circuit section—XXX.XX page

1 TIME BASE TRIGGER

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
21130 1320RM	AUTO MODE triggering improved by changing coupling capacitor.	2928	101.01	-----	-----
25080 2440RM	External trigger decoupling added to prevent voltage spike at TRIGGER INPUT connectors.	6776	101.02 101.03	0.8h	040-0326-00
26800	TRIGGERING LEVEL range increased to insure ±10V offset in EXTERNAL TRIGGER mode.	11418	101.04	-----	-----

2 TIME BASE GENERATOR

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EFF. SN. S.M*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
20060	High speed timing and sync improved by changing holdoff capacitor.	2239	102.01	-----	-----
20200 1030RM	Spike on +GATE A decreased by changing capacitor.	2362	102.02	-------	-----
20247	HF sync improved by reversing V183 filament leads. Pin 5 should be grounded and pin 4 should be "HOT")	2385	102.03	-----	-----
20255	Sweep shortening with trigger variations prevented by adding diode.	2372	102.04	-----	-----
20794	Sweep cables relocated to prevent damage.	2632	102.05	-----	-----
20860 1280RM	+GATE AMPLITUDE reduced by changing resistor.	2915	102.06	-----	-----
20860 1280RM	UNCALIBRATED neon oscillation prevented by adding resistor.	2948	102.07	-----	-----
21440 1370RM	PRESET ADJ potentiometers changed to prevent over-dissipation.	3053	102.08	-----	-----
22960 1890RM	Slow speed timing errors eliminated by rewiring "A" sweep disconnect diode.	3758	102.09	-----	-----
26080	Low frequency modulation reduced by changing to selected "A" sweep disconnect diode.	9134	102.10	-----	-----
26660	Slow sweep speed error and jitter eliminated by addition of silicon diodes in series with vacuum disconnect diodes.	10189	102.11	-----	-----

CONTINUED.

circuit section—XXX.XX page

2 TIME BASE GENERATOR (Continued)

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
26800	Disconnect circuits further improved by adding resistors.	11409	102.12	-----	-----
27180	Type 1A1 compatibility insured by changing alternate trace sync input time constant.	12057	102.13	-----	-----
27700	Alternate trace amplitude increased by changing LR149.	12969	102.14	-----	-----

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3 TIMING SWITCH

	EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
	Not Given	Timing capacitor tolerance changed to reduce rejects. Part numbers not changed but letter suffixes dropped.	3337	----	-----	-----
	23190 1900RM	Trace blurring caused by sweep oscillations eliminated by adding capacitor.	3824	103.01	-----	-----
	26890	Timing capacitor sets changed to more reliable less expensive parts.	10556	103.02	-----	-----
##	28430	Carbon film resistors were changed to metal film to improve reliability.	18313	103.03	-----	-----

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
26100 2610RM	10:1 attenuation ration assured by changing resistor values.	9534	104.01	-----	-----
26180 2610RM	Resistor change versus rotation improved by replacing EXTERNAL HORIZ variable potentiometer.	9474	104.02	-----	-----

5 HORIZONTAL AMPLIFIER

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EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
20520 1140RM	Sawtooth spike eliminated by adding capacitor from junction of MAG ON neon and the switch contact to ground.	2600	105.01	-----	-----
20620	Sweep distortion eliminated by adding capacitor.	2640	105.02	-----	-----
20800 1269RM	Sweep cal range increased by changing resistor.	2766	105.03	-----	-----
20860 1269RM	Norm Mag Regis control replaced to improve adjustability.	2903	105.04	-----	-----
22230 1640RM	Resistor R357 wattage increased.	3392	105.05	-----	-----
26750	Resistor R336 replaced to improve economy and reliability. Superseded by Mod 13006.	10103	105.06 113.02	----- -----	Included In 050-0463-00
27650	Capacitor replaced to improve part availability.	13457	105.07	-----	-----
27970	Resistor R336 replaced to improve reliability.	13006	105.08 113.02	----- -----	Included In 050-0463-00

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6 VERTICAL AMPLIFIER

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
20321 1060	Delay line coil forms replaced for economy.	2300	106.01	-----	-----
22290 1670RM	POSITION neons operation improved by resistor change.	3431-2	106.02	-----	-----
22290 1670RM	Coils changed to improve adjustment range. Superseded by Mod 3570.	3431-3	106.03	-----	-----
22440	Coils changed back to original values to increase bandpass.	3570	106.04	-----	-----
23420	Ripple in VA reduced by modifying rectifier cable.	5184	106.05	-----	-----

7 DELAY LINE NETWORK

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page

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
	NONE				

8 CALIBRATOR

circuit
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page

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.

NONE

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
20320 1060RM	Capacitor C710 voltage rating increased to improve reliability.	2418	109.01	-----	-----
20562 1190RM	Power supply silicon diode manufacturer changed. Superseded by Mod 3727.	2584	109.02	-----	-----
21951 1510RM	Divider resistors replaced to reduce cost and improve performance. Also see Mod 8979.	3147	109.03	-----	-----
Not Given	Silicon diode part number changed from 106-0506-00 to 152-0023-00. Superseded by Mod 3727.	3238	109.04	-----	-----
22074 1580RM	60 cycle AC pickup on CRT eliminated by changing power supply relay. from AC to DC operation.	3338	109.05 109.06	----- 1.0h	040-0258-00
22270 1660RM	DC relay used for special instruments deleted.	3468	109.07	-----	-----
22350 1700RM	+350V electrolytic capacitor protected during warmup by addition of silicon diode.	3498	109.08	-----	-----
22970 1900RM	Silicon diodes replaced to improve reliability and availability.	3727	109.09	-----	-----
23420 1900RM	Ripple in VA reduced by modifying rectifier cable.	5184	106.05	-----	-----
23950 2010RM	Power transformers standardized to export type, 120-0120-00 changed to 120-0140-00.	6114	----	-----	-----
Not Given	Primary wire color coded to insure proper connection.	7521	109.10	-----	-----

CONTINUED.

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9 POWER SUPPLY (Continued)

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
25950 2560RM	Resistor R711 changed to metal film to eliminate duplication of parts. 309-0334-00 replaced with 232-0385-00.	8979	----	-----	-----
26660	Silicon diode type changed to reduce cost and facilitate layout; 152-0047-00 replaced with 152-0066-00.	9973	----	-----	-----
27830	Power supply chassis modified to accommodate mod in Type 543B/545B/ RM.	12173	----	-----	-----
27998	Relay contact welding reduced by adding surge resistors.	14909	109.11	-----	-----
Not Given	Electrolytic capacitor assemblies replaced with capacitor, flange, base, and/or cover subparts to facilitate replacement.	S8959	109.12	-----	-----
28140	Power supply circuit changed to protect V737 turn-on.	15208	109.13	-----	-----

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10 CRT

EFF. SN. S.M*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
20060	HF sync improved by adding decoupling to CRT grid supply.	2245	110.01	-----	-----
20600 1233RM	HV capacitors changed from oil filled to ceramic to improve reliability.	2795	110.02	-----	-----
20650 1260RM	HV capacitors changed from oil filled to ceramic to improve reliability.	2878	110.03	-----	-----
20800 1269RM	HV capacitors changed from oil filled to ceramic to improve reliability.	2853	110.04	-----	-----
21132 1320RM	HV capacitors changed from oil filled to ceramic to improve reliability.	2827	110.05	-----	-----
22290 1670RM	Trace dimming eliminated by adding components.	3431-1	110.06	-----	-----
22530 1760RM	400Hz modulation reduced by addition of CRT circuit filtering.	3555	110.07	-----	-----
22672 1890RM	Trace dimming at high sweep speed eliminated by changing capacitor.	3696	110.08	-----	-----
25550 2510RM	Capacitor released to increase reliability; blanket replacement.	7928	110.09	-----	-----
27510	FOCUS and INTENSITY potentiometers changed to reduce cost and improve quality and availability.	11639	110.10	-----	-----
27920	CRT rotator stud retaining plate added to prevent the stud from working loose.	13795	110.11	-----	-----
ALL	Maximum Intensity Adjust Field Modification Kit.	---	110.12	0.3h	040-0159-00

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
20321 1060RM	Delay line coil forms replaced for economy.	2300	106.01	-----	-----
20410 1060RM	CRT mounting clamp replaced by rotator assembly.	2311	111.01	-----	-----
Not Given	Nylon posts standardized to reduce cost and eliminate extra parts.	2397	111.02	-----	-----
Not Given	Slot added to front panel to facilitate addition of special mod number. Superseded by Mod 5929.	2457	----	-----	-----
20794 1262RM	Sweep cable relocated to prevent damage.	2632	102.05	-----	-----
20950 1290RM	Cabinet finish changed from blue wrinkle to pebble grain vinyl.	2545	111.03	-----	-----
Not Given	Semi-conductor information standardized.	3535	111.04	-----	-----
Not Given	Silver bearing solder on spool added for customer convenience.	3660	111.05	-----	-----
23730	Top bar extrusion lightened and cost reduced; 381-0149-00 replaced by 381-0204-00.	3861	----	-----	-----
23730 1900RM	Rectifier cable modified to reduce ripple in VA.	5184	106.05	-----	-----
23760 1950RM	CRT securing ring replaced to prevent slippage.	5400	111.06 111.07	0.4h	050-0063-00

CONTINUED.

11 MISCELLANEOUS (Continued)

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
24060	Bottom rail extrusion changed to reduce possibility of instrument damage.	5288	111.08	-----	-----
Not G Given	Front panel mod slot added to standard panel.	5929	----	-----	-----
25080 2440RM	UHF connectors replaced with BNC connectors.	6860	----	-----	-----
2510RM	Front subpanel modified to reduce cost and allow easier assembly.	6991	111.09	-----	-----
Not Given	Power supply primary color coded to insure proper connection.	7521	109.10	-----	-----
Not Given	BNC connector plastic cover, 210-0961-00, removed to improve appearance.	7551	----	-----	-----
25110 Not Given-RM	Plug-in housing side plates standardized to reduce cost; 386-0566-00 replaced by 386-0680-00.	6625	----	-----	-----
25270 2491RM	Delay line mounting plates improved; 386-0678-00 and 386-0679-00 replaced by 387-0788-00 and 387-0789-00 respectively.	6653	----	-----	-----
25550 2510RM	Neon bulbs changed from NE-2 to NE-23 to stabilize firing potential. See Mod 8002.	7843	111.10	-----	-----
25610 2510RM	Air filter replaced to reduce cost.	8157	111.11 111.12	----- 0.5h	----- 050-0123-01
26080 2610RM	Knob color changed from black to charcoal for compatibility with new instruments.	9172	111.13	-----	-----

CONTINUED.

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11 MISCELLANEOUS (Continued)

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
Not Given	Electrolytic capacitor assemblies replaced with capacitor, flange, base, and/or cover subparts to facilitate replacement.	S8959	109.12	-----	-----
Not Given	Accessories changed to permit patching without adaptors.	8313	111.14	-----	-----
26290	Separate rackmount serial numbers discontinued to facilitate conversion of standard instruments to rackmount.	9917	111.15	-----	-----
26430	CRT filament shape and color standardized to reduce cost.	9022	111.16	-----	-----
26520	Neon indicating lamps and holders replaced with improved type.	8002	111.17	-----	-----
26860	Motor base connector changed to facilitate assembly and reduce cost. Superseded by Mod 12876.	10903	111.18	-----	-----
27130	Power cord ground connection improved by adding spring.	11292	111.19 111.20	----- -----	 040-0424-01
27410	Power on light color changed to standard green; Pilot light jewel 378-0518-00 replaced by 378-0513-00.	12031	----	-----	-----
27420	Motor base changed to improve ground connection.	12876	111.21	-----	-----
27830	Power cord identification sleeve added to identify wiring color code.	13768	111.22	-----	-----
27920	CRT rotator stud retaining plate added to prevent the stud from working loose.	13795	110.11	-----	-----

CONTINUED.

11 MISCELLANEOUS (continued)

CLASSIFICATIONS
1 Required
2 Recommended
3 Information Only
U Unclassified

XXX.XX — Circuit / Page / Section

EFF. SN.	DESCRIPTION	CL	MOD. NO.	PAGE NO.	LABOR TIME	KIT NO.
28170	Coupling restraints added to shafts to eliminate backlash.	3	14165	111.23	-----	-----
28430	All 3/4" wide ceramic strips were replaced by 7/16" wide strips for standardization.	3	16795	111.24	-----	-----
##ALL	Fan Blade, pn 369-0007-00, is no longer available. Although pn 369-007-02 is a different design, it is a direct replacement.	3	35261	-----	-----	-----

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12 MODIFICATION KITS

EFF. SN. S.M*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
All	Blank Plug-In Modification Kit.	---	112.01	-----	040-0065-00
All	Maximum Intensity Modification Kit.	---	110.12	0.4h	040-0159-00
All	Sweep Lockout Modification Kit.	---	112.02	-----	040-0235-00
20001-22073	Conversion From AC to DC K601 Relay Modification Kit. 1001-1579 (RM)	---	109.06	1.0h	040-0258-00
All	Cradle Mount Modification Kit.	---	112.03	-----	040-0281-00
20001-25079	External Triggering Decoupling Modification Kit. 1001-2439 (RM)	---	101.03	0.8h	040-0326-00
All	3-Wire Power Cord Female Ground Connection Improvement Modification Kit.	---	111.20	-----	040-0424-01

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13 PARTS REPLACEMENT KITS

EFF. SN. S.M*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
20410-23759	CRT Securing Ring Parts Replacement Kit. 1060-1949(RM)	---	111.07	0.4h	050-0063-00
20001-25609	Air Filter Parts Replacement Kit. 100025-100477 (Guernsey) 1001-2509 (RM)	---	111.12	0.5h	050-0123-01
All	DC Fan Motor Replacement Kit.	---	113.01	-----	050-0454-00
20001-27969	Carbon Film Resistor Replacement Kit. 1001-27969 (RM)	10103 13006	113.02	-----	050-0463-00

*series model

Change since last publication

C10 CHANGED TO IMPROVE TRIGGERING IN AUTO MODE

Effective Prod SN 21130 1320RM

Usable in SN 20001-21129 1001-1319RM

The trigger input coupling capacitor is changed to improve triggering primarily in the AUTO mode.

The 500 series instruments have not been triggering well in the AUTO mode on low amplitude signals, in the order of 4mm of deflection (int.).

Parts Removed:

C10	285-0561-00	0.0047µF PTM

Parts Added:

C10	285-0543-00	0.0022µF PTM

INSTALLATION:

Parts Required: See 'Parts Added'.

Replace C10, 0.0047µF between wafer 1 terminal 8 and wafer 3 terminal 9 of the Trigger Selector switch, with a 0.0022µF PTM capacitor.

SW10A/B MODIFIED TO PREVENT REFLECTED SPIKE

Effective Prod SN 25080 Usable in SN 20001-25079

A decoupling network is added to the INT positions of the TRIGGER SLOPE switch, to prevent a large voltage spike from appearing at the TRIGGER INPUT when switching from internal to external positions.

