РАДИОПРИЕМНИК
RADIO RECEIVER
RÉCEPTEUR
RADIORRECEPTOR

«QUARTZ-402»

ИНСТРУКЦИЯ ПО РЕМОНТУ
REPAIR MANUAL
NOTICE DE RÉPARATION
INSTRUCCIONES PARA LA REPARACIÓN

СССР МОСКВА
SSSR MOSKVA

Установка границ диапазонов производится вращением сердечников *L7*, *L8* и *L5*, *L6* и подстройкой емкостей *C6*, *C9*.

Катушки *L1*, *L2* и *L3*, *L4* настраивают передвижением вдоль оси ферритового стержня. Величина напряжения генератора при $U_{вых} = 0{,}23$ *В* является показателем чувствительности приемника.

Частота зеркального канала должна находиться выше частоты основного сигнала на 930 *кГц* и иметь ослабление на диапазоне КВ не менее чем в два раза и на диапазоне СВ — не менее чем в десять раз.

●

Attention! The Manufacturing Works continuously introduces improvements into the design of the radio receiver. Therefore, your set may particularly differ in minor detail from that herebelow described.

SPECIFICATIONS

Range of waves (frequencies):	
MW, m (kHz)	571.4 to 186.9 (525 to 1605)
SW, m (kHz)	50.8 to 24.8 (5.9 to 12.1)
Intermediate frequency, kHz	465±2
Maximum input response at P_{out} =5 mW for built-in magnetic antenna mV/m, better than:	
in MW	0.6
in SW	0.6
Actual response, μV:	
for MW exterior antenna	300
for SW rod antenna	250
Rated output, mW	100
Supply voltage, V	9
Current drain, mA:	
without signal, maximum	12
at maximum output	40 to 60
Loudspeaker	0,25ГД-10 with 8 Ohm voice coil resistance

DESIGN

The general view, layout and designation of the jacks and controls are shown in Figs 1 and 2.

The radio receiver circuit (Figs 3 and 4, insert) is arranged on a circuit board (Fig. 5, insert) attached to the cabinet by means of two stands and two screws.

The nonius (Fig. 6) is secured on the wafer by means of one screw and two spring washers freely placed on respective axles. The volume control knob has a spring-type lock.

DISMANTLING AND ASSEMBLING

The radio receiver can be dismantled with the help of the following tools: screwdrivers for screws M2, M2,5 and M3; spanners for nuts M2,5, M2 and studs M6.

The dismantling procedure is as follows:

1) place the radio receiver with its front upon a bench;
2) remove the power cell cover and take out the battery;
3) undo two screws which fasten the cover (see Fig. 2) and pick off the cover;
4) undo two screws and two stands;
5) undo the screw located on the case bottom and remove the telescopic whip antenna;
6) remove the wafer.

Caution! Most of the parts are made of polystyrene which easily melts under heat. Be careful when using your soldering bit.

Assemble the radio set in the reverse sequence of operations.

POSSIBLE TROUBLES AND THEIR CAUSES

1. No voltage supplied — loose contact in power switch *R5* or across connector and storage battery; supply wire conductor is broken.
2. L.f. amplifier fails, volume control faulty; short-circuits or breaks in windings of transformers *Tp1* or *Tp2* (Fig. 7); solder joint is defective or the wiring is broken.
3. I.f. amplifier fails — solder joint is defective or short-circuit occurs in the wiring; i.f. coils are broken (Fig. 8).
4. Cracking or interruption of sound within the full span-variable capacitor plates jumpered; loose contact in band switch; breakdown in wiring or solder joints of circuit board or switch lugs; transistors contact other elements.
5. Cracking, partial interruption or complete interruption at separate band — solder joint is defective, coil is shortened or broken.
6. The sound distorted — storage battery is heavily discharged, one of transistors *ПП6* or *ПП7* is faulty or considerable variation of their gain (pin numbering, voltage and resistance charts are presented in Figs 9, 10 and 11); automatic gain control circuit is broken or shortened.
7. Rattling noise — cabinet parts (front gratice, rear wall, scale, strips) have not been secured tight; loudspeaker voice coil is misaligned.

LOW-FREQUENCY AMPLIFIER CHECKUP

Connect the output voltage indicating instrument to telephone jack "P", and the a.f. generator to the first stage *(C21)* input. Check that the signal value if received from the a.f. generator at 1000 Hz is not more than 15 to 20 mV at U_{out} = 1.0 V.

INTERMEDIATE-FREQUENCY AMPLIFIER TUNING

Apply a signal from the 465 kHz standard-signal generator, modulated to 1000 Hz and 30%, to the base of the transistor *ПП3* via a 0.1 μF capacitor. Turn the core and adjust the coil *L14* to maximum at the receiver output.

