

'E R T' SERVICE CHART

FIVE VALVE tape recorders with two tracks (EL3515) or four tracks (EL3541), released November, 1959, and March, 1960, at 32gns. and 34gns. respectively.

- Mains.** 110, 127, 200-250V AC, 50c/s.
- Consumption.** 60W.
- Valves.** EF86, ECC83, ECL82, EM84, EZ80, plus germanium diode OA85.
- Deck.** Philips.
- Weight.** 18 lb.
- Dimensions.** 13½ x 11½ x 6½ in.
- Output.** 2.5W.
- Speaker.** 4in., 5ohms.
- Microphone.** Crystal microphone supplied.
- Tape speed.** 3½ips.
- Maximum spool size.** 7in.
- Fuse.** One, heat fuse in one limb of mains input which cuts out if transformer overheats.

Manufacturer. Philips Electrical, Ltd.
Service department. Waddon Factory Estate, Purley Way, Croydon, Surrey.

SERVICE NOTES

Controls (both models). At the front of the machine are five main push buttons, with the following functions reading from left to right: **Fast Rewind, Pause, Stop, Start** (playback/record), **Fast Forward**; the level indicator is seen through an aperture in the Stop button. When machine is used for straight through amplification, a small red button (P.A. amp) situated inside the right-hand cover plate is depressed; release is by pressing Stop button.

The larger knob on left-hand side of top plate acts as **Volume control (R11)** on the high level input when on PA amp and Level control for the same input when on Record. It is

also the general **Volume control** on Playback and carries the mains **On-Off switch Sw5**. To its right is the **Tone control (R33)**, operative on Playback only.

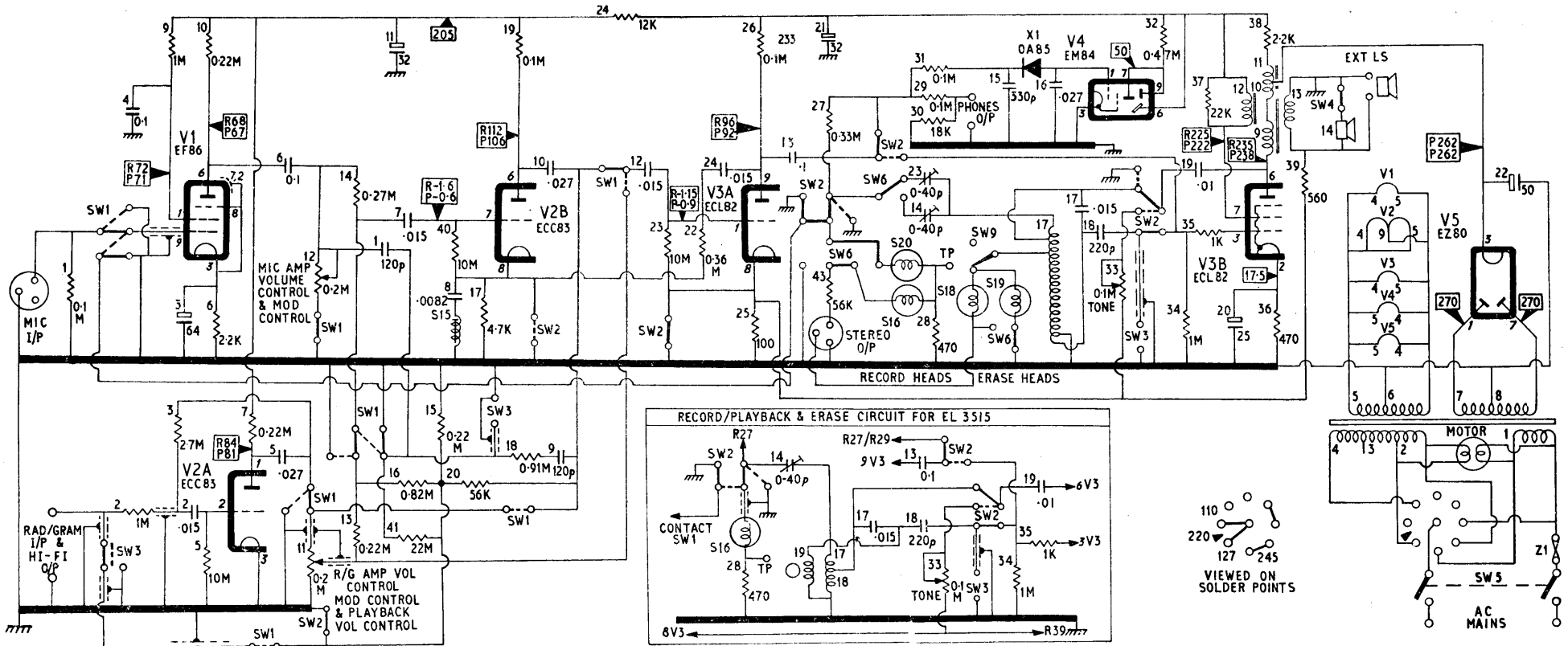
The large knob on right-hand side of top plate acts as **Volume control (R12)** on the microphone input when on PA amp and **Level control** for the same input when on Record. It is inoperative on Playback. To its left is a red button which must be depressed for **Record** before and while the Start button is depressed.

