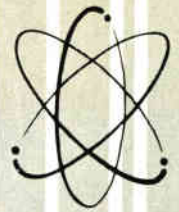




# Techni-talk

COMPLETE ELECTRONIC SERVICING INFORMATION  
radio • tv • hi-fi



Vol. 18 No. 4

Winter, 1966

## How to Build an SCR & Silicon Rectifier Tester

The vast number of silicon rectifiers used today in television receivers, plus the steadily increasing use of silicon controlled rectifiers in home appliances makes it worthwhile to have a unit for testing these semiconductor devices.

A simple tester is described here which will test silicon diode rectifiers for "opens" and "shorts" and SCR's for "opens," "shorts," forward blocking ability and triggering. Indication is by a panel lamp which lights if the test is OK and remains off if the test is not passed. The tester itself contains an SCR which is triggered, and thus lights the lamp, by being so connected that the proper voltage is applied to the trigger circuit if the particular characteristic of the semiconductor being tested is satisfactory. Rearrangement of this circuit for the various tests is done with a five-position rotary switch. Since the tester is operated with internal batteries, it may be used anywhere.

The model of the tester shown in Figure 1 was constructed in a 3" x 5" x 7" hammertone finished aluminum box. However, parts layout and lead lengths are not critical, and almost any enclosure could be used.

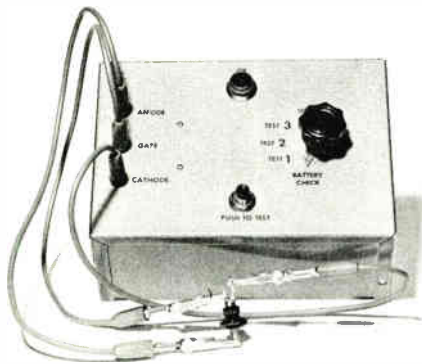


Fig. 1 Completed tester with GE-X3 connected for testing.

Use was made of the perforated insulating board and clips contained in ETR-4228 in mounting the capacitors, resistors and the internal SCR. Incidentally, the rubber feet supplied in ETR-4228 were also used on the bottom of the metal box. Figure 2 is an internal view of the tester and Figure 3 is the schematic diagram.

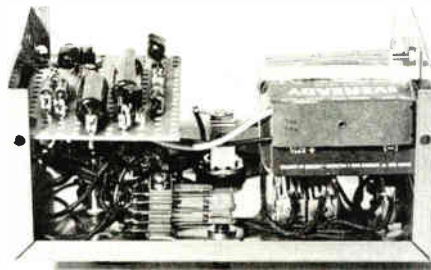


Fig. 2 Internal view showing location of parts.

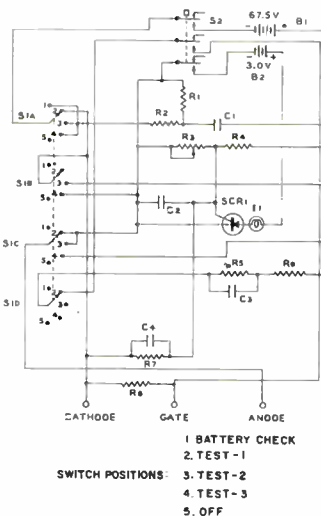


Fig. 3 Schematic diagram of tester.

In constructing the tester, the rotary switch (S1) was wired before being mounted on the box, with leads approximately 6" long provided at the terminals used to connect to the parts to be mounted on the perforated board. The parts board was assembled and wired outside the box. It was then connected to the rotary switch, with the leads provided, and fastened in place in the box with two small angles. A small piece of aluminum, bent to fit, was used to hold battery B1 in place. Battery B2 consists of two penlite cells mounted in a holder designed for the purpose. However, any 3-volt battery may be used.

When the tester has been completed, the only adjustment necessary is to set R2 for the desired leakage current level. To do this, connect a low-range milliammeter and a 500K pot in series between the

ANODE and CATHODE jacks of the tester. Set the rotary switch in either the TEST 1 or TEST 2 position (Select the position which causes the milliammeter to read up-scale). Press the PUSH TO TEST button (S2) and adjust the 500K pot for the desired leakage current. (One milliamper is a satisfactory value). Now release this button, adjust R3 slightly, and again press the button, noting whether the OK panel lamp lights. Continue adjusting R3 and pressing the button after each adjustment until the point is reached where the bulb just lights. Now disconnect the 500K pot and the milliammeter — the tester is ready for use.

