

# MODIFICATION KIT

## SILICON RECTIFIER



For the following Tektronix Oscilloscopes:

- Type 531 serial numbers 101-20000
- Type 533 serial numbers 101- 1190
- Type RM33 serial numbers 101- 129
- Type 535 serial numbers 101-20000
- Type 543 serial numbers 101- 949
- Type RM43 serial numbers 101- 105
- Types RM31, RM35, 541, RM41, 545, RM45,  
all serial numbers

040-0395-00

### DESCRIPTION

This modification replaces the selenium rectifiers in the above listed instruments with silicon rectifiers which offer more reliability and longer life.

The following selenium rectifiers will be eliminated by this modification:

106-012	SR732	106-014	SR780
106-013	SR740	106-015	SR790
106-014	SR756*	106-019	SR756*

The instructions are divided into sections for the different series instruments and serial number ranges. Additional shunt resistors and wiring instructions are added to meet the wide range of instruments involved and their respective power requirements.

This modification replaces 040-201, 040-239, and 040-240.

- \* SR756 changed from 106-014 to 106-019 in:
  - Type 531 at serial number 7601
  - Type 535 at serial number 8628

Publication:  
Instructions for 040-0395-00  
March 1965

Supersedes:  
December 1964

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040-0395-00



PARTS LIST

Quantity	Description	Part Number
1 ea.	Assembly, silicon rectifier bracket, consisting of:	
2 ea.	Strip, ceramic, 7/16 x 9 notches (large), clip-mounted	124-095
6 ea.	Strip, ceramic, 7/16 x 4 notches (large), clip-mounted	124-120
1 ea.	Strip, ceramic, 7/16 x 16 notches (small), clip-mounted	124-146
1 ea.	Strip, ceramic, 7/16 x 7 notches (small), clip-mounted	124-149
20 ea.	Diode, silicon, 750ma 400 PIV	152-066
1 ea.	Cable harness	179-969
1 ea.	Lug, solder, SE-6	210-202
1 ea.	Nut, Keps, 6-32 x 5/16	210-457
5 ea.	Nut, hex, 6-32 x 5/16, resistor mounting	210-478
5 ea.	Eyelet	210-601
6 ea.	Screw, 6-32 x 5/16 BHS	211-507
5 ea.	Screw, 6-32 x 1-1/2 RHS, Phillips	211-553
2 ea.	Resistor, WW, 15 Ω 10w	308-143
1 ea.	Resistor, WW, 100 Ω 10w 5%	308-153
2 ea.	Resistor, WW, 10 Ω 10w 5%	308-175
20 ea.	Spacer, nylon molded, 0.281	361-009
1 ea.	Bracket, silicon rectifier mounting	406-475
1 ea.	Assembly, resistor, consisting of:	
1 ea.	Nut, hex, 6-32 x 5/16, resistor mounting	210-478
1 ea.	Eyelet	210-601
1 ea.	Screw, 6-32 x 5/16 BHS	211-507
1 ea.	Screw, 6-32 x 1-1/2 RHS, Phillips	211-553
1 ea.	Resistor, WW, 3k 10w 5%	308-020
2 ea.	Nut, Keps, 6-32 x 5/16	210-457
2 ea.	Washer, steel, 6L x 3/8 x 0.032	210-803
2 ea.	Screw, 6-32 x 3/8 BHS	211-510
1 ea.	Spool, w/3ft. of silver-bearing solder	214-210
1 ea.	Resistor, WW, 68 Ω 2w 10%	306-680
1 ea.	Resistor, WW, 30 Ω 3w 5%	308-142
1 ea.	Tag, MODIFIED INSTRUMENT, gummed back	(001-910)
3 ea.	Tubing, #12 black 1-1/2 in.	(162-014)
1 ea.	Wire, #22 solid blue 4 in.	(175-522)
2 ea.	Wire, #22 solid white-red 4 in.	(175-522)
1 ea.	Wire, #22 solid white-violet 4 in.	(175-522)
2 ea.	Wire, #22 solid gray-red-red 4 in.	(175-544)
1 ea.	Wire, #22 solid gray-blue-brown 4 in.	(175-544)

INSTRUCTIONS

IMPORTANT: When soldering to the ceramic strips, use the silver-bearing solder supplied with this kit.

A. BEFORE INSTALLING THE ASSEMBLY IN THE INSTRUMENT:

- ( ) 1. Solder the three loose wires on the assembly to the two WW resistors that are strapped together. Use the figure on the opposite page that corresponds to the instrument and serial number range in which the kit is to be installed, as indicated below:

REFER TO FIG. 1 FOR INSTRUMENTS:

