TEKTRONIX®

# RC OSCILLATOR

## SG 502

# INSTRUCTION MANUAL

Tektronix, Inc.
P.O. Box 500
Beaverton, Oregon 97005

Serial Number _____

070-1430-00

## WARRANTY

All TEKTRONIX instruments are warranted against defective materials and workmanship for one year. Any questions with respect to the warranty should be taken up with your TEKTRONIX Field Engineer or representative.

All requests for repairs and replacement parts should be directed to the TEKTRONIX Field Office or representative in your area. This will assure you the fastest possible service. Please include the instrument Type Number or Part Number and Serial Number with all requests for parts or service.

Specifications and price change privileges reserved.

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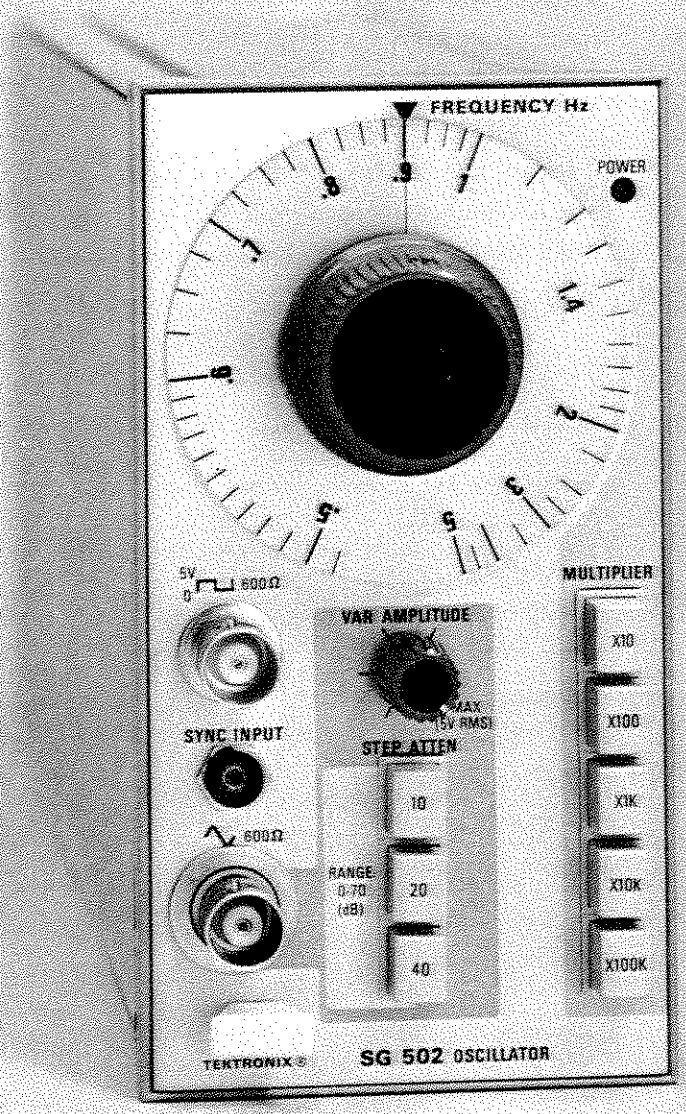

FREQUENCY Hz
POWER
.8
.9
1
1.4
2
3
5
6.5
7
MULTIPLIER
X10
X100
X1K
X10K
X100K
VAR AMPLITUDE
MAX
(5V RMS)
STEP ATTEN
10
20
40
RANGE
0-70
(dB)
5V
0
600Ω
SYNC INPUT
600Ω
TEKTRONIX ®
SG 502 OSCILLATOR

# SECTION 1
# OPERATING INSTRUCTIONS

## INSTRUMENT DESCRIPTION

The SG 502 generates low distortion sine waves and square waves over a frequency range of 5 Hz to 500 kHz. A stable RC oscillator provides 5 V RMS output under no load, or 2.5 V RMS into a 600 Ω load. A continuously-variable control affords greater than 40 dB sine-wave attenuation in addition to pushbutton-selected 10, 20, and 40 dB steps. A 0 to +5 V fixed amplitude square wave, at the same frequency as the sine wave, is available from a separate front panel connector. The SG 502 also features an external sync input which locks the output frequency to a synchronizing signal. A single dial and five decade push-buttons provide frequency selection.

## INSTALLATION

The SG 502 is calibrated and ready for use when received. It operates in any compartment of a TM 500 Series Power Module. See the Power Module instruction manual for line voltage requirements and Power Module operation. Fig. 1-1 shows SG 502 installation and removal. Make certain that the SG 502 is fully inserted in the Power Module. Pull the PWR switch on the Power Module. Check that the POWER pilot light on the SG 502 front panel is on.

The Controls, Connectors, and Adjustments fold-out page in Section 2 gives a complete description of the front panel.

