

Sailor

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INSTRUKTIONSBOG FOR
SAILOR R 103, 104, 105, 106

INSTRUCTION BOOK FOR
SAILOR R 103, 104, 105, 106

INSTRUKTIONSBUCH FÜR
SAILOR R 103, 104, 105, 106

INSTRUCTIONS POUR
SAILOR R 103, 104, 105, 106

INSTRUCCIONES PARA
SAILOR R 103, 104, 105, 106



A/S S. P. RADIO · AALBORG · DENMAR

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A. Operation

I. Introduction:

The 4 SAILOR SSB/AM receivers R103, R104, R105 and R106 are built on the modular system so that, apart from certain facilities, the 4 receivers are identical.

R103:

12 crystal controlled frequencies, which can be used on AM and SSB.

Field of application:

Telephony receiver in the frequency range 1,6—4,2 MHz.

Watch receiver 2182 kHz.

R104:

11 crystal controlled frequencies, which can be used on AM or SSB. Built-in AM receiver. Direction finding on all bands.

Field of Application:

Telephony receiver in the frequency range 1,6—4,2 MHz.

General Broadcasting- and DF-receiver in the frequency ranges:

150— 350 kHz

300— 535 kHz

700—1650 kHz

1600—4200 kHz

R105:

23 crystal controlled frequencies.

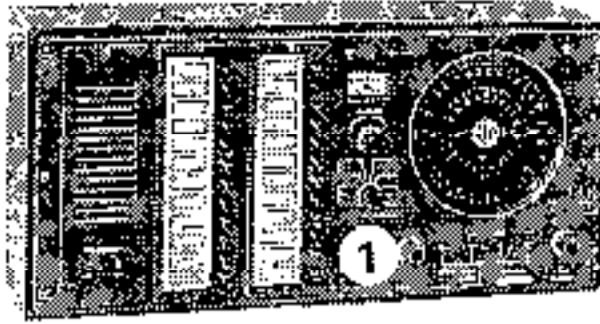
Built-in loudspeaker.

In all other respects identical to R104.

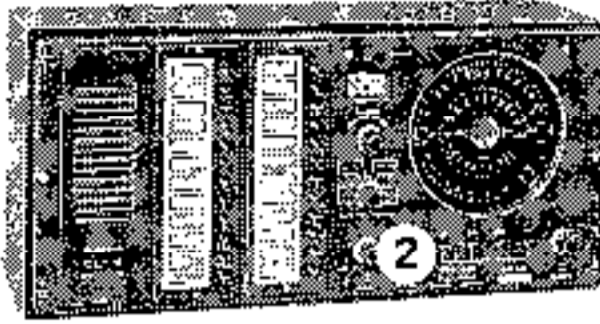
R106:

35 crystal controlled frequencies.

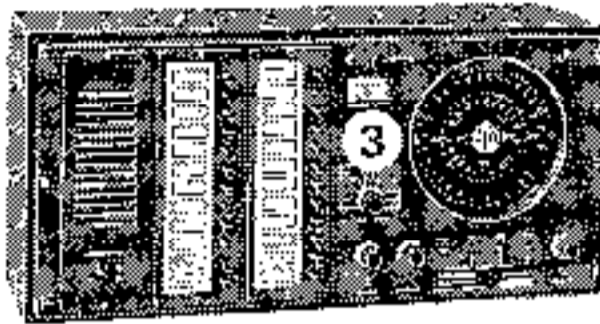
In all other respects identical to R104.



1 AF-GAIN
with main switch. Controls the audio output.



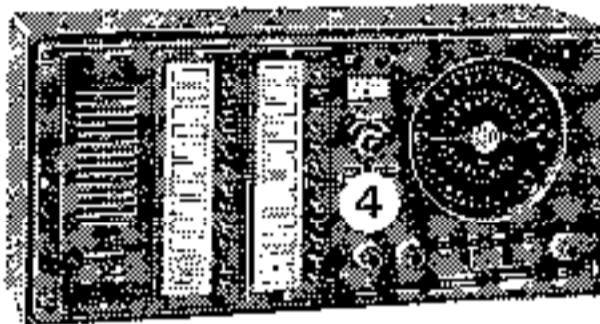
2 RF-GAIN
Regulates the amplification of RF-stage and IF-amplifier.



3 CLARIFIER
Corrects for small frequency-errors in SSB-signals. To be set for clearest reception of SSB-signals.

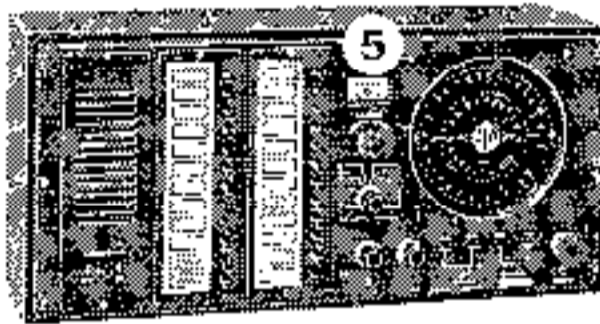
FUNCTION SWITCH

This switch is divided up in a TELEPHONY section and a NAVIGATION section, each with four positions.

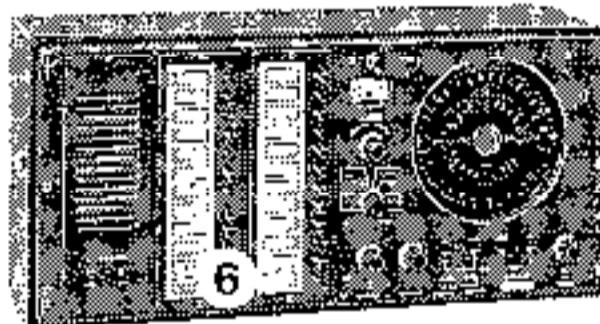


4 In the telephony section is switched between SSB reception and AM reception without AGC and SSB reception and AM reception with AGC.

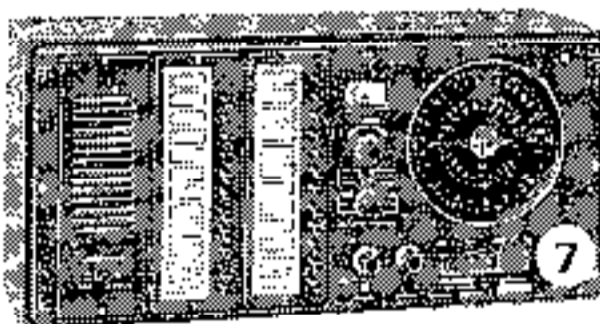
In the navigation section is switched between A₁ and A₂ reception partially via the normal receiver aerial for search for stations and partially via the DF-equipment.



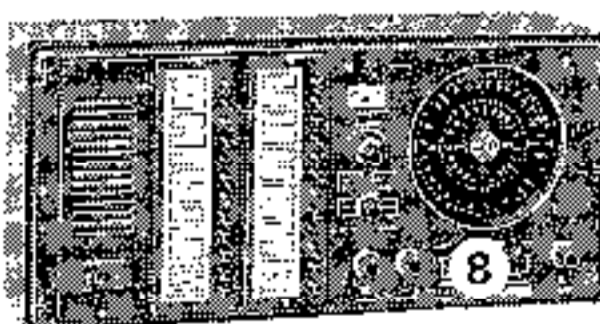
5 METER and DIMMER
The meter is showing the volume of the received signal and the dimmer is for regulation of dial light.



6 BANDS
When the button is pressed, the built-in variable frequency receiver is put into operation. If one of the other buttons in the line (or lines) is pressed, the fixed frequency in question will automatically be switched in. Not applicable to R103.



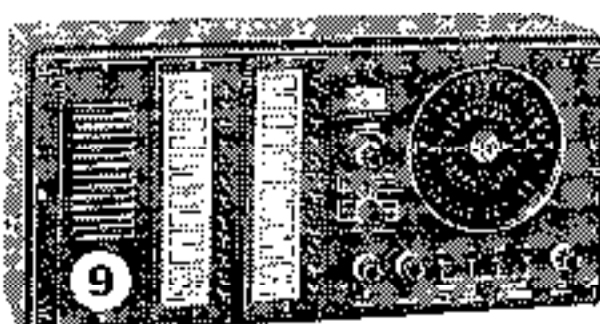
7 STATION INDICATOR (TUNING)
The dial is calibrated in kHz.



8 LINE OF PRESS BUTTONS FOR BANDS, variable receiver:
Reception on aerial or DF-unit.

IW	150-350 kHz	MW	700-1650 kHz
NW	300-535 kHz	SW	1600-4200 kHz

Not applicable to R103.



9 LOUDSPEAKER ON/OFF
for built-in loudspeaker. Only on receivers with built-in loudspeaker (R105).

III. General Broadcasting

1. Switch on the receiver by turning the AF-GAIN clockwise (1).
2. Press button marked BANDS in the row of push buttons to the extreme left of the receiver (6).
3. Set sensitivity control RF-GAIN to max. (2).
4. Set the function switch in position AM AGC-ON (4).
5. Select desired range by pressing one of the four push buttons marked BANDS (8).
6. When the desired station has been located on the dial, tune for maximum meter deflection (7).
7. The volume is controlled by means of the volume control AF-GAIN.

IV. Fixed frequencies

1. Switch on the receiver by turning the AF-GAIN clockwise (1).
2. Set the sensitivity control RF-GAIN to max. (2).
3. Select desired kind of reception, AM AGC-ON or SSB AGC-ON, by means of the function switch (4).
4. Press the push button, which is marked with the desired frequency.
5. If the received signal is SSB, turn CLARIFIER (3) for clearest reception.
6. The volume is controlled by means of the AF-GAIN.
7. When receiving SSB-signals turn RF-GAIN (2) as far as possible anti-clockwise without weakening the received signal. (This only relates to powerful signals).

V. Telegraphy and consol signals

(Please also see »Description of the Navigation Section«).

1. Switch on the receiver by turning the AF-GAIN clockwise (1).
2. Press button marked BANDS in the left push button row of the receiver (6).
3. Set the sensitivity control RF-GAIN to max. (2).
4. Set the function switch to A₂ RX-ANT (4).
5. Select range by pressing one of the push buttons marked BANDS (8).
6. When the desired station has been located (use the triangular frequency marks on LW and NW) tune for suitable meter deflection by means of the AF-GAIN (1) and for max. deflection by means of the TUNING (7).
7. If the received signal is unmodulated A₁, set function switch to position A₁ RX-ANT (4).
8. If the received signal is A₁ and is disturbed by noise from the rigging etc., it will be advantageous to turn AF-GAIN to max. and tune the volume by means of the RF-GAIN.

As to Consol Signals please see special section.

VI. Reception of general circular radio beacons

1. Set for the desired station as described under V.
2. If the received signal is unmodulated, set the function switch to position A₁-DF LOOP. If the received signal is modulated, set the function switch to position A₂-DF LOOP.

3. Select wave range (same as on receiver) on the compass direction finder or on the transformer box of the DF-LOOP.
Tune by means of the knob TUNE on the compass direction finder (transformer box) for max. meter deflection (volume). Volume of signal is tuned by means of the RF-GAIN.
4. Turn DF-aerial for minimum volume or for minimum meter deflection.
5. Repeat 4 by increased sensitivity (RF-GAIN) until a sharp null has been achieved.
6. Read the graduated scale of the DF-equipment and make a note of the result (see section C for further details).
7. If necessary make sense determination by means of the knob SENSE on the DF-equipment. For further particulars see instruction manual for the DF-equipment in question.

Description of the Navigation Section

The left halfpart of the function switch with four positions marked A₂-RX ANT, A₂-DF LOOP, A₁-RX ANT and A₁-DF LOOP has very special functions making direction finding facile and logical. The below scheme will show the control of the individual functions.

FUNCTION					
POSITION	B.F.O.	Filter	A.G.C.	Meter reading	AF filter
SSB AGC ON	ON	SSB	OFF	AGC	OFF
AM AGC ON	OFF	AM	OFF	AGC	OFF
SSB AGC OFF	ON	SSB	ON	AGC	OFF
AM AGC OFF	OFF	AM	ON	AGC	OFF
RX-ANT A ₂	OFF	Narrow Bandwidth	ON	AF	OFF
DF-LOOP A ₂	OFF	Narrow Bandwidth	OFF	AF	OFF
RX-ANT A ₁	ON	Narrow Bandwidth	ON	AF	ON
DF-LOOP A ₁	ON	Narrow Bandwidth	OFF	AF	ON

The following SAILOR direction finding equipment can be used in combination with the receivers R104, R105 and R106.

SAILOR compass direction finder BK171.

SAILOR DF-LOOPS 26 F and 26 FA.

When SAILOR DF-LOOPS are used, a SAILOR transformer box FB175 must also be used.

For further particulars please see our special brochure.

B. Reception of consol signals

I. Description of the consol finding system

The following should be taken only as an introduction to the CONSOL direction finding system. For further information on the subject reference should be made to the publications issued by the competent government departments.

For full details of the U.K. Radio Direction Finding & Radio Beacon Systems refer to Volume 2 and for Position Fixing Systems refer to Volume 5 of the Admiralty List of Radio Signals.

When using the CONSOL direction finding system it is possible, when the approximate position is known, to find the exact position by plotting bearings of two CONSOL radio beacons using the SAILOR receiver.

The CONSOL radio beacon consists partly of a circular radio beacon, transmitting the call signal of the beacon a continuous signal, and partly, of an omnidirectional beacon, transmitting various signals in various directions. The transmissions take place alternatively as indicated in »Details of Stavanger and Bush Mills CONSOL Radio Beacons«. The circular transmission is used for the adjustment of the receiver to the desired radio beacon as for a general telegraphy station, see Chapter A, paragraph V. This Chapter covers a chart showing two stations, »Stavanger« and »Bush Mills«, which are of special interest in the North Sea and the North Atlantic. For each of the two stations the moment for the commencement of the transmissions of the directional beacons is indicated. These consists of A-sectors and B-sectors. In the A-sectors 60 dots and in the B-sectors 60 dashes are transmitted during the transmission period indicated on the chart. The divisions between the sectors are indicated as »beams«. Along the beam, dots and dashes meet in one continuous signal. The sectors are turning exactly one sector-width at a steady speed in the direction of the arrows during the period of a transmission from a directional radio beacon; thus from the position marked X in the North Sea you will from the Stavanger CONSOL radio first hear 48 dots, until the beam »S« passes by, after which you will hear 12 dashes, and the transmission is finished and will re-commence with the circular transmission, and so on. From Bush Mills first 28 dashes will be heard, until the beam »BM« is passing, after which 32 dots will be heard. By means of the quite simple diagrams issued by the competent government departments it will then be a simple matter to find the exact bearing of the CONSOL radio beacons, as these are indicating the direction finding in degrees corresponding to the number of dots and dashes heard during the directional period of the transmission.

As the beams are not well defined, several dots and dashes near the beam will not be heard or will be indistinctly heard. Therefore all dots and dashes must be counted during a transmission period. If for instance a total of 54 dots and dashes are counted, the $60 \div 54 = 6$ characters were lost. These 6 are divided up in 3 dots and 3 dashes, which are then added to the number counted, after which you will have the figure to be used on the diagram for plotting.

The accuracy is greater near the beam centre for direction finding and the margin of error will amount to approximately $\pm 0,2^\circ$. The margin of error will increase upon entering the doubtful sectors. In sectors bordering the doubtful sectors, errors of $\pm 0,5^\circ$ by day and $\pm 1,5^\circ$ by night should be allowed for. In the doubtful sectors and less than 25 nautical miles from the CONSOL radio beacons, direction finding should not be taken.

II. Details of Stavanger and Bush Mills consol radio beacons

Stavanger consol beacon:

Position: $58^{\circ}, 37' 32''$ N., $5^{\circ}, 37' 49''$ E.

Frequency: 318 kHz (940 m).

Call signal: LEC . - . . . - . - .

Signal: A. General circular transmission.

1. Call sign. LEC	6 secs
2. One long dash	50 secs
3. Pause	3 secs

B. Directional transmission.

One dot or one dash each second	60 secs
Pause	1 secs
Duration of transmission in total	120 secs

Operating times: Continuous.

Range: Abt. 850-1300 nautical miles.

Bush Mills consol radio beacon:

Position: $55^{\circ}, 12' 20''$ N., $6^{\circ}, 28' 0,2''$ W.

Frequency: 266 kHz (1128 m).

Call signal: MWN - - . - - .

Signal: A. General circular transmission.

Continuous dash interrupted by call signal	30 secs
--	---------

B. Directional transmission.

One dot or dash each 0,5 sec.	30 secs
Duration of transmission	60 secs

Operating times: Continuous except between 15,00 and 15,15 hours (G.M.T.).

C. Reception of general radio beacons

I. Principles of direction finding:

By taking compass bearings of at least two, but preferably three or four radio beacons of known geographical locations using radio directional equipment, a position can be obtained by plotting the bearings on a chart. Their point of intersection indicates the position of the vessel.

For direction finding by compass a direction finder connected to the receiver is used. The direction finder can be developed in various ways, but it will always comprise an aerial with directional properties and one or more graduated scales. When the direction finder is rotated the signal intensity will depend upon the angle between DF-aerial and the position of the radio beacon. If the direction finder is turned 360 degrees, it will pass through two maximums and two minimums. As the two minimums, one 180 degrees opposite the other, are the most well defined, they are used for the direction finding. It will thus, by means of the direction finder, be possible to find the exact direction to the radio beacon and on the graduated scale to read this direction, either as an angle relative to the fore and aft line of the vessel (this angle is then called the relative bearing) or as an angle relative to magnetic North (the compass bearing).

If the direction finder indicated the relative bearing, the compass bearing is found by adding the relative bearing and the compass course.

With some direction finders this addition can be made by the setting of another graduated scale.

As mentioned two minimums will be found, when the direction finder is rotated 360 degrees, and only one of these minimum is the correct one, the other one being 180 degrees opposite. However, by means of the sensing device of the DF unit it will be possible to determine, which of these minimums is the correct one. This verification is called »sense determination« and is further described for the individual direction finders.

II. Sources of errors in direction finding:

The following conditions may cause errors in the radio direction finding:

1. Magnetic variations.
2. The local compass deviation.
3. The local radio direction finder deviation.
4. Coast-line deviations.
5. Night effect.

When the compass bearing of a beacon is to be determined by means of the radio direction finder, the compass course is used as mentioned in the previous paragraph, and please note:

True course: Deviating course (read course) + deviation + variation.

The variations are in the usual way taken from the chart, and the deviation from the deviation table of the compass.

The local radio-direction-finder deviation is due to the influence of the metallic parts of the vessels, such as rigging, mast, hull etc. This depends upon the location of the DF-aerial on the vessel and upon the angle of the bearing in question in relation to the fore and aft line of the vessel. Therefore bearings should always be taken from the same place on the vessel, and a correction table should be made for the radio direction finder used at this place.

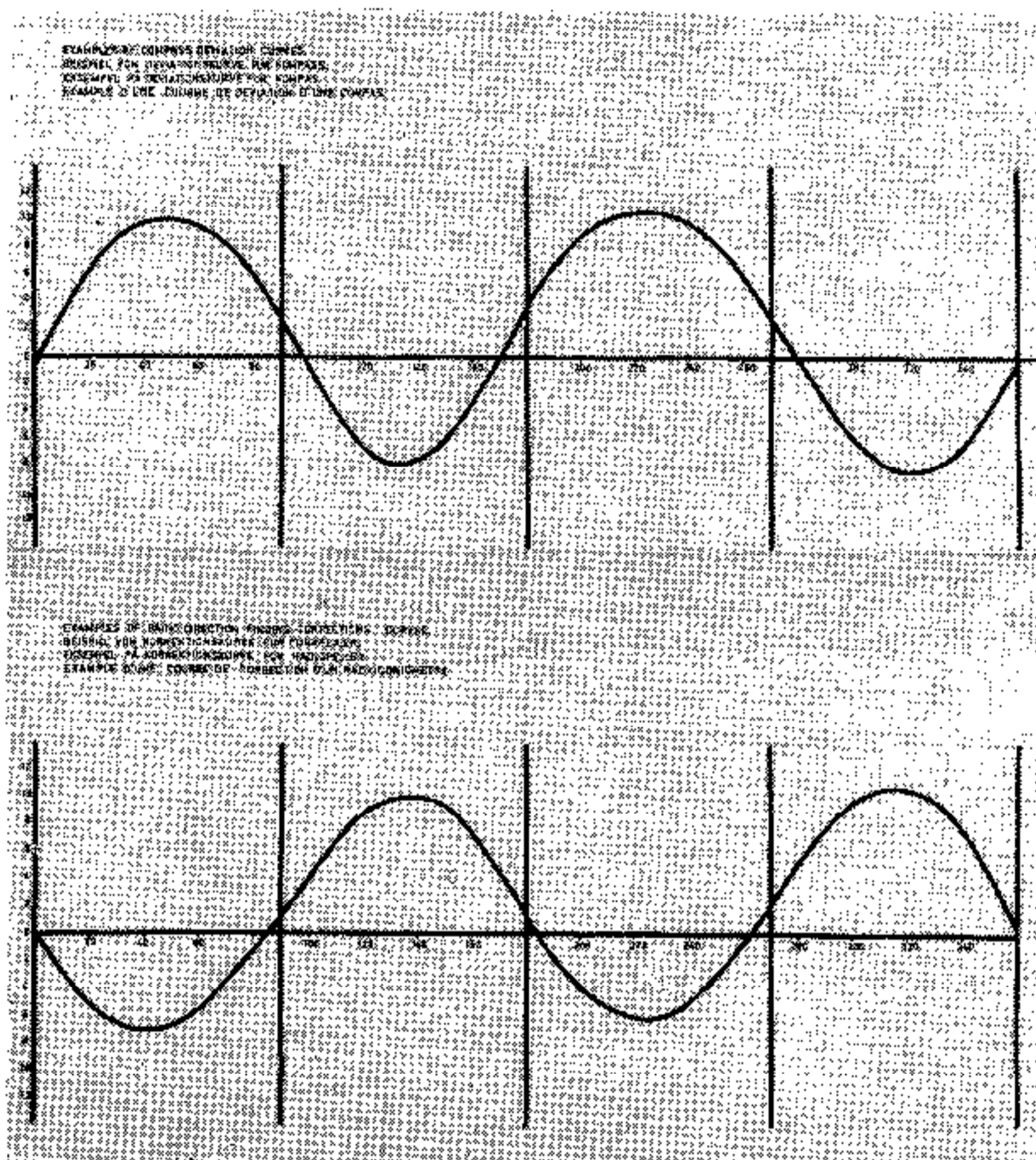
This correction table can be worked out by swinging the vessel near a visible radio

beacon, and for every 10 degrees the difference between the visual bearing and the DF-relative bearing should be found.

To reduce deviation the direction finding compass should be used at a distance of at least 70 cm from any parts of iron (incl. the radio-station).

Coast-line deviation may arise, if the radio waves from the radio beacon travel partly over land and partly over sea in order to reach the vessel, or if they leave the coast in a very acute angle. Therefore, do not use radio beacons from which such deviations are possible.

Night effect is the error in the direction finding, which is due to a mixing up of radio waves reaching the receiver along the surface of the earth, and radio waves



III. Example of correction of radio DF bearing:

Deviating course (indicated compass course)	120°
Magnetic deviation (according to sea chart)	— 4°
Local compass deviation (acc. to comp. correction curve)	— 7°
<hr/>	
True course	109°
Indicated DF relative bearing (radio)	280°
Radio correction (acc. to radio correction curve)	+ 6°
<hr/>	
True radio relative bearing	286°
<hr/>	
True course	109°
True radio relative bearing	286°
<hr/>	
	395°
	— 360°
<hr/>	
True radio compass bearing	35°

reaching the receiver after having been reflected from the ionosphere. This effect will be found at night and especially during the period from one hour before to one hour after sunset and sunrise, and it shows itself in the flattening out or »wandering« of the minimum. Further night effect varies with the seasons and the geographical location. Night effect is minimum at the equator. Under such circumstances radio beacons should be used with certain reservations. If the bearing can be taken on various frequencies, it should generally be taken on the lowest frequency. This will give the most correct bearing and minimum trouble with fading and night effect.

IV. Direction finding with general, fixed direction finder:

1. Place the movable graduated disc so that FOR-mark is in line with 360° .
2. Tune the receiver to the desired radio beacon (described further in Chapter A, paragraph III and VI).
3. Turn the DF-aerial until bearing null is found. Bearing null is indicated either by minimum signal in the phone or speaker or by minimum deflection. If the meter drops to zero at the null, advance SENSITIVITY.
4. The radio relative bearing can now be read on the graduated disc, and it can be corrected according to the correction curve for radio direction finding (see previous paragraph).
5. Turn the graduated disc, until the red pointer of the DF-aerial shows the true course of the vessel at the moment of the direction finding.
6. The FOR-mark now indicates the true compass bearing of the radio beacon, and a line on the chart drawn from the location of the radio beacon and with the read angle relative to true North of the chart, is the position line of the vessel.

V. Direction finding with radio direction finder on direction finding compass:

1. Tune the receiver to the desired radio beacon (described in Chapter A, paragraph III and VI).
2. Switch the DF-aerial to the same BAND as the receiver and tune the DF-aerial with the TUNING knob for maximum meter deflection on the receiver (described in Chapter A, paragraph VI).
3. Turn the direction finder for signal minimum.
4. The compass bearing can now be read directly from the prism of the compass.
5. In case of correction, the correction must in the usual way be performed for the compass and for the direction finder individually. To enter the correction curve of the direction finder use the indicated DF relative bearing (the angle of the radio bearing on the starboard side in relation to the course of the vessel). Said angle is found as the difference between the compass bearing of the radio beacon and the course of the vessel.

D. Installation

1. Aerial and earth wire:

The wire aerial plugs into the single-pole coaxial socket placed on the rear of the receiver. For aerial use a 5—20 m long wire or whip aerial minimum 4 m placed as high and as much in the clear as possible. For the lead-in from the aerial a good quality coaxial cable, ET10M or similar. It is important that the lead-in is as short as possible and that it is not laid near other electric cables. All joints should be made by soldering.

When the receiver has been installed, the aerial must be tuned. This is done by means of the aerial trimmer (AERIAL TUNE) placed behind the crystal cover to the extreme left on the front panel of the receiver.

For tuning use the following procedure:

1. Set the receiver for listening on a push button channel as described under IV of the section a (preferably in the middle of the range 1,6—4,2 MHz).
2. Turn the aerial tune by means of an *insulated* trimming stick for max. volume of signal or noise (max. meter deflection).

The earth-wire is connected to the frame-screw at the back of the receiver.

The earth wire, insulated copper cable not less than 2,5 sq. mm, thick, should be connected to hull (in iron vessels) or through a wide copper-band to keel bolt or (in wooden vessels) to a metal plate not less than one sq. m in size on the outside of the hull below the water line. The earth wire should be as short as possible. A good earth connection is of decisive importance for lownoise reception and a sharp bearing null. See also out special information sheet about installations.

II. Insertion of crystals:

1. Dismount the cover (the covers) at the front of the receiver and insert the crystal in the crystal holder concerned.
2. Connect a frequency counter with min. sensitivity 0,5 V pp and a frequency accuracy of min. »one part per million« to the terminal marked counter.
3. Press the push button concerned and align, by means of the trimmer placed opposite to each crystal, for the frequency stamped on the crystal (reception frequency + 600 kHz).
4. The receivers R.F. circuits are adjusted to maximum sensitivity by means of the metal adjusting screws adjacent to each crystal, using following procedure:
 - A. Unscrew the adjusting screw (anti-clockwise) until the top of the screw becomes level with the front panel.
 - B. Turn R.F. Gain control fully clockwise (max.) Select A. M. Mode with Function switch. Put A.G.C. switch to ON and set A.F. Gain to comfortable volume of noise or signal.
 - C. Screw inwards, the adjusting screw (clockwise) until peak output of signal is obtained (max. meter reading).

N.B. The correct peak must be the first obtained when screwing inwardly otherwise the receiver will be peaked on to an image frequency.

III. Connection of DF-equipment:

Any kind of DF-equipment must be connected by means of an intermediate cable to the socket J 1002.

J1002 is the lower of the 2 multi-sockets at the back of the receiver.

IV. Supply voltage:

From the factory the receiver can be delivered with either 110/220 V AC or 12/24 V DC power supply unit.

The switching between 110/220 V AC and 12/24 V DC respectively is effected by means of a sliding switch at the back of the receiver.

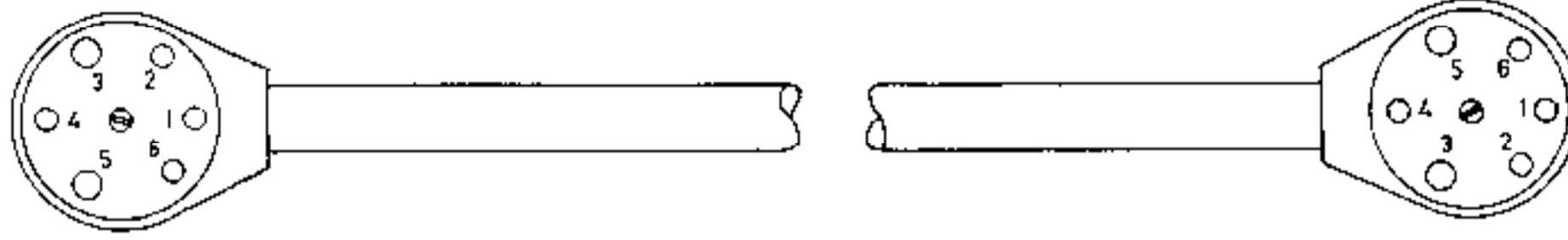
V. Loudspeaker:

Extra loudspeaker, if required, should have connected an impedance of 4—8 ohms.

VI. Other connections:

All connections apart from earth and aerial must be made through the intermediate cable from the transmitter.

The intermediate cable is provided with a multiplug, which is to be inserted in the uppermost multisocket at the rear of the receiver.

