

7514 CRT Design (The PDA Phosphor Storage CRT)

As the 564 and 549 were general purpose oscilloscopes, they were often used in the non-storage mode where they suffered in comparative brightness to their conventional non-storage competition and customers experienced much reduced non-storage performance for applications like fast single-shot events.

This was the result of the lower overall CRT voltage (4kV Vs typically 10kV), the lower efficiency of P1 phosphor used in DVSTs compared to P31 in conventional CRTs, and the lack of an aluminum mirror used on the e-gun side of the P31 phosphor which doubled the brightness.

The goal of the 7514 Storage oscilloscope was increased non-storage brightness and writing speed compared to the 564 and 549, and an improved ability to compare a stored trace with one being refreshed. The refreshed signal would have a beam intensity too low to switch the phosphor into a stored state, this is known as "Write Through", a useful technique to compare a new signal to one that was previously stored. At project launch, the CRT was called "the No-Penalty Tube".

The design path chosen was Post Deflection Acceleration (PDA) operation where the entire DVST portion of the CRT was floating on top of the high voltage (+15kV) at the faceplate. This included the flood guns, the wall bands inside the funnel, and the circuits to operate the storage tube as well as the dynamic controls for erase, split-screen, and non-storage operation. The writing gun cathode was set at -3kV, resulting in an overall voltage of 18kV.

This task was difficult, both for the T7510 CRT team and for the instrument design side where Bob Rullman and team eventually designed an innovative circuit to transmit the 6 control signals to the floating storage control board via optical signals. The CRT flood guns were mounted in the ceramic funnel, instead of at the end of the electron gun, and the front 4 inches were encapsulated in insulation to protect the wall band feedthrus and backplate connections.

Writing Speed Specifications

Photographic with Polaroid 10,000 ASA film:	>450 cm/ μ s
Normal Storage Mode:	>60 cm/ms
Enhanced Storage Mode:	>1000 cm/ms

The 7514 was the first storage product in the 7000 series line; we do not have a 7514 'scope or CRT at the Museum.

As soon as the 7514 (T7510 CRT) project was complete, a project was launched to design Tek's first mesh-storage CRT which was used in the 7613.

7514 Storage Oscilloscope Photo

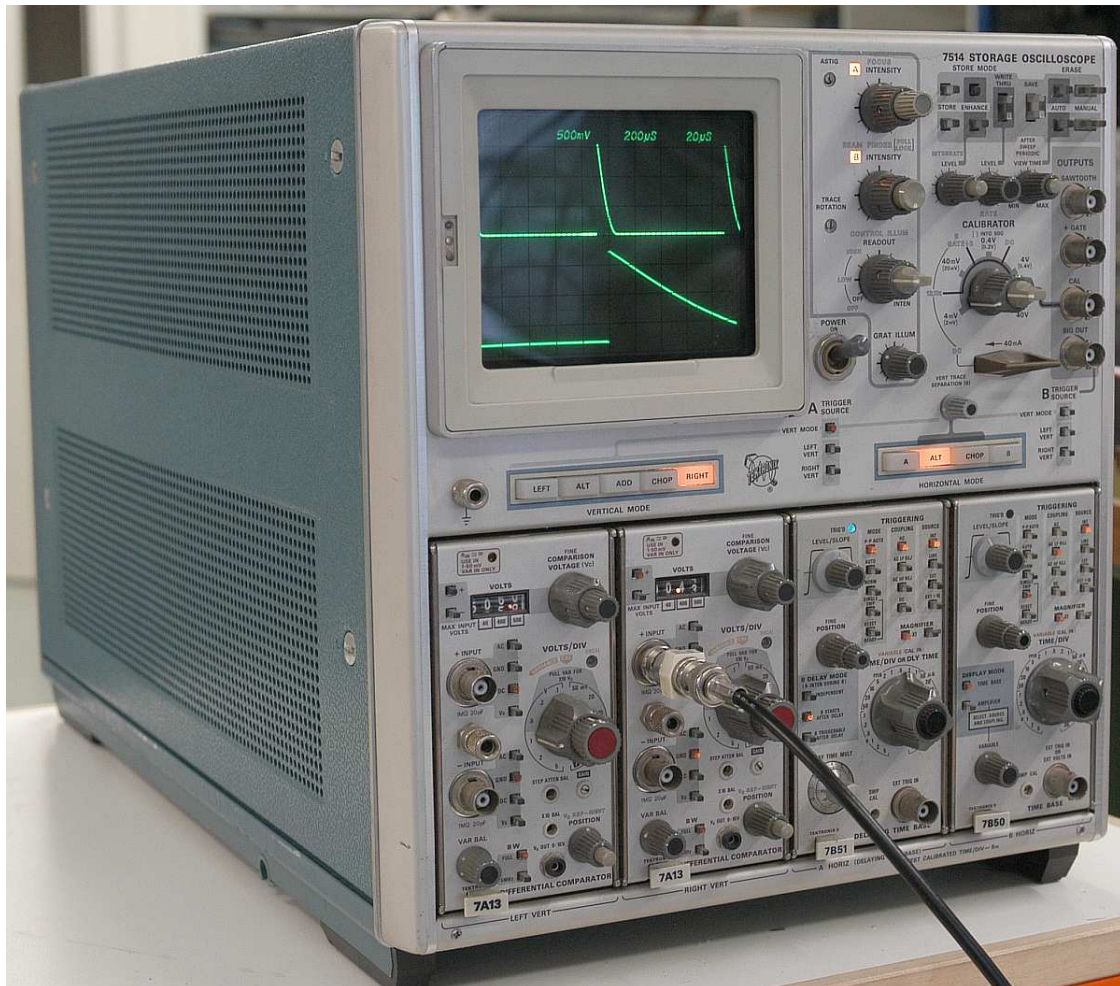


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Chris Curtin
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