

IT'S OUR  
BIRTHDAY!



**Tektronix**<sup>®</sup>



A tour of 75 exhibits  
in the vintageTEK  
museum to  
commemorate the  
75<sup>th</sup> anniversary of  
Tektronix.



Museum co-founders Stan Griffiths and Ed Sinclair





## Certificate of Filing Articles of Incorporation

To All to Whom These Presents May Come, Greeting:

Know Ye, That whereas **MELVIN JACK MURDOCK, CHARLES HOWARD VOLLUM, GLENN LELAND McDOWELL and MILES WILLIAM TIPHERY**

*having presented Articles for a Corporation organized and formed for profit under and pursuant to the Laws of the State of Oregon, and paid the organization and annual license fees in accordance with the Corporation Laws of the said state, providing for the licensing of Domestic Corporations:*

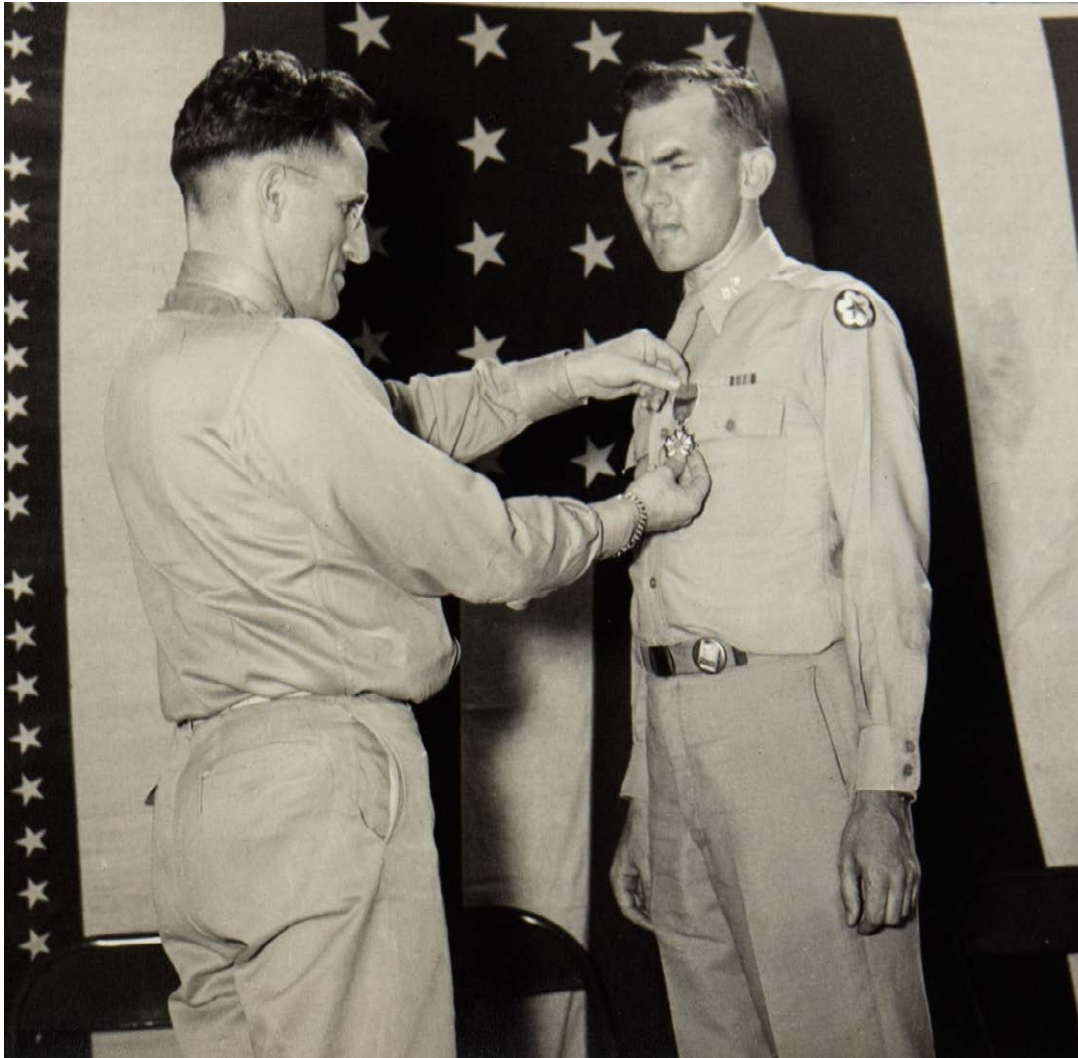
**Now, Therefore, I, Maurice Hudson, Corporation Commissioner of the State of Oregon, DO HEREBY CERTIFY** that said Articles of Incorporation have been filed in the office of the Corporation Commissioner; that the name assumed by said corporation is

**TEKRAD, INC.**

## Founding of the Company

Jack Murdock, Howard Vollum, Miles Tippery, and Glenn McDowell formed the Tekrad company on January 2, 1946. They just knew they wanted to do something with electronics.

A short time later they changed the name of the company to Tektronix.



## Legion of Merit Award

During WWII Howard Vollum was sent to England to work on radar development for over two years. He returned to Camp Evans to work on a fire control system capable of tracking mortar shells with radar that could respond to remove the threat.

He was awarded two Legion of Merits, one for his work in England and the second for his work at Camp Evans.



## Type 101 Video Calibrator Tektronix's First Product

10 were built to establish the production processes in advance of the 511 oscilloscope.

SN 11461 = Nov. 1946 #1

This is the actual first instrument produced by Tektronix



## Type 511 Oscilloscope

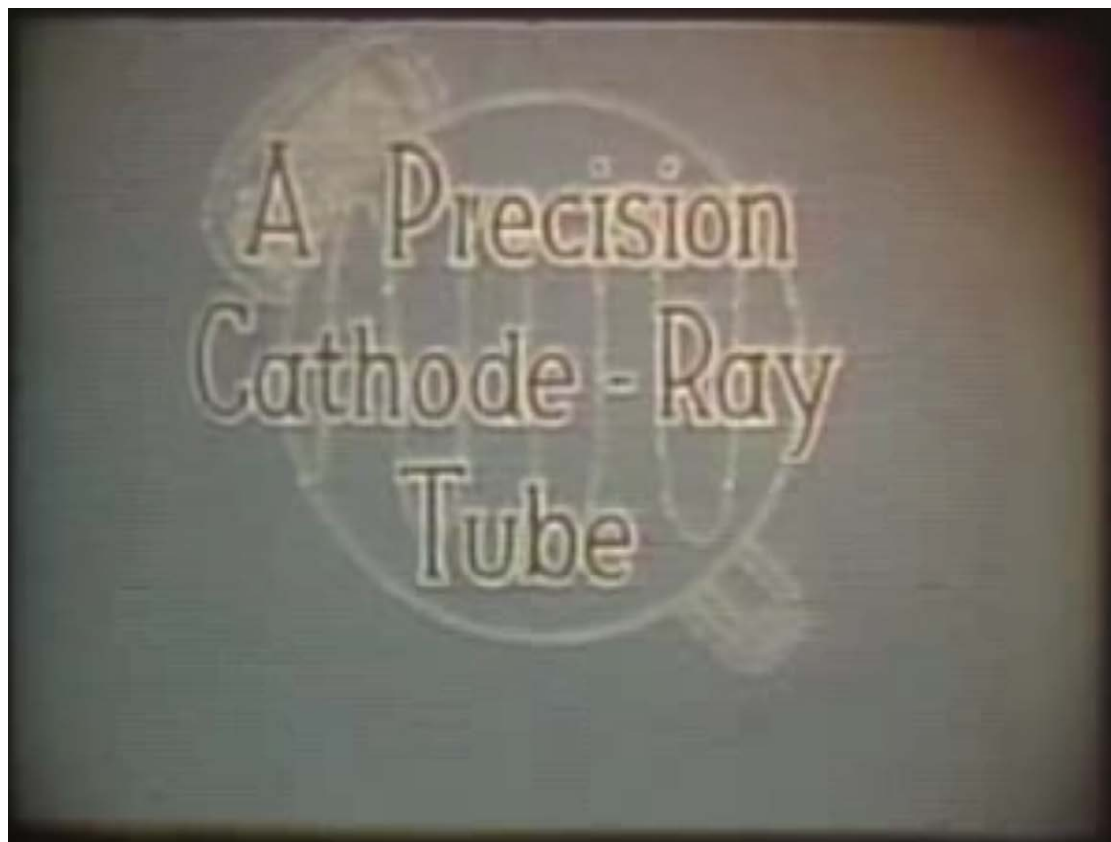
Initially known as the Vollumscope, this instrument enabled precision measurements at an affordable price.

Introduced in July of 1947, the first ads didn't appear for over a year until September 1948.



## Type 121 Wide Band Pre-Amplifier

Introduced in the 1950 catalog for a price of \$265. The 121 pre-amp was designed to increase the vertical sensitivity of the 511 oscilloscope up to 100X.



## **Historic Film and Videos**

Tektronix made a number of promotional films and also educational films which were available on loan or purchase.

The museum website has over 70 of these films available as well as other related Tektronix historic videos.





Scherzinger, John



Schmidt, Karl



Anderson, Gus



Browning, Linda R.



Bull, Thomas



Bingham, Howard



Wayne, Herbert



Weber, Joyce



Semon, Calvin



Muckenstrom, George  
*LONG ISLAND*



Nutt, Geraldine



Sinclair, Nadine



Nakao, Chizuko



Tan, Moira



Young, Gordon

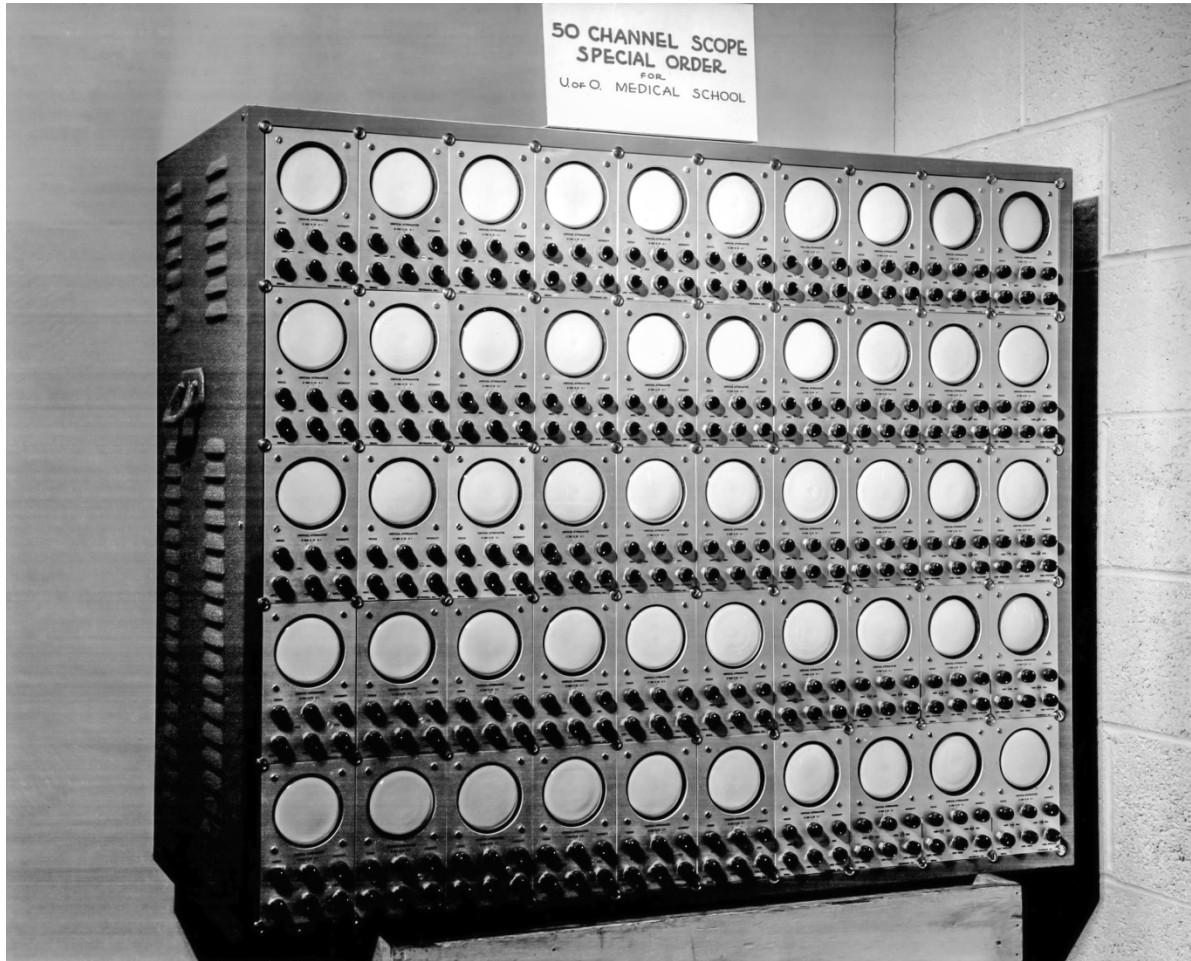


Weber Jr., Dale

## Employee Photo Albums

Tektronix produced photo albums of employees from 1950 to 1970.

The May 1970 album contains 12,854 employee photos



## 50 Channel Oscilloscope

In the early days the directors discussed taking on custom work as with their small size they would be efficient for this type of work.

One project was this oscilloscope for the University of Oregon medical school.

Dr. Archie Tunturi met with Howard to discuss an oscilloscope that would display 50 waveforms simultaneously which could be photographed on a single negative.



## Type 512 Oscilloscope

The 512 oscilloscope was first introduced in the 1948 Tektronix Catalog and was last offered in the August 1954 catalog.

The 512 was a high-gain, low frequency instrument, meant for biological work.

TYPE 513 D CATHODE-RAY OSCILLOSCOPE



## Type 513D Oscilloscope

The Type 513 “Wide Band” oscilloscope was first shown at the 1950 Institute of Radio Engineers meeting in New York City in March.

The 513 was very similar to the 511 in philosophy, except it had a faster sweep and it had a distributed amplifier to achieve DC to 20 MHz bandwidth.



## Type 514D Oscilloscope

The 514 featured DC response with full 10 MHz bandwidth and sensitivity of 0.03V/cm.

As in most early Tektronix oscilloscopes, the 514 was offered with an optional delay line, noted with a “D” suffix.



## Type 517 Oscilloscope

The Type 517 oscilloscope achieved a breakthrough performance of 50 MHz. It was designed by the first three Tektronix engineers - Howard Vollum, Logan Belleville and Dick Rhiger.

The innovative distributed amplifier design required many more amplifier tubes than a conventional scope (a total of 130 vacuum tubes) and power consumption was 1250W.

Most all 517s were mounted on a cart, providing some amount of portability for the indicator unit and the separate power supply.



## Sunset Plant

By 1950 the Hawthorne plant was at capacity and Tektronix needed a larger facility. The location for the new plant was near the intersection of Highway 26 and Barnes Road. The first groups moved early in 1951 but it was obvious by then that they needed even more room.