**CAUTION**

*Turn the Power Module off before inserting the plug-in; otherwise, damage may occur to the plug-in circuitry.*

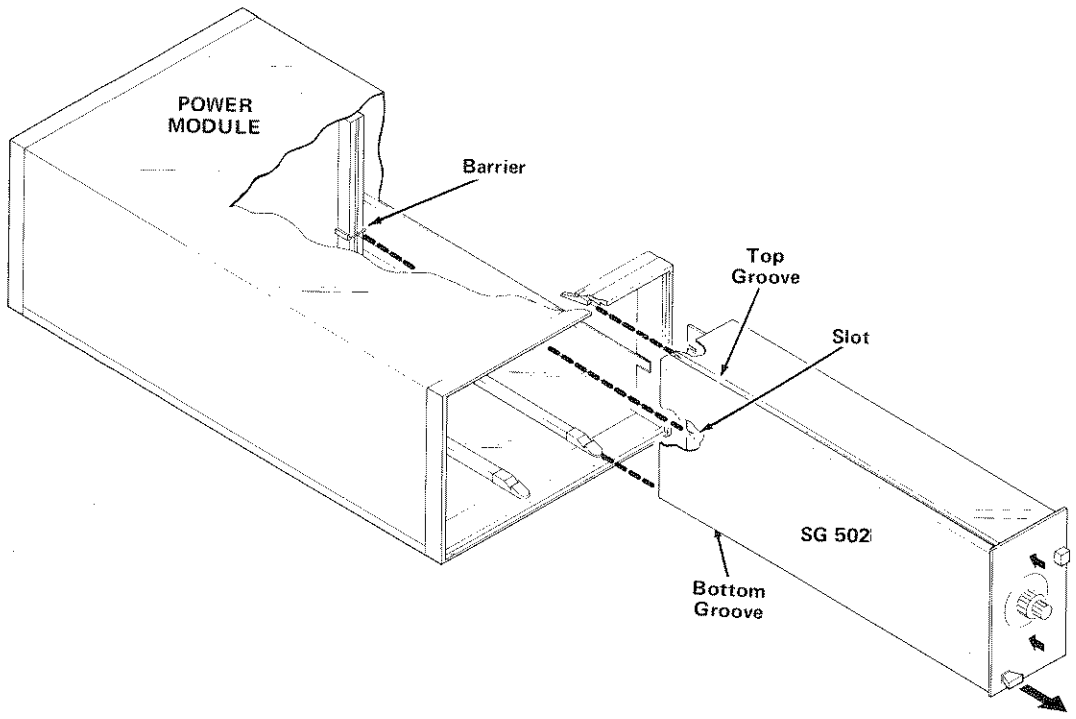



Fig. 1-1. Plug-in module installation/removal.

# OPERATING CONSIDERATIONS

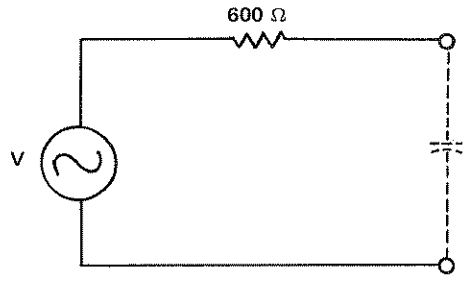



Fig. 1-2. Equivalent 600 Ω output circuits.

## Making Connections

Fig. 1-2 shows an equivalent circuit for the 600 Ω sine-wave and square-wave outputs of the SG 502. 50 Ω coaxial cable adds about 30 pF per foot to the output. Use short cables to avoid reduced sine-wave amplitude and rounded square waves, especially at higher frequencies.

## Synchronization With an External Device

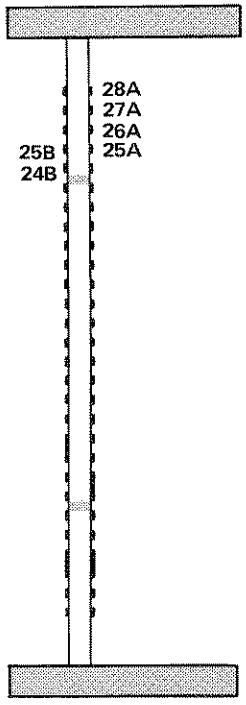
To synchronize the SG 502 with an external oscillator, plug the sine-wave output of the external oscillator into the SYNC INPUT jack on the front panel. Attempting synchronization with other than a sine-wave may cause harmonic distortion of the SG 502 output. Maximum purity is obtained when both signals are the same frequency.

The frequency range over which synchronization occurs depends upon the amplitude of the synchronizing signal. The voltage required for synchronization varies linearly from 0 V (when the frequencies are identical) to approximately 5 V RMS (when the frequencies differ by 5%).

Approximately a 1 V P-P sine wave at the oscillator frequency is available from the SYNC INPUT connector. The source impedance is 10 kΩ.

## Synchronizing an External Device

The +5 V square-wave output can be used to synchronize an external device such as a counter or oscilloscope. The square-wave amplitude will be +5 V open-circuited, and less as the load impedance decreases.




| Contact | Assignment |
|---|---|
| 28A | Sine Wave Out |
| 27A | Sine Wave Out Ground |
| 26A | Sync Out Ground |
| 25B | Sync in (Not Factory Wired) |
| 25A | Sync Out (Squarewave out B070750 & below) |
| 24B | Sync Ground (Not Factory Wired) |

Fig. 1-3. Input/Output assignments at rear connector.

