

P6407 WORD RECOGNIZER PROBE

INTRODUCTION

The Tektronix P6407 Word Recognizer Probe is an optional accessory for use with a host instrument having the required circuitry and programming capability. The probe will recognize any 17-bit digital word synchronously (with an external clock) or asynchronously.

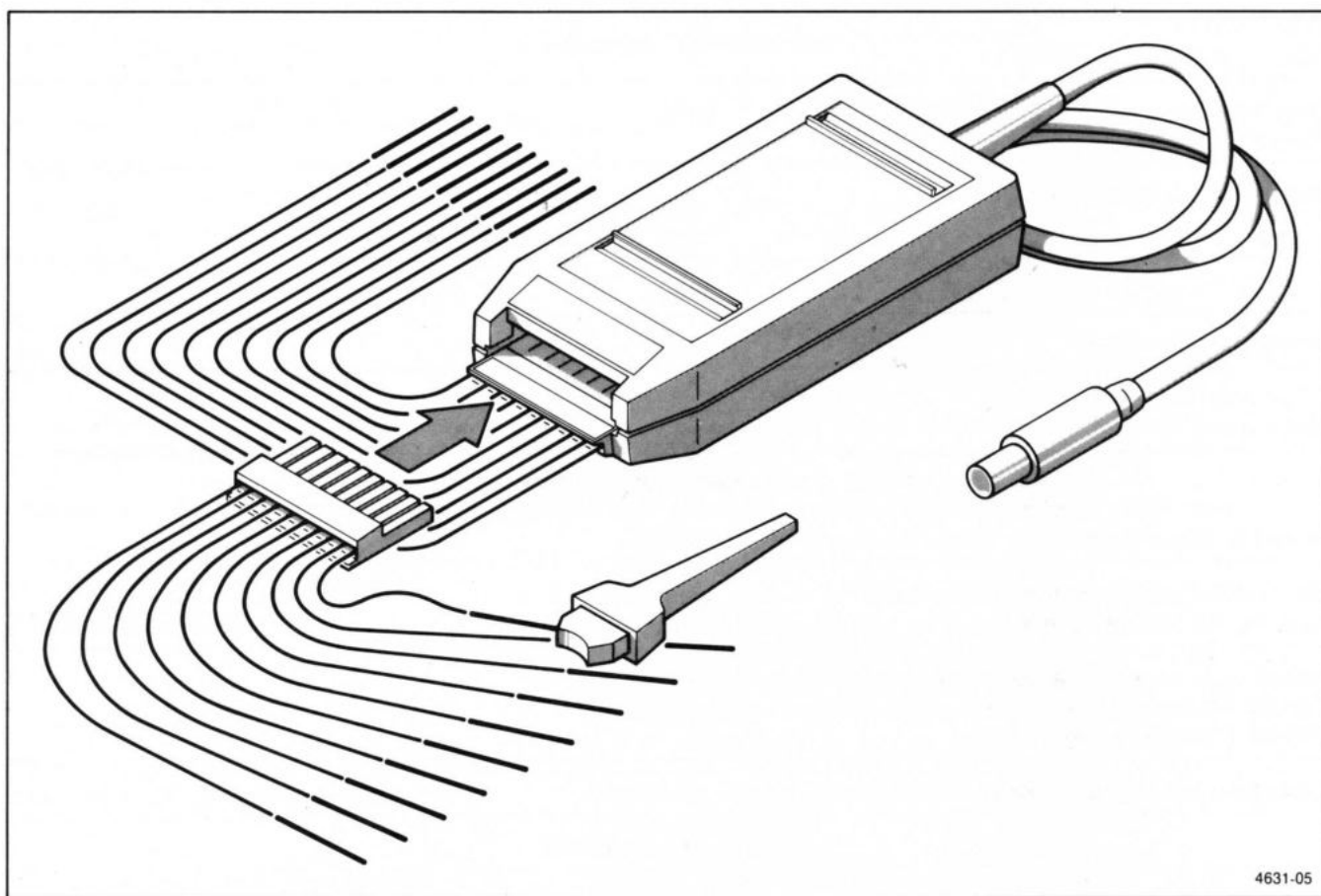


Figure 1. The P6407 Word Recognizer Probe.

This manual contains specifications, circuit descriptions, part replacement, and maintenance information. Specific information concerning interfacing, performance checks, and setup will be found in the host instrument manual.

SPECIFICATION

PERFORMANCE CONDITIONS

Items listed in the "Performance Requirements" column are verifiable qualitative or quantitative limits that define the measurement capabilities of the instrument.

The electrical characteristics are valid when the instrument has been adjusted at an ambient temperature between +20°C and +30°C, has had a warm-up period of at least 20 minutes, and is operated at an ambient temperature between -15°C and +55°C (unless otherwise noted).

Table 1

Word Recognizer Electrical Characteristics



Characteristics	Performance Requirements
SYNCHRONOUS MODE	
Data Setup Time W_0 — W_{15} and Q	25 ns.
Data Hold Time W_0 — W_{15} and Q	0 ns.
Minimum Clock Pulse Width	
High	20 ns.
Low	20 ns.
Minimum Clock Period	50 ns.
Delay from Selected Clock Edge to Word Out	≤ 55 ns.
ASYNCHRONOUS MODE	
Maximum Trigger Frequency	10 MHz.
Minimum Coincidence Between Data Inputs (D_0 — D_{15} & Q) Resulting in a Trigger	85 ns.
Maximum Coincidence Between Any Two Data Inputs (D_0 — D_{15} & Q) Without Producing a Trigger	20 ns.
Delay from Input Word Coincidence to Word Out	≤ 140 ns.
INPUTS AND OUTPUTS	
Input Voltages	
Minimum Input Voltage 	-0.5 V.
Maximum Input Voltage 	5.5 V.
Maximum Input Low Voltage	0.6 V.
Minimum Input High Voltage	2.0 V.

Table 1 (cont)

Environmental Characteristics

Characteristics	Performance Requirements
WORD RECOG OUT	
High	> 2.5 V LSTTL output.
Low	< 0.5 V LSTTL output.
Input High Current	20 μ A.
Input Low Current	–0.6 mA.

Table 2

Environmental Characteristics

Characteristics	Performance Requirements
Temperature	
Operating	–15°C to +55°C.
Nonoperating (storage)	–62°C to +85°C.
Altitude	
Operating	To 15,000 ft. Maximum operating temperature decreases 1°C for each 1,000 ft above 5,000 ft.
Nonoperating (storage)	To 50,000 ft.
Humidity (operating and nonoperating)	Stored at 95% relative humidity for five cycles (120 hours) from 30°C to 60°C, with operational performance checks at 30°C and 55°C.
Vibration (operating)	15 minutes along each of three axes at a total displacement of 0.025 inch p-p (4 g at 55 Hz), with frequency varied from 10 Hz to 55 Hz in one-minute sweeps. Held 10 minutes at each major resonance, or if none existed, held 10 minutes at 55 Hz (75 minutes total test time).
Shock (operating and nonoperating)	50 g, half-sine, 11-ms duration, three shocks on each face, for a total of 18 shocks.
Transit Drop (not in shipping package)	12-inch drop on each corner and each face (MIL-T-28800C, para 3.9.5.2 and 4.5.5.4.2).
Packaged Transportation Drop	Meets the limits of the National Safe Transit Association test procedure 1A-B-2; 10 drops of 36 inches.
Packaged Transportation Vibration	Meets the limits of National Safe Transit Association test procedure 1A-B-1; excursion of 1 inch p-p at 4.63 Hz (1.1 g) for 30 minutes

Table 3
Mechanical Characteristics

Characteristics	Description
Weight	0.27 kg (0.6 lb).
P6407 Probe Dimensions	
Length	
Body	11.4 cm (4.5 in).
Cable	2 m (6.6 ft).
Width	5.6 cm (2.2 in).
Height	2.21 cm (0.87 in).