Apply same signal to the base of the transistor *ПП2*, and then make another attempt to adjust the coil *L14*. Check that the responses at the transistor *ПП3* base, with an output voltage of about 0.23 V, and at the transistor *ПП2* base are respectively 500 to 1000 μV and 50 to 80 μV.

MULTISELECTION FILTER TUNING

Adjust the coils *L10, L11* and *L12* to maximum voltage at the receiver output. Apply same signal used for tuning of the i.f. amplifier to the transistor *ПП1* base. Make another attempt to adjust the coil *L14*. Check that the response across the transistor *ПП1* base is within 2 to 5 μV at U_{out} =0.23 V.

TUNING OF BAND OSCILLATOR AND INPUT CIRCUITS

For tuning the m.f. (MW) and h.f. (SW) circuits, connect the standard-signal generator lead out cable via a 80-Ohm resistor to a commonly used loop antenna (380×380 mm assembled out of copper wire 4 mm s.a.). Check that the distance from the frame up to the ferrite rod of the magnetic antenna of the radio receiver positioned in square of the frame plane accurately, is 1 m. Set up the tuning index in all bands within the graduated portions of the scale, at left — for l.f. tuning, or at right — for h.f. tuning.

First adjust to the band-edge frequencies as indicated on the radio receiver scale by means of the tuning elements of the band oscillator circuits, then match the input circuits.

Tuning Frequencies

Band	Band-edge frequency	Tuning elements	Tracking frequencies of input and oscillator circuits	Tuning elements
MW	525 kHz 1605 kHz	*L7, L8, C6*	585 kHz 1540 kHz	*L3, L4, C3*
CW	5.9 MHz 12.1 MHz	*L5, L6, C9*	6.2 MHz 11.7 MHz	*L1, L2, C4*

Set up the frequency band-edges by turning the cores of coils *L7, L8* and *L5, L6*, and also by adjusting the capacitors *C6* and *C9*.

Coils *L1, L2* and *L3, L4* are to be tuned by shifting them relative

to the ferrite rod. The voltage value gained from the generator at U_{out} =0.23 V indicates the response of the radio receiver.

Check that the image frequency is 930 kHz above that of the main signal, having been attenuated in the h.f. band for at least twice, and in the m.f. band for at least ten times.

Important! Vu le perfectionnement constant de l'appareil, le récepteur livré peut se distinguer du celui décrit dans la présente notice.

CARACTÉRISTIQUES TECHNIQUES PRINCIPALES

Gamme d'ondes (fréquences):	
moyennes	571,4—186,9 m (525—1605 kHz)
courtes	50,8—24,8 m (5,9—12,1 MHz)
Fréquence intermédiaire	465±2 kHz
Sensibilité maximale à l'entrée du récepteur à P_{sortie} =5 mW pour l'antenne intérieure à noyau magnétique, mieux que:	
ondes moyennes	0,6 mV/m
ondes courtes	0,6 mV/m
Sensibilité limitée par le bruit:	
antenne extérieure en ondes moyennes	300 μV
antenne fouet en ondes courtes	250 μV
Puissance de sortie nominale	100 mW
Tension d'alimentation	9 V
Courant absorbé:	
sans signal	12 mA maxi
à puissance de sortie maximale	40 à 60 mA
Haut-parleur	0,25ГД-10 avec bobine oscillante à résistance de 8 Ohms

CONSTRUCTION

La vue générale et l'emplacement des prises et des organes de commande sont indiqués sur les figures 1 et 2.

Le circuit du récepteur (fig. 3 et 4, feuille encartée) est monté sur une plaque à circuit imprimé (fig. 5, feuille encartée) qui se fixe au boîtier au moyen de deux montants et de deux vis.

Le dispositif vernier (fig. 6) est fixé à cette plaque par une vis et deux rondelles élastiques qui se mettent librement sur leurs axes. Le bouton de volume est pourvu d'un ressort.

DÉMONTAGE ET ASSEMBLAGE

Pour le démontage on utilise les tournevis M2; M2,5; M3 et la clé à douille M2,5 et M2 et la clé tube M6.

