

TEKTRONIX®

465
OSCILLOSCOPE
WITH
QB MODIFICATION

INSTRUCTION MANUAL

Tektronix, Inc.
P.O. Box 500
Beaverton, Oregon 97005
061075

Serial Number _____

465 MOD QB

The 465 MOD QB is the addition of a transition counter to the 465 MOD PB. The manual insert describing the 465 MOD PB appears at the end of the section on the Replaceable Parts.

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CHARACTERISTICS

Input Count Frequency	10 MHz (20 μ s transition rate with WIDTH at 50 ns). 5 MHz (10 μ s transition rate with WIDTH at 100 ns).
Width Discriminator	50 ns—Removes pulses ~50 ns width or less. 100 ns—Removes pulses ~100 ns width or less.
Sensitivity	1 major division (Ch 1 and Ch 2).
Counter Modes	Ch 2 Gate—Counted during duration of Ch 2 signal. Ch 2 Period—Counted for a period of Ch 2 signal. Sweep Gate—Counted for the duration of A sweep gate. Totalize—Counted continuously until reset.
GATE OPEN light	Indicates counting activity.
465 Norm-Invert	Provides inversion of Ch 2 as a gating signal.
Display Cycle Time	2 s to 5 s plus detent for indefinite hold.
Comparator Memory	Stores the current measurement and compares value with subsequent readings. Provides lockout when a miscomparison is found. NOT EQUAL light indicates miscomparison.
Operating Temperature	0°C to +45°C

Mod QB is not compatible with Option 5 (TV Sync Separator) and Option 7 (DC Operation) nor is it qualified under EMI requirements for Option 4.

TRANSITION COUNTER

FRONT PANEL CONTROLS AND INDICATORS

Triggering (CH 1 and CH 2)

MONITOR

Lights to indicate correct triggering adjustment, and must be lit for proper counter and gate circuit operations. (For CH 2 gating, lights need be on in CH 2 GATED and CH 2 PERIOD modes only).

ADJUST

Provides proper triggering under various input conditions. The trigger ADJUST controls compensate for dc component, drift, and varying signal levels.

Mode

NOTE

The following gate description (CH 2 GATED and CH 2 PERIOD modes) applies to the gating waveform as displayed on the crt, whether or not CH 2 input of the oscilloscope is normal or inverted. To gate the counter with the positive-true condition of the gating waveform, use CH 2 input of the oscilloscope in the normal mode. To gate the counter with the negative-true condition of the gating waveform, use the CH 2 input of the oscilloscope in the inverted mode.

CH 2 GATED

CH 1 counter is gated on by the first positive-going (threshold crossing) signal as displayed on the crt, and gated off by the following negative-going (threshold crossing) signal. Oscilloscope CH 2 INVERT switch reverses polarity of gating signal.

CH 2 PERIOD

CH 1 counter is gated on by the first negative-going (threshold crossing) signal as displayed on the crt, and gated off by the next negative-going (threshold crossing) signal. Oscilloscope CH 2 INVERT switch reverses polarity of gating signal.

A SWP GATE

CH 1 counter is gated on by the start of the A sweep, and is gated off by the ending of A sweep. In the A SWP GATE mode, the numbers of transitions counted is directly affected by the sweep rate setting and the HORIZ MODE selection. The CH 2 triggering ADJUST control and MONITOR light have no function in this mode.

TOTALIZE

CH 1 counter gate is opened and remains open until manually reset, or until another gate mode is selected. All transitions are accumulated and shown as a total on the readout. The DISPLAY TIME control has no function in this mode.

RESET

Pushbutton resets the counter and display to zero in any operating mode, and inhibits counting until released.

CH 1 WIDTH DISC (Pulse Width Discriminator)

>50 ns—With the pushbutton in the OUT position, the CH 1 counter circuit rejects all transitions with a pulse width of approximately 50 nanoseconds or less.

>100 ns—With the pushbutton in the IN position, the CH 1 counter circuit rejects all transitions with a pulse width of approximately 100 nanoseconds or less.

Readout

Four digit, 7 segment, light-emitting diode array that displays transition counts of 0 to 9999. The 3 leading zeros are suppressed.

GATE OPEN

Lights to indicate that the counter gate is open and transition counts are being accumulated. At the end of the counting period the light goes off, and remains off during display time. In the TOTALIZE mode, the GATE OPEN light is on continuously.

USING THE QB AS A FREQUENCY COUNTER

By using the B ENDS A mode for a precise 10 division sweep length, and setting the A sweep rate in multiples of 5, the QB is useable as a frequency counter. The counter accuracy is largely dependent on the accuracy of the sweep length, and care should be exercised in making this adjustment.

Control Settings:

TRANSITION COUNTER	
MODE	A SWP GATE
OSCILLOSCOPE	
VERT MODE	CH 1
HORIZ MODE	A INTEN
DELAY TIME POSITION	9.0 on vernier
A TRIG MODE	AUTO
A TRIGGER SOURCE	CH 1
A TRIG HOLDOFF	B ENDS A (in detent)
B TRIGGER SOURCE	STARTS AFTER DELAY
A & B TRIGGER COUPLING	AC
A & B TIME/DIV	VAR control in calibrated detent

1. Input Adjustment, Counter and Oscilloscope

- Connect signal to be counted to CH 1 oscilloscope input.
- Set CH 1 Input Coupling switch to QC and adjust CH 1 VOLTS/DIV control to obtain at least 1 division of vertical deflection.
- Adjust A TRIGGER LEVEL control of oscilloscope until a stable display is obtained on crt.
- Adjust counter CH 1 TRIGGERING ADJUST until CH 1 MONITOR light remains on.

2. Sweep Length Adjustment

- Set A sweep rate (A AND B TIME/DIV control) in multiples of 5 (i.e. 5 ms, .5 ms, 50 μ s) until 3 digits are displayed on counter.
- Once 3 digits are displayed, set A sweep to the next slower multiple of 5 for a 4 digit counter display.

NOTE

Full 4 digit readout will not be obtained below 100 Hz.

- With horizontal POSITION controls, precisely align left edge of sweep with extreme left graticule line.
- Reduce INTENSITY until intensified portion of trace is at normal viewing brightness.
- Unlock DLY'D SWP (PULL) and increase B delayed sweep rate until displayed trace becomes a thin vertical line or dot on the crt. Note that A sweep setting has remained at a multiple of 5 as viewed through the clear plastic skirt.
- Turn DELAY TIME POSITION control clockwise to precisely align vertical line or dot with extreme right vertical graticule line.
- Counter display now reads directly in frequency with the decimal place to be determined.

3. Locating Decimal Place

The following table will aid in locating the decimal place. Assume a 5000 reading on counter display.

If A sweep rate is	Frequency is
5 s	500 Hz
.50 ms	5 kHz
.5 ms	50 kHz
.5 ms	500 kHz
.50 μ s	5 MHz

Formula for calculating frequency:

$$\text{Frequency} = \frac{T}{20 \times T_D}$$

T = Transitions displayed on counter

T_D = TIME/DIV reading in seconds

Formula for calculating resolution:

$$\text{Resolution in Hz} = \frac{1}{20 \times T_D}$$

4. Slow Sweep Speed Setup

This procedure will aid in the adjustment of the precision 10 division horizontal sweep length where sweep rates are very slow. It is convenient for frequencies below 1 kHz, and essential for frequencies below 100 Hz where less than 4 digits are displayed on counter.

- a. Set oscilloscope CH 1 Input Coupling switch to GND.
- b. Turn the DELAY TIME POSITION vernier counter-clockwise to the end of travel.
- c. Unlock the DLY'D SWP (PULL) and increase delayed sweep speed to maximum (0.05 μ s).
- d. Reduce INTENSITY until 2 dots (or short flickering line) are seen on crt.
- e. With the horizontal POSITION control, align the left dot or left edge of the line with the extreme left vertical graticule line.
- f. Turn the DELAY TIME POSITION vernier clockwise until the dot or right edge of the line stops on the extreme right vertical graticule line.
- g. Return CH 1 Input Coupling switch to DC.
- h. Counter readout is now in frequency with the decimal place to be determined.

INSTRUMENT CHECKOUT PROCEDURE

1. Channels 1 and 2 Triggering Adjustments

Control Settings:

VERT MODE	CHOP
HORIZ DISPLAY	A LOCK KNOBS
A TRIGGER SOURCE	NORM
X10 MAG	OUT
TRIG MODE	AUTO
B TRIGGER SOURCE	STARTS AFTER DELAY
A & B TIME/DIV	.5 ms

a. Connect a X1 probe from CH 1 oscilloscope to oscilloscope 300 mV CALIBRATOR output.

b. Set CH 1 Input Coupling switch to AC and CH 1 VOLTS/DIV control to 20 mV.

c. Adjust CH 1 VOLTS/DIV VAR control for 8 divisions of vertical deflection of square wave.

