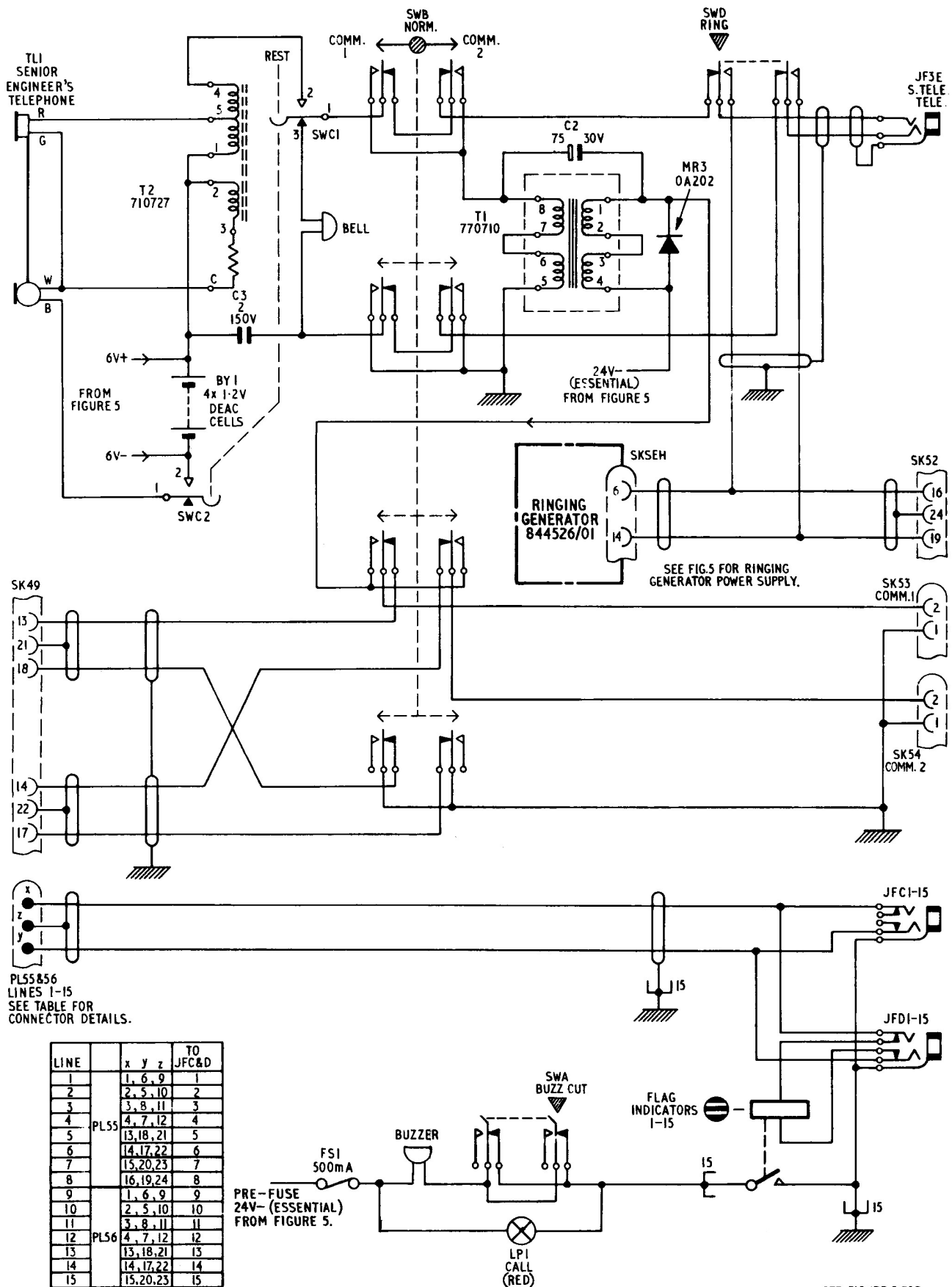
JACKFIELD E & F			LOCATION			OUTERS - EXTERNAL CONNECTIONS	
JACK	TERMINATION	DESIGNATION	ROUTING FROM CONTACTS			FUNCTION	NOTES
			TIP	RING	SLEEVE		
1E	SK	67	4	7	12	EURO. TELE.	TYPE OF TERMINATION TB = TAGBLOCK PL = PLUG SK = SOCKET JF = JACKFIELD (& No.) SW = SWITCH T = TRANSFORMER DESIGNATION PL OR SK PIN No. - P TB LINE & TAG No. - T WHERE 2 OR MORE NUMBERS APPEAR IN THE DESIGNATION COLUMN, THE JACK IS ROUTED TO THE TERMINATIONS SO INDICATED IN PARALLEL.
2E	PL	59	2	5	10	VIS. ENG. TELE.	
3E	SW	D				S. TEL. E. TELE.	
4E	PL	64	15	20	23	TAPE I.P.1	
5E	SK	38	13	18	19	TAPE I.P.2	
6E	PL	64	"	"	21	IDENT. I.P.	
7E	PL/SK	64/52	14/2	17/5	22/10	RADIO	
8E	PL/SW	28/G&H	13/-	18/-	21/-	PROG. SOUND	
9E	PL	35	15	20	23	PREFADE LISTEN	
10E	"	"	4	7	12	P.A. O.P.1	
11E	"	"	13	18	21	" " 2	
12E	"	"	14	17	22	" " 3	
13E	"	"	1	6	9	GROUP O.P.1	
14E	"	"	2	5	10	" " 2	
15E	"	"	3	8	11	" " 3	
16E	"	28	1	6	9	MAIN O.P.1	
17E	"	"	2	5	10	" " 2	
18E	"	"	3	8	11	" " 3	
1F	SK	52	14	17	22	PROD. TELE.	
2F	PL/RL	35/0	16/3	19/4	24/E	MON. LS. I.P.	
3F	WIRE		E	E	E	LOOP E	
4F	SK/T	SEP/G	1/1	3/4	2/-	LS. TELE	
5F	SW	G&H				CUE LS. EXT. I.P.1	
6F	"	"				" " " " 2	
7F	PL	28	4	7	12	P.P.M. 2 I.P.	
8F	WIRE			240Ω		TERMINATION	
9F	"			600Ω		"	
10F	"			600Ω		"	
11F	}	WIRED IN PARALLEL				PARALLELING	
12F							
13F							
14F							
15F	PL	64	1	6	9	TIE LINE 1	
16F	"	"	2	5	10	" " 2	
17F	"	"	3	8	11	" " 3	
18F	"	"	4	7	12	" " 4	

