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DANGER

It is not possible to screen all high voltages, so care should be taken not to touch high voltage tags. Also where possible the instrument should be unplugged AND switched off during servicing. A BLEEDER PATH FOR THE EHT IS NOT PROVIDED, so after switching off and before touching any internal parts, the EHT should be discharged by temporarily shorting the appropriate points to chassis, (for instance the CRT cathode pin and PDA connector where applicable).



FOR SERVICING AND SPARES ENQUIRIES
SEE THE INFORMATION AT START OF SECTION 5.

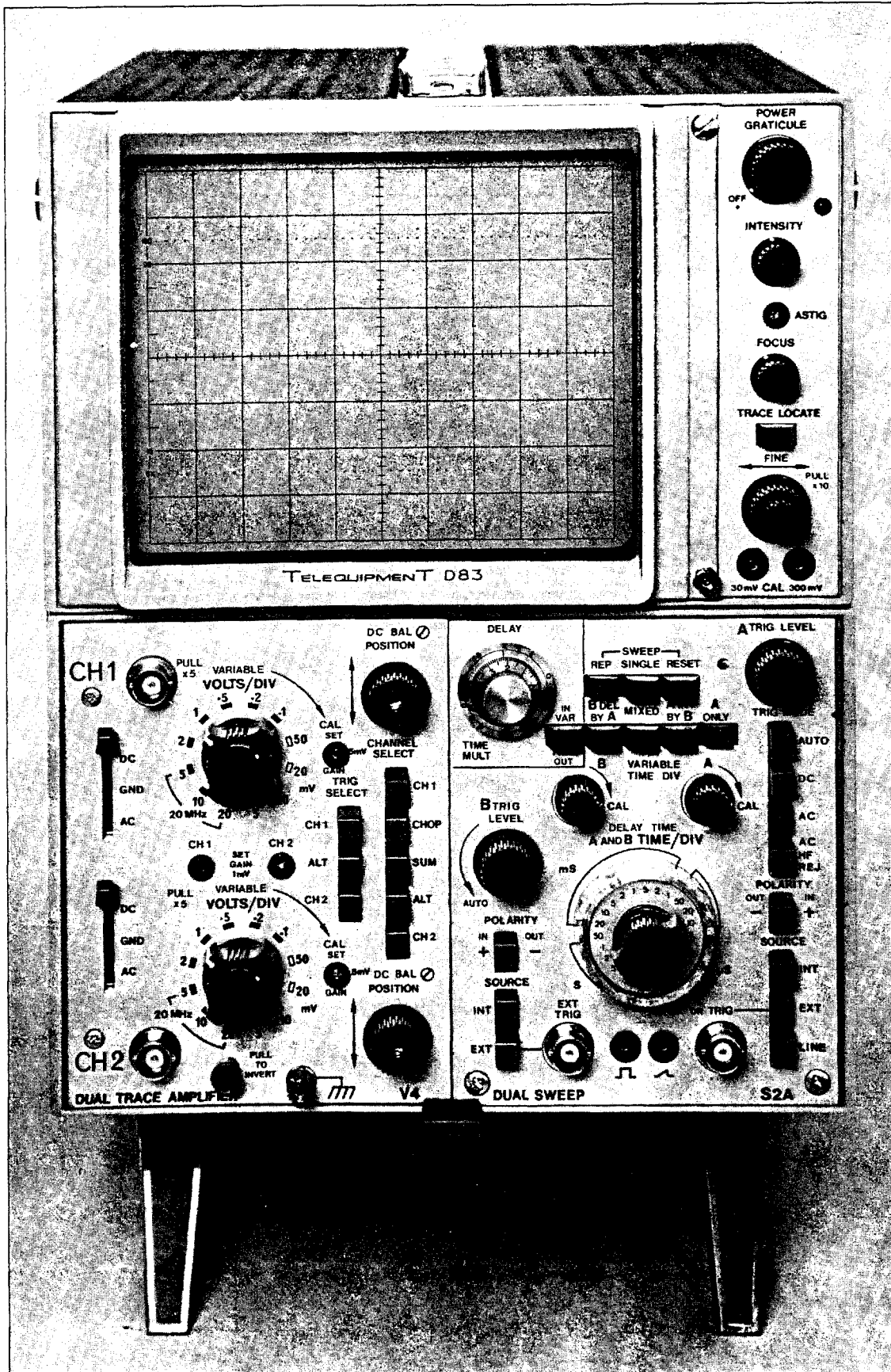
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OSCILLOSCOPE TYPE D83

INSTRUCTION MANUAL



SECTION 1

SPECIFICATION

1.1 CATHODE RAY TUBE (CRT)

Display area	...	...	...	...	8 x 10 div (each div 1.22 cm)
Phosphor Standard	...	...	...	...	P31
Overall accelerating potential	...	...	...	...	15 kV

1.2 FRONT PANEL OUTPUTS

Calibrator, peak to peak	...	...	...	...	30 mV or 300 mV or 3mA } at 1 kHz
Accuracy					
Voltage	...	...	...	...	±1%
Frequency	...	...	...	...	±20%
Current	...	...	...	...	±1%

1.3 Z MOD

Full blanking sensitivity	...	...	...	...	+20 V approx
Input impedance	...	...	...	...	10 kΩ and 15 pF approx.
Frequency response	...	...	...	...	DC—5 MHz approx.

1.4 POWER REQUIREMENTS

Voltage	...	...	...	...	100-125 V in 5 V steps 200-250 V in 10 V steps
Frequency	...	...	...	...	48-400 Hz
Consumption	...	...	...	...	85 VA

1.5 SIZE

Height	...	...	...	...	290 mm
Width	215 mm
Depth	520 mm

1.6 WEIGHT	9.5 kg
	with plug-ins	14 kg

1.7 COOLING	Convection
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1.8 TEMPERATURE LIMITS, ambient

Operating	+5 to +40°C approx.
Non-operating	-25 to +70°C approx.

INTRODUCTION

The D83, with two plug-ins, is an all solid state oscilloscope. An 8 x 10 div. CRT provides a bright and clear display. The features of the horizontal and vertical systems depend on the type of plug-ins used and are given in the appropriate manual.

The manual covers the mainframe, which houses the following:—

- Calibrator
- E.H.T. generator
- Horizontal amplifier
- Un-blanking amplifier
- Vertical amplifier, output stage

This manual should be read in conjunction with the manuals of the plug-ins used.

The design of this instrument is subject to continuous development and improvement, consequently minor changes from the information contained herein may be incorporated.

These changes which usually affect the Components Lists and Circuit Diagrams are described on Amendment Lists issued at regular intervals between manual reprints. Any Amendment List appertaining to this Manual is located in the pocket provided inside the back cover of this manual.

NOTICE TO OWNER

To lessen the risk of damage during transit and to facilitate packaging, the owner is requested NOT to send the probes or any plug assemblies unless they are suspect, if this instrument is returned for servicing.

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SECTION 2

OPERATING INSTRUCTIONS

2.1 FUNCTION OF CONTROLS AND CONNECTORS

Controls are situated on the front panel except where otherwise specified. For the controls not covered below, reference should be made to Section 2 of the manuals for the respective modules.

2.1.1 CRT

GRATICULE varies the intensity of the graticule illumination and serves as the power supply ON/OFF switch.

INTENSITY varies the intensity of the display.

ASTIG a preset used in conjunction with FOCUS for achieving the best overall definition.

TRACE LOCATE when pressed brings the trace onto the screen and free runs the A timebase.

↔ varies the position of the trace in the horizontal axis.

FINE is a fine horizontal position control.

X10 when pulled magnifies trace 10 times in the horizontal axis; sweep calibrations must be divided by 10.

TRACE ROTATION preset situated on the rear panel, rotates a trace about the horizontal axis of the CRT and used to align a trace in the horizontal axis.

2.1.2 SWEEP Sweep Unit Manual.

2.1.3. TRIGGER Sweep Unit Manual.

2.1.4 VERTICAL Vertical Unit Manual.

2.1.5 CONNECTORS

Z MOD input socket situated on the rear panel is DC coupled via Z mod amp. to the CRT grid. A negative-going signal is necessary to intensify the trace whereas a positive-going signal will blank it.

CAL output sockets provide a 1 kHz waveform for checking the calibrations of the vertical channels and setting up probes. The two outputs provide

300 mV 1 kHz (approx). squarewave, when linked a 3 mA peak to peak current passes. an edge connector internally situated connects the plug-ins to main frame.

INTERFACE

2.2 PRE-OPERATIONAL CHECKS

2.2.1 POWER SUPPLY

Check the following:

1. Correct plug-ins are plugged in.
2. Rear voltage-selector plug is indicating the local supply voltage or nearest value.
3. Fuse fitted is a 2 A for 100-125 V operation or 1 A for 200-250 V.

NOTE: The 3-core supply lead is colour coded as follows:

Line	Neutral	Earth Chassis
Brown	Blue	Green/Yellow

Power Cord should be secured by the screws and nuts provided to comply with local legislation.

2.2.2 Set controls as follows:

1. CRT
 - INTENSITY Central
 - FOCUS Central
 - TRACE ROTATION As set
 - GRATICULE Fully anti-clockwise
2. Set Sweep Unit controls.
3. Set Vertical Unit controls.

2.3 OPERATION

1. Plug into the supply; turn GRATICULE clockwise — POWER ON.
2. Allow a few minutes for warm up then press TRACE LOCATE and adjust POSITION controls for a display.
3. Adjust TRACE ROTATION, if necessary, to align trace horizontally.
4. Connect the CAL 30 mV to INPUT via co-axial lead.
5. Set DC-GND-AC to DC.
6. Rotate LEVEL anti-clockwise to lock display.
7. Check amplitude is 6 divisions.

SECTION 3

CIRCUIT DESCRIPTION

3.1.0 VERTICAL AMPLIFIER

3.1.1 The interface reference Figure 1 with the Vertical plug-in is a 16-way socket mounted on the Mother Board PC124. The signal is carried through pins 5 and 13 to the delay line driver amplifier, TR603 and TR604. To ensure that the main frame interface always has the same sensitivity, the gain is set by the series elements R611, R612 and the shunt elements R608, R609. The total gain adjustment is approximately 18%. This enables the input sensitivity to be set to 0.27 mA/div $\pm 5\%$.

3.1.2 This amplifier is a voltage feedback stage giving low input and output impedances, i.e., 9 Ω and 11 Ω approx. The impedance of the delay line used is 93 Ω /side, and the padding resistors, R629 and R628, are used to raise the output impedance of the stage to the correct value. The feedback resistors are split to enable the delay line compensation circuits C607, R617, C608 and R621 to be inserted. These provide medium frequency peaking by reducing the feedback at these frequencies. The ALT trigger signal is taken from the low impedance output of this stage and fed through R626 and R627 to the ALT trigger amplifier TR601 and TR602. Selection of ALT trigger is achieved by a D.C. control voltage from the vertical plug-in switching the diodes D601, D602, D603 and D604; +24 V at pin 6 on SK602 selects ALT trigger and -24 V switches it off. The trigger signal is mixed with that from pins 7 and 10 on SK602 and then fed to the Sweep plug-in via pins 11 and 12 on SK601.

3.1.3 The Sum balance control, R614, is in circuit only when SUM is selected on the Vertical plug-in. When this occurs +24 V is applied to pin 14 of SK602 which switches on D605 and supplies the extra current needed in the SUM mode through R613, R614 and R615. When SUM is not selected; pin 14 is at earth potential.

3.1.4 The delay line is a twin helix type sheathed with braid having a total delay of 140 ns. It is terminated on PC125 by R701, R703 and L701. The two resistors in parallel with the input resistance of the next stage gives a terminating resistance of 186 Ω . L701, adjusted for minimum delay line termination wriggle, is a partial compensation for the input capacity of TR701 and TR702. The following stage is a long-tailed pair, TR701 and TR702, with a gain of 2 and peaking between their emitters. R711 and C703 are delay line compensation and C704 high frequency peaking.

The output stage is a cascode comprising TR703, TR704, TR705 and TR706. It has a gain of approximately 15 and runs at a current of 50 mA/side. Gain is determined by R724, R725 and R718. The components, between the emitters of TR703 and TR704, compensate for the collector time constants of TR705 and TR706 which drive the Y plates of the CRT. R719, C706, C708 and R721 are thermal compensation. Zener diodes, D702 and D703, prevent TR703 and TR704 bottoming at shift and signal extremities.

3.1.5 A portion of the output stage current is used to provide trace rotation. L702 is the trace rotation coil

and R727 the preset control on the back panel of the oscilloscope. Geometry control is provided by R708 which is mounted on PC125.

3.2.0 HORIZONTAL AMPLIFIER

3.2.1 This comprises an input mixing amplifier and an overall multistage feedback amplifier. The input amplifier, TR3, reference Figure 2, has a gain of 0.5 and has low input and output impedances. It mixes the sweep with the two position controls and provides a composite signal to the main amplifier. R17, a balance control, sets the voltage at TR3 collector to centralize position controls. C5 adjusts H.F. peaking, which is set by the manufacturer.

3.2.2 The main amplifier is a voltage feedback type which has the advantage of high input and low output impedances. R32 and R31 are the feedback resistors and the gain is determined by these resistors and those between the emitters of TR4 and TR5. For X1 gain these are R26 and R27. On X10 gain R28 and R29 are put in parallel with R26 and R27. R27 sets X1 gain and R29 the X10 gain.

3.2.3 The mean X plate potential is set by R23 to approximately 55 V. D4 and D5 limit the excursion on the bases of TR6 and TR7 when X10 gain is used. The output stage TR6, TR7, TR8 and TR9 is capable of delivering large current swings into capacitance, while running at a low quiescent current. In the positive direction the emitter followers TR8 and TR9 supply the current and in the negative direction TR6 and TR7 supply the current through diodes D6 and D7. The output is push-pull, TR4 and TR5 being a phase-splitting stage.

