Service Scope

USEFUL INFORMATION FOR USERS OF TEKTRONIX INSTRUMENTS

OCTOBER 1960

VERTICAL AMPLIFIER TUBE PROBLEM

The Type 541A, 543, 545A, 551, and 555 instruments use 6DK6 vacuum tubes in the distributed-amplifier section of their vertical-deflection circuits. Most 6DK6 tubes develop cathode interface after a few hundred hours of operation in these circuits. Tests made at our factory (and in the field) have shown that certain commercially-available 6DK6's, when used in these circuits, develop somewhat less cathode-interface resistance. If you are having trouble with one of the above instruments, we suggest a call to your local Tektronix Field Engineer. He will be glad to help you pin-point the trouble and suggest recommended corrective measures.

TYPE 535/545 DELAYING SWEEP-RANGE MODIFICATION KIT

The sweep delay available in a Type 535 or 545 oscilloscope can be increased one hundred fold. A modification that extends the upper limits of the sweep delay to 10 seconds (upper limit of original equipment is 0.1 second) is available in kit form. The desirable feature of continuous calibrated adjustment has been retained and any period of delay from 1.5 microsecond to 10 seconds can be accurately selected.

The modification is accomplished by replacing the standard 2 microsecond/cm to 10 millisecond/cm delaying-sweep range with a 3 microsecond/cm to 1 second/cm range.

This modification applies only to the Type 535 and Type 545 instruments—all serial numbers. The Types 535A and 545A instruments come equipped with a 2 microsecond/cm to 1 second/cm delaying-sweep range.

The modification kit contains a wired-switch assembly, step-by-step instructions, photos, schematic and parts list. Order through your Tektronix Field Office. Ask for Type 535/545 1 second/cm Delaying Sweep-Range Modification Kit, Tek number 040-179. Price is $30.00.

THIS'N THAT

In Tektronix instruments, a special silver-bearing solder establishes the bond to the ceramic terminal strips. Repeated use of ordinary solder or the application of too much heat will break this bond.

We recommend the use of a solder containing about 3% silver when soldering on Tektronix instruments. This type of solder is often used in printed circuitry and should be readily available from your local supply source. If you experience difficulty in obtaining this solder, it may be ordered through your Tektronix Field Office. Ask for Tektronix number 251-514 Solder, Silver Bearing 1# spool (3% silver). Price $4.50.

The fan motors of most Tektronix instruments should be oiled periodically (see the maintenance section of your instruction manual). A couple of drops on the end of a toothpick is sufficient. A good suggestion would be to oil the motor every time the air filter is cleaned. If the air cleaner is never cleaned, you can oil the new motor you install!

AN INEXPENSIVE COATING FOR WORK BENCH SURFACES

Jack Bannister, a Tektronix Field Maintenance Engineer, has sent in a suggestion for improving the surface of a work bench. He coated his bench top with an epoxy resin. In addition to being easy to keep clean, the resin wears away at a much slower rate than masonite and keeps one from gouging a hole in the work bench when turning instruments—especially the older square-cornered ones—over.

Jack first faced the front of his bench with wood to eliminate a metal rim and then put the resin over this wood also. The resin sticks well to masonite, wood, painted metal and plastic wood. Be sure the plastic wood is completely dry before the resin is applied, otherwise the resin tends to stay soft over it. The material to be covered should be clean and free of wax. All cigarette or soldering-iron burns should be sanded down to clean material—the resin doesn't want to stick to charred surfaces—and any holes, gouges, or indentations filled with plastic wood. Care should be used in this phase as the resin is clear, slightly amber in color and tends to accentuate any messy work. Work the resin in well. It has a tendency to not stick to the surface while it is liquid and working it into the surface helps to overcome this fault. Once dry it adheres very well. A quart provides a two coat finish for a 6' x 3' bench top and the completed surface will be smoother if you sand a bit between coats.