JKI-18E

JKI-18F

Fig.2 AUDIO JACKFIELD SCHEDULE

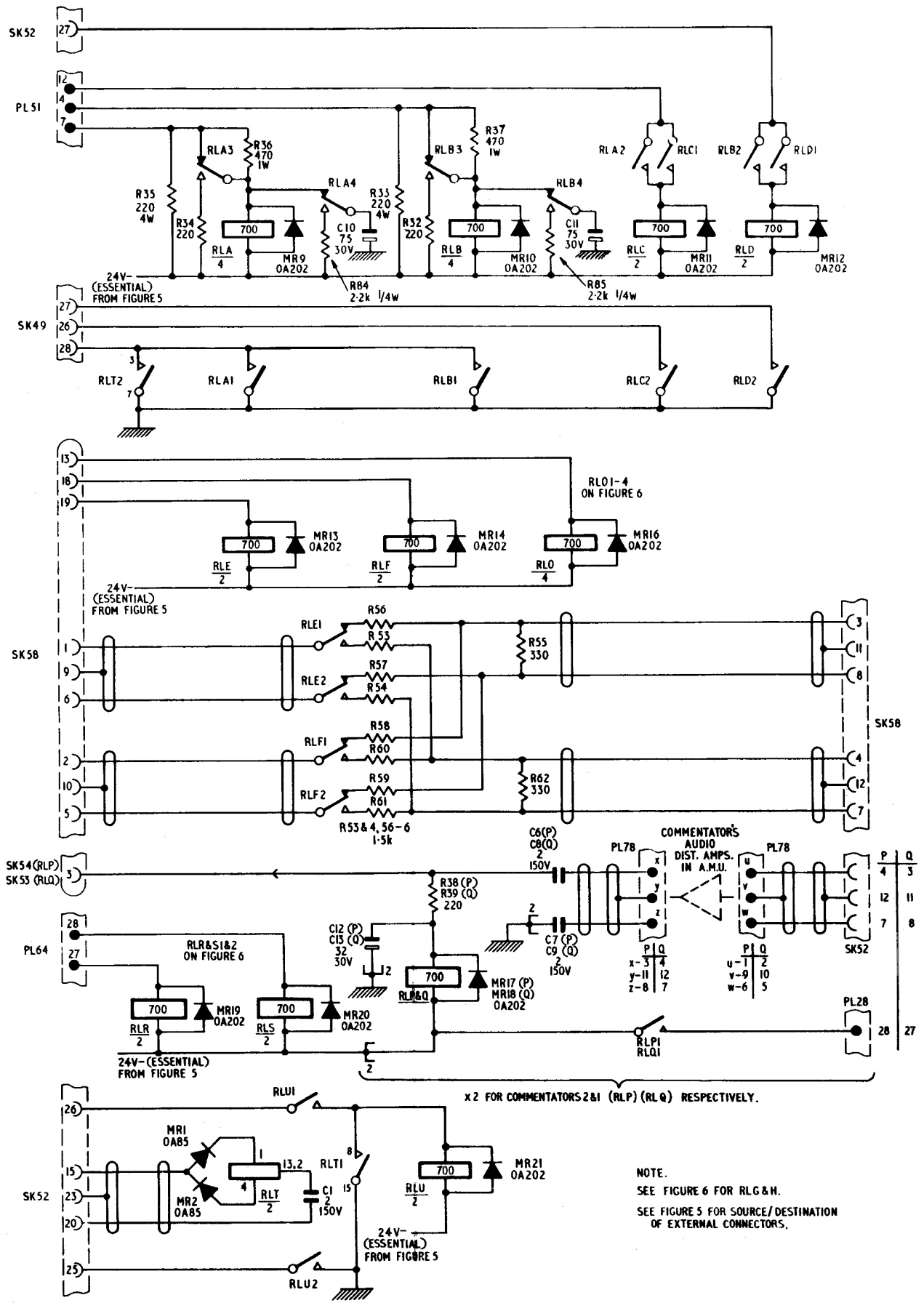
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SEE FIGURE 5 FOR SOURCE/DESTINATION OF EXTERNAL CONNECTORS.

