THE MAIN MANAGEMENT OF CIVIL AIRCRAFT
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Technical description
INSTRUCTION MANUAL
RPS radio receiver

EDITORIAL Nano-and ZDA TEL-LIKI ~ FROM DE LA LO RO FL OTA

MOSCOW **1962**

ATTENTION!

In order to increase the voltage of the calibration signal on the shortest part of the range, in 1959 the scheme of the quartz calibrator was changed. However, this led to an increase in various kinds of undesirable harmonics and the manifestation of one of them in the region of 3MHz.

To exclude the possibility of calibrating the scale by 3 MHz on a false signal, calibration should be performed with the detuned antenna input.

CHAPTER I

PURPOSE AND MAIN DATA OF THE RADIO RECEIVER

§ 1. Purpose

The radio receiver RPS is designed for receiving unmodulated and tonal radio telegraph signals and modulated radiotelephone signals on aircraft of transport aviation. It can also be used for ground communication facilities.
The radio receiver can work in a complete set with the transmitter and SPU.

§ 2. The composition of the radio receiving device

The receiver set (see Figure 1) includes:

1) Receiver with an amortization frame.
2) Rectifier-block "B" with an amortization frame.
3) Converter MA-100M with an amortization frame.
4) Set of cables.

The complete set on the receiver is indicated in the passport to the receiver.

§ 3. Weight and overall dimensions of the radio receiver units

BLOCKS	LENGTH mm	WIDTH mm	HEIGHT mm	WEIGHT kg
Radio	508	327	303	26.5
Rectifier - block "f3"	195	120	118	
Converter MA-100M	245	166	235	7.1

The weight of the blocks is indicated without connecting cables and spare property.

§ 4. Receiver characteristics

The radio has a frequency range:
a) long-wave 143 - 600 kHz (2100 - 500 m);
b) shortwave 2-24 megacycles (150-12.5 m).
The entire receiver range is divided into 7 bands:

I band	143 - 280 kHz
II band	280 - 600 kHz
III band	2 - 4 MHz
IV band	4 - 7 MHz
V band	7 – 12 MHz
VI band	12 - 18 MHz
VII band	18 - 24 MHz

The frequency grading is plotted directly on the receiver scale. Accuracy of graduation on long-wave subranges are not worse than 0.6%, on shortwave-0.3%.
The receiver is powered by an alternating current network with a voltage of 115 V with a frequency of 400 Hz. Power consumption does not exceed 70 VA.
The sensitivity of the receiver at an output voltage of 15V and at a noise voltage of not more than 5V must be:
a) on the long-wave range:
in the telephone mode - no worse than 10 µV, in telegraph mode - no worse than 4 µV,
b) on the shortwave range:
in a telephone mode, not worse than 4 µV, in telegraph mode - not worse than 1.5 µV.
In the receiver, an adjustment of the input circuit is provided; input protection, protection of power circuits and STC from interference ultra-high frequency: manual and automatic sensitivity control (АРЧ-РРЧ); manual adjustment of volume, tone control of telegraph signals and crystal filter with adjustable bandwidth.
Manual sensitivity adjustment is carried out when the РРЧ is on, and when the toggle switch is placed in the АРЧ position a manual volume control is performed.
The receiver bandwidth at the intermediate frequency may be constant or adjustable depending on whether the crystal filter is on or off.
With the crystal filter turned off, the receiver bandwidth is constant and should be 2 times smaller.

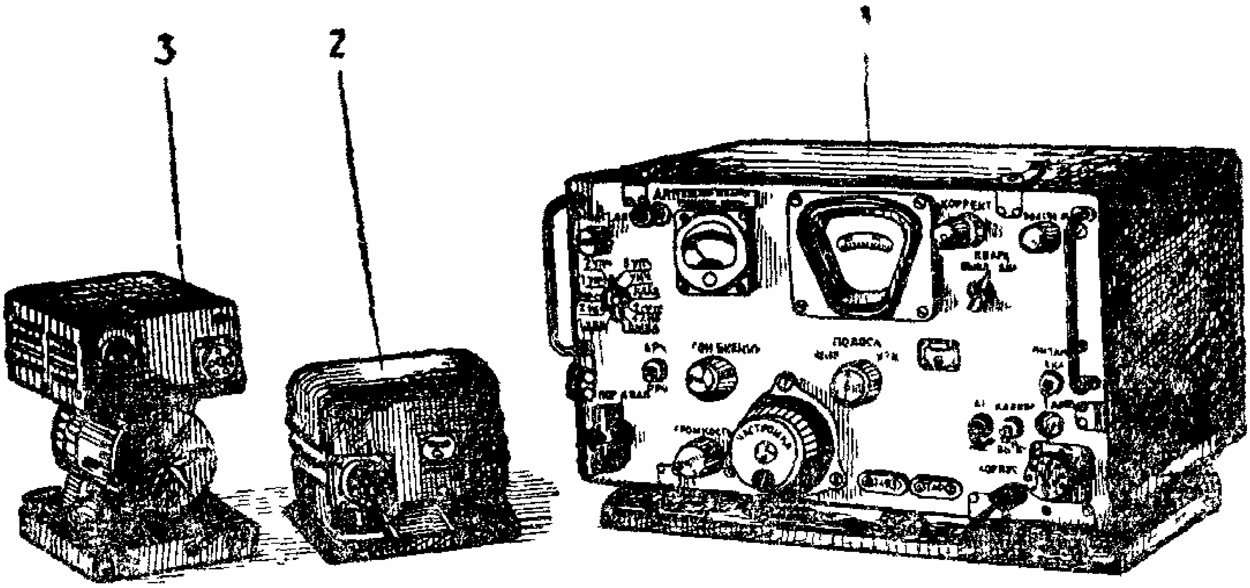


Fig. I. General view of the radio:
1- receiver; 2-rectifier; 3-converter MA-100M.
5 kHz, 100 times-not wider than 13.5 kHz, and when turned on, it can smoothly change from "narrow" to "wide". When the crystal filter is activated and the position of the "Stripe" regulator is in the leftmost position, the bandwidth at the attenuation in 2 times should not be more than 3 kHz, with an attenuation of 100 times, not wider than 11 kHz. Bandwidth at the attenuation of 2 times with the crystal filter on is adjustable from 0.5 kHz to 3 kHz with the "Strip" handle.
The "crystal" band is used when receiving telephone signals, and "crystal" band is used for receiving telegraph and telephone signals in conditions of large interference.
The receiver provides control of anode currents of valves and high voltage.
The receiver is designed to work on two pairs of high-resistance phones TA-4.
In addition, it is possible to operate the receiver through an airborne intercom and in conjunction with transmitter. For this purpose, the power cable has corresponding outputs to the SDH and the transmitter switching relay.

CHAPTER II

RADIO RECEIVER DIAGRAM

The receiver was assembled on a superheterodyne circuit with 11 valves (see Figure 3) with indirect heating and has the following cascades to types of valves:

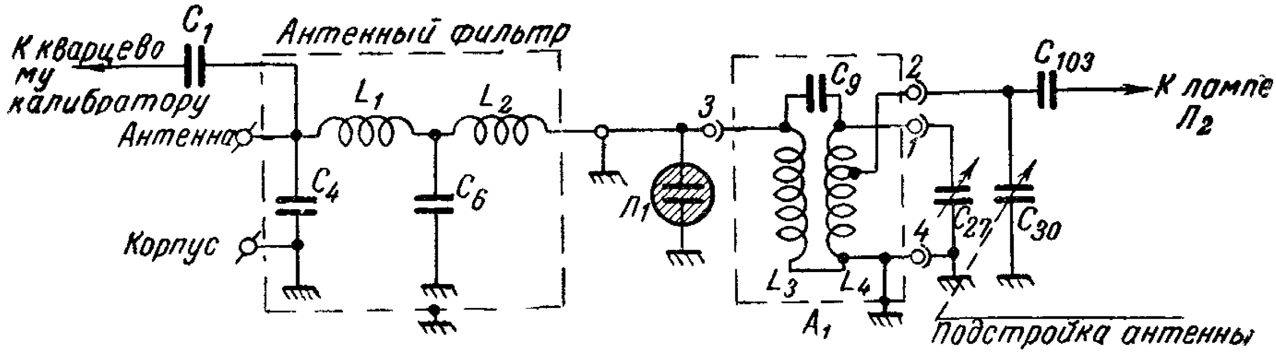
	Cascade assignment	Type of valve and no. in schematic
1	lst high frequency amplifier	Pentode type 6K4 (L2)
2	2nd high frequency amplifier	Pentode type 6K4 (L3)
3	Mixer	Pentagrid type 6A7 (L4)
4	lst local oscillator	Pentode type 6H1N (L5)
5	lst intermediate frequency amplifier	Pentode type 6K4 (L7)
6	2nd intermediate frequency amplifier	Pentode type 6K4 (L8)
7	3rd Intermediate Frequency Amplifier	Pentode type 6K4 (L9)
8	The signal detector and the AGC detector	Double diode type 6X6S (L10)
9	2nd local oscillator	Pentagrid type 6A7 (L13)
10	The quartz calibrator and the preliminary stage of the low-frequency amplifier	Double-triode type 6H8S (L12)
11	The output stage of the low-frequency amplifier	Output tetrode of type 6P6C (L11)

Schematic diagram of the receiver is given in Appendix 8. The description of the circuit elements in the text is given only for the first band.

§ 1. The front end of the radio receiver

The front end of the receiver serves to isolate the useful signal from all incoming signals and to provide the maximum possible amplification of this signal to the grid of the first valve of the high-frequency amplifier.

The front end (see Figure 2) is made in an asymmetric scheme and is designed to include antennas having equivalent capacitances from 70 to 200pF. To compensate for the detuning that occurs when connecting to the antenna receiver, with a spread of parameters, and also when the receiver is tuned to a different frequency, a tuning capacitor C30 is connected in parallel with the capacitor of variable capacitance of the input circuit C27, the axis of which is displayed on the front panel to the control "Подстр. ант."



To protect the input circuit from high RF voltages, a neon MH-3 (L1) type arrester, connected in parallel with the antenna coil L3, is used. At a voltage of 50-60 the surge arrester shorts the input of the receiver.

Protection of the input from ultra-high frequency impulse noise is achieved by means of an antenna filter consisting of 2 inductors L1 and L2 and 2 capacitors C4 and C6.

The antenna filter circuit, taking into account the equivalent antenna impedance and the input resistance of the receiver, is an ordinary three-link L-shaped filter.

The antenna circuit on the 1st, 2nd and 3rd bands is connected to the input loop by inductive-capacitive coupling, on the 4th, 5th, 6th and 7th bands-inductive (see Appendix 7).

The input circuit, as well as the two subsequent circuits of the high-frequency amplifier, consists of a capacitor of variable capacity C27, to which 7 different inductors can be connected, depending on the operating band. In parallel with the coils, trimmer capacitors are included to equalize the initial capacitance of the circuits. In the contours 4, 5, 6 and 7 of the bands, in series with the variable capacitor capacitors of constant capacity are included, reducing the overlap.

The tuning of the circuits is carried out by changing the inductance of the coils by means of carbonyl cores and capacitors of a semi-variable capacitance.

The voltage of the input circuit through the coupling capacitor C103 is fed to the grid of the valve of the 1st high-frequency amplifier.

The switching of the inductance coils across the sub-bands is performed using a drum-type switch.

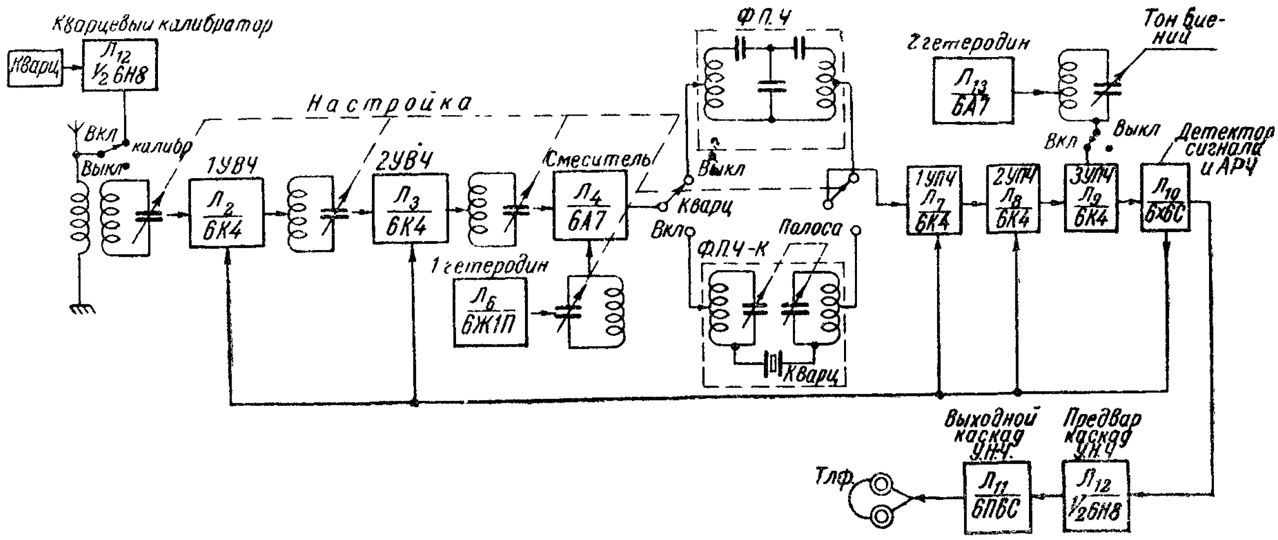


Рис. 3 Блок-схема радиоприемника.

§ 2. High-frequency amplifier

High-frequency amplifier (see figure 4) works on 2 valves 6K4 (L2, L3) Signal voltage through capacitor C103 comes from the input circuit to the control grid of the valve.

From the anode of the valve of this cascade, a serial circuit consisting of inductance L17 and capacitance C36 tuned to the intermediate frequency of the receiver is connected to the ground. The purpose of this circuit is to reduce the level of interference having a frequency equal to the intermediate one.

In the first stage of the high-frequency amplifier, the auto-transformer connection of the anode circuit (L18) with the valve anode is applied in the second cascade-transformer (L46, L47) using an "extension" capacitor C134, which decreases the natural frequency of the anode circuit of the second amplifier cascade. The alternation of the types of connection in combination with the use of an "extension" capacitor makes it possible to obtain uniform amplification within the band. Both cascades are covered by automatic and manual sensitivity adjustment (see chapter II §8).
'The voltage to the anodes of the valves is fed through the resistors R1 and R28, blocked by capacitors C68, C71, C163 and C164. The resistances R18 and R25 are shunts to the instrument that measures the anode currents of the valves.
The voltage drop at these resistances is proportional to the anode currents of the valves and is controlled by a magneto-electric device located on the front panel of the receiver.
The voltage on the screening mesh is removed from the voltage dividers consisting of the resistances R14, R14a and R24, R24a. Capacitors C33 and C121 are decoupling capacitors.
The bias voltage is provided by the resistances in the method R12 and R21, blocked by capacitors C32, C32a, C113. In the chain of control grids there are isolating resistances R11, R20 and capacitances C28 and C70.

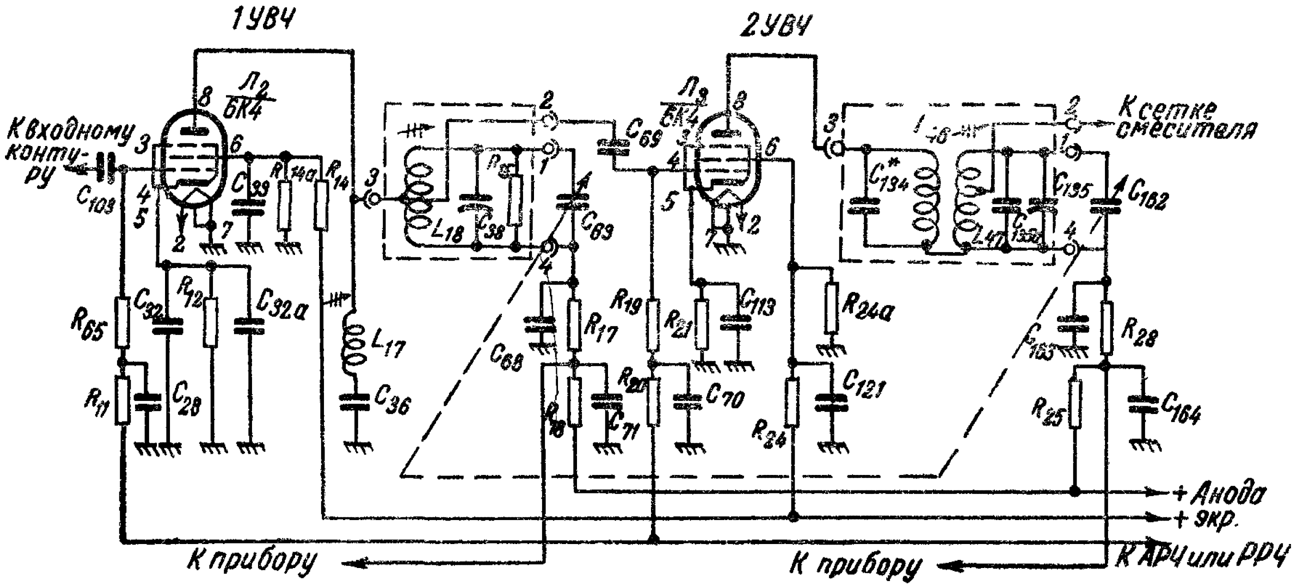


Рис 4 Усилитель высокой частоты.

§ 3. Mixer

The mixer (see Fig. 5) operates on the valve 6A7 (L4). In the mixer circuit, a two-grid frequency conversion (for the first and third grid).

The first grid of the mixer is supplied with voltage from the local oscillator, the third grid is the voltage of the incoming signal, amplified by high-frequency amplifiers. The second and fourth grids are screens, the fifth grid is antidinatron.

The anode current of the valve changes under the influence of the voltage of the local oscillator and the voltage of the signal, as a result of which it contains both fundamental frequencies and frequencies equal to the sum and difference between the frequencies of the local oscillator and the signal.

The frequency of the local oscillator is chosen so that the difference between the local oscillator frequency and the signal frequency is always 730 kHz.

$$f_{\text{гет.}} - f_{\text{сигн.}} = 730 \text{ кгц.}$$

An intermediate frequency filter tuned to a frequency of 730 kHz is included in the anode circuit of the mixing valve, which separates this difference frequency, called the intermediate frequency.

The mixer valve has an automatic bias, obtained by the voltage drop at the cathode resistance R33 blocked by the capacitor C168.

Automatic and manual adjustment of the sensitivity of the mixer is not covered, this ensures the stability of its mode, which has a positive effect on the stability of the frequency of the first local oscillator.

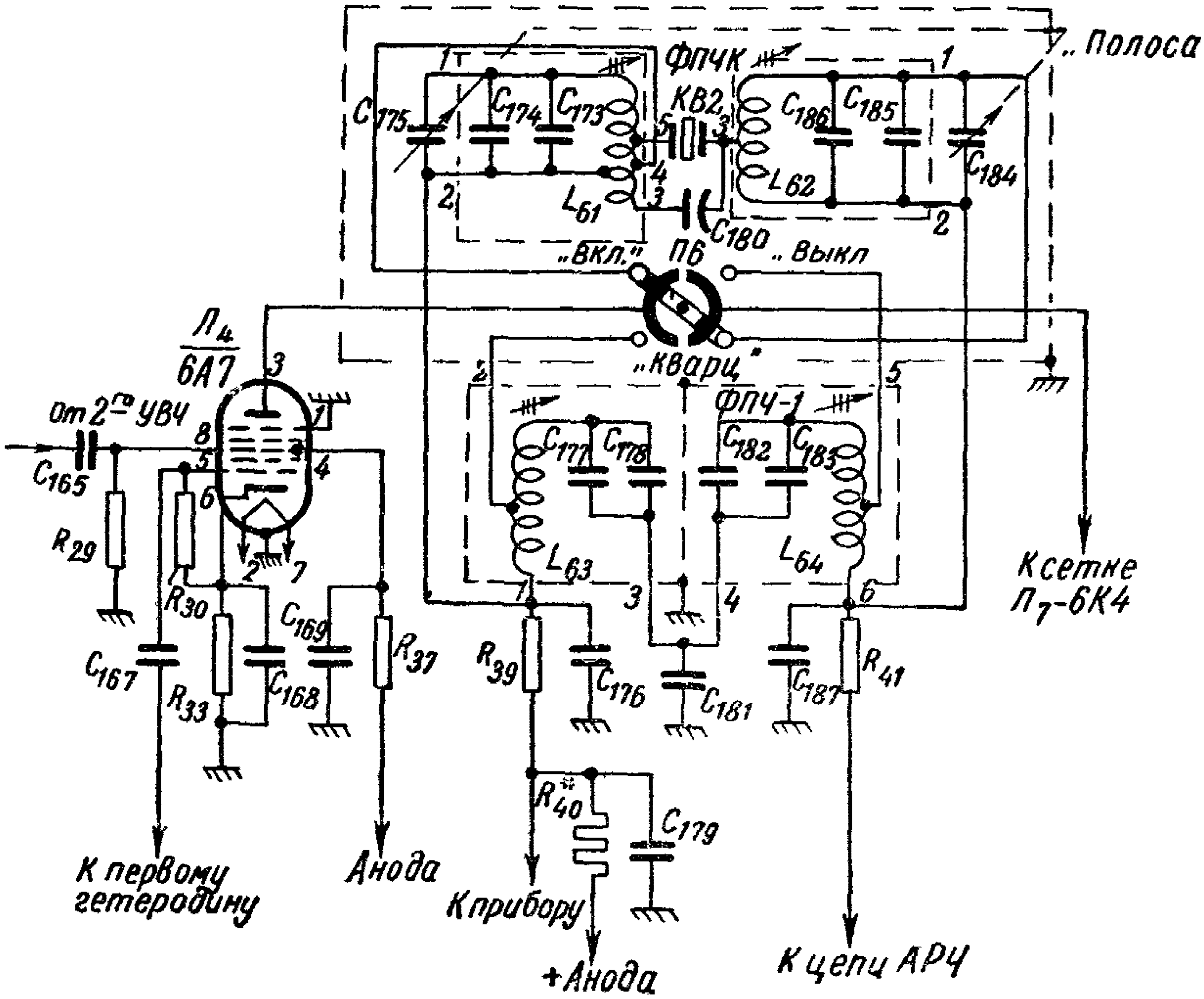


Рис. 5. Смеситель.

The screen grid of the valve is supplied with a stabilized voltage through the quenching resistance R37 blocked by the capacitor C169.

Resistance R30 is the isolating resistance of the heterodyne grid of the mixer, resistance R29 is the decoupling resistance of the signal grid of the mixer.

In the anode circuit of the mixer there are R39 - isolation resistance and C176 - blocking capacitor. In addition, there is resistance R40 in the anode circuit, which is a shunt of the device measuring the anode current of the valve. The mixer is connected to a high-frequency amplifier via a capacitor C165. The connection of the mixer with the first heterodyne is realized through the capacitor C167.

§ 4. The first local oscillator

The first heterodyne (see Figure 6) is assembled on a 6Ж1П (L6) valve according to the inductive three-point circuit with an earthed anode. The valve is turned on as a triode (the screen grid and the anode are connected at high frequency together through the lock capacitors).

The heterodyne circuit is made up of a capacitor of variable capacity C114 and one of the 7 inductors, alternately connected to it using a drum type switch.

In parallel, the coils include semi-variable trim capacitors, as well as ceramic capacitors of constant capacity with a negative temperature coefficient of capacitance (TKE).

These capacitors are designed to compensate for the LO cycle, since the inductor has a positive TCR and its inductance increases with increasing temperature. If a capacitor with a negative TKE is connected in parallel to such a coil (its capacitance will decrease with increasing temperature), then the correct choice of TKE, TKI, C and L can be achieved so that the loop tuning frequency does not change with temperature change, since the tuning frequency of the loop is determined by the product LC .

The tuning frequency of the local oscillator, as indicated above, is higher than the frequency of the received signal by the value of the intermediate frequency. To interface the tuning of the first heterodyne circuit to the tuning of the high-frequency amplifier circuit, a shortening capacitor C81 is connected in series with a capacitor of variable capacitance C114.

High stability of the frequency of the first heterodyne with the change in ambient temperature is reached:

1. The use of inductance coils with a ceramic frame and a winding applied to the ceramic by the method of burning silver and subsequent copper-plating (on short-wave bands).

2. The use of brass cores to change the inductance of heterodyne coils.

3. The heterodyne section of the capacitor of variable capacity is made of a special alloy (Invar), which has a small temperature coefficient of linear expansion.

4. The anode and the screen of the first local oscillator are fed by a stabilized voltage from a neon stabilizer of the СГ-4С (SG-4C) type (L5).

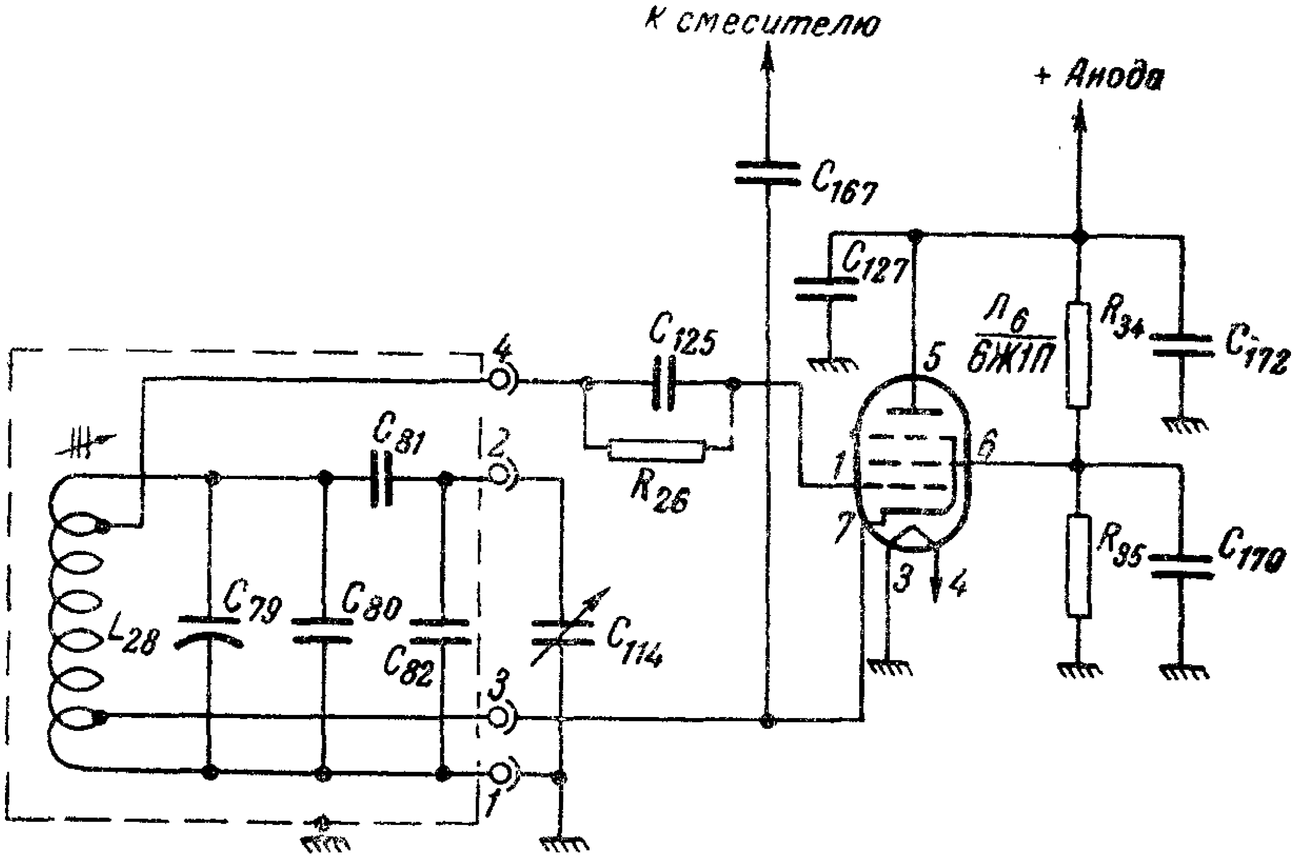


Рис 6 Первый гетеродин

The voltage to the anode of the first heterodyne is fed through the resistance R38 blocked by the capacitor C172; the voltage on the screen grid is removed from the resistance divider R34 and R35, behind the blocked capacitor C170. The offset on the control grid is automatic due to the grid current of the valve, which creates a voltage drop across the resistance of the green grid R28.

The capacitor C125 connects the control network of the first local oscillator to the loop.
The voltage of the first local oscillator is removed from the valve cathode by a mixer.

§ 5. Intermediate frequency amplifier

The intermediate frequency amplifier (see Fig. 7) has three gain cascades on valves of the type 6K4 (N7, N8, L9). All cascades are made with an automatic bias, which is carried out by incorporating resistors R42, R48, R52 blocked by capacitors C188, C198, C210 into cathode circuits.

The resistors R46, R51, R55 blocked by the capacitors C191, C203, C'204 are connected in the anode circuits after the resistance of the decoupling R45, R50, R54 and the isolation capacitors C189, C202, C212. These resistances are device shunts when measuring the anode current of a valve.

The voltage on the screen grids of the valves of the 1st and 2nd intermediate frequency amplifiers is fed from the dividers composed of the resistances R43, R43a and R49, R49a, to the screen grid of the valve of the 3rd amplifier - via resistance R53. Resistances in screen grids are blocked by capacitors C190, C201 and C213.

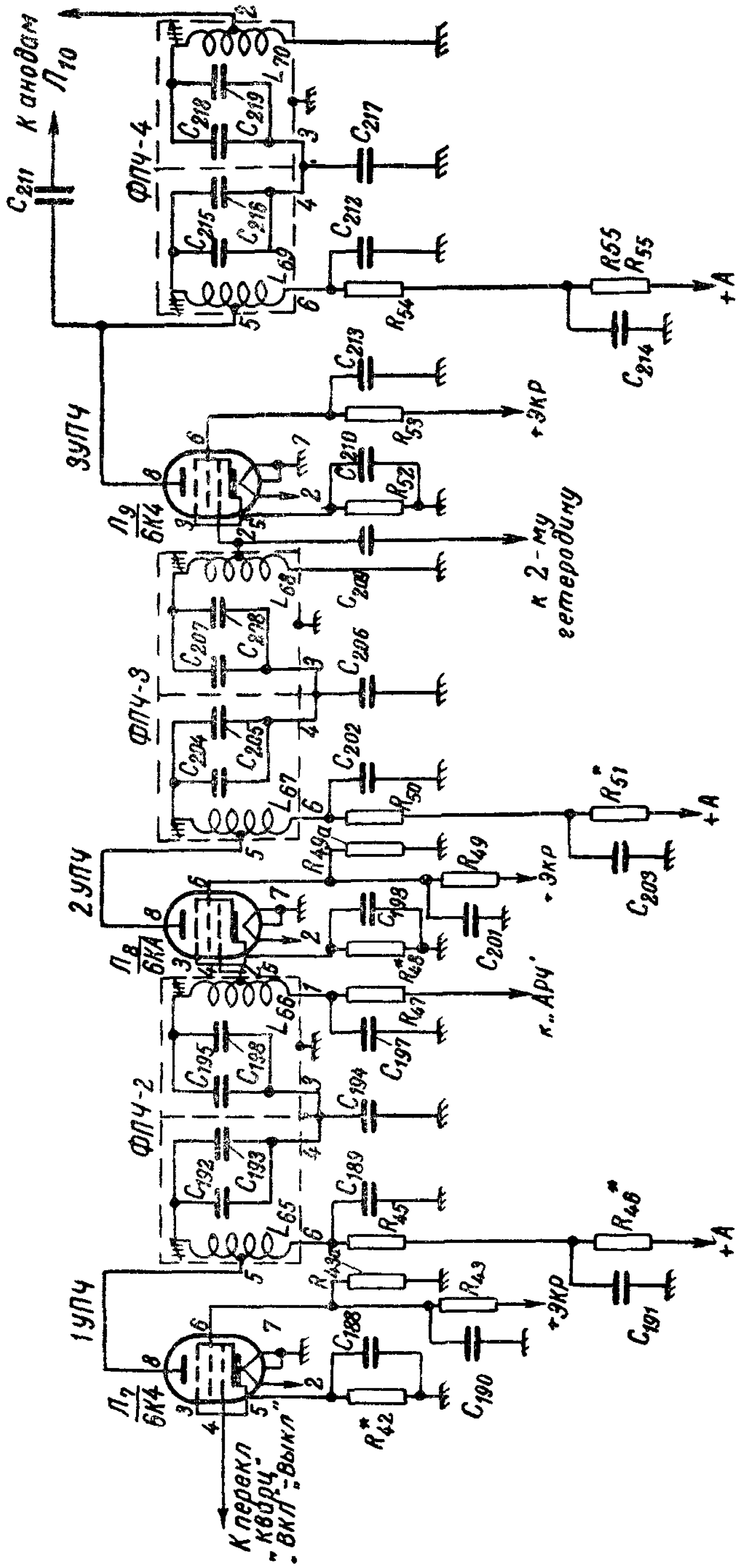


Рис. 7. Усилитель промежуточной частоты.

