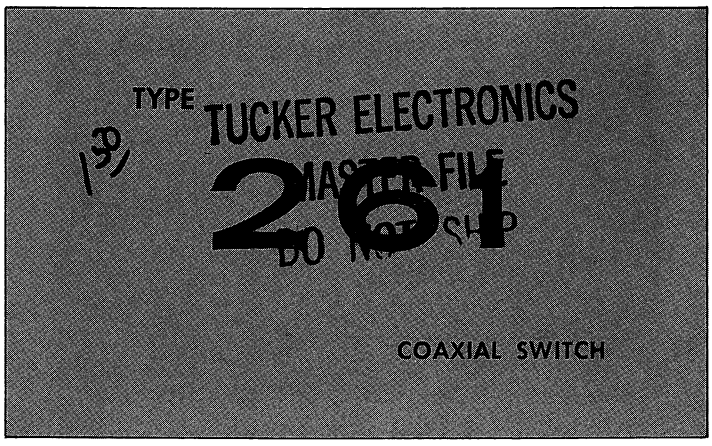
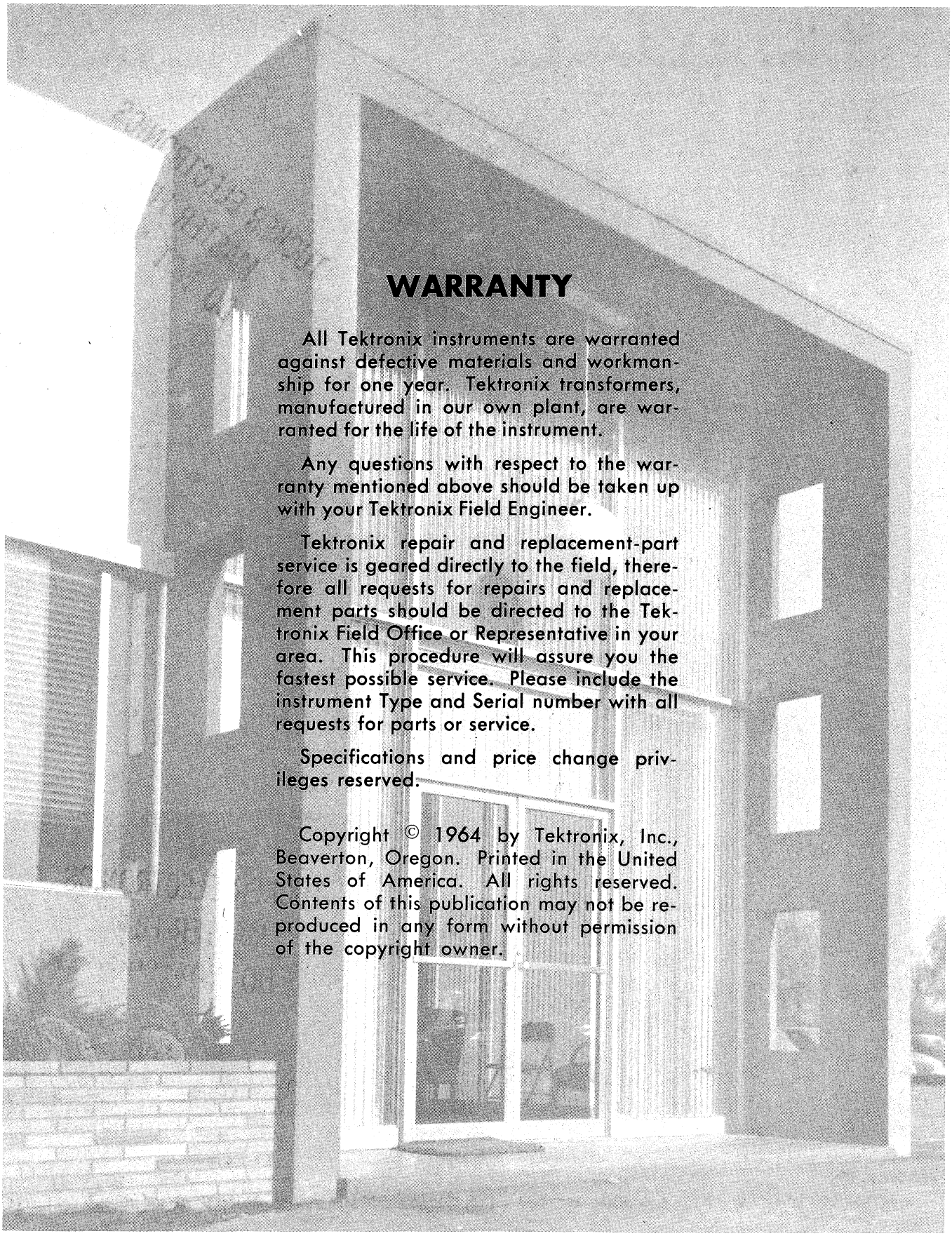
INSTRUCTION MANUAL

Serial Number _____



Tektronix, Inc.
S.W. Millikan Way ● P. O. Box 500 ● Beaverton, Oregon ● Phone MI 4-0161 ● Cables: Tektronix

Tektronix International A.G.
Terrassenweg 1A ● Zug, Switzerland ● PH. 042-49192 ● Cable: Tekintag, Zug Switzerland ● Telex 53.574



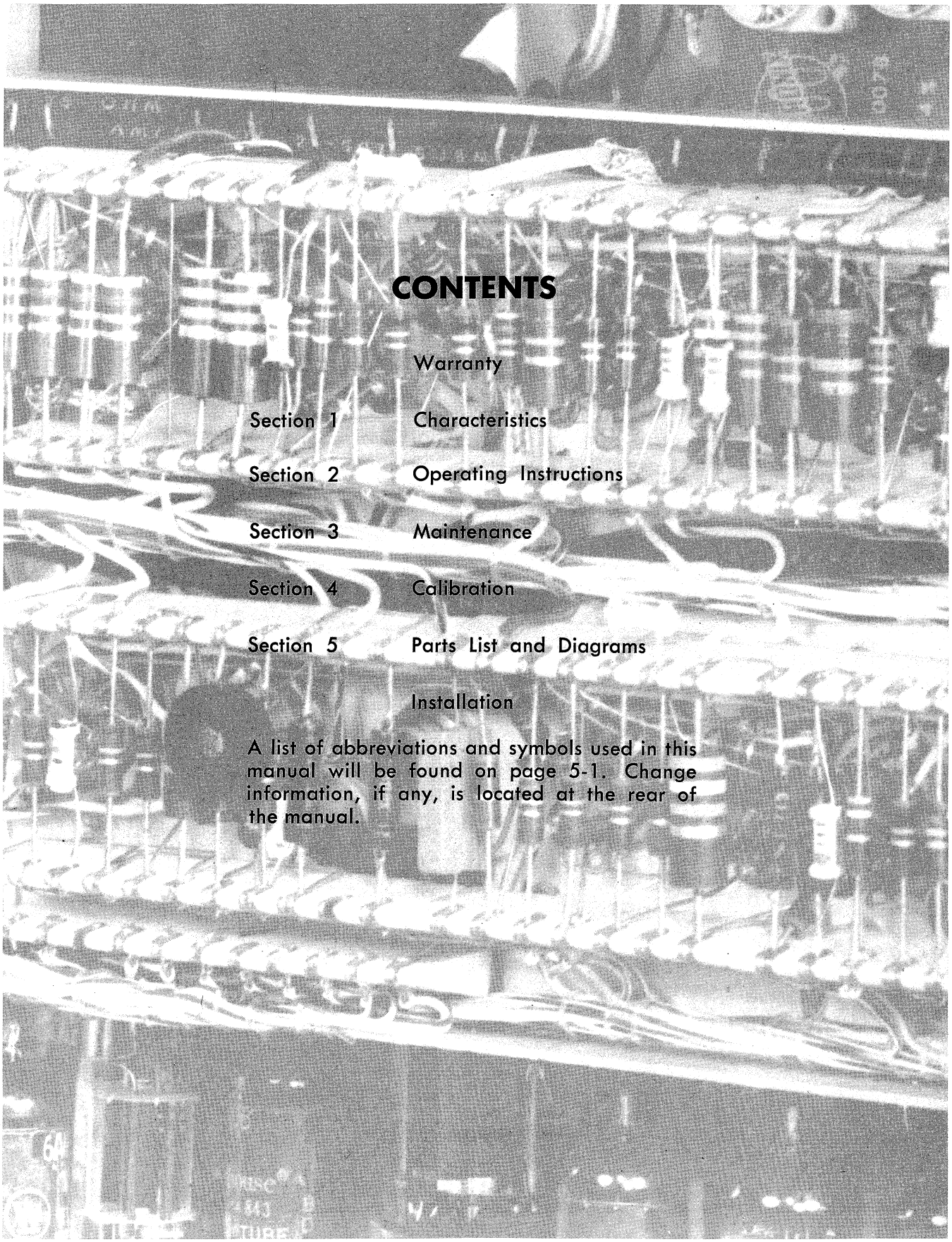
WARRANTY

All Tektronix instruments are warranted against defective materials and workmanship for one year. Tektronix transformers, manufactured in our own plant, are warranted for the life of the instrument.

Any questions with respect to the warranty mentioned above should be taken up with your Tektronix Field Engineer.

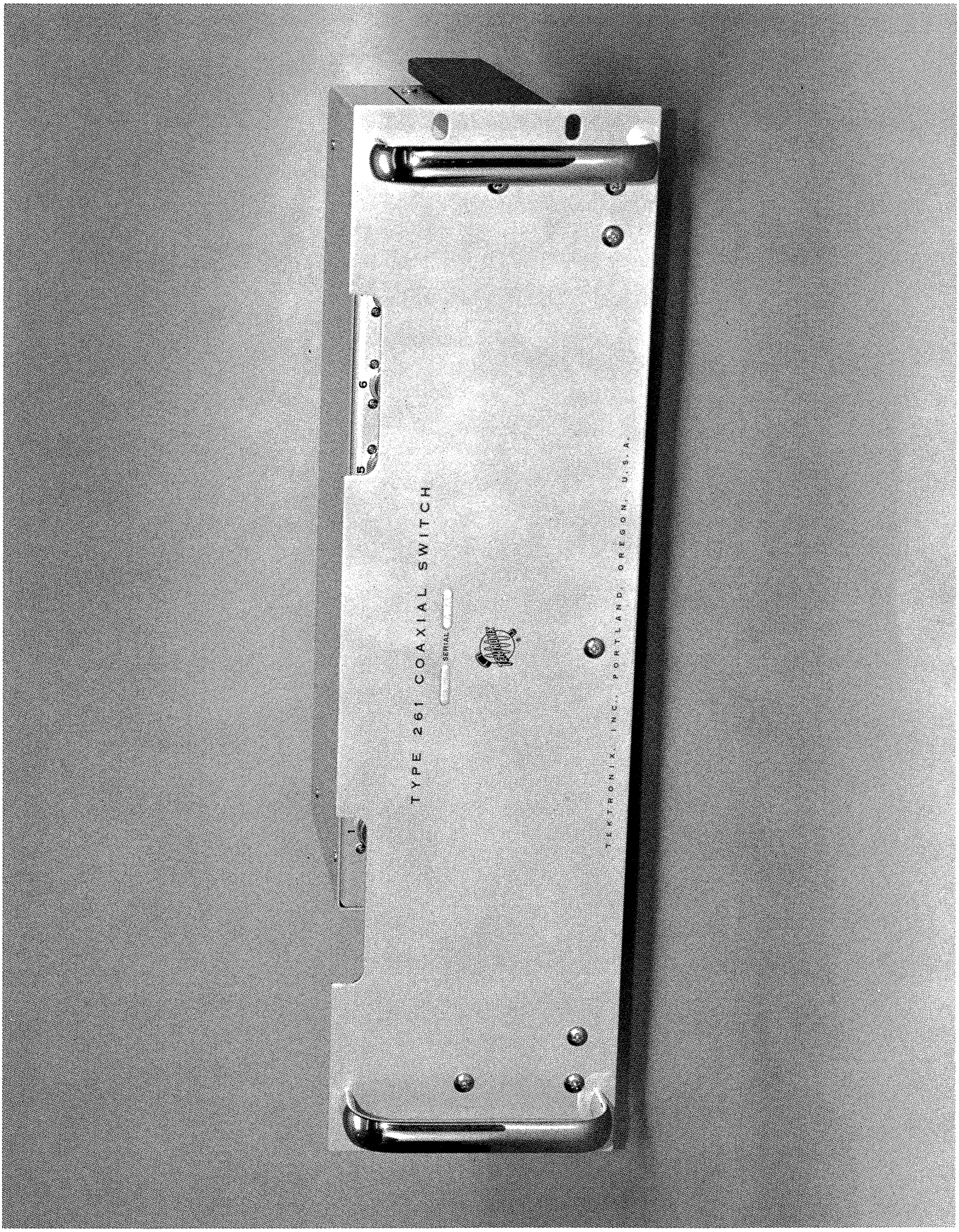
Tektronix repair and replacement-part service is geared directly to the field, therefore all requests for repairs and replacement parts should be directed to the Tektronix Field Office or Representative in your area. This procedure will assure you the fastest possible service. Please include the instrument Type and Serial number with all requests for parts or service.

