

CLASSIFICATION CONFIDENTIAL
 CENTRAL INTELLIGENCE AGENCY
 INFORMATION FROM
 FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT
 CD NO.



50X1-HUM

COUNTRY USSR

DATE OF INFORMATION 1950

SUBJECT Scientific - Radio, television receivers

DATE DIST. 21 Feb 1951

HOW PUBLISHED Monthly periodical

NO. OF PAGES 4

WHERE PUBLISHED Moscow

DATE PUBLISHED Aug 1950

SUPPLEMENT TO REPORT NO.

LANGUAGE Russian

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF ESPIONAGE ACT 50 U. S. C. 32 AND 32. AS HEREIN. ITS TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW. REPRODUCTION OF THIS FORM IS PROHIBITED.

THIS IS UNEVALUATED INFORMATION

SOURCE Radio, No 8, 1950, pp 43-48.

THE SOVIET KVN-49 TELEVISION SET

K. Pokrovskiy and L. Troitskiy

The KVN-49 television set was first exhibited in 1949. In contrast with the Moskvich and Leningrad 22-tube television sets, this set has only 16 tubes, not counting the picture tube. It is, consequently, less expensive and more economical.

The set can be used on 110, 127 and 220-v 50-ac power, and will operate satisfactorily with voltage variations from +5 to -10%. It consumes about 200 w of power and weighs 26 kg. The table model dimensions are 500 x 400 x 400 mm.

The KVN-49 can receive three television programs, as follows:

Channel 1: 48.5-56.5 Mc; video 49.75 Mc (6.03 m), audio 56.25 Mc (5.33 m).

Channel 2: 58.0-66.0 Mc; video 59.25 Mc (5.06 m), audio 65.75 Mc (4.46 m).

Channel 3: 76.0-84.0 Mc; video 77.25 Mc (3.88 m), audio 83.75 Mc (3.58).

Other features are:

Receiver sensitivity (for all three programs) -- not less than 1 mv in the video channel and 700 mv in the audio channel.

Video pass band -- not less than 3.5 Mc for 3 db change.

Maximum undistorted audio power -- 1 watt.

The set has 11 control knobs, only four of which are on the front panel. The remaining knobs are concealed under a removable cover on the right side panel since they are rarely used in operation.

CONFIDENTIAL

CLASSIFICATION CONFIDENTIAL

STATE	<input checked="" type="checkbox"/> NAVY	<input checked="" type="checkbox"/> HSRB							
ARMY	<input checked="" type="checkbox"/> AIR	<input checked="" type="checkbox"/> FBI							

CONFIDENTIAL

CONFIDENTIAL

50X1-HUM

Circuit

The KVN-49 differs from previous models in its "tuned rf" amplification circuit for the video signal channel and manner of obtaining the if signal for the sound channel (beat frequency between the sound and image carriers).

Signals from the television center's picture and sound transmitters, on entering the detector tube, generate an if of 6.5 Mc in the plate circuit, which is then separated in the if sound circuit, switched into the plate circuit of the output tube, and applied to the limiter, discriminator, and lf amplifier.

To eliminate the effect of the sound on the picture, the audio signal must be made 10-12 times weaker than the video signal before reaching the detector. This is accomplished by adjusting the hf amplifier stages.

The KVN-49 circuit has great advantages over those of other models. First of all we should note its completely stable reception, since its quality is not dependent on the frequency stability of the local oscillator used in superhet receivers. Here, the intermediate frequency required for the sound is supplied by the television center which always has a high degree of stability. This arrangement also ensures stability in shifting from one band to another and permits a considerable reduction in the number of tubes in the set since the first seven tubes are used for both the sound and picture signals.

The first four tubes (6AC7) of the set are used in a gang-tuned hf amplifier. Reception of Channel 3 (carrying picture signals at 77.25 Mc, and sound signals at 83.75 Mc) is achieved by tuning individual inductances of the hf stages to the following frequencies: L₁, 81.0 Mc; L₂, 77.25 Mc; L₃, 83.75 Mc; L₄, 81.0 Mc; and L₅, 77.25 Mc.

On switching the receiver over to Channel 2 (carrying picture signals at 59.25 Mc, and sound signals at 65.75 Mc) LC circuits (i.e., with trimmers switched in) are tuned to the following frequencies: L₁C₄, 63.0 Mc; L₂C₉, 59.25 Mc; L₃C₁₅, 63 Mc; and L₄C₂₀, 59.25 Mc.

To shift to Channel 3, now used for broadcasting, another set of trimmers is switched in, and the LC circuits are tuned to the following frequencies: L₁C₅, 54.0 Mc; L₂C₁₀, 49.75 Mc; L₃C₁₆, 54.0 Mc; and L₄C₂₁, 49.75 Mc. These settings provide for a pass band of about 4 Mc.

