

56190

**Tektronix®**

**Y-T CHART  
RECORDER**

INSTRUCTION MANUAL

INSTRUCTION MANUAL



PLEASE CHECK FOR CHANGE  
INFORMATION AT THE REAR  
OF THIS MANUAL.

## **Y-T CHART RECORDER**

**INSTRUCTION MANUAL**

**Tektronix, Inc.  
P.O. Box 500  
Beaverton, OR 97077**

070-5160-00  
Product Group 22

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## OPERATOR SAFETY SUMMARY

The general safety information in this part of the summary is for both operating and servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply, but may not appear in this summary.

### TERMS

#### In This Manual

**CAUTION** statements identify conditions or practices which could result in damage to the equipment or other property.

**WARNING** statements identify conditions or practices which could result in personal injury or loss of life.

#### As Marked on Equipment

**CAUTION** indicates a personal injury hazard not immediately accessible as one reads the marking, or a hazard to property including the equipment itself.

**DANGER** indicates a personal injury hazard immediately accessible as one reads the marking.



## SYMBOLS

### In This Manual



This symbol indicates where applicable cautionary or other information is to be found.

### As Marked on Equipment



DANGER—High Voltage



ATTENTION—refer to manual.



Protective ground (earth) terminal.

### Power Source

This product is intended to operate from a power source supplied by the parent instrument (fiber or metallic TDR). Do not attempt to power this module by any other means.

### Grounding the Product

This product is grounded through the parent instrument. A protective ground connection is essential for safe operation.

### Danger Arising From Loss of Ground

Upon loss of the protective-ground connection, all accessible conductive parts (including knobs and controls that appear to be insulating) can render an electric shock.

## **Do Not Operate in Explosive Atmospheres**

To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.

## **Do Not Service Alone**

Do not perform internal service or adjustment of this product unless another person capable of rendering first aid and resuscitation is present.

## **Use Care When Servicing With Power On**

Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed connections and components while power is on.

Disconnect power before removing protective panels, soldering, or replacing components.

## **Do Not Remove Covers or Panels**

To avoid personal injury, do not remove the product covers or panels. Do not operate the product without the covers and panels properly installed.

# INTRODUCTION AND SPECIFICATION

## INTRODUCTION

The Tektronix Y-T Chart Recorder is an optional accessory for the Tektronix Metallic and Optical Fiber Time Domain Reflectometers. It plugs into the instrument in place of the Blank Module or the XY1 Output Module. The chart recorder uses a heated stylus, and 4 cm wide heat sensitive chart paper to reproduce the CRT display.

A chart recording is a permanent record. It can be of great service in fault interpretation (e.g., a chart recording of a faulty twisted pair can be compared to that of a good twisted pair).

## SPECIFICATION

Table 1-1 lists the electrical characteristics and features that apply to the Tektronix Y-T Chart Recorder when it is installed in the Tektronix 1500 TDR Series or the OF TDR Series instruments after a 20 minute warm-up.

The Performance Requirement column describes the limits of the characteristic and the Supplemental Information column describes features and typical values or information that may be helpful.

**Table 1-1**  
**ELECTRICAL CHARACTERISTICS**

Characteristic	Performance Requirement	Supplemental Information
Chart dimensions corresponding to full CRT graticule area		4 cm X 12.5 cm
Chart running time		16 seconds
Chart distance scale linearity (corr. to CRT graticule)	$\pm 0.2$ major division match at any point	
Chart vertical scale linearity (corr. to CRT graticule)	$\pm 5\%$ of deflection from center, $\pm 0.3$ major division	after setting Stylus Position adjustment
Power Requirements		Power is obtained from the parent instrument via P1096

# OPERATING INSTRUCTIONS



**CAUTION**

*Turn the parent instrument's power switch OFF prior to removing or installing the Y-T Chart Recorder.*

## Installation

The Tektronix Y-T Chart Recorder can be installed in the instrument's plug-in module compartment. The LOCK knob secures the chart recorder in the instrument.

## Stylus Alignment

When the parent instrument's RECORD switch is pressed, power is applied to the recorder stylus. The position of the stylus can then be aligned by adjusting the STYLUS POSITION screw. Align the stylus to correspond with the position of the CRT trace.

## Chart Paper Alignment

To align the chart horizontally, pull the paper until a dark line on the paper is aligned with the red reference line visible through a sprocket hole.

## Record

When the RECORD switch is pressed, then released, a chart recording starts. The chart recording circuitry automatically shuts off when the recording is completed. Extra graph paper is run out to allow removal of the recording. When removing the recording, tear paper upward.

## **Evaluation**

In evaluating a graph, the distance between two dark horizontal lines corresponds to one vertical division of the CRT display. The distance between two dark vertical lines corresponds to one major horizontal division of the CRT display.

## **Battery Operating Time (1500 Series)**

The chart recorder can make up to 20 graphs on a full charge of the batteries; the instrument will still operate for a minimum of 5 hours. After 20 graphs have been made, the time that the instrument can be operated without recharging the batteries will be reduced by approximately three minutes per recording.

## **Installing Chart Recorder Paper**

Approximately 60 graphs can be made with one roll of chart recorder paper for the 1500 TDR Series, or approximately 120 for the OF TDR Series.

### **NOTE**

*Chart paper for the 1500 TDR and OF TDR instruments is different. Check the Mechanical Parts List, Accessories, section of this manual for the proper chart paper part numbers.*

1. Turn LOCK knob counter-clockwise and pull chart recorder from the instrument.
2. Push in on the bottom edges of the bezel and lift upward.
3. Remove empty spool from recorder by pulling it upward.
4. Place new roll of graph paper in top of recorder and push into place between the spring-loaded paper holders. Be sure the grid of the paper faces up (see Figure 2-1).

## Y-T Operating Instructions

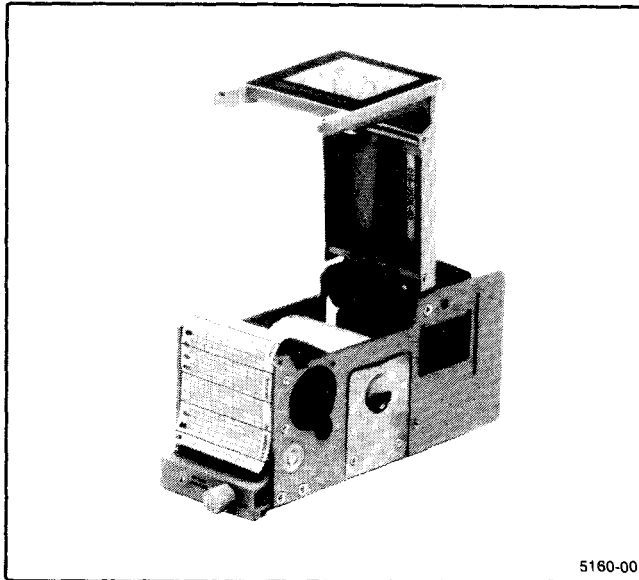


Fig. 2-1. Y-T Chart Recorder.

5. Pull the paper over the rollers and down the front of the recorder. Lower the bezel until it latches into place.
6. Align the graph paper so that one of the dark lines on the paper is lined up with the red reference line visible through a sprocket hole. This sets the graph paper so that a recording will start at one of the dark lines corresponding to the edge of the CRT graticule.
7. Place the chart recorder back into the instrument, then turn the LOCK knob clockwise to lock.

# CIRCUIT DESCRIPTION

This section describes the Chart Recorder circuitry using the circuit diagrams at the back of this manual. The Chart Recorder contains three basic circuits: the motor voltage control, heater voltage regulator, and a pen drive amplifier.

## Motor-Voltage Control

When pin 4 of P1096 is switched to 0 V, transistor Q1015 is turned on and acts as a switch, which applies 12 volts to the Motor Speed Control.

Motor current and torque load are sensed by R2026 and U2035A, providing a signal to U2035B, where it is compared with a reference voltage set by R1015. Integrated circuit U2035B and transistors Q1039 and Q1024 form a voltage-controlled current source for the drive motor.

## Heater-Voltage Regulator

This circuit provides 3 A at 1.0 V to the stylus heating element. The circuit is a series-switching regulator type. Transistor Q2023 acts as a series switch that supplies current to energy storage device L1029. Transistors Q4021 and Q3023 form the sensing amplifier whose signal is amplified by Q3028, Q3027, Q3026, and Q4027 in order to switch Q2023. Diode CR2031 shunts the current that flows through L1029 when Q2023 is turned off. Resistor R4017 is used to set the output voltage at 1 V. The 1 V switching supply is controlled by the stylus heat control line (pin 12), which is grounded when stylus heat is required.



### Pen-Drive Amplifier

The pen-drive amplifier consists of operational amplifier U3034 and power amplifiers Q4030, Q4032, Q3033, and Q4033. STYLUS POSITION, an external screwdriver adjustment, R2034, is used to center the stylus on the chart paper. Gain of the amplifier is controlled by R2033, an internal screwdriver adjustment. The power amplifier circuit provides amplification to either positive or negative going inputs. The +5 V and -5 V (+8 V and -8 V for 1500 Series) to the power amplifiers are controlled by the chart recorder power switches in the parent instrument.

Diodes CR4030 and CR4031 are used to protect the pen drive amplifier from high reverse voltages which may occur on the  $\pm 5$  V ( $\pm 8$  V 1500 Series) power bus. Thermistor RT1039 and R1037 compensate for pen motor non-linearity.

### Speed Sensing

A speed-sensing circuit consists of DS0282, and photosensitive transistor Q0182. As the paper travels, Q0182 is activated by the passing of each sprocket hole. The on-off rate of Q0182 is an indication of the paper motor speed. This activation rate is used to synchronize the display sweep speed with the proper paper motor speed.

# CALIBRATION

## CALIBRATION for 1500 TDR SERIES

### Equipment Required for 1502

1. 50  $\Omega$  terminator (011-0123-00)
2. Chart Recorder Extender (067-1071-00)
3. 3-inch screwdriver

### Equipment Required for 1503

1. Chart Recorder Extender (067-1071-00)
2. 3-inch screwdriver

### 1502 Control Settings:

mp/DIV	200
FEET/DIV	20 ( <i>Metric 5</i> )
DISTANCE DIAL	000
MULTIPLIER	X1
DIELECTRICS	All out
GAIN	5 div. pulse
CABLE	50 $\Omega$ terminator

## 1503 Control Settings:

RET LOSS	0dB
0-dB SET	5 div. pulse
DISTANCE DIAL	000
FEET/DIV	10 ( <i>Metric 1</i> )
MULTIPLIER	X10
DIELECTRICS	All out
IMPULSE WIDTH	100ns
CABLE	No termination

## Stylus Temperature and Gain Adjustment

- a. Remove the chart recorder from the instrument.

