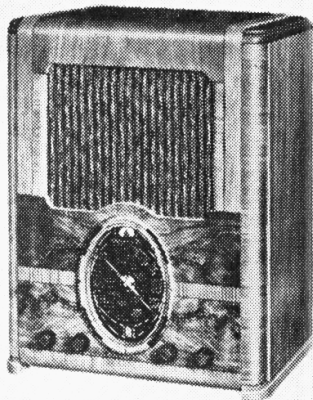


'TRADER' SERVICE SHEET

# 302

# FERGUSON 503,

503C, 503RG, 503T, 503CT, 503RGT



**T**HE Ferguson 503 receiver has an 8-valve (plus rectifier) AC 4-band superhet chassis suitable for mains of 200-250 V, 50-60 C/S, and covering short-wave ranges of 12-35 and 25-70 m. An identical chassis is fitted in the 503C console and 503RG radio-gramophone but this *Service Sheet* was prepared on a 503.

The chassis in the 503T table model receiver, 503CT console and 503RGT radio-gramophone is very similar but in these models the short-wave ranges are

Choke-fed tuned-grid coupling by **L6, C6** and, on MW and LW, **C8**, and tuning coils **L7** (SW1), **L8** (SW2), **L9** (MW) and **L10** (LW) which are tuned by **C42, L9** (MW) and **L10** (LW) which are tuned by **C42, L9** and heptode frequency changer valve (**V2, National Union 6A7**). Oscillator grid coils **L11** (SW1), **L12** (SW2), **L13** (MW) and **L14** (LW) are tuned by **C43**; parallel trimming by **C44** (SW1), **C45** (SW2), **C46** (MW) and **C12, C47** (LW); series tracking by **C48** (SW1), **C49** (SW2), **C50** (MW) and **C51** (LW). Reaction by coils **L15** (SW1), **L16** (SW2), **L17** (MW) and direct coupling on LW.

Third valve (**V3, National Union 6D6**) is a variable-mu pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C52, L18, L19, C53** and **C54, L20, L21, C55**.

**Intermediate frequency 465 KC/S.**

Diode second detector is part of double-diode triode valve (**V4, National Union 75**). Audio frequency component in rectified output is developed across load resistance **R14** and passed via AF coupling condenser **C19** and manual volume control **R13** to CG of triode section, which operates as AF amplifier. Variable tone control by RC filter **R12, C18**, and provision for connection of gramophone pick-up, across **C19, R13**. IF filtering by **R11, C16, C17**.

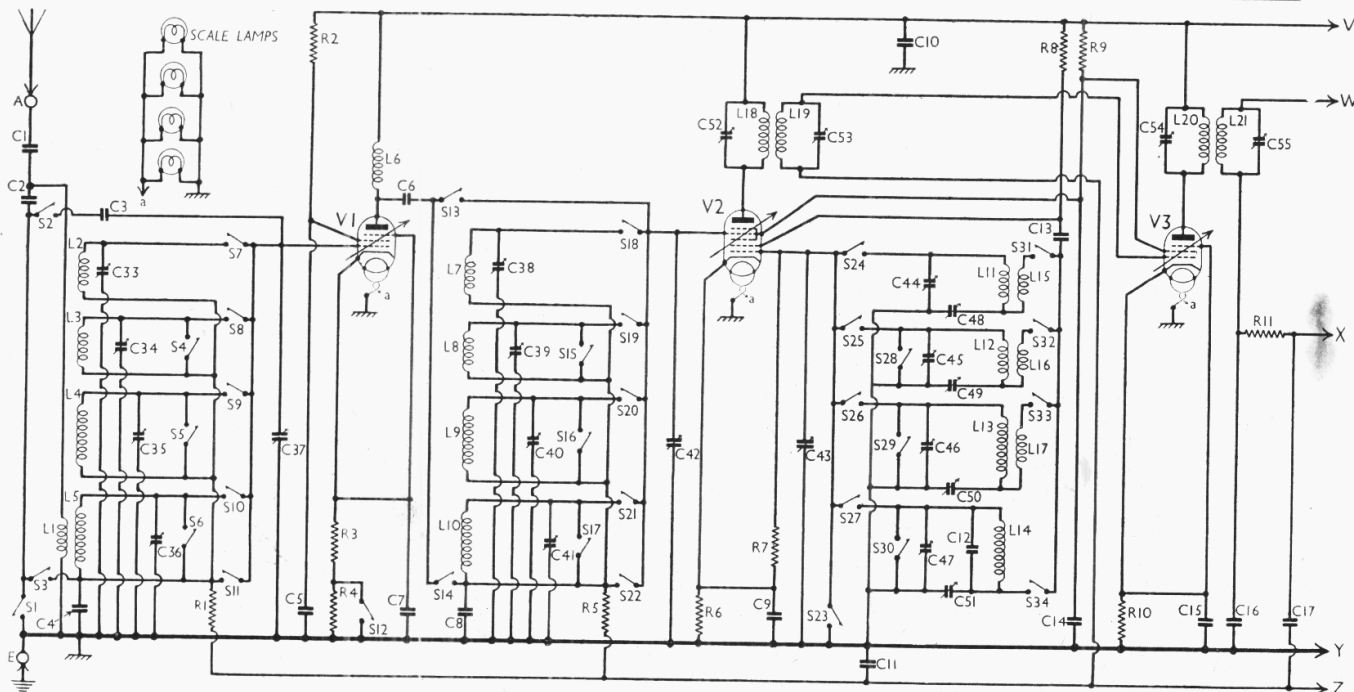
Second diode of **V4**, fed via **C20** from **L21**, provides DC potential which is developed across load resistance **R19** and fed back through decoupling circuits as GB to RF, FC and IF valves, giving automatic volume control.

