Instructions

Tektronix

P6408
Word Recognizer

070-6938-00

ELECTRICAL SPECIFICATIONS

Input Channels: 16 data channels, 1 qualifier channel.

Input Loading: +2.7 V input, 20 μA maximum. +0.5 V input, – 600 μA maximum.

Maximum Input Voltage Swing: 0 V to Vcc.

Maximum Nondestructive Input Voltage: –1 V (LO), +15 V (HI)

Input Logic levels: HI/One, > +2 V; LO/Zero, < +0.7 V.

Input Pulse Width Minimum: 40 ns for any channel combination, 10 ns for any single channel.

Output Pulse Width Minimum: 27 ns for any channel combination, 10 ns for any single channel.

Input to Output Delay: 20 ns maximum.

Output Pulse Risetime: ≤ 10 ns.

Output Pulse Falltime: ≤ 10 ns.

Output Voltage Level: HI/One, ≥ +200 mV, LO/Zero, ≤ +70 mV. (At the output of the P6109 probe.)

Power Requirements: Volts: +5 V ± 0.25 V, Amps: 100 mA maximum.

SAFETY

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

INTRODUCTION

The P6408 Word Recognizer (trigger) probe is designed to be used with digital or analog host instruments (such as oscilloscopes or logic analyzers). The P6408 has circuitry which allows an external 16-bit combinational data and a qualifier input to be defined for recognition. Each bit of the trigger word is individually selectable by the DIP switches on the top of the case. The least significant bit starts with the 0 switch, progressing up to the most significant bit on switch 15. The switch numerals correspond to the lead-set data numerals on the nose of the P6408.

While the P6408 is an active probe, it derives its operating power from the circuit under test rather than from the host oscilloscope. This allows the P6408 to be used with ANY oscilloscope. When powered in this fashion, the P6408 will draw a maximum of 100 mA from the circuit under test's +5 V bus. If the +5V bus cannot tolerate this load, the P6408 may be equipped with an optional probe power cable (see Optional Accessories under Replaceable Parts). This power cable allows the P6408 to be powered from any Tektronix oscilloscope with a probe power connector or from a Tektronix 1101A Probe Power Supply.

OPERATING INSTRUCTIONS

When reading the following instructions, you may find it helpful to refer to the Lead Function Table (Figure 1), the Top View of The Word Recognizer (Figure 2), the GLOSSARY OF TERMS, and the Connection Configuration Diagram (Figure 3).

When the lead sets have been properly installed into the nose of the P6408 probe, the gray lead of the upper lead set is connected to the Qualifier (Q) input pin (if applicable), and its the white lead is connected to the GND pin. The gray lead of the lower lead set is connected to the +5 V (Vcc) pin and the white lead is connected to the bus GND pin. The +5 V gray lead (from the lower lead set) can be connected to the +5 V power bus of the circuit under test by using an IC grabber; or the optional probe power cord (see Optional Accessories under Replaceable Parts). Either of the white leads must be connected to the ground bus of the device under test.

CAUTION

Do not connect either white lead to the +5V (Vcc) bus.

UPPER LEAD SET		LOWER LEAD SET	
COLOR	FUNCTION	COLOR	FUNCTION
WHITE	GROUND	WHITE	GROUND
BLACK	DATA 0	BLACK	DATA 8
BROWN	DATA 1	BROWN	DATA 9
RED	DATA 2	RED	DATA 10
ORANGE	DATA 3	ORANGE	DATA 11
YELLOW	DATA 4	YELLOW	DATA 12
GREEN	DATA 5	GREEN	DATA 13
BLUE	DATA 6	BLUE	DATA 14
VIOLET	DATA 7	VIOLET	DATA 15
GREY	Q	GREY	+5 V (VCC)

Figure 1. Lead Function.

SETUP

All of the data inputs and the qualifier input have a 4.7 KΩ resistor connected to Vcc. When an input is not used, set its corresponding DIP switch high. To use the qualifier input, connect it to a line that is normally low and will only go high when a synchronous word recognition is required. For asynchronous operation, leave the qualifier input unconnected and the word trigger probe will produce a trigger pulse when the data lines agree with the data switch settings. This allows the probe to trigger asynchronously on any digital word from 1 to 16 data bits wide, or use the qualifier bit for synchronous triggering. To set a data line high, depress the HIGH side (see illustration) of the associated DIP switch. To set the data line low, depress the opposite side of the switch.