Parts Removed:

SW10A/B	262-0174-00	TRIG SLOPE/TRIGGERING MODE

Parts Added:

SW10A/B	262-0561-00	TRIG SLOPE/TRIGGERING MODE
**C2	283-0006-00	0.02μF 600V
**R5	302-0106-00	10 meg 1/2W

**Part of wired switch 262-0561-00.

INSTALLATION:

Parts Required:

	040-0326-00	Modification kit

Use Modification kit instructions.

MODIFICATION KIT

EXTERNAL TRIGGER DECOUPLING

040-0326-00

For the following Tektronix Oscilloscopes:

531A s/n 20001-25079	RM31A s/n 1001-2439
533 s/n 301- 3000	RM33 s/n 101-1000
533A s/n 3001- 4649	RM33A s/n 1001-1249
535A s/n 20001-31259	RM35A s/n 1001-3379
541A s/n 20001-22899	RM41A s/n 1001-1529
543 s/n 301- 3000	RM43 s/n 101-1000
543A s/n 3001- 4489	RM43A s/n 1001-1159
545A s/n 20001-38829	RM45A s/n 1001-3839

DESCRIPTION

This modification eliminates the possibility of a large voltage spike appearing at the TRIGGER INPUT connector when switching from internal to external triggering positions.

A decoupling network is added to the INT position of the following Trigger Selector (TRIGGERING MODE/TRIGGER SLOPE) Switches (the wired switch part numbers are changed accordingly):

TIME BASE A (all instruments)

262-0561-00 replaces 262-0174-00

TIME BASE B (535A, RM35A, 545A, RM45A)

262-0562-00 replaces 262-0209-00

Publication:
Instructions for 040-0326-00
February 1966

Supersedes:
June 1965

PARTS LIST

Quantity	Description	Part Number
1 ea	Assembly, resistor-capacitor combination, consisting of:	
	1 ea Capacitor, cer, 4.7 pF 500V ±1%	281-0501-00
	1 ea Resistor, comp, 1 M 1/2W 5%	301-0105-00
1 ea	Assembly, resistor-capacitor combination, consisting of:	
	1 ea Capacitor, cer, 6.8 pF 500V ±1%	281-0541-00
	1 ea Resistor, comp, 1 M 1/2W 5%	301-0105-00
1 ea	Capacitor, cer, 0.01 μF 500V	283-0002-00
1 ea	Capacitor, cer, 0.02 μF 600V	283-0006-00
2 ea	Resistor, comp, 10 M 1/2W 10%	302-0106-00
2 ea	Tag, MODIFIED INSTRUMENT, gummed back	1-910D

INSTRUCTIONS:

NOTE: The following method is used to identify the Trigger Selector Switch terminals:

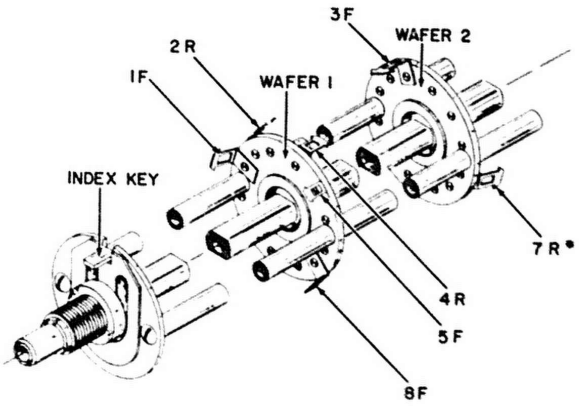
The wafers are numbered from front to rear.

The contact positions are numbered 1 through 12 relative to the index key as shown in drawing.

The contacts have an 'F' or 'R' suffix which denotes that they are on the front or rear of the wafer.

Example: W2-7R (denoted by * on drawing) is contact #7 on the rear of wafer 2.

(TYPICAL SWITCH CONFIGURATION)



STEPS 1 AND 2 APPLY TO TIME BASE A TRIGGER SELECTOR SWITCH IN 531A, RM31A, 541A, OR RM41A, WHICH HAS SWEEP LOCKOUT MOD 040-0235-00 INSTALLED.

1. Remove the following:

( ) bare wire between W1-1F and the top of R593.

( ) RC combination (1 M - 4.7 pF) between W1-4F and W1-1F.

2. Solder the following (from kit):

( ) R1-C1, 1 M - 4.7 pF combination, between W1-4F and the top of R593.

( ) R5, 10 M, between W1-1F and the front detent plate.

( ) C2, 0.02 μF, between W1-1F and the top of R593.

INSTRUCTIONS (cont)

STEPS 3 THROUGH 5 APPLY TO TIME BASE A TRIGGER SELECTOR SWITCH IN ALL OTHER INSTRUMENTS.

( ) 3. Reposition one end of the R1-C1 combination (1 M - 4.7 pF) from W1-1F to W1-2R.

( ) 4. Reposition the bare wire from W1-1F to W1-2R.

5. Solder the following (from kit):

( ) R5, a 10 M resistor, between W1-1F and the front detent plate.

( ) C2, an 0.02 μF capacitor, between W1-1F and W1-2R.

STEPS 6 AND 7 APPLY TO TIME BASE B TRIGGER SELECTOR SWITCH.

6. Remove the following:

( ) bare wire between W1-6R and W2-7R.

( ) white stranded wire from W1-7F.

( ) R51-C51 combination connected between W1-7F and W2-7R.

7. Solder the following (from kit):

( ) R55, 10 M resistor, between W1-7F and the front detent plate.

( ) C52, an 0.01 μF capacitor, between W2-7R and W1-7F.

( ) R51-C51 combination from W1-6R to W2-7R.

( ) white wire (removed in step 6) to W2-7R.

THIS COMPLETES THE INSTALLATION.

( ) Check wiring for accuracy.

( ) Moisten backs of MODIFIED INSTRUMENT tags (from kit) and place them on the Manual Schematic pages affected by this modification.

( ) Install the insert pages in your Instruction Manual.

GG:cet

EXTERNAL TRIGGER DECOUPLING

531A	s/n 20001-25079	RM31A	s/n 1001-2439
533	s/n 301- 3000	RM33	s/n 101-1000
533A	s/n 3001- 4649	RM33A	s/n 1001-1249
535A	s/n 20001-31259	RM35A	s/n 1001-3379
541A	s/n 20001-22899	RM41A	s/n 1001-1529
543	s/n 301- 3000	RM43	s/n 101-1000
543A	s/n 3001- 4489	RM43A	s/n 1001-1159
545A	s/n 20001-38829	RM45A	s/n 1001-3839

Installed in Type _____ s/n _____ Date _____

GENERAL INFORMATION

This modification eliminates the possibility of a large voltage spike appearing at the TRIGGER INPUT connector when switching from internal to external triggering positions.

A decoupling network is added to the INT position of the following Trigger Selector (TRIGGERING MODE, TRIGGER SLOPE) Switches (the wired switch part numbers are changed accordingly):

TIME BASE A (all instruments)	262-0561-00 replaces 262-0174-00
TIME BASE B (535A, RM35A, 545A, RM45A)	262-0562-00 replaces 262-0209-00

ELECTRICAL PARTS LIST

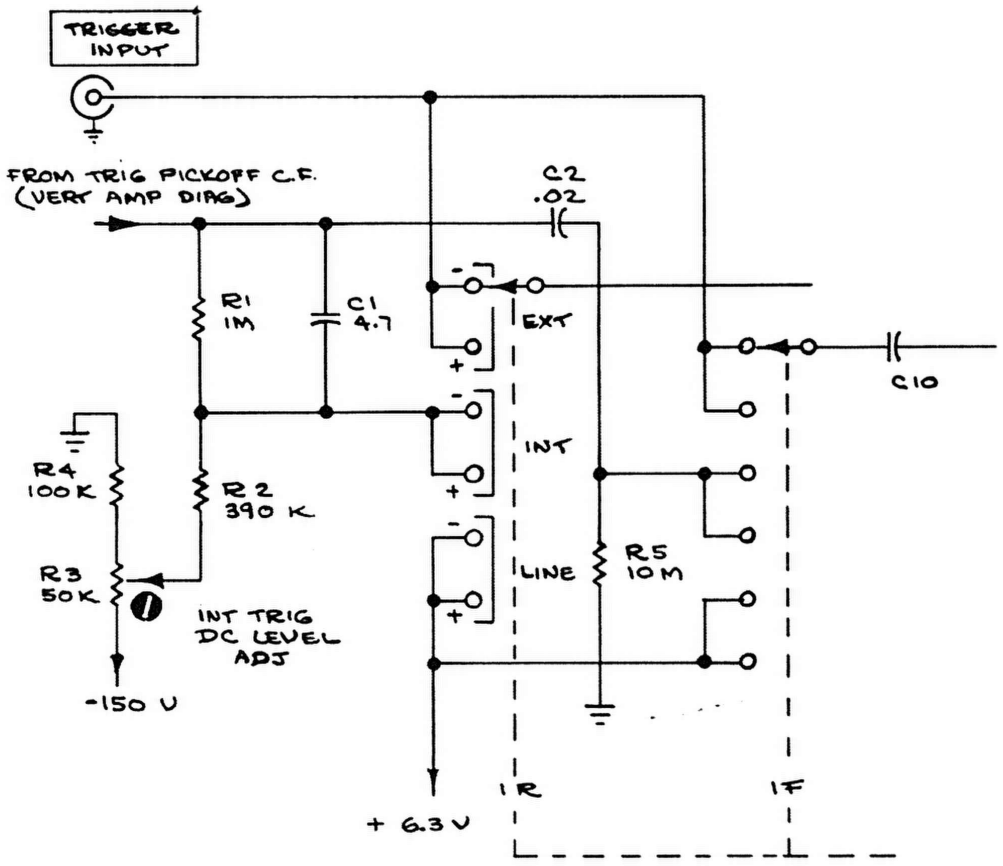
Values fixed unless marked Variable. Only new parts listed.

Ckt. No.	Part Number	Description			
		CAPACITORS			
C2	283-0006-00	0.02 μF	Disc	600V	±20%
C52*	283-0002-00	0.01 μF	Disc	500V	±20%
		RESISTORS			
R5	302-0106-00	10M	1/2W	comp	10%
R55*	302-0106-00	10M	1/2W	comp	10%

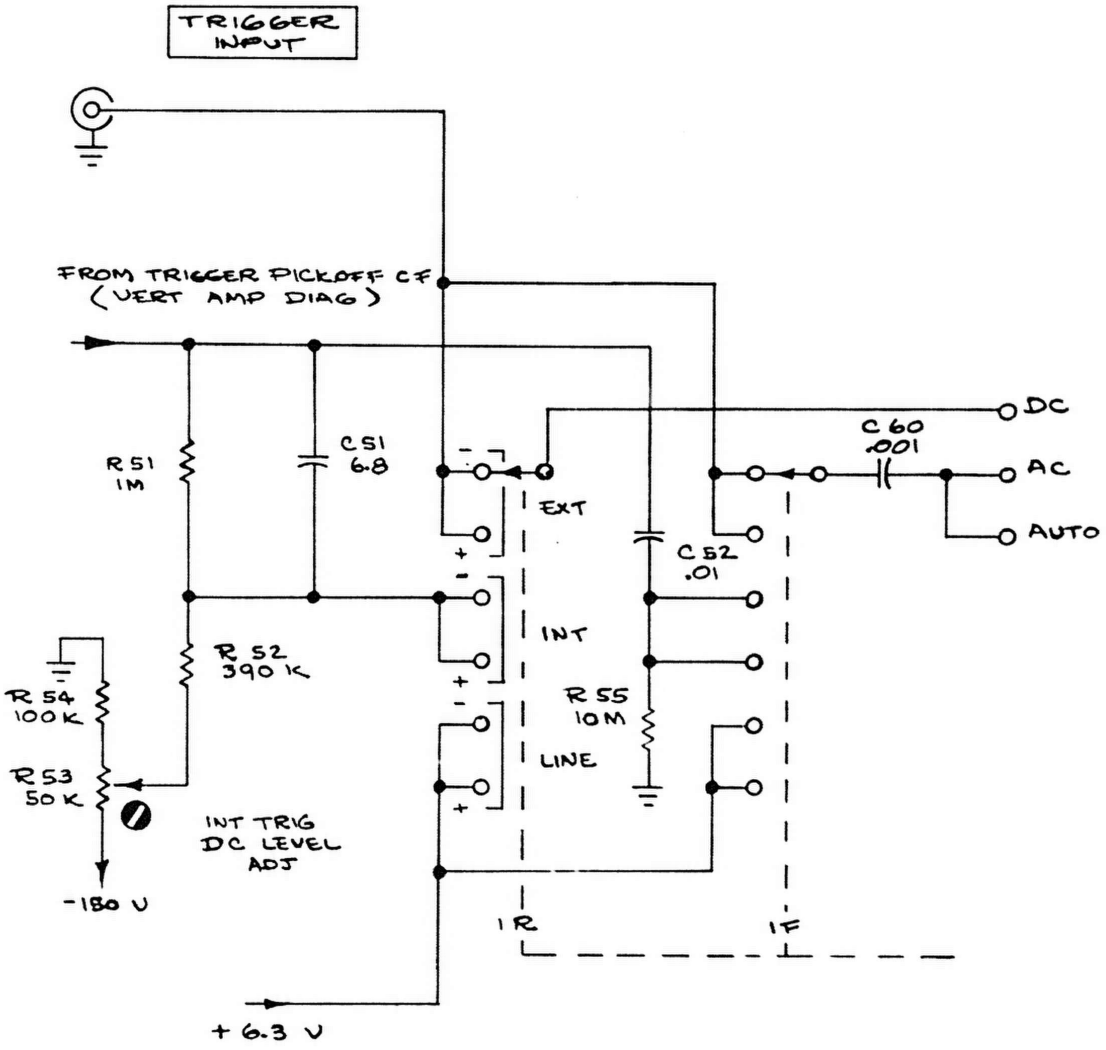
SWITCHES

	Unwired	Wired		
SW10A SW10B	260-0099-00	262-0561-00	Rotary	TRIGGER SLOPE (TIME BASE A) TRIGGERING MODE (TIME BASE A)
SW60A* SW60B*	260-0261-00	262-0562-00	Rotary	TRIGGER SLOPE (TIME BASE B) TRIGGERING MODE (TIME BASE B)

*535A, RM35A, 545A, RM45A ONLY.



TIME BASE A TRIGGER
(Partial Diagram)



TIME BASE B TRIGGER
(Partial Diagram)

R19 - R20 CHANGED TO INSURE SUFFICIENT TRIGGERING LEVEL RANGE

Effective Prod SN 26800 Usable in SN 20001-26799 (531A)
1001-26799 (RM)

In external trigger mode, TRIGGERING LEVEL does not offset + and -10V with borderline tolerance parts.

With borderline tolerance parts instrument did not make above specifications. This was a problem when an operator wanted to trigger externally on signal levels of about + or -10V.

R19 and R20 were changed from 10% to 5% resistors. Also, R20 was changed in value from 56k to 68k.

