Tektronix®
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Instructions

BUFFER TEST KIT

INTRODUCTION

DESCRIPTION

The Buffer Test Kit, which can be ordered from Tektronix, Inc., is intended to aid in the troubleshooting of the Option 05, 06, and/or 10 circuit boards (TV, CTT, and GPIB).

The Buffer Test circuit board and associated parts contained in this kit allow easy access for troubleshooting these Option circuit boards. Instructions and parts are included that allow the Buffer Test circuit board to be used with 2445/2465 or 2445A/2465A/2467 instruments.

This document only supplies information on installing the Buffer Test circuit board and bringing the base instrument back to an operating level with the Option circuit board/s exposed. Refer to the individual Option service manuals for schematics and troubleshooting trees.

Table 1 lists the contents of this kit (Tektronix Part Number 020-1500-00).

Table 1
Buffer Test Kit (020-1500-00)

Item	Qty	Description	Tektronix Part Number
1	1	Buffer Test Board	670-9882-00
2	1	20 Conductor Ribbon Cable	175-4544-00
3	2	2 X 20 Interconnect Pin Set	131-2238-00
4	1	Zero Ohm Jumper	131-0566-00
5	4	Zero Ohm Connector	131-0993-00

PREPARATION FOR USE

As shipped, the Buffer Test circuit board is configured to operate with 2445 and 2465 instruments only. No further modifications to the board itself is necessary.

For use with 2445A, 2465A, or 2467 instruments, the following modification to the Buffer Test circuit board is necessary:

1. Remove R4210 and replace it with the zero ohm jumper (131-0566-00) provided with this kit.
2. Remove R4201 from the circuit board.

CAUTION

The following step requires the use of static prevention techniques to avoid damaging the memory IC (U4260).

For either configuration, it will be necessary to remove the memory IC from the instrument's Buffer board (U4260) and install it in the Buffer Test circuit board. Use static prevention techniques and insure proper pin indexing.

070-6291-00
Product Group 38

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Test Set-Up For 2445/2465 Instruments

1. Install one interconnect pin set (item 3) into each end of the 20 conductor ribbon cable (item 2) to form an Interconnect Cable to be used later.

2. Remove the installed option assembly from the instrument. Note the options installed and all signal connections. As mentioned in the Preparation For Use, transfer the memory IC (U4260) to the Buffer Test circuit board.

3. Install the Buffer Test circuit board into the instrument and re-connect all signal connections that were disconnected while removing the option assembly.

4. Refer to Table 2 for further instructions required to complete the set-up conditions for your particular instrument and option board to be tested. The Options listed under "Option Configuration Installed" refer to the instrument before any options are removed for testing.

5. Remove the problem circuit board from the option assembly and install on the Buffer Test circuit board. Use caution during installation to assure correct pin to connector alignment. Connections for the GPIB port and Word recognizer probe may be made if necessary.

Table 2
2445/2465 Connectors

Board To Be Tested	**Option Configuration Installed**						
	05	06	10	05/06	05/10	06/10	05/06/10
Option 05	a	--	--	b	c	--	e
Option 06	--	a	--	a	--	c	c
Option 10	--	--	a	--	a	d	d

NOTE

P101 and P102 mentioned below are located on the Main circuit board in the standard instrument. Refer to the respective service manual for location of these connectors.

a.	No further connections required.	
b.	Using the zero ohm connectors supplied, connect the following pins together:	
	Pins 1 and 3 of P101	Pins 6 and 8 of P101.
c.	Remove connections from the Front Panel to Buffer board (J651 and J4258) at the Buffer board. Use the interconnect cable to connect the two cables together. When proper connection has been made, the indexing stripes on the ribbon cables (usually red coloring on the grey cables) will align.	
d.	Using the zero ohm connectors supplied, connect the following pins together:	
	Pins 1 and 3 of P101	Pins 3 and 4 of P102 Pins 7 and 8 of P102
e.	Remove connections from the Front Panel to Buffer board (J651 and J4258) at the Buffer board. Use the interconnect cable to connect the two ribbon cables together. When proper connection has been made, the indexing stripes on the ribbon cables (usually red coloring on the grey cables) will align. Using the zero ohm connectors supplied, connect the following pins together:	
	Pins 1 and 3 of P101	Pins 6 and 8 of P101

Test Set-Up For 2445A/2465A/2467 Instruments

1. Remove the installed option assembly from the instrument. Note the options installed. Transfer the memory IC (U4260) to the Buffer circuit test board as mentioned in the Preparation For Use. Verify that the modification described in the Preparation For Use section has been performed.