CHECK—That CH 1 MONITOR light is on for all settings of CH 1 TRIGGERING ADJUST control with the exception of extreme clockwise and counterclockwise settings. At the extreme clockwise and counterclockwise settings, the MONITOR light must be off.

d. Set CH 1 Input Coupling switch to DC and CH 1 VOLTS/DIV control to .2 V.

e. Adjust CH 1 VOLTS/DIV VAR control for 1 division of vertical deflection.

CHECK—That CH 1 TRIGGERING ADJUST will adjust so that the CH 1 MONITOR light remains on.

f. Repeat the steps a through e for CH 2.

2. Modes

Control Settings:

A Sweep TIME/DIV	1 ms
B Sweep TIME/DIV	.5 ms
HORIZ DISPLAY	A INTEN
A TRIG HOLDOFF	NORM
DELAY TIME POSITION	2.5 on vernier
DISPLAY TIME	Around 10 o'clock position

- a. Connect BNC cable from CH 2 oscilloscope input to B +GATE output (located on rear panel of oscilloscope).
- b. Set CH 2 Input Coupling switch to DC and CH 2 VOLTS/DIV control on 2 V. (VAR in calibrated detent.)
- c. Connect a X1 probe from CH 1 oscilloscope input to oscilloscope 300 mV CALIBRATOR output.
- d. Set CH 1 Input Coupling switch to DC and CH 1 VOLTS/DIV control on .2 V. (VAR to calibrated detent.)
- e. Adjust CH 1 and CH 2 TRIGGERING ADJUST controls so that both MONITOR lights remain on.
- f. Press in CH 2 GATED MODE button. Count the number of positive and negative transitions occurring during gated portion as displayed on crt.

CHECK—For a counter reading of above count + 1 count.

- g. Press in CH 2 PERIOD MODE button.

CHECK—For a counter reading of 20 to 34

- h. Press in A SWP GATE MODE button.

CHECK—For a counter reading of 15 to 26.

CHECK—That GATE OPEN light is on only during counting period, and off during display period.

- i. Adjust DISPLAY TIME fully counterclockwise to MIN.

CHECK—That GATE OPEN light blinks at a rapid but perceptible rate.

- j. Adjust DISPLAY TIME fully clockwise to detent, but not into detent.

CHECK—That counter updates approximately every 5 seconds.

- k. Set DISPLAY TIME to approximately midrange.

- l. Press TOTALIZE MODE button.

CHECK—That GATE OPEN light remains on and that counter counts continuously.

- m. Press and hold RESET MODE button.

CHECK—That counter resets to 0 and stops.

CHECK—That GATE OPEN light remains on.

CHECK—That releasing RESET button starts counting again from 0.

- n. Press and lock in LOAD/COMPARE button.

CHECK—That counter reading and functions do not change.

o. Release LOAD/COMPARE button.

CHECK—That counter resets and resumes counting. (This happens very quickly, and zeros will not be seen.)

p. Set DISPLAY TIME to infinite (into detent).

CHECK—That counter continues to count.

q. Press A SWP GATE button, then TOTALIZE button.

CHECK—That counter stops on some arbitrary number.

r. Press and release RESET button.

CHECK—That counter resets to 0, then resumes counting.

s. Press A SWP GATE button.

t. Press and release RESET button.

CHECK—That counter resets to 0, then resumes count of 15 to 26.

u. Lock in LOAD/COMPARE button.

CHECK—That when pressing and releasing RESET button, the NOT EQUAL light remains off.

v. Set DISPLAY TIME to midrange.

CHECK—That counter updates periodically, and NOT EQUAL light remains off.

w. Change A sweep TIME/DIV setting to 2 ms. (B sweep must remain at previous setting of .5 ms.)

CHECK—That counter latches on a reading of 30 to 52 and NOT EQUAL light comes on.

x. Return A sweep TIME/DIV control to .5 ms, and press and release RESET button.

CHECK—That counter resumes count of 15 to 26 and continues to update.

y. Release LOAD/COMPARE button.

This concludes the portion of the check-out procedure which may be accomplished without additional instrumentation. Oscilloscope and transition-counter controls may now be set as desired, or, if CH 1 WIDTH DISC is to be checked, as described in the next section.

3. Channel 1 Pulse Width Discriminator

EQUIPMENT REQUIRED. This check requires a pulse generator capable of delivering a 10 MHz, 50 ns pulse width square wave. It must have a rise and fall time of 5 ns or less, and have adjustable offset. (Tektronix PG 502 or equivalent.)

Control Settings:

DISPLAY TIME	Fully counterclockwise
COUNTER MODE	A SWP GATE
LOAD/COMPARE button	OUT
VERT MODE	CH 1
A & B TIME/DIV	.05 μ s (fully clockwise with knobs locked)
HORIZ DISPLAY	A LOCK KNOBS

a. Connect pulse generator to the CH 1 oscilloscope input.

b. Set oscilloscope CH 1 Input Coupling switch to GND, and position trace to vertical center of crt. Return Input Coupling switch to DC.

c. Set counter CH 1 WIDTH DISC to 50 ns (button out)

d. Set pulse generator pulse width to 80 ns and pulse duration to 160 ns.

e. Adjust oscilloscope CH 1 VOLTS/DIV, pulse generator amplitude and offset, so that a full 8 divisions of vertical amplitude, peak to peak, is displayed on the crt.

f. Set the counter CH 1 TRIGGERING ADJUST to midrange.

g. Narrow the generator pulse width until the counter CH 1 MONITOR light goes out, and display reads 0.

CHECK—That pulse width is 50 ns plus or minus 15 ns.

h. Widen the generator pulse width to restore counter reading and illuminate counter CH 1 MONITOR light.

i. Narrow generator pulse duration until counter CH 1 MONITOR light goes out and display reads 0.

CHECK—That pulse duration is 50 ns plus or minus 15 ns.

j. Depress counter CH 1 WIDTH DISC button, and set generator pulse width to 140 ns, and pulse duration to 280 ns.

k. Repeat steps g through i to check for 100 ns plus or minus 25 ns.

REPLACEABLE PARTS LIST

PARTS ORDERING INFORMATION

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

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

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

SPECIAL NOTES AND SYMBOLS

X000 Part first added at this serial number

00X Part removed after this serial number

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	<i>Name & Description</i>
	<i>Assembly and/or Component</i>
	<i>Attaching parts for Assembly and/or Component</i>
	<i>.....</i>
	<i>Detail Part of Assembly and/or Component</i>
	<i>Attaching parts for Detail Part</i>
	<i>.....</i>
	<i>Parts of Detail Part</i>
	<i>Attaching parts for Parts of Detail Part</i>
	<i>.....</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.

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.

CROSS INDEX MFR. CODE NUMBER TO MANUFACTURER

MFR.CODE	MANUFACTURER	ADDRESS	CITY,STATE,ZIP
Electrical			
01121	Allen-Bradley Co.	1201 2nd St. South	Milwaukee, WI 53204
01295	Texas Instruments, Inc., Components Group	P. O. Box 5012	Dallas, TX 75212
04713	Motorola, Inc., Semiconductor Products Div.	5005 E. McDowell Rd.	Phoenix, AZ 85008
07263	Fairchild Semiconductor, A Div. of Fairchild Camera and Instrument Corp.	464 Ellis St. 12515 Chadron Ave.	Mountain View, CA 94040 Hawthorne, CA 90250
07910	Teledyne Semiconductor	Nela PK. Commerce Drive	Cleveland, OH 44112 Danbury, CT 06810
08806	General Electric Co., Miniature Lamp Products Dept.	10441 Roselle St.	San Diego, CA 92121
12040	National Semiconductor Corp.	600 W. John St.	Hicksville, NY 11802
14158	AVX Ceramics Corp., Western Operations	811 E. Argues	Sunnyvale, CA 94086
14936	General Instrument Corp., Semiconductor Products Group	4001 Miranda Ave.	Palo Alto, CA 94304
18324	Signetics Corp.	644 W. 12th St.	North Adams, MA 01247
31718	Fairchild Microwave and Optoelectronics, a Div. of Fairchild Camera and Instrument Corp.	401 N. Broad St. P. O. Box 500	Erie, PA 16512
56289	Sprague Electric Co.	3029 E. Washington St.	Philadelphia, PA 19108
72982	Erie Technological Products, Inc.	420 Lincoln Hwy.	Beaverton, OR 97005
75042	TRW Electronic Components, IRC Fixed Resistors, Philadelphia Division		Indianapolis, IN 46206
80009	Tektronix, Inc.		Fraser, PA 19355
90201	Mallory Capacitor Co., Div. of P. R. Mallory Co., Inc.		
97979	Reon Resistor Corp.		