## Lunchroom Chair

The lunchroom chairs at Sunset later had the Tektronix “bug” added to the rear

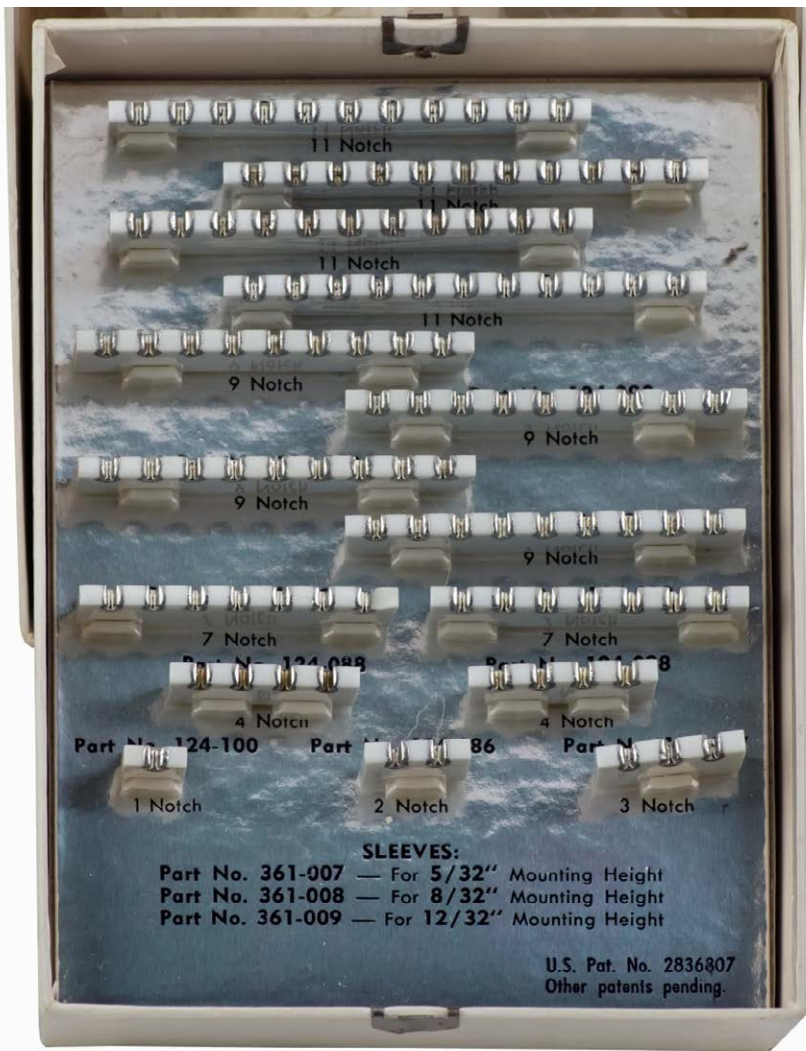






## Cathode Ray Tubes

Tektronix began in 1954 to manufacture CRTs in order to achieve higher performance.



## Ceramic Strips and Funnels

Ted Goodfellow came up with the idea of using ceramic with metallic inlays to replace the bakelite post boards to achieve higher performance.

Ceramic strips were first used in the 315 oscilloscope in 1952.

Ceramic was later used to replace glass CRT funnels. The first CRT with a ceramic funnel was the T5610 introduced in the 561A scope in 1962





## Expansion in Beaverton

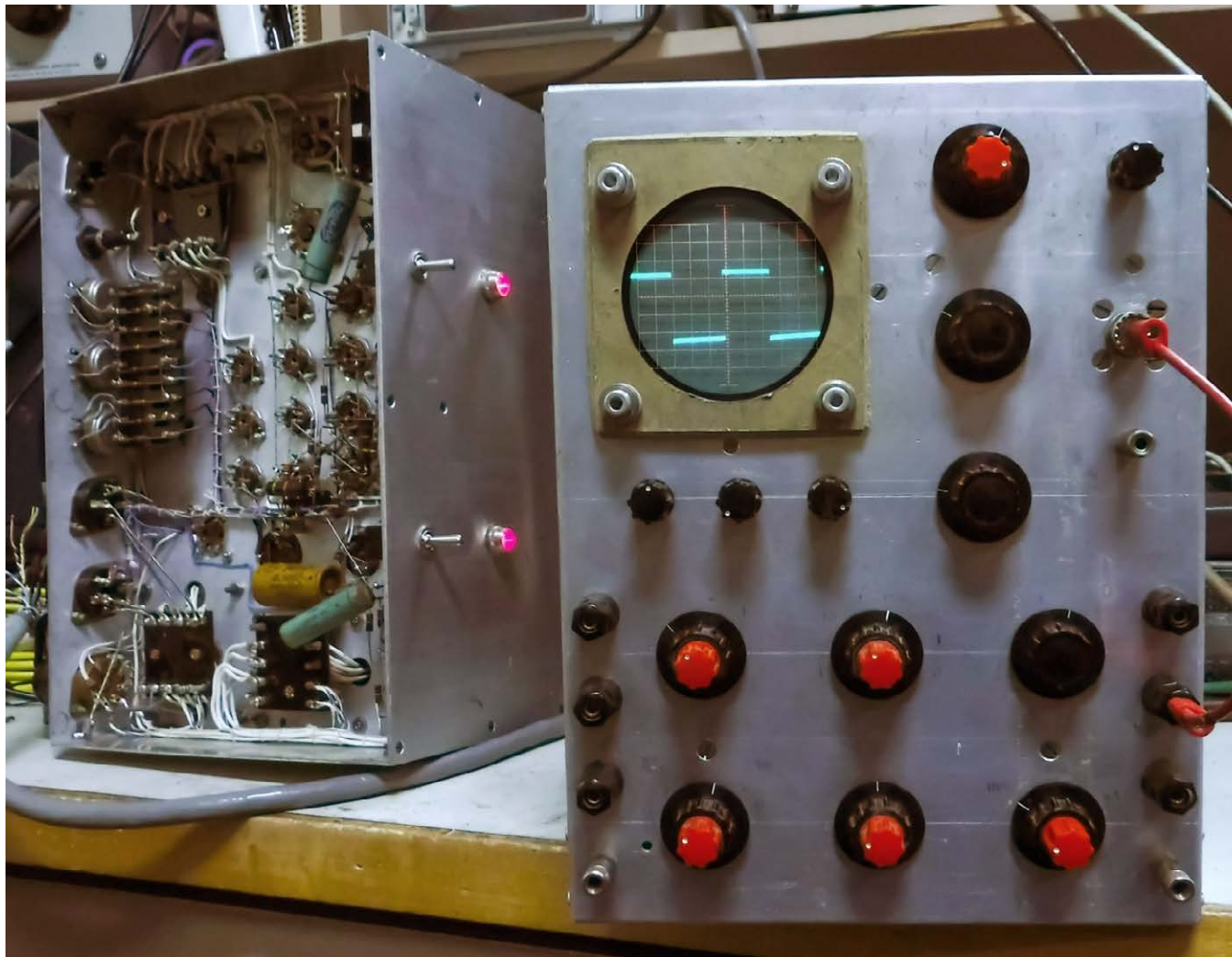
Tektronix purchased 313 acres in 1956 for expansion, only 10 years after founding.



## Type 519 Oscilloscope

The Tektronix 519 is a 1 GHz oscilloscope which first appeared in the 1961 catalog.

The 1 GHz bandwidth was achieved by driving the distributed deflection plate system in the CRT directly with no vertical amplifier.



## Oscilloscope Class

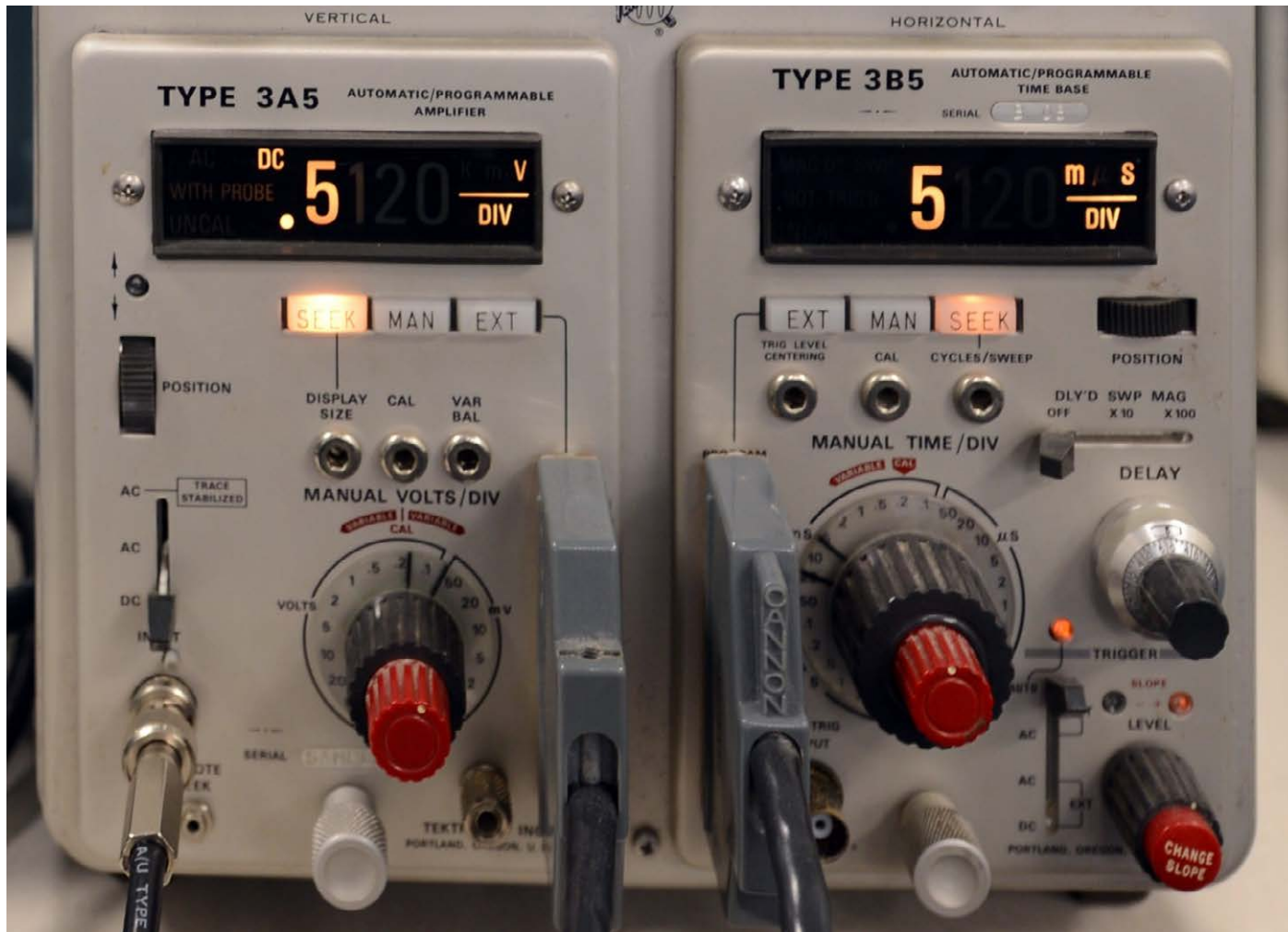
Tektronix organized a class based on a survey of employees who wanted to design and build an oscilloscope for their personal use.

We believe this oscilloscope is from the 1952 class



## 160 Series Instruments

The 160 series was a set of modular "bolt-in" instruments designed by Dick Ropiequet for use in medical research.



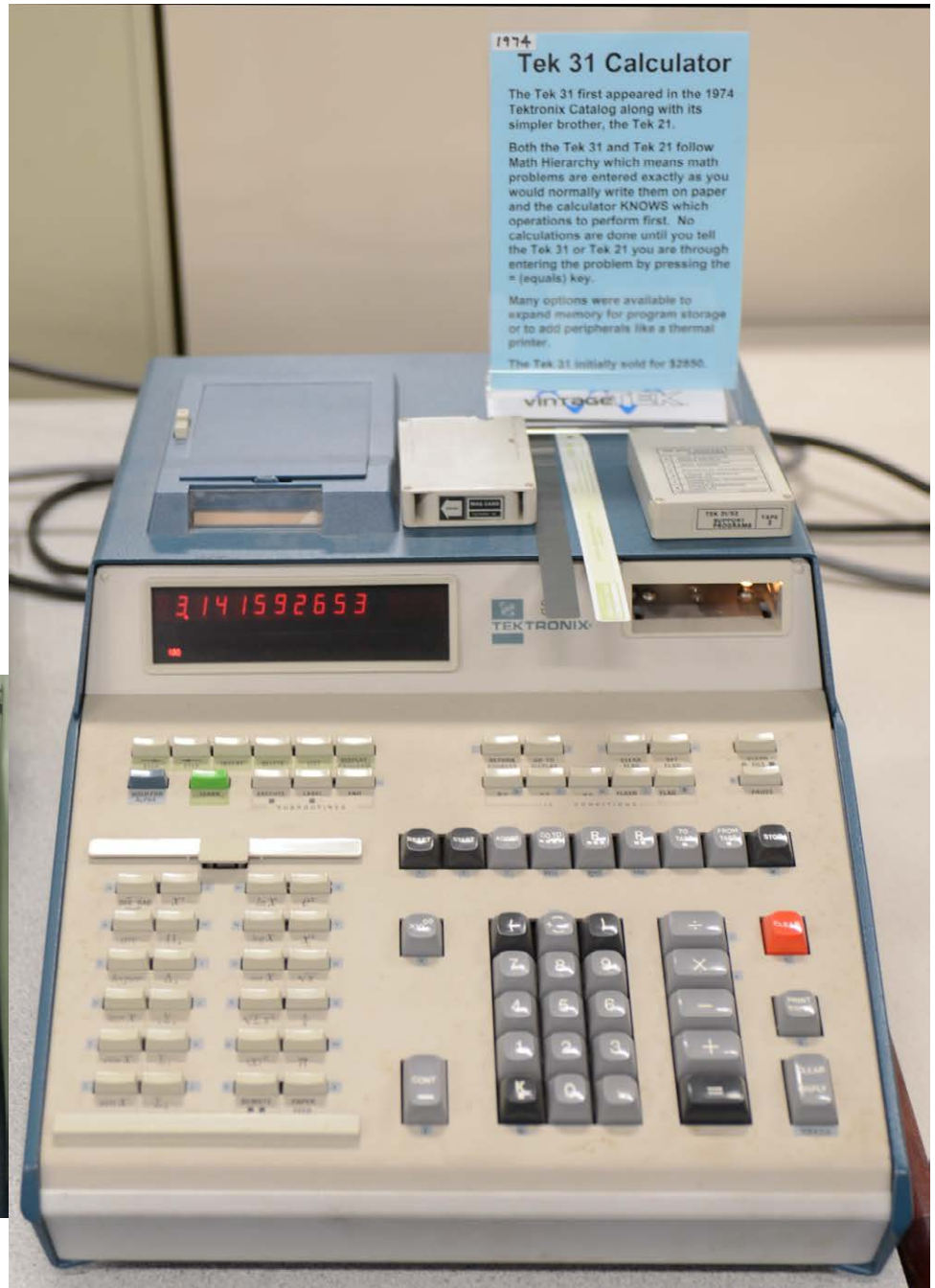
## Automatic/Programmable Plug-Ins

The Type 3A5 Amplifier and the Type 3B5 Time Base were introduced in 1966 and provided automatic configuration and direct setting readout.

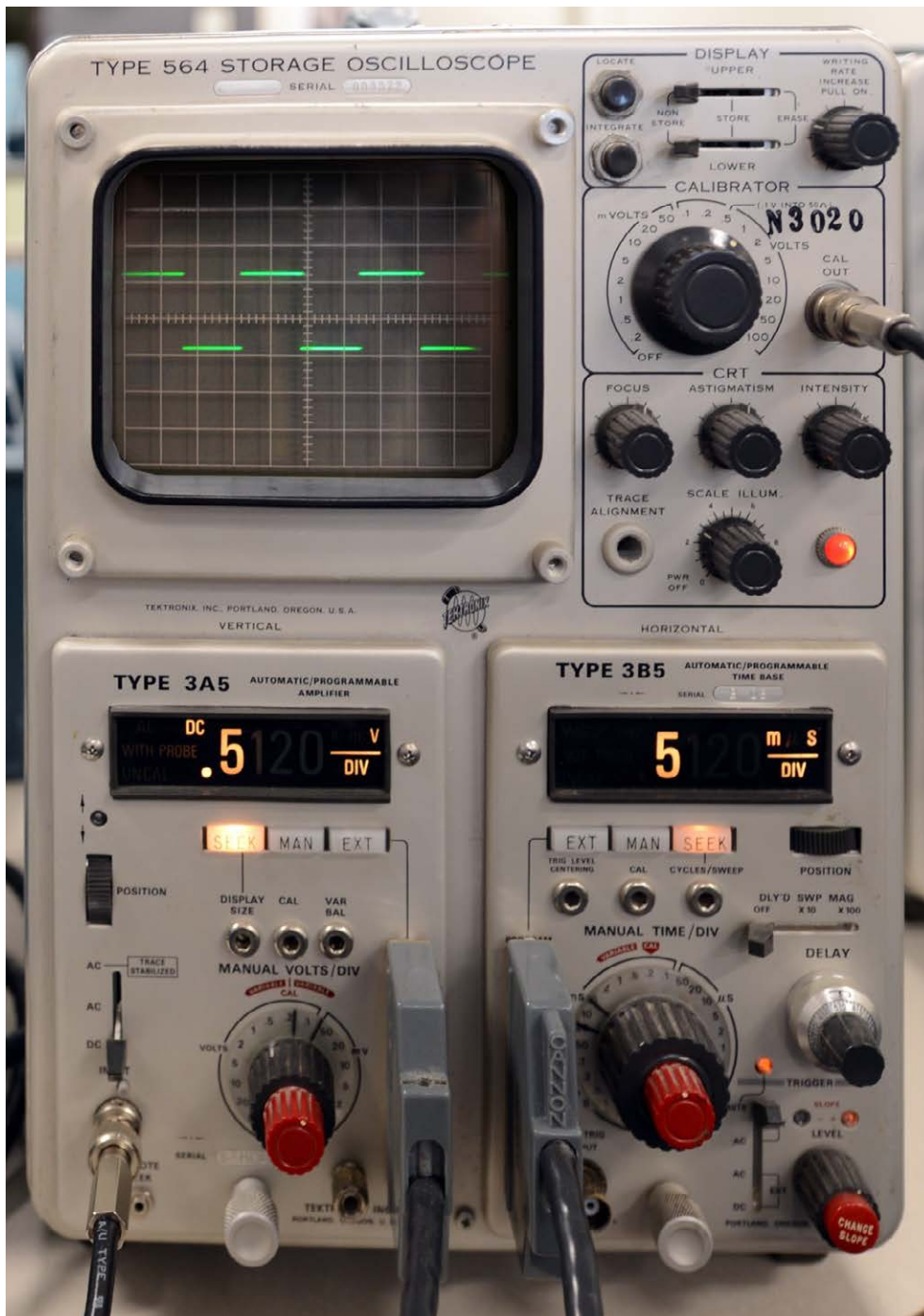
## Calculators

Tektronix acquired Cintra in 1971 to introduce the model 909 Scientist and model 911 Statistician calculators.