3.3.0 UNBLANKING AMPLIFIER

In this amplifier, reference Figure 3, all unblanking signals are summed, at earth potential, in the emitter of TR351. V_{be} drift is compensated for by D351. This composite signal is mixed with the intensity control current at the base of TR352 which, with TR353, forms a low input and output impedance shunt feedback amplifier. R362 and C353 are the gain and frequency response determining components, i.e., a 2 mA current change at the base of TR352 produces 48 V at the collector. A complementary emitter follower stage, TR354 and TR355, to provide the large fast transients required.

3.4.0 MOTHER BOARD PC124

All inter-connections between Vertical and Horizontal plug-ins are made on the Mother Board, which are for trigger, alternate pulse, blanking amplifier and power lines.

3.5.0 TRACE LOCATE

This is obtained by reducing the maximum swing of vertical and horizontal amplifiers and free-running the sweep. S2 performs all these functions. The vertical amplifier is compressed in the output stage and the vertical amplifier is compressed in the delay line termination stage TR701 and TR702. The sweep unit is made to free-run by applying a positive voltage to pin 13 of SK601 via a 330 k Ω resistor R602.

3.6.0 CALIBRATOR

The Calibrator, reference Figure 2, is a simple, saturating multivibrator running at approximately 1 kHz. The timing components are R1, C1, C3 and R6. The transistor TR1 switches between -24 V and earth, TR2 between -24 and +0.7 V; D2 catches TR2 collector as it aims for +24 V. The accuracy of the calibrator depends on the resistors R5, R9, R13 and the -24 V line: R4, a $\pm 1.2\%$ control, takes up the tolerance of R5. If SK1 and SK2 are shorted together 3 mA passes through the short circuit determined by the -24 V line and R4 + R5 + R13.

3.7.0 POWER SUPPLY

+105 V, -24 V and +24 V lines, reference Figure 4, are all stabilizing circuits and protected against short circuits.

3.7.1 +24 V Line. D405, D406, D407 and D408 form a full wave bridge circuit. R424, R425 and R426 act as a sampling chain and use the -24 V line as a reference voltage. Any attempted change in output voltage of the +24 V line is passed back to the controlling network of TR408, TR406 and TR405, which reduces the change to a very small value. TR402 and R407 provide current limiting to protect the output from short circuits.

3.7.2 -24 V Line. This is used as a reference voltage for the other two lines and it is essential that this line is set to its correct voltage. D409, D411, D412 and D413 form a full wave bridge circuit. TR411 and TR407 are a long-tailed pair and together with TR409 and TR413 stabilize the circuit. TR403 and R405

provide current limiting and protect the output from short circuits.

3.7.2 105 V Line. D401, D402, D403 and D404 provide full wave bridge rectification. This line differs from the -24 V and +24 V lines in that if a short circuit occurs in the output the instrument must be switched off and turned on again before the line can be restored to its normal voltage, TR414, TR412, TR415 and TR416 stabilize the output, TR401 and TR404 provide the short circuit protection in the form of a bistable, which is changed over by current flowing through R406.

3.8.0 E.H.T.

The E.H.T., reference Figure 3, PC129, is derived from a class C oscillator operating at approximately 24 kHz. The oscillator transistor TR304 uses transformer, T301, as its load and main frequency determining component. A feedback loop, including a high gain amplifier, TR301, TR302 and TR303, regulates the cathode supply, which is set to the correct potential by adjusting R301 and the grid set to the current tube cut-off potential by adjusting R315. Diodes D304 and D303 provide half wave rectification from T301 for the cathode and grid supplies. A five stage voltage multiplier (quintupler) provides the +12.5 kV PDA, the input to which is taken from T301 on the same tapping as that used for the cathode supply.

Thermistor TH301 limits the O/P at switch on and C304 reduces EHT feedback into the unregulated +30 V line. The tube is focussed by adjusting R327, which is on the front panel.

SECTION 4

MAINTENANCE AND RE-CALIBRATION

4.1 GENERAL

- 4.1.1 This manual should be read in conjunction with the manuals for the plug-ins in use.
- 4.1.2 Before it is assumed a fault condition exists, control settings should be verified with reference to the pre-operational checks, Section 2.2. Where components are replaced, e.g. transistors, it is advised that the calibration checks detailed in para 4.4 be carried out.
- 4.1.3 The entirely solid-state design of the instrument should render frequent re-adjustment of the internal present controls unnecessary; however, to ensure full measurement accuracy, it is desirable to make an occasional check of the vertical amplifier sensitivity, reference 4.4.4. The internally generated 30 mV peak to peak calibrated waveform may conveniently be used for these checks.

4.2 MECHANICAL

4.2.1 ACCESS TO INTERIOR

The cabinet covers are removed as follows:—

1. Disconnect the power cord.
2. Turn two buttons at the top of each cover to release.
3. Ease the top of each side outwards.
4. Lift to clear bottom channel. The chassis base plate is secured by six fixing screws, one at each corner and one halfway along each side.

4.2.2 LOCATION OF PRESET CONTROLS

Circuit	PC Board No.	Location
Calibrator	126	R.H. side
E.H.T.	129	R.H. side
Power supply	127	Rear end
Unblanking Amp.	128	R.H. side
X amplifier	126	R.H. side
Y amplifier output	125	L.H. side

4.2.3 CRT REMOVAL

1. Remove both cabinet sides, reference para 4.2.1.
2. Earth PDA connector with a screwdriver.
3. Unplug PDA connector.
4. Remove rear cover (two screws).
5. Unplug the 14 pin CRT base connector.
6. Unplug the five neck pin connectors.
7. Remove two screws securing the bezel.
8. Slide CRT through the front panel aperture.
9. Remove rubber location moulding.

4.2.4 CRT FITTING

Reverse the order detailed in para 4.2.3.

4.3 CALIBRATION

- 4.3.1 The following procedure enables a calibration check of this unit to be accomplished. It is advised, that isolated adjustments are not made, due to risk of interaction with settings made in earlier checks. A functional check should be made to ensure that the instrument performs according to the specification. Adjustments, if made, should be minimal.

The following tools and facilities will be required:

TOOLS

Screwdrivers	Plain 4 mm blade. Non-capacitive.
Calibration Module	Vertical 067-0672-00. Horizontal 067-0673-00
Flexible Extension Leads	067-0688-00 Screened c/w BNC Adaptors.
Adaptors	BNC 3-way, Male/Female/Male BNC/2 mm.
Probe	X10 c/w earth lead.
Monitor	Oscilloscope (> 20 MHz).

FACILITIES

Variable AC power supply	
Voltage measurement from -24V to 2.5 kV	± 0.5%
Input Signals	Markers
Squarewave	1 ms
25 mV 1 kHz	1%
250 mV 1 kHz	1%
1 V 1 kHz	1%
10 V 1 kHz	1%
10 ns risetime	100 kHz
25 mV	1 MHz
250 mV	1 MHz

NOTE: Input signal voltages are peak to peak

4.3.2 INITIAL SETTINGS

- 1.1 Ensure that instrument is not connected to a power supply.
- 1.2 Set Voltage Selector to correct voltage.
- 1.3 Set INTENSITY to mid position.
- 1.4 Set FOCUS to mid position.
- 1.5 Set FINE and ←→ to mid position.
- 1.6 Connect instrument to a variable AC power supply.
- 1.7 Switch on variable power supply and increase voltage gradually to the instrument voltage setting.
- 1.8 Switch on instrument by rotating POWER GRATICULE clockwise.
- 1.9 Observe graticule illumination.
- 1.10 Adjust INTENSITY to obtain trace.
- 1.11 Adjust FOCUS and ASTIG.
- 1.12 Set trace to vertical mid-position.
- 1.13 Adjust TRACE ROTATION to align trace with graticule.

4.4 CALIBRATION PROCEDURE

NOTE:— This Procedure Calibrates the MAINFRAME only. It is assumed that the two plug-in units are basically working.

4.4.1 POWER SUPPLY

CAUTION:— high voltages.

- 1.1 Check line voltage.
- 1.2 Unplug D83 power cord.
- 1.3 Unplug SK401 (located right hand side of C.R.T. behind FINE Pot.)
- 1.4 Re-connect D83 power cord.
- 1.5 Set voltages as in table.

Set Voltage	Socket Connection Number (See Fig 4)	Adjust Pre-set on PC127
-24	1	R428 access thro. left hand side.
+24	3	R425 access thro. left hand side.
+105	2	R433 access thro. right hand side.

- 1.6 Unplug D83 power cord.
- 1.7 Re-connect SK401.
- 1.8 Remove E.H.T. cover giving access to PC.129.
- 1.9 Re-connect D83 power cord.

4.4.2 SET CATHODE VOLTAGE - 2.5kV.

NOTE:— A Voltmeter of input impedance greater than 25MΩ should be used.

- 1.1 Connect meter to Pin 16 (mauve wire) PC129.
- 1.2 Adjust preset R301 PC129 for a meter reading of -2.5kV.

4.4.3 SET GRID CUT-OFF

- 1.1 Set TIME/DIV to 1ms.
2. Turn INTENSITY anticlockwise.
3. Adjust R315 PC129 until trace just blanks out.

4. Switch off instrument.
5. Replace E.H.T. cover.
6. Switch on instrument.

4.4.4 MAIN FRAME ADJUSTMENTS

Raster distortion

- 1.1 Apply 100kHz sinewave to CH1 input.
- 1.2 Adjust controls for 10 x 8 div raster.
- 1.3 Adjust R708 PC 125 for minimum raster distortion.
- 1.4 Disconnect signal and switch off instrument.

Horizontal balance

- 2.1 Remove Dual Sweep Unit.
- 2.2 Insert HORIZONTAL CALIBRATION UNIT (067-0673-00) and switch on instrument.
- 2.3 Apply 5V D.C. to input.
- 2.4 Set horizontal POSITION and FINE to mid position.
- 2.5 Adjust R17 PC126 to centralize spot.

Horizontal plate potentials

- 3.1 Connect a voltmeter between Pin 14 PC126 and GND.
- 3.2 Adjust R23 PC126 for 57V D.C.
- 3.3 Remove 5V input.

Horizontal sensitivity

- 4.1 Apply 10V, 1kHz squarewave to HORIZONTAL input.
- 4.2 Adjust R27 PC126 for 10.0 div display.
- 4.3 Apply 1V, 1kHz squarewave to HORIZONTAL input.
- 4.4 Pull FINE for X10 magnification.
- 4.5 Adjust R29 PC126 for 10.2 div display.
- 4.6 Disconnect signal and switch off instrument.
- 4.7 Remove HORIZONTAL CALIBRATION UNIT.
- 4.8 Insert Sweep Unit and switch on instrument.

Horizontal linearity

- 5.1 Apply 20MHz to CH1 input.
- 5.2 Set TIME/DIV to 0.1 μ s.
- 5.3 Set controls for a 3 division locked trace.
- 5.4 Adjust C11 PC126 for best linearity on the first few cycles.
- 5.5 Pull LINE for X10 magnification.
- 5.6 Adjust C13 and C5 PC126 for best linearity on the first few cycles.
- 5.7 Push FINE.
- 5.8 Disconnect signal.

Calibrator setting

- 6.1 Select CH1.
- 6.2 Apply 25mV, 1kHz squarewave to CH1.
- 6.3 Set DC-GND-AC to DC.
- 6.4 Set VOLTS/DIV to 5mV.
- 6.5 Push VARIABLE in and set to CAL.

- 6.6 Set TIME/DIV to 1ms.
- 6.7 Adjust SET 5mV GAIN for 5 div display.
- 6.8 Disconnect 25mV input.
- 6.9 Connect 30mV CAL to CH1.
- 6.10 Adjust R4 PC126 for a 6 div display to \pm 0.1 divisions.
- 6.11 Disconnect 30mV input.

Horizontal position balance

- 7.1 Set TIME/DIV to 1ms.
- 7.2 Adjust R17 PC126 to centralize trace so that POSITION and FINE move each end of trace past screen centre equally.

Unblanking amplifier pulse response

- 8.1 Set TIME/DIV to 0.1 μ s.
- 8.2 Set INTENSITY for just visible trace.
- 8.3 Adjust C353 PC 128 for uniformity of intensity at start of trace.

Vertical balance

- 9.1 Remove Vertical Unit.
- 9.2 Insert VERTICAL CALIBRATION UNIT (067-0672-00).
- 9.3 Select BAL.
- 9.4 Set TIME/DIV to 1ms.
- 9.5 Adjust R706 PC 125 to align trace with vertical centre.

Vertical sensitivity

- 10.1 Select CAL.
- 10.2 Apply 250mV 1 Hz squarewave to vertical input.
- 10.3 Adjust R609 PC124 for 5 \pm 0.2 div display
- 10.4 Disconnect signal.

Vertical pulse response (Reference Plate 4.1)

- 11.1 Set TIME/DIV to 0.1 s.
- 11.2 Pull FINE for X10 magnification.
- 11.3 Apply 1MHz squarewave with 1ns risetime to vertical input, to give 5 div display.
- 11.4 Adjust C608 PC124 to give flat top. ($X1' > 0.25$ div)
- 11.5 Adjust C711 and R722 PC125 for optimum response. ($X1' > 0.1 < 0.25$ div)
- 11.6 Adjust C707 PC125 for optimum response. ($X1' < 0.1$ div).
- 11.7 Set C704 PC125 to mid position.
- 11.8 Adjust L701 PC125 for minimum delay-line glitch.
- 11.9 Check top edge ripple ' $X2'$ ' = < 2.8 div.
- 11.10 Adjust C704 PC125 for perpendicular leading edge (' Y' ' = < 0.1 div);
- 11.11 Disconnect signal and switch off instrument.;
- 11.12 Remove VERTICAL CALIBRATION UNIT.;
- 11.13 Insert Vertical Unit.;

SECTION 5

COMPONENT LIST

All requests for repairs or replacement parts should be directed to the Tektronix field office or representative in your area. This procedure will assure you of the fastest possible service. In the UK enquiries should be made to Harpenden (see below).

Values of resistors are stated in ohms or multiples of ohms; ratings at 70°C are in watts or sub-multiples of watts. Values of capacitors are stated in sub-multiples of farads; ratings at 70°C are in volts or kilovolts.

