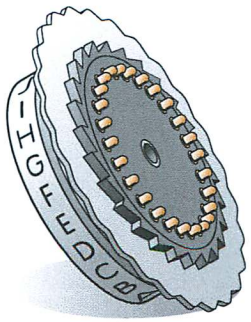
EC Mark III

Modification Instructions for Easy Chair Mark III Equipment

31 July 1963

Project Easy Chair



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1. General.

The modification is intended to update excisting EC-Mk III equipment.
The modification consists of a replacement master oscillator unit for the transmitter and an auxiliary i.f. tuning unit for the receiver.
The required modification of circuitry restricts itself to the EC-Mk III main cabinet.
The actual modification procedure will be described in a logical step-by-step order.
It is recommended to follow the instructions and the respective figures closely in order to avoid confusion.
Revised operating and servicing instructions, as well as additional technical information on new or added circuitry, will be found in "Manual amendment for updated EC-Mk III equipment", dated July 3rd, 1963.

2. Replacement master oscillator unit.

1. Remove perforated top cover from EC-Mk III main cabinet.
2. Remove rear cover.
3. Remove cover on left-hand side (when facing equipment).
4. Remove master oscillator box lid.
5. Remove oscillator tubes (EC81, 2 off).
6. Remove 2 bead capacitors between master oscillator Lecher lines and grid terminals on buffer amplifier socket.
7. Remove r.f.c. between top center strip of Lecher lines and feedthrough condenser on transmitter chassis.
8. Remove coaxial l.o. cable, originating on the oscillator box's cable clamp, from central cable clamp on r.f. receiver unit.
9. Remove 4 cylinder head machine screws fixing the master oscillator box to the transmitter chassis. These screws will be found at the bottom of the main chassis along the rim of the box. The oscillator box can be removed then.
10. Unsolder and unscrew all components such as Lecher lines, tube sockets, etc., associated with the former master oscillator circuit.
11. Remove the feedthrough capacitor for the buffer and oscillator heater voltage and restore buffer heater supply on the top side of the chassis from a second feedthrough capacitor directly beneath the buffer tube bottom to the common connection between buffer heater chokes. The feedthrough capacitor to be removed is located centrally and next to the large oblong hole formerly passing the Lecher lines.

12. Clean the cleared area from dust etc. The chassis is now ready to accept the replacement master oscillator unit.
13. Mount the new master oscillator unit on the transmitter chassis, using the same fixing holes. Eventual slight misalignment of holes should be corrected on the master oscillator box.
14. Mount the pair of coaxial trimmer condensers, as supplied, on the topside of the transmitter chassis between the buffer tube grid terminals and the teflon-bushed output terminals of the new master oscillator. Physical symmetry is recommended, whilst the adjusting rods of the trimmer condensers should be running in a vertical line. This step is illustrated on photograph fig. 5.
15. Solder the red master oscillator h.t. wire to the feedthrough capacitor, formerly carrying the h.t. to the top of the Lecher lines via a r.f.c. This capacitor already carries a dark green wire from the transmitter's main wire harness.
16. Solder the light green master oscillator heater wire to the central feedthrough capacitor carrying the buffer heater voltage. This capacitor already carries a light green wire from the transmitter's main wire harness.
17. Connect the free end of the coaxial l.o. power cable, attached with its other end to the new master oscillator box, to the central coaxial cable clamp on the receiver r.f. unit, preserving the entire cable length as supplied. Bend and lead this cable between units such that it will not obstruct the cabinet rear cover or other components.
18. A white lead, carrying the buffer's d.c. grid current, runs from the buffer stage through the transmitter's main wire harness to the second terminal of a 9-way ceramic terminal block near the center of the transmitter chassis, where it meets a blue -20 Volt lead from the cabinet's main wire harness. Disconnect this blue lead from the terminal strip and tape it off for insulation as this wire will no longer be used.
19. Mount a 100 ohms, $\frac{1}{2}$ Watt resistor on the ceramic terminal strip mentioned before, from the terminal formerly carrying the blue -20 Volt wire (and now still carrying the white lead to the buffer amplifier grid circuit) to the second-next terminal where it will join a white lead of the cabinet's main wire harness and one side of another 100 ohms $\frac{1}{2}$ Watt resistor on the transmitter chassis.
20. Slide the perforated transmitter cover in position again and mark the spot where the excisting square perforation holes should be enlarged such that access is allowed for the trimming to 1 when buffer grid trimmers have to be adjusted. The trimming tool is part of the modification kit.