To test a silicon rectifier, connect the cathode of the rectifier to the CATHODE jack and the anode to the ANODE jack. Set the rotary switch to TEST 1. Press the PUSH TO TEST button. Illumination of the OK lamp indicates a satisfactory forward voltage drop. Next turn the rotary switch to TEST 2 and press the PUSH TO TEST button. If the OK lamp lights, the rectifier has sufficiently low leakage.

To test an SCR, connect the anode, gate and cathode to the corresponding jacks on the tester. Set the rotary switch to TEST 1 and press the PUSH TO TEST button. If the OK lamp lights, the SCR has a satisfactorily low forward voltage drop. Now turn the rotary switch to TEST 2 and press the PUSH TO TEST button. If the OK lamp lights, the SCR has sufficiently low reverse leakage. Next turn the rotary switch to TEST 3 and press the PUSH TO TEST button. If the OK lamp lights, the SCR has sufficiently low forward leakage.

When the tests have been completed, turn the rotary switch to the OFF position.

The BATTERY CHECK position allows both batteries to be checked. In this position, pressing

TABLE OF TESTS		
DEVICE	SWITCH POSITION	TEST
Rectifier	TEST 1	Forward voltage drop
Rectifier	TEST 2	Reverse leakage
SCR	TEST 1	Forward voltage drop
SCR	TEST 2	Reverse leakage
SCR	TEST 3	Forward leakage

Continued on page 8



These special dress-up pieces for G-E Dealers are available from your Authorized G-E Electronic Components Distributor...

## JUST INTRODUCED

Order this brand new trim kit and make your store the best-dressed on the block.

**DEALER WINDOW TRIM KIT (ETR-4426)** This easy to set up set of six modular panels (13" x 24" each) can be combined in many ways to fill your particular window area. Panels are multi-colored and laminated to heavy-duty corrugated board for long life. Kit also includes 6 L-shaped and 6 straight connecting wires, one ETR-4243 window decal, one ETR-3288 Giant Tube Carton, and instructions with suggested arrangements. Your price only \$0.95!



Use these extra dress-up pieces to give your store that extra "professional" service dealer look.



**BANNERS (ETR 4427)** These bright 4-color un-mounted paper banners (13" x 24" ea.) are an attractive supplement to the Window Trim Kit (ETR-4426). Easily mounted on wall or window, these eye-catching banners will decorate your shop while displaying your services. Your price only \$0.25 for set of 4.



**ELECTRIC SIGN (ETR-4304)** Use this sturdy 3-color plastic and aluminum sign to light-up your front windows or counter. Complete with 40-watt G-E bulb. Makes a handy night light, too! Your price now only \$3.95!



**WINDOW DECAL (ETR-4308)** Easily mounted on window or wall, this 3-color decal helps identify you as a color service expert. Use with ETR-4426 Trim Kit or by itself to dress-up any part of your shop. Only \$0.15!



**WINDOW DECAL (ETR-4243)** Add some "fun" to your window or wall with this colorful, easy to apply decal. Comes free with ETR-4426 Trim Kit (described above), or order separately. Only \$0.25!



**GIANT TUBE CARTON (ETR-3288)** Use these large-scale copies of an actual G-E tube carton for windows, counter tops, ceiling mobiles. Four colors on heavy-duty cardboard. size 7 1/8 x 7 1/8 x 17 1/2. Comes free with ETR-4426 Trim Kit (described above), or order separately. Only \$0.35!



**ILLUMINATED CLOCK (ETR-1291)** This 4-color, 16" diameter illuminated clock is a real eye-catcher for wall or window. Complete with bulbs and hanging chain. Only \$14.95!



**SIGN-A-RAMA (ETR-1290)** This deluxe, double-face outdoor illuminated sign has six flashing lamps with 6500 lumens output — can be seen blocks away. Complete with all hardware and your store imprint. Size 24" x 48". Only \$168.75! (Single-face version, ETR-1290-1, also available — \$106.25)

## BENCH NOTES

### SHORT DAMPER LIFE

This occurs in late Zeniths (16K26, 16K33), also many other sets using 6AY3 or 6BA3 dampers. Upon investigation, no trouble will be found with the circuit, but the damper won't last more than a year. The only remedy here is to use a heavier tube, such as the 6DW4B, designed for color sets, but directly interchangeable with the 6AY3 and 6BA3.

Dennis C. Smith  
9201 Meyers Road  
Detroit, Mich. 48228

### SHOCK ABSORBER

For trucking console TV and heavy stereo units in our station wagon, we protect them from jarring due to bouncing by setting the units on a partially inflated auto inner tube as a cushion.

