



TANDBERG® TPT 3011

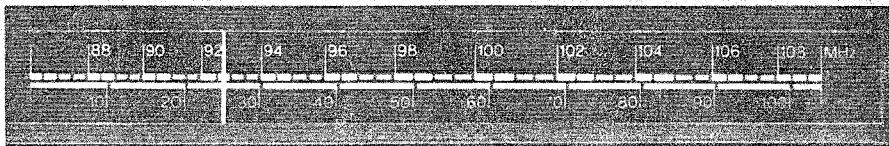
Circuit Diagrams and Alignment Instructions

SH098/32

cy :

TANDBERG Programable FM Tuner 3011

Tuning



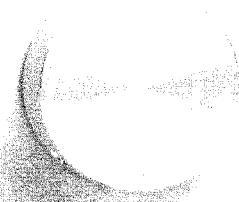
Δf

MPX

Mono

Servo

Muting



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Dial cord drive

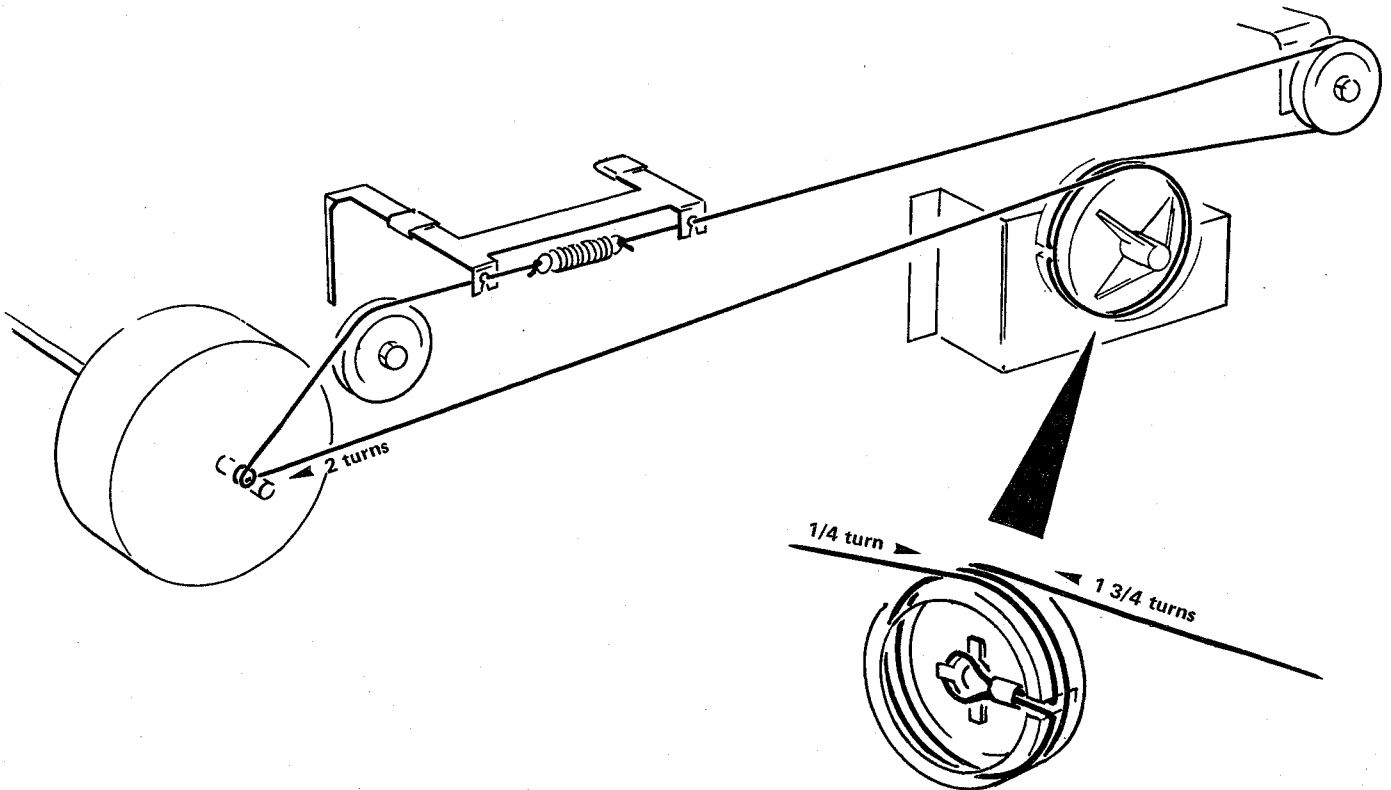
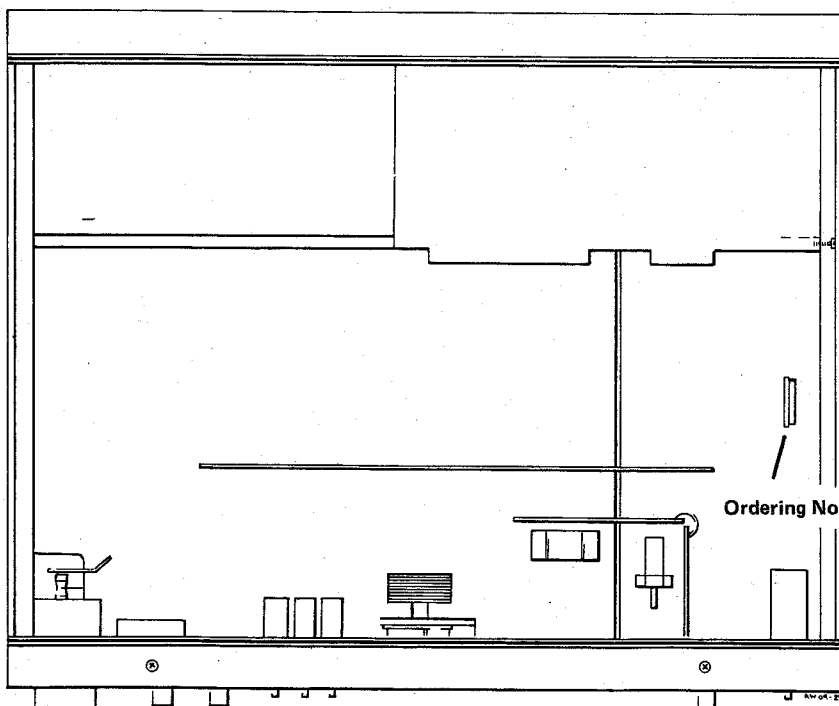


Figure 3 Dial cord drive

Replacing battery in the tuning memory circuit



The memory is powered by an internal battery so that the stored data is not lost when the receiver is switched off.

The battery is the NiCd type, 1.4 V, and is charged continuously when the receiver is switched on.

Under normal conditions the battery will have a life of 10 years.

Figure 4 The tuning circuit battery

Electrical service

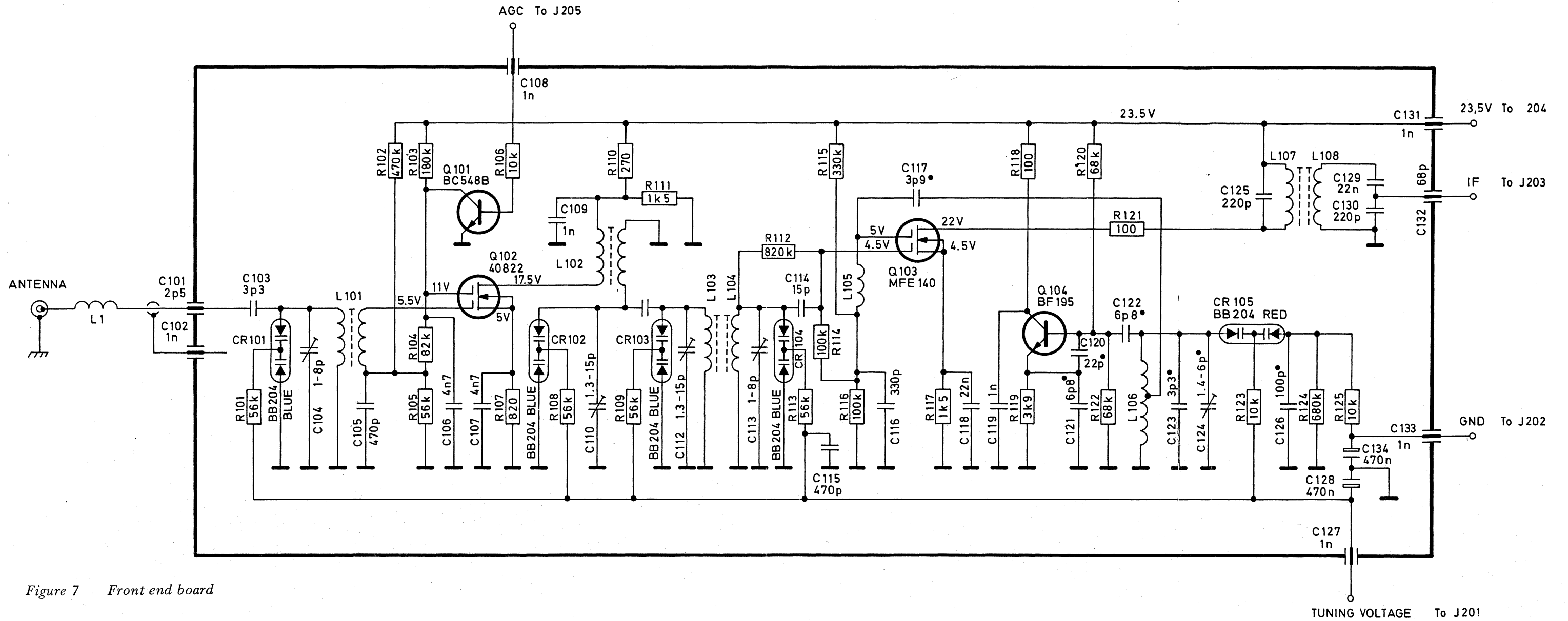


Figure 7 Front end board

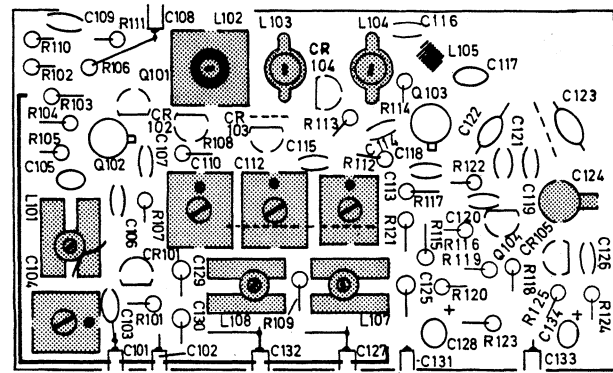


Figure 8 Front end board, component side

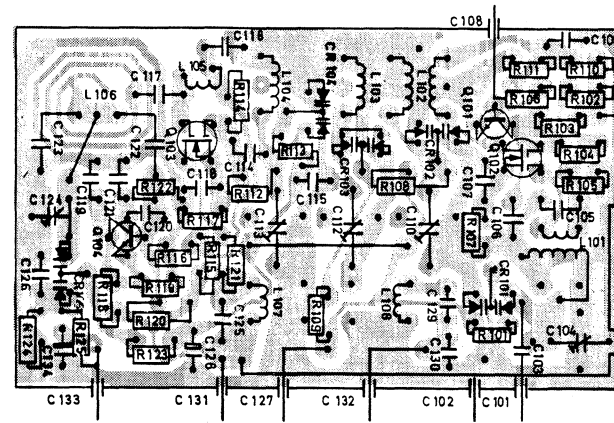


Figure 9 Front end board, foil side

Alignment of stereo decoder

Equipment needed

- FM stereo generator.
- Oscilloscope with sensitivity 5 mV/cm.
- Frequency counter.
- Selective voltmeter or a.c. voltmeter and 20 kHz low pass filter.