The Tektronix-designed 21 and 31 scientific calculators were introduced in 1973.







## Type 564 Oscilloscope

An analog oscilloscope display requires a repetitive signal. Single-shot or transient events often cannot be seen and must be photographed.

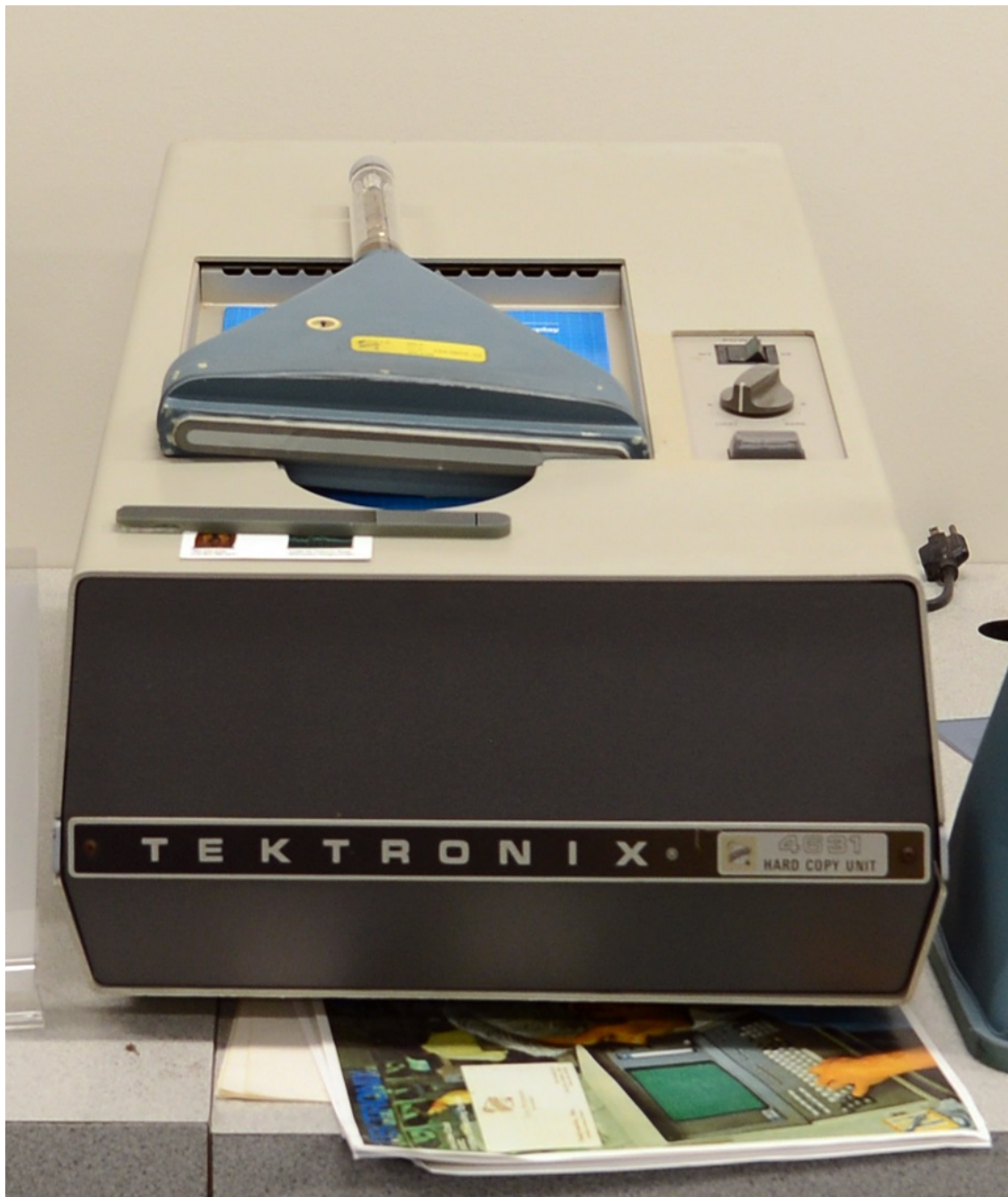
Bob Anderson developed a robust, reliable, and cost effective storage CRT. It was first used in the 564 storage oscilloscope with 10MHz, performance and dual plug-ins for a wide range of capabilities.

The storage CRT opened the door to a number of new markets.



## Direct View Storage Displays

Tektronix entered the computer graphics market by developing an 11 inch storage display. This was followed by a family of computer graphic terminals with screen sizes up to 25 inch.



## 4631 Hard Copy Unit

The graphic terminals needed hard copy output.

Tektronix designed a special 1-line CRT which exposed 3M dry silver paper which was thermally developed to produce quality hard copies.



## 4051 Graphic Computing System

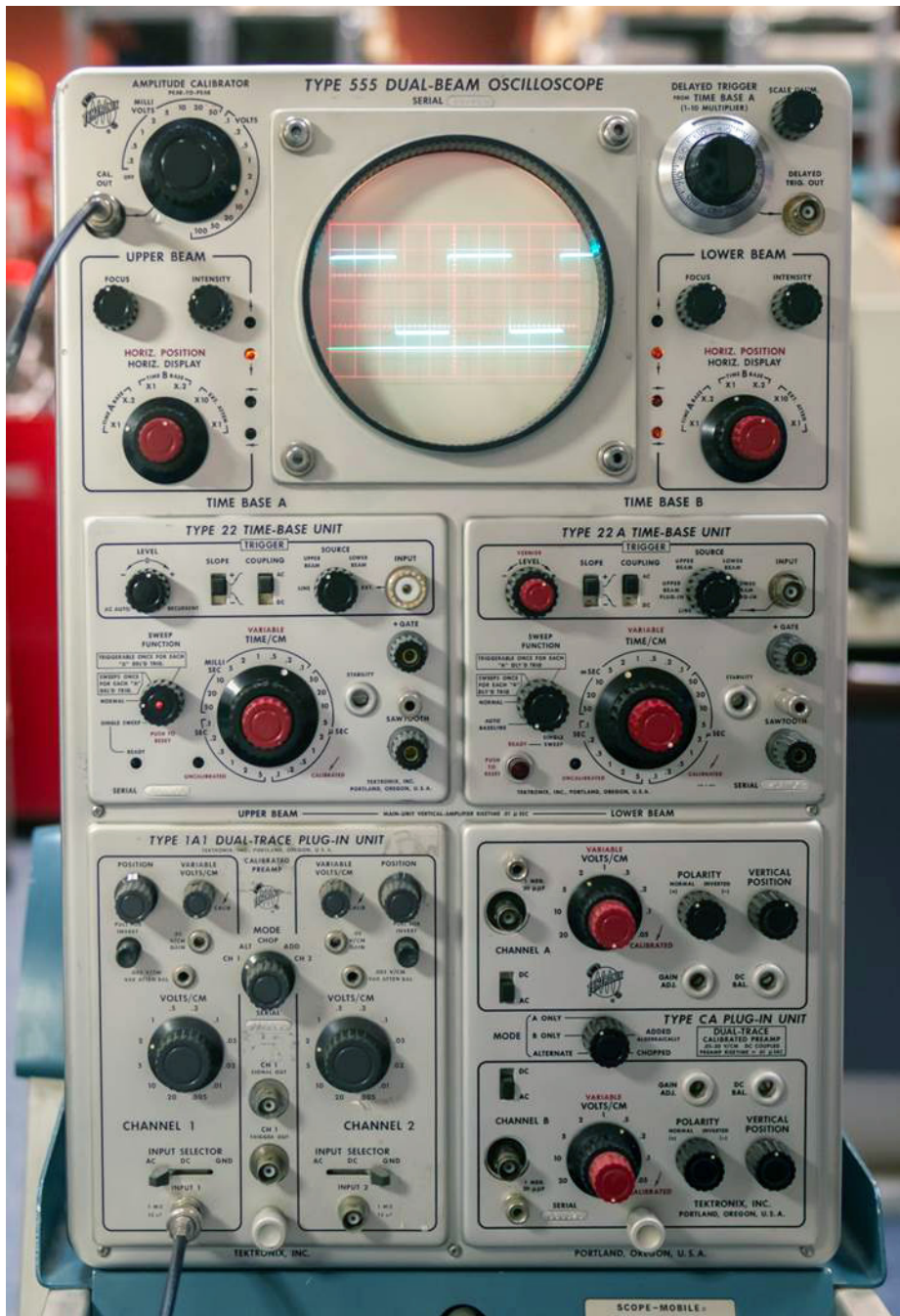
The 4051 desktop computer was introduced in 1975 featuring 1024x768 graphic display, tape storage, BASIC programming, and ROMpacks for extending capability.



## Type 945 Oscilloscope

The Type 945 was a militarized oscilloscope based on the 545 oscilloscope and released in April 1961

It was designed to military standards for shock, vibration, humidity, temperature, and electromagnetic interference.



## Dual Beam Oscilloscopes

Dual trace oscilloscopes multiplex a single beam. As such they can miss displaying some information.

A dual beam oscilloscope has a CRT with two separate electron guns and two sets of electronics. Basically it is two oscilloscopes with a single power supply and screen in the package.

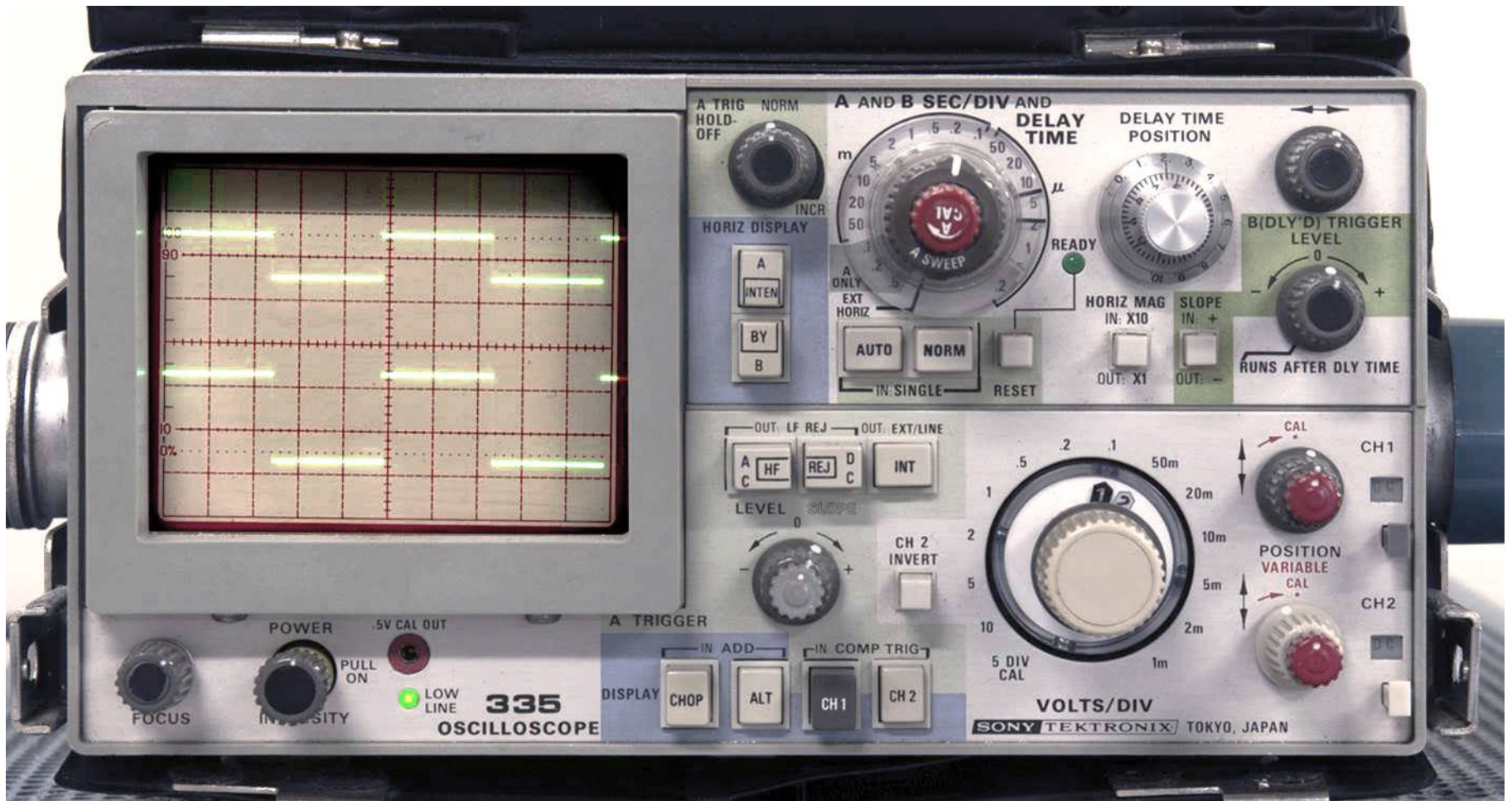


## Clone Oscilloscopes

In 1959 the Air Force awarded contracts to Hickock for Tektronix Type 545 scopes.

Hickock, Lavoie and Jetronics made nearly exact clones including the manuals, of the Tektronix 545 oscilloscope.

Tektronix eventually sued the US Government and won. The case took nearly 18 years to settle.



## Sony/Tektronix

Sony/Tektronix was formed in 1965 through a 50/50 joint venture between Sony and Tektronix. Initially they assembled Tektronix products but soon began developing their own products usually focusing on miniaturization and specialization for the Japanese market.





## Type 130 L-C Meter

The 130 L-C meter was designed for internal use in selecting and measuring capacitors and inductors.

Customers who visited the factory and saw the instrument indicated they would like such a product. It was introduced in 1954.

It was finally retired in 1975 and we believe the longest running Tektronix product.



## Type N Sampling Plug-In

Oscilloscopes display repetitive signals limited by the vertical bandwidth of the circuitry.

A sampling oscilloscope increases bandwidth by collecting samples from successive cycles and assembling them to display a complete waveform image.

