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THE SOVIET LENINGRAD T-2 TELEVISION RECEIVER

D. Kheyfets, V. Klibson
Leningrad

/This report presents information on the Leningrad T-2 television receiver, taken from an article in Radio, No 9, 1951, and also a circuit diagram and a list of components and tubes, which was the enclosure to Air Attache USSR Report No IR-68-52 A general description of the receiver can be found

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Figures referred to are appended. Numbers in parentheses refer to appended sources./

Picture Channels and Sound Accompaniment

The schematic diagram of the television receiver is given in Figure 1 and a block diagram of the video and sound accompaniment channels in Figure 2.

As may be seen from the block diagram, the rf amplifier stage, tube L1, is a 6Zh4 (6AC7), the mixer, tube L2, is of the same type, and the oscillator, tube L3, is a 6S2S (6Z5). These tubes are common to both channels. The picture and sound accompaniment channels are separated at the intermediate frequency.

The average intermediate frequency of the sound accompaniment channel is 29 Mc and that of the picture channel, 35.5 Mc.

These i-f values were selected to eliminate interference which may arise in the picture channel due to the beats between the i-f harmonics of both channels with the carriers and side bands of the video signals.

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The video amplifier has two stages, tubes L7 and L8. Its amplification factor is 120. This makes it possible to apply a low-value video carrier (0.5-0.7) to the detector input and still obtain a linear detection characteristic. At the video channel output, the signal polarity is negative.

For the i-f values selected, the oscillator frequency must vary from 85 to 115 Mc. At such high frequencies, frequency stabilization becomes difficult because of fluctuating supply voltages and self-heating.

The schematic diagram of the oscillator is shown in Figure 3 and its equivalent circuit in Figure 4.

The oscillator uses capacitive feedback; capacitor C4 is connected in series with inductance Lk. This circuit, even without heat compensating elements, provides sufficient stability so that the oscillator need not be tuned for several hours.

Tests of the receiver showed that there was practically no frequency drift for 30 min after a 10-min warm-up.

From the mixer's plate circuit, the audio signals are fed through capacitor C15 to the i-f amplifier of the sound accompaniment channel, using tubes L9, L10, and L11, all 6Zh3's. These signals then pass through an amplitude limiter, tube L12 of the same type, and enter the discriminator, a duodiode L13 type 6Kh6S. We will point out certain features of the receiving part of the circuit. The input of the receiver is aperiodic. An active resistance, R1, of 75 ohms is connected between its input terminals. This insures good matching of the input circuit with the antenna feeder, which is loaded by an impedance at the receiver terminals equal to the characteristic impedance.

Dc reinsertion is accomplished with the help of a peak detector in the grid circuit of the video channel's output stage (right half of the twin triode L16). This stage can be connected to the cathode-ray tube without blocking capacitances. This considerably simplifies the problem of correcting the amplifier for lower frequencies.

The picture contrast is controlled by varying the bias on the grid of tube L1 of the rf amplifier with potentiometer R3. This adjustment permits a 100-fold change in receiver sensitivity, while maintaining the resonance curve practically unchanged.

In addition to the ordinary sensitivity control in the rf amplifier, control of the amplification of the sound channel in the i-f stage is provided by potentiometer R45. This adjustment is made once when the receiver is installed and reduces the voltage of i-f harmonics of the audio signal at the limiter. Thus, it prevents interference on the raster from combined frequencies created by beats of harmonics of the i-f audio signal with the oscillator harmonics.

The band of frequencies amplified at the rf and i-f band is 4.5 Mc, and the band width in the video amplifier reaches 5-5.5 Mc, which provides the proper fidelity curve.

The rejector filter at the video amplifier output consists of choke coil Dr 12 and capacitor C143 and is tuned to 6.5 megacycles. Its purpose is to eliminate parasitic modulation which appears as dots on the raster lines. These are caused by detected beats between the i-f sound and video carriers which reach the modulating electrode of the kinescope.

The Scanning Unit

Line scanning is accomplished with a separately excited saw-tooth oscillator. This oscillator is used to obtain a high voltage for supplying the plate of the cathode-ray tube.

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The left triode in tube L21, a 6N8S, is a blocking oscillator, and the right operates to discharge the latter. The frequency of the blocking oscillator is controlled by variable resistor R113.

The linearity and current drawn by the output stage of the line-scanning circuit are controlled by variable resistors R116 and R117.

The output stage is loaded by line-scanning coils L10 and L11 of the deflecting system through transformer Tr 4, which has low distributed winding capacitance and low losses.

High-voltage impulses of about 5 kv are developed during flyback on the primary winding of the output transformer and the step-up winding connected in series with it. These are rectified in rectifiers L23 and L24 type 1Ts1S in a voltage-doubler rectifier circuit.

The line-scanning transformer Tr4 is constructed so that its output winding (taps 1-3) is closely coupled with the damping winding (taps 2-4), which is loaded by the damping rectifier L25, a 5Ts4S /5Z4/.

Due to the effect of the damping diode, the energy stored in transformer Tr4 during flyback is used to increase the beam deviation during the forward trace.

The resistance R126 in the damper circuit controls the raster size with respect to the horizontal.

The frame scanning unit uses amplification of a sawtooth voltage applied to the grid of the 6F6 in the frame-scanning output stage (tube L20).

The left half of tube L19 (6N8S) operates as a blocking oscillator, in which the oscillator frequency is controlled by variable resistor R100. The right half of this tube operates to discharge the blocking oscillator. The vertical image size is controlled by resistance R103, and linearity by the potentiometers R105, which varies the grid bias on L20, and R106, which varies the magnitude and form of the negative feedback voltage applied to the control grid of the frame-scanning output stage. The feedback circuit consists of capacitor C87 and resistors R106 and R107.