Whenever possible, exact replacements for components should be used, although locally available alternatives may be satisfactory for standard components.

Any order for replacement parts should include:

- | | |
|--------------------------------|--------------------------|
| 1. Instrument type | 4. Component part number |
| 2. Instrument serial number | 5. Component Value |
| 3. Component circuit reference | |

CIRCUIT REFERENCE BLOCKS

The table below gives the blocks of circuit references, so that the reader can relate the items listed in this chapter and their location in the circuitry and printed circuit boards in Section 6.

Circuit Reference		Circuit	Fig.	P.C. Board No.
From	To			
1	300	'X' Output Amplifier	2	126
301	350	Bright-up	3	128
351	400	E.H.T.	3	129
401	450	Power Supply	4	127
601	700	'Y' Amplifier	1	124
701	800	'Y' Amplifier	1	125

ABBREVIATIONS

BM	Button mica	CMP	Cermet preset	PS	Polystyrene
C	Carbon	E	Electrolytic	Se	Selenium
CP	Carbon preset	Ge	Germanium	Si	Silicon
CV	Carbon variable	MF	Metal film	SM	Silver mica
CER	Ceramic	MO	Metal oxide	WW	Wire-wound
CT	Ceramic trimmer	PE	Polyester	WWP	Wire-wound preset
CM	Cermet thick film	PP	Polypropylene	WWV	Wire-wound variable

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ELECTRICAL

Cir Ref	Part Number	Description		Tol %	Rating V
		Value F	Type		
C1	285-1015-00	4.7 n	PE	20	160
C2	281-0710-00	10 n	CER		250
C3	285-0800-00	10 n	PE	20	250
C4	281-0734-00	100 n	CER		30
C5	281-0156-00	1.4.6.4 p	PP		500
C6	281-0710-00	10 n	CER		250
C7	285-0800-00	10 n	PE	20	250
C8	285-0915-00	100 n	PE	20	100
C9	285-0866-00	10 p	PS	1 p	350
C10	285-0854-00	100 p	PS	2 p	350
C11	281-0155-00	2-22 p	PP		500
C12	285-0870-00	120 p	PS	2	350
C13	281-0157-00	5.5-65.5 p	PP		500
C14	290-0664-00	4.7 μ	E		160

C301	285-1014-00	1 μ	PE	20	63
C302	290-0495-00	47 μ	E		40
C303	281-0736-00	1 n	CER		8 k
C304	290-0495-00	47 μ	E		40
C305	285-0799-00	33 n	PE	20	250
C306	281-0681-00	10 n	CER		4 k
C307	285-0837-00	20 n	PE		5 k
C308	285-1015-00	4.7 n	PE	20	160
C309	281-0681-00	10 n	CER		4 k
C310	285-0837-00	20 n	PE		5 k
C311	281-0710-00	10 n	CER		250

C351	285-0800-00	10 n	PE	20	250
C352	281-0710-00	10 n	CER		250
C353	281-0183-00	0.5-3 p	CT		250
C354	285-0800-00	10 n	PE	20	250
C355	285-0800-00	10 n	PE	20	250

C401	285-0793-00	10 n	PE	20	630
C402	285-0793-00	10 n	PE	20	630
C403	285-0793-00	10 n	PE	20	630
C404	290-0547-00	330 μ	E		160

Cir Ref	Part Number	Description		Tol %	Rating V	Eff. Ser. No.
		Value F	Type			
C405	290-0624-00	2.2 m	E		40	
C406	290-0624-00	2.2 m	E		40	
C407	281-0710-00	10 n	CER		250	
C408	281-0710-10	47 μ	E	25		
C409	281-0710-10	10 n	CER	20	100	
C410	285-0854-00	100 p	PS	2 p	350	
C411	290-0635-00	4.7 μ	E		63	
C412	285-0870-00	120 p	PS	2	350	
C413	285-0796-00	100 n	PE	20	250	
C414	290-0556-00	22 μ	E		25	
C415	290-0556-00	22 μ	E		25	
C416	290-0625-00	4.7 μ	E		160	

C601	281-0710-00	10 n	CER		250	
C602	285-0800-00	10 n	PE	20	250	
C603	285-0915-00	100 n	PE	20	100	
C604	285-0800-00	10 n	PE	20	250	
C605	285-0867-00	20 p	PS	1	350	
C606	285-0867-00	20 p	PS	1	350	
C607	285-0844-00	39 p	PS	2 p	350	
C608	281-0155-00	2-22 p	PP		500	
C609	281-0710-00	10 n	CER		250	
C611	281-0710-00	10 n	CER		250	
C612	285-0920-00	56p	PS	2	350	524576

C701	285-0915-00	100 n	PE	20	100	
C702	285-0800-00	10 n	PE	20	250	
C703	285-0844-00	39 p	PS	2	350	
C704	281-0155-00	2-22 p	PP		500	
C705	285-0800-00	10 n	PE	20	250	
C706	281-0710-00	10 n	CER		250	
C707	281-0155-00	2-22 p	PP		500	
C708	281-0710-00	10 n	CER		250	
C709	285-0843-00	30 p	PS	2	350	
C711	281-0155-00	2-22 p	PP		500	
C712	285-0915-00	100 n	PE	20	100	
C713	290-0625-00	4.7 μ	E		160	
C714	281-0710-00	10 n	CER		250	

Cir Ref	Part Number	Value V	Description	Type	Tol %	Rating
D1	152-0062-01		1N914/1N4148	Si		75 V
D2	152-0062-01		1N914/1N4148	Si		75 V
D3	152-0062-01		1N914/1N4148	Si		75 V
D4	152-0062-01		1N914/1N4148	Si		75 V
D5	152-0062-01		1N914/1N4148	Si		75 V
D6	152-0062-01		1N914/1N4148	Si		75 V
D7	152-0062-01		1N914/1N4148	Si		75 V
D301	152-0062-01		1N914/1N4148	Si		75 V
D302	152-0554-00	150	1N914/1N4148	Si		200 mA
D303	152-0515-00	6 k	Rectifier	Si		10 mA
D304	152-0515-00	6 k	Rectifier	Si		10 mA
D305	152-0388-00	130	Zener	Si	5	330 mW
1661 D350	152-0662-01		1N914/1N4148	Si		75 V
D351	152-0062-01		1N914/1N4148	Si		75 V
D352	152-0062-01		1N914/1N4148	Si		75 V
D353	152-0544-00	43	Zener	Si	5	700 mW
D354	152-0062-01		1N914/1N4148	Si		75 V
D355	152-0062-01		1N914/1N4148	Si		75 V
1171 D356	152-0062-01		1N914/1N4148	Si		75 V
D357	152-0062-01		1N914/1N4148	Si		75 V
D358	152-0494-00		Zener	Si	5	700 mW
D401	152-0341-00	450	Rectifier	Si		500 mA
D402	152-0341-00	450	Rectifier	Si		500 mA
D403	152-0341-00	450	Rectifier	Si		500 mA
D404	152-0341-00	450	Rectifier	Si		500 mA
D405	152-0341-00	450	Rectifier	Si		500 mA
D406	152-0341-00	450	Rectifier	Si		500 mA
D407	152-0341-00	450	Rectifier	Si		500 mA
D408	152-0341-00	450	Rectifier	Si		500 mA
D409	152-0341-00	450	Rectifier	Si		500 mA
D411	152-0341-00	450	Rectifier	Si		500 mA
D412	152-0341-00	450	Rectifier	Si		500 mA
D413	152-0341-00	450	Rectifier	Si		500 mA
D414	152-0348-00	6.2	Zener	Si		330 mW
D415	152-0062-01		1N914/1N4148	Si		75 V
D416	152-0062-01		1N914/1N4148	Si		75 V
D417	152-0468-00	150	Rectifier	Si		200 mA
1655 D418	152-0062-01		1N914/1N4148	Si		75 V
D601	152-0062-01		1N914/1N4148	Si		75 V
D602	152-0062-01		1N914/1N4148	Si		75 V
D603	152-0062-01		1N914/1N4148	Si		75 V
D604	152-0062-01		1N914/1N4148	Si		75 V
D605	152-0062-01		1N914/1N4148	Si		75 V
D606	152-0062-01		1N914/1N4148	Si		75 V
D701	152-0546-00	47	Zener	Si	5	1
D702	152-0472-00	5.6	Zener	Si	5	330 mW
D703	152-0472-00	5.6	Zener	Si	5	330 mW
D704	152-0543-00	5.1	Zener	Si	5	330 mW
D705	152-0547-00	22	Zener	Si	5	330 mW

Cir Ref	Part Number	Value	Description	Rating
FS401	159-0073-00	1 A (200-250 V)	1.25 in. fast	
	159-0069-00	2 A (100-125 V)	1.25 in. fast	
FS402	159-0073-00	1 A	1.25 in. fast	
FB	276-0597-00	Ferrite bead Mullard FX1115		
L701	114-0323-00		Variable inductor	
L702	108-0700-00		Trace rotation coil 1920 turns	
LP401	150-0074-00	6.5 V	L.E.S.	1 W
LP402	150-0074-00	6.5 V	L.E.S.	1 W
LP403	150-0074-00	6.5 V	L.E.S.	1 W

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Cir Ref	Part Number	Value ohms	Description			Cir Ref	Part Number	Value ohms	Description		
			Type	Tol %	Rating W				Type	Tol %	Rating W
R1	317-0154-01	150 k	C	5	125 m	R31	321-0850-48	27 k	MF	1	125 m
R2	317-0822-01	8.2 k	C	5	125 m	R32	321-0850-48	27 k	MF	1	125 m
R3	317-0103-01	10 k	C	5	125 m	R33	307-0143-00	5.6 k	MO	5	1.5
R4	311-0717-00	220	CP	20	250 m	R34	307-0143-00	5.6 k	MO	5	1.5
R5	321-0280-48	8.06 k	MF	1	125 m	R35	317-0392-01	3.9 k	C	5	125 m
R6	317-0683-01	68 k	C	5	125 m						
R7	317-0680-01	68	C	5	125 m						
R8	311-1346-00	10 k	CV	20	250 m						
R9	321-0093-42	90.9	MF	0.5	125 m						
R11	317-0393-01	39 k	C	5	125 m						
R12	317-0394-01	390 k	C	5	125 m						
R13	325-0123-00	10.1	MF	0.5	125 m						
R14	321-0844-48	2.2 k	MF	1	125 m						
*R15	311-1345-00	50 k	CV	20	250 m	R301	311-0850-00	15 k	CP	20	250 m
R16	317-0562-01	5.6 k	C	5	125 m	R302	315-0223-01	22 k	C	5	250 m
R17	311-0802-00	4.7 k	CP	20	250 m						
R18	321-0845-48	2.7 k	MF	1	125 m						
R19	317-0152-01	1.5 k	C	5	125 m	R304	307-0532-00	6.8 M	C	5	500 m
R21	317-0562-01	5.6 k	C	5	125 m	R305	307-0532-00	6.8 M	C	5	500 m
R22	317-0512-01	5.1 k	C	5	125 m	R306	317-0102-01	1 k	C	5	125 m
R23	311-0802-00	4.7 k	CP	20	250 m	R307	317-0124-01	120 k	C	5	125 m
R24	317-0123-01	12 k	C	5	125 m	R308	317-0331-01	330	C	5	125 m
R25	317-0123-01	12 k	C	5	125 m	R309	307-0532-00	6.8 M	C	5	500 m
R26	321-0845-48	2.7 k	MF	1	125 m	R310	316-0221-01	220	C	10	250 m
R27	311-0851-00	1 k	CP	20	250 m	R311	317-0102-01	1 k	C	5	125 m
R28	321-0843-48	270	MF	1	125 m	R312	307-0184-00	15 k	MO	5	1.5
R29	311-0712-00	100	CP	20	250 m	R313	307-0532-00	6.8 M	C	5	500 m
R30	317-0101-01	100	C	5	125 m	R314	317-0184-01	180 k	C	5	125 m
						R315	311-0910-00	2.2 M	CP	20	250 m

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*With S1

Cir Ref	Part Number	Value ohms	Description			Rating W	Eff. Ser.No.
			Type	Tol %			
R316	317-0273-01	27 k	C	5		125 m	
R317	301-0106-02	10 M	C	5		500 m	
R318	301-0106-02	10 M	C	5		500 m	
R319	301-0106-02	10 M	C	5		500 m	
R321	301-0106-02	10 M	C	5		500 m	
R322	301-0106-02	10 M	C	5		500 m	
R323	301-1673-01	5.6 M	C	5		500 m	
R324	301-1673-02	5.6 M	C	5		500 m	
R325	301-1673-02	5.6 M	C	5		500 m	
R326	301-1673-01	5.6 M	C	5		500 m	
R327	311-1347-00	2.5 M	CV	20		250 m	
R328	317-0104-01	100 k	C	5		125 m	
R329	311-1348-00	100 k	CV	20		250 m	
R330	317-0102-01	1 k	C	5		125 m	
R331	301-0682-01	6.8 k	C	5		500 m	
R333	321-0481-48	1 M	C	1		125 m	
R351	311-1349-00	10 k	CV	20		250 m	
R352	315-0103-01	10 k	C	5		250 m	
R353	317-0183-01	18 k	C	5		125 m	
R354	317-0103-01	10 k	C	5		125 m	
R355	317-0104-01	100 k	C	5		125 m	
R356	317-0680-01	68	C	5		125 m	
R357	317-0123-01	12 k	C	5		125 m	
R358	317-0273-01	27 k	C	5		125 m	
R359	315-0153-01	15 k	C	5		125 m	
R361	317-0470-01	47	C	5		125 m	
R362	321-1325-48	24 k	MF	1		125 m	
R363	317-0123-01	12 k	C	5		125 m	
R364	317-0273-01	27 k	C	5		125 m	
R365	317-0102-01	1 k	C	5		125 m	
R366	317-0101-01	100	C	5		125 m	
R367	317-0101-01	100	C	5		125 m	
R368	317-0561-01	560	C	5		125 m	
R400	315-0200-01	20	CF	5		250 m	524776
*R401	311-0709-00	25	WWV	10		1	
R402	317-0683-01	68 k	C	5		125 m	
R403	317-0562-01	5.6 k	C	5		125 m	
R404	317-0223-01	22 k	C	5		125 m	
R405	308-0726-00	1.5	WW	10		1	
R406	308-0725-00	2.7	WW	10		1	
R407	308-0727-00	1	WW	10		1	
R408	317-0174-01	470 k	C	5		125 m	
R409	317-0100-01	10	C	5		125 m	
R410	317-0471-01	470	C	5		125 m	

