

OMPACT, two-track, mains operated cassette tape recorders with automatic recording level control and all-transistor amplifiers.

Mains. 100, 127, 220, 245V AC, 50 or 60c/s.

Consumption. 15W approximately.

Transistors. TR1 BC109, TR2 BC109, TR3 BC108, TR4 BC108, TR5 AC188, TR6 AC187, TR7 AC126, TR8 AC127.

Diodes. D1, D2 automatic level control BA114, D3 level rectifier BA114, D4 metering rectifier BA114.

Inputs. SK1 Microphone; Pins 1/4 and 2, 0.25mV across 4.5Kohms. SK1 Radio (diode); Pins 1/4 and 2, 0.25mV across 4.5Kohms. SK1 Pickup; Pins 5/3 and 2, 100mV across 1.5Megohms.

Outlets. SK1 External amplifier; Pins 5/3 and 2, 1V across 18Kohms. SK2 External speaker; 1.8W, 80hms impedance.

Output. 1.8W.

Speaker. 5in. dual cone, 80hms impedance.

Frequency range. $60-10,000c/s\pm6dB$. Signal/noise ratio. Better than 43dB.

Wow and Flutter. Less than 0.6 per cent peak-to-peak.

Tracks. Two track.

Tape speed. 17in. per second.

Tape loading. Snap-in compact cassettes.

Tape width. 0.15in.

Playing time. 2×30 minutes with C60 cassette.

Fast wind time. Less than 60 seconds with C60 cassette.

Tape position indicator. Three-digit, with push-button reset.

Microphone. Moving coil, cardioid response, 0.34mV/microbar at 1000c/s, 5000hms impedance.

Dimensions. $14\frac{1}{2} \times 8 \times 3\frac{3}{4}$ in.

Weight. 8lb. approximately.

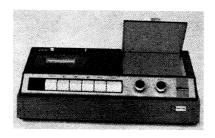
Manufacturer. Philips Electrical Ltd.

Service Department. Combined Electronic Services Ltd, Queensway, Waddon Factory Estate, Croydon, CR9 4DR. Tel: spare parts, 01-686 7311; service enquiries, 01-688 7722. After hours recorded messages on both lines.

DISMANTLING

Chassis removal. Pull off volume and tone control knobs and remove four screws from corners of cabinet base. Top section of case can now be lifted enough to allow unclipping of modulation meter from its aperture. Top section can now be withdrawn to extent of speaker

To remove chassis and amplifier with-

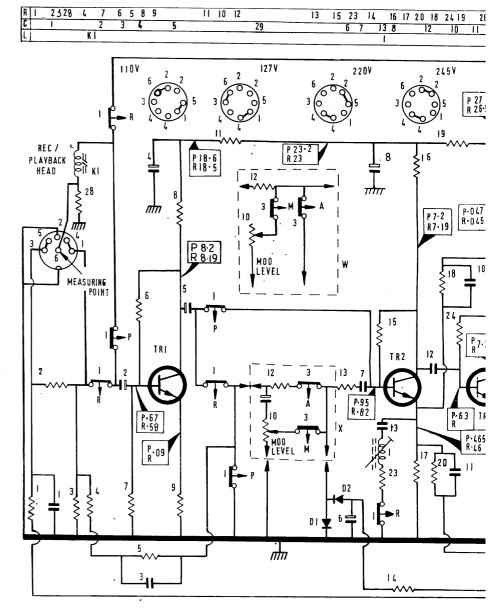


Philips version of mains two-track cassette recorder in teak case with grey polystyrene top and base, piano-key push-button con-trols and adjustable sound deflector above speaker