The frame-scanning output stage uses a choke output (Dr8) and is loaded by the frame deflecting coils L8 and L9.

The picture is centered vertically by varying a dc voltage taken from potentiometer R110.

The kinescope 23LK1B is modulated at the cathode. Its grid is used for brightness control (with variable resistor R80). The cathode-ray tube filament is supplied from a separate ungrounded filament winding of the power transformer. This eliminates the danger of a cathode-to-filament breakdown.

Synchronization

Stability and interference rejection are important in synchronization. Up to now, circuits were used in which an integrated half-frame impulse for frequency selection was used for frame synchronizing. The parameters of the integrating circuits are selected so that impulses synchronizing the line-scanning blocking oscillator cannot get to the grid of the frame-synchronizing blocking oscillator. Taking into account that for interlaced scanning, the permissible asymmetry in the position of the lines of the odd and even half-frames must not exceed 10% of the distance between lines, the shift between the beginning of the odd and even

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half-frames compared to the accurate distance in time between two adjacent half-frames must not exceed 3 μ sec. At the same time, the integrated front of the synchronizing half-frame impulse is 1.6 μ sec in length

A comparison of these figures shows that symmetrical position of the lines of the even half-frame relative to the odd depends for the most part on the operator's skill and cannot be stable during operation because there is always the possibility of line voltage fluctuations, variations of field strength, and other changes.

Among factors which make it difficult to obtain symmetrical line distribution are stray signals of line frequency which penetrate through the dividing circuits common to line- and frame- synchronizing circuits from the line-scanning oscillator.

To eliminate defects in systems which employ an integrated half-frame signal, the T2 Leningrad receiver uses an entirely different synchronizing system, with a number of important advantages.

In this circuit, the left side of L17, a 6N8S, is used as an amplitude selector and the right side as a limiter-amplifier. From the plate circuit of the right half of this tube line synchronizing signals enter the grid of the left side of L16, a 6N8S, which acts as a buffer, eliminating the possible entrance of stray line-scanning signals into the frame-synchronizing channel. The line-synchronizing signals pass from the cathode of this tube to the line-scanning blocking oscillator. From the cathode of the right half of L17, the synchronizing signal is applied to the differentiating circuit consisting of C77 and R92, passing through to the control grid of L18.

Figure 5 clarifies the path of the synchronizing signal. Curve d shows the form of the voltage curve on the heterodyne grid of L18, a 6A7. Bias is applied to this grid so that the positive pulses which result from differentiation of the peaks of double line-scanning frequency in the half-frame impulse are permitted to pass through. The leading edge of the first peak allows the tube to conduct and a pulse of negative polarity is generated in its plate circuit (curve e). Since tube L18 is conducting at this time, capacitor C80, which is in the screen grid circuit of the 6A7, is rapidly discharged and a negative voltage is applied to the signal grid of this tube through capacitor C79, cutting off the tube. Consequently the capacitors in the circuit consisting of C80, C79, R95, R96, and R97 begin to charge. Because the time constant of this circuit is very large, the potential on the control grid of the 6A7 increases very slowly. As a result, only one pulse is generated in the plate circuit of the 6A7, which synchronizes the frame-scanning blocking oscillator. The curvature of this front is similar to that of the pip of double the line-scanning frequency. This ensures that the positioning of the even lines relative to the odd will be symmetrical.

Supply of the Television Receiver

The receiver is supplied by two rectifiers. One consisting of power transformer Tr 6 and rectifier L28 (5Ts4S) supplies the stages of the sound accompaniment channel, the rf amplifier, the mixer, oscillator, and the tubes of the Leningradets receiver. The second rectifier, with power transformer Tr 5 and two rectifiers L26 and L27 (also 5Ts4S's), supplies the remaining tubes of the video channel, the scanning circuits and the synchronizing stages.

Construction

The Leningrad T-2 television receiver is assembled on three chasses. Television components are arranged on one and the power supply on another. The third chassis contains the Leningradets receiver.

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The combined chassis is well shock proofed. The units are connected with flexible cables ending in plugs and terminal strips.

The receiver construction makes possible easy replacement of kinescope from the front panel. The inner surface of the cabinet is metal plated, and in addition, the line-scanning circuit has an electrostatic shield so that the television receiver will not interfere with radio reception. An outdoor antenna is used in the receiver.

Operating experience shows that the construction and circuit selected provide the Leningrad T-2 with a steady picture having good definition, brightness, and contrast.(1)

The following tubes are used in the Leningrad T-2 television receiver:

Designation On Diagram	Tube	Description
L1	6AC7 (6Zh4)	Rf amplifier
L2	6AC7 (6Zh4)	Mixer
L3	6Zh5 (6S2S)	Oscillator
L4	6AC7 (6Zh4)	Video i-f amplifier
L5	6AC7 (6Zh4)	" " "
L6	6X6 (6Kh6S)	Second detector
L7	6AC7 (6Zh4)	Preliminary video-frequency amplifier
L8	6AG7 (6P9)	Output video-frequency amplifier
L9	6SH7 (6Zh3)	Sound channel i-f amplifier
L10	6SH7 (6Zh3)	" " " "
L11	6SH7 (6Zh3)	" " " "
L12	6SH7 (6Zh3)	Limiter
L13	6X6 (6Kh6S)	Discriminator
L14	6SJ7 (6Zh8)	Preliminary af amplifier
L15	6V6 (6P6S)	Output af amplifier
L16	6N8S	Peak detector for reinsertion of the dc component and cathode follower for the synchronization pulses
L17	6N8S	First and second selectors and limiters
L18	6SA7 (6A7)	Selector and limiter of the frame synch signal
L19	6N8S	Blocking oscillator and discharge tube for vertical scan