- b. Adjust R4017 (STYLUS TEMP) clockwise to increase the graph intensity or counterclockwise to decrease the intensity. See Figures 4-1 or 8-3 for location of chart recorder adjustments.

### NOTE

*Power consumption goes up as the stylus temperature increases. Therefore, it is important to have the stylus temperature as low as possible without sacrificing an adequate recording trace.*

- c. Adjust R2033 (GAIN) clockwise to increase the amplitude of the chart trace or counterclockwise to decrease the amplitude of the trace.
- d. After the chart recording has been made, pull the paper until a dark line is aligned with the red reference line seen through a sprocket hole.
- e. Place the chart recorder back in the instrument.

## Chart Recorder Checks

- a. Using ZERO REF and  $\updownarrow$  POSITION controls, center the trace on the CRT. Baseline should be one horizontal line from the bottom. The leading edge of the 1502 trace should be positioned on the center graticule line. The leading edge of the 1503 trace should be positioned one vertical line from the left (arrow).
- b. Adjust 1503 VAR for an 8 division pulse width. Adjust 0-dB SET (1502 GAIN) for a 5 division pulse height.
- c. Press RECORD switch momentarily (for stylus to heat), then release.
- d. Adjust STYLUS POSITION control so the baseline position on the chart trace matches the CRT baseline (see Fig.4-2).
- e. When the recording is complete, check that the recording starts at the second division line from the right. The amplitude of the pulse should match that of the CRT (5 div.). If it does not, adjust the chart recorder gain.
- f. The position of the leading edge of the chart recording should match the position of the leading edge of the CRT pulse. (In the 1503, both the leading and trailing edges should match.) If they do not match within 1 minor division, re-check the the horizontal timing as outlined in the parent instrument manual.

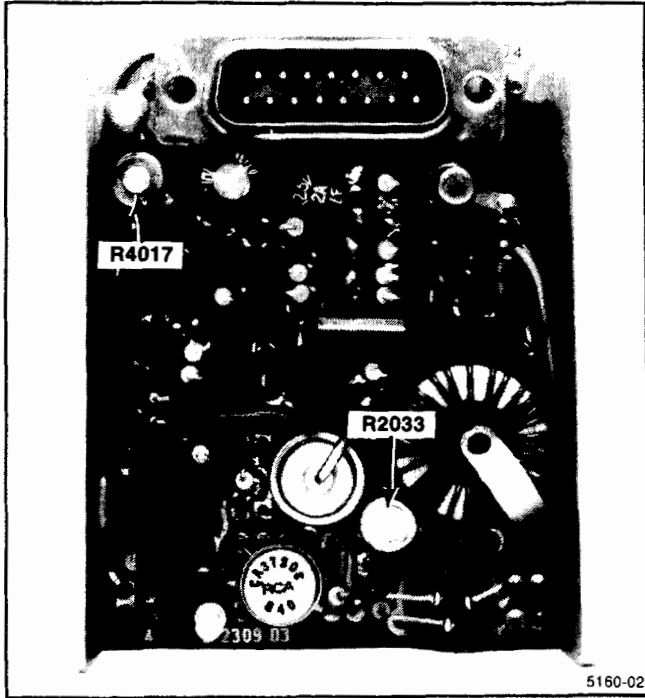


Fig. 4-1. Chart Recorder Controls.

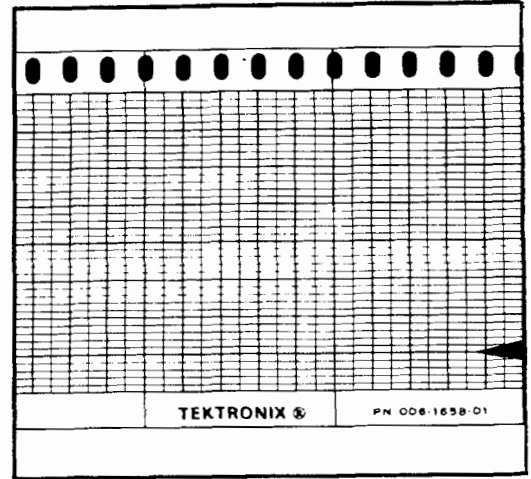


Fig. 4-2. Stylus Position Adjusted.

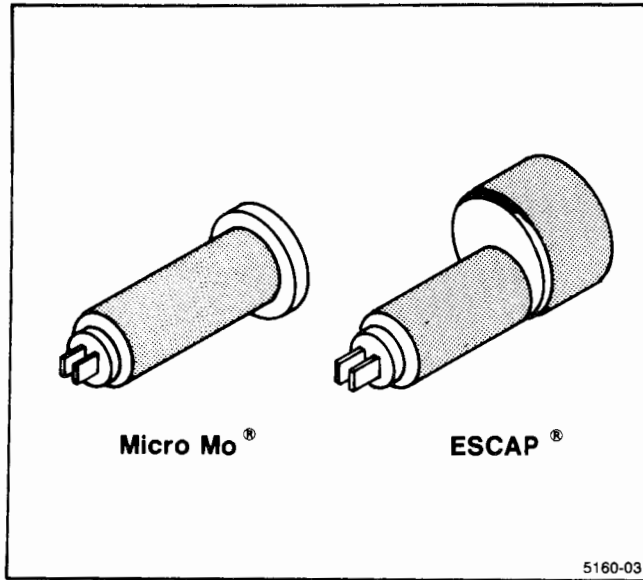


Fig. 4-3. Chart Recorder Motors.

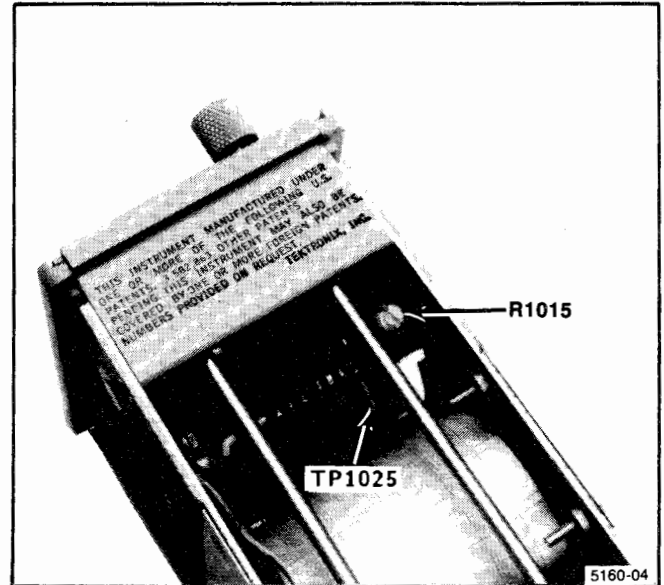


Fig. 4-4. Motor Speed Control.

## Motor Speed Adjustment

- a. To make the motor speed adjustment determine which motor has been used in your instrument (see Figure 4-3).
- b. Attach a voltmeter probe to P1025 on the Motor Speed Control board (see Figure 4-4).
- c. With the Chart Recorder on the Chart Recorder Extender (067-1071-00) push the RECORD button and, while the chart is running, adjust R1015 for 1.55 V (MicroMo motor) or 1.79 V (ESCAP motor).
- d. Remove the Chart Recorder Extender and replace the Chart Recorder in the plug-in module compartment.

## CALIBRATION for OPTICAL FIBER TDR SERIES

### Equipment Required

1. OF TDR Series Service Kit (See parent manual)
2. 3-inch screwdriver
3. Interlock Contact Ring (OF150/OF152)  
(Some later instruments may not require this device. See appropriate service manual.)

### Stylus Temperature and Gain Adjustment

- a. Turn off the power to the parent instrument. Remove the chart recorder from the instrument. (Or the Chart Extender may be used.)
- b. Adjust R4017 (STYLUS TEMP) clockwise to increase the graph intensity or counterclockwise to decrease the intensity. See Figure 4-1 for location of chart recorder adjustments.

#### NOTE

*Power consumption goes up as the stylus temperature increases. Therefore, it is important to have the stylus temperature as low as possible without sacrificing an adequate recording trace.*

- c. Adjust R2033 (GAIN) clockwise to increase the amplitude of the chart trace or counterclockwise to decrease the amplitude. See Figure 4-1.
- d. Pull the chart paper until one of the dark lines is aligned with the red reference line seen through a sprocket hole. See Figure 4-6. Place the chart recorder back in the instrument.



## Motor Speed Adjustment

- a. To make the motor speed adjustment, determine which motor has been used in your instrument (see Figure 4-3).
- b. Attach a voltmeter probe to PI025 on the Motor Speed control board (see Figure 4-4).
- c. With the chart recorder connected to the Chart Recorder Extender, push the RECORD switch and monitor the voltage. Adjust R1015 for 1.55 V (Micromotor) or 1.79 V (ESCAP).
- d. Remove the Chart Recorder Extender, and plug in the Chart Recorder.

## Chart Recorder Checks

- a. On the OF150 and OF152, install an Interlock Contact Ring. (Not necessary on OF151, or later models of the OF150 and OF152).
- b. Put the instrument in the Calibration Aid Mode.
- c. Set the DIST/DIV on the OF151/OF152 to 10 (OF150 to 2). The LCD readout should be 9.
- d. Use the  $\uparrow\downarrow$  POSITION control to set the straight line on the CRT to the center graticule line.
- e. Push and release the RECORD switch.
- f. While the chart is running, adjust the STYLUS POSITION on the chart recorder so the line being drawn is on the center graticule line of the chart.

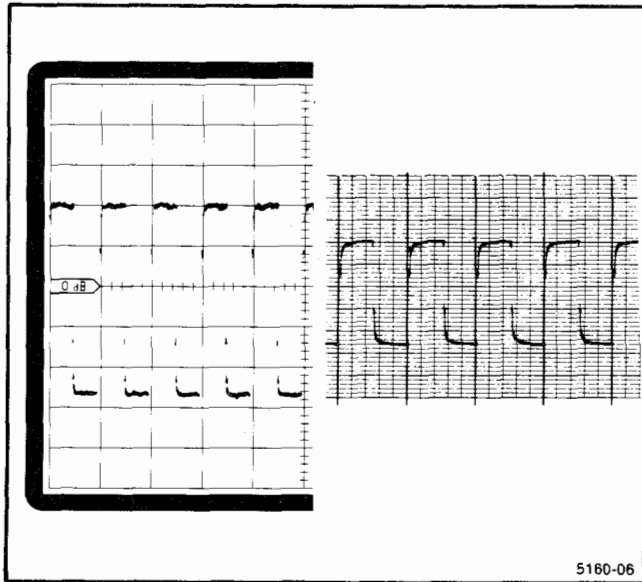


Fig. 4-5. Verifying Peak-to-Peak Signals.