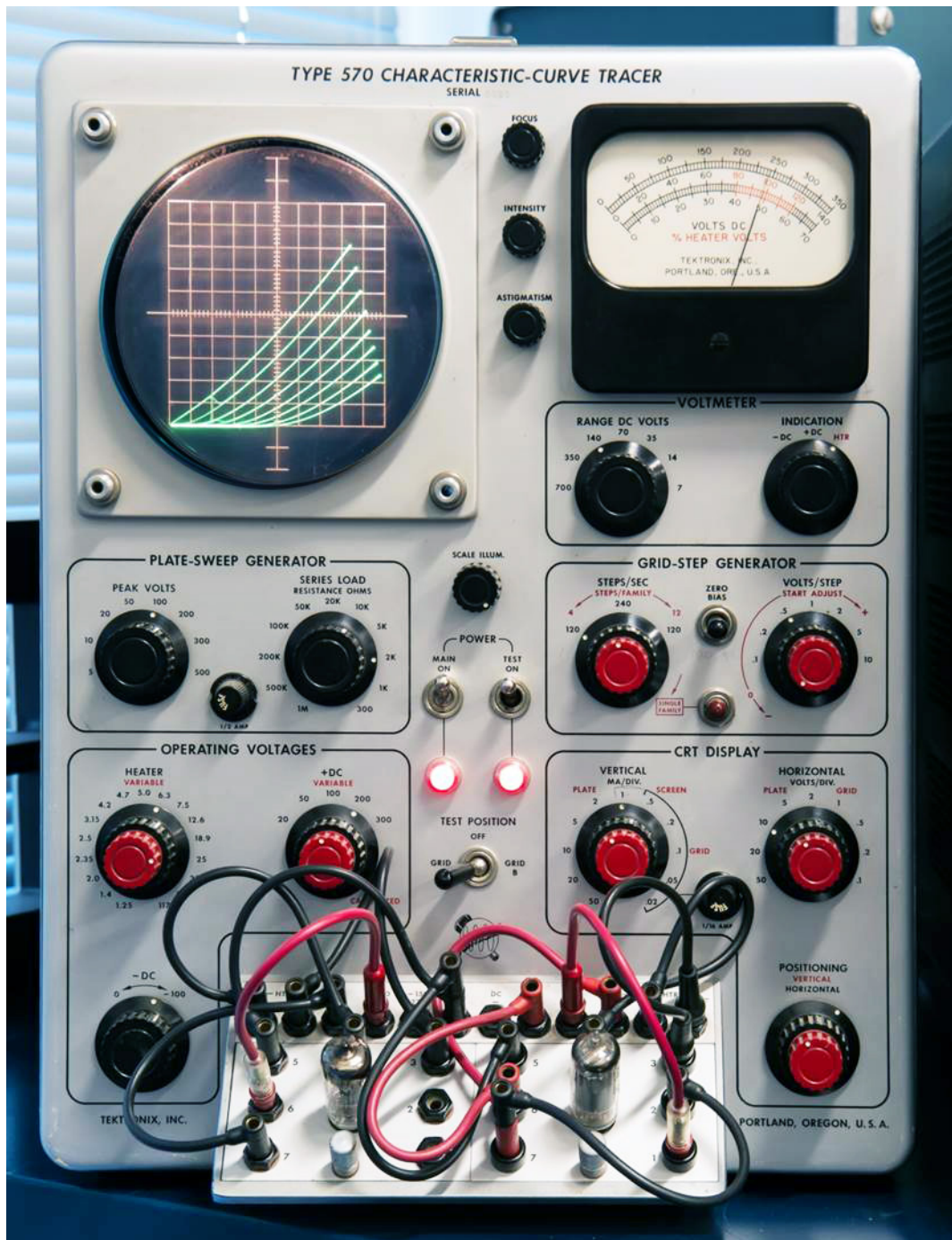
Tektronix first sampling plug-in was designed by Norm Winningstad for the 500 series oscilloscopes and was introduced in 1960.



## **Type 113 Delay Line**

A delay line placed in the vertical signal path after the trigger signal of an oscilloscope enables the display of the trigger portion of the signal.

The Type 113 was a large stand-alone suitcase style delay line introduced in 1960 to for those instruments without internal delay lines.



## Type 570 Curve Tracer

Curve tracers display voltage vs. current characteristic curves for active electronic devices.

The 570 was introduced in 1955 to display the characteristic curves for vacuum tubes.

These curve tracers are highly sought out by audiophiles for matching tubes and still command high prices.



## Type 576 Curve Tracer

The 576 was introduced in 1969 to display the characteristic curves for semiconductor devices.

It features a novel display readout using fiber optics and incandescent bulbs to display key operating parameters directly.



## Type 524 Oscilloscope

Effective measurement of television signals requires features not found in general purpose oscilloscopes.

The 524 was introduced in 1953 with special circuitry to aid in the display and analysis of television signals.



## Television Waveform Monitors

Waveform monitors were a new class of instrument for better monitoring of TV signals in studios and transmitters. The 525 was the first Tektronix waveform monitor appearing in the spring 1955 short-form catalog. It was probably not a coincidence that the 525 was named thusly, since the number of horizontal lines per field in the U.S. TV standard was 525.

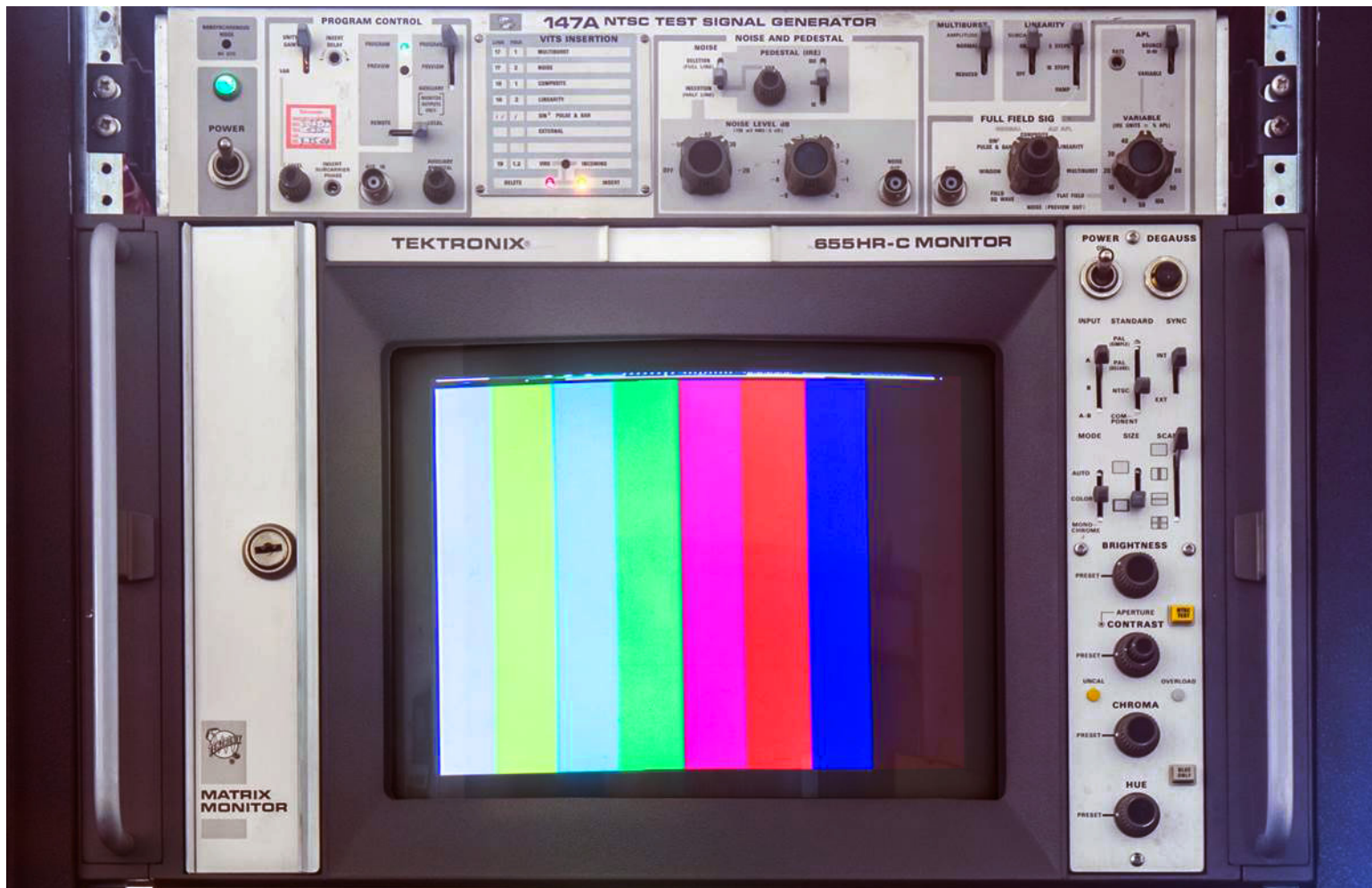


## Color Television Vectorscopes

In 1955, the National Television Standards Committee (NTSC) issued a standard for a compatible color television system, an enhancement of the earlier 525 line monochrome system. A color signal can be represented as containing three components.

The vectorscope was a new class of instrument to provide an X-Y display of these color components conveying information about each point in the raster.





## Television Signal Sources and Monitors

Tektronix developed signal sources for various television standards for internal use. The market needed such sources so Tektronix developed and released these as products. They also developed state-of-the-art display monitors.



## Emmy Awards

The National Academy of Arts and Sciences awards Technology and Engineering Emmys to organizations and individuals for breakthroughs in technology that have a significant effect on television engineering.

Tektronix received its first Emmy in 1976 for *"Leadership in development of equipment for verifying television performance in the vertical interval"*.

Their second Emmy, shown here, was received in 1984 for *"Continued technical excellence and leadership in television test, measurement, and monitoring technology"*.



## Grass Valley Group

Grass Valley Group produced a number of products for the manipulation and distribution of video signals. Tektronix acquired Grass Valley Group in 1974.

Their switchers had the famous “T” handle and a model 1600 switcher was used in the 1977 Star Wars movie as the firing control on the Death Star.



## Automated Machine Control

Machine control is the automated control of machining tools (drills, boring tools, and lathes) by means of coded programmed instruction.

Tektronix started machine controls in the late 1960s by designing equipment for its own internal use.

Tektronix introduced a family of machine control instruments in 1970 which proved to be reliable and easy to maintain.

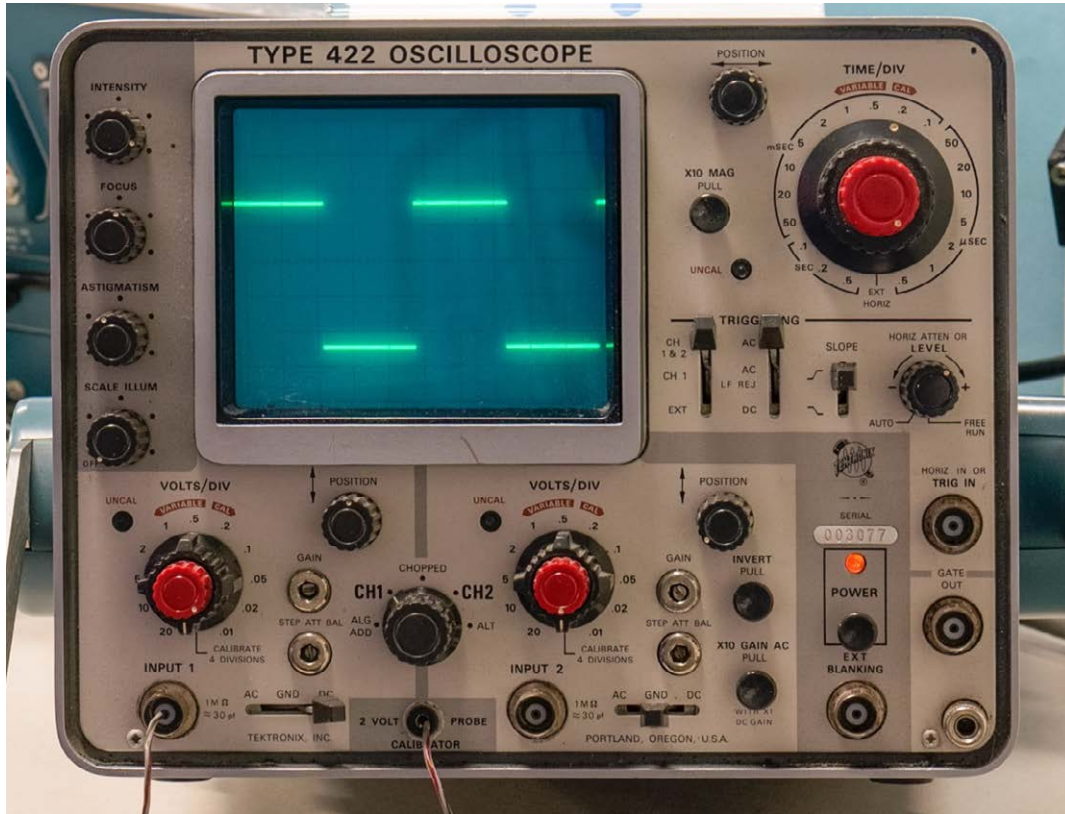


## Type 321 Oscilloscope

The 321 oscilloscope is a very compact single channel 5 MHz oscilloscope introduced in 1960.

It would operate of AC, DC, or 10 D size NiCd batteries.

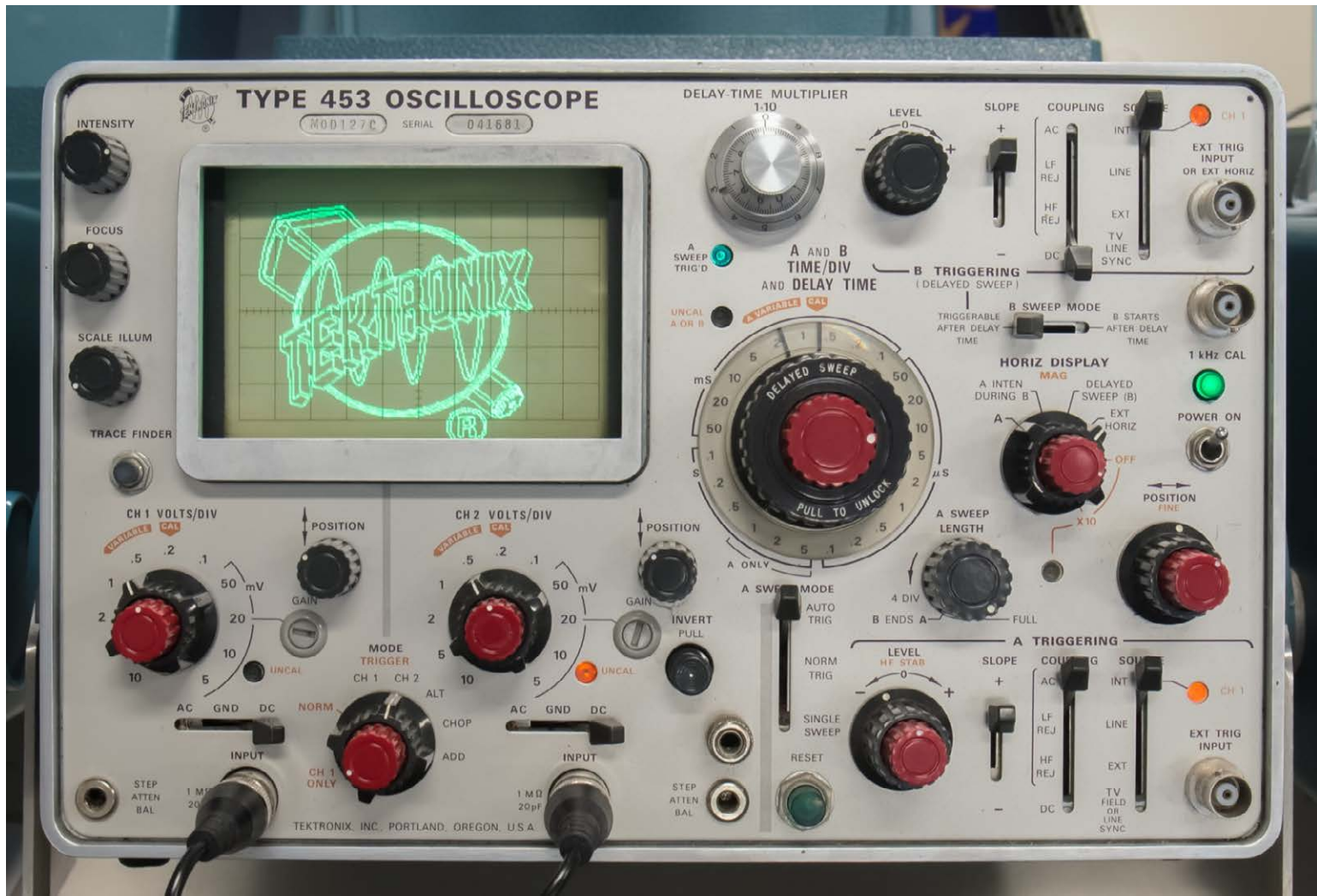
The 321A was introduced in 1964 which increased the bandwidth to 6 MHz.