Mechanical

00779	AMP, Inc.	P. O. Box 3608	Harrisburg, PA 17105
01295	Texas Instruments, Inc., Components Group	P. O. Box 5012	Dallas, TX 75227
08261	Spectra-Strip Corp.	7100 Lampson Ave.	Garden Grove, CA 92642
12127	Freeway Washer and Stamping Co.	P. O. Box 05206	Cleveland, OH 44105
22526	Berg Electronics, Inc.	Youk Expressway	New Cumberland, PA 17070
23050	Product Components Corp	30 Lorraine Ave.	Mt Vernon, NY 10553
23499	Gavitt Wire and Cable, Division of Amerace Esna Corp.	455 N. Quince St.	Escondido, CA 92025
26390	Tridair Industries	3000 W. Lomita Blvd.	Torrance, CA 90505
34114	Oak Industries Inc.	S. Main St.	Crystal Lake, IL 60014
71279	Cambridge Thermionic Corp.	445 Concord Ave.	Cambridge, MA 02138
71785	TEW Electronic Components, Cinch Connector Operations	1501 Morse Ave.	Elk Grove Village, IL 60007
73743	Fischer Special Mfg. Co.	446 Morgan St.	Cincinnati, OH 45206
77250	Pheonl Manufacturing Co., Division of Allied Products Corp.	5700 W. Roosevelt Rd.	Chicago, IL 60650
78189	Illinois Tool Works, Inc.	St. Charles Road	Elgin, IL 60126
79136	Shakeproof Division	47-16 Austel Place	Long Island City, NY 11101
79807	Waldes, Mohnoor, Inc.	2100 S. O Bay St.	Milwaukee, WI 53207
80009	Wrought Washer Mfg. Co.	P. O. Box 500	Beaverton, OR 97005
82647	Tektronix, Inc.	34 Forest St.	Attleboro, MA 02703
83385	Texas Instruments, Inc., Control Products Div.	2530 Crescent Dr.	Broadview, IL 60153
86445	Central Screw Co.	2032 E. Westmoreland St.	Philadelphia, PA 19134

Ckt No.	Tektronix Part No.	Serial/Model No.	Eff	Descrip.	Ref.	Code	Alt Part No.
	672-0453-01 ¹			CKT BOARD ASSY:POWER SUPPLY ASSY			
	670-3470-01			CKT BOARD ASSY:POWER SUPPLY			
	672-0494-00 ²			CKT BOARD ASSY:TRANSITION COUNTER ASSY			
	670-3049-00			CKT BOARD ASSY:DISPLAY			
	670-3050-00			CKT BOARD ASSY:AMP LOGIC			
C2302	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2304	281-0605-00			CAP.,FxD,CER DI:200PF,10%,500V		72982	301-00001500001K
C2311	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2319	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2321	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2349	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2356	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2402	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2404	281-0605-00			CAP.,FxD,CER DI:200PF,10%,500V		72982	301-00001500001K
C2411	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2419	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2421	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2449	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2456	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2472	283-0059-00			CAP.,FxD,CER DI:1UF,+80-20%,25V		72982	8141N0306511052
C2510	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2512	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2514	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2532	283-0059-00			CAP.,FxD,CER DI:1UF,+80-20%,25V		72982	8141N0306511052
C2537	281-0518-00			CAP.,FxD,CER DI:47PF,/-9.4PF,500V		72982	301-0000U2J0470M
C2548	281-0524-00			CAP.,FxD,CER DI:150PF,/-30PF,500V		72982	301-000X5U0151M
C2556	290-0536-00			CAP.,FxD,ELCTLT:10UF,20%,25V		90201	TDC106M025FL
C2557	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2565	281-0546-00			CAP.,FxD,CER DI:330PF,10%,500V		72982	301-000X5D0331K
C2566	281-0504-00			CAP.,FxD,CER DI:10PF,/-1PF,500V		72982	301-000C0G0100F
C2567	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2568	281-0605-00			CAP.,FxD,CER DI:200PF,10%,500V		72982	301-000Y5D0201K
C2573	283-0003-00			CAP.,FxD,CER DI:0.01UF,+80-20%,150V		72982	055-54781012
C2574	281-0605-00			CAP.,FxD,CER DI:200PF,10%,500V		72982	301-000Y5D0201K
C2579	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2583	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2586	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2591	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2592	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2594	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2595	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2596	283-0023-00			CAP.,FxD,CER DI:0.1UF,+80-20%,10V		56289	20C374
C2612	290-0325-00			CAP.,FxD,ELCTLT:330UF,/+75-10%,50V		56289	601D337G050FL4
C2613	283-0198-00			CAP.,FxD,CER DI:0.22UF,20%,50V		72982	8131N075651224M
C2615	290-0527-00			CAP.,FxD,ELCTLT:15UF,20%,20V		90201	TDC156M020FL
C2622	290-0369-00			CAP.,FxD,ELCTLT:800UF,/+75-10%,15V		56289	39D807G15FJ4
C2623	290-0369-00			CAP.,FxD,ELCTLT:800UF,/+75-10%,15V		56289	39D807G15FJ4
C2624	283-0198-00			CAP.,FxD,CER DI:0.22UF,20%,50V		72982	8131N075651224M
C2626	290-0527-00			CAP.,FxD,ELCTLT:15UF,20%,20V		90201	TDC156M020FL
C2632	290-0325-00			CAP.,FxD,ELCTLT:330UF,/+75-10%,50V		56289	601D337G050FL4
C2634	290-0534-00			CAP.,FxD,ELCTLT:1UF,20%,35V		56289	196D105X0035HAI
C2636	290-0527-00			CAP.,FxD,ELCTLT:15UF,20%,20V		90201	TDC156M020PL
CR2323	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA		07910	1N4152
CR2423	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA		07910	1N4152
CR2471	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA		07910	1N4152
CR2475	150-1004-00			LAMP,LED:RED,2.5V,15MA		08806	SSL-12
CR2530	150-1004-00			LAMP,LED:RED,2.5V,15MA		08806	SSL-12
CR2532	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA		07910	1N4152
CR2544	150-1004-00			LAMP,LED:RED,2.5V,15MA		08806	SSL-12

¹Power Supply Assy includes Power Supply Board, 670-3470-01.²Transition Counter Assy includes Display Board, 670-3049-00 and Amp Logic Board 670-3050-01.