Specifications and price change privileges reserved.



CONTENTS

A list of abbreviations and symbols used in this manual will be found on page 5-1. Change information, if any, is located at the rear of the manual.


TYPE 261 COAXIAL SWITCH
SERIAL
TEKTRONIX, INC., PORTLAND, OREGON, U.S.A.
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SECTION 1
CHARACTERISTICS

Introduction

The Type 261 Coaxial Switch is a rack-mounted sub-part of a multi-program oscilloscope digital readout test system. It contains eight single-pole double-throw mercury-wetted relays, each in a 50 Ω environment. Each relay is permanent-magnet biased to its normally closed position. Switching operation is by relay coil current applied through a rear-panel connector. Control is normally by the auxiliary programming section of a Tektronix Type 262 Programmer, an external programming system for the Type 567/6R1A (6R1) Readout Oscilloscope system.

Signal connections to the Type 261 are made with 50 Ω coax cables with General Radio Type 874 connectors. The Type 261 will switch 50 Ω signal sources, signal offset voltages, trigger signals, loads, attenuators, signal delays, and ground reference for complex fractional-nsec measurement systems.

ELECTRICAL

Switches

Each relay will switch from its normally closed position to its normally open position about 2 msec after turn-on when the coil current is 10 ma or more. The drop time, when the coil is de-energized, is slightly less than 2 msec. Times stated are when driven at less than 100 cps. The switching time, when the coil is energized, does not materially decrease with increased coil current. Switches operate correctly when instrument is within 30° of level.

Signal Reflections

Less than 5% when terminated in 50 Ω. Driving pulse for this figure has a 10% to 90% risetime of 0.25 nsec or less, and the oscilloscope has a 0.35-nsec risetime.

Signal Delay (each switch)

2 nsec ±100 psec from input connector to either output connector.

Crosstalk

Less than 6% from active circuit to the open circuit with all leads in a 50 Ω system, when driven with a 0.25-nsec risetime pulse and viewed with a 0.35-nsec risetime oscilloscope.

Relay Coils

Approximately 160 Ω dc resistance. Permanent magnet biased into the normally closed position. Bias magnet set so switch will operate properly with 10 ma ±10% externally applied dc current.

Maximum allowable current, 35 ma.

MECHANICAL

Mounting

Rack mounted with non-tilting extension slides. Slides permit instrument to be extended at least 18½ inches out from mounting rack for convenient signal connections. Slides are provided with sufficient hardware to allow proper mounting in any standard relay rack.

Cable access is through either front or back of instrument.

Dimensions

Front panel is 19 inches wide by $5\frac{7}{32}$ inches high.
Chassis is $18\frac{13}{32}$ inches deep, plus 1½ inch handles.
Mounting depth, including cable, about $20\frac{1}{4}$ inches.
Minimum rack opening, $17\frac{11}{16}$ inches.

Construction

Aluminum-alloy chassis. Photo-etched anodized front panel.

Weight

17 lbs, 5 oz.

ACCESSORIES SUPPLIED

	Tektronix Part No.
1—Slide-out tracks and mounting hardware.	351-040
1—24-pin male cable connector.	131-325
2—Instruction manuals.	070-423

NOTES

SECTION 2

OPERATING INSTRUCTIONS

Introduction

The Type 261 Coaxial Switch, as a sub-part of the Type 567 Digital Readout system, receives its individual relay power externally. The usual power source is the Type 262 Programmer; other power sources are described in this section. Suggested systems are included to show the versatility of the Type 261.

Relay Operation

Both leads of each relay coil are present at the rear-panel connector. The polarity indicated on the diagram at the rear of this manual must be observed. Any number of switches may be operated simultaneously.

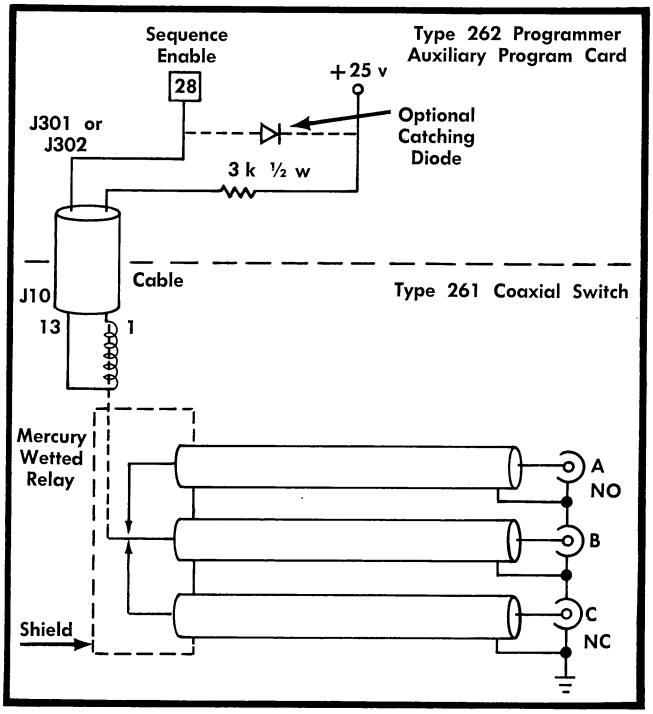


Fig. 2-1. Typical control system of switch number 1.

Proper relay operation is attained at 10 to 30 ma dc coil current. Maximum coil current is 35 ma. Fig. 2-1 shows switch number 1 energized from the +25-volt supply of the Type 262 Programmer. Fig. 2-2 shows an external transistor control circuit.

The catching diode in Fig. 2-1 may be necessary depending upon the breakdown voltage of the control switch used, or if the inductive backswing at turnoff causes crosstalk problems in the interconnecting cables. The catching diode in Fig. 2-2 is necessary to prevent reverse breakdown of the switching transistor. In either case, it is important that the catching diode be placed as illustrated. If the diode is placed directly across the relay coil, the drop-out time will be lengthened considerably. The catching diode can be any type that has a reasonably low-voltage forward drop.

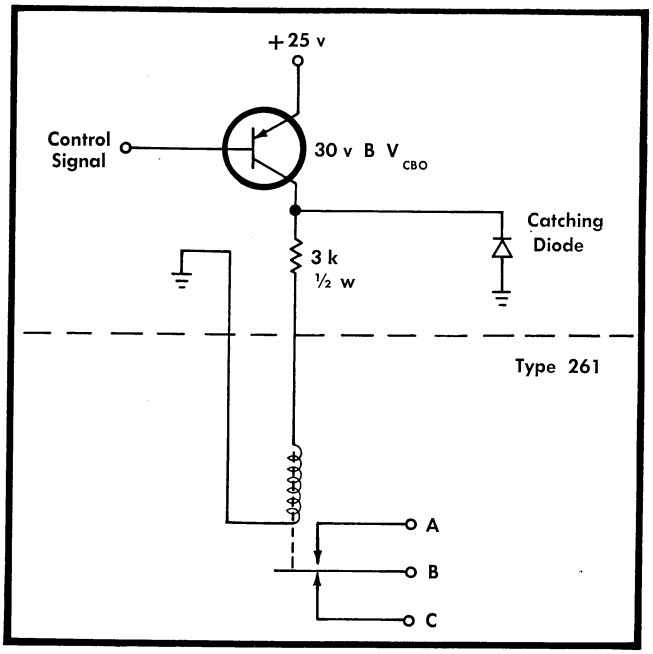


Fig. 2-2. Transistor control system, with diode protection against inductive kickback at turn-off. See text.

Any of the switches may be used as moderate frequency choppers. Very little jitter will be observed up to driving frequencies of about 120 cps. The maximum frequency for full switch travel from normally closed to normally open and back is slightly above 200 cps, with more than 10% jitter above 180 cps. Faster operation is limited by the inductance of the relay coil and the driving impedance.

An example of a chopped-operation driving circuit is shown in Fig. 2-3. The oscilloscope sweep generator is the signal source, switching the cathode coupled bistable multivibrator once each sweep. Thus, the repetition rate of the chopper is the repetition rate of the sweep generator.

The Type 261 can be used as a chopper for referencing a voltage measurement to ground. The Type 567 Digital Readout system sweep signal will cause the driver circuit to hold the relay closed at the beginning of each sweep. As the sweep signal starts positive, adjusting the Switching Time control will vary the point at which the relay is de-energized. Thus, the system shown in Fig. 2-4. assures that the Digital Unit sees zero volts (ground) at the 0% Zone.

Any one, or all eight Type 261 switches may be operated by the Type 262 Sequence Enable signal by using an Auxiliary Program card in the Type 262. Connections are from the Sequence Enable signal, pin 28, through a resistor, to any leads selected for external control of the Type 261. Fig. 2-5 shows the proper connections. Select the proper Type 261 switch by inserting the Type 262 Auxiliary Program card into the corresponding program position in the Type 262.

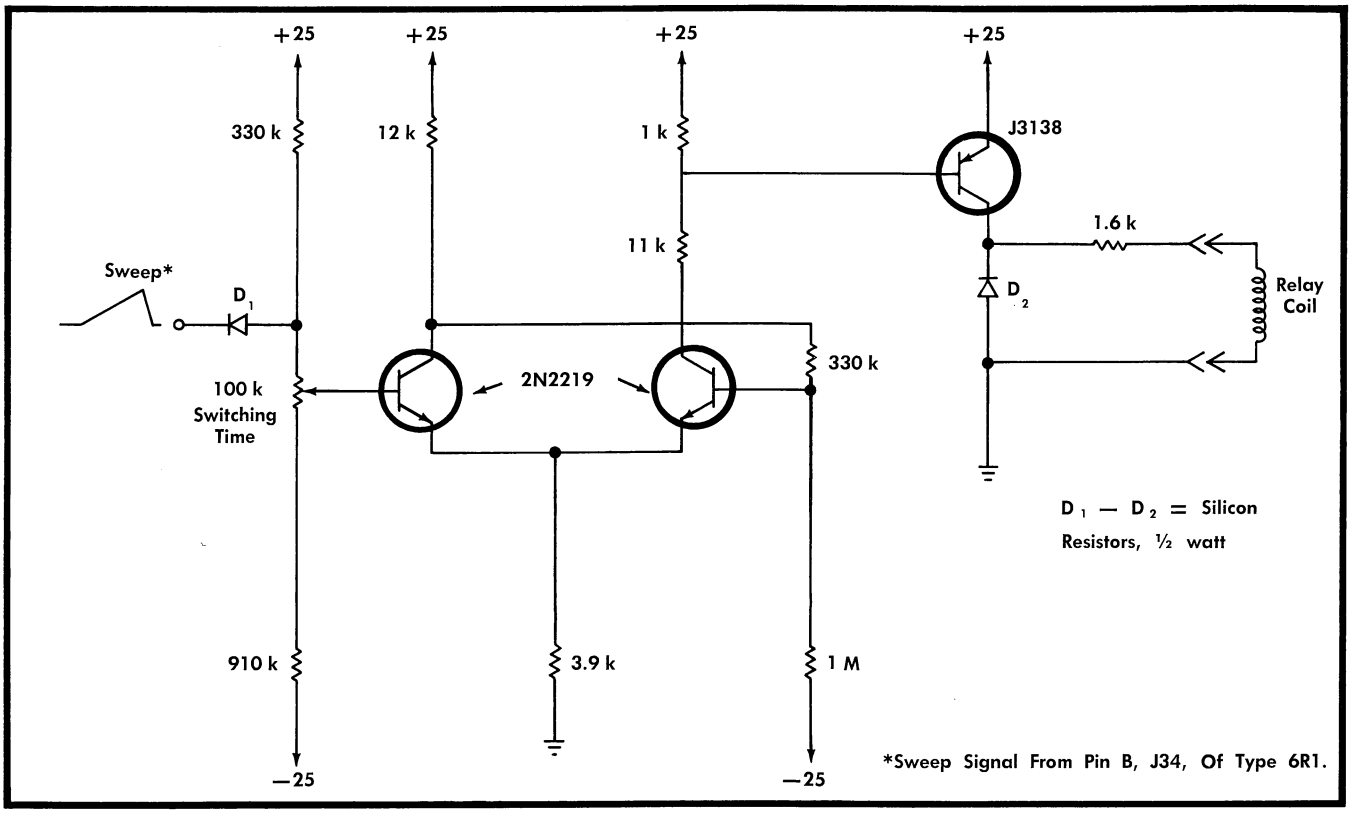


Fig. 2-3. Chopper driver circuit.