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Designation On Diagram	Tube	Description
L20	6F6	Output amplifier for vertical scan
L21	6N8S	Blocking oscillator and discharge tube for horizontal scan
L22-P-50	(GU-50)	Horizontal scanning oscillator
L23	1Ts1	High-voltage rectifier
L24	1Ts1	" " "
L25	5Ts4S	Damper
L26	5Ts4S	Rectifier
L27	5Ts4S	Rectifier
L28	5Ts4S	Rectifier

The following tubes are used in the radio receiver:

L29	6SA7 (6A7)	Mixer and oscillator
L30	6SK7 (6K7)	I-f amplifier
L31	6X6 (6Kn6S)	Second detector

For the af amplifier, the same tubes are used as in the television receiver.

L32	231K1B	Kinescope

Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
R1	Composition resistor	75 ohms + 5%; 0.25 watt	DIN 41 401	
R2	"	120 ohms ± 10%; 0.25 watt	DIN 41 401	
R3	Variable composition resistor	10 kilohms; 0.2 watt	R-92322 151A	
R4	Composition resistor	82 kilohms ± 10%; 0.5 watt	DIN 41 402	
R5	"	560 kilohms ± 10%; 0.25 watt	DIN 41 401	
R6*	"	1.5 kilohms ± 10%; 0.25 watt	DIN 41 401	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
R7*	Composition resistor	4.7 kilohms ± 10%; 0.24 watt	DIN 41 401	
R8*	"	4.7 kilohms ± 10%; 0.25 watt	DIN 41 401	
R9	"	39 kilohms ± 10%; 0.25 watt	DIN 41 401	
R10	"	560 kilohms ± 10%; 0.25 watt	DIN 41 401	
R11*	"	10 kilohms ± 10%; 2 watts	DIN 41 404	
R12	"	600 ohms ± 10%; 0.25 watt	DIN 41 401	
R13	"	540 kilohms ± 10%; 0.5 watt	DIN 41 402	
R14*	"	3.9 kilohms ± 10%; 0.25 watt	DIN 41 401	
R15*	"	3.3 kilohms ± 10%; 0.25 watt	DIN 41 401	
R16	"	4.7 kilohms ± 10%; 0.5 watt	DIN 41 402	
R17	"	100 ohms ± 10%; 0.25 watt	DIN 41 401	
R18	"	82 kilohms ± 10%; 1 watt	DIN 41 403	
R20	"	4.7 kilohms ± 10%; 1 watt	DIN 41 403	
R21	"	100 ohms ± 10%; 0.25 watt	DIN 41 401	
R22	"	82 kilohms ± 10%; 1 watt	DIN 41 403	
R23	"	4.7 kilohms ± 10%; 1 watt	DIN 41 403	
R24	"	560 kilohms ± 10%; 1 watt	DIN 41 401	
R25*	"	2.2 kilohms ± 10%; 0.25 watt	DIN 41 401	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
R26	Composition resistor	220 kilohms ±10%; 0.25 watt	DIN 41 401	
R27	"	220 kilohms ±10%; 0.25 watt	DIN 41 401	
R28*	"	330 kilohms ±10%; 0.25 watt	DIN 41 401	
R29	"	82 kilohms ± 10%; 1 watt	DIN 41 403	
R30	"	560 kilohms ±10%; 0.25 watt	DIN 41 401	
R31	"	910 ohms ± 5%; 0.25 watt	DIN 41 401	
R32	"	2.7 kilohms ±10%; 1 watt	DIN 41 403	
R33	"	15 kilohms ±10%; 0.25 watt	DIN 41 401	
R34	"	100 kilohms ±10%; 0.25 watt	DIN 41 401	
R35	"	1 kilohm ±10%; 0.25 watt	DIN 41 401	
R36	"	47 kilohms ±10%; 0.25 watt	DIN 41 401	
R37	"	1 megohm ±10%; 0.25 watt	DIN 41 401	
R38*	"	470 kilohms ±10%; 0.25 watt	DIN 41 401	
R39	"	22 kilohms ±10%; 2 watts	DIN 41 404	
R40	"	10 kilohms ±10%; 0.25 watt	DIN 41 401	
R41	"	560 kilohms ±10%; 0.25 watt	DIN 41 401	
R42	"	56 ohms ±10%; 1 watt	DIN 41 403	
R43	"	1 kilohm ±10%; 2 watts	DIN 41 404	
R44	"	100 ohms ±10%; 0.25 watt	DIN 41 401	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
R45	Variable composition resistor	10 kilohms; 0.2 watt	R-92322 15ZA (4)	
R46	Composition resistor	220 kilohms ±10%; 0.5 watt	DIN 41 402	
R47	"	560 ohms ±10%; 2 watts	DIN 41 404	
R48	"	82 kilohms ±10%; 0.5 watt	DIN 41 402	
R49	"	4.7 kilohms ±10%; 0.25 watt	DIN 41 401	
R50	"	4.7 kilohms ±10%; 0.5 watt	DIN 41 401	
R51	"	33 kilohms ±10%; 0.25 watt	DIN 41 401	R92345
R52	"	100 ohms ±10%; 0.25 watt	DIN 41 401	
R53	"	82 kilohms ±10%; 0.5 watt	DIN 41 402	
R54	"	4.7 kilohms ±10%; 0.5 watt	DIN 41 402	
R55	"	33 kilohms ±10%; 0.25 watt	DIN 41 401	R92346
R56	"	100 ohms ±10%; 0.25 watt	DIN 41 401	
R57	"	82 kilohms ±10%; 0.5 watt	DIN 41 402	
R58	"	15 kilohms ±10%; 1 watt	DIN 41 403	
R59	"	4.7 kilohms ±10%; 0.5 watt	DIN 41 402	
R60	"	120 kilohms ±10%; 0.25 watt	DIN 41 401	R92347
R61*	Composition resistor	100 kilohms ±10%; 1 watt	DIN 41 403	
R62	"	22 kilohms ±10%; 1 watt	DIN 41 403	