- Type 531 serial numbers 101-7600
- Type 535 serial numbers 101-8627

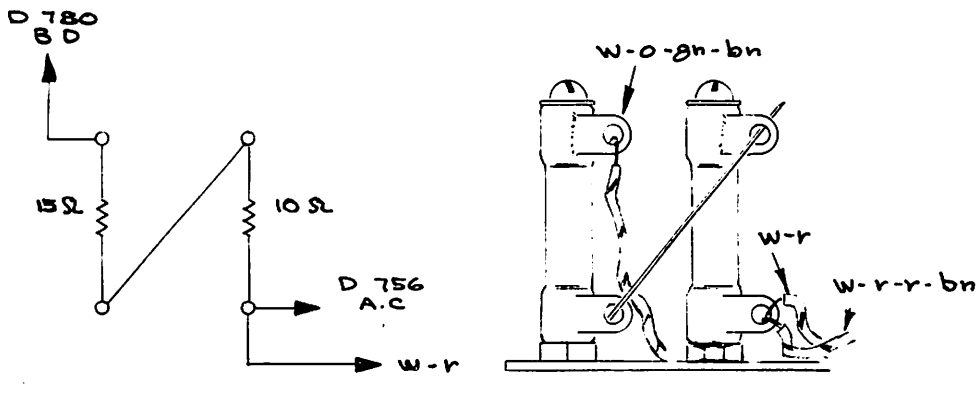
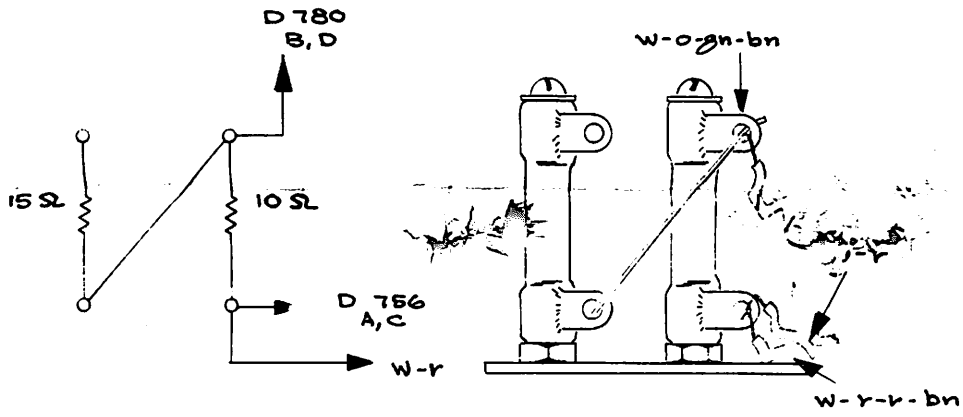
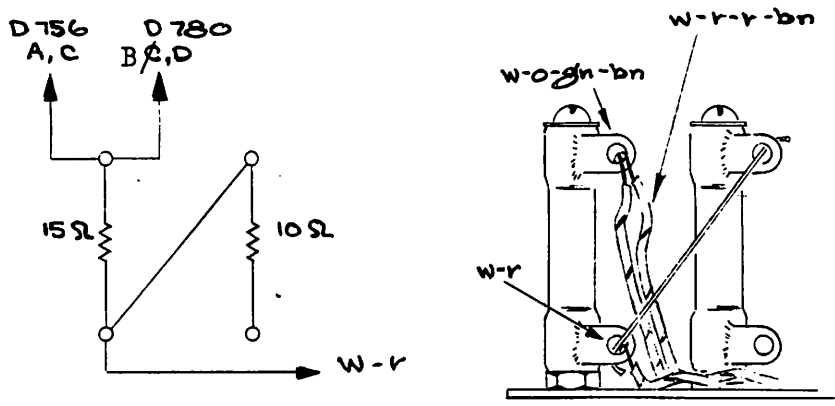
REFER TO FIG. 2 FOR INSTRUMENTS:

- Type 531 serial numbers 7601-20000
- Type 533 serial numbers 101- 1190
- Type RM33 serial numbers 101- 129
- Type 543 serial numbers 101- 950
- Type RM54 serial numbers 101- 105
- Types RM31, 541, RM41, all serial numbers

REFER TO FIG. 3 FOR INSTRUMENTS:

- Type 535 serial numbers 8628-20000
- Types RM35, 545, RM45, all serial numbers

INSTRUCTIONS (con'd)





**INSTRUCTIONS** (con'd)

**B. TO REPLACE THE SELENIUM RECTIFIERS:**

NOTE: STEP 1 APPLIES ONLY TO TYPES 531 S/N 101-7600 AND 535 S/N 101-8627

- ( ) 1. Remove the bare wire connected from the top terminal of SR780 to the center terminal of SR756. On newer instruments, this is a short black wire connected directly between the two rectifier stacks. On the older instruments (serial numbers around 1000 and below), this wire was *dressed* around the back of SR756 and was wired into the main power cable.

FOR ALL INSTRUMENTS:

- ( ) 2. Unsolder and remove the selenium rectifiers from the bulkhead (except SR752 in Types 533, RM33, 543, and RM43).
- ( ) 3. Enlarge the SR740 mounting holes with a 5/32 (#23) drill.
- ( ) Mount the silicon rectifier bracket, using the holes just drilled and the mounting hardware from the kit.

NOTE: On some of the older instruments, the mounting holes for SR740 were spaced only 4 in. apart. If this is the case, drill new holes 9/32 in. above the top hole, and 9/32 in. below the bottom hole. Use a 5/32 (#23) drill.