## Type 422 Oscilloscope

The Type 422 is a dual-trace 15 MHz portable oscilloscope ideal for field service work introduced in 1965.

It used Tektronix' first CRT with a scan expansion mesh to allow a four-inch diagonal screen size with a short package depth.



## Type 453 Oscilloscope

IBM needed a portable oscilloscope with dual vertical inputs, vertical bandwidth of 50 Mhz, and fast dual sweeps. Tektronix responded to IBM's need with the 453.



## Industrial Design

Gale Morris was the first Industrial Designer hired by Tektronix in 1958. His first project was to design a new Scope-Mobile and created this hand-drawn sketch.

Gale donated a full size reproduction of his sketch which we have on display at the museum.





## Scope-Mobiles

The first scope cart was the Type 500 designed for the 517 oscilloscope which had an external power supply.

The 200 series Scope-Mobile replaced the 500 series and was in production for a significant number of years.





## 200 Series Mini-Scopes



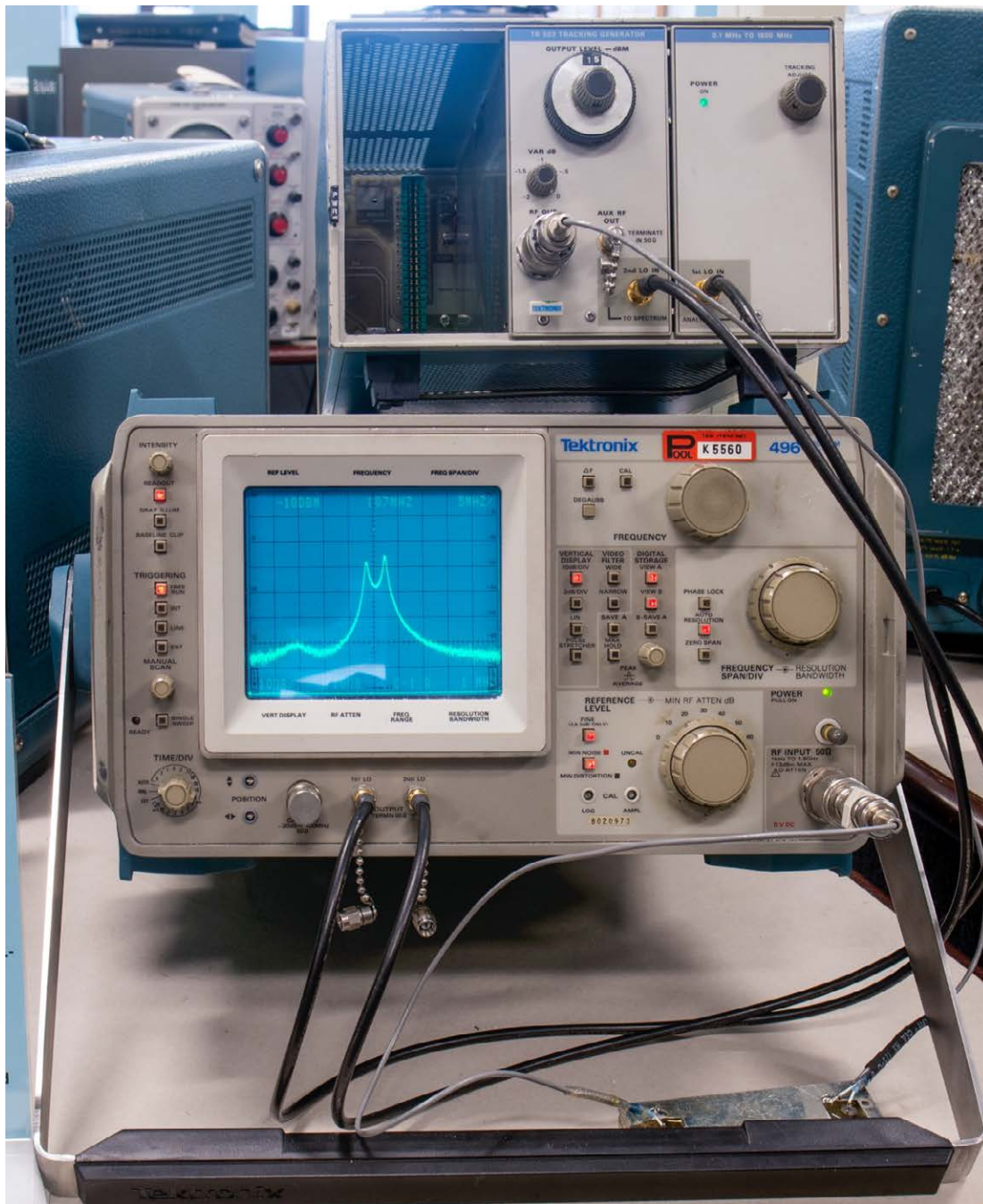
Howard Vollum thought small hand-held oscilloscopes could expand the market. The key challenges to such an instrument were a low power CRT, integrated circuits to minimize power and size, and a small package.

The 211 was introduced in 1971 and grew to a family of five products.



## Time Domain Reflectometers

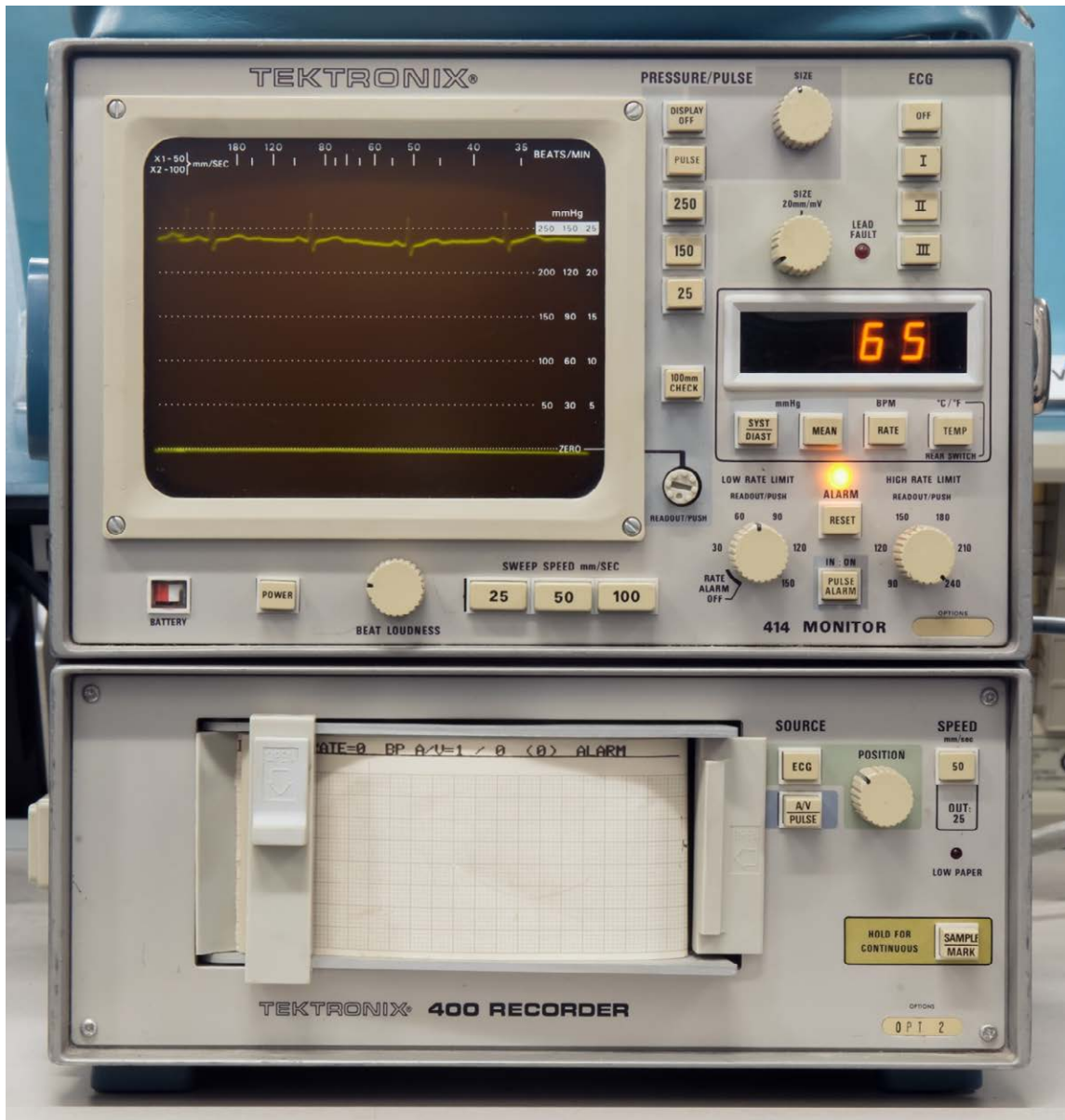
A time domain reflectometer is similar in principle to radar for detecting discontinuities, breaks, and other anomalies in metallic cables such as twisted pair and coax. Any discontinuity will cause a reflection which can be measured and pinpointed in distance with extreme accuracy.



## Spectrum Analyzers

Pentrix, an electronics company in Brooklyn, NY, developed the L10 spectrum analyzer plug-in for the Tektronix 530/540 family of oscilloscopes.

In 1964 Tektronix acquired Pentrix to develop their own spectrum analyzer plug-ins and stand-alone instruments.

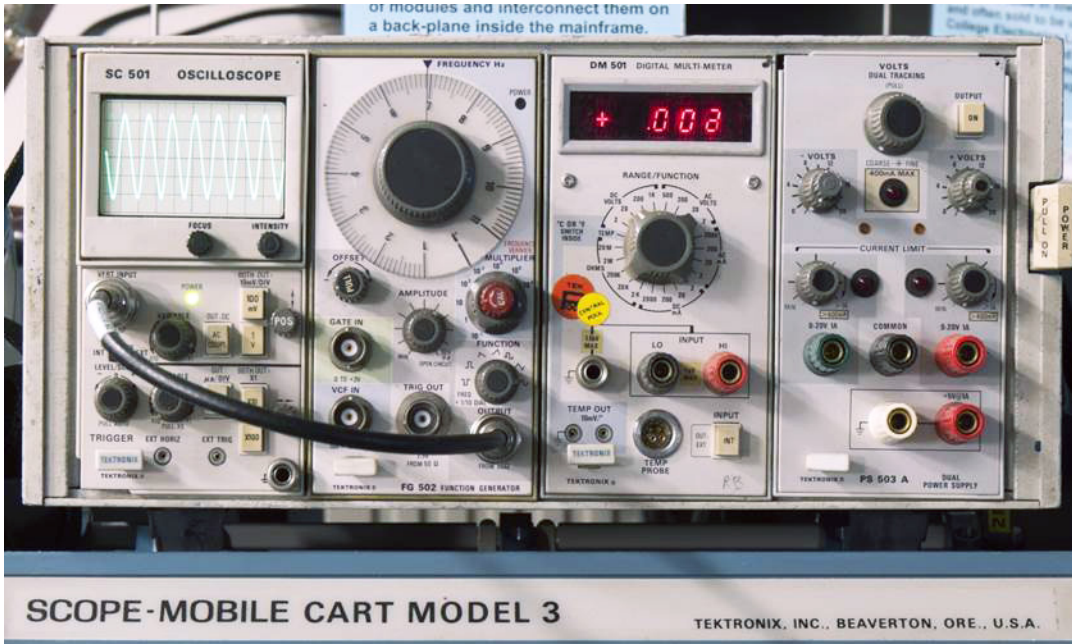


## Medical Products

Tektronix entered the medical products field soon after the company was founded with custom products.

In 1967 Tektronix introduced the 410 Physiological Monitor, a battery powered instrument for use in clinical medicine. This 414 portable patient monitor was introduced in 1976.

or modules and interconnect them on a back-plane inside the mainframe.



## TM-500 Instruments

The TM-500 was a family of modular test and measurement products introduced in 1973.

The main frame was available in one to six slots.

There were over 100 different plug-ins available over the years.





## **Transmission Electron Microscope**

In the early 1960s Tektronix began development of an electrostatic transmission electron microscope (TEM).

This is prototype #2 assembled in 1968. Tektronix chose to spin out the product and team as Elektros with Bert Cathery as President. Bert visited the museum in 2013 for this photo.



## Tektronix Memorabilia

The museum has a display case of various Tektronix memorabilia including clocks, meters, pins, cook books, pens, anniversary medals, Howard's personal checks, Frisbees, hats, patches, and a wide assortment of unique and logoed one-of-a-kind items.

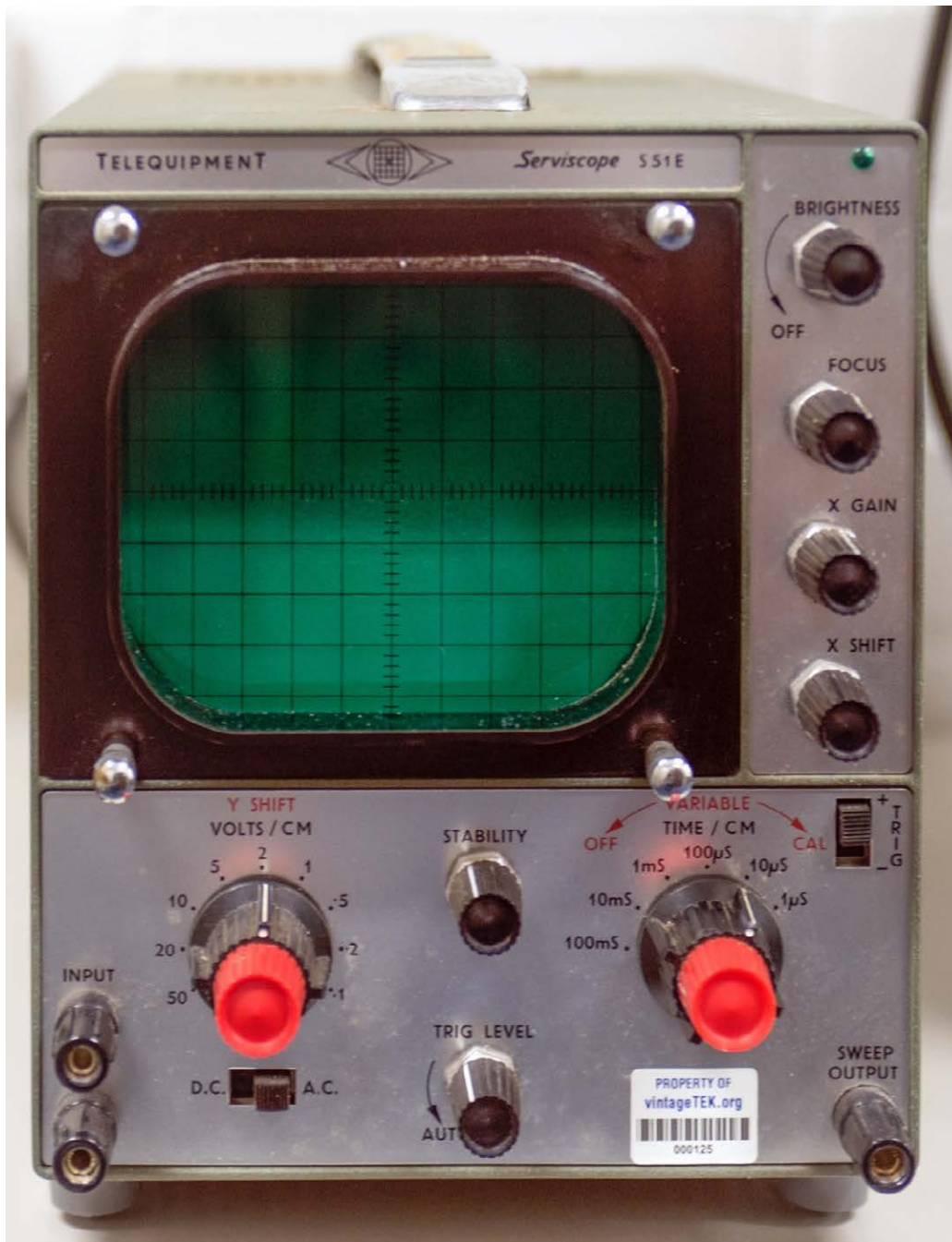




## Probes

Tektronix made a great number of different probes to span the depth and breadth of the product lines.