Signal Connections

Cables into and out of the Type 261 can pass either through the two relief areas of the front panel, or out through the back. Rear-cable access is possible due to clearance provided above the dust cover. Fig. 2-6 shows a general cable and equipment placement example with excess material inside the Type 261.

The moving leaf of each switch is the center connector of each vertical set of three GR Type 874 connectors. Normally closed contacts are at the bottom, and normally open contacts are at the top.

It is important that all cables be good quality 50 Ω impedance if the switches are to perform with good pulse and high-frequency fidelity.

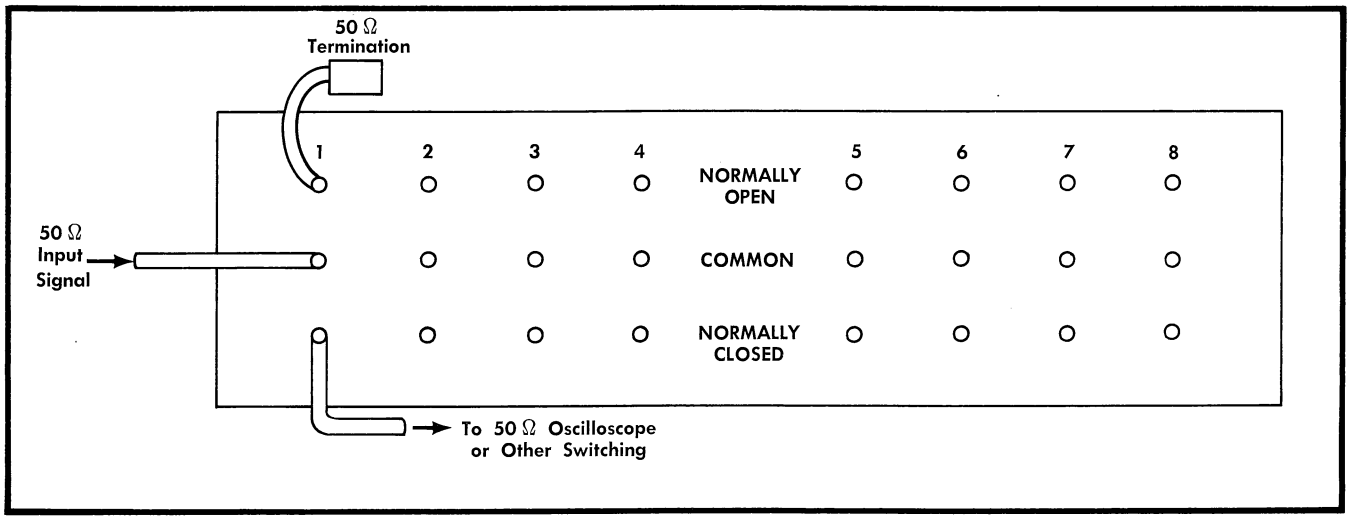


Fig. 2-4. Chopper-driven switch to produce zero volt reference at digital unit 0% Zone.

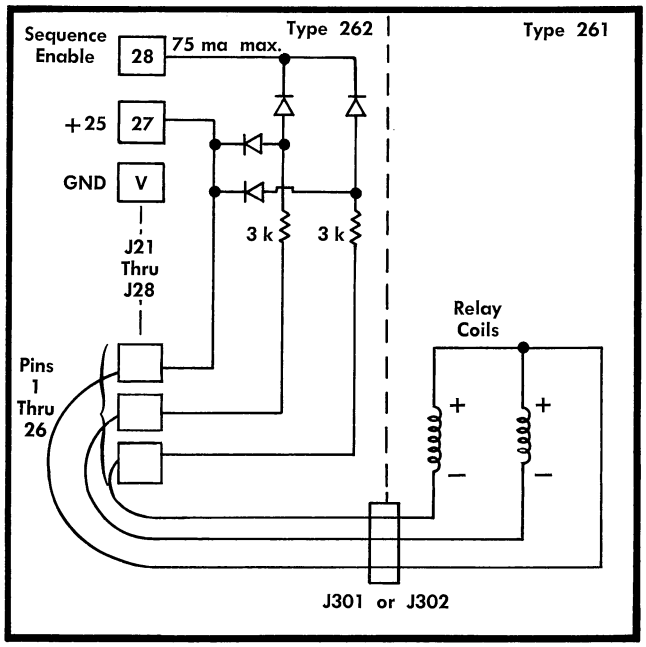


Fig. 2-5. Type 262 Auxilliary Program Card connections for controlling up to 8 Type 261 relays per Type 261 program.

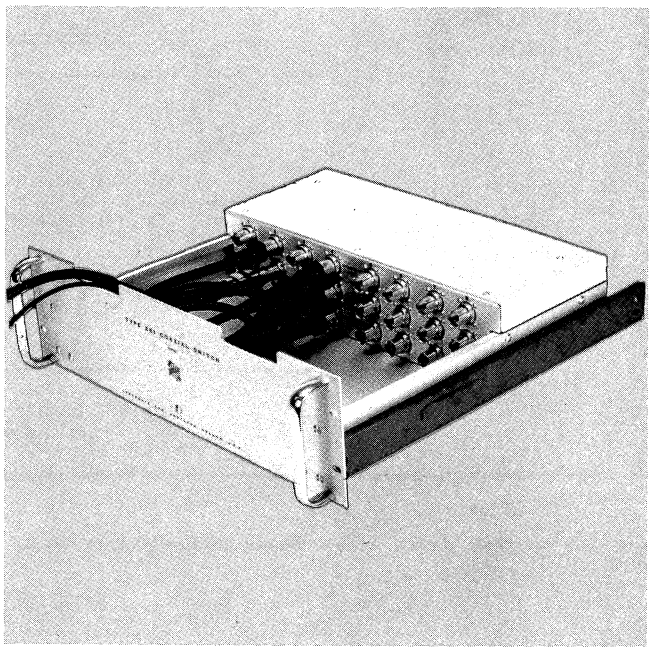


Fig. 2-6. Equipment connections and general cable placement.

Display Positioning

The Type 261 can be employed to shift the horizontal position of an externally triggered oscilloscope display. Display shift is accomplished by adding or subtracting signal delay in the external trigger-input cable as shown in Fig. 2-7.

Signal Dc Offset

It is possible to shift the oscilloscope display vertically by a small dc offset current. The system used does not significantly disturb the fidelity of the 50 Ω input for frequencies up to 1000 mc provided the offest injection probe is correctly frequency compensated. Fig. 2-8 shows how the dc offset

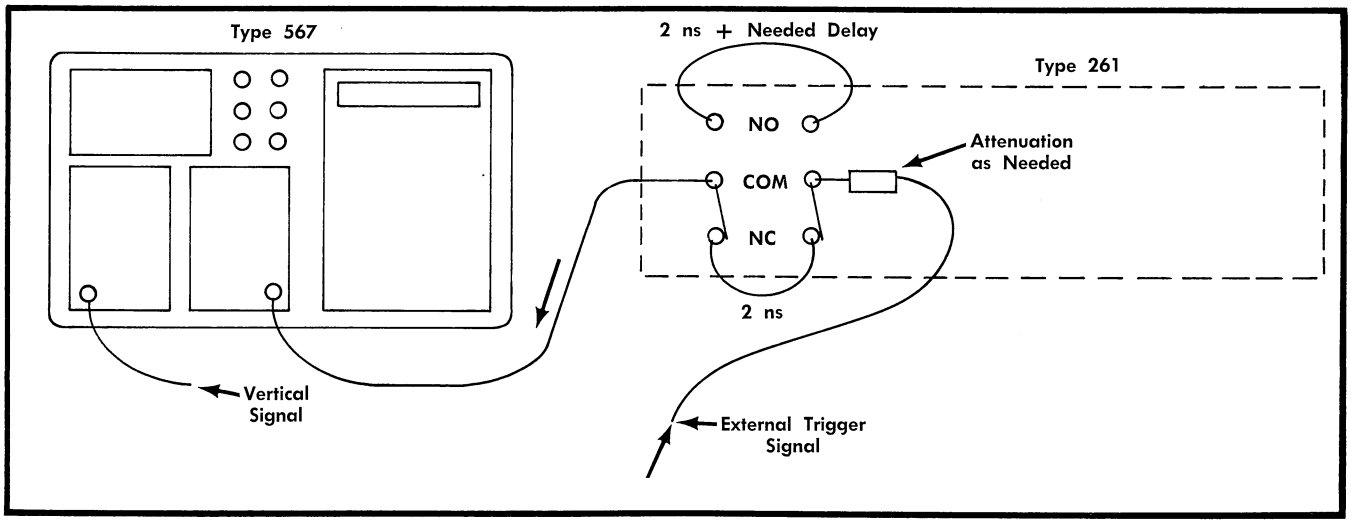


Fig. 2-7. Shifting display horizontally by adding delay in external trigger cable. Two switches are used.

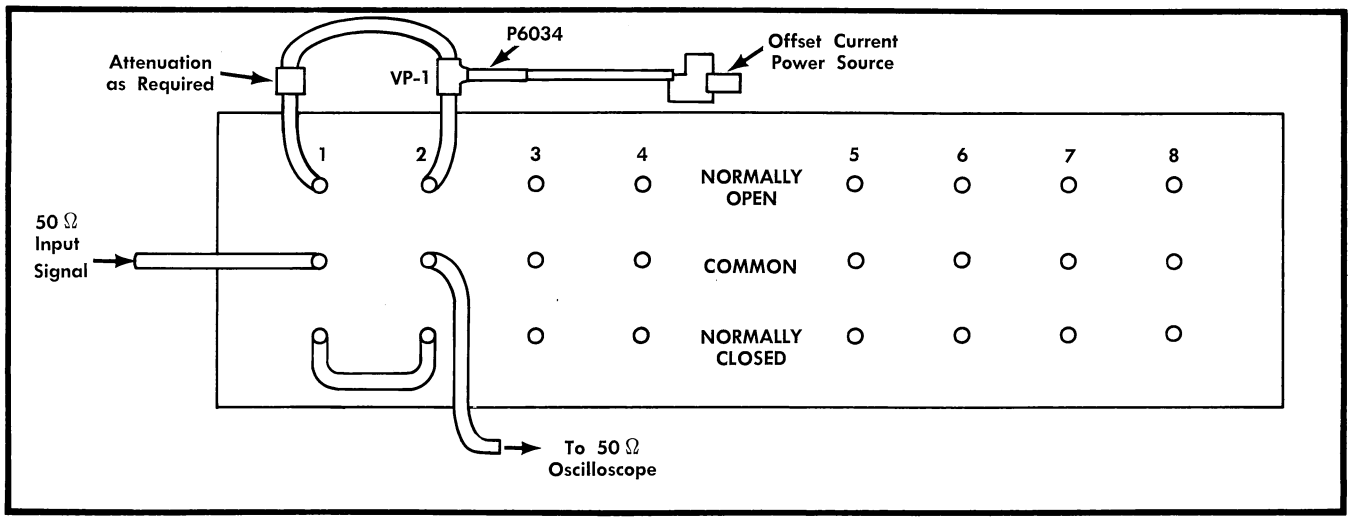


Fig. 2-8. Normally closed: normal signal. Normally open: signal attenuation and dc offset by current injection through P6034 Probe and VP-1.

can be selected for a particular program of a series of programs.

Offset is limited to a maximum current set by the dissipation limit of the injection-probe series resistor. Signal delay can also be controlled in this system if external triggering is used. If no horizontal display shift is needed, internal triggering can be used; then the electrical length of the cables is not important.

The amount of dc offset can be controlled by the circuit shown in Fig. 2-9. Other circuits must be designed to operate within the dissipation limits of the P6034 Probe. A reduced amount of offset (1/10 as much) can be obtained by using a P6035 Probe instead of the P6034. Maximum offset, using the P6034, is approximately 600 mv. A greater amount of offset can be obtained if the input cable is not terminated; the amount depending upon the signal source impedance.

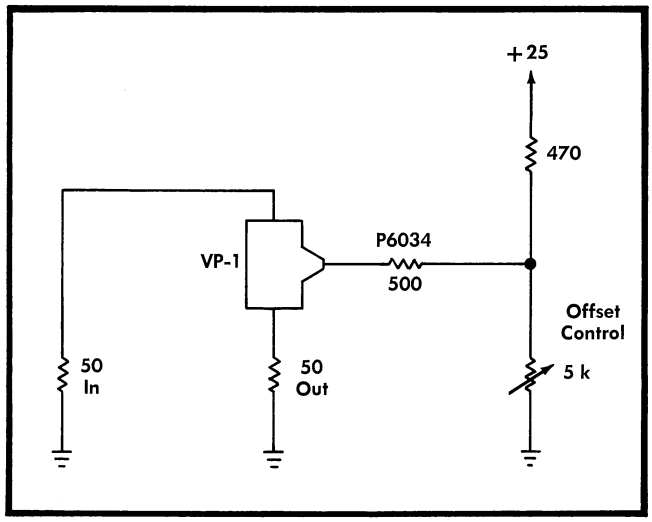


Fig. 2-9. Vertical signal dc offset circuit.