**C. TO WIRE THE SILICON ASSEMBLY:**

FOR TYPES 531 S/N 101-7600 AND 535 S/N 101-8627

- ( ) 1. Solder all wires that were removed from the selenium rectifiers to the ceramic strips, as shown in Fig. 4. If any of the wires will not reach, splice them, using the color-coded wires from the kit. Cover the splice with black tubing from the kit. CAUTION: When soldering to the small notch strips, do not overheat or force wires into them.

**Section C** (con'd)

- ( ) 2. Solder the 30  $\Omega$  3w resistor (from kit) across the 15  $\Omega$  10w resistor, as shown in Fig. 4.
- ( ) 3. Solder the 68  $\Omega$  2w resistor (from kit) across the 100  $\Omega$  10w resistor, as shown in Fig. 4.

FOR TYPES 531 S/N 101-6638 AND 535 S/N 101-1059

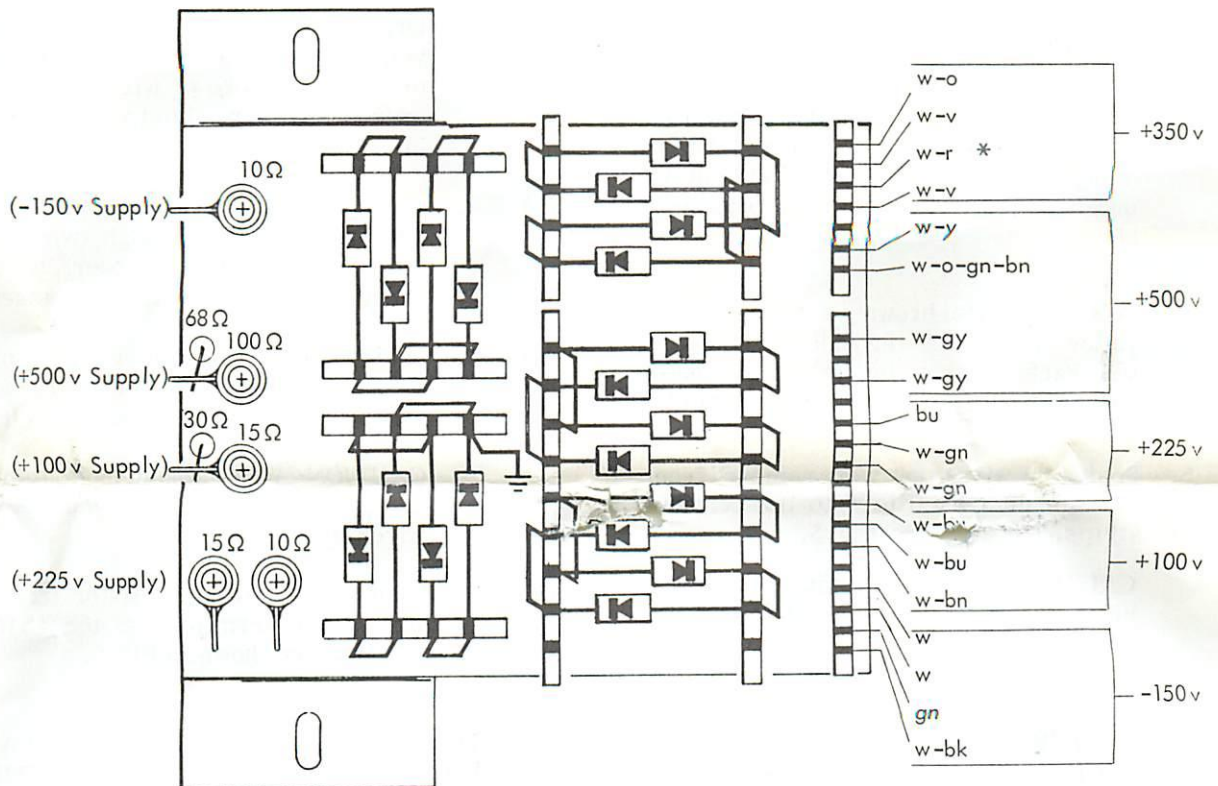
- ( ) 4. Locate R762 (531) or R761 (535) on lower side of power chassis near V784. If the value of this resistor is NOT 3k, replace it with the resistor assembly from the kit.

THIS COMPLETES THE INSTALLATION FOR THE ABOVE-LISTED INSTRUMENTS

- ( ) Check wiring for accuracy.
- ( ) Turn the instrument on and check for proper voltages and regulation of the power supply. (If you make any adjustments in the power supply, you will have to check the calibration of the rest of the instrument.)

NOTE FOR TYPE 535 S/N 101-1059: If the -150 v supply fails to regulate on High Line, Low Load -- remove R724 (10k 2w resistor) which is in parallel with R725 (1k 25w resistor).

- ( ) Moisten back of MODIFIED INSTRUMENT tag (from kit) and place it on the Power Supply schematic.
- ( ) Select the Manual insert page which corresponds to your instrument and fasten it in your Manual.