Henry Mullen  
9193 Manor Ave.  
Cleveland, Ohio 44104

### HV INSULATOR

Did you know that the plastic caps that are used on the new coffee containers makes wonderful high voltage insulating material. I have cured numerous cases of high voltage flash over by the judicious use of this material.

Fred W. Rivette  
Rivette Radio & TV Service  
120 Percy Street  
Syracuse 4, N. Y.

### NEW GRIP FOR NUTDRIVER

The socket on a nutdriver often gets "stripped." Try cutting the end of the socket off about three-sixteenths of an inch. This gives the socket a new grip.

Galen Eggers  
Elk Creek, Nebraska 68348

### NOTE:

Those desiring to have letters published in this column should write the Editor, Techni-Talk, Electronic Components Division, General Electric Company, Owensboro, Kentucky. For each such letter selected for publication you will receive \$10.00 worth of General Electric tubes. In the event of duplicate or similar items, selection will be made by the Editor and his decision will be final. The Company shall have the unlimited right without obligation to publish or otherwise use any idea or suggestion sent to this column. Caution: The ideas and suggestions expressed in this column are those of the individual writers. These ideas and suggestions have not been tried by the General Electric Company and therefore are not endorsed, sponsored or recommended.



# Techni-talk

## COMPLETE INDEX

Vol. 1, No. 1 through

Vol. 18, No. 4

Winter, 1966



### AFC Circuits

"Horizontal" AFC Circuits

### AGC Circuits

Addition of A.G.C. to G-E 805 series T and S  
Correction for Overload "U2" Receivers  
Video Detector, A.G.C. and Video Amplifier

### Anti-Static Cleaner and Polish

TV Anti-Static Cleaner and Polish ETR-3390

### Audio Test and Repair Bench

Construction Details

### Bias Supply for TV

Construction Details

### Business Builders

A complete selection of various dealer  
business aids  
Business Identification — Items  
Advertising Post Cards  
Doorknob Hangers, Book Matches and  
Customer Booklets  
Outdoor Signs

### Capacitor Substitution Boxes

Construction Details

### Color Box

Construction Details

### Color TV

Part I — Color Reproduction  
Part II — Construction of a Color Box  
Part III — Visible Spectrum and  
Chromaticity Charts  
Part IV — Development of Color Signals  
Part V — Color Signal Frequencies and  
Balanced Modulation  
Part VI — Vectors  
Part VII — Development of Chrominance  
Signal  
Part VIII — Color Signal Phase and  
Amplitude and Burst Signal  
Part IX — Gamma Correction, Delay Lines  
and Block Diagram of Transmitter  
Part X — Aperture Mask and Post  
Acceleration Type Picture Tubes

### Color Receivers

Part I — Tuner and Video I-F Amplifiers  
Part II — Video Detectors and Video Am-  
plifiers Block Diagram and Schematic for  
General Electric "CL" Color Receiver  
Part III — Burst Gate, Subcarrier Gener-  
ation, Synchronous Detectors and  
Chroma Amplifiers  
Part IV — Matrixing Circuits and Aperture  
Mask Tube  
Part V — Mechanical Adjustments on  
Aperture Mask Tube  
Part VI — Vertical Sweep and Convergence  
System  
Porta-Color (three parts)

### Console Phono Service Notes

Buzzing in RC4330 and RC4530 Series  
Hum in RC4100, RC4620/30, RC4660 and  
RC4850 Series  
Rattle in Console Series with Porta-Fi  
Trip Failure on VM Changers  
Velocity Trip Lever Bent on G-E Record  
Changer

VOL. No.

2 2

2 4

10 6

1 5

14 4

15 2

12 5

15 4

16 1

16 2

16 3

17 3

2 6

6 2

5 6

6 2

6 3

6 4

6 5

6 6

7 1

7 2

7 3

8 2

9 2

9 3

9 5

10 1

10 2

10 3

18 1,2,3

17 1

17 1

17 1

17 2

18 3

### Conversion to Larger Picture Tubes

G-E Model 811, Admiral Model 4H16S  
G-E Model 809, RCA Model 730TV2  
G-E Model 820, Philco Model 48-1001  
G-E Model 12C101, Stromberg-Carlson  
Model TV-12  
G-E Model 802, Capehart-Farnsworth  
Model 651P  
G-E Model 10C101, RCA Model KRS-20  
G-E Model 910, RCA Model 630TS to  
14 inch  
G-E Model 815, Motorola Model VF-102  
Motorola Model 12VT16  
RCA Model 630TS to 20 inch