*With S401

Cir Ref	Part Number	Value ohms	Description			Rating W	Eff. Ser.No.
			Type	Tol %			
R411	317-0332-01	3.3 k	C	5		125 m	
R412	317-0334-01	330 k	C	5		125 m	
R413	307-0370-00	180	MO	5		6	
R414	315-0472-02	4.7 k	C	5		250 m	
R415	307-0144-00	10 k	MO	5		1.5	
R416	317-0562-01	5.6 k	C	5		125 m	
R417	317-0103-01	10 k	C	5		125 m	
R418	317-0822-01	8.2 k	C	5		125 m	
R419	316-0183-01	18 k	C	10		250 m	
R421	317-0104-01	100 k	C	5		125 m	
R422	317-0683-01	68 k	C	5		125 m	
R423	317-0103-01	10 k	C	5		125 m	
R424	321-0318-48	20 k	MF	1		125 m	
R425	311-1378-00	4.7 k	WWP	10		1	
R426	321-1325-48	24 k	MF	1		125 m	
R427	321-0871-48	6.8 k	MF	1		125 m	
R428	311-1419-00	1.5 k	WWP	10		1	
R429	321-1313-48	18 k	MF	1		125 m	
R431	316-0473-01	47 k	C	10		250 m	
R432	321-1353-48	47 k	MF	1		125 m	
R433	311-1378-00	4.7 k	WWP	10		250 m	
R434	321-0289-48	10 k	MF	1		125 m	
R601	316-0332-01	3.3 k	C	10		250 m	
R602	317-0334-01	330 k	C	5		125 m	
R603	317-0562-01	5.6 k	C	5		125 m	
R604	317-0562-01	5.6 k	C	5		125 m	
R605	317-0242-01	2.4 k	C	5		125 m	
R606	317-0242-01	2.4 k	C	5		125 m	
R607	317-0681-01	680	C	5		125 m	
R608	317-0821-01	820	C	5		125 m	
R609	311-1377-00	10 k	CP	20		250 m	
R610	317-0221-01	220	C	5		125 m	524576
R611	321-0968-48	91	MF	1		125 m	
R612	321-0968-48	91	MF	1		125 m	
R613	317-0152-01	1.5 k	C	5		125 m	
R614	311-0719-00	470	CP	20		250 m	
R615	317-0152-01	1.5 k	C	5		125 m	
R616	317-0221-01	220	C	5		125 m	
R617	317-0183-01	18 k	C	5		125 m	
R618	317-0221-01	220	C	5		125 m	
R619	317-0221-01	220	C	5		125 m	
R621	317-0222-01	2.2 k	C	5		125 m	
R622	317-0221-01	220	C	5		125 m	
R623	317-0470-01	47	C	5		125 m	
R624	307-0173-00	470	MO	5		1.5	
R625	317-0470-01	47	C	5		125 m	
R626	317-0221-01	220	C	5		125 m	
R627	317-0221-01	220	C	5		125 m	
R628	317-0820-01	82	C	5		125 m	
R629	317-0820-01	82	C	5		125 m	

Cir Ref	Part Number	Value ohms	Description		Rating W
			Type	Tol %	
R701	321-0095-48	95.3	MF	1	125 m
R702	317-0101-01	100	C	5	125 m
R703	321-0095-48	95.3	MF	1	125 m
R704	317-0332-01	3.3 k	C	5	125 m
R705	315-0821-01	820	C	5	250 m
R706	311-0719-00	470	CP	20	250 m
R707	315-0821-01	820	C	5	250 m
R708	311-0765-00	100 k	CP	20	250 m
R709	317-0333-01	33 k	C	5	125 m

Cir Ref	Part Number	Value ohms	Description		Rating W
			Type	Tol %	
R711	317-0362-01	3.6 k	C	5	125 m
R712	317-0111-01	110	C	5	125 m
R713	317-0121-01	120	C	5	125 m
R714	317-0470-01	47	C	5	125 m
R715	317-0121-01	120	C	5	125 m
R716	307-0372-00	390	MO	5	3.5
R717	307-0372-00	390	MO	5	3.5
R718	317-0680-01	68	C	5	125 m
R719	317-0680-01	68	C	5	125 m
R721	317-0680-01	68	C	5	125 m
R722	311-0719-00	470	CP	20	250 m
R723	315-0103-01	10 k	C	5	250 m
R724	307-0371-00	510	MO	5	5
R725	307-0371-00	510	MO	5	5
R726	307-0369-00	160	MO	5	1.5
R727	311-1344-00	1 k	WWP	20	1.6
R728	307-0369-00	160	MO	5	1.5

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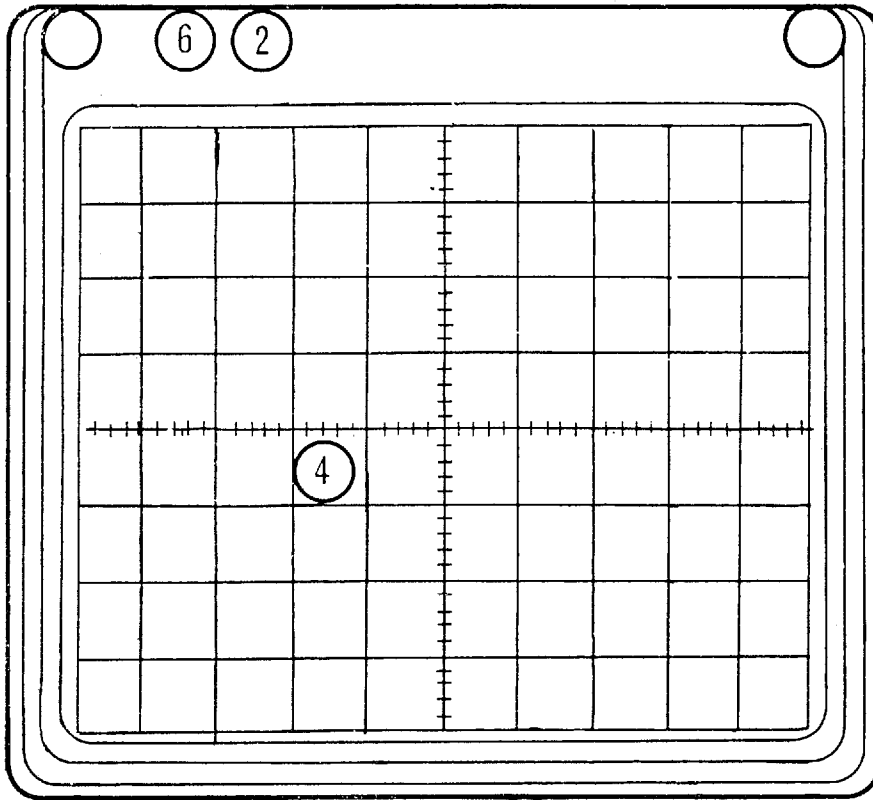
Cir Ref	Part Number	Description
S1	311-1345-00	Pull (with R15)
S2	260-1408-00	Push (1-button)
S401	311-0709-00	Rotary (with R401)

Cir Ref	Part Number	Description
T301	120-0771-00	E.H.T. oscillator transformer
T401	120-0770-00	Power transformer
TH301	307-0258-00	Thermistor NTC 130 Ω

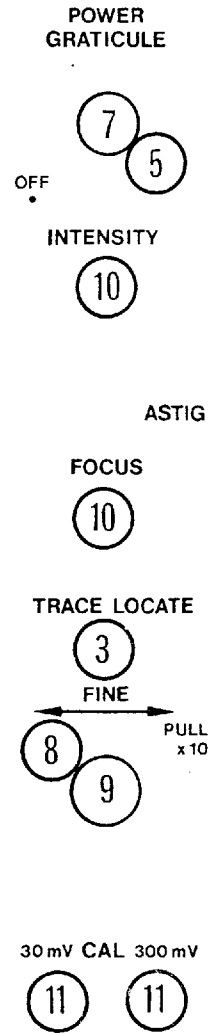
Cir Ref	Part Number	Description
TR1	151-0326-00	BC107 Si NPN
TR2	151-0326-00	BC107 Si NPN
TR3	151-0317-00	BC109C Si NPN
TR4	151-0320-01	MPS6518 Motorola Si PNP
TR5	151-0320-01	MPS6518 Motorola Si PNP
TR6	151-0525-00	SPS5286 Si NPN
TR7	151-0525-00	SPS5286 Si NPN
TR8	151-0525-00	SPS5286 Si NPN
TR9	151-0525-00	SPS5286 Si NPN
TR301	151-0326-00	BC107 Si NPN
TR302	151-0317-00	BC109C Si NPN
TR303	151-0317-00	BC109C Si NPN
TR304	151-0400-00	2N5191 Si NPN

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Cir Ref	Part Number	Description		Eff. Ser. No.
TR351	151-0525-00	SPS5286	Si	NPN
TR352	151-0326-00	BC107	Si	NPN
TR353	151-0404-00	T0203	Si	PNP
TR354	151-0525-00	SPS5286	Si	NPN
TR355	151-0404-00	T0203	Si	PNP
TR401	151-0257-01	BF305 Ates	Si	NPN
TR402	151-0404-00	TZ0203	Si	PNP
TR403	151-0326-00	BC107	Si	NPN
TR404	151-0326-00	BC107	Si	NPN
TR405	151-0400-00	2N5191	Si	NPN
TR406	151-0318-00	BFY51	Si	NPN
TR407	151-0317-00	BC109C	Si	NPN
TR408	151-0326-00	BC107	Si	NPN
TR409	151-0318-00	BFY51	Si	NPN
TR411	151-0317-00	BC109C	Si	NPN
TR412	151-0525-00	SPS5286	Si	NPN
TR413	151-0400-00	2N5191	Si	NPN
TR414	151-0320-00	MPS6518	Si	PNP
TR415	151-0311-00	MJE340	Si	NPN
TR416	151-0311-00	MJE340	Si	NPN
TR601	151-0320-01	MPS6518 Motorola	Si	PNP
TR602	151-0320-01	MPS6518 Motorola	Si	PNP
TR603	151-0127-02	BSX20/2N2369	Si	NPN
TR604	151-0127-02	BSX20/2N2369	Si	NPN
TR701	151-0127-03	BSX20	Si	NPN
TR702	151-0127-03	BSX20	Si	NPN
TR703	151-0127-02	BSX20/2N2369	Si	NPN
TR704	151-0127-02	BSX20/2N2369	Si	NPN
TR705	151-0310-01	E1530LL	Si	NPN
TR706	151-0310-01	E1530LL	Si	NPN
V301	154-0640-10	CRT Tektronix T7400-31-2		524876



PANEL, FRONT.



MECHANICAL

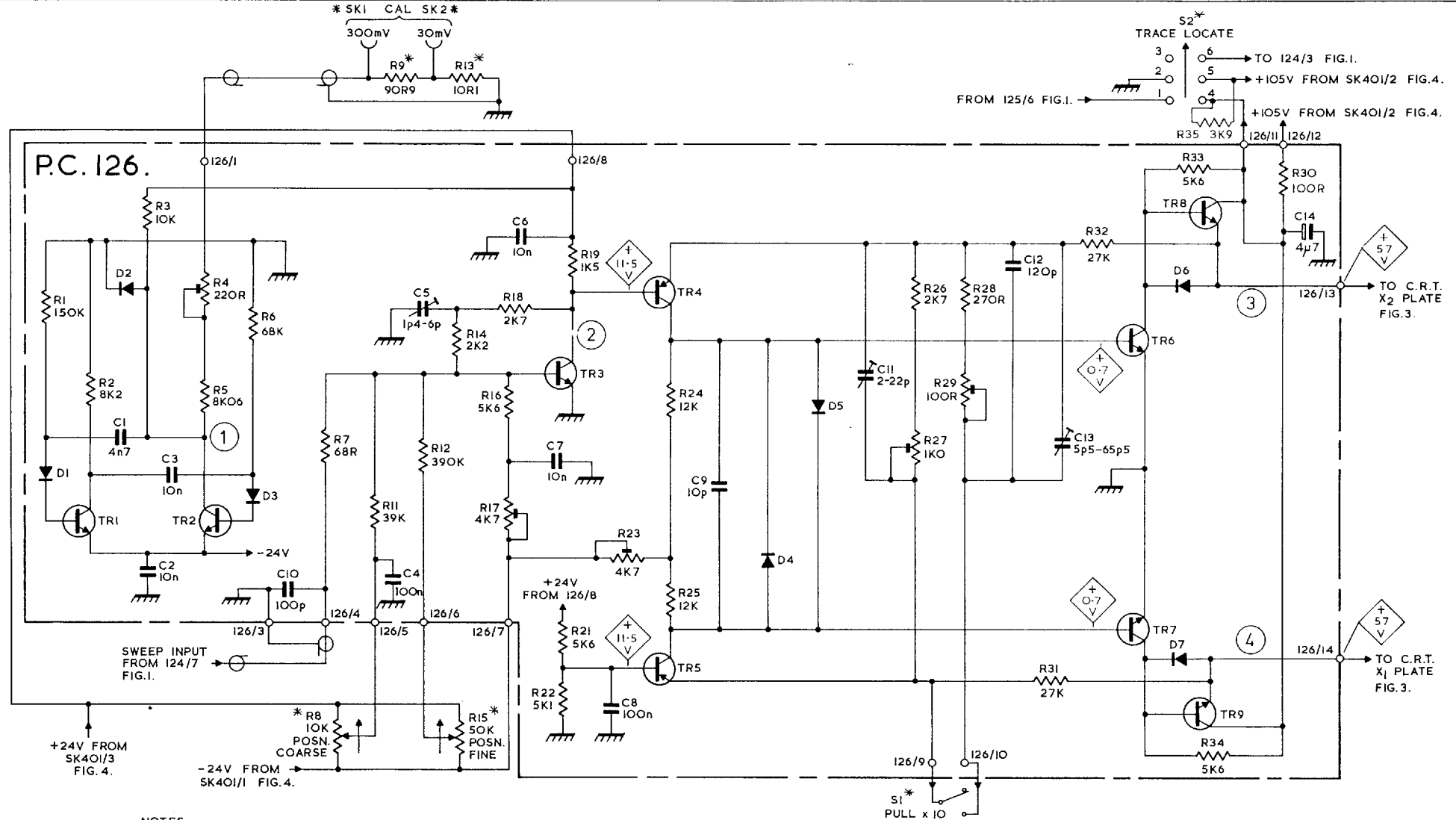
Part Number	Description	Location
381-0334-00	Bar, Handle	
136-0304-00	Base	
136-0183-01	Base Transistor, T05	PCB
136-0343-00	Base Transistor, T018	PCB
361-0254-00	Bead, Ceramic	PC127
276-0597-00	Bead, Ferrite	PC125
200-1218-01	Bezel	
200-1218-02	Bezel, Marked	2
366-1403-00	Button, Push	3
358-0460-00	Bush, Panel	Handle
377-0386-00	Bush, Thread, 4 BA	
390-0277-00	Cabinet, Side	
334-1305-00	Card, Instruction	Accessory
343-0196-00	Clamp, Cable (Brass)	Delay line
343-0198-00	Clamp, Cable Tie Down	Delay line
343-0631-00	Clip quarter turn fastener	
344-0247-00	Clip, Fuse	PC127
131-1282-01	Connector, Edge 16 Way Socket	PC124
131-0649-00	Connector, Male BNC	Accessory
131-0650-01	Connector, BNC	Z Mod.
131-0026-00	Connector, PDA Button	EHT

