# 1393 'E R T' SERVICE CHART GRUNDIG TK14, TK23

PORTABLE tape recorders, the TK23 having four tracks and the TK14 two tracks and both being single speed 3¾ ips. The former was released April 1962 and the latter August 1961.

**Manufacturer.** Grundig (Great Britain) Ltd.

**Service department.** Newlands Park, Sydenham, London SE26.

**Voltage ranges.** 200-240V both models (TK23 also 110-120V) 50c/s AC only.

**Fuses.** TK23 0.8A (110V), 0.3A (220-240V), 80mA surge resisting (HT). TK14 0.8A (mains) and 0.1A surge resisting (HT).

**Valves.** TK23, EF86, ECC81, EM84, EL95; TK14: ECC83, ECL86, EM84.

**Spools.** Maximum size 5¾in. both models.

**Frequency response.** 60-12,000c/s +3 – 5dB both models.

**Input sensitivities.** TK23: microphone 1.95mV; diode 11.5mV; radio/gram 465mV. TK14: microphone 2mV; radio/gram 80mV.

**Input impedances.** Microphone 0.5 meg.; radio/gram 1 meg. both models. Diode 44K TK23 only.

**Output power.** 2.5W both models.

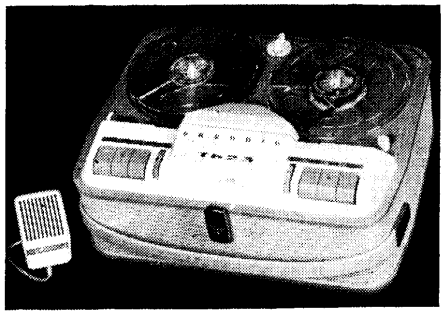
**Outputs.** Extension speaker 5 ohms and high impedance 15K, both models.