\*Two wires in some instruments

Fig. 4



INSTRUCTIONS (con'd)

D. TO WIRE THE SILICON ASSEMBLY:

FOR TYPES 531 S/N 7601-20000, 533 S/N 101-1190, RM33 S/N 101-129, 543 S/N 101-950, RM43 S/N 101-105; RM31, 541, AND RM41 - ALL S/N

- ( ) 1. Pull the cable that was soldered to SR780 and SR756 back through the grommet to the right side of the bulkhead.
- ( ) 2. Locate and remove from the cable the white-red or gray-red-red wire that was soldered to SR756.
- ( ) 3. Dress the two white-gray, the white-yellow or gray-brown-green, and white-orange-green-brown wires from SR790 under the power cable to the new assembly.
- ( ) 4. Pull the white-brown or gray-brown-yellow wire back through two loops of the cable lacing in order to obtain enough length to reach the assembly.
- ( ) 5. Solder all wires that were removed from the selenium rectifiers to the ceramic strips, as shown in Fig. 5.

CAUTION: When soldering to the small notch strips, do not overheat or force wires into them.

THIS COMPLETES THE INSTALLATION FOR THE ABOVE-LISTED INSTRUMENTS

- ( ) Check wiring for accuracy.
- ( ) Turn the instrument on and check for proper voltages and regulation of the power supply. (If you make any adjustments in the power supply, you will have to check the calibration of the rest of the instrument.)
- ( ) Moisten back of MODIFIED INSTRUMENT tag (from kit) and place it on the Power Supply schematic.
- ( ) Select the Manual insert page which corresponds to your instrument and fasten it in your Manual.

E. TO WIRE THE SILICON ASSEMBLY:

FOR TYPES 535 S/N 8628-20000 AND RM35, 545 AND RM45 - ALL S/N

- ( ) 1. Pull the cable that was soldered to SR780 and SR756 back through the grommet to the right side of the bulkhead.
- ( ) 2. Locate and remove from the cable the white-red or gray-red-red wire that was connected to SR756.
- ( ) 3. Dress the two white-gray, the white-yellow or gray-brown-green, and white-orange-green-brown wires from SR790 under the power cable to the new assembly.
- ( ) 4. Pull the white-brown or gray-brown-yellow wire back through two loops of the cable lacing in order to obtain enough length to reach the assembly.
- ( ) 5. Solder all wires that were removed from the selenium rectifiers to the ceramic strips, as shown in Fig. 6.

CAUTION: When soldering to the small notch strips, do not overheat or force wires into them.

- ( ) 6. Solder the 30  $\Omega$  3w resistor (from kit) across the terminals of the 15  $\Omega$  10w resistor, as shown in Fig. 6.

THIS COMPLETES THE INSTALLATION FOR THE ABOVE-LISTED INSTRUMENTS

- ( ) Check wiring for accuracy.
- ( ) Turn the instrument on and check for proper voltages and regulation of the power supply. (If you make any adjustments in the power supply, you will have to check the calibration of the rest of the instrument.)
- ( ) Moisten back of MODIFIED INSTRUMENT tag (from kit) and place it on the Power Supply schematic.
- ( ) Select the Manual insert page which corresponds to your instrument and fasten it in your Manual.

GG/TL:ls

INSTRUCTIONS (con'd)