21. Make sure that all modification steps have been performed completely and check for accidental damage to other parts of the circuitry. Check for and remove eventual alien particles in the equipment such as bits of wire or solder. Subsequently the perforated top cover and the cabinet's left-hand side panel can be mounted again.
This will complete the modification of the master oscillator section.

3. Auxiliary i.f. tuning unit.

1. Remove frontpanel switch S6, labeled "SUBC. TUNING" with the condensers C106-C107-C108 mounted on it.
2. Remove electrolytic condenser C109 (250 mF., 12,5 Volts) between front panel rear side and i.f. box.
3. Remove L14, C65, C78 and C94 from the i.f. box interior. These components may be located and checked by consulting figures 1, 2 and 3.
4. Check that a 5,2 mm diameter hole in the i.f. box excists at the spot indicated in figure 3. Some equipments may not have this hole, in which case a drilling operation is required. Slip the ceramic feedthrough terminal, supplied with the modification outfit, into the hole and fix it with the corresponding lock spring.
5. Use the former L14 hole, eventually enlarged to some extent, to mount the 3-way ceramic terminal strip holding R118 and C132. Connect the pre-cut and pre-bended wires on this terminal strip to the appropriate points indicated in fig. 2 and 3.
6. Connect the R57 terminal, formerly also holding one end of C65, to the ceramic feedthrough mentioned under 4.
7. Mount bead condenser C131 between chassis and the ceramic feedthrough mentioned under 4.
8. Locate an excisting ceramic feedthrough, formerly used for connection to the tuning switch and now still holding condenser C63.
From this feedthrough a wire runs to the yellow (base) lead of transistor V17. Change over the feedthrough end of this wire from the feedthrough terminal to the red (collector) lead of transistor V16, such that V17 base connects to V16 collector.
9. Use a piece of new wire to connect the feedthrough terminal just mentioned with the junction of blue V17 emitter lead and on side of R55.
10. The new terminal board and the cable to the auxiliary unit are mounted in the hole formerly occupied by tuning switch S6. Figure 4 should be consulted for the correct order of assembly. A special spanner is supplied with the modification outfit in order to tighten the hexagonal nut of the assembly. This nut should be tightened before leads or components are mounted.
11. Mount the terminal board components as shown in figures 3 and 4.

12. Inspect the area worked over during the modification for any wire or solder particles left around accidentally. Check that no components or leads have been damaged or displaced in the process.
It will be noticed that resistor R77 is connected at one side only. This resistor is of no further usage and may eventually, although not necessarily, be removed.
13. The i.f. section modification is completed now and electrical tests in conjunction with the auxiliary unit may be performed. For this we refer to the manual amendment.