CIRCUIT DESCRIPTION

Introduction

The Word Trigger Probe is for use with a host instrument having the required circuitry and programming capability that allows an external 17-bit combinational input to be defined for recognition. Each bit of the trigger word is individually selectable by a host instrument's word recognizer programming feature and may be set to either a logic 0, 1, or X (don't care). When operating in synchronous-trigger mode, either a rising-edge or falling-edge clock may be selected.

Control Register

The Control Register (composed of U6330, U6325, U6420, U6430, and U6425) is a 40-bit serial-input, parallel-output register written to by the host instrument. These 40 data bits control the recognition mode of the Word Trigger Probe. The desired trigger-word data, including clock mode and qualifier-bit data, is applied to the probe input as a sequential data stream on the W DATA (word data) line. Each bit of the data stream is sequentially clocked into the probe's 40-bit register by a host instrument processor-generated W CLOCK (word clock).

The 40-bits of control data consist of the (inverted) 16-bit trigger word, 16 bits that define whether or not a given bit will be considered in the comparison, a bit to select either asynchronous or synchronous trigger mode, a bit to select clock polarity (for synchronous mode), a bit defining the logic level of the qualifier bit (if used), a bit to enable or disable the qualifier bit, and four diagnostic bits.

The first four bits clocked into the register are the diagnostic bits used to detect extra shifts that occur if static discharges clock the register. Of these first four bits, the first is always set HI, while the next three are set LO. Normally, the DATA RTRN line will be HI, as set by the first bit. If one, two, or three extra clocks occur (caused by static discharge), the DATA RTRN line (U6425 pin 13) will be LO, warning the host processor of an erroneous setup condition.

The $\overline{\text{QUAL EN}}$ (qualifier enable) bit from Control Register U6425, pin 3, applied to U6335C determines whether or not the qualifier bit should be used in generating a trigger. If the external qualifier is to be ignored, both $\overline{\text{QUAL EN}}$ and QUAL MATCH (from U6425, pin 4) will be set HI by the host processor. This forces the output of U6335C HI and enables Comparator U6415 via U6435A. This is the non-qualified mode and the level of the external Qualifier input is ignored.

To use the qualifier bit, the $\overline{\text{QUAL EN}}$ output from U6425 will be set LO and the QUAL MATCH bit will be set

to the desired "match" level for the bit. With QUAL MATCH set LO, the input level applied to pin 2 of exclusive-OR gate U6435 will pass straight through the gate unchanged; thus the output from U6335C must be LO to enable U6415. This will only occur when the qualifier input line to U6335C, pin 10, is also LO.

With the QUAL MATCH bit set HI, the output from pin 8 of U6335C will be inverted by U6435A before being applied to the enable input of Comparator U6415. This requires that the output of U6335C (and thus the qualifier input line) be HI to enable the Comparator.

Comparator U6320 is enabled all the time and, with U6415 enabled by the proper qualifier bit (or by the "ignore-qualifier" mode), the comparator is ready to look for the combination of inputs to produce a trigger.

Input Gating

The sixteen bits of the trigger word are applied (in their inverted state) to the "match" inputs of the 16-bit comparator made up of U6320 and U6415 from the input control register. The sixteen bits determining whether a given bit is to be used for the comparison are applied to the NAND gates of U6310, U6315, U6405, and U6409. These gate outputs drive the "compare" inputs to the comparators. If a given bit is to be ignored, that trigger-word "match" bit is set HI, and the associated enable bit applied to the NAND gate is set LO. The LO applied to the NAND gate forces its "compare" output HI, and an automatic "match" occurs regardless of what may actually be at the probe's input for that bit.

For any bit to be used in the comparison, the enable bit to the associated NAND gate will be set HI. This enables the probe's input line to control the gate's output applied to the comparator. As mentioned above, the "match" bits are applied to the comparator in their inverted state to compensate for the inversion that occurs through each enabled NAND gate.

Inverting-AND gate U6335D will produce a LO MATCH output whenever both comparators detect that all their bits are matched. This MATCH trigger signal is then applied to the Trigger-Mode Select logic and to the Trigger Synchronizer stages for further processing.

The resistors in series with the probe's input lines and the associated clamping diodes provide over-voltage protection for the probe inputs.

Table 4 lists the function, setup states, and location of each bit of the Control Register.

Table 4
Control Register Setup

IC	Pin	Function	WORD RECOGNIZER SETUP ^a	Control Register Bit ^a
U6330	3	Data input 8 match bit	0	H
			1	L
			X	H
U6330	4	Data input 9 match bit	0	H
			1	L
			X	H
U6330	5	Data input 10 match bit	0	H
			1	L
			X	H
U6330	6	Data input 11 match bit	0	H
			1	L
			X	H
U6330	10	Data input 12 match bit	0	H
			1	L
			X	H
U6330	11	Data input 13 match bit	0	H
			1	L
			X	H
U6330	12	Data input 14 match bit	0	H
			1	L
			X	H
U6330	13	Data input 15 match bit	0	H
			1	L
			X	H

Table 4 (cont)

IC	Pin	Function	WORD RECOGNIZER SETUP ^a	Control Register Bit ^a
U6325	3	Data input 8 input enable	0	H
			1	H
			X	L
U6325	4	Data input 9 input enable	0	H
			1	H
			X	L
U6325	5	Data input 10 input enable	0	H
			1	H
			X	L
U6325	6	Data input 11 input enable	0	H
			1	H
			X	L
U6325	10	Data input 12 input enable	0	H
			1	H
			X	L
U6325	11	Data input 13 input enable	0	H
			1	H
			X	L
U6325	12	Data input 14 input enable	0	H
			1	H
			X	L
U6325	13	Data input 15 input enable	0	H
			1	H
			X	L

^aX = don't care, H = high, and L = low.

Table 4 (cont)

IC	Pin	Function	WORD RECOGNIZER SETUP ^a	Control Register Bit ^a
U6420	3	Data input 0 input enable	0	H
			1	H
			X	L
U6420	4	Data input 1 input enable	0	H
			1	H
			X	L
U6420	5	Data input 2 input enable	0	H
			1	H
			X	L
U6420	6	Data input 3 input enable	0	H
			1	H
			X	L
U6420	10	Data input 4 input enable	0	H
			1	H
			X	L
U6420	11	Data input 5 input enable	0	H
			1	H
			X	L
U6420	12	Data input 6 input enable	0	H
			1	H
			X	L
U6420	13	Data input 7 input enable	0	H
			1	H
			X	L
U6430	3	Data input 0 match bit	0	H
			1	L
			X	H
U6430	4	Data input 1 match bit	0	H
			1	L
			X	H
U6430	5	Data input 2 match bit	0	H
			1	L
			X	H
U6430	6	Data input 3 match bit	0	H
			1	L
			X	H
U6430	10	Data input 4 match bit	0	H
			1	L
			X	H

Table 4 (cont)

IC	Pin	Function	WORD RECOGNIZER SETUP ^a	Control Register Bit ^a
U6430	11	Data input 5 match bit	0	H
			1	L
			X	H
U6430	12	Data input 6 match bit	0	H
			1	L
			X	H
U6430	13	Data input 7 match bit	0	H
			1	L
			X	H
U6425	3	Qualifier input enable	0	L
			1	L
			X	H
U6425	4	Qualifier match bit	0	L
			1	H
			X	H
U6425	5	Clock edge set	↑	L
			↓	H
			X	X
U6425	6	Synchronous/Asynchronous set	↑	H
			↓	H
			X	L
U6425	10			L
U6425	11			L
U6425	12			L
U6425	13	(first bit sent by C/T/T)		H

^aX = don't care, H = high, and L = low.