The decoder oscillator: 19 kHz

Apply a 0.5 mV signal from the FM stereo generator unmodulated. (No pilot signal applied.)

- Adjust R304 so that the frequency counter connected to M301 indicates 19 kHz.

Alternative method without the frequency counter

Apply a 1 mV signal from the FM stereo generator, modulation: 10% pilot signal.

- Turn R304 slowly from one extreme position to the point where the stereo indicator lights up. Turn further in the same direction until the light goes out. Then turn in the opposite direction to set R304 in the middle of the range where the indicator lights.

Channel separation

Apply a 0.5 mV signal from the FM stereo generator, modulation: 10% pilot signal. Modulate the right channel with 1 kHz at 30% deviation. Connect the oscilloscope to the Variable Output L socket.

- Adjust R320 to minimum deflection on the scope. Check this adjustment with the 1 kHz signal in the left channel and measure the output of the right channel.

Alternative method without the stereo generator

- Adjust R320 for minimum signal in left (right) speaker when receiving a test FM stereo, transmission with signal in the right (left) channel only.

FM alignment procedure

Step	Alignment procedure	TPT 3011	Generator		Oscilloscope	Circuits	Notes	
		Frequency	Frequency	Deviation	Applied to	Connected to		Adjust
1	25 V						R411 (Power board)	Meter connected to M302. Adjust to 25 V d.c. reading.
2	FM oscillator	90 MHz	90 MHz	± 22.5 kHz	Antenna input	M303	R202	Check the position of the dial pointer (Figure 13). Check 95 MHz and 100 MHz.
		105 MHz	105 MHz				C124	
3	Aerial circuit	90 MHz	90 MHz	± 200 kHz	Antenna input	M303	L101–L102–L103–L104	Adjust for max. curve height (see Figure 10).
		105 MHz	105 MHz				C104–C110–C112–C113	
4	FM-IF	90 MHz	90 MHz	± 200 kHz	Antenna input	M303	L107–L108	Adjust for max. curve height and symmetry (see Figure 10).
5	Discriminator	90 MHz	90 MHz	± 75 kHz	Antenna input 1 mV, 75 ohms	Variable Output	L201–L202	Adjust L201 for < 2 mV d.c. across R231, or max. output voltage. Adjust L202 for min. distortion or min. output voltage.
6	Signal meter *	90 MHz	90 MHz	± 0 kHz	No signal		R219	Adjust to zero on the signal meter.
					Antenna input 1 mV, 75 ohms		R218	Adjust to 1000 uV on the Signal meter.

* The adjustments for muting and stereo/mono switching should be correctly adjusted before this adjustment.

Muting and stereo/mono switching threshold

Muting

Apply a 3 μV signal from the FM generator to the 75 ohms antenna input. Adjust the Tuning/Frequency meter on the tuner to center. Set R223 in the middle position and R217 fully clockwise (seen from component side). Turn R217 slowly counter clockwise until the signal is recovered.

Stereo/mono switching threshold

Set R223 fully counter clockwise (seen from component side).

- Apply 0 μV from the FM stereo generator to the 75 ohms antenna input modulated with 10% pilot signal.

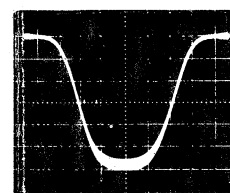
Increase the signal from the FM stereo generator from 0 μV to 7.5 μV. Turn R223 slowly clockwise until the stereo (MPX) indicator light comes on.

NOTE! The adjustments for muting and stereo/mono switching threshold interact. This should be carried out before the Signal meter adjustment.

Alternative method without the stereo generator

If an FM stereo generator is not available an ordinary FM generator can be used for this adjustment.

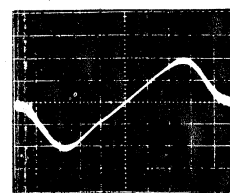
- Apply a 7.5 μV signal from the generator to the 75 ohms antenna input, modulated with 19 kHz, deviation 7.5 kHz (10%). Check the modulation frequency with a counter. Proceed as explained above.



Signal: $U_{in} = 150 \mu\text{V}/75 \text{ ohms}$, $f = 90 \text{ MHz}$. Deviation ± 200 kHz applied to M1 via antenna plug.

Oscilloscope: Vert.: 5 mV/dev., Hor.: 50 kHz/dev. connected to M4 via diodeprobe (Figure 12).

Figure 10 FM-IF curve



Signal: $U_{in} = 150 \mu\text{V}/75 \text{ ohms}$, $f = 90 \text{ MHz}$. Deviation ± 200 kHz applied to M1 via antenna plug.

Oscilloscope: Vert.: 1 V/dev., Hor.: 50 kHz/dev. connected to M5.