Part Number	Description	Location
131-1557-00	Contact, Earth	
131-1259-00	Contact, Earth	
200-1005-00	Cover	
378-0719-01	Filter	4
252-0606-00	Foam Rubber, ¼" x ¼"	CRT
348-0463-01	Foot, Front (Grey)	
348-0168-00	Foot, Rear (Grey)	
348-0160-00	Grommet, ⅜" id.	EHT
348-0161-00	Grommet, ⅛" id.	EHT & CRT
367-0168-00	Handle	
136-0311-00	Holder, Bulb	5
352-0152-00	Holder, Fuse	PC127
352-0160-00	Holder, Lamp	6
342-0156-00	Insulator, Stand Off	
003-0674-00	Key, Allen 1.5 mm A/F	7 - 10
131-1364-00	Key, Polarizing	Interface
366-1239-01	Knob, Neutral Grey	7
366-1254-00	Knob, Grey	8
366-1255-00	Knob, Red	9
366-1266-00	Knob, Grey	10
195-0105-00	Lead Set, CRT Deflection (X Plate)	
195-0106-00	Lead Set, CRT Deflection (Y Plate)	
210-0291-00	Lug, Pillar	EHT
004-1142-00	Packaging	Accessory
386-2407-00	Plate, Spring	
214-2443-00	Pin quarter turn fastener	
214-2444-00	Pin spring	
131-0865-00	Pin, Terminal	CRT X
134-0135-00	Plug, Mains	
134-0097-00	Plug, 8 Way	
213-0248-00	Screw, Socket, 3 x 3 mm	7 - 10
166-0464-00	Sleeve	Graticule
131-1325-00	Socket, 8 Way	
131-1268-00	Socket, 2 mm	11
136-0448-00	Socket and Lead, U.K.	
136-0448-01	Socket and Lead, U.S.A.	
344-0246-00	Spiral Fix (Push-On)	
385-0215-00	Spacer, 6 BA x 5.0 mm	PC125
385-0209-00	Spacer, ⅜" x 11 mm	
361-0413-00	Spacer, ⅜" x 25 mm	
361-0198-00	Spacer, 6 BA x ⅜"	EHT
385-0206-00	Spacer, 6 BA 8 BA x .5 ⅜"	
361-0202-00	Spacer 6 BA x 1.0"	
361-0283-00	Spacer, Mounting	
361-0197-00	Spacer, 4 BA Clear x ½"	
214-1080-00	Spring, 1" lg.	Graticule
252-0607-00	Strip, PVC Edging	CRT Shield
355-0167-01	Stud, 6 BA x 52 mm	EHT
124-0289-00	Tag strip, 4-way	
210-0275-00	Tag, Solder, ⅜"	
253-0108-00	Tape, PVC Adhesive, 1" wide	CRT
210-1075-01	Washer, Foot Packing	
210-1086-00	Washer, Locking	Astig
161-0085-01	Cord, Power, U.K.	Accessory
161-0085-00	Cord, Power, U.S.A.	Accessory
204-0563-01	Body))
136-0522-00	Socket) PDA Connection	) CRT 524876
210-1206-00	Washer 4BA Plain))

ASSEMBLIES

Assembly	Part Number	Includes Circuit References
Bright-up PC128	670-2182-02	C351 to C355, D350 to D358, R353 to R359, R361 to R368, TR351 to TR355
EHT PC129	670-2183-00	C301 to C309, D301, D302, L301, R301, R305, R309, R311 to R319, R321 to R326, R333, TR301 to TR304
Graticule Light	352-0160-00	L402, L403
Mother Board PC124	670-2178-00	C601 to C609, C611, D601 to D605, R601 to R609, R611 to R619, R621 to R629, SKT601, TR601 to TR604, R610, C612.
Power Board PC127	670-2181-01	C401 to C416, D401 to D409, D411 to D418, FS402, R400, R402 to R419, R421 to R429, R431 to R434, TR401 to TR409, TR411 to TR416.
Quintupler	650-0021-00	Sealed unit.
'Y' Output PC125	670-2179-00	C701 to C709, C711, C712, D701 to D704, R701 to R709, R711 to R719, R721 to R723, R726 to R728, TR701 to TR704
'X' Output PC126	670-2180-01	C1 to C9, C11 to C14, D1 to D7, R1 to R7, R11, R12, R14, R16 to R19, R21 to R30, R31 to R35, TR1 to TR9

RESISTORS	3	4	6	7	11	9	12	13	16	19	23	24	26	28	31	32	33	34	30
	1	2	5	8				14	17	21	25		27	29					
CAPACITORS	1	2	3	10	4	5	6	7	8	9	11	12	13					14	
MISC.	D2	TR2	D3	SK1	SK2					TR3	TR4	D4	D5	SI		TR6	S2		
	DI	TR1								TR5	TR7					TR7	D6	D7	



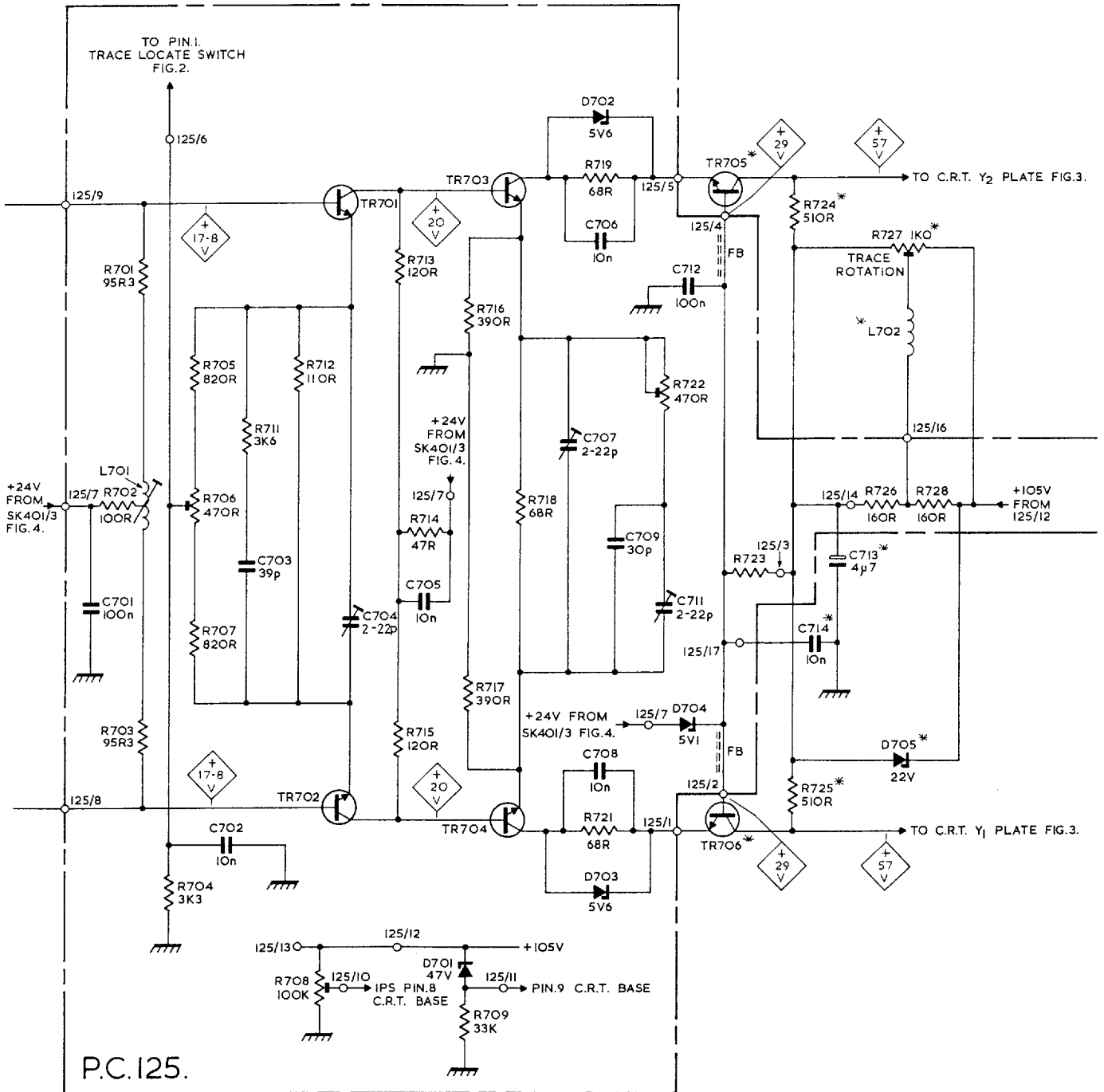
NOTES.

- * DENOTES COMPONENTS NOT MOUNTED ON P.C. BOARD.
- I26/2 DENOTES P.C. BOARD/EYELET OR TERMINAL No.

'X' AMPLIFIER & CALIBRATOR - D83

FIG. 2.

701	704	711	708	713	709	718	719	722	723	724		726
702	705	712	714	715	716		721		725			727
703	706		715	717								728
707	707											
L701	TR701	TR702	TR703	TR704	D702	TR704	D703	TR704	TR706	L702		
			D701					D704		D705		



MAIN 'Y' AMPLIFIER - D83
FIG. 1.