4. Revision of excisting EC-Mk III manual

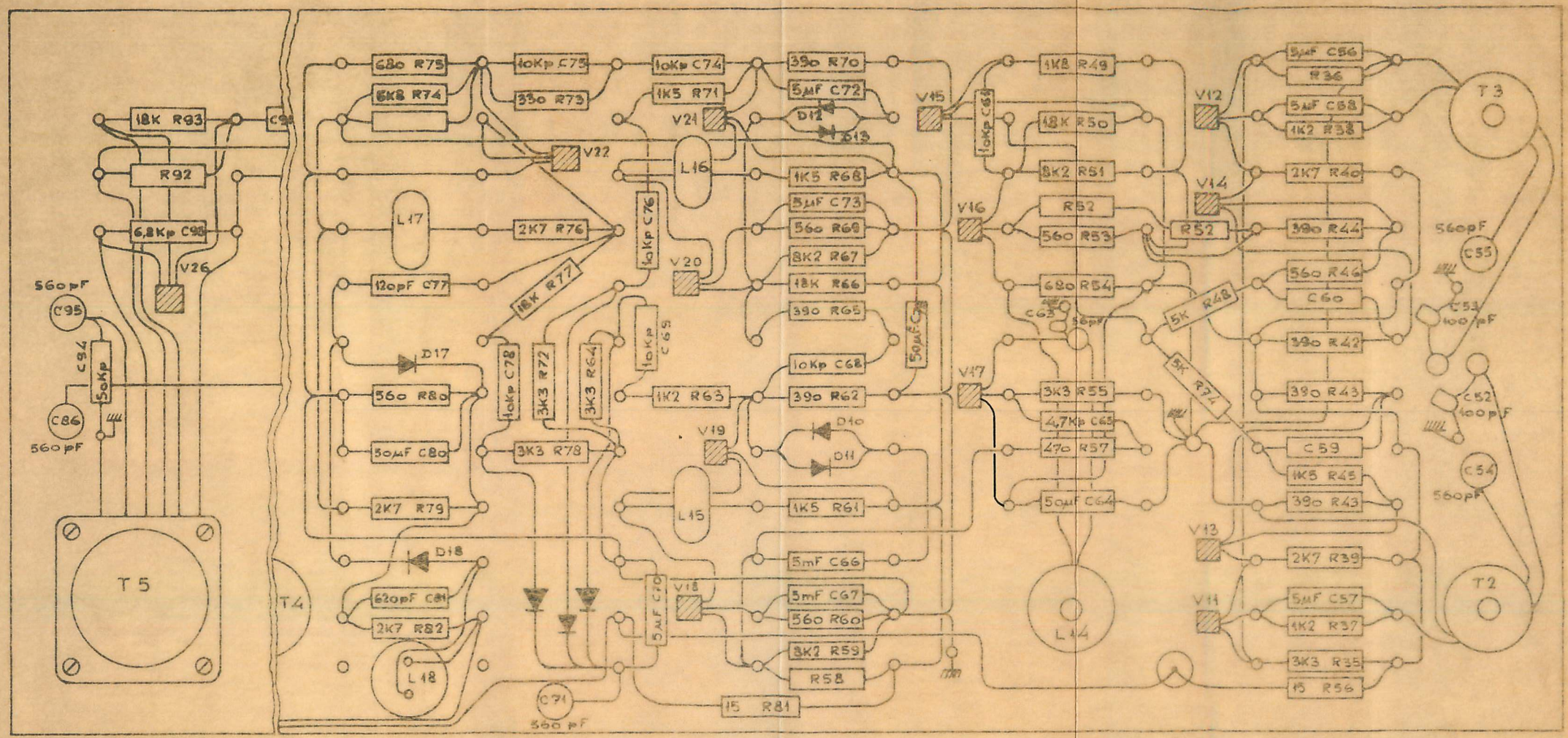
It is recommended to modify the schematics no 1, 3 and 8 of the original EC-Mk III manual such that the all changes or additions are included. We refer partly to the manual amendment mentioned under 1, and partly to the step-by-step instructions above. In addition a complete revised shematic of the main equipment's i.f. section is included with the present instructions.

The original lists of components should be amended as follows:

Fig. 3 Add :	C68A	0,022	mF	10%	125 V	polyester	Philips
	C74A	"		"	" "	"	"
	C77A	270	pF	2%		mica-molded	"
	C93A	3300	"	10%	400 V	polyester	"
	C131	56	"	Ceramic bead condenser			"
	R118	1000	ohms	10%	½W	carbon	Rosenthal.