**Speaker.** 5¾ x 4¾in. elliptical, both models.

**Weight.** 20lb. both models.

**Microphone.** GDM18 moving coil, both models.

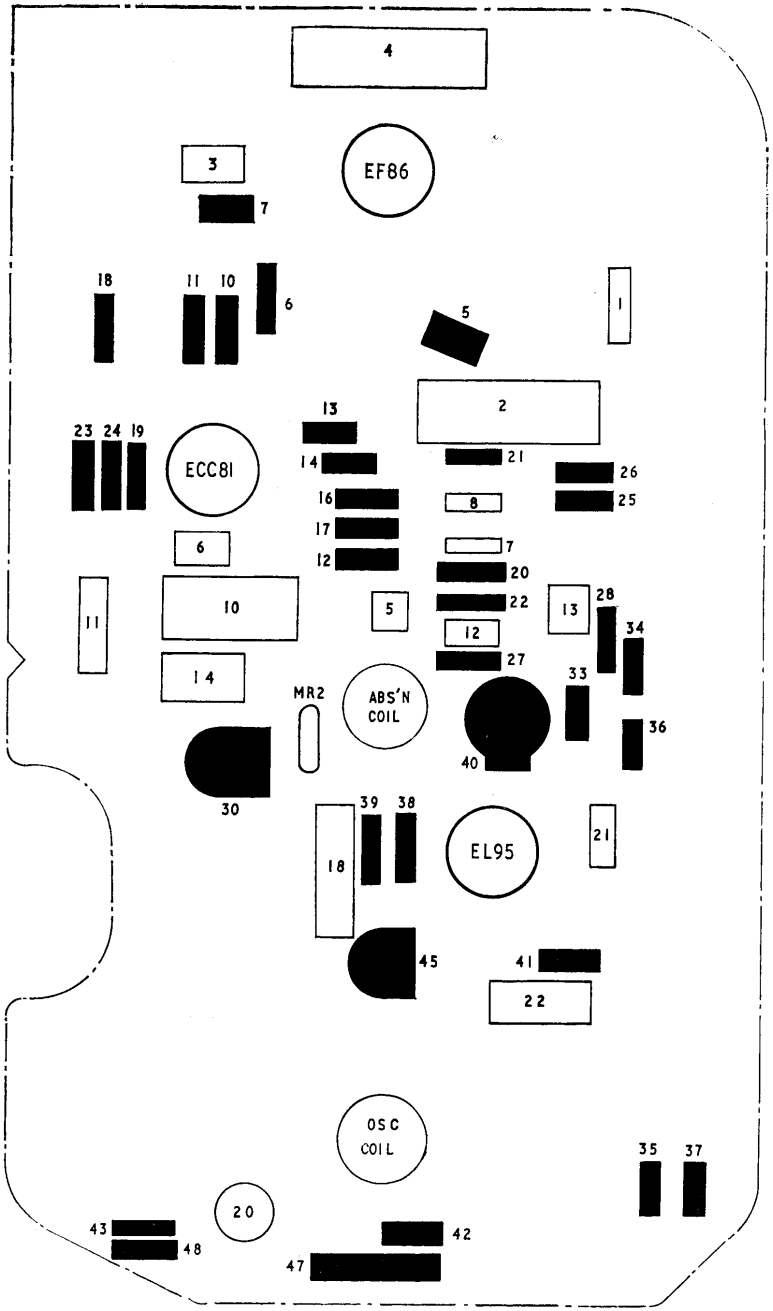
**CONTINUED ON PAGE ii**

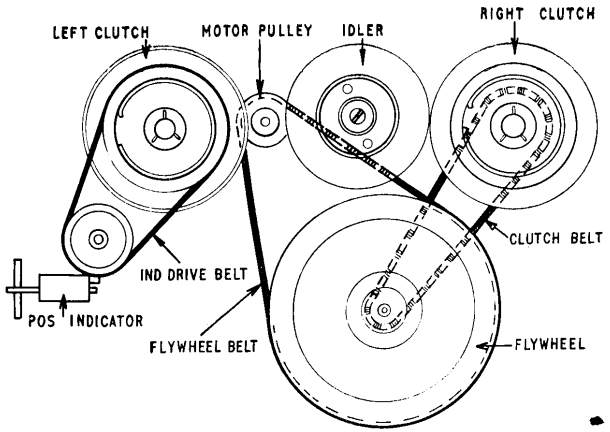


**Model TK23. TK14 is similar in size and appearance except for the track selector switch located between the tape spools which is not fitted**




**Circuit of TK23. Pre-set controls, C17 recording bias, R40 oscillator amplitude, R30 magic eye, R45 humdinger. Manual controls, R4 recording level for 465mV input, R9 recording level for mic and diode input also replay volume control, R29 tone control. All voltages taken with Avo 8**

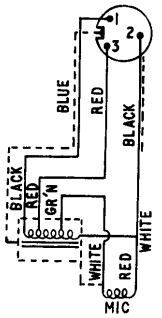


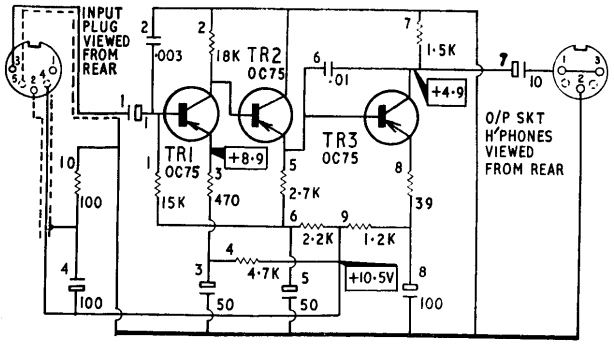

**Above, detail of the drive and indicator belts which applies to both models. The idler is shown in the " stop " position when it is disengaged from the drive**

**Left, TK23 component board layout on the top of the printed circuit**

**Right, circuit diagram of the GDM18 moving-coil microphone which has a 15ohm voice coil and a built-in auto transformer giving low, medium or high impedance outputs**




**Below, circuit of the transistor monitor amplifier MA2 which can be used in conjunction with the TK23. In some units type OC604 transistors may be used instead of type OC75**




# GRUNDIG TK14, TK23—contd.

## DISMANTLING

**Top deck.** Remove four holding screws, pull off track selector knob and lift up back of top cover. Place three fingers of each hand on the keys and carefully lift the front lip of the top with the thumbs.