The intermediate frequency amplifier has three identical filters with an internal capacitive coupling (C194, C206 and C217) between the circuits and one crystal filter.

Valves are connected to the part of the filter circuit, thus reducing the influence of the valve on the tuning of the circuit and on its quality factor.

At the input of the first intermediate frequency amplifier, i.e. between the anode of the mixer valve and the control grid of the valve of the 1st intermediate frequency amplifier, by switching the "Crystal" switch, either a conventional bandpass filter with an internal capacitance coupling between the circuits, or a crystal filter with smoothly adjustable bandwidth.

§ 6. Crystal filter

In order to obtain high selectivity along the adjacent channel and the possibility of changing the transmission bandwidth between the mixer and the 1st intermediate frequency amplifier, a crystal filter is included (see Figure 8). It provides an adjustable narrow band, thereby reducing the level of various types of interference and improving the ratio signal/interference.

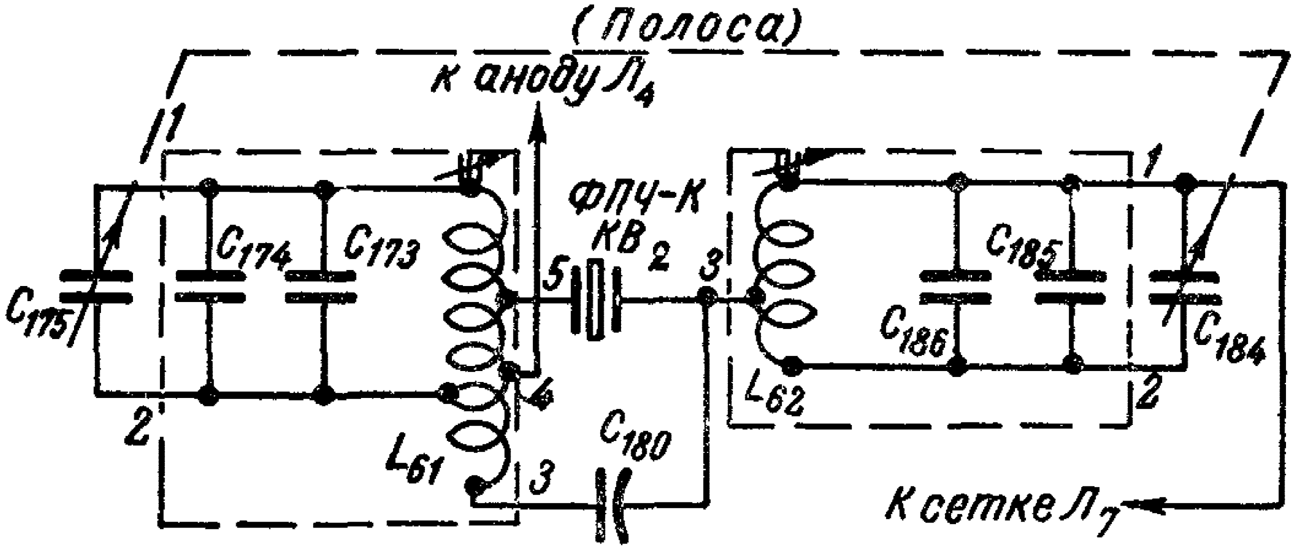


Рис. 8. Кварцевый фильтр.

The crystal filter consists of 2 tuned circuits (I-L61 C175, C174 and C173 and II-L62, C184, C185, C186) connected by a quartz plate KB-2, which is a coupling element in the filter circuit.

A quartz plate with certain parameters behaves like a circuit consisting of a series-connected capacitance, resistance and inductance, in parallel to which the quartz holder is connected.

At a frequency that depends on the parameters of the crystal, a consecutive resonance occurs, at which the resistance of the circuit is minimal, hence, the transfer of voltage from the primary circuit to the second circuit will be maximum. At a frequency below resonance, the capacitive resistance of the circuit rises sharply, and above the resonant one, the inductive resistance of the circuit. At a frequency higher than the resonant frequency, a parallel resonance of the circuit arises, formed by the inductance of quartz, quartz capacitances and quartz holders, and quartz resistance.

At this frequency, the resistance of the circuit will be maximal, i.e. the circuit will behave like a filter plug and the transfer of voltage from the 1st circuit to the 2nd circuit will be minimal. The resonance characteristic of such a circuit will be very sharp, which allows us to obtain a narrow bandwidth. For a series resonance, the equivalent crystal circuit represents a series circuit. The oscillatory circuits of the crystal filter are included in a chain of equivalent crystal circuit, and if these circuits are tuned to resonance with an equivalent sequential quartz circuit, then their resistance will be greatest, so that the attenuation of the equivalent sequential crystal circuit will be the largest and the band comparatively broad.

The detuning of the filter circuits reduces their resistance, as a result of which the attenuation of the equivalent sequential crystal circuit decreases and the bandwidth becomes narrower.
To obtain a better symmetry in a narrow band, the filter contours are detuned in different directions. The detuning of these circuits is done by the control, which is displayed on the front panel with the inscription "Полоса шир.-узк." (Bandwidth wide-narrow).

The capacity of the crystal holder and circuit mounting is harmful, which distorts the symmetry of the resonance characteristic of the filter, so it is neutralized by a semi-variable capacitor C180 connected to the additional winding of the 1st circuit. If the capacitances are equal and the intermediate frequency voltages between points 2-5 and 2-3 (see Fig. 8) of the 1st circuit are equal, the voltage between points 2-3 of the 2nd circuit will be zero, since the voltage between the points 2-5 and 2-3 of the 1st circuit are phase-shifted by 180 ° relative to each other.

§ 7. The detector

As a signal detector (see Fig. 9) one of the valve diodes of type 6X6C (L10) is used. The load of the detector is a potentiometer consisting of resistances R56, R57.

In the AGC mode, the low frequency voltage taken from the detector through the C220 transition capacitor is applied to the variable resistance R1, which is fed to the preamplifier cascade of the low-frequency amplifier 6H8S (L12). By changing the value of this resistance, we change the value of the sound voltage, that is, the volume is adjusted.

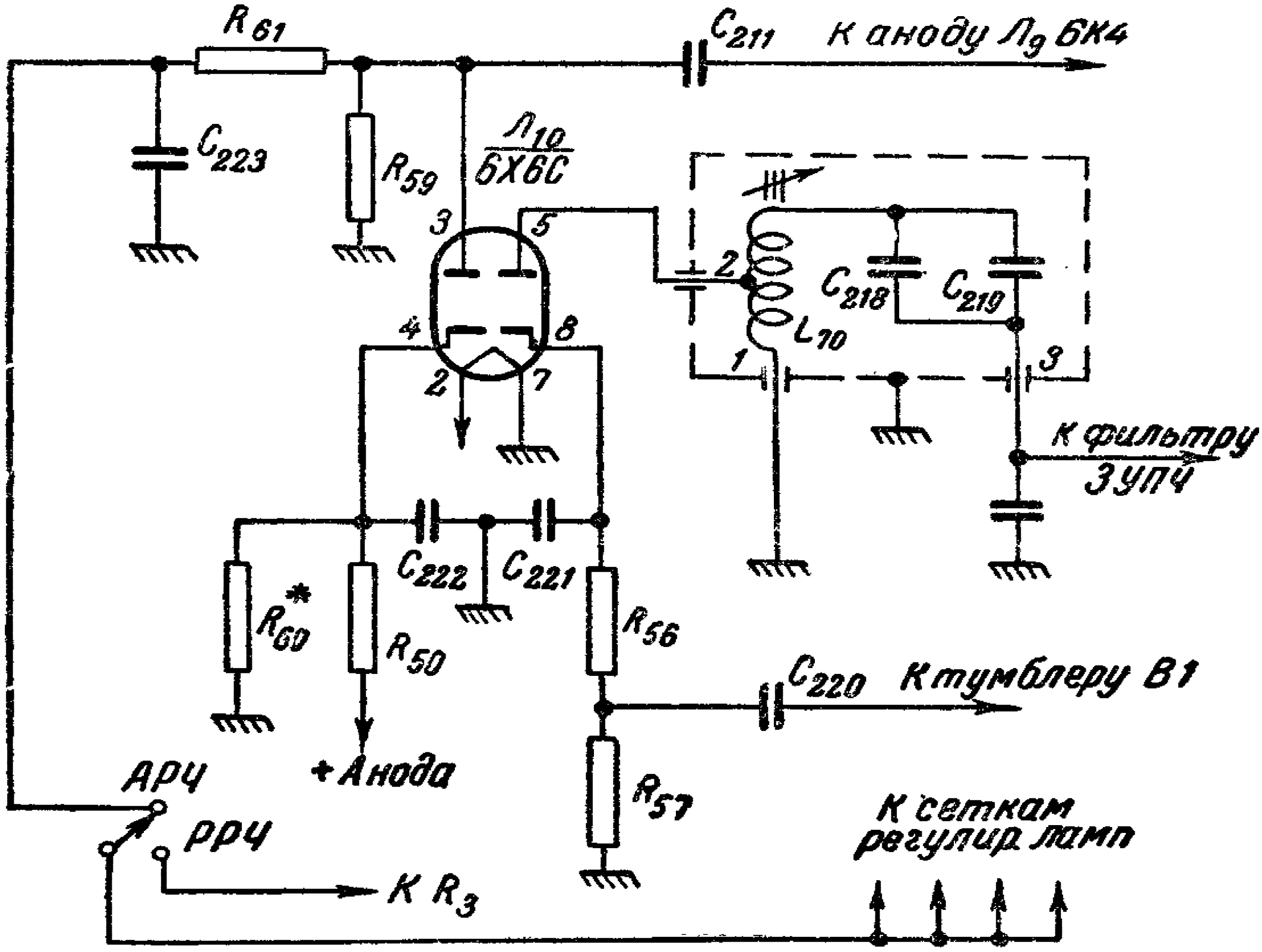


Рис. 9. Детектор сигнала и детектор АРЧ.

As already mentioned, the receiver has automatic (АРЧ) and manual (РРЧ) sensitivity controls. The transition from the АРЧ to the РРЧ and back is performed by the "АРЧ-РРЧ" tumbler located on the front panel of the receiver.

§ 8. Automatic and manual sensitivity adjustment

The second diode of a valve of the type 6X6S (L10) is used as an detector (see Fig. The intermediate frequency voltage is applied to the anode of this diode from the anode circuit of the 3rd intermediate frequency amplifier through the coupling capacitor C211.

The load of the AGC detector is the resistance R59 The control voltage of the AGC is applied to the grids of the high-frequency amplifier cascades through the filter R61 and C223 and the filters in the chains of the grids C28, R11 and C70, R20, and to the grids of the 1st and 2nd stages of the intermediate frequency amplifier through filters in chains of grids of valves R41, C187 and C47, C197. The receiver uses a delayed AGC scheme.

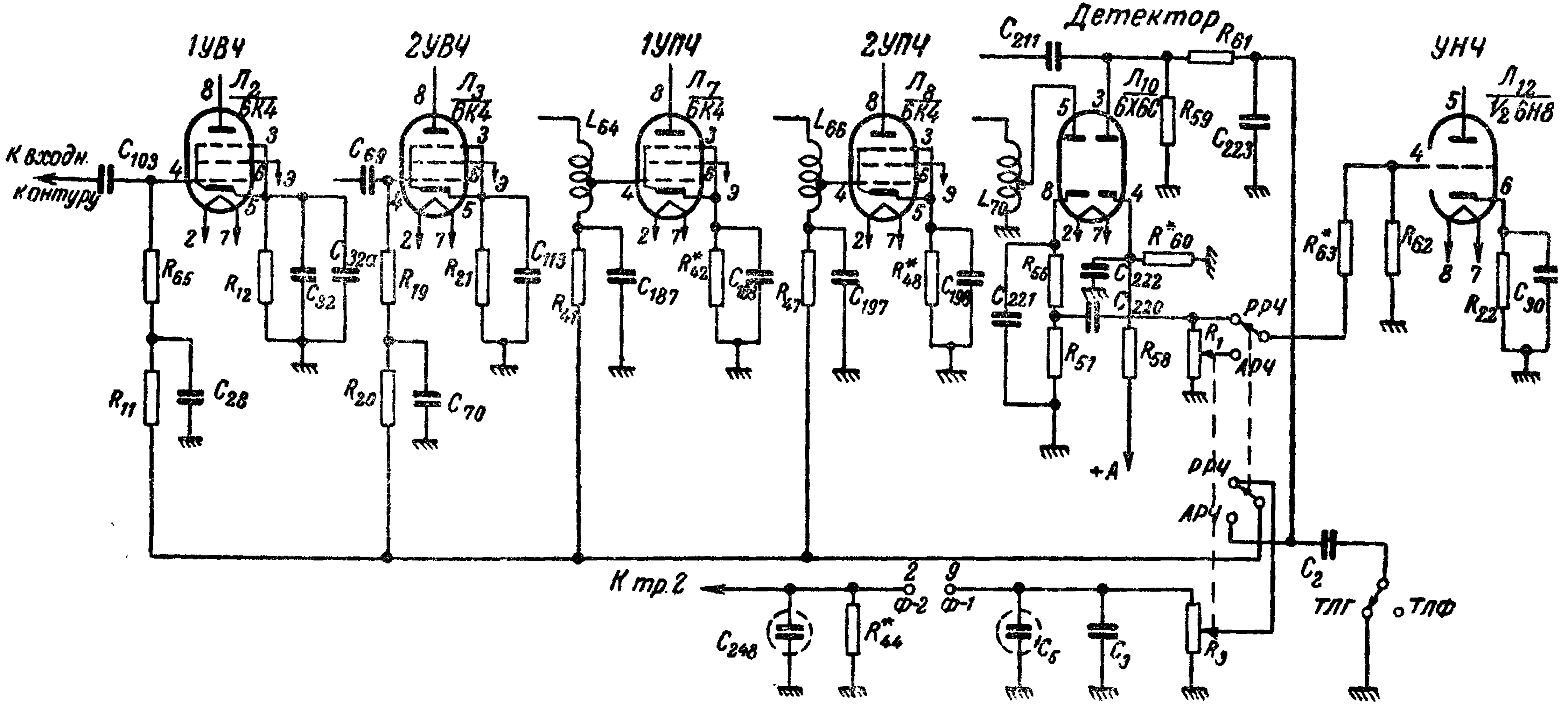


Рис. 10. Автоматическая и ручная регулировка чувствительности.

The delay voltage to the cathode of the diode is removed from the potentiometer consisting of the resistances R58 and R60.

The delay voltage is selected such that when the volume control is set to the maximum volume setting, the AGC starts to work when the output voltage exceeds 40 V at a modulation of 30% and a modulation frequency of 1000 Hz.

Manual sensitivity adjustment is carried out by supplying a network of grids of adjustable negative voltage valves. A negative voltage of 25 V is created at the resistance R44, 'located in the rectifier. In parallel, it has a potentiometer R3 in the receiver, from which the voltage is removed and fed to the grids of the valves.

Toggle "АРЧ-РРЧ" in this case should be in the position of the РРЧ.

The potentiometer for manual volume control R1 and the potentiometer for adjusting the sensitivity of R3 have a common axis that is drawn to the front panel and one knob is the "Volume".

§ 9. Second local oscillator

The second heterodyne (see Fig. 11) operates on a valve of type 6A7 (L13).

The loop of the 2nd heterodyne is tuned to a frequency of 730 kHz. This frequency can be smoothly changed up to 2000-4000 Hz in both directions with the help of a tuning capacitor C124, the axis of which is displayed on the front panel to the handle "Beat Tone".

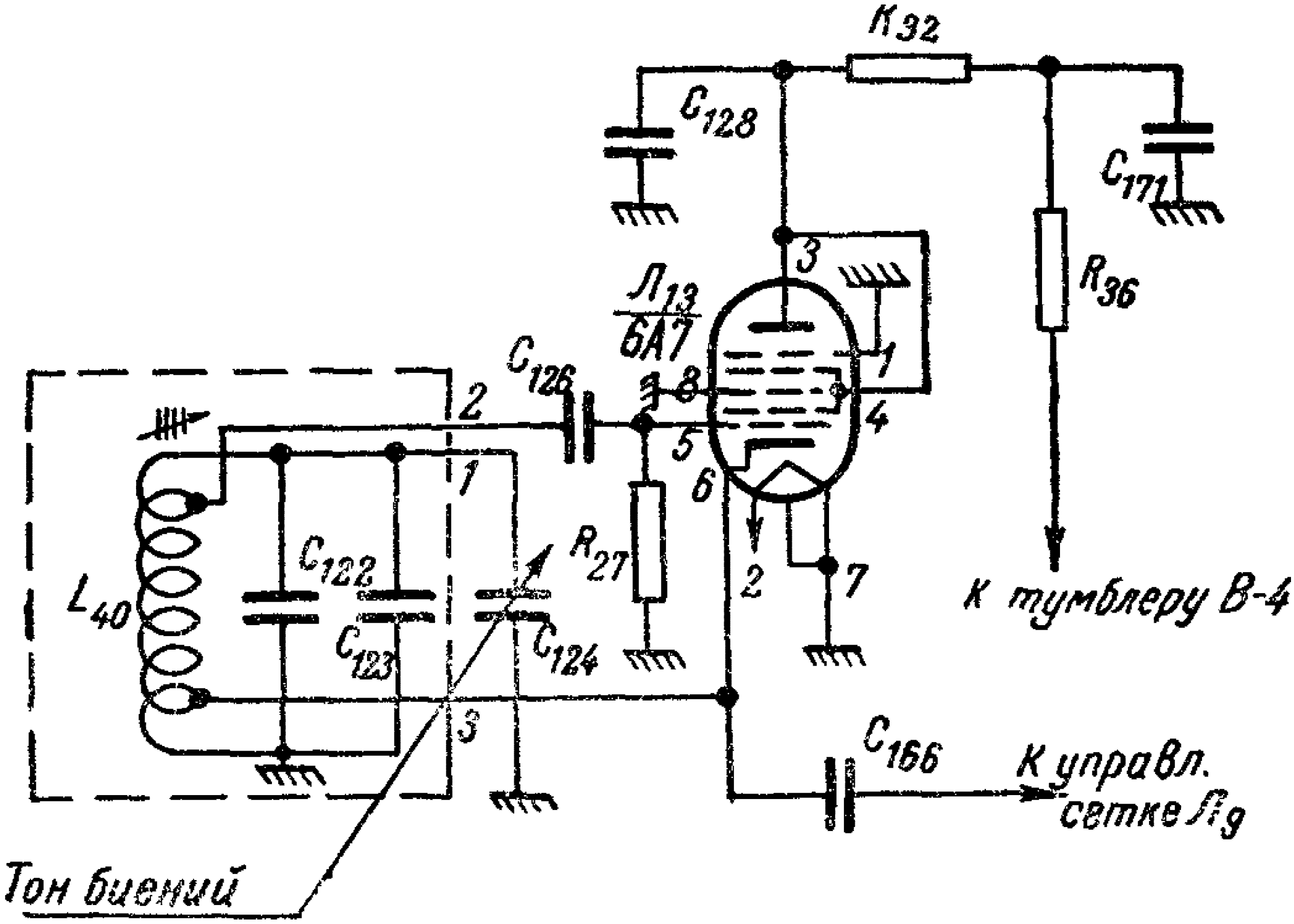


Рис. 11. Второй гетеродин

To reduce the intensity of the harmonics, the oscillation amplitude of the second heterodyne is chosen to be the smallest, and in addition, in the anode circuit there is a U-shaped filter consisting of two capacitors C128 and € 171 and a quenching resistor R32
Switching on and switching off of the 2nd heterodyne is carried out by the tumbler "ТЛФ-ТЛГ": in the "ТЛФ" position the anode voltage is switched off; in the "TLG" position, the anode voltage is turned on and an additional capacitor C2 is connected to the AGC circuit to increase the AGC time constant in the telegraph mode. Resistance R5 is a shunt of the device for measuring the anode current of a valve.

To reduce the intensity of the harmonics, the amplitude of the oscillations of the second heterodyne is chosen to be the smallest, and in addition, in the anode circuit there is a U-shaped filter consisting of two capacitors C128 and € 171 and a quenching resistor R32. The switching on and off of the 2nd local oscillator is carried out by the toggle switch "ТЛФ-ТЛГ": in the "ТЛФ" position the anode voltage is switched off; in the "TLG" position, the anode voltage is turned on and an additional capacitor C2 is connected to the AGC circuit to increase the AGC time constant in the telegraph mode.

Resistance R5 is a shunt of the device for measuring the anode current of a valve.

§ 10. Crystal Calibrator

A crystal calibrator (see Fig. 12) is assembled on one of the triodes of a 6H8S (L12) valve.
The crystal calibrator is designed to check the calibration of the receiver scale for short-wavelength bands.

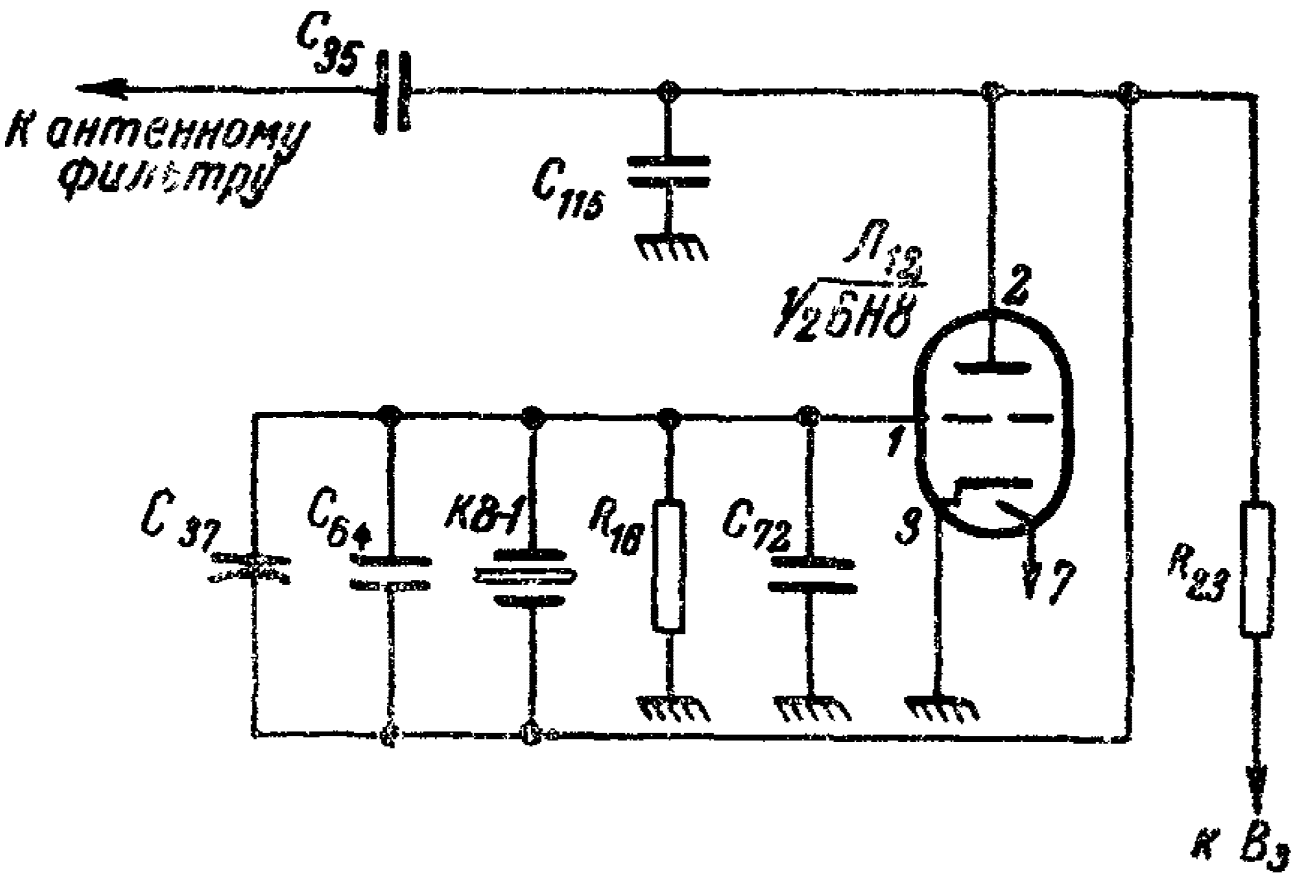


Рис. 12. Кварцевый калибратор

The calibrator is a generator stabilized by crystal KV-1 with a frequency of 1 MHz, which is switched on by a non-loop circuit. The crystal is connected between the anode and the control grid. Through capacitors C1 and C35, the voltage from the crystal calibrator is applied to the input of the receiver. Calibration is performed when the 2nd heterodyne is switched on, i.e. when the "TFF-TLG" toggle switch is in the "TLG" position. In this case, the "Beats Tone" knob should be facing the point on the front panel.

Since the 2 nd local oscillator has a frequency of 730 kHz, at zero beats the intermediate the frequency should be 730 kHz. This can be the case when the receiver is precisely tuned to the incoming signal (in this case, to the calibrator signal).

But since the crystal calibrator does not have a continuous spectrum of frequencies, but only frequencies equal to an integer number of megahertz (harmonics of 1 MHz), zero beats will occur at the receiver tuning points by an integer number of megahertz. These calibration points are marked on the receiver scale by circles.

Since the frequency of the signal is less than 1 megahertz on the long-wave band, it is impossible to check the accuracy of the calibration on the 1st and 2nd sub-bands using the receiver's crystal calibrator.

Constant capacitances C64, C72, C115 and trimmer C37 are feedback elements of the generator. Resistance R4 is a shunt of the device that measures the anode current of a crystal calibrator valve. The crystal calibrator is switched on by the "Calibration-Off" switch.

§ 11. Low-frequency amplifier

The low-frequency amplifier (see Figure 13) has two amplification stages. In the first stage of amplification (preliminary) one of the triodes of the valve 6H8S (L12) is used. It is assembled according to the amplifier circuit with resistances with automatic bias.

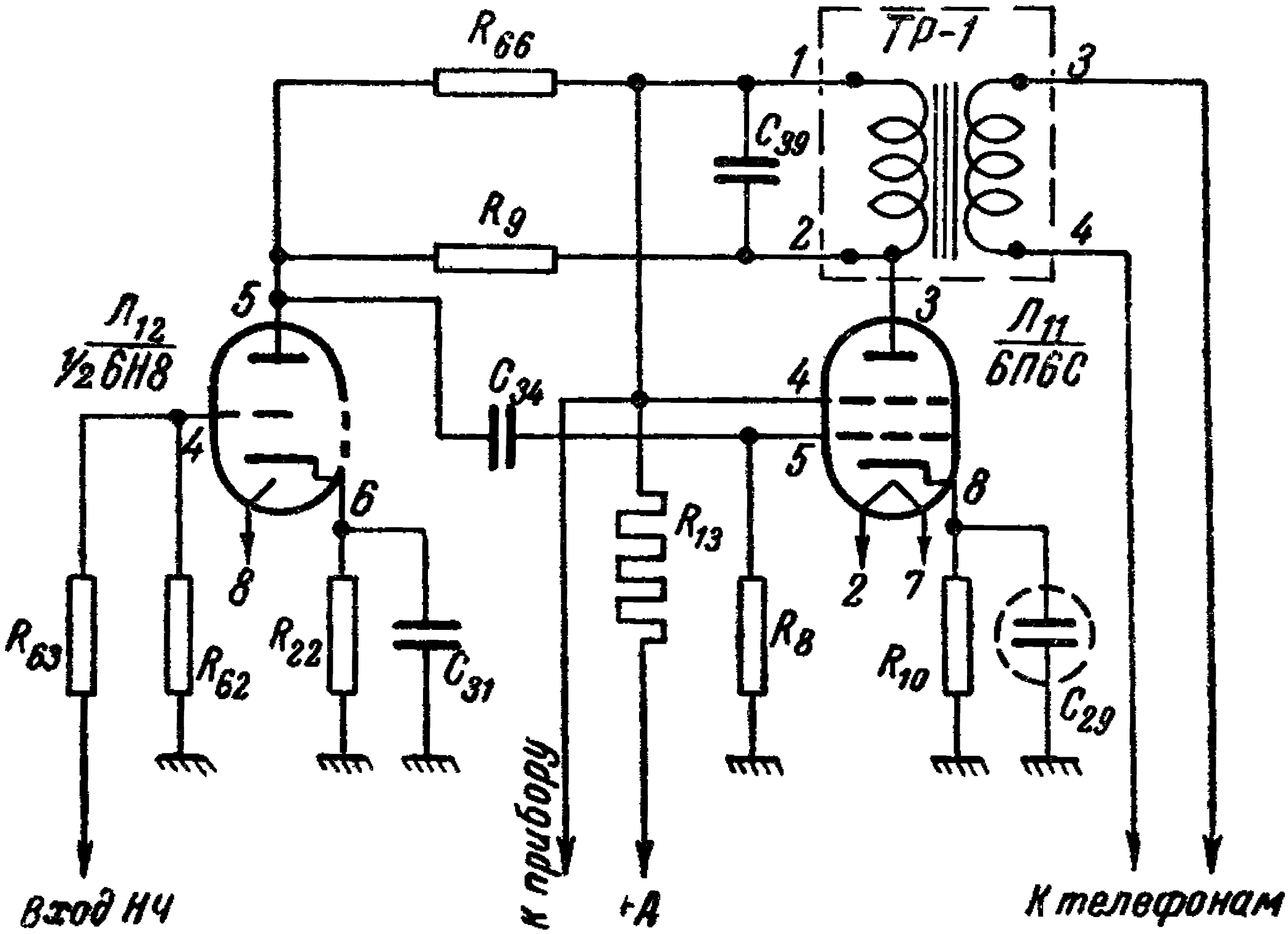


Рис 13 Усилитель низкой частоты.

In the control grid of the preliminary stage of the low-frequency amplifier there is a voltage divider made up of resistors R62 and R63. In the second stage of low-frequency gain-output, a 6P6C (L11) valve is used.

The use of this valve makes it possible to obtain the required output voltage with a nonlinear distortion factor of no more than 10%.

To match the loads in the anode circuit of the valve, the output transformer Tr-1 is included; its secondary winding is connected to the "TFF" sockets, located on the front panel, which includes high-resistance telephones with a resistance to a direct current of 4,400 ohm. It is possible to include two pairs of phones. The output of the receiver is symmetrical.

For inclusion in the airborne intercom system (STC), the receiver output is also fed to pins 5 and 7 on the F-1 power supply chip.

In order to reduce the nonlinear distortion in the cascade, negative voltage feedback is applied, which is realized through R9. The reduction of nonlinear distortions is as follows: if nonlinear distortions occur in the amplifier, then from its output to the input through the feedback circuit, not only the voltage of the fundamental frequency (of the useful signal) but also the harmonics arising in this amplifier will be fed, and, since the feedback has a negative sign, then the phases of all the harmonics coming from the feedback loop to the input will be such that the output voltage of these harmonics will be weakened. Consequently, as a result of the introduction of negative feedback, the voltage of all the components at the output of the amplifier, including all harmonics and interferences arising in the amplifier, will be weakened. However, the voltage of the useful signal at the output can be brought to the previous level by increasing this signal at the input in proportion to the decrease in the amplification of the feedback circuit.