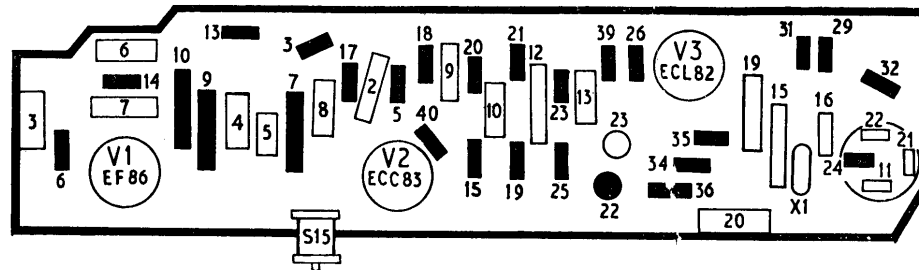
On Record, switches, 1, 2 and 3 are operative; on playback, switch 3 is in position; and on PA amp, switch 1 operates.

Controls (EL3541 only). In addition to all the above, there are two extra controls on the four track model. Concentric with the



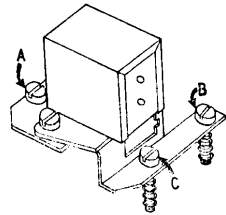
EL3541





COMPONENT RATINGS

Capacitors
1,000V: C19
125V: C24
Electrolytic 350V: C11
21 22
Electrolytic 25V: C20
Electrolytic 12.5V: C3
All others 400V wkg
Resistors
½W: R10 18 41 43 44
All others ¼W.



spindle of the main Volume control (R11) is the **Track Changeover** switch (Sw6), giving tracks 1 and 3 or tracks 2 and 4. Between the **Pause** and **Stop** buttons is a small button (Sw9) which is depressed for **Superimposition**.

Superimposing. Depression of Sw9 disconnects erase head, allowing recording over previous signal (EL3541 only).

Straight through amplifier. Depression of PA amp button connects circuit as straight amplifier, with independent volume controls on each input and 2½W output. If external speaker is used, insertion of plug actuates Sw4 and thereby disconnects internal speaker.

Bias current. This should be adjusted to achieve an overall frequency response through the recording system that is within 6dB of the level at 1kc/s from 60c/s to 13kc/s. Bias level must be high enough to avoid distortion greater than 5 per cent. Level should be between 105 and 280microamps, corresponding to 50 and 130mV across R28, as measured at the test point. Adjustment is by variable capacitors C14 and C23 (the latter in EL3541 only).

Inputs and outputs. The following appear on both models: Microphone (low level) input; Radio/gram (high level) input; Hi-fi outlet on replay (from high level input socket); Monitoring outlet for headphones while recording (monitors signal prior to recording head); External speaker socket for 3-7ohm speaker.