Parts Removed:

R19	302-0474-00	Resistor, composite 470k 1/2W 10%
R20	302-0563-00	Resistor, composite 56k 1/2W 10%

Parts Added:

R19	301-0474-00	Resistor, composite, 470k 1/2W 5%
R20	301-0683-00	Resistor, composite, 68k 1/2W 5%

INSTALLATION:

Parts Required: See 'Parts Added'.

a) Replace the 470k 1/2W 10% resistor (R19), between wafer 2 of the Trigger Selector switch and the center terminal of the TRIGGERING LEVEL potentiometer with a 470k 1/2W 5% resistor.

b) Replace the 56k 1/2W 10% resistor (R20), between the same terminal of the Trigger Selector switch as R19 and the rear detent plates with a 68k 1/2W 5% resistor.

CAPACITOR C181 CHANGED

Effective Prod SN 20060 Usable in SN 20001-20059

Signal coupling between the sweep 'hold-off lead' and adjacent circuitry may adversely affect high speed linearity and high frequency sync. The lead is replaced with coax and the value of capacitor C181, located on the TIME/CM switch, is lowered to compensate for the greater capacitance of the cable.

Parts Removed:

C181	281-0517-00	39pF ceramic
SW160	262-0222-00	TIME/CM

Parts Added:

*C181	281-0515-00	27pF ceramic
SW160	262-0244-00	TIME/CM
	385-0033-00	Post, nylon
	*175-0026-00	Cable, coax 75Ω (8-1/2in.)

NOTE: C181 is part of wired TIME/CM switch.

INSTALLATION:

Parts Required: See 'Parts Added' with asterisks.

a) Locate white-violet wire between wafer 1, contact 6 of TIME/CM switch and ceramic strip notch to which 47Ω resistor (R183) from pin 7 of V133 is connected. Replace wire with coax cable (cut both ends of white-violet wire where they enter wiring cable). Cut off coax shield at switch end and solder shield at other end to nearest socket ground lug.

b) Replace 39pF capacitor (C181) between wafer 1, contact 6 of TIME/CM switch and front of switch, with 27pF capacitor.

C190 CHANGED TO DECREASE SPIKE ON +GATE

Effective Prod SN 20200 1030RM

Usable in SN 20001-20199 1001- 1029RM

The +GATE OUT CF input attenuator compensating capacitor, C190, is lowered in value to decrease the spike on the front panel +GATE OUT waveform.

Parts Removed:

C190	281-0542-00	18pF 500V

Parts Added:

C190	281-0509-00	15pF 500V

INSTALLATION:

Parts Required: See 'Parts Added'.

Change C190, an 18pF ceramic capacitor in parallel with a 47k resistor on the ceramic strips above V183, with a 15pF capacitor.

FILAMENT LEADS REVERSED TO IMPROVE HF SYNC

Effective Prod SN	Usable in SN
20247 1039RM	20001-20246 1001- 1038

The V183 filament connections (pins 4 and 5) are reversed to reduce 60 cycle pickup in the Hold-off tubes, thereby improving High Frequency Sync.

INSTALLATION:

Reverse the leads to pins 4 and 5 of V183 (pin 5 should be grounded and pin 4 'hot').

V131 ADDED TO PREVENT SWEEP SHORTENING

Effective Prod SN 20255 1040RM

Usable in SN 20001-20254 1001-1039RM

Shortening of the sweep with variations in the front panel trigger controls is prevented by adding a T12G diode in the Holdoff circuit.

Parts Added:

V131	152-0008-00	T12G

INSTALLATION:

Parts Required: See 'Parts Added'.

Add a T12G diode in parallel with R131, a 1k 1/2W resistor across the ceramic strips above V314. The cathode (banded) end of the diode should be connected to the same notch as the bare wire from pin 3 of V133.

SWEEP CABLE RELOCATED

Effective Prod SN 20794
1262RM

Pinching or rubbing of the sweep cable by the TIME/CM switch, causing cable damage and shorting, is eliminated by relocating the cable slightly. Location of the cable hole through the sweep chassis is changed and the cable is shortened.

Parts Removed:

179-0299-00	Cable, sweep

Parts Added:

179-0404-00	Cable, sweep

R191 CHANGED TO REDUCE PLUS GATE AMPLITUDE

Effective Prod SN 20860
1280RM

A divider resistor in the +GATE OUT circuitry is changed to reduce excessive amplitude of the front panel waveform.

Parts Removed:

R191	302-0124-00	120k 1/2W 10%

Parts Added:

R191	301-0114-00	110k 1/2W 5%

R160V ADDED TO PREVENT OSCILLATIONS

Effective Prod SN 20860 1280RM

Usable in SN 20001-20859 1001-1279RM

Oscillation of the UNCALIBRATED neon, when the timing switch VARIABLE control is in the CALIBRATED position, is prevented by adding a 1 meg resistor in parallel with the neon.

Parts Added:

R160V	302-0105-00	1 meg 1/2W

INSTALLATION:

Parts Required: See 'Parts Added'.

On TIME/CM Switch, solder 1 meg resistor from junction of 100k resistor and wire going to UNCALIBRATED neon (i.e., wafer 6 terminal 4) to ground lug on nearby bracket.

R111 CHANGED TO PREVENT OVER-DISSIPATION

Effective Prod SN 21440 1370RM | Usable in SN 20001-21439 1001-1369RM

The 100k PRESET ADJUST potentiometer is out of dissipation rating. It is replaced by a 200k potentiometer to bring it within its rating.

Parts Removed:

R111	311-0088-00	100k 0.2W

Parts Added:

R111	311-0219-00	200k 0.2W

INSTALLATION:

Parts Required: See 'Parts Added'.

Replace 100k 0.2W PRESET ADJUST potentiometer with 200k 0.2W potentiometer.

V152 REWIRED TO ELIMINATE SLOW SWEEP SPEED TIMING ERRORS

Effective Prod SN 22960 1890RM	Usable in SN 20001-22959 1001-1889RM

The inter-element shield (pin 6) of the disconnect diode is ungrounded and the shield is tied to one plate (pin 7). When the shield is grounded, a small current can flow from cathode to shield when the cathodes are negative; this 'diode' current may affect timing on slow sweep speeds, where timing current is very small.

INSTALLATION:

a) Remove the strap from pin 3 of V152 to pin 6 to socket ground lug.

b) Add strap from pin 3 to the socket ground lug.

c) Add strap from pin 6 to pin 7.

V152 SELECTED TO REDUCE LOW FREQUENCY MODULATION

Effective Prod SN 26080
2610RM

Changes the Sweep Generator disconnect diode from a raw to a selected 6AL5 tube.

The 157-0104-02 6AL5 is selected for 20mV (peak to peak) or less heater-to-cathode hum at pin 5 with pin 3 grounded and 6.3V AC at pin 4.

This selection process should yield tubes with at least 2000 hours service in the most critical applications. We have vendors who produce tubes with a low, medium and also a high yield, only to fall below our requirements before one year of service. The 157-0104-02 will be selected from vendors offering an acceptable tube.

Superseded by M10189.

Parts Removed:

V152	154-0016-00	6AL5

Parts Added:

V152	157-0104-02	6AL5

D152 ADDED TO REDUCE SELECTION OF DISCONNECT DIODE

Effective Prod SN 26660 Usable in SN 20001-26659 (531A)
1001-26659 (RM)

Slow speed timing error and jitter.

Excessive leakage of the Miller disconnect diode was causing slow speed timing error and jitter.

A low leakage semiconductor diode was added in series with the Miller tube control grid disconnect diode. This combines the low leakage characteristics of the semiconductor with the fast turn-off capability of the vacuum diode. Also, selected vacuum tube disconnect diode (introduced Mod 9134) were changed back to raw tubes.

NOTE: Mod 11409 should be installed in conjunction with Mod 10189.

Parts Removed:

V152	154-0104-02	Tube, checked 6AL5

Parts Added:

V152	154-0016-00	Tube, raw 6AL5
*D152	152-0246-00	Diode, low leakage silicon

INSTALLATION:

Parts Required: See 'Parts Added' with asterisk and part listed below.

R165	306-0223-00	Resistor, 22k 2W 10%

a) Remove the bare wire between CSC-28 and CSC-29 (see drawing).

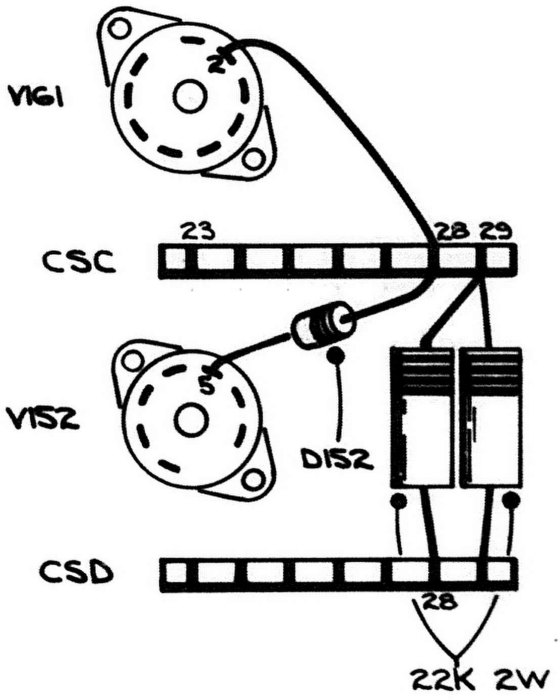
b) Remove the white-green wire between pin 2 of V161 and pin 5 of V152.

c) Replace the 22k 2W resistor (R165), between CSC-28 and CSD-28, with a new resistor, reconnecting one end to CSC-29, as shown in drawing.

d) Add a #22 bare wire between pin 2 of V161 and CSC-28.

e) Add diode D152 between CSC-28 (banded end) and pin 5 of V152.

Continued.



DISCONNECT CIRCUIT IMPROVED BY ADDING A RESISTOR

Effective Prod SN 26800 Usable in SN 26660-26799**

**Also any instrument containing Mod 10189

Slow speed timing error and high speed jitter.

Mod 10189 did not totally eliminate slow speed timing error and high speed jitter.

A 6.8M 1/2W 10% resistor was installed in parallel with the Miller tube control grid disconnect diode D152 to remain off when V152 is turned off. Mod 11409 should only be utilized in instruments containing Mod 10189.

Parts Added:

R154	302-0685-00	Resistor, 6.8M 1/2W 10%

INSTALLATION:

Parts Required: See 'Parts Added'.

Install a 6.8M 1/2W 10% resistor between pins 2 and 5 of V152.

INPUT TIME CONSTANT CHANGED

Effective Prod SN 27180 Usable in SN 20001-27179 (531A)
1001-27179 (RM)

All Type 1A1 plug-ins will not operate in the Alternate Mode as oscilloscopes age because the input time constant at the grid of the dual-trace sync amplifier is too long.

The grid suppressor resistor of the Alternate-Trace sync amplifier was changed from 10k to 47Ω.

Parts Removed:

R153	302-0103-00	Resistor, comp, 10k 1/2W 10%

Parts Added:

R153	302-0470-00	Resistor, comp, 47Ω 1/2W 10%

INSTALLATION:

Parts Required: See 'Parts Added'.

Replace R153, a 10k 1/2W resistor connected between pin 2 of V154 and a ceramic strip, with a 47Ω 1/2W 10% resistor.

PULSE AMPLITUDE INCREASED BY CHANGING LR149

Effective Prod SN 27700

For certain multi-channel plug-ins, some main frame Alternate Trace switching circuits supply pulses with insufficient amplitude to trigger the alternate switching circuit in the plug-in.

The amplitude of the Alternate Trace switching pulse was increased by increasing LR149 from 850μH to 1.2mH.

Parts Removed:

LR149	108-0058-00	Coil, fixed, 850μH, LR5

Parts Added:

LR149	108-0164-00	Coil, fixed, 1.2mH 303-0362-00

C160K ADDED TO ELIMINATE HF OSCILLATIONS

Effective Prod SN 23190 1900RM — Usable in SN 20001-23189 1001-1899RM

High frequency oscillations which originate in the sweep circuit (between 2sec/cm and 1ms/cm) may appear in the vertical as a trace blurring. This problem is eliminated by adding a 270pF capacitor between the TIME/CM switch terminal connected to the common lug on the timing capacitor (that is, wafer 5, terminal 11) and a ground lug added to the switch.

Parts Removed:

	210-0017-00	Lockwasher, No. 5.

Parts Added:

	210-0203-00	Lug, solder, SE6 long
C160K	281-0543-00	Capacitor, 270pF 500V ±10%

INSTALLATION:

Parts Required: See 'Parts Added'.

a) Replace lockwasher beneath bottom potentiometer bracket mounting nut on TIME/CM switch, with a solder lug pointing 180° away from VARIABLE potentiometer terminals.

b) Add 270pF capacitor between wafer 5 terminal 11 of TIME/CM switch (same location as white-brown wire) and solder lug just installed.

TIMING CAPACITOR SETS CHANGED

Effective Prod SN 26890

Old timing capacitor sets were expensive, unreliable, and difficult to produce.

Timing capacitor 'cans' were replaced by a metal bracket that now holds the timing capacitors mounted on strips. The new timing capacitor sets will be numbered 295-xxxx-xx and the individual components will be 285-xxxx-xx. All the 285-xxxx-xx numbers used in these sets are individual replaceable tubular capacitors with percent designations (letter coded). The letter code must be specified in addition to the part number when ordering replacement parts.

The wired timing switch will be given a new part number. The new switch is the same as the old except for the removal of the 0.001µF (291-0008-00) tubular timing capacitor. This capacitor will now be included in the 295-xxxx-xx capacitor set number.

