A history of oscilloscope development in Vilnius

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During the Soviet era that ended in 1991, trade between the Soviet Union and the outside world was largely blocked. Some test equipment managed to get in or out but by and large, the Soviet Union developed and manufactured its own oscilloscopes. The center of oscilloscope design and manufacturing was, for many years, in Vilnius, now the capital of Lithuania. Through the following photos, we've assembled a history of oscilloscopes designing and manufactured in Vilnius, both during and after the Soviet era.

Before WWII: Poland

The first electronics company in Vilnius was established in 1925. At that time, Vilnius was a provincial capital of Poland. The first Elektrit factory was built in 1934 on Shepticky Street in the Naujamiestis district. Before WWII, this was the largest factory in Vilnius, designing and producing radio receivers for civil use. It occupied 10,000m² and had its own power station, six assembly lines, and 1100 engineers and workers. The plant produced 54,000 radio receivers annually at a total cost of USD 1.2 million. Figure 1 shows a radio and Figure 2 shows the factory.
Figure 1 An Elektrit radio.

Figure 2 The Elektrit factory and workers.
Elektrit was nationalized in 1939, at the beginning of WWII and its equipment dismantled and transported to Minsk where another factory was later established. Information about the history of Elektrit is available in [1]. Even now, these pre-war factory buildings are in quite good condition, but are used for other purposes. The main building at the corner of Shvitrigailos Street and T. Shevchenkos Street stands out, as ever, from the surrounding buildings. Figure 3 shows the building in 1945 following WWII.

![Figure 3](image)

**Figure 3** The Elektrit building after WWII.

### 1944–1991: USSR

The factory was restored at the end of the WWII (Figure 4) when Vilnius became part of the USSR and the capital of Soviet Lithuania. It was turned into a plant for the Soviet Union’s aviation industry. The factory was named 555, which people referred to as The Fives, and for five decades it was the flagship of Lithuania’s high-tech industry. All the other Lithuanian electronic companies (such as Elektrografija, Lyra, Nuklonas, Venta and Vilma) were founded afterwards with the help of specialists from the 555 company.
In March 1949, a new Experimental Design Bureau was created at the 555 factory. The oscilloscope business became one of its main activities. In 1948, the plant's specialists created the industry's first oscilloscope, the C1-1, with a bandwidth of 250 kHz (Figure 5). One year later, the plant produced a 5 MHz oscilloscope, the C1 2, developed by Moscow Research No. 17 (Figure 6). The first oscilloscope designed by the Experimental Design Bureau was the C1-4 (Figure 7) in 1954. At the same time the plant produced thousands of special OK- oscilloscopes that were used in nuclear tests.
Figure 5 The industry's first oscilloscope, the C1-1, with a bandwidth of 250 kHz.
Figure 6 Moscow Research No. 17 developed the C1 2, a 5 MHz oscilloscope.

Figure 7 The C1-4 was the first oscilloscope designed by the Experimental Design Bureau.

In 1960 the 555 factory and Research Institute already existed. They designed and manufactured such products as oscilloscopes, microwave measuring instruments, and pulse generators, then came ultrasonic medical equipment. Both companies were owned by the military-industrial complex, but military applications accounted for only 25% of production. In the 1980s the companies employed 7000 people in total. The turnover exceeded USD 250 million, while USD 80 million was generated from oscilloscope production. The main technical specialists were graduates of the country’s best technical universities.
The stages of oscilloscope development in Vilnius in the period 1945-1991 are listed on the following pages.

The stages of oscilloscope development in Vilnius from 1945-1969

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Figure 8 1958: C1-11, the first wide-bandwidth 100 MHz oscilloscope.
Figure 9 1959: C1-14, the first 1.5 GHz traveling wave oscilloscope.
Figure 10 1961: C1-15 and C1-17, the first 25 MHz plug-in oscilloscopes.
Figure 11 1964: C8-1, the first oscilloscope based on a storage CRT.
1965: The first sampling modules for plug-in oscilloscopes.

Figure 12 1966: C1-40, the first precision oscilloscope.