Synchronizer

The Synchronizer circuit is used to synchronize the probe trigger output to the external clock input (C). The CLK POLARITY bit from Control Register U6425 (pin 5) selects which edge of the clock signal will synchronize the trigger.

Clock-edge selection is performed by exclusive-OR gate U6435B. When the CLK POLARITY bit is set LO, the output of the gate (at pin 6) will follow the input clock signal with no inversion occurring. When the CLK POLARITY bit is set HI, the input clock will be inverted. Since Flip-Flop U6350 requires a positive-edge clock, data at its D input (the MATCH bit) will be latched to the output on either the rising edge (CLK POLARITY bit set LO) or the falling edge (CLK POLARITY bit set HI) of the input clock signal.

Each rising edge of the flip-flop clock will latch the present state of the MATCH input at pin 2 to the Q OUTPUT. At power up, the output of Flip-Flop U6350A will be in an unknown state. If it powers up LO, it will automatically be set HI via U6335A when the flip-flop clock first goes LO. If it powered up HI, the flip-flop's set input will be held HI by U6335A. In either case, the HI set level at pin 4 allows the flip-flop to be clocked. When a clock occurs, a synchronized SYNTRIG (synchronous trigger) will be produced at the Q output if a LO MATCH level is present at the D input.

Whenever a LO SYNTRIG occurs, one input, pin 2, of OR-gate U6335A will be low. When the flip-flop CLOCK goes LO, the Q output of U6350A will be set HI (back to the original state) through the OR-gate in preparation for the next CLOCK rising edge.

Trigger Mode Select

The Trigger Mode Select logic steers either the asynchronous MATCH trigger or the synchronized SYNTRIG trigger to the probe's WORD (word trigger) output. Trigger selection is controlled by the SYNC/ASYNC bit from Control Register U6425, pin 6, and is used to turn on the desired data path.

With the SYNC/ASYNC bit set HI, the asynchronous trigger path is turned off by disabling U6356D. Transistor Q6334, configured as an inverter, will be turned on to enable the synchronous path through U6356C. Resistor R6330 holds one input of U6356B low and the inverted SYNTRIG signal from pin 10 of U6356C is reinverted by U6356B and placed on the WORD output line. This is the synchronous-trigger mode, and all the bit input lines must match the predefined trigger word when the triggering clock event occurs.

With the SYNC/ASYNC bit set LO, transistor Q6334 will be turned off and the synchronous-trigger path through U6356C will be disabled. The resulting LO output from U6356C is used to enable the trigger path through U6356A while the LO SYNC/ASYNC bit opens up the asynchronous path through U6356D. The filter network between U6356D and U6356A slows the trigger's positive-going edges by 35 ns to 60 ns while allowing the negative-going edges to be transferred at a much faster rate. This "pulse stretching" allows very narrow trigger events to stably trigger a host instrument. This is the asynchronous-trigger mode, and a trigger output will be produced whenever the input lines match the predefined trigger word.

MAINTENANCE

This section of the manual contains information for conducting preventive maintenance, troubleshooting, and corrective maintenance on the P6407.

STATIC-SENSITIVE COMPONENTS

The following precautions are applicable when performing any maintenance involving internal access to the instrument.



Static discharge can damage any semiconductor component in this instrument.

This instrument contains electrical components that are susceptible to damage from static discharge. Table 5 lists the relative susceptibility of various semiconductors. Static voltages of 1 kV to 30 kV are common in unprotected environments.

When performing maintenance, observe the following precautions to avoid component damage:

1. Minimize handling of static-sensitive components.
2. Transport and store static-sensitive components or assemblies in their original containers or on a metal rail. Label any package that contains static-sensitive components or assemblies.
3. Discharge the static voltage from your body by wearing a grounded antistatic wrist strap while handling these components. Servicing static-sensitive components or assemblies should be performed only at a static-free work station by qualified service personnel.
4. Nothing capable of generating or holding a static charge should be allowed on the work station surface.
5. Keep the component leads shorted together whenever possible.

6. Pick up components by their bodies, never by their leads.

Table 5
Susceptibility
to Static Discharge Damage

Semiconductor Classes	Relative Susceptibility Levels ^a
MOS or CMOS microcircuits or discretes, or linear microcircuits with MOS inputs. (Most Sensitive)	1
ECL	2
Schottky signal diodes	3
Schottky TTL	4
High-frequency bipolar transistors	5
JFETs	6
Linear microcircuits	7
Low-power Schottky TTL	8
TTL (Least Sensitive)	9

^aVoltage equivalent for levels: (Voltage discharged from a 100 pF capacitor through a resistance of 100 Ω .)

1 = 100 to 500 V 4 = 500 V 7 = 400 to 1000 V(est.)
 2 = 200 to 500 V 5 = 400 to 600 V 8 = 900 V
 3 = 250 V 6 = 600 to 800 V 9 = 1200 V

7. Do not slide the components over any surface.

8. Avoid handling components in areas that have a floor or work-surface covering capable of generating a static charge.

9. Use a soldering iron that is connected to earth ground.

10. Use only approved antistatic, vacuum-type desoldering tools for component removal.

PREVENTIVE MAINTENANCE

INTRODUCTION

Preventive maintenance consists of cleaning, visual inspection, and checking instrument performance. When accomplished regularly, it may prevent instrument malfunction and enhance instrument reliability. The severity of the environment in which the instrument is used determines the required frequency of maintenance. An appropriate time to accomplish preventive maintenance is just before instrument adjustment.

INSPECTION AND CLEANING

Accumulation of dirt in the instrument can cause overheating and component breakdown. Dirt on components acts as an insulating blanket, preventing efficient heat dissipation. It also provides an electrical conduction path that could result in instrument failure, especially under high-humidity.

CLEANING. Loose dust on the outside of the instrument can be removed with a soft cloth or small soft-bristle brush. The brush is particularly useful for dislodging dirt on and around the controls and connectors. Dirt that remains can be removed with a soft cloth dampened in a mild detergent-and-water solution. Do not use abrasive cleaners.

CAUTION

Avoid the use of chemical cleaning agents which might damage the plastics used in this instrument. Use a nonresidue-type cleaner, preferably isopropyl alcohol or a solution of 1% mild detergent with 99% water. Before using any other type of cleaner, consult your Tektronix Service Center or representative.

CAUTION

To prevent getting moisture inside the instrument during external cleaning, use only enough liquid to dampen the cloth or applicator.

CLEANING. To clean the interior, blow off dust with dry, low-pressure air (approximately 9 psi). Remove any remaining dust with a soft brush or a cloth dampened with a solution of mild detergent and water. A cotton-tipped applicator is useful for cleaning in narrow spaces and on circuit boards.

CAUTION

To prevent damage from electrical arcing, ensure that circuit boards and components are dry before applying power to the instrument.