Le démontage se fait comme suit:

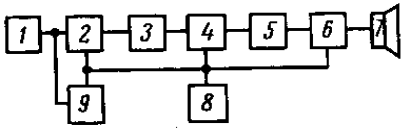

Рис. 3. Блок-схема приемника:

1 — входное устройство; *2* — смеситель; *3* — фильтр сосредоточенной селекции ФСС; *4* — двухкаскадный усилитель промежуточной частоты; *5* — детектор сигнала и АРУ; *6* — усилитель низкой частоты; *7* — громкоговоритель; *8* — источник питания 9 *В*; *9* — гетеродин

Fig. 3. Radio Receiver Block Diagram:

1 — input circuit; *2* — mixer; *3* — multi-selection filter; *4* — i. f. two-stage amplifier; *5* — signal detector and AVC; *6* — l. f. amplifier; *7* — loudspeaker; *8* — supply source 9 V; *9* — oscillator

Fig. 3. Bloc-diagramme:

1 — dispositif d'entrée; *2* — mélangeur; *3* — filtre très sélectif; *4* — amplificateur à deux étages F. I.; *5* — détecteur de signal et de C. A. G.; *6* — amplificateur B. F.; *7* — haut-parleur; *8* — source d'alimentation de 9 V; *9* — hétérodyne

Fig. 3. Diagrama sinóptico del receptor:

1 — dispositivo de entrada; *2* — mezclador; *3* — filtro de selección concentrada ФСС; *4* — amplificador bietápico de frecuencia intermedia; *5* — detector de la señal y del mando automático de amplificación; *6* — amplificador de baja frecuencia; *7* — altoparlante; *8* — fuente de alimentación de 9 V; *9* — heterodino

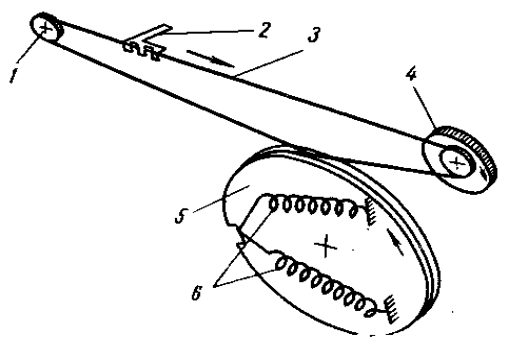

Рис. 6. Схема механизма настройки:

1 — ролик; *2* — стрелка; *3* — шнур; *4* — ручка настройки; *5* — колесо; *6* — пружина

Fig. 6. Adjustment Gear Diagram:

1 — roller; *2* — pointer; *3* — thread; *4* — tuning knob; *5* — pulley; *6* — spring

Fig. 6. Dispositif vernier:

1 — galet; *2* — aiguille; *3* — cordon; *4* — bouton d'accord; *5* — poulie; *6* — ressort

Fig. 6. Esquema del mecanismo de sintonización:

1 — rodillo; *2* — aguja; *3* — cordón; *4* — perilla de sintonía; *5* — rueda; *6* — muelle

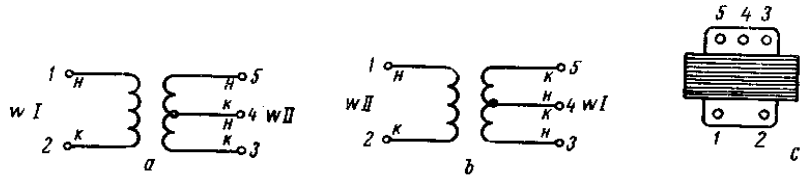

Рис. 7. Данные намотки трансформаторов:

а — согласующий трансформатор; *wI* — 1900 витков проводом ПЭВ-1-0,06; *wII* — 2×320 витков проводом ПЭВ-1-0,08; *b* — выходной трансформатор; *wI* — 2×320 витков проводом ПЭВ-1-0,1; *wII* — 85 витков проводом ПЭВ-1-0,29; *c* — вид на трансформатор со стороны монтажа (магнитопровод 3×6, лента 0,35×200 50Н ГОСТ 10160—62)

Fig. 7. Transformer Winding Data:

a — matching transformer; *wI* — 1900 turns of wire ПЭВ-1-0,06; *wII* — 2×320 turns of wire ПЭВ-1-0,08; *b* — output transformer; *wI* — 2×320 turns of ПЭВ-1-0,1 wire; *wII* — 85 turns of ПЭВ-1-0,29 wire; *c* — transformer wiring view (ferrous core 3×6, strip 0.35×200 50H to ГОСТ 10160—62)

Fig. 7. Données de bobinage des transformateurs:

a — transformateur d'adaptation; *wI* — 1900 spires fil ПЭВ-1-0,06; *wII* — 2×320 spires fil ПЭВ-1-0,08; *b* — transformateur de sortie; *wI* — 2×320 spires fil ПЭВ-1-0,1; *wII* — 85 spires fil ПЭВ-1-0,29; *c* — vue côté câblage (circuit magnétique 3×6, bande 0,35×200 50H ГОСТ 10160—62)