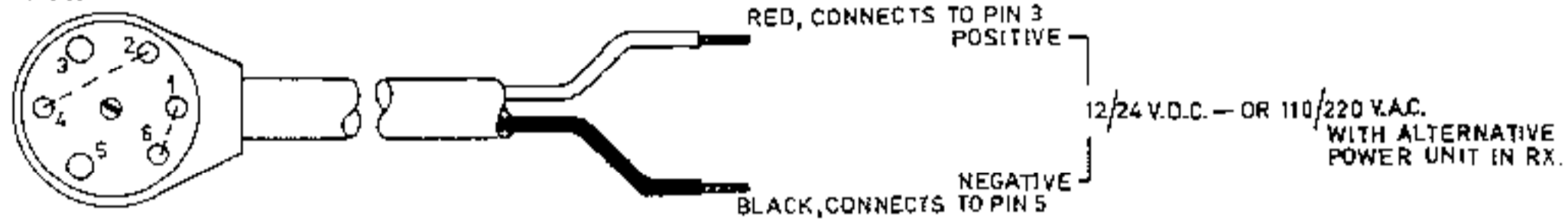


RECEIVER PLUG FEMALE
HIRSCHMANN TYPE Mck 60z

PIN 1 - LOUDSPEAKER - VIOLET
PIN 2 - TO RX. BANDS SECT. - WHITE
PIN 3 - 24 V.D.C. POSITIVE - RED (BUHR)
PIN 4 - COMMON - BROWN
PIN 5 - 24 V.D.C. NEGATIVE - BLACK
PIN 6 - A F OUTPUT FROM RX. BLUE (BUHR)
PLUGS VIEWED FROM PIN SIDES

TRANSMITTER PLUG MALE
HIRSCHMANN TYPE Mes 60z

Connection cable between transmitter and receivers



RECEIVER PLUG FEMALE
HIRSCHMANN TYPE Mck 60z
VIEWED ON PIN SIDE

PIN 1, LINKED TO PIN 6, INSIDE PLUG
PIN 2, LINKED TO PIN 4, INSIDE PLUG

RED, CONNECTS TO PIN 3 POSITIVE
BLACK, CONNECTS TO PIN 5 NEGATIVE TO PIN 5
12/24 V.D.C. - OR 110/220 V.A.C. WITH ALTERNATIVE POWER UNIT IN RX.

Connection cable when receiver used only

VII. Noise and interference in the receiver:

The effective range obtained with a radiotelephone will first and foremost be dependant upon the aerial and the earth connection. The better, i.e. the higher and the more in the clear the receiver aerial, and the shorter and more direct the earth connection the larger the range and less the undesired noise and interference.

Possible interference may be grouped as follows:

1. Atmospherics. i.e. electrical discharges. This noise is a natural phenomenon consequently cannot be silenced. If there is thunder in the air, crackling will be heard in the radio. The influence of rain, hailstorms and static discharges may be reduced, if the best possible insulation of the receiver aerial is provided for.
2. Man made noise. This interference can be produced by engines, dynamo's, echo sounders, radar etc. and can only be remedied by effective suppression at the noise source. Generally your service agent should be able to advise you how to deal with possible radio interference. But should the problem be a little more tricky, it would be advisable to consult a specialist in this field.
3. Rigging-noise, which may originate from bad electrical connections between shackles, thimbles, and in short, all metallic parts, where the electrical connection are varying. Sometimes the propeller shaft may produce noise, if for instance, the connection to sterntube or machinery is unreliable.

In general, a good, well positioned receiver aerial and a good, short earth connection will help in reducing interference level.

E. Service informations

E. Technical data:

PRESS-BUTTON-CHANNELS 1,6—4,2 MHz

Frequency range:

Crystal frequency: Received frequency + 600 kHz

Frequency stability:

Short time stability ± 20 Hz
 Long time stability ± 100 Hz

Selectivity:

	SSB	AM
6 dB band width	>2,4 kHz	>6 kHz
60 dB band width	<4 kHz	<20 kHz

Sensitivity:

S/N = 10 dB	better than 1,5 μ V	4,5 μ V
IF-attenuation		90 dB
Image-attenuation	80 dB at about	2,5 MHz
Audio output		max. 5 W

VARIABLE AM-RECEIVER:

(only R104, R105, R106)

Sensitivity:For all ranges better than 5 μ V**Frequency ranges:**

LW: 150— 350 kHz
 NW: 300— 535 kHz
 MW: 700—1650 kHz
 SW: 1600—4200 kHz

Direction Finding on all ranges.

Audio output 5 W.

Power supply:

The receiver are available with one of the following power supplies:

12/24 Volt DC
 110/220 Volt AC

Intermediate frequency:

600 kHz.

II. Description of circuits for SAILOR R103, R104, R105 and R106:**Generally:**

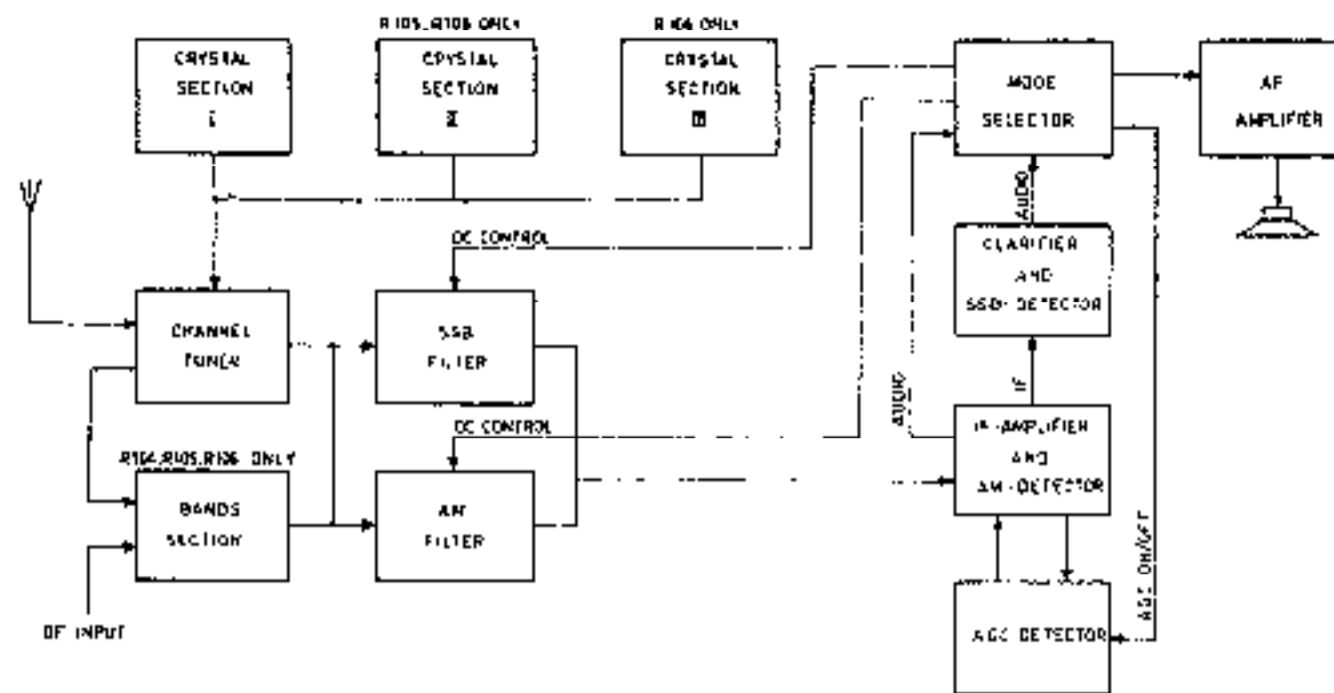
Generally:

These receivers are fully transistorized of modular construction resulting in a great uniformity in the fundamental construction of the four receiver types.

The block diagram and the main diagram clearly indicate this design.

The receiver is designed for the reception of AM, DSB, SSB and CW.

The receivers are constructed on the super heterodyne principle with a 600 kHz intermediate frequency.



Going over the block diagram:

The signal from the aerial is led to the CHANNEL TUNER, which amplifies and mixes the aerial signal with crystal frequencies from the CRYSTAL SECTION I, II and III, to an intermediate frequency of 600 kHz. The CHANNEL TUNER is push-button controlled, and tuning of the selective circuits once made should need no further adjustment.

With reception of LW, NW, MW and SW with continuous tuning, the aerial is connected to the BANDS SECTION, which is a separate unit selecting the incoming signal, and mixing it with the variable oscillator resulting in intermediate frequency.

The produced intermediate frequency signal is led through either the AM-FILTER or the SSB-FILTER. The switching between these filters takes place electronically.

The signal is then passed on to the IF AMPLIFIER, which also contains the AM detector. The IF AMPLIFIER is a selective amplifier with a band-width wider than both the AM and SSB filter. There are three stages in the amplifier, two of which are AGC regulated.

The IF AMPLIFIER supplies a signal to the AGC DETECTOR, which contains an AGC amplifier, AGC detector and HANG AGC circuit.

The IF AMPLIFIER also supplies a signal to the CLARIFIER and SSB DETECTOR circuit.

The audio signal from AM and SSB detectors is fed to the AF AMPLIFIER via a volume control.

The above mentioned units are powered by a built-in POWER SUPPLY, which can be switched to 12 or 24 V DC. A 110/220 V AC version can be supplied on request.

Channel tuner

The aerial tuned circuit is composed of a 3 section bandpass-filter with permeability tuning. The neonlamp GJL1001 and the diodes D101 and D102 protect the transistor T101, which is the HF amplifier, against overload.

The mixer is a field effect transistor T102, which operates as a multiplicative mixer.

The oscillator signal to the mixer is taken from the transistor T103, which acts as emitter follower to the crystal oscillator T104. The transistor T105 is the amplitude stabilizing circuit, which shifts the operation point of the oscillator by rectification of the oscillator signal in its base, until a constant amplitude is obtained.

The crystal oscillator is of the PIERCE-COLPITTS type.

Crystal section

The selection of the individual crystals takes place mechanically. At the same time

the 3 section bandpass-filter in the CHANNEL TUNER is tuned mechanically. In the CRYSTAL SECTION there are trimming capacitors for the alignment of the crystal frequencies.

Band section

This unit is provided with a balanced mixer using two field effect transistors T301 and T302. T303 acts as impedance converter.

The diodes D301 and D302 together with the neonlamp GL1001 protect the mixer against overload.

The variable oscillator with transistor T305 is a grounded gate oscillator, which delivers its signal to the balanced mixer from the emitter. T304 amplitude stabilizes the oscillator. When using the balanced mixer both the incoming aerial and the oscillator signals are suppressed at the output of the mixer.

In the position DIRECTION FINDER the signal is supplied directly to the balanced mixer via T303.

AM-filter

This filter is a five-element tuned filter, which is loaded by a field effect transistor T401 acting as a buffer in order to avoid the feedback from the IF amplifier, when this is AGC regulated, due to input impedance variations.

The coupling-in and -out takes place by means of the shifting diodes D401 and D402.

SSB-filter

The SSB-filter is a crystal filter with the carrier frequency 600 kHz. The filter is terminated at the input with L501, D501 and C503.

Also at the output, the filter is terminated with L502, C504 and C505. The buffer stage T501 compensates for the insertion loss in the filter.

The coupling-in and -out takes place by means further shifting diodes D501 and D502.

IF-AMPLIFIER

The IF AMPLIFIER is composed of three stages using the transistors T703, T704 and T705. The first two stages are AGC regulated. These transistors are forward biased, which means that the gain is decreased by increasing current in the transistors. The transistors T701 and T702 are coupled as DC-AMPLIFIER. Their function is to supply T703 and T704 with AGC voltage, which is led to the base of T701.

The transistor T706 operates as AM detector. T706 peak-rectifies the incoming IF signal.

The IF AMPLIFIER has a wide bandwidth, so that the final selectivity is determined by the AM and SSB filters in frontend of the receiver.

AGC SECTION

The signal from the IF AMPLIFIER is amplified in the transistor T805. From a tapping on the coil L801 this amplified signal is peak-rectified by means of the diode D806. The charging capacitor C804 is supplying voltage to the base of the transistor T801, which is working as AGC holding circuit.

In the emitter complex of T801 there are two time-constants. A short time-constant comprising C802—R804 and a long one comprising C801—R800.

At the reception of SSB both time-constants are coupled in. The short time-constant provides for a rapid reduction of the sensitivity of the receiver, when a signal appears. C801, forming part of the long time-constant, is charged to the peak value of the signal. When the base bias on T801 disappears, T801 is blocked, and the AGC voltage, supplied to the IF AMPLIFIER via the diodes D804 and D803 will remain. By this the HANG AGC is achieved, which has the effect that the receiver will not operate on full sensitivity, when the input signal disappears. This is the case during speech intervals at the reception of DSB and SSB. This HANG AGC function will stop after abt. 3 sec., if the input signal disappears for more than abt. 3 sec. If the input signal drops more than abt. 10dB the sensitivity will also be adjusted after a few seconds.

The circuit controlling the HANG AGC, is made up of the transistors T802, T803 and T804. T802 and T803 are coupled in such a way that, if the base voltage on T802 is more than 0,7 V lower than the emitter voltage, then T802 and T803 will act as a short-circuit.

When a signal is supplied to the receiver, a voltage will be established on the AGC line as described. At the same time a higher voltage will be established on the base of T804 at the peak-rectifying by means of the diode D808, which is fed from the top of L801. C806 in the emitter of T804 is charged for this higher voltage, by which T802 is blocked. When the incoming signal disappears, C806 is slowly discharged by means of the resistor P802 and thus the base voltage on T802, whereas the AGC voltage over C801 will hang. When the base voltage on T802 drops 0,7 V below the emitter voltage owing to the discharge of C806, T802 and T803 will be momentarily conducting, and C801, C802 and C806 will rapidly be discharged through R809, and the receiver will have max. sensitivity.

In the position AM R804 is short-circuited to frame and the connection to C802 is interrupted. By this only the long time-constant is coupled in. T801 is constantly conducting and the HANG circuit is out of function. This kind of coupling will ensure that the AGC voltage is independent of the modulation of the incoming signal.

The network with P801 and D802 is used for the adjustment of the operation point for the IF AMPLIFIER for max. amplification without signal on the aerial.

The switch AGC OFF-ON connects the diodes D803 and D804, so that these will be cut-off. By this amplification is only controlled by P1002 (RF-GAIN) via the diode D801.

The RF-GAIN can be used with AGC coupled-in, only the max. sensitivity of the receiver is reduced to a level, which is controlled by means of the RF-GAIN.

SSB DETECTOR — CLARIFIER

The SSB detector is equipped with a field effect transistor T605, which operates as multiplicative mixer between the IF signal and the variable 600 kHz oscillator signal containing the remaining circuits.

The variable 600 kHz signal is produced by mixing a 6,7 MHz and a 7,3 MHz crystal oscillator signal, the frequency of which is altered by means of a capacity diode.

The multiplicative mixing takes place by means of the transistors T603 and T604.

The crystal oscillator T601 and T602 are of the PIERCE COLPITTS type. Both oscillators are provided with capacity diodes for optimum frequency stability.

AUDIO AMPLIFIER

The output transistors T903 operate in push-pull mode and drive the loudspeaker through the transformer T1001. The supply voltage to the output stage is 12 V. The driver transformer TR902 is driven by the transistor T902, which again is driven by the amplifier T901.

Transistor T902 is fed from the output transformer across part of the emitter resistor. An extra winding on the output transformer TR1001 is connected to the meter on the front panel in position DF. This facility is used on direction finding operations. In the position AM and SSB, the same meter tests the AGC voltage.

Remaining circuits

Supply filter, fuses and plugs, are mounted on a printed circuit, on the rear plate of the receiver, where you also find the plug-connection to the transmitter and DIRECTION FINDER.

Power unit 12/24 V DC

This power unit supplies 12 V and 18 V DC to the receiver. 18 V is used for all low level circuits and 12 V for the AF output stage.

The 12 V requirement is taken directly from the vessels batteries on 12 V operation, after the series regulator, with the power transistor T1101 and the zener diode D1102, on 24 V operation.

The diode D1101 protects against wrong polarity of the supply voltage.

The DC converter composed of the transistors T1102 and T1103 and the transformer TR1101 delivers voltage to the rectifier circuit and the series regulator composed of the transistor T1104 and the zener diodes D1104 and D1105.

AC Power unit 110/220 V AC

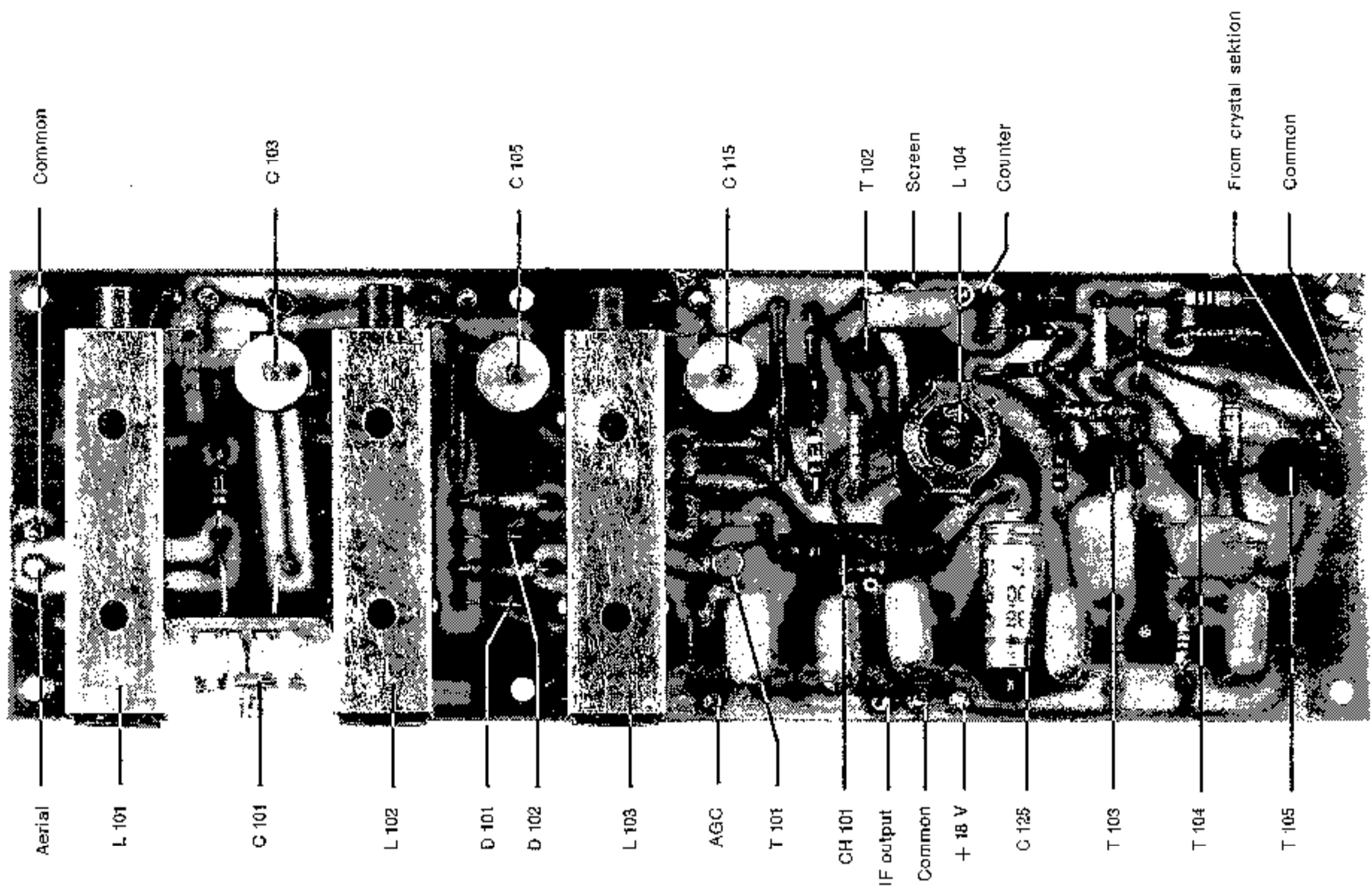
This power unit supplies stabilized 12 V to the AF output stage of the receiver and stabilized 18 V to the low level circuitry.

The transformer TR1201 supplies rectified voltage to the two series regulators from the two secondary windings.

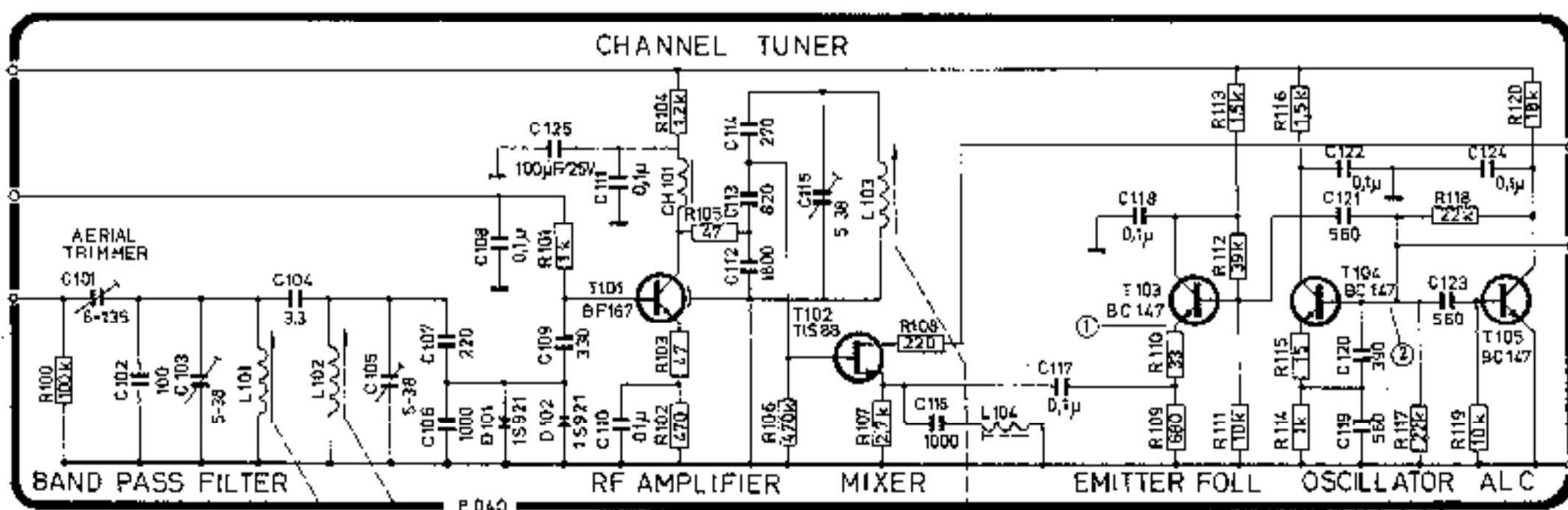
The 18 V series regulator is equipped with the transistor T1201 and zener diodes D1203 and D1204.

The 12 V series regulator is equipped with the power transistor T1204 operated by the emitter follower T1203, which again is driven by the transistor T1202. The zener diode D1205 forms the reference element for T1202. T1202 compares the reference voltage on the emitter with the base voltage, which is proportional to the output voltage, by means of the voltage divider composed of R1208 and R1209.

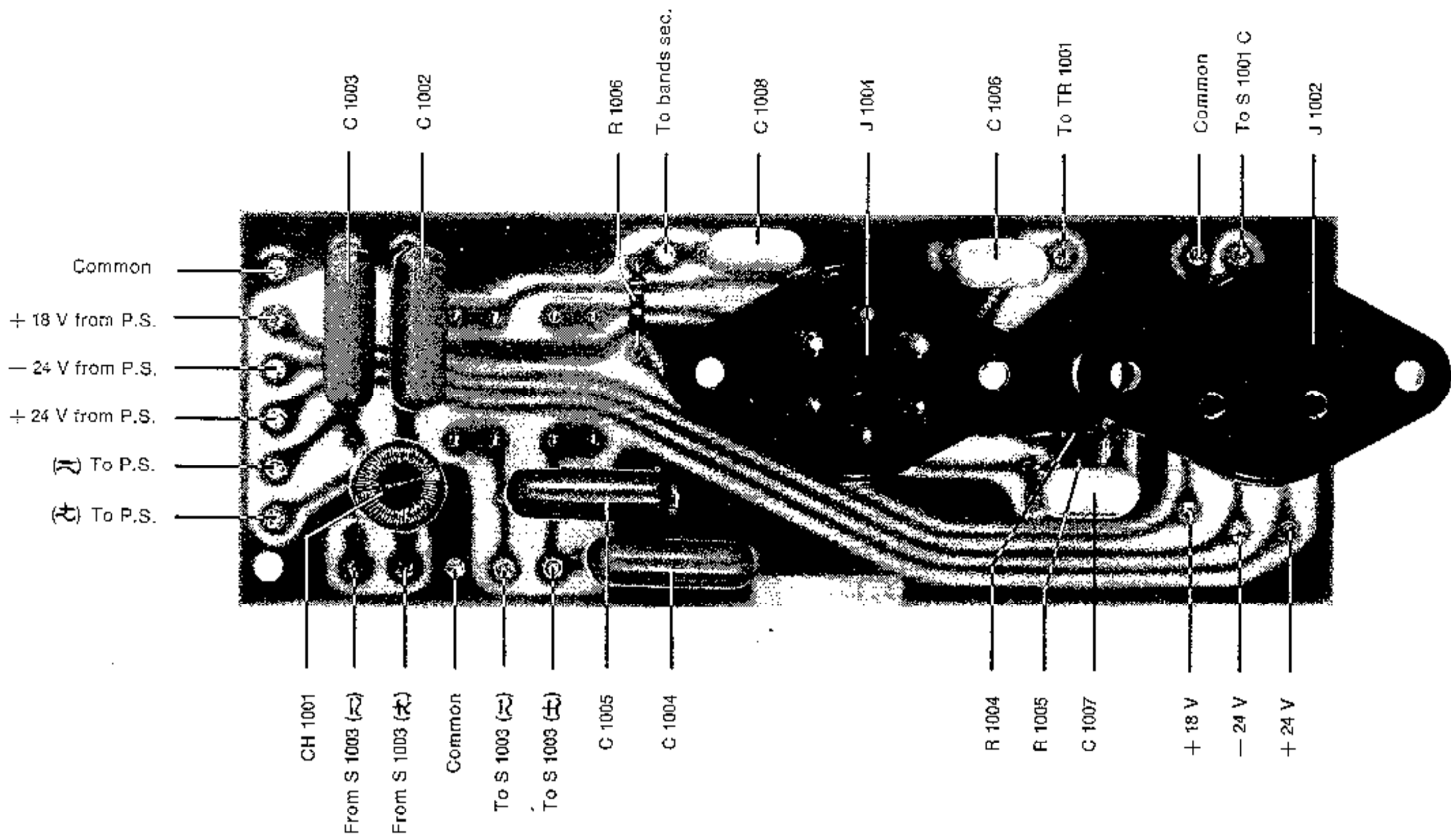
Conditions are stable, when the base voltage is about 0,7 V higher than the emitter voltage.



