
FERGUSON

Model 3T18

General Description: A three-waveband A.M./F.M. stereo radio cassette-recorder with Dolby noise reduction and operating from mains or battery supplies. A digital clock is incorporated and sockets are provided for auxiliary inputs and stereo headphones.

Mains Supply: 240 volts, 50Hz.

Batteries: 12 volts (8×HP2).

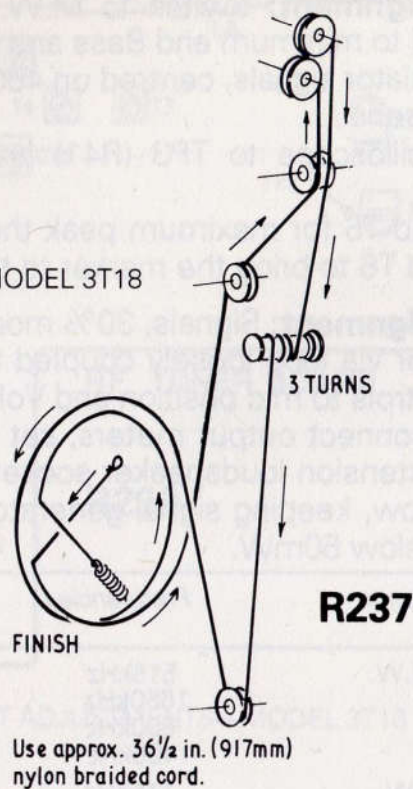
Wavebands: 150–270kHz; M.W. 520–1620kHz; F.M. 87.5–108MHz.

Bias: 85kHz pprox.

Access for Service

Remove 6 screws from the back cover and pull-off aerial lead from P.C.B. To remove front cover, take out two screws either side of cassette compartment and lift-off cover and envelope. Remove control knobs and prise top edge away from clips. Pull off attached socket.

(R237) DRIVE CORD—MODEL 3T18

**I.C. 801 Voltages:**

Pin	M.W. (1000kHz) Display		M.W. (200kHz) Display		F.M. (MHz) Display	
	Off	On	Off	On	Off	On
7	2.3	1.8	3.8	1.8	3.8	1.7
2	2.3	1.8	3.8	1.8	3.8	1.7
3	1.8	—	2.4	—	1.7	—
4	1.8	1.8	2.0	1.8	2.2	1.7
5	1.8	1.8	2.0	1.8	1.7	1.7
6	1.7	1.1	3.0	1.1	1.7	1.1
7	2.5	0	1.9	0	1.7	7.2
8	1.2	0	1.9	0	1.7	1.7
9	1.7	0	1.9	0	1.7	0
10	1.7	—	1.7	—	1.4	—
11	1.7	7.9	1.7	7.9	1.4	7.8
12	2.2	0.6	2.7	0.6	1.4	0.6
13	1.7	1.7	1.7	1.7	1.4	1.7
14	1.7	—	1.7	—	1.4	—
15	2.2	0	2.7	0	1.4	0
16	1.7	7.9	1.7	7.9	1.4	7.8
17	1.7	7.9	1.7	7.9	1.4	7.8
18	1.7	—	1.7	—	1.7	—
19	1.7	0	1.7	0	1.7	0
20	2.2	4.1	2.2	4.1	2.2	4.1

Alignment (See Fig. R239)

A.M. I.F. Alignment: Switch to M.W.; Loudness control (S106) OFF; Volume control to minimum and Bass and Treble controls to mid-position.

Inject wobbulator signals, centred on 460kHz, via a loop loosely coupled to the ferrite rod aerial.

Connect oscilloscope to TP3 (R41) and set tuning gang to minimum capacity.

Adjust T5 and T6 for maximum peak then switch on 460kHz marker and readjust T5 and T6 to bring the marker to the peak of the curve.

A.M. R.F. Alignment: Signals, 30% modulated, are injected from an A.M. signal generator via loop loosely coupled to the ferrite rod aerial. Set Bass and Treble controls to mid position and Volume control to maximum. Switch to Mono and connect output meters, set to 4 ohms minimum, via suitable plugs to the extension loudspeaker sockets. Inject and tune to frequencies as detailed below, keeping signal generator output low enough to maintain audio output below 50mW.

<i>Range</i>	<i>Frequencies</i>	<i>Adjust for max.</i>
M.W.	515kHz	T4
	1650kHz	CT4
	600kHz	L8*
	1400kHz	CT3
L.W.	145kHz	T3
	280kHz	CT6
	160kHz	L7*
	250kHz	CT5

* Adjust by sliding coils along ferrite rod.