On MW and LW only, noise suppressor valve (**V9, National Union 76**), operating as a diode with anode and cathode strapped, may be connected across **V4** signal diode output by closing the local-distant switch **S37**, thus damping the AF circuit.

(**V8, National Union 80**). Smoothing by speaker field **L24** and electrolytic condensers **C30, C31**. RF filtering in HT circuit by **C10** and in mains circuit by **C32**.

**COMPONENTS AND VALUES**

RESISTANCES		Values (ohms)
R1	V1 CG decoupling .. ..	500,000
R2	V1 SG HT feed .. ..	100,000
R3	V1 fixed GB resistances .. ..	300
R4	V1 fixed GB resistances .. ..	5,000
R5	V2 tetrode CG decoupling .. ..	500,000
R6	V2 fixed GB resistance .. ..	200
R7	V2 osc. CG resistance .. ..	25,000
R8	V2 osc. anode HT feed .. ..	25,000
R9	V2, V3 SG's HT feed .. ..	50,000
R10	V3 fixed GB resistance .. ..	300
R11	IF stopper .. ..	25,000
R12	Variable tone control .. ..	500,000
R13	Manual volume control .. ..	500,000
R14	V4 signal diode load .. ..	500,000
R15	V4 GB resistance .. ..	10,000
R16	V4 triode and V5 anodes' decoupling .. ..	100,000
R17	V4 triode anode load .. ..	250,000
R18	AVC line decoupling .. ..	500,000
R19	V4 AVC diode load .. ..	500,000
R20	V5, V7 CG resistances .. ..	500,000
R21	V5, V7 CG resistances .. ..	50,000
R22	V5 GB resistance .. ..	10,000
R23	V5 Anode load resistance .. ..	250,000
R24	V6 CG resistance .. ..	500,000
R25	V6, V7 GB resistance .. ..	300
R26	T1 anode HT feed .. ..	250,000



16-50 and 75-175 m. The differences in these models are explained under "General Notes."

**CIRCUIT DESCRIPTION**

Aerial input via series condenser **C1** and, on SW, condenser **C2** and coupling condenser **C3**; on MW **C2** and coupling condenser **C4**; on LW coupling coil **L1**; to single tuned circuits **L2, C37** (SW1), **L3, C37** (SW2), **L4, C37** (MW) and **L5, C37** (LW). **C2** is connected across **L1** to remove a resonance; **C4** acts as a coupling impedance on MW; **L1** also prevents hum modulation.

First valve (**V1, National Union 6D6**) is a variable-mu pentode operating as RF amplifier.