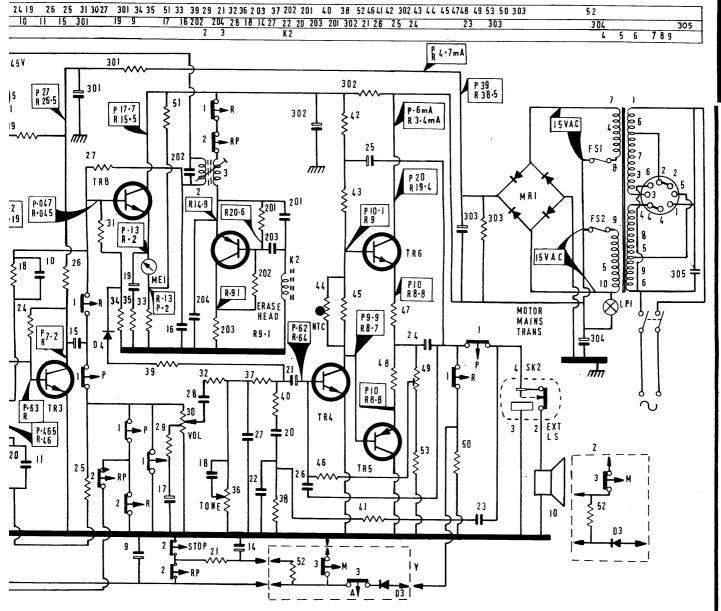
PHILIPS EL3310A STELLA ST9111A TAPE RECORDERS

Additional copies of this chart price 1s. 6d. post free. Payment with order please to E R T, 33-39 Bowling Green Lane, London EC1.

draw four screws from chassis corners Take out two screws holding volume and tone control bracket and remove lead compartment cover by taking out its two fixing screws. Complete chassis assembly may now be withdrawn.

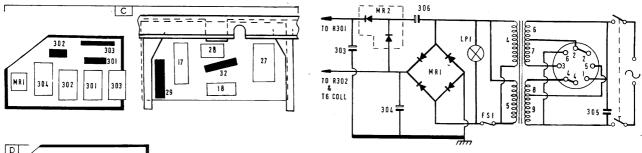


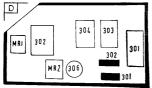
RESIST (R1 R2 R3 R4 R5 R6	18K 1M or 1M5 18K 82K 1M 910K	B3 ————————————————————————————————————	R27 R28 R29 R30 R31 R32 R33	12K 47 470 22K 5K6 2K2 5K6	B2 A3 C A2 C A2	R53 R201 R202 R203 R301 R302 R303	220K 33K 100K 47 2K2 100 1K	A1 B2 B2 B2 C/D C/D	C17 C18 C19 C20 C21 C22 C23	640KpF 100KpF 50mF 39KpF 4mF 100KpF 100KpF	A2 A2 A1 A2 A2	C28 C29 C201 C202 C203 C204 C301	100KpF 1.6mF 47KpF 8.2KpF 27KpF 47KpF 400mF	B3 B2 B2 B2 B2
R7 R8 R9 R10 R11	100K 22K 200 22K 10K	B3 B3 B3 B3	R34 R35 R36 R37 R38	1K5 330 22K 2K2 3K3	A1 A2 — B1 A2	CAPAC C1 C2	100pF 10mF	B3 B3	C24 C25 C26 C27	250mF 50mF 180pF 18KpF	A1 B1 A1 C	C302 C303 C304 C306	400mF 640mF 640mF 10KpF	C/I C/I C/I C/I
R12 R13 R14 R15 R16 R17 R18 R19 R20 R21 R23 R24 R25 R26	R12 2K R13 22K R14 10K R15 1M8 R16 7K5 R17 240 R18 82K R19 1K6 R20 39K R21 100 R21 100 R23 4.7 R24 910K R25 12K	B3 R39 B3 R40 B2 R41 B3 R42 B3 R43 B3 R44 A3 R45 B2 R46 B3 R47 B2 R50 A3 R51 B2 R50	R40 R41 R42 R43 R44 R45 R46 R47 R48 R49 R50 R51	1K 10K 3K3 270 270 Thermistor 30 68K 2.2 2.20K 15 680K 3K3	A1 A1 A2 A1 B1 B1 B1 B1 B1 B1/2 A2 B1	C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C15	10KpF 12.5mF 16mF 16mF 100KpF 100mF 150pF 15KpF 100KpF 220KpF 1600mF 12.5mF 4.7KpF	B3 B3 B2 A3 B3 B1 A3 B3 A3 B1 B2 B2	TRANSISTO No. Type TR1 BC109 TR2 BC109 TR3 BC108 TR4 BC108 TR5 AC188 TR6 AC187 TR7 AC126 TR8 AC127 Voltages taker mains input 24 First figure	Function audio pre- audio ampl driver output pail bias oscilla meter amp with resp	amplifier ifier r r tor lifier ect to c	0.465/0.46 0.0/0.0 0.0/0.0 10.0/8.8 10.0/8.8 14.9 0.13/0.2 hassis using	0.63/0.63 0.62/0.64 9.9/8.7 10.1/9.0 20.6 0.047/0.045 100Kohm/	volt met