Figure 11 Discriminator

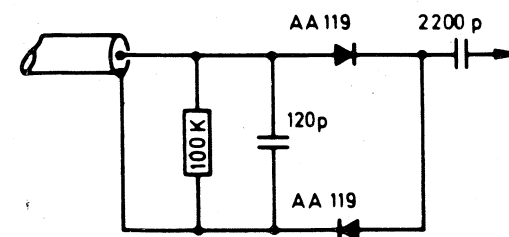


Figure 12 Diodeprobe

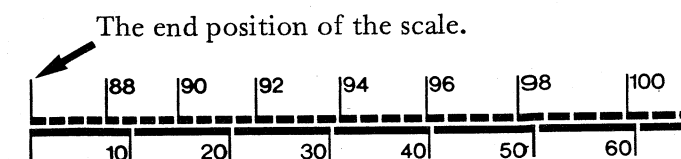


Figure 13 Adjusting the dial pointer

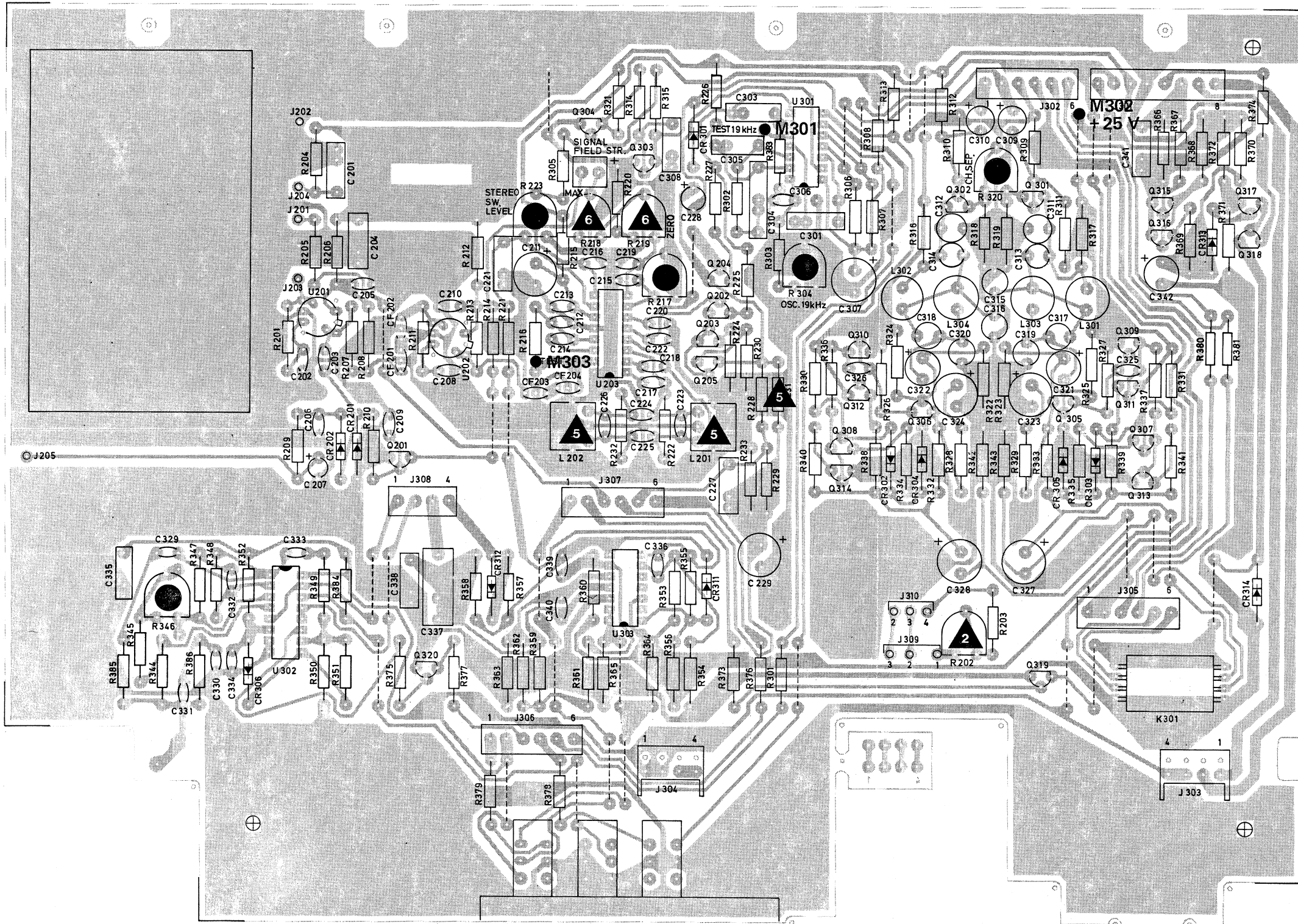


Figure 14 FM tuner, main board with trimming points

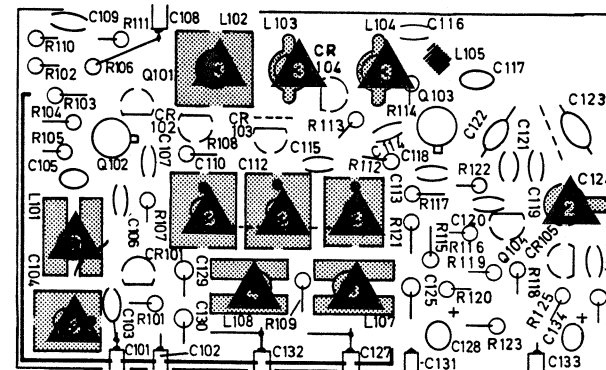
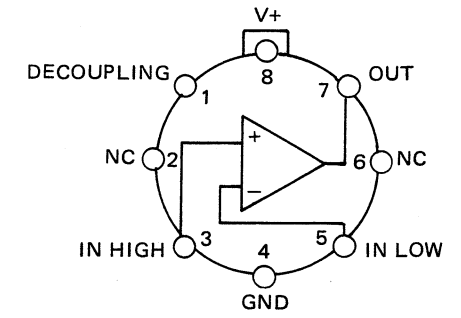
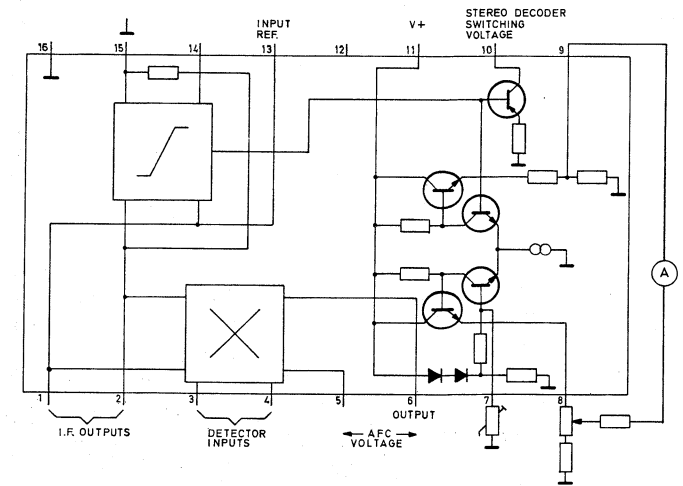