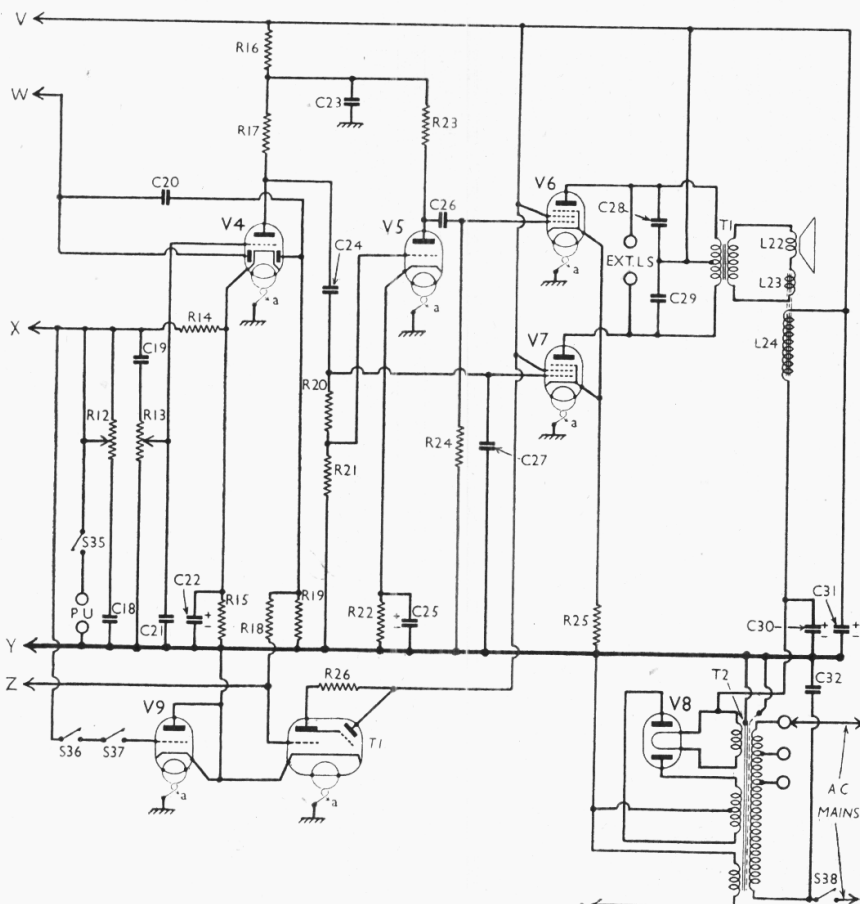
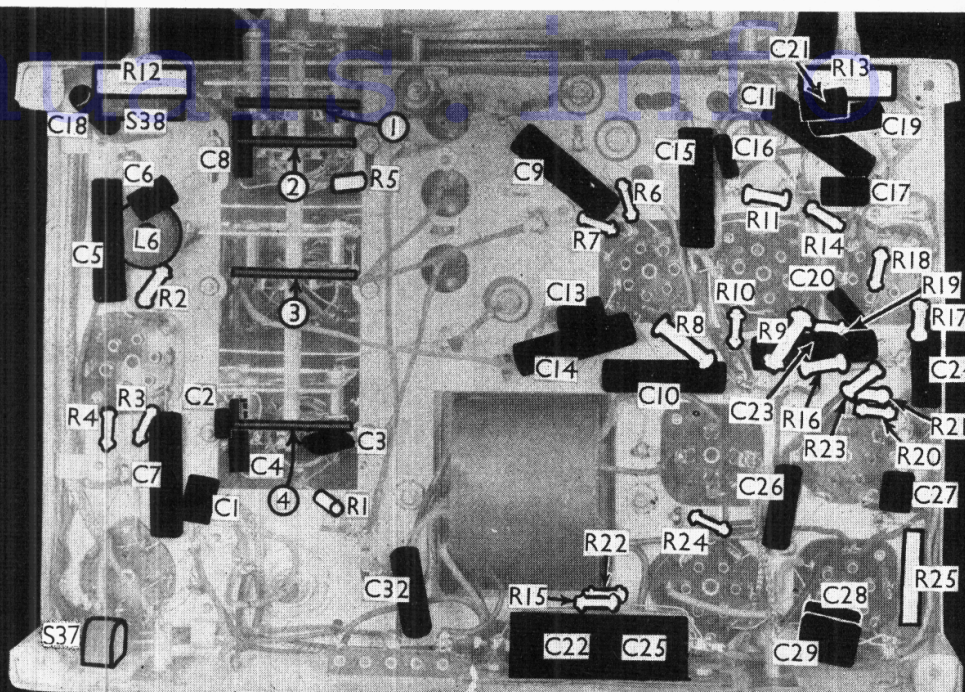
Operating potential for tuning indicator (**T1, National Union 6G5**) is obtained from AVC line.