Fig.3 TELEPHONES CIRCUIT

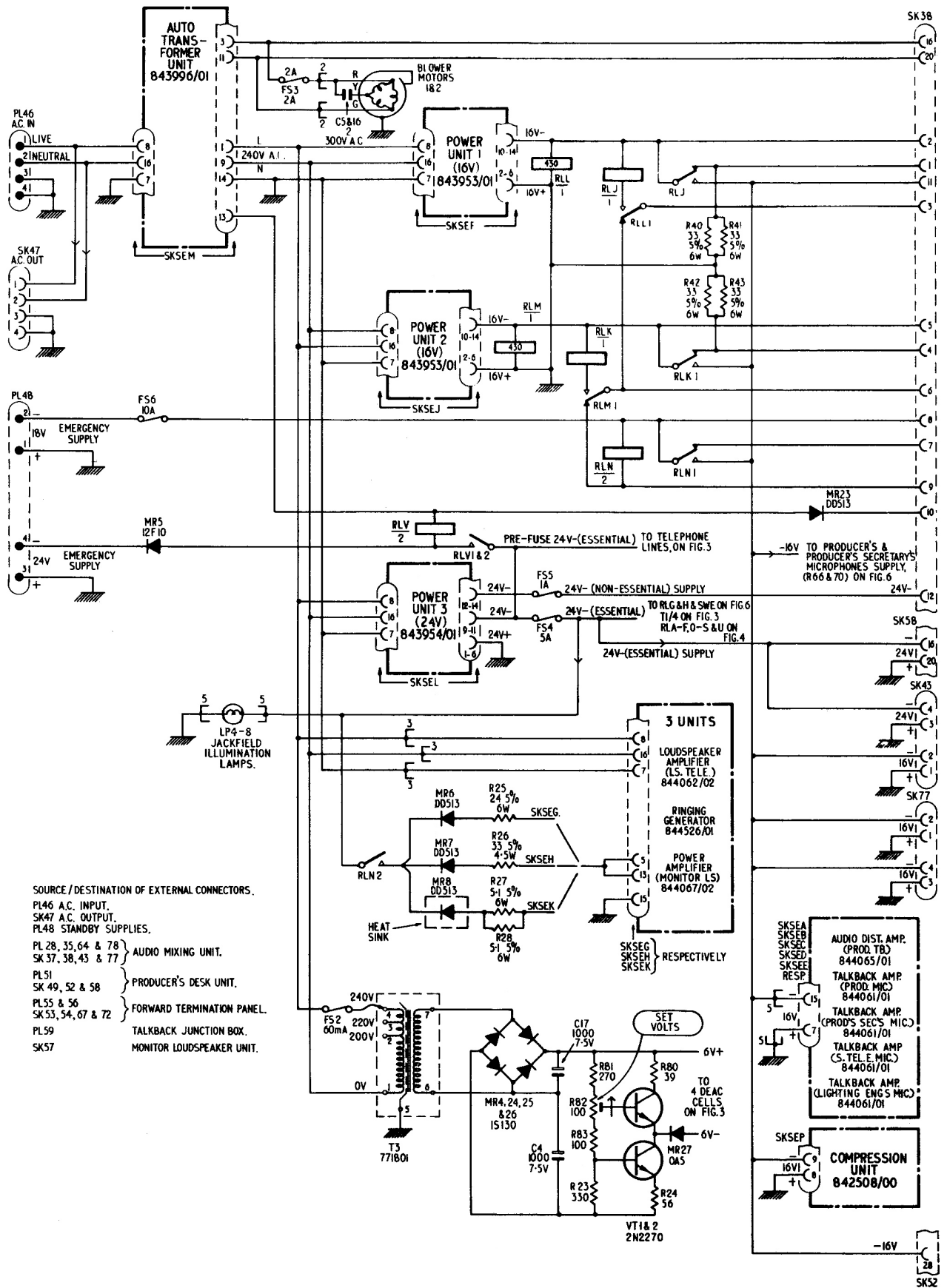
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Fig. 4 AUDIO CONTROL RELAYS CIRCUIT

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SOURCE / DESTINATION OF EXTERNAL CONNECTORS.

- PL46 A.C. INPUT.
- SK47 A.C. OUTPUT.
- PL48 STANDBY SUPPLIES.
- PL 28, 35, 64 & 78
SK 37, 38, 43 & 77 } AUDIO MIXING UNIT.
- PL51
SK 49, 52 & 58 } PRODUCER'S DESK UNIT.
- PL55 & 56
SK 53, 54, 67 & 72 } FORWARD TERMINATION PANEL.
- PL59 } TALKBACK JUNCTION BOX.
- SK57 } MONITOR LOUSPEAKER UNIT.