Figure 15 FM tuner, component side

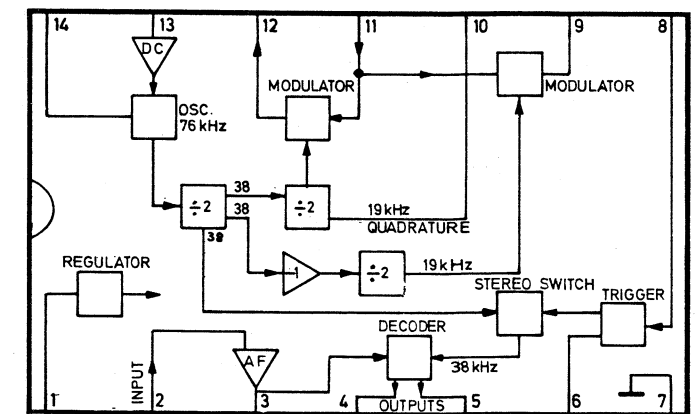


Note! Pin 4 connected to case

U201/202
UA 703 HC



U203
TCA 420 A



U301
MC 1310 L

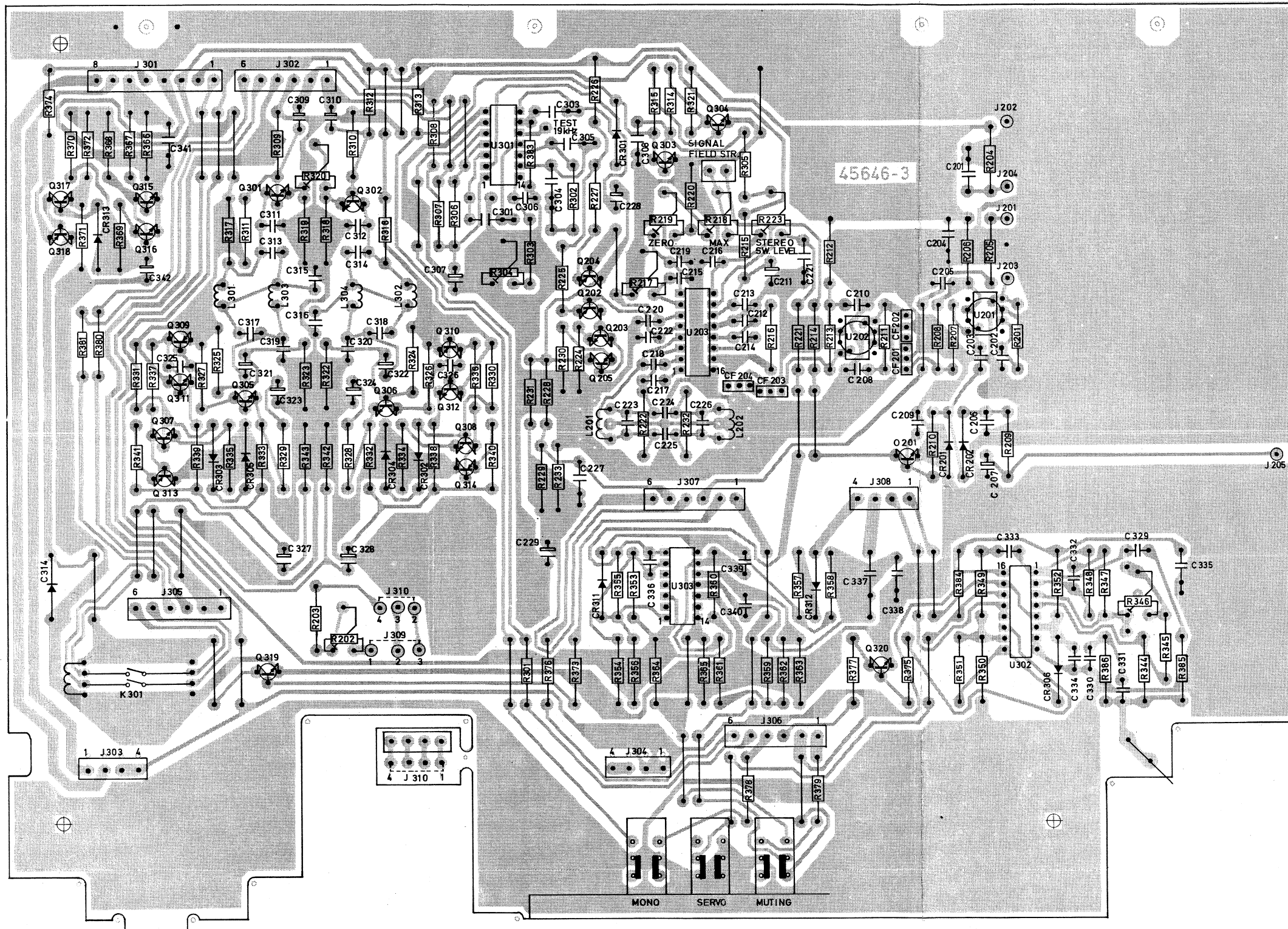


Figure 16 FM tuner, main board above serial No. 00701, foil side

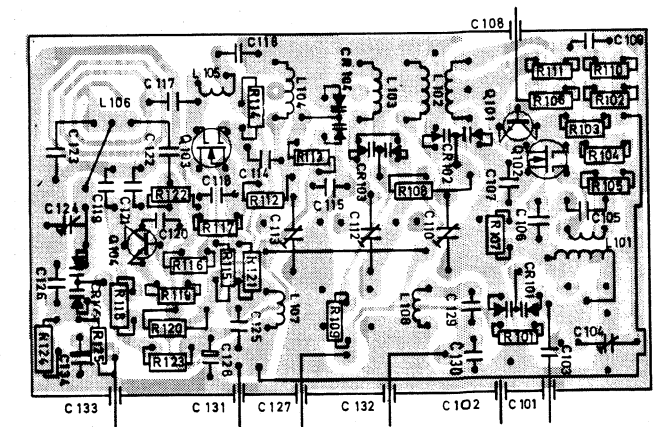


Figure 17 FM tuner, foil side

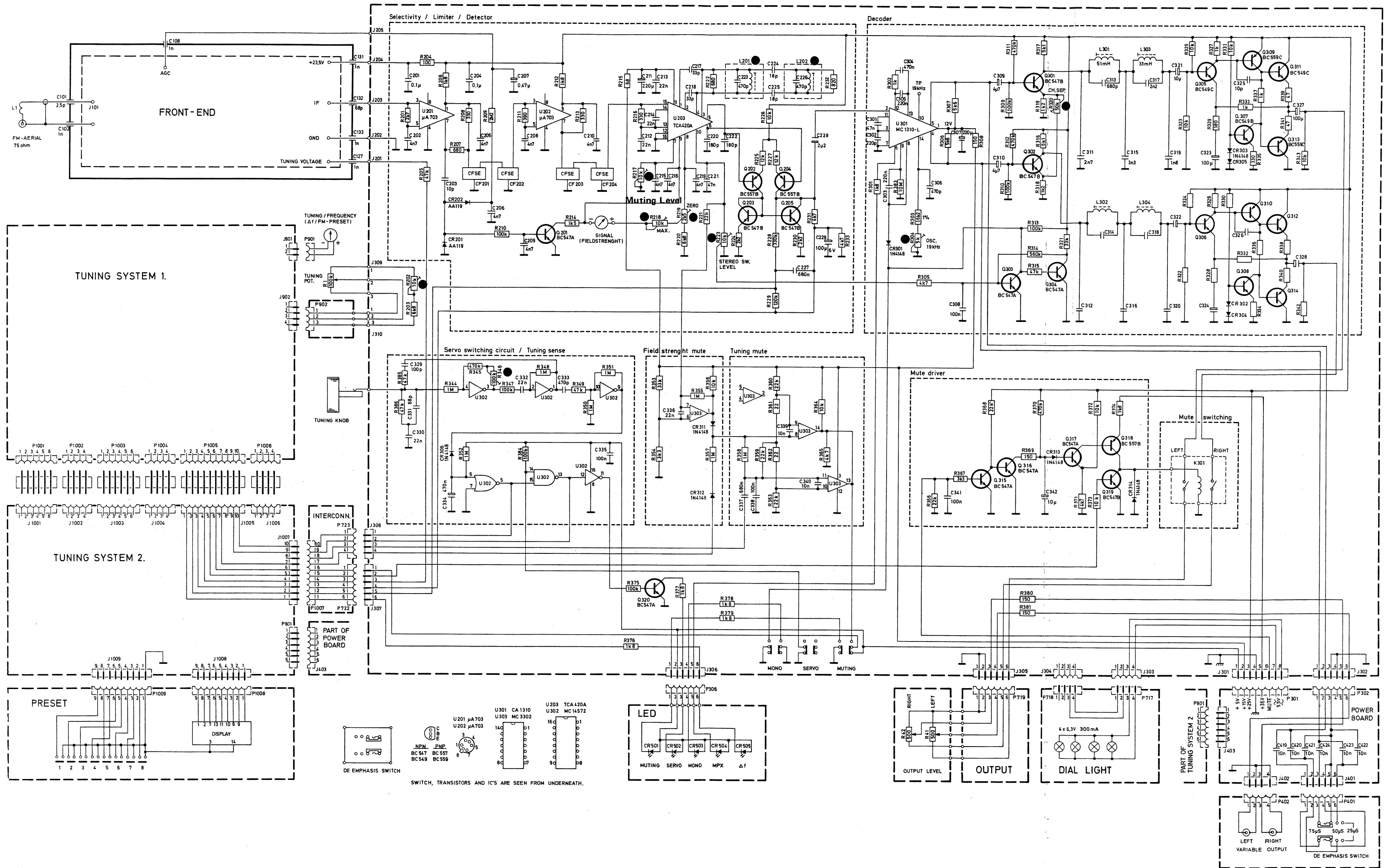


Figure 18 Main circuit diagram above serial No. 00701

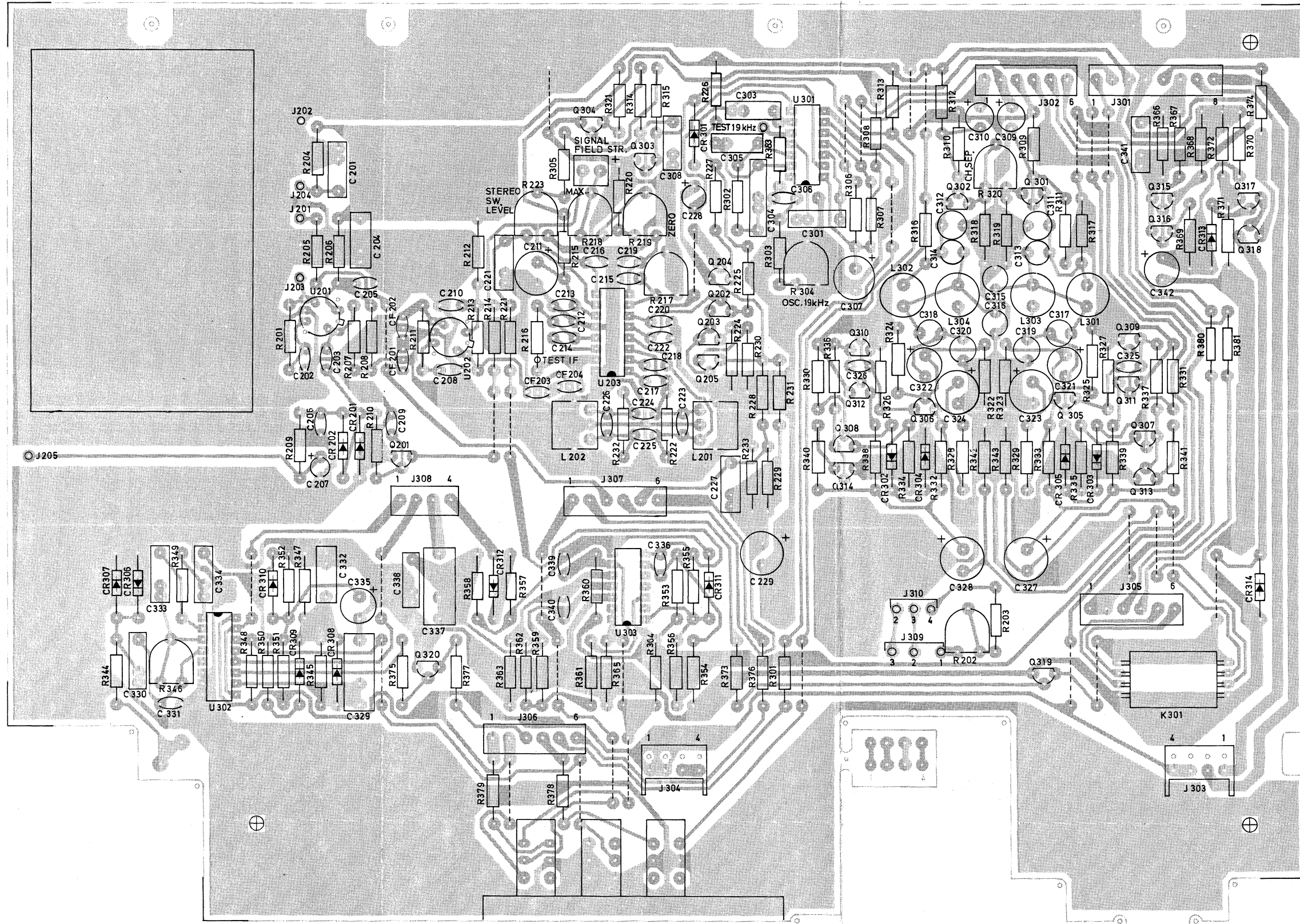


Figure 19 FM tuner, main board below serial No. 00700, component side

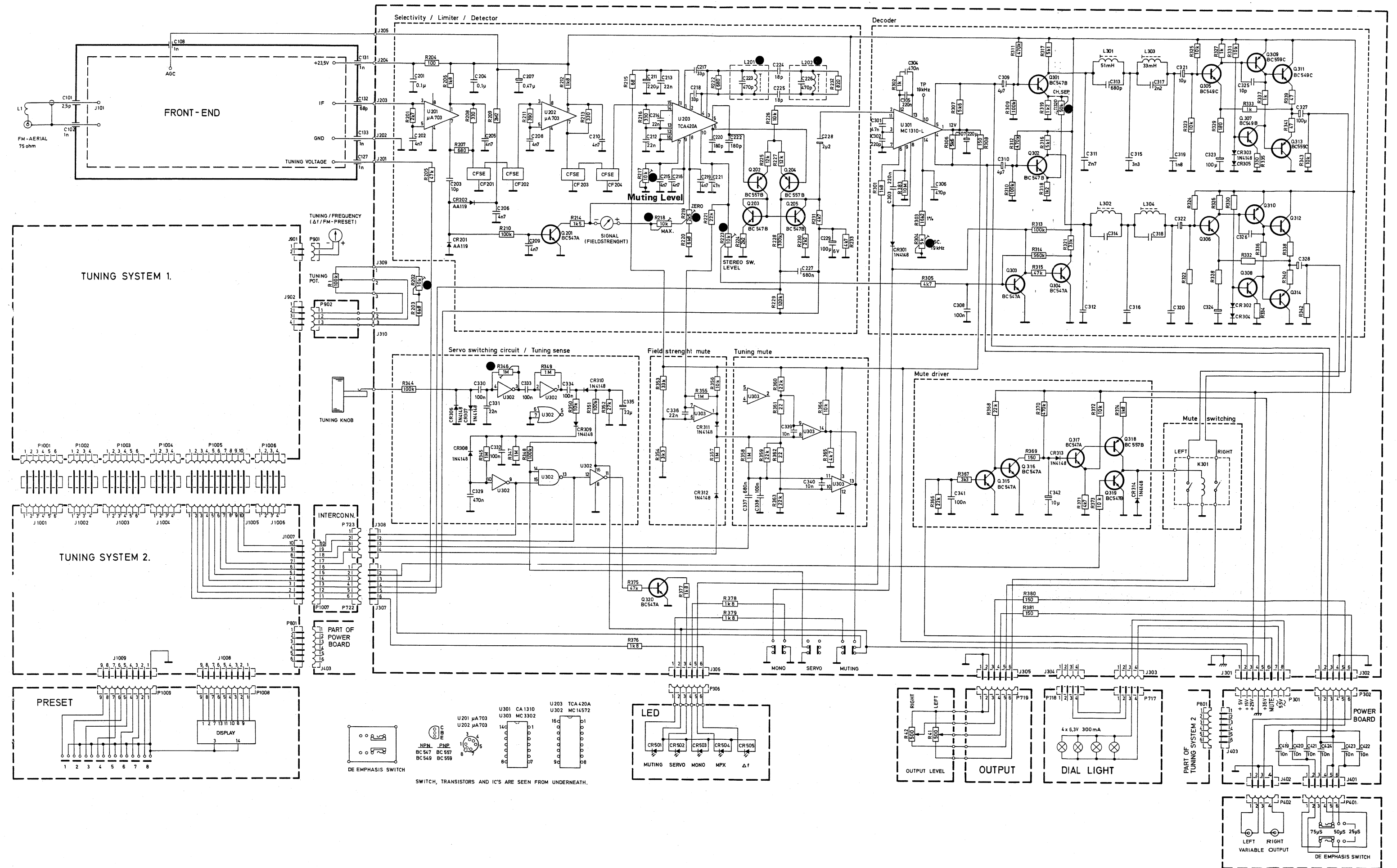


Figure 20 Main board below serial No. 00700

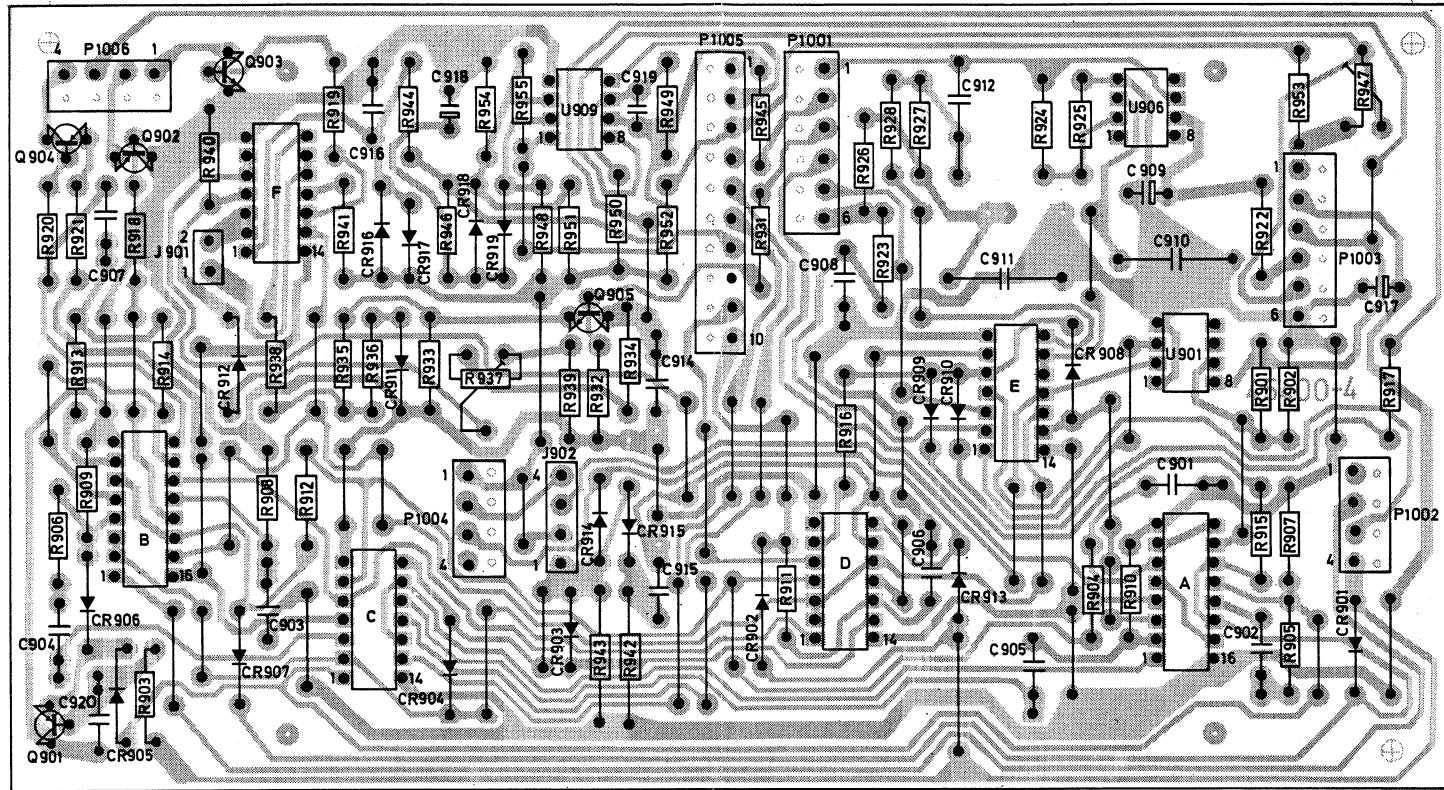


Figure 21 Tuning system 1 board, foil side

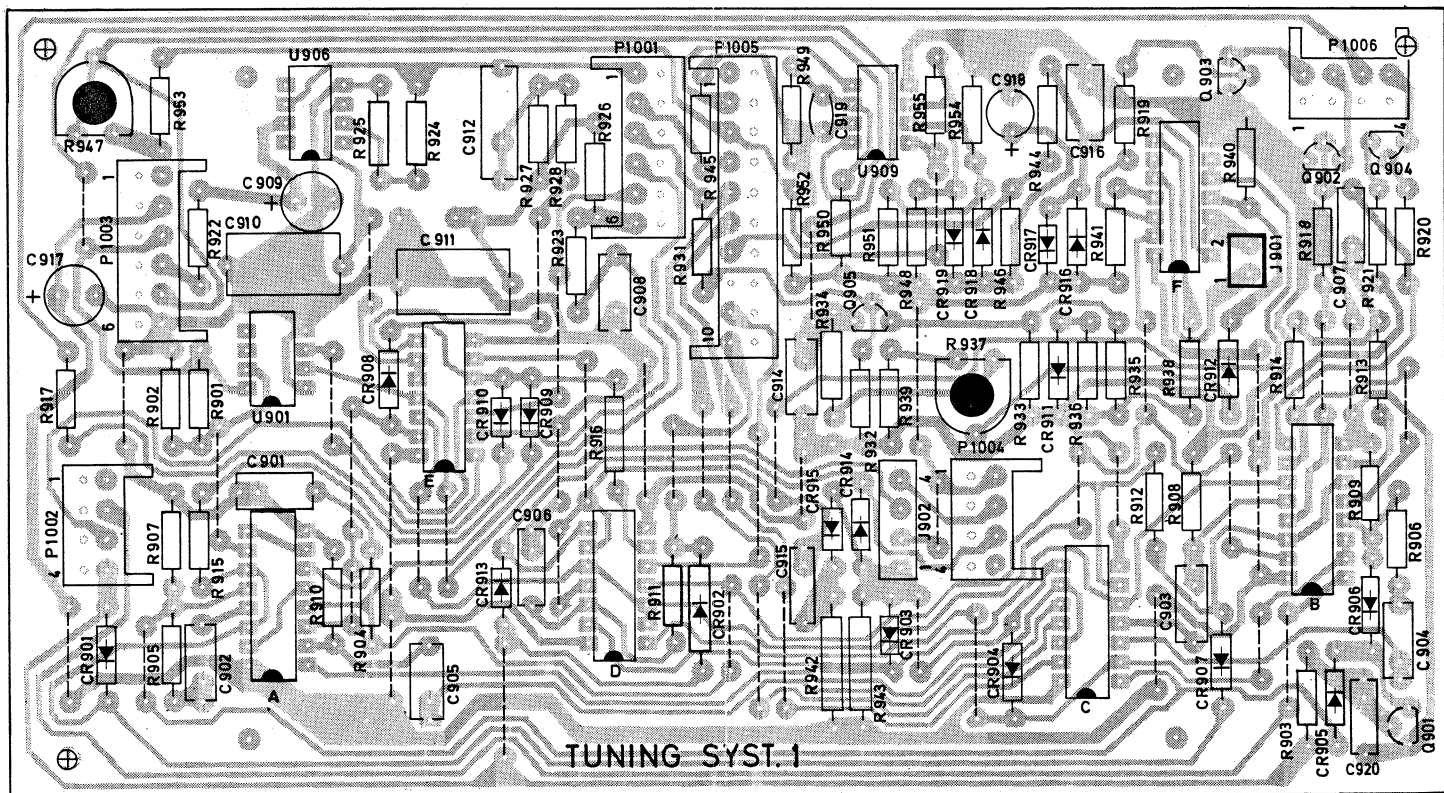


Figure 22 Tuning system 1 board, component side

The tuning system

- Connect signal generator to the antenna terminal. Signal 98 MHz, ± 75 kHz modulation, approx. $0.7 \mu\text{V}$.
- Connect an oscilloscope (a.c.-mode) to the output.
- Place the tuner horizontally to prevent the force of gravity from influencing the meter needle.
- Tune for 98 MHz and symmetrical noise on the sinewave.
- Press Program Preset 1.
- Press Store Program.