### Functions Available at Rear Connector

A slot between pins 23 and 24 on the rear connector identifies the SG 502 as a member of the signal source family. Insert a barrier in the corresponding position of the Power Module jack to prevent other than signal source plug-ins from being used in that compartment. This protects the plug-in should specialized connections be made to that compartment. Consult the Building A System section of the Power Module manual for further information.

Signal outputs, or other specialized connections, are made to the rear interface connectors as shown in Fig. 1-3. The Sync In and Sync Ground are not factory wired. The Sync Out signal is a sine wave of the same frequency as the output signal. It has an amplitude of at least 1 V RMS, which is essentially constant over the entire frequency range. The source impedance is 1 kΩ. Use this signal to trigger external devices such as oscilloscopes or counters etc.

# SPECIFICATIONS

### Performance Conditions

The electrical characteristics are valid only if the SG 502 is calibrated at an ambient temperature between +20°C and +30°C and operated between 0°C and +50°C, unless otherwise noted. The outputs must be terminated in 600 Ω loads.

#### SINE WAVE

FREQUENCY RANGE: 5 Hz to 500 kHz.

CALIBRATION ACCURACY: Within 5% of dial setting from 5 Hz to <50 kHz; within 10% of dial setting from 50 kHz to 500 kHz.

AMPLITUDE RESPONSE: Within 0.3 dB over entire range (1 kHz reference).

MAXIMUM OUTPUT VOLTAGE: 5 V RMS, open-circuit, 2.5 RMS into a 600 Ω load.

HARMONIC DISTORTION: < 0.035% from 20 kHz to 50 kHz. < 0.15% over the remaining frequency range.

HUM/NOISE: <0.1% of rated output.

ATTENUATION: 0 to >40 dB continuously variable. 10, 20, and 40 dB steps within ±2% for each step.

#### SQUARE WAVE

FREQUENCY RANGE: 5 Hz to 500 kHz.

AMPLITUDE: ≈+5 V open-circuit (+2.5 V into a 600 Ω load).

RISE AND FALL TIME: ≤50 ns into 50 Ω or 600 Ω; terminated and measured at the front panel.

#### SYNC INPUT

INPUT IMPEDANCE: 10 kΩ.

# REPLACEABLE ELECTRICAL PARTS

## PARTS ORDERING INFORMATION

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

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, instrument type or number, 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, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

## SPECIAL NOTES AND SYMBOLS

| | |
|---|---|
| X000 | Part first added at this serial number |
| 00X | Part removed after this serial number |

### ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

## ABBREVIATIONS

| | | | |
|---|---|---|---|
| ACTR | ACTUATOR | PLSTC | PLASTIC |
| ASSY | ASSEMBLY | QTZ | QUARTZ |
| CAP | CAPACITOR | RECP | RECEPTACLE |
| CER | CERAMIC | RES | RESISTOR |
| CKT | CIRCUIT | RF | RADIO FREQUENCY |
| COMP | COMPOSITION | SEL | SELECTED |
| CONN | CONNECTOR | SEMICOND | SEMICONDUCTOR |
| ELCTLT | ELECTROLYTIC | SENS | SENSITIVE |
| ELEC | ELECTRICAL | VAR | VARIABLE |
| INCAND | INCANDESCENT | WW | WIREWOUND |
| LED | LIGHT EMITTING DIODE | XFMR | TRANSFORMER |
| NONWIR | NON WIREWOUND | XTAL | CRYSTAL |