### D-C Restoration

D-C Restoration and Sweep Circuits

### FM Stereo Multiplex

Tuner Modifications

### Germanium Diodes

Germanium Diodes in Video Detectors

### Horizontal Circuits

D-C Restoration and Sweep Circuits  
Deflection Waveforms and RF Supplies  
Excessive Width — "M4"  
Excessive Width — "U2"  
Horizontal AFC Systems  
Horizontal Deflection Circuits and Kickback  
Power Supplies  
Horizontal Hold — AA and AB  
Horizontal Jitter — "M4"  
Horizontal Retrace Elimination Circuit  
Horizontal Sync Unstable — DB  
Intermittent Horizontal Oscillator—SB Chassis  
Kill that Retrace — Horizontal  
Replacement Sweep Transformers  
G-E Horizontal Phase Detector (4 Parts)

### How Electronic Components Are Made and Tested

Reduce Call-Backs with New G-E 6AX4  
Birth of a TV Bulb  
How G-E 110° Picture Tubes are Made  
How G-E Picture Tube Phosphors are Made  
How G-E Receiving Tubes are Tested  
How G-E Semiconductors are Made  
How G-E Service Designed Tubes are Made  
How G-E Transistors are Made  
G-E Tubes are 3 to 4 Times Better  
New G-E Copper Core Anode Material  
New G-E 23" Picture Tube  
New G-E Sandwich Cathode  
New G-E Electron Gun  
No More Loose Top Caps  
G-E Develops New Heater Wire

### How to Build

Bias Supply for TV Servicing  
Capacitor Substitution Boxes  
Color Box  
Complete Service Shop  
Picture Tube Tester  
Resistor Substitution Boxes  
SCR and Silicon Rectifier Tester  
Service Bench  
Speed Control for Portable Electric Drills  
Transistor Radio Power Supply  
Transistor Tester  
HV Rectifier Filament Voltage Tester  
Stereo/Audio Test and Repair Bench

VOL. No.

2 5

2 6

3 1

3 2

3 3

3 4

3 5

3 6

4 1

4 2

1 6

14 2

2 3

1 6

2 3

11 3

10 5

2 2

2 4

18 2

11 4

4 2

18 3

17 3

2 6

11 1

14 5,6

15 1,2

15 3

11 2

10 6

12 2

11 6

11 3

11 1

10 5

15 3

13 3

12 5

12 6

13 2

14 6

14 1

12 5

2 6

6 2

8 4

5 1

2 5

18 4

3 1

17 3

13 2

10 6

15 1

15 2

### Hum or Buzz

Hum or Buzz in TV Receivers I	11	6
Hum or Buzz in TV Receivers II	12	1
Stereo Hum Problem (5 Parts)	11	1-5
Sync Buzz — "U-2"	11	1

### Indian Head Test Pattern

Tele-Clues No. 181 thru 188	6	3
-----------------------------	---	---

### Noise Canceller Circuits

"EE", "H", "J" and "O" Receivers	10	5
"G" and "K" Receivers	10	6
"S", "ST", "U" and "U2" Receivers	11	1

### Oscilloscopes

A Valuable Service Tool-1	15	4
Determining Usability — 2	16	1
Checking Square Wave Response — 3	16	2
Calibrating — 4	16	3
Use in Troubleshooting — 5	16	4
Signal Tracing — 6	17	1
Determining Accuracy of Sweep Generator — 7	17	2
Cathode Ray Oscillograph (2 Parts)	2	3,4
Selecting an oscilloscope for TV servicing	1	3

### Picture Tubes

Reliability Improved	15	3
Open Heaters Due to Arc-over	7	5
Picture Tube Tester — Construction Details	5	1
New General Electric 21FLP4 Replaces 13 Popular Type Picture Tubes	13	5
Porta-Color TV Picture Tube (three parts)	18	1,2,3
Protecting Picture Tube Replacement Guide	14	5
Testing Newer Type Picture Tubes	17	1
9-Inch Picture Tube for TA and TB	13	6
	18	3

### Portable Phonograph Service Hints

RP-2150 — Distorted Audio	16	4
RP-2150 — Buzz and Hum	16	4
RP-2160 — Dead Set	16	4

### Power Tuning

TV — "U-2" Power Tuning Repairs	10	6
---------------------------------	----	---

### Printed Circuits

Servicing Procedures and Tools	11	3
Cracked Boards and Arc-over	11	4
Servicing and Servicing Aids	11	5