- When the programming is finished control the frequency deviation by adjusting the generator frequency for symmetrical noise on the sinewave. Tolerance: 20 kHz deviation.
- If the deviation exceeds 20 kHz, this can be due to inaccurate adjustment of the Tuning indicator, the AFC or the d.c. reference voltage in the detector.

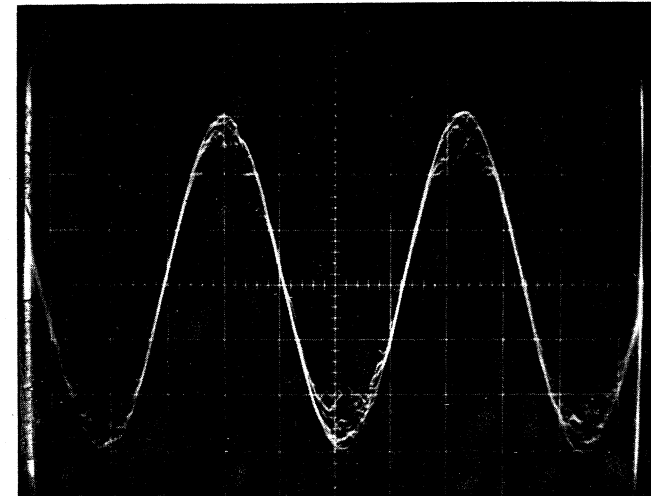


Figure 23 Symmetrical sinewave

Preset dial

- Set the tuner to 88 MHz on the main dial.
- Press Program Preset 1.
- Press Store Program.
- Adjust R937 for pointer deflection to the 88 MHz mark on the Tuning/Frequency meter, lower dial.

Touch sense

- Turn R346 (figure 24) counterclockwise to increase the touch sensitivity on the Tuning knob.
- On some tuners the pot.meter R346 is replaced by a fixed resistor. Increased resistance will give increased sensitivity.

- Adjust R947 to obtain mid-scale position of the Tuning meter needle.
- Check that electrical mid-position corresponds with physical mid-position by disconnecting plug J901. This should not influence the position of the needle. If necessary, adjust R947.
- Press the Servo button.
- Adjust R1002 (Tuning system 2, figure 24) for symmetrical noise on the sinewave.