In this case, the ratio between the useful and harmful components of the output voltage will be improved, i.e. the nonlinear distortions will decrease while maintaining the constant amplitude of the useful signal at the output.

§ 12. Receiver power supply

The receiver is powered by an alternating current network with a voltage of 115 V with a frequency of 400 Hz. The transformation of this voltage is carried out with the help of a full-wave kenotron rectifier (see Fig. 14) on a valve of the type SZ4C (L14).

A high-voltage filter uses a smoothing filter consisting of C199, C200 capacitors and the Dr-1 choke.

The bias voltage on the grid of valves is taken from the resistances R44 and R44a blocked by the capacitor C248.

By heating the receiver's valves are powered by a special winding power transformer, giving a voltage of 6.3 volts. The filament valves are connected in parallel.

Provides protection of power circuits and STC from high and ultra-high frequency. For this purpose, there are separate filters in the circuits of low and high voltage. In the low-voltage circuit, the filter consists of capacitors C67, C75, C118 and C131 and inductances L27, L37 and L43; in the high-voltage circuit - from capacitors C65, C73, C116, C129, C66, C74, C117, C130 and inductances L25, L35, L41, L26, L36 and L42; in the chain of SPU capacitors C76, C119, C132, C77, C120, C133 and inductances L38, L44, L39 and L45.

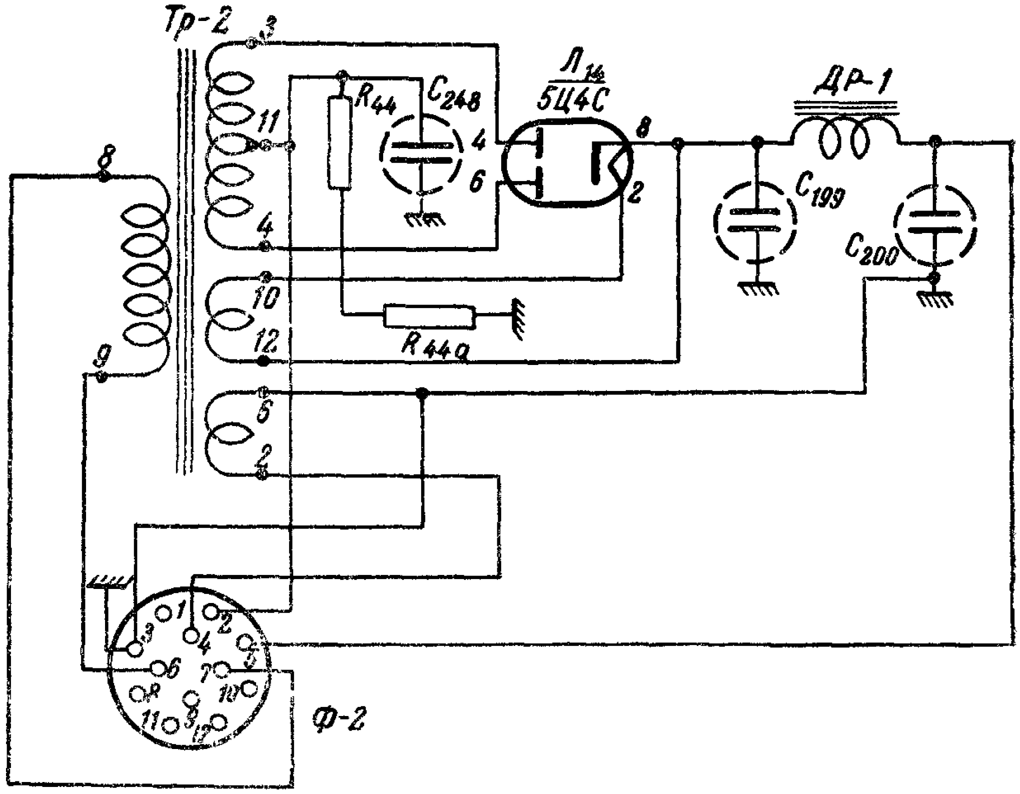


Рис 14 Схема выпрямителя

CHAPTER III.

CONSTRUCTION OF THE RADIO RECEIVER

The receiver is enclosed in a removable casing and is structurally made of 4 knot-blocks (see Figure 15), completely interchangeable in production: the high-frequency block - "HF", the intermediate frequency block - "IF", the low-frequency block - "LF" and front panel.
The chassis of the blocks carries all the mechanical and electrical parts, as well as the electrical installation of the receiver.
Electric blocks are connected to each other by means of plug-in connectors, which ensure easy disconnection of the receiver units.
The mechanical connection of the blocks with screws ensures fast disassembly of the receiver in blocks. The receiver housing is made of aluminum sheet.
The receiver is fixed in a casing with six locks, which attract the housings to the front panel.
From the bottom of the case are two bases with two rubber shock absorbers of the "Lord" type.
The receiver with the casing is fixed on the receiver frame by the frame flaps.

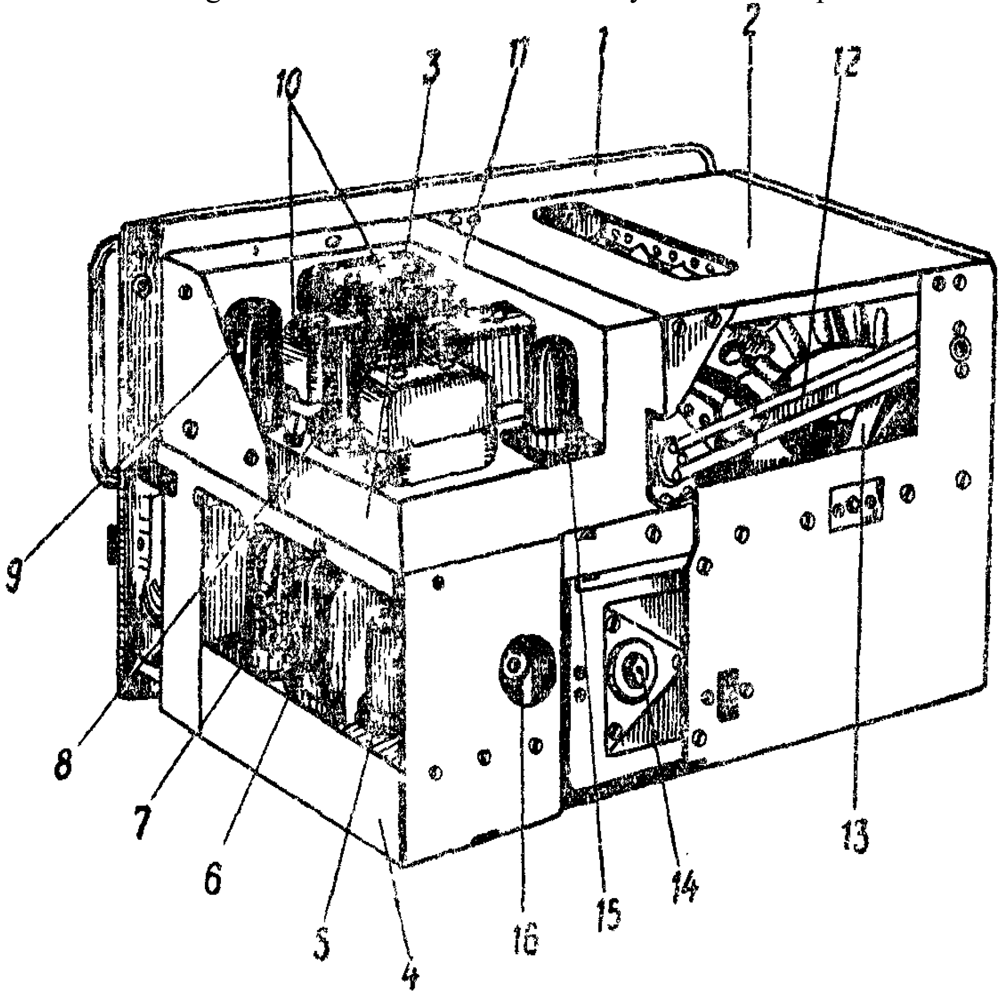


Fig. 15 View of the radio without casing.
l-front panel; 2-block B. Ч; B-block P. 4; 4-block H Ч; 5-valve L13; 6-valve L11, 7-valve L12; 8-valve L9; 9-valve L7; 10-filter of intermediate frequency, 11-valve L8; 12-throttle thrust antenna building; 13-reel switch; 14-block of condensers variable capacity; 15-valve L10; l6-loop of the 2nd local oscillator

§ 1. Front panel

The front panel (see figure 16) is made of aluminum sheet and serves for mounting the receiver controls.

On the inside of the panel there is an electrical installation (see Figure 17). On the front side of the front panel are the following receiver controls:

Перекл. Диап. (Switching. range)- band switch of the receiver (rotation of the drum).

Настройка (Tuning) - the vernier tuning of the receiver to the working frequency (rotor rotation of the condenser of variable capacitance).

Подстр. Ант. (Ref. ant.)- tuning the input of the receiver (changing the capacity of the input circuit).

Тон биений (Tone of beats) - change of tone of telegraph signals (change of frequency of 2nd heterodyne).

Громкость (Volume) is a manual volume control (with ARC) and a manual sensitivity control (under the hub).

Кварц (Crystal) - switching the receiver to work with a crystal filter and without it.

Полоса (Band) - the change of the frequency bandwidth along the channel of the intermediate frequency amplifier when working with a crystal filter.

Корректора (Corrector)-carries out the movement of the visor.

Подсвет шкалы (Illumination of the scale) - rheostat in the chain of valves for lighting the scale.

АРЧ—РРЧ (AUTO-MANUAL) - switch for switching sensitivity adjustment (automatic or manual).

ТЛФ-ТЛГ is a toggle switch that includes a 2-nd local oscillator for receiving undamped oscillations or frequency calibration (**ТЛГ**) or turning off the 2nd heterodyne for reception of modulated oscillations (**ТЛФ**).

Калибр.—Вкл (Calibraton-On) - toggle switch, which includes a crystal calibrator.

Анодные токи ламп (Anode currents of valves) is a switch of the device.

Питание вкл (Power on) - toggle switch, which includes the voltage in the primary circuit of the power transformer.

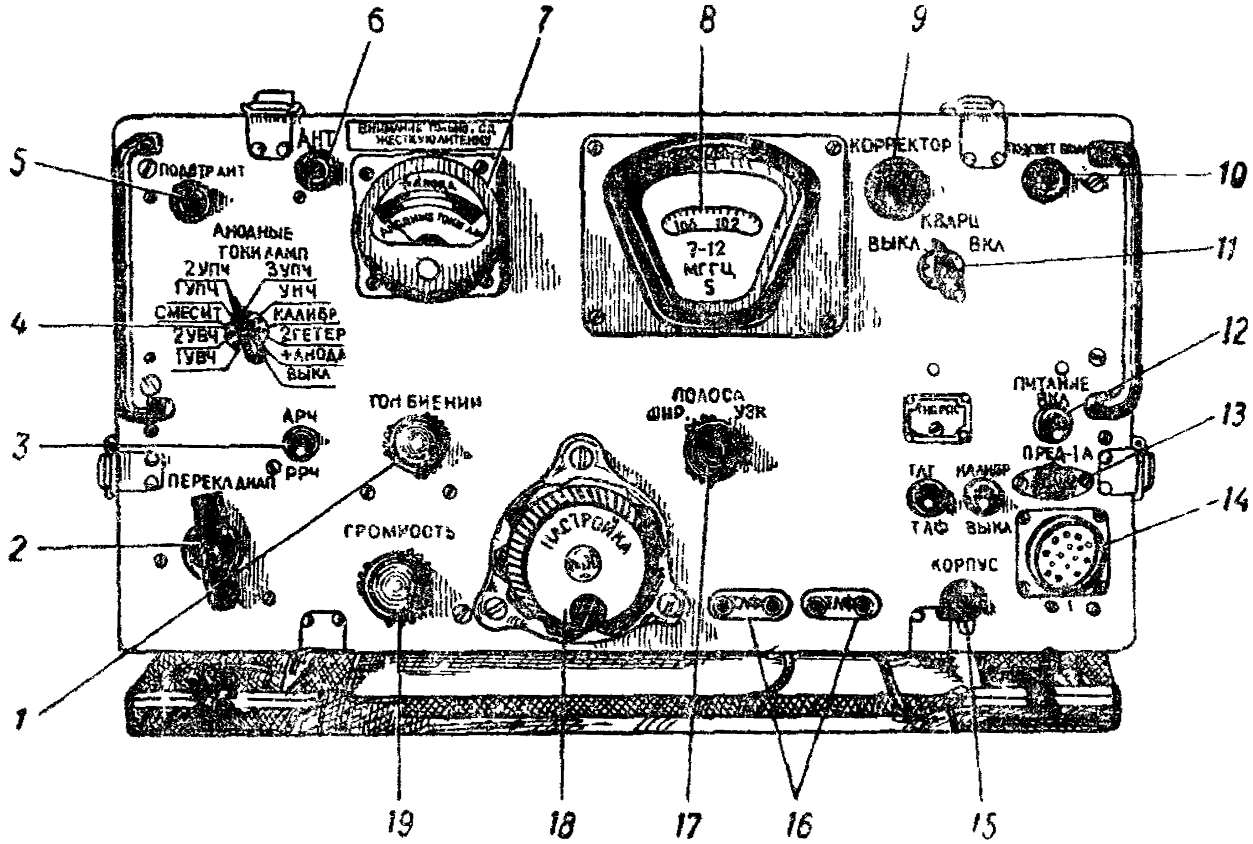


Fig. 16. Front panel

1 - BFO dial; 2 - band switch; 3 - AGC switch; 4 - meter switch: 5 - antenna tuning;
6 - socket connecting an antenna; 7 – meter; 8 - tuning scale; 9 - tuning scale adjustment knob;
10 - handle knob. 11 - crystal filter switch; 12 - volume: blur on the receiver; 13 - fuse;
14 - pin to connect power; 15 - ground connection l6 - phone jacks;
17 - adjustment of the bandwidth of the crystal filter; 18 - tuning vernier; 19 - volume control knob

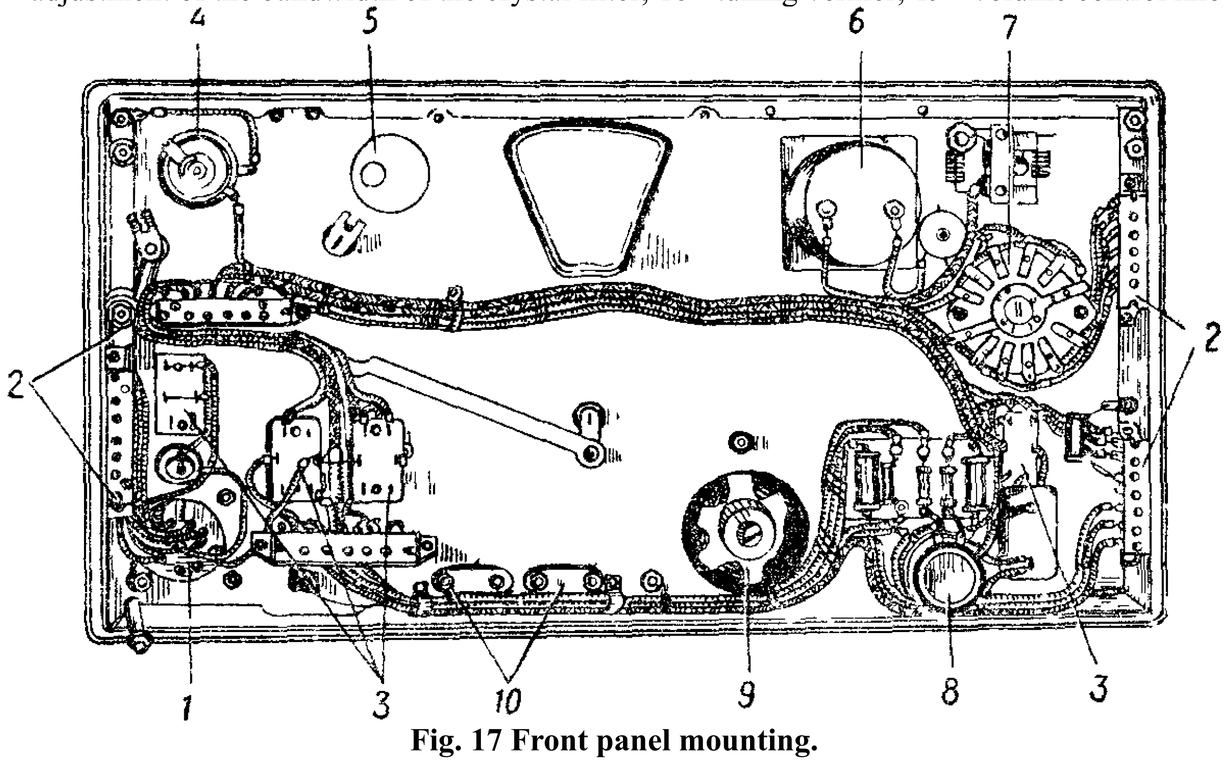


Fig. 17 Front panel mounting.

l-power supply chip; 2-pin connector; 3-tumbler, 4-rheostat lighting: 5-sight of the visor;
6-meter; 7 ~ meter switch; 8-twin potentiometer; 9-vernier; 10-jack phones.

§ 2. Construction of the vernier mechanism

To adjust the receiver, a differential vernier is used, which is attached to the front panel of the receiver. The device of the vernier is shown in Fig. 18. The vernier axis 4 and the pinion shaft axis on the "HF" block are connected by a knife coupling. The knife is forked by the screw 15 in the slot of the vernier.

The driving pinion is connected to the gear of the aggregate of variable capacitors. Therefore, when the rotors of the vernier rotate, the rotor of the aggregate of variable capacitors also rotates.

Large handle 2 and small handle 3 serve for smooth and rough tuning of the receiver.

Coarse adjustment is carried out with a large handle 2. At the same time, the axis 4 rotates simultaneously with the handle, which rotates the rotor of the aggregate of variable capacitors through a pair of gears at a considerable speed.

Smooth adjustment is carried out with a small handle 3. When the small handle is rotated, the bushings 9, the rollers 8 and the washer 6 are put into motion. The ratio of the diameters of the bushing 9, the rollers 8 and the running washer 6 provides a significant slowing of the rotation of the axis 4, and consequently the rotor of the aggregate of variable capacitors . The force of the large handle is regulated by the tension of the springs 5, which are pressed against the base / when screwing the ring 7 - this increases the friction between the plane of the handle and the base.

After installation, the ring is locked with screw 13. The force of the small handle depends on the pressure of the sleeve 9 on the rollers 8. This force is regulated by the tension of the springs 10.

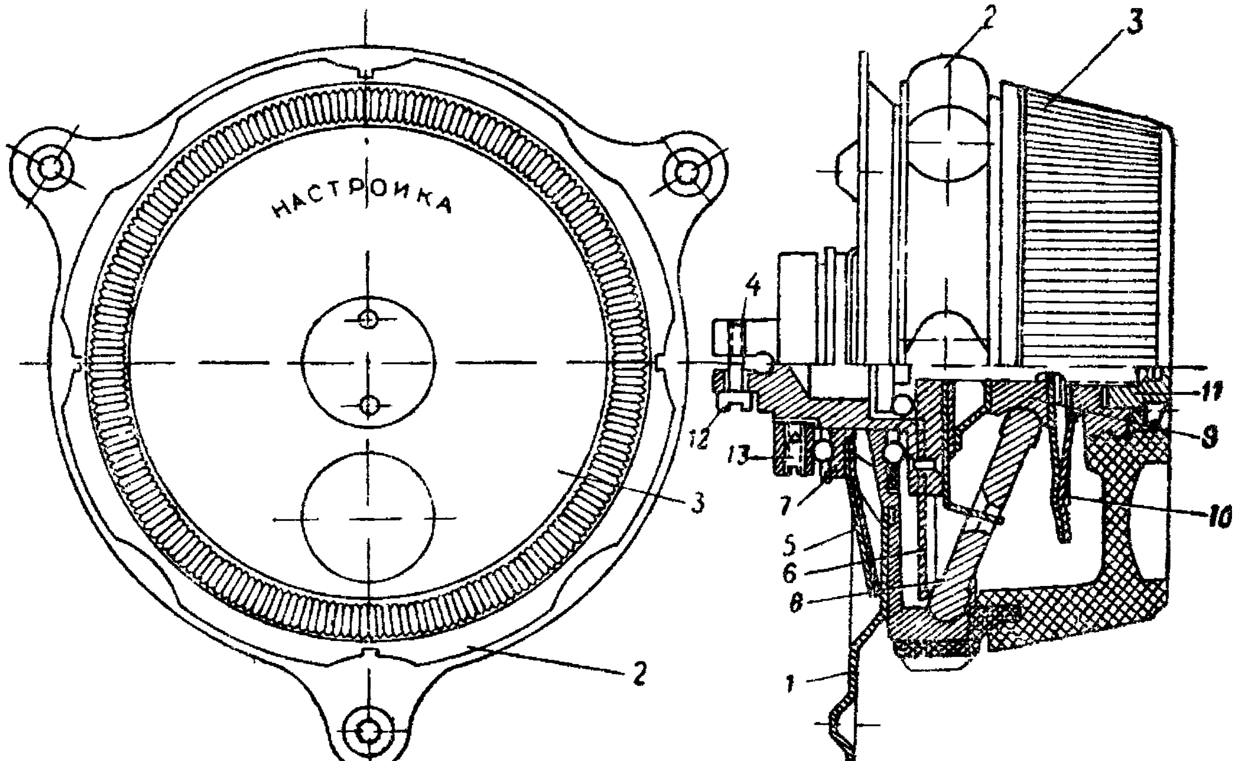


Fig. 18. Vernier mechanism
1-base; 2-large handle; 3-small handle; 4-osc vernier; 5-spring;
b-washer, 7-ring; 8-roller; 9-bushing; 10-spring;
11 - counternut; 12 - protracted screw; 13 - locking screw.

If the small handle rotates very easily, then there may be a play, ie, when the handle is rotated within a small range, the scale remains stationary. In this case, it is necessary to increase the force of the spring 10 on the roller 8. To do this, release the lock nut 11 and turn the vernier axis counterclockwise, then tighten the lock nut.

When disassembling the receiver, the vernier mechanism from the front panel is not removed.

§ 3. High-frequency block construction

The connecting element of the units of the high-frequency block (see Figure 19) is a cast frame made of an aluminum alloy.

In the upper right part of the frame (when viewed from the front panel), a molded chassis of the high-frequency unit is mounted, on which the valve panels and the main electrical installation are located.

From the bottom of the frame are attached two dual-sectional capacitor banks of variable capacity.

In the central part of the frame there is a drum consisting of 7 sections corresponding to the number of bands and contact springs mounted on ceramic pads and fixed on a special bridging frame. The lower free ends of the springs touch the contacts of the section of the operating sub-band, and the upper ones are soldered to the corresponding points of installation of the high-frequency unit.

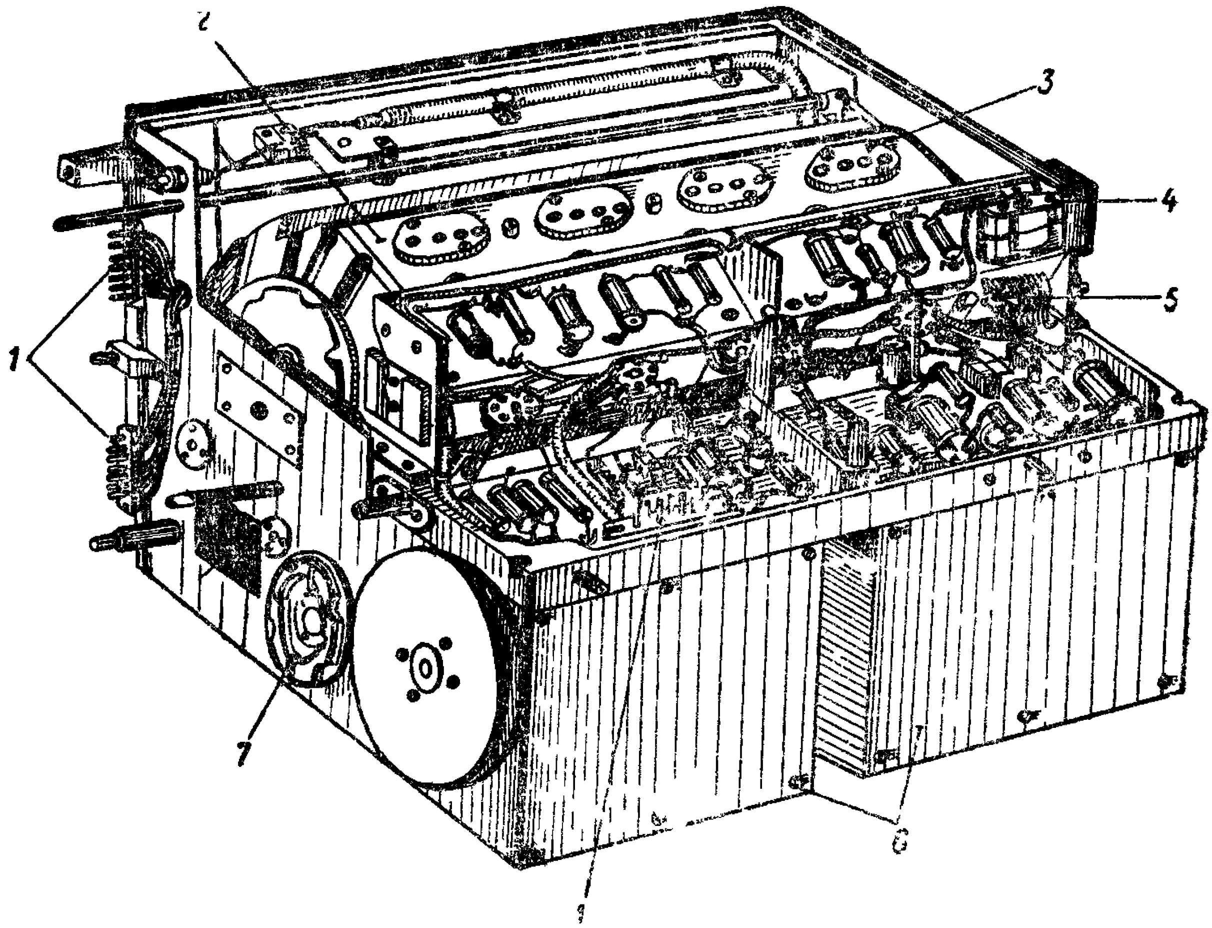


Figure 19. The HF unit
1--plug connector; 2--reel switch; 3--co-operative group; 4--notch filter
5--antenna tuning capacitor; 6--variable capacior; 7--driving gear

Elements of the switching device are located on 2 stamped aluminum cheeks attached to the cast frame. Each of the 7 sections of the drum bands is mounted on a cast aluminum base.

The winding of the inductance coils is made on ceramic frames, whereby the coils of the inductors of all the contours 5, 6 and 7 of the bands and the contour of the heterodyne of the 4th band are wound by a silver burning method followed by the application of a copper layer by galvanic means.

Such an inductor device provides high inductance stability with significant ambient temperature fluctuations. The winding of the coils of the inductance of the other circuits and coils of communication is complete with the usual enameled wire and lithcitrat. To increase moisture resistance, the winding is impregnated.

The adjustment of the inductance of all circuits of the high-frequency amplifier is carried out with the help of carbonyl cores. In all contours of the heterodyne - through brass cores.

The contour of all bands has tuning capacitors.

The sections of the sub-bands (see figure 20) are located on cast aluminum slats - bases.

Each contour of the band section has 4 loops: 1st heterodyne, 2nd UHF, 1st UHF and input circuit, counting from the front panel. The sections of the sub-bands are fixed with screws on the frame of the drum, which rotates in the bronze bearings mounted on the cast frame. Rotation of the drum is carried out through the gear of the switching device.

The fastening of the drum in the position of the corresponding sub-band is carried out using a lock consisting of a steel disc with 7 grooves and a locking lever with 2 rollers, which, alternating in one of the seven grooves of the disc, fix the drum in the desired position.

The mechanism for switching the drum allows the drum to rotate in both positions.

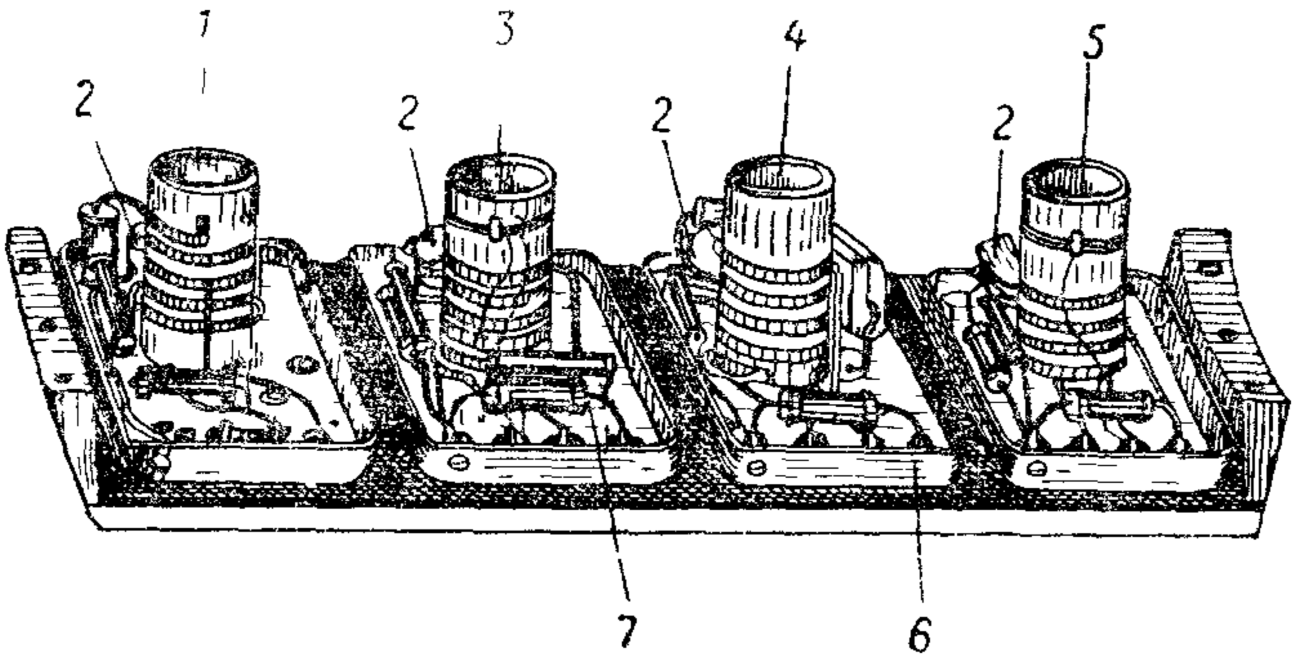


Figure 20. Drum Section.
l-coil of the circuit; 2-trimmer capacitor; 3-coil of the anode circuit of the 2nd IF;
4-coil of the anode circuit of the lst IF; 5-input coil; 6-screen base; 7-"extension" capacitor.

The capacitor bank of variable capacity is made up of two double blocks, articulated with each other by means of a knife coupling. Such a connection allows for some misalignment of the axes of the capacitor banks of variable capacity, but at the same time ensures the absence of backlashes and a dead stroke.

Each of the blocks of capacitors of variable capacity is mounted in a cast aluminum housing, which provides high mechanical strength and stability. Material for the manufacture of sections of blocks included in UHF cascades is steel. The section of the block included in the heterodyne circuit is made of Invar, which ensures high frequency stability.

The tuning of the receiver within each sub-band is performed by rotating the rotor of capacitor banks of variable capacity using a differential vernier (see Chapter III, § 2) connected to the unit via a gearless gearless type.