# CROSS INDEX MFR. CODE NUMBER TO MANUFACTURER

| MFR.CODE | MANUFACTURER | ADDRESS | CITY,STATE,ZIP |
|---|---|---|---|
| 00853 | SANGAMO ELECTRIC CO., S. CAROLINA DIV. | P. O. BOX 128 | PICKENS, SC 29671 |
| 01121 | ALLEN-BRADLEY CO. | 1201 2ND ST. SOUTH | MILWAUKEE, WI 53204 |
| 02735 | RCA CORP., SOLID STATE DIVISION | ROUTE 202 | SOMERVILLE, NY 08876 |
| 03508 | GENERAL ELECTRIC CO., SEMI-CONDUCTOR PRODUCTS DEPT. | ELECTRONICS PARK | SYRACUSE, NY 13201 |
| 04713 | MOTOROLA, INC., SEMICONDUCTOR PRODUCTS DIV. | 5005 E. MCDOWELL RD. | PHOENIX, AZ 85036 |
| 07263 | FAIRCHILD SEMICONDUCTOR, A DIV. OF FAIRCHILD CAMERA AND INSTRUMENT CORP. | 464 ELLIS ST. | MOUNTAIN VIEW, CA 94042 |
| 07910 | TELEDYNE SEMICONDUCTOR | 12515 CHADRON AVE. | HAWTHORNE, CA 90250 |
| 08806 | GENERAL ELECTRIC CO., MINIATURE LAMP PRODUCTS DEPT. | NELA PK. | CLEVELAND, OH 44112 |
| 12697 | CLAROSTAT MFG. CO., INC. | LOWER WASHINGTON ST. | DOVER, NH 03820 |
| 14936 | GENERAL INSTRUMENT CORP., SEMICONDUCTOR PRODUCTS GROUP | 600 W. JOHN ST. | HICKSVILLE, NY 11802 |
| 16546 | U.S. CAPACITOR CORP. | 2151 N. LINCOLN | BURBANK, CA 91504 |
| 18324 | SIGNETICS CORP. | 811 E. ARQUES | SUNNYVALE, CA 94086 |
| 27014 | NATIONAL SEMICONDUCTOR CORP. | 2900 SAN YSIDRO WAY | SANTA CLARA, CA 95051 |
| 34553 | AMPEREX ELECTRONIC CORP., COMPONENT DIV. | 35 HOFFMAN AVE. | HAPPAUGE, NY 11787 |
| 50852 | MELSEY CORPORATION | 202 CARLE ROAD | CARLE PLACE, LI, NY 11514 |
| 56289 | SPRAGUE ELECTRIC CO. | | NORTH ADAMS, MA 01247 |
| 71400 | BUSSMAN MFG., DIVISION OF MCGRAW-EDISON CO. | 2536 W. UNIVERSITY ST. | ST. LOUIS, MO 63107 |
| 71590 | CENTRALAB ELECTRONICS, DIV. OF GLOBE-UNION, INC. | 5757 N. GREEN BAY AVE. | MILWAUKEE, WI 53201 |
| 72136 | ELECTRO MOTIVE CORP., SUB OF INTERNATIONAL ELECTRONICS CORP. | SOUTH PARK AND JOHN STREETS | WILLIMANTIC, CT 06226 |
| 72982 | ERIE TECHNOLOGICAL PRODUCTS, INC. | 644 W. 12TH ST. | ERIE, PA 16512 |
| 73138 | BECKMAN INSTRUMENTS, INC., HELIPOT DIV. | 2500 HARBOR BLVD. | FULLERTON, CA 92634 |
| 75042 | TRW ELECTRONIC COMPONENTS, IRC FIXED RESISTORS, PHILADELPHIA DIVISION | 401 N. BROAD ST. | PHILADELPHIA, PA 19108 |
| 80009 | TEKTRONIX, INC. | P. O. BOX 500 | BEAVERTON, OR 97077 |
| 80031 | ELECTRA-MIDLAND CORP., MEPCO DIV., A NORTH AMERICAN PHILLIPS CO. | 22 COLUMBIA RD. | MORRISTOWN, NJ 07960 |
| 80294 | BOURNS, INC., INSTRUMENT DIV. | 6135 MAGNOLIA AVE. | RIVERSIDE, CA 92506 |
| 82389 | SWITCHCRAFT, INC. | 5555 N. ELSTON AVE. | CHICAGO, IL 60630 |
| 90201 | MALLORY CAPACITOR CO., DIV. OF P. R. MALLORY CO., INC. | 3029 E. WASHINGTON ST. | INDIANAPOLIS, IN 46206 |
| 91637 | DALE ELECTRONICS, INC. | P. O. BOX 609 | COLUMBUS, NB 68601 |
| 91836 | KINGS ELECTRONICS CO., INC. | 40 MARBLEDALE ROAD | TUCKAHOE, NY 10707 |
| 98291 | SEALECTRO CORP. | 225 HOYT | MAMARONECK, NY 10544 |