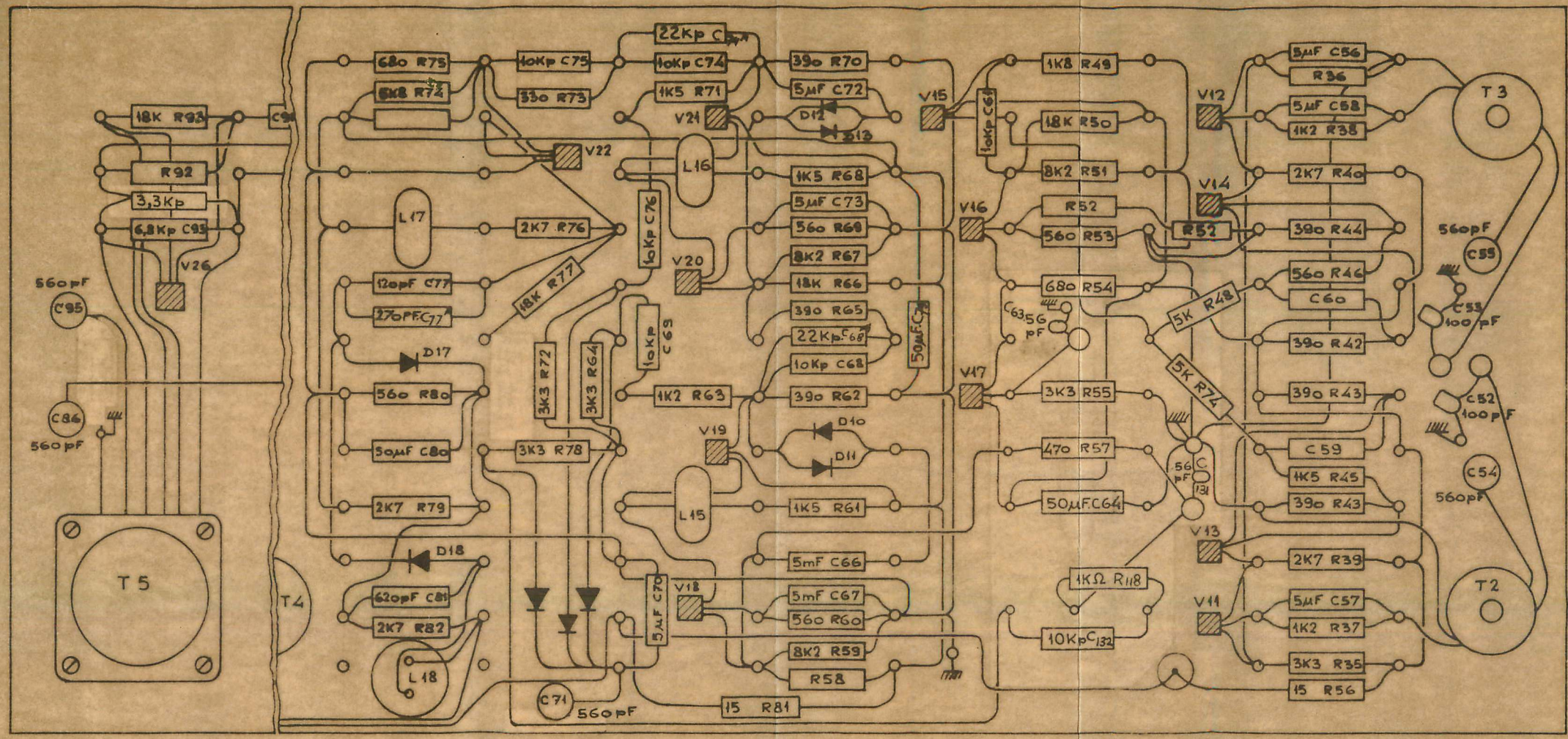
Delete: L14, C65, C78 and C94.

Fig. 8 Delete: S6, C106, C107 and C108.