Fig. 5 POWER SUPPLIES CIRCUIT

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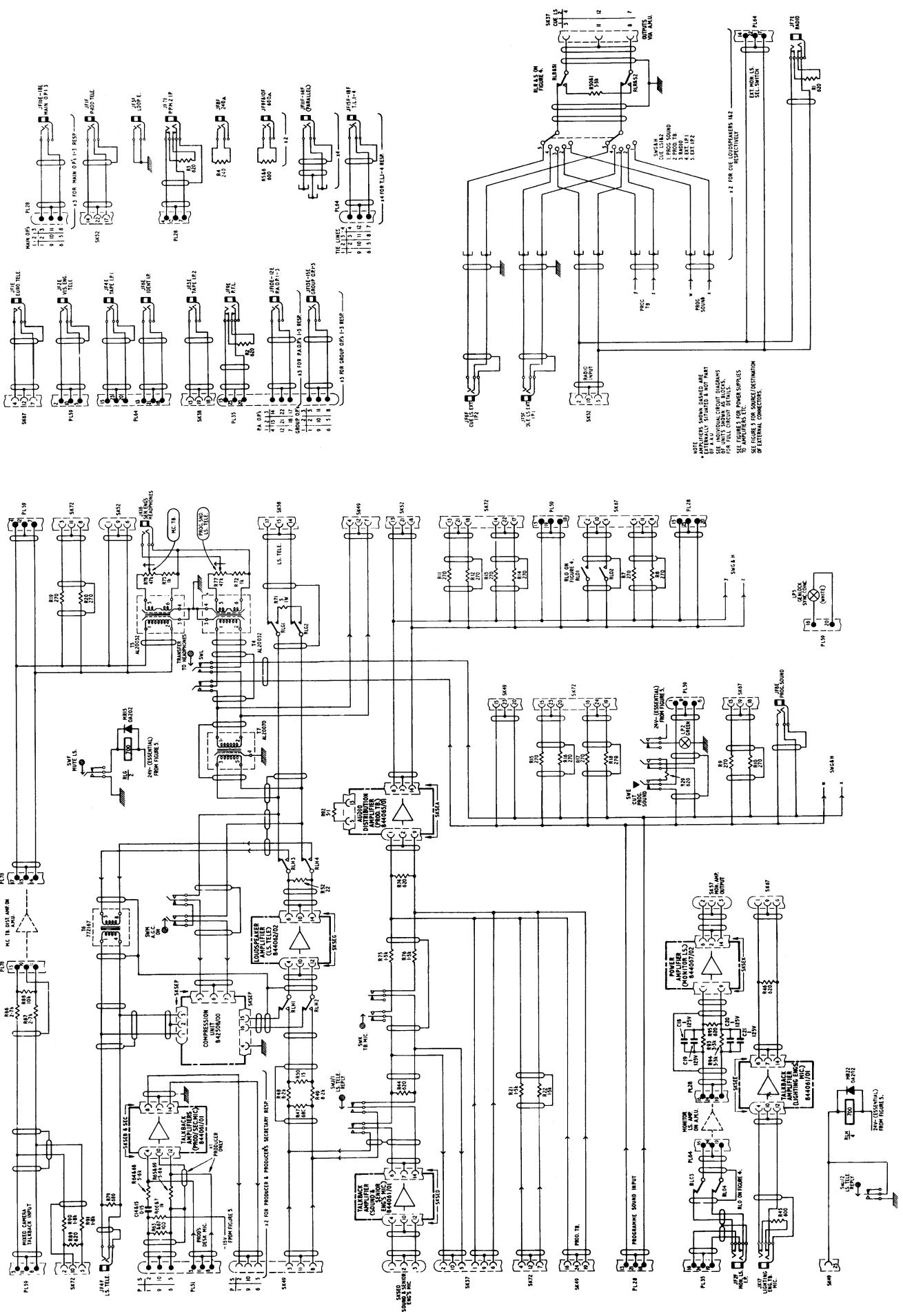


Fig. 6 AUDIO CIRCUITS

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PARTS LIST
FOR
AUDIO AUXILIARY UNIT
TYPE 3992

Item	Pye Part No.	Manufacturer	Type
6.1 RESISTORS			
5 ohms ±5% 3W	PE05058	Painton	306A
5.1 " " 6W	678053	"	300A
15 " " 1/2W	NE15065	"	92
22 " " 1.5W	NE22059	"	MV1A
24 " " 6W	PE24057	"	301A
33 " " 4.5W	PE33056	"	"
33 " " 6W	PE33057	"	"
68 " " 1.5W	PE68059	"	MV1A
100 " " 1/2W	PE10167	Electrosil	CJ20
120 " " "	PE12167	"	"
220 " " 4.5W	JS02180	Painton	301A
240 " " 1/2W	PE24167	Electrosil	CJ20
270 " " "	PE27167	"	"
330 " " "	PE33167	"	"
470 " " 1.5W	JS02590	Painton	MV1A
600 " " 1/2W	ND60151	Erie	109
620 " " 1/2W	PE62167	Electrosil	CJ20
1 k " " "	PE10267	"	"
1.5k " " "	PE15267	"	"
1.8k " " "	PE18267	"	"
2.2k " " "	PE22267	"	"
2.7k " " "	PE27267	"	"
3.3k " " "	PE33267	"	"
5.6k " " "	PE56267	"	"
8.2k " " "	PE82267	"	"
10k " " "	PE10367	"	"
6.2 POTENTIOMETERS			
100 ohms ±10% Lin. 1/2W	PL02881	Colvern	CLR1106/15
47k " ±20% " 2W	811553	Plessey	E
6.3 CAPACITORS			
0.15µF ±10% 125V	PR20000	Waycom	Wima Tropyfol M
1µF " " "	PR25508	"	" " "
2µF " 200V a.c.	668189	Hunts	W351
2 " ±25% 150V	669594	Dubilier	428/150
32µF -20%±50% 30V	PS29017	Plessey	E21063/1
75" " " "	PS35008	"	CE21115/1
1000µF " " 15V	680217	"	1302