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont | Name & Description | Mfr Code | Mfr Part Number |
|---|---|---|---|---|---|---|
| A1 | 670-2215-00 | | | CKT BOARD ASSY:MAIN | 80009 | 670-2215-00 |
| C10 | 283-0177-00 | | | CAP.,FXD,CER DI:1UF,+80-20%,25V | 72982 | 8131N039651105Z |
| C12 | 283-0177-00 | | | CAP.,FXD,CER DI:1UF,+80-20%,25V | 72982 | 8131N039651105Z |
| C18 | 281-0656-00 | | | CAP.,FXD,CER DI:22PF,5%,500V | 72982 | 374-000C0G0220J |
| C50[1], C51, C52, C53, C54 | 295-0161-00 | | | CAP.,SET,MATCHED:0.01,995PF,10UF,0.1UF,1UF | 80009 | 295-0161-00 |
| C55 | 283-0632-00 | | | CAP.,FXD,MICA D:87PF,1%,100V | 00853 | D151E870F0 |
| C91 | 290-0512-00 | | | CAP.,FXD,ELCTLT:22UF,20%,15V | 56289 | 196D226X0015KA1 |
| C97 | 290-0536-00 | | | CAP.,FXD,ELCTLT:10UF,20%,25V | 90201 | TDC106M025NLF |
| C101 | 290-0531-00 | | | CAP.,FXD,ELCTLT:100UF,20%,10V | 90201 | TDC107M010WLC |
| C103 | 290-0531-00 | | | CAP.,FXD,ELCTLT:100UF,20%,10V | 90201 | TDC107M010WLC |
| C105 | 290-0536-00 | | | CAP.,FXD,ELCTLT:10UF,20%,25V | 90201 | TDC106M025NLF |
| C107 | 290-0536-00 | | | CAP.,FXD,ELCTLT:10UF,20%,25V | 90201 | TDC106M025NLF |
| C109 | 290-0534-00 | | | CAP.,FXD,ELCTLT:1UF,20%,35V | 56289 | 196D105X0035HA1 |
| C110 | 290-0517-00 | | | CAP.,FXD,ELCTLT:6.8UF,20%,35V | 56289 | 196D685X0035KA1 |
| C112 | 290-0517-00 | | | CAP.,FXD,ELCTLT:6.8UF,20%,35V | 56289 | 196D685X0035KA1 |
| C120 | 281-0504-00 | | | CAP.,FXD,CER DI:10PF,+/-1PF,500V | 72982 | 301-055C0G0100F |
| C140 | 283-0003-00 | | | CAP.,FXD,CER DI:0.01UF,+80-20%,150V | 72982 | 855-547E103Z |
| C146 | 290-0512-00 | | | CAP.,FXD,ELCTLT:22UF,20%,15V | 56289 | 196D226X0015KA1 |
| C150 | 281-0504-00 | | | CAP.,FXD,CER DI:10PF,+/-1PF,500V | 72982 | 301-055C0G0100F |
| C160 | 290-0208-00 | | | CAP.,FXD,ELCTLT:350UF,+75-15%,15V | 56289 | 113D357C7015P1 |
| C200 | 281-0525-00 | | | CAP.,FXD,CER DI:470PF,+/-94PF,500V | 04222 | 7001-1364 |
| C321 | 283-0003-00 | | | CAP.,FXD,CER DI:0.01UF,+80-20%,150V | 72982 | 855-547E103Z |
| C322 | 283-0111-00 | | | CAP.,FXD,CER DI:0.1UF,20%,50V | 72982 | 8131N075651104M |
| C324 | 290-0528-00 | | | CAP.,FXD,ELCTLT:15UF,20%,50V | 90201 | TDC156M050WLC |
| C325 | 290-0517-00 | | | CAP.,FXD,ELCTLT:6.8UF,20%,35V | 56289 | 196D685X0035KA1 |
| C330 | 290-0534-00 | | | CAP.,FXD,ELCTLT:1UF,20%,35V | 56289 | 196D105X0035HA1 |
| C341 | 283-0003-00 | | | CAP.,FXD,CER DI:0.01UF,+80-20%,150V | 72982 | 855-547E103Z |
| C342 | 283-0111-00 | | | CAP.,FXD,CER DI:0.1UF,20%,50V | 72982 | 8131N075651104M |
| C344 | 290-0528-00 | | | CAP.,FXD,ELCTLT:15UF,20%,50V | 90201 | TDC156M050WLC |
| C345 | 290-0517-00 | | | CAP.,FXD,ELCTLT:6.8UF,20%,35V | 56289 | 196D685X0035KA1 |
| C350 | 290-0534-00 | | | CAP.,FXD,ELCTLT:1UF,20%,35V | 56289 | 196D105X0035HA1 |
| CR80 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR86 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR90 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR91 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR150 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR154 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR195 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR196 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR198 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR199 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR200 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR202 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR210 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR212 | 152-0141-02 | | | SEMICOND DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR322 | 152-0066-00 | XB040000 | | SEMICOND DEVICE:SILICON,400V,750MA | 02735 | 37304 |
| CR324 | 152-0107-00 | XB040000 | | SEMICOND DEVICE:SILICON,375V,400MA | 80009 | 152-0107-00 |
| CR342 | 152-0066-00 | XB040000 | | SEMICOND DEVICE:SILICON,400V,750MA | 02735 | 37304 |

[1]Individual timing capacitors in this assembly must be ordered by the 9-digit part number, letter suffix and tolerance printed on the timing capacitor to be replaced. The letter suffix and the tolerance should be the same for all of the timing capacitors in the assembly.

EXAMPLE: 285-XXXX-XX F-

The letter suffix and the tolerance should be the same for all of the timing capacitors in the assembly.