Figure 13 1969: C7-8, the first 1.5 GHz sampling oscilloscope.
Figure 14 1969: C8-8, the first automated oscilloscope.

The stages of oscilloscope development in Vilnius from 1972-1991

The stages of oscilloscope development in Vilnius from 1972-1991
Figure 15 From 1972: C1-70, the best-known 50 MHz plug-in oscilloscope family. It was produced until 1991.

Figure 16 1974: C1-75, the first 250 MHz oscilloscope.

Figure 17 From 1977: C1-91, C1-115, C1-122 and C8-21 plug-in oscilloscopes with 100 MHz bandwidth. They had up to 14 plug-in modules.
Figure 18 1979: C9-5, the first digital storage oscilloscope with 5 MHz bandwidth and 10 MS/s sampling rate.
Figure 19 1980: The C1-112 service oscilloscope. Its annual production in 1991 reached 27 000 units (Vilnius).
Figure 20 1981: C1-91/4, the first 18 GHz sampling oscilloscope.
Figure 21 1981: C9-9, the first oscilloscope with a microprocessor. It was an 18 GHz precision sampling oscilloscope used as a metrological standard for pulse measurements.

Figure 22 1982: C7-19, the first 5 GHz traveling-wave oscilloscope having 250 000 km/s writing speed.
Figure 23 From 1986: C9-20 to C9-26 family of digital storage oscilloscopes with sampling rates up to 100 MSa/s.
Figure 24 1989: C1-129, the first analog 1 GHz oscilloscope.

Figure 25 1990: C7-20/4, the first 30 GHz sampling oscilloscope.
In total 144 models of oscilloscope and plug-in modules were created in Vilnius between 1948 and 1992.

**The people behind the oscilloscopes**

The three oscilloscope departments of the Research Institute employed 200 people including doctors and doctoral candidates (*Figures 26-29*). One of the main factory shops specialized in the production of oscilloscopes. Thus a powerful oscilloscope school was created in Vilnius. You can read about it in Reference [2].
The development of the companies was associated with serious organizational changes: the Experimental Design Bureau was transformed into the Research Institute, the plant became proficient, laboratories were converted into scientific departments, and powerful mechanical and technological services were created. The range of design work in the Research Institute was significantly expanded. The instruments were manufactured at 8 factories around the country.

From 1960 to 1970, a significant impact was made on development by leading oscilloscope manufacturers: primarily Tektronix (plug-in oscilloscopes), Hewlett-Packard (sampling oscilloscopes), and Du Mont.

For a long time, the leading role in the development and manufacture of Soviet oscilloscopes belonged to enterprises in Vilnius. By the mid-1960s, 21 models out of 28 had been developed in Vilnius, including 16 in the Experimental Design Bureau and Research Institute, and 5 in the 555 factory. The remaining seven models were developed in Moscow (1), Lvov (5) and Gorky (1). For the
first 16 years, 75% of all oscilloscopes were created in Vilnius.

The Vilnius enterprises, however, couldn't provide for the rapidly developing field of science and technology, as well as the Ministry of Defence. Therefore, the design and production of certain types of oscilloscopes were transferred to other enterprises of the Ministry. A company in Lvov specialized in developing ruggedized oscilloscopes. A company in Minsk specialized in developing low-frequency (less than 100 MHz) oscilloscopes for common use. A company in Gorky was involved in the development of digital storage and sampling oscilloscopes.

Vilnius Research Institute was always the USSR's leading oscilloscope enterprise. The program manager was Anatoly Cherny, chief engineer of the Research Institute (Figure 30). His deputy was Aleksandr Denisov, head of the oscilloscope department. The main functions of the program were the development of new directions in oscilloscope technologies, and the preparation of annual and long-term plans to create new types of instruments and the necessary components. By the mid-1980s, due to these efforts, a fifth of all oscilloscopes were produced in the USSR. The interest of Western experts in the level of Soviet oscilloscope production was evident [3, 4].