Ckt No.	Tektronix Part No.	Serial/Model No.	Eff	Discnt	Name & Description	Ref Code	Alt Ref Code	Alt Part No.	Ref No.
R2405	315-0222-00				RES., FXD, COMP: 2.2K OHM, 5%, 0.25W	01121	CB2225		
R2411	315-0300-00				RES., FXD, COMP: 30 OHM, 5%, 0.25W	01121	CB1035		
R2412	315-0821-00				RES., FXD, COMP: 820 OHM, 5%, 0.25W	01121	CB8215		
R2413	315-0472-00				RES., FXD, COMP: 4.7K OHM, 5%, 0.25W	01121	CB4725		
R2414	311-0546-00				RES., VAR, NONVIR: 10K OHM, 20%, 0.75W	97979	TN0546G		
R2415	315-0222-00				RES., FXD, COMP: 2.2K OHM, 5%, 0.25W	01121	CB2225		
R2419	315-0300-00				RES., FXD, COMP: 30 OHM, 5%, 0.25W	01121	CB3005		
R2421	315-0101-00				RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015		
R2422	315-0392-00				RES., FXD, COMP: 3.9K OHM, 5%, 0.25W	01121	CB3925		
R2423	315-0202-00				RES., FXD, COMP: 2K OHM, 5%, 0.25W	01121	CB2025		
R2426	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2431	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2433	321-0326-00				RES., FXD, FILM: 24.3K OHM, 1%, 0.125W	75042	CEATG-2432F		
R2434	321-0311-00				RES., FXD, FILM: 16.9K OHM, 1%, 0.125W	75042	CEATG-1692F		
R2435	321-0289-00				RES., FXD, FILM: 10K OHM, 1%, 0.125W	75042	CEATG-1002F		
R2436	315-0752-00				RES., FXD, COMP: 7.5K OHM, 5%, 0.25W	01121	CB7525		
R2441	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2442	315-0242-00				RES., FXD, COMP: 2.4K OHM, 5%, 0.25W	01121	CB2425		
R2443	315-0101-00				RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015		
R2445	315-0621-00				RES., FXD, COMP: 620 OHM, 5%, 0.25W	01121	CB6215		
R2446	315-0222-00				RES., FXD, COMP: 2.2K OHM, 5%, 0.25W	01121	CB2225		
R2449	315-0510-00				RES., FXD, COMP: 51 OHM, 5%, 0.25W	01121	CB5105		
R2455	315-0621-00				RES., FXD, COMP: 620 OHM, 5%, 0.25W	01121	CB6215		
R2456	315-0101-00				RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015		
R2457	315-0101-00				RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015		
R2458	315-0202-00				RES., FXD, COMP: 2K OHM, 5%, 0.25W	01121	CB2025		
R2459	315-0820-00				RES., FXD, COMP: 82 OHM, 5%, 0.25W	01121	CB8205		
R2461	315-0202-00				RES., FXD, COMP: 2K OHM, 5%, 0.25W	01121	CB2025		
R2462	315-0820-00				RES., FXD, COMP: 82 OHM, 5%, 0.25W	01121	CB8205		
R2464	315-0242-00				RES., FXD, COMP: 2.4K OHM, 5%, 0.25W	01121	CB2425		
R2471	315-0273-00				RES., FXD, COMP: 27K OHM, 5%, 0.25W	01121	CB2735		
R2472	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2474	315-0202-00				RES., FXD, COMP: 2K OHM, 5%, 0.25W	01121	CB2025		
R2475	315-0511-00				RES., FXD, COMP: 510 OHM, 5%, 0.25W	01121	CB5115		
R2500	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2501	315-0121-00				RES., FXD, COMP: 120 OHM, 5%, 0.25W	01121	CB1215		
R2503	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2516	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2518	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2520	315-0101-00				RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015		
R2521	315-0202-00				RES., FXD, COMP: 2K OHM, 5%, 0.25W	01121	CB2025		
R2522	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2524	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2526	315-0101-00				RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015		
R2528	315-0242-00				RES., FXD, COMP: 2.4K OHM, 5%, 0.25W	01121	CB2425		
R2530	315-0511-00				RES., FXD, COMP: 510 OHM, 5%, 0.25W	01121	CB5115		
R2532	315-0273-00				RES., FXD, COMP: 27K OHM, 5%, 0.25W	01121	CB2735		
R2533	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2535	315-0202-00				RES., FXD, COMP: 2K OHM, 5%, 0.25W	01121	CB2025		
R2540	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2543	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2544	315-0821-00				RES., FXD, COMP: 820 OHM, 5%, 0.25W	01121	CB8215		
R2546	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2548	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2549	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2550	315-0512-00				RES., FXD, COMP: 5.1K OHM, 5%, 0.25W	01121	CB5125		
R2552	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2554	311-1431-00				RES., VAR, NONVIR: 500K OHM, 10%, 0.25W	01121	GS-8032		
R2555	315-0562-00				RES., FXD, COMP: 5.6K OHM, 5%, 0.25W	01121	CB5625		
R2558	315-0200-00				RES., FXD, COMP: 20 OHM, 5%, 0.25W	01121	CB2005		

Cat No.	Tektronix Part No.	Serial/Model No.	Eff	Discnt	Name & Description	Ref	Code	Alt Ref	Reason
R2405	315-0222-00				RES., FXD, C**P: 2.2K OHM, 5%, 0.25W	01121	CB2225		
R2411	315-0300-00				RES., FXD, COMP: 30 OHM, 5%, 0.25W	01121	CB3005		
R2412	315-0821-00				RES., FXD, COMP: 820 OHM, 5%, 0.25W	01121	CB8215		
R2413	315-0472-00				RES., FXD, COMP: 4.7K OHM, 5%, 0.25W	01121	CB4725		
R2414	311-0546-00				RES., VAR, NONWIR: 10K OHM, 20%, 0.75W	97979	TR0546G		
R2415	315-0222-00				RES., FXD, COMP: 2.2K OHM, 5%, 0.25W	01121	CB2225		
R2419	315-0300-00				RES., FXD, COMP: 30 OHM, 5%, 0.25W	01121	CB3005		
R2421	315-0101-00				RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015		
R2422	315-0392-00				RES., FXD, COMP: 3.9K OHM, 5%, 0.25W	01121	CB3925		
R2423	315-0202-00				RES., FXD, COMP: 2K OHM, 5%, 0.25W	01121	CB2025		
R2426	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2431	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2433	321-0326-00				RES., FXD, FILM: 24.3K OHM, 1%, 0.125W	75042	CEATO-2432F		
R2434	321-0311-00				RES., FXD, FILM: 16.9K OHM, 1%, 0.125W	75042	CEATO-1692F		
R2435	321-0289-00				RES., FXD, FILM: 10K OHM, 1%, 0.125W	75042	CEATO-1002F		
R2436	315-0752-00				RES., FXD, COMP: 7.5K OHM, 5%, 0.25W	01121	CB7525		
R2441	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2442	315-0242-00				RES., FXD, COMP: 2.4K OHM, 5%, 0.25W	01121	CB2425		
R2443	315-0101-00				RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015		
R2445	315-0621-00				RES., FXD, COMP: 620 OHM, 5%, 0.25W	01121	CB6215		
R2446	315-0222-00				RES., FXD, COMP: 2.2K OHM, 5%, 0.25W	01121	CB2225		
R2449	315-0510-00				RES., FXD, COMP: 51 OHM, 5%, 0.25W	01121	CB5105		
R2455	315-0621-00				RES., FXD, COMP: 620 OHM, 5%, 0.25W	01121	CB6215		
R2456	315-0101-00				RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015		
R2457	315-0101-00				RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015		
R2458	315-0202-00				RES., FXD, COMP: 2K OHM, 5%, 0.25W	01121	CB2025		
R2459	315-0820-00				RES., FXD, COMP: 82 OHM, 5%, 0.25W	01121	CB8205		
R2461	315-0202-00				RES., FXD, COMP: 2K OHM, 5%, 0.25W	01121	CB2025		
R2462	315-0820-00				RES., FXD, COMP: 82 OHM, 5%, 0.25W	01121	CB8205		
R2464	315-0242-00				RES., FXD, COMP: 2.4K OHM, 5%, 0.25W	01121	CB2425		
R2471	315-0273-00				RES., FXD, COMP: 27K OHM, 5%, 0.25W	01121	CB2735		
R2472	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2474	315-0202-00				RES., FXD, COMP: 2K OHM, 5%, 0.25W	01121	CB2025		
R2475	315-0511-00				RES., FXD, COMP: 510 OHM, 5%, 0.25W	01121	CB5115		
R2500	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2501	315-0121-00				RES., FXD, COMP: 120 OHM, 5%, 0.25W	01121	CB1215		
R2503	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2516	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2518	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2520	315-0101-00				RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015		
R2521	315-0202-00				RES., FXD, COMP: 2K OHM, 5%, 0.25W	01121	CB2025		
R2522	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2524	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2526	315-0101-00				RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015		
R2528	315-0242-00				RES., FXD, COMP: 2.4K OHM, 5%, 0.25W	01121	CB2425		
R2530	315-0511-00				RES., FXD, COMP: 510 OHM, 5%, 0.25W	01121	CB5115		
R2532	315-0273-00				RES., FXD, COMP: 27K OHM, 5%, 0.25W	01121	CB2735		
R2533	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2535	315-0202-00				RES., FXD, COMP: 2K OHM, 5%, 0.25W	01121	CB2025		
R2540	315-0102-00				RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025		
R2543	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2544	315-0821-00				RES., FXD, COMP: 820 OHM, 5%, 0.25W	01121	CB8215		
R2546	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2548	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2549	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2550	315-0512-00				RES., FXD, COMP: 5.1K OHM, 5%, 0.25W	01121	CB5125		
R2552	315-0103-00				RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035		
R2554	311-1431-00				RES., VAR, NONWIR: 500K OHM, 10%, 0.25W	01121	GS-8032		
R2555	315-0562-00				RES., FXD, COMP: 5.6K OHM, 5%, 0.25W	01121	CB5625		
R2559	315-0200-00				RES., FXD, COMP: 20 OHM, 5%, 0.25W	01121	CB2005		

Electrical Parts List--465 MOD QB.