INSPECTION. Inspect the internal portions of the P6407 for damage and wear, using Table 6 as a guide. Deficiencies found should be repaired immediately. The corrective procedure for most visible defects is obvious; however, particular care must be taken if heat-damaged components are found. Overheating usually indicates other trouble in the instrument; therefore, it is important that the cause of overheating be corrected to prevent recurrence of the damage.

Table 6
Internal Inspection Check List

Item	Inspect For	Repair Action
Circuit Boards	Loose, broken, or corroded solder connections. Burned circuit boards. Burned, broken, or cracked circuit-run plating.	Clean solder corrosion with an eraser and flush with isopropyl alcohol. Resolder defective connections. Determine cause of burned items and repair. Repair defective circuit runs.
Resistors	Burned, cracked, broken, blistered.	Replace defective resistors. Check for cause of burned component and repair as necessary.
Solder Connections	Cold solder or rosin joints.	Resolder joint and clean with isopropyl alcohol.
Capacitors	Damaged or leaking cases. Corroded solder on leads or terminals.	Replace defective capacitors. Clean solder connections and flush with isopropyl alcohol.
Semiconductors	Loosely inserted in sockets. Distorted pins.	Firmly seat loose semiconductors. Remove devices having distorted pins. Carefully straighten pins (as required to fit the socket), using long-nose pliers, and reinsert firmly. Ensure that straightening action does not crack pins, causing them to break off.
Wiring and Cables	Loose plugs or connectors. Burned, broken, or frayed wiring.	Firmly seat connectors. Repair or replace defective wires or cables.
Chassis	Dents, deformations, and damaged hardware.	Straighten, repair, or replace defective hardware.

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.

LIST OF ASSEMBLIES

A list of assemblies can be found at the beginning of the 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

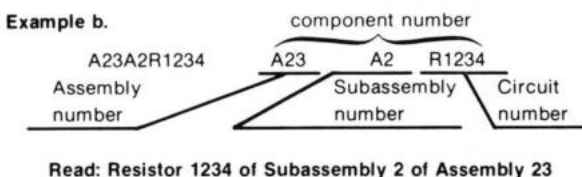
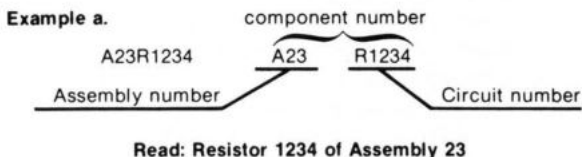
The Mfr. Code Number to Manufacturer index for the Electrical Parts List is located immediately after this page. The Cross Index provides codes, names and addresses of manufacturers of components listed in the Electrical Parts List.

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 by the following:



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

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

Chassis-mounted parts have no assembly number prefix and are located at the end of the Electrical Parts List.

TEKTRONIX PART NO. (column two of the Electrical Parts List)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL/MODEL NO. (columns three and four of the Electrical Parts List)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

NAME & DESCRIPTION (column five of the Electrical Parts List)

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.

MFR. CODE (column six of the Electrical Parts List)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

MFR. PART NUMBER (column seven of the Electrical Parts List)

Indicates actual manufacturers part number.

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
00779	AMP, INC.	P.O. BOX 3608	HARRISBURG, PA 17105
04222	AVX CERAMICS, DIVISION OF AVX CORP.	P O BOX 867	MYRTLE BEACH, SC 29577
04713	MOTOROLA, INC., SEMICONDUCTOR PROD. DIV.	5005 E MCDOWELL RD,PO BOX 20923	PHOENIX, AZ 85036
07263	FAIRCHILD SEMICONDUCTOR, A DIV. OF FAIRCHILD CAMERA AND INSTRUMENT CORP.	464 ELLIS STREET	MOUNTAIN VIEW, CA 94042
12969	UNITRODE CORPORATION	580 PLEASANT STREET	WATERTOWN, MA 02172
22526	BERG ELECTRONICS, INC.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
27014	NATIONAL SEMICONDUCTOR CORP.	2900 SEMICONDUCTOR DR.	SANTA CLARA, CA 95051
50434	HEWLETT-PACKARD COMPANY	640 PAGE MILL ROAD	PALO ALTO, CA 94304
57668	R-OHM CORP.	16931 MILLIKEN AVE.	IRVINE, CA 92713
76493	BELL INDUSTRIES, INC., MILLER, J. W., DIV.	19070 REYES AVE., P O BOX 5825	COMPTON, CA 90224
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
T1557	TEKA PRODUCTS, INC.	45 SALEM ST.	PROVIDENCE, RI 02907

Replaceable Parts P6407
Word Recognizer

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A32	670-7999-00		CKT BOARD ASSY:WORD RECOGNIZER PROBE #1	80009	670-7999-00
A33	670-7998-01		CKT BOARD ASSY:WORD RECOGNIZER PROBE #2	80009	670-7998-01
A32	670-7999-00		CKT BOARD ASSY:WORD RECOGNIZER PROBE #1	80009	670-7999-00
A32C6303	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A32C6334	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A32C6338	281-0767-00		CAP.,FXD,CER DI:330PF,20%,100V	12969	CGB331MEN
A32CR6330	152-0141-02		SEMICON DVC,DI:SW,SI,30V,150MA,30V,DO-35	12969	NDP0263 (1N4152)
A32CR6335	152-0664-00		SEMICON DEVICE:SWITCHING,SI,70V	50434	5082-2800
A32CR6340	152-0664-00		SEMICON DEVICE:SWITCHING,SI,70V	50434	5082-2800
A32J6300	131-3046-00		TERM SET,PIN:HEADER,1 X 10,0.155 SPACING	22526	OBD
A32J6370A	131-1425-00		CONN,RCPT,ELEC:RT ANGLE HEADER,1 X 36	22526	65521-136
A32J6370B	131-1426-00		CONN,RCPT,ELEC:RT ANGLE HEADER,1 X 36	22526	65524-136
A32J6380	131-3045-00		CONN,RCPT,ELEC:CKT BD,RTANG,1 X 5,0.1 SP		
A32J6385	136-0547-00		CONNECTOR,RCPT,:6 PIN,FEMALE	00779	1-380949-6
A32L6354	108-0245-00		COIL,RF:3.9UH	76493	B6310-1
A32Q6334	151-0190-00		TRANSISTOR:NPN,SI,TO-92	04713	SPS7969
A32R6301	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6302	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6303	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6304	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6305	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6306	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6307	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6308	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6325	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6330	315-0471-00		RES.,FXD,CMPSN:470 OHM,5%,0.25W	57668	NTR25J-E470E
A32R6336	315-0203-00		RES.,FXD,CMPSN:20K OHM,5%,0.25W	57668	NTR25J-E20K0
A32R6340	315-0222-00		RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A32R6350	315-0152-00		RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A32U6310	156-1707-00		MICROCIRCUIT,DI: QUAD 2-INPUT NAND GATE	07263	74F00PCQR
A32U6315	156-1707-00		MICROCIRCUIT,DI: QUAD 2-INPUT NAND GATE	07263	74F00PCQR
A32U6320	156-0441-00		MICROCIRCUIT,DI:8 BIT IDENTITY COMPARATOR	07263	74F521(PC OR DC)
A32U6325	156-0572-02		MICROCIRCUIT,DI:8 BIT SERIAL IN/PRL OUT,SE	27014	MM74C164JA +
A32U6330	156-0572-02		MICROCIRCUIT,DI:8 BIT SERIAL IN/PRL OUT,SE	27014	MM74C164JA +
A32U6335	156-1724-00		MICROCIRCUIT,DI:QUAD 2 INPUT OR GATE,SCRN	04713	74F32(ND OR JD)
A32U6350	156-1611-00		MICROCIRCUIT,DI:DUAL D TYPE EDGE-TRIGGERED	07263	74F74(PC OR DC)
A32U6356	156-1743-00		MICROCIRCUIT,DI:QUAD 2 INPUT NOR GATE	07263	74F02(PCQR OR DC)