![Anatoly Cherny, chief engineer of the Vilnius Research Institute.](image)

**Figure 30** Anatoly Cherny, chief engineer of the Vilnius Research Institute.

We should identify the principal experts who worked at different times in the oscilloscope business. The heads of oscilloscope departments were Aleksandr Denisov (Figure 31), Viktor Levin (Figure 32), Lev Auzin, Michail Efimchik (Figure 33, Figure 34). The heads of laboratories were Gennady Lifanov (Figure 35), Anatoly Kalamkarov, Aleksey Zibin, Chaim Zaidelson, Vladimir Silvestruk, Anatoly Onischenko, Aleksandr Michalev, Jakovas Rosokis, Anatoly Kozhuchov, Aleksandr Lichtinshain, Nikolay Radionov and Nikolay Isaenko. The oscilloscope departments’ engineers received hundreds of patents, published 8 books and over 200 articles in scientific journals. From 1972 to 1990, Vilnius held the All-Union Scientific-Technical Conference on oscilloscope measurement methods, and conference proceedings were published. Leading experts were involved in the development of international standards, and several employees received State and Republican prizes.
Figure 31  Aleksandr Denisov, a head of oscilloscope departments.

Figure 32  Viktor Levin, a head of oscilloscope departments.

Figure 33  Lev Auzin, a head of the oscilloscope departments.
After 1992: Lithuania

With the collapse of the USSR, the strong system of oscilloscope design and production ceased to exist. When Lithuania regained its independence, dramatic changes began. In mid-1993, the factory was privatized by people who knew nothing about its plans and in a couple of years the factory ceased to exist. The production of oscilloscopes was completely halted. One newspaper wrote: “It was the sunset of the Lithuanian industry stars.”

The privatization of the Research Institute was different. The leaders properly understood the necessity of sustaining their main technical potential. In 1993, the Lithuanian Council of Ministers published a decree on the privatization of scientific research institutes. Independent companies were separated from the institutes and then privatized according to the procedures. Many specialists believe that the privatization of the Vilnius Institute was the most successful. The events in the privatization of such companies as Eltesta, Elgama, Elmika, Geozondas, Inmatsis, Kontestas,
Lifodas and Medelkom are well-known. However, their material and human resources are incomparably smaller than those of the former Research Institute.

Eltesta is currently the only successor of the former oscilloscope department. The road to recognition was a very hard one. Out of 70 people who worked there before 1991, only 10 remained in 1995. The volume of work reduced to a minimum, the contacts in the East were lost, and none were yet found in the West. However, in time the company found its feet. In early 2000, Eltesta produced the market’s only 20 GHz bandwidth USB sampling oscilloscope (Figure 36).

Figure 36 In 2000, Eltesta produced the market’s only 20 GHz bandwidth USB sampling oscilloscope.

Eltesta is now a sister-company of British oscilloscope manufacturer Pico Technology. Eltesta designs and manufactures wide-bandwidth PC sampling oscilloscopes, optical communications analyzers and time-domain reflectometers while Pico Technology handles the company’s marketing and sales. From 2007 Eltesta created the PicoScope 9200 family of PC Sampling Oscilloscopes with bandwidths up to 12 GHz (Figure 37). In 2012 the company designed the new PicoScope 9300 family of PC Sampling Oscilloscopes with bandwidths up to 20 GHz (Figure 38).
Figure 37 Eltesta created the PicoScope 9200 family of PC Sampling Oscilloscopes with bandwidths up to 12 GHz.
Eltesta designed the new PicoScope 9300 family of PC Sampling Oscilloscopes with bandwidths up to 20 GHz. Currently, Eltesta employs 16 people (Figure 39). The Managing Director is Jakovas Rososkis and the Technical Director is Oleg Zaytsev (Figure 40).
Figure 39 The current Eltesta staff.

Figure 40 Eltesta Managing Director Jakovas Rososkis and Technical Director Oleg Zaytsev.

References

2. А.Ф. Денисов, Я.М. Россоский. Люди. Годы. Осциллографы. Вильнюс. 2012.
4. SOVIET TRAVELING WAVE OSCILLOSCOPES (S-08910), CIA, 1975 [View a scan here, and a transcript here]

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- Weird and unexpected oscilloscope applications
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