Item	Pye Part No.	Manufacturer	Type
6.4 WINDINGS			
Transformer	AL20070	Pye	B9283
"	770710	"	770710
"	771801	"	771801
"	710727	Siemens	22A
"	AL20032	Pye	B9179
"	772167	"	B8584
6.5 SEMICONDUCTORS			
Diode	709075	Mullard	OA85
"	FV09050	Int Rec Co	12F10
"	FV09055	Lucas	DD513
"	721646	Hughes International	HG5008
"	709052	Mullard	OA202
6.6 CONNECTORS			
Socket 4-way	737910	Magnetic Devices	737910
" 12-way	737912	" "	737912
" 20-way	737913	" "	737913
" 28-way	737914	" "	737914
Relay Socket 18-way	926140	" "	926140
Jack Socket	722875	S.T.C.	4112C
Microphone Socket	705374	Cannon	EP3-13
Socket 4-way	704780	"	EP4-13
" 3-way	FS17409	"	XLR-3-13
Plug 4-way	734480	Magnetic Devices	734480
" 12-way	734482	" "	734482
" 20-way	734483	" "	734483
" 28-way	734484	" "	734484
" 4-way	705044	Cannon	EPU/14
Clamp 4-way	730601	Magnetic Devices	730601
" 12-way	730607	" "	730607
" 20-way	730610	" "	730610
" 28-way	730613	" "	730613
Locking Device 4-way	732599	" "	732599
" " 12-way	732601	" "	732601
" " 20-way	732602	" "	732602
" " 28-way	732603	" "	732603
6.7 SWITCHES			
Microswitch	830731	Burgess	V4T1
Push Switch 2-p c/o.L	FS03002	T.M.C.	S525599
" " 4-p c/o.L	FS03003	"	S525594

Item	Pye Part No.	Manufacturer	Type
Rotary 2-p 5-way	FS02009	Pye	FS02009
Key Switch 2-p c/o.L	831300JC	Ericsson	N9301A
" " " " "	831300JA	"	"
" " " " "	831300CK	"	"
" " " " N/L	831301JU	"	N9314A
" " 4-p " "	831317JB	"	N9321A
" " " " NL	831347JF	"	N9317A
6.8 MISCELLANEOUS			
Jack Cable and Housing Assy.	AG21622	Pye	AG21622
Audio Jackfield 15-way	AG22257	"	AG22257
" " 18-way	AG22256	"	AG22256
Indicator Jack	FS00255	Ericsson	(4855L modified)
Telephone Handset	BJ21168	"	FM00500 for TELE Type 232
" Cradle	EA15073	"	" "
" " Plunger	EA15074	"	" "
Push Knob	FK00003	TMC	S525510
Lens (Red)	FLO2002	"	S525514
Lamp 24V 1.3W	FLO1000	"	S525554
Lens (Green)	FLO2003	"	S525512
Buzzer 24V	701706	S.T.C.	4004A
Relay	722312	Siemens	65420/93C/154D
" 4-pole. c/o	FRO1022	"	TRLS 154D TBV 65421/93E
" 2-pole make	720160	Magnetic Devices	305TS 2217
" 2-pole c/o	FRO1700	" "	302TS 4482
"	FRO7024	Siemens	TRLS 65421/154D TBV/97D
Deak Cell 1.2V	870016	D.E.A.K. Co	BB 2.5
" " Battery Clip Assy	AG22001	Pye	AG22001
Lamp 28V 0.4A	FLO1021	Atlas	995-9118
Lampholder (white)	FLO1013	Bulgin	737
Microphone	FM03054	Reslo	CD PM
Fuse (Cartridge) 2A	722371	Belling Lee	L1055
" " 1.5A	700489	" "	"
" " 5A	700492	" "	"
" " 500mA	700487	" "	"
" " 60mA	722372	" "	"
" " 10A	705565	" "	"
Fan Motor	BJ21031	Papst	1200 r.p.m. 240V

6.9 AMPLIFIERS etc.

Certain standard units are used in the audio auxiliary unit, each of these has its own parts list included in the individual manual. The units concerned are listed as follows:

Power Unit 24V	843954/01
" " 16V	843953/01
Power Amplifier	844067/02
Loudspeaker Amplifier	844062/02
Talkback "	844061/01
Distribution "	844065/01
Ring Generator	844526/01

The following units are included in the sub-unit section of this manual, each has its own parts list.

Auto Transformer Unit	843996/01
Compression Unit	842508/00

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 $\frac{1}{8}$ 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 semiconductor equipments this is of more than normal importance.