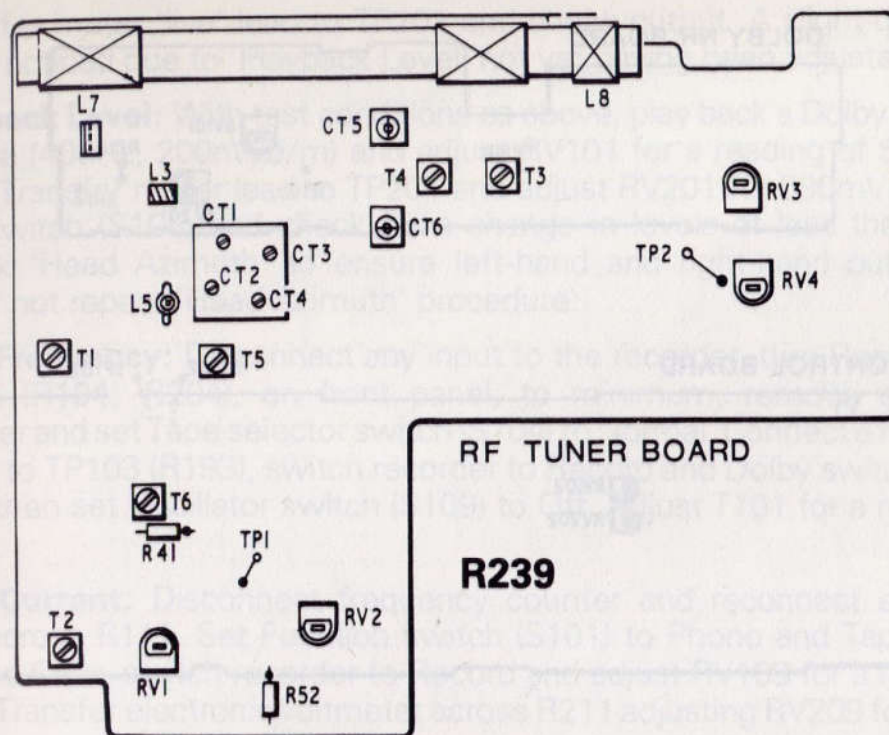
Repeat adjustments on both ranges until no further improvement results.

F.M. I.F. Alignment: Signals are injected from a V.H.F. wobbulator, terminated with a 75 ohm resistor, between pins 2 and 3 of PL1. Set wobbulator to sweep 200kHz either side of 10.7MHz with a marker at 10.7MHz. Set tuning gang to minimum capacitance; Volume control at minimum, Loudness control switched off and Bass and Treble controls at mid-position.

Switch receiver to V.H.F. and connect an oscilloscope to TP4 (R52) then adjust T1 for a symmetrical response with the 10.7MHz marker at the peak of the curve. Adjust T2 for a symmetrical 'S' curve with the 10.7MHz marker at the centre of the straight section of the curve. Repeat adjustments until no further improvement results.

F.M. R.F. Alignment: Signals, modulated 1kHz (22.5kHz deviation), are injected from an F.M. signal generator, terminated with a 75 ohm resistor, and a 10nF capacitor in series with 'live' lead between pins 2 and 3 of PL1. Connect, with suitable plugs, output meters set to 4 ohms impedance to the extension loudspeaker sockets.

Set Volume control at maximum with Bass and Treble controls at mid-



(R239) ALIGNMENT ADJUSTMENTS—MODEL 3T18

position and Loudness control switched off. Inject and tune to frequencies as detailed below keeping signal generator output as low as possible so that audio output does not exceed 50mW.

Range	Frequencies	Adjust for max.
F.M.	87MHz	L5
	109MHz	CT2
	90MHz	L3*
	106MHz	CT1

* Adjust by slightly opening or closing coil turns.

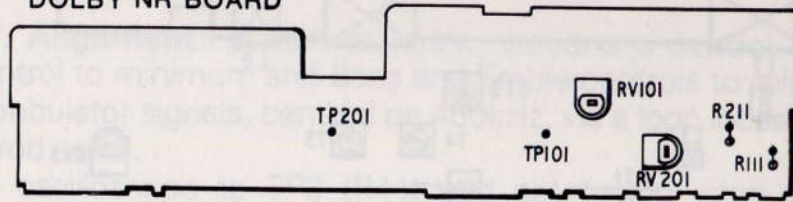
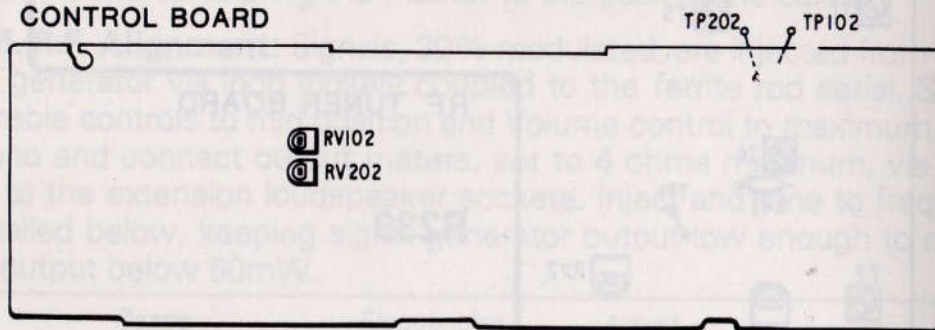
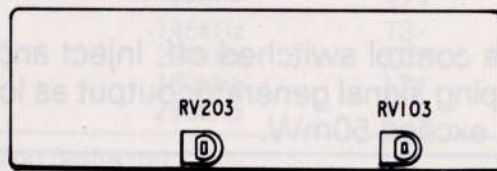
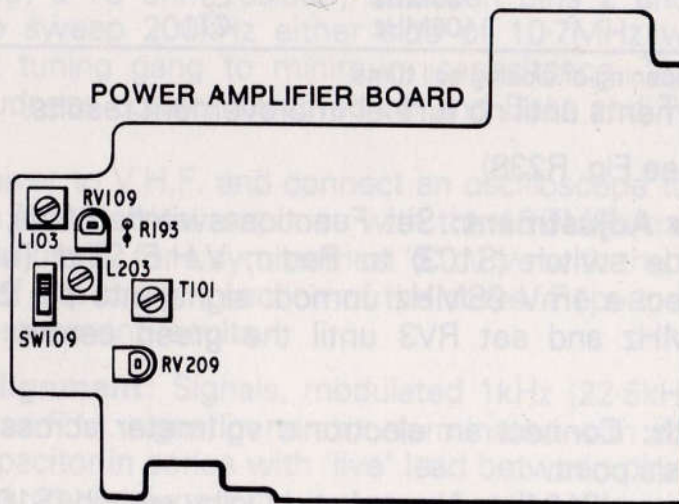
Repeat adjustments until no further improvement results.