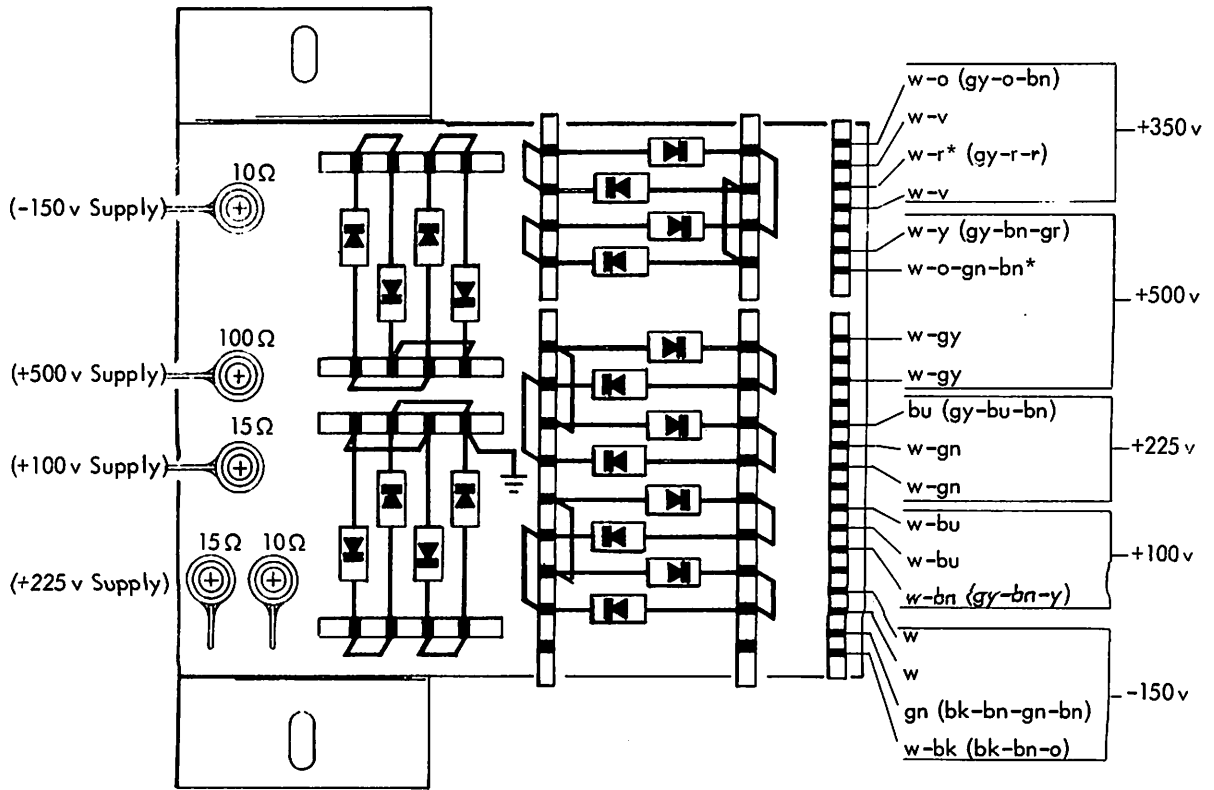


FIG. 5

\*two wires in some instruments