7. PARTS LIST

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

AUDIO AUXILIARY UNIT

TYPE 3992/00

PART TWO

SPECIAL SUB-UNITS

PYE T.V.T. LTD
CAMBRIDGE
ENGLAND

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PART 2 CONTENTS

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COMPRESSION UNIT TYPE 2058/00

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FIGURES

1. Circuit Autotransformer Unit	Following page 2
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AUTO TRANSFORMER UNIT
TYPE 3996/01

SECTION 1 - DESCRIPTION AND OPERATION

This auto transformer unit is designed for use with equipment, such as used in a large mobile audio system, to which it may be necessary to connect, at various times, mains supplies with differing voltages. The use of the auto-transformer unit avoids the necessity of individually adjusting each unit to match the mains supply to be used. The unit provides also a mains voltmeter and a mains isolation switch for the equipment as a whole.

After setting the voltage selector plug, with the arrow on the plug pointing to the rated voltage of the mains supply, the unit should be inserted into its compartment, the meter on the unit will then give a reference reading of the mains supply voltage, and if the reference reading agrees with the selector plug setting the unit may then be switched on. The input of the meter is automatically transferred to monitor the output of the unit.

The ON/OFF switch is located just above the spring catch which holds the unit in position. When the unit is switched on a mechanical interlock prevents the spring catch being raised, and the unit cannot then be withdrawn until the ON/OFF switch is moved to 'OFF'.

Two outputs are available on the connector, they are across pins 3-11 and 4-9 respectively, a supply at the local mains voltage may be obtained across pins 3-11, the standard 240V supply from the autotransformer is available across pins 4-9.

Extra contacts are provided for simultaneously switching other circuits (e.g. emergency supplies).

SECTION 2 - SPECIFICATION

A.C. INPUTS	200-250V	47-70 c/s
A.C. OUTPUT VOLTAGE	240 (nominal)	
POWER OUTPUT	650 VA (maximum)	
OVERALL APPROXIMATE DIMENSIONS		

Height	$5\frac{3}{4}$ in. ($14\frac{1}{2}$ cm)
Width	$5\frac{3}{4}$ in. ($14\frac{1}{2}$ cm)
Depth	$9\frac{1}{4}$ in. ($23\frac{1}{2}$ cm)

PARTS LIST
FOR
AUTOTRANSFORMER UNIT
TYPE 3996/01

Item	Pye Part No.	Manufacturer	Type
Voltage Selector Plate Auto Transformer Voltmeter a.c. 250V	FS16500 AL20075 EA19091	Mc Murdo Pye Taylor Instru- ments	B279002 B9317 Model 30
Toggle Switch 4-pole Fuse Cartridge 5A Plug 16-way	FS03041 700492 724101	Arrow Belling Lee Amphenol	93A/420B L1055/5 26/195/16