### Check Distance Scale Linearity

( $\pm 0.2$  major division match at any point)

### Check Vertical Scale Linearity

( $\pm 5\%$  of deflection from center,  $\pm 0.3$  major division)

- a. Push SWEEP.
- b. Use the  $\uparrow\downarrow$  POSITION control to set the waveform peaks to the third graticule line from the top of the CRT.
- c. Push and release the RECORD switch. When the chart recording is finished, remove it and compare it to the display on the CRT.
- d. Check that the rising edges of the waveform coincide with the major graticule lines on the chart,  $\pm 0.2$  major divisions match at any point. If they do not match, adjust R1015 (Motor Speed Control).

## Y-T Calibration

- e. Check that the peak-to-peak signal on the CRT display coincides with the major graticule lines on the chart,  $\pm 5\%$  of deflection from the center graticule line,  $\pm 0.3$  major division (see Figure 4-5). If they do not match, adjust R2033 (GAIN).
- f. Remove the Chart Recorder Extender, and plug in the Chart Recorder.

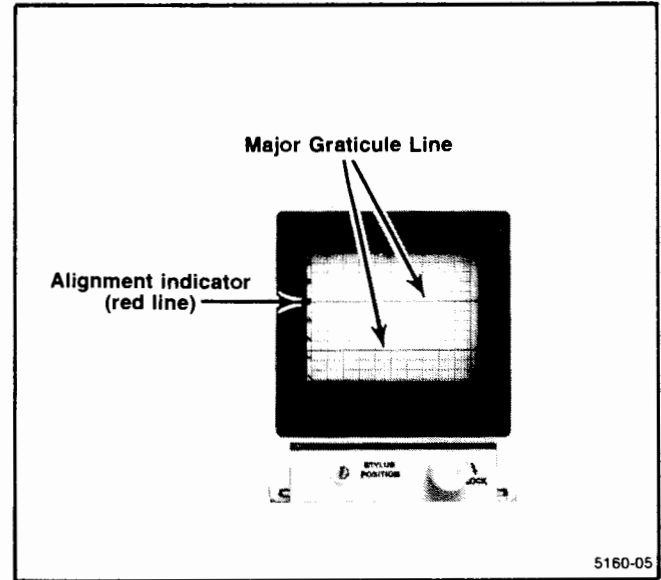


Fig. 4-6. Aligning Chart Paper.

# MAINTENANCE

## Chart Recorder Repair

Except for the stylus and the rubber rollers, the chart recorder is virtually maintenance free. Instructions for replacing the stylus and the rubber rollers are given in the following procedures. If replacement of other mechanical parts should be necessary, refer to the exploded views which are located in the mechanical parts list section.

## Changing the Stylus

1. Disconnect P4012 from the circuit board (see Figure 5-1a).
2. Remove the two screws from the rear of the cover and carefully remove the cover (see Figure 5-1b).
3. Disconnect P1013 from the circuit board.
4. Using a 0.05-inch allen wrench, loosen the set screw and lift the assembly off the motor shaft.
5. Remove the holding screw from the stylus assembly.
6. Separate the stylus and the holder.
7. Install a new stylus (Tek Part No. 119-0365-00).
8. Loop the stylus wires around the motor shaft as shown in Figure 5-2. Connect P4012 and P1013.

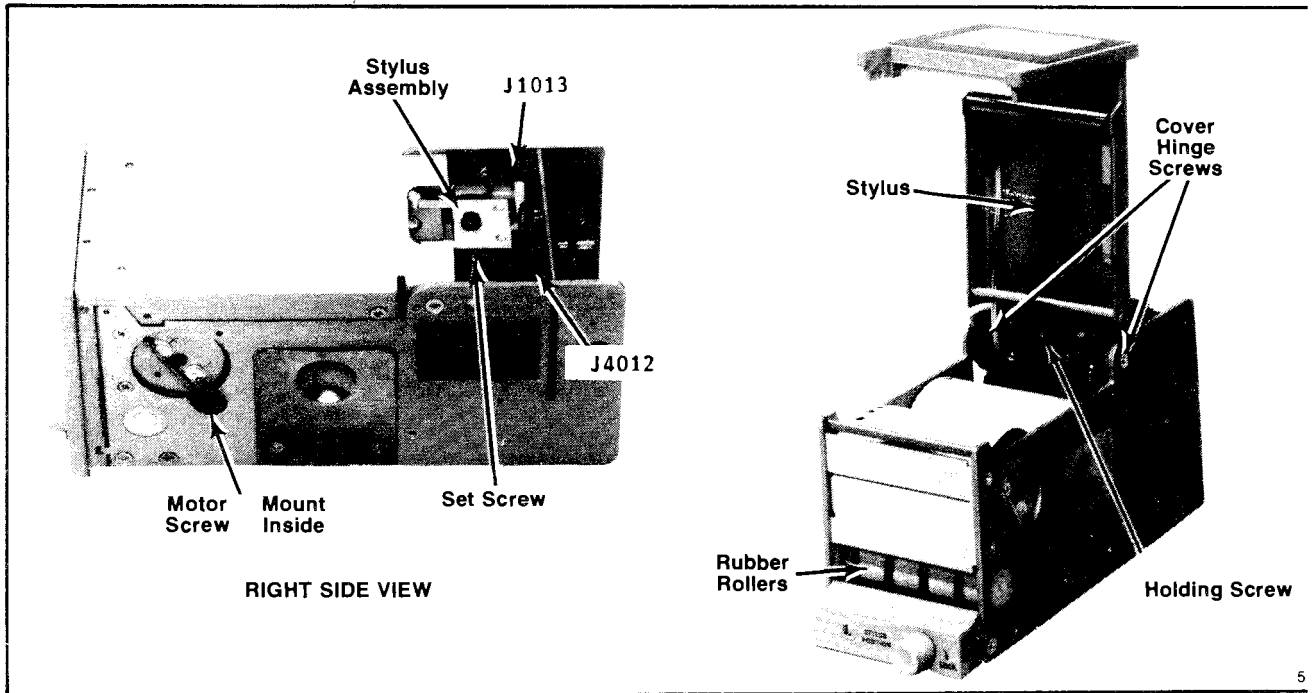


Fig. 5-1a and 5-1b. Location of Chart Recorder Components.

**CAUTION**

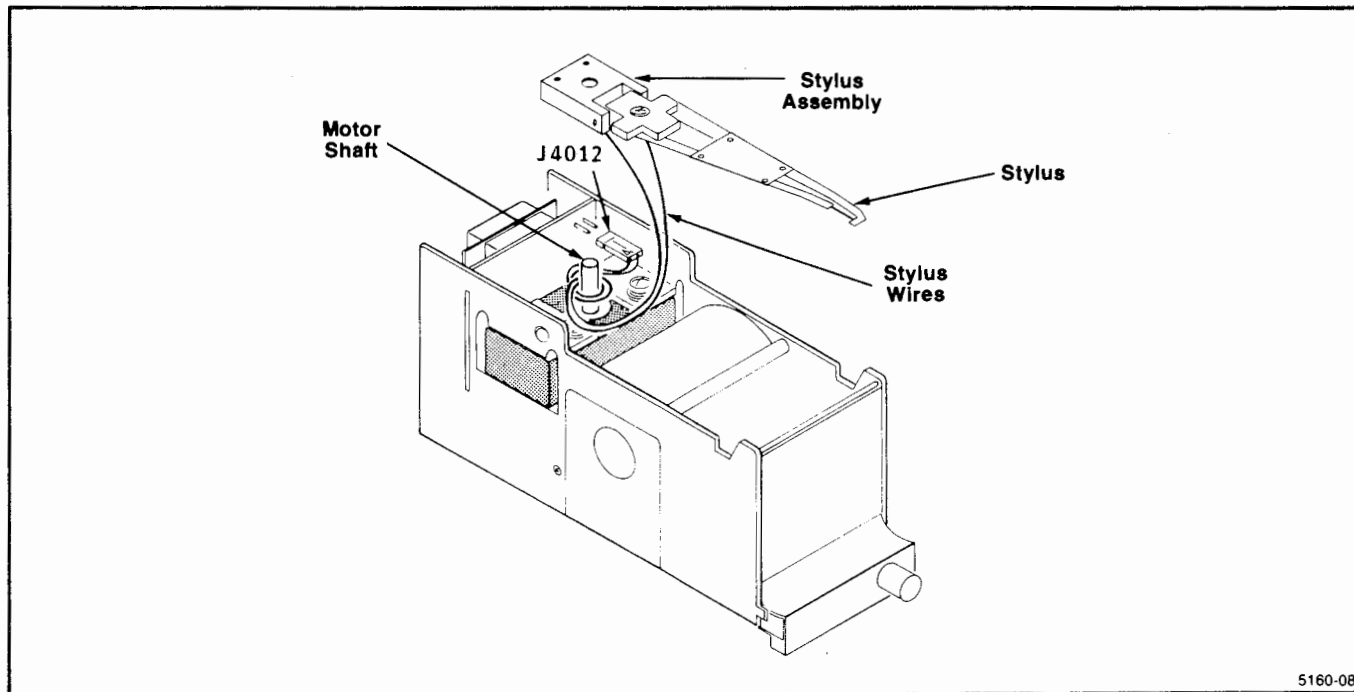
*The recorder will not operate accurately unless step 8 is performed exactly as described.*

9. Re-install the stylus assembly so that approximately 1/16 inch of the motor shaft protrudes through the assembly.
10. Center the writing element on the writing roller.
11. Tighten the set-screw. The stylus should now move freely with a light pressure on the writing roller. Adjust as necessary by bending the stylus near the holder.
12. Move the stylus assembly into a vertical position.
13. Carefully re-install the cover. The stylus should be located behind the two metal rollers.

14. With the cover closed and the paper roll removed, check to see if the stylus holder clears the left side of the cover. Readjust the height of the stylus holder and stylus pressure as necessary.

### Replacing the Rubber Rollers

1. Remove the chart recorder from the instrument.
2. Remove the chart recorder's cover and right side (see Figure 5-1).
3. Loosen the motor mount screws.
4. Remove the metal roller.
5. Remove the old rubber rings and install four new rings.
6. Set the metal roller back into the left bearing. Be sure drive belt is positioned properly.



5160-08

Fig. 5-2. Correct Alignment of Stylus Assembly Connecting Wire.

7. Replace the right side.
8. Move the motor slightly to take up slack in the belt and tighten the motor mount screws.



*Do not overtighten the drive belt.*

9. Position the motor LC network (circuit board A2) clear of the paper roll and drive roller.

## REPACKING FOR SHIPMENT

If the Tektronix instrument is to be shipped to a Tektronix Service Center for service or repair, attach a tag showing: owner (with address) and the name of an individual at your firm that can be contacted, complete instrument serial number and description of the service required.

Save and re-use the package in which your instrument was shipped. If the original packaging is unfit for use, or not available, repackage the instrument as follows:

1. Obtain a carton of corrugated cardboard having inside dimensions of no less than six inches more than the instrument dimensions; this will allow for cushioning. Refer to the following table for carton test strength requirements.