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R63	Composition resistor	220 kilohms ±10% 0.5 watt	DIN 41 402	
R64	"	120 kilohms ±10% 0.25 watt	DIN 41 401	
R65	"	120 kilohms ±10% 0.25 watt	DIN 41 401	
R66	"	120 kilohms ±10% 0.25 watt	DIN 41 401	
R67	Variable composition resistor	500 kilohms 0.2 watt	R-92322-149	
R68	Composition resistor	1 kilohm ±10% 0.25 watt	DIN 41 401	
R69	"	560 kilohms ±10% 0.25 watt	DIN 41 401	
R70	"	150 kilohms ±10% 0.25 watt	DIN 41 401	
R71	"	560 kilohms ±10% 0.25 watt	DIN 41 401	
R72	"	270 ohms ±10% 1 watt	DIN 41 403	
R73	"	470 kilohms ±10% 0.25 watt	DIN 41 401	
R74	"	680 kilohms ±10% 0.25 watt	DIN 41 401	
R75	Variable composition resistor	500 kilohms 0.2 watt	R-92322-149	
R77	Composition resistor	1 watt 100 kilohms ±10%	DIN 41 403	
R78	"	2.7 megohms ±10% 0.25 watt	DIN 41 401	
R79*	"	47 kilohms ±10% 0.25 watt	DIN 41 401	
R80	Variable composition resistor	47 kilohms 0.2 watt	R-92322-151 B	

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Designation On Diagrem	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
R81	Composition resistor	100 kilohms ± 10% 0.5 watt	DIN 41 402	
R82*	"	150 ohms ± 10% 2 watts	DIN 41 404	
R83	Variable composition resistor	500 ohms 3 watts	R-92322-150 (4)	
R84	Composition resistor	220 kilohms ± 10% 0.5 watt	DIN 41 402	
R85	"	22 kilohms ± 10% 0.25 watt	DIN 41 401	
R86	"	47 kilohms ± 10% 0.5 watt	DIN 41 402	
R87	"	560 kilohms ± 10% 0.25 watt	DIN 41 401	
R88	"	10 kilohms ± 10% 0.5 watt	DIN 41 402	
R89	"	1 kilohm ± 10% 0.25 watt	DIN 41 401	
R90	"	15 kilohms ± 10% 0.5 watt	DIN 41 402	
R91	"	820 kilohms ± 10% 0.25 watt	DIN 41 401	
R92	"	22 kilohms ± 10% 0.25 watt	DIN 41 401	
R93	"	1.5 megohms ± 10% 0.25 watt	DIN 41 401	
R94	"	1.5 megohms ± 10% 0.25 watt	DIN 41 401	
R95	"	91 kilohms ± 5% 1 watt	DIN 41 403	
R96	"	22 kilohms ± 10% 0.5 watt	DIN 41 402	
R97	"	150 kilohms ± 10% 0.25 watt	DIN 41 401	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
R98	Composition resistor	330 kilohms ± 10% 0.25 watt	DIN 41 401	
R99	"	2.7 kilohms ± 10% 0.25 watt	DIN 41 401	
R100	Variable composition resistor	47 kilohms 0.2 watt	R-92322-152 D (4)	
R101*	Composition resistor	180 kilohms ± 10% 0.25 watt	DIN 41 401	
R102*	"	560 kilohms ± 10% 0.25 watt	DIN 41 401	
R103	Variable composition resistor	2.2 megohms 0.2 watt	R 92322 152 C (4)	
R104	Composition resistor	1.5 megohms ± 10% 0.25 watt	DIN 41 401	
R105	Variable composition resistor	10 kilohms 0.2 watt	R-92322 152 A (4)	
R106	"	47 kilohms 0.2 watt	R-92322 152 D (4)	
R107	Composition resistor	470 kilohms ± 10% 0.25 watt	DIN 41 401	
R108	"	2.2 kilohms ± 10% 2 watts	DIN 41 404	
R109	"	3.3 kilohms ± 10% 2 watts	DIN 41 404	
R110	Variable composition resistor	100 kilohms 0.2 watt	R-92322 152 B (4)	
R111*	Composition resistor	12 kilohms ± 10% 0.25 watt	DIN 41 401	
R112	"	1.5 kilohms ± 10% 0.25 watt	DIN 41 401	
R113	Variable composition resistor	47 kilohms 0.2 watt	R-92322 152 D (4)	