SECTION 3
MAINTENANCE

General Information

The Type 261 switches are available as a complete assembly. Since the switches are identical, it is advisable to keep one complete switch assembly as a spare . However, the relay coil, mercury switch, shield, and magnet are replaceable (see Section 6 for parts ordering information). Dismantling procedures are provided in this section.

Replacing the Switch Assembly (Fig. 3-1)

Tools required to replace a complete switch assembly are a small-tip soldering iron, a screwdriver, and a 3/4-inch open-end wrench.

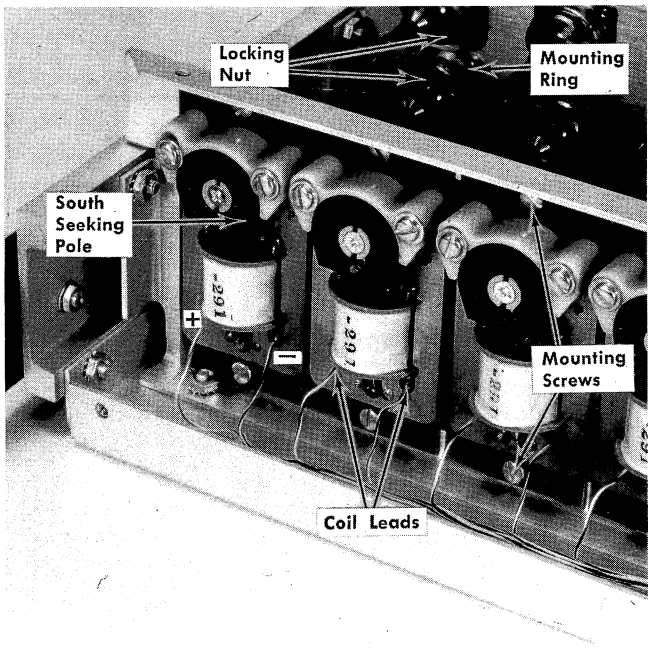


Fig. 3-1. Parts location.

1. Remove the dust cover.
2. Unsolder the two leads to the coil.
3. With the 3/4-inch wrench, remove the locking nuts on the cable side of each GR Type 874 connector. Withdraw the cable and connector from each mounting ring.
4. Remove the 6-32 screws at the top and bottom of the switch glass-laminate board and lift out the assembly.
5. Place a new checked assembly in position and secure it with the two 6-32 screws (Fig. 3-2).
6. Secure the upper-right cable (facing unit from rear) to the NORMALLY CLOSED mounting ring and tighten the locking nut.

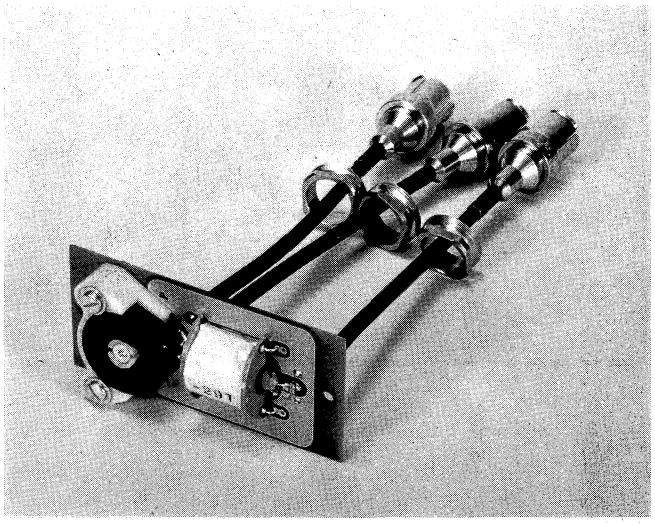


Fig. 3-2. Complete switch assembly.

7. Secure the lower cable to the COMMON mounting rings and tighten the locking nut.
8. Secure the upper-left cable to the NORMALLY OPEN mounting ring and tighten the locking nut.
9. Solder the two coil leads in their original positions.
10. Calibrate the new assembly and the two adjacent switches described in step 2 of the calibration procedure.

Dismantling the Switch Assembly

The relay coil, mercury switch, shield, and magnet must all be removed from the laminate board if any of the first three needs to be replaced. Proper placement of all soldered parts is shown in Figs. 3-3, 3-4, and 3-5.

CAUTION

Special safety precautions must be taken when working on the mercury-wetted switches. Excess stress or heat will shatter the glass capsule. Read the following before proceeding.

The mercury-wetted switches contain hydrogen gas at about 250 pounds of pressure. The pressure assures that the mercury constantly wets the switch members.

The liquid temperature of 62-38 solder is 354° F (179°C). If the hydrogen gas temperature is raised to 365° its pressure is increased about 1.7 times. Thus, leaving the soldering iron on a switch lead too long will cause the switch to explode.

If the mercury is raised to its boiling temperature, it will increase the pressure only about 15 pounds.

It is improtant, then, that a special procedure be followed when soldering the mercury-wetted switch to, or removing it from, the laminate board.

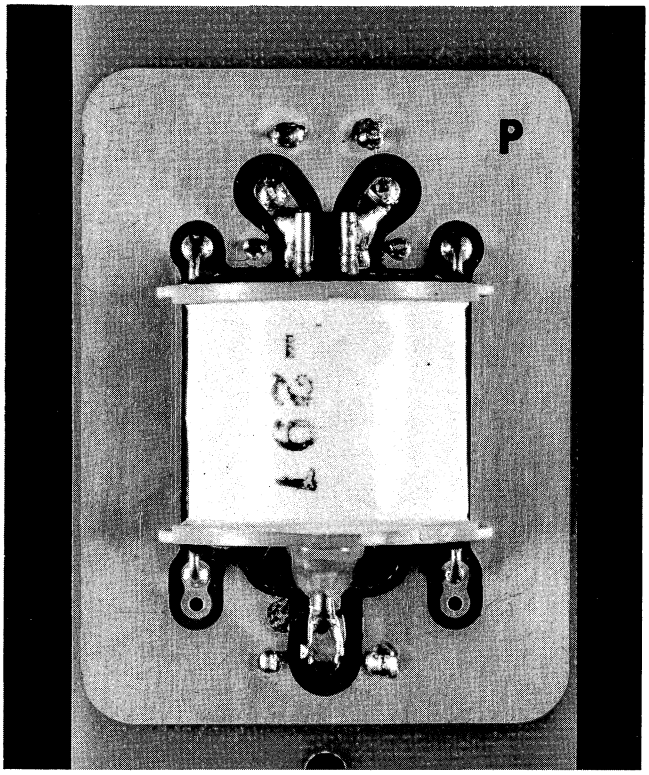


Fig. 3-3. Switch assembly with bias magnet removed.

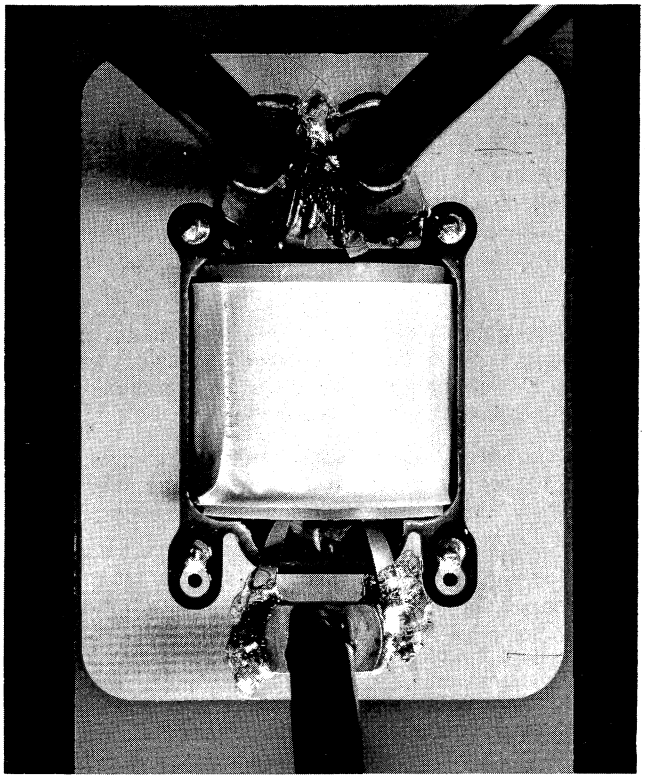


Fig. 3-4. Switch assembly showing location of shield straps.

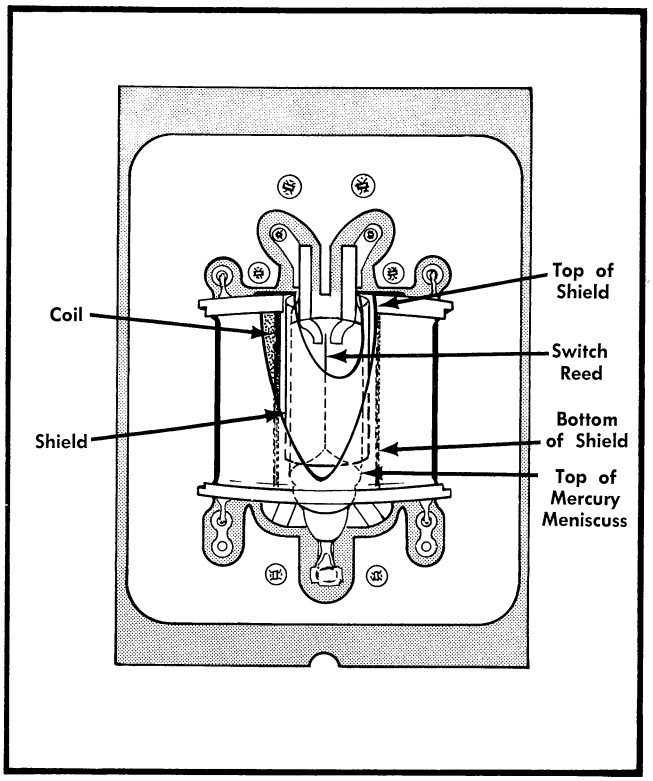


Fig.3-5. Shield and mercury switch positions inside coil.

Soldering Instructions

1. Wear proper safety glasses or a plastic face protector. Jewelry should not be worn in case the switch explodes and blows mercury on the hands.
2. The work should be positioned with the switch-lead axis in a line away from the person soldering. The mylar tape that is wrapped around the switch will prevent glass from blowing in all directions. A wrapped switch that explodes usually blows contacts and mercury out the end.
3. Use a 60-watt soldering iron. The tip should be $\frac{1}{4}$ inch in diameter, tapered to about $\frac{1}{8} \times \frac{1}{32}$ inch. Make sure the iron is hot before soldering. Use 60-40 solder.
4. The switch should be tilted so the mercury pool is in contact with the lead being soldered. The mercury thus acts as a heat sink, slowing the gas pressure increase.
5. Soldering must be done quickly, one contact at a time. Then let the whole unit cool to room temperature before soldering the next terminal.
6. When removing a switch from the laminate, use either a wire brush or a controlled air blast to remove the solder from the lead being unsoldered. Do not shake or flex the unit to remove the molten solder.

Dismantling Procedure

1. Prepare the work area and safety equipment as described under Soldering Instructions.

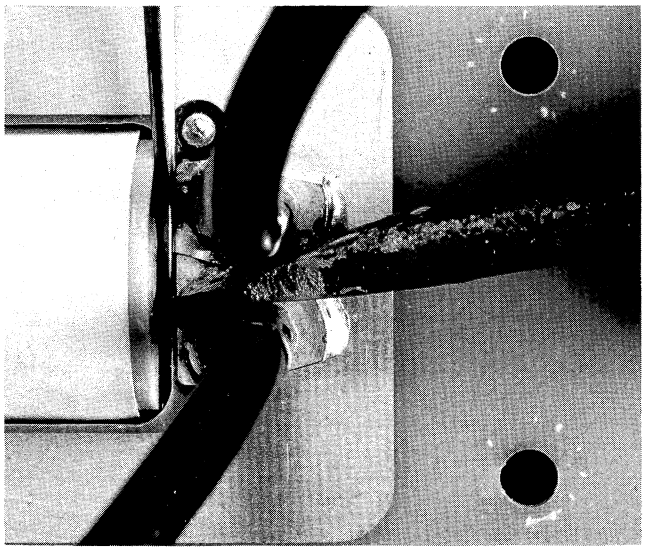


Fig. 3-6. Soldering iron and scribe positions for lifting a shield strap.