SHIPPING CARTON TEST STRENGTH	
Gross Weight (lb)	Carton Test Strength (lb)
0-10	200
10-30	275
30-120	375
120-140	500
140-160	600

2. Surround the instrument with polyethylene sheeting to protect the finish of the instrument.



## **Y-T Maintenance**

- 3.** Cushion the instrument on all sides by tightly packing dunnage or urethane foam between carton and instrument, allowing three inches on all sides.
- 4.** Seal carton with shipping tape or industrial stapler.

# OPTIONS

No options are planned for the Tektronix Y-T Chart Recorder at this time.

# 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 provide 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 Field Office or representative will contact you concerning any change in

part number.

Change information, if any, is incorporated on each page when the change occurs.

### List of Assemblies

A list of assemblies can be found at the beginning of the Replaceable Electrical Parts list. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

### Cross Index:Mfr. Code Number to Manufacturer

The Mfr. Code Number to Manufacturer index for the Electrical Parts List is located immediately following this introduction. The Cross Index provides codes, names, and addresses of manufacturers of components listed in the Replaceable Electrical Parts List.

### Abbreviations

Abbreviations conform to American National Standard Y1.1.

### Component Number (Column One of the Electrical Parts List)

A numbering method has been used to identify assemblies, subassemblies, and parts. Examples of this numbering method and typical expansions are illustrated below.

### Example a.

Component number

A23R1234 :    A23    R1234

Assembly    Circuit  
number      number

**Read: Resistor 1234 of assembly 23**

### Example b.

Component number

A23A2R1234 : A23    A2    R1234

Assembly    Subassembly    Circuit  
number      number      number

**Read: Resistor 1234 of subassy 2 of Assy 23**

Only the circuit number will appear on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical

## Replaceable Electrical Parts - YT- CHART RECORDER

exploded views located in the Replaceable Mechanical Parts list. The component number is obtained by adding the assembly number prefix to the circuit number.

The parts list is divided and arranged by assemblies in numerical sequence (e.g., assembly A1, with its subassemblies and parts, precedes A2, with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are listed at the end of the Replaceable Electrical Parts list.

### **Tektronix Part No. (Column Two)**

This indicates the part number to be used when ordering a replacement part from Tektronix.

### **Serial/Model No. (Columns Three and Four)**

Column three indicates the serial number of the first instrument in which the part was used. Column four indicates the serial number of the last instrument in which the part was used. No entries indicates that the part is used in all instruments.

### **Name and Description (Column Five)**

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

## **Replaceable Electrical Parts - YT- CHART RECORDER**

### **Mfr. Code (Column Six)**

This indicates the code number of the actual manufacturer of the part. (The Mfr. Code Cross Index begins on the following page.)

### **Mfr. Part Number (Column Seven)**

This column lists the manufacturer's part number.

## Replaceable Electrical Parts - YT- CHART RECORDER

### CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
TK0020	UNITED CHEMI-CON INC	1128 LEXINGTON AVE	ROCHESTER, NY 14606
TK0058	NEC ELECTRON INC	252 HUMBOLDT COURT	SUNNYVALE, CA 94086
TK1394	MURATA ERIE NORTH AMERICAN INC	1148 FRANKLIN RD SE	MARIETTA, GA 30067
01121	ALLEN-BRADLEY COMPANY	1201 2ND STREET SOUTH	MILWAUKEE, WI 53204
01295	TEXAS INSTRUMENTS, INC	13500 N CENTRAL EXPRESSWAY	DALLAS, TX 72265
02735	RCA CORPORATION	ROUTE 202	SOMERVILLE, NY 08876
03508	GENERAL ELECTRIC COMPANY	W GENESEE ST	AUBURN, NY 13021
04222	AVX CERAMICS	19th AVE SOUTH P O BOX 867	MYRTLE BEACH, SC 29577
04713	MOTOROLA INC	5005 E MCDOWELL RD., P.O. BOX 20923	PHOENIX, AZ 85036
05397	UNION CARBIDE CORP	11901 MADISON AVE	CLEVELAND, OH 44101
14433	ITT SEMICONDUCTORS DIVISION		WEST PALM BEACH, FL
15454	AMETEK INC/RODAN DIV	2905 BLUE STAR ST.	ANAHEIM, CA 92806
32997	BOURNS INC/TRIMPOT PRODUCTS DIV.	1200 COLUMBIA AVE.	RIVERSIDE, CA 92507
50778	PORTESCAP, US	730 FIFTH AVENUE	NEW YORK, NY 10019
56289	SPRAGUE ELECTRIC CO.	87 MARSHALL ST.	NORTH ADAMS, MA 01247
75915	LITTELFUSE, INC.	800 E. NORTHWEST HWY	DES PLAINES, IL 60016
80009	TEKTRONIX, INC.	P.O. BOX 500	BEAVERTON OR 97077

## Replaceable Electrical Parts - YT- CHART RECORDER

### A1 - CHART RECORDER

Ckt.No.	Part No.	Eff.	Dscont	Name & Description	Code	Number
A1	670-1742-06			CKT BOARD ASSY: CHART RECORDER ( MFD BEFORE 5/24/87)	80009	670-1742-06
	670-1742-07			CKT BOARD ASSY:CHART RECORDER ( MFD 5/24/87 -- 6/1/87)	80009	670-1742-07
	670-1742-08			CKT BOARD ASSY:CHART RECORDER ( MFD AFTER 6/1/87)	80009	670-1742-08
A1C2034	283-0204-00			CAP.,FXD,CER DI:0.01 $\mu$ F,20%,50V	04222	SR155E103MAA
A1C3023	283-0111-00			CAP.,FXD,CER DI:0.1 $\mu$ F,20%,50V	04222	SR215E104MAA
A1C4015	290-0530-00			CAP.,FXD,ELECTLT:68 $\mu$ F,20%,6V	05397	T368B686M006ASC8
A1C4016	290-0943-00			CAP.,FXD,ELECTLT:47 $\mu$ F,+50-10%,25V	TK0020	SM25VB-470
A1C4018	290-0522-00			CAP.,FXD,ELECTLT:1 $\mu$ F,20%,50V	05397	T368A105M050AZ
A1C4035	283-0032-00			CAP.,FXD,CER DI:470pF,5%,500V	56289	562CBB501AE
A1CR2018	152-0323-00			SEMICON DVC:SI,35V,0.1A	14433	WG1518
A1CR2031	152-0502-00			SEMICON DVC:SI,20V,5A	04713	1N5823
A1CR3018	152-0141-02			SEMICON DVC:SI,30V,150mA	01295	IN4152
A1CR4030	152-0333-00			SEMICON DVC:SI,55V,200mA	03508	DJ2011
A1CR4031	152-0333-00			SEMICON DVC:SI,55V,200mA	03508	DJ2011
A1F2017	159-0128-00			FUSE,CARTRIDGE:2A,125V,5 SEC	75915	273002



## Replaceable Electrical Parts - YT- CHART RECORDER

### A1 - CHART RECORDER (cont)

Ckt.No.	Part No.	Eff.	Dscnt	Name & Description	Code	Number
A1J1013	-----			(SEE 1-62 RMPL)		
A1J1037	-----			(SEE 1-62 RMPL)		
A1J1096	-----			(SEE 1-62 RMPL)		
A1J4012	-----			(SEE 1-62 RMPL)		
A1J4036	-----			(SEE 1-62 RMPL)		
A1J4037	-----			(SEE 1-62 RMPL)		
A1L1029	108-0708-00			COIL,RF:FIXED,75nH	80009	108-0708-00
A1Q1015	151-0301-00			XSTR:SI,PNP ( MFD BEFORE JUNE 1, 1987)	04713	ST898
A1Q1015	151-0164-00			XSTR:SI,PNP ( MFD AFTER JUNE 1, 1987)	04713	2N2907A
A1Q1016	151-0342-00			XSTR:SI,PNP	01295	SKA6177
A1Q1023	151-0207-00			XSTR:SI,NPN	03508	X38D6191
A1Q2023	151-0366-00			XSTR:SI,PNP	03508	X45CR277
A1Q3023	151-0341-00			XSTR:SI,NPN	04713	SPS6919

## Replaceable Electrical Parts - YT- CHART RECORDER

### A1 - CHART RECORDER (cont)

Ckt.No.	Part No.	Eff.	Dscont	Name & Description	Code	Number
A1Q3026	151-0341-00			XSTR:SI,NPN	04713	SPS6919
A1Q3027	151-0334-00			XSTR:SI,NPN	04713	SJE914
A1Q3028	151-0342-00			XSTR:SI,PNP	01295	SK6177
A1Q3032	151-0341-00			XSTR:SI,NPN	04713	SPS6919
A1Q3033	151-0342-00			XSTR:SI,PNP	01295	SKA6177
A1Q4021	151-0341-00			XSTR:SI,NPN	04713	SP6919
A1Q4027	151-0341-00			XSTR:SI,NPN	04713	SP6919
A1Q4030	151-0324-00			XSTR:SI,PNP	04713	SJE915
A1Q4033	151-0323-00			XSTR:SI,NPN,SEL FROM MJE521	04713	SJE916
A1R1023	315-0183-00			RES.,FXD,CMPSN:18K OHM,5%,0.25W	01121	CB1835
A1R1027	315-0241-00			RES.,FXD,CMPSN:240 OHM,5%,0.25W	01121	CB2415
A1R1037	307-0103-00			RES.,FXD,CMPSN:2.7 OHM,5%,0.25W	01121	CB27G5
A1R2016	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
A1R2017	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
A1R2019	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125

## Replaceable Electrical Parts - YT- CHART RECORDER

### A1 - CHART RECORDER (cont)

Ckt.No.	Part No.	Eff.	Dscont	Name & Description	Code	Number
A1R2021	315-0623-00			RES.,FXD,CMPSN:62K OHM,5%,0.25W	01121	CB6235
A1R2022	315-0623-00			RES.,FXD,CMPSN:62K OHM,5%,0.25W	01121	CB6235
A1R2025	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1R2033	311-1269-00			RES.,VAR,NONWW:TRMR,20K OHM,0.5W	32997	3329P-L58-203
A1R2034	311-1970-00			RES.,VAR,NONWW:PNL,50K OHM,10%,1.0W	01121	SPSN 0485503U
A1R2035	315-0243-00			RES.,FXD,CMPSN:24K OHM,5%,0.25W	01121	CB2435
A1R2036	315-0274-00			RES.,FXD,CMPSN:270K OHM,5%,0.25W	01121	CB2745
A1R3017	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A1R3018	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
A1R3019	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1R3021	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
A1R3022	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125