Surface coat, the desirable type of resin for this work, is made by several companies. Your supplier can provide you with measured amounts of resin and catalyst as well as a 2" inch brush to apply the coating. The brush should have a special resin-resistant glue to hold the bristles.

Cost of the resin, catalyst and brush to do Jack's job was $5.50.

SILICON RECTIFIER MOD KITS

Below is a partial list of the currently available silicon rectifier field modification kits. These kits replace the selenium rectifiers in the low-voltage power supply of some Tektronix instruments with the silicon type rectifiers. These more reliable rectifiers give longer service and the kits are designed to be installed with a minimum of effort.

Each kit contains a prewired chassis with silicon rectifiers mounted, step-by-step instructions, photos, schematic and parts list.

We strongly recommend that you place your order for these kits through your Tektronix Field Engineer. He can apply the special considerations necessary when ordering some of the kits and thus assure you speedy delivery of the correct kit for your instrument.

Type 310 Oscilloscope, all serial numbers below 7141. Order Tektronix Type 310 Silicon Rectifier Modification Kit, Tek number 040-195. Price: $40.00.

Type 513 Oscilloscope, all serial numbers. Order Tektronix Type 513 Silicon Rectifier Mod Kit, Tek number 040-211. Price: $30.00

Type 515 or 515A Oscilloscopes, serial numbers below 4030. Order Tektronix Type 515/515A Silicon Rectifier Mod Kit, Tek number 040-205. Price: $24.00.

Type RM15 Oscilloscope, serial numbers below 756. Order Tektronix Type RM15 Silicon Rectifier Mod Kit, Tek number 040-208. Price: $35.00.

Type 524 Oscilloscope. There are special considerations to be made when ordering a silicon rectifier for this instrument. Consult your Tektronix Field Engineer before placing your order.

Type 525 Television Waveform Monitor, serial numbers below 526. Order Tektronix Type 525 Silicon Rectifier Mod Kit, Tek number 040-207. Price: $28.00.

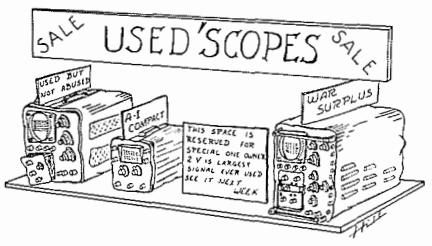
As previously stated, this is but a partial list of the available silicon rectifier modification kits. Contact your Tektronix Field Engineer for information on instruments not included in this list.

IMPROVED TRIGGERING LEVEL CONTROL WHEN TRIGGERING FROM EXTERNAL WAVEFORMS

The TRIGGERING LEVEL control of a Type 530 Series, a Type 540 Series, or a Type 551 Oscilloscope becomes extremely sensitive when the instrument is triggered externally from very low amplitude signals. To some, the ability to trigger reliably from these signals is important. More so than the ability to range through the positive or negative slope of relatively large signals. For these people, Tektronix Field Engineer, John Mulvey, suggests the following modification: Locate, on the TRIGGERING MODE-TRIGGER SLOPE switch a 56 k, ½ w, 10% resistor and a 0.001 μf, 500 v capacitor. These are designated on the Type 531, 535, 541, and 545 schematics as R19 and C17; on the Type 533, 543, and 551 schematics as R21 and C20; and on the Type 532 schematic as R319 and C317. Jumper the top of the resistor to the top of the capacitor. This reduces, by almost 10 to 1, the sensitivity of the TRIGGER LEVEL control to low-amplitude external signals. A switch can be wired in the jumper to allow the operator to select the correct triggering-level range for the external triggers being used.

This modification applies only to the instruments in the Type 530 and 540 Series and to the Type 551. The Type 531A, 535A, 541A, 545A, and 555 trigger reliably on external signals of from 0.2 v to 10 v.