SETTING UP FOR WORD RECOGNITION

1. Connect any or all of the 0 to 15 data inputs (depending on the bus width) to the bus under test. Set each DIP switch to its desired state.
2. Set the state of the unused DIP switches to HIGH.
3. Connect the P6408 to the host instrument (see below).

SETTING UP FOR GLITCH DETECTION

1. Connect one input to the bus to be observed.
2. Set the state of the DIP switch as desired.
3. Set the state of all DIP switches on unused inputs to HIGH.
4. Connect the P6408 to the host instrument (see below).

CONNECTION TO THE HOST INSTRUMENT

The P6408 is connected to the host instrument by inserting the tip of the P6109 probe (supplied) into the probe connector on the P6408. The probe output is then connected to the host instrument. (The P6109 probe is designed for connection to an oscilloscope with an auto scale factor readout. When used with an oscilloscope that is not equipped with auto scale readout, the coding pin should be removed from the probe's BNC connector to avoid scratching the oscilloscope front panel . This is accomplished by pulling the pin from the BNC with long-nosed pliers.) The P6408 may be used with any 1 MΩ external trigger input or vertical input BNC of the host instrument.

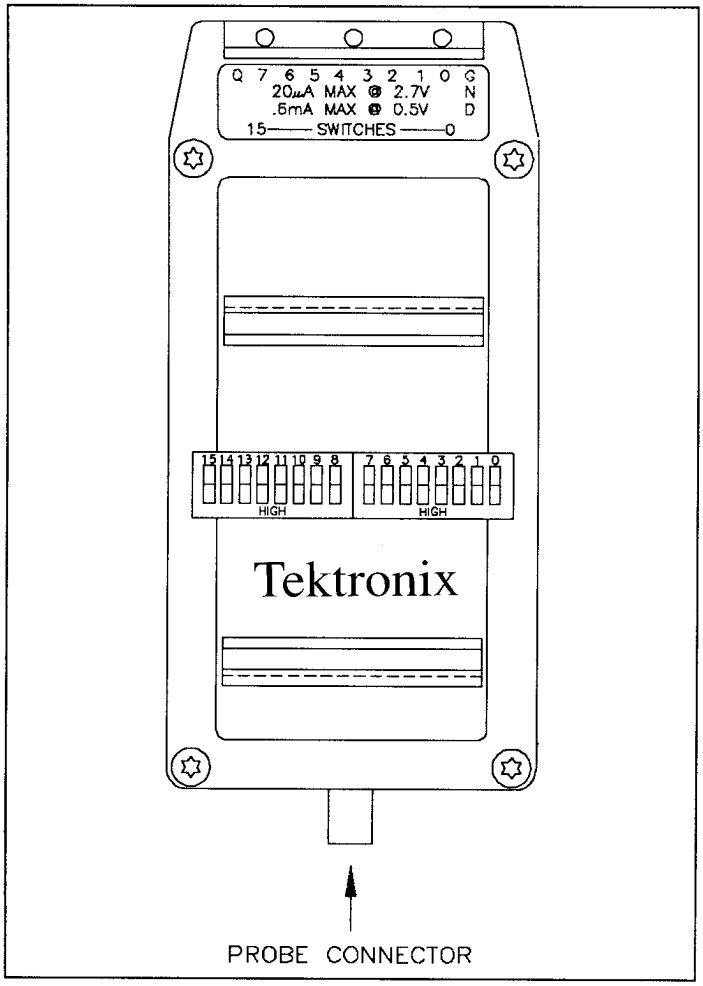

Figure 2. Top View of Word Recognizer.

PERFORMANCE VERIFICATION PROCEDURE

Confirming probe specifications for input and output pulse widths and voltage levels is generally not necessary and is typically impractical to perform. However, proper probe operation can be confirmed by a simple go/no-go test. If all probe inputs pass the go/no-go test, the remaining specifications are guaranteed by Tektronix.

