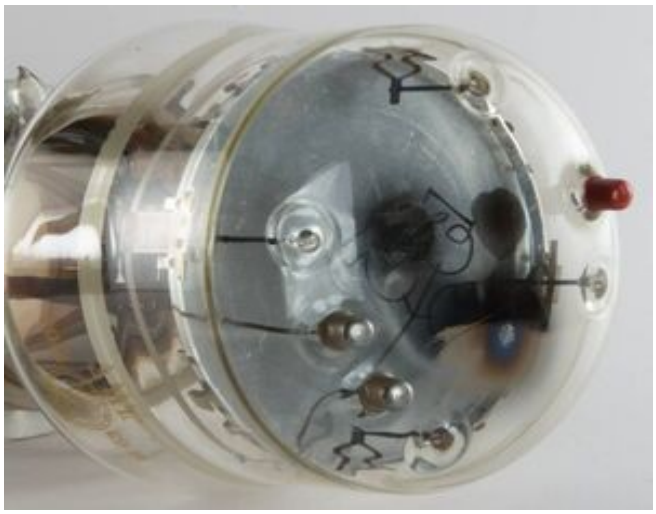
Supericonoscope LI-7



Developer	Television Research Institute
Chief designer	M. A. Chistov
Year of development	1951
Manufacturer	OKB X-ray devices (Svetlana)
Start of production	1956

The LI-7 supericonoscope is a transmitting television tube with charge accumulation and image transfer to a supericonoscope type target. The first tube of this type to be mass-produced in the Soviet Union for use in standard television centers. It was installed in the KT-5 television camera .

History of development and application

Before the development of the LI-7 supericonoscope, studio television cameras in the Soviet Union used various prototypes of the "iconoscope" type tubes and serial models of the LI-1 iconoscopes as a transmitting tube. Iconoscopes differ from the more advanced supericonoscopes in that they are much less light sensitive, which created problems when designing television centers – for the operation of cameras on tubes of this type, the illumination of the object in the studio must be at least 5000 - 8000 lux. To ensure the operation of telecinema projectors with such cameras, an electric arc was used – this was the only effective small-sized light source that provided such a high level of illumination.

To solve this problem, in 1949, the laboratory of transmitting tubes of NII-380 (Research Institute of Television) under the direction of M. A. Chistov began developing a studio supericonoscope. This type of tube was not new to the engineers of NII-380 – the development of supericonoscopes had been conducted in the USSR since 1933 (the Shmakov-Timofeev tube, later the idea of creating supericonoscopes was developed in the pre-war predecessors of the Research Institute of Television - Research Institute-8 and Research Institute-9). In addition, at the same time, two parallel projects were being conducted in the laboratory:

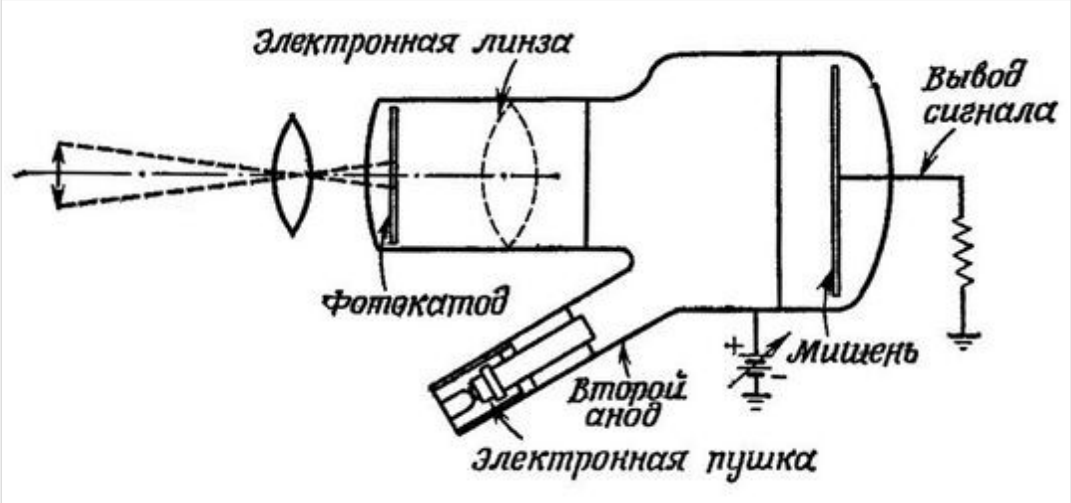
- Development of a transmitting tube sensitive to IR rays with a resolution of 1000 lines, which resulted in the creation of a supericonoscope with a silver-cesium photocathode and a 10x12 cm target that met the specified requirements (chief designer N. M. Dubinina).
- Work on the creation of a small-sized supericonoscope for use in industrial television installations, the result of which was the LI-3 supericonoscope. This supericonoscope was also used in an

experimental camera for the Leningrad television center, manufactured in 1951.

The results of the work of the team of engineers under the leadership of M. A. Chistov were the creation by 1951 of the LI-7 supericonoscope, the light sensitivity of which was 6-10 times higher than the light sensitivity of the LI-1 iconoscopes. The development was considered successful, and the newest supericonoscope was introduced into pilot production directly in the laboratory of transmitting tubes. This made it possible to significantly simplify the lighting equipment of television centers. Later, after the mid-1950s, the production of the LI-7 was transferred to the Leningrad OKB of X-ray devices, which was part of the Svetlana production association.

Based on the LI-7 supericonoscope, an experimental set of cameras was created for the Kiev television center (1951), and a serial studio television camera KT-5 (1951) was developed, which was used in the typical television centers of the TC-5 and TC-8 projects. The LI-7 was produced serially at least until 1965.

Device and technical characteristics



Supericonoscope diagram

In the predecessors of the supericonoscope, tubes of the “iconoscope” type, charge accumulation is carried out by bombarding a light-sensitive mosaic (target) with photoelectrons directly from an electron gun. In the supericonoscope, the mosaic is replaced by a system of a solid photocathode and a solid target separated in space. In this case, charge accumulation and the formation of a potential relief on the target occur due to secondary electron emission from it during bombardment with photoelectrons in the process of transferring an electron image. This design, compared to iconoscopes, provides much higher (6-10 times) light sensitivity.

Length	32 cm
Maximum diameter	14 cm
Photocathode type	Antimony-cesium
Target type	Mica
Target Image Size	18 mm x 24 mm
Resolution in the center	625 TVL
Minimum illumination on the photocathode	10 lux
The required level of illumination of the object being photographed	400-1000 lux