Adjustments (See Fig. R238)

Tuning Meter Adjustment: Set Function switch (S101), Meter switch (S102) and Mode switch (S103) to Radio, V.H.F. and Tuning positions respectively. Inject a 1mV 98MHz unmod. signal into pin 2 of PL1. Tune receiver to 98MHz and set RV3 until the green centre 'L.E.D. is fully illuminated.

Head Azimuth: Connect an electronic voltmeter across TP101 and a convenient chassis point.

Set Tape selector (S104) to Normal and Dolby switch (S105) to Off. Play back a standard azimuth tape and adjust the azimuth screw for maximum reading on meter.

DOLBY NR BOARD**CONTROL BOARD****LED BOARD****R238****POWER AMPLIFIER BOARD**

(R238) ELECTRICAL ADJUSTMENTS—MODEL 3T18

Transfer meter 'live' lead to TP201 and check output. A slight difference may be noticed due to 'Playback Level' not yet having been adjusted.

Playback Level: With test conditions as above, play back a Dolby standard test tape (400Hz, 200nWb/m) and adjust RV101 for a reading of 580mV at TP101. Transfer meter lead to TP201 and adjust RV201 for 580mV. Operate Dolby switch (S105) and check for a change in levels of less than $\pm 1\text{dB}$. Recheck 'Head Azimuth' to ensure left-hand and right-hand outputs are equal, if not repeat 'Head Azimuth' procedure.

Bias Frequency: Disconnect any input to the recorder, turn Record Level controls (R104; R204), on front panel, to minimum, remove electronic voltmeter and set Tape selector switch (S104) to Normal. Connect a frequency counter to TP103 (R193), switch recorder to Record and Dolby switch (S105) to Off, then set Oscillator switch (S109) to Off. Adjust T101 for a reading of 85kHz.

Bias Current: Disconnect frequency counter and reconnect electronic meter across R111. Set Function switch (S101) to Phono and Tape switch (S104) to CrO₂, switch recorder to Record and adjust RV109 for a reading of 5.4mV. Transfer electronic voltmeter across R211 adjusting RV209 for 5.4mV.

Bias Trap: Return Function switch (S101) to Tape and switch recorder to Record. Connect an oscilloscope to TP102 and adjust L103 for minimum display.

Transfer oscilloscope to TP202 and adjust L203 for minimum display.

Note: These test points are two short black leads soldered to the Control Board to facilitate connections.

Recording Current: Connect the electronic voltmeter to TP101 with Function switch (S101) and Tape switch (S104) switched to Tape and Metal respectively. Set recorder to Record and inject a 400Hz signal to the microphone socket (J101).

Adjust Record Level control (RV104), on front panel, to centre of its track. Reset 400Hz signal so that 580mV appears at TP101.

Make a recording at this level using Metal tape then playback and check the replay output at TP102. If 580mV is not shown at TP102 adjust RV102 for this value.

Make similar recordings on Normal and Chrome tapes and note that the same level is obtained on replay.

Signal Strength Meter Adjustment: Set Function switch (S101) to Phono and Meter switch (S102) to Level positions. Connect the electronic voltmeter to TP101. Inject a 400Hz signal to pin 3 of Phono socket (J104). Adjust RV104 to produce 580mV at TP101. Finally adjust RV103 until the +3 L.E.D. is fully illuminated.

Repeat operations for right-hand channel with meter connected to TP201. Injecting signal to pin 5 and adjusting RV204, RV203 to illuminate the right-hand channel L.E.D.