**Replaceable Parts P6407
Word Recognizer**

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A33	670-7998-01		CKT BOARD ASSY:WORD RECOGNIZER PROBE #2	80009	670-7998-01
A33C6410	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A33C6440	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A33J6400	131-3046-00		TERM SET,PIN:HEADER,1 X 10,0.155 SPACING	22526	OBD
A33P6380	131-3153-00		TERM SET,PIN:0.025 SQ,RTANG,0.22 L	T1557	082-3643-RS20
A33P6385	131-3153-00		TERM SET,PIN:0.025 SQ,RTANG,0.22 L	T1557	082-3643-RS20
A33R6400	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6401	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6402	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6403	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6404	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6405	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6406	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6407	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6408	315-0301-00		RES.,FXD,CMPSN:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6432	315-0272-00		RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	57668	NTR25J-E02K7
A33R6443	315-0202-00		RES.,FXD,CMPSN:2K OHM,5%,0.25W	57668	NTR25J-E02K0
A33U6405	156-1707-00		MICROCIRCUIT,DI: QUAD 2-INPUT NAND GATE	07263	74F00PCQR
A33U6409	156-1707-00		MICROCIRCUIT,DI: QUAD 2-INPUT NAND GATE	07263	74F00PCQR
A33U6415	156-0441-00		MICROCIRCUIT,DI:8 BIT IDENTITY COMPARATOR	07263	74F521(PC OR DC)
A33U6420	156-0572-02		MICROCIRCUIT,DI:8 BIT SERIAL IN/PRL OUT,SE	27014	MM74C164JA +
A33U6425	156-0572-02		MICROCIRCUIT,DI:8 BIT SERIAL IN/PRL OUT,SE	27014	MM74C164JA +
A33U6430	156-0572-02		MICROCIRCUIT,DI:8 BIT SERIAL IN/PRL OUT,SE	27014	MM74C164JA +
A33U6435	156-1800-00		MICROCIRCUIT,DI:QUAD 2 INPUT EXCLUSIVE OR	07263	74F86(PCQR OR DC)

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 located at the rear of this manual.

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.

FIGURE AND INDEX NUMBERS

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

INDENTATION SYSTEM

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

1	2	3	4	5	Name & Description
					<i>Assembly and/or Component</i>
					<i>Attaching parts for Assembly and/or Component</i>

					<i>Detail Part of Assembly and/or Component</i>
					<i>Attaching parts for Detail Part</i>

					<i>Parts of Detail Part</i>
					<i>Attaching parts for Parts of Detail Part</i>

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.

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
73743	FISCHER SPECIAL MFG. CO.	446 MORGAN ST.	CINCINNATI, OH 45206
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
93907	TEXTRON INC. CAMCAR DIV	600 18TH AVE	ROCKFORD, IL 61101

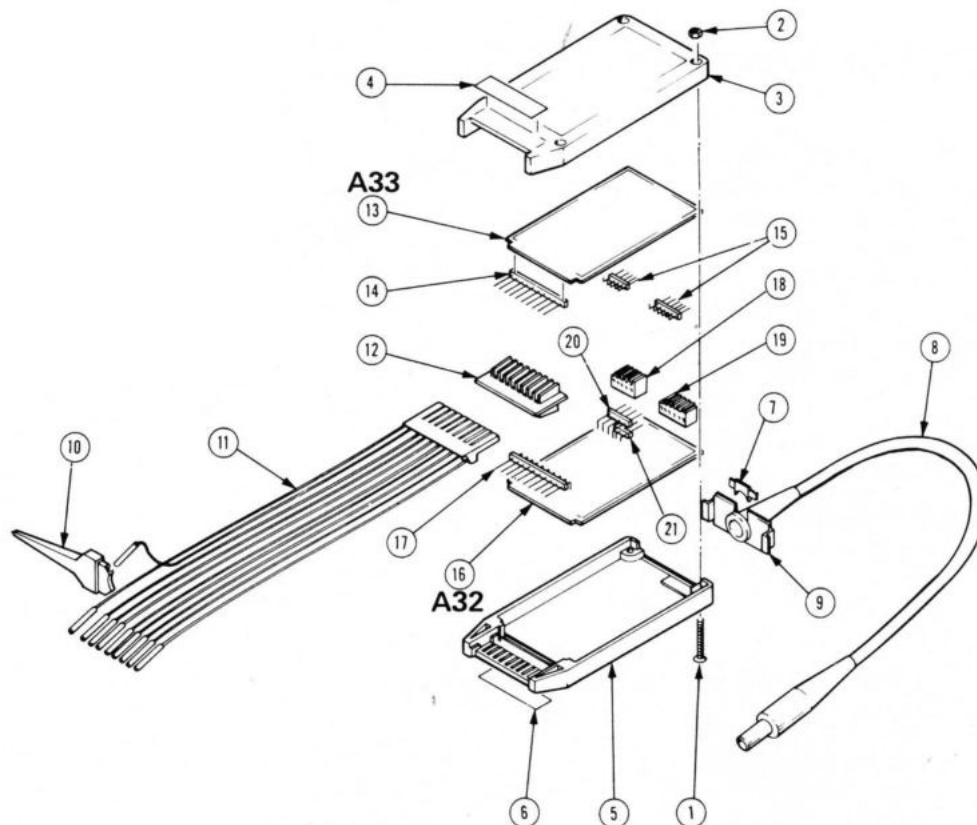


Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Qty	1	2	3	4	5	Name & Description	Mfr Code	Mfr Part Number
1-	010-6407-02		1						PROBE,WORD RECO:P6407,W/ACCESS & MNL	80009	010-6407-02
	010-6407-00		1						..PROBE,WORD RECO:P6407	80009	010-6407-00
-1	211-0318-00		4						..SCREW,MACHINE:4-40 X 0.75,FLH,100 DEG	93907	ORD BY DESCR
-2	210-0406-00		4						..NUT,PLAIN,HEX:4-40 X 0.188,BRS,CD PL	73743	12161-50
-3	380-0711-00		1						..HOUSING,PROBE:POLYCARB,SLATE GRAY,UPPER	80009	380-0711-00
-4	334-5200-00		1						..MARKER,IDENT:MKD WORD RECOGNIZER PROBE		
-5	380-0710-00		1						..HOUSING,PROBE:POLYCARB,SLATE GRAY,LOWER	80009	380-0710-00
-6	334-5201-02		1						..MARKER,IDENT:MKD 0.5V TO 5.5V PEAK MAX		
-7	358-0675-00		1						..STRAIN RLF,CA:UPPER		
-8	175-8853-01		1						..CA ASSY,SP,ELEC:6,26 AWG,80.5 L,8-N		
-9	358-0347-00		1						..STRAIN RLF,CA:LOWER,PLASTIC		
-10	206-0222-00		20						..TIP,PROBE:MICROCIRCUIT TEST	80009	206-0222-00
-11	012-0747-00		2						..LEAD SET,ELEC:10 WIDE,25 CML	80009	012-0747-00
-12	361-0758-01		1						..SPACER,PROBE:ACETAL,SLATE GRAY	80009	361-0758-01
-13	-----		1						..CKT BOARD ASSY:WORD RECOGNIZER PROBE #2		
	-----		-						...(SEE A33 REPL)		
-14	-----		1						...TERM SET,PIN:HEADER,1 X 10,0.155 SPACIN		
	-----		-						...(SEE A33J6400 REPL)		
-15	-----		2						...TERM SET,PIN:0.025 SQ,RTANG,0.22 L		
	-----		-						...(SEE A33P6380 REPL)		
-16	-----		1						..CKT BOARD ASSY:WORD RECOGNIZER PROBE #1		
	-----		-						...(SEE A32 REPL)		
-17	-----		1						...TERM SET,PIN:HEADER,1 X 10,0.155 SPACIN		
	-----		-						...(SEE A32J6300 REPL)		
-18	-----		1						...CONN,RCPT,ELEC:CKT BD,RTANG,1 X 5,0.1 S		
	-----		-						...(SEE A32J6380 REPL)		
-19	-----		1						...CONN,RCPT,:6 PIN,FEMALE		
	-----		-						...(SEE A32J6385 REPL)		
-20	-----		1						...TERM SET,PIN:(36)0.025 SQ RTANG,0.150 L		
	-----		-						...(SEE A32J6370A REPL)		
-21	-----		1						...TERM SET,PIN:(36)0.025 SQ RTANG,0.25 L		
	-----		-						...(SEE A32J6370B REPL)		
STANDARD ACCESSORIES											
	070-5582-00		1						SHEET,TECHNICAL:INSTR,P6407 PROBE,WORD REC	80009	070-5582-00