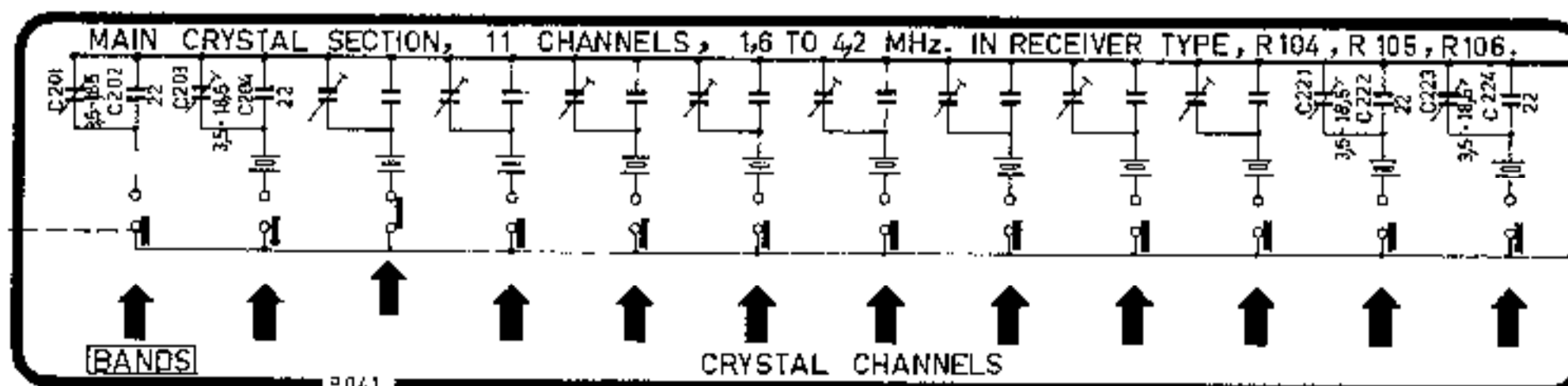
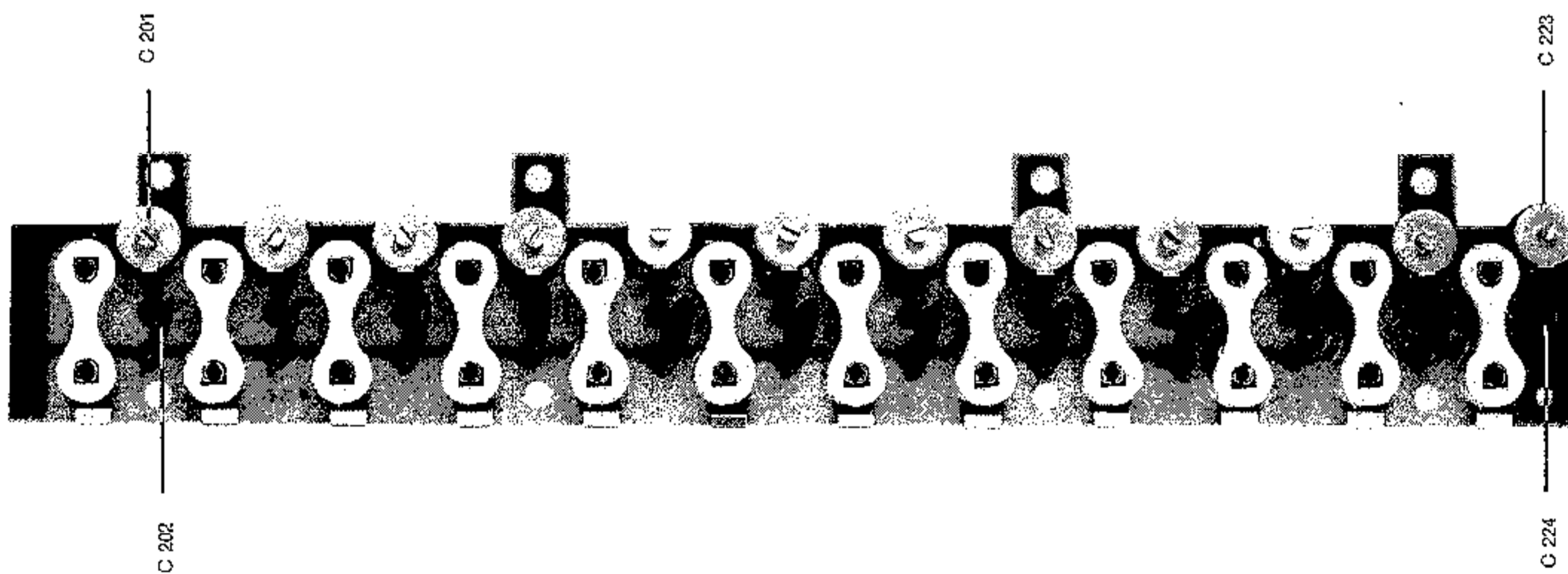
	T101	T103	T104	T105		T102
E	2,9	1,8	2,4	0,0	D	14,0
B	3,1	2,5	3,3	0,1	S	1,6
C	13,0	12,5	14,6	4,8	G	0,0



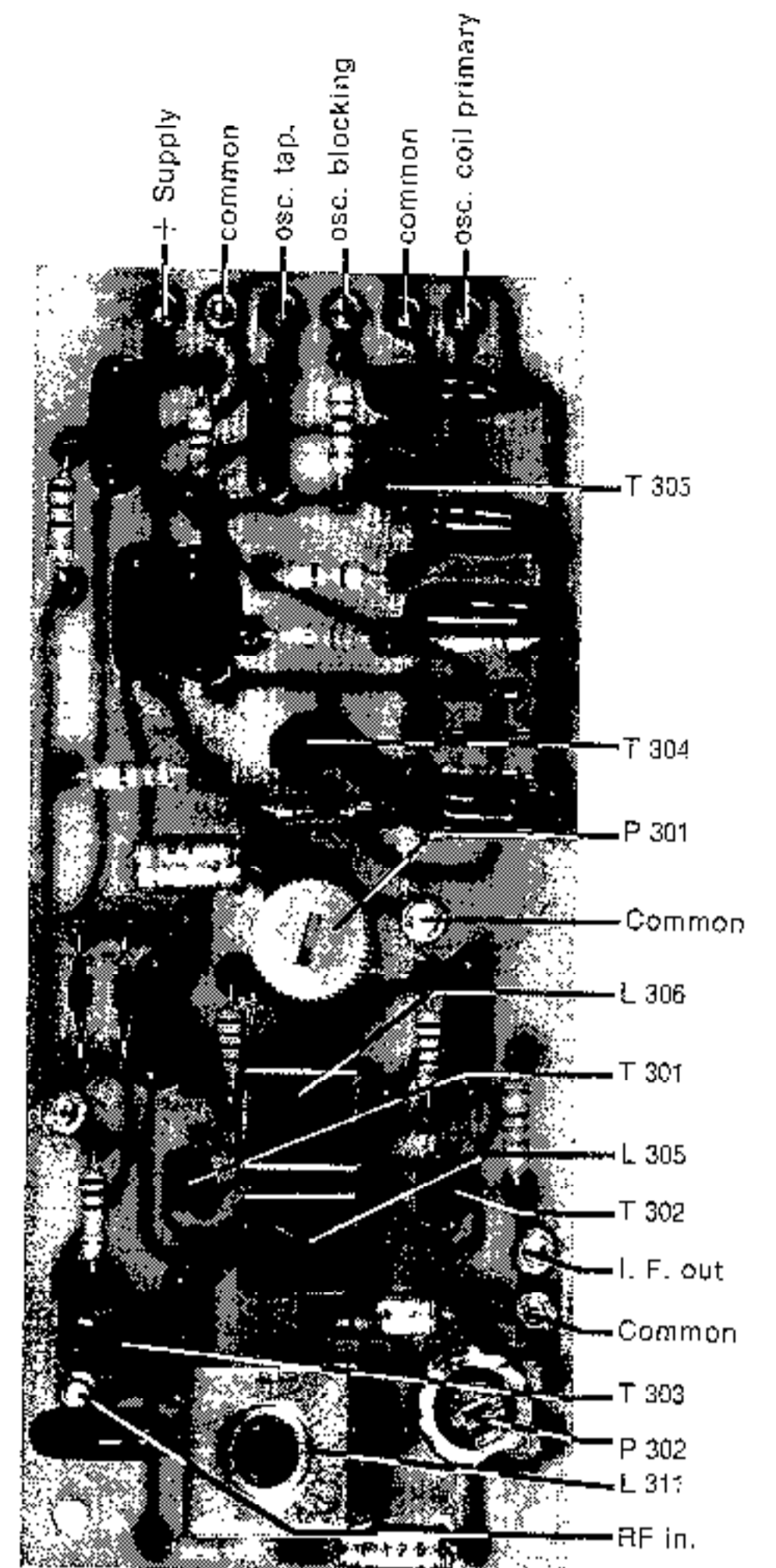
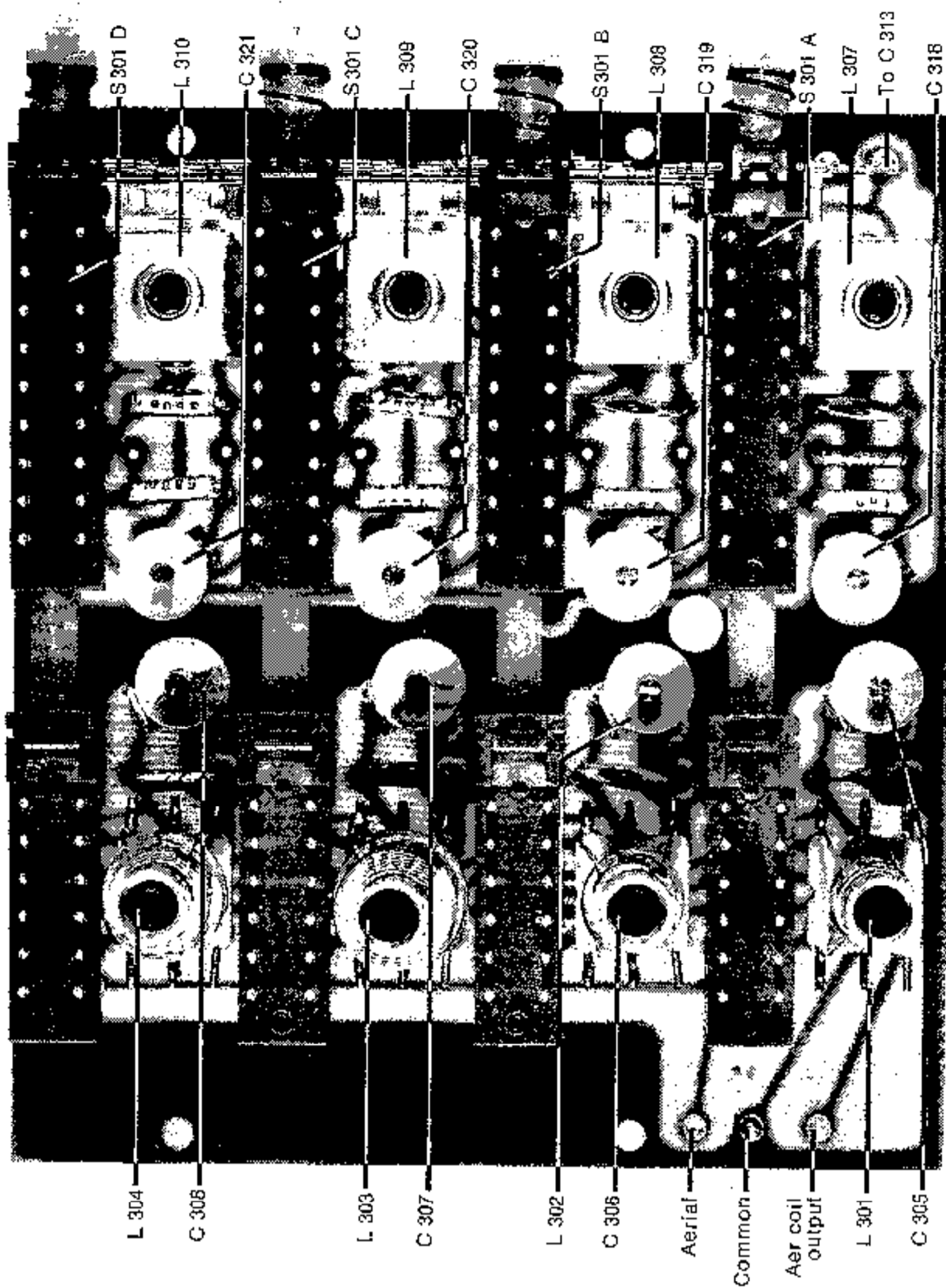
Channel tuner



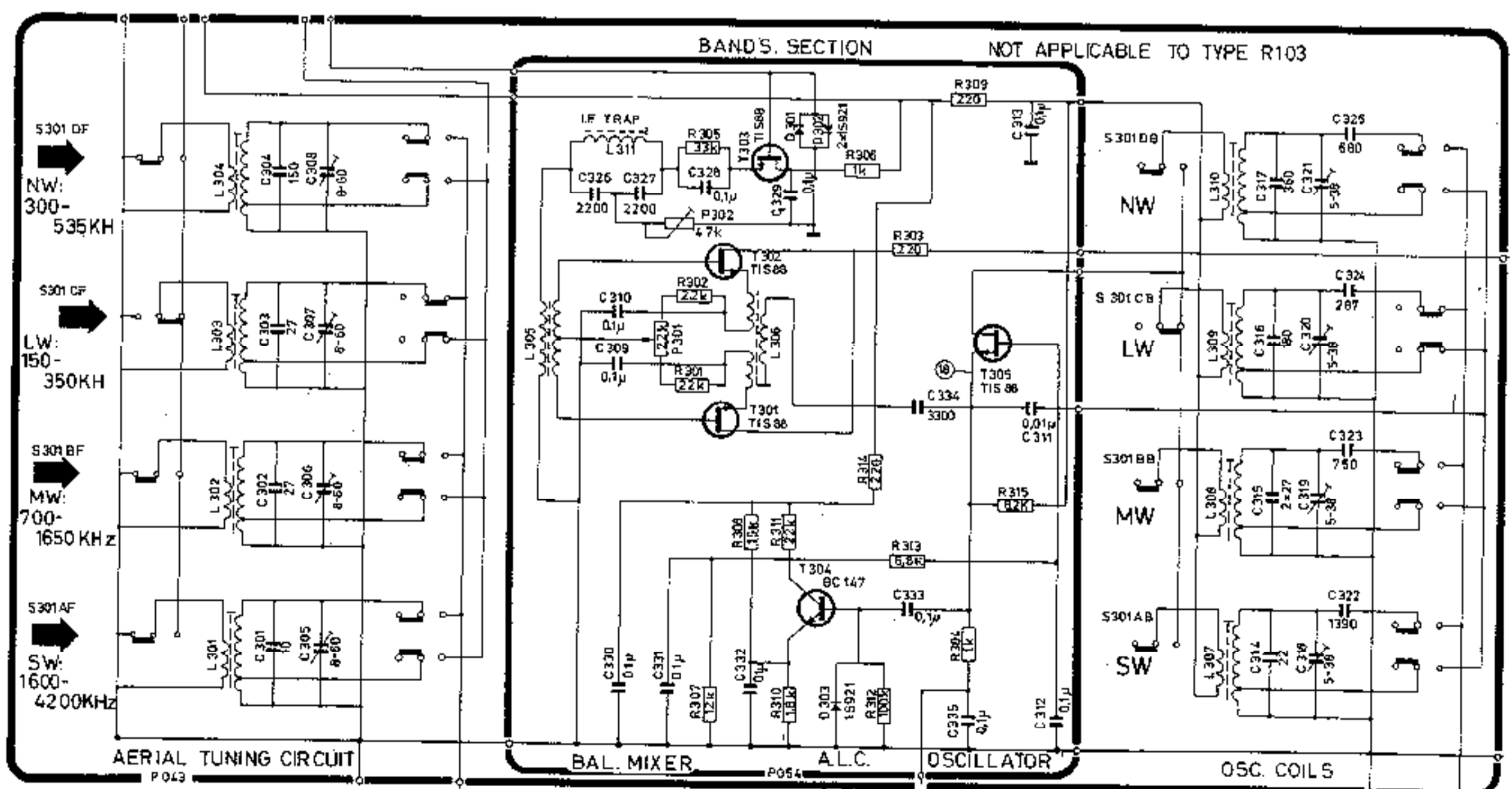
Filter section



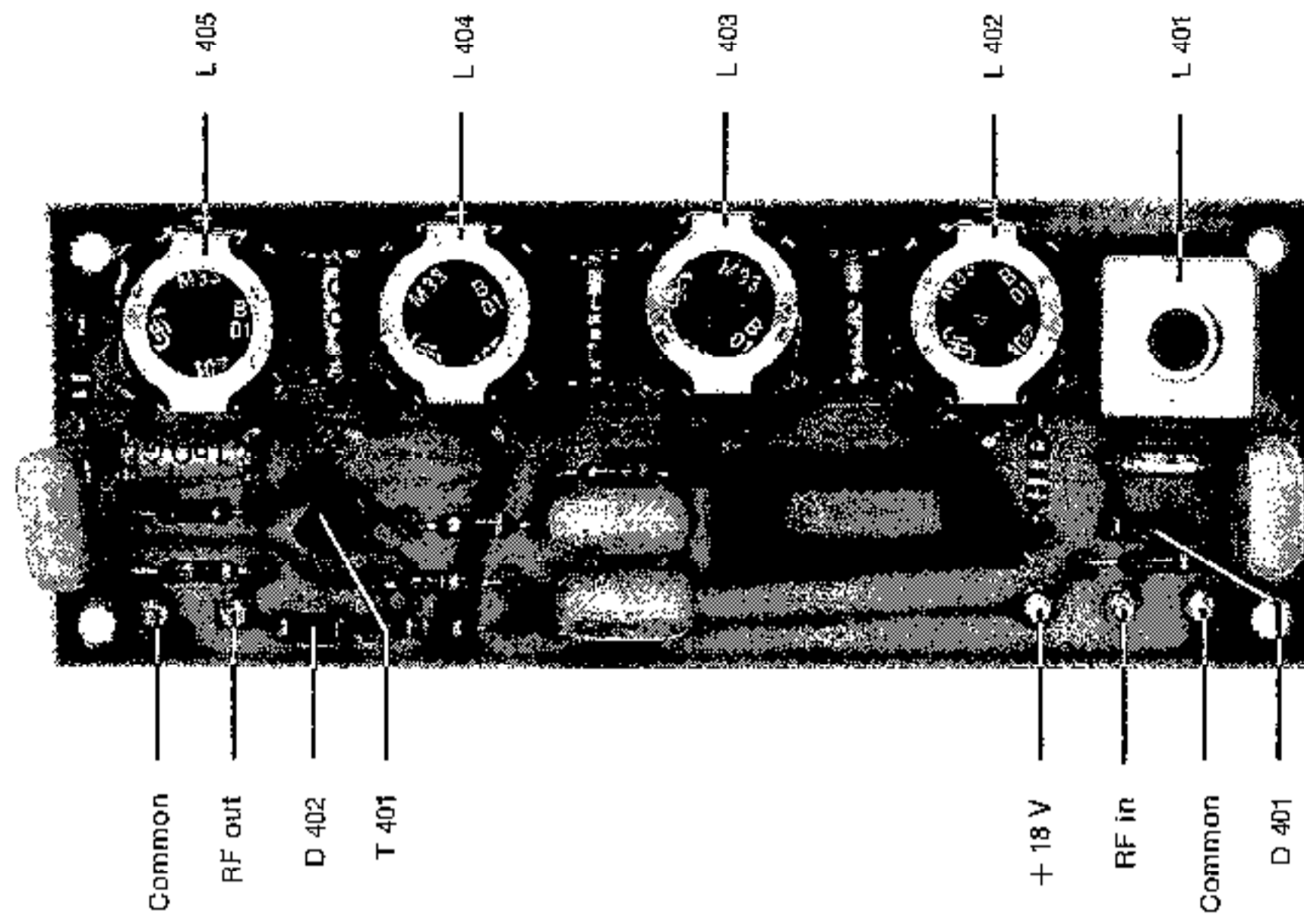
Crystal section



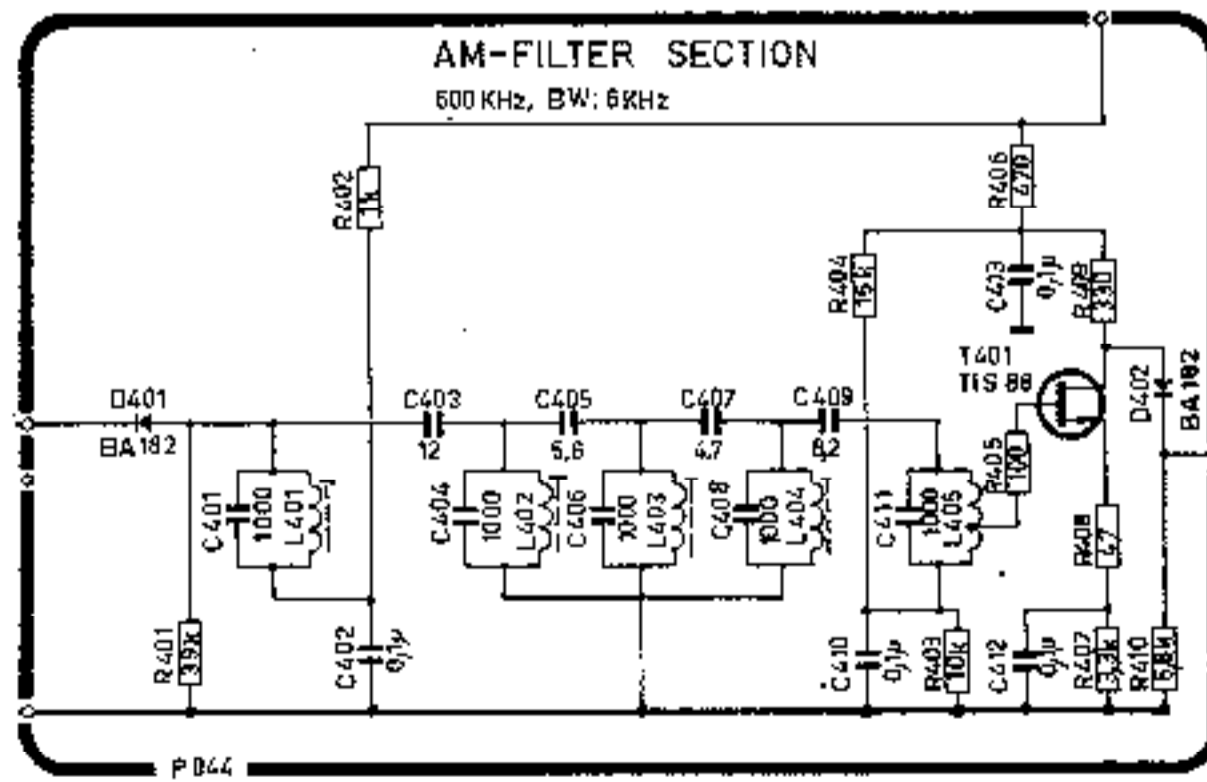
	T 301	T 302	T 303	T 305		T 304
S	3,0	3,0	2,5	5,8	E	2,3
G	0	0	0	3,8	B	1,2
D	14,1	14,1	17,1	17,0	C	3,8