### Publications for the Service Technician

Essential Characteristics ETR-15 — Receiving Tubes, Picture Tubes, Reed Switches, Photocells and Capacitors	18	3
Picture Tube Replacement Guide ETR-702	18	3
Tele-Clues in Three-Ring Binder ETR-1095	18	3
TV Service Manual ETR-1765, Vol 1, Years 1946-1953	18	3
TV Service Manual ETR-1766, Vol. 2, Years 1953-1955	18	3
TV Service Manual ETR-1767, Vol. 3, Years 1955-1957	18	3
Receiving Tube Interchangeability Wall Chart ETR-1916	18	3
Techni-Talk Binder ETR-2000	18	3
Tube Inventory and Order Guide ETR-2162	18	3
Techni-Talk Back Issues ETR-2579 (Vol. 1, No. 1 thru Latest Issue) and Binder	18	3
TV Service Manual ETR-2892, Vol. 4, Years 1958-1960	18	3
Radio Service Guide ETR-2975 (1946-1961)	18	3
Transistor Manual ETR-3296	18	3
101 Tele-Clues ETR-3700	18	3
Glow Lamp Manual ETR-3710	18	3
Radio Service Guide ETR-3733 (1961-1962)	18	3
TV & Phono Subscription Plan "E" ETR-3790	18	3
TV & Phono Subscription Plan "F" ETR-3791 — Includes Plan "E" for current year and previous year	18	3
Subscription Plan "A" ETR-3845 for Radio and Portable Phonograph	18	3

### VOL. No.

Subscription Plan "B" ETR-3846 — Includes Plan "A" plus Radio Service Guides	18	3
SCR Manual ETR-3875	18	3
TV Service Manual on GE "W" Line 1961-1962 Receivers ETR-3906	18	3
TV Service Manual on GE "X" Line 1963 Receivers ETR-3907	18	3
Hobby Manual ETR-3960	18	3
Entertainment Semiconductor Almanac ETR-4311	18	3
Catalog and Interchangeability Guide for Service Designed Capacitors ETR-4340	18	3
Radio Service Guide ETR-4406 (1963-1965)	18	3
TV Service Manual on GE "Y" Line 1964 Receivers ETR-4411	18	3
Transistor Circuit Trouble-Shooting Course ETR-4423	18	3
TV Service Manual on GE "A" Line 1965 Receivers ETR-4491	18	3

### Radio Service Notes

Radio — Fading and Intermittents	13	1
Radio — G-E "Silent Partners" Save Service Time	13	3
Radio — Motorboating in Transistor Radios	12	2
Radio — Removing Large Components	15	1
Radio — Repeated Silicon Rectifier Failure	15	3
Radio — C435 and T125 No Audio	12	5
Radio — P115, P165 Loose Tuning Knobs	14	3
Radio — P675 and P720 Current Readings	10	6
Radio — P710, P711-A Circuit Revisions	12	4
Radio — P715, P765 Antenna Support	11	5
Radio — P715, P765 Intermittents and Motor Boating	13	2
Radio — P715, P765 Loose Leatherette	11	5
Radio — P745 — Low Sensitivity	11	5
Radio — P745 and P750 Circuit Changes	10	6
Radio — P755 Oscillation and Distortion	11	3
Radio — P755 and P805 Voltage Readings	12	3
Radio — P780 Troubleshooting	14	4
Radio — P820A, P821A, P822A Trouble- shooting	14	5
Radio — P835A, P840A, B and P870A Isolation	15	1
Radio — P870 Dial Slippage	15	2
Radio — 925 Spurious Signal Reception	16	2
Radio — RP1120 and AS2 Tone Improvement	11	4
Radio — P1820, P1830 Shorted Speaker	17	1
Radio — T105, C405, 875, 930 Excessive Volume	14	3
Radio — T120 Dial Cord Breakage	12	1
Radio — T120 No AM	11	2
Radio — T120 No AM on l.f. End of Band	11	1

### Raster

Visible Without Damper Tube	17	1
-----------------------------	----	---

### Receiving Tube

Popularity Listing	18	2
--------------------	----	---

### Record Changer Service Hints

G-E RD 100 Series — Cycles to off position	16	3
G-E RD 100 Series — No automatic shut off	16	3
GE Record Changer — Bent Velocity Trip Lever	18	3
All VM — Changer shuts off	16	3
All VM — Trip Failure	17	2
CH10 Speed Control	14	1
Repair Support	14	2

### Remote Control Systems

Adjusting Reed Relay Contact Points	14	2
G-E Wireless Remote Control System (6 Parts)	12	1-6
G-E Sonic Remote Control System (5 Parts)	13	5,6
	14	1,3,4

### Replacement of 21AP4 with 21ZP4-B

Replacement of 21AP4 Metal with 21ZP4-B Aluminized Glass Picture Tube	7	6
--	---	---