The scale is a disk glued from two plexiglass plates, between which is a photographic film with seven subranges on it, in the form of concentric, non-closed rings. Indication of subranges is carried out using a curtain with seven arc-shaped cutouts, placed on the axis in front of the scale. Rotation of the drum when switching bands is transmitted by gearing directly to the shade, cut-outs of which open the corresponding sub-range of the scale one by one. Frequency and numbering of bands are put on the blind. The scale is illuminated by two bulbs located behind it. Adjustment of the scale illumination is provided.

The main electrical installation of the high-frequency unit (see appendix 2) is placed on four getinaksovyh bakelyized boards.

In the lower left corner under the drum there is a voltage stabilizer on a valve type SG-4S (L5).

The capacitor of the input trim is fixed on the rear wall of the chassis of the HF unit.

Transmission of rotation to the axis of the condenser is carried out by means of a crank-and-rod system.

The mutual position of the drum, contact springs, valve panels and variable capacitor capacitor banks is selected so as to maximally match the conclusions of the valve panels, variable capacitors and contact springs for simple and rigid mounting of the main high-frequency circuits, while maintaining full accessibility to all mounting elements, is essential when repairing the receiver.

The connection of the circuit of the high-frequency unit with the general circuit of the receiver is carried out by means of three plug-in sockets:

one of them - with a block of intermediate frequency, and two others - with the front panel of the receiver.

§ 4. Construction of the intermediate frequency block

The block of intermediate frequency-the "IF" block (see Figure 21) is assembled on a cast frame of aluminium alloy.

Fastening of the "IF" block to other receiver units is carried out by means of three captive screws located in special jacks, which include columns from other units and fix the "IF" block in a certain position.

On the horizontal part (top) there are three amplifying and one detector valves and 4 filters of intermediate frequency.

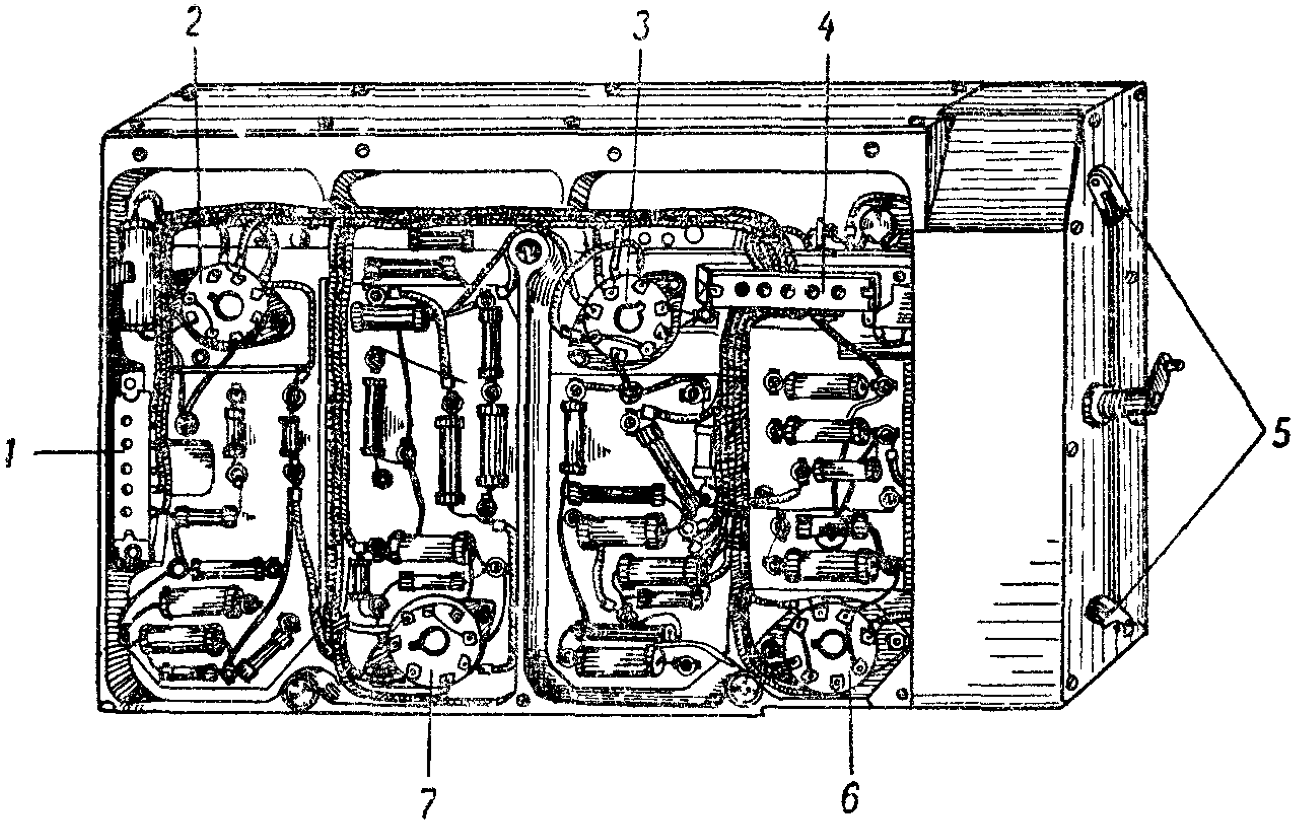


Fig. 21 Block "inverter"
l-plug connector; 2-valve L1 0; 3-L6 valve; 4-plug connector;
5-capacitors C175 and C184; 6-valve L7; 7-L6 valve

Under the horizontal part of the chassis and on one side of the vertical part, in the special compartments on the removable getinax bakelized boards the entire installation, capacitors and resistances of the intermediate frequency block are located. The walls of the compartments serve as a cascade screening and simultaneously impart sufficient rigidity to the block. On the front of the chassis is mounted a crystal filter.

The entire installation of the "IF" unit from below, from the left and front sides is covered with an aluminum screen.

The design of the intermediate frequency filter and crystal filter

Bandpass filter of intermediate frequency consists of tuned circuits.
The coil of each circuit is wound on a ceramic frame and placed in a carbonyl pot.
The pot is placed in a plastic holder with a sealing rubber gasket and tightened with screws.
On the axis of the pot there is a hole with a thread, into which a carbonyl core is screwed.

The ends of the coil are soldered to the petals of the cage. Capacitors of the circuit are soldered to the same petals. The contours are mounted on a brass base. Each intermediate frequency filter consists of two circuits shielded from each other. The leads from the petals pass through sealed glass insulators, since the filters of the intermediate frequency are hermetically sealed.

The design of the crystal filter contours is identical to the construction of the intermediate frequency filter circuits. The crystal filter is mounted on an aluminium base. Based on the two resonant

resonant circuits of the intermediate frequency, two variable capacitors, a crystal, a tuning ceramic capacitor and a switch for turning the crystal filter on and off.

The mounted base is inserted into a special compartment in the general chassis of the IF unit.

In the chassis there are openings for access to the tuned capacitor and carbonyl cores.

The axes of the variable capacitors emerge outside the crystal filter and are connected to the crank-crank mechanism, by means of which the rotors are rotated (for adjusting the strip).

§ 5. Low-frequency block construction

The low-frequency block - the "LF" block (see Figure 22) is assembled on two double frames connected by an aluminium triangle.

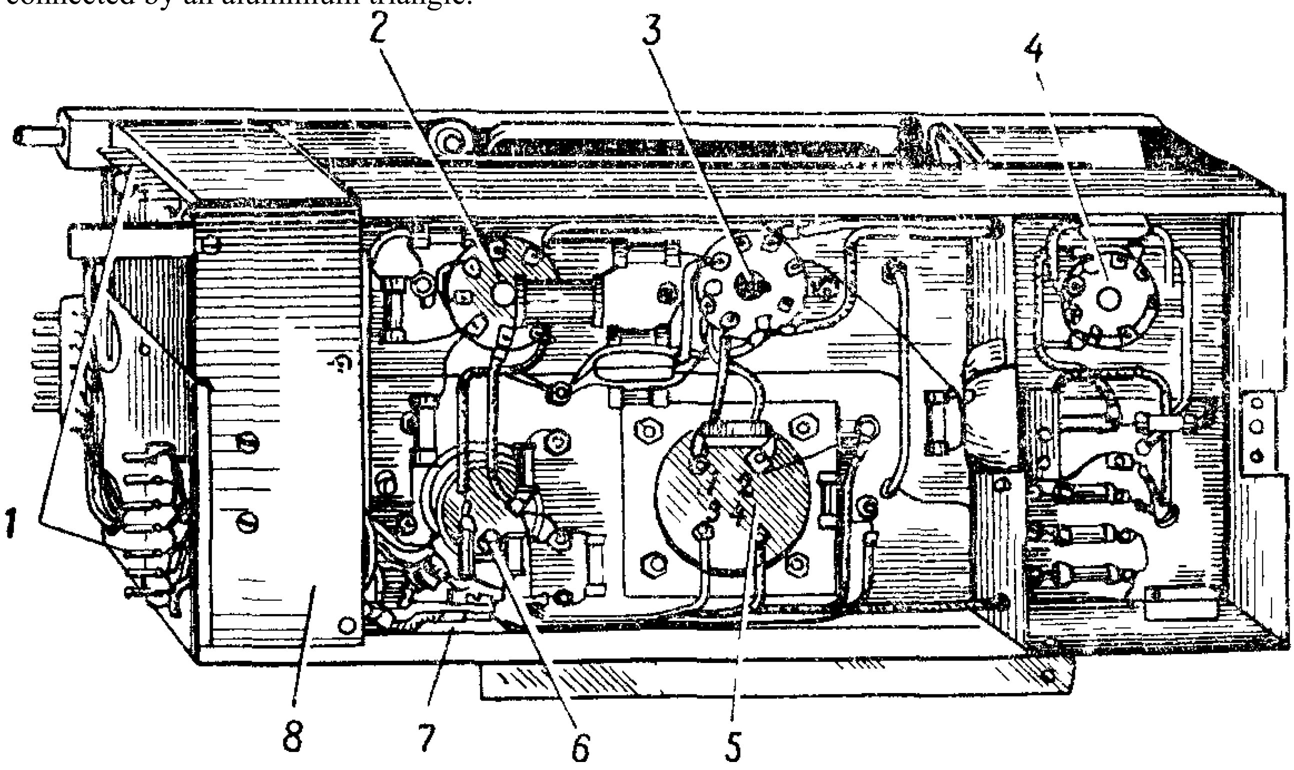


Fig. 22. Block "LF"
l-plug connector; 2-valve L12; 3-valve; 4-valve; 5-output transformer; 6-crystal; 7-trimmer of the quartz calibrator; 8-box of filters.

On the upper frame there are two sockets, which include the columns of the "HF" block and three columns, of which two serve for articulation with the intermediate frequency unit, one for articulation with the front panel.

Structurally, the "LF" block consists of two separate parts: power filter boxes (high-frequency and UHF filters in power circuits and SPM) and the low-frequency block itself, which includes the second VLF heterodyne and a crystal calibrator.

The power filter box is located closer to the front panel. The filter box has two connectors: one of them is inside the box and it is powered by a chip located on the front panel, the other is located on the cover of the filter box and through it the power to the high frequency unit is fed. The filter box itself has three compartments. In the first compartment there is the 1st high-frequency filter, in the second and third compartments there is the 2nd HF filter, which is connected in series with the first one and is designed to protect the receiver from high-frequency interference along the supply circuits.

The installation of the crystal calibrator and low-frequency amplifier is located on one chassis, on which 6H8S and 6P6S valves, crystal and a sealed output transformer are placed. All installation is located at the bottom of the chassis on two boards (see Appendix 4). The crystal calibrator is switched on and off by the switch located on the front panel of the receiver.

The second heterodyne is made on a separate chassis. The contour of the second heterodyne is structurally executed in the same way as the contours of the intermediate frequency filter.

Changing the tone of telegraph signals is made with the help of an air condenser, which is fixed above the contour. Since the "Beats Tone" knob is installed on the left side and the "LF" block is on the right side of the receiver, the connection is made using a bar and two cranks. The installation of the 2nd heterodyne is shielded. Turning on and off the 2nd heterodyne is done by the toggle switch. located on the front panel.

The electrical connection of the "LF" block with the rest of the blocks is carried out using four connectors. The entire assembly of the low-frequency block is closed from below with an aluminium screen.

§ 6. Rectifier design

Structurally, the rectifier (see Figure 23) is made as a separate unit.
On the chassis are attached all the details: power transformer, choke, capacitors and valve panel valve 5TS4S (L14).
The resistance bars R44 and R44a are mounted on the power transformer bar. The entire installation of the rectifier is closed with a cover that has an opening for the F-2 chip on the front side.
The rectifier is mounted on an amortization frame having four shock-absorbers of the "Lord" type and fixed with two latches.

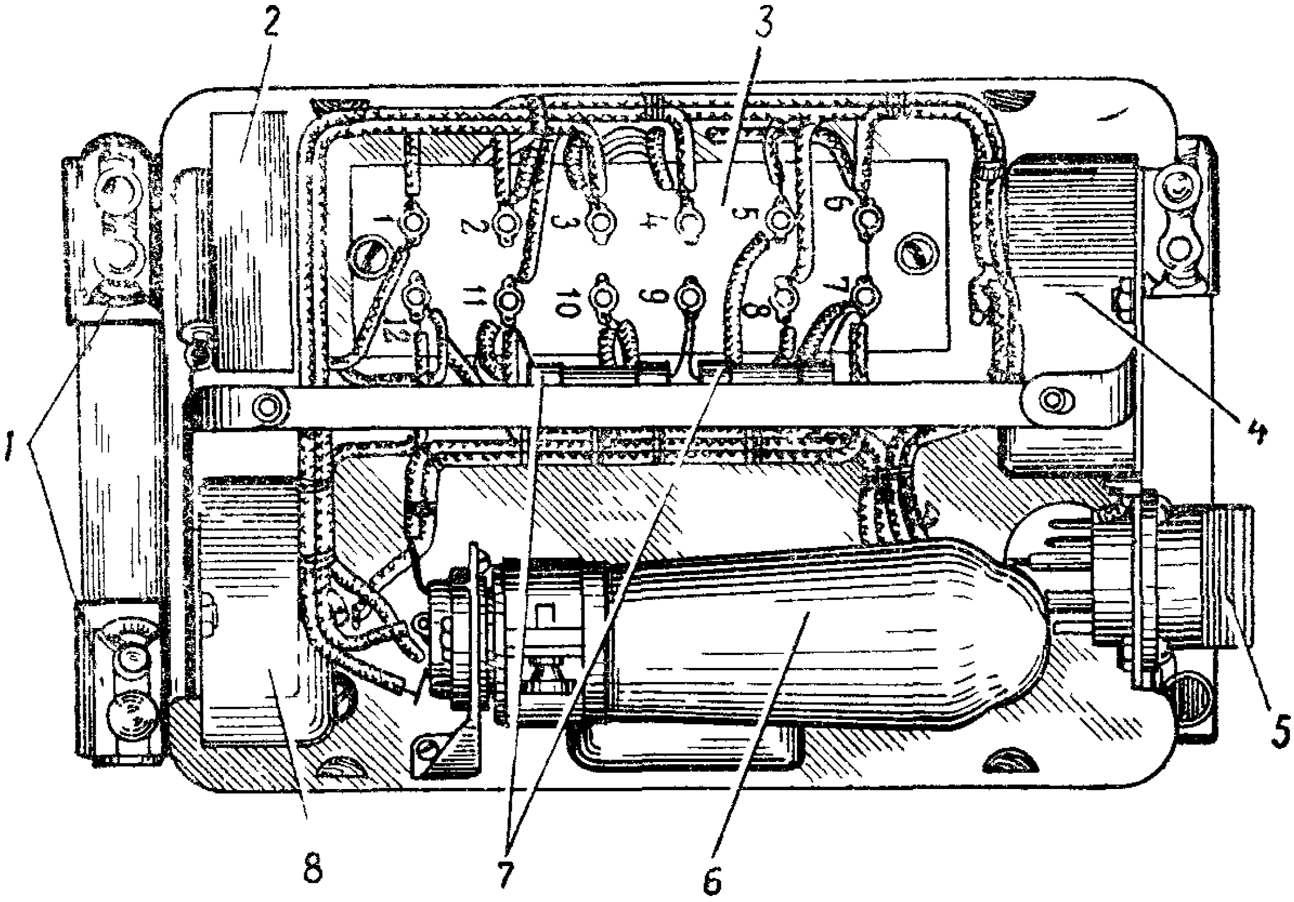


Figure 23 Block "B"

1-fixing the shock-absorber frame; 2-throttle filter; 3-power transformer; 4-capacitor C100; 5-chip power F-2; 6-valve L14; 7-resistance R44, R44a; 8-capacitor C199

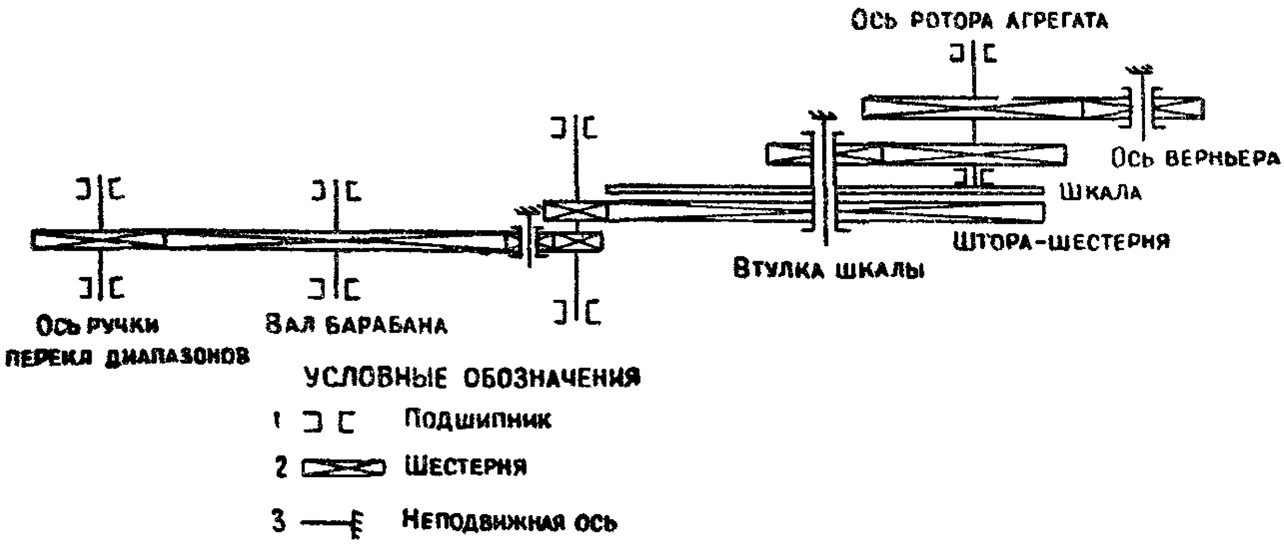


Рис. 24 Кинематическая схема элементов переключения и настройки

CHAPTER IV

DISASSEMBLY AND ASSEMBLY OF THE RADIO RECEIVER

Due to the block design and the use of plug-in connectors, the receiver can be dismantled without decoupling into separate blocks: an intermediate frequency block, a low frequency unit, a front panel and a high frequency unit.

In addition, the drum switch can be disassembled into sections - sections. Each section represents one sub-range of the receiver and contains 4 circuits placed under separate screens.

§ 1. Removing the intermediate frequency block

To remove the intermediate frequency block, it is necessary to unscrew the three screws that secure it to the HF and LF blocks and one screw that secures the unit to the front panel.

The handle labelled "Strip" should be set to a position close to "narrow." The "Crystal" switch is in the middle position. When all the preliminary operations are done, you need to raise the "IF" block upwards by approximately 20 mm, while the connectors must exit the connection, and the guide columns-out of their sockets. The removed "IF" block opens access to the "HF" block assembly.

§ 2. Removing the front panel

In order to remove the front panel, it is necessary to remove the " Ant. "," Tone of beats "and" Switching. then turn the 6 screws off. Unscrew the nut under the handle "Switch." and a screw that presses the coaxial cable that connects the "Ant." terminal to the input circuit, and detaches the spring that connects the front panel to the viewer on the "HF" block. Care should be taken when removing the front panel so as not to damage the scale.

In addition, do not touch the protruding gears-this will lead to the ceramic-axis trimming of the capacitor bank of variable capacity and the detuning of the receiver. The receiver is recommended to put the front panel up and lift it. After the pins of the connectors come out of the connection, and the guide columns come out of their sockets - the panel will be separated from the blocks.

§ 3. Removing the low-frequency block

It is necessary to dismember the "LF" block and the "HF" block. To do this, remove the screw connecting the connecting rod with the crank located on the "LF" block, unscrew the 2 screws securing the "LF" block to the "HF" block, and then take the "LF" block from the "HF" block.

The "LF" block is removed only when it is necessary to have access to a block of variable capacitors or when it is required to replace the "LF" block itself.

4. Dismantling of the high-frequency block

In order to have access to the "HF" loops located in the drum sections, it is necessary to remove the bottom screen (bottom) and the upper screen (cover). Then only it will be seen that each section is fastened with four screws to the cheeks of the drum, turning them off you can take out the desired section.

The contour screens are fixed with two screws to the base. Taking them off. you can view the installation of any drum circuit.

§ 5. Assembling the Receiver

The receiver is assembled in the reverse order of disassembly.

First, the blocks "HF" and "LF" are jumpered. In the frame of the "HF" block there are two directional columns, and in the frame of the "LF" block they correspond to the nests.

The "LF" block is put on these guide columns. Inside the columns there is a thread, and in the nest are inserted captive screws, with which both blocks are attracted to each other. Then the connecting rod is turned to the crank. Further assembly can go differently: you can first attach the "IF" block, and then - the front panel and vice versa.

It is more convenient to first connect the front panel with the "HF" and "LF" blocks, and then install the "IF" block. On the "HF" block - on the left on the "LF" block - on the right at the same height there are two guide columns on which the front panel is worn.

At the same time, it is necessary to ensure that the axes from the knobs "Tone of beats", " ant. "and" Switching. diapes "entered their holes, and the vernier axis was articulated with the axis of the leading bushing located on the" HF "block.

WHEN FRONT PANEL IS INSTALLED, YOU NEED A FORGER ON THE AREA OF VERNIER, LEFT INTO THE ROUGH COUPLINGS AND WHEN RUNNING THE VERNIER, DOES NOT REPLACE THE SCALE.

After this, the front panel should be pressed lightly against the blocks and tightened with 6 screws.

Secure the screw in the coaxial cable connection to the "Ant." Terminal, tighten the nut on the range switch axis and put on the handles.

After installing and securing the front panel, the "IF" block is installed. The guides when installing the "IF" block are three columns pressed in the frame. Block "inverter"
puts on these columns and presses screws. In this case, you need to make sure that the "Stripe" knob is in a position close to "narrow." And the "Crytsal" switch is in the middle position. Only then the leashes installed on the unit will enter the forks located on the front panel.

To the front panel, the "IF" block is attached with a screw passing through the guide socket.

Before closing the drum switch with screens, it is necessary to check whether the drum switch sections are fully attached.

When the blocks and the front panel are articulated, and the drum switch is assembled, the receiver can be put into the case and the locks closed.

CHAPTER V

OPERATING INSTRUCTIONS FOR THE RADIO RECEIVER

§ 1. Installing the receiver in an aircraft

When installing the receiver on an airplane it is necessary: in order to avoid noises and cracks, the cables in the fastening points should be securely fastened to the airplane body, avoiding various kinds of adapter connectors, especially high-frequency ones. Long cables and the presence of additional connectors lead to excessive electrical losses and deterioration of operational qualities and reliability of the receiver.

When installing the receiver, it is necessary to ensure a distance of at least 15 mm between the receiver and surrounding objects, which will eliminate the possibility of its impacts when vibrating on the shock-absorber frame.
The above applies to the fastening of the rectifier.

The marking of the holes for fastening the shock-absorber frame is given on the dimensional-installation drawing (see Appendix 6).

After installing the receiver on the shock-absorber frame, it is necessary to connect the terminal "housing" of the receiver to the metallization tires with an amortization frame. The wire from the antenna is connected to the terminal "Ant.", Located on the front panel of the receiver. The power cable, antenna wires and metallization must have a slack, which ensures the normal operation of the shock absorbers.

1) Turning the receiver on

Check the correct connection of the power cable, antenna wires, metallization, insert the phone plug into the corresponding slots on the front panel or the SDH board, turn on the power switch, rotate the knob "Illumination scale", set the desired illumination, set the toggle switch "АРЧ-РРЧ" HRB ", the knob" Tone of beats "- against the point, the knob "Crystal "- to "Off" If, after the receiver was turned on, about a minute has passed, when the "Volume" knob is rotated, the phones will hear a noise that changes as the pen rotates. Calibrate the receiver frequency. Calibration is performed only on short-wave bands; the frequency of the crystal calibrator has a frequency equal to an integer number of megahertz. For calibration, you must turn on the 2nd heterodyne and the crystal calibrator, tune to zero beats with the "Settings" knob, turn off the lock nut on the "Corrector" knob and set the sight precisely against the calibrated point. In this case, the knob "Beat tone" must be set "against the point on the front panel." After calibration, the sight is countered with the nut located on the "Corrector" handle.

During calibration, it is necessary to turn the "Calibration-Off" toggle switch on and off, and if the signal disappears when this toggle switch is turned off, then this is the calibration signal, and not a hindrance. In case of high noise, it is advisable to disconnect the antenna.

2) Reception of telephone transfer

Set the toggle switch "ТЛФ-ТЛГ" to the "ТЛФ" position and use the band switch to set the desired frequency sub-band.

The crystal calibrator must be switched off. Rotating the coarse tuning knob, set the required frequency on the receiver scale, and then, slowly rotating the smooth tuning knob, to fine tune the receiver to the correspondent.

Rotate the "Adjust. Ant. "to achieve the highest volume of the received signal. If the sound strength is high, - change it to the desired value by adjusting the "Volume" knob. If the signal strength changes dramatically, switch to automatic sensitivity adjustment by turning the АРЧ-РРЧ switch to the АРЧ position and using the Volume knob again to set the desired sound strength in the phones. It is recommended to search for a correspondent only with manual adjustment of sensitivity (РРЧ).

Reception in the conditions of interference is recommended to be conducted with the crystal filter on (switch "Crystal" in the "Off" position), the "Band" knob-in the "Wide" position.

3) Reception of telegraph transmission by undamped oscillations

When receiving telegraphic transmission by undamped oscillations, the operating procedure remains the same as when receiving a telephone transmission, except that the toggle switch "TLF-TLG" should be set to the "TLG" position, the crystal filter "On", the handle "Stripe" - in the position "Wide."

The tuning to the correspondent frequency is made and the "Beat tone" knob sets the desired tone of the signals. If you need to change the tone heard in the phone during the operation, turn the "Beats Tone" knob in one direction or another until you get the desired tone. Detuning from signals interfering with radio stations during radio telegraph reception, you should sometimes make a handle "Beat Tone" and simultaneously with the "Settings" knob. If there is strong electrical interference or interference from neighboring stations, to maximize the selectivity of the receiver, you should narrow the bandwidth as much as possible by turning the "Band" knob clockwise. At the same time, it should be borne in mind that due to the narrowing of the bandwidth, a more accurate tuning of the receiver to the correspondent will be required, a more careful adjustment of the volume and tone of the beats. To avoid loss of tuning, adjust the beat tone when working with a narrow bandwidth should only be performed with the "Beat Tone" knob.

The transition to automatic sensitivity adjustment is done by setting the "АРЧ-РРЧ" toggle switch to the "АРЧ" position, the volume level is regulated by the "Volume" knob.

At the end of work turn off the receiver, for which the toggle switch "Power" put in the "Off" position.

§ 2. Radio operation regulations

a) Care of the receiver

To ensure the normal operation of the receiver, systematic care and monitoring of its condition is required.

When using the receiver, the following basic requirements must be met:
1) Protect the receiver from impact, shock and fall.
2) Switch on the receiver to the board with a voltage not lower than 24.3 and not higher than 29.7 V. If this rule is not observed, the MA-100M transducer and the radio tubes may be damaged. It should be remembered that undervoltage is as dangerous as increased.
3) Keep the receiver clean.

4) Do not expose the receiver to water.
5) Do not twist or bend the connecting wires of the headphones at an acute angle.
b) care of the MA-100M transducer

In the process of MA-100M operation it is necessary to be guided by the requirements stated in the special description "Upgraded converters MA-100M, MA-250M, MA-500M and MA-1500M".

§ 3. Routine work

Scheduled works are works performed at certain intervals to check the status of the receiver, determine its suitability for further operation and bring the receiver's state in line with technical requirements.

The procedure and terms of maintenance of the receiver are established by the maintenance procedures developed for each type of aircraft, taking into account the features of its operation.

As a rule, the regulation consists of the following types of maintenance:
a) preflight maintenance;
b) post-flight maintenance;
c) periodic maintenance.

a) Preflight maintenance of the receiver

Pre-flight maintenance is performed before the aircraft is released into flight, regardless of pre-flight or periodic scheduled maintenance. as well as when the aircraft is delayed at the airport in the event of flight cancellation after a short-term parking service and is intended to check the status of the receiver and the actual readiness of the aircraft to take off.

b) Post-flight maintenance of the receiver

Post-flight technical maintenance of the receiver is carried out mainly at the base and final airports after a flight of 20 ±5 hours from the time of useful post-flight or periodic routine maintenance.

The purpose of this check is to check the state of the receiver after flights, to identify faults, to establish the causes of their occurrence and to eliminate these malfunctions.

When proceeding to a post-flight inspection, it is necessary first of all to get acquainted with all the remarks of the flight crew on the work of the radio receiver in flight. After this, we must begin the examination. Inspection should be carried out in the following order:

1) Check the fastening of the blocks, paying attention to:
a) quality of instrumentation of cables,
b) the quality of the connection of the cable connectors,
c) quality of metallization of blocks and cables,
d) serviceability of depreciation,
e) absence of external mechanical damages, durability of locks on casings and latches on amortization frames.
2) Check the operation of the receiver under voltage:
a) the correctness of the position of the volume control, the reliability and smoothness of the operation of the AGC and the RF Gain,
b) the presence of noise in the phones,
c) check the operation of the crystal filter to reduce noise or noise when narrowing the band,

d) clarity and legibility of reception of any station,
e) the clarity of the band switch operation and the smoothness of the receiver tuning knob's rotation.
Eliminate all noticed external faults and defects and, if the receiver is working properly, limit it.

c) Periodic maintenance

Periodic maintenance of the receiver is performed at the base airports every 500 ± 50 and 1000 ± 100 hours of flying time.

With periodic maintenance of the receiver, the list of mandatory post-flight maintenance operations is taken as a basis.

Additionally, work may be carried out, the need to perform which is detected during the operation of the receiver.

In addition, every 1000 hours of flight, in addition to the next service, the receiver is subject to verification for compliance with the technical parameter norms approved by the chief engineer of the GUHEP, and in the absence of the latter, according to the characteristics listed in Chapter VII of this manual.

CHAPTER VI

RADIO RECEIVER REPAIR

§ 1. General instructions for finding the damage to the radio receiver

Abnormal operation of the receiver or a complete failure in operation can occur in most cases for the following reasons:
1. Change of supply voltages in excess of permissible values.
2. Valve failure.
3. Malfunction in the antenna circuit.
4. Malfunction of the phone circuit.
5. The power cord is damaged.

Therefore, when trying to restore the receiver, first of all it is necessary to make sure that all the conditions for the correct inclusion of the receiver are met, that the supply voltages are supplied and differ from the nominal value by no more than ± 10%, that there is no break or short circuit in the antenna circuit, completely serviceable.

In order to quickly find out exactly where in which cascade the damage occurred, it is necessary to adhere to a certain sequence when finding the damage.

Using the device located on the front panel of the receiver, it is determined which of the receiver cascades has failed to operate or is operating in a changed mode. The normal operation of the cascade is characterized by the location of the instrument needle in the green sector of the scale.

If the external causes of the fault are not detected, then it is necessary to open the receiver and rectifier and check the quality of the valves, changing them alternately to known ones, starting with the 16P6S valve.