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 Y32.14-1973 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 the 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 Standard 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 picofarads (pF).
Values less than one are in microfarads (μ F).

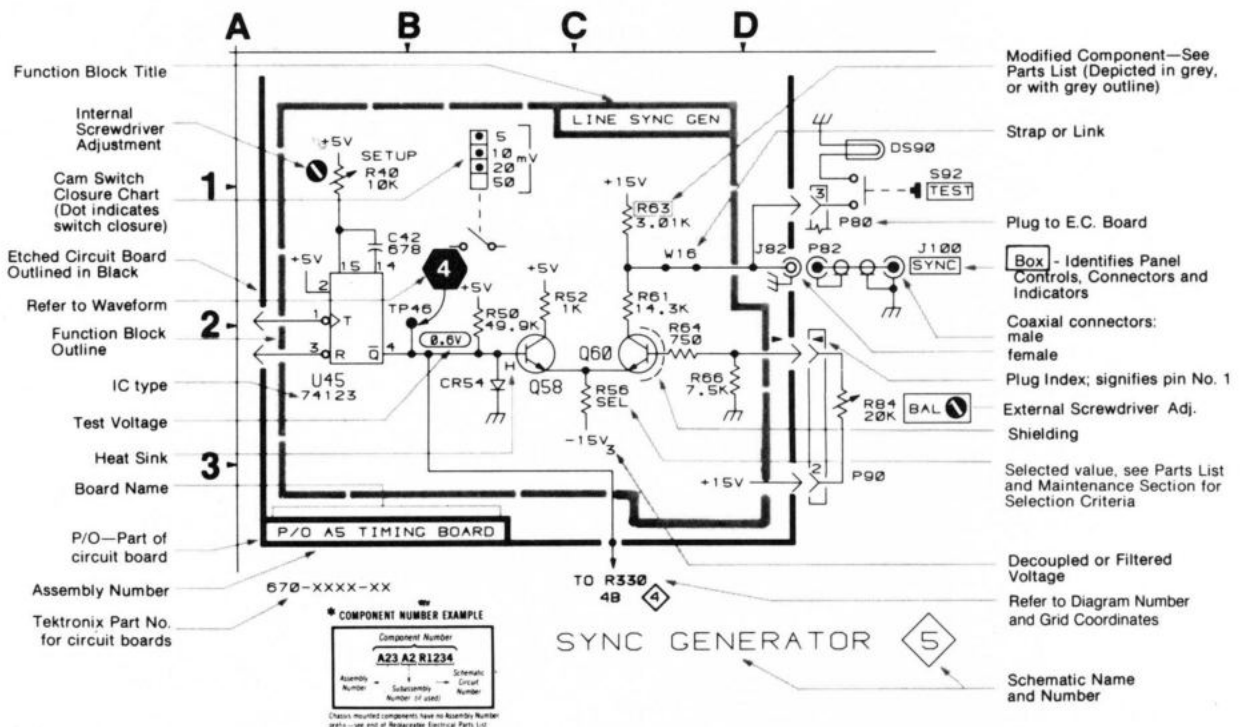
Resistors = Ohms (Ω).