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont | Name & Description | Mfr Code | Mfr Part Number |
|---|---|---|---|---|---|---|
| CR344 | 152-0107-00 | XB040000 | | SEMICOND DEVICE:SILICON,375V,400MA | 80009 | 152-0107-00 |
| VR91 | 152-0149-00 | | | SEMICOND DEVICE:ZENER,0.4W,10V,5% | 04713 | 1N961B |
| VR146 | 152-0149-00 | | | SEMICOND DEVICE:ZENER,0.4W,10V,5% | 04713 | 1N961B |
| DS346 | 150-0109-00 | | | LAMP,INCAND:18V,26MA | 71744 | CM7220 |
| J10 | 136-0187-00 | | | JACK,TIP: | 17117 | 4653-113-0 |
| J180 | 131-0274-00 | | | CONNECTOR,RCPT,:BNC | 91836 | KC79-67 |
| J205 | 210-0774-00 | | | EYELET,METALLIC:0.152 OD X 0.245 INCH L,BRS | 80009 | 210-0774-00 |
| | 210-0775-00 | | | EYELET,METALLIC:0.126 OD X 0.25 INCH L,BRS | 80009 | 210-0775-00 |
| J210 | 131-0955-00 | | | CONNECTOR,RCPT,:BNC,FEMALE | 24931 | 28JR200-1 |
| P205 | 131-1003-00 | | | CONNECTOR BODY,:CKT BD MT,3 PRONG | 80009 | 131-1003-00 |
| Q10A,B | 151-1054-00 | | | TRANSISTOR:SILICON,JFE,N-CHANNEL,DUAL | 80009 | 151-1054-00 |
| Q20 | 151-0188-00 | | | TRANSISTOR:SILICON,PNP | 01295 | 2N3906 |
| Q24 | 151-0188-00 | | | TRANSISTOR:SILICON,PNP | 01295 | 2N3906 |
| Q30 | 151-0188-00 | | | TRANSISTOR:SILICON,PNP | 01295 | 2N3906 |
| Q70 | 151-0190-00 | | | TRANSISTOR:SILICON,NPN | 80009 | 151-0190-00 |
| Q80 | 151-0190-00 | | | TRANSISTOR:SILICON,NPN | 80009 | 151-0190-00 |
| Q82 | 151-0302-00 | | | TRANSISTOR:SILICON,NPN | 04713 | 2N2222A |
| Q86 | 151-0190-00 | | | TRANSISTOR:SILICON,NPN | 80009 | 151-0190-00 |
| Q88 | 151-0301-00 | | | TRANSISTOR:SILICON,PNP | 04713 | 2N2907A |
| Q90 | 151-0302-00 | | | TRANSISTOR:SILICON,NPN | 04713 | 2N2222A |
| Q110 | 151-1021-00 | | | TRANSISTOR:SILICON,JFE | 17856 | FN815 |
| Q120 | 151-0190-00 | | | TRANSISTOR:SILICON,NPN | 80009 | 151-0190-00 |
| Q128 | 151-0190-00 | | | TRANSISTOR:SILICON,NPN | 80009 | 151-0190-00 |
| Q130 | 151-0190-00 | | | TRANSISTOR:SILICON,NPN | 80009 | 151-0190-00 |
| Q140 | 151-0188-00 | | | TRANSISTOR:SILICON,PNP | 01295 | 2N3906 |
| Q145 | 151-0188-00 | | | TRANSISTOR:SILICON,PNP | 01295 | 2N3906 |
| Q150 | 151-0302-00 | | | TRANSISTOR:SILICON,NPN | 04713 | 2N2222A |
| Q154 | 151-0301-00 | | | TRANSISTOR:SILICON,PNP | 04713 | 2N2907A |
| Q200 | 151-0190-00 | | | TRANSISTOR:SILICON,NPN | 80009 | 151-0190-00 |
| Q210 | 151-0190-00 | | | TRANSISTOR:SILICON,NPN | 80009 | 151-0190-00 |
| Q220 | 151-0188-00 | | | TRANSISTOR:SILICON,PNP | 01295 | 2N3906 |
| Q230 | 151-0188-00 | | | TRANSISTOR:SILICON,PNP | 01295 | 2N3906 |
| Q235 | 151-0188-00 | | | TRANSISTOR:SILICON,PNP | 01295 | 2N3906 |
| R10 | 315-0103-00 | | | RES.,FXD,CMPSN:10K OHM,5%,0.25W | 01121 | CB1035 |
| R12 | 315-0105-00 | | | RES.,FXD,CMPSN:1M OHM,5%,0.25W | 01121 | CB1055 |
| R15 | 315-0121-00 | | | RES.,FXD,CMPSN:120 OHM,5%,0.25W | 01121 | CB1215 |
| R18 | 315-0752-00 | | | RES.,FXD,CMPSN:7.5K OHM,5%,0.25W | 01121 | CB7525 |
| R22 | 315-0512-00 | | | RES.,FXD,CMPSN:5.1K OHM,5%,0.25W | 01121 | CB5125 |
| R25 | 315-0220-00 | | | RES.,FXD,CMPSN:22 OHM,5%,0.25W | 01121 | CB2205 |
| R27 | 315-0512-00 | | | RES.,FXD,CMPSN:5.1K OHM,5%,0.25W | 01121 | CB5125 |
| R29 | 315-0220-00 | | | RES.,FXD,CMPSN:22 OHM,5%,0.25W | 01121 | CB2205 |
| R32 | 315-0561-00 | | | RES.,FXD,CMPSN:560 OHM,5%,0.25W | 01121 | CB5615 |
| R35 | 315-0132-00 | | | RES.,FXD,CMPSN:1.3K OHM,5%,0.25W | 01121 | CB1325 |
| R36 | 315-0392-00 | | | RES.,FXD,CMPSN:3.9K OHM,5%,0.25W | 01121 | CB3925 |
| R38 | 315-0752-00 | | | RES.,FXD,CMPSN:7.5K OHM,5%,0.25W | 01121 | CB7525 |
| R40 | 315-0121-00 | | | RES.,FXD,CMPSN:120 OHM,5%,0.25W | 01121 | CB1215 |
| R45 | 321-0661-00 | | | RES.,FXD,FILM:600 OHM,1%,0.125W | 75042 | CEATO-6000F |
| R50A,B | 311-1502-00 | | | RES.,VAR,WW:PNL,2 X 10K OHM,2.75W | 02111 | 100-9625 |