If the valve change does not work, then it is necessary to check if the low-frequency amplifier works by touching the end of the screwdriver of the 4th leg of the 6H8S valve. The presence of a whistle in the phone indicates the serviceability of the low-frequency path. Then you need to check the reception from the antenna. If there is no reception when a signal is input to the receiver's input (the "Ant." Terminal), then you need to connect the antenna alternately to the grid of the 1st and then 2nd high-frequency amplifier, and then to the transducer grid.

If the receiver does not work when a signal is applied to the transducer grid, and the low-frequency amplifier is good, you need to know whether the 1st local oscillator generates. It is possible to verify the presence of oscillations of the first heterodyne by changing the current flowing through the valve L5 of the voltage regulator.

If the luminescence of the voltage regulator valve changes when the capacitor (1000-5000 μmf) closes to the ground of the contacts of the drum switch (the switched on band) of the LO contour, then the first LO generates.

Having discovered the area of damage, it is necessary to do a more detailed examination of the elements of the circuit for an accurate explanation of the defect.

In this case, it is necessary to resort to measuring the mode of valves (see Table 1) in the area of damage, and if it is normal, then using a probe or an ohmmeter to establish whether the connections in the circuit are not broken.

Measuring the valve mode and checking the connections usually make it possible to determine the cause of the fault.

In the presence of strong cracks and noises, it is necessary to disconnect the antenna and listen to the receiver noise when powered by the on-board battery when the aircraft's engines are not working. If this interferes with the disappearance of the cod, the source of interference is the elements of the electrical equipment of the aircraft.

If the cod does not disappear, it is necessary to check the converter MA-100M. The minimum of devices necessary for repairing the receiver in the workshop is indicated in Ch. VII of this Instruction.

The spread of voltages on the valve electrodes specified in Table 1 is determined by the spread of the tolerances of the circuit elements and the tolerances for the valves. The voltages are measured directly on the valve pins, the second terminal of the high-resistance tube volt meter being connected to the receiver housing.

When measuring the filament voltage, both outputs of a high-resistance tube voltmeter are connected to the corresponding pins of the valve panels.

The measurements are made in the RR mode, the knob "The volume should be at the maximum volume position. Checking the mode of valves is carried out at a supply voltage of 115 V ± 10% / o.

If the measured voltages are different from the values given in the table, a thorough check of the circuits and resistance values of the circuit is made in accordance with the specification data.

After checking the circuits with an ohmmeter, it is necessary to check the sensitivity of the receiver on the blocks by feeding the corresponding signal from the standard signal generator to the control grid of the mixer, as well as the 1st and 2nd UHF cascades. The sensitivity of the low-frequency path of the receiver is preliminarily checked by means of an audio generator by feeding an audio frequency to the 6H8S valve grid. This will help find the faulty node.

The results of the check are compared with Table 2 below.

If the measurement data does not correspond to Table No. 2, then it is necessary to detect and correct the defect.
When adjusting contours, if necessary, it is necessary to keep in mind the following:
In connection with the fact that the scales for the data of radio transmitters are manufactured PHOTO ON EACH RADIO RECEIVER IS INDIVIDUALLY AND DO NOT BE INTERCHANGEABLE, FLEXIBLE ELEMENTS SETTING CIRCUITS: INPUT CIRCUITS, 1 UHF 2nd UHF, 1st and 2nd HETERODINES-CATEGORALLY PROHIBITED.

Failure to do this will lead to a breach of the receiver's GRADUATION.

If it is necessary to adjust the contours of the intermediate frequency path, the latter follows produce only in that cascade, where necessary.

It should be noted that the adjustment of the intermediate frequency filters requires great accuracy and accuracy. The accuracy of tuning the filters of the intermediate frequency amplifier greatly affects the gain in the intermediate frequency and the passband at the intermediate frequency.

Таблица 1

а) Примерный режим работы отдельных каскадов

№ ламп по схеме	Функция лампы	Тип лампы	Анод (в)	Экран. сетка (в)	Управ. сетка (в)	Катод (в)	Накал (в)
$Л_2$	1-й усилитель высокой частоты.	6К4	От 75 до 110	От 80 до 105	—	От 1,0 до 1,7	От 5,7 до 6,9
$Л_3$	2-й усилитель высокой частоты	6К4	От 75 до 105	От 80 до 105	—	От 1,0 до 1,7	От 5,7 до 6,9
$Л_4$	Смеситель.	6А7	От 150 до 200	От 28 до 47	От 0 до −6,8	От 0,7 до 1,0	От 5,7 до 6,9
$Л_6$	1-й гетеродин.	6Ж1П	От 120 до 160	От 20 до 50	От 0 до −2,5	—	От 5,7 до 6,9
$Л_7$	1-й усилитель промежуточной частоты	6К4	От 70 до 130	От 80 до 100	—	От 1,0 до 3,0	От 5,7 до 6,9
$Л_8$	2-й усилитель промежуточной частоты	6К4	От 70 до 130	От 80 до 100	—	От 1,0 до 3,0	От 5,7 до 6,9
$Л_9$	3-й усилитель промежуточной частоты.	6К4	От 100 до 165	От 80 до 110	—	От 1,4 до 2,1	От 5,7 до 6,9
$Л_{10}$	Детектор сигнала	1/2 6Х6С	—	—	—	От 0 до 1,0	От 5,7 до 6,9
	Детектор АРЧ.	1/2 6Х6С	—	—	—	От 10 до 16	—
$Л_{11}$	Выходной каскад	6П6С	От 175 до 220	От 175 до 220	—	От 12 до 18	От 5,7 до 6,9
$Л_{12}$	Предварительный каскад усилителя низкой частоты.	1/2 6Н8С	От 35 до 45	—	—	От 1,2 до 1,6	От 5,7 до 6,9
	Кварцевый калибратор.	1/2 6Н8С	От 65 до 80	—	От 6,0 до −30	—	—
$Л_{13}$	2-й гетеродин.	6А7	От 13 до 19	От 13 до 19	От 0 до −6,8	—	От 5,7 до 6,9

№ п/п.	Обнаруженный дефект	Возможная причина	Способ устранения дефекта
9	То же при подаче сигнала на сетку 6К4 ($Л_7$) 2-го УПЧ.	Изменилась настройка ФПЧ-2.	Подстроить в резонанс ФПЧ-2.
10	То же при подаче сигнала на сетку лампы 6А7 ($Л_4$).	Изменилась настройка ФПЧ-1.	Подстроить в резонанс ФПЧ-1.
11	При включении кварцевого фильтра полоса не изменяется.	Отказал переключатель включения кварца или кварц.	Сменить переключатель или сменить кварц.
12	Отсутствуют нормальные биения частот при приеме незатухающих сигналов.	Не работает 2-й гетеродин: а) Отказал тумблер «ТЛГ—ТЛФ». б) Замыкание подстроечного конденсатора C_{124}.	а) Сменить тумблер. б) Заменить подстроечный конденсатор или устранить замыкание.
13	При вращении ручки «Громкость» в режиме АРЧ трески в телефонах.	Неисправный потенциометр R_1.	Сменить потенциометр
14	Трески в телефонах при вращении ручки «Громкость» в режиме РРЧ.	Неисправный потенциометр R_3.	Сменить потенциометр
15	При вращении ручки «Настройка» шкала не вращается.	Люфт в верньере.	Отвернуть контргайку и подтянуть ось верньера, затем закрепить контргайку.

§ 3. Карта прозвонки монтажа радиоприемника

При прозвонке монтажа радиоприемника необходимо учитывать:'

а) прозвонка монтажа производится с вынутыми лампами;

б) от радиоприемника должны быть отключены все кабели;

в) все тумблеры и переключатели на передней панели радиоприемника должны стоять в положении «Выкл.»;

г) потенциометры для АРЧ и РРЧ должны находиться в максимальном положении;

д) при измерениях рекомендуется пользоваться прибором АВО-5;

е) «О» соответствует короткому замыканию;

ж) « » соответствует обрыву цепи;

з) величины сопротивлений даны с возможными разбросами из-за допусков, без учета погрешности измерительного прибора;

и) прозвонка производится по отдельным блокам.

б) Ориентировочная таблица чувствительности по каскадам при выходном напряжении 15 *в* и одной паре телефонов

№ п/п.	Частота и характер модуляции	Куда подается сигнал	Напряжение сигнала, необходимое для получения номинального выходного напряжения	Примечание
1	$F = 1000$ *гц*	На 4-ю ножку лампы 6Н8С через емкость 0,5 ÷ 2 *мкф*	0,3 *в*	При всех измерениях: 1. Тумблер — в положении «ТЛФ».
2	$f = 730$ *кгц* $M = 30\%$	На 4-ю ножку лампы 6К4 ($Л_9$) через емкость 3 тыс. ÷ 5 тыс. *мкмкф.*	0,1 ÷ 0,2 *в*	2. Ручка «Громкость» в крайнем правом положении.
3	То же	На 4-ю ножку лампы 6К4 ($Л_8$) через емкость 3 тыс. ÷ 5 тыс. *мкмкф.*	5 ÷ 8 *мв*	3. Измерения производить в режиме РРЧ.
4	То же	На 4-ю ножку лампы 6К4 ($Л_7$) через емкость 3 тыс. ÷ 5 тыс. *мкмкф.*	200 ÷ 300 *мкв*	4. Купроксный вольтметр для измерения выходного напряжения включается параллельно телефонам.
5	$f = 730$ *кгц* $M = 30\%$ $F = 1000$ *гц*	На контактную пружину, соединенную с сеткой смесителя, предварительно изолированную от контакта.	50 ÷ 100 *мкв*	
6	$f = 0{,}143 \div 24$ *мггц* $M = 30\%$ $F = 1000$ *гц*	На контактную пружину, соединенную с сеткой смесителя (предварительно изолированную от контакта барабана) через емкость 80 *мкмкф.*	100 ÷ 190 *мкв*	
7	То же	На контактную пружину, соединенную с сеткой лампы 2-го УВЧ (предварительно изолированную от контакта) через емкость 80 *мкмкф.*	10 ÷ 20 *мкв*	
8	То же	На контактную пружину, соединенную с сеткой лампы 1-го УВЧ (предварительно изолированную от контакта) через емкость 80 *мкмкф.*	2 ÷ 10 *мкв*	

рительно изолированную от контакта) через емкость 80 *мкмкф.* 10 ÷ 20 *мкв*
8 То же На контактную пружину, соединенную с сеткой лампы 1-го УВЧ (предварительно изолированную от контакта) через емкость 80 *мкмкф.* 2 ÷ 10 *мкв*

§ 2. Список возможных неисправностей и способы их устранения

№ п/п.	Обнаруженный дефект	Возможная причина	Способ устранения дефекта
1	При включении приемника и регулировке освещения ручкой «Подсвет шкалы» лампочки не зажигаются.	Сгорел предохранитель цепи питания в приемнике.	Сменить предохранитель на исправный.
2	Дефект повторяется после смены предохранителя.	Короткое замыкание в цепи анодного напряжения — пробой одного из конденсаторов в анодной цепи.	Проверить конденсаторы.
3	Приемник не работает. Прибор показывает отсутствие высокого напряжения.	а) Обрыв в цепи высокого напряжения.	Прозвонить цепи высокого напряжения и, обнаружив дефект, устранить его.
		б) Обрыв нити накала лампы выпрямителя.	Сменить лампу.
		в) Пробит конденсатор фильтра выпрямителя.	Заменить конденсатор.
4	Нет высокого напряжения на экранных сетках приемника.	При работе на прием разомкнуты 6-й и 3-й контакты фишки питания.	Проверить омметром и обеспечить надежное замыкание контактов.
5	Напряжения питания в норме, но в телефоне не слышно шума приемника.	Обрыв нити накала одной из ламп приемника, неисправны телефоны.	а) Проверить по прибору режим ламп. Годность лампы 1-го гетеродина проверяется заменой на заведомо годную. Неисправную лампу заменить. б) Проверить исправность телефонов.
6	Характерный шум в телефонах, но ни на одном из диапазонов нет приема.	Нарушена цепь антенны.	Устранить обрыв.
7	При подаче на сетку лампы 6К4 (*Л*₉) сигнала по таблице № 2, на выходе не имеем нормального напряжения 15 *в*	Изменилась настройка ФПЧ-4.	Подстроить в резонанс ФПЧ-4.
8	То же при подаче сигнала на сетку 6К4 (*Л*₈) 3-го УПЧ.	Изменилась настройка ФПЧ-3.	Подстроить в резонанс ФПЧ-3.

№ п/п.	Обнаруженный дефект	Возможная причина	Способ устранения дефекта
9	То же при подаче сигнала на сетку 6К4 ($Л_7$) 2-го УПЧ.	Изменилась настройка ФПЧ-2.	Подстроить в резонанс ФПЧ-2.
10	То же при подаче сигнала на сетку лампы 6А7 ($Л_4$).	Изменилась настройка ФПЧ-1.	Подстроить в резонанс ФПЧ-1.
11	При включении кварцевого фильтра полоса не изменяется.	Отказал переключатель включения кварца или кварц.	Сменить переключатель или сменить кварц.
12	Отсутствуют нормальные биения частот при приеме незатухающих сигналов.	Не работает 2-й гетеродин: а) Отказал тумблер «ТЛГ—ТЛФ». б) Замыкание подстроечного конденсатора C_{124}.	а) Сменить тумблер. б) Заменить подстроечный конденсатор или устранить замыкание.
13	При вращении ручки «Громкость» в режиме АРЧ трески в телефонах.	Неисправный потенциометр R_1.	Сменить потенциометр
14	Трески в телефонах при вращении ручки «Громкость» в режиме РРЧ.	Неисправный потенциометр R_3.	Сменить потенциометр
15	При вращении ручки «Настройка» шкала не вращается.	Люфт в верньере.	Отвернуть контргайку и подтянуть ось верньера, затем закрепить контргайку.

§ 3. Карта прозвонки монтажа радиоприемника

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а) прозвонка монтажа производится с вынутыми лампами;

б) от радиоприемника должны быть отключены все кабели;

в) все тумблеры и переключатели на передней панели радиоприемника должны стоять в положении «Выкл.»;

г) потенциометры для АРЧ и РРЧ должны находиться в максимальном положении;

д) при измерениях рекомендуется пользоваться прибором АВО-5;

е) «О» соответствует короткому замыканию;

ж) « » соответствует обрыву цепи;

з) величины сопротивлений даны с возможными разбросами из-за допусков, без учета погрешности измерительного прибора;

и) прозвонка производится по отдельным блокам. 46

а) Карта прозвонки блока «ВЧ»

Точки, между которыми измеряется сопротивление	Величина сопротивления	Цепи, охватываемые измерением
Ш-1, контакт № 1—Ш-2, контакт № 7.	0	Проводник между указанными точками
Ш-1, контакт № 2—шасси.	∞	Цепи управляющих сеток ламп $Л_2$ и $Л_3$.
Ш-1, контакт № 3—шасси.	19,8 ÷24,2 *ком*	$\frac{(R_{14}+R_{14а})\ (R_{24}+R_{24а})}{R_{14}+R_{14а}+R_{24}+R_{24а}}$
Ш-1, контакт № 5—шасси.	46,7 ÷ 57,7 *ком*	Сопротивления R_{34}, R_{35}, R_{38}.
Ш-1, контакт № 6—шасси.	∞	Контакт № 6—шасси.
Ш-1, контакт № 7—шасси.	∞	Цепь стабиловольта $Л_5$
Ш-2, контакт № 1—шасси.	∞	Анодная цепь лампы $Л_4$.
Ш-2, контакт № 3—шасси.	∞	Контакт № 3—шасси.
Ш-2, контакт № 3—Ш-3, контакт № 1.	0	Проводник между указанными контактами.
Ш-2, контакт № 4—шасси.	∞	Контакт № 4—шасси.
Ш-2, контакт № 4—Ш-3, контакт № 2.	0	Проводник между указанными контактами.
Ш-2, контакт № 5—шасси.	∞	Контакт № 5—шасси.
Ш-2, контакт № 5—Ш-3, контакт № 3.	0	Проводник между указанными контактами.
Ш-2, контакт № 6—шасси.	∞	Контакт № 6—шасси.
Ш-2, контакт № 6—Ш-3, контакт № 4	0	Проводник между указанными контактами.
Ш-3, контакт № 7—шасси.	∞	Контакт № 7—шасси.
Лампа $Л_2$, контакт № 1—шасси.	0	Проводник между указанными контактами.
Лампа $Л_2$, контакт № 2—шасси.	0	Проводник между указанными контактами.
Лампа $Л_2$, контакты № 3, 5—шасси.	243 ÷ 297 *ом*	Сопротивление R_{12}
Лампа $Л_2$, контакт № 4—Ш-1, контакт № 2.	513 ÷627 *ком*	Сопротивления R_{11}, R_{65}.
Лампа $Л_2$, контакт № 6—Ш-1, контакт № 3.	14,85÷ 18,15 *ком*	$\frac{R_{14}(R_{14а}+R_{24}+R_{24а})}{R_{14}+R_{14а}+R_{24}+R_{24а}}$
Лампа $Л_2$, контакт № 8—Ш-1, контакт № 5.	29,8 ÷ 36,85 *ком*	Сопротивления R_{17}, R_{18}.
Лампа $Л_2$, контакт № 7—лампа $Л_3$, контакт № 7.	0	Проводник между указанными контактами
Лампа $Л_3$, контакт № 1—шасси.	0	Проводник между указанными контактами
Лампа $Л_3$, контакты № 3, 5—шасси.	243 ÷ 297 *ом*	Сопротивление R_{21}.

Точки, между которыми измеряется сопротивление	Величина сопротивления	Цепи, охватываемые измерением
Лампа $Л_8$, контакт № 2—Лампа $Л_9$, контакт № 2.	0	Проводник между указанными контактами.
Лампа $Л_8$, контакты № 3, 5—шасси.	243 ÷ 517 *ом*	Сопротивление R_{48}.
Лампа $Л_8$, контакт № 6—Ш-4, контакт № 6.	14,85 ÷ 18,15 *ком*	$\frac{R_{49}(R_{43}+R_{43a}+R_{49a})}{R_{49}+R_{43}+R_{43a}+R_{49a}}$
Лампа $Л_8$, контакт № 6—шасси.	14,85 ÷ 18,15 *ком*	$\frac{R_{49a}(R_{49}+R_{43}+R_{43a})}{R_{49a}+R_{49}+R_{43}+R_{43a}}$
Лампа $Л_8$, контакт № 8—Ш-4, контакт № 7.	29,8 ÷ 36,8 *ком*	Сопротивления R_{50}, R_{51}
Лампа $Л_8$, контакт № 7—шасси.	0	Проводник между указанными контактами.
Лампа $Л_9$, контакт № 1—шасси.	0	Проводник между указанными контактами.
Лампа $Л_9$, контакт № 2—Лампа $Л_{10}$, контакт № 2.	0	Проводник между указанными контактами.
Лампа $Л_9$, контакты № 5, 3—шасси.	243 ÷ 297 *ом*	Сопротивление R_{52}.
Лампа $Л_9$, контакт № 4—шасси.	0	Сопротивление части катушки контура ФПЧ-3
Лампа $Л_9$, контакт № 6—Ш-4, контакт № 6.	61,2 ÷ 74,8 *ком*	Сопротивление R_{53}.
Лампа $Л_9$, контакт № 7—шасси.	0	Проводник между указанными контактами.
Лампа $Л_9$, контакт № 8—Ш-4, контакт № 7.	13,59 ÷ 17,05 *ком*	Сопротивления R_{54}, R_{55}
Лампа $Л_{10}$, контакт № 2—Ш-4, контакт № 5.	0	Проводник между указанными контактами.
Лампа $Л_{10}$, контакт № 3—шасси.	423 ÷ 517 *ом*	Сопротивление R_{59}.
Лампа $Л_{10}$, контакт № 4—шасси.	29,7 ÷ 68,2 *ком*	Сопротивление R_{60}.
Лампа $Л_{10}$, контакт № 5—шасси.	0	Сопротивление части катушки контура ФПЧ-3.
Лампа $Л_{10}$, контакт № 7—шасси.	0	Проводник между указанными контактами.
Лампа $Л_{10}$, контакт № 8—шасси.	495 ÷ 605 *ком*	Сопротивления R_{56}, R_{57}.

в) Карта прозвонки монтажа передней панели

Ш-1, контакт № 1—шасси.	∞	Изоляция C_2 при **П-4 в** положении «ТЛГ».
Ш-1, контакт № 2—шасси.	Часть R_8	В положении РРЧ.
	∞	В положении АРЧ.
Ш-1, контакт № 3—шасси.	∞	Изоляция конденсатора C_7.

Точки, между которыми измеряется сопротивление	Величина сопротивления	Цепи, охватываемые измерением
Ш-1, контакт № 4—шасси.	∞	Сопротивление изоляции проводника между указанными точками.
Ш-1, контакт № 5—шасси.	324 : 397 *ком*	При положении П-2 — «+анода»
	∞	При остальных положениях П-2
Ш-1, контакт № 6—шасси.	0 ÷ 2,64 *мгом*	Сопротивление R_1.
Ш-1, контакт № 7—шасси.	17,6 ÷ 26,4 *ком*	Сопротивление R_3.
Ш-1, контакт № 5—Ш-5, контакт № 3	0	Проводник между указанными контактами.
Ш-1, контакт № 4—Ш-5, контакт № 4.	0	Проводник между указанными контактами.
Ш-1, контакт № 3—Ш-5, контакт № 5.	0	Проводник между указанными контактами.
Ш-3, контакты №№ 1, 2, 3, 4, 5, 6 — шасси.	∞	Контакты №№ 1, 2, 3, 4, 5, 6—шасси.
Ш-5, контакт № 1—шасси.	∞	Контакт № 1—шасси.
Ш-5, контакт № 2—шасси.	∞	Контакт № 2—шасси.
Ш-5, контакт № 6—шасси.	0	Проводник между указанными контактами.
Ш-5, контакт № 7—шасси.	∞	Контакт № 7—шасси.
Ш-6, контакт № 1—шасси.	0	Проводник между указанными контактами.
Ш-6, контакт № 2—шасси.	0 ÷ 2,64 *мгом*	При П-1 в положении РРЧ—сопротивление R_1.
Ш-6, контакт № 3—шасси.	Часть R_1	При П-1 в положении АРЧ
Ш-6, контакт № 4—шасси.	∞	Контакт № 4—шасси.
Ш-6, контакт № 5—шасси.	0	При П-3 в положении «Выкл »
	∞	При П-3 в положении «Вкл.».
Ш-6, контакт № 6—шасси.	∞	При П-3 в положении «Выкл.».
Ш-6, контакт № 6—шасси.	∞	При П-4 в положении «ТЛФ».
Ш-7, контакты №№ 1, 2, 3, 4, 5—шасси.	∞	Изоляция конденсаторов фильтров питания и СПУ.
Ш-7, контакт № 6—шасси.	0	Проводник между указанными контактами.

Точки, между которыми измеряется сопротивление	Величина сопротивления	Цепи, охватываемые измерением

г) Карта прозвонки монтажа блока «НЧ»

Ш-4, контакт № 1—шасси.	0	Проводник между указанными контактами.
Ш-4, контакт № 2—шасси.	∞	Изоляция конденсатора C_{166}.
Ш-4, контакт № 3—шасси.	0	Проводник между указанными контактами.
Ш-4, контакт № 4—шасси.	∞	Контакт № 4—шасси
Ш-4, контакт № 5—шасси	∞	Изоляция цепи накала ламп.
Ш-4, контакт № 6—шасси	∞	Изоляция экранных цепей.
Ш-4, контакт № 6—Ш-5, контакт № 5	0	Проводник между указанными контактами
Ш-4, контакт № 7—шасси.	∞	Изоляция цепи высокого напряжения
Ш-4, контакт № 5—Ш-5, контакт № 4	0	Проводник между указанными контактами.
Ш-4, контакт № 7—Ш-5, контакт № 3.	∞	Изоляция цепи СПУ.
Ш-5, контакт № 1—шасси.	∞	Контакт № 1—шасси.
Ш-5, контакт № 1—Ш-7, контакт № 1	0	Проводник между указанными контактами.
Ш-5, контакт № 2—Ш-7, контакт № 2	0	Проводник между указанными контактами.
Ш-5, контакт № 3—Ш-7, контакт № 3	0	Проводник между указанными контактами.
Ш-5, контакт № 4—Ш-7, контакт № 5	0	Проводник между указанными контактами.
Ш-5, контакт № 5—Ш-7, контакт № 4.	0	Проводник между указанными контактами.
Ш-5, контакт № 7—шасси.	∞	Контакт № 7—шасси
Ш-5, контакт № 6—шасси.	0	Проводник между указанными контактами.
Ш-6, контакт № 1—шасси.	0	Проводник между указанными контактами.
Ш-6, контакт № 3—шасси.	549 ÷ 1112 *ком*	Сопротивления R_{62}, R_{63}
Ш-6, контакт № 5—шасси.	∞	Изоляция конденсаторов C_{35} и C_{115}.
Ш-6, контакт № 6—шасси.	∞	Анодная цепь лампы $Л_{12}$
Ш-6, контакт № 7—шасси.	∞	Цепь высокого напряжения лампы $Л_{13}$.
Ш-7, контакт № 6—шасси	0	Проводник между указанными контактами.
Ш-7, контакт № 6—Ш-4, контакт № 1.	0	Проводник между указанными контактами

Точки, между которыми измеряется сопротивление	Величина сопротивления	Цепи, охватываемые измерением
Лампа $Л_{11}$, контакт № 2—шасси	0	Проводник между указанными контактами.
Лампа $Л_{11}$, контакт № 4—Ш-5, контакт № 3.	20 ÷ 50 *ом*	Сопротивление R_{13}.
Лампа $Л_{11}$, контакт № 3—Ш-5, контакт № 3.	240 ÷ 430 *ом*	Сопротивление R_{13} и сопротивление обмотки Тр-1.
Лампа $Л_{11}$, контакт № 4—Лампа $Л_{11}$, контакт № 3.	280 ÷ 400 *ом*	Сопротивление обмотки Тр-1.
Лампа $Л_{11}$, контакт № 8—шасси.	900 ÷ 1100 *ом*	Сопротивление R_{10}.
Лампа $Л_{12}$, контакт № 3—шасси.	0	Проводник между указанными контактами.
Лампа $Л_{12}$, контакт № 4—шасси.	351 ÷ 429 *ком*	Сопротивление R_{62}.
Лампа $Л_{12}$, контакт № 5—Лампа $Л_{11}$, контакт № 4.	187 ÷ 229 *ком*	Сопротивления R_{66}, R_{9}.
Лампа $Л_{12}$, контакт № 6—шасси.	1,35 ÷ 1,65 *мгом*	Сопротивление R_{22}.
Лампа $Л_{12}$, контакт № 7—Лампа $Л_{11}$, контакт № 7.	0	Проводник между указанными контактами.
Лампа $Л_{13}$, контакты №№ 1, 8—шасси.	0	Проводник между указанными контактами.
Лампа $Л_{13}$, контакты №№ 3, 4—Ш-6, контакт № 7.	387 ÷ 473 *ком*	Сопротивления R_{32}, R_{38}.
Лампа $Л_{13}$, контакт № 5—шасси.	297 ÷ 363 *ком*	Сопротивление R_{27}.
Лампа $Л_{13}$, контакт № 7—Лампа $Л_{12}$, контакт № 2.	0	Проводник между указанными контактами.

ГЛАВА VII

ОСНОВНЫЕ ЭЛЕКТРИЧЕСКИЕ ХАРАКТЕРИСТИКИ РАДИОПРИЕМНИКА И КРАТКАЯ МЕТОДИКА ИХ ИЗМЕРЕНИЯ

К основным электрическим характеристикам радиоприемника РПС относятся:

1. Чувствительность приемника.
2. Погрешность градуировки и запас перекрытия по диапазону.
3. Ослабление частоты по зеркальному каналу.
4. Полоса пропускания усилителя промежуточной частоты.
5. Нелинейные искажения. 52

Нормы по данным параметрам приведены в гл. I § 4 настоящей инструкции.

При измерении основных электрических характеристик радиоприемника РПС необходимо иметь следующую измерительную аппаратуру:

1. Генератор стандартных сигналов типа ГСС-6.
2. Измеритель выхода типа ИВ-4.
3. Измеритель частоты типа ИЧ-5 или ИЧ-6.
4. Звуковой генератор.
5. Измеритель нелинейных искажений типа ИНИ-10.
6. Гетеродинный волномер типа 527.
7. Вольтметр переменного тока с пределами измерений до 300в, проверенный для частоты 400 *гц*.

Измерение основных электрических характеристик радиоприемника производить при нормальных климатических условиях и номинальном напряжении питания 115 *в*.

CHAPTER VII.

BASIC ELECTRICAL CHARACTERISTICS OF THE RADIO RECEIVER AND BRIEF METHOD OF THEIR MEASUREMENT

The main electrical characteristics of the radio receiver of the RPM are:
1. The sensitivity of the receiver.
2. The calibration error and the overlap margin for the range.
3. Attenuation of the frequency along the mirror channel.
4. Passband of the intermediate frequency amplifier.
5. Nonlinear distortion. 52

The norms for these parameters are given in Chap. I §4 of this Instruction.

When measuring the main electrical characteristics of a radio receiver, it is necessary to have the following measuring equipment:
1. Generator of standard signals such as GCC-6.
2. Output meter type IV-4.
3. Frequency meter of the type ICh-5 or ICh-6.
4. Sound generator.
5. Measuring instrument of non-linear distortions of the INI-10 type.
6. Heterodyne wavemeter of type 527.
7. AC voltmeter with measurement limits up to 300V, tested for a frequency of 400Hz.

Measurement of the main electrical characteristics of the radio receiver is performed under normal climatic conditions and a nominal supply voltage of 115 volts.

All measurements of the receiver are performed with a normal load on the output - one pair of high-resistance telephones.

§ 1. Measuring the sensitivity of the receiver

The sensitivity of the receiver is the minimum EMF value in the antenna (at the receiver input), which is necessary to obtain a normal voltage on the output load. For the RPS receiver, the normal output voltage is 15 volts.

Order, measurements Measurements are made at three points of each sub-band:
one middle and two extreme with AGC and without AGC with a nominal equivalent of an antenna - with a capacity of 80 µmk in telephone and telegraph modes,
a) The receiver and GSS-6 are switched on for 10 min. before the measurement starts. The modulation depth GSS-6 M = 30% is set with the frequency F = 1000 Hz, the AGC receiver is off.

10 minutes after the power is turned on, the receiver is tuned in telephone mode on one of the frequencies. The load of the receiver is one pair of high-resistance TA-4 phones and a high-resistance alternating current voltmeter (R = 20,000 ohms). The receiver's "Volume" knob is set to the maximum gain position. The maximum sensitivity corresponds to the signal-generator voltage at which the voltage on the load is 15 volts. When determining the sensitivity value, the input circuits of the receiver are tuned to the maximum
gain.

To determine the receiver noise when there is a carrier, the GCC-6 modulation is turned off and the noise voltage is measured.

The actual sensitivity is measured at a ratio of the noise voltage to the signal voltage of 1: 3. If the noise voltage is less than 5 V, the measured maximum sensitivity is real. If the noise voltage is more than 5 V, then the "Volume" knob slightly decreases the gain of the receiver until the output of noise of 5 volts. Then, the modulation of the GSS-6 is turned on and the input voltage is increased until the output is 15 V and the noise voltage is again measured. After several successive settings, the "Volume" knob is where the voltage of the carrier noise is 5 V, and the output voltage is 15 volts. The resulting voltage at the input of the receiver will determine the real sensitivity.