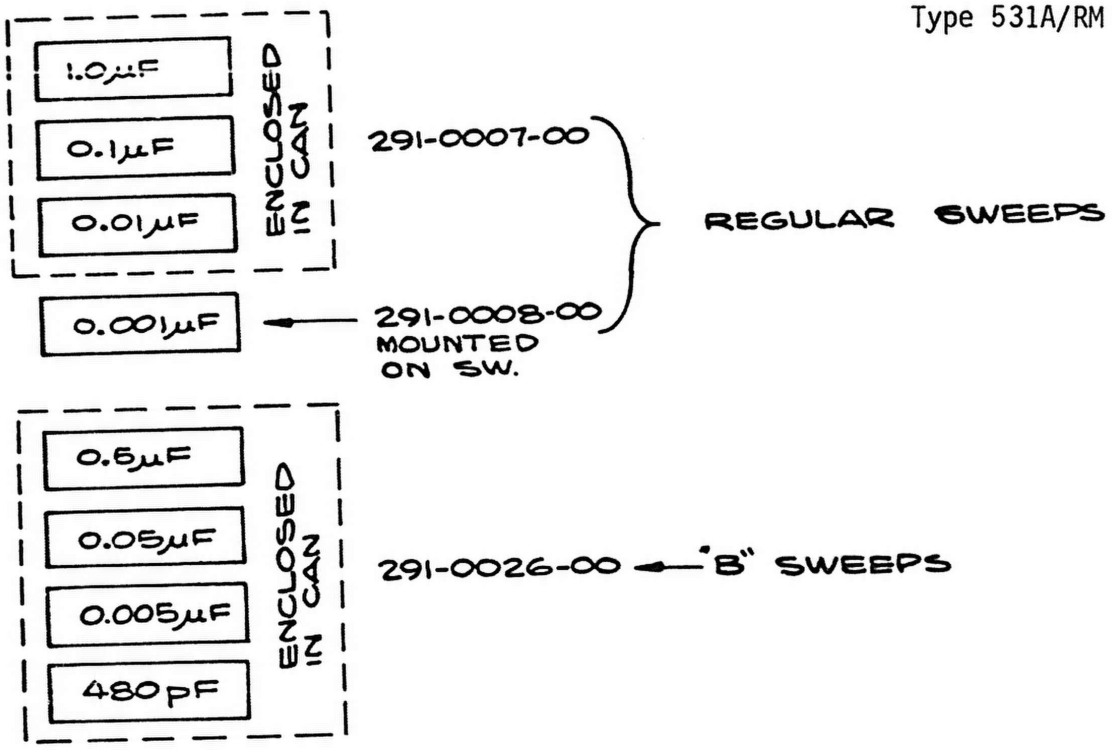
Parts Removed:

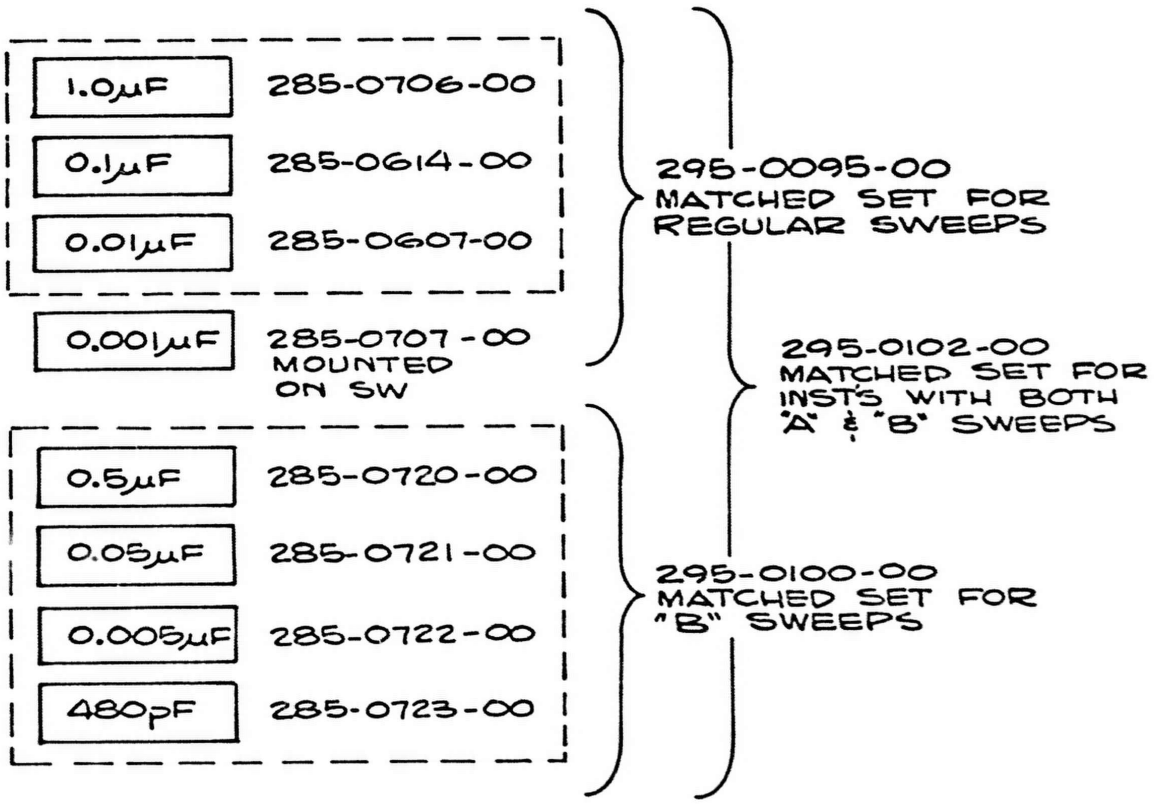
SW160	262-0244-00	Switch, wired, TIME/CM
C160J C160H C160G	291-0007-00	Capacitor, 1x0.1x0.01µF ±1/2%
C160F	291-0008-00	Capacitor, 0.001µF ±1/2%

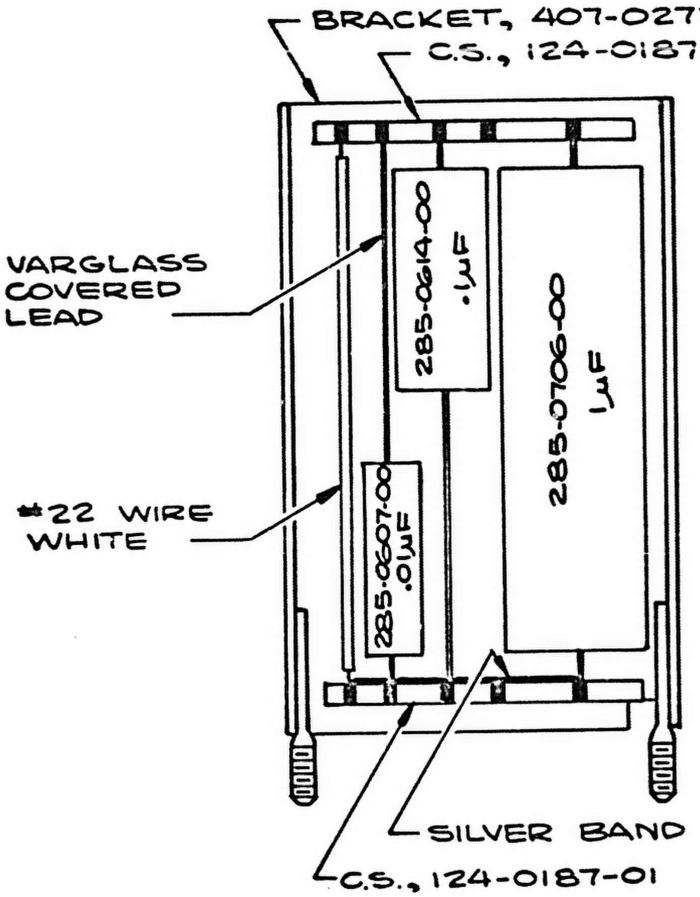
Parts Added:

SW160	262-0244-01	Switch, wired, TIME/CM
C160J C160H C160G C160F	295-0095-00	Capacitor assembly, checked
	407-0277-00	Bracket, capacitor mounting

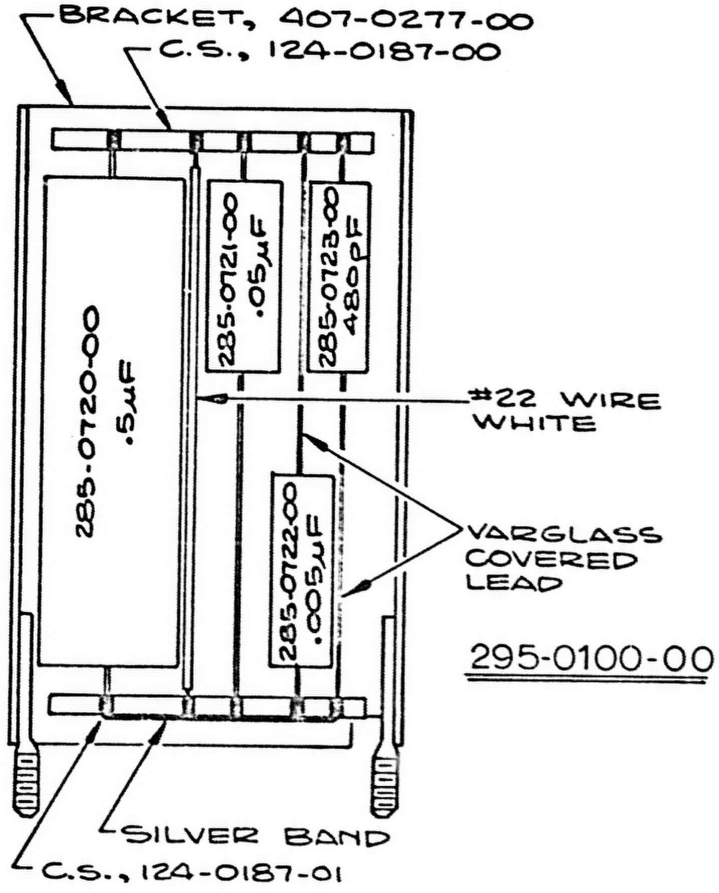
Continued.







295-0095-00
(w/o .001µF cap)



295-0100-00

CARBON FILM RESISTOR CHANGED TO METAL FILM

Effective Prod SN 28430

Carbon film resistors were changed to metal film to improve reliability.

Parts Removed:

R160A	309-0045-00	Resistor,carbon film	100K	1/2W	1%
R160B	309-0051-00	Resistor,carbon film	200K	1/2W	1%
R160C	309-0003-00	Resistor,carbon film	500K	1/2W	1%
R160D	309-0014-00	Resistor,carbon film	1M	1/2W	1%
R160E	309-0023-00	Resistor,carbon film	2M	1/2W	1%
R160F	309-0087-00	Resistor,carbon film	5M	1/2W	1%
R160G,R160H	310-0107-00	Resistor,carbon film	10M	1 W	1%
R160J	310-0505-00	Resistor,carbon film	30M	1 W	1%

Parts Added:

R160A	323-0385-00	Resistor, metal film	100K	1/2W	1%
R160B	323-0414-00	Resistor, metal film	200K	1/2W	1%
R160C	323-0740-00	Resistor, metal film	500K	1/2W	1%
R160D	323-0481-00	Resistor, metal film	1M	1/2W	1%
R160E	323-0510-00	Resistor, metal film	2M	1/2W	1%
R160F	325-0056-00	Resistor, metal film	5M	1 W	1%
R160G,R160H	325-0072-00	Resistor, metal film	10M	1 W	1%
R160J	325-0057-00	Resistor, metal film	30M	1 W	1%

CIRCUIT VALUES CHANGED TO ASSURE A 10:1 ATTENUATION RATIO

Effective Prod SN 26100
2610RM

In some cases it has been necessary to select R314 to achieve a 10:1 attenuation ratio when using the variable attenuator.

R313 and R315 were changed from 47k to 33k resistor and R318 was changed from 33k to 27k.

Parts Removed:

R313 R315	304-0473-00	47k 1W 10%
R318	306-0333-00	33k 2W 10%

Parts Added:

R313 R315	306-0333-00	33k 2W 10%
R318	306-0273-00	27k 2W 10%

R314 REPLACED TO IMPROVE POT CENTERING

Effective Prod SN 26180
2630RM

The resistance change versus rotation of EXTERNAL HORIZONTAL ATTENUATOR 10:1 potentiometer (311-0112-00) is not suitable for some applications.

The 15k linear taper potentiometer was replaced with a 15k logarithmic taper potentiometer.

Parts Removed:

R314	311-0112-00	Potentiometer, composite, 15k ±10% linear taper

Parts Added:

R314	311-0571-00	Potentiometer, composite 15k ±10% CCW logarithmic taper

C 347 ADDED TO ELIMINATE SAWTOOTH SPIKE

Effective Prod SN 20520
1140RM

Usable in SN 20001-20519
1001-1139RM

A positive spike on the sawtooth waveform is eliminated by installing a capacitor from the junction of the MAG ON neon and the switch contact to ground.

Parts Added:

C347	283-0000-00	0.001µF 500V

INSTALLATION:

Parts Required: See 'Parts Added'.

Add a 0.001µF capacitor between wafer 2, contact 7 of the rear HORIZONTAL DISPLAY switch (same contact as white-black wire) and switch ground.

C396 ADDED TO ELIMINATE SWEEP DISTORTION

Effective Prod SN 20620 1250RM

Usable in SN 20001-20619 1001-1249RM

The left neon light fires too soon, distorting the sweep waveform. This is eliminated by adding a capacitor across the two horizontal neon indicators as shown in schematic.

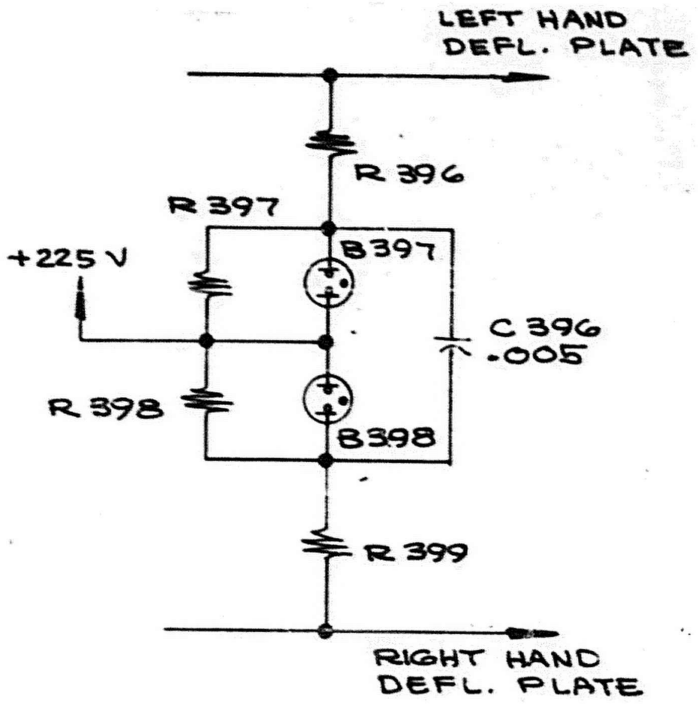
Parts Added:

C396	283-0001-00	0.005μF 500V

INSTALLATION:

Parts Required: See 'Parts Added'.

On the ceramic strip just below the Norm/Mag Regis potentiometer (R358), add a 0.005μF discap between the junction of R398 (820k) and white-red wire and the junction of R397 (820k) and white-green wire.



R349 CHANGED TO IMPROVE SWEEP CAL ADJUSTMENT RANGE

Effective Prod SN 20800
1270RM

To provide more range of adjustment for the Sweep Cal Potentiometer, the resistor in series with the potentiometer is increased in value.

Parts Removed:

R349**	309-0046-00	111k 1/2W 1%
SW348	262-0221-00	Rear Horiz Display

Parts Added:

R349**	309-0091-00	120k 1/2W 1%
SW348	262-0313-00	Rear Horiz Display

** Part of HORIZONTAL DISPLAY Switch.

R358 REPLACED TO IMPROVE ADJUSTABILITY

Effective Prod SN 20860
1280RM

The Norm/Mag Regis control generally must be set near its upper range of adjustment, and in some cases has insufficient range to be properly set. Therefore, the 10k potentiometer is replaced with a 20k potentiometer. (This also standardizes the potentiometer with the Types 551, 555, 581, and 585.)