Fig. 7. Datos del devanado de los transformadores:

a — transformador adaptador; *wI* — 1900 espiras de hilo ПЭВ-1-0,06; *wII* — 2×320 espiras de hilo ПЭВ-1-0,08; *b* — transformador de salida; *wI* — 2×320 espiras de hilo ПЭВ-1-0,1; *wII* — 85 espiras de hilo ПЭВ-1-0,29; *c* — vista del transformador desde el montaje (circuito magnético 3×6, cinta 0,35×200 50H ГОСТ 10160—62)

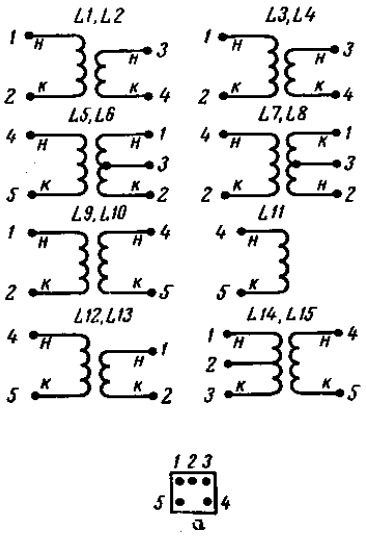

Рис. 8. Схемы обмоток контурных катушек:

а — вид на контур со стороны монтажа

Fig. 8. Circuit Coil Winding Diagram:

a — coil base as viewed from the wiring side

Fig. 8. Schémas des enroulements:

a — circuits côté montage

Fig. 8. Esquema de los devanados de las bobinas de circuito oscilante:

a — vista del circuito desde el montaje

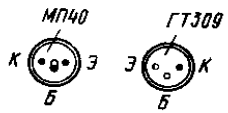

Рис. 9. Цоколевка транзисторов.

Темная точка на корпусе — эмиттер

Fig. 9. Transistor Pin Numbering.

Dark dot on the case indicates the emitter

Fig. 9. Culottage.

Point foncé — émetteur

Fig. 9. Conexión de los zócalos de los transistores.

El punto negro en la caja es el emisor

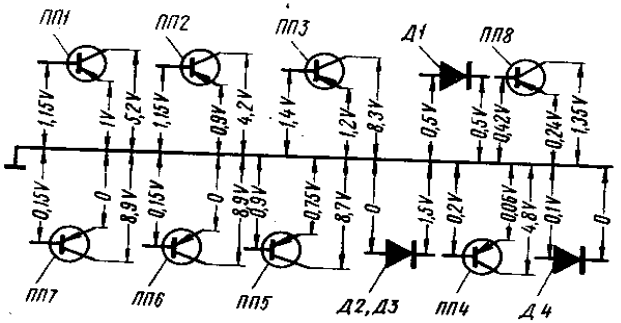

Рис. 10. Карта напряжений:

Fig. 10. Voltage Chart

Fig. 10. Tableau de tensions

Fig. 10. Cuadro de tensiones

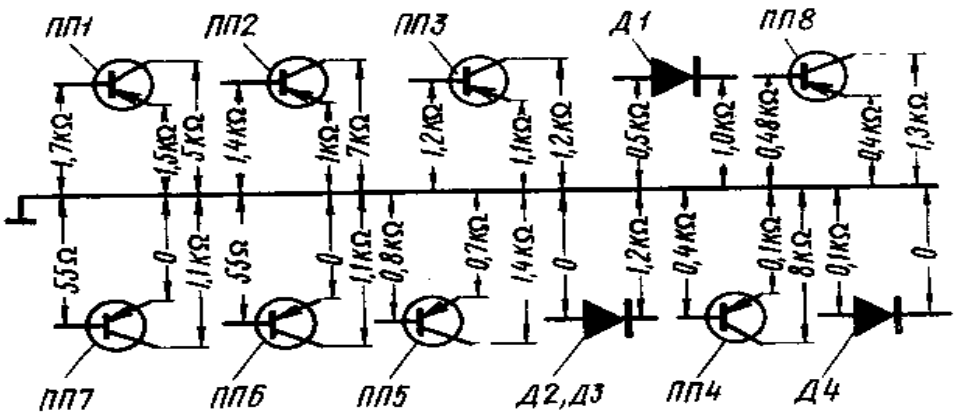

Рис. 11. Карта сопротивлений

Fig. 11. Resistance Chart

Fig. 11. Tableau de résistances

Fig. 11. Cuadro de resistencias

Внешторгиздат. Изд. № 5707СО.
Радиоприемник «Quartz-402». Инструкция по ремонту на русском, английском, французском и испанском языках.
Тип. № 5. Заказ 3146.