USED INSTRUMENTS FOR SALE



1 Type 511AD Ser. #5160	Pennon Electronics, Inc. 7500 South Garfield Ave. Bell Gardens, California.
1 Type 513D Ser. #691	Bill Johnson Station W P C A-TV, Ch. 17 Mermaid Lane Philadelphia 18, Penn.
1 Type 531 Ser. #114 with 1 Type C Plug-In Unit Ser. #116 1 Type 53D Ser. #118	Dr. Harry Williams Pharmacology Department Emory University Atlanta, Georgia
1 Type 53/-54C Ser. #7414	Argonaut Attn: Ken Mollenauer 250 Middlefield Road Menlo Park, California.

INSTRUMENTS TO TRADE

1 Type 532 wants a Type 575	John Kimber Transitron Electronics Denver, Colorado

He is willing to pay some additional for the Type 575.

USED INSTRUMENTS WANTED

6 Type 514's or 524's	DeVry Technical Institute Brendan Hawkins 4141 W. Belmont Ave. Chicago, Ill.
1 Type 524 or any Tektronix Wide-Band (10 MC) scope	Robert Breed P. O. Box 372 Camden 1, New Jersey
1 Type 530 or 540 Series Price $300 to $400 (condition no object)	L.F. Gilbert Bailey Meter Company 1040 Ivanhoe Road Cleveland 10, Ohio
1 Type 517	Warren F. Stubbins University of Cincinnati Eden and Bethesda Ave. Cincinnati 21, Ohio

TROUBLE-SHOOTING HINT

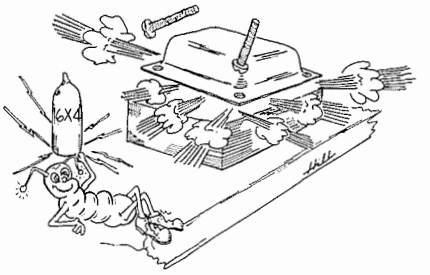
If you are troubled by an erratic triggering problem in your Type 316 Oscilloscope that has defied your efforts to correct it, you might consider the following information.

Tektronix Maintenance Engineer Joe Vistica, when confronted with this problem, determined that the trouble was caused by about 5 to 10 mv of 60 cycle ripple between the sub-panel and the sweep chassis. He eliminated the problem by removing the front panel and sub-panel and sanding the sub-panel, sweep chassis and vertical chassis at their points of contact with each other. Disassembly, sanding and reassembly required about 2½ hours. Joe says, "I am happy to report that after all this the instrument worked perfectly."

CORRECTION

A typographical error slipped past the "not so" eagle eye of your editor in the August issue of SERVICE SCOPE. In the article "Type 536 Amplifier Modification", the tube type number 6340 should read 6360.

TYPE 524D OR 524AD TRANSFORMER MODIFICATION KIT



Early models of the Type 524D and 524AD (instruments with serial numbers below 5729) used 6X4 rectifier tubes in their low-voltage power supply. An internal short developing in this tube could cause a current surge through the transformer that would damage the transformer and require its replacement. A fuse resistor can be installed in the plate leads of the 6X4 tubes to prevent this damage. A modification kit containing schematics, instructions and necessary components to make this installation is available. Ask your Tektronix Field Engineer for Type 524D or 524AD Transformer Protective Modification Kit, Tek number 040-196. There is no charge for this kit.

FLASH! HOT SCOPES!

We have just received word from the Bendix Computer Division of Bendix Aviation Corporation that Tektronix Type 310 Oscilloscopes have apparently been stolen from three of their field engineers. Instruments with serial numbers 10415 and 10867 disappeared from the Chicago area and one with serial number 11735 from the Kansas City, Missouri area. If you have any information on these instruments contact Harvey W. Renfeldt, Customer Engineering Computer Division, The Bendix Corporation, 5630 Arbor Vitae Street, Los Angeles 45, Calif.

Any Tektronix instrument offered for sale without a serial number or one that shows signs of attempts to alter or remove the serial number should be viewed with suspicion. If you have an instrument with these indications, contact your local Tektronix Field Office. In most instances there are ways to trace the instrument and determine if it has been stolen or not.