Parts Removed:

R358	311-0016-00	10k variable

Parts Added:

R358	311-0018-00	20k variable

R357 WATTAGE INCREASED

Effective Prod SN 22230 1640RM

Usable in SN 20001-22229 1001-1639RM

Resistor R357 is operating at 95-100% of its dissipation rating. It is replaced by a higher wattage resistor.

Parts Removed:

R357	302-0223-00	22k 1/2W 10%

Parts Added:

R357	304-0223-00	22k 1W 10%

INSTALLATION:

Parts Required: See 'Parts Added'.

Replace R357, a 22k 1/2W resistor connected between the Norm/Mag Regis potentiometer (R358) and the nearby ceramic strip, with a 22k 1W resistor.

RESISTOR REPLACED FOR ECONOMY AND RELIABILITY

Effective Prod SN 26750 — Usable in SN 20001-26749 (531A) 1001-26729 (RM)

The 12.1M 1/2W 1% resistor used in the Horizontal Amplifier was relatively expensive and was in rather short supply. Although some failures had been reported, the resistor was not failing because of excessive dissipation, but from the thin resistive film required for this resistance and physical size.

R336 was changed from 12.1M 1/2W 1% to 13M 1W 2%. The 1W resistor has a film thickness that is 2 to 3 times that of the original 1/2W size.

Parts Removed:

R336	309-0268-00	Resistor, precision, 12.1M 1/2W 1%

Parts Added:

R336	310-0069-00	Resistor, precision 13M 1W 2%

INSTALLATION:

Parts Required: See 'Parts Added'.

Replace R336, a 12.1M 1/2W resistor located immediately above V343, with a 13M 1W 2% resistor.

BY-PASS CAPACITOR REPLACED TO IMPROVE PART AVAILABILITY

Effective Prod SN 27650

The vendor is having difficulty supplying the 6.25µF, 300V, part number 290-0000-00, capacitor.

Replaces the 6.25µF capacitor with a 10µF, 150V capacitor. Because of its smaller physical size, the capacitor must be relocated from its mounting location on the chassis to a mounting location on the ceramic strips.

Parts Removed:

C380	290-0000-00	Capacitor, EMT, 6.25µF 300V

Parts Added:

C380	290-0405-00	Capacitor, EMT, 10µF 150V

HORIZONTAL AMPLIFIER R336 REPLACED

Effective Prod SN 27970

No fine Horizontal adjust and off tolerance sweep speeds.

High value carbon film resistors tend to become noisy or open after long time operation.

R336 was replaced by two composition resistors connected in series.

Parts Removed:

R336	310-0069-00	Resistor, precision, carbon film 13 meg, 1W, 2%

Parts Added:

R336	301-0625-00	Resistor, composite, 6.2 meg, 1/2W 5%
R337	301-0685-00	Resistor, composite, 6.8 meg, 1/2W 5%

DELAY LINE COIL FORMS REPLACED

Effective Prod SN 20321
1060RM

To eliminate pre-winding assembly time and shop reworking time, molded Cymac 325 coil forms will replace reworked poly rods for delay lines. The new rods have molded extrusions instead of metal pins, and are white in color rather than clear.

Parts Removed:

L905 L906	108-0143-00	Delay line, 18 sec
L935 L936	108-0144-00	Delay line, 11 sec

Parts Added:

L905 L906	108-0178-00	Delay line, 18 sec
L935 L936	108-0179-00	Delay line, 11 sec

RESISTOR CHANGE INSURES PROPER OPERATION OF VERTICAL POSITION NEONS

Effective Prod SN 22290 1670RM

Usable in SN 20001-22289 1001-1669RM

Indicator neon divider resistor, R533, in the VA is changed to keep the vertical position neons from firing in the wrong direction.

Parts Removed:

R533	302-0154-00	150k 1/2W 10%

Parts Added:

R533	302-0104-00	100k 1/2W 10%

INSTALLATION:

Parts Required: See 'Parts Added'.

On the sweep chassis, replace R533, a 150k 1/2W resistor located across the ceramic strips midway between V45 and V183, with a 100k 1/2W resistor.

L506 - L523 CHANGED TO AID IN ADJUSTMENT

Effective Prod SN 22290
1670RM

The "T-coils" in the Input Amplifier plate circuits are changed because of insufficient adjustment range.

Superseded by Mod 3570.

Parts Removed:

L506 L523	114-0121-00	15-34μH

Parts Added:

L506 L523	114-0100-00	10-21μH

COILS CHANGED TO INCREASE BANDPASS

Effective Prod SN 22440 1730RM

Usable in SN 22290-22439 1670-1729RM

To increase bandpass the "T-coils" in the Input Amplifier plate circuits are changed back to their original values (see mod 3431-3).

Parts Removed:

L506 L523	114-0100-00	10-21µH

Parts Added:

L506 L523	114-0121-00	15-34µH

INSTALLATION:

Parts Required: See 'Parts Added'.

Change L506 and L523 to 15-34µH coils.

RECTIFIER CABLE MODIFIED TO REDUCE RIPPLE IN VA

Effective Prod SN 23420
1900RM

Standard instrument exceptions: 23430-23433

Rectifier cable 179-0298-00 is modified to route the -150V supply to the Power Supply first instead of the VA, reducing -150V ripple in the VA. Also, several cable breakouts on the Power chassis are re-dressed to facilitate installation of the cable. The cable part number is unchanged.

C710 VOLTAGE RATING INCREASED FOR RELIABILITY

Effective Prod SN 20320 1060RM — Usable in SN 20001-20319 1001-1059RM

C710 is replaced with a higher voltage rated capacitor to provide greater reliability.

Parts Removed:

C710	285-0510-00	0.01µF 400V PTM

Parts Added:

C710	285-0511-00	0.01µF 600V PTM

INSTALLATION:

Parts Required: See 'Parts Added'.

Replace C710, a 0.01µF 400V capacitor directly above the V724 socket, with a 0.01µF 600V capacitor.

C710 VOLTAGE RATING INCREASED FOR RELIABILITY

Effective Prod SN 20320 1060RM — Usable in SN 20001-20319 1001-1059RM

C710 is replaced with a higher voltage rated capacitor to provide greater reliability.

Parts Removed:

C710	285-0510-00	0.01µF 400V PTM

Parts Added:

C710	285-0511-00	0.01µF 600V PTM

INSTALLATION:

Parts Required: See 'Parts Added'.

Replace C710, a 0.01µF 400V capacitor directly above the V724 socket, with a 0.01µF 600V capacitor.

SILICON DIODE MANUFACTURER CHANGED

Effective Prod SN 20562
1190RM

Part number 106-0056-00** silicon diodes are changed from Motorola to Transitron. Transitrons are a direct replacement, but since they are an axial lead type, a double bend is made in the leads to insure adequate clearance (approximately 1/4 inch) between diodes. The lead from the large end of the Transitron diode corresponds to the shell side of the Motorola.

This mod is superseded by Mod 3727.

**Number changed to 152-0023-00 by Mod 3238.

Parts Removed:

V642A-D V672A-D V762A-D V732A-B V702A-B	106-0056-00	Silicon, Motorola
	106-0056-00	Motorola, (4) (Mod 101 and Mod 109 only)

Parts Added:

V642A-D V672A-D V762A-D V732A-B V702A-B	106-0056-00	Silicon, Transitron
	106-0056-00	Transitron (4) (Mod 101 and Mod 109 only)

R710 - R711 REPLACED AS A COST SAVINGS

Effective Prod SN 21951
1510RM

Daven wire-wound resistors 308-0083-00 and 308-0084-00 are replaced with Corning Glass Works tin oxide resistors 310-0124-00 and 309-0334-00. The new resistors cost less and have high stability and low noise characteristics. See Mod 8979, which replaces R711.

Parts Removed:

R710	308-0083-00	236k 1W ww
R711	308-0084-00	100k 1/2W ww

Parts Added:

R710	310-0124-00	237k 1W
R711	309-0334-00	100k 1/2W

SILICON DIODE PART NUMBER CHANGED

Effective date 9-1-60

In order to place the Transitron silicon diode in the proper parts category, its part number is changed from 106-0056-00 to 152-0023-00.

Superseded by Mod 3727.

Parts Removed:

V642A-D V672A-D V762A-D V732A-B	106-0056-00	Silicon, SP209
V702A-B	106-0056-00	Silicon, (4) (Mod 101 and Mod 109A only)

Parts Added:

V642A-D V672A-D V762A-D V732A-B	152-0023-00	Silicon, SP209
V702A-B	152-0023-00	Silicon, (4) (Mod 101 and Mod 109A only)

K601 CHANGED TO ELIMINATE 60 CYCLE PICKUP

Effective Prod SN 22074
1580

Usable in SN 20001-22073
1001-1579RM

To eliminate AC pickup on the CRT display caused by magnetic flux leakage from the AC relay, reduce contact burning and relay noise, and lower the incoming inspection reject rate, the AC relay is changed to a DC type. The new relay operates off the +180V unregulated supply. See drawing.

The amount of ripple on the CRT trace can be determined as follows:

1. Short the vertical deflection plates together and rapidly rotate the horizontal position control back and forth while looking for vertical ripple.

2. Short the horizontal deflection plates together and rapidly rotate the vertical position control back and forth while looking for horizontal ripple.

Parts Removed:

K601	148-0004-00	AC relay 6.3V
C601	283-0004-00	0.02μF 150V

Parts Added:

K601	148-0016-00	DC relay 2kΩ
C601	283-0008-00	0.01μF 500V
R604	308-0052-00	6k 5W ww

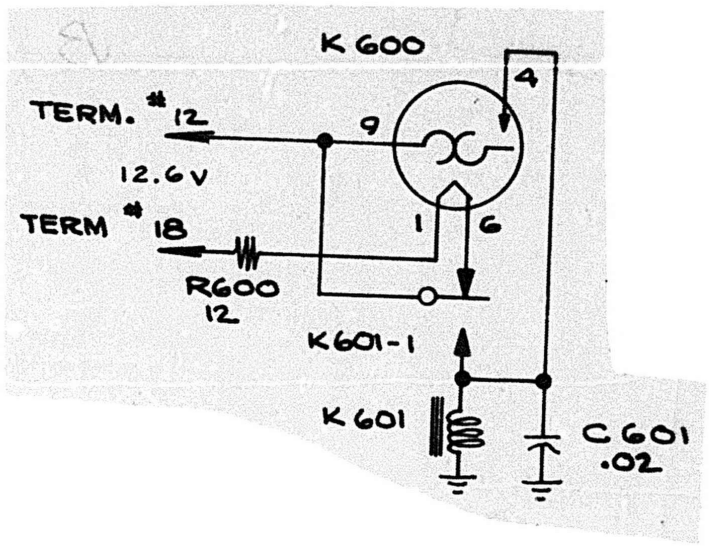
INSTALLATION:

Parts Required:

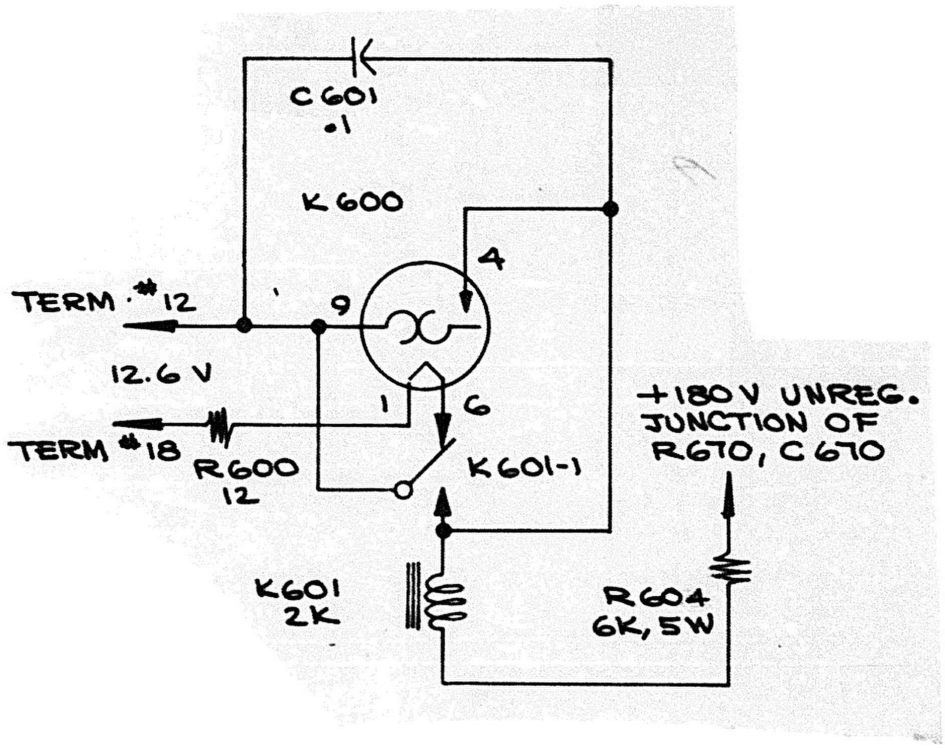
	040-0258-00	Modification Kit

Use kit instructions.

Continued.