The Tektronix P600X probe is used to check out the AE-35 unit in the 1968 film *2001: A Space Odyssey*.



## Telequipment

Tektronix acquired Telequipment in 1967 as a way to enter the low cost market.

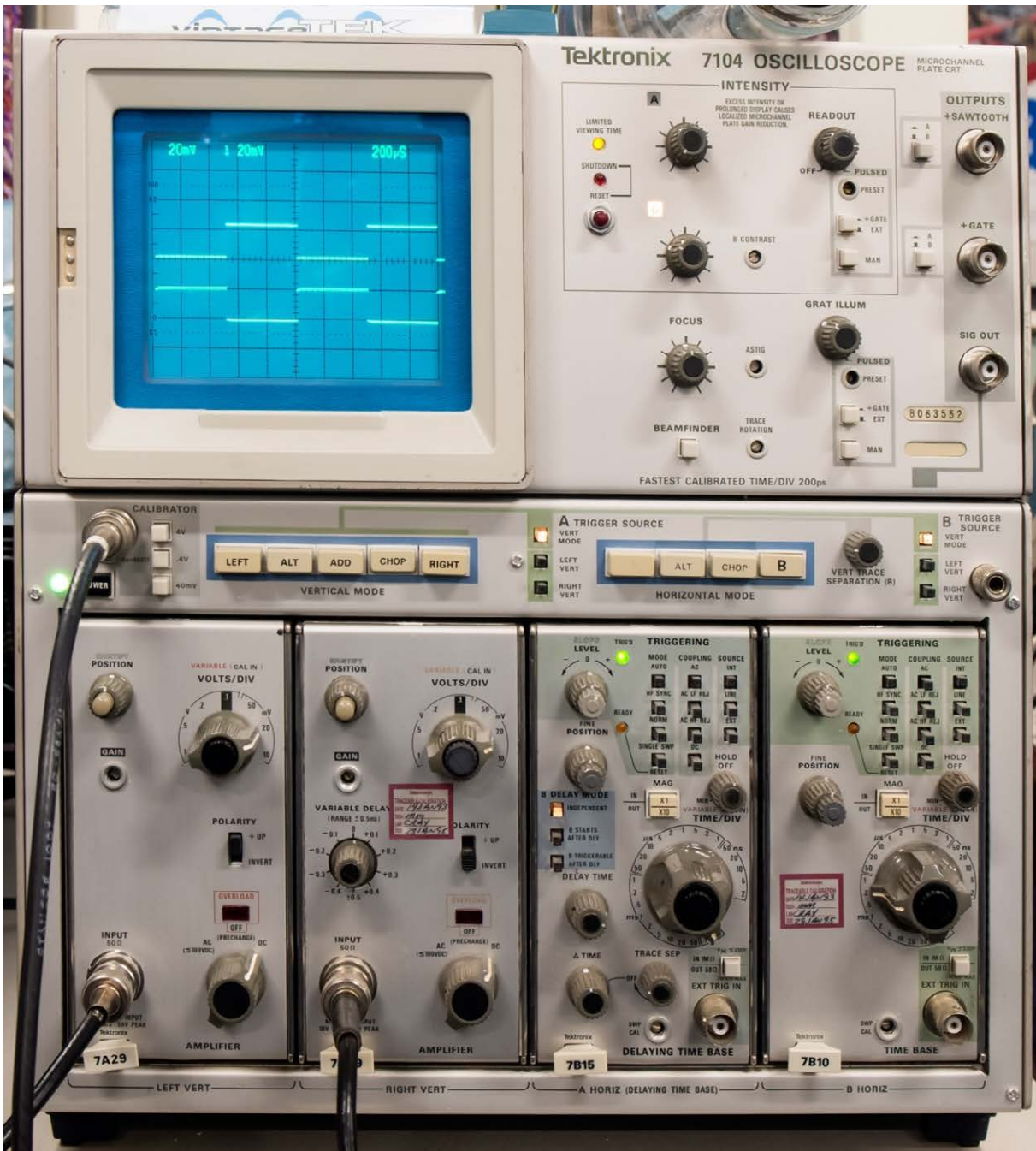
In 1978 the decision was made to terminate the Telequipment line as Tektronix had already produced a line of low cost oscilloscopes.

The facility in Hoddesdon was utilized to build other Tektronix products until 1988.



## J15 Photometer

The J15 is unique in that it was not sold directly by Tektronix but instead by Mine Safety Appliances.

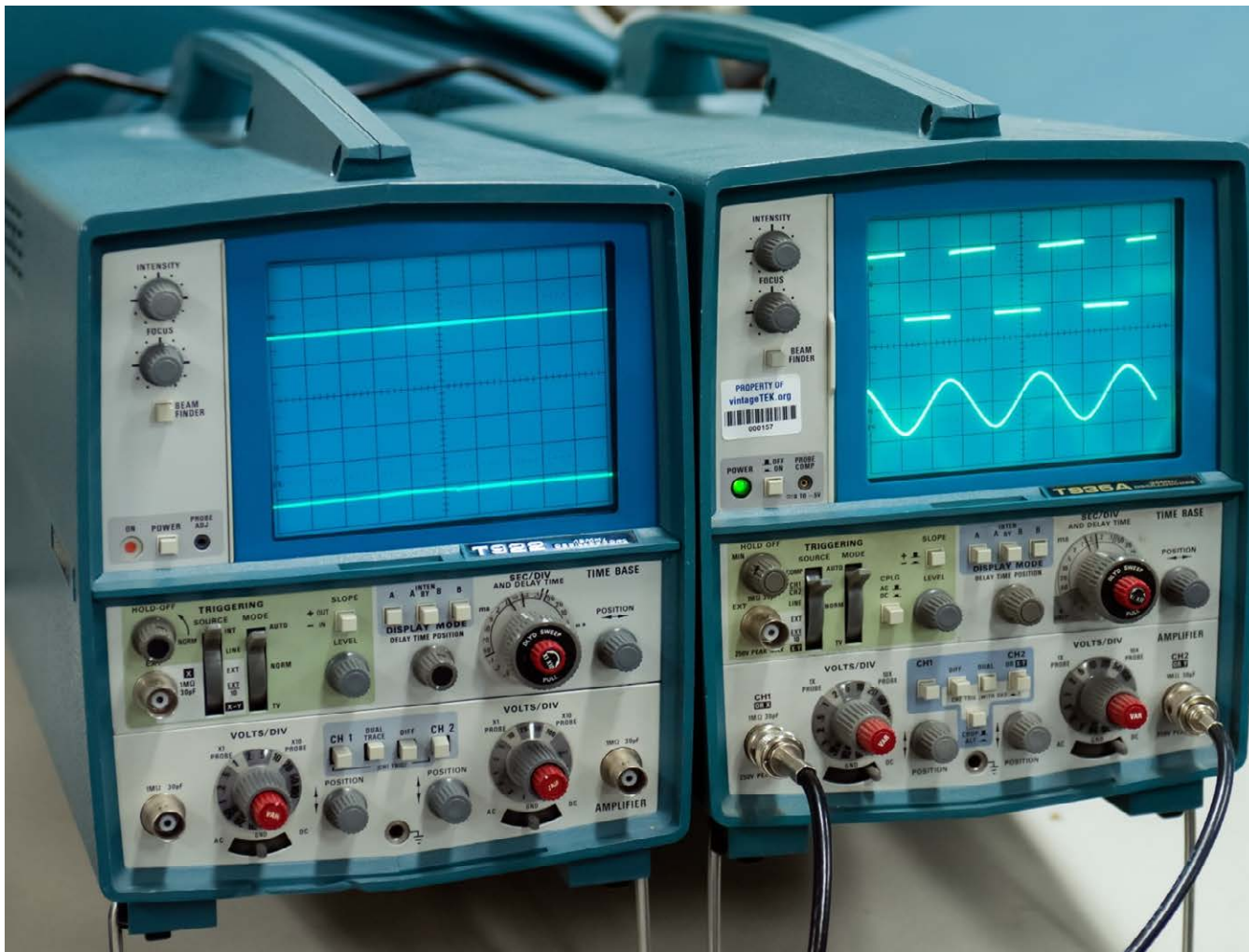


## 7104 Oscilloscope

The 7104 is a 1 GHz, non-storage 7000-series oscilloscope mainframe that was introduced in 1979.

It achieved this performance with a unique micro-channel plate CRT for a bright display at high sweep speeds.

The 7104 was named the Product Of The Year by Electronics Products Magazine.



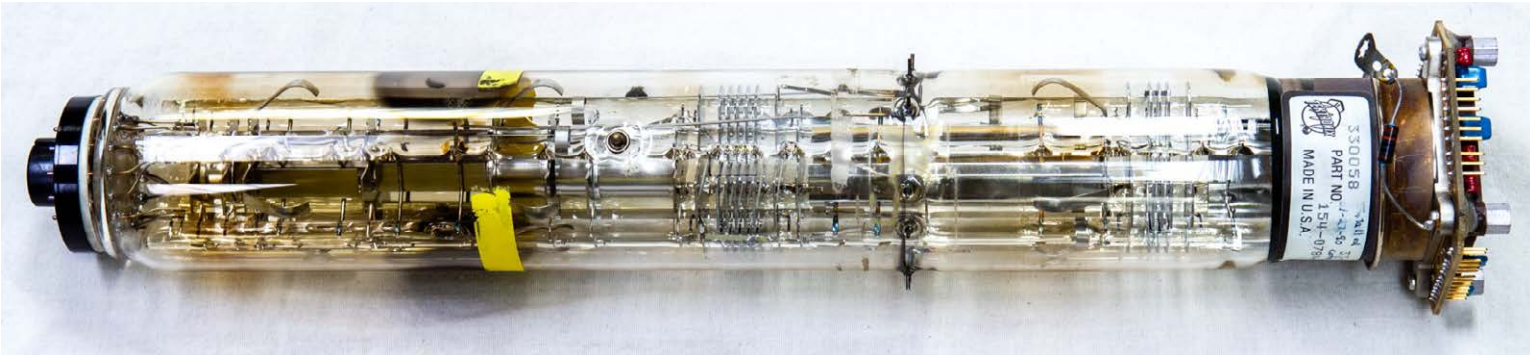
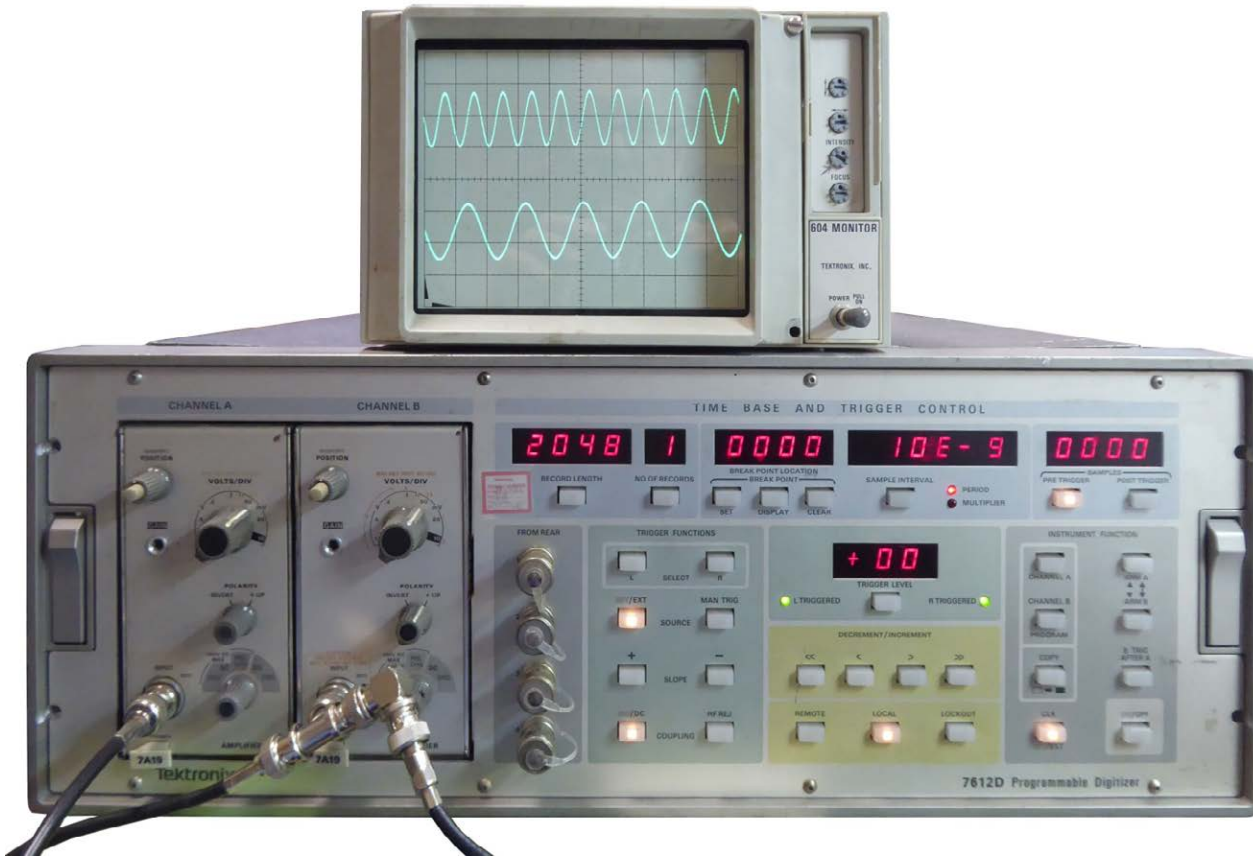
## T900 Series

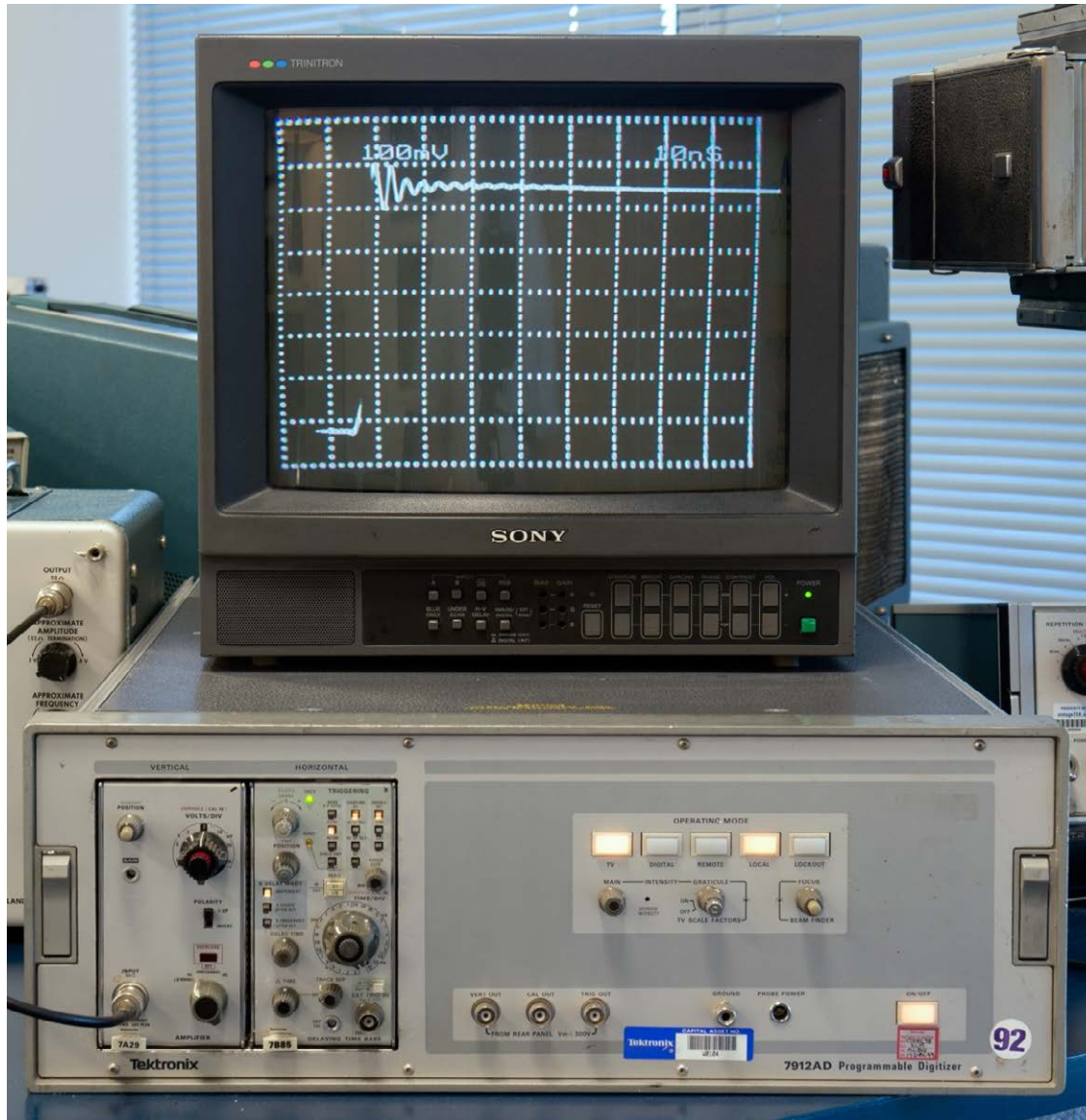
The T900 series were inexpensive oscilloscopes introduced in 1976.