To refit the top deck place it loosely in position and press the rear well home on to its lip. Depress the operating keys with one hand and push the left corner of the deck downwards with the other hand. Repeat with the right-hand corner, depressing three keys with one hand and locating the top deck with the other.

Note that the shortest one of the four deck mounting screws must be located in the front lefthand position closest to the start key. The printed circuit panel is accessible on removing the bottom screen as follows: loosen four mounting screws holding printed circuit screen to panel and slide the metal screen downwards pulling the screen off. By removing the four screws completely (taking care of the spacers), the printed circuit may be swung outward, though retained by its connecting cables. The machine is fully operational in this position and by standing it on its side all electronic functions may be checked.

When reassembling the printed circuit and replacing on its mounting pillars, care should be taken to see that the recording button swivel bracket engages properly in the slider. The opening on the printed circuit panel allows the relative positions of the slider assembly to be observed.

## SERVICING NOTES

### Replacement of Drive Belts

The drive belt system is shown on this page, and for replacements the following procedure should be adopted: (i) remove mains lead; (ii) remove top deck; (iii) unclip EM84 and base from holding bracket; (iv) remove dust cover from drive spindle; (v) remove indicator drive belt; (vi) remove three countersunk fixing screws of sound channel plate; (vii) remove complete sound channel and top deck fixing bracket under right side of sound channel, moving it forward on its leads; (viii) replace clutch drive and flywheel drive belts as required.

Reassembly should be undertaken in reverse order, ensuring that righthand top deck

fixing bracket is properly positioned with threaded hole uppermost and that it is held by the longest of the three countersunk screws.

## CLUTCHES AND BRAKES

The clutches are of friction type and will not normally need attention. Their felts may be cleaned with methylated spirits and roughened with fine sandpaper. To dismantle remove large spring ring thereby releasing upper clutch spindle and exposing circlip of upper clutch half. This allows cleaning of the felt insert.

Before reassembling, ensure that the plastic washers are undamaged, otherwise wow and flutter may result.

**Brakes.** In the neutral position the brakes are engaged and the operating rods must have a play of at least 1 mm. The lefthand clutch brake exerts force when this clutch is rotated anti-clockwise. The braking ring from the periphery of the righthand clutch is at the same time lifted off; this to prevent the formation of tape loops. For a like reason, braking is applied only to righthand clutch when stopping after fast rewind.

**Tape guides.** It is most important that the tape be guided in a straight line along its entire length of travel. Misalignment here can be corrected by carefully adjusting the tape guides, after which the screws should be re-sealed with sealing lacquer.

**Pressure roller.** This should be kept perfectly clean by treating periodically with methylated spirits. The roller is self-aligning and the pressure should be such that a tape pull occurs, when the machine is running, of 3½oz. for the TK14 and 7 oz. for the TK23.

**Pressure tape.** The tension is fixed and adjustment is not normally required. Periodic cleaning should be carried out with soft brush; damaged pressure tape must be replaced. Ensure that the pressure tape does not foul the mu-metal case of the head or the mu-metal front plate screening.

**Lubrication.** All bearings are of the self-lubricating sintered type and frequent lubrication is unnecessary. A check should be made after 1,000 hours use and if necessary Shell Vitrea Oil No. 21 should be used very sparingly. Metal sliders, push-rod linkages and the two press-button assemblies should be treated with a high viscosity Vaseline grease.