BEFORE



AFTER

product modification

040-0258-00

TYPE SEE BELOW

CONVERSION FROM AC TO DC K601 RELAY

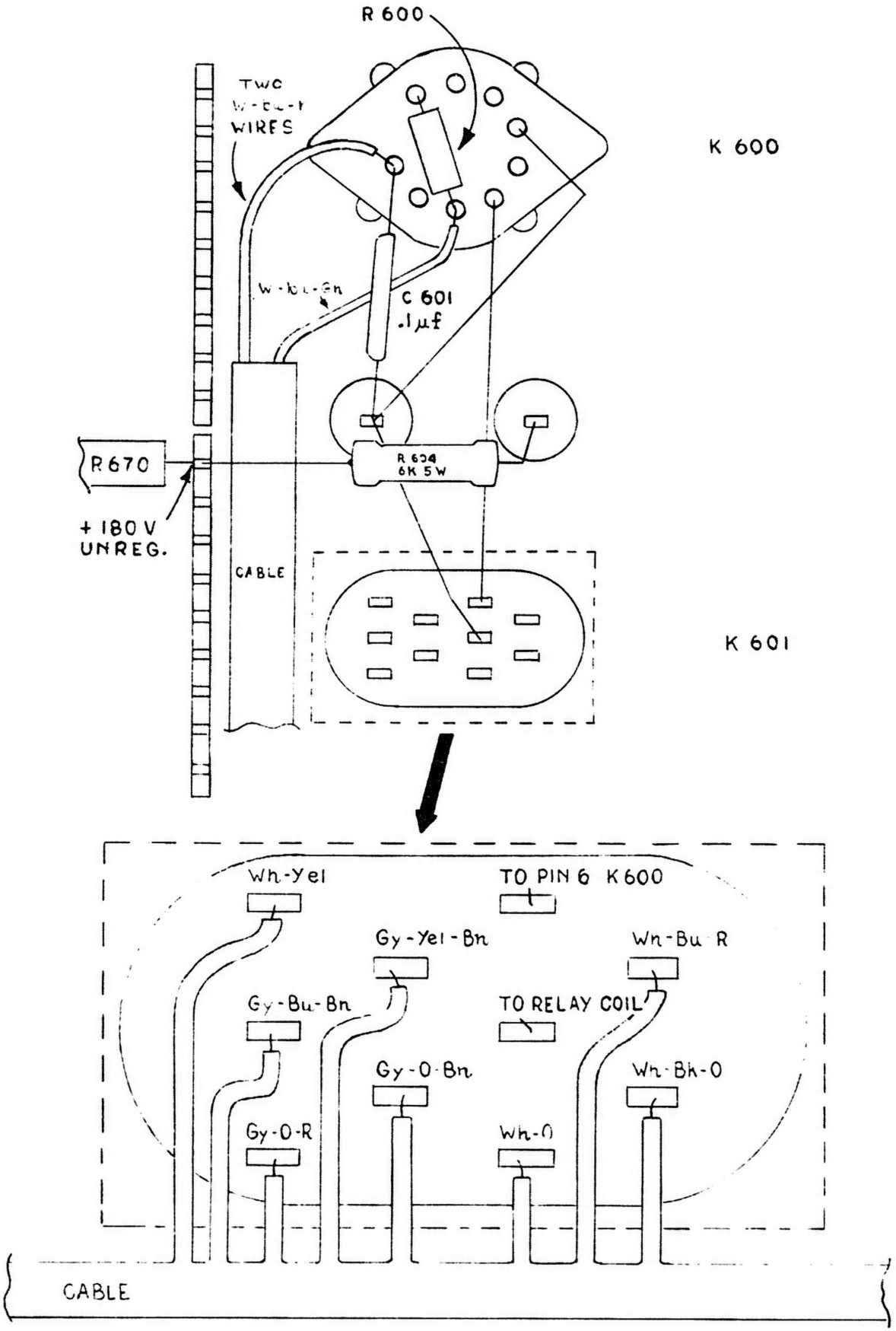
For the following TEKTRONIX® Type Oscilloscopes:

Type 531A	Serial Numbers 20001-22073
Type RM31A	Serial Numbers 1001- 1579
Type 535A	Serial Numbers 20001-24349
Type RM35A	Serial Numbers 1001- 1850
Type 541A	Serial Numbers 20001-21454
Type RM41A	Serial Numbers 1001- 1189
Type 545A	Serial Numbers 20001-27729
Type RM45A	Serial Numbers 1001- 1892

Modification Kit, PN 040-0258-00, changes the AC relay (K601) to a DC relay in the above listed instruments,* thus eliminating the 60Hz AC pickup on the CRT display.

*Instruments which have a DC Fan Mod DO NOT NEED THIS MODIFICATION.

11-2-71
Supersedes: December 1966 (format change)



PARTS INCLUDED IN MODIFICATION KIT

Quantity	Part Number	Description
1 ea	148-0016-00	Relay, DC, 45V (or 2k)
1 ea	148-0002-00	Relay, delay, 6N045T
1 ea	283-0008-00	Capacitor, cer, 0.1µF 500V discap
1 ea	308-0052-00	Resistor, WW, 6k 5W 5%

INSTRUCTIONS

1. Temporarily remove the following components from the instrument:

( ) a) Shield covering K601

( ) b) Air deflector above power transformer (if present)

( ) c) Plexiglass shield over the LV rectifiers

( ) 2. Unsolder all the wires connected to relay K601.

( ) 3. Remove the relay from the instrument and replace it with the new DC relay from the kit.

( ) 4. Replace the relay shield, removed in step 1a.

( ) 5. Solder the wires to the relay contact terminals, as shown in drawing on page 2.

( ) 6. Remove C601 (0.02µF capacitor connected from pin-4 of K600 to ground) and solder in the new C601 (0.1µF capacitor, from kit), from pin-4 (or at relay coil terminal, as shown in drawing) to pin-9 of K600.

( ) 7. Install R604, 6k 5W WW resistor (from kit) as shown in drawing on page 3.

( ) 8. Replace the Time Delay Relay (K600) in your instrument with the one from the kit.

( ) 9. Replace the air deflector and plexiglass shield, removed in steps 1b and 1c.

( ) Check wiring for accuracy.

( ) Fasten the Manual Insert pages in your Instruction Manual.

DF:ljs

INSTRUCTION MANUAL

MODIFICATION INSERT

CONVERSION FROM AC TO DC K601 RELAY

Type 531A -- SN 20001-22073	Type RM31A -- SN 1001-1579
Type 535A -- SN 20001-24349	Type RM35A -- SN 1001-1850
Type 541A -- SN 20001-21454	Type RM41A -- SN 1001-1189
Type 545A -- SN 20001-27729	Type RM45A -- SN 1001-1892

Installed in Type_____ SN_____ Date_____

This insert has been written to supplement the Instruction Manual for these instruments. The information given in this insert will supersede that given in the manual.

GENERAL INFORMATION

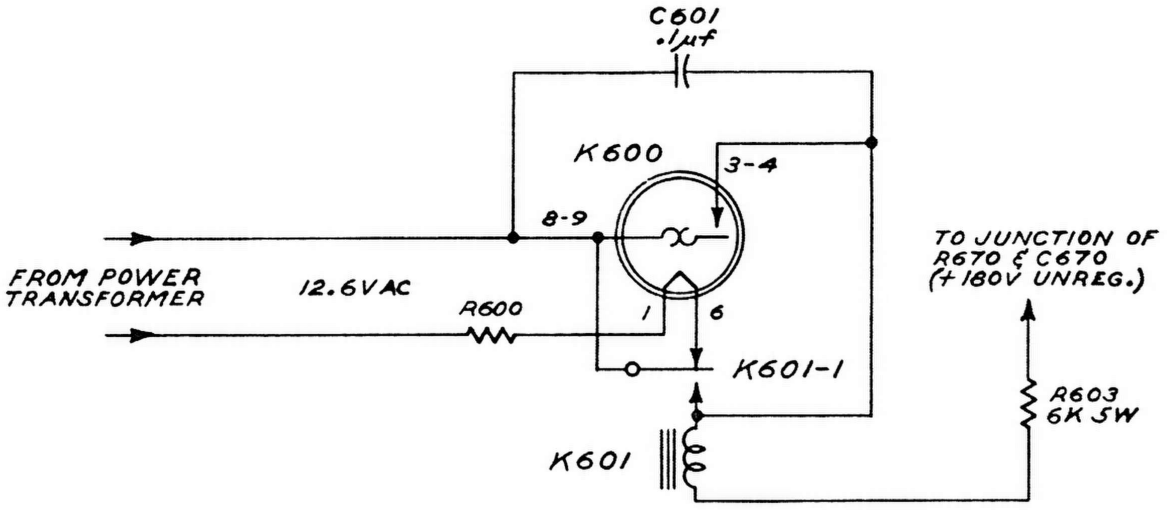
Modification Kit, PN 040-0258-00, changes the AC relay (K601) to a DC relay in the above listed instruments,* thus eliminating the 60Hz AC pickup on the CRT display.

*Instruments which have a DC Fan Mod DO NOT NEED THIS MODIFICATION.

ELECTRICAL PARTS LIST

Ckt.No.	Part Number	Description
		CAPACITORS
C601	283-0008-00	0.1µF 500V fixed
		RELAYS
K600	148-0002-00	6N045T Time Delay
K601	148-0016-00	2k 45V DC
		RESISTORS
R604	308-0052-00	6k 5W WW fixed

SCHEMATICS



K601 USED FOR SPECIAL INSTRUMENTS IS DELETED

Effective Prod SN 22270 (Type 531A - Mods 101 and 109A only)
1660RM

A previous mod (M3338), which changed the regular AC relay to a DC relay, eliminates the need for replacing the relay with a special DC relay for Mod 101 and 109A instruments.

Parts Removed:

K601	148-0005-00	32V relay
K600	148-0006-00	26V thermal delay relay
C600	283-0004-00	0.02µF 150V ceramic
	136-0015-00	Socket, tube, STM9G
	202-0012-00	Cover, relay, alum
	386-0935-00	Plate, rectifier
	179-0349-00	Cable, DC1 rectifier
	179-0354-00	Cable, trans

Parts Added:

See Mod 3338

D679 ADDED TO PROTECT ELECTROLYTIC IN +350V SUPPLY

Effective Prod SN 22350
1700RM

Addition of a diode in parallel with the +350V electrolytic capacitor protects the capacitor from an approximate 60V negative voltage which would otherwise occur during the 45 second time delay period.

Parts Added:

D679	152-0047-00	1N2862

SILICON DIODES REPLACED FOR RELIABILITY

Effective Prod SN 22970
1900RM

Silicon diode 152-0023-00, which is in uncertain supply, is replaced with a diode more suitable for this application.

Parts Removed:

D642A-D D672A-D D762A-D D702A-B D732A-B	152-0023-00	Silicon, SP209
D701A-D	152-0023-00	Silicon, SP209 (Mod 101 and Mod 109A only)

Parts Added:

D642A-D D672A-D D762A-D D702A-B D732A-B	152-0047-00	Silicon, 1N2862 (or equal)
D701A-D	152-0047-00	Silicon, 1N2862 (or equal) (Mod 101 and Mod 109A only)

PRIMARY WIRE COLOR-CODED TO INSURE PROPER CONNECTION

Effective Prod SN Not Given

To eliminate a shock hazard when changing the line fuse, the wire from the 'hot' side of the motor base connector is connected to the end (center) terminal of the fuseholder. This wire is color-coded yellow-brown-red-brown to insure its proper connection.

POWER SUPPLY SURGE RESISTORS ADDED

Effective Prod SN 27997

Modified out of sequence:

278001	27811	27921	27970	27976-77	27984-88	27993-95
278007-08	27844	27946	27973	27980-82	27990	

No specific symptom. Welded contacts can cause failures to occur throughout the instrument by applying B+ to all tubes before sufficient warm-up time. Also, surge current is increased in Power Supply bridge diodes and all 6DJ8's are subject to undue stress.

K601 relay contacts -3 and -4 are "welding" or being disfigured by initial surge current plus excessive power dissipation. It appears that if they do not fail in the first few cycles, they will be all right.

Series resistance was added between relay contact K601-3 and D702A and B to reduce surge current.

Parts Added:

R684 R687	308-0123-00	Resistor, 20Ω ww 5W ±5%

ELECTROLYTIC CAPACITOR ASSEMBLIES REPLACED WITH EQUIVALENT CAPACITORS

Effective Prod SN Not Given

All electrolytic capacitor assemblies were replaced with their equivalent raw capacitor, metal or fiber flange, plastic cover and delrin base (when required) to eliminate unnecessary part numbers and to facilitate replacement of electrolytic capacitors by customers. For replacement of capacitor assemblies, Customer Service will supply raw capacitors with both metal and fiber flanges and plastic covers when required.

Parts Removed:

C679A, B, C	290-0033-00	3x10µF 450V
C760A, B	290-0042-00	2x40µF 450V
C640 C730	290-0044-00	125µF 350V
C700	290-0045-00	125µF 450V
C670 C671	290-0048-00	150µF 250V
C649 C603	290-0040-00	2x40µF 250V

Parts Added:

C679A, B, C	290-0005-00	3x10µF 450V
C760A, B	290-0013-00	2x40µF 450V
C640 C730	290-0016-00	125µF 350V
C700	290-0017-00	125µF 450V
C670 C671	290-0019-00	150µF 250V
C649 C603	290-0012-00	2x40µF 250V
C605A,B,C	290-0062-00	40/20/10µF 475V
C507A	290-0075-00	2x10µF 250V
	386-0252-00	Flange
	386-0253-00	Flange
	386-0254-00	Flange
	386-0255-00	Flange
	200-0256-00	Cover
	200-0258-00	Cover
	200-0293-00	Cover

CIRCUIT CHANGED TO PROTECT V737 TURN-ON

Effective Prod SN 28140

Mod 14909 was only partially effective in solving the problem of stuck relay contacts.

A wire was changed to return R736 and R737 to the opposite ("on") side of K601-4 to provide protection bias for V737 at turn-on. Also, C710 and R712 were changed to slow down the rate at which the regulator comes into equilibrium. R732 was replaced by D731 to protect C730. Also see Mod 14909.

Parts Removed:

C710	385-0511-00	Capacitor, fixed, 0.01µF PTM 600V
R712	302-0154-00	Resistor, composite, 150k 1/2W 10%
R732	306-0823-00	Resistor, composite, 82k 2W 10%

Parts Added:

C710	285-0517-00	Capacitor, fixed, 0.022µF PTM 600V
D731	152-0066-00	Diode, silicon 400 PIV 500-700mA
R712	302-0105-00	Resistor, composite, 1 Meg 1/2W 10%

DECOUPLING ADDED TO IMPROVE HF SYNC

Effective Prod SN 20060 Usable in SN 20001-20059

High frequency ripple coupled into the Sweep Multiplier is causing poor High Frequency Sync. This ripple is reduced by adding a decoupling network to the CRT circuit as shown in schematic.

Parts Added:

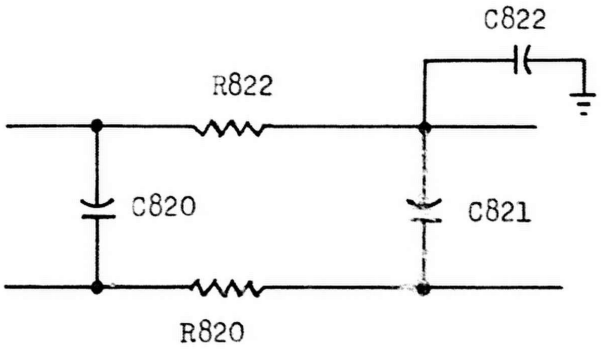
C822	281-0525-00	470pF
R822	302-0333-00	33k 1/2W 10%

INSTALLATION:

Parts Required: See 'Parts Added'.

a) Replace the bare wire that connects the two center slots of two ceramic strips (under the hv shield next to the transformer) with R822, 33k.

b) Add C822, 470pF, between the R822/white-violet wire junction and the ground side of C803 (0.001µF capacitor adjacent to R822 and nearest the outside edge of the chassis).



CAPACITORS CHANGED FROM OIL-FILLED TO CERAMIC

Effective Prod SN 20600
1233(RM)

w/exceptions: 20603-4 (531A)

The manufacturer is having difficulty supply HV oil-filled capacitors due to the high reject rate and failure rate from oil leaks. Oil-filled capacitor 285-0500-00 is replaced with a ceramic capacitor.