## 7612D Programmable Digitizer

The 7612D was introduced in 1980 with a vertical bandwidth of 80 MHz and a sample rate of 200 Msamples/s.

No semiconductor devices could achieve this level of performance so Tektronix designed their own hybrid CRT-semiconductor converter tube.





## 7912 Transient Digitizer

The 7912 high speed digitizer was introduced in September 1973 and achieved a bandwidth of 500 MHz with a 7A19 vertical amplifier plug-in and 1 GHz bandwidth by accessing the CRT deflection plates directly with a 7A21N plug-in.

## 11K Series Oscilloscopes

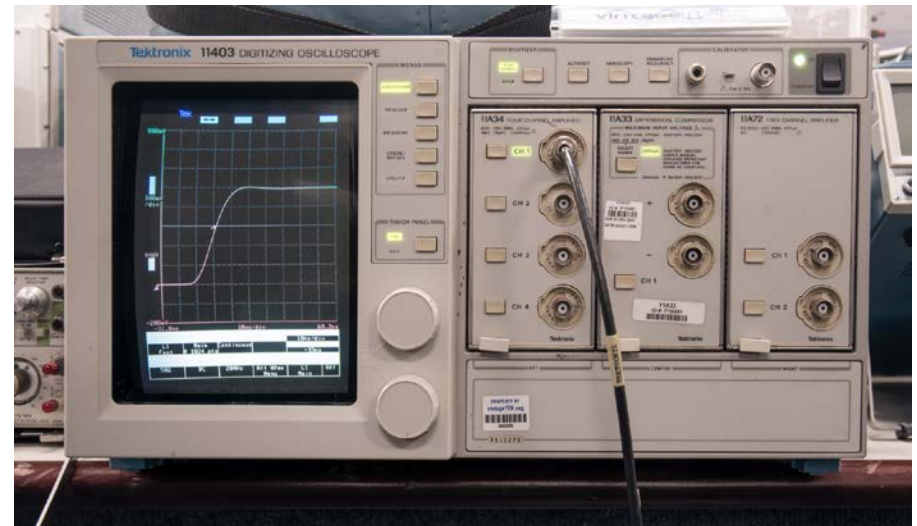
The 11K series of oscilloscopes replaced the 7K series in 1986. The user interface uses a touch screen and menu system so there are fewer controls on the mainframe and plug-ins



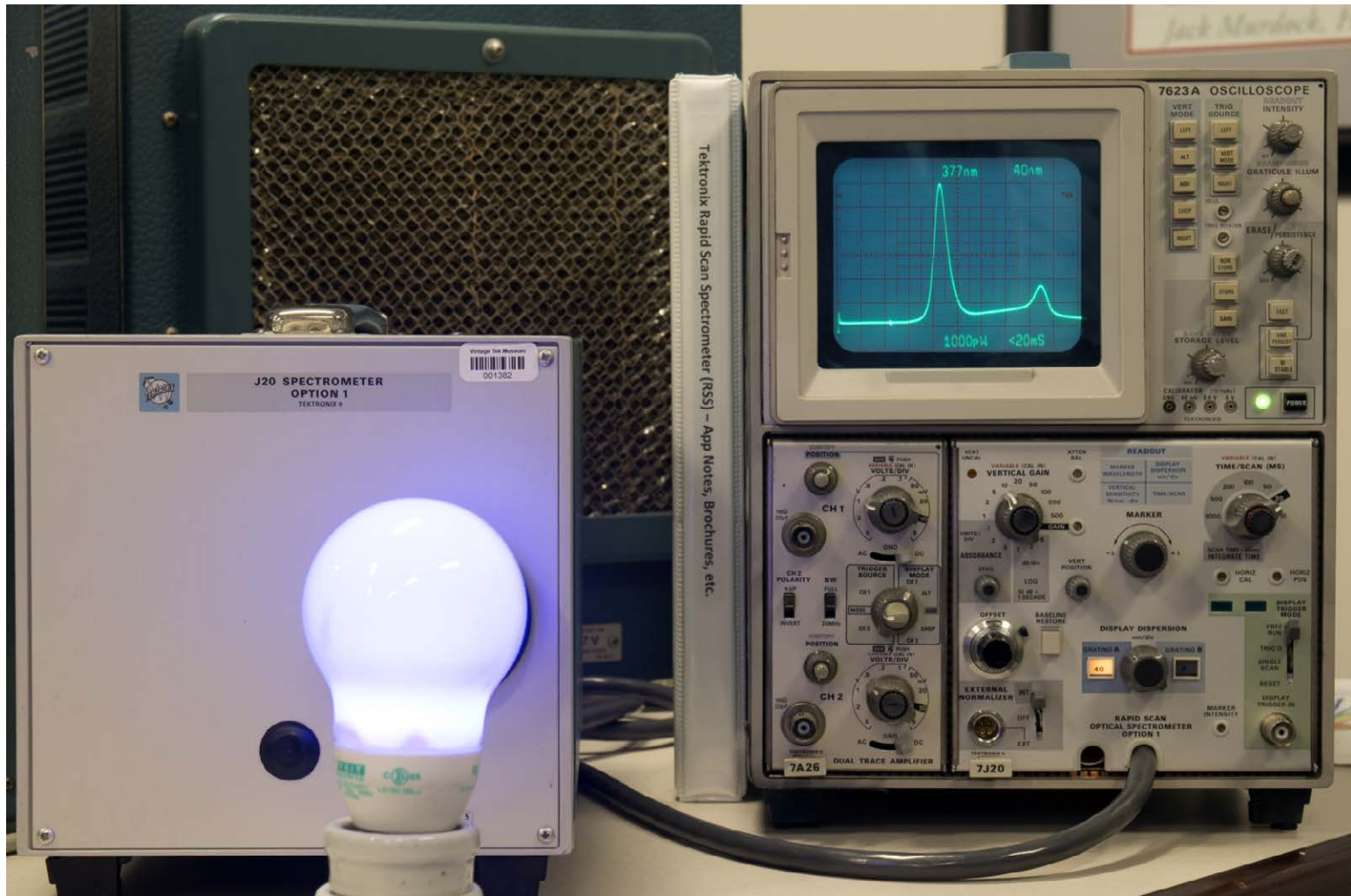
11301A Programmable Analog Oscilloscope is a 400 MHz oscilloscope featuring an analog CRT.

### 11403 Digitizing Oscilloscope

The 11403 is a 1 GHz digitizing oscilloscope featuring a color display.







## Rapid Scan Optical Spectrometer

The 7J20/J20 was introduced in 1975 to provide optical spectrometric capabilities.



### **Tek Labs PDP-11/34 Graphic Frame Buffer**

This mini-computer and \$50,000 512x512x24 bit color frame buffer was used for color research in the mid-1980s.



## CACHe Worksystem

This chemical modeling system utilizes a liquid crystal shutter to provide a stereo 3D display using passive glasses.



## 7704A Oscilloscope

The 7704 oscilloscope was introduced in 1969 and the upgraded 200 MHz 7704A in 1973.

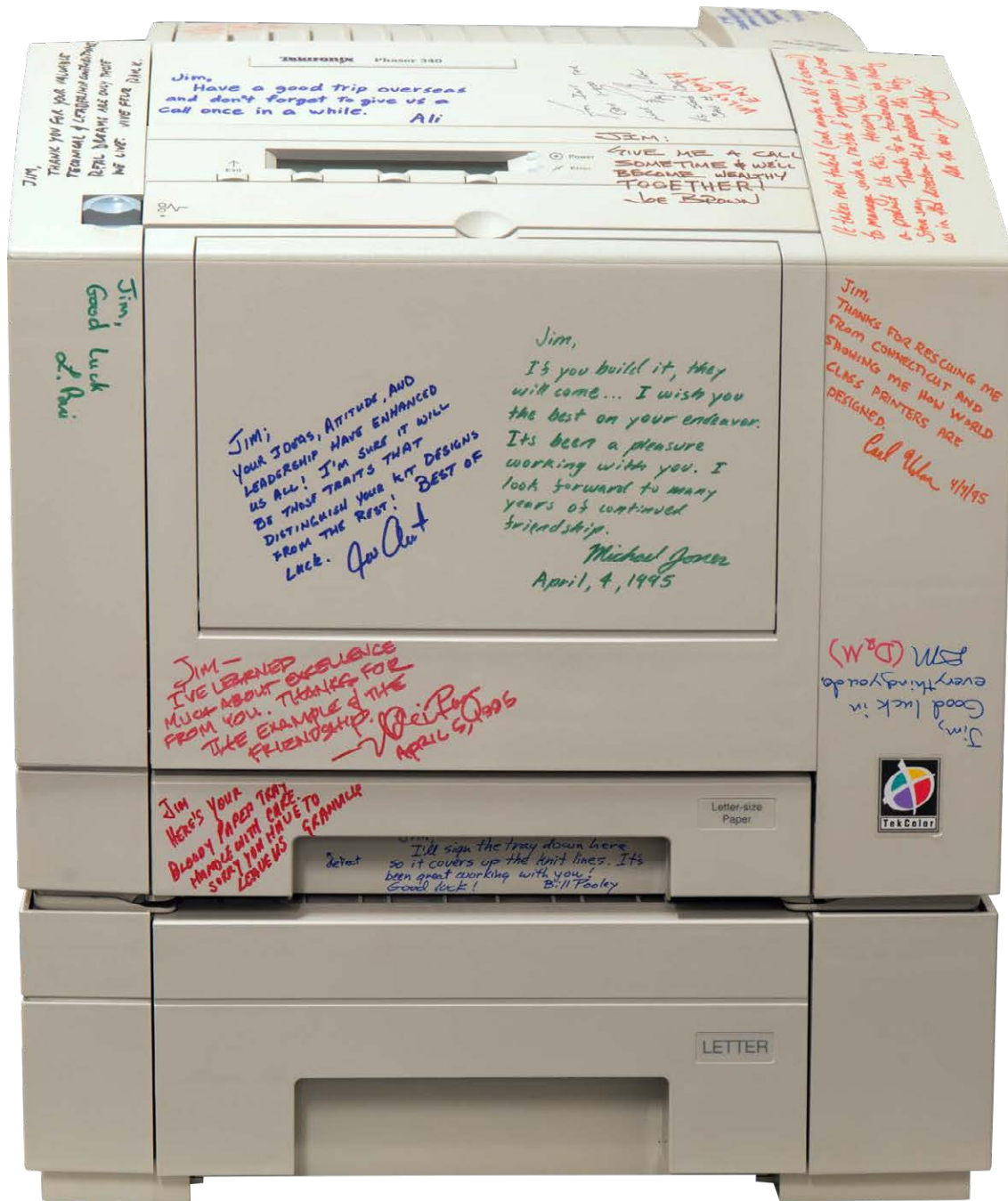
The construction is modular with a display unit and plug-in unit. These could be separated to accommodate a P7001 Digitizer.

This particular exhibit features a spectrum analyzer and two horizontal plug-ins to display live analog television.



## 4100/4200 Series Terminals

The 4100 series were low cost color terminals introduced in 1983 as a replacement for the low end DVST terminals. The 4200 series terminals were even a lower cost version to replace the 4100 series.

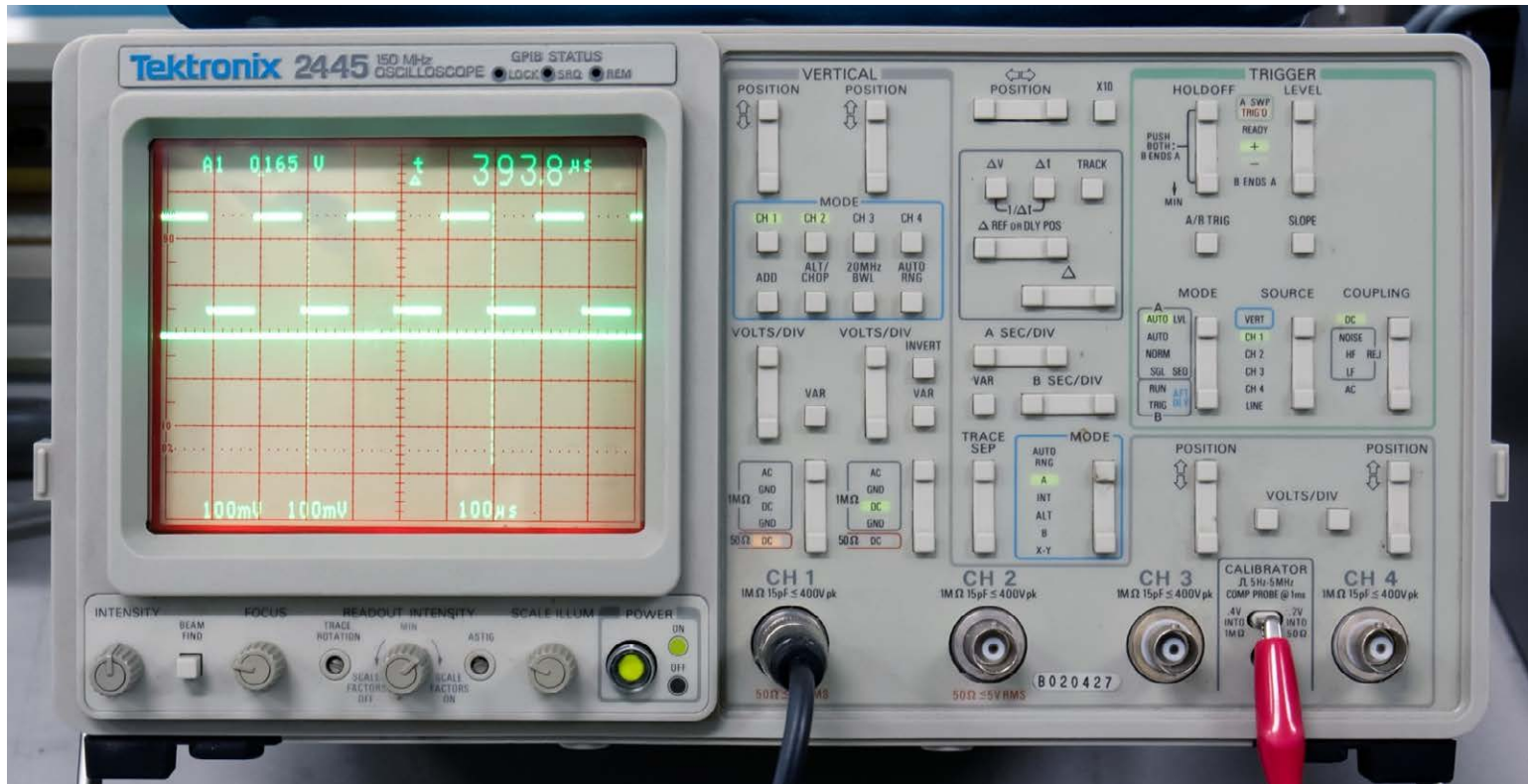


## Phaser 340 Color Printer

Tektronix developed color printing technology using a proprietary solid wax ink.