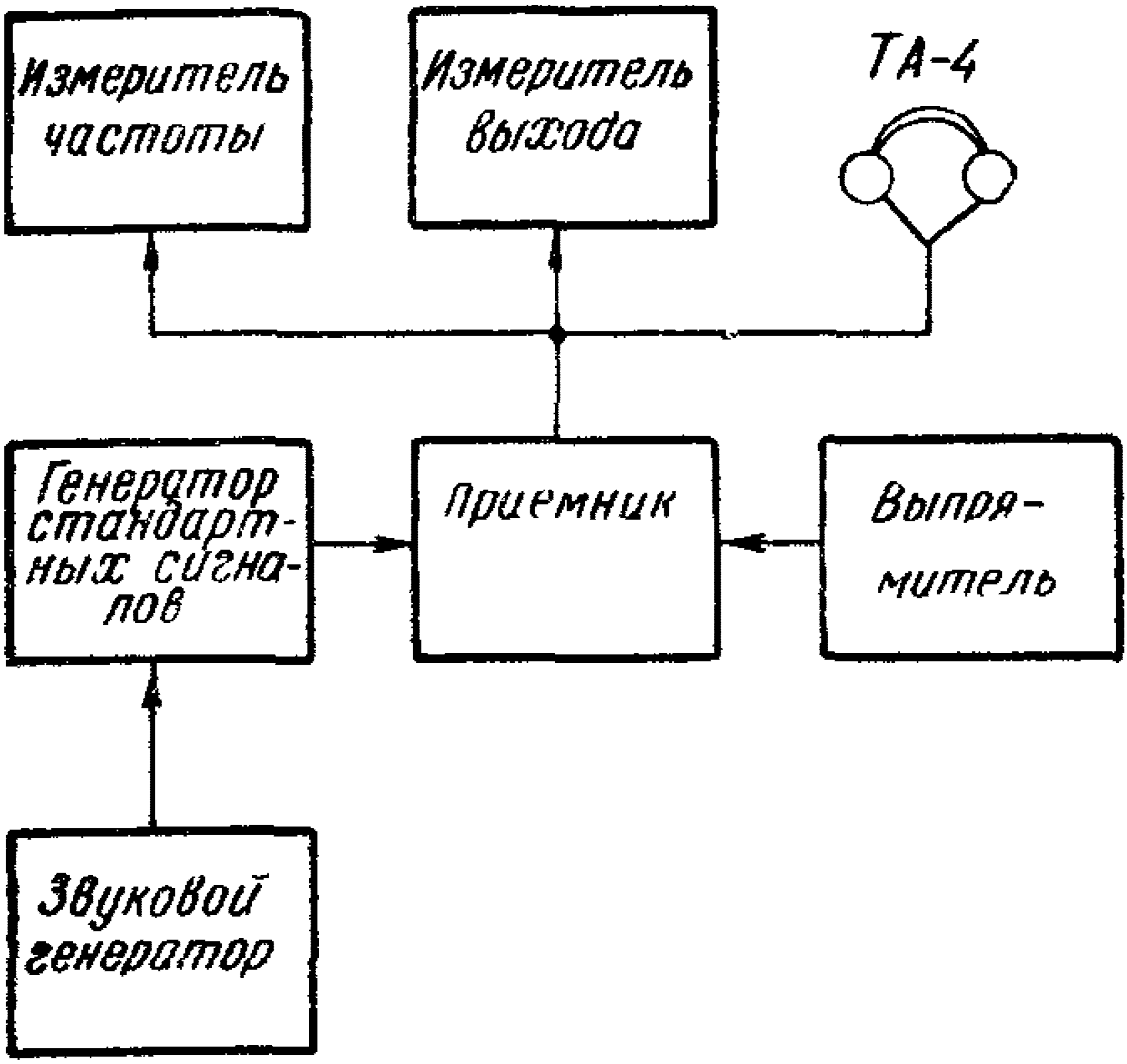


Рис. 25. Блок-схема измерения чувст-
вительности приемника.

Without tuning the receiver, ARC is switched on and analogous measurements are made.

b) After measuring the maximum and real sensitivity in the phone mode, without modifying the receiver's setting, the GCC-6 modulation is removed and the receiver switches to telegraph mode. The AFC shuts down. Handle "Volume" - in the maximum position.

The tone control knob of the receiver's telegraph signals is set from the tone frequency meter 1000 ± 100 Hz. If the beating tone is obtained in two positions, the tone control knob is set to the position at which a large output voltage is obtained. The voltage at the input of the receiver is set so as to obtain a beat voltage at the output of the 15th century. This value of the input signal will determine the maximum sensitivity in the telegraph mode.

To measure the real sensitivity in telegraph mode, the signal voltage of the GCC-6 is removed, the receiver input is short-circuited and the voltage of the intrinsic noise is measured. The actual sensitivity in the telegraph mode is also measured with a ratio of the noise voltage to the signal voltage of 1: 3. If the noise voltage is less than 5 V, the measured maximum sensitivity is real. If the noise voltage is more than 5 V, then the "Volume" knob slightly decreases the gain of the receiver until the output of noise of 5 volts. Then to the input of the receiver the carrier is supplied and the input voltage is set until it reaches the output of 15 volts. Received thus the voltage at the input of the receiver will determine the real sensitivity in the telegraph mode. Without reconfiguring the receiver, ARC is switched on and analogous measurements are made. The sensitivity when the AFC is switched on should not differ by more than 30% from that measured in the position of the RFR. Then the receiver is tuned in series to other frequencies and the sensitivity is measured in telephone and telegraph modes with AGC and without AGC. A block diagram of the measurements is shown in Fig. 25.

§ 2. Measurement of the calibration error and the margin for overlapping the band

Measurement order

The measurements are carried out in the telegraph mode, the knob of the "Beat Tone" knob is set with a risk against the point. The toggle switch is turned to the "Calibration" position and the receiver scale is calibrated at a frequency of 15 MHz and the sight is fixed. To measure the calibration error with the receiver's "Tuning" knob, set the scale position at the checked frequency so that the risk on the scale is exactly opposite to the sight on the curtain. At the appropriate frequency of the band, the heterodyne wavemeter is calibrated and weakly connected to the input of the receiver. By turning the LO tuning knob, zero beats are achieved in the phones at the receiver output, the true value of the tuning frequency is determined from the heterodyne wavemeter table and the calibration error is calculated.

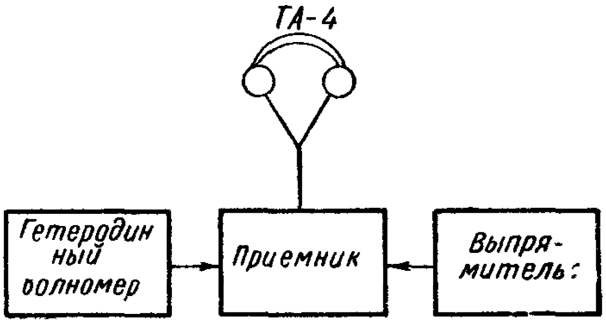


Рис. 26. Блок-схема измерения погрешности градуировки и запаса по перекрытию поддиапазона

To determine the frequency range and the margin for overlap, measurements similar to those described above are made with the only difference that the dial of the receiver scale is set to the far right and the leftmost position alternately. The difference between the tuning frequency measured at the end position of the dial of the receiver scale and the nominal extreme frequency of the range is the overlap margin at that point.

The overlap margin on the long-wave bands should be not less than 8 kHz, for shorter wavelengths, not less than 30 kHz. A block diagram of the measurements is shown in Fig. 26.

§ 3. Measurement of signal attenuation by a mirror channel

The attenuation of a signal over a mirror channel is the ratio of the sensitivity over the mirror channel to the sensitivity at the fundamental frequency.

Order, measurements

The receiver scale is set to the highest band frequency. The input of the receiver from GS'S-6 is fed with a signal and the real sensitivity is measured. Then, without touching the tuning knob of the receiver, the GSS-6 is rebuilt in the direction of increase by twice the intermediate frequency and an input signal is set such that the receiver output has a voltage of 15 volts. Voltage GSS-6, fed to the input of the receiver, in this case, determines the sensitivity of the mirror channel.

Attenuation of the signal along the mirror channel should be at least 4000 times at frequencies of 18-24 MHz at least 1000 times. The block diagram of the measurements is shown in Fig. 25.

§ 4. Measurement of the passband of the intermediate frequency amplifier

The pass band of the amplifier of the intermediate frequency of the receiver is called the frequency difference at which its sensitivity is a predetermined number of times less than the sensitivity at resonance.

Measurement order

The receiver is extracted from the casing and an intermediate frequency signal F = 730 kHz with a modulation frequency of 400 Hz and a modulation depth of 3% is fed to the eighth leg of the L4 valve from the GSS-6. Toggle "АРЧ-РРЧ" - in the position of the radio frequency band, the volume control knob is in the maximum position, "Crystal" - off, the GCC-6 is precisely tuned to the intermediate frequency according to the maximum voltage at the receiver output. Then, at the output of the signal generator, a voltage is set at which the output voltage of the receiver is 15 volts.

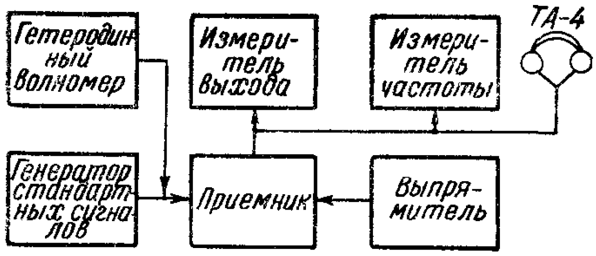


Рис. 27. Блок-схема измерения полосы пропускания приемника.

After that, the voltage of the SCS-6 increases by a factor of 2 and the frequency of the SCS-6 changes from the resonance to the output of the receiver at a voltage of 15 volts. The frequency value for both detunings is measured by a heterodyne wavemeter. The magnitude of the detuning of the GSS-6 in both directions is the bandwidth of the receiver with a 2-fold attenuation. In the same way, the bandwidth is measured by attenuating by a factor of 100. In this case, the signal from the GCC-6 is increased 100 times. 56 Then "Crystal" is turned on, the band adjustment knob is set to "Wide." And the above method measures the passband when it is 2 times smaller and 100 times. Next, the passband is measured at a 2-fold attenuation when the strip adjustment knob is set to the "Narrow" position.

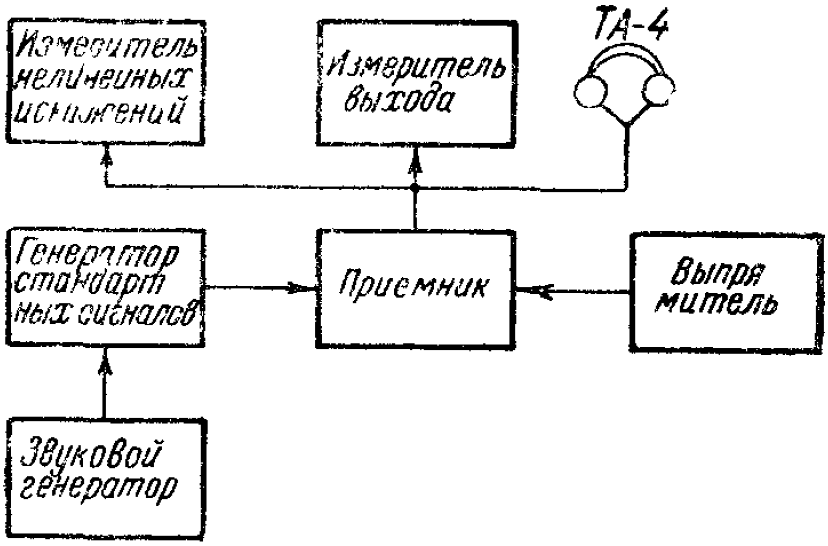
The voltage of the GCS-6 is set so that the output of the receiver is 3 volts. Then the voltage from the GSS-6 increases by a factor of 2 and the generator is detuned until a voltage of 3 V is obtained at the receiver output. After that the GCC-6 modulation is switched off, the second receiver heterodyne is turned on and the zero beat on the output of the receiver is set by rotating the "Beating Tone" knob.

The second heterodyne of the receiver is turned off, the modulation of the GSS-6 is turned on, the GSA-6 is again detuned in the direction opposite to the first detuning, until it is received at the receiver's output of 3 V; the modulation is turned off, the second heterodyne of the receiver is turned on and the frequency corresponding to the passband is counted according to the frequency counter on the output. A block diagram of the measurements is shown in Fig. 27.

§ 5. Measurement of the coefficient of nonlinear distortion

Measurement order

The input of the receiver from the GSS-6 is supplied with a voltage of 50 µV, modulated at a frequency of 1000 Hz at a modulation depth of 30%. To the output of the receiver, a distortion meter is connected in parallel with the load. The "Volume" knob sets the output voltage to 60 V and measures the nonlinear distortion factor, the value of which should not be more than 8%.



When the AVR is on, the receiver's volume control is set to the maximum gain position. A signal of 0.1 V is applied to the receiver input and the nonlinear distortion coefficient is measured again, which should not be more than 10%. A block diagram of the measurements is shown in Fig. 28.

§ 6. Measurement of valve modes

The mode of the receiver and rectifier valves is checked at the rated supply voltage by measuring voltages with a valve voltmeter on the valve pins or at points with the same potential, but excluding the effect on the high frequency mode.

When measuring voltages, the signal to the receiver is not applied, the sensitivity controller is in the maximum gain position.

When checking the anode currents of valves with the device on the front panel of the receiver, the arrow of the instrument must be in the green sector of the scale. The test is performed on all sub-bands by rotating the "Tuning" knob on the whole range of the scale.

The operating mode of the mixer is checked on the 6th sub-band:
The arrow of the instrument must be within the green sector of the scale. On the other bands, the anode current of the mixer can be changed outside the green sector of the instrument scale in the direction of decreasing.

CHAPTER VIII.

MAIN CHANGES PRODUCED IN THE RADIO RECEIVER OF RPS

In the process of the production of radio receivers, the following main constructive and schematic changes:

1. Since September 1956

a) to improve the coupling of the axis of the adjustment vernier with the drive gear, a flexible joint is introduced, and in order to remove forces from the ceramic axis of the rotor at its extreme positions, the limit stops from the gearbox are transferred to the drive gear;

b) to improve the stability of the sensitivity of the receiver when the ambient temperature changes (due to a deterioration in the Q-factor of the insulation resistance of capacitors), ceramic tuning capacitors of the KPK-8/30 type are replaced by capacitors with an air dielectric.

When replacing the capacitors of the PDA type with the air-insulated trimmers, the latter are attached to the sub-band section by means of a specially designed getinax washer.

When setting up the trimmer, it is necessary to pay attention to the fact that the trimmer nut is not shorted to the getinax board on the band section.

2. Since August 1957, to eliminate the jerk of the leash of the visor in the extreme positions of the cochlea, the design of the scale corrector has been changed, while the corrector knob has acquired a circular rotation.

3. Since November 1957, due to the frequent cases of plate closure, sealed pods of the "barrel" type (in heterodyne circuits) have been replaced by capacitors with an air dielectric.

4. Since April 1958, in order to eliminate the breakage of the scales, the glass scale has been replaced with a scale made of organic glass.

5. Since July 1959 (from receiver No. 2000) the following changes have been introduced:

a) to improve the stability of the frequency of the first local oscillator from the change in supply voltages, the circuit of the first local oscillator is changed.

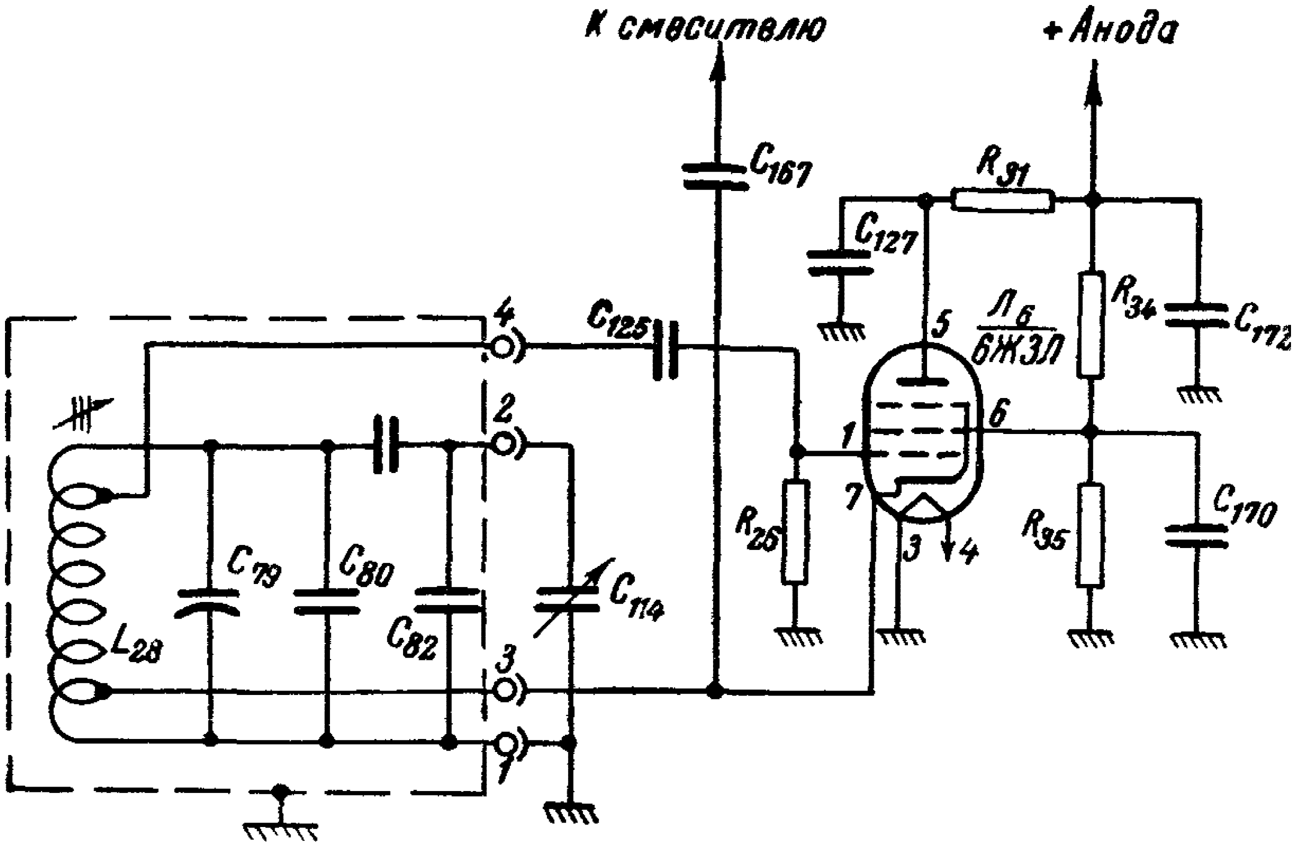


Рис. 29. Схема первого гетеродина до изменения.

Valve 6Ж3П (6ZH3P) (L6) was replaced by 6Ж1П (6ZH1P) with the corresponding change in the regime, in connection with which the values of the following elements changed:

Обозначение элемента по принципиальной схеме	Величина до изменения	Величина после изменения
R_{26}	ВС-0,25-1-56 *ком*-II	ВС-0,25-1-1000-II
R_{34}	ВС-0,5-1-5,1 *ком*-II	ВС-0,5-1-33 *ком*-II
R_{35}	ВС-1-1-51 *ком*-II	ВС-0,5-1-15 *ком*-II
R_{31}	ВС-1-1-10 *ком*-II	Исключено
C_{125}	КТК-3С-51-1	КТК-2С-27-I
C_{127}	КБГ-И-600-0,01-II	КТК-1Д-150-II

b) the screening scheme of the drum sections has been changed, since the contour screens in the anode circuits of the 1st and 2nd UHF were under high voltage.

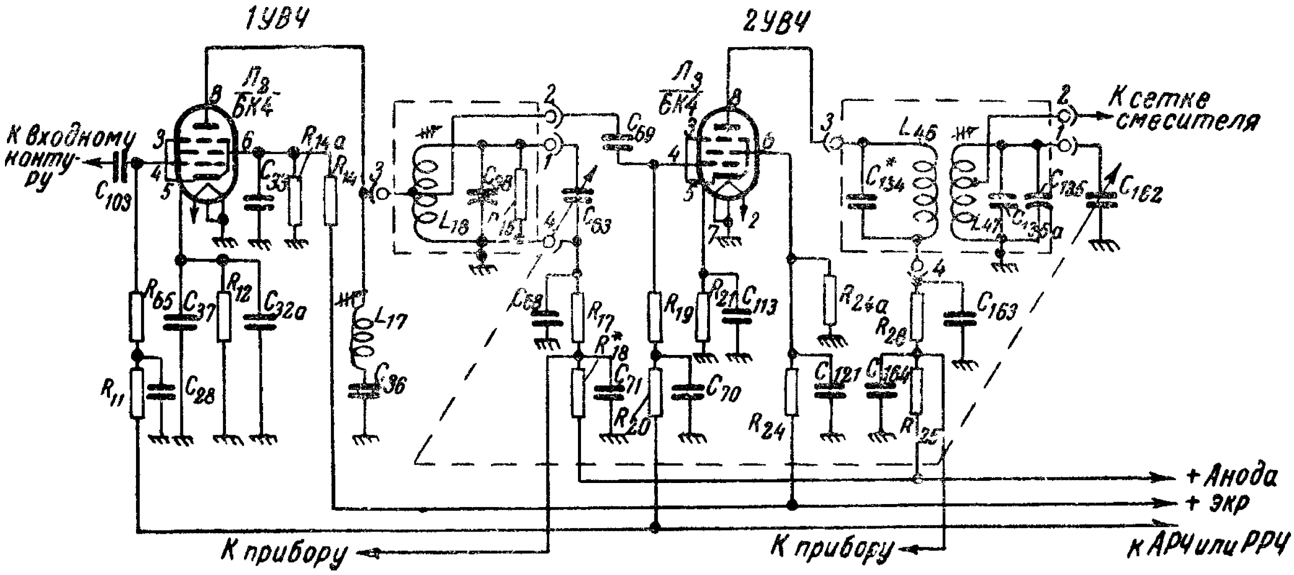


Рис. 30. Усилитель высокой частоты до изменения.

The ingress of dust, moisture, etc. into the drum switch could lead to the closure of the anode circuit to the housing. To eliminate this drawback, the screens of all sections of the drum are grounded. The scheme of the first and second UHF before the change is shown in Fig. Thirty;

c) to ensure the stock when adjusting the tuning containers (both during the adjustment process at the enterprise and in the operating conditions), the values of the capacitors that are parallel to them are changed:

Обозначение элемента по принципиальной схеме	Величина до изменения	Величина после изменения
C_{57}	КГК-1М-33-I	КТК-1М-39-II
C_{40}	КГК-1М-12-II	КТК-1М-5-II
C_{88}	КГК-1М-39-II	КТК-1М-33-II

d) because the total current consumed by the receiver is on the average 0.56, and when using the fuse 2a for short-term closures caused by defects in the radio tubes before the fuse burns, the combustion of various elements of the circuit-resistances, transformers, etc., was possible .

In order to eliminate this and more efficient operation of the fuse, the latter was replaced from 2-ampere to 1-ampere;

e) in order to simplify the attachment of the receiver to the cushioning frame, the structure of the frame and the articulation with the casing of the receiver are changed. At the same time, the overall dimensions of the product, as well as the dimensions and arrangement of the fixing holes, remained unchanged.

6. Since January 1960 (from receiver No. 2114), the installation is carried out with a coloured wire PMVG 0 0.5 mm.

CHAPTER IX.

SPECIFICATION TO THE PRINCIPAL DIAGRAM OF THE RADIO RECEIVER

In addition to the type BC resistances specified in this specification, the enterprise for the manufacture of a radio receiver applies the resistance of the MLT. Resistances MLT are produced with a power of 0.5 watt and above. Therefore, the resistance BC-0.25 and BC-0.5 are replaced by MLT-0.5.

Resistance BC-1 and BC-2 are replaced respectively by МЛТ-1 and МЛТ-2.
The MLT type resistances specified in the specification can not be replaced by resistance type BC.

№ марк.	Наименование	Основная характеристика	Примечание
C_1	Конденсатор связи антенны с кварцевым калибратором.	КДК-1а-М-2,5 ± 0,4 *пф*	
C_2	Конденсатор фильтра АРЧ.	БГМ-2-400-0,05-II	
C_3	Конденсатор блокировки в цепи смещения	БГМ-2-400-0,05-II	
C_4	Конденсатор антенного фильтра	КДК-1а-М-2,5 ± 0,4 *пф*	
C_5	Конденсатор блокировки в цепи смещения	КЭГ-1-В = $\frac{30}{20}$ *ом*	
C_6	Конденсатор антенного фильтра	КДК-1а-М-2,5 ± 0,4 *пф*	
C_7	Конденсатор развязки цепей экранных сеток	БГМ-2-400-0,05-II	
C_9	Конденсатор связи антенны с входным контуром на 1-м поддиапазоне	КТК-1а-М-10-II	
C_{11}	Конденсатор связи антенны с входным контуром на 2-м поддиапазоне	КТК-1а-Д-10-II	
C_{13}	Конденсатор подстроечный входного контура на 3-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{14}	Конденсатор подстроечный входного контура на 4-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{15}	Конденсатор сопрягающий входного контура на 4-м поддиапазоне	ОКСО-2-500-Г-680-I	
C_{17}	Конденсатор подстроечный входного контура на 5-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{19}	Конденсатор сопрягающий входного контура на 5-м поддиапазоне	ОКСО-2-500-Г-680-I	
C_{20}	Конденсатор подстроечный входного контура на 6-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{21}	Конденсатор сопрягающий входного контура на 6-м поддиапазоне	КТК-3а-М-150-I	
C_{22}	Конденсатор сопрягающий входного контура на 6-м поддиапазоне.	КТК-3а-М-150-I	
C_{23}	Конденсатор подстроечный входного контура на 7-м поддиапазоне	$C = 3 \div 18$ *пф*	

№ марк.	Наименование	Основная характеристика	Примечание
C_{58}	Конденсатор сопрягающий входного контура на 7-м поддиапазоне	КТК-3а-М-150-I	
C_{43}	Конденсатор подстроечный контура 1-го УВЧ на 3-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{44}	Конденсатор контура 1-го УВЧ на 4-м поддиапазоне	КТК-1а-М-22-II	
C_{45}	Конденсатор подстроечный контура 1-го УВЧ на 4-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{46}	Конденсатор сопрягающий контура 1-го УВЧ на 4-м поддиапазоне	ОКСО-2-500-Г-680-I	
C_{48}	Конденсатор контура 1-го УВЧ на 5-м поддиапазоне	КТК-1а-М-33-I	
C_{49}	Конденсатор подстроечный контура 1-го УВЧ на 5-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{50}	Конденсатор сопрягающий контура 1-го УВЧ на 5-м поддиапазоне	ОКСО-2-500-Г-680-I	
C_{51}	Конденсатор развязки контура 1-го УВЧ на 5-м поддиапазоне	ОКСО-5-250-Б-10000-II	
C_{52}	Конденсатор контура 1-го УВЧ на 6-м поддиапазоне	КТК-1а-М-39-II	
C_{53}	Конденсатор подстроечный контура 1-го УВЧ на 6-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{54}	Конденсатор сопрягающий контура 1-го УВЧ на 6-м поддиапазоне	КТК-3а-М-150-I	
C_{55}	Конденсатор сопрягающий контура 1-го УВЧ на 6-м поддиапазоне	КТК-3а-М-150-I	
C_{56}	Конденсатор развязки контура 1-го УВЧ на 6-м поддиапазоне	ОКСО-5-250-Б-10000-II	
C_{57}	Конденсатор контура 1-го УВЧ на 7-м поддиа-	КТК-1а-М-39-II	
C_{60}	Конденсатор сопрягающий контура 1-го УВЧ на 7-м поддиапазоне	КТК-3а-М-150-I	
C_{61}	Конденсатор сопрягающий контура 1-го УВЧ на 7-м поддиапазоне	КТК-1а-М-22-I	
C_{62}	Конденсатор развязки контура 1-го УВЧ на 7-м поддиапазоне	ОКСО-5-250-Б-10000-II	
C_{63}	Конденсатор переменный контура 1-го УВЧ	$C_{мин} = 20$ *пф* $C_{макс} = 300$ *пф*	
C_{64}	Конденсатор корректирующий кварцевого калибратора	КТК-1а-М-4 $\pm$ 0,4 *пф*	
C_{65}	Конденсатор фильтра в общей цепи анодного напряжения	ОКСО-2-500-Б-680-II	
C_{66}	Конденсатор фильтра в общей цепи экранного напряжения	ОКСО-2-500-Б-680-II	
C_{67}	Конденсатор фильтра в общей цепи накала ламп	ОКСО-2-500-Б-680-II	
C_{68}	Конденсатор развязки анодного контура 1-го УВЧ	БГМ-2-400-0,05-II	
C_{69}	Конденсатор связи 1-го УВЧ со 2-м УВЧ	КТК-1а-Д-150-II	
C_{70}	Конденсатор развязки управляющей сетки 2-го УВЧ	КБГ-И-600-0,01-II	
C_{71}	Конденсатор развязки сопротивления шунта 1-го УВЧ	БГМ-2-400-0,05-II	
C_{72}	Конденсатор обратной связи кварцевого калибратора	КТК-1а-Д-91-II	
C_{73}	Конденсатор фильтра в общей цепи анодного напряжения	ОКСО-2-500-Б-680-II	
C_{74}	Конденсатор фильтра в общей цепи экранного напряжения	ОКСО-2-500-Б-680-II	
C_{75}	Конденсатор фильтра в общей цепи накала ламп	ОКСО-2-500-Б-680-II	
C_{76}	Конденсатор фильтра в цепи СПУ	ОКСО-2-500-Б-680-II	
C_{77}	Конденсатор фильтра в цепи СПУ	ОКСО-2-500-Б-680-II	
C_{79}	Конденсатор подстроечный контура 1-го гетеродина на 1-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{80}	Конденсатор контура 1-го гетеродина на 1-м поддиапазоне	КТК-1а-М-39-II	

№ марк.	Наименование	Основная характеристика	Примечание
C_{81}	Конденсатор сопрягающий контура 1-го гетеродина на 1-м поддиапазоне	КТК-3а-М-100-I	
C_{82}	Конденсатор сопрягающий контура 1-го гетеродина на 1-м поддиапазоне	КТК-1а-М-22-I	
C_{83}	Конденсатор контура 1-го гетеродина на 2-м поддиапазоне	КТК-1а-М-22-I	
C_{84}	Конденсатор подстроечный контура 1-го гетеродина на 2-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{85}	Конденсатор сопрягающий контура 1-го гетеродина на 2-м поддиапазоне	КТК-3а-М-150-I	
C_{86}	Конденсатор сопрягающий контура 1-го гетеродина на 2-м поддиапазоне	КТК-1а-М-22-I	
C_{87}	Конденсатор сопрягающий контура 1-го гетеродина на 2-м поддиапазоне	КТК-1а-М-22-I	
C_{88}	Конденсатор контура 1-го гетеродина на 3-м поддиапазоне	КТК-1а-М-33-II	
C_{89}	Конденсатор подстроечный контура 1-го гетеродина на 3-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{90}	Конденсатор сопрягающий контура 1-го гетеродина на 3-м поддиапазоне	КТК-4а-М-200-I	
C_{91}	Конденсатор сопрягающий контура 1-го гетеродина на 3-м поддиапазоне	КТК-4а-М-200-I	
C_{92}	Конденсатор сопрягающий контура 1-го гетеродина на 3-м поддиапазоне	КТК-4а-М-200-I	
C_{93}	Конденсатор сопрягающий контура 1-го гетеродина на 3-м поддиапазоне	КТК-4а-М-200-I	
C_{94}	Конденсатор контура 1-го гетеродина на 4-м поддиапазоне	КТК-1а-М-39-II	
C_{95}	Конденсатор подстроечный контура 1-го гетеродина на 4-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{96}	Конденсатор сопрягающий контура 1-го гетеродина на 4-м поддиапазоне	КТК-4а-М-200-I	