365
366
367

323
324
325
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327

330

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329

331

368

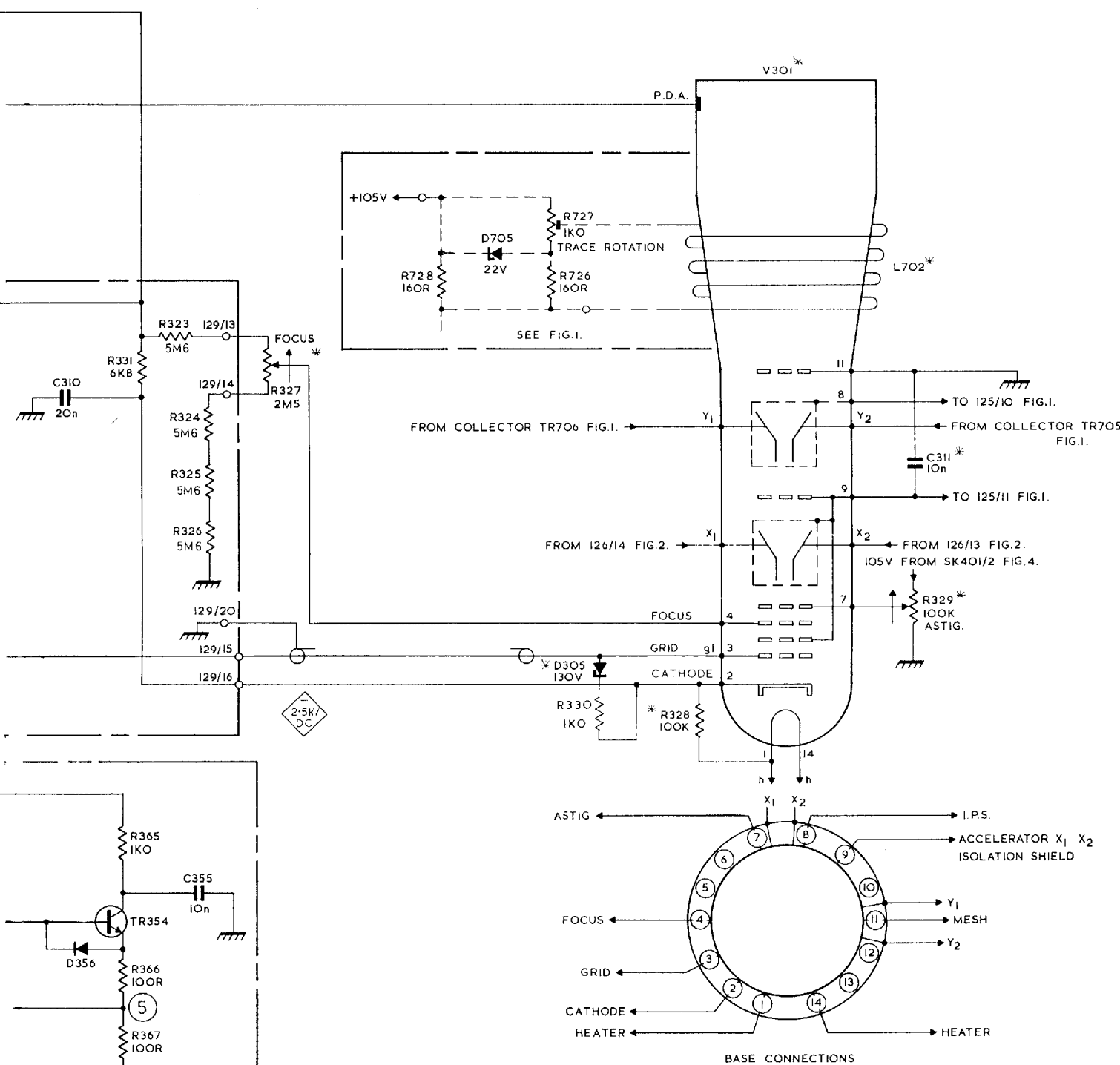
311

TR354
TR355

D305

V301

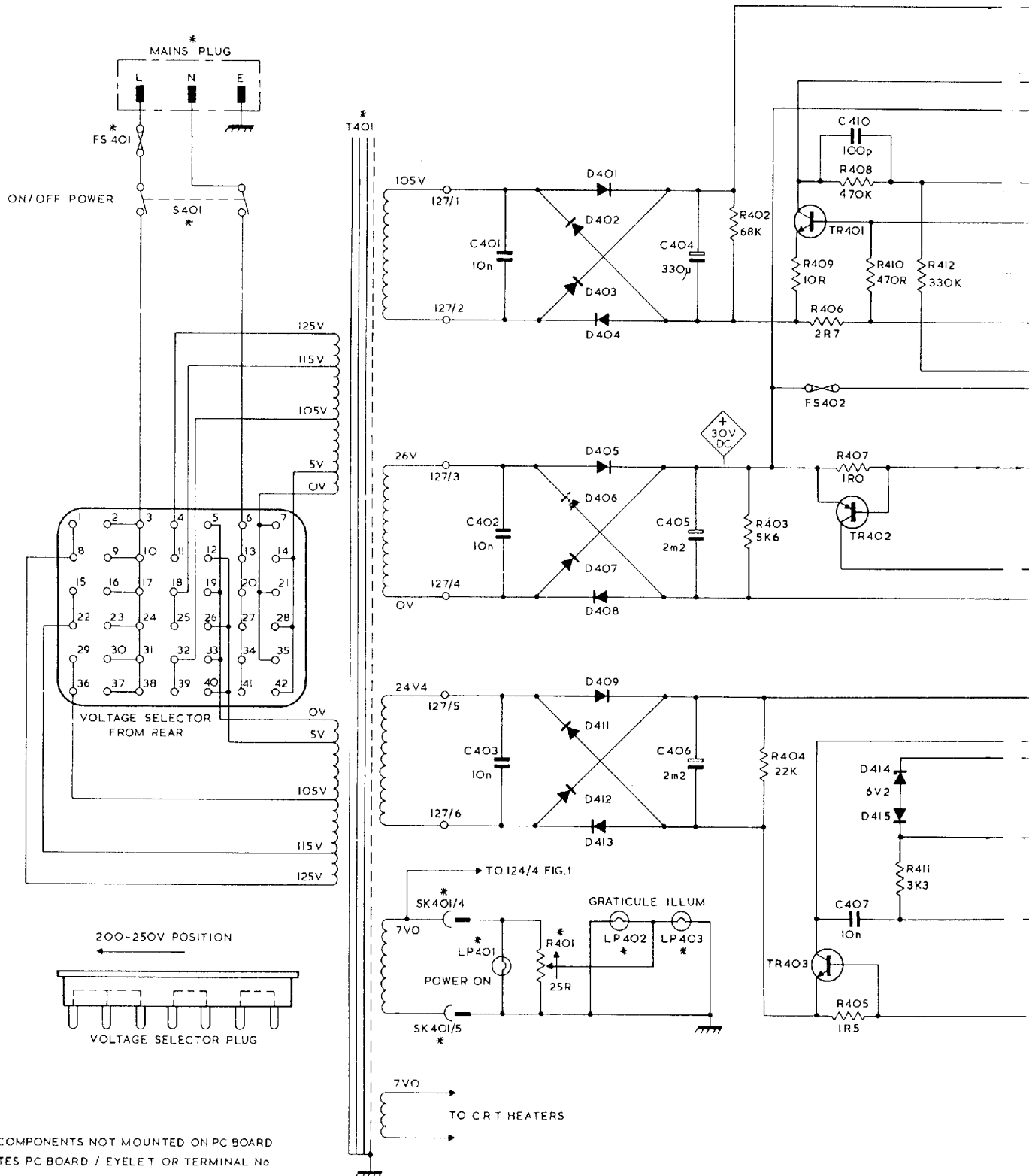
356



NOTES.
1. * DENOTES COMPONENTS NOT MOUNTED ON P.C. BOARD.
2. 128/4 DENOTES P.C. BOARD/EYELET OR TERMINAL No.

QUINTUPLER, E.H.T.-P.C.129,
BRIGHT-UP-P.C.128, & C.R.T. - D83
FIG. 3.

RESISTORS				401			402	408	
							403	406	410
							404	407	411
								405	412
CAPACITORS				401			404		410
				402			405		
				403			406		
MISC.	FS 401	S 401	T 401	D 401	D 405	D 409		TR 401	
				D 402	D 406	D 411		FS 402	
				D 403	D 407	D 412	LP 402	TR 402	D 414
				D 404	D 408	D 413	LP 403	TR 403	D 415



- NOTES:
 1. * DENOTES COMPONENTS NOT MOUNTED ON PC BOARD
 2. I27/2 DENOTES PC BOARD / EYELET OR TERMINAL No

POWER SUPPLY PC127 — D83

SECTION 6

CIRCUIT DIAGRAMS

To minimize the risk of misinterpretation of component values on circuit diagrams, the decimal point has been replaced by the multiplier or sub-multiplier of the basic unit. For instance, 2.2 megohms is shown as 2M2 and 1.8 picofarads is shown as 1p8.

To aid the reader further, in addition to the block Circuit Reference Table in Section 5.1, to locate a component in the circuit diagrams, a table is provided at the top of each circuit diagram, in which the circuit reference will appear, where practical, directly above the component being sought.

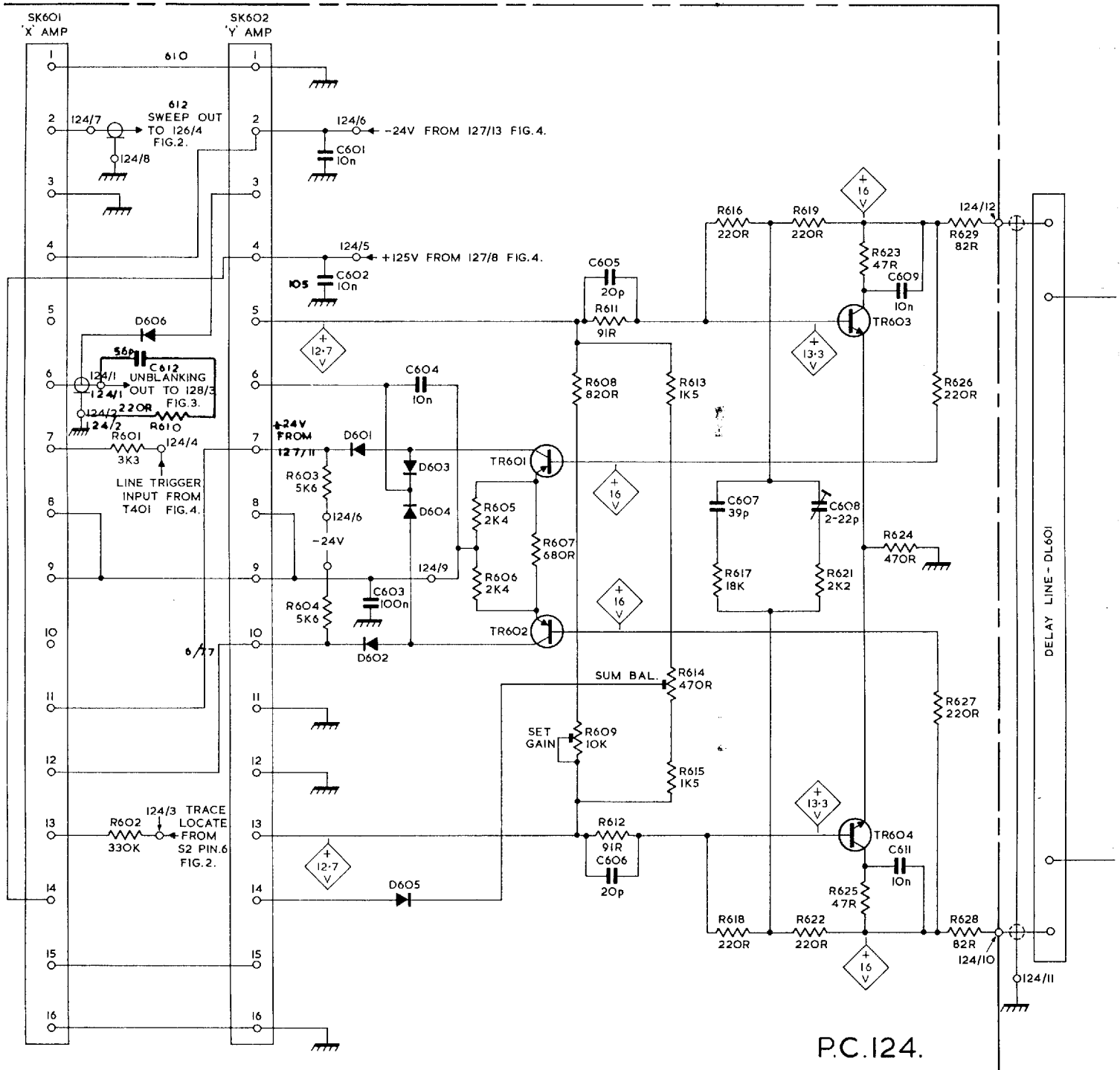
PRINTED CIRCUIT

Blue shows the rear track as seen through the board. Yellow the component side track.
Component locations are given on the page preceding the Figure 5.

WAVEFORMS

Waveforms, illustrated in Plate 6/1, may be monitored at point with the corresponding number.