Chr No.	Tektronix Part No.	Serial/Model No.	Eff	Discont	Name & Description	Ref. No.	Code	Date Part Prepared
R2559	315-0112-00				RES.,FWD,COMP:1.1K OHM,5%,0.25W		01121	C81125
R2561	315-0202-00				RES.,FWD,COMP:2K OHM,5%,0.25W		01121	C80207N
R2562	315-0473-00				RES.,FWD,COMP:47K OHM,5%,0.25W		01121	C84735
R2563	315-0821-00				RES.,FWD,COMP:820 OHM,5%,0.25W		01121	C808215
R2565	315-0103-00				RES.,FWD,COMP:10K OHM,5%,0.25W		01121	C81035
R2566	315-0103-00				RES.,FWD,COMP:10K OHM,5%,0.25W		01121	C81035
R2568	315-0301-00				RES.,FWD,COMP:300 OHM,5%,0.25W		01121	C83015
R2573	315-0301-00				RES.,FWD,COMP:300 OHM,5%,0.25W		01121	C83015
R2574	315-0301-00				RES.,FWD,COMP:300 OHM,5%,0.25W		01121	C83015
R2575	315-0512-00				RES.,FWD,COMP:5.1K OHM,5%,0.25W		01121	C85125
R2577	315-0102-00				RES.,FWD,COMP:1K OHM,5%,0.25W		01121	C81025
R2580	315-0512-00				RES.,FWD,COMP:5.1K OHM,5%,0.25W		01121	C85125
R2582	315-0102-00				RES.,FWD,COMP:1K OHM,5%,0.25W		01121	C81025
R2633	307-0104-00				RES.,FWD,COMP:3.3 OHM,5%,0.25W		01121	C83305
R2634	321-0274-00				RES.,FWD,FILM:6.98K OHM,1%,0.125W	75042	CEATO-6981F	
R2635	321-0274-00				RES.,FWD,FILM:6.98K OHM,1%,0.125W	75042	CEATO-6981F	
R2636	315-0392-00				RES.,FWD,COMP:3.9K OHM,5%,0.25W	01121	CB3925	
S2516	260-1453-00				SWITCH,PUSH:	80009		260-1453-00
S2521	260-1729-00				SWITCH,PUSH:	80009		260-1729-00
S2571	260-1482-00				SWITCH,PUSH:	80009		260-1482-00
U2362	156-0251-00				MICROCIRCUIT,DI:VOLTAGE COMPENSATOR	18324	E5059K/NE529K	
U2432	156-0067-00				MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	07263	U6T7741393	
U2462	156-0251-00				MICROCIRCUIT,DI:VOLTAGE COMPENSATOR	18324	E5059K/NE529K	
U2494	150-1011-00				LAMP,LED:RED,7-SEQUENCE	31718	FND70	
U2495	150-1011-00				LAMP,LED:RED,7-SEQUENCE	31718	FND70	
U2496	150-1011-00				LAMP,LED:RED,7-SEQUENCE	31718	FND70	
U2497	150-1011-00				LAMP,LED:RED,7-SEQUENCE	31718	FND70	
U2504	156-0035-00				MICROCIRCUIT,DI:SGL 8-INPUT POS NAND GATE	01295	SN7430N	
U2506	156-0058-00				MICROCIRCUIT,DI:HEX INVERTER	04713	MC7404P	
U2508	156-0035-00				MICROCIRCUIT,DI:SGL 8-INPUT POS NAND GATE	01295	SN7430N	
U2509	156-030-00				MICROCIRCUIT,DI:QUAD 2-INPUT POS NAND GATE	01295	SN7400N	
U2510	156-0034-00				MICROCIRCUIT,DI:DUAL 4-INPUT NAND GATE	01295	SN7420N	
U2512	156-0047-00				MICROCIRCUIT,DI:3-INPUT NAND GATE	01295	SN7410N	
U2514	156-0057-00				MICROCIRCUIT,DI:QUAD 2-INPUT NAND GATE	07263	U6A740159X	
U2516	156-0057-00				MICROCIRCUIT,DI:QUAD 2-INPUT NAND GATE	07263	U6A740159X	
U2524	156-0038-00				MICROCIRCUIT,DI:J-K MASTER SLAVE FLIP-FLOP	01295	SN7472N	
U2528	156-0331-00				MICROCIRCUIT,DI:DUAL D-TYPE,FLIP-FLOP	01295	SN74S74N	
U2536	156-0062-00				MICROCIRCUIT,DI:QUAD 2-INPUT POS EXCL GATE	04713	MC7486P	
U2538	156-0047-00				MICROCIRCUIT,DI:3-INPUT NAND GATE	01295	SN7410N	
U2540	156-0042-00				MICROCIRCUIT,DI:J-K M/S FLIP-FLOP	01295	SN7476N	
U2564	156-0030-00				MICROCIRCUIT,DI:QUAD 2-INPUT POS NAND GATE	01295	SN7400N	
U2566	156-0072-00				MICROCIRCUIT,DI:MONOSTABLE MV,TTL	12040	DM74121N	
U2570	156-0043-00				MICROCIRCUIT,DI:2-INPUT NOR GATE	01295	SN7402N	
U2578	156-0097-00				MICROCIRCUIT,DI:DIV BY 2 AND 5 RIPPLE CNTR	18324	M8290A	
U2579	156-0040-00				MICROCIRCUIT,DI:QUAD LATCH,TTL	07263	7475PC	
U2580	156-0123-00				MICROCIRCUIT,LI:4-BIT MAGNITUDE COMPARATOR	01295	SN7485N	
U2582	156-0091-00				MICROCIRCUIT,DI:DIV BY 2 AND 5 RIPPLE CNTR	18324	N8292A	
U2583	156-0040-00				MICROCIRCUIT,DI:QUAD LATCH,TTL	07263	7475PC	
U2584	156-0123-00				MICROCIRCUIT,LI:4-BIT MAGNITUDE COMPARATOR	01295	SN7485N	
U2586	156-0091-00				MICROCIRCUIT,DI:DIV BY 2 AND 5 RIPPLE CNTR	18324	N8292A	
U2587	156-0040-00				MICROCIRCUIT,DI:QUAD LATCH,TTL	07263	7475PC	
U2588	156-0123-00				MICROCIRCUIT,LI:4-BIT MAGNITUDE COMPARATOR	01295	SN7485N	
U2590	156-0091-00				MICROCIRCUIT,DI:DIV BY 2 AND 5 RIPPLE CNTR	18324	N8292A	
U2591	156-0040-00				MICROCIRCUIT,DI:QUAD LATCH,TTL	07263	7475PC	
U2592	156-0123-00				MICROCIRCUIT,LI:4-BIT MAGNITUDE COMPARATOR	01295	SN7485N	

Mechanical Parts List—465 MOD QB

Fig & Index No.	Tektronix Part No.	Serial/Model No.	Eff	Dscont	Qty	Name & Description	Mfr Code	Mfr Part Number
	670-3849-00				1	CKT BOARD ASSY:DISPLAY (ATTACHING PARTS)	80009	670-3849-00
	211-0062-00				2	SCREW,MACHINE:2-56 X 0.312 INCH,RDH STL	83385	OBD
	210-1002-00				2	WASHER,FLAT:0.125 ID X 0.25 INCH OD,BRS	12327	OBD
	131-0589-00				14	CONTACT,ELEC:0.46 INCH LONG	22526	47350
	131-0608-00				18	CONTACT,ELEC:0.365 INCH LONG	22526	47357
	136-0252-04				40	CONTACT,ELEC:0.188 INCH LONG	22526	75060
	670-3850-00				1	CKT BOARD ASSY:AMP LOGIC (ATTACHING PARTS)	80009	670-3850-00
	211-0116-00				6	SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS	83385	OBD
	129-0080-00				1	POST,ELEMCH:0.675 INCH LONG,NYLON (ATTACHING PARTS)	80009	129-0080-00
	210-1133-00				1	WASHER,NONMETAL:0.142 ID X 0.25"OD FIBER	86445	OBD
	211-0097-00				1	SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL	83385	OBD
	131-0608-00				25	CONTACT,ELEC:0.365 INCH LONG	22526	47357
	131-1003-00				4	CONNECTOR BODY:,CKT BD MT,3 PRONG	80009	131-1003-00
	136-0220-00				18	SOCKET,PLUG-IN:3 PIN	71785	133-23-11-034
	136-0241-00				2	SOCKET,PLUG-IN:10 CONTACT,ROUND	71785	133-99-12-064
	136-0252-04				4	CONTACT,ELEC:0.188 INCH LONG	22526	75060
	136-0260-02				13	SOCKET,PLUG-IN:16 CONTACT,LOW CLEARANCE	01295	C931602
	136-0269-02				21	SOCKET,PLUG-IN:14 CONTACT,LOW CLEARANCE	01295	C931402
	136-0328-02				14	CONTACT,ELEC:HORIZONTAL	00779	86282-2
	136-0514-00				1	SOCKET,PLUG-IN:MICROCIRCUIT,8 CONTACT	82647	C930802
	200-0945-00				2	COVER,HALF XSTR:FOR DUAL TO-18CASE	80009	200-0945-00
	200-0945-01				2	COVER,HALF XSTR:FOR DUAL TO-18 CS,2-56 THD	80009	200-0945-01
	211-0062-00				2	SCREW,MACHINE:2-56 X 0.312 INCH,RDH STL	83385	OBD
	-----				1	SW,PUSH BUTTON:(SEE S1516)		
	-----				1	SW,PUSH BUTTON:(SEE S1571)		
	-----				1	SW,PUSH BUTTON:(SEE S2521)		
	361-0608-00				10	SPACER,PUSH SW:PLASTIC	80009	361-0608-00
	-----				1	RESISTOR,VAR:(SEE R2554) (ATTACHING PARTS)		
	210-0046-00				1	WASHER,LOCK:INTL,0.26 ID X 0.40" OD,STL	78189	1214-05-00-0541C
	210-0940-00				1	WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
	210-0583-00				1	NUT,PLAIN,HEX:0.25-32 X 0.312 INCH,BRS	73743	2X20319-402
	407-0312-00				1	BRET,CKT BD MTG:DOUBLE ANGLE	80009	407-0312-00