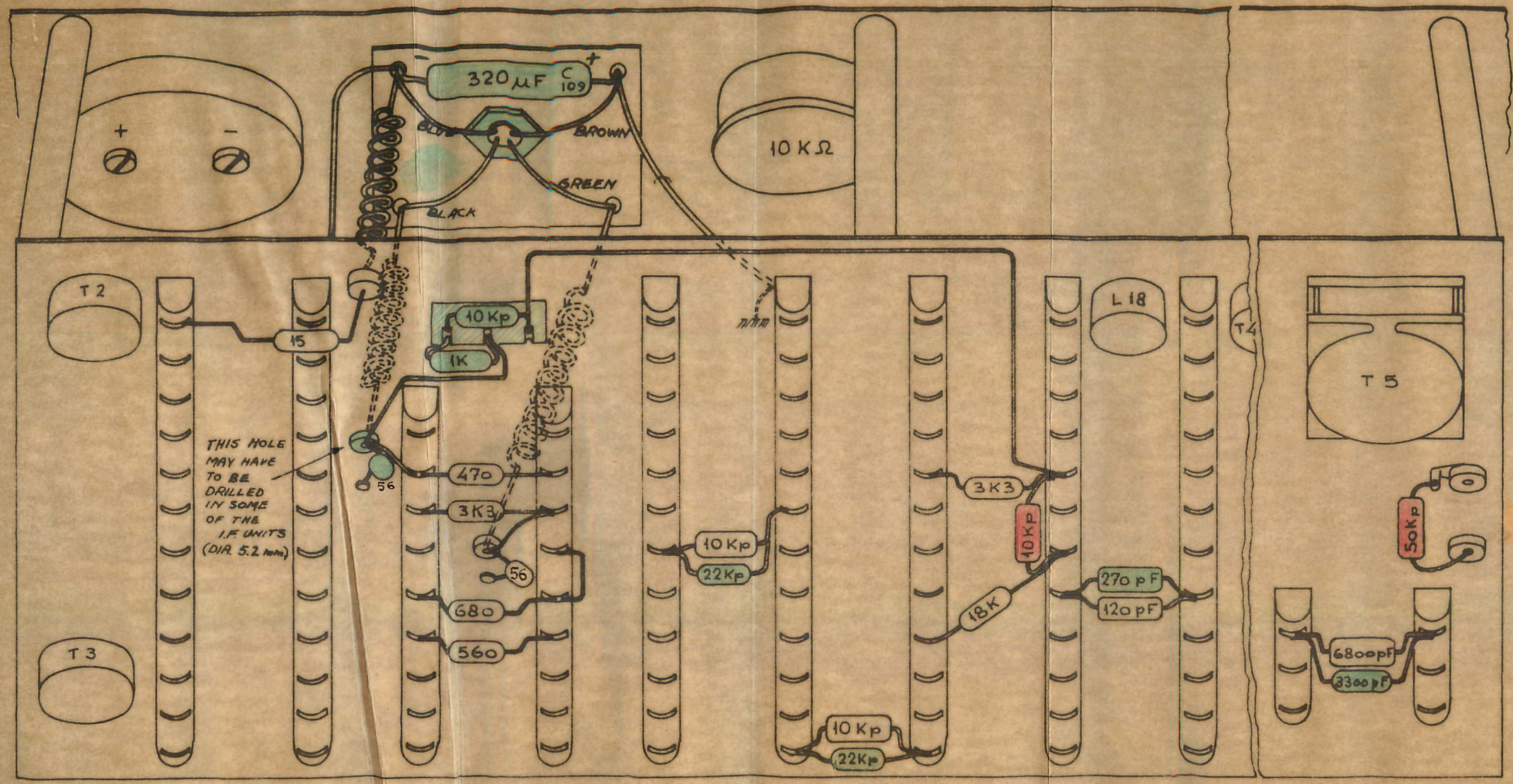
IF COMPONENT LAYOUT
BEFORE MODIFICATION

FIG. 1



IF COMPONENT LAYOUT
AFTER MODIFICATION

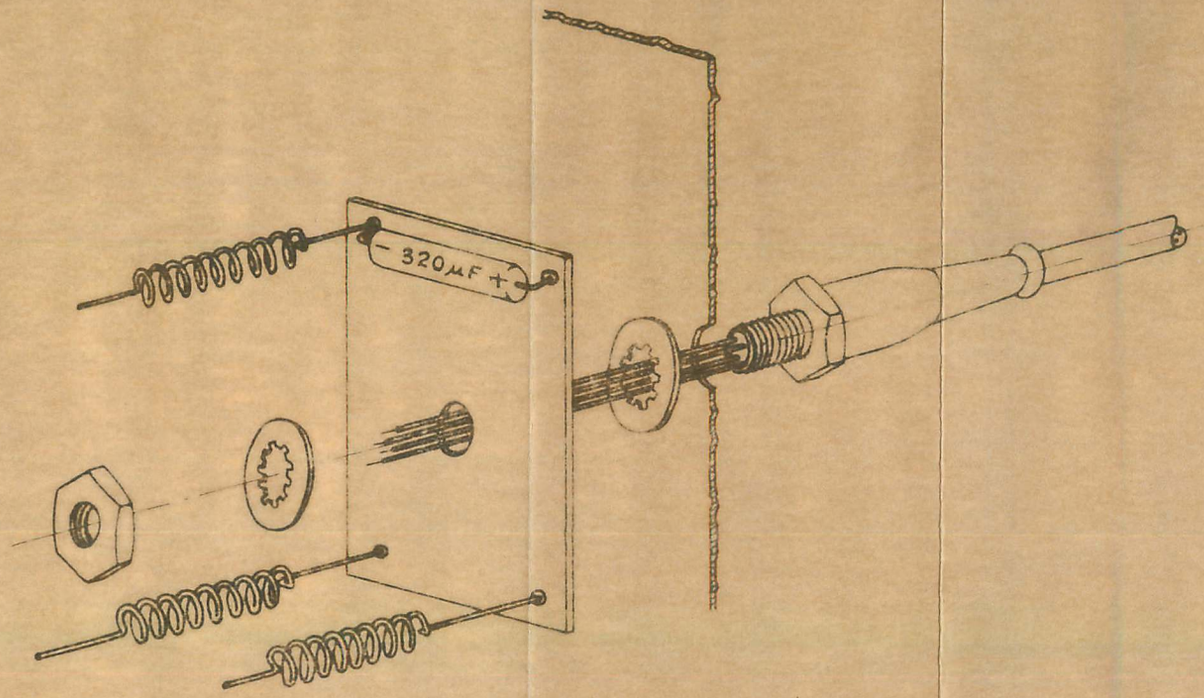
FIG. 2



RED : TO BE REMOVED
GREEN: TO BE ADDED

PERSPECTIVE VIEW OF I.F. MODIFICATION

FIG. 3



CABLE ENTRY &
TERMINAL BOARD
(EXPLODED VIEW)