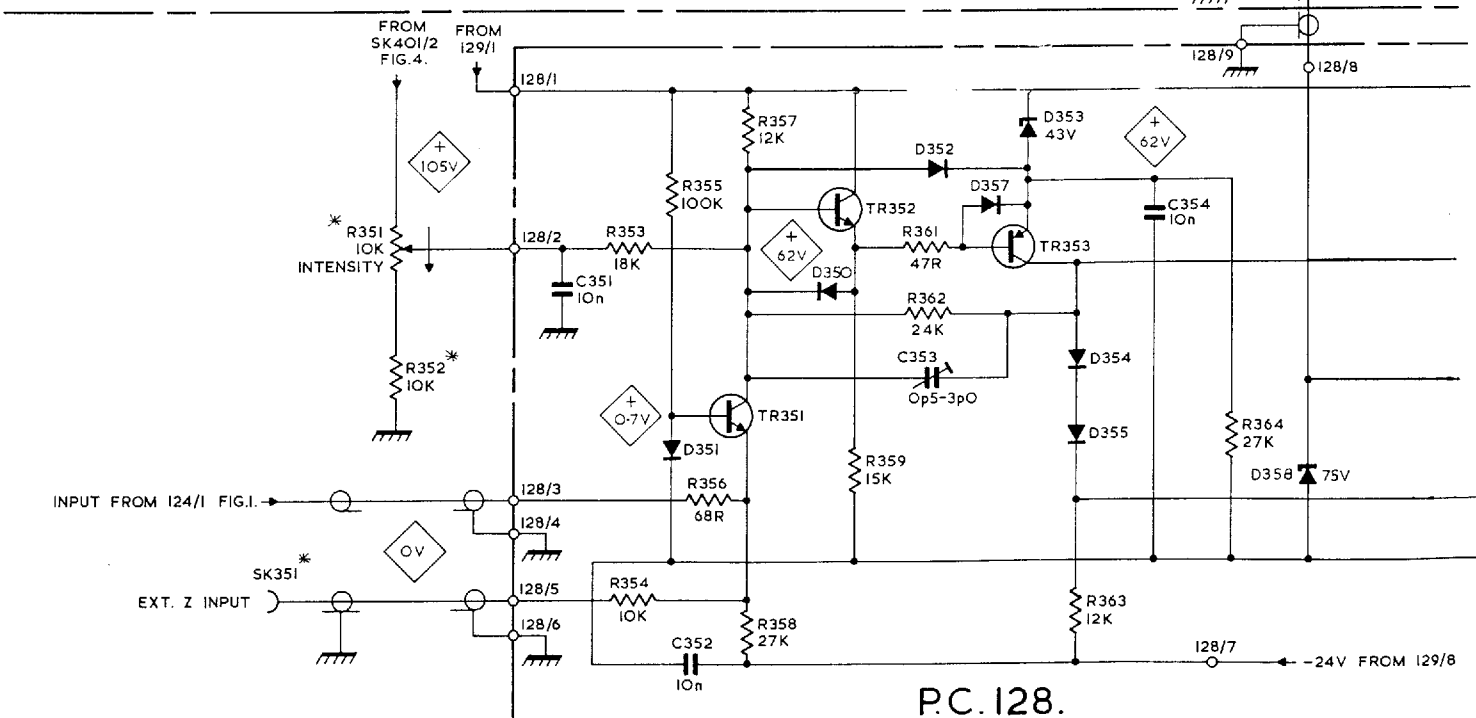
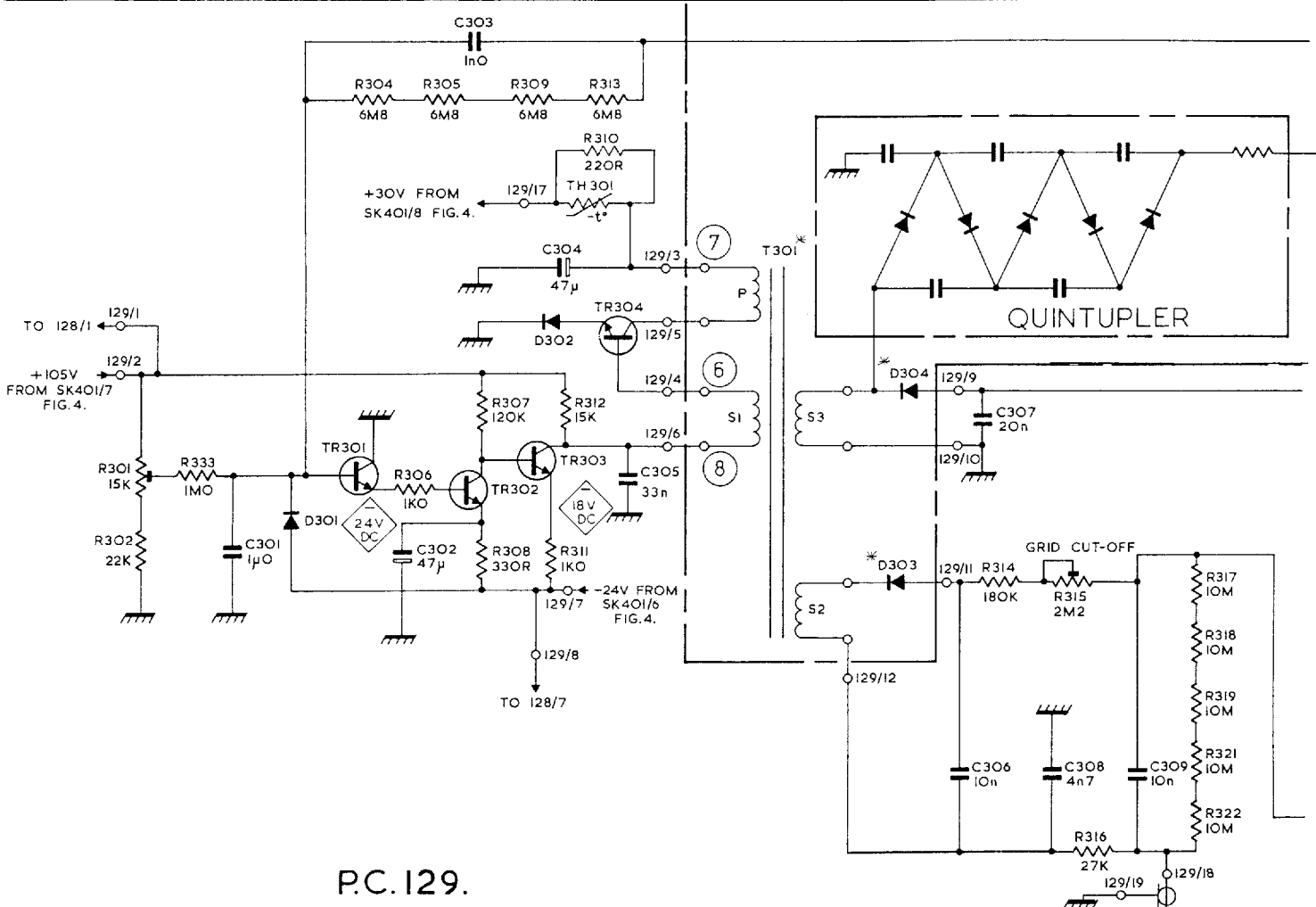
RESISTORS	601 602	603	604	605 606	607	608 611 612 609	613 614 615	616 617 618	619 621 622	623 624 625	626 627	629 628
CAPACITORS		601 602	603	604		605 606		607	608		609 611	
MISC.	D606	D601 D602	D603 D604	D605	TR601 TR602				TR603 TR604			DL601
	SK601		SK602									

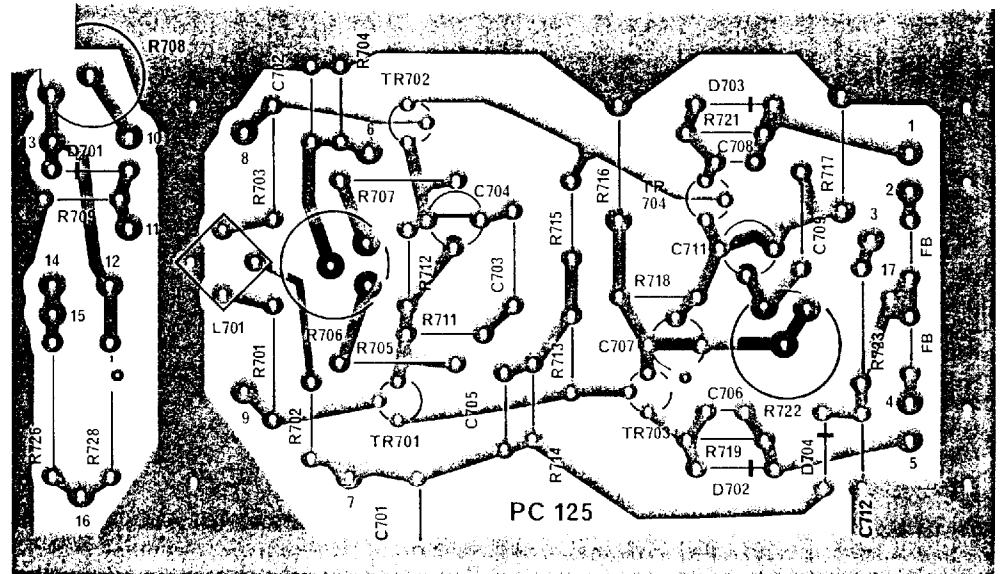
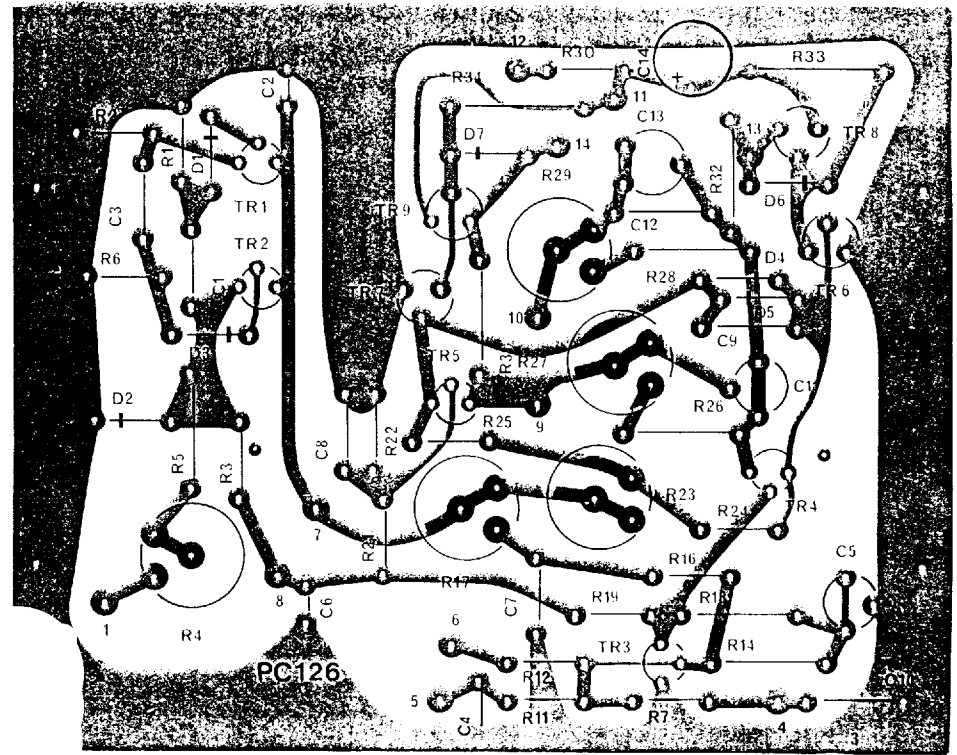
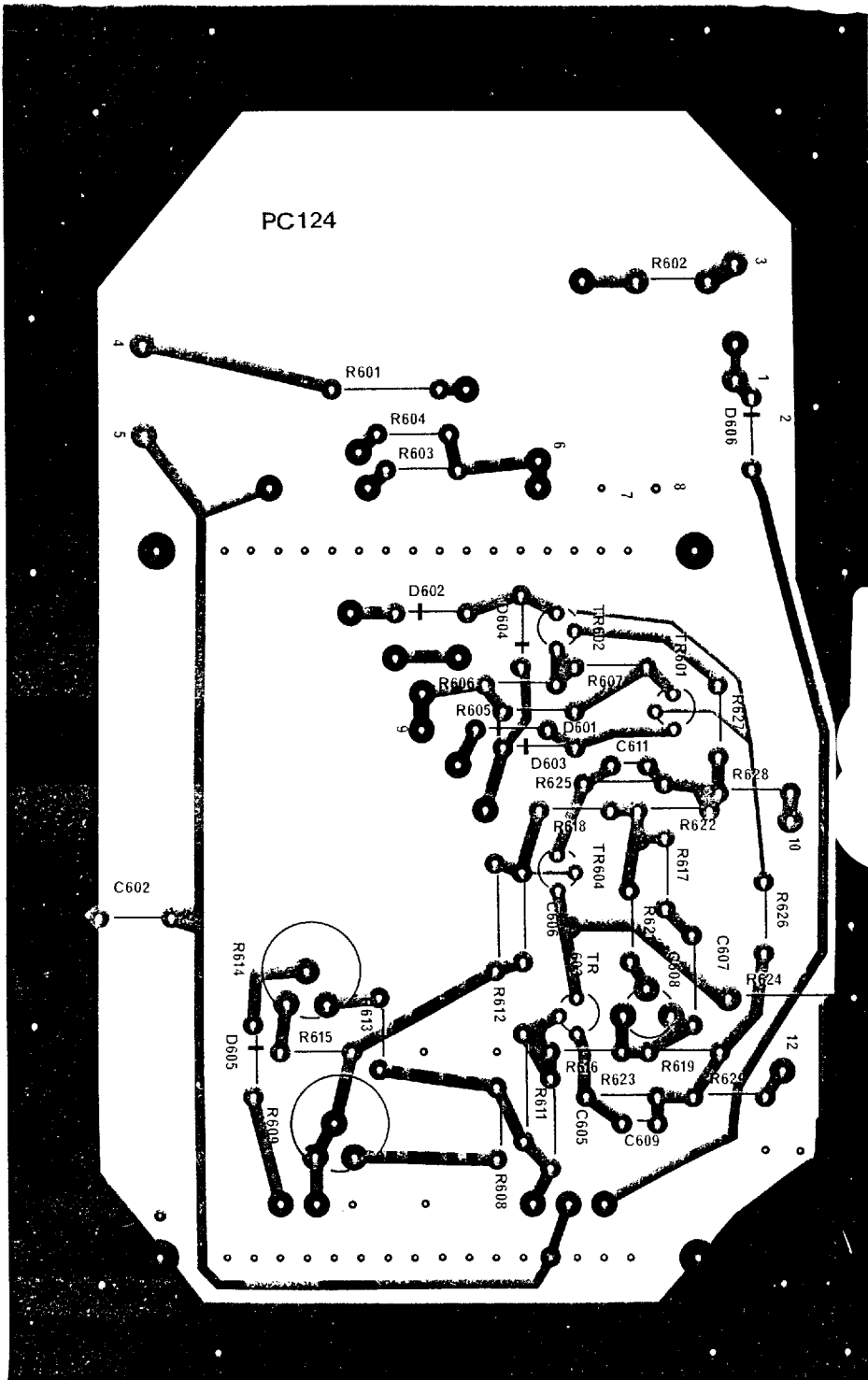


NOTES.