## ELECTRICAL NOTES

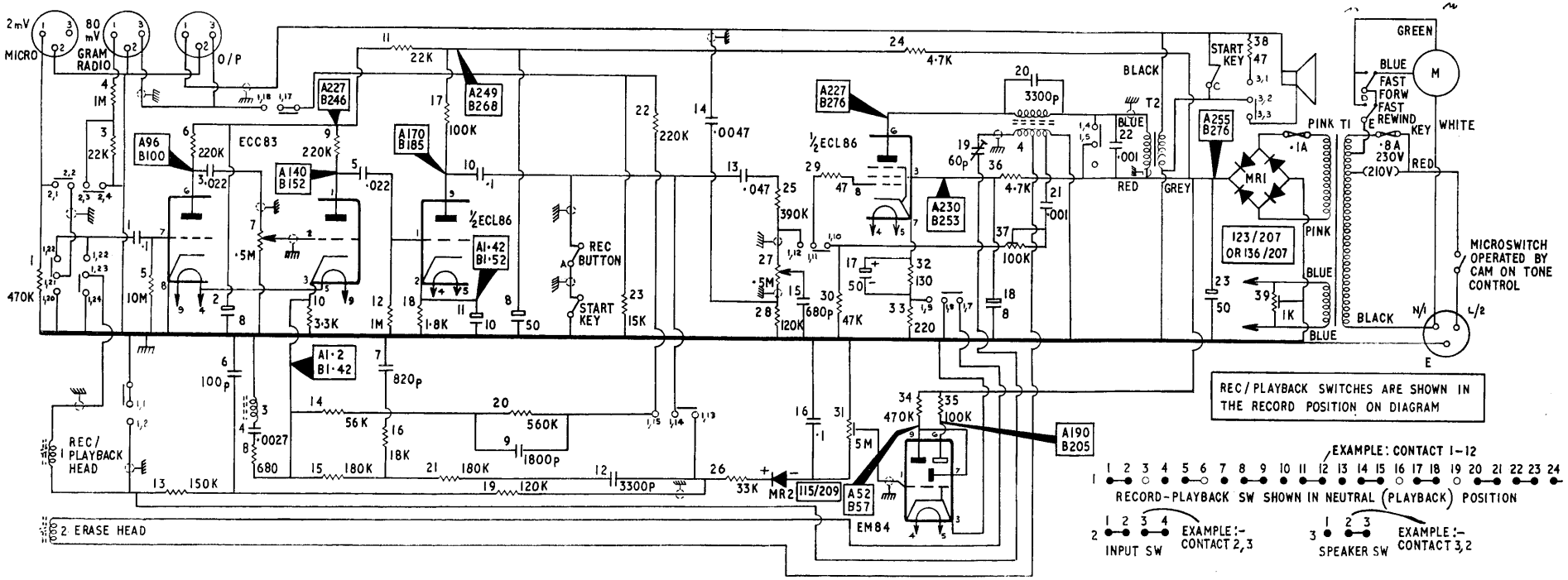
**Head alignment.** Connect valve voltmeter to the high impedance output (TK23 pins 2 and 3 of diode socket and TK14 pins and 2 and 3 of radio/gram socket) and play tape with 6kc/s recording made on "standard" machine. Adjust two screws either side of head for maximum output. Tape guides should also be adjusted at this stage so that gap in upper head system (TK23) protrudes 0.1mm above top edge of tape or (TK14) until pole pieces protrude 0.1mm above top edge of tape.

**Full level recording.** This condition is required for most electronic tests and is obtained when maximum permissible current is fed to the recording head consistent with the tape remaining below saturation.

The conditions for this are: (1) record indicator should close at 1,000c/s, adjust preset level if necessary, (2) input signal for this must not exceed sensitivity figure, (3) current should produce 5mV (TK14) and 4mV (TK23) across a 100ohm resistor in parallel with the head, (4) on playback the signal should produce 500mV (TK14) and 700mV (TK23) at the high impedance output socket, (5) maximum harmonic distortion should not exceed 6 per cent, and (6) hum and noise level under no signal conditions should not exceed 2.5mV (TK14) and 3mV (TK23).