## Replaceable Electrical Parts - YT- CHART RECORDER

### A1 - CHART RECORDER (cont)

Ckt.No.	Part No.	Eff.	Dscont	Name & Description	Code	Number
A1R3023	315-0621-00			RES.,FXD,CMPSN:620 OHM,5%,0.25W	01121	CB6215
A1R3024	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1R3025	315-0511-00			RES.,FXD,CMPSN:510 OHM,5%,0.25W	01121	CB5115
A1R3026	315-0622-00			RES.,FXD,CMPSN:6.2K OHM,5%,0.25W	01121	CB6225
A1R3027	315-0622-00			RES.,FXD,CMPSN:6.2K OHM,5%,0.25W	01121	CB6225
A1R3028	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1R3030	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
A1R3031	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1R3034	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
A1R4017	311-1263-00			RES.,VAR,NONWWW:1K OHM,10%,0.50W	32997	3329P-L58-102
A1R4023	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A1R4025	307-0111-00			RES.,FXD,CMPSN:3.6 OHM,5%,0.25W	01121	CB36G5

Replaceable Electrical Parts - YT- CHART RECORDER

**A1 - CHART RECORDER** (cont)

Ckt.No.	Part No.	Eff.	Dscont	Name & Description	Code	Number
A1R4027	307-0111-00			RES.,FXD,CMPSN:3.6 OHM,5%,0.25W	01121	CB36G5
A1R4033	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
A1RT1039	307-0157-00			RES.,THERMAL:5 OHM,10%,DISC	15454	5DA5R0K270SSSIL
A1U3034	156-0686-02			MICROCKT,LI:OPNL AMP,SCREENED	02735	CA3130SX

## Replaceable Electrical Parts - YT- CHART RECORDER

### A2 - MOTOR SPEED CONTROL

Ckt.No.	Part No.	Eff.	Dscont	Name & Description	Code	Number
A2	670-7275-00			CKT BD ASSY:MOTOR SPEED CONTROL	80009	670-7275-00
A2C2019	283-0191-00			CAP.,FXD,CER DI:0.022 $\mu$ F,20%,50V	04222	SR205E223MAA
A2C3026	283-0024-00			CAP.,FXD,CER DI:0.1 $\mu$ F,+80-20%,50V	TK1394	RPE122-Z5U104Z
A2CR2031	152-0460-00			SEMICOND DVC:FE,SI,25V,1mA	04713	SCL072
A2J1036	-----			(SEE 1-60 RMPL)		
A2Q1024	151-0302-00			XSTR:SI,NPN	04713	ST899
A2Q1039	151-0311-01			XSTR:SI,NPN	TK0058	NT340
A2R1015	311-1284-00			RES.,VAR,NONWW:20K OHM,10%,0.5W	32997	3329W-L58-203
A2R2014	317-0623-00			RES.,FXD,CMPSN:62K OHM,5%,0.125W	01121	BB6235
A2R2015	317-0134-00			RES.,FXD,CMPSN:130K OHM,5%,0.125W	01121	BB1345
A2R2016	317-0513-00			RES.,FXD,CMPSN:51K OHM,5%,0.125W	01121	BB5135
A2R2024	317-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.125W	01121	BB1045
A2R2025	307-0114-00			RES.,FXD,CMPSN:6.2 OHM,5%,0.25W	01121	CB62G5

## Replaceable Electrical Parts - YT- CHART RECORDER

### A2 - MOTOR SPEED CONTROL (cont)

Ckt.No.	Part No.	Eff.	Dscont	Name & Description	Code	Number
A2R2026	307-0105-00			RES.,FXD,CMPSN:3.9 OHM,5%,0.25W	01121	CB39G5
A2R2029	317-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.125W	01121	BB4715
A2R2035	317-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.125W	01121	BB8225
A2R3015	317-0623-00			RES.,FXD,CMPSN:62K OHM,5%,0.125W	01121	BB6235
A2R3019	317-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.125W	01121	BB1035
A2R3025	317-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.125W	01121	BB4735
A2TP1025	-----			(SEE 1-60 RMPL)		
A2U2035	156-0853-00			MICROCKT,LI:OPER AMP,DUAL	04713	MLM358P1
A2VR3024	152-0195-00			SEMICOND DVC:ZENER,0.4W,5.1V,5%	04713	SZ11755

## Replaceable Electrical Parts - YT- CHART RECORDER

### CHASSIS PARTS AND WIRE ASSEMBLIES

Ckt.No.	Part No.	Eff.	Dscont	Name & Description	Code	Number
- CHASSIS MOUNTED PARTS -						
B0291	147-0036-01			MOTOR,DC:BRUSH TYPE,29 RPM,7V	50778	16M11-2083 W/E
B0295	147-0037-02			ACTR,ELCMCH,RTRY:1.5V	80009	147-0037-02
DS0282	150-1040-04			LED:RED,690nm,40mA MAX W/LEADS & HLDR (150X)	80009	150-1040-01
Q0182	151-0313-01			XSTR:NPN,SI FPT-106 W/HOLDER,WIRE & CONN	80009	151-0313-01
- WIRE ASSEMBLIES -						
W1001	198-2796-01			WIRE SET ELEC:670-1742-06	80009	198-2796-01



# DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

## Symbols

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.12-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

The overline on a signal name indicates that the signal performs its intended function when it is in low state.

Abbreviations are based on ANSI Y1.1-1972.

Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc. are:

Y14.15- 1966    Drafting Practices  
Y14.2 - 1973    Line Conventions and Lettering

Y10.5 - 1968    Letter Symbols for Quantities  
Used in Electrical Science and  
Electrical Engineering

American National Standards Institute  
1430 Broadway  
New York, New York 10018

## Component Values

Electrical components shown on the diagrams are in the following units unless noted otherwise:

Capacitors -    Values one or greater are in pico-  
farads ( $p$  F). Values less than one  
are in microfarads ( $\mu$  F).  
Resistors -    Ohms ( $\Omega$ ).

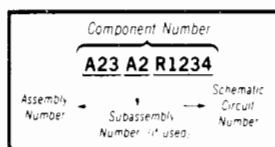
-- The information and special symbols below may appear in this manual --

### **Assembly Numbers and Grid Coordinates**

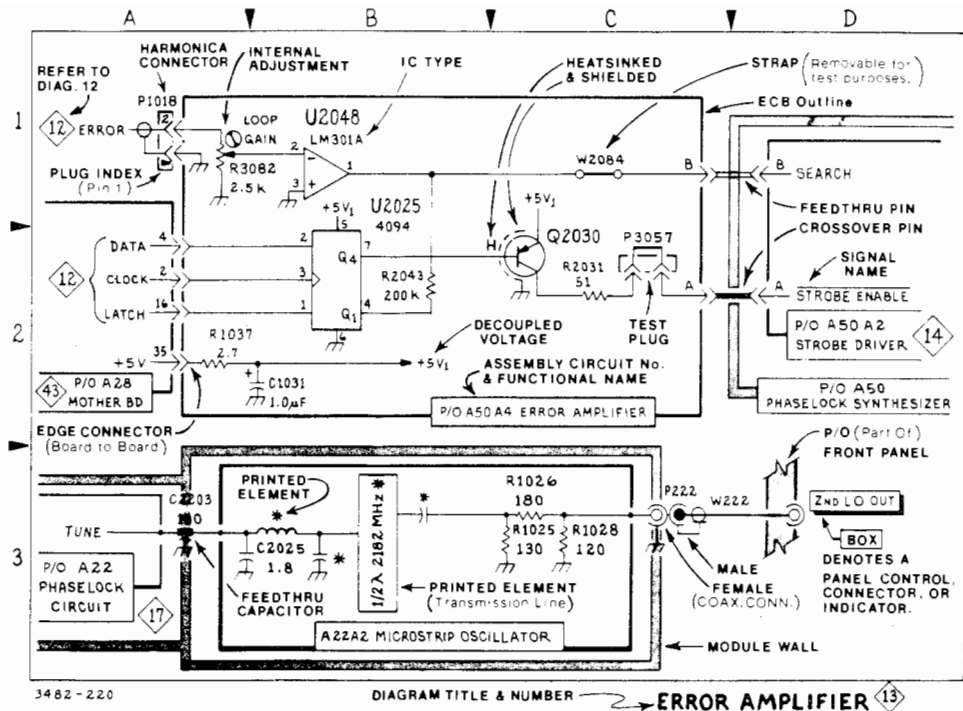
Each assembly in the instrument is assigned an assembly number (e.g., A13). The assembly number appears on the circuit board outline on the diagram, in the title for circuit board component location illustrations, and in the lookup table for the schematic and corresponding component locator illustration. The Replaceable Electrical Parts list is arranged by assemblies in numerical sequence. The components are listed alphabetically and numerically by component number.

The schematic diagram and circuit board component location illustration have grids. A lookup table with the grid coordinates is provided for ease of locating the component. Only the components illustrated on the facing diagram are listed in the lookup table. When more than one schematic diagram is used to illustrate circuitry on a circuit board, the circuit board illustration may only appear opposite the first diagram on which it is illustrated. The lookup table will list the diagram number of other diagrams on which the circuitry of that circuit board appears.