C_{97}	Конденсатор сопрягающий контура 1-го гетеродина на 4-м поддиапазоне	КТК-4а-М-200-I
C_{98}	Конденсатор сопрягающий контура 1-го гетеродина на 4-м поддиапазоне	КТК-2а-М-51-I
C_{99}	Конденсатор контура 1-го гетеродина на 5-м поддиапазоне	КТК-1а-М-39-II
C_{100}	Конденсатор подстроечный контура 1-го гетеродина на 5-м поддиапазоне	$C = 3 \div 18$ *пф*
C_{101}	Конденсатор сопрягающий контура 1-го гетеродина на 5-м поддиапазоне	КТК-3а-М-100-I
C_{102}	Конденсатор сопрягающий контура 1-го гетеродина на 5-м поддиапазоне	КТК-4а-М-200-I
C_{102a}	Конденсатор сопрягающий контура 1-го гетеродина на 5-м поддиапазоне	КТК-4а-М-200-I
C_{103}	Конденсатор связи 1-го УВЧ с входным контуром	КТК-1а-Д-150-II
C_{104}	Конденсатор контура 1-го гетеродина на 6-м поддиапазоне	КТК-2а-М-47-I
C_{105}	Конденсатор подстроечный контура 1-го гетеродина на 6-м поддиапазоне	$C = 3 : 18$ *пф*
C_{106}	Конденсатор сопрягающий контура 1-го гетеродина на 6-м поддиапазоне	КТК-2а-М-51-I
C_{107}	Конденсатор сопрягающий контура 1-го гетеродина на 6-м поддиапазоне	КТК-4а-М-200-I
C_{108}	Конденсатор контура 1-го гетеродина на 7-м поддиапазоне	КТК-1а-М-39-II
C_{109}	Конденсатор подстроечный контура 1-го гетеродина на 7-м поддиапазоне	$C = 3 \div 18$ *пф*
C_{110}	Конденсатор сопрягающий контура 1-го гетеродина на 7-м поддиапазоне	КТК-3а-М-150-I
C_{112}	Конденсатор сопрягающий контура 1-го гетеродина на 7-м поддиапазоне	КТК-1а-М-22-I
C_{113}	Конденсатор блокировки сопротивления автоматического смещения 2-го УВЧ	БГМ-2-400-0,05-II
C_{114}	Конденсатор переменный контура 1-го гетеродина	$C_{мин} = 20$ *пф* $C_{макс} = 300$ *пф*
C_{115}	Конденсатор обратной связи кварцевого калибратора	КТК-1а-Д-33-II

№ марк.	Наименование	Основная характеристика	Примечание
C_{116}	Конденсатор фильтра в общей цепи анодного напряжения	ОКСО-2-500-Б-680-II	
C_{117}	Конденсатор фильтра в общей цепи экранного напряжения	ОКСО-2-500-Б-680-II	
C_{118}	Конденсатор фильтра в общей цепи накала ламп	ОКСО-2-500-Б-680-II	
C_{119}	Конденсатор фильтра в цепи СПУ	ОКСО-2-500-Б-680-II	
C_{120}	Конденсатор фильтра в цепи СПУ	ОКСО-2-500-Б-680-II	
C_{121}	Конденсатор блокировки экранной сетки 2-го УВЧ	БГМ-2-400-0,05-II	
C_{122}	Конденсатор контура 2-го гетеродина	КТК-3а-Р-51-I	
C_{123}	Конденсатор контура 2-го гетеродина	КТК-3а-М-150-I	
C_{124}	Конденсатор переменный контура 2-го гетеродина	$C = 2 \div 7$ *пф*	
C_{125}	Конденсатор связи управляющей сетки 1-го гетеродина с контуром	КТК-2а-С-27-II	
C_{126}	Конденсатор связи управляющей сетки 2-го гетеродина с контуром	КТК-2а-М-51-I	
C_{127}	Конденсатор блокировки в цепи анода 1-го гетеродина	КТК-1а-Д-150-II	
C_{128}	Конденсатор блокировочный анодной цепи 2-го гетеродина	ОКСО-5-250-Б-10000-II	
C_{129}	Конденсатор фильтра в общей цепи анодного напряжения	БГМ-2-400-0,05-II	
C_{130}	Конденсатор фильтра в общей цепи экранного напряжения	КБГ-И-600-0,01-II	
C_{131}	Конденсатор фильтра в общей цепи накала ламп	ОКСО-5-250-Б-10000-II	
C_{132}	Конденсатор фильтра в цепи СПУ	ОКСО-2-500-Б-680-II	
C_{133}	Конденсатор фильтра в цепи СПУ	ОКСО-2-500-Б-680-II	
C_{134}*	Конденсатор «Удлиняющий» в аноде 2-го УВЧ 1-го поддиапазона	ОКСО-2-500-Б-4700-II	Подбирается при регулировке от 4700 *пф* до 10000 *пф*
C_{135}	Конденсатор подстроечный контура 2-го УВЧ 1-го поддиапазона	$C = 3 \div 18$ *пф*	
C_{135a}	Конденсатор контура анода 2-го УВЧ на 1-м поддиапазоне	КТК-1а-М-22-II	
C_{136}*	Конденсатор «Удлиняющий» в аноде 2-го УВЧ на 2-м поддиапазоне	ОКСО-5-250-Б-6800-	Подбирается при регулировке от 4700 *пф* до 10000 *пф*
C_{137}	Конденсатор подстроечный контура 2-го УВЧ на 2-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{138}*	Конденсатор «Удлиняющий» в аноде 2-го УВЧ на 3-м поддиапазоне	ОКСО-2-500-Г-470-I	Подбирается при регулировке от 330 *пф* до 1000 *пф*
C_{139}	Конденсатор связи анода 2-го УВЧ с контуром на 3-м поддиапазоне	КТК-1а-М-5-II	
C_{140}	Конденсатор подстроечный контура 2-го УВЧ на 3-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{141}*	Конденсатор «Удлиняющий» в аноде 2-го УВЧ на 4-м поддиапазоне	ОКСО-2-500-Г-470-I	Подбирается при регулировке от 240 *пф* до 820 *пф*
C_{42}	Конденсатор контура 2-го УВЧ на 4-м поддиапазоне	КТК-1а-М-15-I	
$C_{14?}$	Конденсатор подстроечный контура 2-го УВЧ на 4-м поддиапазоне	$C = 3 - 18$ *пф*	
C_{144}	Конденсатор сопрягающий контура 2-го УВЧ на 4-м поддиапазоне	ОКСО-2-500-Г-680-I	
C_{146}*	Конденсатор «Удлиняющий» в аноде 2-го УВЧ на 5-м поддиапазоне	КТК-2а-Д-240-II	Подбирается при регулировке от 91 *пф* (КТК-1Д) до 390 *пф* (КТК-3Д)
C_{147}	Конденсатор контура 2-го УВЧ на 5-м поддиапазоне	КТК-1а-М-22-II	
C_{148}	Конденсатор подстроечный контура 2-го УВЧ на 5-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{149}	Конденсатор сопрягающий контура 2-го УВЧ на 5-м поддиапазоне	ОКСО-2-500-Г-680-I	
C_{151}*	Конденсатор «Удлиняющий» в аноде 2-го УВЧ на 6-м поддиапазоне	КТК-1а-Д-91-II	Подбирается при регулировке от 68 *пф* до 150 *пф*

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C_{152}	Конденсатор контура 2-го УВЧ на 6-м поддиапазоне	КТК-1а-М-33-I	
C_{153}	Конденсатор подстроечный контура 2-го УВЧ на 6-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{154}	Конденсатор сопрягающий сеточного контура смесителя на 6-м поддиапазоне	КТК-3а-М-150-I	
C_{155}	Конденсатор сопрягающий сеточного контура смесителя на 6-м поддиапазоне	КТК-3а-М-150-I	
C_{156}*	Конденсатор «Удлиняющий» в аноде 2-го УВЧ на 7-м поддиапазоне	КТК-2а-М-47-II	Подбирается при регулировке от 33 *пф* до 62 *пф*
C_{157}	Конденсатор контура 2-го УВЧ на 7-м поддиапазоне	КТК-1а-М-33-I	
C_{158}	Конденсатор подстроечный контура 2-го УВЧ на 7-м поддиапазоне	$C = 3 \div 18$ *пф*	
C_{159}	Конденсатор сопрягающий контура 2-го УВЧ на 7-м поддиапазоне	КТК-3а-М-150-I	
C_{160}	Конденсатор сопрягающий контура 2-го УВЧ на 7-м поддиапазоне	КТК-1а-М-22-I	
C_{161}	Конденсатор сопрягающий контура 2-го УВЧ на 7-м поддиапазоне	КТК-1а-М-22-I	
C_{162}	Конденсатор переменный контура 2-го УВЧ	$C_{мин} = 20$ *пф* $C_{макс} = 300$ *пф*	
C_{163}	Конденсатор развязки в аноде 2-го УВЧ	БГМ-2-400-0,05-II	
C_{164}	Конденсатор развязки сопротивления шунта 2-го УВЧ	КБГ-И-600-0,01-II	
C_{165}	Конденсатор связи 2-го УВЧ со смесителем	КТК-1а-Д-150-II	
C_{166}*	Конденсатор связи 2-го гетеродина с 3-м УПЧ	КТК-1а-Д-10-II	Подбирается при регулировке от 4 до 91 *пф*
C_{167}	Конденсатор связи смесителя с 1-м гетеродином	КТК-2а-М-51-II	
C_{168}	Конденсатор блокировки сопротивления автоматического смещения смесителя	БГМ-2-400-0,05-II	
C_{169}	Конденсатор блокировки экранной сетки смесителя	БГМ-2-400-0,05-II	
C_{170}	Конденсатор блокировки экранной сетки 1-го гетеродина	КБГ-И-600-0,01-II	
C_{171}	Конденсатор фильтра анодного напряжения 2-го гетеродина	ОКСО-5-250-Б-10000-I	
C_{172}	Конденсатор развязки в анодной цепи 1-го гетеродина	БГМ-2-400-0,05-II	
C_{173}	Конденсатор 1-го контура кварцевого фильтра	КТК-3а-Р-51-I	
C_{174}	Конденсатор 1-го контура кварцевого фильтра	КТК-3а-М-150-I	
C_{175}	Конденсатор подстроечный 1-го контура кварцевого фильтра	$C = 5 \div 30$ *пф*	
C_{176}	Конденсатор развязки анодного контура ФПЧ-1 и кварцевого фильтра	БГМ-2-400-0,05-II	
C_{177}	Конденсатор 1-го контура ФПЧ-1	КТК-3а-Р-51-I	
C_{178}	Конденсатор 1-го контура ФПЧ-1	КТК-3а-М-150-I	
C_{179}	Конденсатор блокировки сопротивления шунта смесителя	БГМ-2-400-0,05-II	
C_{180}	Конденсатор полупеременный нейтродинный ФПЧК	КПК-1-8/30	
C_{181}*	Конденсатор связи 1-го контура со 2-м контуром ФПЧ-1	КБГ-И-400-0,03-I	Ставится при регулировке КБГ-И-600-0,025-II
C_{182}	Конденсатор 2-го контура ФПЧ-1	КТК-3а-М-150-I	
C_{183}	Конденсатор 2-го контура ФПЧ-1	КТК-3а-Р-51-I	
C_{184}	Конденсатор подстроечный 2-го контура кварцевого фильтра	$C = 5 \div 30$ *пф*	
C_{185}	Конденсатор 2-го контура кварцевого фильтра	КТК-3а-М-130-I	
C_{186}	Конденсатор 2-го контура кварцевого фильтра	КТК-3а-Р-51-I	
C_{187}	Конденсатор развязки 1-го контура ФПЧ-1 или 1-го контура ФПЧК	КБГ-И-600-0,01-II	
C_{188}	Конденсатор блокировки сопротивления автоматического смещения 1-го УПЧ	БГМ-2-400-0,05-II	
C_{189}	Конденсатор развязки анодного контура ФПЧ-2	БГМ-2-400-0,05-II	

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C_{190}	Конденсатор блокировки экранной сетки 1-го УПЧ	БГМ-2-400-0,05-II	
C_{191}	Конденсатор развязки сопротивления шунта 1 го УПЧ	БГМ-2-400-0,05-II	
C_{192}	Конденсатор 1-го контура ФПЧ-2	КТК-3а-Р-51-I	
C_{193}	Конденсатор 1-го контура ФПЧ-2	КТК-3а-М-150-I	
C_{194}*	Конденсатор связи 1-го контура со 2-м контуром ФПЧ-2	КБГ-И-400-0,03-I	Ставится при регулировке КБГ-И-600-0,025-II
C_{195}	Конденсатор 2-го контура ФПЧ-2	КТК-3а-М-150-I	
C_{196}	Конденсатор 2-го контура ФПЧ-2	КТК-3а-Р-51-I	
C_{197}	Конденсатор развязки 2-го контура ФПЧ-2	КБГ-И-600-0,01-II	
C_{198}	Конденсатор блокировки сопротивления автоматического смещения 2-го УПЧ	БГМ-2-400-0,05-II	
C_{199}	Конденсатор фильтра выпрямителя	КЭГ-1-В $\frac{300}{10}$ *ом*	
C_{200}	Конденсатор фильтра выпрямителя	КЭГ-1-В $\frac{300}{10}$ *ом*	
C_{201}	Конденсатор блокировки экранной сетки 2-го УПЧ	БГМ-2-400-0,05-II	
C_{202}	Конденсатор развязки анодного контура ФПЧ-3	БГМ-2-400-0,05-II	
C_{203}	Конденсатор развязки сопротивления шунта 2-го УПЧ	БГМ-2-400-0,05-II	
C_{204}	Конденсатор 1-го контура ФПЧ-3	КТК-3а-Р-51-I	
C_{205}	Конденсатор 1-го контура ФПЧ-3	КТК-3а-М-150-I	
C_{206}	Конденсатор связи 1-го контура со 2-м контуром ФПЧ-3	КБГ-И-400-0,03-I	
C_{207}	Конденсатор 2-го контура ФПЧ-3	КТК-3а-М-150-I	
C_{208}	Конденсатор 2-го контура ФПЧ-3	КТК-3а-Р-51-I	
C_{209}	Конденсатор связи 3-го УПЧ со 2-м гетеродином	КТК-1а-Д-4-II	
C_{210}	Конденсатор блокировки сопротивления автоматического смещения 3-го УПЧ	БГМ-2-400-0,05-II	
C_{211}	Конденсатор связи 3-го УПЧ с детектором АРЧ	КТК-1а-Д-91-II	
C_{212}	Конденсатор развязки анодного контура ФПЧ-4	БГМ-2-400-0,05-II	
C_{213}	Конденсатор блокировки экранной сетки 3-го УПЧ	БГМ-2-400-0,05-II	
C_{214}	Конденсатор развязки сопротивления шунта 3-го УПЧ	БГМ-2-400-0,05-II	
C_{215}	Конденсатор 1-го контура ФПЧ-4	КТК-3а-Р-51-I	
C_{216}	Конденсатор 1-го контура ФПЧ-4	КТК-3а-М-150-I	
C_{217}	Конденсатор связи 1-го контура ФПЧ-4 со 2-м контуром	КБГ-И-400-0,03-I	
C_{218}	Конденсатор 2-го контура ФПЧ-4	КТК-3а-М-150-I	
C_{219}	Конденсатор 2-го контура ФПЧ-4	КТК-3а-Р-51-I	
C_{220}	Конденсатор связи детектора сигнала с УНЧ	ОКСО-5-250-Б-10000-II	
C_{221}	Конденсатор, шунтирующий сопротивление нагрузки детектора	КТК-1а-Д-120-II	
C_{222}	Конденсатор блокировки в катоде детектора АРЧ	БГМ-2-400-0,05-II	
C_{223}	Конденсатор фильтра АРЧ	КБГ-1-М-400-0,1-II	
C_{224}	Конденсатор связи антенны с входным контуром на 3-м поддиапазоне	КДК-1а-Д-5 $\pm$ 0,4 *пф*	
C_{247}	Конденсатор блокировки анодной цепи	КЭГ-1-В- $\frac{300}{10}$ *ом*	
C_{248}	Конденсатор блокировки цепи смещения	КЭГ-1-В- $\frac{50}{50}$ *ом*	

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R_1	Сопротивление переменное РРГ	СП-III-ОС-5-20-гр. IV-А0,5 *вт* 2,2М-10%	
R_2	Сопротивление добавочное к прибору для замера анодного напряжения	ВС-0,5-1-360 *ком*-II-А	
R_3	Сопротивление переменное РРЧ	СП-III-ОС-5-20-гр. IV-БI *вт* 22К-10%	
R_4*	Сопротивление шунта для измерения анодного тока кварцевого калибратора	ВС-0,25-1-270-II	Подбирается от 56 *ом* до 300 *ом*
R_5*	Сопротивление шунта для измерения анодного тока 2-го гетеродина	ВС-0,25-1-10- *ком*-II	Подбирается при регулировке от 3,6 *ком* до 15 *ком*
R_6	Сопротивление добавочное к прибору	Проволочное 1000 *ом*-II	
R_7	Сопротивление переменное регулировки интенсивности освещения шкалы	Проволочное перем.	
R_8	Сопротивление утечки управляющей сетки УНЧ	ВС-0,25-1-100 *ком*-II-А	
R_9	Сопротивление отрицательной обратной связи УНЧ	ВС-0,25-1-680 *ком*-II-А	
R_{10}	Сопротивление автоматического смещения выходного каскада УНЧ	ВС-1,0-1-1 *ком*-II	
R_{11}	Сопротивление развязки управляющей сетки 1-го УВЧ	ВС-0,25-1-100 *ком*-II-А	
R_{12}	Сопротивление автоматического смещения 1-го УВЧ	ВС-0,25-1-270-II	
R_{13}*	Сопротивление шунта для измерения анодного тока УНЧ	ВС-0,25-1-33-II	Подбирается при регулировке от 20 *ом* до 51 *ом*
R_{14}	Сопротивление потенциометра в экранной сетке 1-го УВЧ	МЛТ-2-1-22 *ком*-II	
$R_{14п}$	Сопротивление потенциометра в экранной сетке 1-го УВЧ	МЛТ-1-1-22 *ком*-II	
R_{15}*	Сопротивление контура 1-го УВЧ 1-го поддиапазона	ВС-0,25-1-100 *ком*-II-А	Подбирается при регулировке от 47 *ком* до 180 *ком*
R_{16}	Сопротивление утечки управляющей сетки кварцевого калибратора	ВС-0,25-1-56 *ком*-II-А	
R_{17}	Сопротивление развязки в аноде 1-го УВЧ	ВС-1-1-33 *ком*-II-А	
R_{18}*	Сопротивление шунта для измерения анодного тока 1-го УВЧ	ВС-0,25-1-270-II	Подбирается при регулировке от 100 *ом* до 510 *ом*
R_{19}	Сопротивление утечки управляющей сетки 2-го УВЧ	ВС-0,25-1-100 *ком*-II-А	
R_{20}	Сопротивление развязки управляющей сетки 2-го УВЧ	ВС-0,25-1-100 *ком*-II-А	
R_{21}	Сопротивление автоматического смещения 2-го УВЧ	ВС-0,25-1-270-II	
R_{22}	Сопротивление автоматического смещения предварительного каскада УНЧ	ВС-0,25-1-1,5 *ком*-II	
R_{23}	Сопротивление гасящее в цепи анода кварцевого калибратора	ВС-0,25-1-56 *ком*-II-А	
R_{24}	Сопротивление потенциометра в экранной сетке 2-го УВЧ	МЛТ-2-1-22 *ком*-II	
$R_{24п}$	Сопротивление потенциометра в экранной сетке 2-го УВЧ	МЛТ-1-1-22 *ком*-II	
R_{25}*	Сопротивление шунта для измерений анодного тока 2-го УВЧ	ВС-0,25-1-270-II	Подбирается при регулировке от 100 *ом* до 510 *ом*
R_{26}	Сопротивление утечки управляющей сетки 1-го гетеродина	ВС-0,25-1-1,0 *ком*-II	
R_{27}	Сопротивление утечки управляющей сетки 2-го гетеродина	ВС-0,25-1-330 *ком*-II-А	
R_{28}	Сопротивление развязки в аноде 2-го УВЧ	ВС-1-1-33 *ком*-II-А	
R_{29}	Сопротивление утечки 2-й сигнальной сетки смесителя	ВС-0,25-1-150 *ком*-II-А	
R_{30}	Сопротивление утечки 1-й сигнальной сетки смесителя	ВС-0,25-1-22 *ком*-II-А	
R_{32}	Сопротивление гасящее анодной цепи 2-го гетеродина	ВС-0,25-1-330 *ком*-II-А	
R_{33}	Сопротивление автоматического смещения смесителя	ВС-0,25-1-270-I	

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R_{34}	Сопротивление потенциометра в анодной цепи 1-го гетеродина	МЛТ-1-1-33 *ком*-II	
R_{35}	Сопротивление потенциометра в анодной цепи 1-го гетеродина	ВС-0,5-1-15 *ком*-II-А	
R_{36}	Сопротивление фильтра анодного напряжения 2-го гетеродина	ВС-0,25-1-100 *ком*-II-А	
R_{37}	Сопротивление гасящее в экранной сетке смесителя	ВС-1,0-1-39 *ком*-II-А	
R_{38}	Сопротивление нагрузки стабиловольта	МЛТ-2,0-1-1,8 *ком*-II	Ставятся последовательно
$R_{38п}$	Сопротивление нагрузки стабиловольта	МЛТ-2,0-1-1,8 *ком*-II	
R_{39}	Сопротивление развязки анодного контура ФПЧ-1 и кварцевого фильтра	ВС-0,5-1-33 *ком*-II-А	
R_{40}*	Сопротивление шунта для измерения анодного тока смесителя	ВС-0,25-1-1 *ком*-II	Подбирается при регулировке от 680 *ом* до 5,1 *ком*
R_{41}	Сопротивление утечки управляющей сетки 1-го УПЧ	ВС-0,25-1-100 *ком*-II-А	
R_{42}*	Сопротивление автоматического смещения 1-го УПЧ	ВС-0,25-1-470-II	Подбирается при регулировке от 270 *ом* до 470 *ом*
R_{43}	Сопротивление потенциометра в экранной сетке 1-го УПЧ	МЛТ-2-1-22 *ком*-II	
$R_{43п}$	Сопротивление потенциометра в экранной сетке 1-го УПЧ	МЛТ-1-1-22 *ком*-II	
R_{44}*	Сопротивление начального смещения	МЛТ-2,0-1-180 *ом*-II	Подбирается при регулировке от 160 *ом* до 270 *ом*. Ставятся последовательно
$R_{44п}$	Сопротивление начального смещения	МЛТ-2,0-1-180 *ом*-II	
R_{45}	Сопротивление развязки анодного контура	ВС-1-1-33 *ком*-II-А	
R_{46}*	Сопротивление шунта для измерения анодного тока 1-го УПЧ	ВС-0,25-1-270-II	Подбирается при регулировке от 100 *ом* до 470 *ом*
R_{47}	Сопротивление развязки управляющей сетки 2-го УПЧ	ВС-0,25-1-100 *ком*-II-А	
R_{48}*	Сопротивление автоматического смещения 2-го УПЧ	ВС-0,25-1-470-II	Подбирается при регулировке от 270 *ом* до 470 *ом*
R_{49}	Сопротивление потенциометра в экранной сетке 2-го УПЧ	МЛТ-2-1-22 *ком*-II	
$R_{49п}$	Сопротивление потенциометра в экранной сетке 2-го УПЧ	МЛТ-1-1-22 *ком*-II	
R_{50}	Сопротивление развязки анодного контура ФПЧ-3	ВС-0,5-1-33 *ком*-II-А	
R_{51}*	Сопротивление шунта для измерения анодного тока 2-го УПЧ	ВС-0,25-1-270-II	Подбирается при регулировке от 100 *ом* до 470 *ом*
R_{52}	Сопротивление автоматического смещения 3-го УПЧ	ВС-0,25-1-270-II	
R_{53}	Сопротивление гасящее в экранной сетке 3-го УПЧ	ВС-0,5-1-68 *ком*-II-А	
R_{54}	Сопротивление развязки анодного контура ФПЧ-4.	ВС-1-1-15 *ком*-II-А	
R_{55}*	Сопротивление шунта для измерения анодного тока 3-го УПЧ	ВС-0,25-1-270-II	Подбирается при регулировке от 100 *ом* до 510 *ом*
R_{56}	Сопротивление нагрузки детектора сигнала	ВС-0,25-1-220 *ком*-II-А	
R_{57}	Сопротивление нагрузки детектора сигнала	ВС-0,25-1-330 *ком*-II-А	
R_{58}	Сопротивление потенциометра задержки детектора АРЧ	ВС-0,25-1-680 *ком*-II-А	
R_{59}	Сопротивление нагрузки детектора АРЧ	ВС-0,25-1-470 *ком*-II-А	
R_{60}*	Сопротивление потенциометра задержки детектора АРЧ	ВС-0,25-1-47 *ком*-II-А	Подбирается при регулировке от 33 *ком* до 62 *ком*
R_{61}	Сопротивление фильтра АРЧ	ВС-0,25-1-100 *ком*-II-А	
R_{62}	Сопротивление утечки сетки предварительного усилителя низкой частоты	ВС-0,25-1-390 *ком*-II-А	

№ марк	Наименование	Основная характеристика	Примечание
R_{63}*	Сопротивление делителя усилителя низкой частоты	ВС-0,25-1-390 *ком*-II-А	**Подбирается при регулировке от 220 *ком* до 680 *ком***
R_{65}	Сопротивление утечки сетки 1-го УВЧ	ВС-0,25-1-470 *ком*-II-А	
R_{66}	Сопротивление анодной нагрузки предварительного каскада УНЧ	ВС-0,25-1-300 *ком*-II-А	
L_1	Дроссель ВЧ антенного фильтра	$L = 0,1 \pm 20\%$ *мкгн*	
L_2	Дроссель ВЧ антенного фильтра	$L = 0,1 \pm 20\%$ *мкгн*	
L_3	Антенная катушка 1-го поддиапазона	$L = 13300 \pm 5\%$ *мкгч*	
L_4	Катушка входного контура 1-го поддиапазона	$L = 5100 \pm 5\%$ *мкгн*	
L_5	Антенная катушка на 2-м поддиапазоне	$L = 4500 \pm 5\%$ *мкгн*	
L_6	Катушка входного контура на 2-м поддиапазоне	$L = 1200 \pm 5\%$ *мкгн*	
L_7	Катушка входного контура на 3-м поддиапазоне	$L = 18,6 \pm 5\%$ *мкгн*	
L_8	Катушка входного контура на 4-м поддиапазоне	$L = 6,8 \pm 5\%$ *мкгн*	
L_9	Катушка входного контура на 5-м поддиапазоне	$L = 1,9 \pm 10\%$ *мкгн*	
L_{10}	Катушка входного контура на 6-м поддиапазоне	$L = 0,85 \pm 10\%$ *мкгн*	
L_{11}	Катушка входного контура на 7-м поддиапазоне	$L = 0,4 \pm 10\%$ *мкгн*	
L_{12}	Антенная катушка на 3-м поддиапазоне	$L = 78 \pm 10\%$ *мкгн*	
L_{13}	Антенная катушка на 4-м поддиапазоне	$L = 29,5 \pm 10\%$ *мкгн*	
L_{14}	Антенная катушка на 5 м поддиапазоне	$n = 9$ витков	
L_{15}	Антенная катушка на 6-м поддиапазоне	$n = 8$ витков	
L_{16}	Антенная катушка на 7-м поддиапазоне	$n = 6$ витков	
L_{17}	Катушка индуктивности режекторного фильтра	$L = 28 \pm 5\%$ *мкгн*	
L_{18}	Катушка индуктивности контура 1-го УВЧ 1-го поддиапазона	$L = 4650 \pm 5\%$ *мкгн*	

L_{19}	Катушка контура 1-го УВЧ на 2-м поддиапазоне	$L = 1050 \pm 5\%$ *мкгн*
L_{20}	Катушка контура 1-го УВЧ на 3-м поддиапазоне	$L = 17,0 \pm 5\%$ *мкгн*
L_{21}	Катушка контура 1-го УВЧ на 4-м поддиапазоне	$L = 15 \pm 5\%$ *мкгн*
L_{22}	Катушка контура 1-го УВЧ на 5-м поддиапазоне	$L = 1,9 \pm 10\%$ *мкгн*
L_{23}	Катушка контура 1-го УВЧ на 6-м поддиапазоне	$L = 0,85 \pm 10\%$ *мкгн*
L_{24}	Катушка контура 1-го УВЧ на 7-м поддиапазоне	$L = 0,46 \pm 10\%$ *мкгн*
L_{25}	Дроссель фильтра в общей цепи анодного напряжения	$L = 0,5 \pm 10\%$ *мкгн*
L_{26}	Дроссель фильтра в общей цепи экранного напряжения	$L = 0,5 \pm 10\%$ *мкгн*
L_{27}	Дроссель фильтра в общей цепи накала ламп	$L = 0,5 \pm 10\%$ *мкгн*
L_{28}	Катушка контура 1-го гетеродина на 1-м поддиапазоне	$L = 230 \pm 5\%$ *мкгн*
L_{29}	Катушка контура 1-го гетеродина на 2-м поддиапазоне	$L = 140 \pm 5\%$ *мкгн*
L_{30}	Катушка контура 1-го гетеродина на 3-м поддиапазоне	$L = 12 \pm 5\%$ *мкгн*
L_{31}	Катушка 1-го гетеродина на 4-м поддиапазоне	$L = 4,55 \pm 10\%$ *мкгн*
L_{32}	Катушка контура 1-го гетеродина на 5-м поддиапазоне	$L = 1,85 \pm 10\%$ *мкгн*
L_{33}	Катушка контура 1-го гетеродина на 6-м поддиапазоне	$L = 0,75 \pm 10\%$ *мкгн*
L_{34}	Катушка контура 1-го гетеродина на 7-м поддиапазоне	$L = 0,54 \pm 10\%$ *мкгн*
L_{35}	Дроссель фильтра в общей цепи анодного напряжения	$L = 0,5 \pm 10\%$ *мкгн*
L_{36}	Дроссель фильтра в общей цепи экранного напряжения	$L = 0,5 \pm 10\%$ *мкгн*
L_{37}	Дроссель фильтра в общей цепи накала ламп	$L = 0,5 \pm 10\%$ *мкгн*

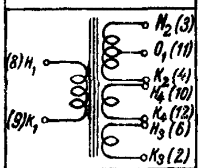
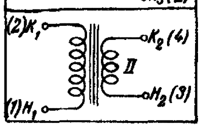
№ марк.	Наименование	Основная характеристика	Примечание
L_{38}	Дроссель фильтра в цепи СПУ	$L = 0,5 \pm 10\%$ *мкгн*	
L_{39}	Дроссель фильтра в цепи СПУ	$L = 0,5 \pm 10\%$ *мкгн*	
L_{40}	Катушка индуктивности контура 2-го гетеродина	$L = 100 \pm 10\%$ *мкгн*	
L_{41}	Дроссель фильтра в общей цепи анодного напряжения	$L = 560 \pm 10\%$ *мкгн*	
L_{42}	Дроссель фильтра в общей цепи экранного напряжения	$L = 1600 \pm 10\%$ *мкгн*	
L_{43}	Дроссель фильтра в общей цепи накала ламп	$L = 3 \pm 10\%$ *мкгн*	
L_{44}	Дроссель фильтра в цепи СПУ	$L = 0,5 \pm 10\%$ *мкгн*	
L_{45}	Дроссель фильтра в цепи СПУ	$L = 0,5 \pm 10\%$ *мкгн*	
L_{46}	Катушка связи анода 2-го УВЧ с контуром на 1-м поддиапазоне	$L = 760 \pm 10\%$ *мкгн*	
L_{47}	Катушка контура 2-го УВЧ 1-го поддиапазона	$L = 4700 \pm 5\%$ *мкгн*	
L_{49}	Катушка связи анода 2-го УВЧ с контуром на 2-м поддиапазоне	$L = 200 \pm 5\%$ *мкгн*	
L_{50}	Катушка контура 2-го УВЧ на 2-м поддиапазоне	$L = 1050 \pm 5\%$ *мкгн*	
L_{51}	Катушка связи анода 2-го УВЧ с контуром на 3-м поддиапазоне	$L = 30 \pm 5\%$ *мкгн*	
L_{52}	Катушка контура 2-го УВЧ на 3-м поддиапазоне	$L = 19,5 \pm 5\%$ *мкгн*	
L_{53}	Катушка связи анода 2-го УВЧ с контуром на 4-м поддиапазоне	$L = 15 \pm 10\%$ *мкгн*	
L_{54}	Катушка контура 2-го УВЧ на 4-м поддиапазоне	$L = 5,8 \pm 5\%$ *мкгн*	
L_{55}	Катушка связи анода 2-го УВЧ с контуром на 5-м поддиапазоне	$n = 12$ витков	
L_{56}	Катушка контура 2-го УВЧ на 5-м поддиапазоне	$L = 1,9 \pm 10\%$ *мкгн*	
L_{57}	Катушка связи анода 2-го УВЧ с контуром на 6-м поддиапазоне	$n = 8$ витков	

