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"The Struggles of Creating the Top Ten New Products No.3"
"Ise Electronics "Digitron" fluorescent character display electron tube"
"Although low voltage and high brightness technologies have been overcome, problems remain in terms of "Lifespan"

The "Digitron" fluorescent character display electron tube developed by Ise Electronics (Wada, Ueno-cho, Ise City, Mie Prefecture, President Tadashi Nakamura) has the major feature of being able to display green fluorescent characters with high brightness (about 800 lux) at low voltage (25 volts), and for this reason it is considered ideal as a numeric display tube for electronic desktop calculators that have been made into ICs (integrated circuits).

Among domestic computer manufacturers, Hayakawa Electric Industry, which cooperated with Ise Electronics in the development of Digitron, was one of the first to adopt it as the numeric display tube for its recently released electronic desktop calculator, "Compet 16" (Proposer's note: "Compet 16" = "CS-16A" elsewhere in this proposal) and the interest in the product is rapidly growing, with NEC entering into a technical partnership with Ise Electronics to begin production of Digitron. The Digitron is an ultra-high vacuum electron tube with a unique group of electrodes built into the glass tube. It works by accelerating the thermionic electrons emitted from the filament with a grid and striking an anode phosphor element, where this energy is converted into light and emitted as characters.

In addition to being low voltage and high brightness, it emits green light, so your eyes don't get tired. It is low voltage, high brightness, and emit green light, so our eyes won't get tired. It also has feature of ease of reading because all the digits are shown at the same depth and displaying characters, and Professor Eiji Sugata, Dean of the Faculty of Engineering at Osaka University, has praised it for its low voltage and high brightness, saying, "It is an electron tube that goes beyond conventional wisdom and will contribute greatly to the development of the electronics industry."

伊勢電子工業

けい光文字表示用
電子管「デジトロン」

中村 正社長

本社
選定

十大新製品生みの苦心

「寿命」の点でなやむ

高電圧
両技術は克服したが









The company's president, Tadashi Nakamura, worked at the Kobe Industry headquarters until June 1966 in researching cathode ray tubes for televisions, and in May 1964 developed the single-gun color picture tube for transistor color televisions. The development of the Digitron was initiated when Hayakawa Electric Industries commissioned the company to carry out research into "whether it is possible to create a low-voltage numeric display tube for use in IC-based desktop calculators." So they started development.

Initially, with the cooperation of Nippon Electronic Materials (Kuchidanaka Nogami, Amagasaki City, President Masao Okubo), they borrowed the company's laboratory (Nagaoka-cho, Otokuni-gun, Kyoto Prefecture...now the research laboratory of Ise Electronics) and President Nakamura and several other researchers worked on development.

Technical Section Chief Kanji Tanji, who was involved in this, said, "First, we struggled to break the 50-volt barrier, provide sufficient brightness, and extend the lifespan. In order to emit light at low voltages, we installed a grid (an extremely fine mesh-like control grid) between the filament cathode and the anode phosphor element to control the diffusion and acceleration of thermal electrons, and it became possible to emit light even at 25 volts. However, the brightness was low, so a special material was used for the conductor of the anode phosphor element, and sufficient brightness was obtained. Even so, evaporation from the oxide was absorbed by the phosphor, and the brightness deteriorated and the lifespan was shortened, so a screen grid was installed between the phosphor screen and the grid, which extended the lifespan and finally allowed us to go ahead with commercialization."

President Nakamura also spoke of the difficulties that led to the birth of the new product, saying, "Developing a new product is not something that can be done in an instant; it is an accumulation of well-known principles, and it only becomes successful after a series of logical improvements and repeated efforts."

Thus, with the commercialization of the product in sight, Ise Electronics. was established in September 1966, and at the same time, construction of a factory began in Ueno-cho, Ise City, and sample production of 1,000 units per month began in April 1967.

Around this time, the domestic computer industry was under pressure to resolve the fact that the manufacture and circuitry of neon numeric display tubes infringed on the patents of Burroughs Corporation of the United States, and just as they were hoping for an alternative product to emerge, Digitron was developed and the product suddenly became popular. For this reason, the company plans to complete construction of a new factory by the end of February, and is set to mass-produce 100,000 units per month in order to meet demand. President Nakamura, who brought the product to market in just a year and a half, said, "Because it's an entirely new product, reliability is necessary. For this reason, our next challenge is how to mass-produce it with high quality," and Manufacturing Department Second Manufacturing Section Manager Masuda Mitsuru said, "We will place emphasis on uniform quality and strive to reduce costs and improve yields."

Also, Technical Section Manager Tanji, who is in charge of the technical department, showed his enthusiasm, saying, "We want to develop something with lower voltage and higher brightness and explore new demand," while Kyoto Research Laboratory Chief Matsuda Taizo spoke forcefully, saying, "We will research circuits that can fully utilize Digitron's characteristics as one way to explore new applications."