To perform the go/no-go test:

1. Apply power to the probe by connecting the lower gray lead to +5 V and the white lead to GROUND.

2. Install the P6109 probe and connect its output to the oscilloscope vertical input connector. Set the vertical input sensitivity to 0.5 V/DIV if your oscilloscope provides scale factor readout *and* recognizes Tektronix probe attenuation factor coding; otherwise, set the vertical input sensitivity to 50 mV/DIV.

3. Set the oscilloscope input coupling to DC.

4. Adjust the oscilloscope to display a baseline trace even when there is no trigger signal. On Tektronix oscillocopes, select AUTO or AUTOLEVEL triggering.

5. Position the displayed trace one major division down from the top of the graticule.

6. Set all of the P6048 DIP switches to HIGH. Leave all probe data leads disconnected (floating).

7. While monitoring the oscilloscope display, alternately connect each data lead to GROUND and then disconnect it. The DC level displayed on the oscilloscope should change from HIGH to LOW as the lead is grounded and from LOW to HIGH as the lead is disconnected.

GLOSSARY OF TERMS

ASYNCHRONOUS LOGIC:	Logic whose response is not controlled by a clock.
BIT:	A bit is a digit in a binary word.
COMBINATIONAL LOGIC:	Logic whose output variables at each instant are determined by the values of the input variables.
DON'T CARE STATE:	The conditioning of an input so its logic does not care what state is applied to the input.
LEAST SIGNIFICANT BIT:	The units bit in a binary number, placed in the lowest power of "2" column and is the right-most digit of the number in standard form.
MOST SIGNIFICANT BIT:	The highest power of "2" in a binary number and is the left-most digit of the number in standard form.
SYNCHRONOUS LOGIC:	Logic whose response is controlled by a clocking pulse.
TRIGGER WORD:	A group of coded binary bits that will cause a response from a word recognizer probe when their bit-for-bit codes (switches and corresponding line levels) match.
QUALIFIER INPUT:	An input that controls the time response of a logic circuit.
Vcc:	The supply voltage needed to properly bias the circuit of interest (for TTL +5 V ±0.25 V). The +5 V designation on the label indicates the nominal value of the input. In actuality, the input can support voltages from +4.5 V to +7.5 V.