A characteristic feature of the hf amplifier is the use of decoupling bars, made in the form of metallic strips with distributed capacitance in which a triacetate film is used as a dielectric (mica was used for this purpose in the first models). The capacitance of each bar is about 700 mmfd. In all, three decoupling bars are used in the hf amplifier circuit, namely, the plate, screen and heater bars. These bars ensure stable operation of the television set in all radio channels. At the receiver input circuit, resistance is used in place of a tuned circuit.

Other tubes used in the circuit are as follows: 6AC7 plate detector; 6AC7 first video amplifier; 6AG7 final video amplifier; 6SJ7 limiter; 6N7 discriminator and lf amplifier; 6V6 final audio amplifier; 6N8M twin triode for synchronizing-pulse separation; 6N8M blocking oscillator for line scanning; G-807 tetrode oscillator in output stage of line scanning circuit; 1T51 high-voltage half-wave rectifier; 6N8M blocking oscillator and saw-tooth pulse amplifier in frame scanning circuit; 5U4G full-wave plate voltage rectifier; and an LK-715A picture tube.

Special Receiver Features

The method of utilizing the beat of the audio and video carriers in the KVN-49 set has certain specific features. Since the if is equal to the difference between the carrier frequencies, it will change if the carrier frequencies change. The

- 2 -

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

50X1-HUM

percentage modulation of the video transmitter must not exceed 85%. In other words, under any atmospheric conditions, the video carrier must have a minimum amplitude of not less than 15%. Noncompliance with this condition might cause the video signal modulation to "crawl through" the sound if channel and modulate it in amplitude. An ac hum at frame frequency would then be heard at the audio channel output. This hum cannot always be eliminated by the limiter and discriminator.

The first television models were supplied with discriminators tuned by ceramic trimmer capacitors. Operating experience showed that these trimmers did not make stable discriminator operation possible. Even small shocks disturbed the balance of the discriminator and, as a result, it was necessary to adjust the trimmers periodically. In the 1950 models, the trimmers were replaced by magnetic cores which produced a smoother balance in the discriminator, with a permissible if deviation (difference between carriers) of ± 6 kc.

It is advisable to have the receiving antenna feeder made of coaxial cable to avoid disturbing the ratio of audio and video signals, which occurs when improvised feeders are used.

It must be borne in mind that the picture transmitter serves, so to speak, as an oscillator for the sound receiver. Hence, if breakdowns occur in the picture signal receiver, the television set will not receive either picture or sound signals.

Modernizing the Receiver

As soon as the KVN-49 was designed and manufactured, it was subjected to systematic modernization with improvements in both circuits and structural parts. The substantial changes made in the receiver were:

1. The focusing coil was transferred from series to parallel feeding, which reduced the total current consumption by 12-15 ma and increased smoothness in regulating picture focusing without depending on brightness control.
2. One supplementary control knob (the 12th) for sensitivity control was eliminated.
3. In the early models, as stated above, discriminator tuning was done by trimmers located under the chassis. Later the discriminator was tuned by magnetic cores.
4. The quality of assembly work was greatly improved.
5. Another resistor was added to the negative load of the power transformer secondary, thus decreasing the pulse value of the plate current at the moment the receiver was switched on, and at the same time, decreasing the load on the rectifier tube.
6. In the process of modernization, certain capacitors and resistors in the circuit were eliminated.

"Radio" Editorial Note

The KVN-49 television set has a number of grave defects, which may be divided into two groups. The first group includes defects in the TV receiver. The most obvious defect is the presence of a strong ac hum occurring at the frame scanning frequency.

- 3 -

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL **CONFIDENTIAL**



50X1-HUM

In addition, strong interference in neighboring radio receivers is caused by the line scanning circuits.

The second group comprises structural defects and the poor quality of certain parts and tubes of the TV receiver. The poor quality of certain thermionic tubes, especially the 5U4G, has a decided effect on the set's operation. Almost all 1K-715A tubes quickly develop ion spots on the screen, thus impairing the image. The electrolytic filter capacitors also break down frequently. Some TV sets have poor contacts and slipshod soldering. Individual parts of the set are not constructed for continuous operation and after 3-4 hours these parts become overheated.

The output of suitably designed outdoor television antennas must be increased since the reliability of the set's operation depends on the antenna.

Although the quality of the picture in the KVN-49 is considerably better than that in other commercial models, there is room for further improvement by increasing the plate voltage on the picture tube.



50X1-HUM

- E N D -

- 4 -

CONFIDENTIAL

CONFIDENTIAL