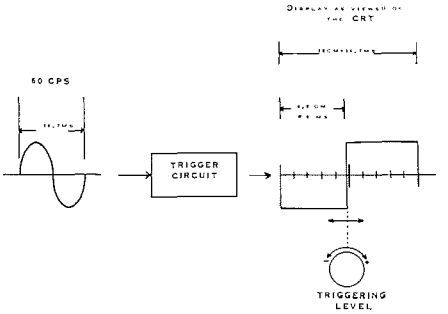
TEKTRONIX OPENS TWO NEW FIELD OFFICES

With the opening of two new field offices, the services offered by a Tektronix Field Office have been made more conveniently available to people in the Indianapolis, Indiana area and in the section of California composed of Santa Maria, Vandenberg Air Force Base and the San Fernando Valley areas. The office serving this California area is located in Encino.

The Indianapolis Office is located at 3937 North Keystone Avenue, Indianapolis 5, Indiana. The phone number is Liberty 6-2408 or 6-2409. At this location you can call on Tektronix Field Engineer Ted Anderson or Field Secretary Ann Dollars to avail yourself of the field services.

The Encino Office is located at 17418 Ventura Boulevard, Encino, California. A phone call to State 8-5170 will put you in touch with Tektronix Field Engineers Duncan Doane, Jim Cook, or Field Secretary Phyllis Worth. This staff will gladly assist you in matters pertaining to Tektronix instruments or services.

TIMING IN A "PINCH"



The following method may be used to adjust the sweep timing in any Tektronix oscilloscope which has a variable sweep-time control and triggering-level control. The oscilloscope itself is the only instrument used in making this adjustment.

The 60-cycle line frequency and the trigger circuit are used to establish a time reference. Set the TRIGGER SLOPE control to + or — LINE and the TRIGGERING MODE control to AC or DC. Using a probe, connect the output of the trigger circuit to the vertical input and set the TIME/CM and VARIABLE TIME/CM to display one cycle in 10 cm of graticule length (see Fig. 1). With the TRIGGERING LEVEL control, adjust the display until the first portion (negative half cycle) occupies 4.8 cm of graticule length (see Fig. 2). This establishes a time reference of 8 milliseconds.

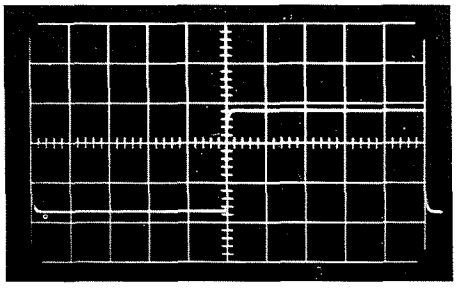


Figure 1

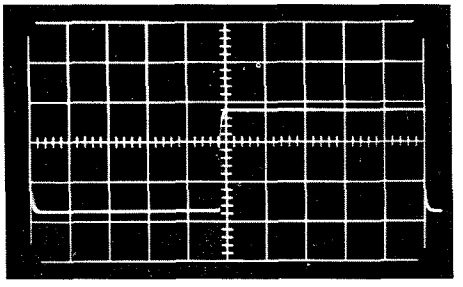


Figure 2

Now that the time reference has been set up, turn the VARIABLE TIME/CM to the CALIBRATED position, set the TIME/CM control to the 1 millisecond position and adjust SWP CAL control so that the first half cycle of the display covers 8 centimeters—between the 2nd and 9th vertical graticule lines (see Fig. 3).

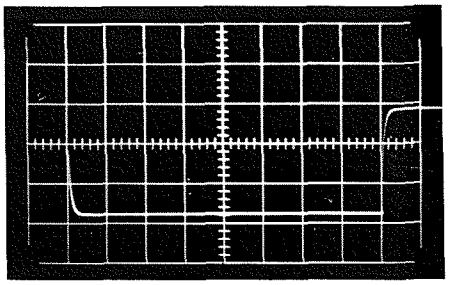


Figure 3

NOTE: This method is not recommended except in instances where an accurate time mark generator such as the Tektronix Type 180 is not available. See your Tektronix Field Engineer for a copy of the factory recommended calibration procedure.