2. Remove the magnet and plastic mount. Do not remove the magnet from the plastic.
3. Remove soldered parts by first lifting the shield grounding straps. Fig. 3-6 shows a scribe used to push the molten solder out from under a strap. Then, remove the soldering iron as soon as possible and let the assembly cool before lifting another strap. A small fan will speed cooling.
4. Clip all four coil-mounting leads snug against the glass laminate board. Hold coil gently so no stress is applied to the switch.
5. Tilt the switch assembly so the mercury pool is in contact with the common switch lead. Place the unit so molten solder can be safely brushed or blown away. Apply heat just long enough to remove some solder. If not all the solder is removed, let the unit cool and repeat.
6. Invert the unit so the mercury pool is in contact with the two output leads and repeat the solder removal procedure. Let the unit cool after each heat application.
7. After the coil, shield, and switch are removed from the laminate, clean excess solder off the laminate and shake out the cut coil leads.

Preparing a New Switch

New mercury-wetted switches, purchased from Tektronix, have been wrapped in mylar tape. Switches purchased from other suppliers are not wrapped, and should be wrapped before cutting off the excess lead at the "common" end.

Note the "common" end lead length of the removed switch; the excess was cut off adjacent to the seal on the side away from the switch. Wrap the capsule in a cloth for easy handling and hand protection. Cut the excess off the new switch with the wire cutters parallel to the seal backing piece. Cut slowly with an even pressure to minimize the shock applied to the switch. (The metal is soft copper.)

Reassembling the Switch Assembly

1. Fig. 3-7 shows the physical arrangement of the parts of the switch just before assembly. Place the shield in the coil as shown in Fig. 3-5, with the top of the shield even with the top of the coil plastic bobbin. Insert the switch inside the coil and shield; it does not have an output lead polarity.

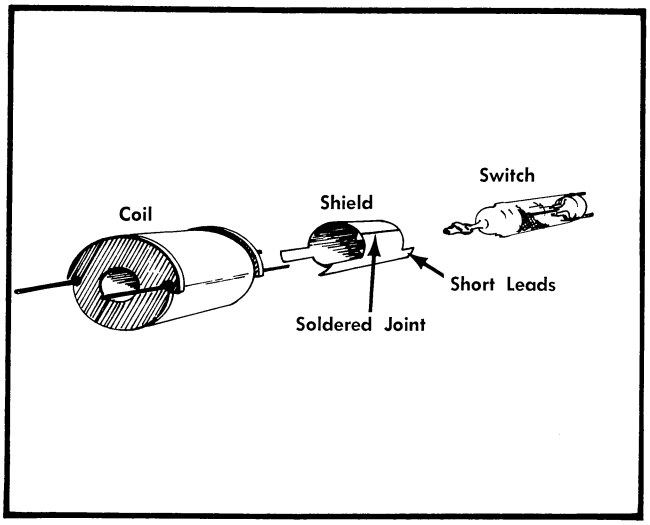


Fig. 3-7. Physical arrangement of the coil, shield and switch prior to assembly.

2. Place the assembly into position in the laminate board. Carefully position all parts. Solder the switch in position first; cool after each heat application. Then add short lengths of No. 18 wire to the four leads of the coil and solder in place.
3. Check the shield position (Fig. 3-5). Adjust if necessary. Solder all four straps; cool after each heat application.

NOTE

If a strap breaks, do not rejoin it with wire, but replace the whole shield. Wire will alter the 50 Ω environment around the switch.

4. Replace the magnet and plastic mount. Then set the magnet position according to the calibration procedure in Section 4.

Installing a New Magnet

Before placing a new magnet into the plastic mounting piece, determine which pole face seeks the south pole of a compass. The magnet is quite strong so do not place it very close to the compass or the compass polarity may be reversed. Mark the south-seeking pole and place it on the right side as shown in Fig. 3-1. Positioning the magnet assembly is discussed in the calibration procedure, Section 4.

NOTES

SECTION 4

CALIBRATION

Introduction

Calibration of the Type 261 switches can be on a replacement basis rather than at regular intervals. The suggested method in this section is based upon individual switch replacement. A spare, calibrated switch can be kept in stock, ready for quick replacement if a switch is defective. The removed switch assembly can then be repaired, checked, and returned to stock for future use. The mercury-wetted reed switch is usually reliable for over 1 billion operations.

Equipment Required

The following equipment or its equivalent is required to perform a complete calibration of each Type 261 switch assembly.

1. A magnetic compass.
2. An ohmmeter, or other continuity indicator.
3. A 0- to 15-ma milliameter. (Can be part of a multimeter that is within 5% at 10 ma.)

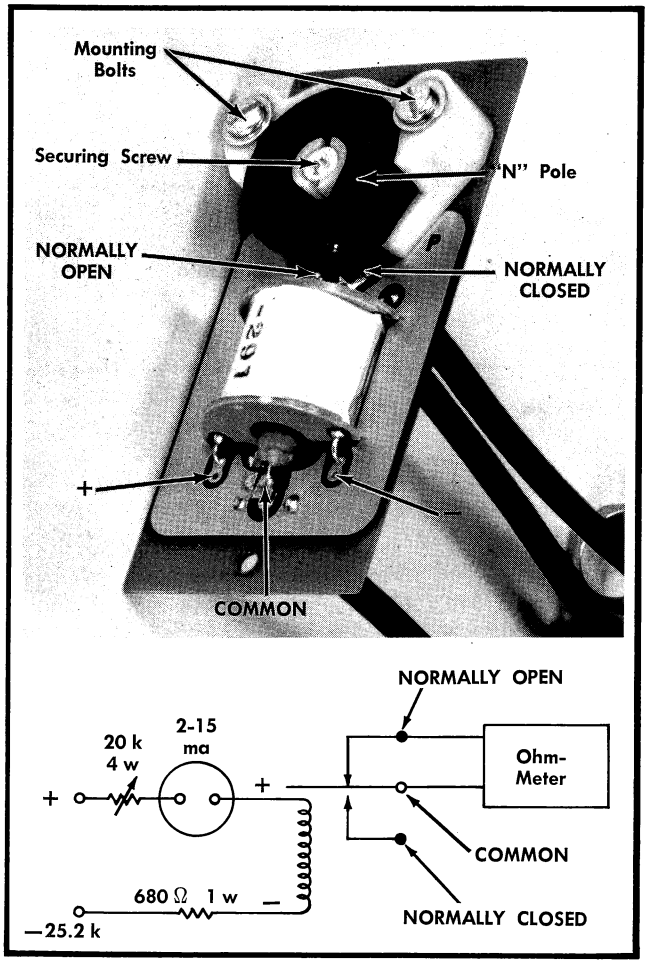


Fig. 4-1. Circuit used when setting bias magnet position.

4. A 20 k, 4 w rheostat.
5. Two clip leads to connect items 3 and 4 to the relay coil (Fig. 4-1).
6. A 0.35-nsec risetime dual-trace oscilloscope, such as the Tektronix Type 661 with Type 4S1 and Type 5T1A plug-in units.
7. A pulse generator with up to 10-volts peak-to-peak output, at least a 20-nsec pulse duration, and a risetime of 0.25 nsec or less, such as the Tektronix Type 109 or Type 110.
8. The following items with GR Type 874 connectors:

	Tektronix Part Number
1—20-nsec delay cable, RG-8A/U	017-504
3—5-nsec delay cables, RG-8A/U	017-502
1—2-nsec delay cable, RG-58A/U	017-505
1—1-nsec delay, 30-cm air line, GR 874-L30	None
1—Coax Tee, GR 874-T	017-069
2—2× Attenuators	017-046
1—50 Ω End-Line Termination	017-047

9. A small screwdriver, about 1/8-inch bit.

Adjustment Procedurce

Steps 1and 2 of the following procedure must be completed first. The rest of the procedure may be done in any order.

1. Bias Magnet Polarity

NOTE

This step is important if the bias magnet is either new or has been removed from its plastic mount.

a. Hold the magnet a few inches away from a magnetic compass; preferably directly above it. The south-seeking pole of the magnet will be above the south pole of the compass; mark the pole "N".

b. Place the "N" side of the magnet in the right side of the plastic mount as shown in Fig. 4-1. Tighten the securing screw to hold the magnet firmly in place.

2. Bias Magnet Position (Relay Current Set)

a. Assemble the circuit as shown in Fig. 4-1 with the 20 k rheostat at maximum resistance. The 25 volts can be obtained from the Type 661 Oscilloscope at the —25.2-volt terminals shown in the Type 661 Osciloscope instruction manual calibration procedure.

b. Set the current to 10 ma. Loosen the bias magnet mounting bolts and move the magnet away from the letter "P" (etched in the laminate) until the Normally Open contacts open. Now slowly move the magnet back until the Normally Open contacts just close.

c. Slowly reduce the coil current and note the current at which the switch returns to its Normally Closed position. The current should be somewhere between 2 and 4 ma.

d. Slowly increase the current and note the current at which the relay switch returns to the Normally Open position. The current should be between 7 and 9 ma.

e. Adjust the magnet position until the current required to actuate the switch is between 7 and 9 ma.

3. Signal Reflection Check

a. Set up the reflectometer as shown in Fig. 4-2.

b. Set the 0.25-nsec risetime pulse generator for a positive pulse of between 8- and 10-volts amplitude and about a 40-nsec duration.

f. Connect the 50 Ω terminattion to the Normally Closed gered 2 nsec/cm sweep rate and a 200 mv/cm vertical deflection factor.

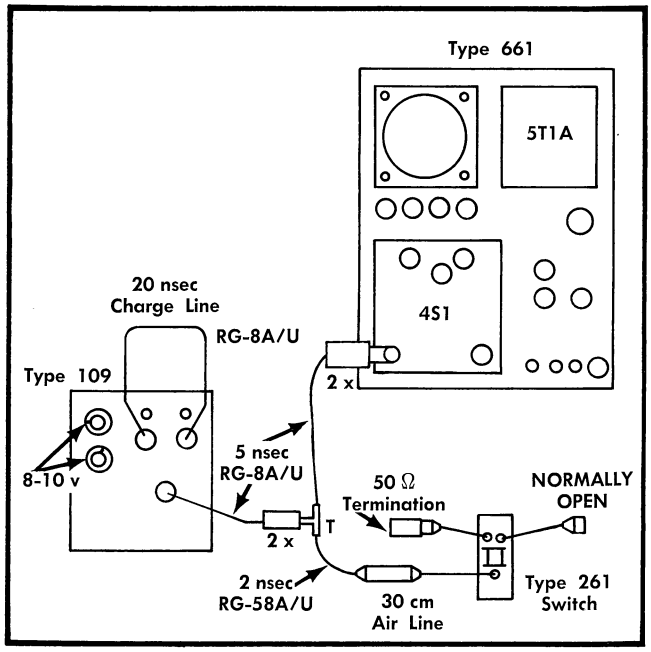


Fig. 4-2. Reflectometer circuit used in step. 3.

d. Disconnect the Type 261 switch from the end of the air line. Adjust the pulse generator output and the oscilloscope position control to obtain a display similar to Fig. 4-3 (a).

NOTE

The reflectometer waveform shows signal travel down and back through the reflection stub; thus the 1-nsec delay air line appears as 2 nsec of the display as shown in Fig. 4-3 (a). Likewise, the 2-nsec delay in the Type 261 switch appears as 4-nsec of the display as shown in Fig. 4-3 (b).