L_{58}	Катушка контура 2-го УВЧ на 6-м поддиапазоне	$L = 0,85 \pm 10\%$ *мкгн*
L_{59}	Катушка связи анода 2-го УВЧ с контуром на 7-м поддиапазоне	$n = 6$ витков
L_{60}	Катушка контура 2-го УВЧ на 7-м поддиапазоне	$L = 0,46 \pm 10\%$ *мкгн*
L_{61}	Катушка индуктивности 1-го контура кварцевого фильтра	$L = 190 \pm 10\%$ *мкгн*
L_{62}	Катушка индуктивности 2-го контура кварцевого фильтра	$L = 100 \pm 10\%$ *мкгн*
L_{63}	Катушка индуктивности 1-го контура ФПЧ-1	$L = 100 \pm 10\%$ *мкгн*
L_{64}	Катушка индуктивности 2-го контура ФПЧ-1	$L = 100 \pm 10\%$ *мкгн*
L_{65}	Катушка индуктивности 1-го контура ФПЧ-2	$L = 100 \pm 10\%$ *мкгн*
L_{66}	Катушка индуктивности 2-го контура ФПЧ-2	$L = 100 \pm 10\%$ *мкгн*
L_{67}	Катушка индуктивности 1-го контура ФПЧ-3	$L = 100 \pm 10\%$ *мкгн*
L_{68}	Катушка индуктивности 2-го контура ФПЧ-3	$L = 100 \pm 10\%$ *мкгн*
L_{69}	Катушка индуктивности 1-го контура ФПЧ-4	$L = 100 \pm 10\%$ *мкгн*
L_{70}	Катушка индуктивности 2-го контура ФПЧ-4	$L = 100 \pm 10\%$ *мкгн*
Тр-1	Выходной трансформатор	
Тр-2	Трансформатор силовой	
Др-1	Дроссель фильтра выпрямителя	
Ф-1	Фишка питания	
Ф-2	Фишка выпрямителя	
$Л_1$	Неоновая лампа	МН-3
$Л_2$	Лампа 1-го каскада УВЧ	6К4
$Л_3$	Лампа 2-го каскада УВЧ	6К4
$Л_4$	Лампа смесителя	6А7
$Л_5$	Стабиловольт	СГ-4С
$Л_6$	Лампа 1-го гетеродина	6Ж1П
$Л_7$	Лампа 1-го каскада УПЧ	6К4

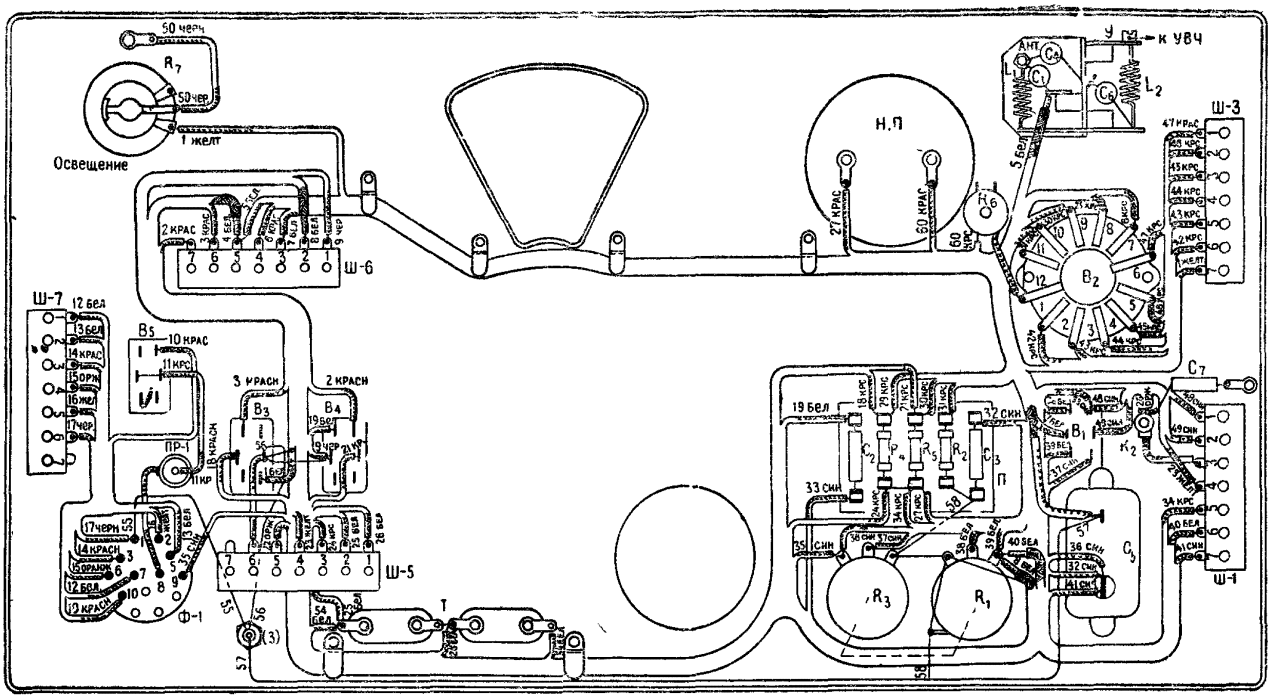
№ марк.	Наименование	Основная характеристика	Примечание
$Л_8$	Лампа 2-го каскада УПЧ	6К4	
$Л_9$	Лампа 3-го каскада УПЧ	6К4	
$Л_{10}$	Лампа детектора сигнала и детектора АРЧ	6Х6С	
$Л_{11}$	Лампа оконечного УНЧ	6П6С	
$Л_{12}$	Лампа кварцевого калибратора и предварительного каскада УНЧ	6Н8С	
$Л_{13}$	Лампа 2-го гетеродина	6А7	
$Л_{14}$	Лампа выпрямителя	5Ц4С	
$Л_{15}$	Лампочка подсветки шкалы	МН-14; 6,3 × 0,28 *а*	
$Л_{16}$	Лампочка подсветки шкалы	МН-14; 6,3 × 0,28 *а*	
В-1	Тумблер	Переключатель «АРЧ—РРЧ»	
П-2	Переключатель шунтов для измерения режима ламп		
В-3	Тумблер	«Калибр. — Выкл.»	
В-4	Тумблер	«ТЛФ—ТЛГ»	
В-5	Тумблер	«Питание»	
П-6	Переключатель кварцевого фильтра		
КВ-1	Кварц—генераторный	1 *мггц*	
КВ-2	Кварц—резонаторный	730 *кгц*	
Пр-1	Предохранитель	1 *а*	

Таблица 3

НАМОТОЧНЫЕ ДАННЫЕ ТРАНСФОРМАТОРОВ И ДРОССЕЛЕЙ

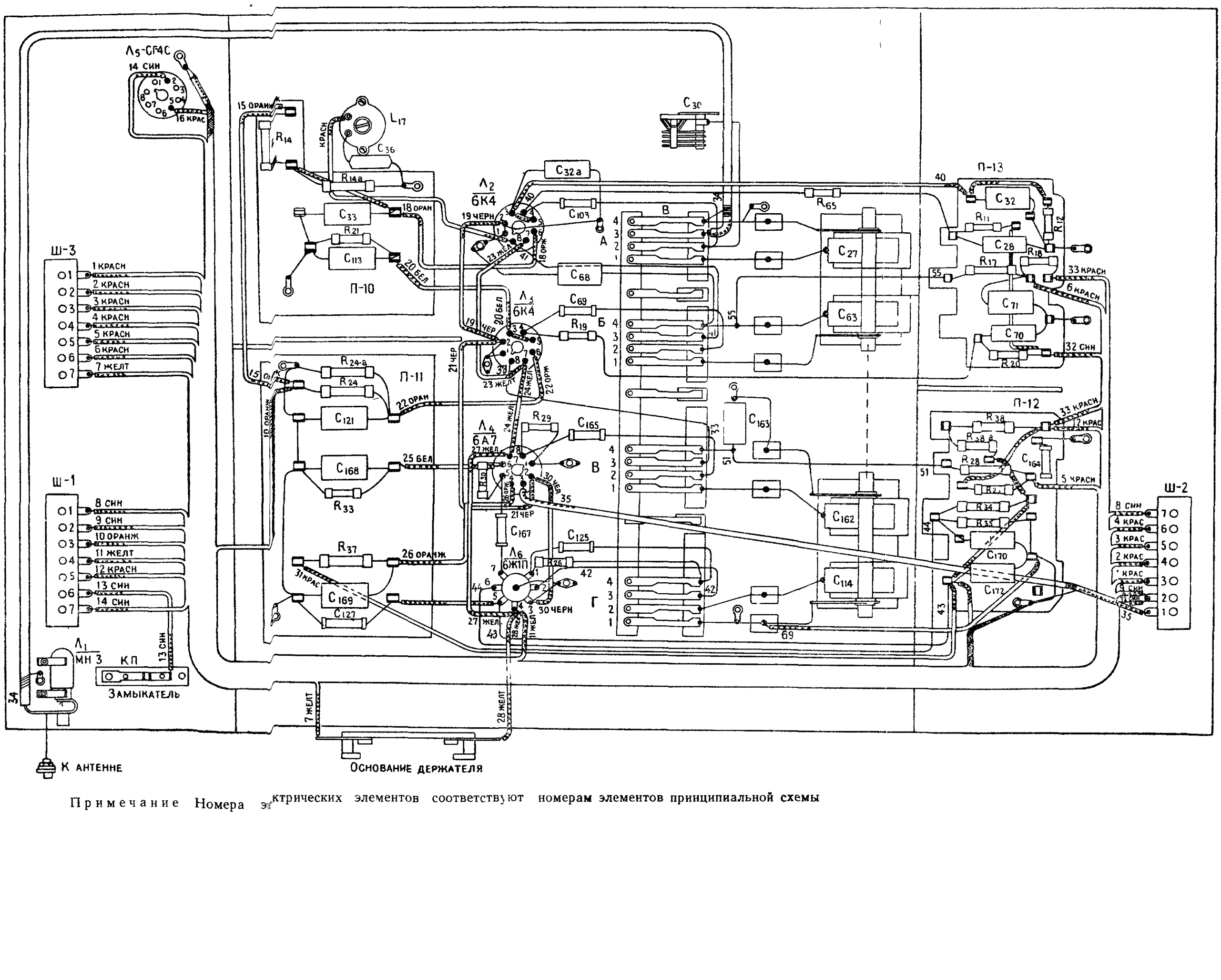
№ п/п	Название детали	Обознач. в принцип схеме	№№ заводских чертежей	Обознач обмоток	Количество витков	Количество слоев	Количество витков в слое	Сопротивлен постоянному току	Наименован провода	Электрическая схема
1	Дроссель выпрямителя	Др-1	ИЖ5.750 005		~1680	24	70	70÷80 *ом*	ПЭЛ ∅ 0,2	
2	Дроссели высокой частоты	L_{25}, L_{35}, L_{41} L_{27}, L_{37}, L_{43} L_{26}, L_{36}, L_{42}	ИЖ5 752 003 ИЖ5 752.002 ИЖ5 750 004		2×100 29 3×150	2секции 1 3секции	100 29 150	7,8÷8,9 *ом* 0,02÷0,03 *ом* 41÷51 *ом*	ПЭЛШО∅0,15 ПЭЛ—1∅1,0 ПЭЛШО∅0,1	
3	Силовой трансформатор	Тр-2	ИЖ5.714 000	I II III IV	207 760 9 12	5 7 1 1	4 слоя-по 41 *в* 1 слой-43 *в* 6 сл-по 110 *в* 1 сл-100 *в* 9 12	2,18÷2,38 *ом* 50÷60 *ом* 0,042÷0,05 *ом* 0,02÷0,036 *ом*	ПЭЛ ∅0,49 ПЭЛ ∅0,2 ПЭЛ ∅0,93 ПЭЛ ∅1,35	
4	Выходной трансформатор	Тр-1	В-13075-502	I II	~1900 ~1530	19 14	100 13 сл.-110 *в* 1 слой-400 *в*	220÷380 *ом* 260÷400 *ом*	ПЭЛ ∅ 0,1 ПЭЛ ∅0,09	

ЭЛЕКТРОМОНТАЖНАЯ СХЕМА ПЕРЕДНЕЙ ПАНЕЛИ



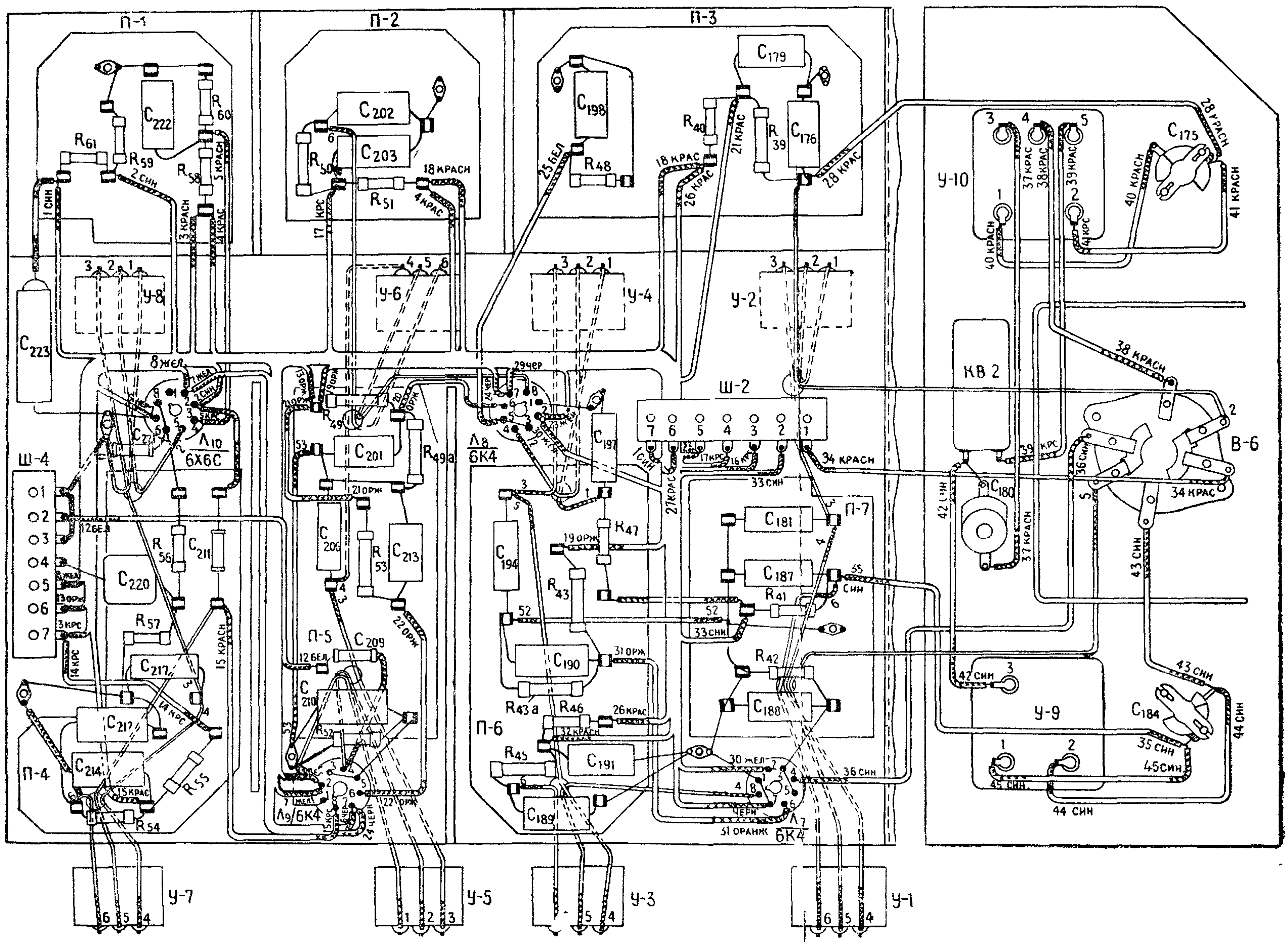
Примечание Номера электрических элементов соответствуют номерам элементов принципиальной схемы

ЭЛЕКТРОМОНТАЖНАЯ СХЕМА БЛОКА ВЫСОКОЙ ЧАСТОТЫ



Примечание Номера электрических элементов соответствуют номерам элементов принципиальной схемы

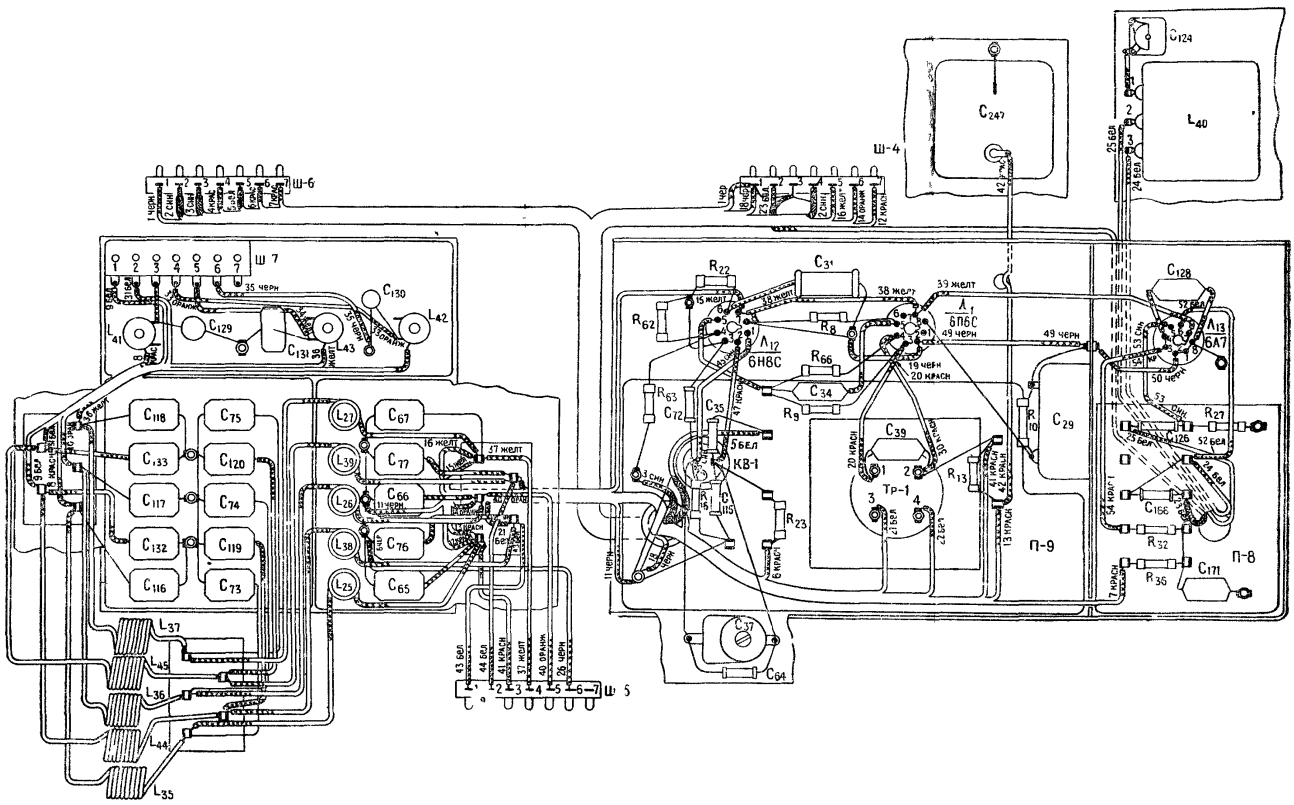
ЭЛЕКТРОМОНТАЖНАЯ СХЕМА БЛОКА ПРОМЕЖУТОЧНОЙ ЧАСТОТЫ



Примечание. Номера электрических элементов соответствуют номерам элементов принципиальной схемы.

ПРИЛОЖЕНИЕ 4

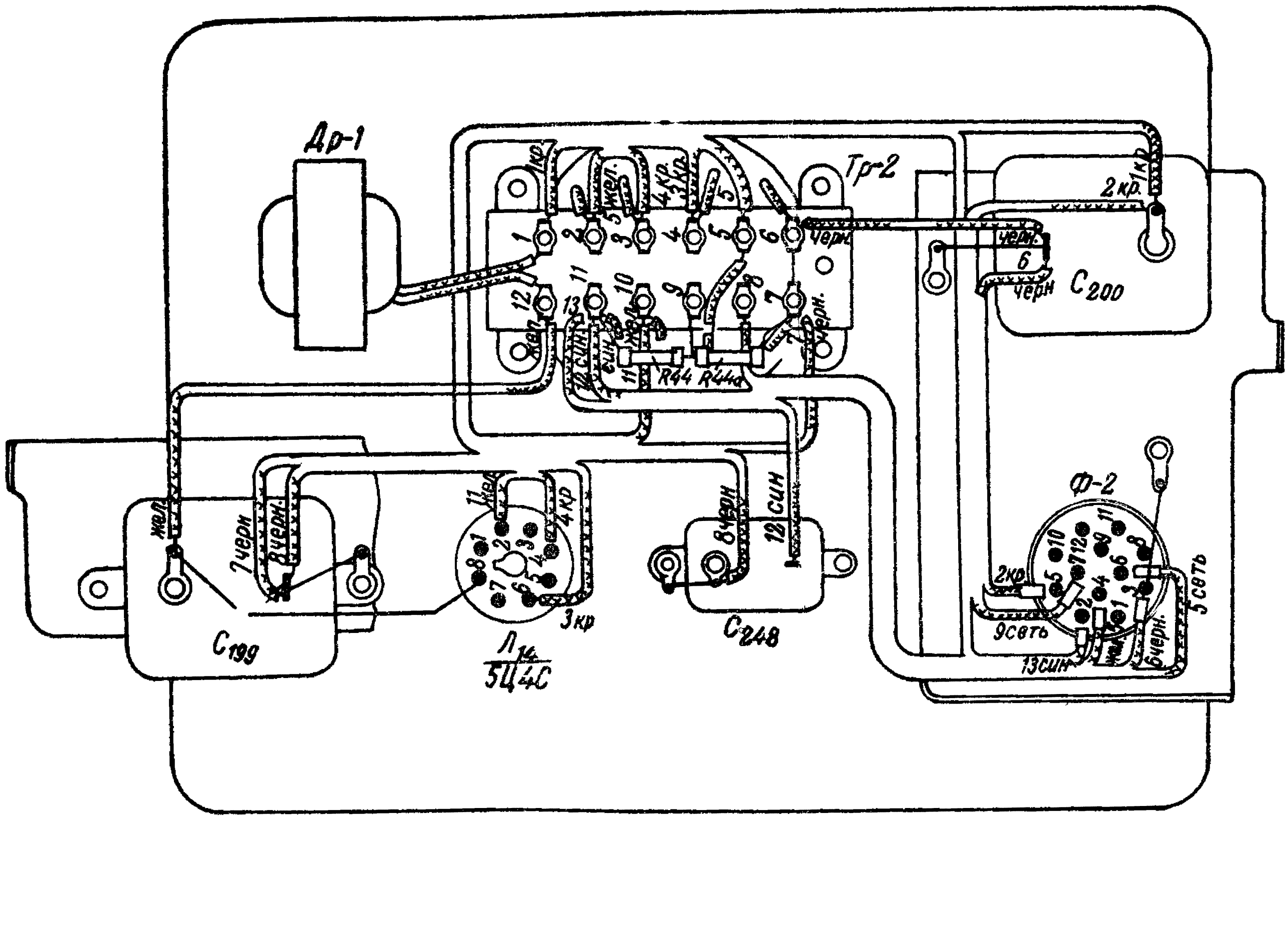
ЭЛЕКТРОМОНТАЖНАЯ СХЕМА БЛОКА НИЗКОЙ ЧАСТОТЫ



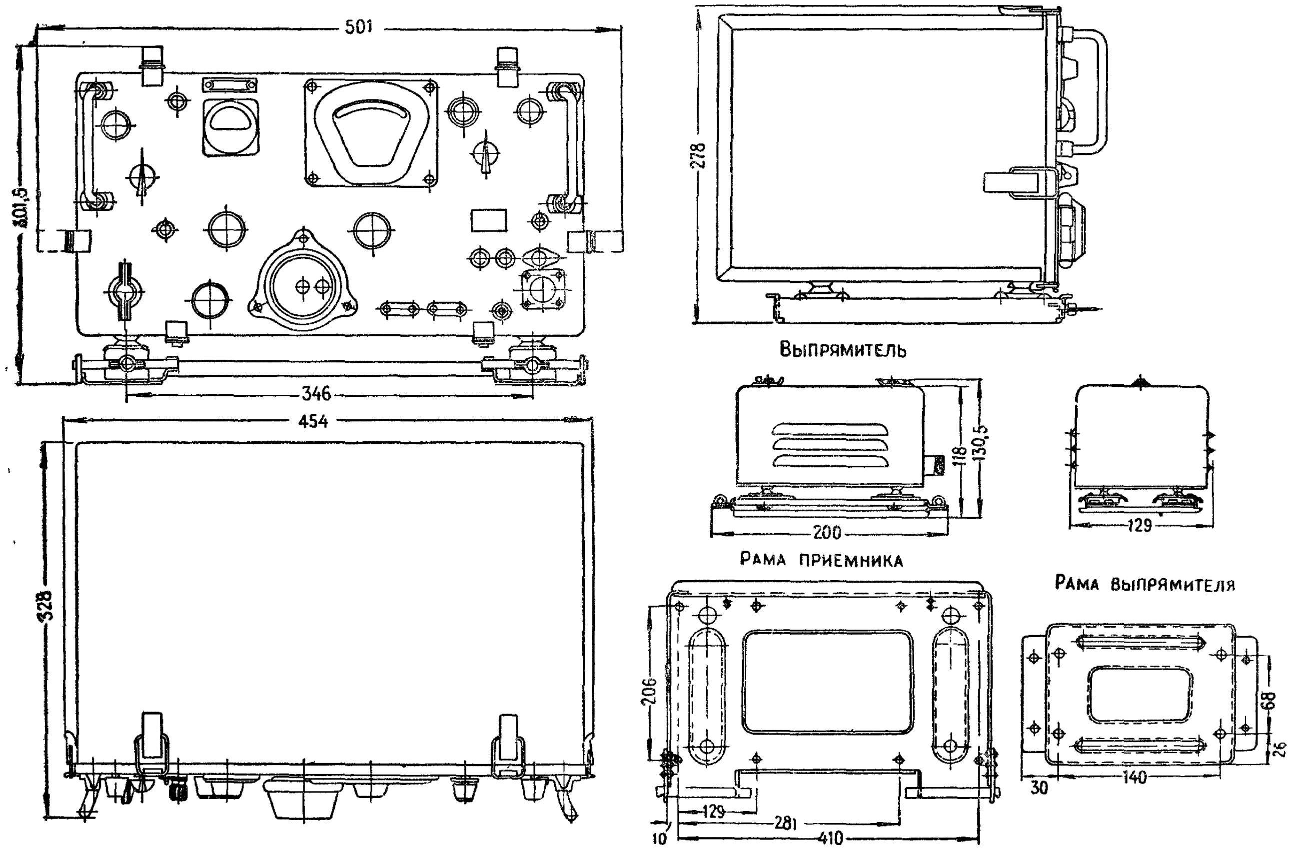
Примечание Номера электрических элементов соответствуют номерам элементов принципиальной схемы

ПРИЛОЖЕНИЕ 5

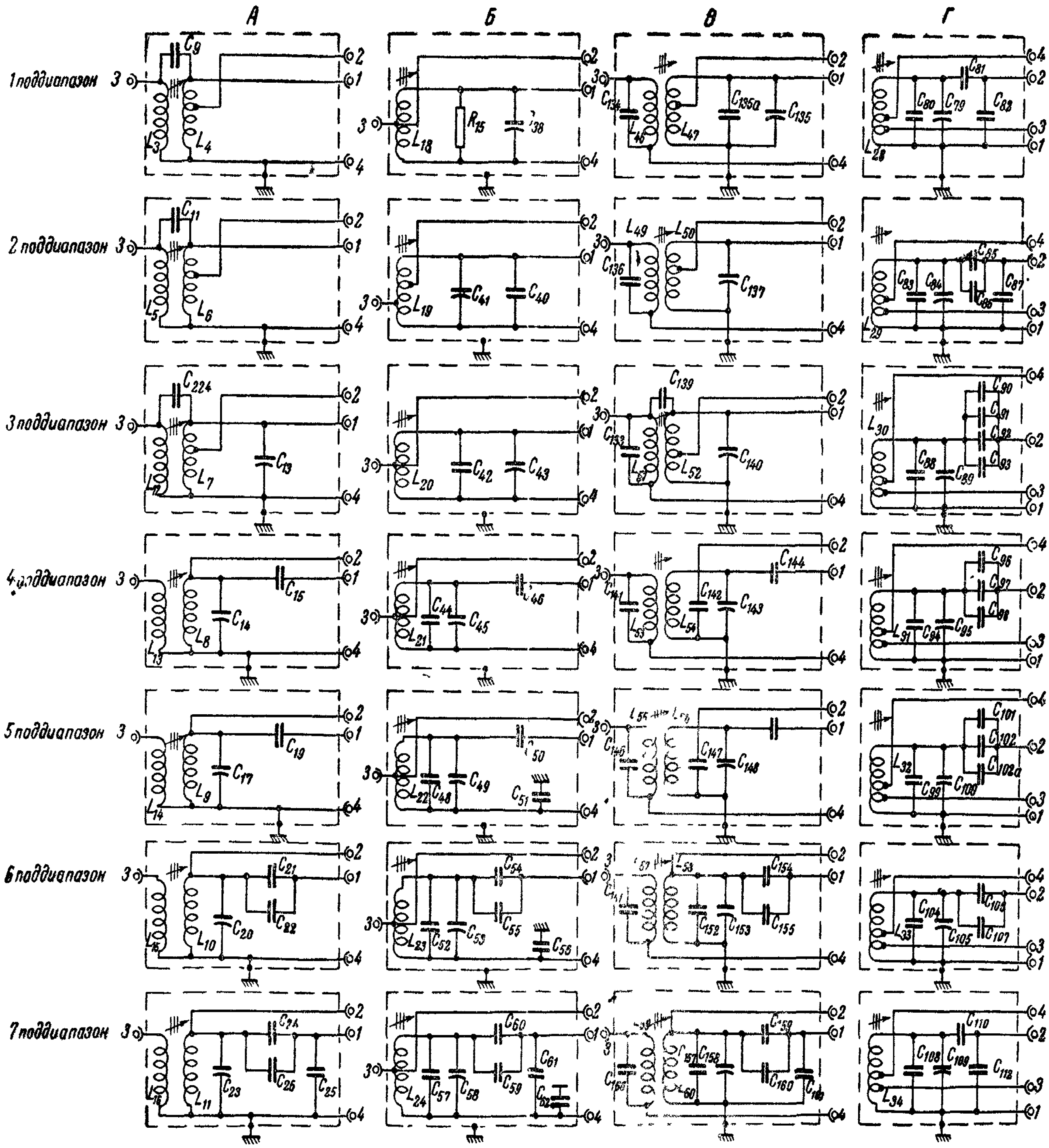
ЭЛЕКТРОМОНТАЖНАЯ СХЕМА ВЫПРЯМИТЕЛЯ



ГАБАРИТНО-УСТАНОВОЧНЫЙ ЧЕРТЕЖ РАДИОПРИЕМНИКА



ПРИНЦИПИАЛЬНАЯ СХЕМА СЕКЦИЙ БАРАБАНА



ПРИНЦИПИАЛЬНАЯ СХЕМА РАДИОПРИЕМНИКА РПС