**Head currents and voltages.** Correct HF bias current is 0.6mA (TK14) and 0.22mA (TK23) and should produce 60mV and 22mV respectively on a valve voltmeter connected across a 100ohm resistor inserted in the chassis

CONTINUED ON PAGE Iv




Circuit of TK14. Pre-set controls, C19 recording bias, R37 erase current, R31 magic eye, R39 humdinger. Manual controls, R7 recording level and replay volume, R27 tone

## GRUNDIG TK14, TK23—contd.

return lead of the record head.

TK14 erase current is correct when a valve voltmeter shows 420mV across a 10ohm resistor in the chassis return lead of the head. Adjust R37 as required, rechecking bias current and C19 if necessary. TK23 erase current is correct when a valve voltmeter connected directly across the head gives a minimum reading of 9V for each track. Adjust R40 as required rechecking bias current and C17 if necessary.

**Hum and noise level.** Make full level recording. On playback note output. With tape removed the noise and hum should not exceed −50dB (TK14) and −47dB (TK23) of noted level. Hum level can be adjusted to minimum by R39 (TK14) and R45 (TK23).

**Superimposition.** The TK23 has facilities for superimposing a second recording on an existing one by disconnecting the erase head and switching a dummy load in its place to keep the oscillator output constant. To obtain this facility the start key must be depressed and the record button turned in a clockwise direction and held down for the period required.

**Dual track playback.** (TK23). Selecting position D on the track switch allows tracks 1 and 3 or tracks 2 and 4 to be replayed together by connecting the heads together in series.

### MECHANICAL FAULTS

**Tape does not move after depressing start key.** Check tape threading, pressure between pressure roller and capstan spindle and that pressure roller is free on spindle.

**Incorrect record and play tape speed.** Check tape pull, tape through guides, that left-hand clutch is free, that spools are not scraping against top deck, mains voltage setting, drive belts for twist.

**Tape runs slow on fast wind.** Make checks as above, check for oil on left clutch tyre and on idler pulley—clean if necessary, ensure that correct tape being used.

**Fast wind key jamming.** Check locking bracket adjustment.

**Rapid head wear.** Incorrect tape pressure.

**Tape jumps out of guides.** Check pressure roller adjustment, excessive iron oxide on pressure roller or capstan spindle, check alignment of sound channel, check that correct tape in use.

**Tape moves with no key depressed.** Check and adjust brakes.

**Tape scrapes against edge of spool.** Check for warped spool and alignment of tape guides.

**Flywheel drive belt jumps out of groove.** Adjust motor pulley until centre of belt runs at 14.5 mm above chassis.

### ELECTRICAL FAULTS

**Recording distorted, low volume, no erase.** Indication of bias oscillator failure. Check (TK23) EL95, osc. coil, s/c erase head, slider switch inoperative, record head, C22. (TK14). As above but ECL86 instead of EL95 and C20 instead of C22.

**Crosstalk.** Check setting of tape guides, head alignment, the fitting of the pressure tape.

**Wow and flutter.** Check clutch adjustment, pressure tape, motor pulley adjustment, tension pressure roller, for dirt and oxide on pressure roller and capstan spindle, jamming position indicator, inefficient brakes, flywheel bearing lubrication, for twisted belts.

**High hum level.** Check EF86 and ECC81 (TK23) and ECC83 and ECL86 (TK14), smoothing capacitors and filters, humdinger adjustment.

**No record level indication.** Check EM84, preset R30 TK23 or R31 TK14, MR2 rectifier.

**Recording level too low.** Check HT voltage, EF86 and ECC81 (TK23) and ECC83 (TK14), slider switch.

**Low playback gain.** Check HF bias, for dirt on heads, output transformer, HT voltage, tape pressure, tape for type and twist.

**No playback.** Check contacts at1, st1 and tt2 TK23 and contact B TK14, for muted speaker—check contacts st2 and tt3 TK23 and contact C TK14, speaker switch.



Printed in Great Britain by Odhams Press Limited, 93 Long Acre, London, W.C