Vintage Service Data CD-Rom

Electrical and Radio Trading, October 17, 1968





Above left, printed panel layouts of power supply and tone/volume control circuits for machines WRO4 1/67 to WRO4 52/67. Left, circuit board layout corresponding with later power supply circuit, shown above right

Amplifier panel. Loosen two screws at lower edge of output transistor heat sink and two screws under sockets SK1 and SK2. Release panel, heat sink, and socket assembly from fixing screws and switch operating levers by sliding it towards edge of chassis.

Panel can now be moved away from chassis to extent of connecting leads. When refitting panel, ensure that switch operating levers are correctly engaged with the switch sliders.

SERVICE NOTES

Modifications. In EL3310A machines prior to marking WR04 52/66 an alternative recording level control circuit is used as shown on circuit diagram, circuits W and Z. EL3310A and ST9111A machines marked WR05 1/68 onwards, use a new power supply circuit as shown separately. On some machines connections to L4 and L5 are transposed.

Mains voltage and frequency. Circuit diagram shows connections on voltage

selector for various mains input voltages. For frequency conversion, uncase recorder and place upside down. Put drive belt in upper, large diameter section of motor pulley for 50c/s working, lower, smaller diameter section for 60c/s working and corresponding groove in flywheel pulley.

Indicator lamp. Access to pilot lamp is by raising cassette container. Depress cassette key and lift container higher by releasing retaining bracket. In some cases this is secured by circlip, in others by a spring.

Head azimuth. Remove top of case. Connect valve voltmeter to pins 3/5 and 2 of SK1 and insert azimuth test cassette (10kc/s sine wave) into machine. Depress Play key and adjust spring loaded screw to get maximum output. Seal screw with locking compound.

Erase and bias oscillator. With Record and Play keys depressed, oscillator voltage across erase head, should be 13-18V.

Recording bias adjustment. Connect AC millivoltmeter to pin 6 SK1 and depress

Record and Play keys. Adjust core of L2 by sliding it in or out to give meter reading of about 32mV.

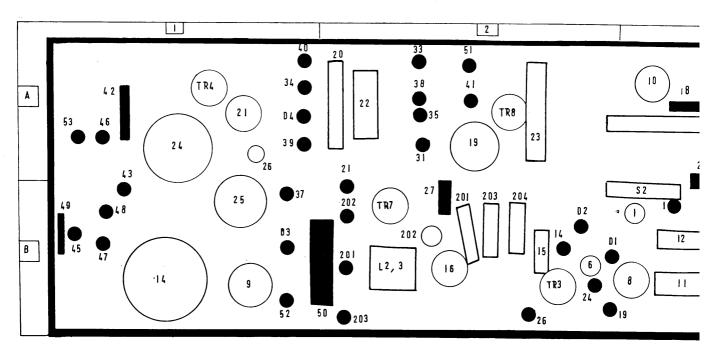
Record Sensitivity. Connect AC millivoltmeter between pins 6 and 2, SK1. Set S3 to 'MAN', turn modulation control fully clockwise and depress Record key. This can be held down by sliding locking strip to the left.

Apply 1kc/s signal to pins 3/5 and 2 SKI and adjust generator output voltage to give meter reading of 7mV. Generator output voltage should be 75–125mV.