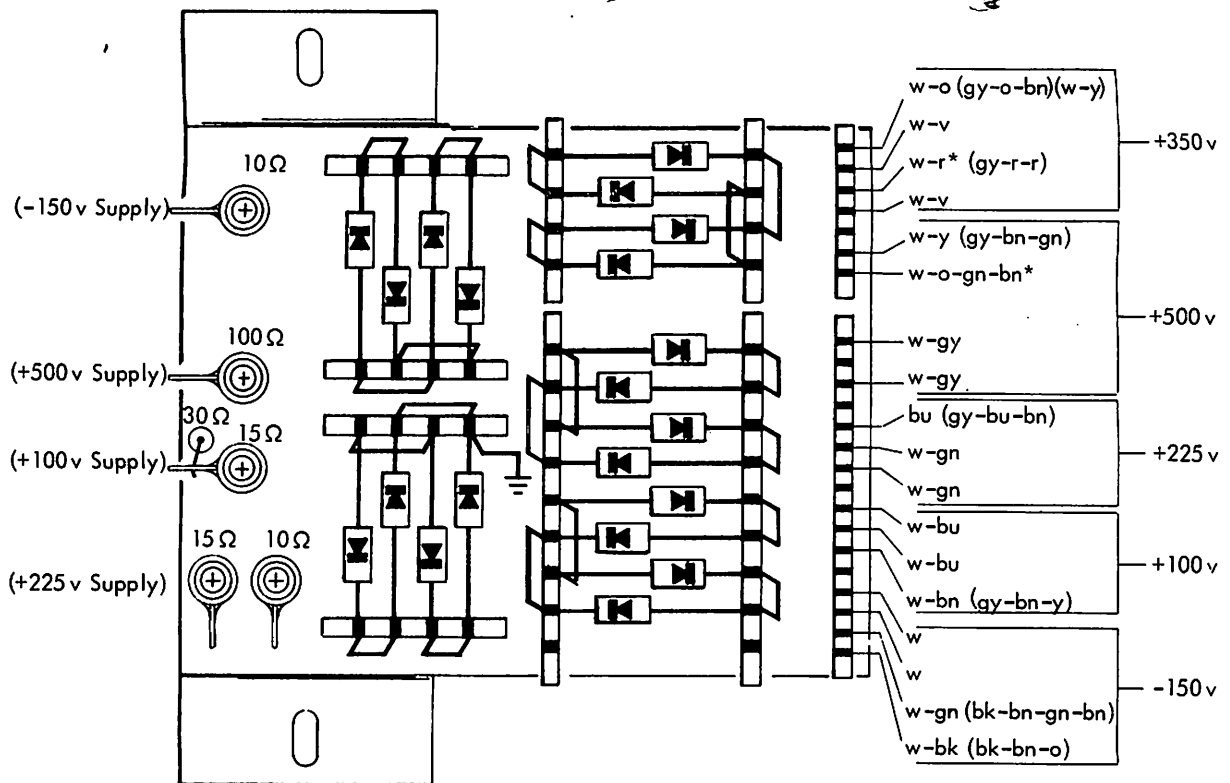
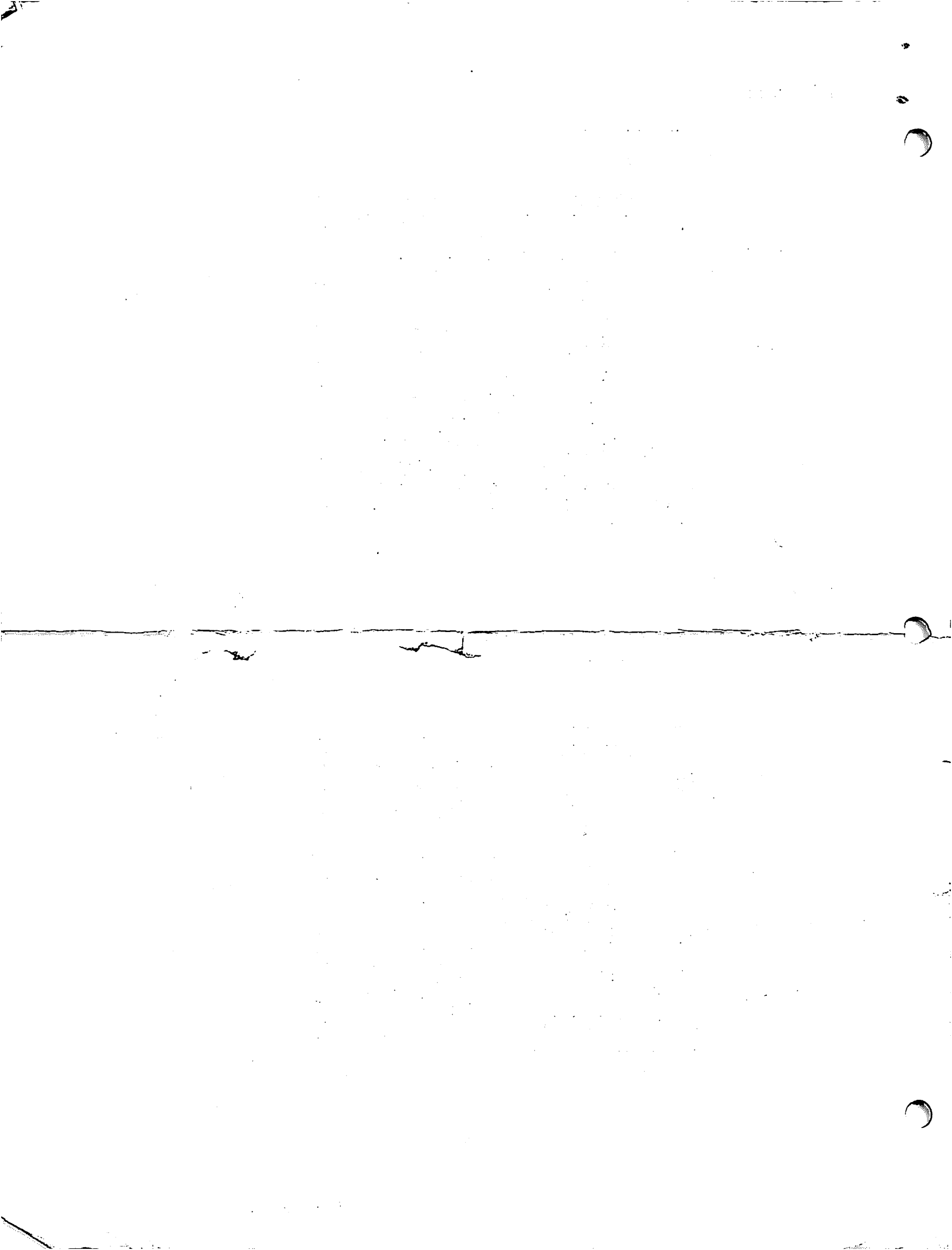