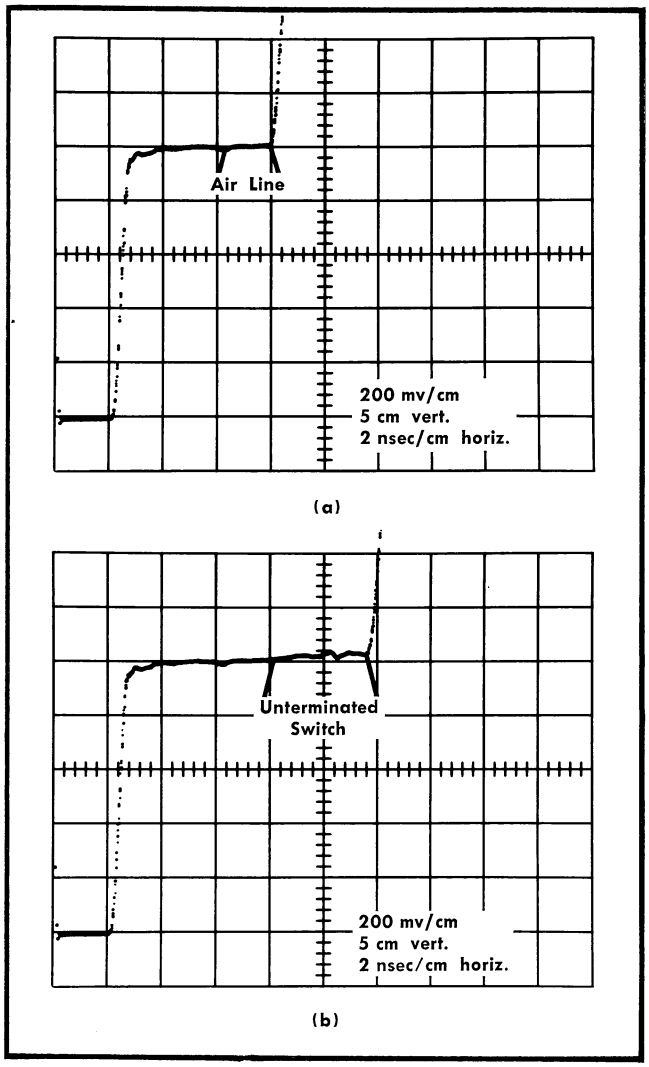


Fig. 4-3. Setting up the reflectometer for step 3.

e. Connect the Type 261 switch to the air line, without the 50 Ω termination. The display should be as shown in Fig. 4-3 (b).

f. Connect the 50 Ω termination to the Normally Closed cable of the Type 261 switch. The display should be as shown in Fig. 4-4 (a).

g. *Be sure the switch is mounted or held vertically.* Increase the oscilloscope deflection sensitivity to 50 mv/cm. The display will now show 5% reflection for each vertical centimeter. The display should be as shown in Fig. 4-4 (b).

h. Move the termination to the Normally Open cable, energize the switch, and measure the reflections again. If the reflections are greater than 5%, look for excess solder at each switch contact, an incorrect vertically-positioned shield, or inadequate electrical contact at the ends of the shield. See Section 3 for correct vertical shield position instructions.

The shield should be rolled so that the ends overlap and are soldered to make a good electrical contact as shown in Fig. 3-7.

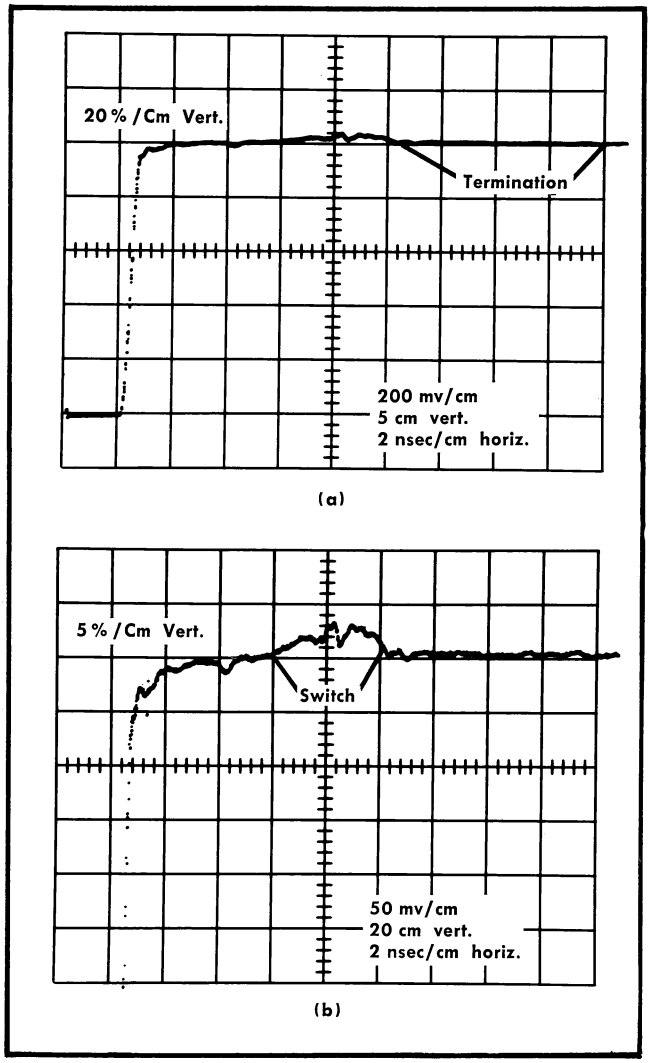


Fig. 4-4. Measuring signal reflection, step 3.

4. Crosstalk Check

a. Check and record the Type 4S1 crosstalk as described in the Type 4S1 calibration procedure.

b. Set up the system as shown in Fig. 4-5. If the switch is mounted in the Type 261, use a 5-nsec delay RG-8A/U cable in each input to the oscilloscope.

c. Set the timing unit to produce a free-running 2 nsec/cm sweep.

d. Set the vertical unit for dual-trace operation at 100 mv/cm each channel.

e. Position the display to show a negative step at mid-screen. Adjust the variable deflection factor of the channel fed by the normally-closed switch lead for exactly a 5-cm display.

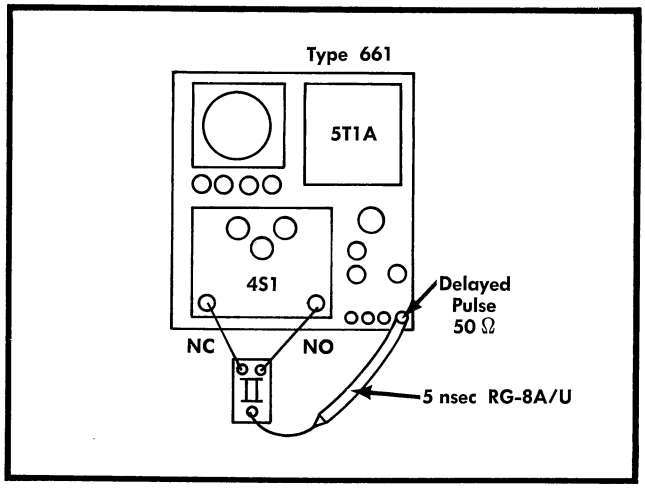


Fig. 4-5. Crosstalk check circuit.

f. Move the normally closed lead to the other channel and set its variable control for exactly a 5-cm display.

g. Connect both leads. Increase the deflection sensitivity of the channel fed by the normally-open switch lead a factor of two. Be careful not to move the variable control. (Type 4S1: 50 mv/cm).

The display can now be read at 10%/cm on the normally-open lead channel. Add or subtract the Type 4S1 crosstalk. The negative pip in the crosstalk picture in Fig. 4-6 shows 4.8% to 5% crosstalk. The switch must be energized to check the crosstalk of the other lead.

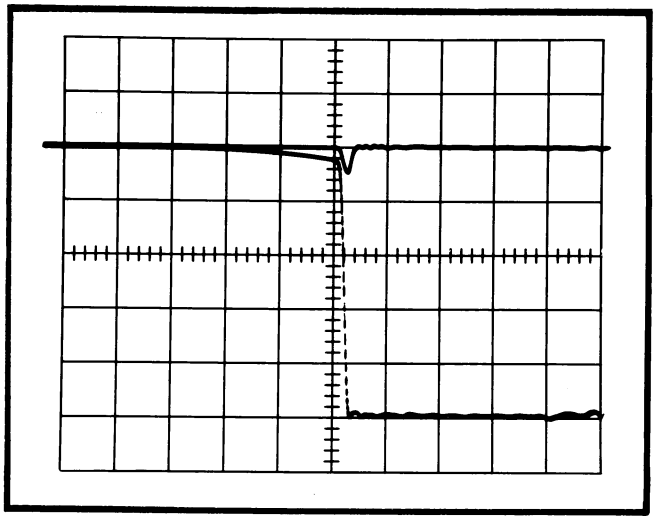


Fig. 4-6. Crosstalk check.

5. Signal Delay Check

NOTE

The signal delay cannot be accurately measured when the switch is mounted in the Type 261. Check and record the dual-trace time coincidence

of the oscilloscope. The Tektronix Type 4S1 time-coincidence check is described in the Type 4S1 instruction manual calibration procedure.

a. Set up the system as shown in Fig. 4-7.

b. Set the oscilloscope timing unit to produce a free-running 2 nsec/cm sweep and the vertical unit for dual-trace operation at 100 mv/cm each channel.

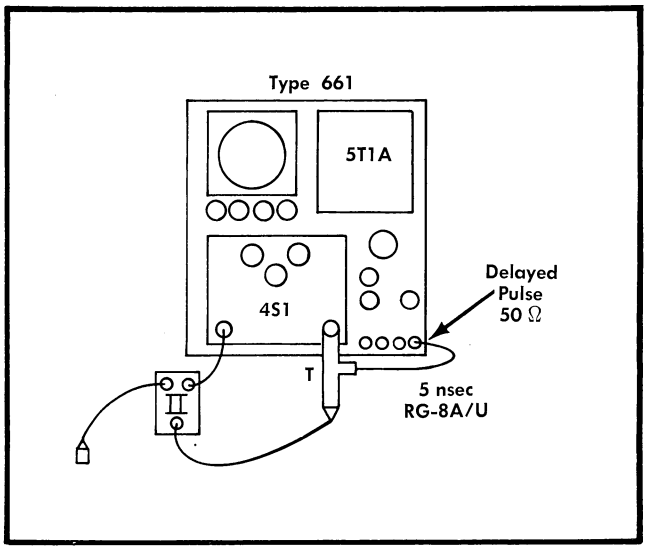


Fig. 4-7. Signal delay check circuit.

c. It may be necessary to remove the right side panel of the Type 661 Oscilloscope and turn the DELAYED PULSE GEN BIAS control a few degrees clockwise. The Delayed Pulse tunnel diode normally drives 50 Ω; the test circuit here is 25 Ω.

d. Obtain a display as shown in Fig. 4-8 (a). Position the display to the right so the two traces are superimposed at the left side of the display.

e. Increase the vertical-unit deflection sensitivity to 20 mv/cm each channel. Reposition the traces to be vertically equal as shown in Fig. 4-8 (b).

f. Increase the sweep rate to 200 psec/cm. (Type 5T1A: TIME/CM at 2 nSEC, TIME EXPANDER at ×10.) Set the Type 5T1A TIME POSITION control for a display similar to Fig. 4-8 (c).

Record the time difference of the two negative steps as they cross the graticule vertical centerline. Be sure you know which channel is which, then add or subtract the vertical-unit time-coincidence error to obtain the signal delay through the Type 261 switch.

g. Repeat this procedure for the Normally Open side of the switch with the coil energized.

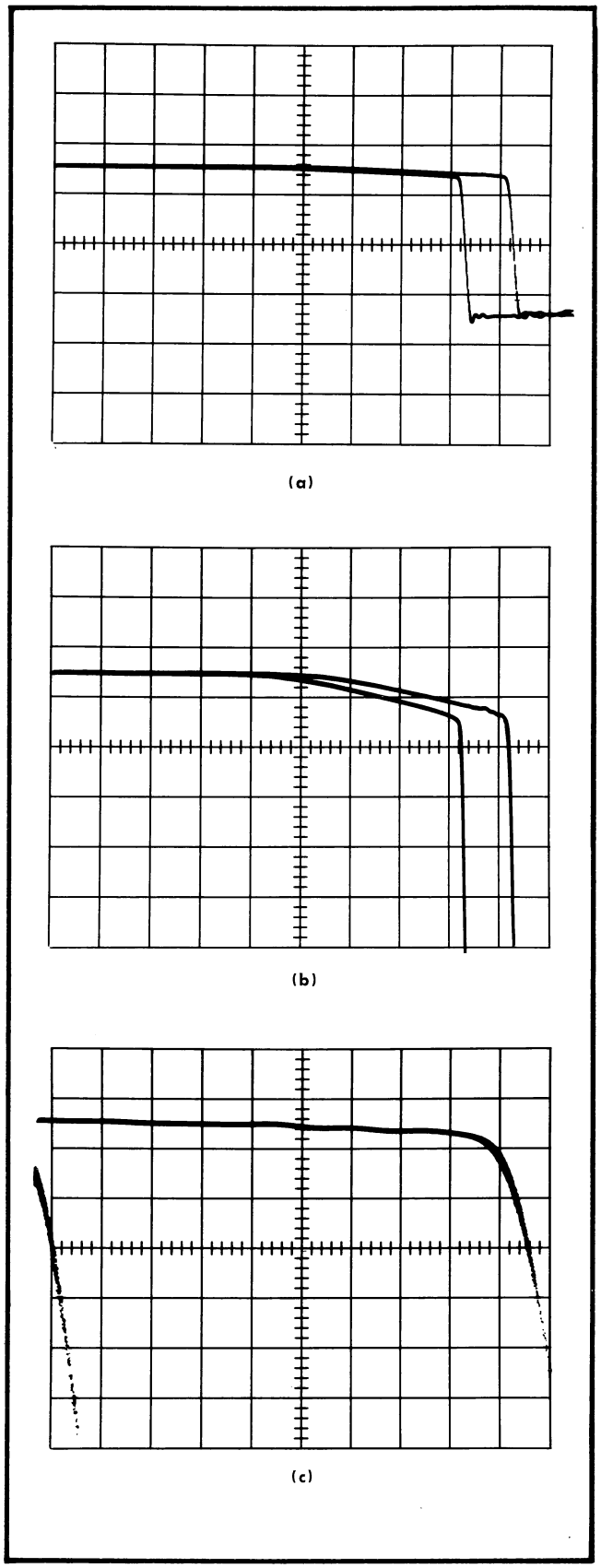


Fig. 4-8. Time delay check, step 5.