The Phaser 340 significantly increased print speeds and color quality.

This printer was signed by the development team and presented to the project manager.



## Knobless 2445 Oscilloscope

The 2400 series was Tektronix most advanced line of analog oscilloscopes featuring a unique meshless scan expansion electron gun design.

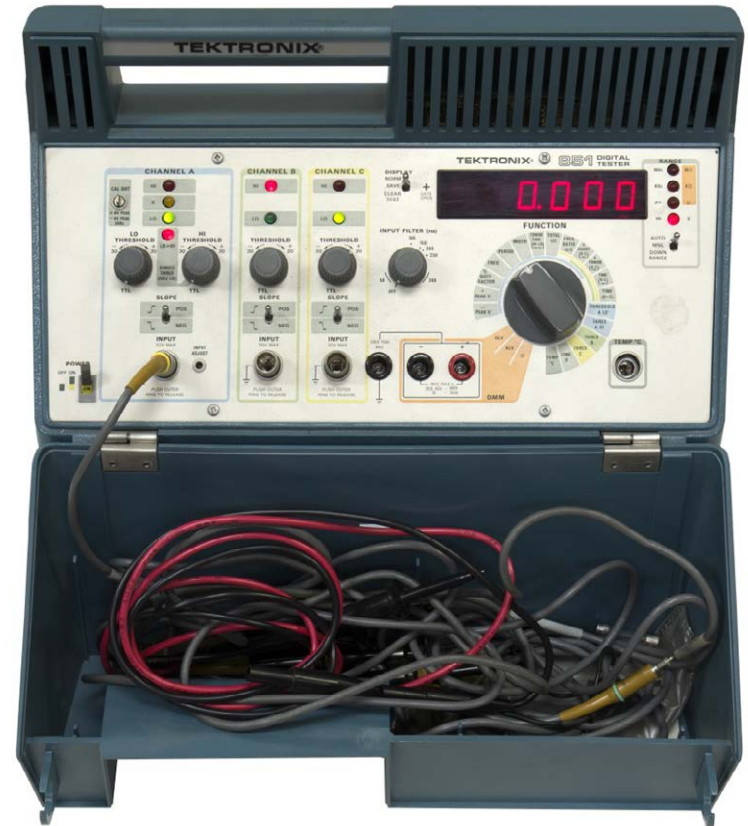
This prototype was developed to evaluate the use of buttons to replace knobs as a possible cost reduction.



## Semiconductor Test Systems

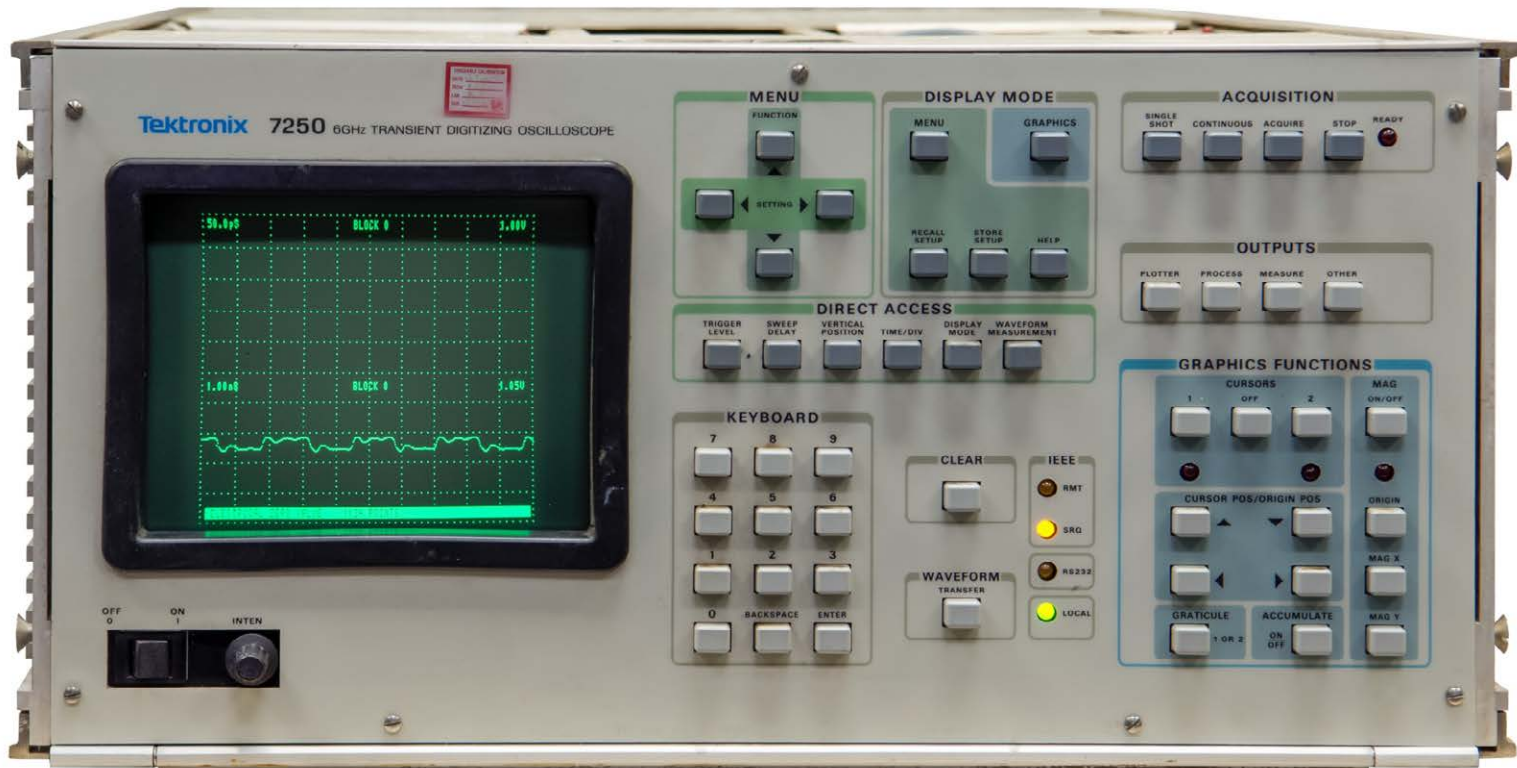
Tektronix began working on digital or automated test systems in the mid 1960s. This S-3280 semiconductor test system was introduced in 1979.





## 800 Series Digital Analyzers

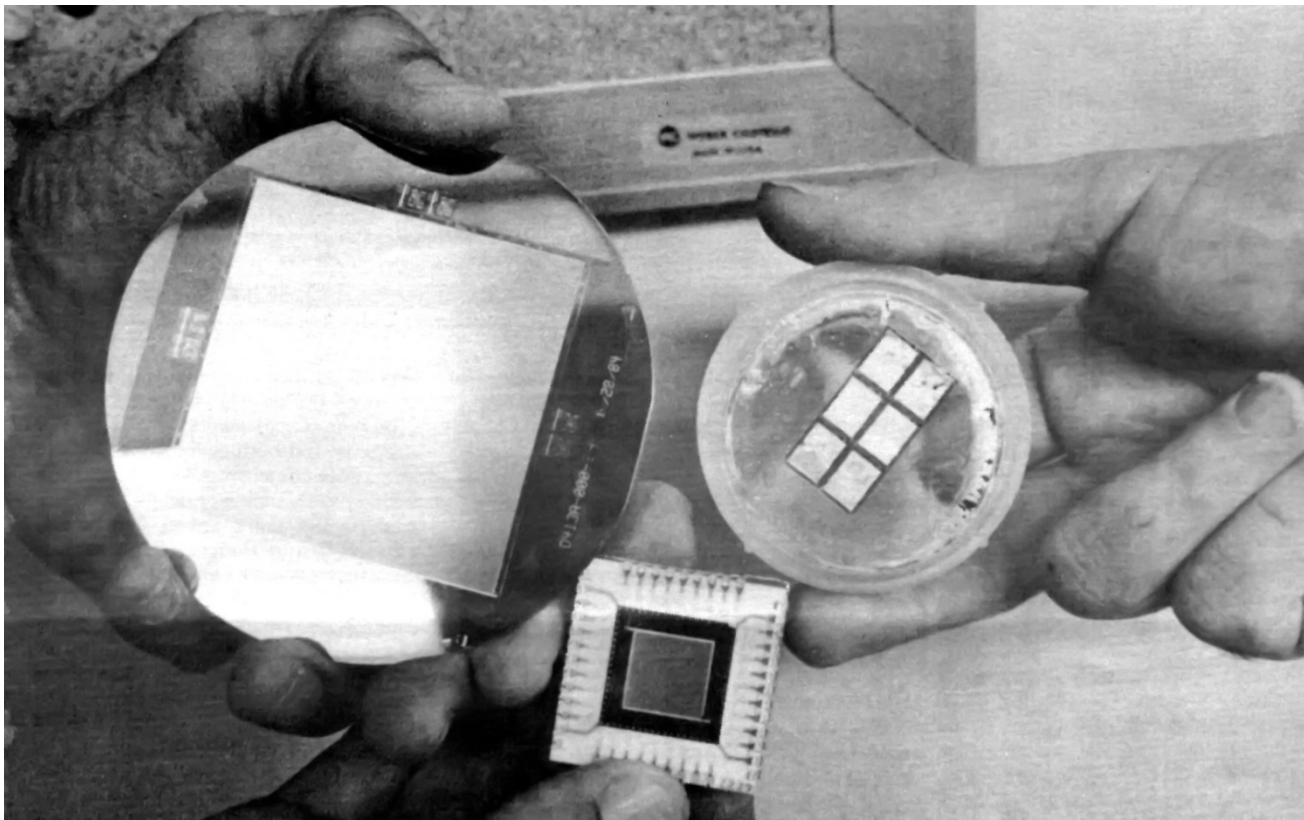
For years Tektronix oscilloscopes were the primary instrument used to verify and service mainframe and mini-computers. At the request of Burroughs , Tektronix developed the 850 Techaid and later the 851 Digital Tester.



## 7250 Transient Digitizing Oscilloscope

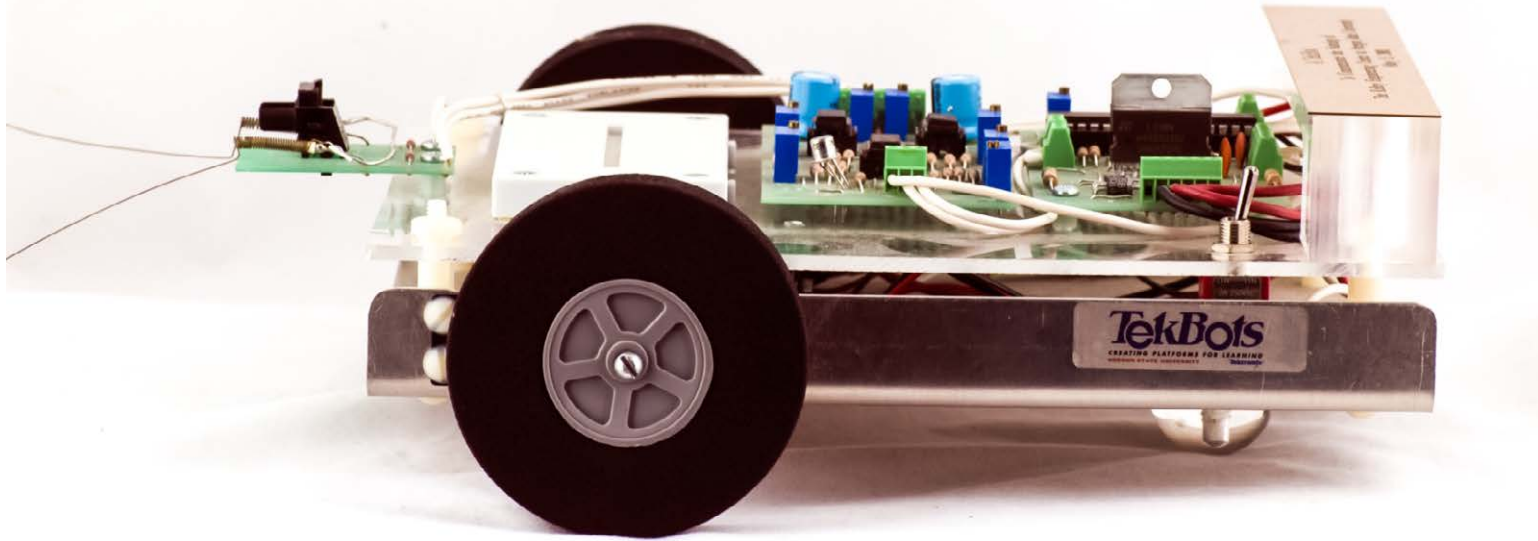
The 7250 Transient Digitizing Oscilloscope represents the peak bandwidth achieved by an analog oscilloscope at 6 GHz. It uses a scan converter CRT to acquire and digitize the incoming signal.

It was designed and sold by Intertechnique of France as the IN7000. Tektronix rebranded and introduced it in 1986.



## Charge Coupled Devices

Tektronix developed and produced CCD (charge coupled devices) imagers in the 1980s as part of their Integrated Circuits Operation. A Tektronix CCD imager was installed on the Hubble Space Telescope but was swapped out in 1993 as part of the upgrade to address the significant mirror flaw.



## TekBots

In 2000 Tektronix funded the start of a program at Oregon State University called TekBots with a grant of \$500,000. The program was intended to give students a hands-on experience in their Freshman year and give them opportunities to increase their design, troubleshooting, and teamwork skills over the next 4 years.



## Remote Exhibits

The museum has displayed exhibits at a number of remote events in support of our STEM initiative.

This particular remote booth was at the University of Portland's Reading Fair and Family STEM Day event held in early 2020.



THANK YOU

We hope you enjoyed your tour

Be sure to check out our website [vintagetek.org](http://vintagetek.org) for more information, exhibits, photos, movies, and much more.

# CREDITS

Tour Guide  
Photography  
Scripting  
Editing



Dave Brown spent 34 years at Tektronix working in computer graphics, video and networking, and test and measurement. He is the President of the Museum Board of Directors and has been a volunteer with the museum since the very beginning.

Editing



Chris joined Tek in 1963 as a CRT Design Engineer assisting with the 321A, 422, 647, 453 and 549 CRT designs. He later worked on various storage CRTs as a Group and Department manager. After a stint in CRT Manufacturing, he became Display Device General Manager, leaving Tek in 1989.

Tour Guide



Hale Farley spent 14 years at Tektronix working in marketing for SPS (Signal Processing Systems), Sales Specialist for SPS in Santa Clara, and Sales Engineer for STS (Semiconductor Test Systems). Hale resides in California and volunteers remotely.

Tour Guide



Lorren Fletcher is a 29 year veteran of Tektronix and the Treasurer of the Museum. Lorren started in Cost Services and then an accounting liaison to many different areas in the company - Component Mfg., Engineering, Marketing, and Service. His last position was Accounting Manager for Facilities when major construction projects including Forest Grove, Vancouver, Redmond, Building 59 Integrated Circuits, and field office expansions / new locations occurred.

# CREDITS

Tour Guide



Tom Goodapple worked for Rodgers Organ, a Tektronix spinoff and funded by Howard Vollum because of his great interest in organs. Tom volunteers and restores instruments for the museum, additionally having a large personal collection of restored instruments inspired by his long friendship with museum co-founder Stan Griffiths.

Video  
Production  
and Editing



Bob Haas is Chairman of the Museum Board of Directors. He worked on graphics products at Tektronix from 1977 to 1984. Most recently he retired in 2015 from a 14-year career at Maxim Integrated, spending most of that time in the Building 59, the old Tektronix Integrated Circuits Operation.

Tour Guide  
Scripting



Kurt Krueger worked in storage CRT engineering, the Scientific Computer Center, and IC design and simulation tools ADS and Tekspice. He spent his career trying to become somewhat of an expert in something before it became obsolete. Generally failed but it was a marvelous 32 year ride!

Tour Guide  
Editing



Dan Murphy worked for Maxtek, a 50/50 venture of Maxim and Tektronix, formerly the Tektronix Hybrid Components Organization (HCO), and now wholly owned by Tektronix.