Parts Removed:

C833 C834 C836	285-0500-00	470pF 10kV PTM

Parts Added:

C833 C834 C836	281-0556-00	500pF 10kV ceramic

CAPACITORS CHANGED FROM OIL-FILLED TO CERAMIC

Effective Prod SN 20650
1260RM

The manufacturer is having difficulty supplying HV oil-filled capacitors due to high reject rate and failure rate from oil leaks. Oil-filled capacitor 285-0513-00 is replaced with a ceramic capacitor. To prevent disturbances in the unblanking, additional circuitry changes must be made.

Parts Removed:

C821 C827 C845 C848	285-0513-00	0.015µF 3kV PTM
R827	302-0104-00	100k 1/2W

Parts Added:

C821 C827 C845 C848 C828	283-0011-00	0.01µF 2kV ceramic
R827	302-0333-00	33k 1/2W

CAPACITORS CHANGED FROM OIL-FILLED TO CERAMIC

Effective Prod SN 20800
1269RM

w/exceptions: 20721-20739 (Standard)

The manufacturer is having difficulty supplying HV oil-filled capacitors due to high reject rate and failure rate from oil leaks. Oil-filled capacitor 285-0509-00 is replaced with a ceramic capacitor.

Parts Removed:

C832	285-0509-00	0.0068µF 5kV PTM

Parts Added:

C832	283-0034-00	0.005µF 4kV ceramic

CAPACITORS CHANGED FROM OIL-FILLED TO CERAMIC

Effective Prod SN 21132
1320RM

The manufacturer is having difficulty supplying HV oil-filled capacitors due to high reject rate and failure rate from oil leaks. Oil-filled capacitor 285-0508-00 is replaced with a ceramic capacitor.

Parts Removed:

C820 C831 C842	285-0508-00	0.0068µF 3kV PTM

Parts Added:

C820 C831 C842	283-0011-00	0.01µF 2kV ceramic

CIRCUIT MODIFIED TO ELIMINATE TRACE DIMMING

Effective Prod SN 22290 1670RM — Usable in SN 20650-22289** 1260-1669RM**

**Also SN 20001-20649 if M2878 has been installed.
Also SN 1001-1259RM if M2878 has been installed.

Several components are added to the HV circuit to eliminate the unblanking dim-out at the start of the sweep (at 10ms/cm) caused by HV transformer capacitance.

Without C827 in the circuit, the leading edge of the unblanking pulse to the CRT grid would be rounded off by the charging time of the distributed capacity to ground of the HV transformer's bifilar winding. C827 provides a low impedance path to the CRT grid for the high frequency components of the unblanking pulse. Its time constant (C827 and R828) provides only a very short time support to the left top corner of the waveform, and if its effect passes before the capacity to ground of the transformer winding is fully charged through R827, the waveform as seen at the CRT grid has a momentary sag.

The above actually happens, but it isn't noticed with normal intensity levels because, in that case, the unblanking is not so marginal as to demand an absolutely flat-topped waveform. With very low intensity levels, the dim-out is only apparent on the 10ms/cm range and its multipliers because the duration of the unblanking sag is such as to occupy only a portion of the sweep. At faster sweep rates, the duration time exceeds the sweep length; at slower sweep rates it is too small a fraction of the sweep to be noticed.

Also see Mod 7928, which replaces the 0.1µF capacitor, C819.

Parts Added:

*R818 *R819	302-0185-00	1.8M 1/2W 10%
*R829	302-0223-00	22k 1/2W 10%
C819	283-0012-00	0.1µF 100V
*C829	283-0000-00	0.001µF ceramic

INSTALLATION:

Parts Required: See 'Parts Added' with asterisk and part listed below.

C819	283-0057-00	0.1µF 200V

Continued.

INSTALLATION: (Continued)

a) Remove both HV shields.

b) Remove strap between CSK-9 and V814 pin 1.

c) Move end of R814, 470k 1/2W, connected to CSK-9, to V814 pin 1.

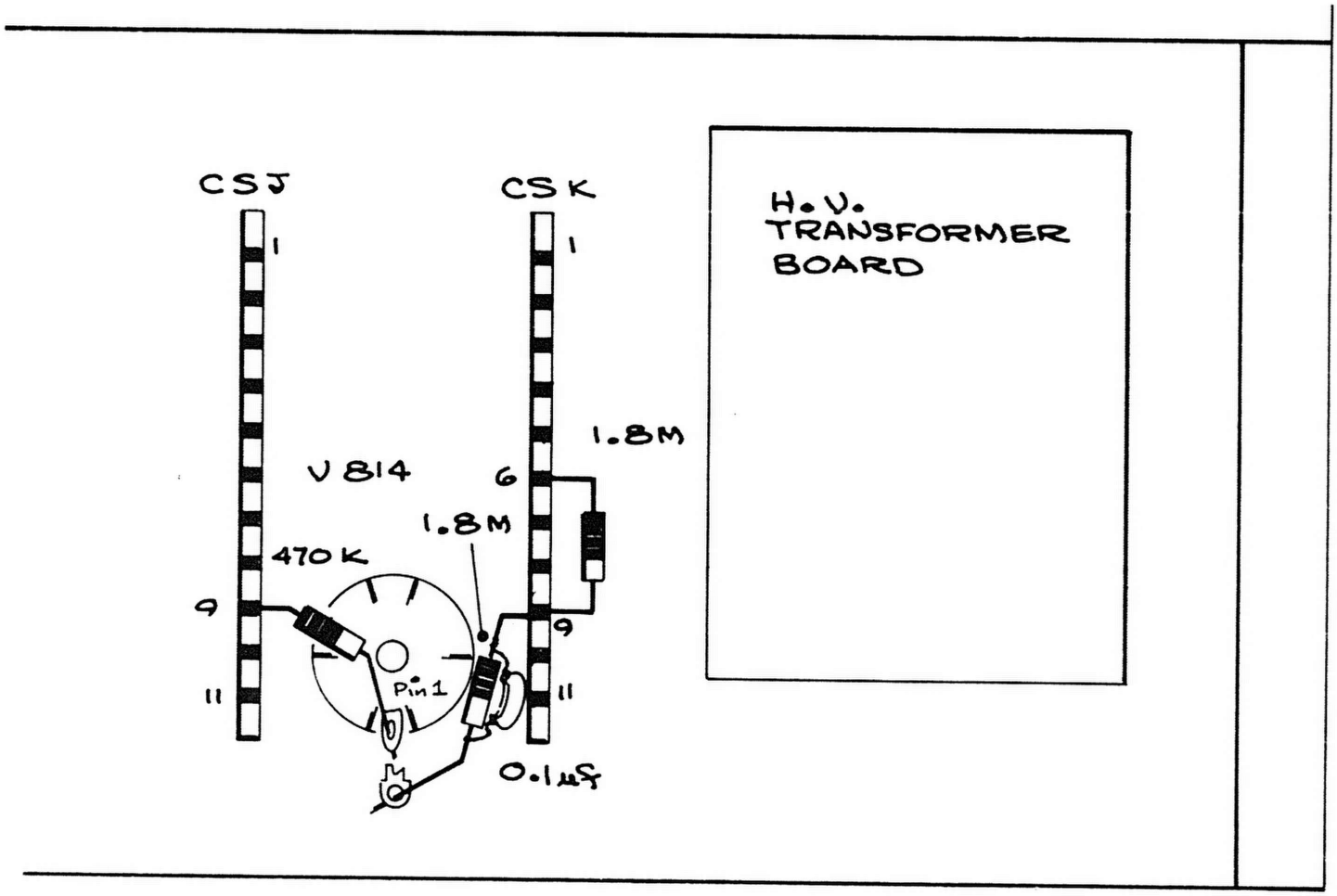
d) Add R818, 1.8 meg, between CSK-6 and CSK-9.

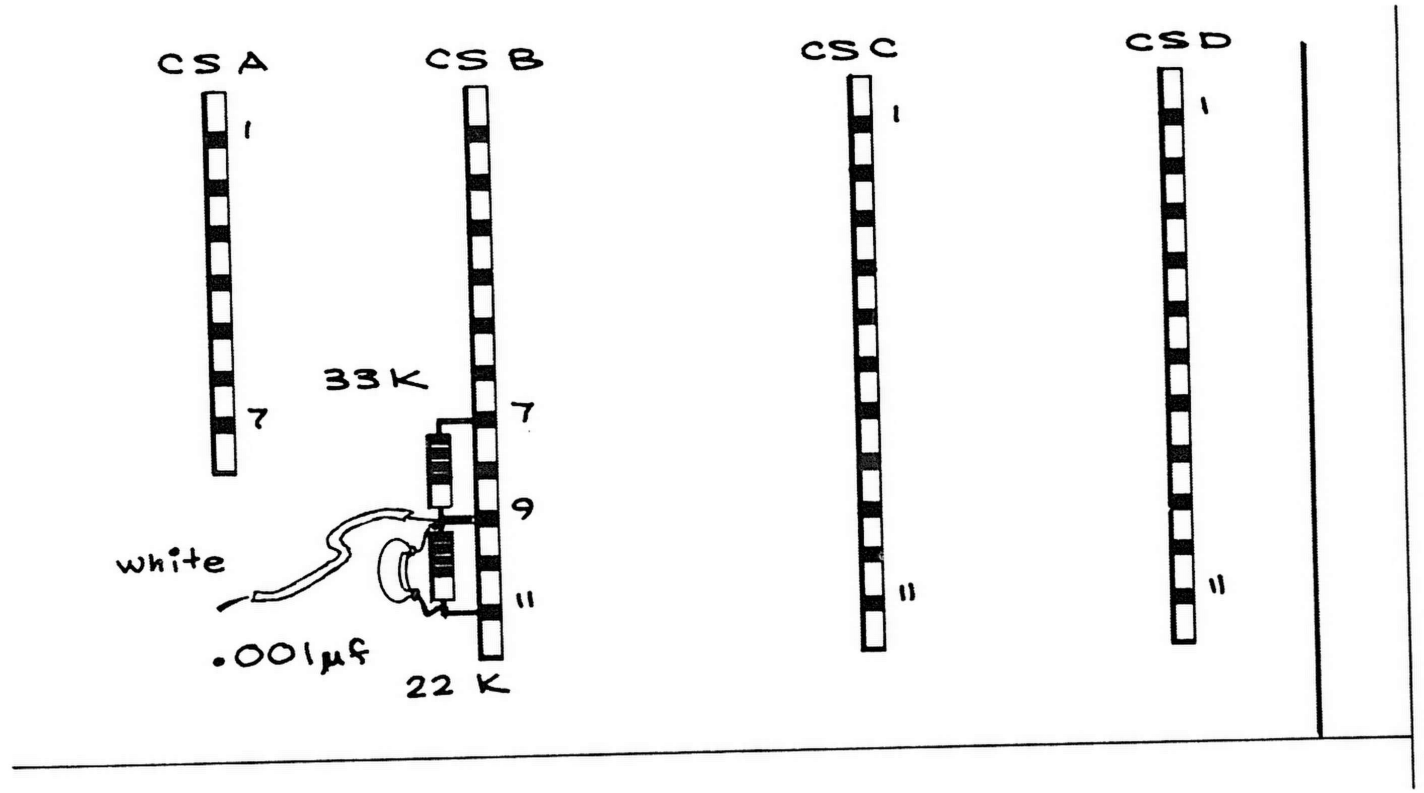
e) Add R819, 1.8 meg, and C819, 0.1µF, in parallel, between CSK-9 and V814 ground lug.

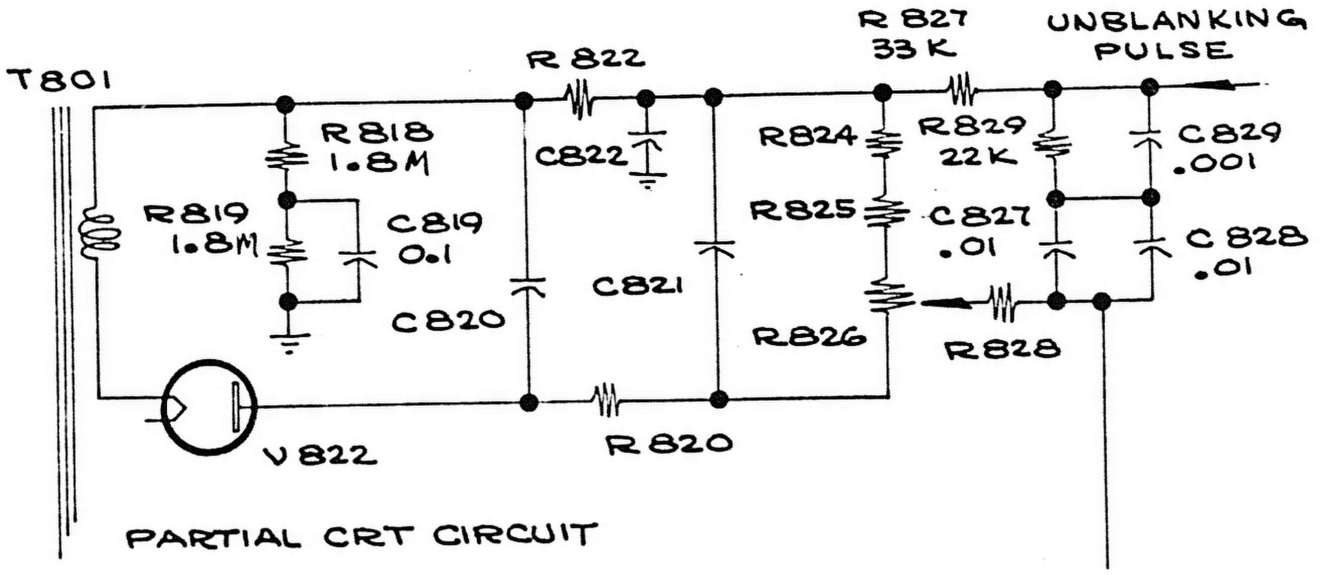
f) Move the white wire, connected to CSB-11, to CSB-9.

g) Move R827, 33k, connected between CSB-8 and 11, to between CSB-7 and 9.

h) Add R829, 22k, and C829, 0.001µF, in parallel, between CSB-9 and CSB-11.







CRT CIRCUIT FILTERING ADDED

Effective Prod SN 22530 -- Mod 101 only 1760RM

Usable in SN 20001-22529 1001-1759RM

A filter is added to the CRT filament circuit to reduce 400 cycle intensity modulation. Also see Mod 7843, which replaces NE2 neons with NE23's.

Parts Added:

B849	150-0002-00	NE2
*C849	283-0011-00	0.01µF 2kV
*R849	302-0105-00	1 meg 1/2W
	*343-0043-00	Clamp, neon bulb

INSTALLATION:

Parts Required: See 'Parts Added' with asterisks and part listed below.

B849	150-0027-00	NE23

a) On the chassis above the base of CRT, move strap from CSA-1 to CSA-2.

b) Add strap between CSA-1 and CSA-2.

c) Move the white-brown wire from CSB-3 to CSB-2.