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R114*	Composition resistor	100 kilohms ± 10% 0.25 watt	DIN 41 401	
R115	"	12 kilohms ±10% 0.25 watt	DIN 41 401	
R116	Variable composition resistor	100 kilohms 2 watts	R-92322 152 B (4)	
R117	"	10 kilohms 0.2 watt	R-92322 152 A (4)	
R118	Composition resistor	390 ohms ±10% 0.25 watt	DIN 41 401	
R119	"	2.7 megohms ±10% 0.25 watt	DIN 41 401	
R120*	"	6.8 kilohms ±10% 2 watts	DIN 41 404	
R121	"	2.7 megohms ±10% 2 watts	DIN 41 404	
R122*	"	10 kilohms ±10% 1 watt	DIN 41 403	
R123	"	3.3 megohms ±10% 0.25 watt	DIN 41 401	
R124*	Wire-wound resistor	3 kilohms 12 watts		Panton (Dralovid) RFT
R126	Variable wire-wound resistor	4 kilohms 3 watts	R-92322 153 B (4)	
R127	"	30 ohms 3 watts	R-92322 153 A (4)	
R128	Composition resistor	510 ohms ±10% 6 watts	DIN 41 406	
R129	Wire wound resistor	150 ohms ±10%	R-90598-00	
R130	Composition resistor	470 kilohms ±10% 0.25 watt	DIN 41 401	
R131	"	22 kilohms ± 10% 0.25 watt	DIN 41 401	
R132	"	22 kilohms ±10% 2 watts	DIN 41 404	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
R133	Composition resistor	120 kilohms ± 10% 0.5 watt	DIN 41 402	
R134	"	47 kilohms ± 10% 0.25 watt	DIN 41 401	R97212
R135	"	100 kilohms ± 10% 0.25 watt	DIN 41 401	R97212
R136	"	1 megohm ± 10% 0.25 watt	DIN 41 401	
R137	"	1 megohm ± 10% 0.25 watt	DIN 41 401	
R138	Wire wound resistor	10 kilohms ± 5% 12 watts	DIN 41 418	
R170	"	40 ohms ± 10%	R-98165-00	
R180	"	60 ohms ± 10%	R-98165-00	
R184	"	5 kilohms ± 10% 30 watts		Panton Pralovid RFT
R185*	Composition resistor	10 kilohms ± 10% 0.25 watt	DIN 41 401	R 92341
R186*	"	10 kilohms ± 10% 0.25 watt	DIN 41 401	R 92341
C1	Mica condenser	1,000 micromicro-farads ± 10% 350 volts	8 DIN 41348	
C2	Paper condenser	10,000 micromicro-farads ± 20% 500 volts	0216.001	
C3	Mica condenser	1,000 micromicro-farads ± 10% 350 volts	8 DIN 41348	
C4	"	1,000 micromicro-farads ± 10% 350 volts	8 DIN 41348	
C5	"	240 micromicro-farads ± 10% 250 volts	4 DIN 41343	
C6	"	24 micromicro-farads ± 10% 250 volts	4 DIN 41348	
C7	Variable condenser		R-92371-00	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
C7	Variable condenser		R-92371-00	
C8	Mica condenser	24 micromicrofarads ± 5% 450 volts	4 DIN 41349	
C9*	"	10 micromicrofarads ± 5% 450 volts	4 DIN 41349	
C10	"	51 micromicrofarads ±10% 250 volts	1 DIN 41348	
C11	"	1,000 micromicrofarads ±10% 350 volts	8 DIN 41348	
C12	"	5 micromicrofarads ± 10% 650 volts	4 DIN 41349	
C13	"	1,000 micromicrofarads ± 10% 350 volts	8 DIN 41348	
C14	Paper condenser	1,000 micromicrofarads ±20% 500 volts	0216.001	
C15	Mica condenser	5 micromicrofarads ± 10% 650 volts	4 DIN 41349	
C16	"	240 micromicrofarads ±10% 250 volts	DIN 41348	R 92341
C16a	"	240 micromicrofarads ± 10% 250 volts	DIN 41348	R 92341
C17	Paper condenser	5,100 micromicrofarads ±20% 500 volts	0216.001	Rr92341
C17a	Paper condenser	5,100 micromicrofarads ±20% 500 volts	0216.001	R92341
C18	"	5,100 micromicrofarads ±20% 500 volts	0216.001	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
C19	Paper condenser	5,100 micromicro-farads ± 20% 500 volts	0216.001	
C21	"	1,000 micromicro-farads ± 20% 500 volts	0216.001	
C22	"	1,000 micromicro-farads ± 20% 500 volts	0216.001	
C23	"	5,100 micromicro-farads ± 20% 500 volts	0216.001	
C24	"	5,100 micromicro-farads ± 20% 500 volts	0216.001	
C25	Plate trimmer	5/30 micromicro-farads	KO 2497 AK	
C26	Paper condenser	5,100 micromicro-farads ± 20% 500 volts	0216.001	R 92343
C27	Plate trimmer	5/30 micromicro-farads	KO 2497 AK	
C28	"	5/30 micromicro-farads	KO 2497 AK	
C29	Paper condenser	0.2 micro-farad ± 10% 250 volts	0216.001	
C30	"	0.05 micro-farad ± 20% 250 volts	0216.001	
C31	Electrolytic condenser	16 micro-farads 350/385 volts		
C32	"	50 micro-farads 500/550 volts	G 7255	
C33	Paper condenser	1,000 micromicro-farads ± 20% 500 volts	0216.001	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
C34	Paper condenser	0.2 microfarad ± 10% 500 volts	0216.001	
C35	"	0.05 microfarad ± 20% 250 volts	0216.001	
C36	Electrolytic condenser	16 microfarads 500/550 volts		
C37	Mica condenser	10 micromicrofarads ± 10% 450 volts	4 DIN 41349	R92344
C38**	Paper condenser	5,100 micromicrofarads ± 20% 500 volts	0216.001	
C39	"	10,000 micromicrofarads ± 20% 500 volts	0216.001	
C40	"	10,000 micromicrofarads ± 20% 500 volts	0216.001	
C41	Mica condenser	10 micromicrofarads ± 10% 450 volts	4 DIN 41349	R92345
C42	"	240 micromicrofarads ± 10% 250 volts	4 DIN 41349	R92345
C43	Paper condenser	10,000 micromicrofarads ± 20% 500 volts	0216.001	R92345
C44	"	5,100 micromicrofarads ± 20% 500 volts	0216.001	
C45	"	10,000 micromicrofarads ± 20% 500 volts	0216.001	
C46	Mica condenser	12 micromicrofarads ± 10% 450 volts	4 DIN 41349	R92346
C47	"	240 micromicrofarads ± 10% 250 volts	4 DIN 41349	R92346