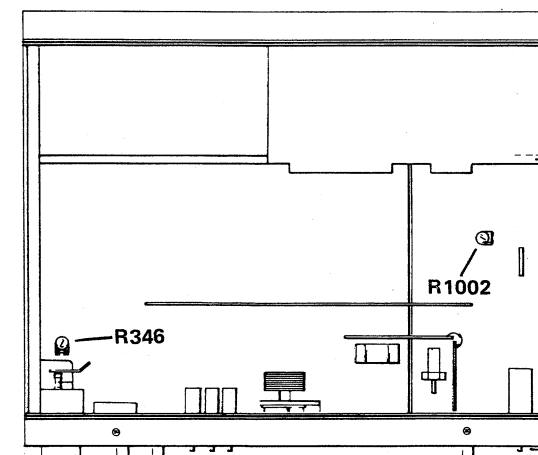
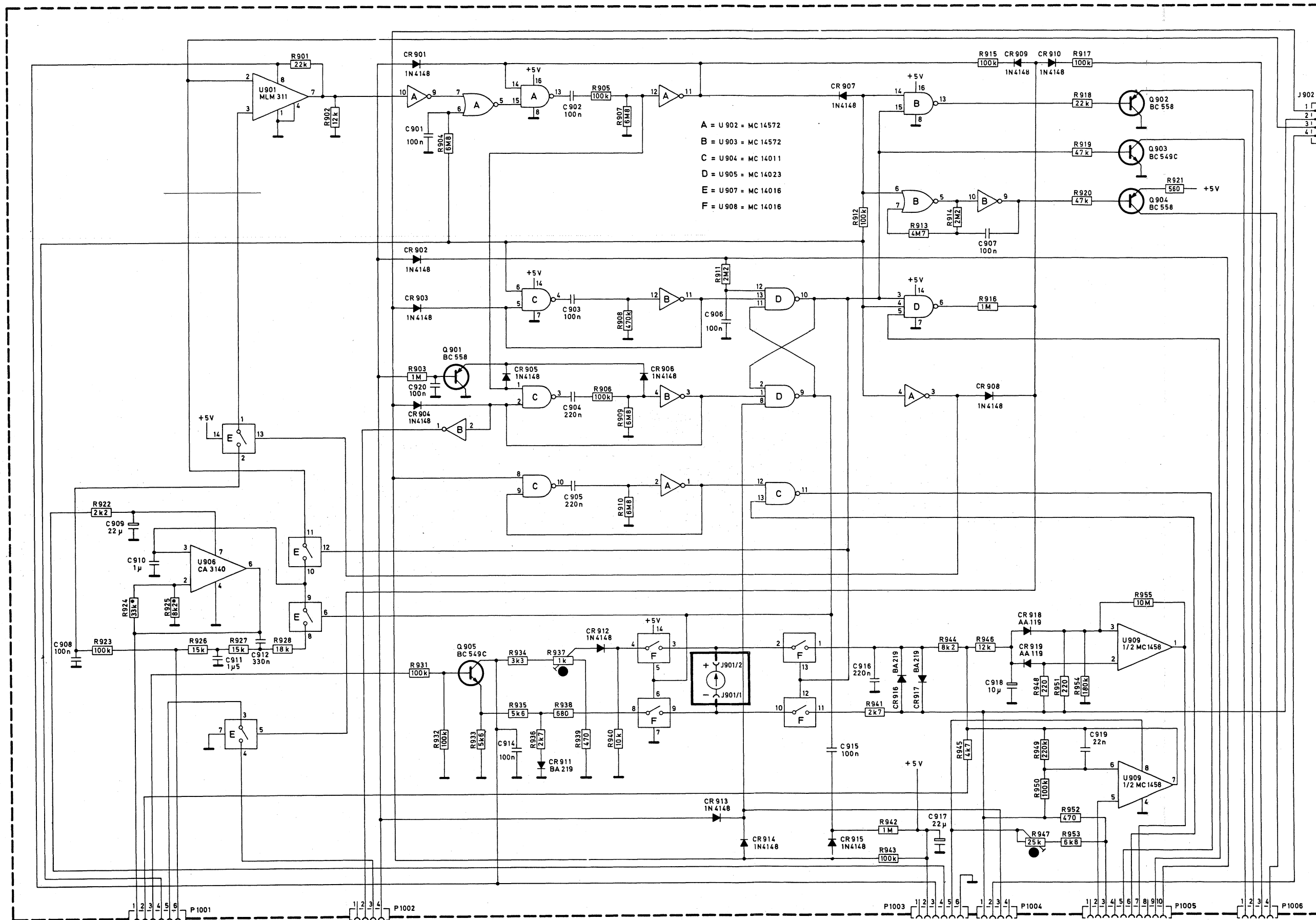
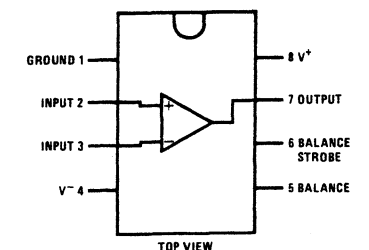


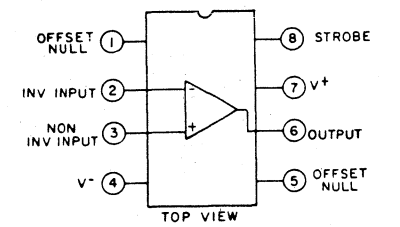
Figure 24 Test points



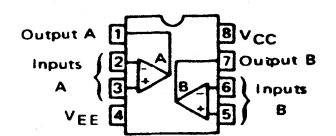
- A = U902 = MC 14572
- B = U903 = MC 14572
- C = U904 = MC 14011
- D = U905 = MC 14023
- E = U907 = MC 14016
- F = U908 = MC 14016



U901
MLM311



U906
CA3140



U909
MC1458

Figure 25 Tuning system 1 circuit

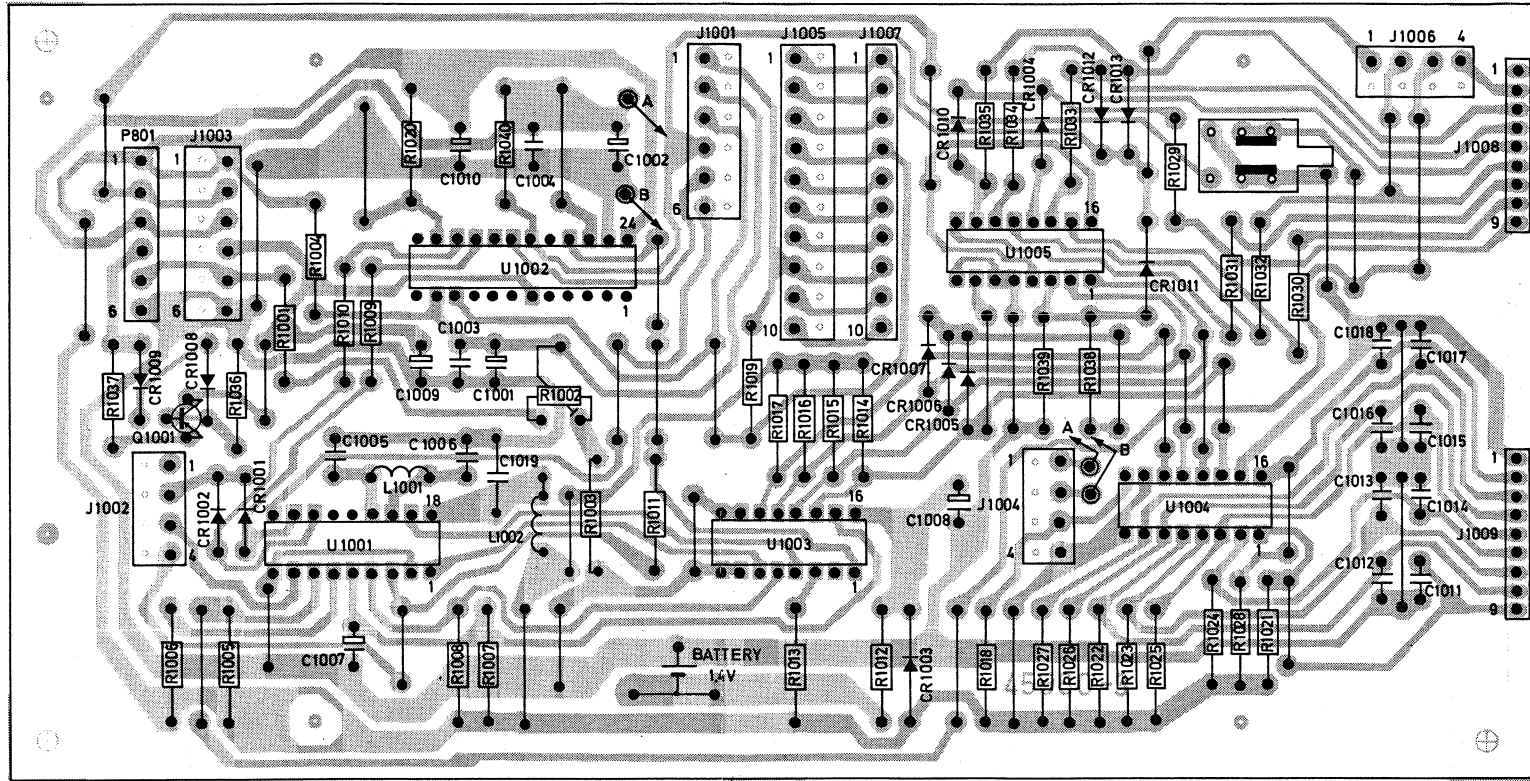


Figure 26 Tuning system 2 board, foil side

Adjusting R1002, see page 14, The tuning system.