Electrical Parts List—465 MOD QB

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Discont	Name & Description	Mfr Code	Mfr Part Number
U2594	156-0493-00			MICROCIRCUIT,DI:BCD TO 7-SEG DEC/DRIVER	07263	9368PC
U2595	156-0493-00			MICROCIRCUIT,DI:BCD TO 7-SEG DEC/DRIVER	07263	9368PC
U2596	156-0493-00			MICROCIRCUIT,DI:BCD TO 7-SEG DEC/DRIVER	07263	9368PC
U2597	156-0493-00			MICROCIRCUIT,DI:BCD TO 7-SEG DEC/DRIVER	07263	9368PC
U2614	156-0285-00			MICROCIRCUIT,LI:VOLTAGE REGULATOR,12V,1A	07263	UGH78/2393
U2624	156-0285-00			MICROCIRCUIT,LI:VOLTAGE REGULATOR,12V,1A	07263	UGH78/2393
VR2321	152-0175-00			SEMICOND DEVICE:ZENER,0.4W,5.6V,5%	04713	IN752A
VR2345	152-0175-00			SEMICOND DEVICE:ZENER,0.4W,5.6V,5%	04713	IN752A
VR2355	152-0175-00			SEMICOND DEVICE:ZENER,0.4W,5.6V,5%	04713	IN752A
VR2421	152-0175-00			SEMICOND DEVICE:ZENER,0.4W,5.6V,5%	04713	IN752A
VR2445	152-0175-00			SEMICOND DEVICE:ZENER,0.4W,5.6V,5%	04713	IN752A
VR2455	152-0175-00			SEMICOND DEVICE:ZENER,0.4W,5.6V,5%	04713	IN752A

14

Mechanical Parts List—465 MOD QB

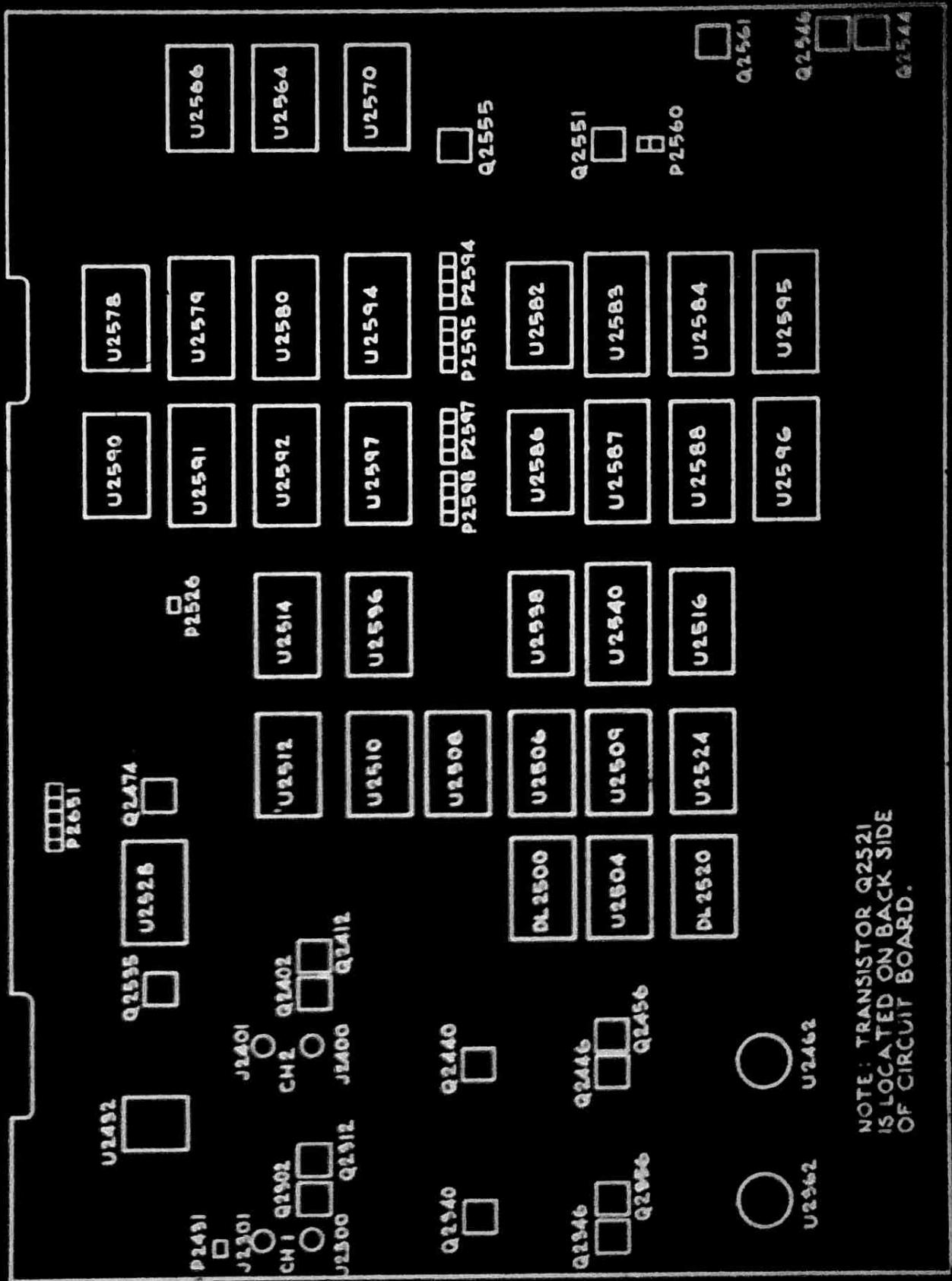
PARTS DELETED FROM STANDARD INSTRUMENT

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Discont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
	016-0535-02			1	POUCH,ACCESSORY:W/HARDWARE		80009	016-0535-02
	119-0238-00			1	COIL,CALIBRATION:		80009	119-0238-00
	179-1873-02			1	WIRING HARNESS,:TRIGGER		80009	179-1873-02
	210-0593-00			2	NUT,FINISHING:0.25 HEX X 0.312" LONG,BRS		80009	210-0593-00
	333-1635-00			1	PANEL,FRONT:		80009	333-1635-00
	361-0059-00			1	INSULATOR,PLATE:0.406 X 1.094 INCH L,PLSTC		80009	361-0059-00
	386-2330-00			1	SUBPANEL,FRONT:		80009	386-2330-00
	437-0141-00			1	CHAS,ELEC EQUIP:		80009	437-0141-00