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
C48	Paper condenser	10,000 micromicrofarads ± 20% 500 volts	0216.001	R92346
C49	"	5,100 micromicrofarads ± 20% 500 volts	0216.001	
C50	"	10,000 micromicrofarads ± 20% 500 volts	0216.001	
C51	Mica condenser	240 micromicrofarads ± 10% 250 volts	4 DIN 41349	R92347
C52	Paper condenser	10,000 micromicrofarads ± 20% 500 volts	0216.001	R92347
C53	Mica condenser	10 micromicrofarads ± 10% 450 volts	4 DIN 41349	R92347
C54	"	51 micromicrofarads ± 10% 250 volts	4 DIN 41348	R92347
C55	Paper condenser	10,000 micromicrofarads ± 20% 500 volts	0216.001	
C56	Mica condenser	10 micromicrofarads ± 10% 450 volts	4 DIN 41349	R97038
C57	Paper condenser	10,000 micromicrofarads ± 20% 500 volts	0216.001	R97038
C58	Mica condenser	51 micromicrofarads ± 10% 250 volts	4 DIN 41348	R97038
C59	"	15 micromicrofarads ± 10% 450 volts	4 DIN 41349	R97038
C60	"	51 micromicrofarads ± 10% 250 volts	4 DIN 41348	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
C61	Mica condenser	51 micromicrofarads ± 10% 250 volts	4 DIN 41348	
C62	"	620 micromicrofarads ± 10% 350 volts	8 DIN 41348	
C63**	Paper condenser	10,000 micromicrofarads ± 20% 500 volts	0216.001	
C64	Mica condenser	470 micromicrofarads ± 10% 350 volts	8 DIN 41348	
C65	Electrolytic condenser	50 microfarads 30/35 volts	G 7805	
C66	Paper condenser	0.1 microfarad ± 10% 500 volts	0216.001	
C67**	"	5,100 micromicrofarads ± 20% 500 volts	0216.001	
C68**	"	10,000 micromicrofarads ± 20% 500 volts	0216.001	
C69	"	10,000 micromicrofarads ± 20% 500 volts	0216.001	
C70**	"	2,000 micromicrofarads ± 20% 500 volts	0216.001	
C71	"	1,000 micromicrofarads ± 20% 500 volts	0216.001	
C73	Electrolytic condenser	50 microfarads 30/35 volts	G 7805	
C74	Metal-paper condenser	0.5 microfarad ± 20% 400 volts	R 92322 - 155 (5)	
C75	Paper condenser	1,000 micromicrofarads ± 20% 500 volts	0216.001	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
C76	Paper condenser	0.2 microfarad ±10% 500 volts	0216.001	
C77	"	1,000 micromicrofarads ±20% 500 volts	0216.001	
C78**	"	5,100 micromicrofarads ±20% 500 volts	0216.001	
C79**	Paper condenser	10,000 micromicrofarads ±20% 500 volts	0216.001	
C80**	"	5,100 micromicrofarads ±20% 500 volts	0216.001	
C81	Mica condenser	510 micromicrofarads ±10% 350 volts	8 DIN 41348	
C82	Paper condenser	0.1 microfarad ±10% 250 volts	0216.001	
C83	"	0.2 microfarad ±10% 500 volts	0216.001	
C84	"	0.05 microfarad ±20% 500 volts	0216.001	
C85	"	0.2 microfarad ±10% 500 volts	0216.001	
C86	"	0.05 microfarad ±20% 250 volts	0216.001	
C87	"	0.05 microfarad ±20% 500 volts	0216.001	
C88	Mica condenser	180 micromicrofarads ±10% 400 volts	4 DIN 41348	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
C89	Electrolytic condenser	25 microfarads 500/550 volts	G 7254	
C90	Mica condenser	300 micromicrofarads ± 10% 350 volts	8 DIN 41348	
C91	"	390 micromicrofarads ± 10% 350 volts	8 DIN. 41348	
C92	Paper condenser	1,000 micromicrofarads ± 20% 500 volts	0216.001	
C93	Electrolytic condenser	25 micromicrofarads 500/550 volts		
C94	Metal paper condenser	0.5 microfarad ± 20% 400 volts	R92322 -156 (5)	
C97	Styroflex condenser	390 micromicrofarads ± 10% 5/15 kilovolts	DIN 41387	
C98	"	390 micromicrofarads ± 10% 5/15 kilovolts	DIN 41397	
C99	"	390 micromicrofarads ± 10% 5/15 kilovolts	DIN 41387	
C100	Mica condenser	68 micromicrofarads ± 15% 2.5 kilovolts	R92318 1A (5)	
C101*	Mica condenser	68 micromicrofarads ± 15% 2.5 kilovolts	R92316 1A (5)	
C102	Metal paper condenser	0.5 microfarad ± 20% 400 volts	R92322 15[illegible] (5)	
C103	Electrolytic condenser	50 microfarads 500/550 volts	Assembly item G 7255	
C104	Condenser in container	1 microfarad ± 10% 2.50 volts	DIN 41143	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
C105	Electrolytic condenser	50 microfarads 500/550 volts	Assembly item G 7255	
C106	"	25 microfarads 500/550 volts	Assembly item G 7254	
C107	"	50 microfarads 500/550 volts	Assembly item G 7255	
C108	"	25 microfarads 500/550 volts	Assembly item G 7254	
C109	Mica condenser	120 micromicrofarads ± 10% 250 volts	4 DIN 41348	
C110*	"	360 micromicrofarads ± 10% 350 volts	8 DIN 41348	
C111	"	120 micromicrofarads ± 10% 250 volts	4 DIN 41348	
C112	"	360 micromicrofarads ± 10% 350 volts	8 DIN 41348	
C113	"	75 micromicrofarads ± 10% 250 volts	4 DIN 41348	
C114*	"	24 micromicrofarads ± 10% 250 volts	4 DIN 41348	
C115	"	68 micromicrofarads ± 10% 400 volts	4 DIN 41348	
C116	"	360 microfarads ± 10% 350 volts	8 DIN 41348	
C117	"	68 micromicrofarads ± 10% 400 volts	4 DIN 41348	
C118	Paper condenser	0.1 microfarad ± 10% 250 volts	0216.001	