Resistance-capacity coupling by **R17, C24** and **R20, R21, C27**, between **V4** triode and one section (**V7**) of push-pull output stage comprising two pentodes (**V6, V7, National Union 42**s). Second section (**V8**) is fed by phase reversing valve (**V5, National Union 76**), which obtains its input voltage from the junction of **R20, R21**. Fixed tone correction in output stage by **C28, C29**. Provision for connection of high impedance external speaker across primary of **T1**.

HT current is supplied by full-wave rectifying valve

Circuit diagram of the Ferguson 503 AC superhet. The same chassis is also fitted in several other models, while the 503T chassis is similar except for the wavelength range of the two SW bands. The diagram continues over to the opposite page.

Under-chassis view. S37 is the local-distant switch. The four rotary switch units are indicated by arrows, and are shown in detail in the diagrams on page VIII. The condensers C22 and C25 are two dry electrolytics in a single carton.



CONDENSERS		Values (μF)
C1	Aerial series condenser	0.00025
C2	Aerial coupling condenser	0.00025
C3	Aerial SW1, SW2 coupling	0.00002
C4	Aerial MW coupling	0.002
C5	V1 SG decoupling	0.1
C6	Part of V1 to V2 RF coupling	0.00005
C7	V1 cathode by-pass	0.1
C8	V1 to V2 MW and LW coupling	0.002
C9	V2 cathode by-pass	0.1
C10	HT circuit RF by-pass	0.1
C11	AVC line decoupling	0.1
C12	Osc. circuit LW trimmer	0.00007
C13	V2 osc. anode coupling	0.00025
C14	V2, V3 SG's decoupling	0.1
C15	V3 cathode by-pass	0.1
C16	IF by-pass condensers	0.00025
C17	Part of variable tone control	0.004
C18	AF coupling to V4 triode	0.01
C19	AF coupling to V4 triode	0.01
C20	Coupling to V4 AVC diode	0.00025
C21	IF by-pass	0.00025
C22*	V4 cathode by-pass	25.0
C23	V4, V5 anodes' decoupling	0.1
C24	V4 triode to V5 and V7 AF coupling	0.01
C25*	V5 cathode by-pass	5.0
C26	V5 to V6 AF coupling	0.01
C27	Fixed tone correctors	0.001
C28	Fixed tone correctors	0.002
C29	Fixed tone correctors	0.002
C30*	HT smoothing	8.0
C31*	Mains RF by-pass	16.0
C32	Aerial circuit SW1 trimmer	0.01
C33†	Aerial circuit SW2 trimmer	—
C34†	Aerial circuit MW trimmer	—
C35†	Aerial circuit LW trimmer	—
C36†	V2 CG circuit SW1 trimmer	—
C37†	V2 CG circuit SW2 trimmer	—
C38†	V2 CG circuit MW trimmer	—
C39†	V2 CG circuit LW trimmer	—
C40†	V2 CG circuit tuning	—
C41†	Oscillator circuit tuning	—
C42†	Osc. circuit SW1 trimmer	—
C43†	Osc. circuit SW2 trimmer	—
C44†	Osc. circuit MW trimmer	—
C45†	Osc. circuit LW trimmer	—
C46†	Osc. circuit SW1 tracker	—
C47†	Osc. circuit SW2 tracker	—
C48†	Osc. circuit MW tracker	—
C49†	Osc. circuit LW tracker	—
C50†	Osc. circuit tuning	—
C51†	Osc. circuit tuning	—