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont | Name & Description | Mfr Code | Mfr Part Number |
|---|---|---|---|---|---|---|
| R55 | 321-0661-00 | | | RES.,FXD,FILM:600 OHM,1%,0.125W | 75042 | CEAT0-6000F |
| R71 | 315-0222-00 | | | RES.,FXD,CMPSN:2.2K OHM,5%,0.25W | 01121 | CB2225 |
| R73 | 315-0392-00 | | | RES.,FXD,CMPSN:3.9K OHM,5%,0.25W | 01121 | CB3925 |
| R75 | 315-0132-00 | | | RES.,FXD,CMPSN:1.3K OHM,5%,0.25W | 01121 | CB1325 |
| R82 | 315-0220-00 | | | RES.,FXD,CMPSN:22 OHM,5%,0.25W | 01121 | CB2205 |
| R84 | 315-0102-00 | XB070000 | | RES.,FXD,CMPSN:1K OHM,5%,0.25W | 01121 | CB1025 |
| R86 | 315-0112-00 | | | RES.,FXD,CMPSN:1.1K OHM,5%,0.25W | 01121 | CB1125 |
| R88 | 315-0220-00 | | | RES.,FXD,CMPSN:22 OHM,5%,0.25W | 01121 | CB2205 |
| R91 | 315-0681-00 | | | RES.,FXD,CMPSN:680 OHM,5%,0.25W | 01121 | CB6815 |
| R93 | 315-0303-00 | | | RES.,FXD,CMPSN:30K OHM,5%,0.25W | 01121 | CB3035 |
| R95 | 315-0753-00 | | | RES.,FXD,CMPSN:75K OHM,5%,0.25W | 01121 | CB7535 |
| R97 | 315-0302-00 | | | RES.,FXD,CMPSN:3K OHM,5%,0.25W | 01121 | CB3025 |
| R110 | 321-0364-00 | | | RES.,FXD,FILM:60.4K OHM,1%,0.125W | 75042 | CEAT0-6042F |
| R113 | 321-0364-00 | | | RES.,FXD,FILM:60.4K OHM,1%,0.125W | 75042 | CEAT0-6042F |
| R115 | 311-0978-00 | | | RES.,VAR,NONWIR:250 OHM,10%,0.50W | 80740 | 62-67-3 |
| R116 | 315-0102-00 | | | RES.,FXD,CMPSN:1K OHM,5%,0.25W | 01121 | CB1025 |
| R117 | 315-0102-00 | | | RES.,FXD,CMPSN:1K OHM,5%,0.25W | 01121 | CB1025 |
| R120 | 315-0220-00 | | | RES.,FXD,CMPSN:22 OHM,5%,0.25W | 01121 | CB2205 |
| R123 | 315-0220-00 | | | RES.,FXD,CMPSN:22 OHM,5%,0.25W | 01121 | CB2205 |
| R125 | 315-0242-00 | | | RES.,FXD,CMPSN:2.4K OHM,5%,0.25W | 01121 | CB2425 |
| R126 | 315-0220-00 | | | RES.,FXD,CMPSN:22 OHM,5%,0.25W | 01121 | CB2205 |
| R129 | 315-0242-00 | | | RES.,FXD,CMPSN:2.4K OHM,5%,0.25W | 01121 | CB2425 |
| R130 | 315-0202-00 | | | RES.,FXD,CMPSN:2K OHM,5%,0.25W | 01121 | CB2025 |
| R132 | 315-0102-00 | | | RES.,FXD,CMPSN:1K OHM,5%,0.25W | 01121 | CB1025 |
| R133 | 315-0102-00 | | | RES.,FXD,CMPSN:1K OHM,5%,0.25W | 01121 | CB1025 |
| R140 | 315-0122-00 | | | RES.,FXD,CMPSN:1.2K OHM,5%,0.25W | 01121 | CB1225 |
| R143 | 315-0201-00 | | | RES.,FXD,CMPSN:200 OHM,5%,0.25W | 01121 | CB2015 |
| R146 | 315-0102-00 | | | RES.,FXD,CMPSN:1K OHM,5%,0.25W | 01121 | CB1025 |
| R150 | 315-0220-00 | | | RES.,FXD,CMPSN:22 OHM,5%,0.25W | 01121 | CB2205 |
| R154 | 315-0220-00 | | | RES.,FXD,CMPSN:22 OHM,5%,0.25W | 01121 | CB2205 |
| R156 | 315-0472-00 | | | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W | 01121 | CB4725 |
| R160 | 321-0661-00 | | | RES.,FXD,FILM:600 OHM,1%,0.125W | 75042 | CEAT0-6000F |
| R164 | 321-0661-00 | | | RES.,FXD,FILM:600 OHM,1%,0.125W | 75042 | CEAT0-6000F |
| R165A,B | 311-1440-00 | | | RES.,VAR,NONWIR:PNL,600 OHM,T ATTENUATOR | 01121 | 10M479 |
| R166 | 321-0661-00 | | | RES.,FXD,FILM:600 OHM,1%,0.125W | 75042 | CEAT0-6000F |
| R170 | 322-0703-07 | | | RES.,FXD,FILM:311.7 OHM,0.1%,0.25W | 91637 | MFF1421C311R7B |
| R171 | 322-0702-07 | | | RES.,FXD,FILM:421.6 OHM,0.1%,0.25 W | 91637 | MFF1421C421R6B |
| R172 | 322-0703-07 | | | RES.,FXD,FILM:311.7 OHM,0.1%,0.25W | 91637 | MFF1421C311R7B |
| R174 | 322-0701-07 | | | RES.,FXD,FILM:490.9 OHM,0.1%,0.25W | 91637 | MFF1421C490R9B |
| R175 | 322-0704-07 | | | RES.,FXD,FILM:121.2 OHM,0.1%,0.25W | 91637 | MFF1421C121R2B |
| R176 | 322-0701-07 | | | RES.,FXD,FILM:490.9 OHM,0.1%,0.25W | 91637 | MFF1421C490R9B |
| R178 | 322-0700-07 | | | RES.,FXD,FILM:588.1 OHM,0.1%,0.25W | 91637 | MPP1421C588R1B |
| R179 | 321-1008-04 | | | RES.,FXD,FILM:12.0 OHM,0.1%,0.125W | 91637 | MFF1816D12R00B |
| R180 | 322-0700-07 | | | RES.,FXD,FILM:588.1 OHM,0.1%,0.25W | 91637 | MPP1421C588R1B |
| R191 | 311-0633-00 | | | RES.,VAR,NONWIR:5K OHM,10%,0.50W | 80740 | 62-58-3 |
| R194 | 315-0102-00 | | | RES.,FXD,CMPSN:1K OHM,5%,0.25W | 01121 | CB1025 |
| R195 | 315-0103-00 | | | RES.,FXD,CMPSN:10K OHM,5%,0.25W | 01121 | CB1035 |
| R200 | 315-0202-00 | | | RES.,FXD,CMPSN:2K OHM,5%,0.25W | 01121 | CB2025 |
| R206 | 315-0202-00 | | | RES.,FXD,CMPSN:2K OHM,5%,0.25W | 01121 | CB2025 |
| R210 | 315-0202-00 | | | RES.,FXD,CMPSN:2K OHM,5%,0.25W | 01121 | CB2025 |
| R212 | 315-0472-00 | | | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W | 01121 | CB4725 |
| R220 | 315-0301-00 | | | RES.,FXD,CMPSN:300 OHM,5%,0.25W | 01121 | CB3015 |
| R224 | 321-0661-00 | | | RES.,FXD,FILM:600 OHM,1%,0.125W | 75042 | CEAT0-6000F |