Apply a 1kc/s signal to pins 1/4 and 2, SK1, via 470K resistor with 470chm resistor in parallel and adjust generator output to give reading of 7mV on meter. The generator output should be 165-285mV.

Set S3 to 'AUT' and apply 1kc/s signal at 3V between pins 3/5 and 2, SK1. The modulation meter should show slightly less than full deflection. Reduce generator output to 300mV. Modulation meter indication should immediately drop and take about 60 seconds for pointer to return to junction of red and green scale segments.

Set S3 to 'MAN' and adjust generator output to 100mV. Following voltages should be measured using AC voltmeter with 10K resistor in series with 'live' probe: TR1 base 0.25mV, TR1 collector



Main printed circuit board layout viewed from component side

Published by NTP Business Journals Limited, 33/39 Bowling Green Lane, and distributed (a member of the National Trade Press Group of Companies). Printed at The Baynard Pre

7.5mV, TR2 base 7.0mV, TR2 collector 9.5mV, TR3 collector 1.6V, pin 6 SK1 7.0mV.

Playback Sensitivity. Apply a 250c/s signal at 380mV between pins 6 and 2, SK1, via a 100K resistor. Turn volume control to minimum and depress Play key. 1.0-1.2V should be measured at diode output, pins 3/5 and 2, SK1.

output, pins 3/5 and 2, SK1.

Tune generator to 1kc/s at 400mV. Turn tone control fully clockwise. With Play key depressed the following voltages should be read, using 10K resistor in series with 'live' probe: TR1 base 0.2mV, TR1 collector 10.0mV, TR2 base 10.0mV, TR2 collector 4.0mV, TR3 collector 650.0mV, TR4 base 40.0mV with volume control on maximum, TR4 collector 4.0V with volume control on maximum, pins 3/5 SK1 630.0mV.

Record amplifier response. Set S3 to 'MAN', modulation control fully clockwise. Depress Record key and lock it down. Connect AC voltmeter between pins 6 and 2 SK1, and a signal generator between pins 3/5 and 2 SK1. Apply 1kc/s signal and adjust generator output to give meter reading of about 20mV.

Reset generator to 10kc/s, when reading should be 14mV. If not, adjust L1 by sliding its core in or out. With same generator output level, set frequency to 60c/s. This should give reading of about 2.9mV.

Playback amplifier response. With generator between pins 6 and 2 SK1, via 100K resistor, and millivoltmeter between pins 3/5 and 2 SK1, turn volume control to minimum and depress Play key. Adjust generator output to give meter reading of 85mV at a frequency of 1kc/s. Keeping generator output voltage constant, apply 60c/s signal; reading should be 270mV. At 250c/s reading should be 170mV; at 1kc/s, 85mV and at 10kc/s, 58mV.

Overall response. Load cassette into machine and connect signal generator to pins 3/5 and 2 SK1. Set S3 to 'MAN', turn modulation control to maximum and volume control to minimum. Depress Record and Play keys and record several spot frequencies between 60c/s and 10kc/s with generator output a constant 5mV.

with generator output a constant 5mV.

Remove generator and connect millivoltmeter to pins 3/5 and 2 SK1 and play back recorded tape. Output voltages should be within 6dB.

Output pair collector current. Depress Play key, turn volume control to minimum and adjust R49 so that voltage at R47/R48 junction is exactly half the HT voltage at TR6 collector. This should give a quiescent current of about 6mA in the output stage.

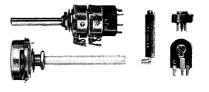
Cleaning. To maintain optimum performance, magnetic head faces, tape guides, pressure roller, capstan, drive belts, pulleys, clutch and brake surfaces should be periodically cleaned using soft cloth wrapped around wooden stick and moistened with methylated spirit or industrial alcohol. Never allow metal objects to contact magnetic heads.

Lubrication. Machines are fully lubricated during manufacture and should not require further attention for a lengthy period of service. If lubrication is undertaken, bearings etc, must be sparingly lubricated. Shell Tellus 33 oil and Alvania grease or equivalents should be used. It is imperative that lubricants be kept away from all driving and braking surfaces.



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