2. Install the Buffer test circuit board into the instrument and re-connect all signal connections that were disconnected during the option assembly removal process.

3. Refer to Table 3 for further instructions required to complete the set-up conditions for your particular instrument and option board to be tested. The Options listed under "Option Configuration Installed" refer to the instrument before any options are removed for testing.

4. Remove the problem circuit board from the option assembly and install on the Buffer test circuit board. Use caution during installation to assure correct pin to connector alignment. Connections for the GPIB port and Word Recognizer probe may be made if necessary.

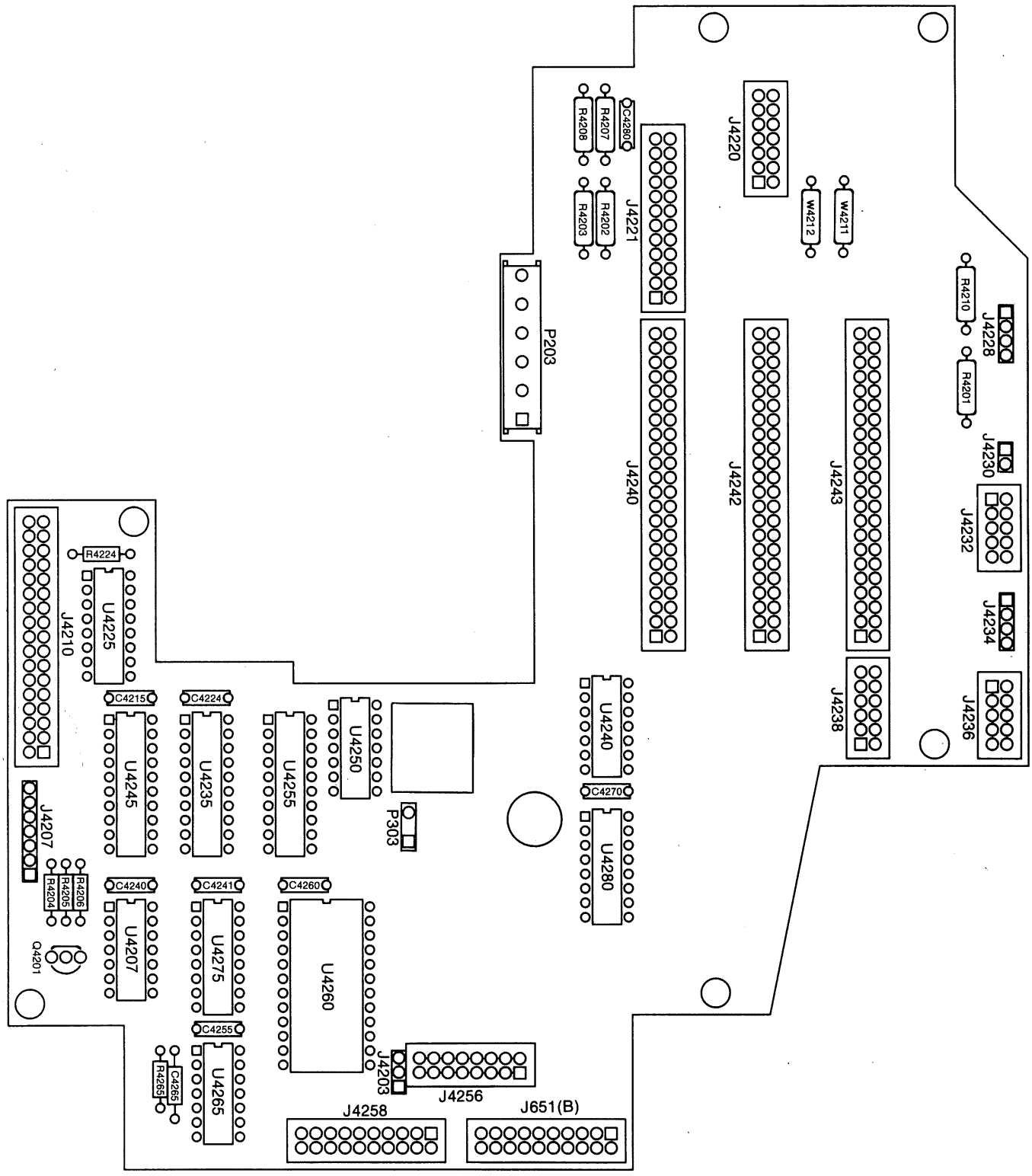
Table 3
2445A/2465A/2467 Connectors

Board To Be Tested	**Option Configuration Installed**						
	05	06	10	05/06	05/10	06/10	05/06/10
Option 05	a	--	--	b	a	--	b
Option 06	--	a	--	a	--	a	a
Option 10	--	--	a	--	a	c	c

NOTE

P101 and P102 mentioned below are located on the Main circuit board in the standard instrument. Refer to the respective service manual for location of these connectors.

a.	No further connections required.	
b.	Using the zero ohm connectors supplied, connect the following pins together:	
	Pins 1 and 3 of P101	Pins 6 and 8 of P101.
c.	Using the zero ohm connectors supplied, connect the following pins together:	
	Pins 1 and 3 of P101 Pins 6 and 8 of P101	Pins 3 and 4 of P102 Pins 7 and 8 of P102



A20—BUFFER BOARD

REPLACEABLE 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.

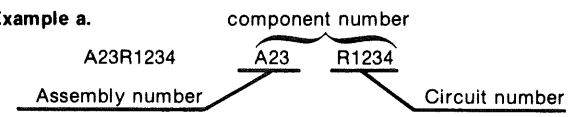
ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

COMPONENT NUMBER (column one of the Electrical Parts List)