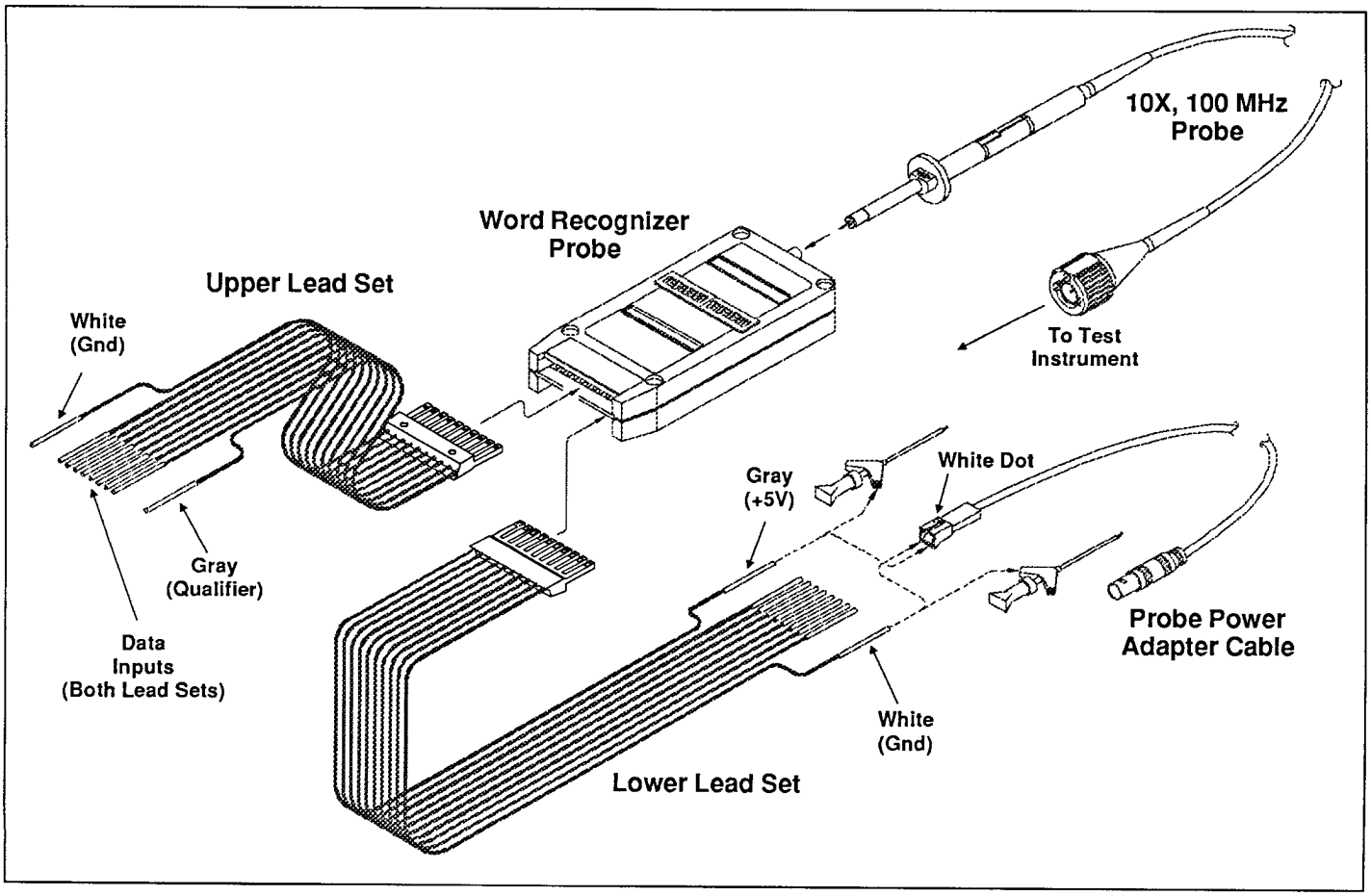

Figure 3. Connection Configuration.