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Designation On Diagram	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
C119	Mica condenser	68 micromicrofarads ± 10% 400 volts	4 DIN 41348	
C120*	Mica	51 micromicrofarads ± 10% 400 volts	4 DIN 41348	
C121	Mica condenser	68 micromicrofarads ± 10% 400 volts	4 DIN 41348	
C122	"	68 micromicrofarads ± 10% 400 volts	4 DIN 41348	
C123	Variable condenser		P-90798	
C124	Paper condenser	0.1 microfarad ± 10% 500 volts	0216.001	
C125	Mica condenser	120 micromicrofarads ± 10% 400 volts	4 DIN 41348	R 97211
C126	"	120 micromicrofarads ± 10% 400 volts	4 DIN 41348	R 97211
C127	Paper condenser	0.1 microfarad ± 10% 500 volts	0216.001	
C128	Mica condenser	120 micromicrofarads ± 10% 400 volts	4 DIN 41348	R 97212
C129	"	120 micromicrofarads ± 10% 400 volts	4 DIN 41348	R 97212
C130	"	220 micromicrofarads ± 10% 250 volts	4 DIN 41348	R 97212
C131	Paper condenser	0.2 microfarad ± 10% 500 volts	0216.001	
C132	Mica condenser	68 micromicrofarads ± 10% 400 volts	4 DIN 41348	

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Designation On Design	Name	Type and Other Data	DIN Design Specifications of Supplier	Comments
C133	Plate trimmer	5/30 micromicro-farads	KO 2497 AK	

* Selected during adjuctment
** Can use the styroflex condenser

Note: The given voltage for mica condensers indicates effective AC volts; for other condensers, it indicates DC volts.

/Appended figures follow:/

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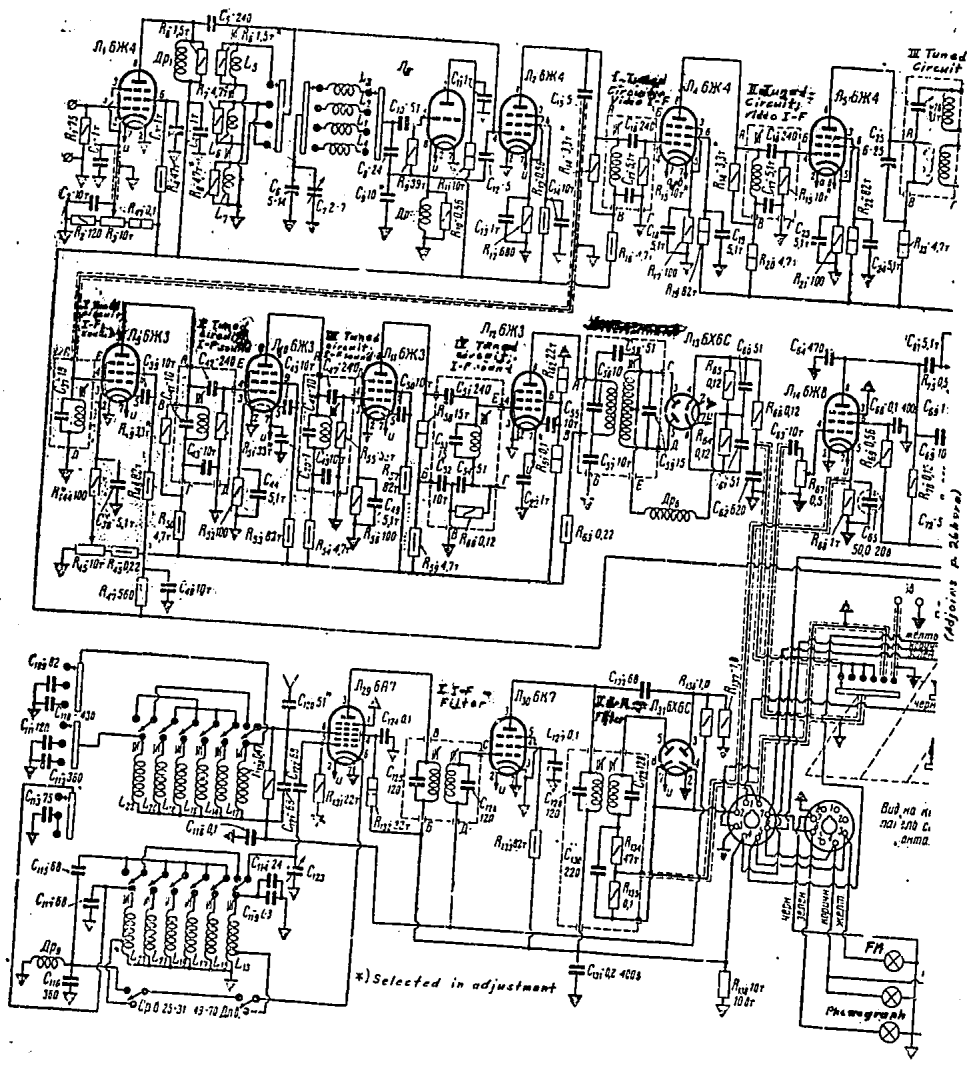