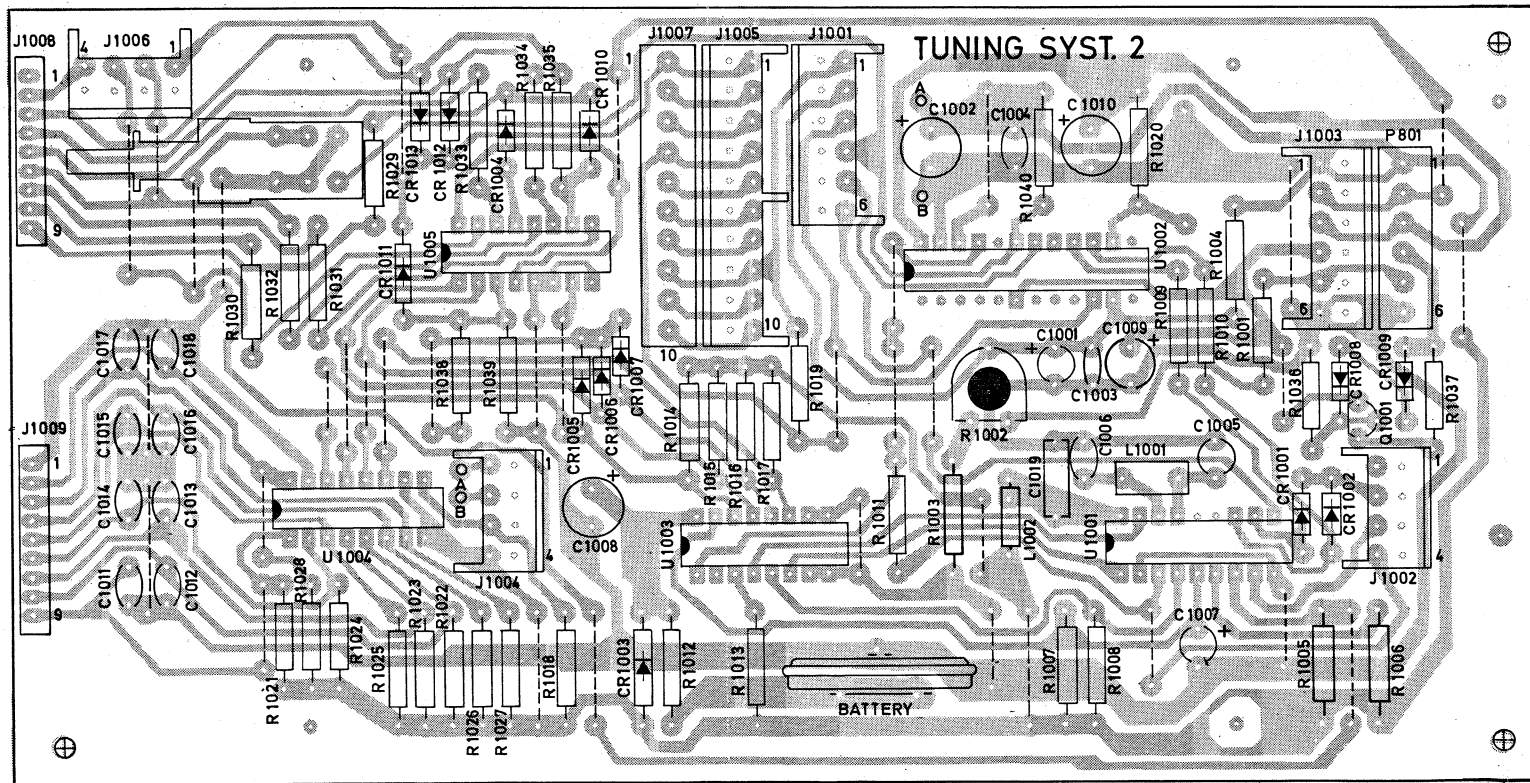
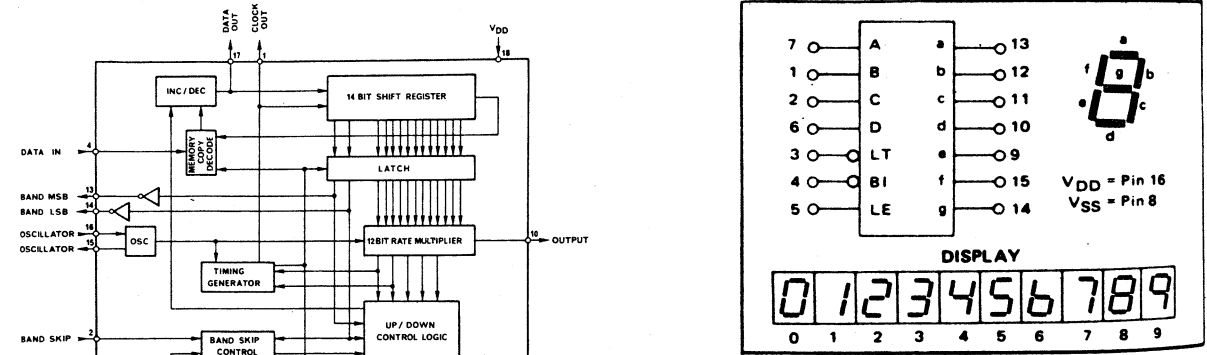
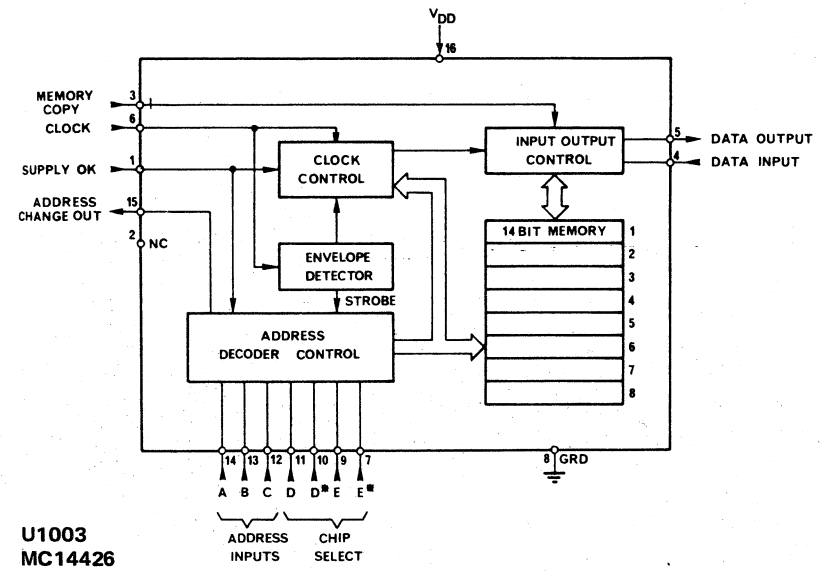