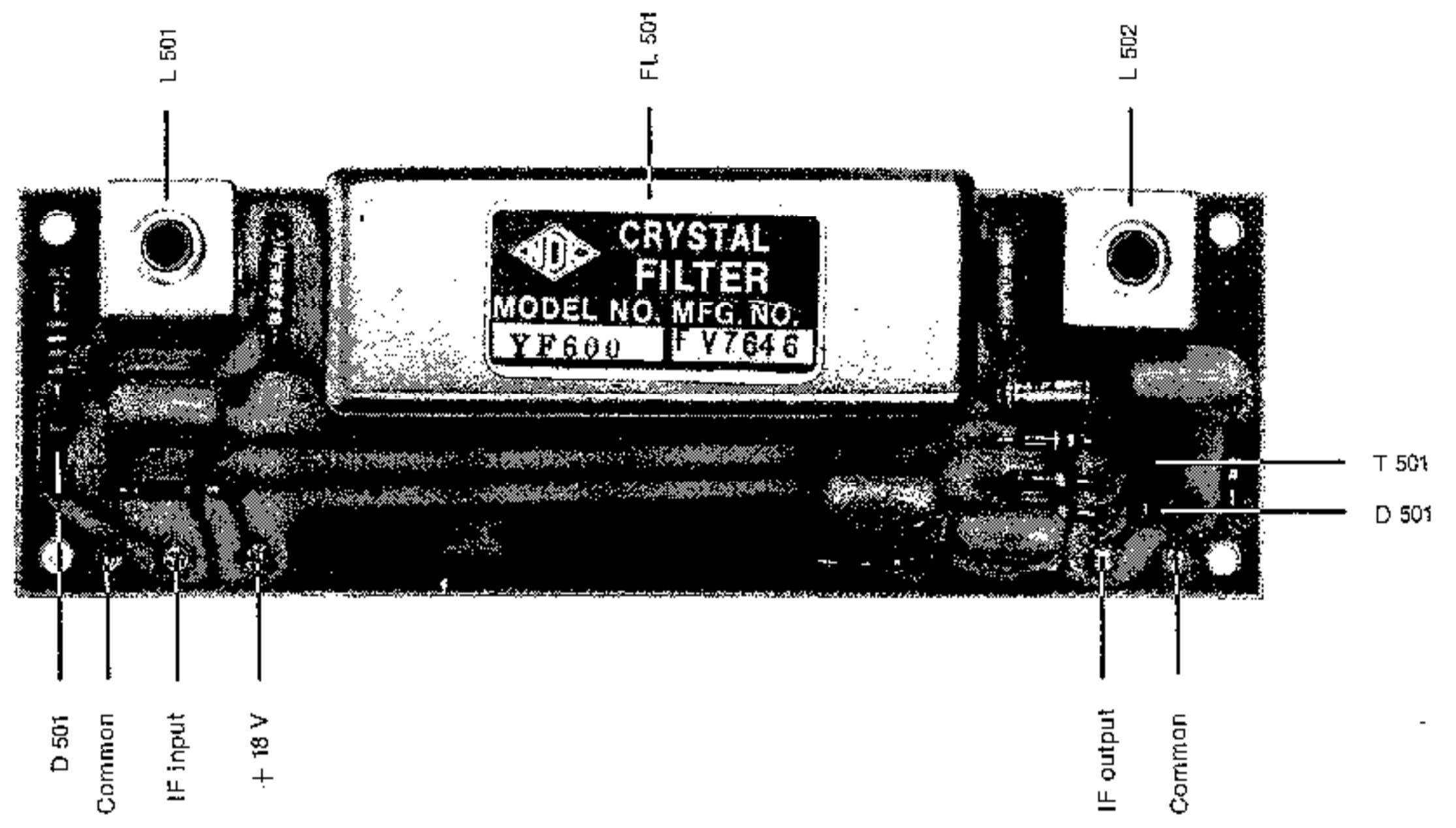
Bands section



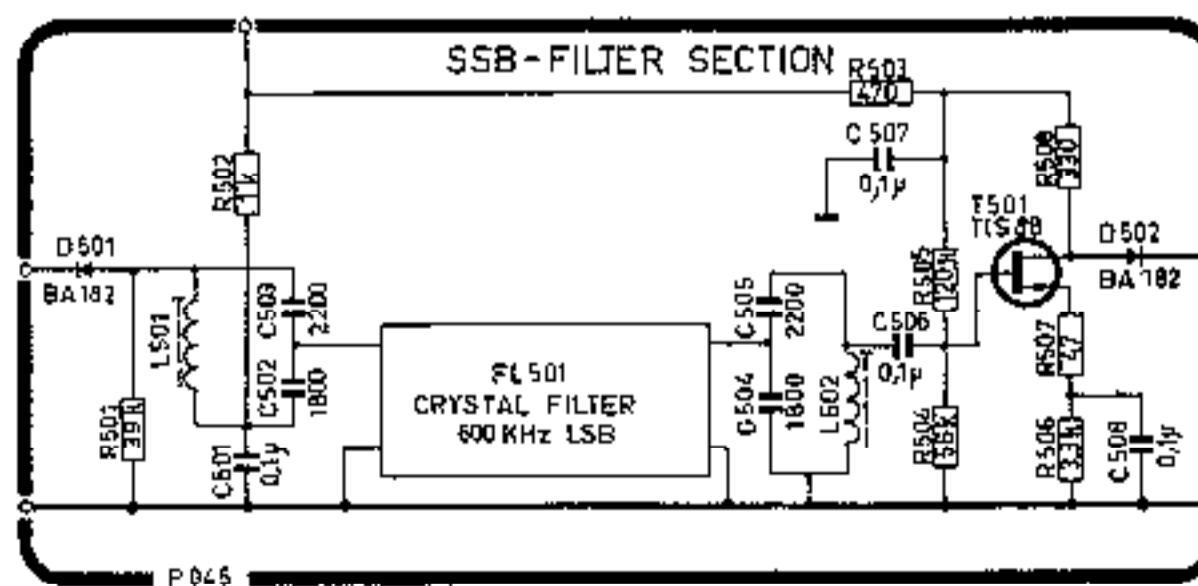
	T401
D	14,2
S	7,6
G	5,8



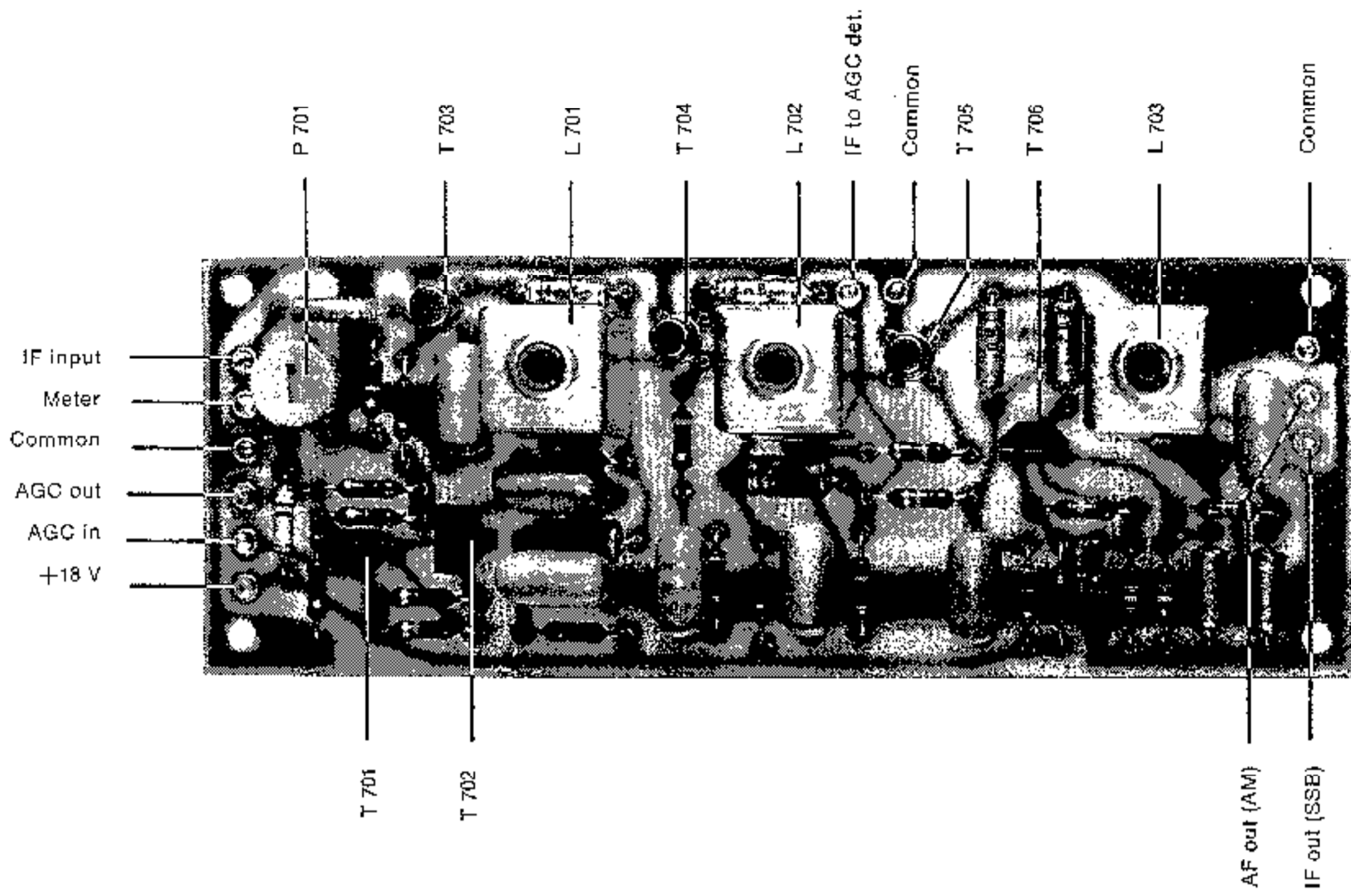
AM - filter section



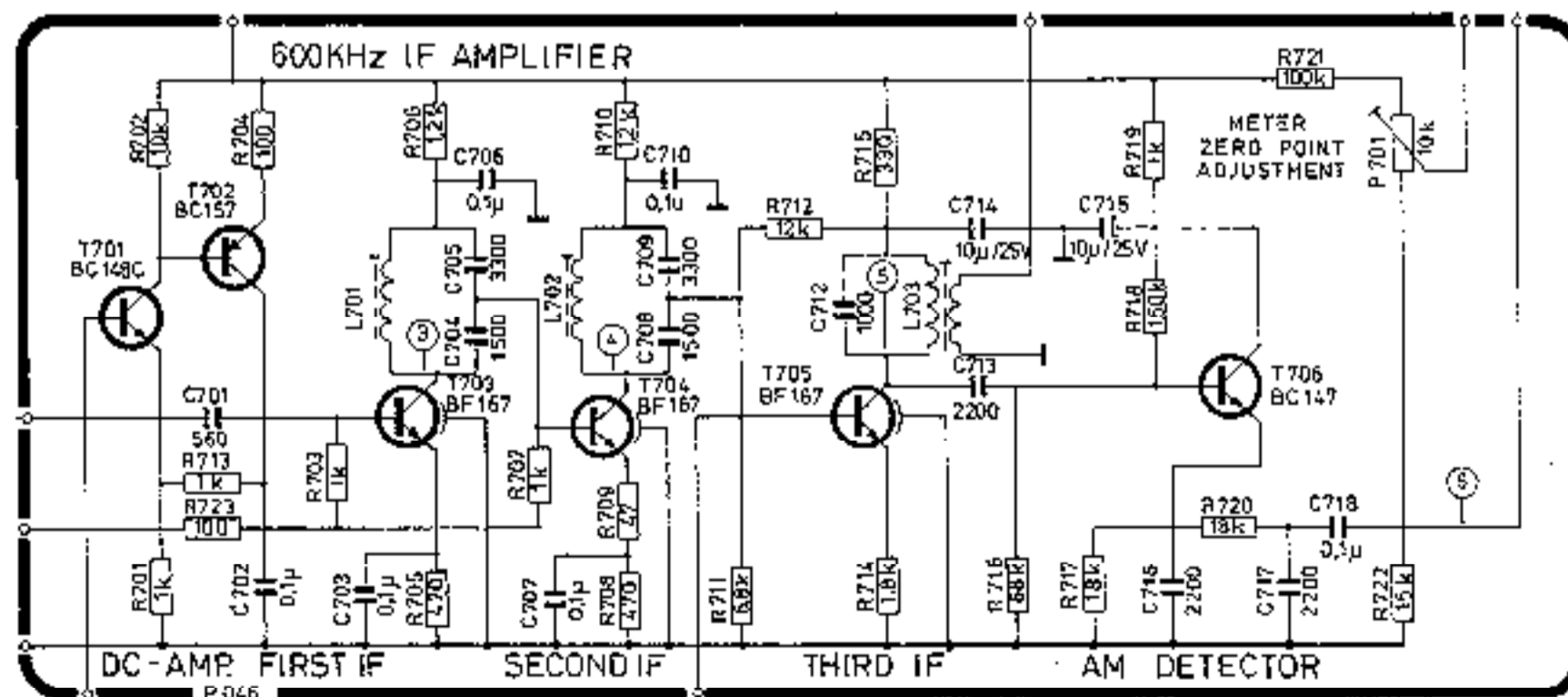
	T 501
D	14,1
S	6,9
G	5,0



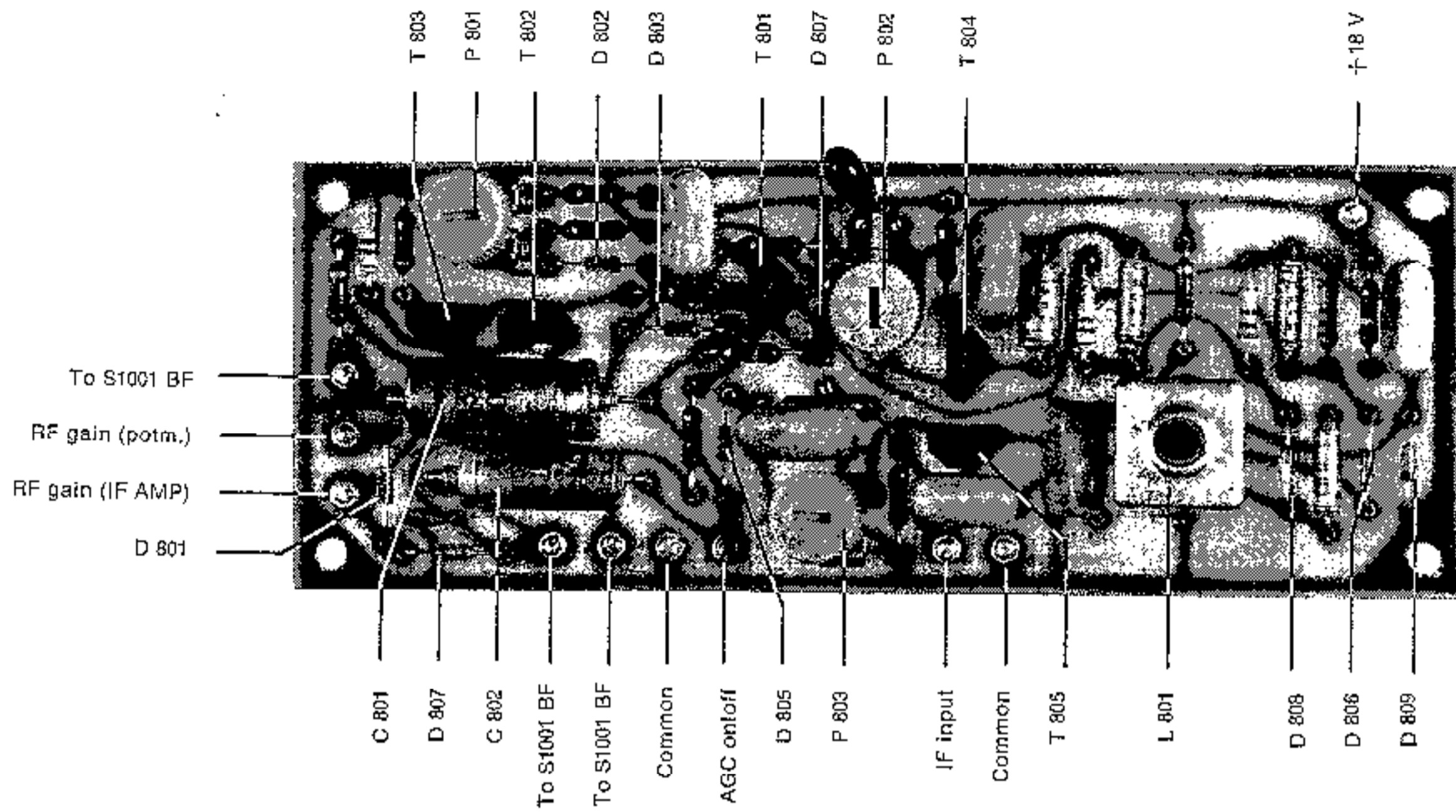
SSB-filter section



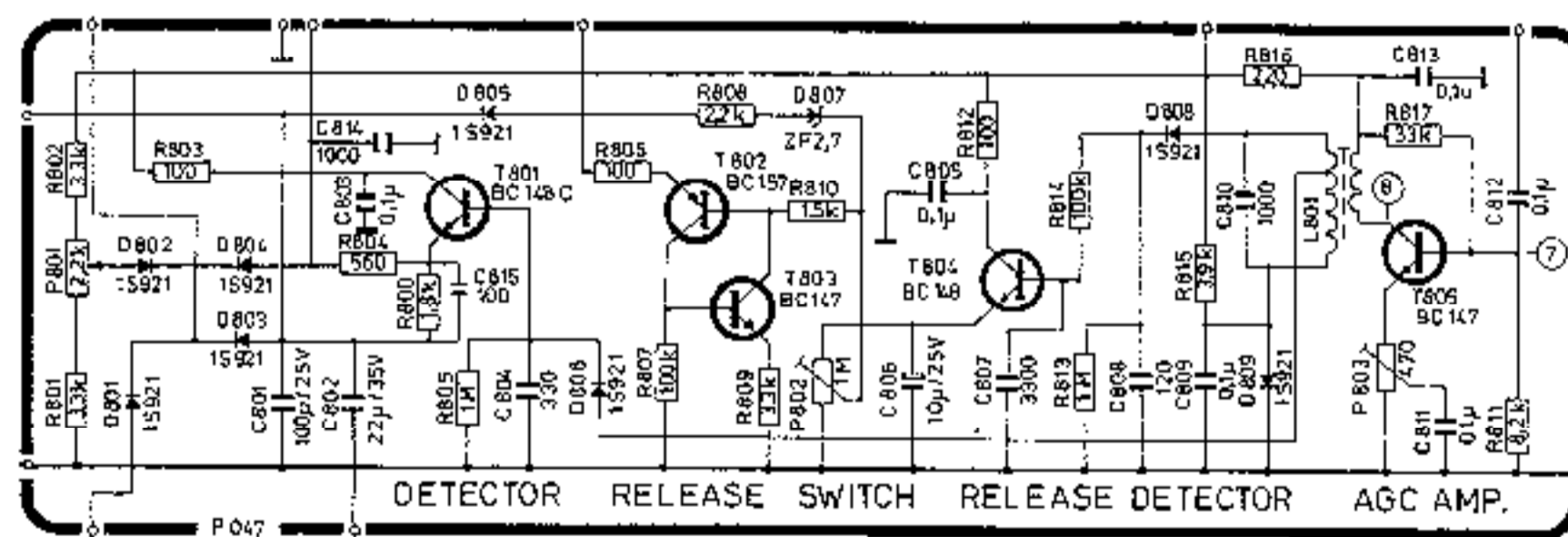
	T701	T702	T703	T704	T705	T706
E	1,4	2,6	1,9	1,9	5,0	4,7
B	2,0	16,9	2,6	2,6	5,8	5,2
C	16,9	17,6	12,9	13,3	16,5	17,4



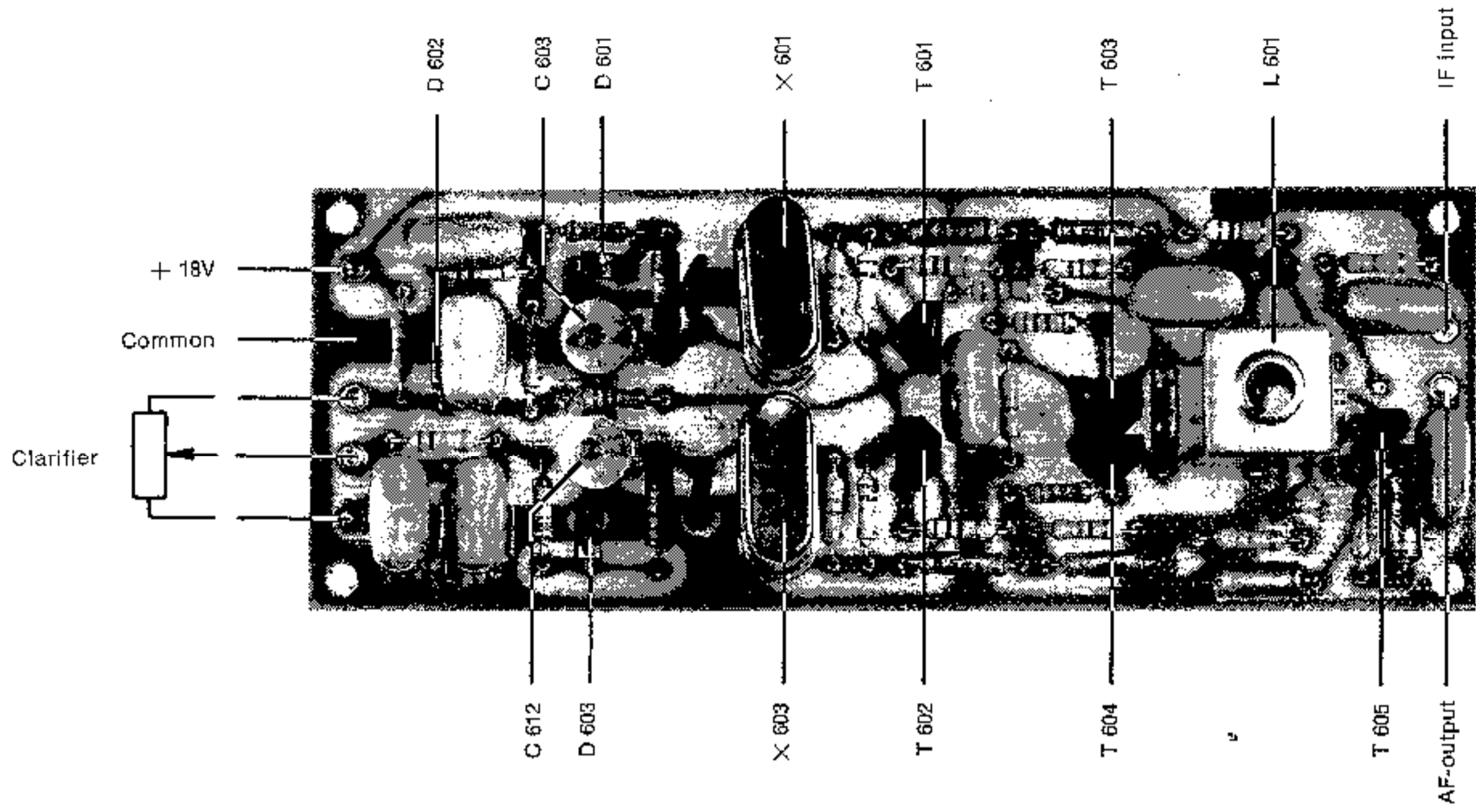
600 KHz IF amplifier



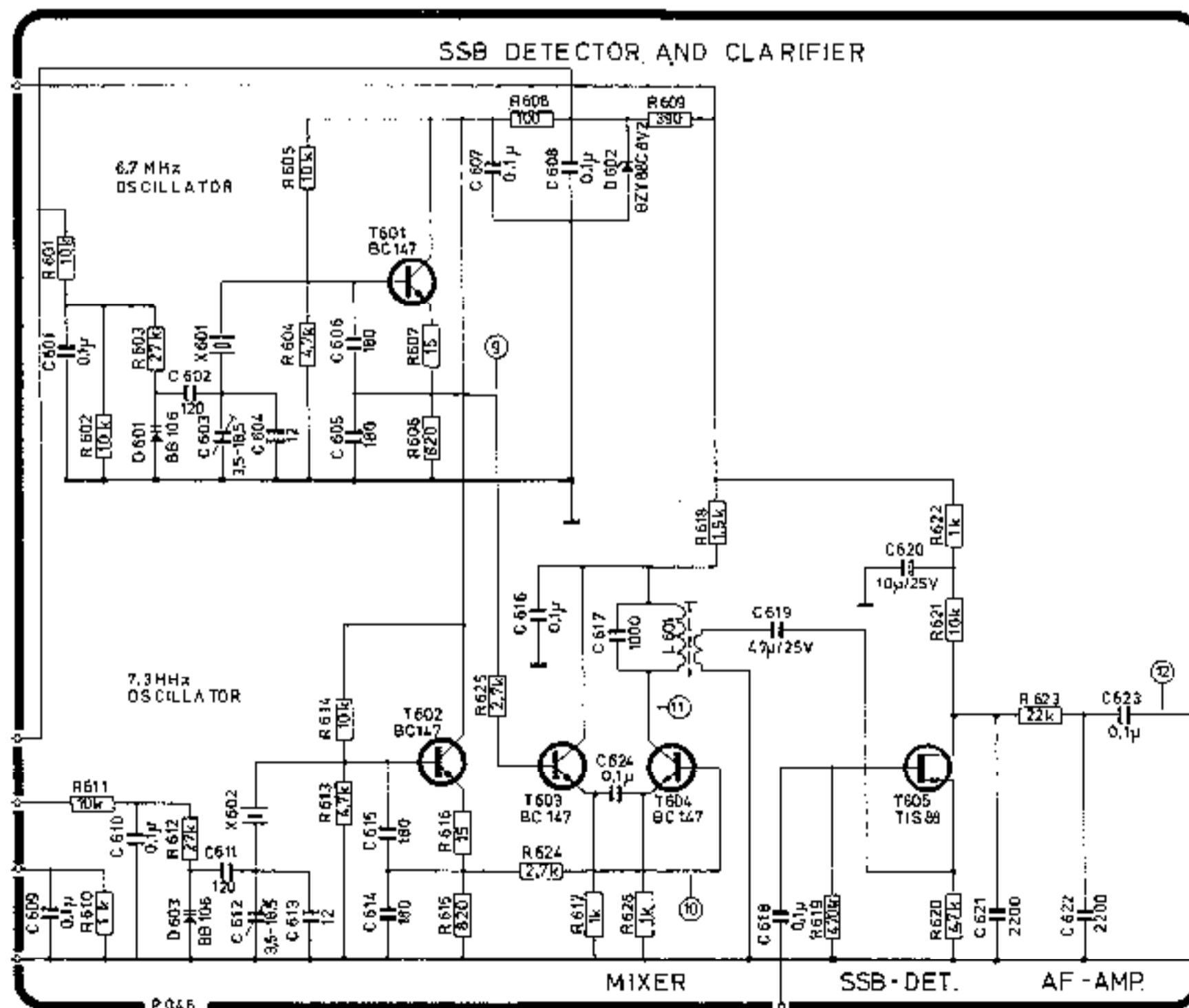
	T 801	T 802	T 803	T 804	T 805
E	0,7	1,0	0,0	0,8	2,3
B	0,5	0,5	0,2	0,7	2,9
C	17,8	0,2	0,5	17,8	16,4



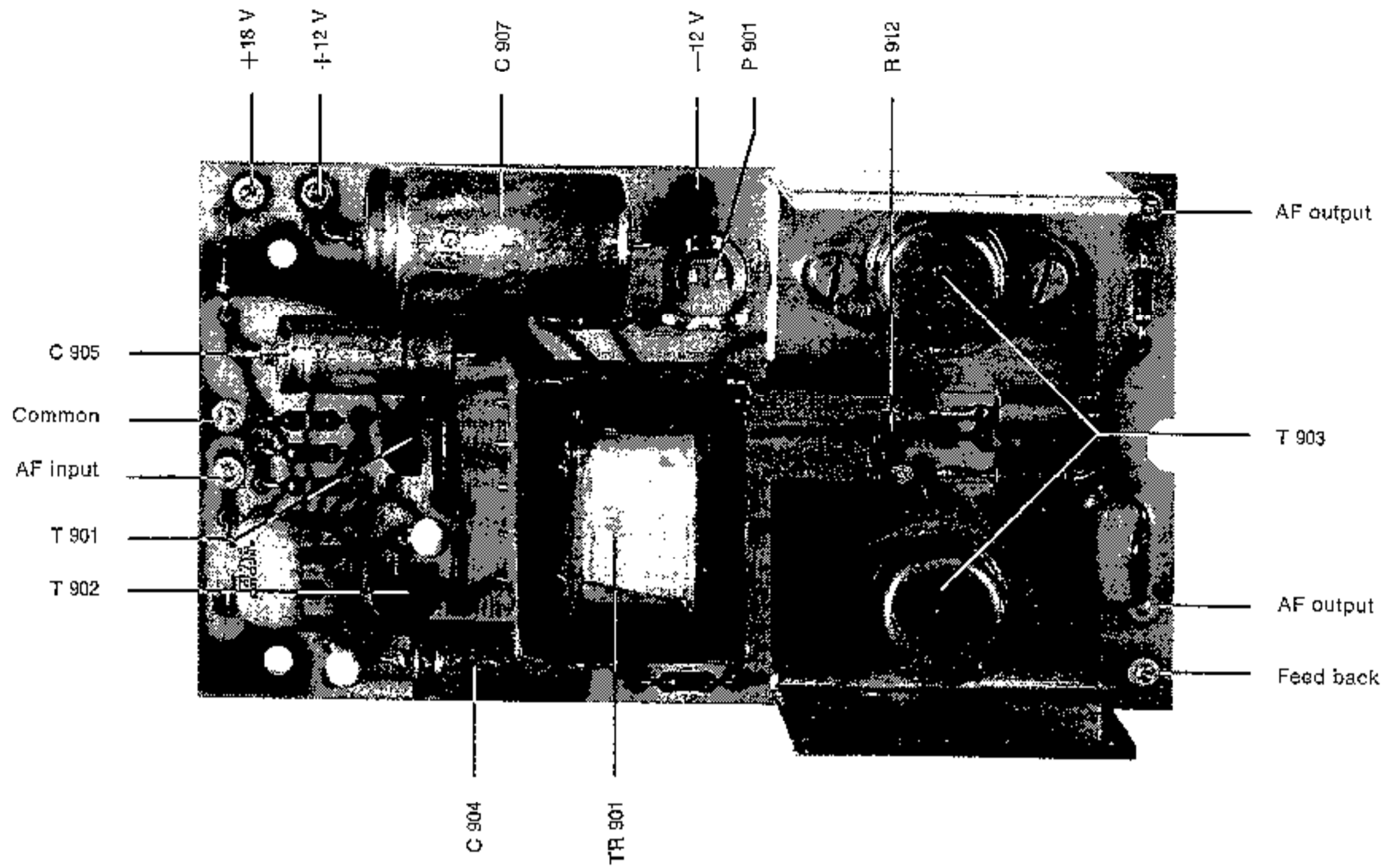
AGC detector



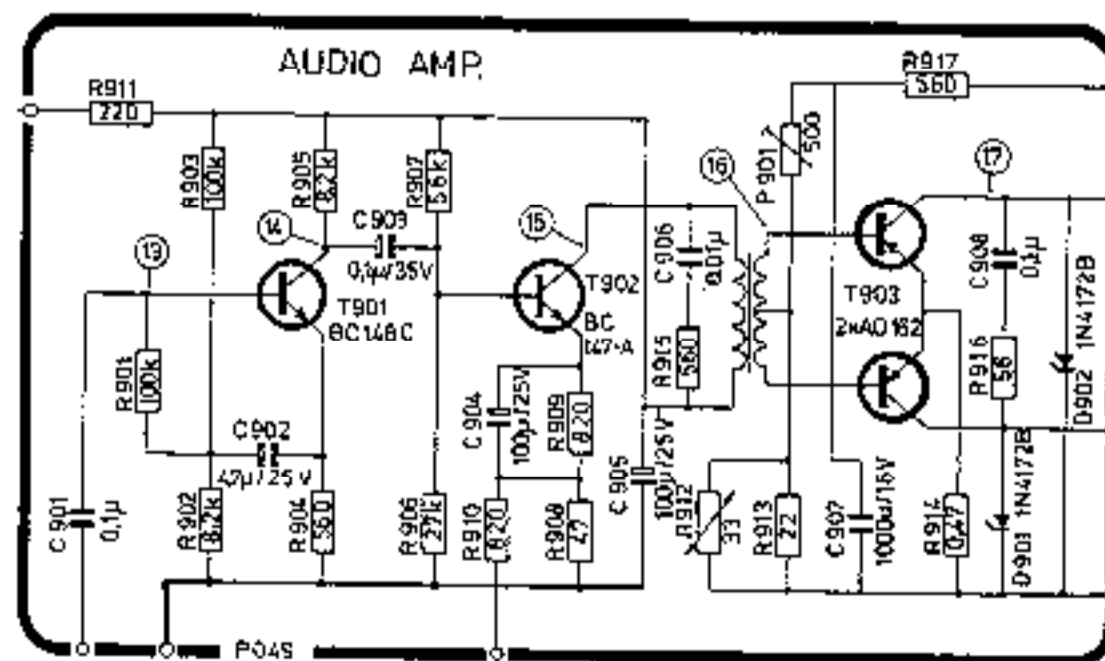
	T601	T602	T603	T604		T605
E	3,2	2,9	3,3	3,2	D	12,0
B	2,4	2,4	3,2	2,9	S	3,1
C	7,8	7,8	8,2	8,2	G	0,0



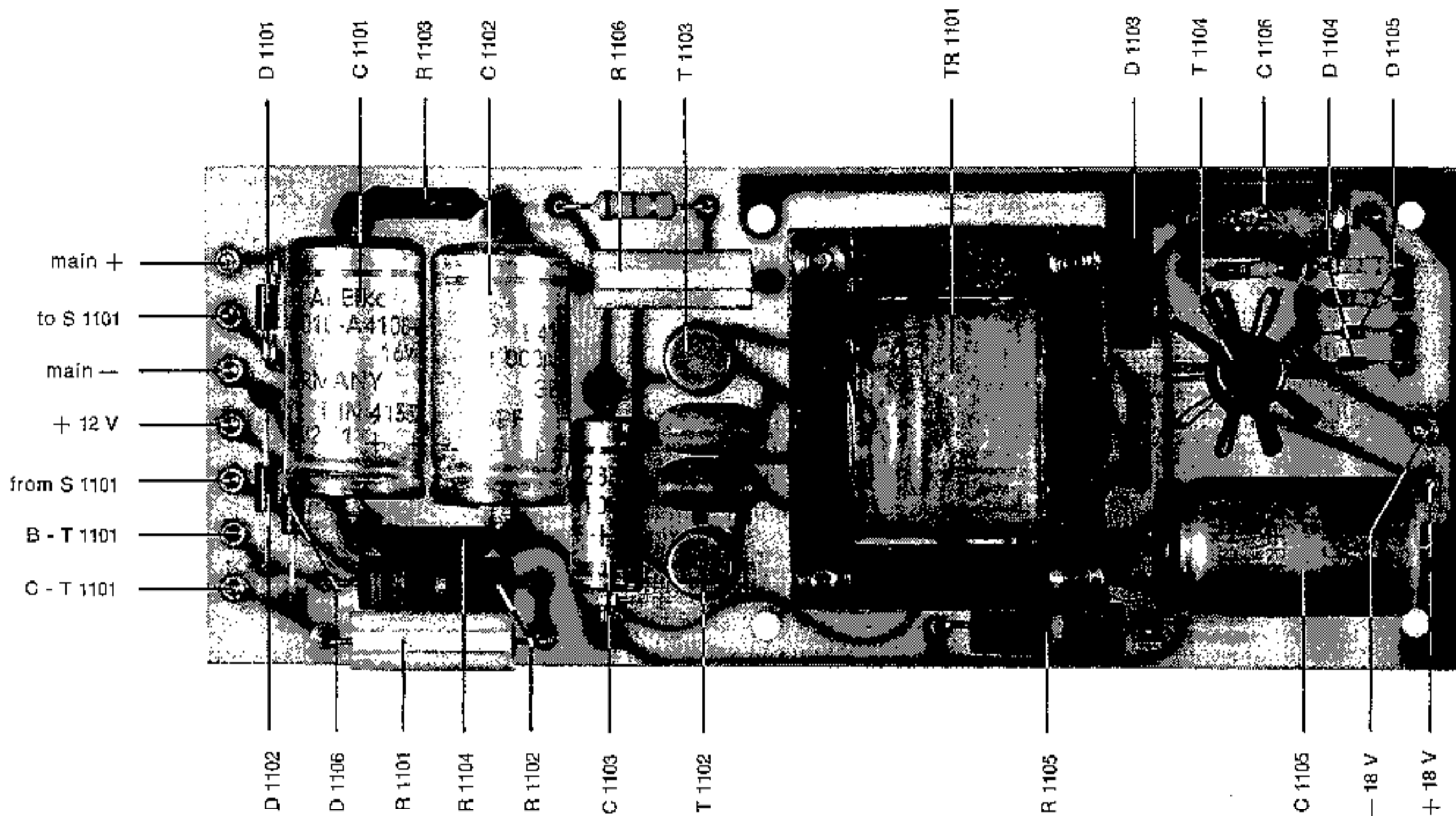
SSB detektor and clarifier



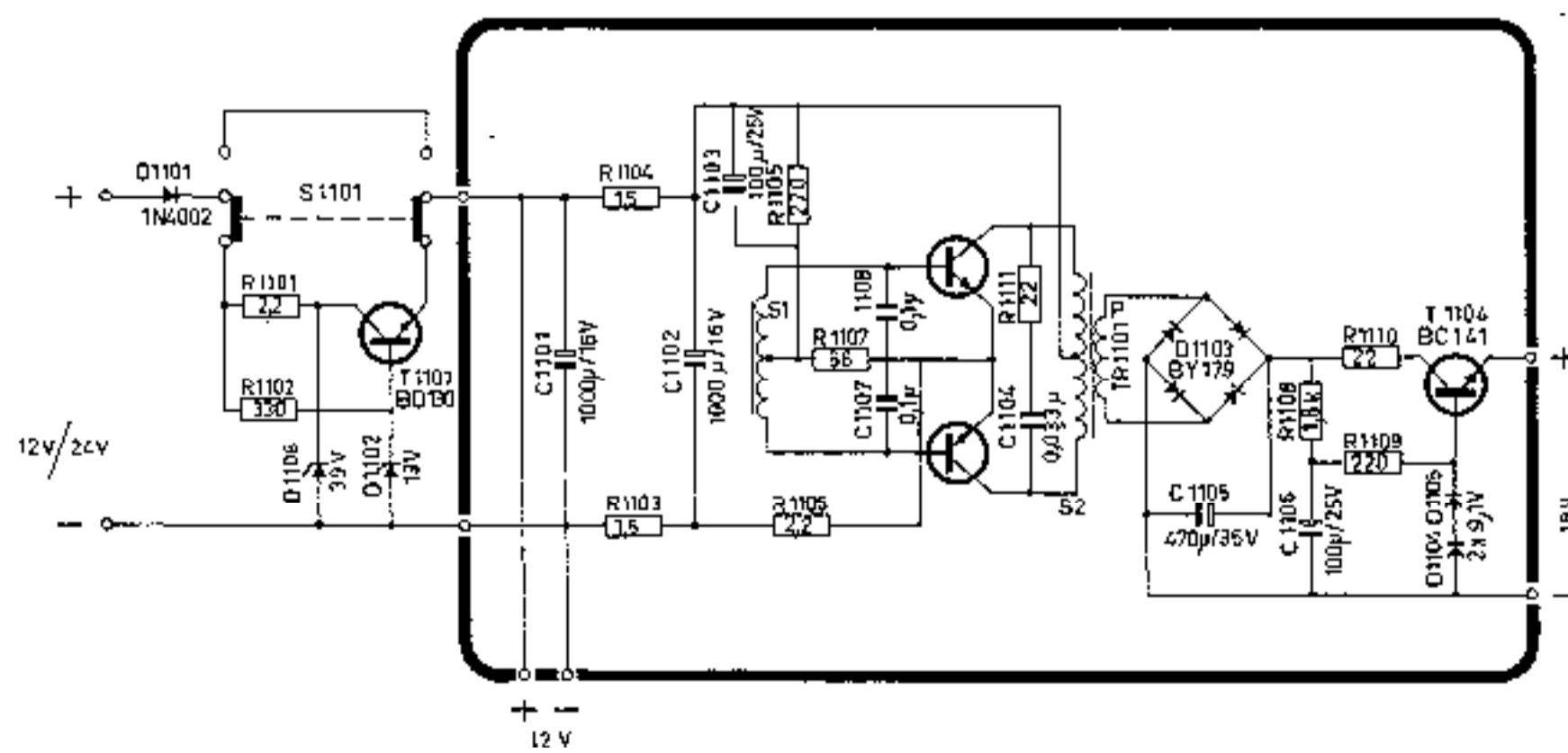
	T901	T902	T903	T904
E	0,4	4,3	-14 m	-14 m
B	1,0	4,9	-142 m	-142 m
C	9,7	15,1	-12,2	-12,2