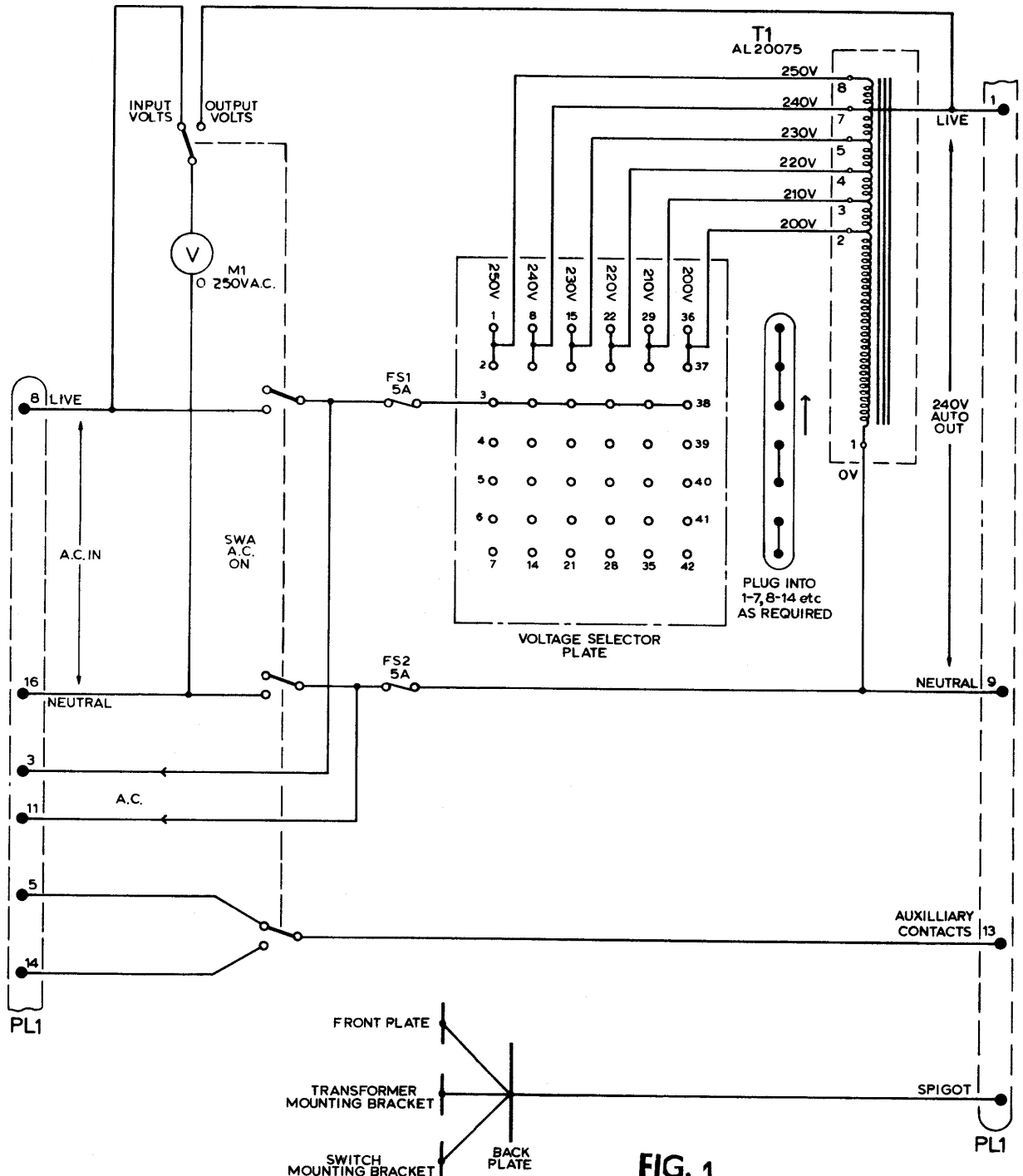


FIG. 1

C843996/01

AUTO TRANSFORMER UNIT CIRCUIT

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COMPRESSION UNIT TYPE 2058/0C

SECTION 1 - DESCRIPTION

1.1 GENERAL

The purpose of a compression unit is to regulate the output of an amplifier used for example, in a talkback system, and to prevent overloads caused by sudden bursts of signals of excessive amplitude.

The amount of compression applied is determined, within the limits set by a potentiometer, by the signal itself; no compression being applied when the amplitude of the signal is too low to require it. In the event of a severe signal overload the output of the amplifier will not be exceeded but distortion will result.

1.2 TECHNICAL

The signal to be regulated is passed into the amplifier via the compression unit.

A sample of the output of the amplifier is then fed back to the compression unit where it enters by the CONTROL SIGNAL INPUT, passing via the COMPRESSION RANGE potentiometer (R4) into the base of the phase-splitting stage VT1. This stage supplies antiphase drives to the rectifying diodes MR6 and MR7.

The rectified output from the diodes is passed into the d.c. amplifier formed by VT2, VT3, and VT4. Control signals, in antiphase, are fed from VT3 and VT4 to the series and shunt attenuators formed by MR3-MR4 and MR1-MR2 respectively.

With an increase in signal voltage the output from the amplifier will give a sample of increased amplitude to the control signal input of the compression unit, and this will result in a consequent increase of the control signal voltage. The resultant increased potential on the collector of VT3 is transferred by the wiper of the BALANCE potentiometer (R3) to the cathodes of MR3 and MR4, and will increase the forward impedance of the diodes. The consequence of the increased forward impedance is that the signal amplitude at the output of the compression unit is reduced in an inverse proportion.

Concurrent with the action on the collector of VT3, the increase in control signal input, which at the collector of VT4 is in antiphase to that at the collector of VT3, is fed to the cathodes of MR1 and MR2, and reduces the forward impedance of the diodes. This will provide a low resistance path across the secondary winding of T1 and so reduce the signal input.

By holding the rectifiers MR6 and MR7 at reverse bias, the diode MR5 prevents conduction of the rectifiers. The reverse bias holds the control circuit in a non-operative state until a control signal, at an amplitude sufficient to require attenuation, is

applied to the rectifiers. The control signal will overcome the reverse bias, and the rectifiers will conduct. The maximum amplitude of the control signal is adjusted by R4 the COMPRESSION RANGE preset control. The BALANCE control should be set to give minimum distortion compatible with minimum overload.

The d.c. supply to the unit is stabilised by the zener diode MR8.

SECTION 2 - SPECIFICATION

<u>Minimum Input Level</u>	0.3V r.m.s.
<u>Insertion Loss</u>	minimum 10 dB maximum 70 dB
<u>Compression Ratio</u>	30 dB

SECTION 3 - MAINTENANCE

3.1 HIGH PERMEABILITY CORED TRANSFORMERS

WARNING: D.C. resistance measuring devices and continuity checking equipment, e.g. Avometers should not be used for checking the resistance or continuity of certain transformer windings. The reason for this, and the treatment to be used if d.c. is accidentally applied are dealt with in the appendix 'Demagnetisation of High Permeability Cores'.