### Resistor Substitution Boxes

Construction Details	2	5
----------------------	---	---

### Retrace Elimination

Horizontal Retrace Elimination Circuit	4	2
Kill that Retrace — Horizontal	2	6
Kill that Retrace — Vertical	1	4

## Semiconductors

New Service-Designed Entertainment Types

## Service Aids

Bench Mirror ETR-1275  
Capacitor Tab Adjuster ETR-2968  
Compactron Sockets ETR-2976  
Door Clock Sign, ETR-3826  
Experimenter/Hobbyist Kit ETR-4288  
Five-In-One Combination Tool, ETR-3910  
Fuse and Heater Checker ETR-981A  
Magnetic Swing-Beam Service Light  
ETR-1593  
Multi-Tube Pin Straightener ETR-3200  
Paper Bags-2, 4, 10 and 14 Lb. Sizes  
Picture Tube Pillow ETR-1469  
Part Holder, ETR-3851  
Pocket Tool, ETR-3594  
Printed Circuit Board Cutting Tool, ETR-3896  
Rear Control Extension ETR-2089  
Safety Glass Puller ETR-1592  
Service Call Board ETR-2144  
Service Drop Cloth ETR-1021A  
Soldering Gun Holder ETR-2582  
Soldering Iron Holder ETR-2790  
Tube and Parts Cabinet, ETR-3803  
Tube Puller ETR-1094  
Twin-X Wrench Set ETR-752  
Wire Stripper ETR-2376

## Service Cases

Armored Vinyl Covered — Small Size  
Armored Vinyl Covered — Medium Size  
Armored Vinyl Covered — Large Size  
Matched Service Cases  
Plastic Tool Cases

## Service Shop Plans

A Plan for Success (Complete Service  
Shop)  
Make Your Own Service Bench

## Signal Generators

AM Signal Generator in Place of  
Cross-Hatch Generator  
G-E ST-16A Color Alignment Generator  
I-F Alignment I  
I-F Alignment II

## Stereo/Audio Test and Repair Bench

Construction Details

## Snivets

Description and Photos

## Snow

TV Receiver Noise

## Sparker

Sparker to Check for "Gas" or "Air Leaker"

## Speakers

TV — Speaker Phasing

## Stereo Hum Problem

Description and Correction (6 Parts)

## Subscription Plans

Radio Plans A and B  
TV Plans E and F

## Successful Service Management

Dealer Modernization — H. B. Nelson  
Planning for Success in the Soaring  
Sixties — Andrew E. Kimball  
Profile of the "Boss" — L. M. Robb  
"Swim — or Sink!" — G. E. Burns  
The Interrelation of Large and Small  
Business — Senator J. Sparkman  
You and Your Customers —  
W. F. Greenwood  
Promote Your Business — F. J. Nataly  
The Four C's of Credit — K. E. Kenny

VOL. No.

18 2

17 2

17 2

17 2

17 2

17 3

17 2

17 2

17 2

17 2

15 4

17 2

17 2

17 2

17 2

17 2

17 2

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17 2

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18 1

17 1

17 1

17 1

17 1

8 4

3 1

4 2

8 6

1 6

2 2

15 2

7 3

4 1

5 1

11 4

11 1-6

18 4

18 4

11 3

12 2

11 6

10 5

11 2

11 4

12 4

12 5

Small Marketers Aids — A U. S. Government  
Service  
Friendly Tips at Income Tax Time —  
V. R. Dahlgren