— The information and special symbols below may appear in this manual. —

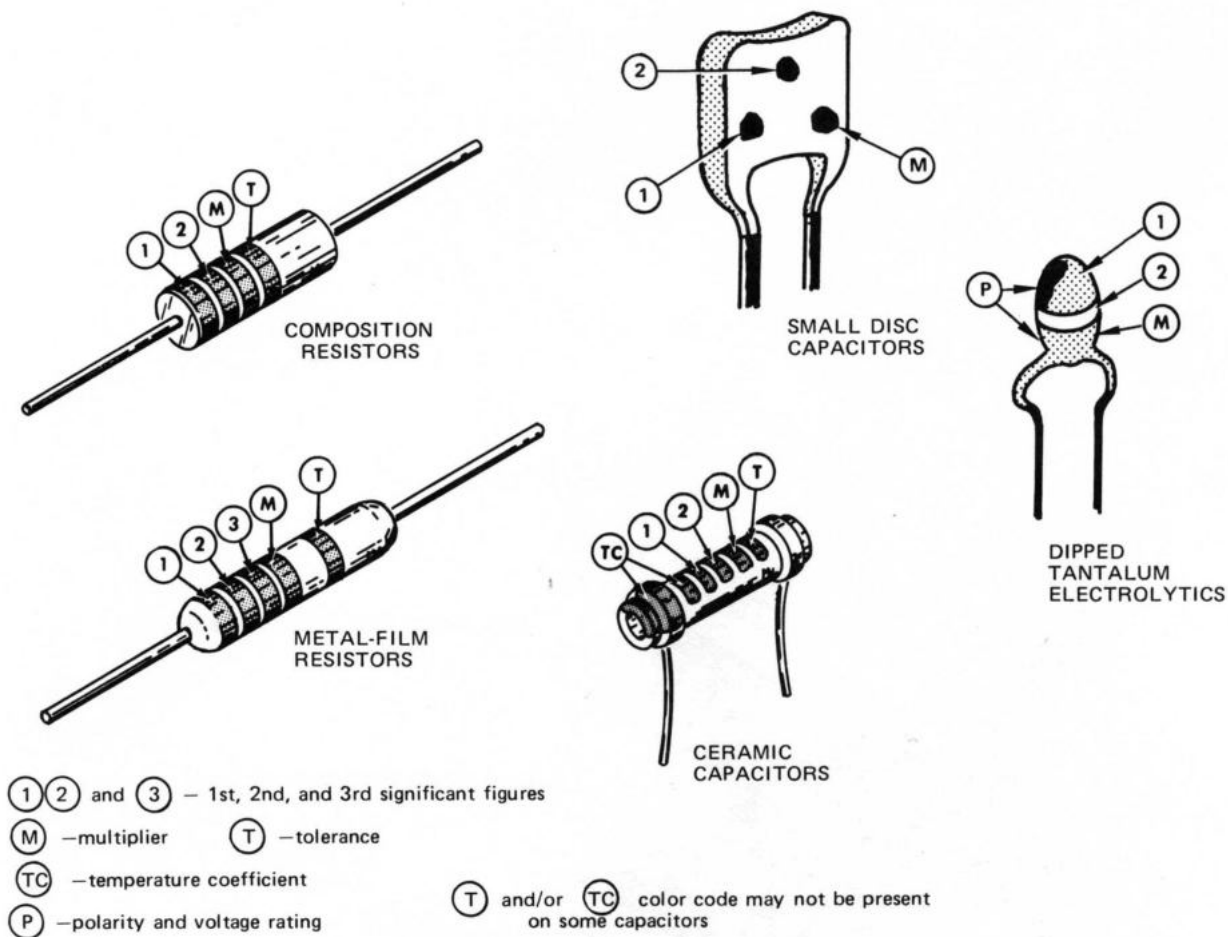
Assembly Numbers and Grid Coordinates

Each assembly in the instrument is assigned an assembly number (e.g., A20). The assembly number appears on the circuit board outline on the diagram, in the title for the circuit board component location illustration, and in the lookup table for the schematic diagram and corresponding component locator illustration. The Replaceable Electrical Parts list is arranged by assemblies in numerical sequence; the components are listed by component number *(see following illustration for constructing a 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 the circuitry on a circuit board, the circuit board illustration may only appear opposite the first diagram on which it was illustrated; the lookup table will list the diagram number of other diagrams that the circuitry of the circuit board appears on.



COLOR CODE



COLOR	SIGNIFICANT FIGURES	RESISTORS		CAPACITORS			DIPPED TANTALUM VOLTAGE RATING
		MULTIPLIER	TOLERANCE	MULTIPLIER	TOLERANCE		
					over 10 pF	under 10 pF	
BLACK	0	1	---	1	±20%	±2 pF	4 VDC
BROWN	1	10	±1%	10	±1%	±0.1 pF	6 VDC
RED	2	10 ² or 100	±2%	10 ² or 100	±2%	----	10 VDC
ORANGE	3	10 ³ or 1 K	±3%	10 ³ or 1000	±3%	----	15 VDC
YELLOW	4	10 ⁴ or 10 K	±4%	10 ⁴ or 10,000	+100% -9%	----	20 VDC
GREEN	5	10 ⁵ or 100 K	±½%	10 ⁵ or 100,000	±5%	±0.5 pF	25 VDC
BLUE	6	10 ⁶ or 1 M	±¼%	10 ⁶ or 1,000,000	----	----	35 VDC
VIOLET	7	----	±1/10%	----	----	----	50 VDC
GRAY	8	----	----	10 ⁻² or 0.01	+80% -20%	±0.25 pF	----
WHITE	9	----	----	10 ⁻¹ or 0.1	±10%	±1 pF	----
GOLD	—	10 ⁻¹ or 0.1	±5%	----	----	----	----
SILVER	—	10 ⁻² or 0.01	±10%	----	----	----	----
NONE	—	----	±20%	----	±10%	±1 pF	----

Figure 2. Color code for resistors and capacitors.

(1861-20A)4206-31

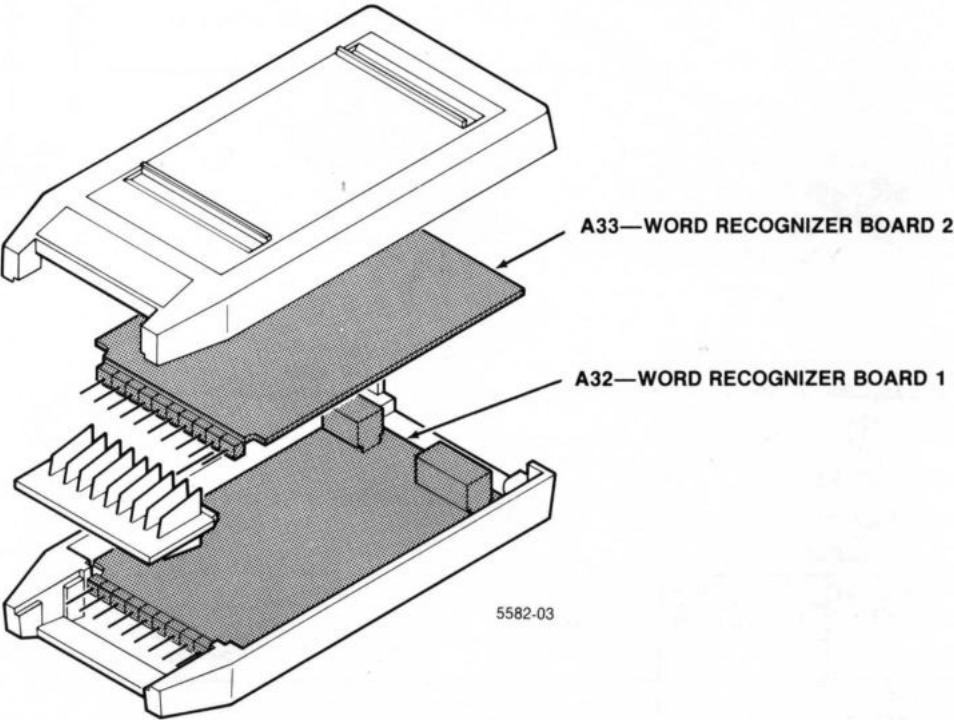
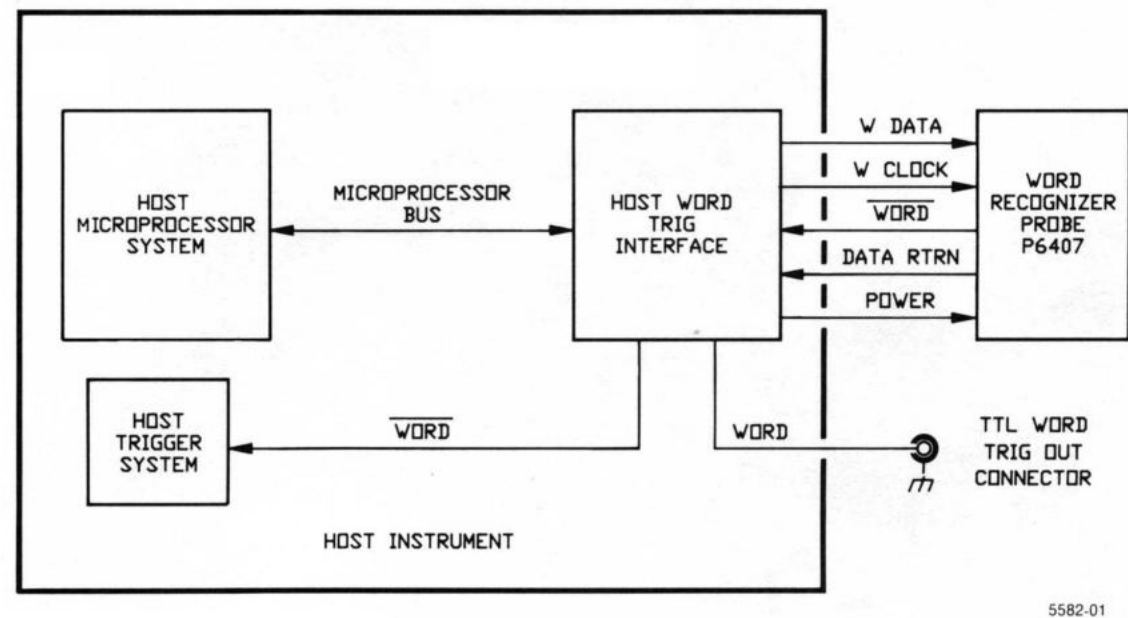