On EL3541 only there is a stereo socket providing an output from the second track of the pair in use for feeding an external amplifier.

Sensitivities. Nominal sensitivities at the

microphone inputs on the two and four track models respectively are 2.5 and 3.0mV; on the high level inputs the levels are 200 and 150mV. To check that overall amplification is correct, apply 6.5mV at 1kc/s to the EL3541 high level input, record the signal, then replay; the output at the same socket should be greater than 70mV. The corresponding figures for the EL3515 are 5mV and 150mV.

Circuit differences. The main circuit depicts the EL3541 and the subsidiary circuit shows the main differences in the EL3515. In addition, on the latter, the following differences occur:

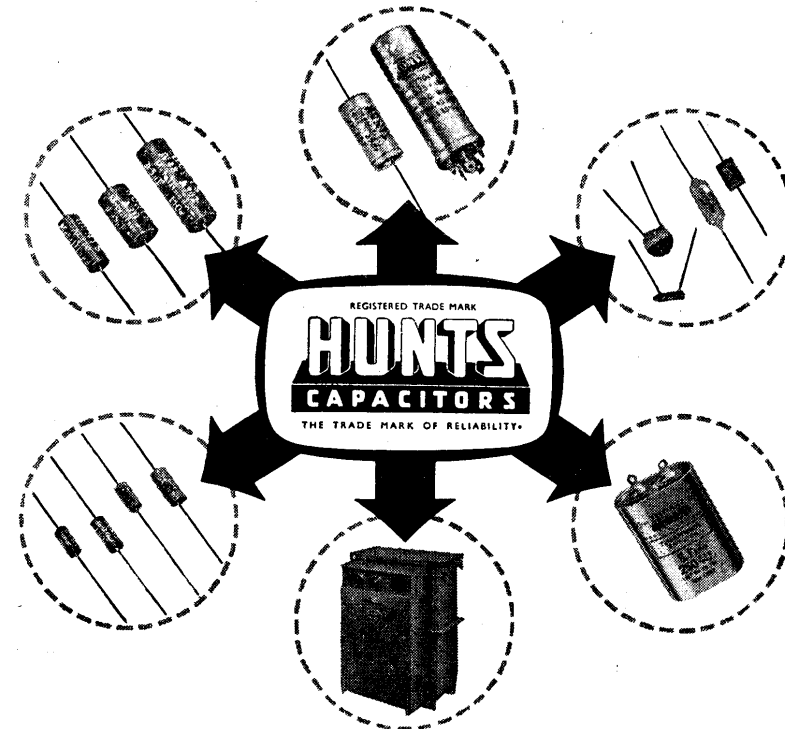
C24 is replaced by a short, R41 is omitted, section of Sw1 beneath R20 in circuit is omitted, R21 (100K) is inserted between junction C9/C10/R20 and end of C12 remote from R23. C3, C8 become 50mF and .0056 mF. R15, 18, 20, 22, 27 become, respectively, 100K, 1.5M, 100K, 390K, 220K. On some EL3515 models a 56pF is added between lower end of R27 and chassis to achieve sufficiently low bias current. Switches 6 and 9 are also omitted on the EL3515.

Circuit shows the system switched for recording, playback arrangement is indicated by dotted switch lines.

Head alignment. Adjust screws A, B and C (see diagram) on Record/Playback head so that tape runs through guide plate without twisting. Load a test tape carrying a steady 5kc/s tone on to the machine, playback and adjust screw B for maximum output voltage. Check that tape still runs freely through bracket and adjust tape guide if necessary; seal screws with locking paint.

The erase efficiency and position of erase head may be checked as follows: The core of the head should protrude 0.5mm above the top of the tape; when this is correct, any recorded signal should not be attenuated in level by more than 15 per cent when the immediately adjacent track is erased. When a signal is erased, it should be inaudible. If one or other of the above conditions is not fulfilled, the head should be raised or lowered accordingly.

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