## Sweep Transformer Replacement

TV — "EE" Sweep Transformer  
Replacement

## Sync Signals and Circuits

Synchronizing Pulses and Circuits

## Tape Recorder

Threading

## Techni-Talk Index

Complete Index of Techni-talk Vol. 1, No. 1  
thru Vol. 18, No. 4 — by subjects

## Tele-Clue Index

Tele-Clues from Vol. 1, No. 1 —  
Vol. 12, No. 6 Indexed by Circuit

## Tele-Clues

No. 1 thru 8

No. 9 thru 16

No. 17 thru 24

No. 25 thru 32

No. 33 thru 40

No. 41 thru 48

No. 49 thru 56

No. 57 thru 64

No. 65 thru 72

No. 73 thru 80

No. 81 thru 88

No. 89 thru 96

No. 97 thru 104

No. 105 thru 112

No. 113 thru 120

No. 121 thru 128

No. 129 thru 133

No. 134 thru 140

No. 141 thru 148

No. 149 thru 155

No. 156 thru 162

No. 163 thru 170

No. 171 thru 180

No. 181 thru 188

No. 189 thru 194

No. 195 thru 202

No. 203 thru 207

No. 208 thru 213

No. 214 thru 221

No. 222 thru 228

No. 229 thru 235

No. 236 thru 240

No. 241 thru 251

No. 252 thru 262

No. 263 thru 273

No. 274 thru 284

No. 285 thru 295

## Tele-Clue Schematics

"LW" Chassis

"LX" Chassis

"MM" Chassis

"M-4" Chassis

"M-5" Chassis

"M-6" Chassis

"MW" Chassis

"MX" Chassis

"N" Chassis

"QX" Chassis

"S" Chassis

"U" Chassis

"U-3" Chassis

"U-4" Chassis

"U-5" Chassis

## Tele-Tips

No. 1 thru 5

No. 6 thru 10

No. 11 thru 15

No. 16 thru 20

No. 21 thru 25

No. 26 thru 30

VOL. No.

12 6

13 1

11 1

2 1

17 1

18 4

12 6

1 5

1 6

2 1

2 2

2 3

2 4

2 5

2 6

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3 2

3 3

3 4

3 5

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11 1

11 2

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11 4

12 1

13 6

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14 1

8 3

10 5

11 6

12 4

13 5

14 5

7 1

15 2

8 1

8 4

10 6

11 5

12 5

2 1

2 2

2 3

2 4

2 5

2 6

	VOL.	No.
No. 31 thru 35	3	1
No. 36 thru 39	3	2
No. 40 thru 43	3	3
No. 44 thru 47	3	4
No. 48 thru 51	3	5
No. 52 thru 55	3	6
No. 56 thru 58	4	1
No. 59 and 60	4	4
No. 61	4	6
No. 63 and 64	5	3
No. 65	5	4
No. 65 thru 67	5	5
No. 68 and 69	5	6
No. 70	6	3
No. 71	6	5
No. 72 and 73	7	2
No. 74 and 75	7	5
No. 76	10	1
No. 77	10	3

### Test Equipment

AM Generator in Place of Cross-Hatch	4	2
Capacitance-resistance Bridge	1	3
Cathode Ray Oscilloscope (2 Parts)	2	3,4
G-E ST-16A Color Alignment Generator	8	6
Oscilloscope — Use in Servicing (7 parts)	15	4
	thru	
	17	2
Signal Generator — 1	1	6
Signal Generator — 2	2	2
Tube Tester	1	2
Vacuum Tube Voltmeter	1	5

### Transistors

How to Make a Transistor Tester	10	6
Listing of Entertainment Types	16	3
Power Supply	13	2
Transistor Theory	8	1

### Transistor Tester

G-E Transistor Tester	8	1
How to Make a Transistor Tester	10	6

### Tube Testers

How to Get the Most Out of Your Test Equipment — Tube Tester	1	2
--	---	---

### Tuners

G-E Model FA-10 and FA-12 Hi-Fi Tuner	11	3
The G-E UHF 103 Tuner (2 Parts)	5	3,4
The Head-End (2 Parts)	1	3,4
UHF Converter or Tuners	5	2
Servicing TV Tuners (5 Parts)	12	6
	13	1-4,6

### TV Antennas

Television Reception (2 Parts)	1	1,2
UHF Antennas	5	2
UHF Antenna Installations	6	4

### TV Circuit Description

D-C Restoration	1	6
Deflection Circuit Waveforms and RF Power Supplies	2	3
Horizontal AFC Systems	2	2
Horizontal Deflection Circuits and Kickback Power Supplies	2	4
Synchronizing Pulses and Circuits	2	1
The Head-End (2 Parts)	1	3,4
Video Detector, A.G.C. and Video Amplifier	1	5
Vertical Sweep Circuits	1	6

### TV Picture Tubes

Part I — Phosphor Specifications and Implosions	4	4
Part II — Electron Gun and Gun Defects	4	5
Part III — Gun Defects continued and Cathode Images	4	6
Part IV — Construction of a Picture Tube Tester	5	1
Open Heaters Due to Arc-Over	7	5
Replacement of 21AP4 Metal with 21ZP4-B Aluminized Glass Picture Tube	7	6