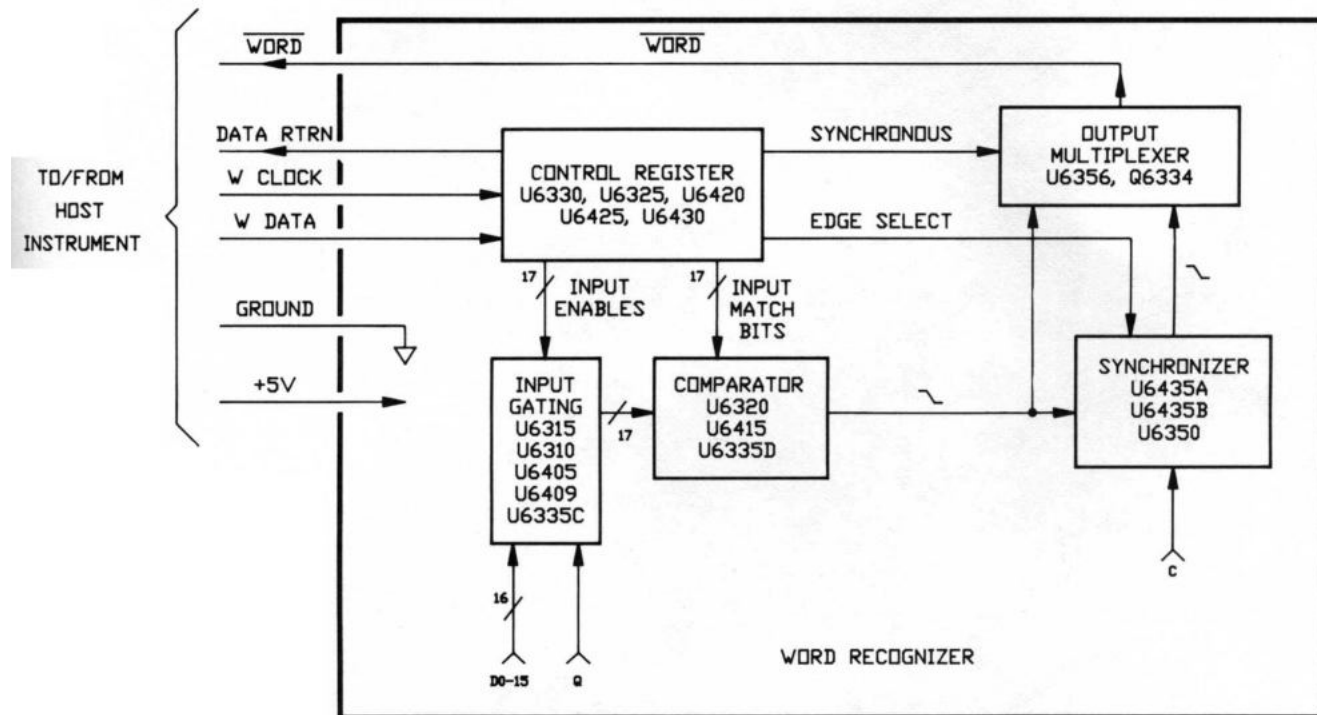
Figure 6. Word Recognizer board locations.

P6407 Word Recognizer



5582-01

Figure 3. Typical system.



5582-02

Figure 4. Block diagram.

WORD RECOGNIZER

ASSEMBLY A32											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C6303	1N	2A	Q6334	5S	2B	U6310A	4J	1A	U6335A	3P	2B
C6334	1N	2C				U6310B	4J	1A	U6335B	4N	2B
C6338	3S	2C	R6301	4D	1A	U6310C	4J	1A	U6335C	4M	2B
			R6302	4D	1A	U6310D	5H	1A	U6335D	4M	2B
CR6330	2S	2C	R6303	4D	2A	U6310	1S	1A	U6335	2S	2B
CR6335	3P	2C	R6304	4D	1A	U6315A	3K	2A	U6350A	4P	1C
CR6340	2P	2C	R6305	4D	2A	U6315B	3K	2A	U6350B	3N	1C
			R6306	3D	2A	U6315C	4K	2A	U6350	2S	1C
J6300	3C	2A	R6307	3D	2A	U6315D	4K	2A	U6356A	2S	2C
J6370	1C	2C	R6308	3D	2A	U6315	1S	2A	U6356B	4S	2C
J6380	5E	1C	R6325	5D	2B	U6320	1P	1B	U6356C	4S	2C
J6380	5N	1C	R6330	2S	1C	U6320	3L	1B	U6356D	2P	2C
J6385	5D	2C	R6336	4P	2C	U6325	1S	2B	U6356	2S	2C
J6385	5F	2C	R6340	4S	2C	U6325	2F	2B			
			R6350	2P	1C	U6330	1E	1B			
L6354	2P	2C				U6330	2S	1B			

ASSEMBLY A33											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C6410	9E	3B	R6402	7D	3A	U6405C	7K	3A	U6425	10G	4B
C6440	9F	4C	R6403	6D	3A	U6405D	7K	3A	U6425	9J	4B
			R6404	7D	4A	U6405	10G	3A	U6430	10G	3C
J6400	6C	4A	R6405	8D	4A	U6409A	7J	4A	U6430	8H	3C
			R6406	6D	4A	U6409B	7J	4A	U6435A	7M	4C
P6380	5E	4C	R6407	7D	4A	U6409C	8H	4A	U6435B	7N	4C
P6380	5N	4C	R6408	7D	4A	U6409D	8J	4A	U6435C	6N	4C
P6385	5D	3C	R6432	10J	4C	U6409	10G	4A	U6435D	6N	4C
P6385	5F	3C	R6443	5E	4C	U6415	10F	4B	U6435	10G	4C
						U6415	8L	4B			
R6400	7D	3A	U6405A	6K	3A	U6420	10G	3B			
R6401	7D	4A	U6405B	7K	3A	U6420	5G	3B			

CHASSIS MOUNTED PARTS											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
J2732	1B	CHASSIS	P6304	4C	CHASSIS	P6400	6C	CHASSIS	P6408	7C	CHASSIS
P2732	1B	CHASSIS	P6305	4C	CHASSIS	P6401	8C	CHASSIS	P6409	7C	CHASSIS
P5990	1A	CHASSIS	P6306	4C	CHASSIS	P6402	8C	CHASSIS	P6410	6C	CHASSIS
P6300	3C	CHASSIS	P6307	4C	CHASSIS	P6403	8C	CHASSIS			
P6301	3C	CHASSIS	P6308	4C	CHASSIS	P6404	7C	CHASSIS	W5990	1B	CHASSIS
P6302	3C	CHASSIS	P6309	4C	CHASSIS	P6405	7C	CHASSIS	W6300	5C	CHASSIS
P6303	3C	CHASSIS	P6310	5C	CHASSIS	P6406	7C	CHASSIS	W6370	2C	CHASSIS
			P6370	1C	CHASSIS	P6407	7C	CHASSIS	W6400	8C	CHASSIS

CIRCUIT BOARDS BOARD LOCATOR

CIRCUIT BOARDS BOARD LOCATOR



CIRCUIT BOARDS BOARD LOCATOR

CIRCUIT BOARDS BOARD LOCATOR

CIRCUIT BOARDS BOARD LOCATOR



CIRCUIT BOARDS BOARD LOCATOR