### COMPONENT NUMBER EXAMPLE

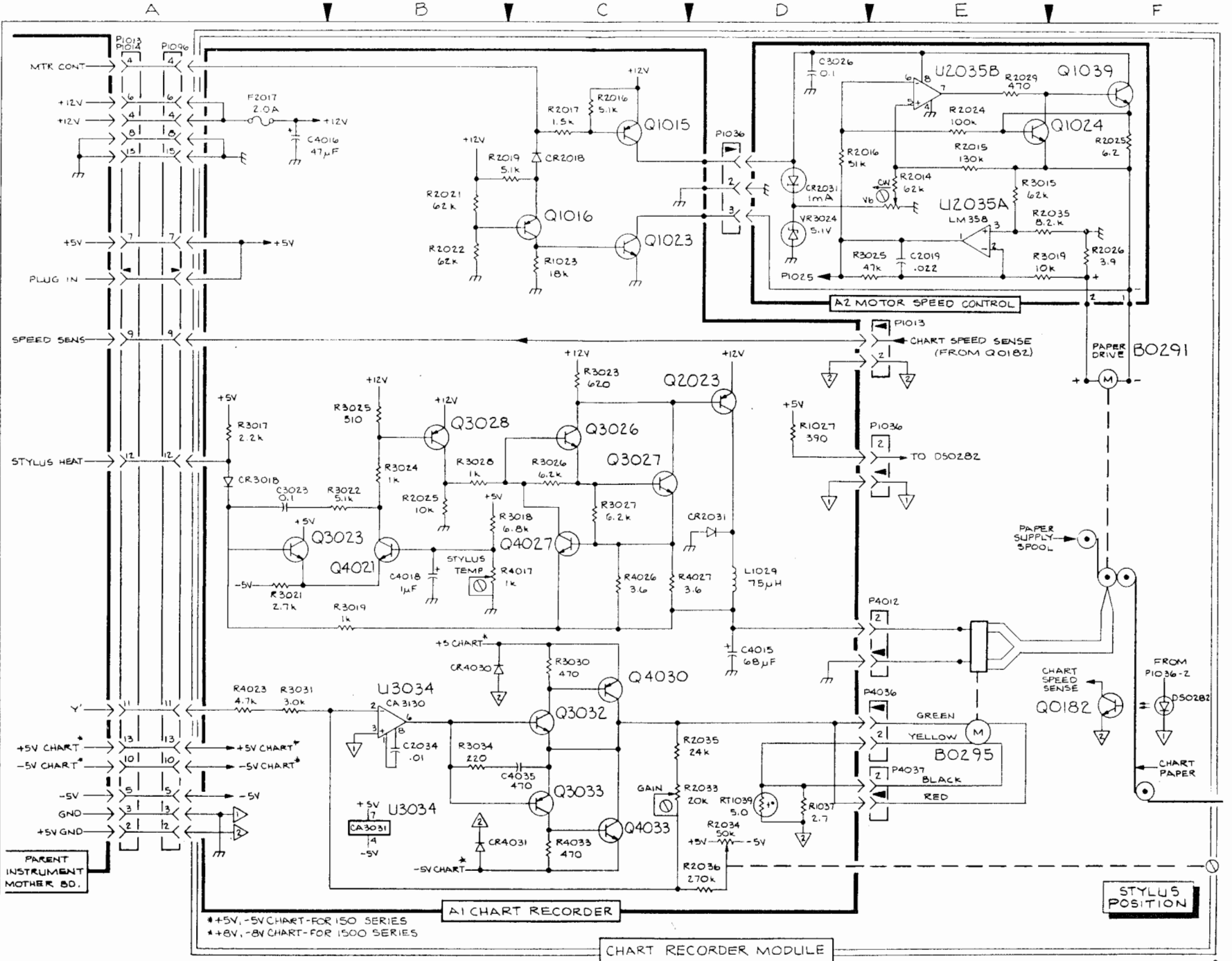


Chassis mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List



3482-220

DIAGRAM TITLE & NUMBER → ERROR AMPLIFIER 13



\*+5V, -5V CHART - FOR 150 SERIES  
 \*+8V, -8V CHART - FOR 1500 SERIES

A1 CHART RECORDER

CHART RECORDER MODULE

STYLUS POSITION

CHART RECORDER A1

## ASSEMBLY A1

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C2034	B4	C2	Q1015	C1	A1	R2034	D5	C2
C3023	A3	B3	Q1016	B2	A1	R2035	D4	C2
C4015	D4	A4	Q1023	C2	B1	R2036	D5	C2
C4016	A1	A3	Q2023	D3	B2	R3017	A3	A3
C4018	B4	A4	Q3023	A3	B3	R3018	B3	A3
C4035	C4	C4	Q3026	C3	B3	R3019	A4	B4
			Q3027	C3	B3	R3021	B4	B3
CR2018	B1	C3	Q3028	B3	B3	R3022	B3	B3
CR3018	A3	B3	Q3032	C4	C3	R3023	C2	B3
CR4030	C4	C4	Q3033	E4	C3	R3024	B3	B3
CR4031	B5	C4	Q4021	B3	B4	R3025	B3	B3
			Q4027	C3	B4	R3026	C3	B3
F2017	A1	A2	Q4030	C4	C4	R3027	C3	B3
			Q4033	C5	C4	R3028	B3	B3
L1029	D3	B1				R3030	C4	B3
			R1023	C2	B2	R3034	B4	C3
J1013	E2	A1	R1027	D3	B1	R4017	B4	A4
J1036	E3	C1	R1037	D5	B4	R4023	A4	B4
J1096	A1	A2	R2016	C1	A2	R4025	C3	B4
J4012	E4	C1	R2017	C1	A2	R4027	C3	B4
J4036	E4	C4	R2019	B1	A2	R4033	C5	C4
J4037	E5	C4	R2021	B1	B2			
			R2022	B2	B2	RT1039	D5	C4
P1037	D1	A1	R2025	B3	B2			
			R2033	D5	C2	U3034	B4	C3

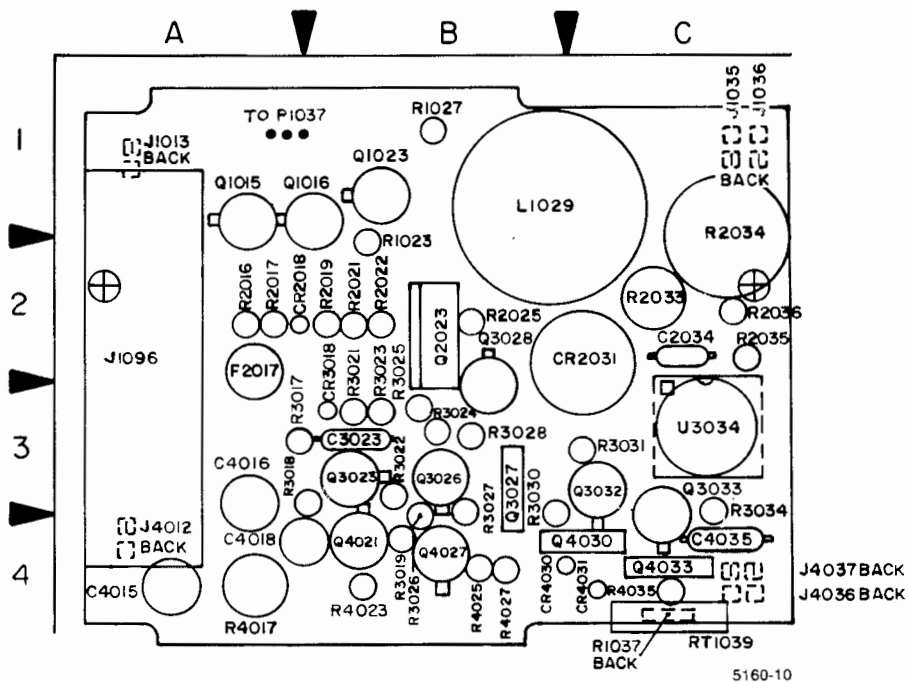
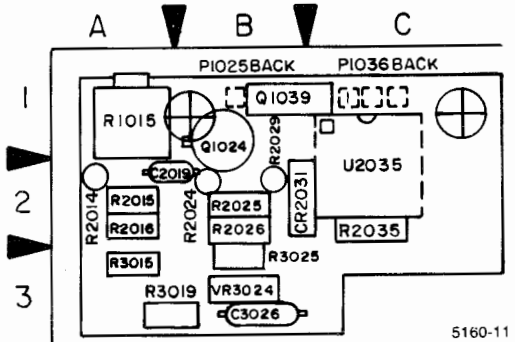


Fig. 8-1. Y-T Chart Recorder Circuit Board.

**ASSEMBLY A2**

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C2019	E2	A2	R2014	E1	A2	R3015	E1	A3
C3026	D1	B3	R2015	E1	A2	R3019	E2	A3
			R2016	D1	A2	R3025	E2	B3
CR2031	D1	C2	R2024	E1	D2			
			R2025	E1	B2	TP1025	D2	B1
Q1024	F1	B1	R2026	E2	B2			
Q1039	F1	B1	R2029	E1	B2	U2035A	E2	C2
			R2035	E2	A3	U2035B	E1	C2
R1015	E1	A1						



5160-11

**Fig. 8-2. Motor Speed Control Circuit Board.**

# Diagrams - Y-T Chart Recorder

CIRCUIT NUMBER	BOARD LOCATION	CIRCUIT NUMBER	BOARD LOCATION	CIRCUIT NUMBER	BOARD LOCATION
C2034	C2	O1015	A1	R2035	B2
C3023	B3	O1016	A2	R2036	D2
C4015	A2	O1023	A1	R3017	B3
C4016	A3	Q2023	B2	R3018	B3
C4018	A3	Q3023	A3	R3018	B3
C4035	D3	Q3026	A2	R3019	B3
CR2018	B1	Q3027	C3	R3021	C3
CR2031	C2	Q3028	C2	R3022	C3
CR3018	B3	Q3032	C2	R3023	B2
CR4030	C3	Q4021	A3	R3024	C3
CR4031	C3	Q4027	C2	R3025	C3
		Q4036	D2	R3026	B2
F2017	A3	Q4033	D2	R3027	B2
				R3028	B3
				R3030	C3
J1013	A1	R1023	A1	R3031	C3
J1036	D1	R1027	B1	R3034	C3
J1096	A1	R1037	D8	R4017	A2
J4012	A3	R2016	A1	R4023	C3
J4036	D3	R2017	B1	R4025	B2
J4037	D3	R2019	B1	R4027	B2
		R2021	B1	R4033	C3
L1029	C1	R2022	B2		
		R2025	B3		
P3030	D3	R2033	D1	RT1039	C3
		R2034	D2	U3034	D2

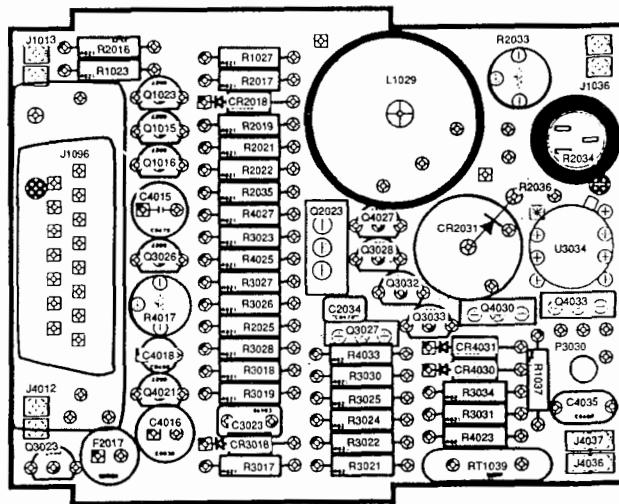


Fig. 8-3. Modified Chart Recorder Board.



# REPLACEABLE MECHANICAL 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 incorporated on each page when the change occurs.

## SPECIAL NOTES AND SYMBOLS

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

## INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. The following is an example of the indentation system used in the description column:

Name & Description

Assembly and/or Component

Attaching parts for this Assembly or Component

---\*---

. Detail Part of Assy or Component

. Attaching parts for Detail Part

---\*---

.. Parts of Detail Part

.. Attaching parts for Parts of Detail Part

---\*---

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included

with, the next higher indentation. The separation - - - \* -  
- - symbol indicates the end of attaching parts.

**Attaching parts must be purchased separately, unless otherwise specified.**

## FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations showing that part.

## ITEM NAME

In this 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.