SECTION 5
PARTS LIST and DIAGRAMS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix Field Office.

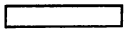
Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number including any suffix, instrument type, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix Field Office will contact you concerning any change in part number.

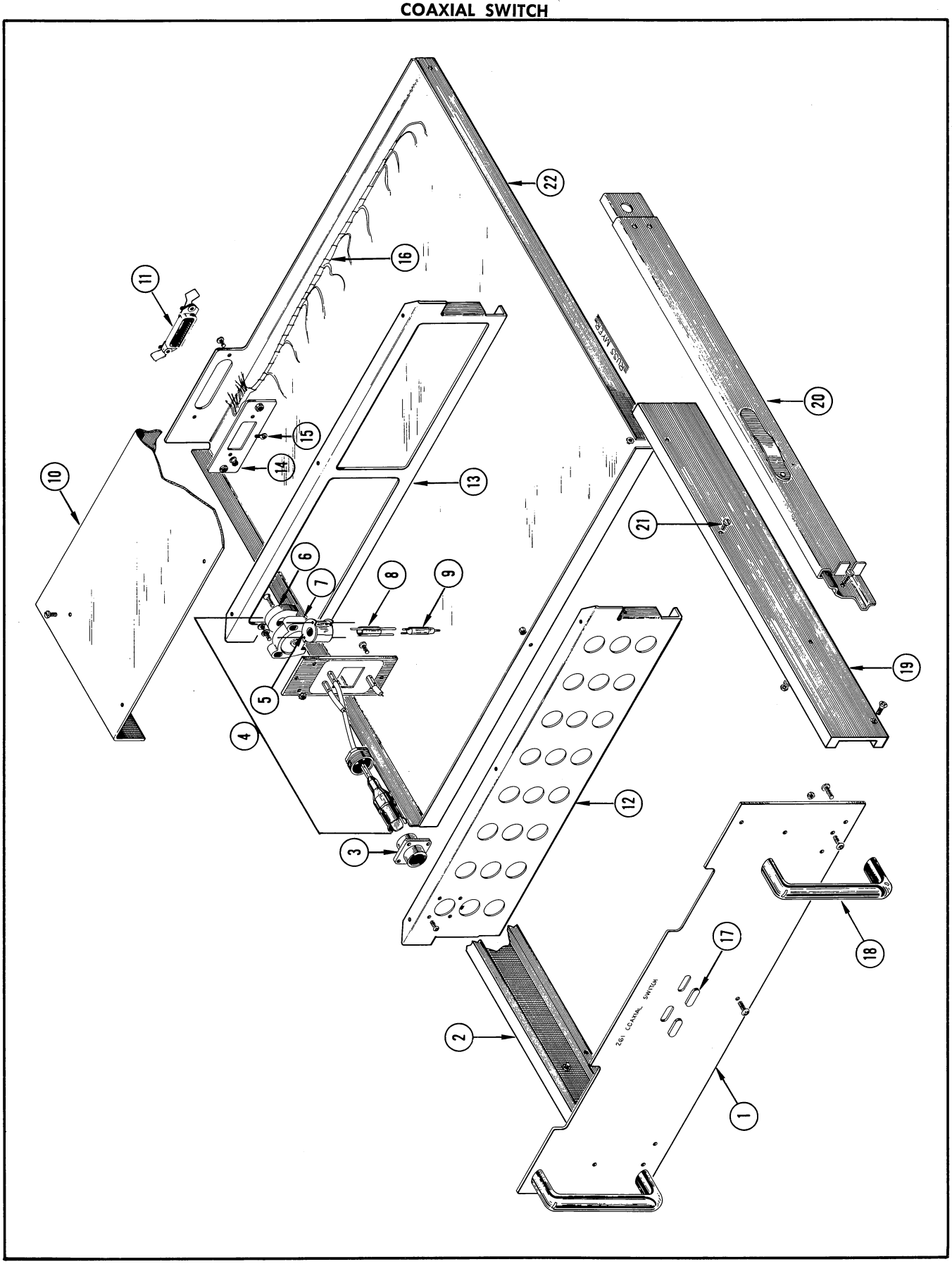
ABBREVIATIONS AND SYMBOLS

a or amp	amperes
BHS	binding head steel
C	carbon
cer	ceramic
cm	centimeter
comp	composition
cps	cycles per second
crt	cathode-ray tube
CSK	counter sunk
dia	diameter
div	division
EMC	electrolytic, metal cased
EMT	electroyltic, metal tubular
ext	external
f	farad
F & I	focus and intensity
FHS	flat head steel
Fil HS	fillister head steel
g or G	giga, or 10^9
Ge	germanium
GMV	guaranteed minimum value
h	henry
hex	hexagonal
HHS	hex head steel
HSS	hex socket steel
HV	high voltage
ID	inside diameter
incd	incandescent
int	internal
k or K	kilohms or kilo (10^3)
kc	kilocycle
m	milli, or 10^{-3}
mc	megacycle
mm	millimeter
meg or M	megohms or mega (10^6)
met.	metal
μ	micro, or 10^{-6}
n	nano, or 10^{-9}
Ω	ohm
OD	outside diameter
OHS	oval head steel
p	pico, or 10^{-12}
PHS	pan head steel
piv	peak inverse voltage
plstc	plastic
PMC	paper, metal cased
poly	polystyrene
Prec	precision
PT	paper tubular
PTM	paper or plastic, tubular, molded
RHS	round head steel
rms	root mean square
sec	second
Si	silicon
S/N	serial number
t or T	tera, or 10^{12}
TD	toroid
THS	truss head steel
tub.	tubular
v or V	volt
Var	variable
w	watt
w/	with
w/o	without
WW	wire-wound

SPECIAL NOTES AND SYMBOLS

X000	Part first added at this serial number.
000X	Part removed after this serial number.
*000-000	Asterisk preceding Tektronix Part Number indicates manufactured by or for Tektronix, or reworked or checked components.
Use 000-000	Part number indicated is direct replacement.
	Internal screwdriver adjustment.
	Front-panel adjustment or connector.

COAXIAL SWITCH

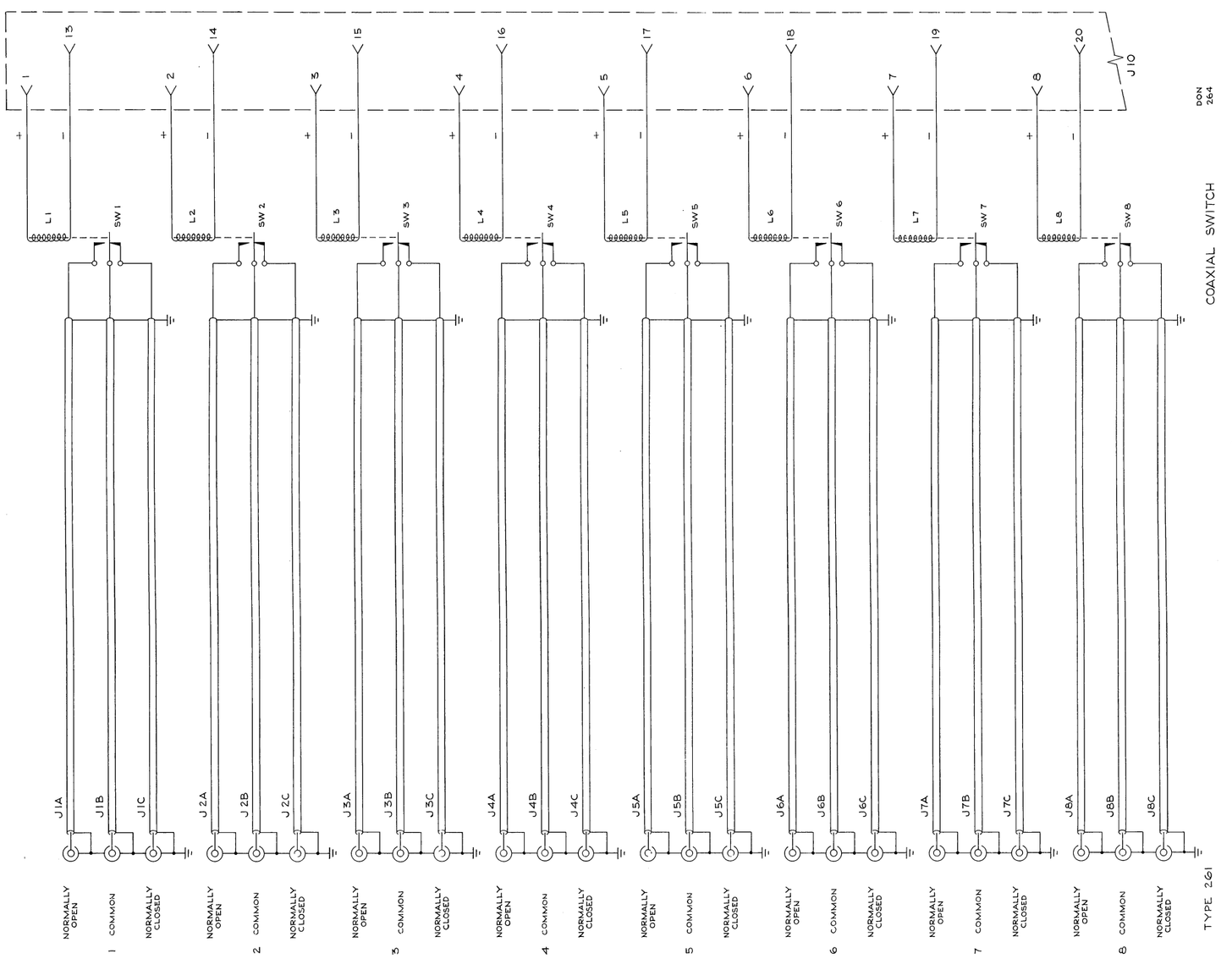


COAXIAL SWITCH

REF. NO.	PART NO.	SERIAL NO. EFF.	SERIAL NO. DISC.	QTY.	DESCRIPTION
1	333-801			1	PANEL, front
	- - - -			-	Mounting Hardware: (not included)
	212-039			7	SCREW, 8-32 x 3/8 inch THS
	210-458			3	NUT, keps, 8-32 x 11/32 inch
2	122-122			1	ANGLE, rail, left
	- - - -			-	Mounting Hardware: (not included)
	212-011			4	SCREW, 8-32 x 3/4 inch, FHS 100°
	210-458			4	NUT, keps, 8-32 x 11/32 inch
3	132-040			24	ADAPTER, panel
	- - - -			-	Mounting Hardware For Each: (not included)
	211-065			4	SCREW, 4-40 x 3/16 inch, PHS phillips
4	388-601			8	BOARD, etched circuit, assembly
	- - - -			-	Includes:
5	108-291			8	COIL, REED DRIVE, single
6	119-006			8	MAGNET, pocket
	- - - -			-	Mounting Hardware For Each: (not included)
	211-512			1	SCREW, 6-32 x 1/2 inch, FHS 100°
7	352-027			8	HOLDER, magnet
	- - - -			-	Mounting Hardware For Each: (not included)
	210-803			2	WASHER, 6L x 3/8 inch
	211-514			2	SCREW, 6-32 x 3/4 inch BHS
	210-457			2	NUT, keps, 6-32 x 5/16 inch
8	337-639			1	SHIELD, switch
9	260-334			1	SWITCH, mercury
	- - - -			-	Mounting Hardware For Each Board: (not included)
	211-507			2	SCREW, 6-32 x 5/16 inch BHS
	210-457			2	NUT, keps, 6-32 x 5/16 inch
10	200-569			1	COVER, top
	- - - -			-	Mounting Hardware: (not included)
	211-504			8	SCREW, 6-32 x 1/4 inch BHS
11	131-324			1	CONNECTOR, 24 pin, chassis mount, female
	- - - -			-	Mounting Hardware: (not included)
	210-001			1	LOCKWASHER, internal #2
	211-001			2	SCREW, 2-56 x 1/4 inch RHS
	210-405			2	NUT, hex, 2-56 x 3/16 inch
12	387-925			1	PLATE, mounting, connector
	- - - -			-	Mounting Hardware: (not included)
	212-040			3	SCREW, 8-32 x 3/8 inch, FHS 100°
	210-458			3	NUT, keps, 8-32 x 11/32 inch
13	387-924			1	PLATE, mounting, printed circuit board
	- - - -			-	Mounting Hardware: (not included)
	212-040			3	SCREW, 8-32 x 3/8 inch, FHS 100°
	210-458			3	NUT, keps 8-32 x 11/32 inch
14	131-333			1	PLATE, connector
	- - - -			-	Mounting Hardware: (not included)
	211-008			2	SCREW, 4-40 x 1/4 inch BHS
15	210-259			1	LUG, peewee
16	179-876			1	CABLE HARNESS
17	334-679			2	TAG, metal, serial number
18	367-032			2	HANDLE
	- - - -			-	Mounting Hardware For Each: (not included)
	212-507			2	SCREW, 10-32 x 3/8 inch BHS
19	122-121			1	ANGLE, rail, right
	- - - -			-	Mounting Hardware: (not included)
	212-011			4	SCREW, 8-32 x 3/4 inch, FHS 100°
20	351-040			1	NUT, keps, 8-32 x 11/32 inch
	210-458			4	SLIDE, chassis track, 1 pair, left and right
	- - - -			-	Mounting Hardware For Each: (not included)
	210-010			2	LOCKWASHER, internal, #10
	212-507			2	SCREW 10-32 x 3/8 inch BHS
	210-410			2	NUT, hex, 10-32 x 5/16 inch

