

MODIFIED DEFLECTION PLATE CAPACITANCE STANDARDIZER RECOMMENDED

FEN 4-10-64

Flood gun electrons attracted to the deflection plates in the 564 draw current creating an "R" component in the deflection plate impedance which throws off indications of the 560 series capacitance standardizer. The amount of current varies with positioning and signal amplitude, so there is no single time-constant correction that can be made to allow accurate adjustment of C760 or C761.

The factory cal procedure suggests holding down the "Integrate" button during the adjustment of C760 or C761. Unfortunately, there is still sufficient flood-gun current from leakage and filament emission to allow up to a microampere of current to flow to the deflection plates, upsetting the time-constant of the standardizer.

An easy field mod reduces the common deflection plate potential and hence the attraction for flood-gun electrons -- returning the bottom ends of the two 500 k output divider resistors in the standardizer to -100 v instead of to ground. This is not a complete cure by any means, but does help. This is about the only mod to existing units that can be made without upsetting their calibration. Engineering is working on a complete new self-contained capacitance-standardizing plug-in for the 560 series which will eliminate both the flood gun current intercept problem in the 564 and the necessity for keeping a "standard" Type 60 on hand to drive the standardizer. It should be available in a few months.

TARGET IDENTIFICATION

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Early production T5640 tubes were identified as T5640 for the high-light output target and T5641 for the high-writing-speed target, and this identification was visible in the neckpin area.

Later, when the 10-digit nomenclature system was adopted, the marking at the neckpins was of the gun-type and manufacturing code only; target identification was shown only on the envelope near the Tek "bug".

Recently, the identification method has been changed, and instead of hand-lettered digits, the

neckpin area carries a sealed-on label showing not only the gun type and code numbers but the target type as well. In the 564, the label is visible without removing the instrument cabinet side.

For a customer with RM instruments, or one having an assortment of instruments requiring quick identification of the target type, the blank mod-slot on the instrument panel might be marked in pencil to aid quick identification. "Permanent" (stamped) mod slot inserts are not normally furnished on instrument options involving easily interchangeable parts such as CRT's, probes, knobs, power cords, etc.

Among CRT's returned to Beaverton is an increasing number showing "bright burn" -- the bright image of some previous trace which shows up after enhancement, and which won't erase using the front-panel controls. It usually is also visible when the entire screen is faded positive as a trace slightly brighter than the rest of the target, though it may not be visible in the normal stored mode.

The cause is the same as the familiar "dark burn" -- writing with excessive beam current for the spot velocity used. At a power-density level just below that which would destroy the phosphor, a high-intensity writing beam can cause significant changes in the characteristics of the storage target if it's allowed to operate long enough (slow trace or high rep-rate).

We are looking into possible ways to restore a target damaged in this way, but do not yet have any techniques which work in all cases.

For now, the key to the bright-burn problem is prevention. The customer should be aware that the 564's

target is just as susceptible to burning as conventional CRT's, and that *extra* precautions should be observed to prevent "bright burns" which limits the usability of the writing speed increase feature.

Rules:

1. Turn intensity to minimum during warmup. Uncontrolled HV and deflection during warmup can easily cause a burned spot or streak.
2. Use no more than the intensity level and duration necessary to obtain proper viewing or storage.
3. Do not use the stored mode for conventional (non-store) applications. Although the susceptibility of the target to burning may not be affected by the operating mode, the natural tendency of the operator to turn the intensity higher than normal to override the background may be a contributing factor in some cases.

So far as warranty considerations are concerned, "bright burn" should be treated about the same as "dark burn" in conventional tubes.

SOME PRECAUTIONARY MEASURES

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Here are some precautionary measures which, if observed, will prolong the useful life of the storage screen in the Type 564 and Type RM564 Oscilloscopes.

First and foremost, take great care in the degree of writing-gun intensity you use. High writing-beam current can cause permanent damage to the storage target. Always use the minimum beam intensity required to produce a clear well-defined display. Special care should be taken during warm up or when using slow rates or sampling displays.

Use caution when storing fast-changing portions of a waveform. Beam current could then be too great on the slow-changing portions of the waveform.

Avoid repeated use of the same area of the screen for storing displays. Distributing the use will allow the storage target to "age" uniformly and will prolong the effective life of the storage tube.

Turn the intensity control to minimum when changing plug-in units. An undeflected spot on the crt screen can burn the storage target even at normal intensity.

Do not leave a display on the crt screen (either writing or stored) when the display is not needed.

Do not leave the DISPLAY switches at STORE when the storage mode is not needed.

"Negative images" (dark waveform images that appear as a darker background light level when the DISPLAY switch is at STORE) result from writing or storing a waveform in one position on the screen for a relatively long period of time. Negative images will usually disappear in a short time, but may cause a temporary decrease in writing speed of the affected areas.

"Bright burns" (bright waveform images that will not erase completely) are caused by excessive intensity of the writing-gun beam. Severe burns may remain indefinitely; a mild case which may only show when the writing speed enhancement circuit is used (Type 564, sn 2000 up, or RM564), will slowly fade to normal over a period of a few days normal use.

"Dark burns" (spots or lines on the screen that will neither write nor store) result from destructive burning of the storage target by the writing-gun beam. Replacement of the storage tube will be required if dark burns impair operation of the instrument.