FIG. 4

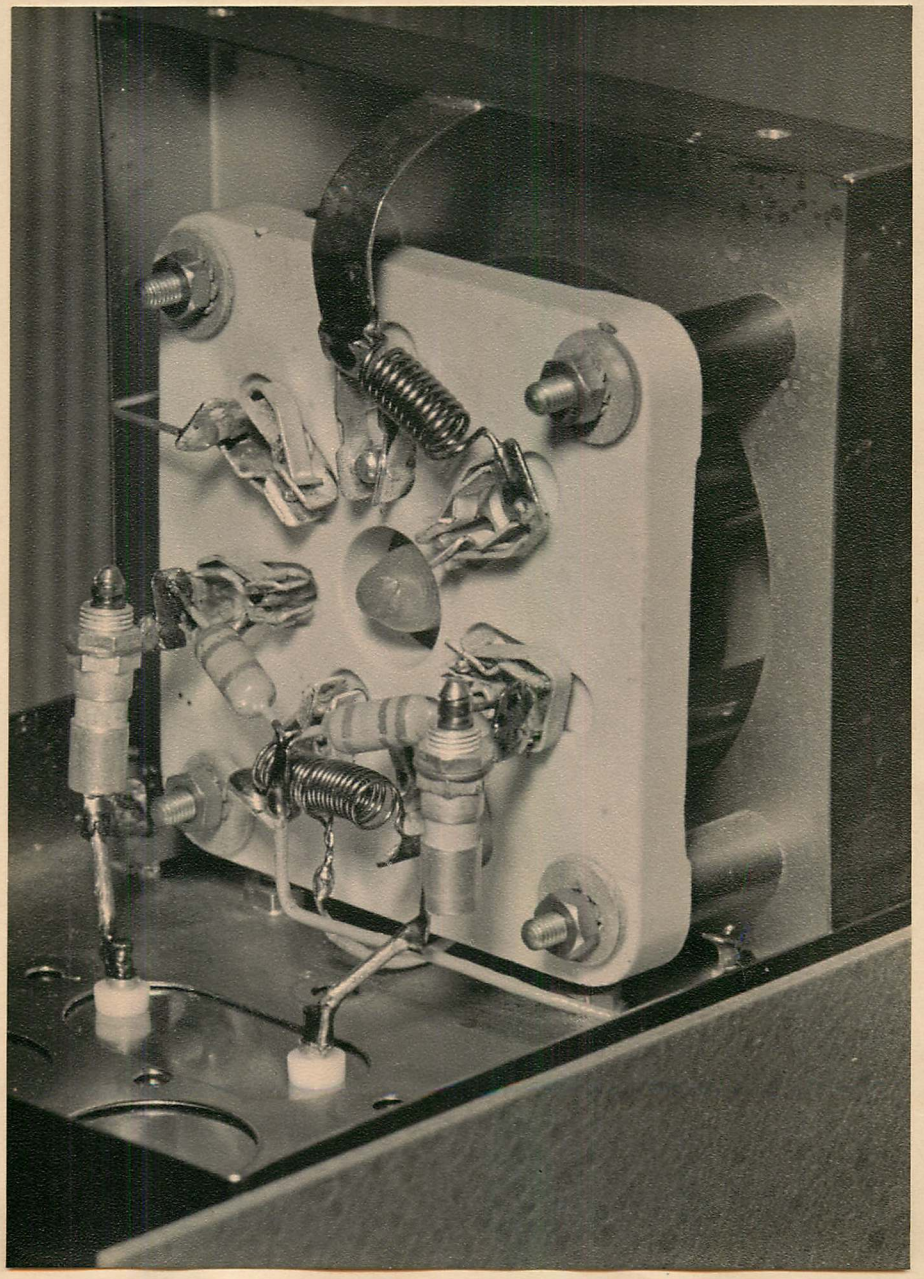
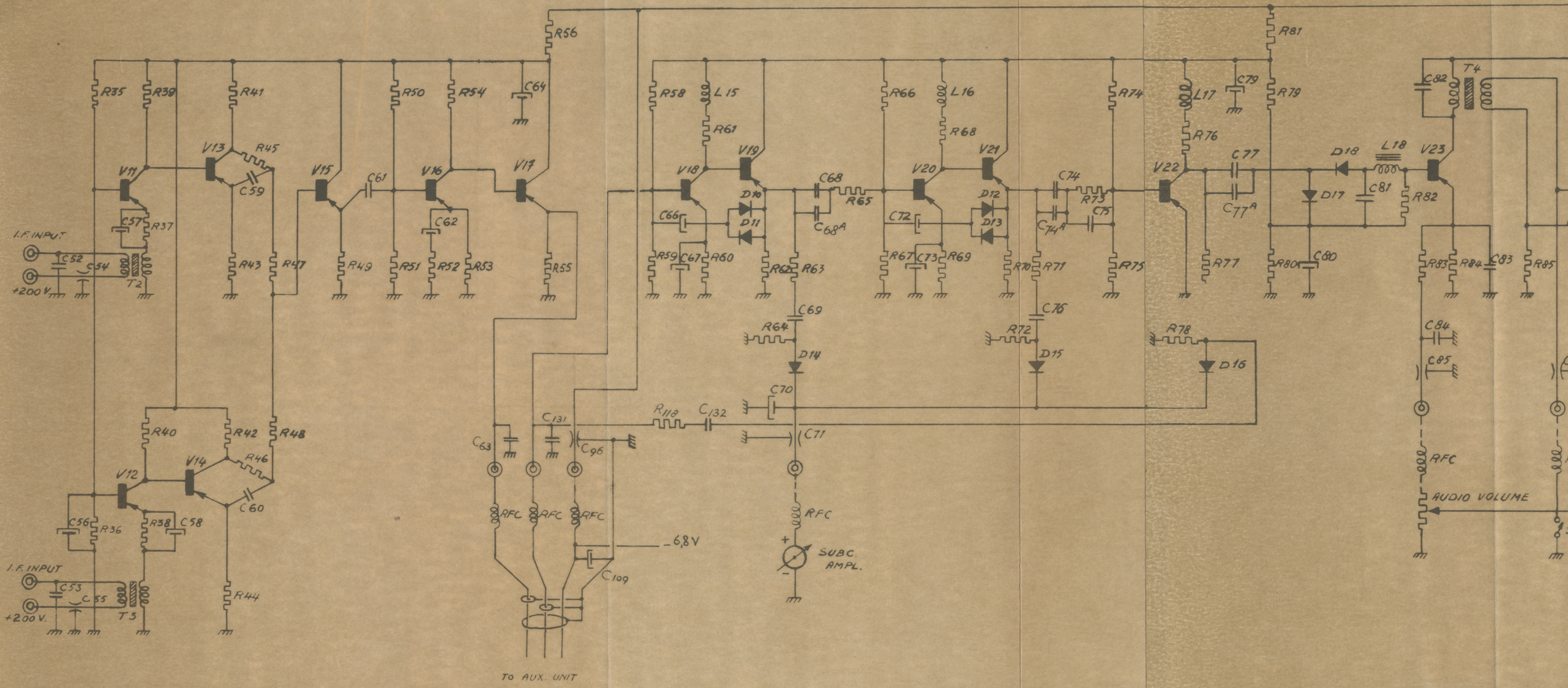