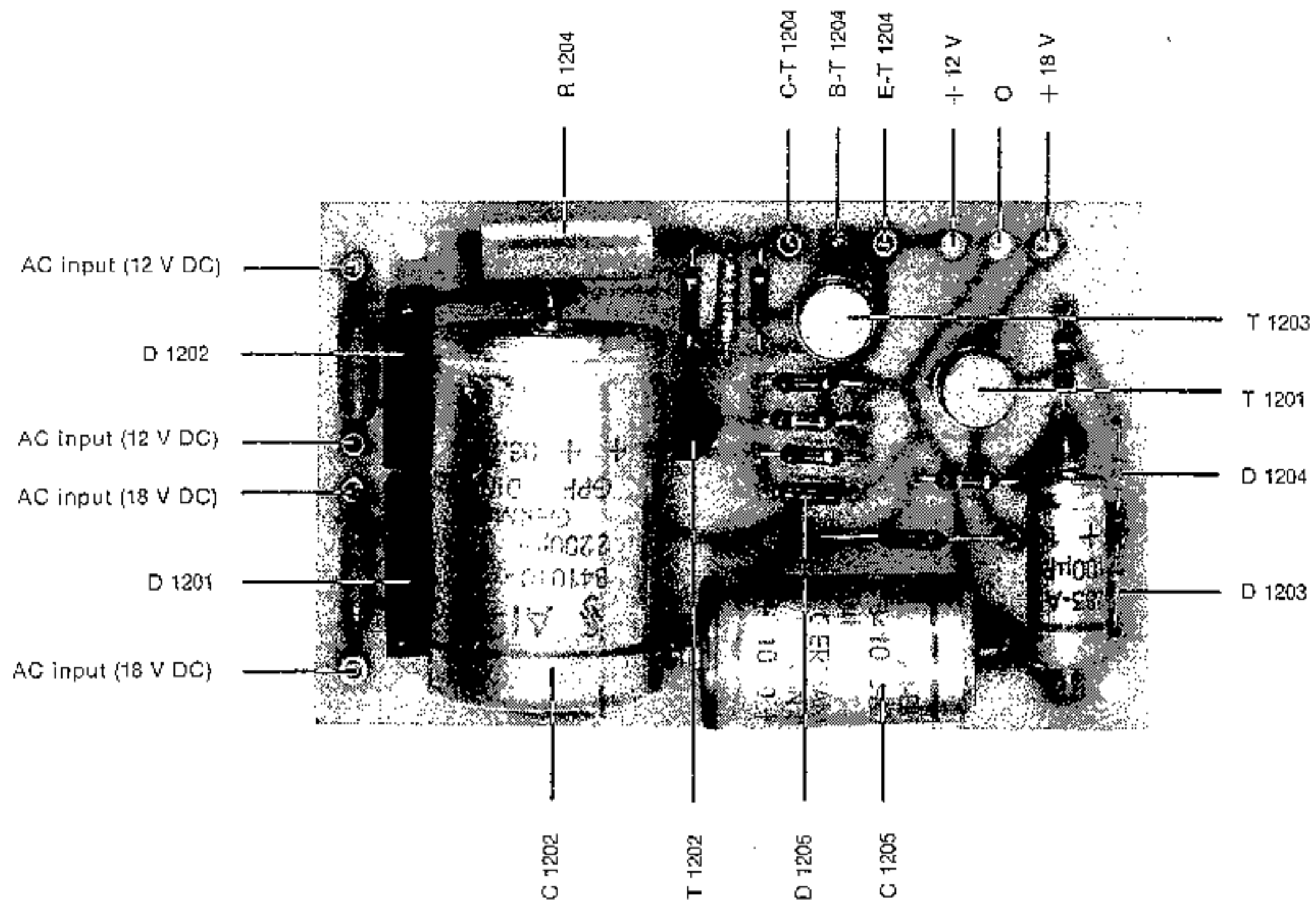
Audio amplifier



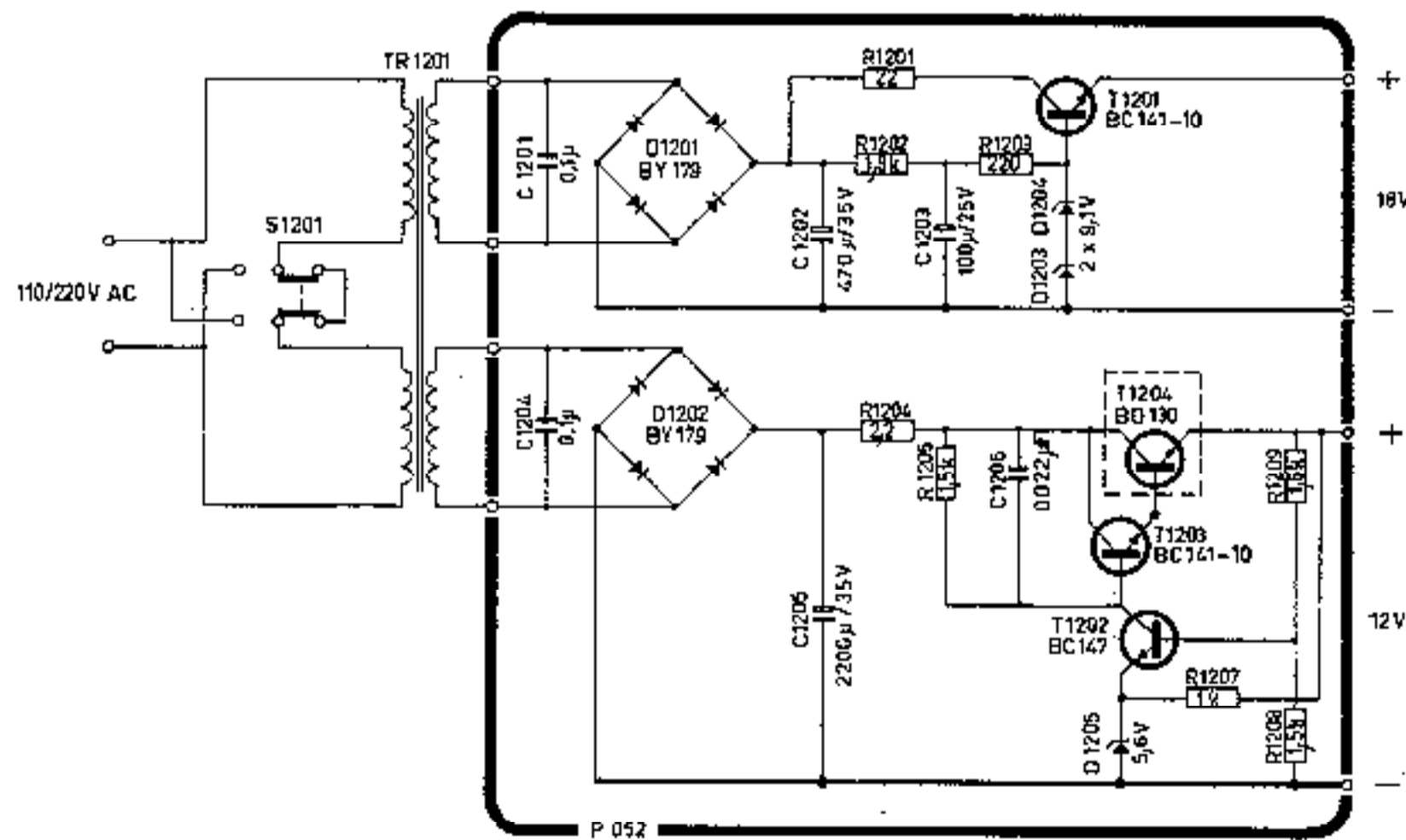
	T 1101	T 1102	T 1103	T 1104
E	12,3	1,1	1,1	18,0
B	13,0	-0,5	-0,5	18,7
C	22,4	11,0	11,0	25,6



12/24 V DC power supply



	T1201	T1202	T1203	T1204
E	17,6	5,6	14,6	13,9
B	18,2	6,2	15,0	14,6
C	27,0	15,0	27,8	26,8



110/220 V AC power supply

Measurement point	Voltage <i>V_{pp}</i>	Xtal. control in operation		V.F.O. in operation	A.F.
		Position of mode switch			
		A.M.	S.S.B.		
1	1,2	●	●		
2	1,7	●	●		
3	0,02		●		
4	0,4		●		
5	1,0		●		
6	0,2	●			
7	0,13		●		
8	9,1		●		
9	1,2		●		
10	1,0		●		
11	13,5		●		
12	0,5		●		
13	0,05				●
14	0,44				●
15	6,5				●
16	1,1				●
17	10,6				●
18	0,29			●	

Typical A.C. Voltages at Points on Main Diagram shown circled

Tensions alternatives types, repérées sur le schéma général par les nombres entourés d'un cercle.

Condition de test:

Entrée antenne: 1 mV eff.

Circuit antenne: 250 pF en série avec 10 ohms ou 50 ohms seul.

Modulation du générateur de test: M.A.: 30 % 1kHz. BLU.: Rien.

Les tensions A.F. sont mesurées pour une puissance de sortie de 0,5 W avec L'AGC en service.

Typically A.C. voltages indicated by circled numbers in main diagram.

Test conditions:

Antenna input: 1 mV RMS.

Dummy antenna: 250 pF in series with 10 ohm or 50 ohm alone.

Modulation of test generator: AM: 30 % 1kHz SSB: none

AF voltages measured for 0,5 W output with AGC-ON.

All voltages measured as peak to peak voltages with an oscilloscope. (Input impedance more than 1MΩ in parallel with max. 20pF).

Typiske vekselspændinger angivet ved indcirklede numre i hoveddiagrammet.

Målebetiingelser:

Antenne input: 1mV RMS.

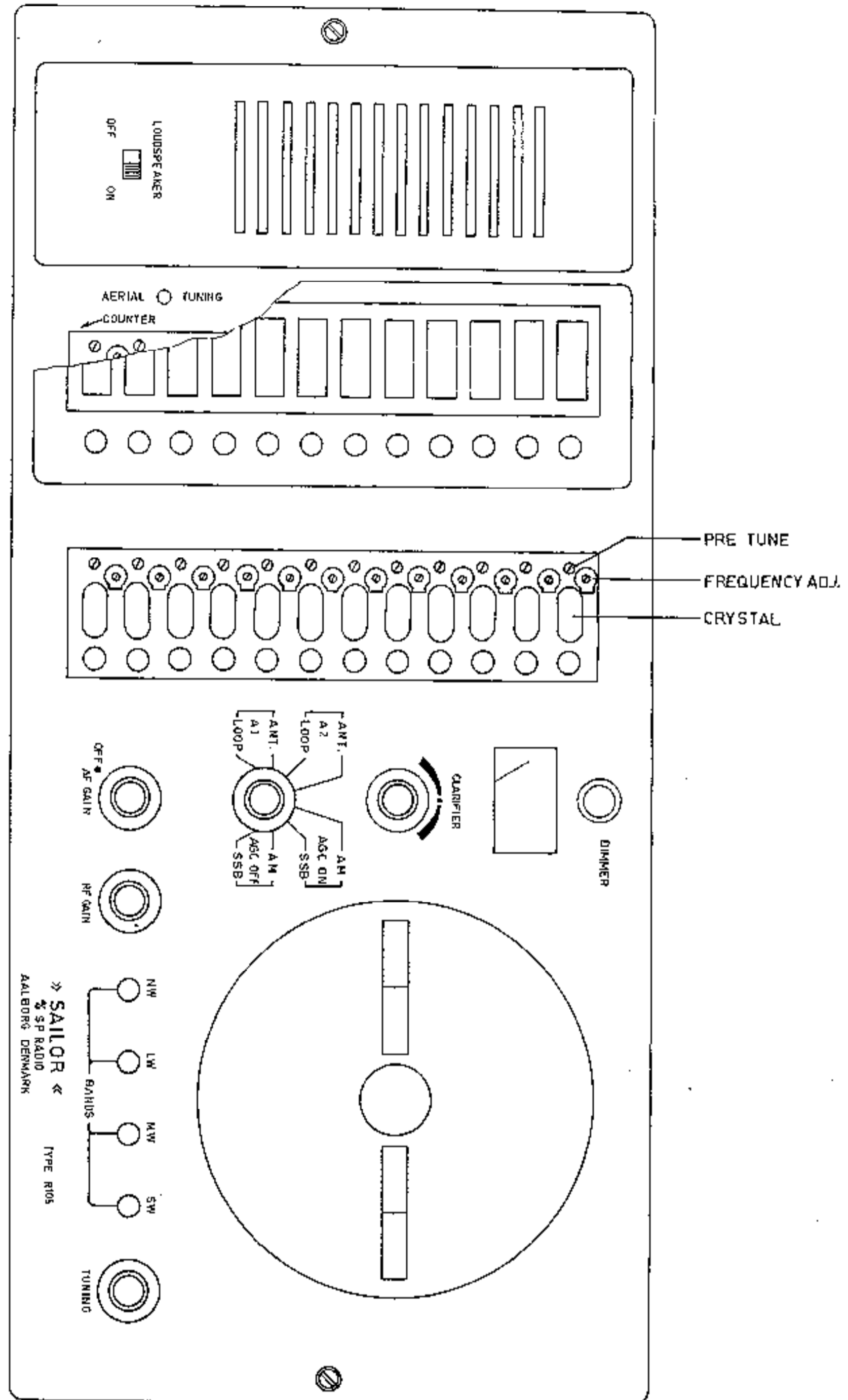
Kunst antenne: 250 pF i serie med 10 ohm eller 50Ω rent ohmsk.

Modulation af målesender: AM: 30 % 1kHz. SSB: Ingen.

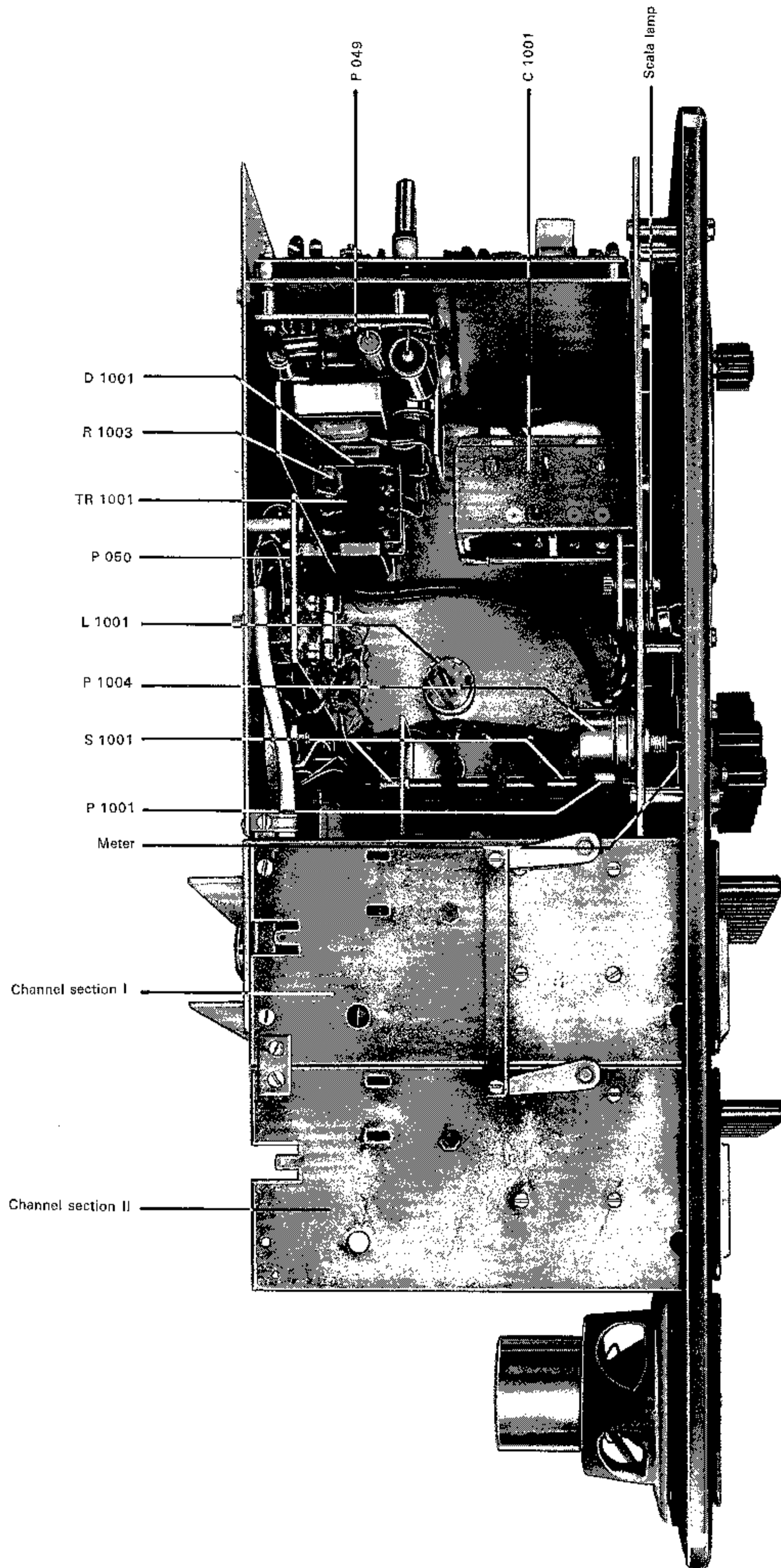
LF spændinger målt for 0,5 W output med AGC-ON.

Alle spændinger målt som spids-spids spændinger med oscilloscop. (Indgangsmodstand større end 1MΩ parallelt med max. 20 pF).

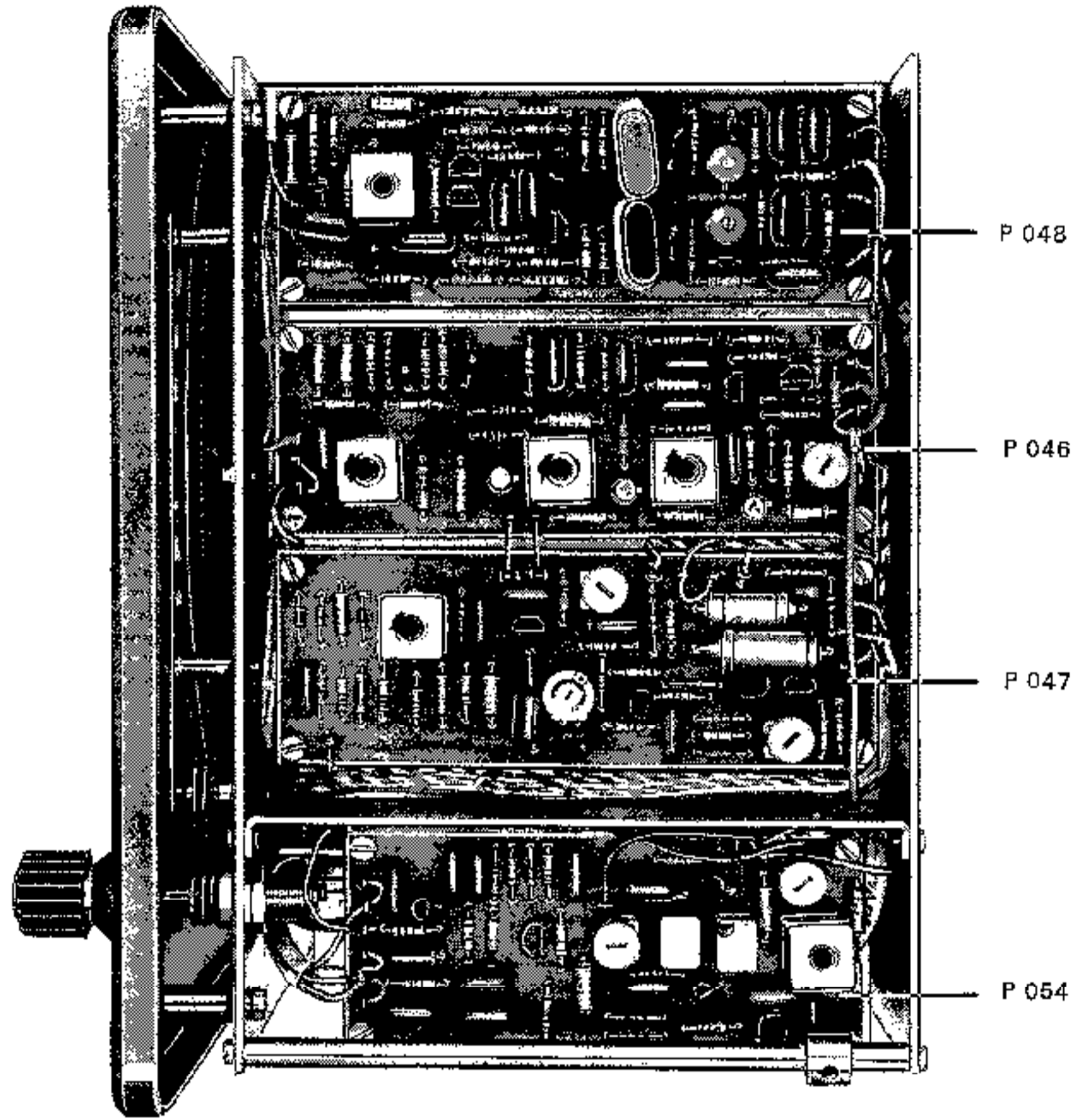
**Typical A. C. Voltage chart
for all SSB Rcvrs. R103-6**