Continued overleaf

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**FERGUSON 503—Continued**

CONDENSERS (Continued)		Values ( $\mu$ F)
C52†	1st IF trans. pri. tuning	—
C53†	1st IF trans. sec. tuning	—
C54†	2nd IF trans. pri. tuning	—
C55†	2nd IF trans. sec. tuning	—

\* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial LW coupling coil	125.0
L2	Aerial SW1 tuning coil	Very low
L3	Aerial SW2 tuning coil	0.05
L4	Aerial MW tuning coil	3.2
L5	Aerial LW tuning coil	18.0
L6	V1 anode RF choke	117.0
L7	V2 CG SW1 tuning coil	Very low
L8	V2 CG SW2 tuning coil	0.05
L9	V2 CG MW tuning coil	3.2
L10	V2 CG LW tuning coil	17.5
L11	Osc. circuit SW1 tuning coil	Very low
L12	Osc. circuit SW2 tuning coil	Very low
L13	Osc. circuit MW tuning coil	2.2
L14	Osc. LW tuning and reaction	4.0
L15	Oscillator SW1 reaction	0.4
L16	Oscillator SW2 reaction	1.0
L17	Oscillator MW reaction	0.7
L18	1st IF trans.	Pri. 9.0
L19		Sec. 13.0
L20	2nd I.F. trans.	Pri. 13.0
L21		Sec. 9.0
L22	Speaker speech coil	1.8
L23	Hum neutralising coil	0.1
L24	Speaker field coil	1,000.0
T1	Speaker input	Pri., total 725.0
		Sec. 0.3
T2	Mains	Pri., total 17.0
		Heater sec. 0.05
		Rect. heat. sec. 0.1
	HT sec., total	220.0
S1-S34	Waveband switches	—
S35	Gram. PU switch	—
S36	V9 control switch	—
S37	Local-distant switch	—
S38	Mains switch, ganged R12	—

**DISMANTLING THE SET**

**Removing Chassis.**—To remove the chassis from the cabinet, remove the knobs (pull off) and the felt washers from the four control spindles. Now remove the four bolts (with washers and spring washers) holding the chassis to the bottom of the cabinet, when the chassis can be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes.

If the valves are removed, it should be noted when replacing them that the screens go on **V1, V2, V3, V4, and V5.**

If it is desired to free the chassis entirely, unsolder the speaker leads and when replacing, connect them as follows:— F and 2 joined, red: 3, blue; 1, blue; F, red, white.

**Removing Speaker.**—To remove the speaker from the cabinet, unsolder the leads and remove the nuts from the four screws holding it to the sub-baffle. When replacing, see that the transformer is on the left and connect the leads as above.

**VALVE ANALYSIS**

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 6D6	255	5.6	72	1.5
V2 6A7	255	2.1	62	2.7
	Oscillator			
V3 6D6	133	4.4	62	1.2
	255	4.5		
V4 75	61	0.2	—	—
V5 76	45	0.4	—	—
V6 42	24.5	24.0	255	5.2
V7 42	24.2	31.0	255	6.2
V8 80	343†	—	—	—
V9 76	—	—	—	—
T.L. 6G5	43	0.9	—	—
	Target			
	255	0.7	—	—

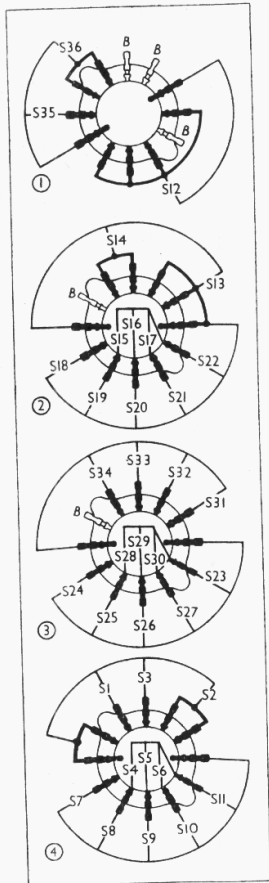
† Each anode AC.

Valve voltages and currents given in the table above are those measured in our receiver when it was operating on mains of 226 V, using the 220-230 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and the volume and local-distant controls were at maximum (the latter down), but there was no signal input.