Figure 27 Tuning system 2 board, component side

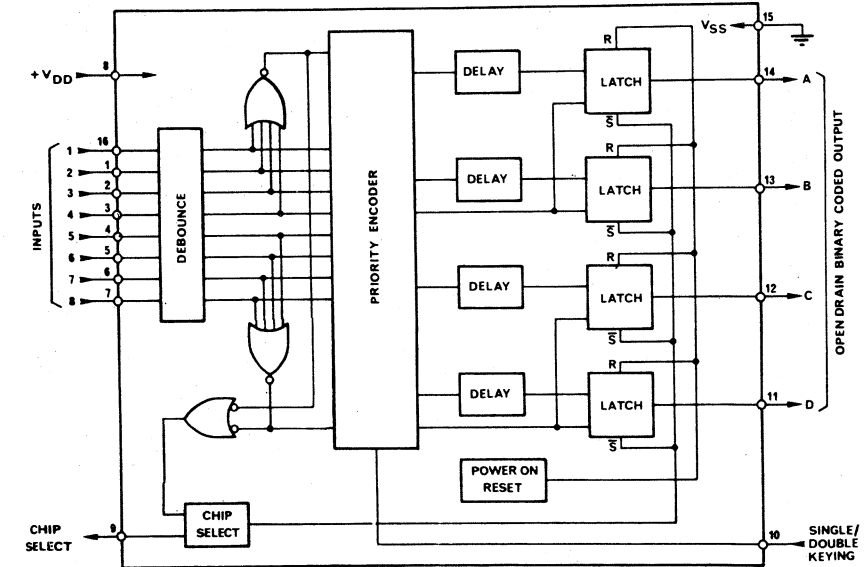


U1005
MC14511B

U1001
MC14429



U1003
MC14426



U1004
MC14430

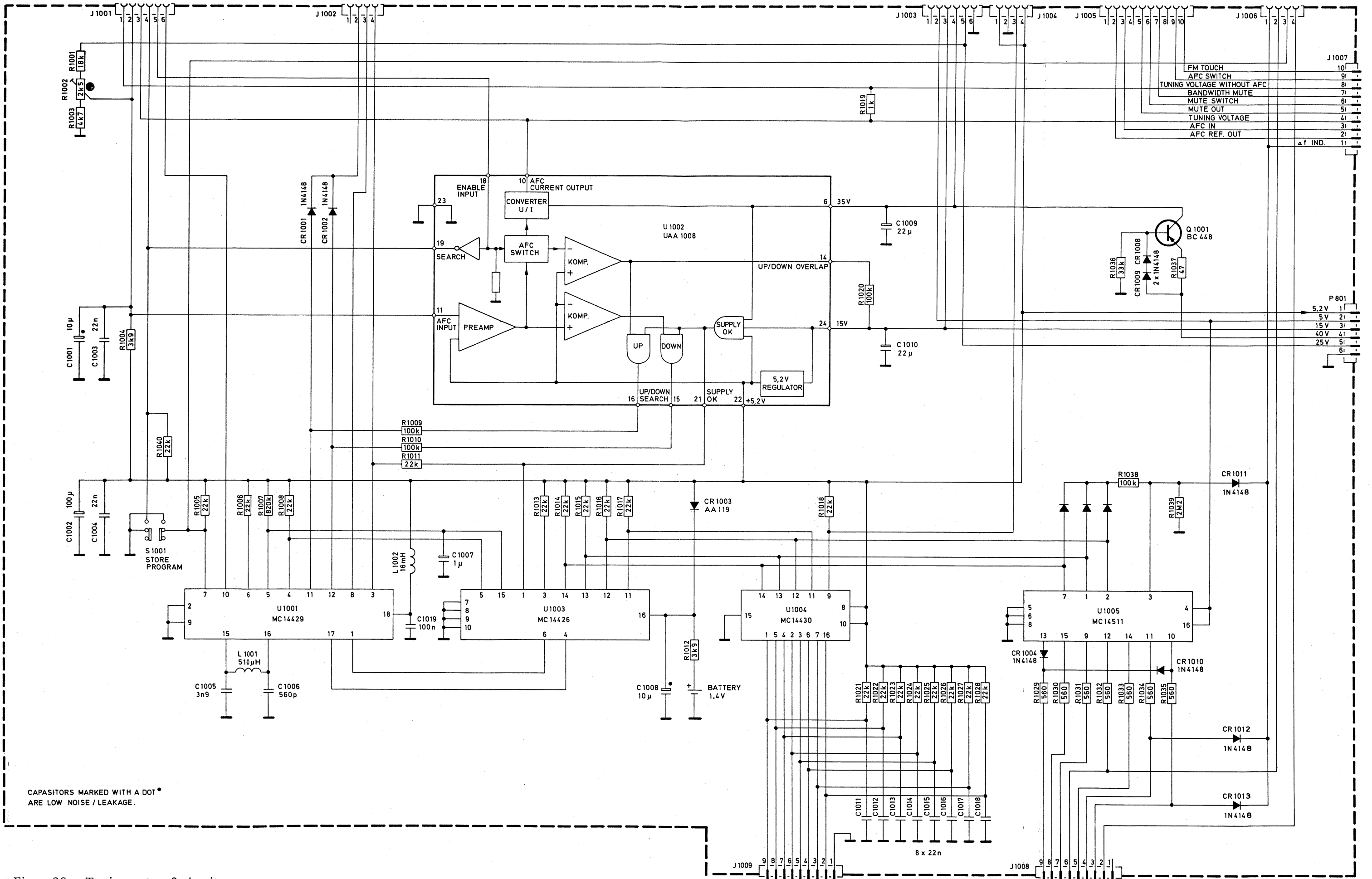


Figure 28 Tuning system 2 circuit

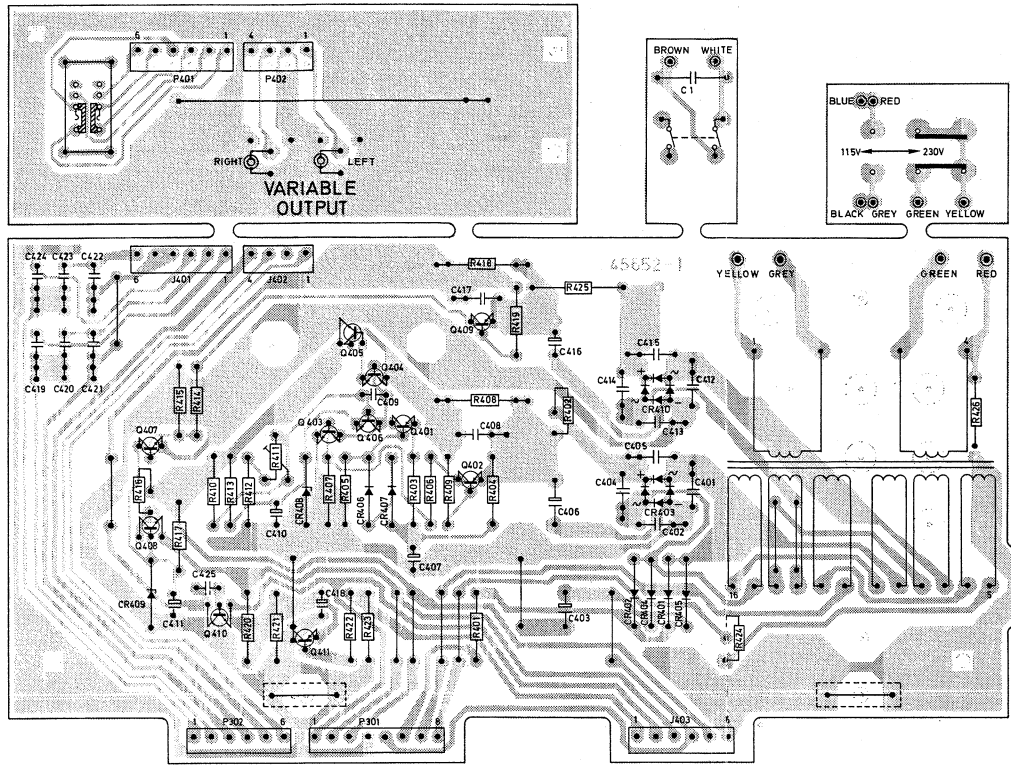


Figure 29 Power supply board, foil side

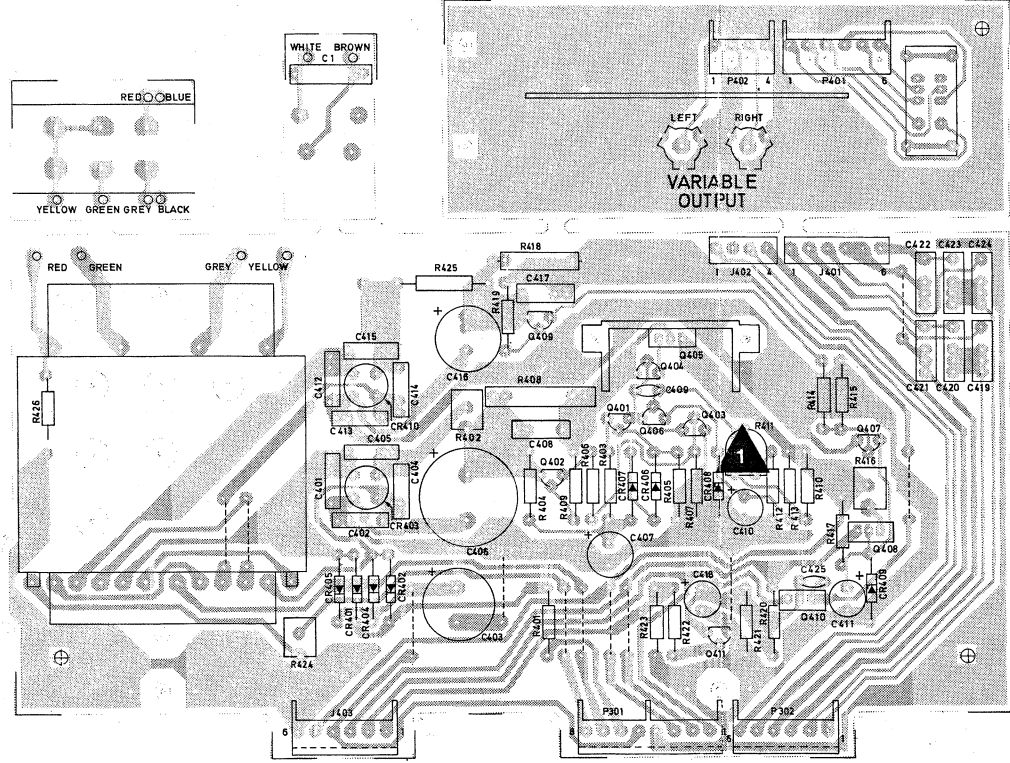


Figure 30 Power supply board, component side

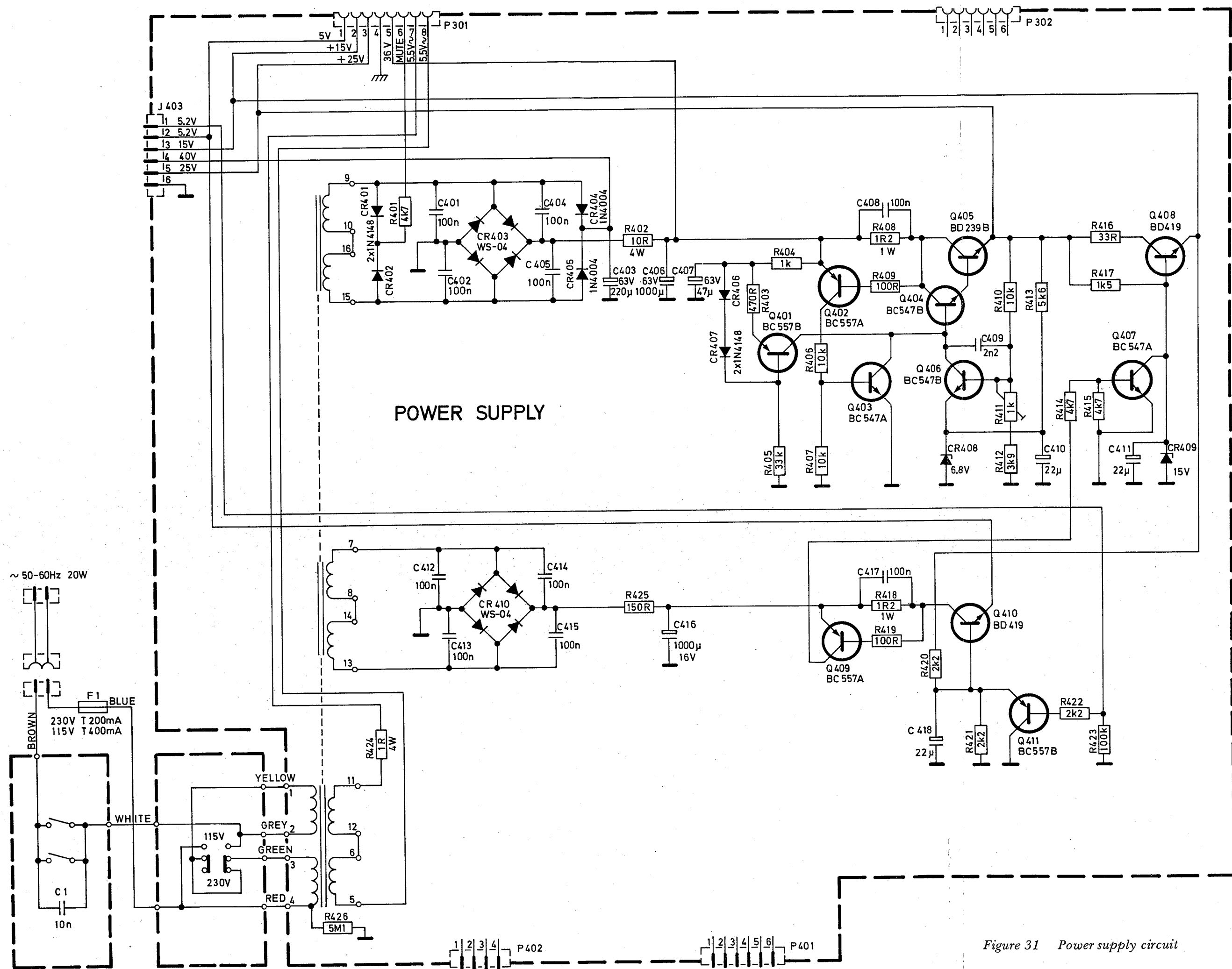


Figure 31 Power supply circuit

Tandberg Programable Tuner TPT 3011

Technical Data

Power requirements:	230/115 V \pm 10%, 50/60 Hz
Power consumption:	23 W
Dimensions:	Width: 17 1/8" (43.5 cm)
	Depth: 13 3/4" (35.0 cm)
	Height: 3 1/4" (8.3 cm)
	Weight: 12.6 lbs (5.8 kg)

Technical Data according to IHF-T-200, 1975 IEEE Std. 185, 1975

Tuning range:	87.5 – 108 MHz
Usable sensitivity:	Mono 0.85 μ V/75 ohms
50 dB quieting sensitivity:	Mono 1.5 μ V/75 ohms
	Stereo 20.0 μ V/75 ohms
Signal to noise ratio:	Mono 78 dB
	Stereo 75 dB
Muting threshold:	3 μ V/75 ohms
Muting hysteresis:	6 dB
Stereo threshold:	7.5 μ V/75 ohms
Stereo hysteresis:	8 dB
Frequency response 30 Hz to 15 kHz:	Mono + 0.5 dB – 1 dB
	Stereo + 0.5 dB – 1 dB
Distortion at 50 dB quieting:	Mono 0.3%
	Stereo 0.3%
Distortion at 65 dBf (0.5 mV/75 ohms at 1 kHz):	Mono 0.2%
	Stereo 0.3%
Distortion at 65 dBf (30 Hz to 15 kHz)	Mono 0.3%
	Stereo 0.4%
Intermodulation distortion:	Mono 0.2%
	Stereo 0.2%
Capture ratio, selectively measured:	0.9 dB
Adjacent channel selectivity \pm 200 kHz:	14 dB
Alternate channel selectivity \pm 400 kHz:	> 100 dB
Spurious response ratio:	> 70 dB
Image response ratio, balanced:	> 95 dB
RF intermodulation:	> 70 dB
AM suppression ratio:	> 70 dB
Stereo separation (60 Hz to 10 kHz, selectively measured):	> 40 dB
Subcarrier product ratio:	60 dB
19 kHz suppression:	70 dB
38 kHz suppression:	60 dB
Dynamic range of signal meter:	0.5 μ V – 100 mV/75 ohms

Technical Data according to DIN 45301 and DIN 45500

Sensitivity mono DIN 45301 at 26 dB signal/noise ratio, RMS, dev. \pm 22.5 kHz:	0.8 μ V/75 ohms
Sensitivity stereo DIN 45500 at 46 dB signal/noise ratio, RMS, dev. \pm 40 kHz:	20 μ V/75 ohms
Signal/noise ratio, weighted DIN 45500 quasi-peak dev. \pm 40 kHz:	Mono 66 dB
	Stereo 62 dB
Unweighted DIN 45500 RMS, dev. \pm 40 kHz:	Mono 68 dB
	Stereo 65 dB
Selectivity, carrier down:	80 dB at \pm 300 kHz
Total harmonic distortion dev. \pm 40 kHz:	Mono 0.15%
	Stereo 0.15%

Optional Extras:

- Black acrylic side walls for freestanding units.
- Attachment set for installation in 19 inch racks.

● Specifications are subject to change for further improvement without notice.