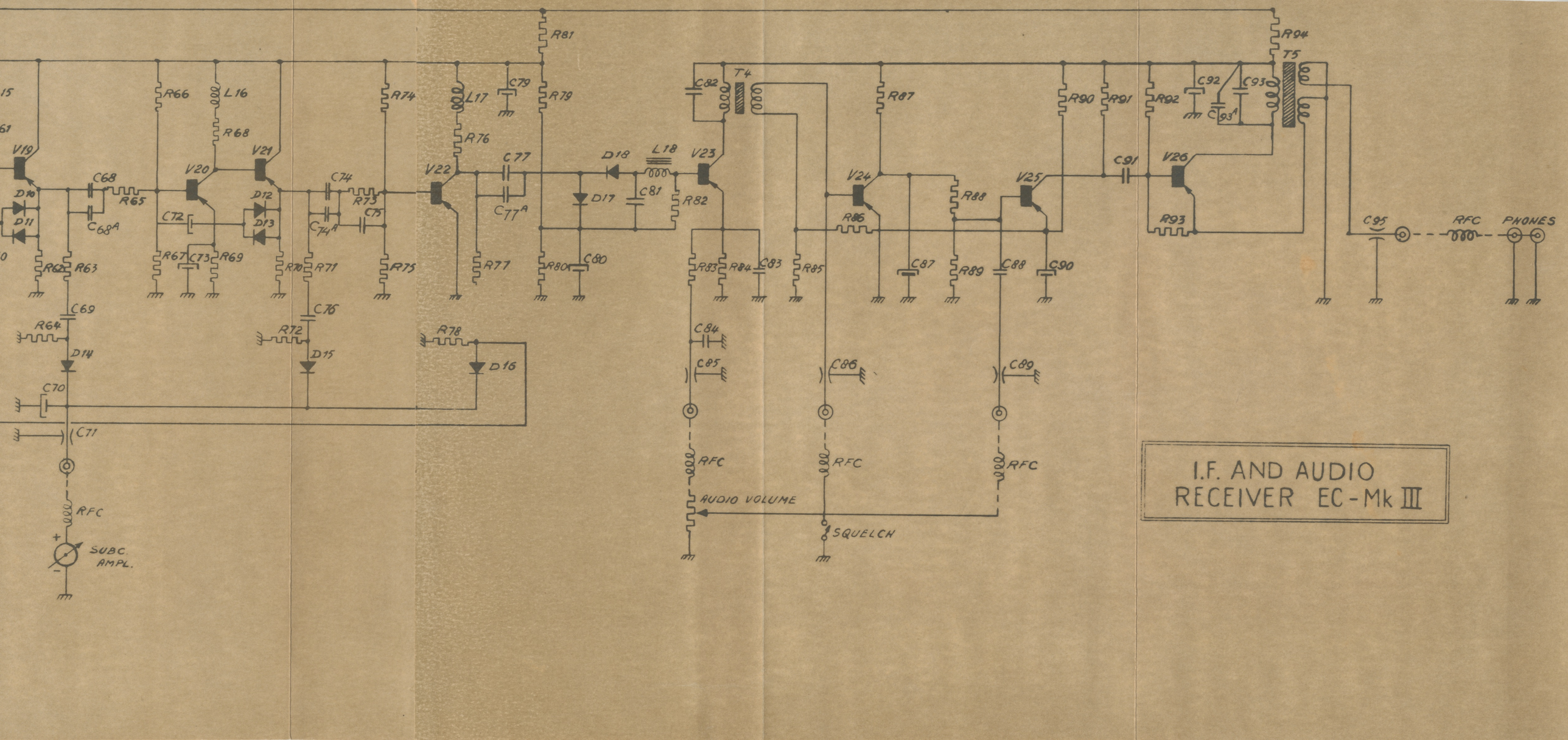


FIG. 5


I.F. INPUT
+200 V.
I.F. INPUT
+200 V.
TO AUX. UNIT
-6,8 V
RFC
SUBC. AMPL.
AUDIO VOLUME
T2
T3
T4



I.F. AND AUDIO RECEIVER EC-Mk III