## Replaceable Mechanical Parts - Y-T Chart Recorder

### ABBREVIATIONS

"	INCH	ELECTRN	ELECTRON	IN	INCH	SCT	SECTION
#	NUMBER SIZE	ELEC	ELECTRICAL	INCAND	INCANDESCENT	SEMICOND	SEMICONDUCTOR
ACTR	ACTUATOR	ELECTLT	ELECTROLYTIC	INSUL	INSULATOR	SHLD	SHIELD
ADPTR	ADAPTER	ELEM	ELEMENT	INTL	INTERNAL	SHLDR	SHOULDERED
ALIGN	ALIGNMENT	EPL	ELECTRICAL PARTS LIST	LPHLDR	LAMP HOLDER	SKT	SOCKET
AL	ALUMINUM	EQPT	EQUIPMENT	MCH	MACHINE	SL	SLIDE
ASSEM	ASSEMBLED	EXT	EXTERNAL	MECH	MECHANICAL	SLVG	SLEEIVING
ASSY	ASSEMBLY	FIL	FILLISTER HEAD	NIP	NIPPLE	SPR	SPRING
ATTEN	ATTENUATOR	FLEX	FLEXIBLE	NONWWW	NOT WIRE WOUND	SQ	SQUARE
AWG	AMERICAN WIRE GUAGE	FLH	FLAT HEAD	ORD BY DESCR	ORDER BY DESCRIPTION	SST	STAINLESS STEEL
BD	BOARD	FLTR	FILTER	OD	OUTSIDE DIAMETER	STL	STEEL
BRKT	BRACKET	FR	FRAME or FRONT	OVB	OVAL HEAD	SW	SWITCH
BRS	BRASS	FSTNR	FASTENER	PHBRZ	PHOSPHOR BRONZE	T	TUBE
BRZ	BRONZE	FT	FOOT	PL	PLAIN or PLATE	TERM	TERMINAL
BSHG	BUSHING	FXD	FIXED	PLSTC	PLASTIC	THD	THREAD
CAB	CABINET	GSKT	GASKET	PN	PART NUMBER	THK	THICK
CAP	CAPACITOR	HDL	HANDLE	PNH	PAN HEAD	TNSN	TENSION
CER	CERAMIC	HEX	HEXAGON	PWR	POWER	TPG	TAPPING
CHAS	CHASSIS	HEXHD	HEXAGONAL HEAD	RCPT	RECEPTACLE	TRH	TRUSS HEAD
CKT	CIRCUIT	HEXSOC	HEXAGONAL SOCKET	RES	RESISTOR	V	VOLTAGE
COMP	COMPOSITION	HLCPS	HELICAL COMPRESSION	RGD	RIGID	VAR	VARIABLE
CONN	CONNECTOR	HLEXT	HELICAL EXTENSION	RLF	RELIEF	W	WITH
CVR	COVER	HV	HIGH VOLTAGE	RTNR	RETAINER	WSHR	WASHER
CPLG	COUPLING	IC	INTEGRATED CIRCUIT	SCH	SOCKET HEAD	WWW	WIRE WOUND
CRT	CATHODE RAY TUBE	ID	INSIDE DIAMETER	SCOPE	OSCILLOSCOPE	XFMR	TRANSFORMER
DEG	DEGREE	IDENT	IDENTIFICATION	SCR	SCREW	XSTR	TRANSISTOR
DWR	DRAWER	IMPLR	IMPELLER	SE	SINGLE END		

CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
TKQ392	NORTHWEST FASTENER SALES	7923 SW CIRRUS DRIVE	BEAVERTON, OR 97005
TK0435	LEWIS SCREW CO	4114 SOUTH PEORIA	CHICAGO, IL 60609
0000Y	PLASTOCK, INC.	380 CHESTNUT ST	NORWOOD, NJ 07648
00779	AMP, INC.	P.O.BOX 3608	HARRISBURG, PA 17105
06540	MITE CORPORATION	446 BLAKE STREET	NEW HAVEN, CT 06515
12327	FREEWAY CORPORATION	9301 ALLEN DRIVE	CLEVELAND, OH 44125
17405	GRAPHIC CONTROLS CORP.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
22526	BERG ELECTRONICS, INC.	730 FIFTH AVENUE	CAMPBELLSVILLE, KY 42718
45722	USM CORP., PARKER-KALON FASTENER DIV.		NEW YORK, NY 10019
50578	PORTESCAP U S		
56878	STANDARD PRESSED STEEL CO.	BENSON EAST	JENKINTOWN, PA 19046
70276	ALLEN MFG. CO.	P.O. DRAWER 570	HARTFORD, CT 06101
71468	ITT CANNON ELECTRIC	666 E. DYER RD.	SANTA ANA, CA 92702
73743	FISCHER SPECIAL MFG. CO.	446 MORGAN STREET	CINCINNATI, OH 45206
74445	HOLO-KROME CO.	31 BROOK ST. WEST	HARTFORD, CT 06110
79136	WALDES, KOHINOOR, INC.	47-16 AUSTEL PLACE	LONG ISLAND, NY 11101
79807	WROUGHT WASHER MFG. CO.	2100 S. O BAY ST.	MILWAUKIE, WI 53207
80009	TEKTRONIX, INC.	P.O. BOX 500	BEAVERTON, OR 97077

CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
83259	PARKER SEAL CO-O-SEAL,	10567 JEFFERSON BLVD	CULVER CITY, CA 90231
83309	ELECTRICAL SPECIALITY CO	213 E HARRIS AVE	SOUTH SAN FRANCISCO, CA 94080
83385	CENTRAL SCREW CO.	2530 CRESCENT DRIVE	BROADVIEW, IL 60153
86928	SEASTROM MFG. CO., INC.	701 SONORA AVENUE	GLENDALE, CA 91201
95987	WECKESSER CO., INC.	4444 WEST IRVING PARK RD.	CHICAGO, IL 60641

## Replaceable Mechanical Parts - Y-T Chart Recorder

Fig. & Index No.	Tektronix Part.No.	Serial/Model No.		Qty.	Name & Description	Mfr. Code	Mfr.Part Number
		Eff.	Dscont.				
1-	016-0506-07			1	CHART RECORDER:OF15X ONLY	80009	016-0506-07
-1	386-2118-00			1	PLATE,BACKING:CHART PAPER (ATTACHING PARTS)	80009	386-2118-00
-2	211-0030-00			3	SCREW,MACHINE:2-56 X .250 FLH STL -----	83385	ORD BY DESCR
-3	358-0378-00			1	BUSHING,SLEEVE:0.131 ID X 0.125 L	80009	358-0378-00
-4	366-0650-00			1	. KNOB:THUMBSCREW,CLEAR,0.12 X 0.37	80009	366-0650-00
	213-0048-00			1	. . SETSCREW:4-40 X 0.125,STL,BLK,OXD	TK0433	ORD BY DESCR
-5	210-1011-00			1	WASHER,FLAT:0.13 ID X 0.375 OD,0.01 THK,NYLON	83309	ORD BY DESCR
-6	426-0852-01			1	FRAME SECTION,CABINET:LOWER FRONT (ATTACHING PARTS)	80009	426-0852-01
-7	213-0107-00			4	SCREW,TPG,TF:4-40 X 0.25 FLH STL -----	83385	ORD BY DESCR
-8	354-0163-00			1	RING,RETAINING:TYPE EXT,0.125 ID SFT	79136	5133-18-MI
-9	384-1349-00			1	PIN,STR,THD:0.125 DIA X 6.417 L,AL	80009	384-1349-00
-10	384-1157-00			1	SHAFT,EXTENSION:0.125 OD X 4.44 L,AL	80009	384-1157-00
-11	376-0029-00			1	CPLG,SHAFT,RGD:0.128 ID X 0.312 OD,AL	80009	376-0029-00
-12	200-1302-03			1	BEZEL ASSEMBLY:GENERAL PURPOSE (ATTACHING PARTS)	80009	200-1302-03
-13	220-0629-00			2	NUT,SLEEVE:4-40 X 0.312,HEX,BRS	80009	220-0629-00
-14	211-0101-00			2	SCREW,MACHINE:4-40 X 0.25 FLH STL	83385	ORD BY DESCR

### Replaceable Mechanical Parts - Y-T Chart Recorder

Fig. & Index No.	Tektronix Part.No.	Serial/Model No.		Qty.	Name & Description	Mfr. Code	Mfr.Part Number
		Eff.	Dscont.				
					* * * * *		
1-15	214-1663-00			1	BEZEL ASSEMBLY INCLUDES:	80009	214-1663-00
-16	214-1679-00			1	RLR,CHART PPR:2.179 L,SST MOVING	80009	214-1679-00
					SPRING,RLR TNSN:LEFT		
					(ATTACHING PARTS)		
-17	213-0254-00			1	SCREW,TPG,TF:2-32 X 0.25 FLH	45722	ORD BY DESCR
					* * * * *		
-18	105-0714-00			2	STOP,SLIDE:0.25 L X 0.128 ID,SST	80009	105-0714-00
-19	129-0236-00			1	SPACER,POST:0.125 OD X 2.1 L,AL	06540	9726-A-0440
					(ATTACHING PARTS)		
-20	211-0355-00			2	SCREW,MACHINE:2-56 X 0.250 FLH STL (150X)	80009	211-0355-00
					* * * * *		
-21	214-1674-00			1	RLR,CHART PPR:2.154 L,SST,DRIVEN		
-22	214-1678-00			1	SPRING,RLR TNSN:RIGHT	80009	214-1678-00
					(ATTACHING PARTS)		
-23	213-0254-00			1	SCREW,TPG,TF:2-32 X 0.250 FLH	45722	ORD BY DESCR
					* * * * *		
-24	-----			1	TRANSISTOR:W/HOLDER (SEE Q0182 CHASSIS PARTS)		

## Replaceable Mechanical Parts - Y-T Chart Recorder

Fig. & Index No.	Tektronix Part.No.	Serial/Model No. Eff. Dscont.	Qty.	Name & Description	Mfr. Code	Mfr.Part Number
				(ATTACHING PARTS)		
1-25	213-0254-00		2	SCREW,TPG,TF:2-32 X 0.250 FLH -----*	45722	ORD BY DESCR
-26	214-1682-00		1	HINGE HALF:STYLUS,MOVING UPPER (ATTACHING PARTS)	80009	214-1682-00
-27	210-0406-00		1	NUT,PLAIN HEX:4-40 X 0.188,BRS CDPL	73743	12161-50
-28	211-0008-00		1	SCREW,MACHINE:4-40 X 0.250,PNH,STL CD PL	83385	ORD BY DESCR
-29	214-1749-00		1	PIN,HINGE:0.75 L X 0.125 OD SST -----*	80009	214-1749-00
-30	214-1681-00		1	HINGE HALF:STYLUS,STATIONARY (ATTACHING PARTS)	80009	214-1681-00
-31	211-0008-00		2	SCREW,MACHINE:4-40 X 0.250,PNH,STL CD PL -----*	83385	ORD BY DESCR
-32	214-1682-01		1	HINGE HALF:STYLUS,MOVING LOWER	80009	214-1682-01
-33	214-1680-00		1	SPRING,PIN HINGE	80009	214-1680-00
-34	119-0365-00		1	STYLUS:CHT RCDR:W/W (ATTACHING PARTS)	80009	119-0365-00
-35	211-0602-00		1	SCR,ASSEM WSHR:6-32 X 0.438,DBL SEMS (OF15X)	80009	211-0602-00
-36	210-0202-00		1	TERMINAL LUG:0.146 ID	86928	5442-7