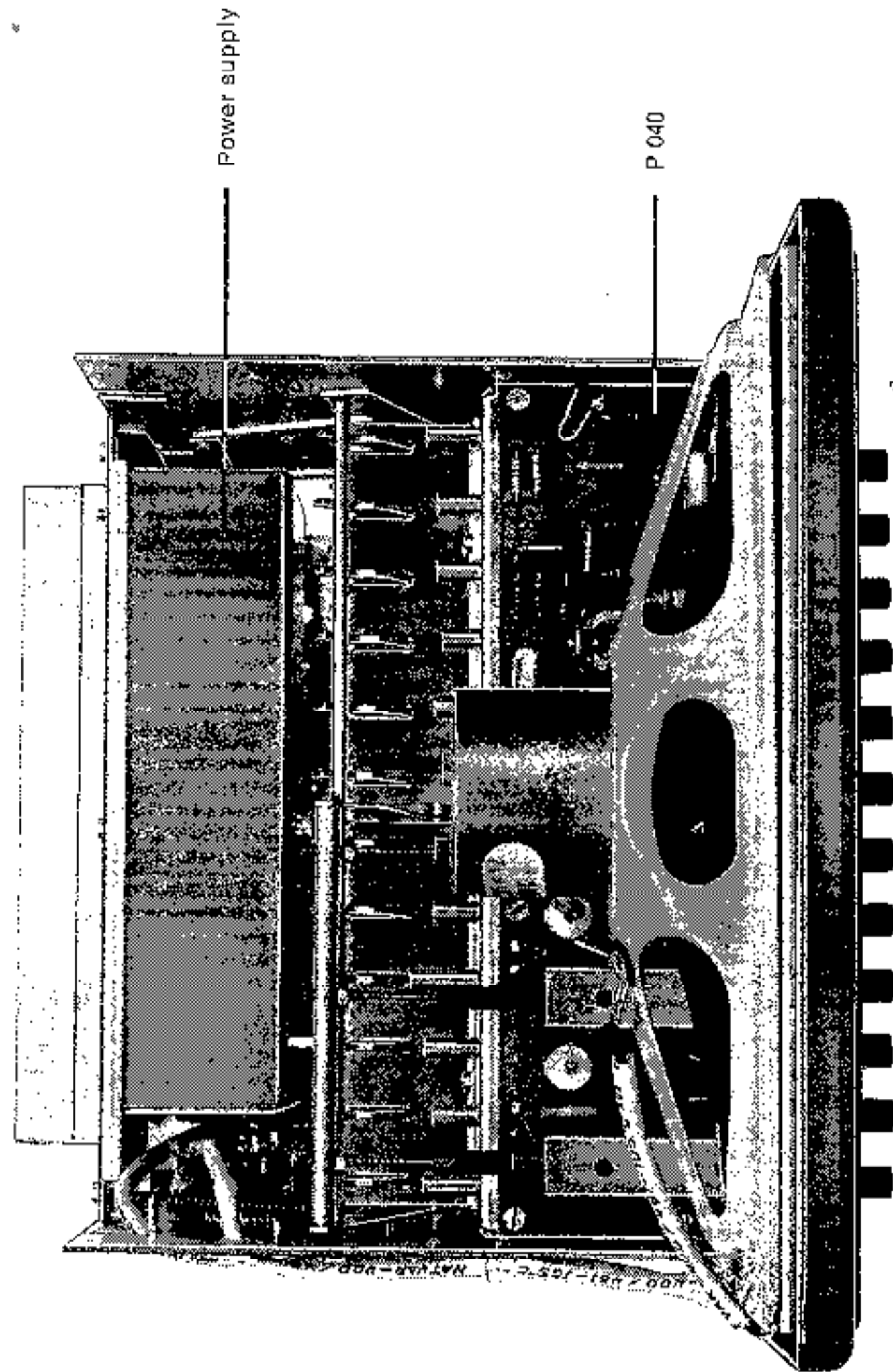
R 105. Front view



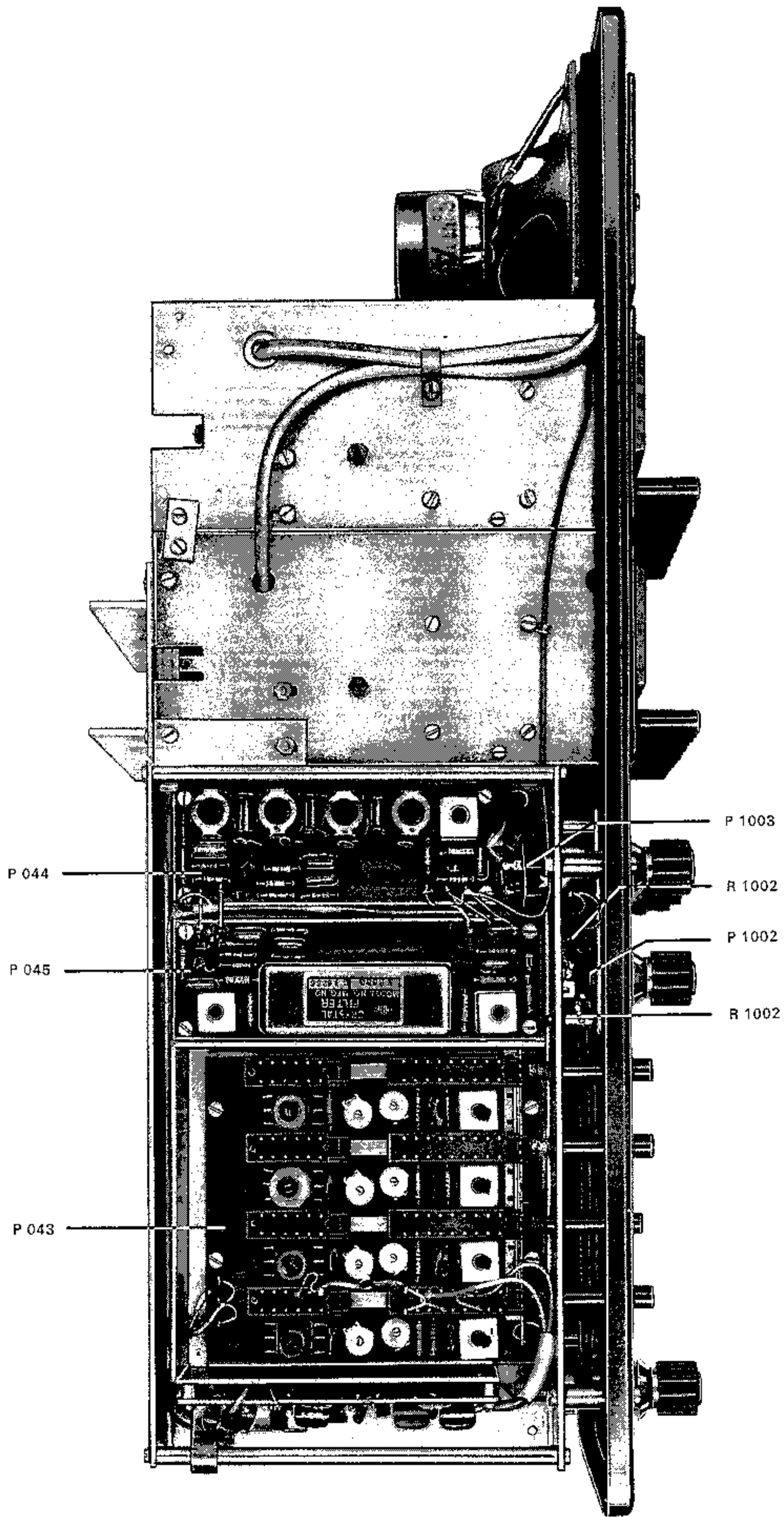
R105. Top view



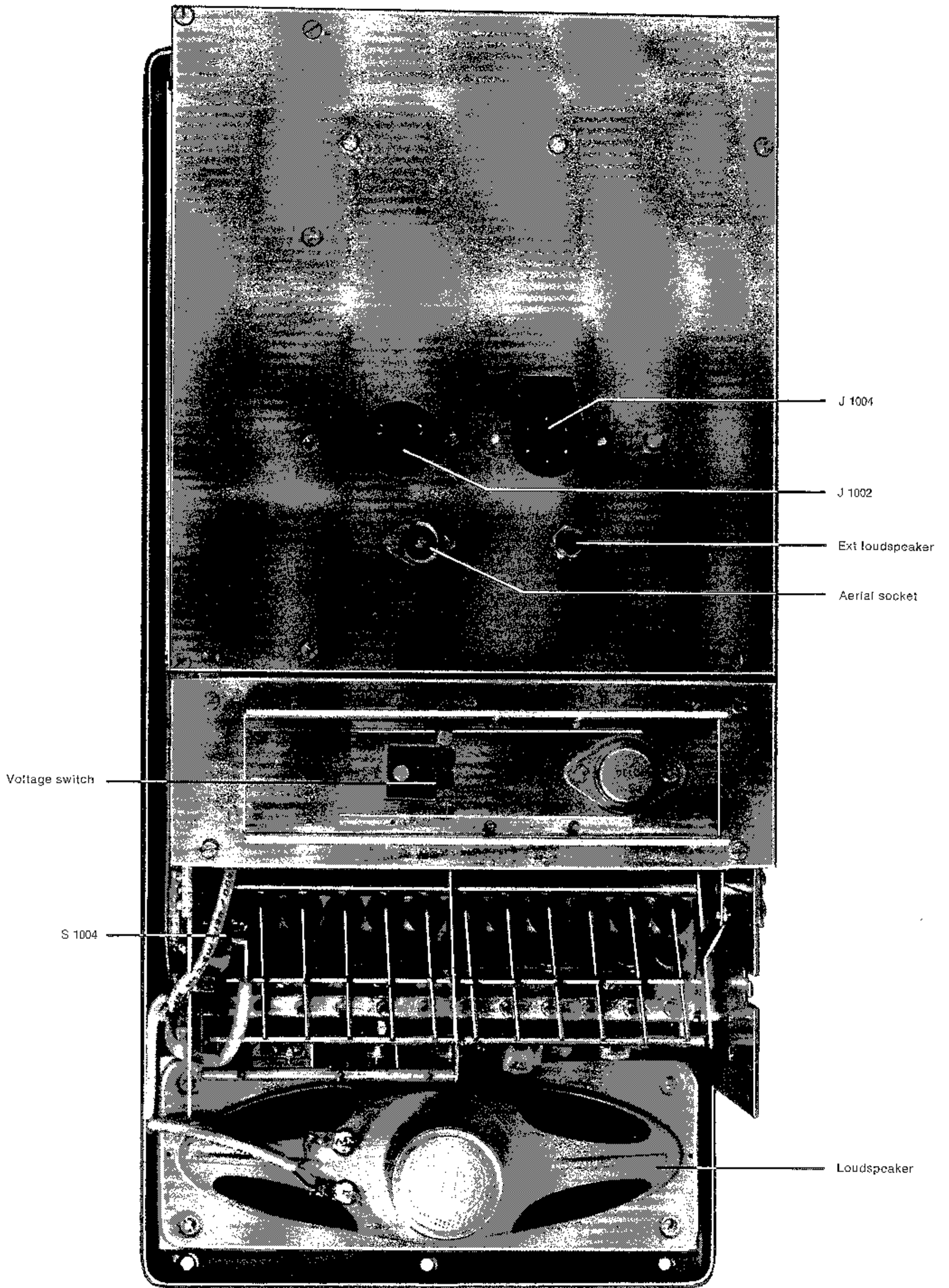
R105. Right side view



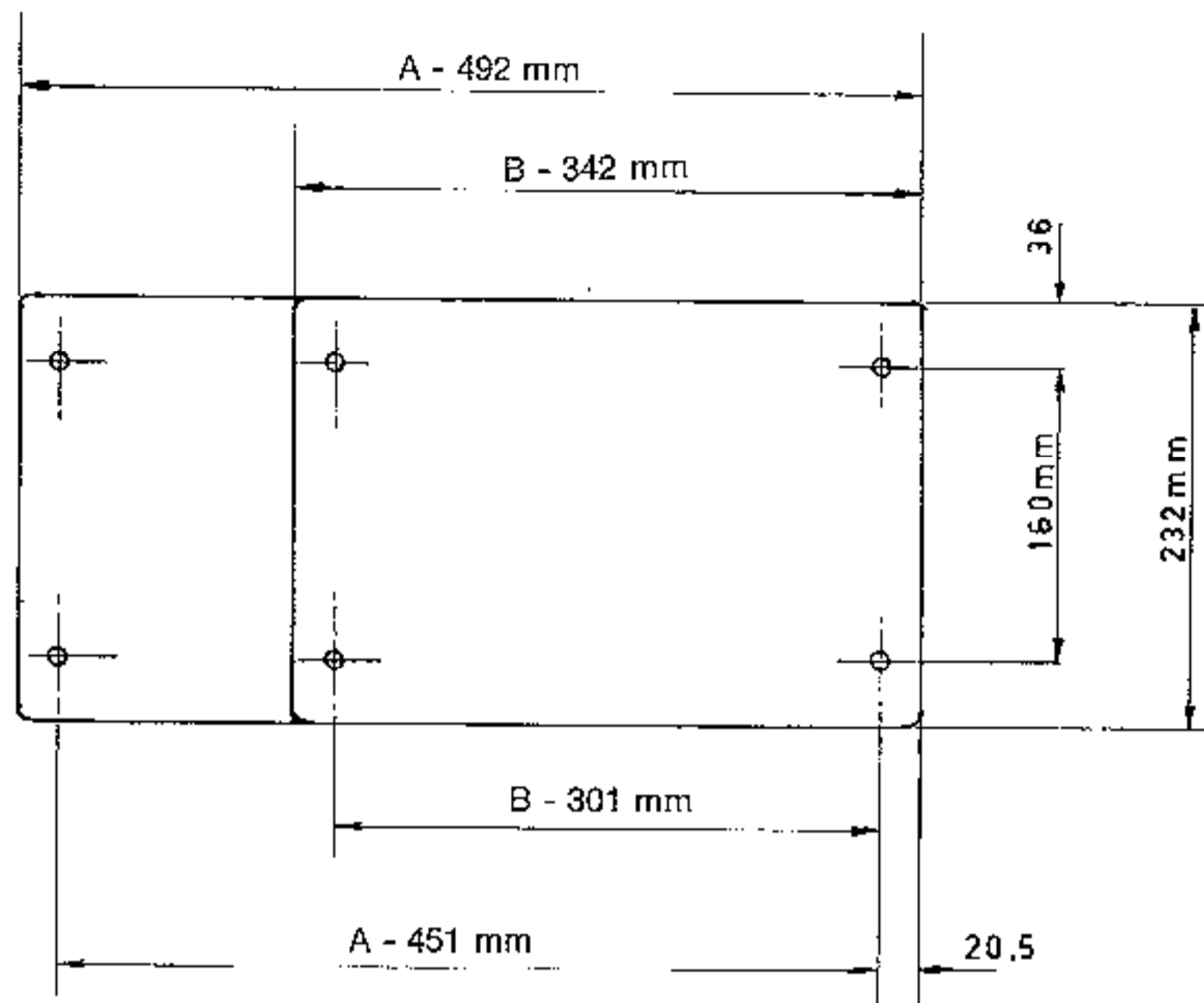
R105. Left side view



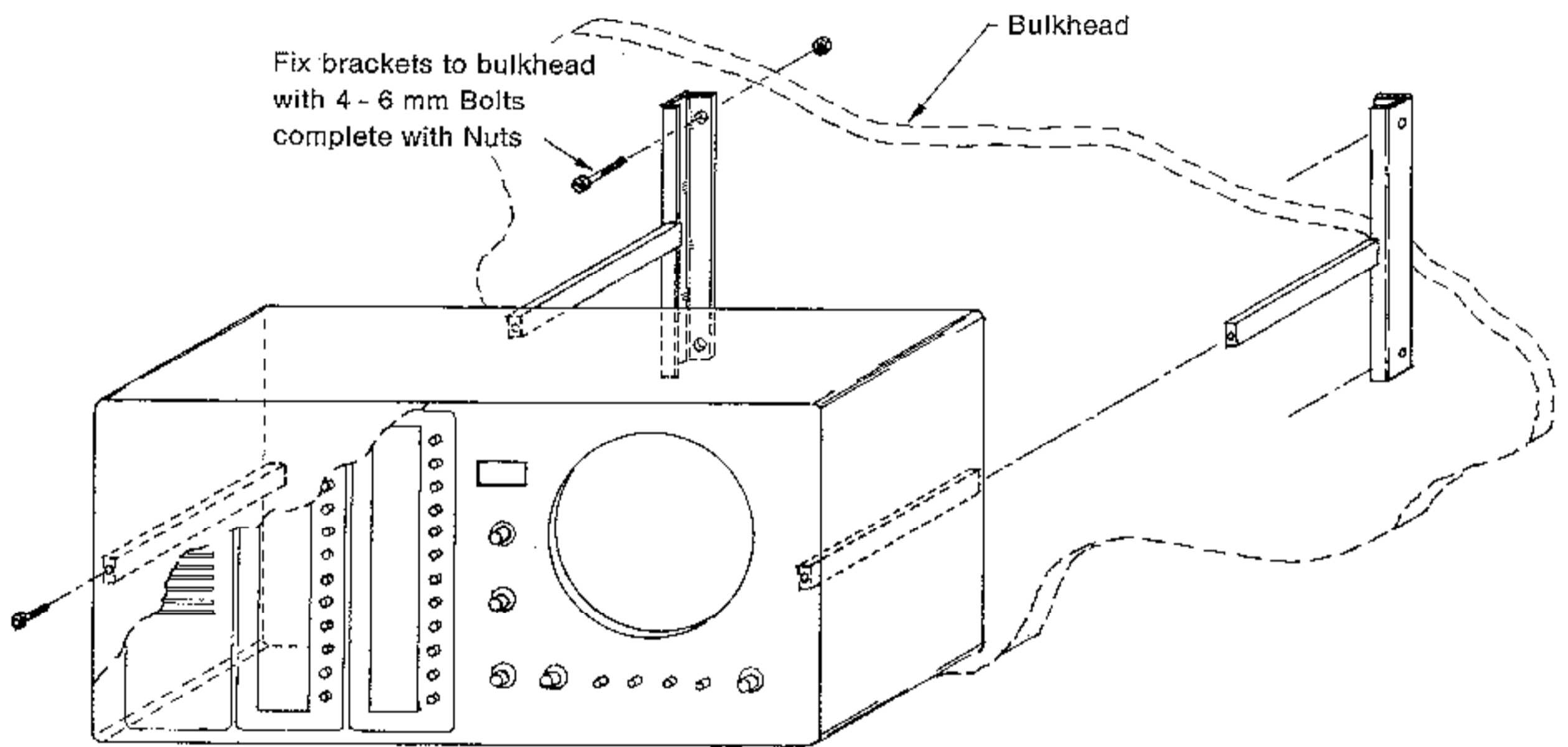
R 105. Bottom view



R 105. Rear view

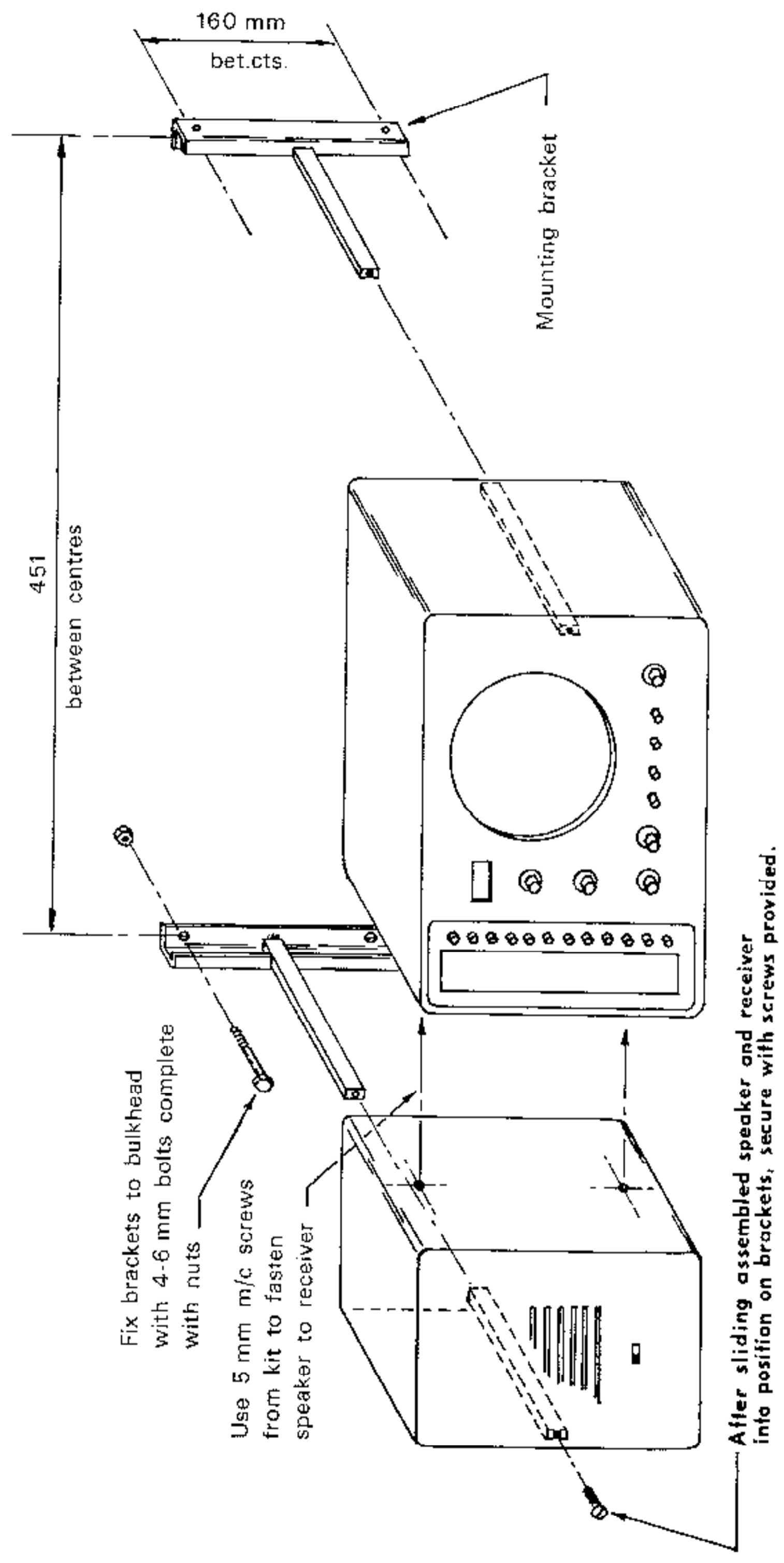


Dimns. prefixed 'A' refer to R105 & R106 only
 Dimns. prefixed 'B' refer to R103 & R104



After sliding receiver into position on brackets
 Secure with screws provided.

**Mounting R 103, R 104, R 105 or 106
 to bulkhead**



**Mounting R 103 or R 104 on bulkhead
in unit with speaker**

CHANNEL TUNER R102 R106

Symbol	Description	Manufact.	
C 101	Capacitor trimming 8-135 pF teflon	Dau	115 - 34S
C 102	Capacitor ceramic 100 pF \pm 5% 250V	Ferroperm	9/0121,3 isol.
C 103	Capacitor trimming 5-38 pF teflon	Dau	109 - 34S
C 104	Capacitor ceramic 3,3 pF \pm 0,25pF	Ferroperm	9/0112,9 400V
C 105	Capacitor trimming 5-38 pF teflon	Dau	109 - 34S
C 106	Capacitor polystyrene 1000 pF \pm 2%	Philips	2222 425 31002
C 107	Capacitor ceramic 220 pF \pm 5% 250V	Ferroperm	9/0121,3 isol.
C 108	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 109	Capacitor polystyrene 330 pF \pm 2%	Philips	2222 426 33301
C 110	Capacitor polyester 0,1 uF 250V	Efco	PMT
C 111	Capacitor polyester 0,1 uF 250V	Efco	PMT
C 112	Capacitor polystyrene 1800 pF \pm 2%	Philips	2222 425 31802
C 113	Capacitor polystyrene 820 pF \pm 2%	Philips	2222 425 38201
C 114	Capacitor ceramic 270 pF \pm 5% 250V	Ferroperm	9/0121,3 isol.
C 115	Capacitor trimming 5-38 pF teflon	Dau	109 - 34S
C 116	Capacitor polyester 1000 pF \pm 2%	Philips	2222 425 31002
C 117	Capacitor polyester 0,1 uF 250V	Efco	PMT
C 118	Capacitor polyester 0,1 uF 250V	Efco	PMT
C 119	Capacitor polystyrene 560 pF \pm 2%	Philips	2222 425 35601
C 120	Capacitor polystyrene 390 pF \pm 2%	Philips	2222 426 33901
C 121	Capacitor polystyrene 560 pF \pm 2%	Philips	2222 425 35601
C 122	Capacitor polyester 0,1 uF 250V	Efco	PMT
C 123	Capacitor polystyrene 560 pF \pm 2%	Philips	2222 425 35601
C 124	Capacitor polyester 0,1 uF 250V	Efco	PMT
C 125	Capacitor elektrolytic 100 uF 25V	Siemens	B41283-A5107-Z
CH101	Drossel coil 1 mH \pm 10%	Prahn	1580/9N
D 101	Diode	Texas/Sie.	1S921/1N4148
D 102	Diode	Texas/Sie.	1S921/1N4148
L 101	Aerial coil 1	S.P.	drg.no. TL 002
L 102	Aerial coil 11	S.P.	drg.no. TL 002
L 103	RF coil	S.P.	drg.no. TL 002
L 104	Shunting coil 600 kHz	S.P.	drg.no. TL 003

CHANNEL TUNER R102 R106

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
R 100	Resistor 100 K ohm 0,33W	Philips	2322 101 33104
R 101	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 102	Resistor 470 ohm 0,33W	Philips	2322 101 33471
R 103	Resistor 47 ohm 0,33W	Philips	2322 101 33479
R 104	Resistor 1,2 K ohm 0,33W	Philips	2322 101 33122
R 105	Resistor 47 ohm 0,33W	Philips	2322 101 33479
R 106	Resistor 470 K ohm 0,33W	Philips	2322 101 33474
R 107	Resistor 2,7 K ohm 0,33W	Philips	2322 101 33272
R 108	Resistor 220 ohm 0,33W	Philips	2322 101 33221
R 109	Resistor 680 ohm 0,33W	Philips	2322 101 33681
R 110	Resistor 33 ohm 0,33W	Philips	2322 101 33339
R 111	Resistor 10 K ohm 0,33W	Philips	2322 101 33103
R 112	Resistor 39 K ohm 0,33W	Philips	2322 101 33393
R 113	Resistor 1,5 K ohm 0,33W	Philips	2322 101 33152
R 114	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 115	Resistor 15 ohm 0,33W	Philips	2322 101 33159
R 116	Resistor 1,5 K ohm 0,33W	Philips	2322 101 33152
R 117	Resistor 22 K ohm 0,33W	Philips	2322 101 33223
R 118	Resistor 22 K ohm 0,33W	Philips	2322 101 33223
R 119	Resistor 10 K ohm 0,33W	Philips	2322 101 33103
R 120	Resistor 18 K ohm 0,33W	Philips	2322 101 33183
T 101	Transistor	Siemens	BF 167
T 102	Transistor	Texas	TIS 88A
T 103	Transistor	Siemens	BC 147A
T 104	Transistor	Siemens	BC 147A
T 105	Transistor	Siemens	BC 147A

CRYSTAL SECTION R102 R106

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
C 201	Capacitor trimming 3,5 - 18,5 pF teflon	Dau	107-23S
C 202	Capacitor ceramic 22 pF \pm 5% NPO	Ferroperm	9/0112,9-400V
C 203	Capacitor trimming 3,5 - 18,5 pF teflon	Dau	107-23S
C 204	Capacitor ceramic 22 pF \pm 5% NPO	Ferroperm	9/0112,9-400V
C 205	Capacitor trimming 3,5 - 18,5 pF teflon	Dau	107-23S
C 206	Capacitor ceramic 22 pF \pm 5% NPO	Ferroperm	9/0112,9-400V
C 207	Capacitor trimming 3,5 - 18,5 pF teflon	Dau	107-23S
C 208	Capacitor ceramic 22 pF \pm 5% NPO	Ferroperm	9/0112,9-400V
C 209	Capacitor trimming 3,5 - 18,5 pF teflon	Dau	107-23S
C 210	Capacitor ceramic 22 pF \pm 5% NPO	Ferroperm	9/0112,9-400V
C 211	Capacitor trimming 3,5 - 18,5 pF teflon	Dau	107-23S
C 212	Capacitor ceramic 22 pF \pm 5% NPO	Ferroperm	9/0112,9-400V
C 213	Capacitor trimming 3,5 - 18,5 pF teflon	Dau	107-23S
C 214	Capacitor ceramic 22 pF \pm 5% NPO	Ferroperm	9/0112,9-400V
C 215	Capacitor trimming 3,5 - 18,5 pF teflon	Dau	107-23S
C 216	Capacitor ceramic 22 pF \pm 5% NPO	Ferroperm	9/0112,9-400V
C 217	Capacitor trimming 3,5 - 18,5 pF teflon	Dau	107-23S
C 218	Capacitor ceramic 22 pF \pm 5% NPO	Ferroperm	9/0112,9-400V
C 219	Capacitor trimming 3,5 - 18,5 pF teflon	Dau	107-23S
C 220	Capacitor ceramic 22 pF \pm 5% NPO	Ferroperm	9/0112,9-400V
C 221	Capacitor trimming 3,5 - 18,5 pF teflon	Dau	107-23S
C 222	Capacitor ceramic 22 pF \pm 5% NPO	Ferroperm	9/0112,9-400V
C 223	Capacitor trimming 3,5 - 18,5 pF teflon	Dau	107-23S
C 224	Capacitor ceramic 22 pF \pm 5% NPO	Ferroperm	9/0112,9-400V

BANDS SECTION R102 R106

Symbol	Description	Manufact.	
C 301	Capacitor ceramic 10 pF $\pm 5\%$ 400V	Ferroperm	9/0112,9
C 302	Capacitor ceramic 27 pF $\pm 5\%$ 400V	Ferroperm	9/0112,9
C 303	Capacitor ceramic 27 pF $\pm 5\%$ 400V	Ferroperm	9/0112,9
C 304	Capacitor polystyrene 150 pF $\pm 1\%$ 500V	Philips	2222 427 41501
C 305	Capacitor trimming 8 -60pF	Dau-Tefl.	109-45S
C 306	Capacitor trimming 8 -60pF	Dau-Tefl.	109-45S
C 307	Capacitor trimming 8 -60pF	Dau-Tefl.	109-45S
C 308	Capacitor trimming 8 -60pF	Dau-Tefl.	109-45S
C 309	Capacitor polyester 0,1 uF 250V	Efco	PMT (ny type)
C 310	Capacitor polyester 0,1 uF 250V	Efco	PMT (ny type)
C 311	Capacitor polyester 10 nF $\pm 10\%$ 250V	Philips	2222 342 45103
C 312	Capacitor polyester 0,1 uF 250V	Efco	PMT (ny type)
C 313	Capacitor polyester 0,1 uF 250V	Efco	PMT (ny type)
C 314	Capacitor ceramic 22 pF $\pm 5\%$ 400V	Ferroperm	9/0112,9
C 315	Capacitor ceramic 2x27 pF $\pm 5\%$ 400V	Ferroperm	9/0112,9
C 316	Capacitor polystyrene 180 pF $\pm 1\%$ 500V	Philips	2222 427 41801
C 317	Capacitor polystyrene 360 pF $\pm 1\%$ 250V	Philips	2222 426 43601
C 318	Capacitor trimming 5 -38pF	Dau-Tefl.	109-34S
C 319	Capacitor trimming 5 -38pF	Dau-Tefl.	109-34S
C 320	Capacitor trimming 5 -38pF	Dau-Tefl.	109-34S
C 321	Capacitor trimming 5 -38pF	Dau-Tefl.	109-34S
C 322	Capacitor polystyrene 390 pF $\pm 1\%$ 250V	Philips	2222 426 43901
C 322	Capacitor polystyrene 1000pF $\pm 1\%$ 125V	Philips	2222 425 41002
C 323	Capacitor polystyrene 750 pF $\pm 1\%$ 125V	Philips	2222 425 47501
C 324	Capacitor polystyrene 287 pF $\pm 1\%$ 250V	Philips	2222 426 42871
C 325	Capacitor polystyrene 680 pF $\pm 1\%$ 125V	Philips	2222 425 46801
C 326	Capacitor polystyrene 2200pF $\pm 1\%$	Philips	2222 425 42202
C 327	Capacitor polystyrene 2200pF $\pm 1\%$	Philips	2222 425 42202
C 328	Capacitor polyester 0,1 uF 250V	Efco	PMT (ny type)
C 329	Capacitor polyester 0,1 uF 250V	Efco	PMT (ny type)
C 330	Capacitor polyester 0,1 uF 250V	Efco	PMT (ny type)
C 331	Capacitor polyester 0,1 uF 250V	Efco	PMT (ny type)
C 332	Capacitor polyester 0,1 uF 250V	Efco	PMT (ny type)
C 333	Capacitor polyester 0,1 uF 250V	Efco	PMT (ny type)
C 334	Capacitor polystyrene 3300pF $\pm 1\%$ 125V	Philips	2222 425 3302
C 335	Capacitor polyester 0,1 uF 250V	Efco	PMT (ny type)
D 301	Diode	Texas/Sie.	1S921/1N4148
D 302	Diode	Texas/Sie.	1S921/1N4148
D 303	Diode	Texas/Sie.	1S921/1N4148

BANDS SECTION R102 R106

Symbol	Description	Manufact.	
L 301	Aerial coil SW	SP	TL 007
L 302	Aerial coil MW	SP	TL 006
L 303	Aerial coil LW	SP	TL 005
L 304	Aerial coil NW	SP	TL 004
L 305	Mixer bl. transformator	SP	TL 012
L 306	OSC bl. transformator	SP	TL 078
L 307	OSC coil SW	SP	TL 011
L 308	OSC coil MW	SP	TL 010
L 309	OSC coil LW	SP	TL 009
L 310	OSC coil NW	SP	TL 008
L 311	IF trap	SP	TL 013
P 301	Potentiometer trimming 2,2 K ohm	Philips	2322 410 43305
P 302	Potentiometer trimming 4,7 K ohm	Philips	2322 410 43306
R 301	Resistor 2,2 K ohm 0,33W	Philips	2322 101 33222
R 302	Resistor 2,2 K ohm 0,33W	Philips	2322 101 33222
R 303	Resistor 220 ohm 0,33W	Philips	2322 101 33221
R 304	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 305	Resistor 3,3 K ohm 0,33W	Philips	2322 101 33332
R 306	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 307	Resistor 12 K ohm 0,33W	Philips	2322 101 33123
R 308	Resistor 15 K ohm 0,33W	Philips	2322 101 33153
R 309	Resistor 220 ohm 0,33W	Philips	2322 101 33221
R 310	Resistor 1,8 K ohm 0,33W	Philips	2322 101 33182
R 311	Resistor 22 K ohm 0,33W	Philips	2322 101 33223
R 312	Resistor 100 K ohm 0,33W	Philips	2322 101 33104
R 313	Resistor 6,8 K ohm 0,33W	Philips	2322 101 33682
R 314	Resistor 220 ohm 0,33W	Philips	2322 101 33221
R 315	Resistor 8,2 K ohm 0,33W	Philips	2322 101 33822
S 301	Push button for PW 4+6 Switch	Petrick	Skitse 70624/1
T 301	Transistor	Texas	TIS 88A
T 302	Transistor	Texas	TIS 88A
T 303	Transistor	Texas	TIS 88A
T 304	Transistor	Siemens	BC 147A
T 305	Transistor	Texas	TIS 88A

AM - FILTER R102 R106

Symbol	Description	Manufact.	
C 401	Capacitor polystyrene 1000pF $\pm 2\%$ 160V	Philips	2222 425 31002
C 402	Capacitor polyester 0,1 uF $\pm 10\%$ 250V	Efco	PMT
C 403	Capacitor ceramic 12 pF $\pm 5\%$ NPO	Ferroperm	9/0112,9
C 404	Capacitor polystyrene 1000pF $\pm 2\%$ 200V	Rifa	PFE 216
C 405	Capacitor ceramic 5,6 pF $\pm 0,5pF$ NPO	Ferroperm	9/0112,9 - 400V
C 406	Capacitor polystyrene 1000pF $\pm 2\%$ 200V	Rifa	PFE 216
C 407	Capacitor ceramic 4,7 pF $\pm 0,5pF$ NPO	Ferroperm	9/0112,9 - 400V
C 408	Capacitor polystyrene 1000pF $\pm 2\%$ 200V	Rifa	PFE 216
C 409	Capacitor ceramic 8,2 pF $\pm 0,5pF$ NPO	Ferroperm	9/0112,9 - 400V
C 410	Capacitor polyester 0,1 uF $\pm 10\%$ 250V	Efco	PMT
C 411	Capacitor polystyrene 1000pF $\pm 2\%$ 200V	Rifa	PFE 216
C 412	Capacitor polyester 0,1 uF $\pm 10\%$ 250V	Efco	PMT
C 413	Capacitor polyester 0,1 uF $\pm 10\%$ 250V	Efco	PMT
D 401	Diode	Philips	BA 182
D 402	Diode	Philips	BA 182
L 401	Coil AM-filter	S.P.	TL 013
L 402	Coil AM-filter	S.P.	TL 003
L 403	Coil AM-filter	S.P.	TL 003
L 404	Coil AM-filter	S.P.	TL 003
L 405	Coil AM-filter	S.P.	TL 004
R 401	Resistor 39 K ohm 0,33W	Philips	2322 101 33393
R 402	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 403	Resistor 10 K ohm 0,33W	Philips	2322 101 33103
R 404	Resistor 15 K ohm 0,33W	Philips	2322 101 33153
R 405	Resistor 100 ohm 0,33W	Philips	2322 101 33101
R 406	Resistor 470 ohm 0,33W	Philips	2322 101 33471
R 407	Resistor 3,3 K ohm 0,33W	Philips	2322 101 33332
R 408	Resistor 47 ohm 0,33W	Philips	2322 101 33479
R 409	Resistor 330 ohm 0,33W	Philips	2322 101 33331
R 410	Resistor 6,8 K ohm 0,33W	Philips	2322 101 33682
T 401	Transistor	Texas	TIS 88A