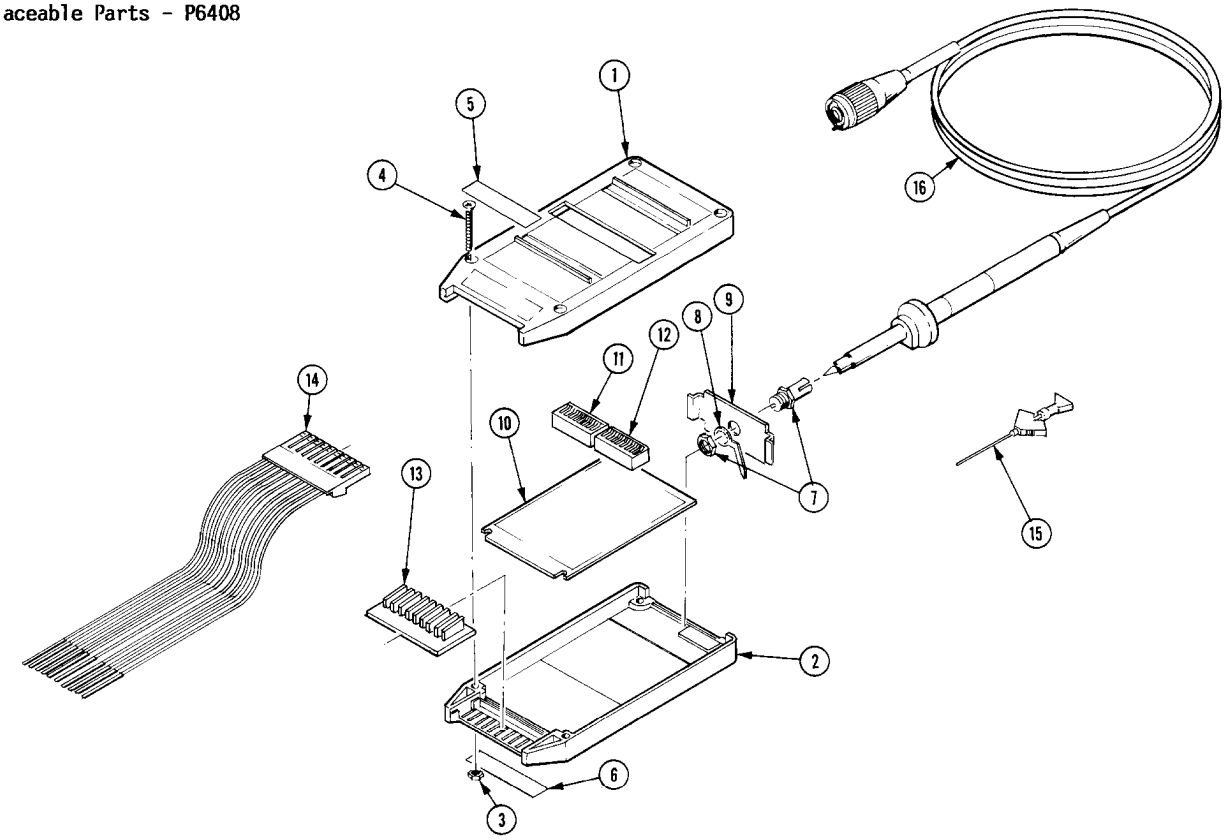

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-1	380-0711-01			1	HOUSING,PROBE:UPPER,PC W/O LABEL	80009	380-0711-01
-2	380-0710-00			1	HOUSING,PROBE:LOWER,PC	80009	380-0710-00
					ATTACHING PARTS		
-3	210-0406-00			4	NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
-4	211-0451-00			4	SCREW MACHINE:4-40 X 0.750,FLH,CD PL	TK0858	ORDER BY DESCR
					END ATTACHING PARTS		
-5	334-7247-00			1	MARKER,IDENT:MKD UPPER VOLTAGE & CURRENT	80009	334-7247-00
-6	334-7246-00			1	MARKER,IDENT:MARKED WORD RECOG,P6408	80009	334-7246-00
-7	131-0258-00			1	CONN,RCPT,ELEC:TEST JACK	24931	33JR115-2
-8	210-0269-00			1	TERMINAL,LUG:0.257 ID,PLAIN,BRS TINNED	78584	905-020
-9	407-3732-00			1	BRKT,REAR PNL:ALUMINUM	80009	407-3732-00
-10	671-0615-00			1	CIRCUIT BD ASSY:MAIN	80009	671-0615-00
					CKT BD ASSY INCLUDES:		
-11	260-2433-00			1	.SWITCH,ROCKER:8,SPST,125MA,30VDC	81073	76YY22282$
-12	260-2434-00			1	.SWITCH,ROCKER:8,SPST,125MA,30VDC	81073	76YY22283S
-13	361-0758-00			1	SPACER,PROBE:GRAY ACETAL	80009	361-0758-00
					STANDARD ACCESSORIES		
-14	012-0747-01			2	LEAD SET,ELEC:10 WIDE,25 CML	80009	012-0747-01
-15	----- -----			1	TIP,PROBE:MICROCKT TEST,0.05 CTR		
					(SEE OPTIONAL ACCESSORIES)		
-16	----- -----			1	P6109;2 METER PASSIVE PROBE		
	070-6938-00			1	MANUAL,TECH:INSTR,P6408	80009	070-6938-00
					OPTIONAL ACCESSORIES		
	----- -----			1	AG50:IC GRABBERS,PKG OF 20		
	174-1342-00			1	CA ASSY,SP,ELEC:2,26 AWG,3 METER,8-N	80009	174-1342-00

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
24931	SPECIALTY CONNECTOR CO INC	PO BOX 5477	FRANKLIN IN 46131
73743	FISCHER SPECIAL MFG CO	111 INDUSTRIAL RD	COLD SPRING KY 41076-9749
78584	STEWART STAMPING CORP SUB OF INSILCO CORP	630 CENTRAL PARK AVE	YONKERS NY 10704-2018
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500 MS 53-111	BEAVERTON OR 97707-0001
81073	GRAYHILL INC	PO BOX 10373	LA GRANGE IL 60525-5914
TK0858	STAUFFER SUPPLY CO (DIST)	810 SE SHERMAN	PORTLAND OR 97214