COAXIAL SWITCH

REF. NO.	PART NO.	SERIAL NO. EFF.	SERIAL NO. DISC.	QTY.	DESCRIPTION
21	212-033			4	SCREW, 8-32 x 3/4 inch BHS
	210-458			4	NUT, keps, 8-32 x 11/32 inch
22	200-570			1	COVER, bottom


COAXIAL SWITCH
DON 264
TYPE 261
A
J10
L1
L2
L3
L4
L5
L6
L7
L8
SW 1
SW 2
SW 3
SW 4
SW 5
SW 6
SW 7
SW 8
NORMALLY OPEN
COMMON
NORMALLY CLOSED
1
2
3
4
5
6
7
8

INSTALLATION

The Type 261 will fit most 19-inch wide racks with dimensions that conform to EIA/RETMA specifications. The Type 261 is intended to be mounted by the non-tilting slide-out tracks provided. The tracks can be removed and the chassis permanently mounted in the rack.

The drawings on the fold-out page of this section show the instrument dimensions and tolerances, as well as some rack-mounting information.

Both the front and rear of the slide-out tracks should be secured to the rack cabinet. Fig. 5-1 shows the general possibilites of track mounting and some mounting dimensions. When mounted without slide-out tracks, the rear of the instrument does not have to be supported if four front-panel 10-32 screws are used.

Sufficient hardware is provided with the instrument for proper mounting in racks with clearance holes or tapped holes. If there is no rear-mounting rail, a substitute rail must be devised.

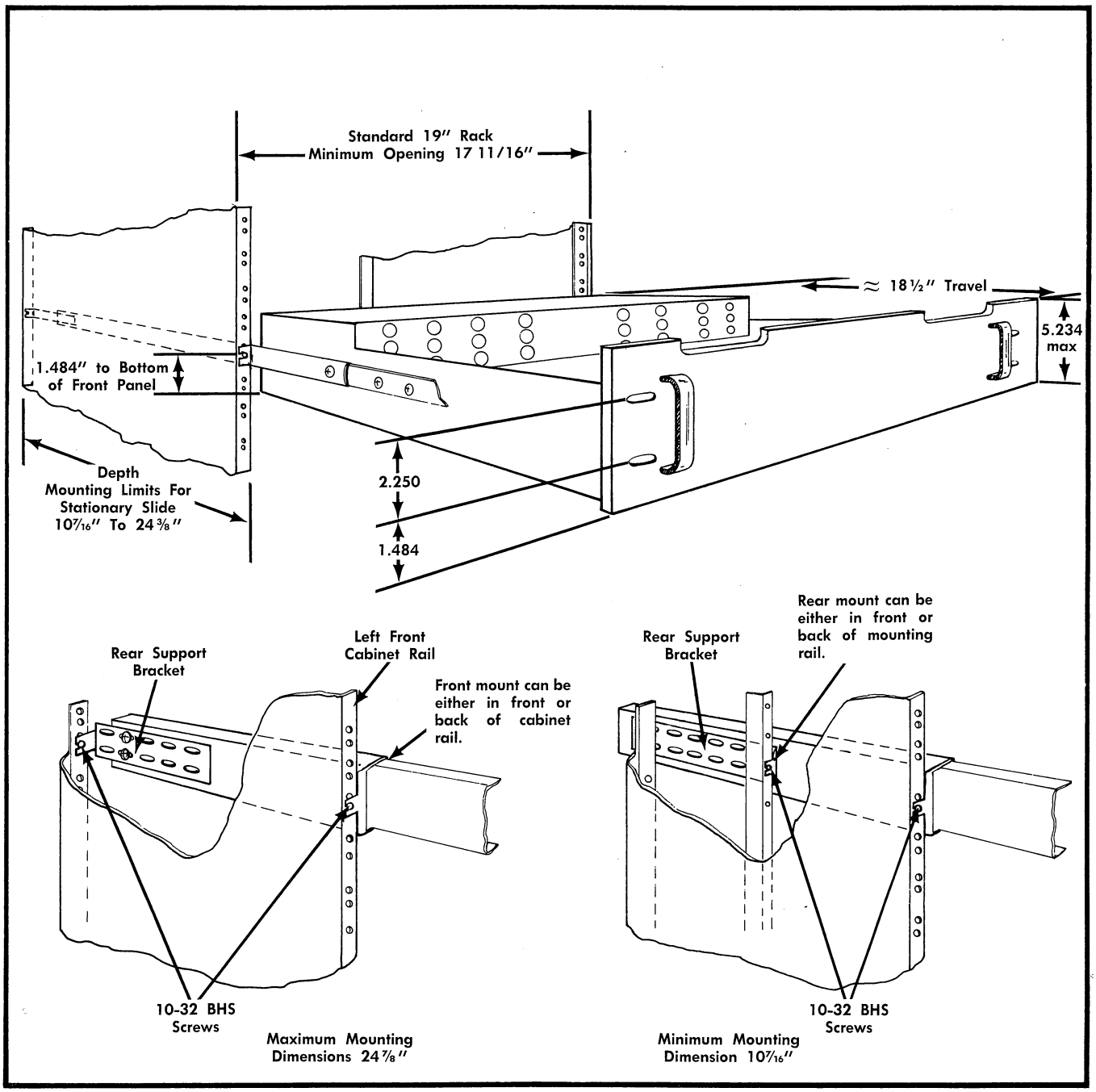
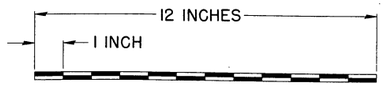
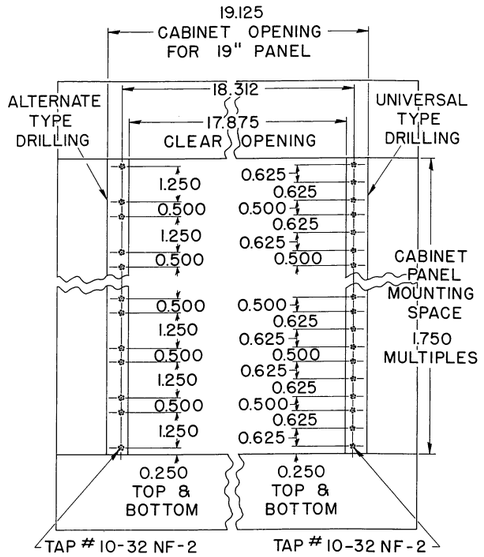


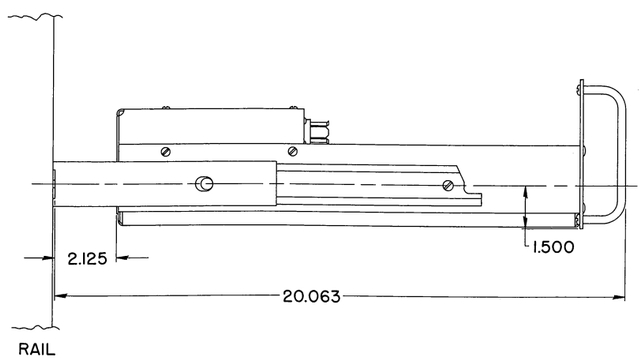
Fig. 5-1. Mounting suggestions.

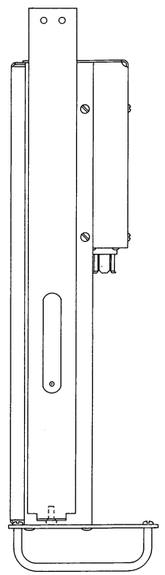


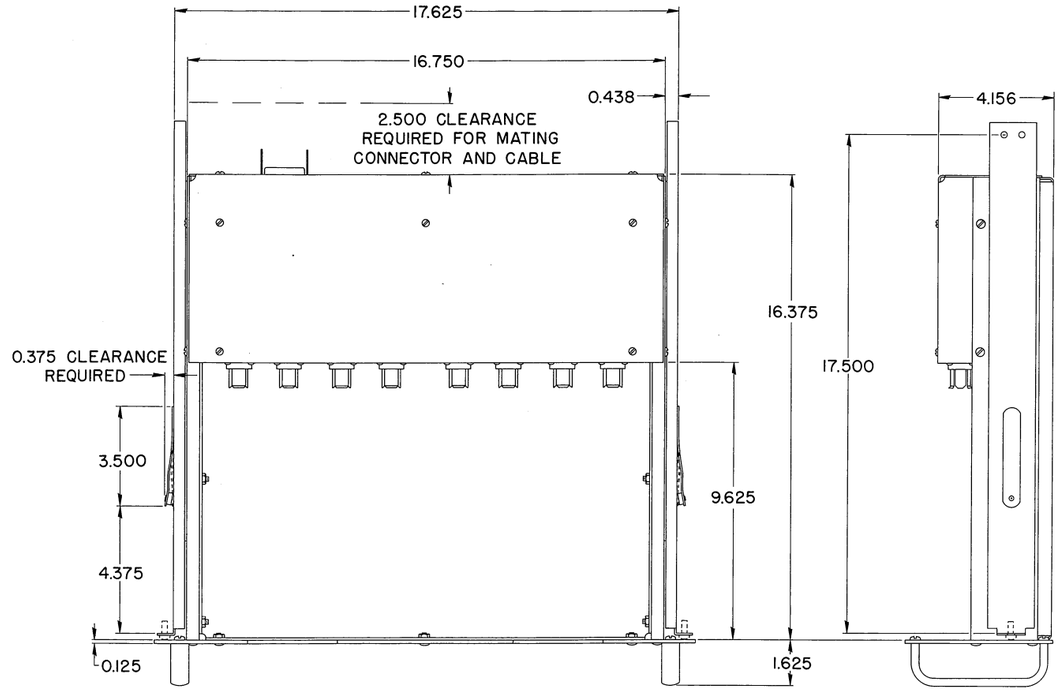


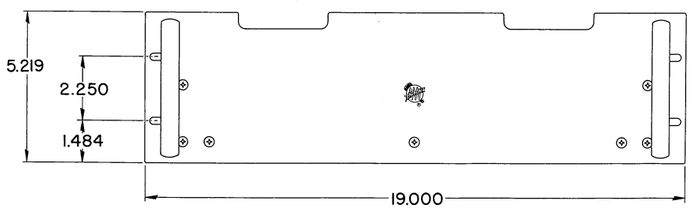
RECOMMENDED RAIL TYPES

NOTE: ALL DIMENSIONS ARE
REFERANCE DIMENSIONS

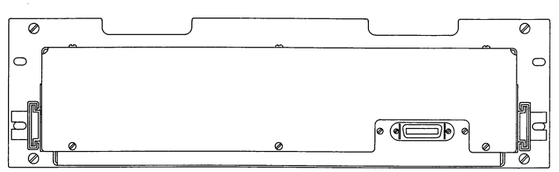








261 COAXIAL SWITCH



REAR VIEW

MANUAL CHANGE INFORMATION

At Tektronix, we continually strive to keep up with latest electronic developments by adding circuit and component improvements to our instruments as soon as they are developed and tested.

Sometimes, due to printing and shipping requirements, we can't get these changes immediately into printed manuals. Hence, your manual may contain new change information on following pages. If it does not, your manual is correct as printed.

TEXT CORRECTION

Page 4-2, the third paragraph under 3. Signal Reflection Check should read as follows:

c. Set the sampling oscilloscope for an internally triggered 2 nsec/cm sweep rate and a 200 mv/cm vertical deflection factor.