SSB - FILTER R102 R106

Symbol	Description	Manufact.	
C 501	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 502	Capacitor polystyrene 1800 pF \pm 2%	Philips	2222 425 31802
C 503	Capacitor polystyrene 2200 pF \pm 2%	Philips	2222 425 32202
C 504	Capacitor polystyrene 1800 pF \pm 2%	Philips	2222 425 31802
C 505	Capacitor polystyrene 2200 pF \pm 2%	Philips	2222 425 32202
C 506	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 507	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 508	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
D 501	Diode	Philips	BA 182
D 502	Diode	Philips	BA 182
FL501	Crystalfilter 600 KHz NKD	NKD	YF 600
L 501	SSB filter coil	S.P.	drawn TL 017
L 502	SSB filter coil	S.P.	drawn TL 017
R 501	Resistor 39 K ohm 0,33W	Philips	2322 101 33393
R 502	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 503	Resistor 470 ohm 0,33W	Philips	2322 101 33471
R 504	Resistor 56 K ohm 0,33W	Philips	2322 101 33563
R 505	Resistor 120 K ohm 0,33W	Philips	2322 101 33124
R 506	Resistor 3,3 K ohm 0,33W	Philips	2322 101 33332
R 507	Resistor 47 ohm 0,33W	Philips	2322 101 33479
R 508	Resistor 330 ohm 0,33W	Philips	2322 101 33331
T 501	Transistor FET N-channel	Texas	TIS 88A

SSB DETECTOR SECTION R102 R106

Symbol	Description	Manufact.	
C 601	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 602	Capacitor polystyrene 120 pF \pm 2% 250V	Philips	2222 427 31201
C 603	Capacitor trimming 3,5-18,5pF teflon	Dau	107-23S
C 604	Capacitor ceramic 12 pF \pm 5% NPO	Ferroperm	9/0112,9 - 400V
C 605	Capacitor polystyrene 180 pF \pm 2% 500V	Philips	2222 427 31801
C 606	Capacitor polystyrene 180 pF \pm 2% 500V	Philips	2222 427 31801
C 607	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 608	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 609	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 610	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 611	Capacitor polystyrene 120 pF \pm 2% 500V	Philips	2222 427 31201
C 612	Capacitor trimming 3,5-18,5pF teflon	Dau	107-23S
C 613	Capacitor ceramic 12 pF \pm 5% NPO	Ferroperm	9/0112,9 - 400V
C 614	Capacitor polystyrene 180 pF \pm 2% 500V	Philips	2222 427 31801
C 615	Capacitor polystyrene 180 pF \pm 2% 500V	Philips	2222 427 31801
C 616	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 617	Capacitor polystyrene 1000pF \pm 2% 125V	Philips	2222 425 31002
C 618	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 619	Capacitor tantal 4,7 uF 35V	Ero	ETP 2
C 620	Capacitor tantal 10 uF 25V	Ero	ETP 3
C 621	Capacitor polystyrene 2200pF \pm 2% 125V	Philips	2222 425 32202
C 622	Capacitor polystyrene 2200pF \pm 2% 160V	Philips	2222 425 22202
C 623	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 624	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
D 601	Diode variable capacitance	Philips	BB 106
D 602	Diode - zener	Philips	BZY88/C8V2
D 603	Diode variable capacitance	Philips	BB 106
R 601	Resistor 10 K ohm 0,33W	Philips	2322 101 33103
R 602	Resistor 10 K ohm 0,33W	Philips	2322 101 33103
R 603	Resistor 27 K ohm 0,33W	Philips	2322 101 33273
R 604	Resistor 4,7 K ohm 0,33W	Philips	2322 101 33472
R 605	Resistor 10 K ohm 0,33W	Philips	2322 101 33103
R 606	Resistor 820 ohm 0,33W	Philips	2322 101 33821
R 607	Resistor 15 ohm 0,33W	Philips	2322 101 33159
R 608	Resistor 100 ohm 0,33W	Philips	2322 101 33101
R 609	Resistor 390 ohm 0,33W	Philips	2322 101 33391

SSB DETECTOR SECTION R102 ... R106

Symbol	Description	Manufact.	
R 610	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 611	Resistor 10 K ohm 0,33W	Philips	2322 101 33103
R 612	Resistor 27 K ohm 0,33W	Philips	2322 101 33273
R 613	Resistor 4,7 K ohm 0,33W	Philips	2322 101 33472
R 614	Resistor 10 K ohm 0,33W	Philips	2322 101 33103
R 615	Resistor 820 ohm 0,33W	Philips	2322 101 33821
R 616	Resistor 15 ohm 0,33W	Philips	2322 101 33159
R 617	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 618	Resistor 1,5 K ohm 0,33W	Philips	2322 101 33152
R 619	Resistor 470 K ohm 0,33W	Philips	2322 101 33474
R 620	Resistor 4,7 K ohm 0,33W	Philips	2322 101 33472
R 621	Resistor 10, K ohm 0,33W	Philips	2322 101 33103
R 622	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 623	Resistor 22 K ohm 0,33W	Philips	2322 101 33223
R 624	Resistor 2,7 K ohm 0,33W	Philips	2322 101 33272
R 625	Resistor 2,7 K ohm 0,33W	Philips	2322 101 33272
R 626	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
L 601	Mixer coil (clarifier)	S.P.	Drg.no. TL 017
T 601	Transistor NPN	Siemens	BC 147 A
T 602	Transistor NPN	Siemens	BC 147A
T 603	Transistor NPN	Siemens	BC 147 A
T 604	Transistor NPN	Siemens	BC 147 A
T 605	Transistor N- channel	Texas	TIS 88 A
X 601	Crystal HC/6/W 6,7 MHz	Kristall V	
X 602	Crystal HC/6/W 7,3 MHz	Kristall V	

IF - SECTION R102 R106

Symbol	Description	Manufact.	
C 701	Capacitor polystyrene 560 pF \pm 2%	Philips	2222 425 35601
C 702	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 703	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 704	Capacitor polystyrene 1500 pF \pm 2%	Philips	2222 425 31502
C 705	Capacitor polystyrene 3300 pF \pm 2%	Philips	2222 425 33302
C 706	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 707	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 708	Capacitor polystyrene 1500 pF \pm 2%	Philips	2222 425 32502
C 709	Capacitor polystyrene 3300 pF \pm 2% 63V	Philips	2222 425 33302
C 710	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
C 711	Not used		
C 712	Capacitor polystyrene 1000 pF \pm 2%	Philips	2222 425 31002
C 713	Capacitor polystyrene 2200 pF \pm 2%	Philips	2222 425 32202
C 714	Capacitor tantal 10 uF 25V	Ero	ETP 3
C 715	Capacitor tantal 10 uF 25V	Ero	ETP 3
C 716	Capacitor polystyrene 2200 pF \pm 2%	Philips	2222 425 32202
C 717	Capacitor polystyrene 2200 pF \pm 2%	Philips	2222 425 32202
C 718	Capacitor polyester 0,1 uF \pm 10% 250V	Efco	PMT
L 701	IF coil	S.P.	drawn. TL 013
L 702	IF coil	S.P.	drawn. TL 013
L 703	IF coil	S.P.	drawn. TL 015
R 701	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 702	Resistor 10 K ohm 0,33W	Philips	2322 101 33103
R 703	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 704	Resistor 100 ohm 0,33W	Philips	2322 101 33101
R 705	Resistor 470 ohm 0,33W	Philips	2322 101 33471
R 706	Resistor 1,2 K ohm 0,33W	Philips	2322 101 33122
R 707	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 708	Resistor 470 ohm 0,33W	Philips	2322 101 33471
R 709	Resistor 47 ohm 0,33W	Philips	2322 101 33479
R 710	Resistor 1,2 K ohm 0,33W	Philips	2322 101 33122
R 711	Resistor 6,8 K ohm 0,33W	Philips	2322 101 33682
R 712	Resistor 12 K ohm 0,33W	Philips	2322 101 33123
R 713	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 714	Resistor 1,8 K ohm 0,33W	Philips	2322 101 33182
R 715	Resistor 330 ohm 0,33W	Philips	2322 101 33331

IF - SECTION R102 R106

Symbol	Description	Manufact.	
R 716	Resistor 68 K ohm 0,33W	Philips	2322 101 33683
R 717	Resistor 18 K ohm 0,33W	Philips	2322 101 33183
R 718	Resistor 150 K ohm 0,33W	Philips	2322 101 33154
R 719	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 720	Resistor 18 K ohm 0,33W	Philips	2322 101 33183
R 721	Resistor 100 K ohm 0,33W	Philips	2322 101 33104
R 722	Resistor 15 K ohm 0,33W	Philips	2322 101 33153
R 723	Resistor 100 ohm 0,33W	Philips	2322 101 33101
P 701	Potentiometer, trimming 10 K ohm	Philips	2322 410 43307
T 701	Transistor	Siemens	BC 148 C
T 702	Transistor	Siemens	BC 157 A
T 703	Transistor	Siemens	BF 167
T 704	Transistor	Siemens	BF 167
T 705	Transistor	Siemens	BF 167
T 706	Transistor	Siemens	BC 147 A

AGC - SECTION R102 R106

Symbol	Description	Manufact.	
C 801	Capacitor electrolytic 100 uF 25V	Siemens	B41283-B5107-T
C 802	Capacitor electrolytic 22 uF 40V	Siemens	B41283-B7226-T
C 803	Capacitor polyester 0,1 uF 125V	Efco	PMT
C 804	Capacitor polystyrene 330 pF	Philips	2222 426 33301
C 805	Capacitor polyester 0,1 uF 250V	Efco	PMT
C 806	Capacitor tantal 10 uF 25V	Ero	ETP 3
C 807	Capacitor polystyrene 3300pF	Philips	2222 425 33302
C 808	Capacitor polystyrene 120 pF	Philips	2222 427 31201
C 809	Capacitor polyester 0,1 uF 250V	Efco	PMT
C 810	Capacitor polystyrene 1000pF 200V	Philips	2222 425 41002
C 811	Capacitor polyester 0,1 uF 250V	Efco	PMT
C 812	Capacitor polyester 0,1 uF 250V	Efco	PMT
C 813	Capacitor polyester 0,1 uF 250V	Efco	PMT
C 814	Capacitor ceramic -20/+80 1 nF 40V	Ferroperm	9/0129,8
C 815	Capacitor ceramic 100 pF 20% 63V	Ferroperm	9/0116,8 isol.
D 801	Diode	Texas/Sie	1S921/1N4148
D 802	Diode	Texas/Sie	1S921/1N4148
D 803	Diode	Texas/Sie	1S921/1N4148
D 804	Diode	Texas/Sie	1S921/1N4148
D 805	Diode	Texas/Sie	1S921/1N4148
D 806	Diode	Texas/Sie	1S921/1N4148
D 807	Diode - zener 2,7V	ITT	ZF 2,7
D 808	Diode	Texas/sie	1S921/1N4148
D 809	Diode	Texas/Sie	1S921/1N4148
L 801	ACC coil	S.P.	Drg.no. TL 016
P 801	Potentiometer 2,2 K ohm	Philips	2322 410 43305
P 802	Potentiometer 1 M ohm	Ruwido	S 52/S 52K
P 803	Potentiometer 470 ohm	Philips	2322 410 3303

AGC - SECTION R102 R106

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
R 800	Resistor 1,8 K ohm 0,33W	Philips	2322 101 33182
R 801	Resistor 3,3 K ohm 0,33W	Philips	2322 101 33332
R 802	Resistor 33 K ohm 0,33W	Philips	2322 101 33333
R 803	Resistor 100 ohm 0,33W	Philips	2322 101 33101
R 804	Resistor 560 ohm 0,33W	Philips	2322 101 33561
R 805	Resistor 1 M ohm 0,33W	Philips	2322 101 33105
R 806	Resistor 100 ohm 0,33W	Philips	2322 101 33101
R 807	Resistor 100 K ohm 0,33W	Philips	2322 101 33104
R 808	Resistor 2,2 K ohm 0,33W	Philips	2322 101 33222
R 809	Resistor 3,3 K ohm 0,33W	Philips	2322 101 33332
R 810	Resistor 1,5 K ohm 0,33W	Philips	2322 101 33152
R 811	Resistor 8,2 K ohm 0,33W	Philips	2322 101 33822
R 812	Resistor 100 ohm 0,33W	Philips	2322 101 33101
R 813	Resistor 1 M ohm 0,33W	Philips	2322 101 33105
R 814	Resistor 100 K ohm 0,33W	Philips	2322 101 33104
R 815	Resistor 3,9 K ohm 0,33W	Philips	2322 101 33392
R 816	Resistor 220 ohm 0,33W	Philips	2322 101 33221
R 817	Resistor 33 K ohm 0,33W	Philips	2322 101 33333
T 801	Transistor	Siemens	BC 148 C
T 802	Transistor	Siemens	BC 157 A
T 803	Transistor	Siemens	BC 147 A
T 804	Transistor	Siemens	BC 148 C
T 805	Transistor	Siemens	BC 147 A

AUDIO AMP R102 R106

Symbol	Description	Manufact.	
C 901	Capacitor polyester 0,1 uF \pm 20% 250V	Efco	PMT
C 902	Capacitor tantal 4,7 uF 35V	Ero	ETP 2
C 903	Capacitor tantal 0,1 uF 35V	Ero	ETP 1
C 904	Capacitor electrolytic 100 uF 25V	Siemens	B41283-A5107-Z
C 905	Capacitor electrolytic 100 uF 25V	Siemens	B41283-A5107-Z
C 906	Capacitor polyester 10 nF \pm 10% 250V	Philips	2222 342 45103
C 907	Capacitor electrolytic 1000uF 16V	Siemens	B41010-A4108-Z
C 908	Capacitor polyester 0,1 uF \pm 20% 250V	Efco	PMT
D 901	Diode 27V \pm 5% 1W	Silec	1N 4172 B
D 902	Diode 27V \pm 5% 1W	Silec	1N 4172 B
P 901	Potentiometer - trimming 500 ohm \pm 10%	Ruwido	S 52 K
R 901	Resistor 100 K ohm 0,33W	Philips	2322 101 33104
R 902	Resistor 8,2 K ohm 0,33W	Philips	2322 101 33822
R 903	Resistor 100 K ohm 0,33W	Philips	2322 101 33104
R 904	Resistor 560 ohm 0,33W	Philips	2322 101 33561
R 905	Resistor 8,2 K ohm 0,33W	Philips	2322 101 33882
R 906	Resistor 27 K ohm 0,33W	Philips	2322 101 33273
R 907	Resistor 56 K ohm 0,33W	Philips	2322 101 33563
R 908	Resistor 47 ohm 0,33W	Philips	2322 101 33479
R 909	Resistor 820 ohm 0,33W	Philips	2322 101 33821
R 910	Resistor 820 ohm 0,33W	Philips	2322 101 33821
R 911	Resistor 220 ohm 0,33W	Philips	2322 101 33221
R 912	Resistor NTC 33 ohm 1 W	Philips	2322 610 11339
R 913	Resistor 22 ohm 0,33W	Philips	2322 101 33229
R 914	Resistor \pm 20% 0,47 ohm 0,7 W	Resista	RN 3
R 915	Resistor 560 ohm 0,33W	Philips	2322 101 33561
R 916	Resistor 56 ohm 0,33W	Philips	2322 101 33569
R 917	Resistor 560 ohm 0,33W	Philips	2322 101 33561

AUDIO AMP R102 R106

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
T 901	Transistor	Siemens	BC 148 C
T 902	Transistor	Siemens	BC 147 A
T 903	Transistor - matched pair	Miniwatt	2 x AD 162
TR901	Transformer - driver	Tradania	1805

CHASSISMONTAGE R102 R106

Symbol	Description	Manufact.	
C 1001	Capacitor variable 2x518 pF	Dau	207-10ZD/KD.700
C 1002	Capacitor polyester 10 nF 1000V	Ero	P1872 310/10
C 1003	Capacitor polyester 10 nF 1000V	Ero	P1872 310/10
C 1004	Capacitor polyester 10 nF 1000V	Ero	P1872 310/10
C 1005	Capacitor polyester 10 nF 1000V	Ero	P1872 310/10
C 1006	Capacitor polyester 0,1 uF 250V	Efco	PMT (short)
C 1007	Capacitor polyester 0,1 uF 250V	Efco	PMT (short)
C 1008	Capacitor polyester 0,1 uF 250V	Efco	PMT (short)
C 1009	Capacitor polyester 56 nF 250V	Philips	2222 342 45563
CH1001	Filter choke 2x5 mHy	Siemens	B82791-A2-A1
CH1002	Filter choke 250 mHy	S.P.	TL 079
CH1003	Filter choke 250 mHy	S.P.	TL 079
D 1001	Diode	Texas/Sie	1S921/1N4148
F 1001	Fuse 1,6 AT 5x20 mm	E1.V.	
F 1002	Fuse 1,6 AT 5x20 mm	E1.V.	
GL1001	Neonlamp	Siemens	B1-C90-Q69-X151
J 1001	Aerial socket	Bell.&Lee	L 734/5
J 1002	DF socket	Hirschmann	Meb 60H
J 1003	Phone jack, and loudspeaker jack	Daut	3/2 - 053
J 1004	Power socket	Hirschmann	Mesei 60F
LA1001	Diallamp 12V	Philips	8003 DIMP.X.
L 1001	AF - filtercoil	S.P.	drawn. TL 080
LS1001	Loudspeaker 8 ohm	Seas	21/8 TV-L6

CHASSISMONTAGE R102 R106

Symbol	Description	Manufact.	
M 1001	Meter - nonimeter	Elmatok	MG 20
P 1001	Potmeter 10 K ohm lin.	Lesa	tegn. M008
P 1002	Potmeter 10 K ohm lin.	Lesa	tegn. M008
P 1003	Potmeter 100 K ohm W/switch	Lesa	tegn. M010
P 1004	Potmeter 330 ohm	Philips	2322 003 90027
R 1001	Resistor 2,2 K ohm 0,33W	Philips	2322 101 33222
R 1002	Resistor 22 K ohm 0,33W	Philips	2322 101 33223
R 1003	Resistor 10 K ohm 0,33W	Philips	2322 101 33103
R 1004	Resistor 10 ohm 0,33W	Philips	2322 101 33109
R 1005	Resistor 39 ohm 0,33W	Philips	2322 101 33399
R 1006	Resistor 470 ohm 0,33W	Philips	2322 101 33471
RE1001	Relay	Siemens	V23016 B0005-A101
S 1001	Switch 8 still. 5 dæk	MEC	OM 006E + OM 016
S 1003	Power switch part of P1003		
S 1004	Loudspeaker switch	MEC	SMA - 4
S 1006	Bands/channel switch	Petrick	skitse 701120
TR1001	Output transformer	Tradania	1839

12/24V DC POWER SUPPLY

R102 R106

Symbol	Description			Manufact.	
C 1101	Capacitor electrolytic	1000 uF	16V	Siemens	B41010-A4108-Z
C 1102	Capacitor electrolytic	1000 uF	16V	Siemens	B41010-A4108-Z
C 1103	Capacitor electrolytic	100 uF	25V	Siemens	B41283-A5107-Z
C 1104	Capacitor polyester	0,22 uF	100V	Philips	2222 342 24224
C 1105	Capacitor electrolytic	470 uF	35V	Siemens	B41010-A7477-Z
C 1106	Capacitor electrolytic	100 uF	25V	Siemens	B41283-A5107-Z
C 1107	Capacitor polyester	0,1 uF	250V	Elco	PMT (short)
C 1108	Capacitor polyester	0,1 uF	250V	Elco	PMT (short)
D 1101	Diode			ITT	1N4002
D 1102	Diode	zeener 13V 2 W		Semcor	LMZ 13A
D 1103	Diode	bridge connection		Philips	BY 179
D 1104	Diode	zeener 9,1V- 400mW		Philips	BZX 79.9V1
D 1105	Diode	zeener 9,1V- 400mW	P	Philips	BZX 79.9V1
D 1106	Diode	zeener 39 V- 5W		Motorola	1N5366B
R 1101	Resistor	2,2 ohm - 1/4 W		Vitrohm	206-0
R 1102	Resistor	330 ohm - 1 W		Vitrohm	107-0
R 1103	Resistor	1,5 ohm - 1 W		Vitrohm	253-0
R 1104	Resistor	1,5 ohm - 1 W		Vitrohm	253-0
R 1105	Resistor	270 ohm - 1 W		Vitrohm	107-0
R 1106	Resistor	2,2 ohm - 1/4 W		Vitrohm	206-0
R 1107	Resistor	56 ohm - 0,5 W		Philips	2322 212 13569
R 1108	Resistor	1,8 K ohm - 0,33W		Philips	2322 101 33182
R 1109	Resistor	220 ohm - 0,33W		Philips	2322 101 33221
R 1110	Resistor	22 ohm - 0,33W		Philips	2322 101 33229
R 1111	Resistor	22 ohm - 0,33W		Philips	2322 101 33229
S 1101	Voltage switch			Mec	SMA - 4

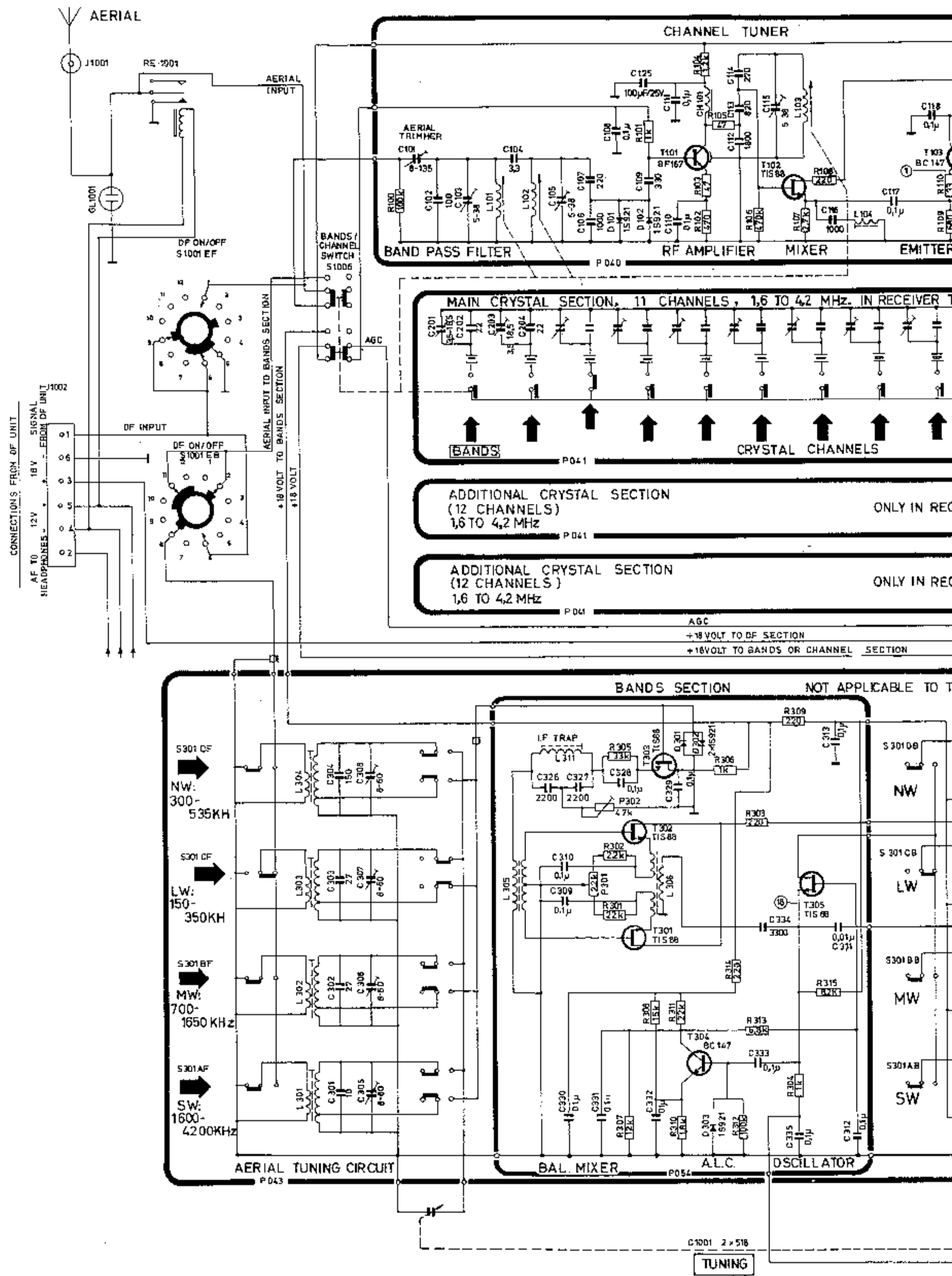
12/24 DC POWER SUPPLY R102 R106

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
T 1101	Transistor	Siemens	BD 130
T 1102	Transistor	Siemens	BC 141-10
T 1103	Transistor	Siemens	BC 141-10
T 1104	Transistor	Siemens	BC 141-10
TR1101	Transformer	Tradania	1611 - 7101