FIG. 6

\*two wires in some instruments





# SILICON RECTIFIER

Types 531 -- s/n 101-7600; 535 -- s/n 101-8627

Installed in Type \_\_\_\_\_ s/n \_\_\_\_\_

## GENERAL INFORMATION

This modification replaces the selenium rectifiers used in the instruments listed above with silicon rectifiers offering more reliability and longer life.

The information on these pages supplements or supersedes the information in your Manual.

## ELECTRICAL PARTS LIST

Values are fixed unless marked variable.

DIODES				
Ckt. No.	Part Number		Description	
D732A,B,C,D	152-066	Silicon	1N3194 (or equivalent)	400 PIV
D740A,B,C,D	152-066	Silicon	1N3194 (or equivalent)	400 PIV
D756A,B,C,D	152-066	Silicon	1N3194 (or equivalent)	400 PIV
D780A,B,C,D	152-066	Silicon	1N3194 (or equivalent)	400 PIV
D790A,B,C,D	152-066	Silicon	1N3194 (or equivalent)	400 PIV

## RESISTORS

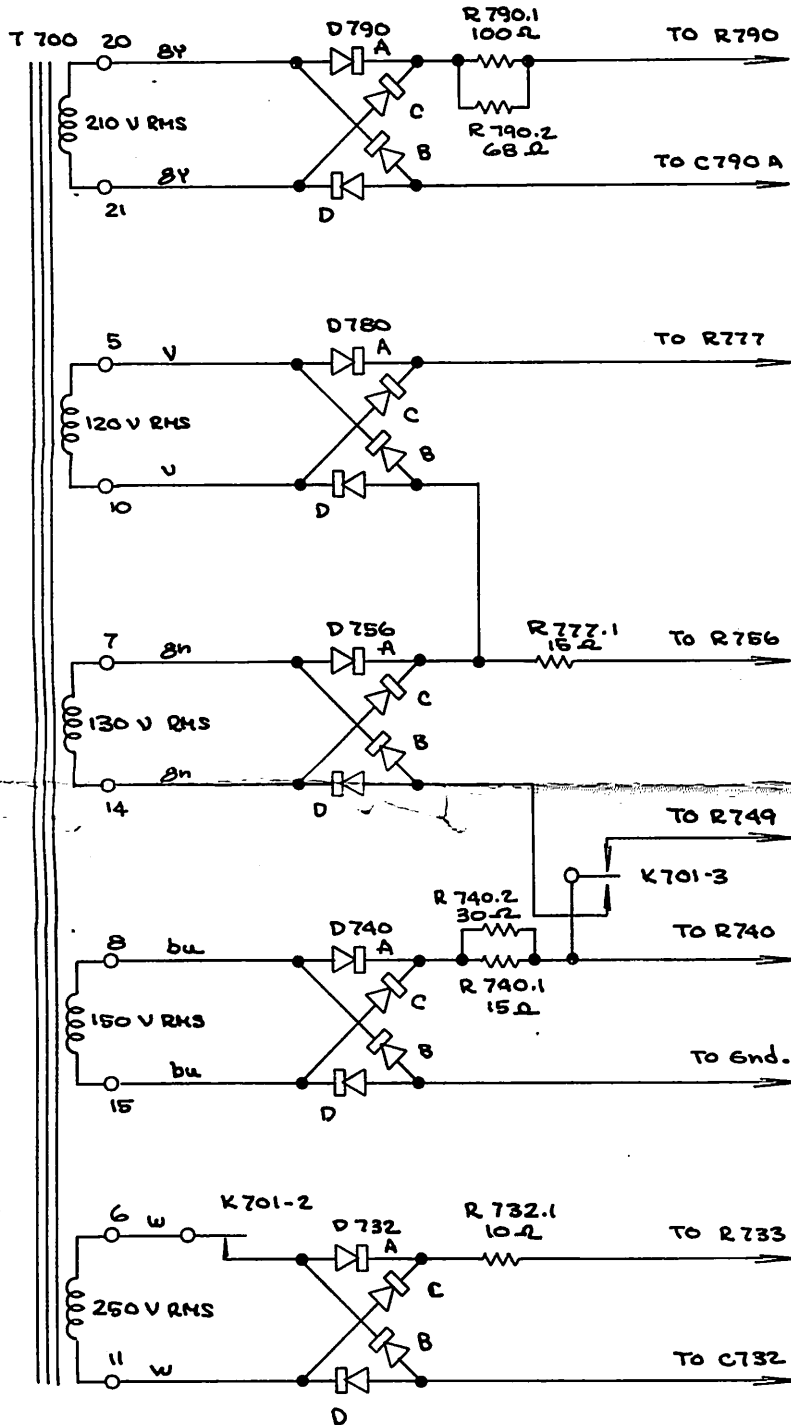
All resistors are WW 5% unless otherwise marked.

R732.1	308-175	10 $\Omega$	10 w		
R740.1	308-143	15 $\Omega$	10 w		
R740.2	308-142	30 $\Omega$	3 w		
R777.1	308-143	15 $\Omega$	10 w		
R790.1	308-153	100 $\Omega$	10 w		
R790.2	306-680	68 $\Omega$	2 w	comp	10%

## MECHANICAL PARTS LIST

	Part Number
Bracket, silicon rectifier mounting	406-475
Cable harness	179-969
Eyelet	210-601
Lug, solder, SE-6	210-202
Nut, Keps, 6-32 x 5/16	210-457
Nut, hex, 6-32 x 5/16, resistor mounting	210-478
Screw, 6-32 x 5/16 BHS	211-507
Screw, 6-32 x 1-1/2 RHS, Phillips	211-553
Spacer, nylon molded, 0.281	361-009
Strip, ceramic, 7/16 x 9 notches (large), clip-mounted	124-095
Strip, ceramic, 7/16 x 4 notches (large), clip-mounted	124-120
Strip, ceramic, 7/16 x 16 notches (small), clip-mounted	124-146
Strip, ceramic, 7/16 x 7 notches (small), clip-mounted	124-149

SCHMATICS





# SILICON RECTIFIER

Types 531 -- s/n 7601-20000; 533 -- s/n 101- 1190;  
 RM33 -- s/n 101- 129; 535 -- s/n 8628-20000;  
 543 -- s/n 101- 950; RM43 -- s/n 101- 105;  
 RM31, RM35, 541, RM41, 545, RM45 - s/n 101- up

Installed in Type \_\_\_\_\_ s/n \_\_\_\_\_

## GENERAL INFORMATION

This modification replaces the selenium rectifiers used in the instruments listed above with silicon rectifiers offering more reliability and longer life.

The information on these pages supplements or supersedes the information in your Manual.

## ELECTRICAL PARTS LIST

Values are fixed unless marked variable.

### DIODES

Ckt. No.	Part Number		Description	
D732A,B,C,D	152-066	Silicon	1N3194 (or equivalent)	400 PIV
D740A,B,C,D	152-066	Silicon	1N3194 (or equivalent)	400 PIV
D756A,B,C,D	152-066	Silicon	1N3194 (or equivalent)	400 PIV
D780A,B,C,D	152-066	Silicon	1N3194 (or equivalent)	400 PIV
D790A,B,C,D	152-066	Silicon	1N3194 (or equivalent)	400 PIV

### RESISTORS

All resistors are WW 5% unless otherwise marked.