Figure 1. Schematic Diagram of the Leningrad T-2 Television Receiver

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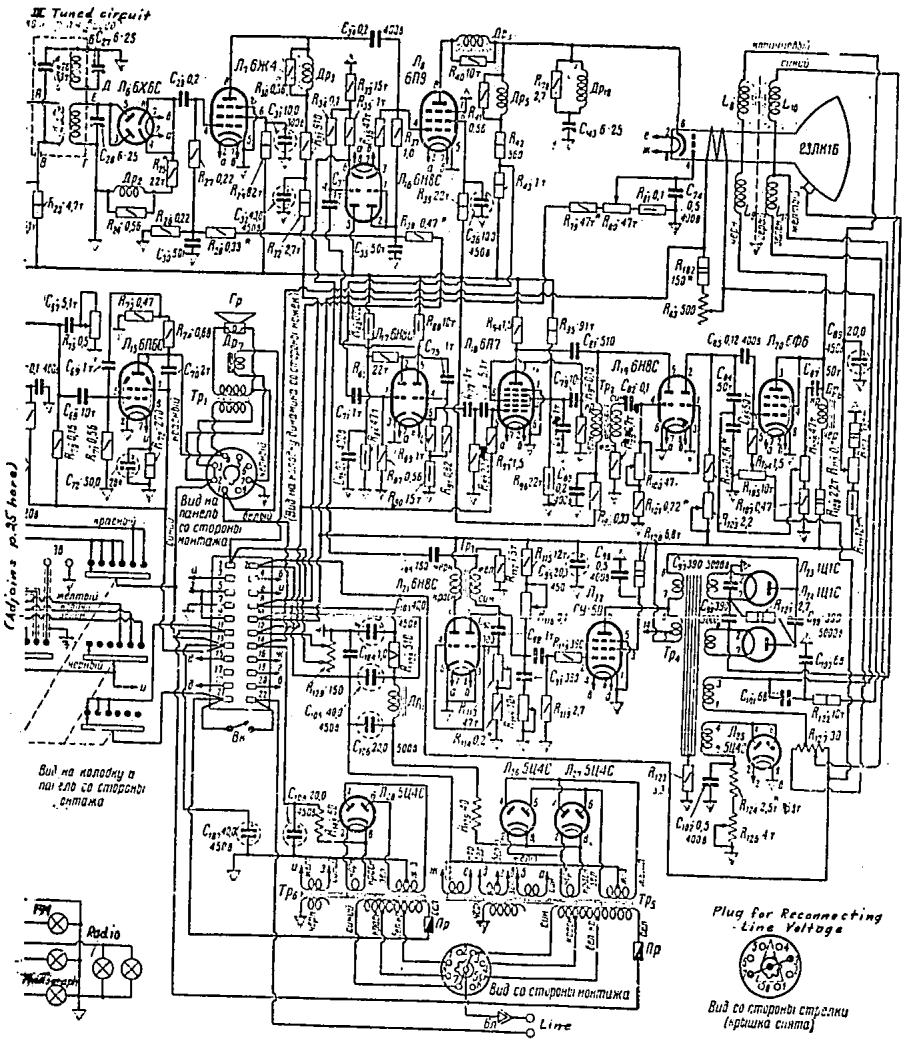

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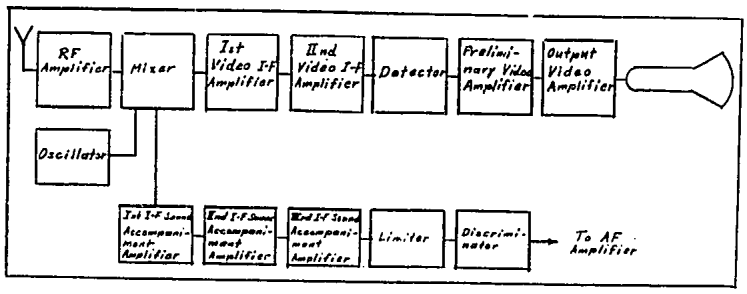

Figure 2. Block Diagram of the Video and Sound Accompaniment Channels

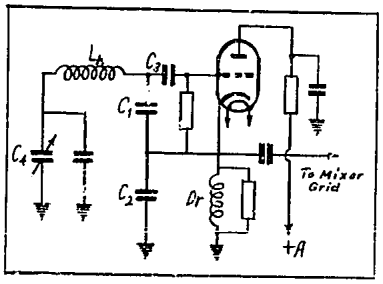

Figure 3. Oscillator Circuit of the Receiver

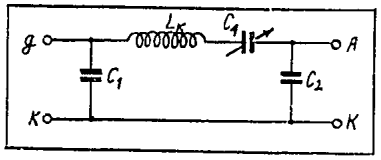

Figure 4. Equivalent Circuit of the Oscillator

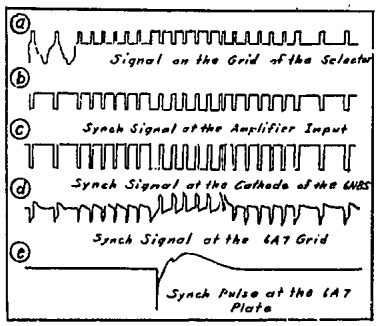

Figure 5. Path of the Synchronizing Signal

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SOURCES

1. Moscow, Radio, No 9, Sep 51
2. Encl to Air Attache USSR Report No IR-68-52 [redacted]

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