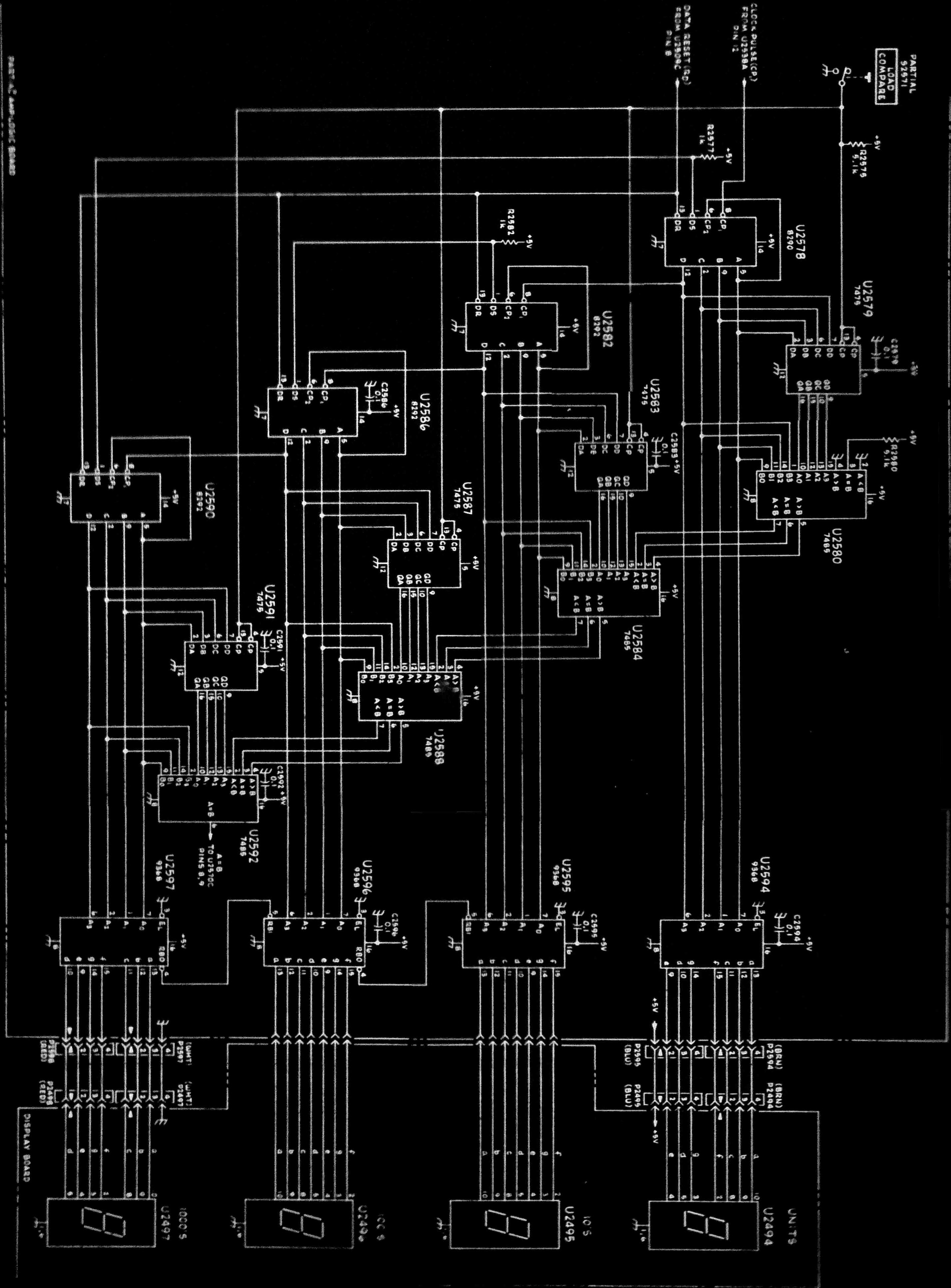
15

Fig. &
Index

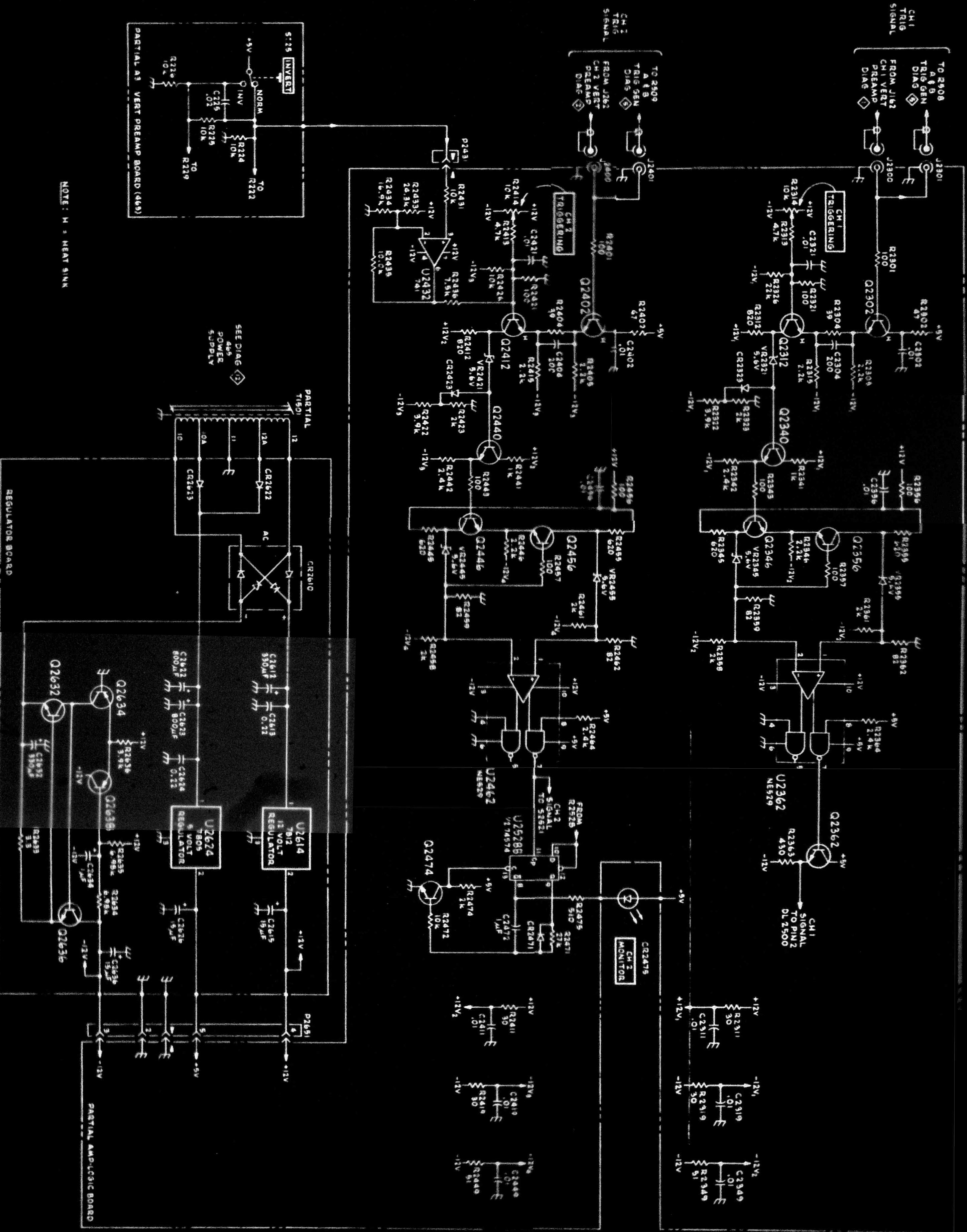
Index No.	Tektronix Part No.	Serial/Model No.	Eff	Discont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
	004-1208-02				4		FR,CUSHIONING:	80009	004-1208-02
	004-1227-00				1		PROTECTOR,FRONT:PRE FORMED	80009	004-1227-00
	004-1235-00				1		PROTECTOR,REAR:PRE FORMED	80009	004-1235-00
	010-0190-00				1		LEAD,TEST:6 FT,BNC 1 END	80009	010-0190-00
	016-0594-00				1		POUCH,ACCESSORY:W/HARDWARE	80009	016-0594-00
	016-0537-00				1		. POUCH,ACCESSORY:9 X 6 INCHES,W/ZIPPER	80009	016-0537-00
	016-0594-01				1		. POUCH,ACCESSORY:	80009	016-0594-01
	210-0804-00				2		. WASHER,FLAT:0.17 ID X 0.375 INCH OD,STL	12327	OBD
	212-0001-00				1		. SCREW,MACHINE:8-32 X 0.250 INCH,PNH STL	77250	OBD
	212-0068-00				4		. SCREW,MACHINE:8-32 X 0.312 INCH,TRH STL	77250	OBD
	220-0661-00				4		. NUT,SLFLKG,HEX:8-32 X 0.344 X 0.215",NYLON	23050	OBD
	354-0175-00				1		. RING,RETAINING:TRUARC	79136	5133-18-MI
	386-3106-00				1		. PLATE,RACKING:	80009	386-3106-00
	386-3107-00				1		. PLATE,MOUNTING:	80009	386-3107-00
	030-0022-05				1		SUBPANEL,FRONT:	80009	030-0022-05
	034-0516-00				1		PANEL,FRONT:	80009	034-0516-00
	037-2064-00				1		COIL,CALIBRATIO:	80009	037-2064-00
	136-0387-00				1		JACK,TIP:GRAY	71279	4352-1-0318
	175-0825-00				FT		WIRE,ELECTRICAL:2 WIRE RIBBON	23499	TEK-175-0825-00
	179-2182-00				1		WIRING HARNESS:trigger	80009	179-2182-00
	200-1722-01				1		COVER,CKT BD:TRANSISTION COUNTER ASSY	80009	200-1722-01
	210-0457-00				1		NUT,PLAIN,EXT W:6-32 X 0.312 INCH,STL	83385	OBD
	210-0803-00				2		WASHER,FLAT:0.15 ID X 0.375 INCH OD,STL	12327	OBD
	211-0008-00				3		SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
	212-0033-00				2		SCREW,MACHINE:8-32 X 0.750 INCH,PNH STL	83385	OBD
	212-0130-00				2		SCREW,MACHINE:8-32 X 0.50 INCH,PNH STL	26390	OBD
	213-0146-00				2		SCR,TPG,THD FOR:6-20 X 0.313 INCH,PNH STL	83385	OBD
	348-0063-00				1		GROMMET,PLASTIC:0.50 INCH DIA	80009	348-0063-00
	437-0174-00				1		CABINET,OSCPI:	80009	437-0174-00
	672-0453-01				1		CKT BOARD ASSY:POWER SUPPLY	80009	672-0453-01
	175-0860-00				FT		. WIRE,ELECTRICAL:5 WIRE RIBBON,5.5 INCH L	23499	TEK-175-0860-00
	175-0860-00				FT		. WIRE,ELECTRICAL:5 WIRE RIBBON,8 INCHES L	23499	TEK-175-0860-00
	131-0707-00				5		CONNECTOR,TERM:0.48" L,22-26 AWG WIRE	22526	47439
	352-0163-00				1		HOLDER,TERM.CON:5 WIRE BLACK	80009	352-0163-00
	210-0586-00				3		NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL	78189	OBD
	211-0116-00				2		SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS	83385	OBD
	342-0238-00				1		INSULATOR,PLATE:	80009	342-0238-00
	343-0507-00				1		RETAINER,XSTR:	80009	343-0507-00
	348-0055-00				1		GROMMET,PLASTIC:0.25 INCH DIA	80009	348-0055-00
	348-0141-00				1		GROMMET,PLASTIC:U-SHP,0.625 X 0.658 INCH	80009	348-0141-00
	441-1171-00				1		CHAS,ELEC EQUIP:INVERTER	80009	441-1171-00
	670-3470-01				1		CKT BOARD ASSY:POWER SUPPLY	80009	670-3470-01
	136-0252-04				9		. CONTACT,ELEC:0.188 INCH LONG	22526	75060
	672-0494-00				1		CKT BOARD ASSY:TRANSITION COUNTER	80009	672-0494-00
	175-0825-00				1		WIRE,ELECTRICAL:2 WIRE RIBBON	23499	TEK-175-0825-00
	175-0827-00				4		WIRE,ELECTRICAL:4 WIRE RIBBON	08261	TEK-175-0827-00
	-----				2		RESISTOR,VAR:(SEE R2314,R2414 EPL) (ATTACHING PARTS)	.	.
	210-0046-00				2		. WASHER,LOCK:INTL,0.26 ID X 0.40" OD,STL	78189	1214-05-00-0541C
	210-0940-00				2		. WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
	210-0583-00				4		. NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20319-402
	331-0397-00				1		WINDOW,READOUT:0.55 X 1.495 X 0.06 INCH	80009	331-0397-00
	333-2014-00				1		PANEL,FRONT:	80009	333-2014-00
	348-0063-00				1		GROMMET,PLASTIC:0.50 INCH DIA	80009	348-0063-00
	348-0417-00				1		GROMMET,PLASTIC:0.20 X 0.75 INCH	80009	348-0417-00
	358-6301-01				1		BUSHING,SLEEVE:0.185 INCH DIA,GRAY	80009	358-6301-01
	361-0158-00				2		SPACER,SLEEVE:0.116ID X 0.156ODX0.093" L	34114	10918-220
	366-1023-01				3		KNOB:GRAY	80009	366-1023-01
	366-1559-00				7		PUSH BUTTON:0.18 SQ X 0.43 INCH LG,PLSTC	80009	366-1559-00
	376-0051-00				1		CPLG,SHAFT,FLEX:FOR 0.125 INCH DIA SHAFTS	80009	376-0051-00
	384-1240-00				1		SHAFT,EXT:0.125 OD X 2.5 INCH LONG	80009	384-1240-00
	386-3108-00				1		SUPPORT,CKT BD:MAIN	80009	386-3108-00
	407-1568-00				1		BRACKET,ANGEL:CKT BD MOUNTING	80009	407-1568-00
	211-0504-00				2		SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL	83385	OBD
	426-1072-00				7		FR,PUSH BUTTON:PLASTIC	80009	426-1072-00
	426-1176-00				1		FR,CABINET:FRONT	80009	426-1176-00