R732.1	308-175	10 $\Omega$	10 w
R740.1	308-143	15 $\Omega$	10 w
*R740.2	308-142	30 $\Omega$	3 w
R777.1	308-143	15 $\Omega$	10 w
*R777.2	308-175	10 $\Omega$	10 w
R790.1	308-153	100 $\Omega$	10 w

\* Used only in the following instruments:

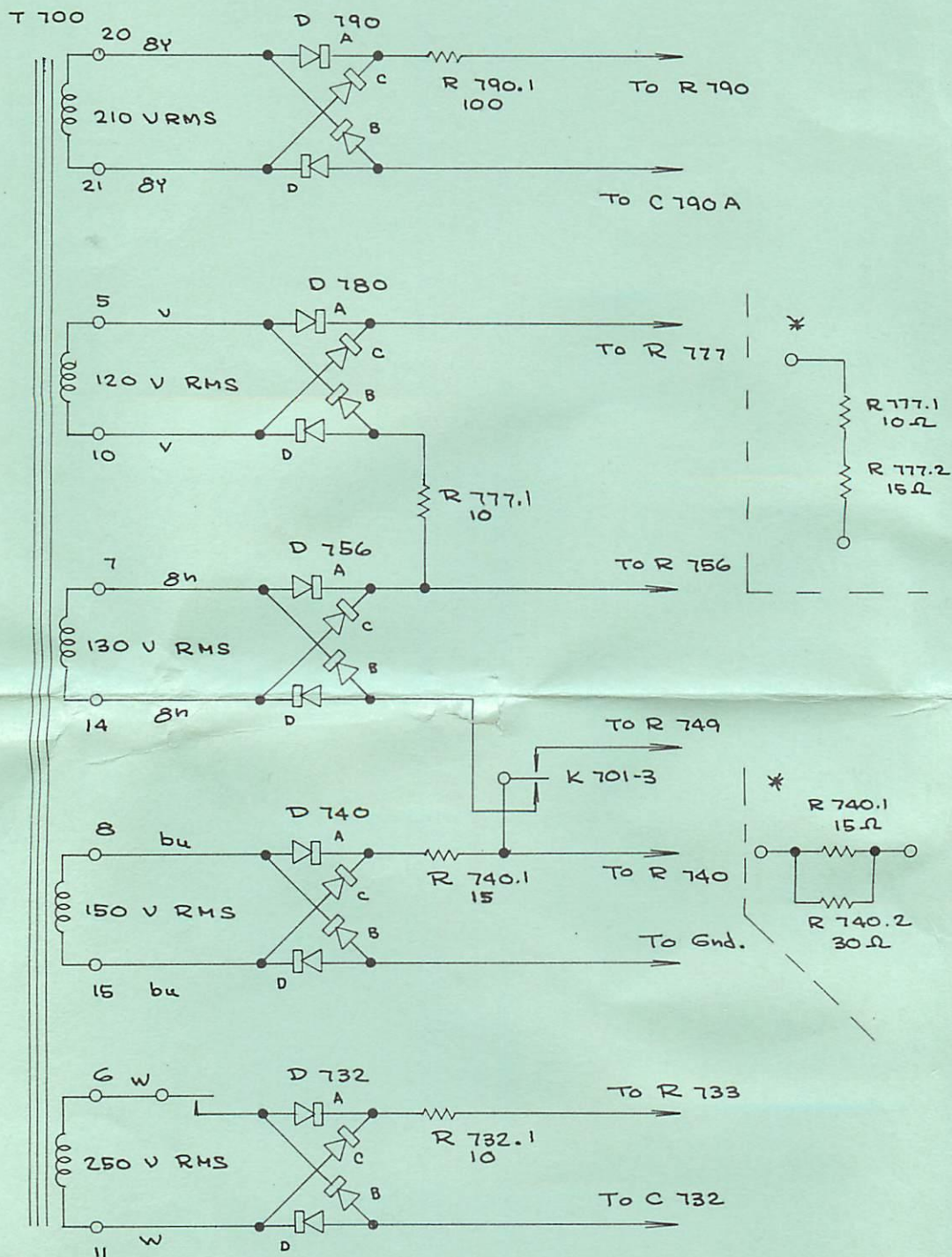
Types 535 -- s/n 8628-20000  
 RM35, 545, RM45 -- s/n 101-up

## MECHANICAL PARTS LIST

	Part Number
Bracket, silicon rectifier mounting	406-475
Cable harness	179-969
Eyelet	210-601
Lug, solder, SE-6	210-202
Nut, Keps, 6-32 x 5/16	210-457
Nut, hex, 6-32 x 5/16, resistor mounting	210-478
Screw, 6-32 x 5/16 BHS	211-507
Screw, 6-32 x 1-1/2 RHS, Phillips	211-553
Spacer, nylon molded, 0.281	361-009
Strip, ceramic, 7/16 x 9 notches (large), clip-mounted	124-095
Strip, ceramic, 7/16 x 4 notches (large), clip-mounted	124-120
Strip, ceramic, 7/16 x 16 notches (small), clip-mounted	124-146
Strip, ceramic, 7/16 x 7 notches (small), clip-mounted	124-149



SCHEMATICS



\* Resistor values for the following instruments:

Types 535 -- serial numbers 8628-20000  
 RM33, 545, RM45 -- all serial numbers