### TV Receiver Noise or Interference

TV Receiver Noise	4	1
TV — "U-3" Apparent Ignition Interference	11	2

### TV Reception

The Antenna (2 Parts)	1	1,2
UHF Antenna Installations	6	4

### TV Service Notes

Alignment of quadrature grid	16	1
Apparent Ignition Interference On "U3"	11	2
Chassis Ventilation — "QX"	15	3
Clock Replacement — DB	18	3
Color Receiver — Models: 21T500, 21C700 & 1	11	5
Color Generator — Modification for ST-16	16	2
Color TV Demagnetizing Coil	15	2
Color TV Service Hints	16	3
Correction for Overload on "U2"	10	6
Damage to Semiconductor Power Rectifiers	15	3
Electrical Safety Test	12	2
Excessive Width — "M4" Sets	11	3
Excessive Width — "U2" Receivers	10	5
Horizontal Hold — AA and AB	18	2
Horizontal Jitter in "M4" Receivers	11	4
Horizontal Pull or Weave — "QX"	15	3
Horizontal Shrinkage — AY Chassis	16	4
Horizontal Syn. Unstable — DB	18	3
HV Rectifier Failures SB	17	3
Identifying Dual Diodes	13	1
Intermittent Brightness — "CW" Color	15	3
Intermittent Horizontal Oscillator — SB Chassis	17	3
Inoperative Fine Tuning — "M6" and "U5"	14	1
Intermittent Channel Selection "M6"	12	5
Neon Bulb Failure — CB	18	3
Phasing on 2 and 3-Speaker Models	11	4
Pincushioning Correction	13	3
Power Tuning Repairs — "U2" Receivers	10	6
Protecting Picture Tube	14	5
Production Changes — "MW"	15	1
Removal of the Metal Back on "M4"	11	2
Removing Scratches and Static Electricity	14	4
Replacement Sweep Transformers	11	1
Replacing Compactron Sockets on Etched Circuit Boards	17	1
Rolling Bright Line — "CX" Color	15	3
Servicing the "M6" Contrast Control Circuit	13	2
Slippage in Fine Tuning Control	11	3
Special Components in TV Receivers	12	4
Testing Horizontal Phase Detection Diodes	14	3
Transistorized UHF Tuner — Intermittent Operation	16	1
Troubleshooting the "DB"	17	2
Vertical Retrace Lines — AY	18	2
Vertical Sync Buzz Trouble — "U2" Chassis	11	6
6CD6 Horizontal Output Tube Failures	12	3
6GH8 Replaces 6EA8 in Remote Receivers	12	6

### TV Signal Description

Synchronizing Pulses and Circuits	2	1
-----------------------------------	---	---

### TV Sound Systems

Delta Sound System	10	3
Repair of Ratio Detector Transformers	10	5

### UHF Reception

UHF Antenna Installations	6	4
---------------------------	---	---

### Vertical Circuits

Kill that retrace — Vertical	1	4
Vertical Sweep Circuits	1	6

### Video Amplifiers

Video Detector, A.G.C. and Video Amplifier	1	5
--	---	---

### Video Detectors

Germanium Diodes in Video Detector	2	3
Video Detector, A.G.C. and Video Amplifier	1	5

### What's Wrong with This Picture?

What's Wrong With This Picture?	11	2,3,4
---------------------------------	----	-------

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*Continued from page 1*

### HOW TO BUILD AN SCR AND SILICON RECTIFIER TESTER

the PUSH TO TEST button will light the OK lamp if both batteries are good. However, if the lamp does not light, a voltmeter or battery tester will be required to find which battery is bad.

#### PARTS LIST

B 1	67 1/2-volt battery (Eveready No. 467 or equivalent)
B 2	3-volt battery (Two pen-lite cells in series or equivalent)
C 1 & 4	0.01 uf, 400-volt capacitor (G-E MPC-4S1)
C 2 & 3	0.1 uf, 200-volt capacitor (G-E MAL-2P1)
I 1	#49 panel lamp
R 1 & 2	4.7K, 1 watt resistor
R 3	100 ohm potentiometer
R 4	22K, 1 watt resistor
R 5 & 7	100K, 1 watt resistor
R 6	680 ohm, 1 watt resistor
R 8	1K, 1 watt resistor
S 1	Four-pole, five-position, non-short-ing rotary switch (Centralab 1415 or equivalent)
S 2	Three-pole, push button switch (Switchcraft FF1009 or equivalent)
SCR 1	GE-X5
Enclosure	Bud CU-2108-A, 3" x 5" x 7" Minibox or equivalent
ETR-4288	Experimenter/Hobbyist Kit (see coupon on page 7)

Panel lamp socket, pointer knob, three banana jacks, test leads, and misc. screws and nuts.



Vol. 18, No. 4 Winter, 1966

In this issue:	Page
How To Build An SCR and Silicon Rectifier Tester	1
Dress-up Your Store	2
Bench Notes	2
Complete Index of Techni-Talk, Vol. 1, No. 1 through Vol. 18, No. 4	3
Subscription Plans	
Radio Plans A and B	7
TV Plans E and F	7

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