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont | Name & Description | Mfr Code | Mfr Part Number |
|---|---|---|---|---|---|---|
| R235 | 315-0511-00 | | | RES.,FXD,CMPSN:510 OHM,5%,0.25W | 01121 | CB5115 |
| R238 | 315-0102-00 | | | RES.,FXD,CMPSN:1K OHM,5%,0.25W | 01121 | CB1025 |
| R240 | 315-0302-00 | | | RES.,FXD,CMPSN:3K OHM,5%,0.25W | 01121 | CB3025 |
| R320 | 301-0201-00 | | | RES.,FXD,CMPSN:200 OHM,5%,0.50W | 01121 | EB2015 |
| R321 | 315-0510-00 | | | RES.,FXD,CMPSN:51 OHM,5%,0.25W | 01121 | CB5105 |
| R322 | 307-0051-00 | | | RES.,FXD,CMPSN:2.7 OHM,5%,0.50W | 01121 | EB27G5 |
| R325 | 315-0100-00 | | | RES.,FXD,CMPSN:10 OHM,5%,0.25W | 01121 | CB1005 |
| R330 | 315-0100-00 | | | RES.,FXD,CMPSN:10 OHM,5%,0.25W | 01121 | CB1005 |
| R340 | 301-0201-00 | | | RES.,FXD,CMPSN:200 OHM,5%,0.50W | 01121 | EB2015 |
| R341 | 315-0510-00 | | | RES.,FXD,CMPSN:51 OHM,5%,0.25W | 01121 | CB5105 |
| R342 | 307-0051-00 | | | RES.,FXD,CMPSN:2.7 OHM,5%,0.50W | 01121 | EB27G5 |
| R345 | 315-0100-00 | | | RES.,FXD,CMPSN:10 OHM,5%,0.25W | 01121 | CB1005 |
| R346 | 315-0301-00 | | | RES.,FXD,CMPSN:300 OHM,5%,0.25W | 01121 | CB3015 |
| R348 | 321-0314-00 | B010100 | B029999 | RES.,FXD,FILM:18.2K OHM,1%,0.125W | 75042 | CEAT0-1822F |
| R348 | 321-0314-00 | B030000 | | RES.,FXD,FILM:18.2K OHM,1%,0.125W | 75042 | CEAT0-1822F |
| R350 | 315-0100-00 | | | RES.,FXD,CMPSN:10 OHM,5%,0.25W | 01121 | CB1005 |
| S50A, S50B, S50C, S50D, S50E | 260-1449-00 | | | SWITCH,TOGGLE:5 STA,NON-SHORT,INTERLOCK | 80009 | 260-1449-00 |
| S160A, S160B, S160C | 260-1448-00 | | | SWITCH,TOGGLE:3 STA,NON-SHORT | 80009 | 260-1448-00 |
| U320 | 156-0208-00 | | | MICROCIRCUIT,LI:DUL TRACKING VOLT REG | 80009 | 156-0208-00 |