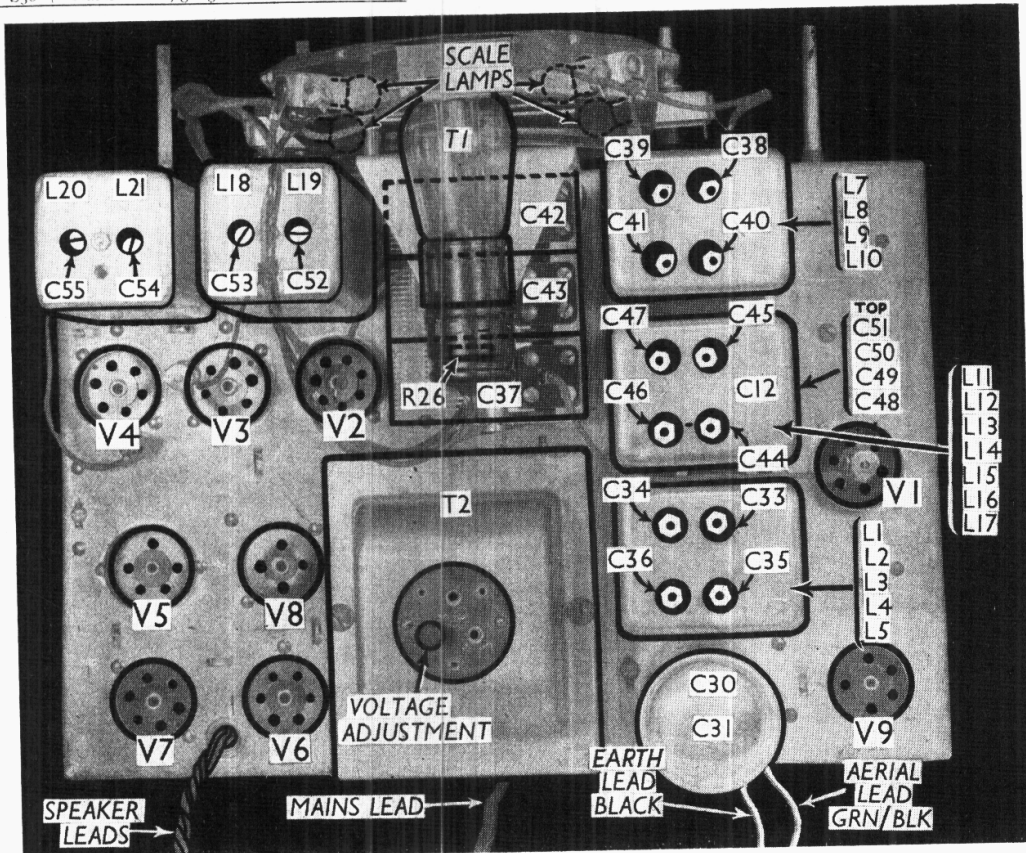
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**SWITCH TABLE AND DIAGRAM**

Switch	SW1	SW2	MW	LW	Gram
S1	—	—	—	C	—
S2	C	C	—	—	—
S3	—	—	C	—	—
S4	C	—	—	—	—
S5	—	—	—	—	—
S6	C	C	C	—	—
S7	—	—	—	—	—
S8	—	C	—	—	—
S9	—	—	C	—	—
S10	—	—	—	C	—
S11	—	—	—	—	C
S12	C	C	C	—	—
S13	C	C	—	—	—
S14	—	—	C	C	—
S15	C	—	—	—	—
S16	C	C	—	—	—
S17	C	C	C	—	—
S18	C	—	—	—	—
S19	—	C	—	—	—
S20	—	—	C	—	—
S21	—	—	—	C	—
S22	—	—	—	—	C
S23	—	—	—	—	C
S24	C	—	—	—	—
S25	—	C	—	—	—
S26	—	—	C	—	—
S27	—	—	—	C	—
S28	C	—	—	—	—
S29	C	C	—	—	—
S30	C	C	C	—	—
S31	—	—	—	—	—
S32	—	C	—	—	—
S33	—	—	C	—	—
S34	—	—	—	C	—
S35	—	—	—	—	C
S36	—	—	C	C	—



Switch diagrams, as seen from the underside of the chassis, looking in the directions of the arrows in the under-chassis view.



Plan view of the chassis. R26 is inside the T1 holder.

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