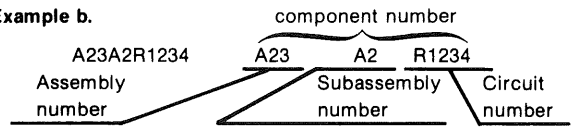
A numbering method has been used to identify assemblies, subassemblies and parts. Examples of this numbering method and typical expansions are illustrated by the following:

Example a.



Read: Resistor 1234 of Assembly 23

Example b.



Read: Resistor 1234 of Subassembly 2 of Assembly 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 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 Code
00779	AMP INC	P O BOX 3608	HARRISBURG PA 17105
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPRESSWAY P O BOX 225012 M/S 49	DALLAS TX 75265
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR GROUP	5005 E MCDOWELL RD	PHOENIX AZ 85008
07263	FAIRCHILD CAMERA AND INSTRUMENT CORP SEMICONDUCTOR DIV	464 ELLIS ST	MOUNTAIN VIEW CA 94042
07716	TRW INC TRW ELECTRONICS COMPONENTS TRW IRC FIXED RESISTORS/BURLINGTON	2850 MT PLEASANT AVE	BURLINGTON IA 52601
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
18324	SIGNETICS CORP	811 E ARQUES	SUNNYVALE CA 94086
19701	MEPCO/ELECTRA INC A NORTH AMERICAN PHILIPS CO	P O BOX 760	MINERAL WELLS TX 76067
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT CONNECTOR SYSTEMS	30 HUNTER LANE	CAMP HILL PA 17011
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701
27264	MOLEX INC CORPORATE HQ	2222 WELLINGTON COURT	LISLE IL 60532
54583	TDK ELECTRONICS CORP	755 EASTGATE BLVD	GARDEN CITY NY 11530
57668	ROHM CORP	16931 MILLIKEN AVE	IRVINE CA 92713
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077
TK1146	MITSUBISHI ELECTRIC CORP	1230 OAKMEAD PARKWAY	SUNNYVALE CA 94086
TK1483	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
TK1650	AMP INC	19200 STEVENS CREEK BLVD	CUPERTINO CA 95014