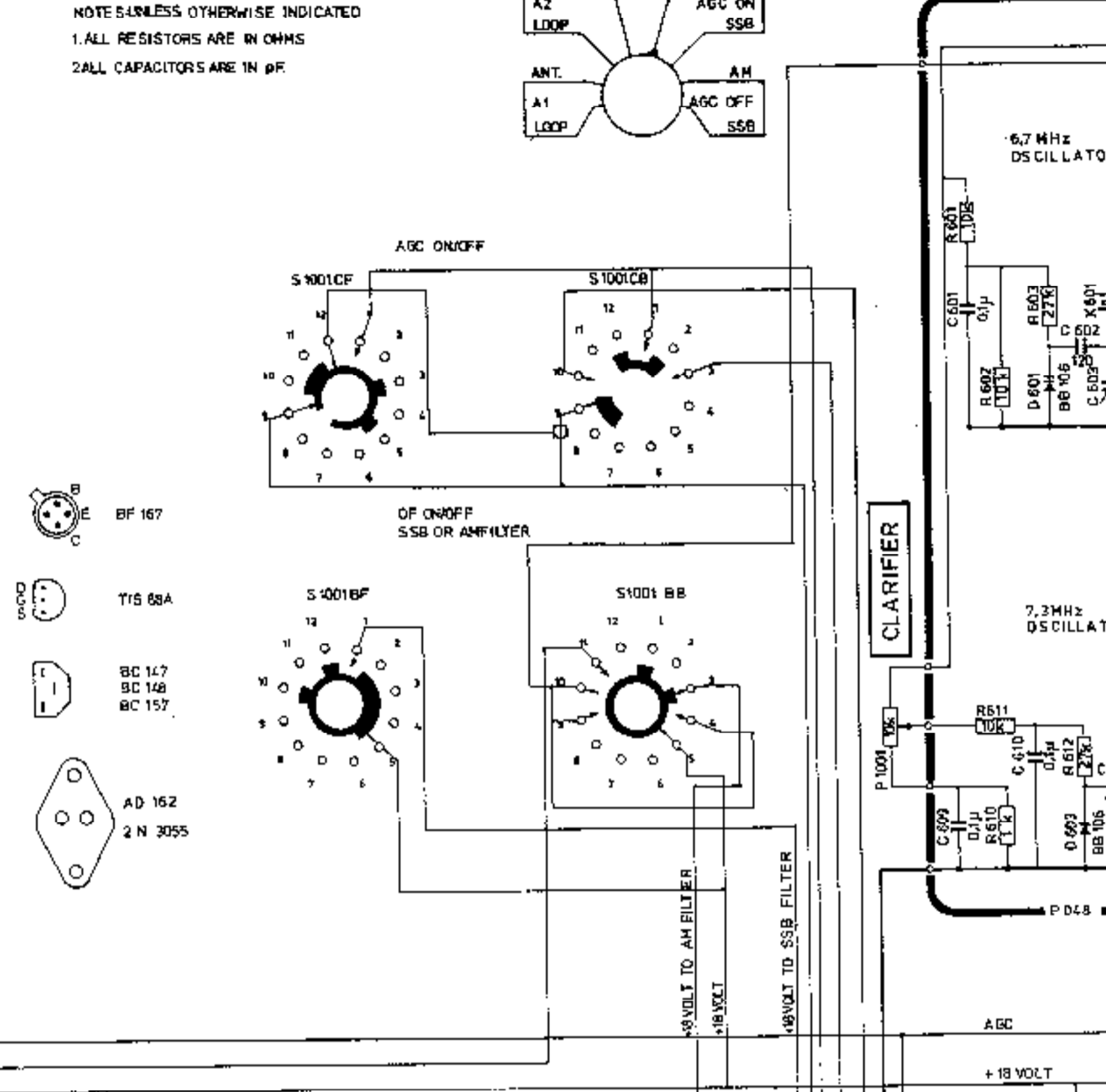
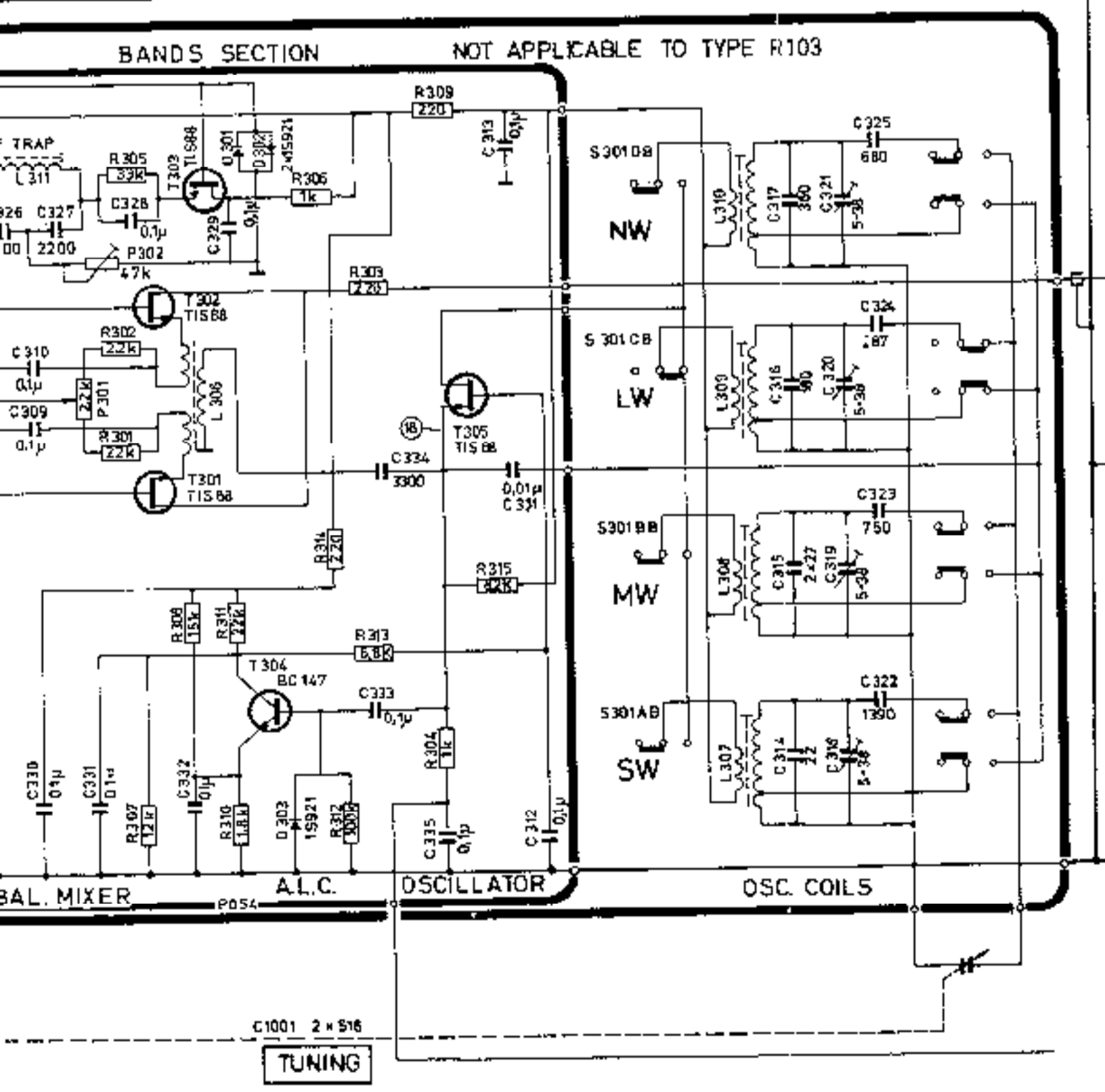
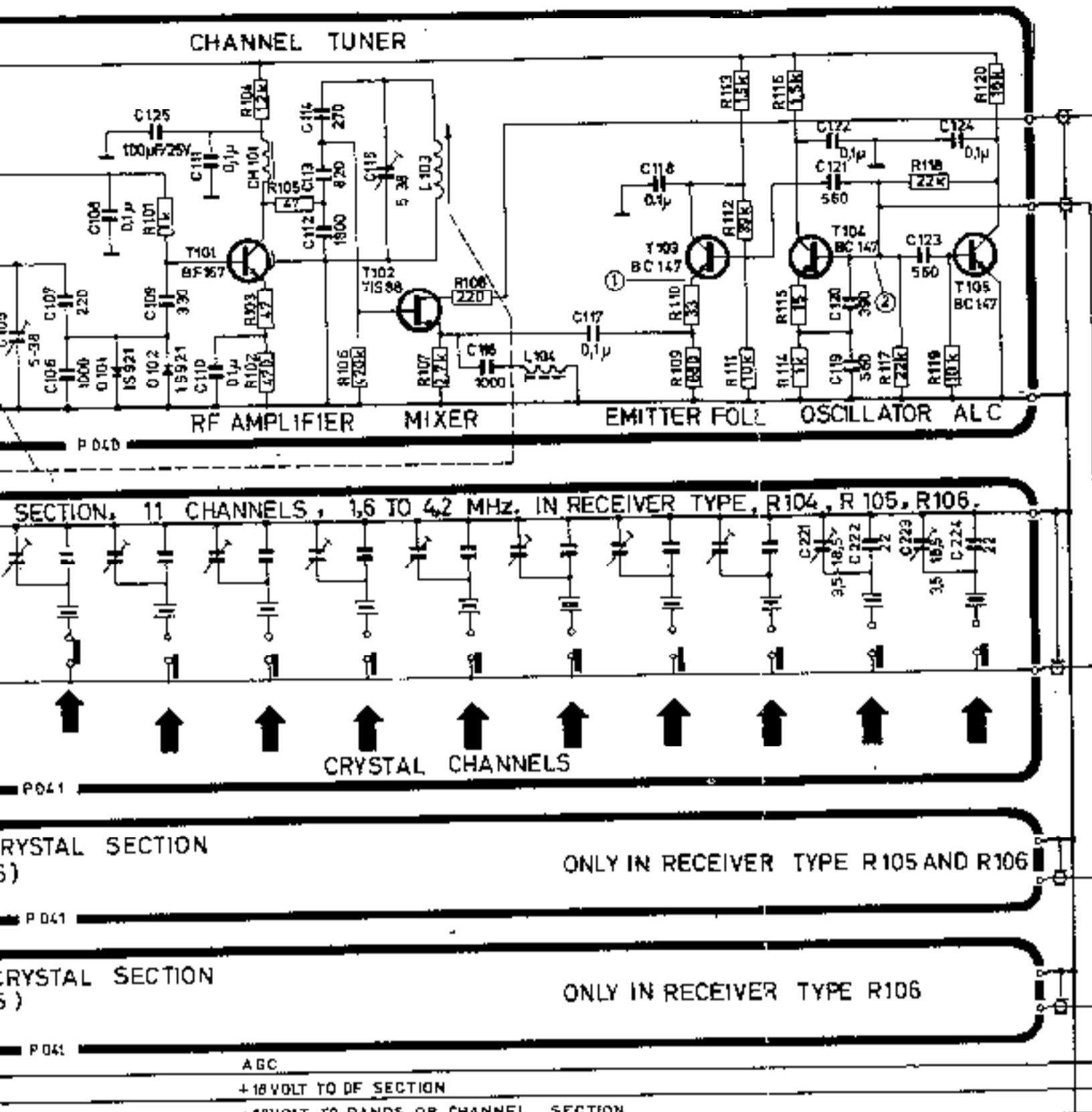
110/220V AC POWER SUPPLY

R102 R106

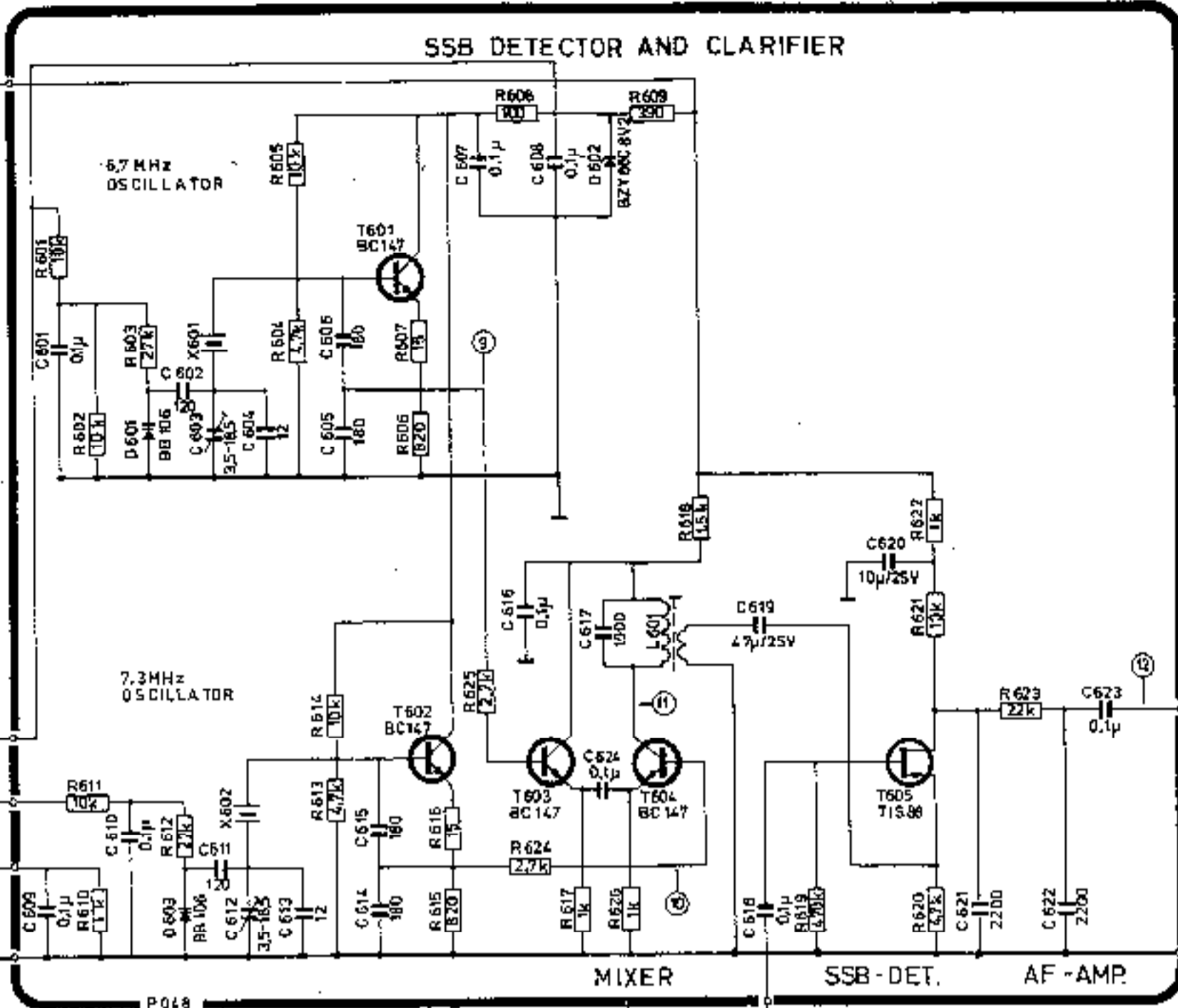
Symbol	Description	Manufact.	
C 1201	Capacitor polyester 0,1 uF 250V	Efco	PMT (short)
C 1202	Capacitor electrolytic 470 uF 35V	Siemens	B41010-A7477-Z
C 1203	Capacitor electrolytic 100 uF 25V	Siemens	B41283-A5107-Z
C 1204	Capacitor polyester 0,1 uF 250V	Efco	PMT (short)
C 1205	Capacitor electrolytic 2200 uF 35V	Siemens	B41010-A7228-T
C 1206	Capacitor polyester 22 nF 250V	Philips	2222 342 44223
D 1201	Diode bridge connection	Philips	BY 179
D 1202	Diode bridge connection	Philips	BY 179
D 1203	Diode zeener 9,1V 400mW	Philips	BZX 79.9V1
D 1204	Diode zeener 9,1V 400mW	Philips	BZX 79.9V1
D 1205	Diode zeener 5,6V 400mW	Philips	BZX 79.5V6
R 1201	Resistor 22 ohm 0,33W	Philips	2322 101 33229
R 1202	Resistor 1,8K ohm 0,33W	Philips	2322 101 33182
R 1203	Resistor 220 ohm 0,33W	Philips	2322 101 33221
R 1204	Resistor 2,2 ohm 4 W	Vitrohm	206-0
R 1205	Resistor 1,5K ohm 0,33W	Philips	2322 101 33152
R 1206	Not used		
R 1207	Resistor 1 K ohm 0,33W	Philips	2322 101 33102
R 1208	Resistor 1,5K ohm 0,33W	Philips	2322 101 33152
R 1209	Resistor 1,5K ohm 0,33W	Philips	2322 101 33152
S 1201	Voltage switch	Mec	SMA - 4
T 1201	Transistor	Siemens	BC 141-10
T 1202	Transistor	Siemens	BC 147
T 1203	Transistor	Siemens	BC 141-10
T 1204	Transistor	Siemens	BD 130
TR1201	Transformator	Tradania	1988



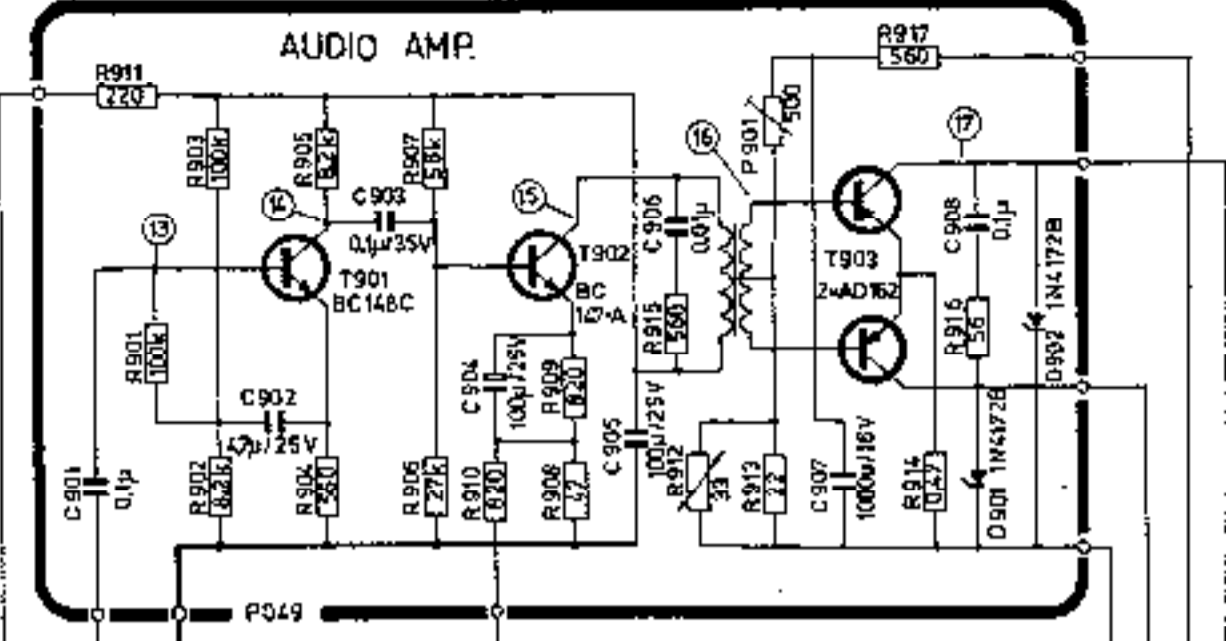
This diagram refers to Sailor R103-104-105-106



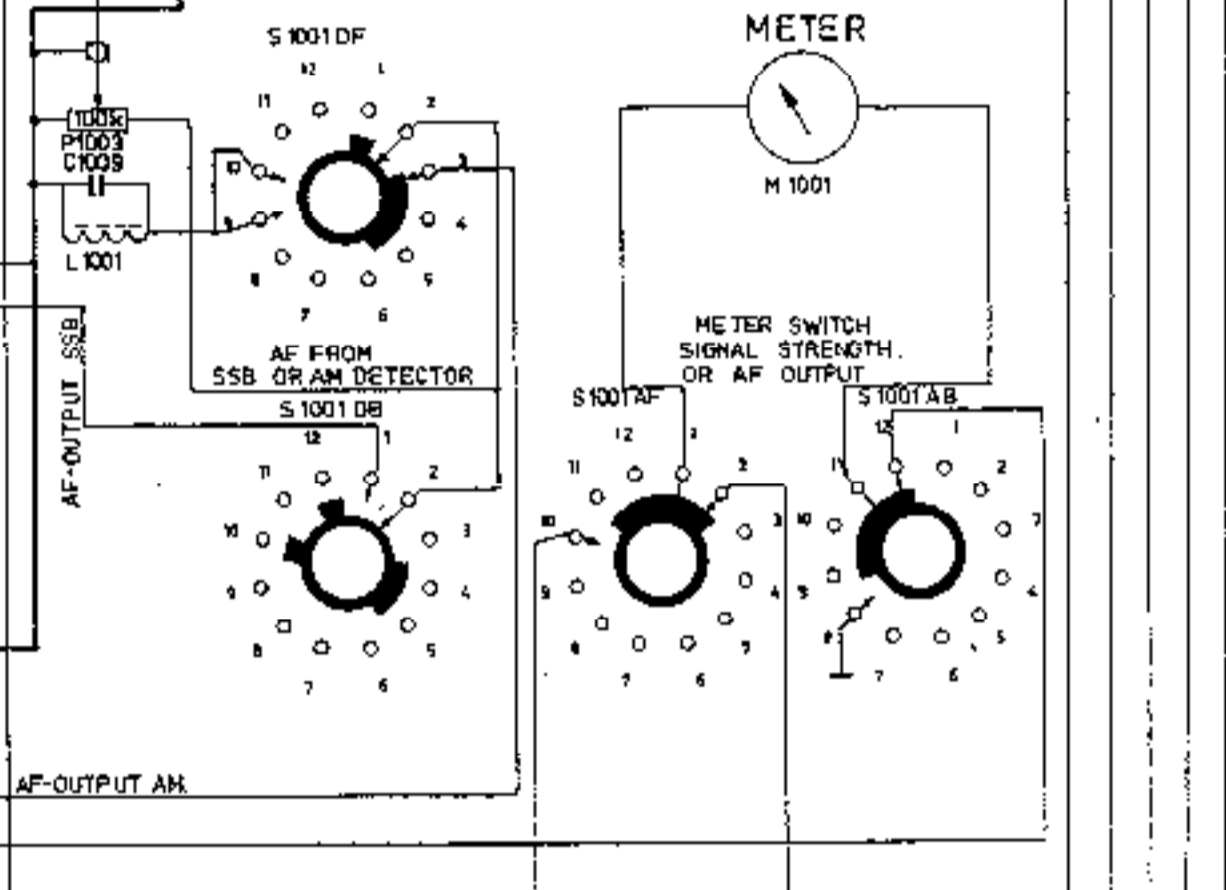
SSB DETECTOR AND CLARIFIER



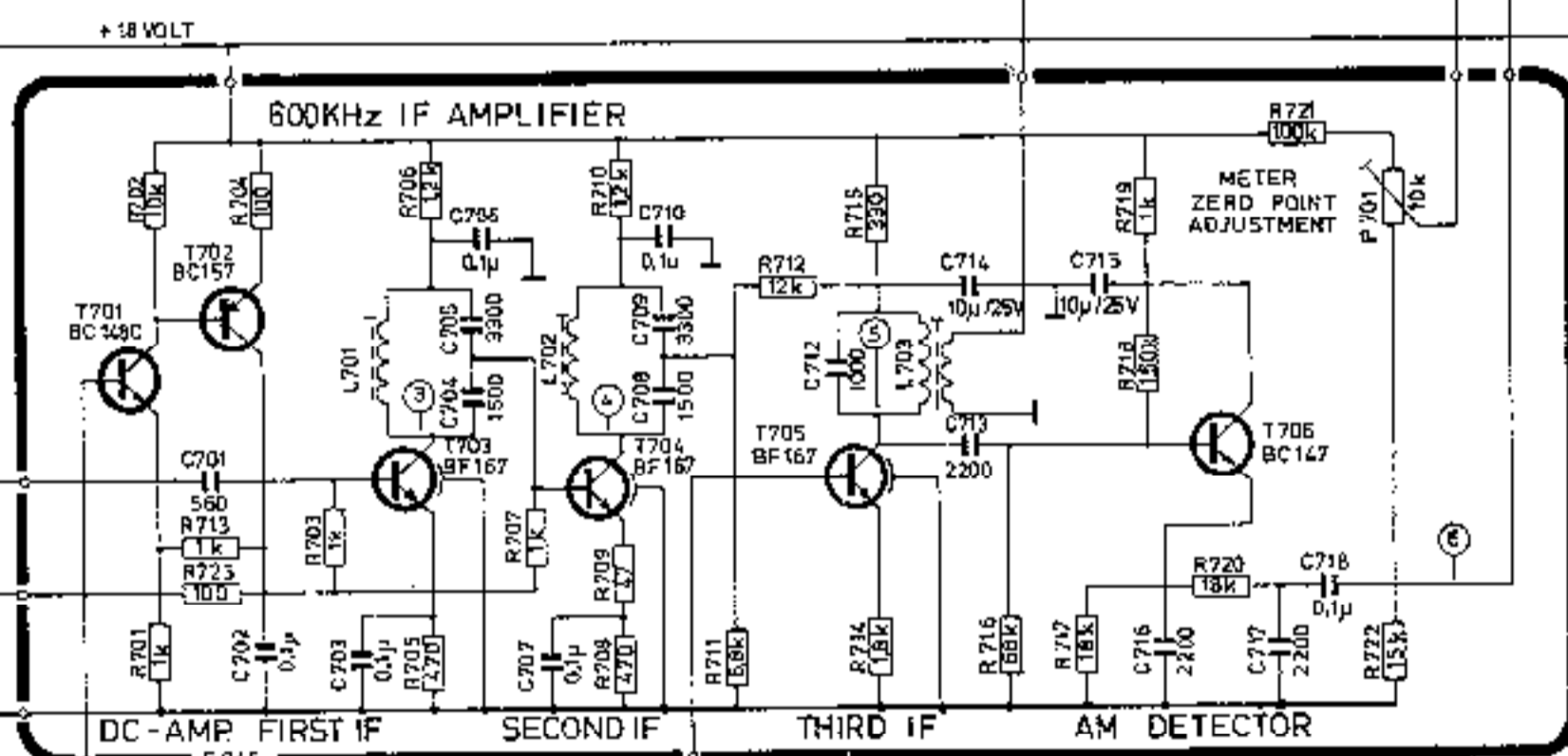
AUDIO AMP.



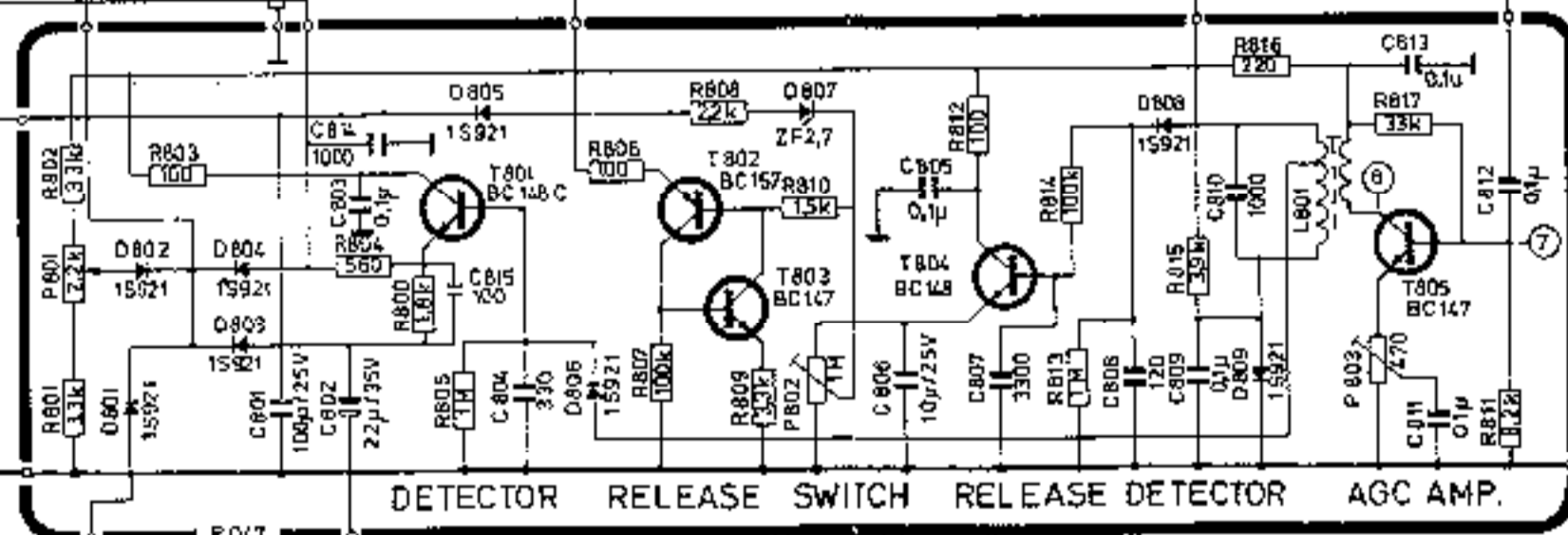
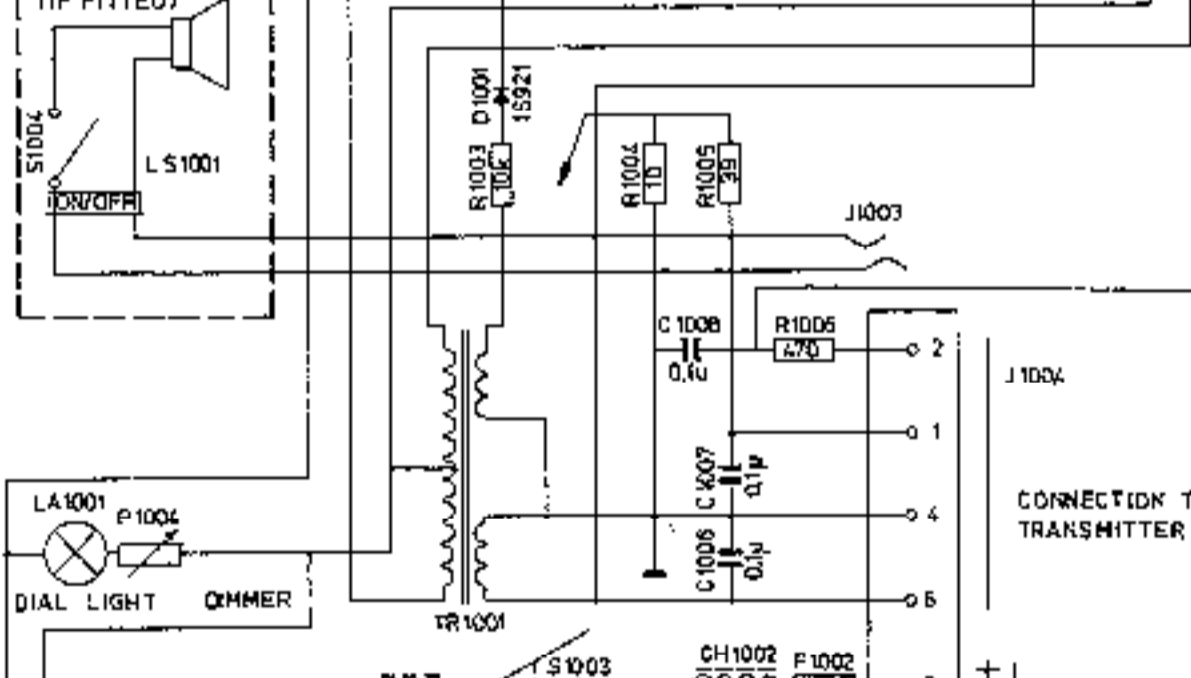
METER



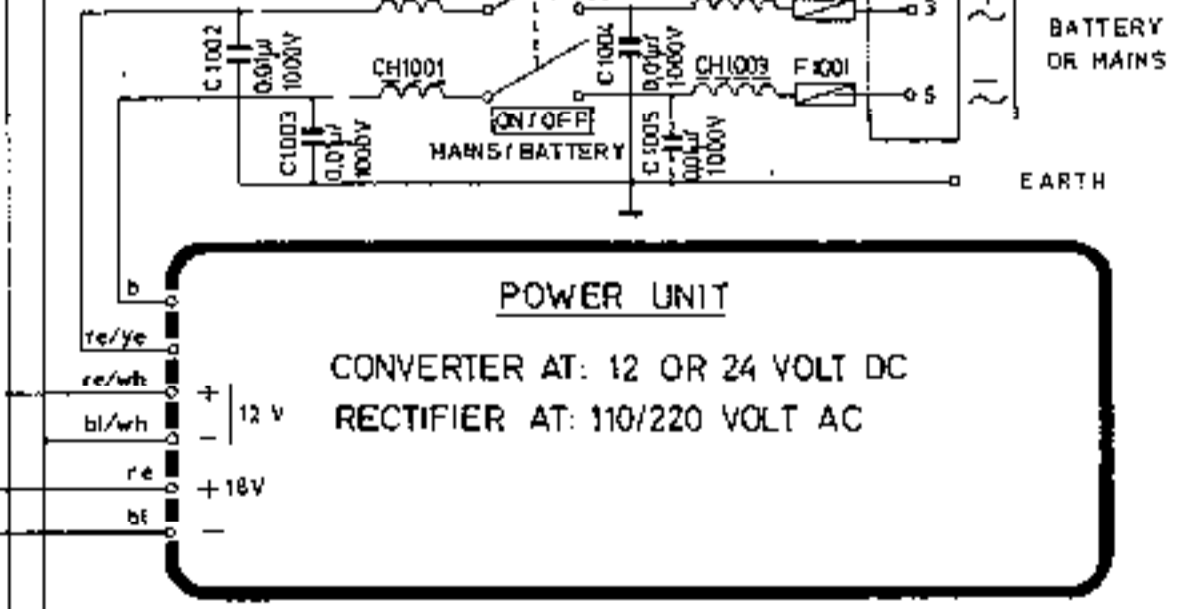
AGC



BUILT IN LOUDSPEAK (IF FITTED)



POWER UNIT



TO OF-CONNECTOR