## Replaceable Mechanical Parts - Y-T Chart Recorder

Fig. & Index No.	Tektronix Part.No.	Serial/Model No.		Qty.	Name & Description	Mfr. Code	Mfr.Part Number
		Eff.	Dscont.				
1-37	211-0601-00			3	SCR,ASSEM WSHR:6-32 X 0.312,DBL SEMS (150X) ---*---	83385	ORD BY DESCR
-38	-----			1	STYLUS MOTOR W/WIRES (SEE B0295 CHASSIS PARTS)		
-39	352-0296-00			2	HOLDER,PAPER:CHART ROLL CU BE (ATTACHING PARTS)	80009	352-0296-00
-40	211-0112-00			4	SCREW,MACHINE:2-56 X 0.375 FLH ---*---	83385	ORD BY DESCR
-41	-----			1	LED ASSY (SEE DS0282, CHASSIS PARTS) (ATTACHING PARTS)		
-42	213-0254-00			2	SCREW,TPG,TF:2-32 X 0.25 FLH STL	45722	ORD BY DESCR
-43	343-0119-00			1	CLAMP,LOOP:0.093 ID,NYLON	95987	3/32-2
-44	210-0405-00			1	NUT,PLAIN HEX:2-56 X 0.188 BRS	73743	12157-50
-45	210-0053-00			1	WASHER,LOCK:SPLIT,0.02 THK,STL CD PL	83385	ORD BY DESCR
-46	210-0850-00			1	WASHER,FLAT:0.093 ID X 0.281 OD ---*---	12327	ORD BY DESCR
-47	426-0838-01			1	FRONT SECTION,CHART:RIGHT (ATTACHING PARTS)	80009	426-0838-01
-48	211-0030-00			1	SCREW,MACHINE:2-56 X 0.250 FLH STL ---*---	83385	ORD BY DESCR
-49	214-1709-00			1	BELT,POZ DRIVE:44 TOOTH,3.59 L X0.125 W	OOOY	44MX18-40DP

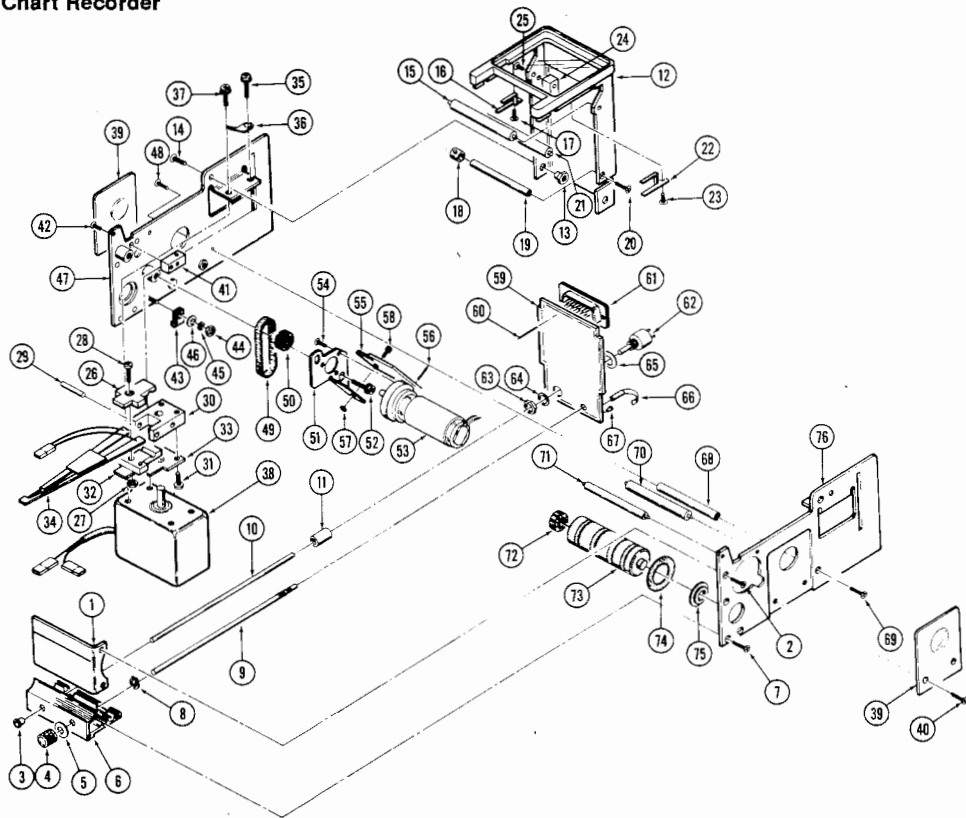
# Replaceable Mechanical Parts - Y-T Chart Recorder

Fig. & Index No.	Tektronix Part.No.	Serial/Model No. Eff. Dscont.	Qty.	Name & Description	Mfr. Code	Mfr. Part Number
1-50	401-0186-01		1	SPROCKET,WHEEL:20 TOOTH,NYLON	80009	401-0186-01
-51	407-2871-00		1	BRACKET,CMPNT:MOTOR,AL (ATTACHING PARTS)	80009	407-2871-00
-52	211-0207-00		2	SCR,ASSEM WSHR:4-40 X 0.312 DOUBLE SEMS -----	TK0435	ORD BY DESCR
-53	-----		1	MOTOR,DC: (SEE B0291, CHASSIS PARTS) (ATTACHING PARTS)		
-54	211-0331-00		3	SCREW,MACHINE:1-72 X 0.125,FLH STL -----	TK0392	ORD BY DESCR
-55	-----		1	CKT BOARD ASSY:MOTOR SPEED CONTROL (SEE A2 REPL)		
-56	131-0608-00		4	.TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD (ATTACHING PARTS)	22526	48283-036
-57	210-0405-00		2	NUT,PLAIN HEX:2-56 X 0.188 BRS	73743	12157-50
-58	211-0180-00		2	SCR,ASSEM WSHR:2-56 X 0.250 DOUBLE SEMS -----	TK0435	ORD BY DESCR
-59	-----		1	CKT BOARD ASSY:CHART RECORDER (SEE A1 REPL)		
-60	131-0608-00		12	.TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	48283-036
-61	131-1164-00		1	.CONNECTOR,RCPT ELEC:CKT BD MT,15 CONTACT	71468	DA 15 PH
-62	-----		1	.RES,VAR: (SEE A1R2034 REPL) (ATTACHING PARTS)		
-63	210-0583-00		1	NUT,PLAIN HEX::25-32 X 0.312 BRS	73743	2X20317-402

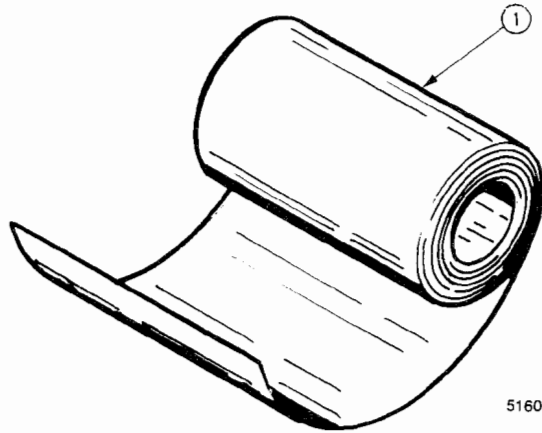
## Replaceable Mechanical Parts - Y-T Chart Recorder

Fig. & Index No.	Tektronix Part No.	Serial/Model No.		Qty.	Name & Description	Mfr. Code	Mfr. Part Number
		Eff.	Dscont.				
1-64	210-0940-00			1	WASHER,FLAT:0.25 ID X 0.02 THK,STL	79807	ORD BY DESCR
-65	210-0992-00			1	WASHER,FLAT:0.265 ID X 0.01 THK,TEFLON	80009	210-0992-00
-66	343-0089-00			1	CLAMP LOOP:0.3 DIA,PLASTIC	80009	343-0089-00
-67	136-0252-00			2	SOCKET,PIN TERM:U/W 0.019 DIA PINS	00779	2-330808-7
-68	129-0327-00			1	SPACER,POST:2.024 L,W/2-56 THD EA END,AL (ATTACHING PARTS)	80009	129-0327-00
-69	211-0030-00			1	SCREW,MACHINE:2-56 X 0.250	83385	ORD BY DESCR
-70	214-1662-00			1	RLR,CHART PPR:0.250 DIA X 2.154 L	80009	214-1662-00
-71	214-1664-00			1	RLR,CHART PPR:0.125 DIA X 2.154 L	80009	214-1664-00
-72	401-0186-02			1	SPROCKET WHEEL:W/BUSHING	80009	401-0186-02
-73	214-1675-01			1	RLR,CHART PPR:DRIVE CORE	80009	214-1675-01
-74	354-0558-00			4	PACKING,PREFMD:0.549 ID X 0.103 XSECT	83259	2113E7745D
-75	401-0147-00			2	BUSHING,PLASTIC:0.730 DIA X 0.080 W/.260 DIA		
-76	426-0837-02			1	FRONT SECTION,CHART:LEFT	80009	426-0837-02

# Replaceable Mechanical Parts - Y-T Chart Recorder



Replaceable Mechanical Parts - Y-T Chart Recorder



5160-13

FIGURE 9-2  
Y-T CHART PAPER

## Replaceable Mechanical Parts - Y-T Chart Recorder

Fig. & Index No.	Tektronix Part.No.	Serial/Model No.		Qty.	Mfr. Name & Description	Mfr.Part	
		Eff.	Dscont.			Code	Number
2-1	006-2658-01			1	PAPER,RCDG,CHART:GRAY (150X ONLY)	80009	006-1658-01
-2	006-3618-00			1	PAPER,RCDG,CHART:GRAY (OF15X ONLY)	17405	ORD BY DESCR

# ACCESSORIES

## Standard Accessories

- 1 Instruction Manual (070-5160-00)
- 1 Roll of Chart Paper (006-3618-00)  
(OF TDR Series only)
- 1 Roll of Chart Paper (006-1658-01)  
(1500 TDR Series only)

## Optional Accessories

- Chart Paper, 25-Roll Pack (006-3618-01)  
(OF TDR Series only)
- Chart Paper, 100-Roll Pack (006-3618-02)  
(OF TDR Series only)
- Chart Paper, 100-Roll Pack (006-1658-02)  
(1500 Series only)