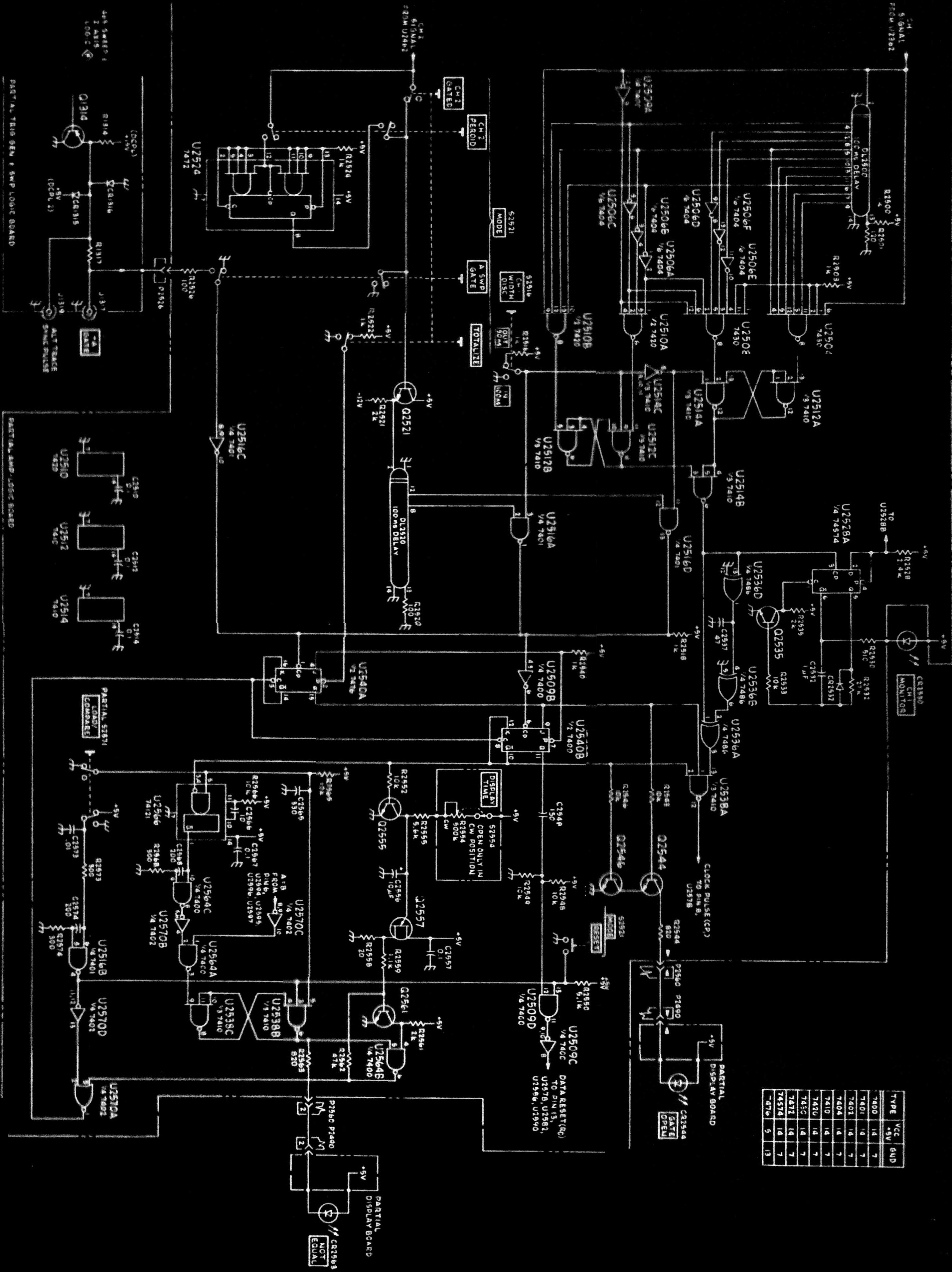


NOTE: TRANSISTOR Q2521 IS LOCATED ON BACK SIDE OF CIRCUIT BOARD.



COUNTER, COMPARATOR & READOUT





INDEX

PRODUCT FILE

465 SN1

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