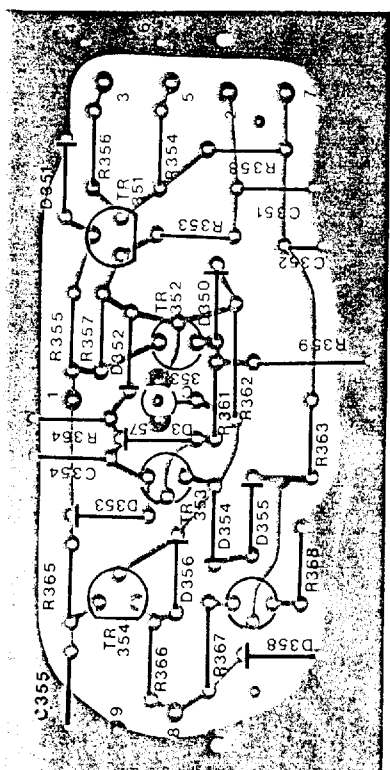
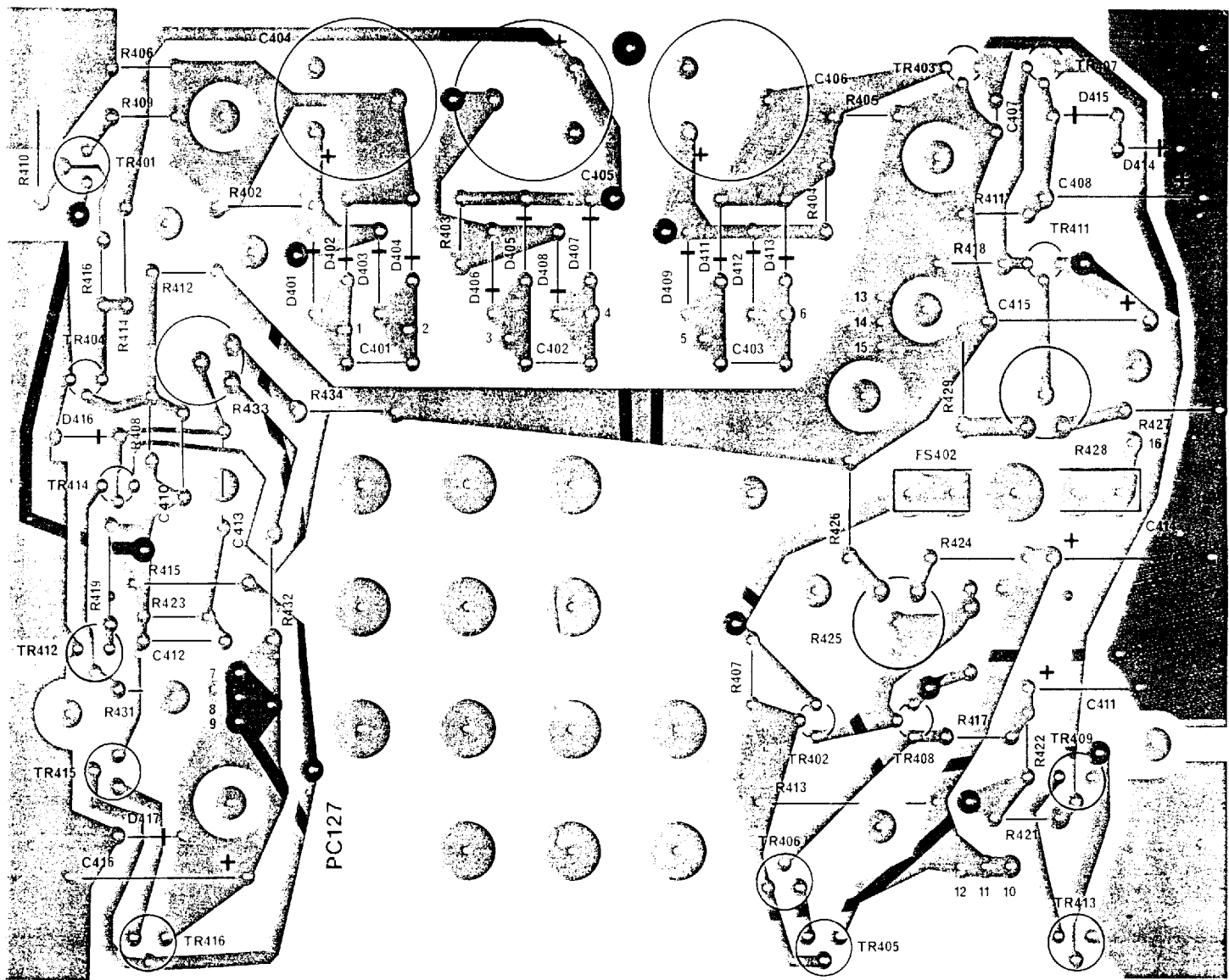
- * DENOTES COMPONENTS NOT MOUNTED ON P.C. BOARD.
- I24/2 DENOTES P.C. BOARD/EYELET OR TERMINAL No.

RESISTORS	301 302	333	304	305 306	307 308	309 311 312	313 353 354 310 355	357 358	359	361 362	363	314 315 316	364	317 318 319 321 322
CAPACITORS	301	302	303	351	304 352	305	353	306 307	308	309	354			
MISC.	SK351 D301	TR301	TR302	TR303 D302 D351	TR304 TH301	D350 T301	TR351 TR352	D352 D357	D353	D303 D304 D354 D355	TR353 D353			D358

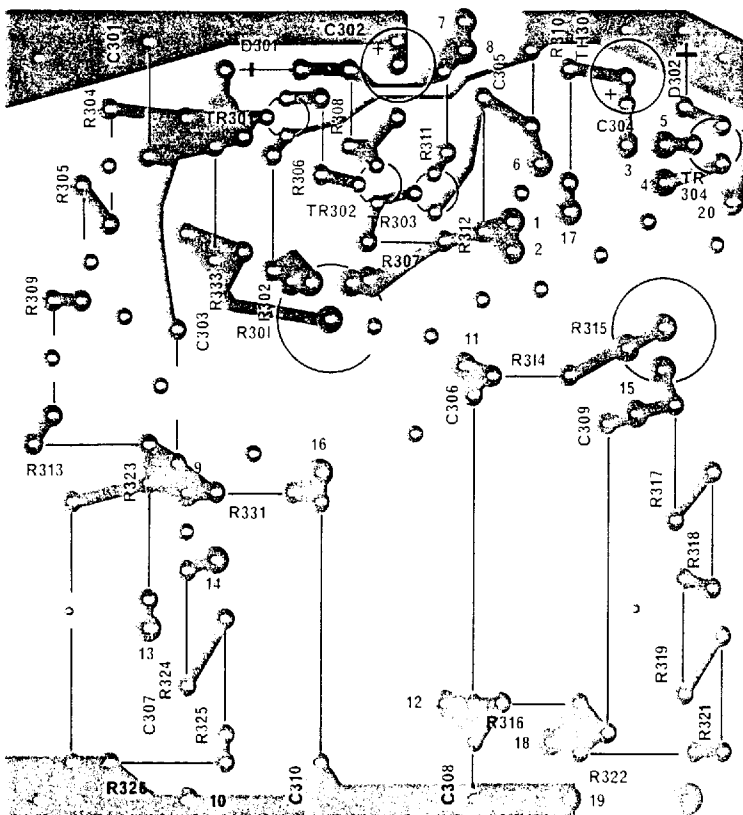




COMPONENT REFERENCE Figure 5



PC-128



416	415	419	423	424	431	432
	414	417	421	425	426	433
	413	418	422	427		434
			429			

408	412	413	414	416
	411	409	415	
TR404	TR412	TR415	D416	D417
TR405	TR408	TR414		
TR406	TR409		TR416	
TR407	TR411 TR413			

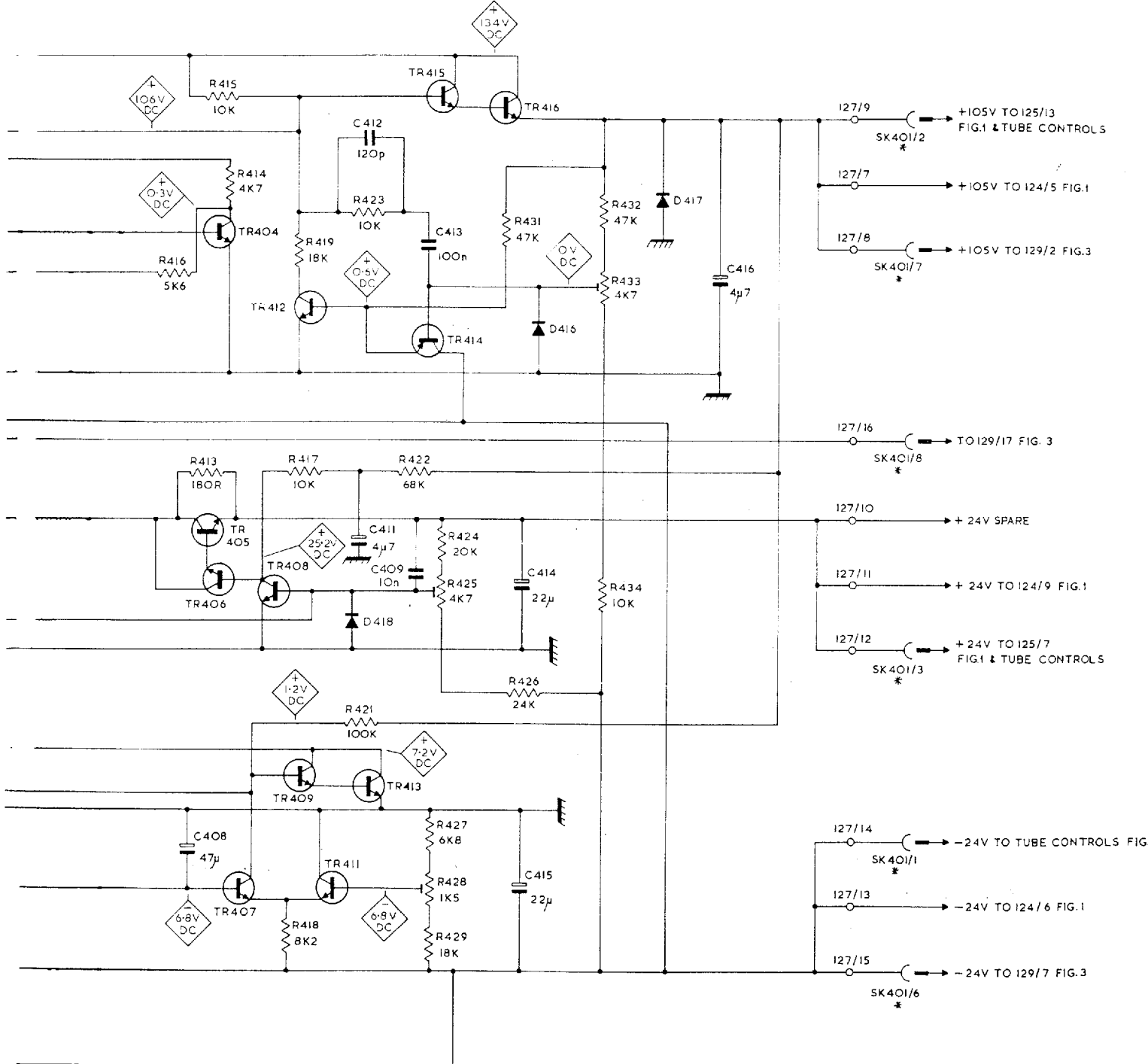
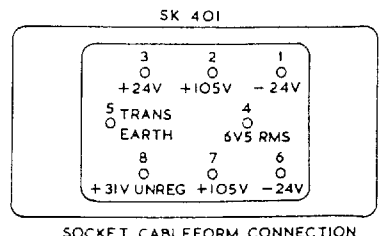
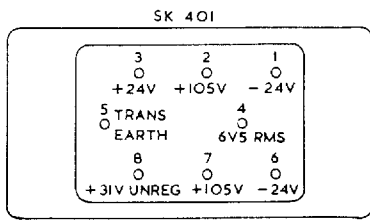
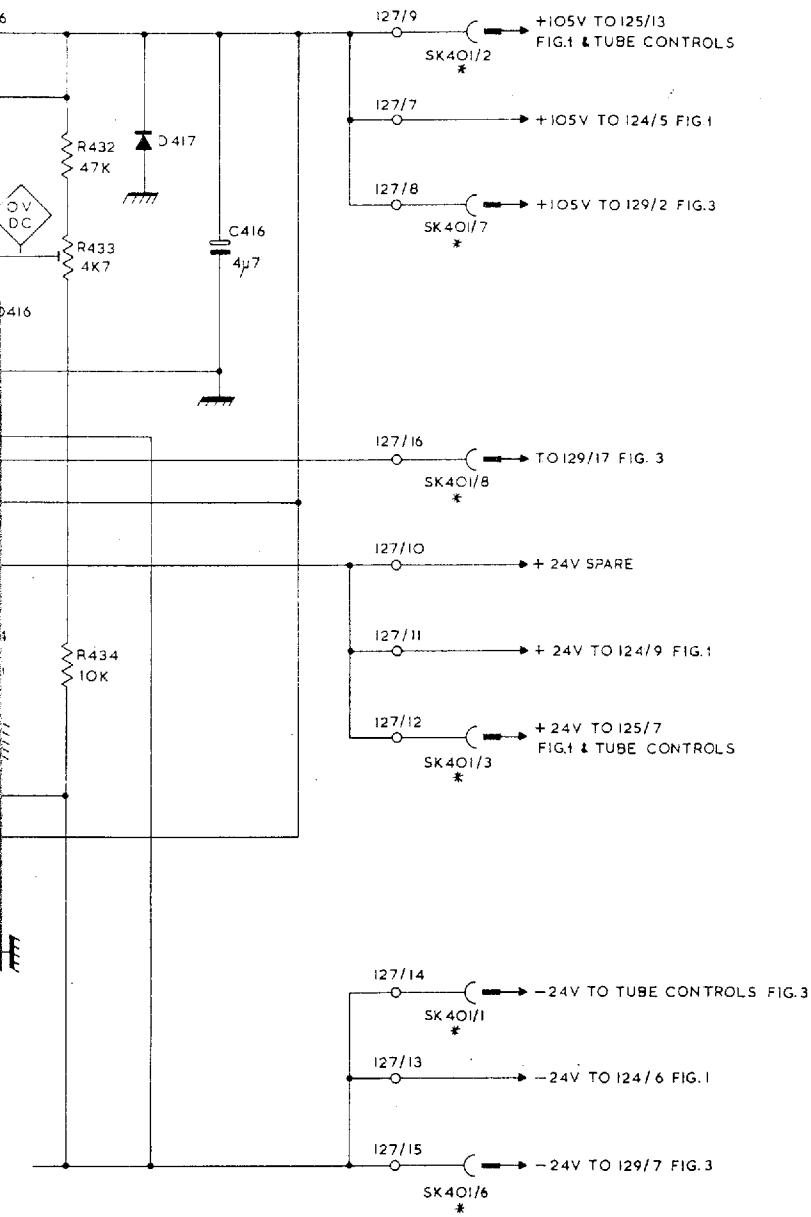
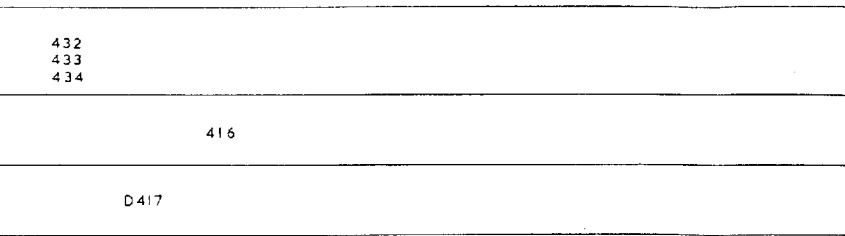


FIG. 4.





SOCKET CABLEFORM CONNECTION