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
	670-9882-00			CIRCUIT BD ASSY:BUFFER TEST	80009	670-9882-00
C4215	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
C4224	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
C4240	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
C4241	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
C4255	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
C4260	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
C4265	281-0764-00			CAP,FXD,CER DI:82PF,5%,100V	04222	MA101A820JAA
C4270	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
C4280	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
J651	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
J4203	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
J4207	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
J4210	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
J4220	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
J4221	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
J4228	131-2919-00			CONN,RCPT,ELEC:HEADER,1 X 4,0.1 SPACING	80009	131-2919-00
J4230	131-3766-00			CONN,RCPT,ELEC:HEADER,1 X 2,0.10 SPACING	TK1650	87232-2
J4232	131-2920-00			CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
J4234	131-2919-00			CONN,RCPT,ELEC:HEADER,1 X 4,0.1 SPACING	80009	131-2919-00
J4236	131-2920-00			CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
J4238	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
J4240	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
J4242	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
J4243	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
J4258	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
J4260	136-0751-00			SKT,PL-IN ELEK:MICROCKT,24 PIN	09922	DILB24P108
P203	131-2924-00			CONN,RCPT,ELEC:HEADER,1 X 6,0.2 SPACING	27264	10-51-1061
P303	131-2923-00			CONN,RCPT,ELEC:HEADER,1 X 2,0.2 SPACING	27264	10-51-1021
Q4201	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
R4201	321-0085-00			RES,FXD,FILM:75 OHM,1%,0.125W,TC=T0 (REMOVE FOR 2445A/2465A/2467)	57668	CRB14FXE 75 OHM
R4202	321-0132-00			RES,FXD,FILM:232 OHM,1%,0.125W,TC=T0	19701	5043ED232R0F
R4203	321-0101-00			RES,FXD,FILM:110 OHM,1%,0.125W,TC=T0	07716	CEAD110R0F
R4204	313-1512-00			RES,FXD,CMPSN:5.1K OHM,5%,0.2W	57668	TR20JE 5K1
R4205	313-1103-00			RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
R4206	313-1512-00			RES,FXD,CMPSN:5.1K OHM,5%,0.2W	57668	TR20JE 5K1
R4207	321-0101-00			RES,FXD,FILM:110 OHM,1%,0.125W,TC=T0	07716	CEAD110R0F
R4208	321-0132-00			RES,FXD,FILM:232 OHM,1%,0.125W,TC=T0	19701	5043ED232R0F
R4210	313-1471-00			RES,FXD,FILM:470 OHM,5%,0.2W (2445/2465 ONLY)	57668	TR20JE 470E
R4210	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 X 0.225 (2445A/2465A/2467 ONLY)	24546	OMA 07
R4224	313-1102-00			RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
R4265	313-1681-00			RES,FXD,FILM:680 OHM,5%,0.2W	57668	TR20JE 680E
U4207	156-1566-00			MICROCKT,DGTL:PMOS,100 X 14,EEPROM14	TK1146	M5G1400P
U4225	156-1318-00			MICROCKT,DGTL:LSTTL,4-BIT BISTABLE LATCH	01295	SN74LS375NP3
U4235	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
U4240	156-0718-03			MICROCKT,DGTL:TRIPLE 3-INP NOR GATE	01295	SN74LS27NP3
U4245	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
U4250	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE	07263	74LS10PCQR
U4255	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVRS W/3 ST OUT	01295	SN74LS245N3
U4260	160-1833-06			MICROCKT,DGTL:4096 X 8 EPROM,PRGM (2445/2465 ONLY)	80009	160-1833-06
U4260	160-3676-01			MICROCKT,DGTL:4096 X 8 EPROM,PRGM (2445A/2465A/2467 ONLY)	80009	160-3676-01
U4265	156-0383-02			MICROCKT,DGTL:QUAD 2-INP NOR GATE	18324	N74LS02NB

Replaceable Parts - Buffer Test Kit

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
U4275	156-0392-03			MICROCKT,DGTL:QUAD LATCH W/CLEAR	07263	74LS175PCQR
U4280	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
W4211	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 X 0.225	24546	OMA 07
W4212	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 X 0.225	24546	OMA 07
	131-0993-00			BUS,CONDUCTOR:SHUNT ASSEMBLY,BLACK (QUANTITY OF 4)	22526	65474-005
	131-2238-00			CONN,RCPT,ELEC:CKT BD,2 X 20,MALE (QUANTITY OF 2)	TK1483	082-2043-SD08
	175-4544-00			CA ASSY,SP,ELEC:20,28 AWG,3.0 L,RIBBON (QUANTITY OF 1)	80009	175-4544-00
	070-6291-00			SHEET,TECHNICAL:INSTR,2400 SERIES	80009	070-6291-00