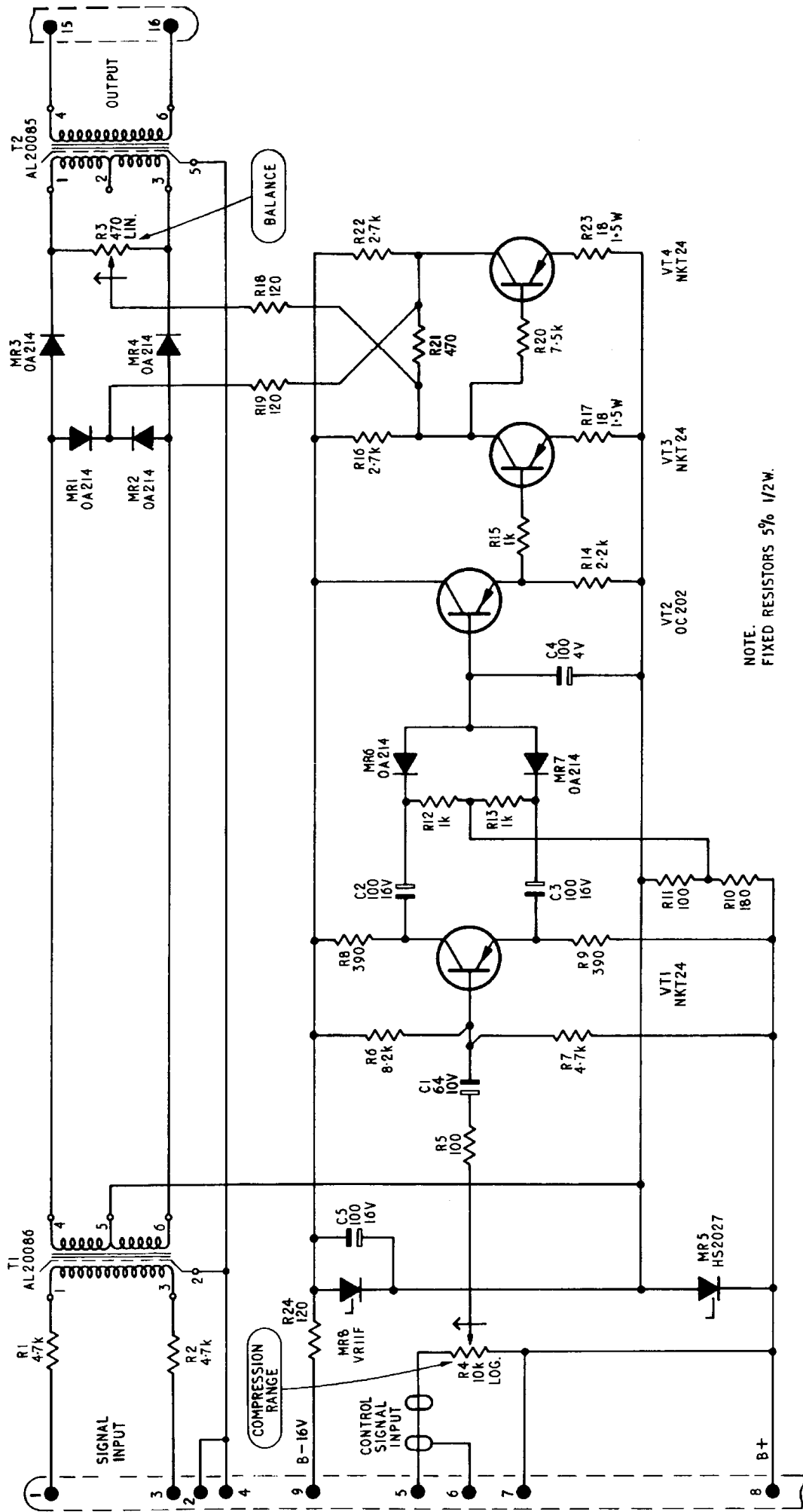
The transformers to which this warning applies are listed below, together with the inductance of the windings, the voltage and frequency at which it is measured, the r.m.s. demagnetising voltage, and the pins to which the voltage is to be applied.

Circuit Ref.	Inductance/Voltage/Frequency	Demagnetising Volts	Pins
T1 Primary	⋖ 55H 0.2 50c/s	12	1-3
T2 Secondary	⋖ 8H 0.1 50c/s	6.3	4-6

SECTION 4 - PARTS LIST

Item	Pye Part No.	Manufacturer	Type
<u>RESISTORS</u>			
18 ohms ±5% 1½W		Painton	MV1A
100 " " ½W	PE10167	Electrosil	CJ20
120 " " "	PE12167	"	"
150 " " "	PE15167	"	"
180 " " "	PE18167	"	"
390 " " "	PE39167	"	"
470 " " "	PE47167	"	"
1k " " "	PE10267	"	"
2.2k " " "	PE22267	"	"
2.7k " " "	PE27267	"	"
4.7k " " "	PE47267	"	"
7.5k " " "	PE75267	"	"
8.2k " " "	PE82267	"	"
470 " ±20% ¼W	811721	Plessey	MH2
Linear Pot.			
10k " " " " "	PL02450	"	"
<u>MISCELLANEOUS</u>			
Transformer	AL20086	Pye	B9360
"	AL20085	"	B9361
Transistor	865369	Mullard	OC202
"	865570	Newmarket Transistors	NKT24
Diode	709090	Mullard	OA214
Zener Diode	FV09004	B.T.H.	VT11F
" "	FV09018	Hughes	H52027

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NOTE.
FIXED RESISTORS 5% 1/2W.