Mike Nash
Customer Service Staff
Tektronix, Inc.

A HELPING HAND

Tektronix Field Engineers are in daily contact with users of cathode-ray oscilloscopes in almost all branches of industry and research. These contacts afford a continually varying experience in oscilloscope uses and applications. For help with an oscilloscope problem that has defied your efforts at solution or one that you feel may have a better solution, consult the Tektronix Field Engineer in your area. He is no farther away than your telephone and he may have the answer to your problem. In any event he will be happy to consult with you and show how to use Tektronix instruments to their fullest capabilities.

CHANGE IN STANDARD P2 PHOSPHOR

A new improved-type phosphor is now used in all Tektronix cathode-ray tubes calling for a P2 phosphor. This new Type P2 phosphor can be distinguished by its blue fluorescence. The older P2 phosphor, as you will recall, fluoresced green.

The primary reason for the phosphor change was to improve the writing rate of the tubes. The new P2 phosphor has a writing rate approximately 75% that of the P11.

Even though the new Type P2 phosphor decays to 10% of full brightness in only 2 milliseconds (compared to about 100 milliseconds for the old type), the long-term persistence components of the two types have nearly the same energy. Futhermore, the brightness of the new phosphor is much better than the old.

There are two peaks in spectral response of the new phosphor. A major peak occurs at 5300 Angstrom units (0.5300 micron) and a minor peak occurs at 4500 Angstrom units (0.4500 microns).

One other desirable characteristic of the new phosphor: it has distinct advantages for oscilloscope photography.

Tektronix Instrument-Repair Facilities: There is a fully-equipped and properly-staffed Tektronix Instrument Repair Station near you. Ask your Field Engineer about Tektronix Instrument-Repair facilities.

Tektronix, Inc.
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USERS OF TEKTRONIX INSTRUMENTS

USEFUL INFORMATION FOR

Service Scope

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AN OREGON CORPORATION

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BUFFALO ..... Tektronix, Inc., 961 Maryvale Drive, Buffalo 25, New York....TWX—WMSV 2..... NF 3-7861

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Pittsburgh Area: ZEnith 0212

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GREENSBORO .....Tektronix, Inc., 1838 Banking Street, Greensboro, North Carolina....TWX—GN 540..... BRoadway 4-0486

HOUSTON ..... Tektronix, Inc., 2605 Westgrave Lane, Haustan 27, Texas....TWX—HO 743..... MOhawk 7-8301, 7-8302

KANSAS CITY ..... Tektronix, Inc., 5920 Nall, Mission, Kansas....TWX—MSN KAN 1112 ..... HEdrick 2-1003
St. Louis Area: ENterprise 6510

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Encino .....Tektranix, Inc., 17418 Ventura Blvd., Encino California....TWX—VNYS 7037..... STate 8-5170

*West L. A. .....Tektranix, Inc., 11681 San Vicente Blvd., West Los Angeles 49, California..... BRadshaw 2-1563
TWX—W L A 6698 ..... GRanite 3-1105

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Westchester County, Western Connecticut, Hudson River Valley served by:
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*Northern New Jersey served by:
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PHOENIX * .....Tektronix, Inc., 7000 E. Camelback Road, Scottsdale, Arizona.....TWX—SCSDL 52..... WHitney 6-4273

PORTLAND ..... Hawthorne Electronics, 700 S. E. Hawthorne Blvd., Portland 14, Oregon ..... BElmont 4-9375

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SEATTLE ..... Howthorne Electronics, 112 Administration Bldg., Boeing Field, Seattle, Washington ..TWX—SE 798 PArkway 5-1460

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