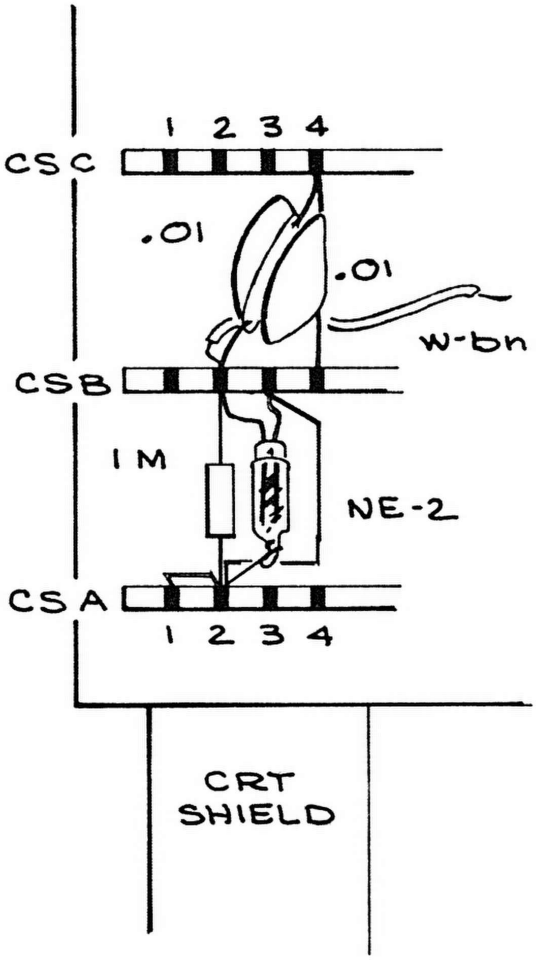
d) Install C849, 0.01µF capacitor between CSB-2 and CSC-4.

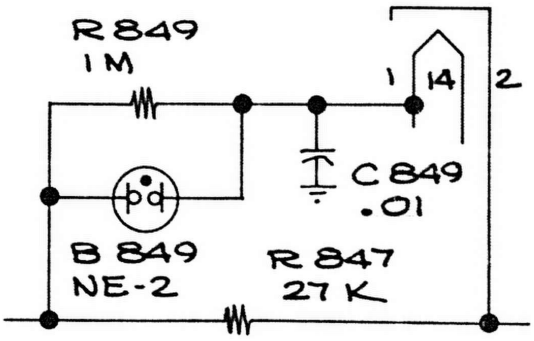
e) Install R849, 1 meg 1/2W 10% between CSA-2 and CSB-2.

f) Install B849, NE-2 between CSB-2 and CSB-3.

g) Install the neon bulb holder in CSA-2.

Continued.





PARTIAL CRT CIRCUIT

C841 CHANGED TO ELIMINATE TRACE DIMMING

Effective Prod SN 22672
1800RM

Usable in SN 20001-22671
1001-1799RM

Standard instrument exceptions:

20897	21176	21337-8	21446	21860-79	22137	22330-9	22470-9
20964	21205	21341-3	21448-9	21890-9	22150-9	22348-59	22481-2
20971	21222-3	21345	21481-2	21910-19	22163-6	22364-5	22484-5
20988	21225-9	21347	21487-9	21930-9	22169-99	22367-91	22500-9
21068	21255	21360-74	21520	21958	22203-6	22393	22512
21085	21261-2	21376-81	21560-79	21960-9	22208-25	22395-7	22514
21087	21264-8	21383-4	21600	21980-9	22229-40	22399-420	22516-7
21094	21276	21386	21619	22000-9	22243-7	22406	22520-1
21099	21290-5	21400	21640-3	22020-9	22249-64	22424	22530-49
21116-7	21297-9	21405	21645-58	22041	22266	22428-9	22557-83
21121	21320	21407	21680-700	22050-79	22270-9	22433-4	22587-8
21146	21322	21410-13	21720-39	22090-9	22286-300	22436-49	22590-643
21151	21324	21415-29	21760-79	22109-19	22302	22451	22645-6
21157	21326-7	21440	21800-19	22130	22308	22455	22648-70
21159	21332-4	21442-4	21830-49	22132	22310-20	22457	

Rackmount instrument exceptions:

1340-49	1541	1580-1600
1351-1419	1564-65	1797

The discap between pin 2 of V814 and ground is changed to a 0.02µF discap. This will eliminate trace dimming at high sweep speeds caused by spurious HV regulator oscillations.

Parts Removed:

C841	283-0002-00	0.01µF 500V

Parts Added:

C841	283-0006-00	0.02µF 600V

INSTALLATION:

Parts Required: See 'Parts Added'.

Replace the 0.01µF discap, between pin 2 of V814 and the socket ground lug, with a 0.02µF discap.

C819 REPLACED TO INCREASE RELIABILITY

Effective Prod SN 25550 2510RM

Usable in SN 22290-25549 1670-2509RM

Accumulated breakdown failures in all types of instruments prompted a 'blanket' replacement of ceramic disc capacitor 283-0012-00 with a higher rated capacitor.

Parts Removed:

C819	283-0012-00	0.1µF 100V

Parts Added:

C819	283-0057-00	0.1µF 200V

INSTALLATION:

Parts Required: See 'Parts Added'.

Replace 0.1µF 100V capacitor C819, connected from the ceramic strip notch near pin 9 of V814 to ground, with a 0.1µF 200V capacitor.

FOCUS AND INTENSITY POTENTIOMETERS CHANGED

Effective Prod SN 27510

FOCUS and INTENSITY potentiometers were changed,as indicated in the remove/add list, to reduce cost, improve quality and provide better supply of potentiometers.

Parts Removed:

R826	311-0041-00	Potentiometer, composite, 1M
R856	311-0043-00	Potentiometer, composite, 2M

Parts Added:

R826	311-0041-02	Potentiometer, composite, 1M
R856	311-0043-02	Potentiometer, composite, 2M

CRT ROTATOR STUD RETAINING PLATE ADDED

Effective Prod SN 27920

If the bottom rear section of the instrument is bumped or jolted, the CRT rotator stud may come out of the slot in the CRT rotator base.

A 2-56 hole was tapped adjacent to the slot in the CRT rotator base and a retaining plate was bolted to the base.

Parts Removed:

432-0022-00	Base, CRT Rotator

Parts Added:

432-0022-02	Base, CRT Rotator
386-1485-00	Plate, Retaining
211-0022-00	Screw, 2-56 x 3/16
432-0023-00	Base, CRT Rotator, Casting

MODIFICATION KIT

MAXIMUM INTENSITY

040-0159-00

For the following Tektronix Oscilloscopes:

Types: 531, 531A, 532, 533, 533A, 535, 535A, 541, 541A, 543, 543A, 545, 545A
All serial numbers

DESCRIPTION

The object of this modification is to prevent cathode-ray tube phosphor from burning, especially at slow sweep speeds. Basically the modification consists of replacing the 1M INTENTSITY potentiometer with two 2M potentiometers in parallel. One is a screwdriver adjustment, the other is the front panel INTENSITY control.

WARNING: IF THE MAXIMUM INTENSITY POTENTIOMETER IS ADJUSTED FOR BEST PHOSPHOR PROTECTION AT SLOW SWEEP SPEEDS, THE WRITING RATE WILL NOT BE ADEQUATE AT THE FASTEST SWEEP SPEEDS. CONSEQUENTLY, A READJUSTMENT OF THE MAXIMUM INTENSITY POTENTIOMETER IS NECESSARY.

CONVERSELY, IT SHOULD BE RESET AGAIN AT THE SLOW SPEEDS.

The screwdriver adjusted potentiometer is set for maximum required intensity when the front panel INTENSITY CONTROL is fully clockwise.

Publication:
Instructions for 040-0159-00
April 1969

Supersedes:
December 1966

PARTS LIST

Quantity	Part Number	Description
(1 ea)		Assembly, potentiometer, consisting of:
1 ea	210-0012-00	Lockwasher, int, 3/8 x 1/2
1 ea	210-0013-00	Lockwasher, int, 3/8 x 11/16
1 ea	210-0494-00	Nut, hex, aluminum bushing
## 1 ea	311-0043-02	Potentiometer, 2M, 3/8x3/8 w/insulated shaft
1 ea	358-0010-00	Bushing, aluminum
1 ea	(175-0522-00)	Wire, #22 solid, 2 in. white-orange
1 ea	(175-0522-00)	Wire, #22 solid, 2 in. white-brown
2 ea	210-0614-00	Rivet, aluminum, 1/16x3/16
1 ea	311-0043-00	Potentiometer, 2M, 3/8x3/8 w/insulated shaft
1 ea	334-0527-00	Tag, MAX INT, adjust
1 ea	334-0741-00	Tag, MAX INT

Indicates change since last publication.

INSTRUCTIONS

( ) 1. Unsolder the three wires from the INTENSITY potentiometer.

( ) 2. Remove the INTENSITY knob.

( ) 3. Remove the INTENSITY potentiometer and replace it with the 2M potentiometer (from kit) that doesn't have wire connected to it.

( ) Replace the knob.

( ) 4. Locate the plate on top of the plug-in housing. On the outside flange, mark and drill a 3/8 in. hole, 3/4 in. from the bottom, and 3 in. from the front panel (see drawing).

( ) 5. Install the 2M potentiometer (from kit) that has the two wires soldered to it. Use the large lockwasher on the inside of the flange, install the bushing from the outside over the MAX INT tag and tighten with a 1/4 in. allen wrench (see drawing, step 5).

( ) 6. Solder the white-green wire to the center terminal of the INTENSITY potentiometer.

( ) 7. Solder both the white-brown wires (one that was removed from the old INTENSITY potentiometer, and one that is connected to the MAX INT potentiometer installed in step 5) to the counter-clockwise terminal of the new INTENSITY potentiometer (see drawing).

( ) 8. Solder both white-orange wires (one that was removed from the old INTENSITY potentiometer, and one that is connected to the MAX INT potentiometer installed in step 5) to the clockwise terminal of the new INTENSITY potentiometer (see drawing, step 8).

( ) 9. Drill a 3/8 in. adjustment access hole in the cabinet.

( ) 10. Drill two #50 rivet holes and mount tag onto cabinet.

THIS COMPLETES THE INSTALLATION.

INSTRUCTIONS (cont)

( ) Check wiring for accuracy.

( ) Correct your Instruction Manual as required.

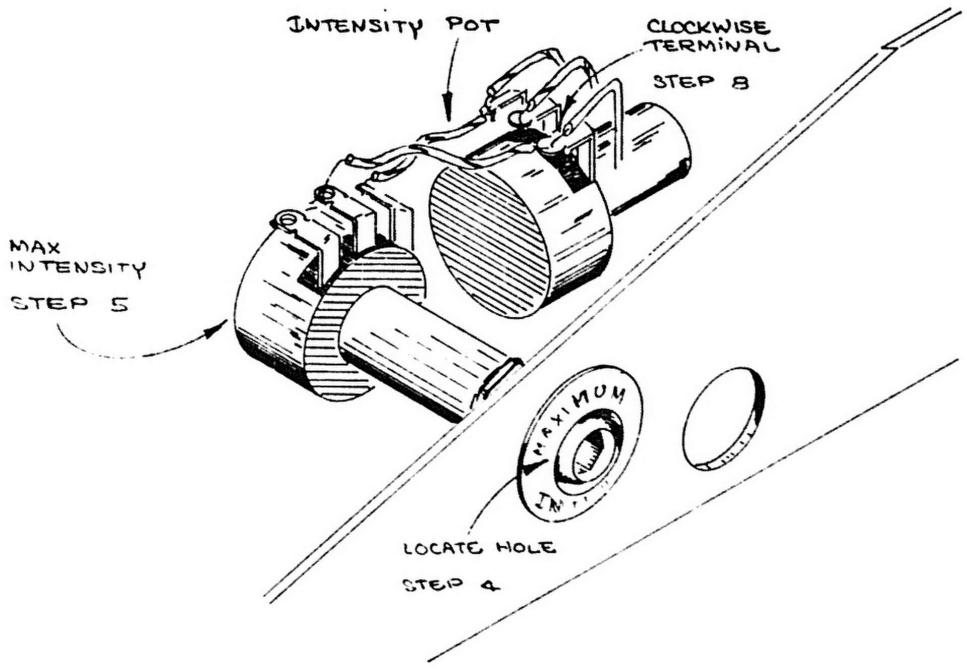
( ) Turn on the instrument and free-run the sweep at the fastest sweep speed.

( ) Set the MAXIMUM INTENSITY potentiometer fully counter-clockwise and the front panel INTENSITY control fully clockwise.

( ) Adjust the MAX INT potentiometer to give optimum intensity with a sharply focused trace (maximum writing rate).

NOTE: If the instrument is not used for maximum writing rate application, you might want to set the MAX INT potentiometer a little below the optimum intensity point to give ample protection against phosphor burning.

BE:ls



CRT MOUNTING CLAMP REPLACED

Effective Prod SN 20410
1060RM

Replaces the CRT mounting clamp with a rotator assembly. The new assembly provides a finger-operated screw adjustment for easier, more precise CRT rotation. It also permits lateral and vertical adjustment of the socket end of the CRT, to minimize parallax problems when viewing the trace and graticule.

Parts Removed:

354-0066-00	Ring, rotating
210-0006-00	Lockwasher, no. 6 int (2)
210-0407-00	Nut, 6-32 x 1/4 (2)
210-0416-00	Nut, 10-24 x 3/8
211-0507-00	Screw, 6-32 x 5/16 (2)
212-0536-00	Screw, 10-24 x 7/8 RHS
343-0034-00	Clamp, CRT
210-0803-00	Washer, no. 6 L (2)
406-0251-00	Bracket, CRT mtg.

Parts Added:

210-0407-00	Nut, 6-32 x 1/4
210-0502-00	Nut, CRT rotator
210-0503-00	Nut, securing, dble
211-0560-00	Screw, 6-32 x 1 RHS
211-0561-00	Screw, 6-32 x 3/8 (2)
354-0078-00	Ring, securing
354-0079-00	Ring, clamping
355-0049-00	Shaft, CRT rotator
366-0032-00	Knob, CRT rotator
432-0022-00	Base, CRT rotator
406-0251-00	Bracket, CRT mtg.

NYLON POSTS REPLACED AND STANDARDIZED

Effective Prod SN Not Given

Nylon posts produced from 1/4 inch nylon rod are replaced with molded Delrin posts. The new posts are standardized to save time and expense and to facilitate manufacture and installation.

Parts Removed:

385-0074-00	Post, Nylon	(2)
385-0073-00	Post, Nylon	(2)
**385-0096-00	Post, Nylon	
**385-0082-00	Post, Nylon	
385-0076-00	Post, Nylon	(2)
385-0090-00	Post, Nylon	

Parts Added:

385-0135-00	Post, Delrin	(2)
385-0134-00	Post, Delrin	(2)
**385-0136-00	Post, Delrin	
**385-0137-00	Post, Delrin	
385-0138-00	Post, Delrin	(2)
385-0090-00	Post, Delrin	

** Quantity is (2) on Type 531A Mod 101 and Type 531A Mod 109A.

CABINET FINISH IMPROVED

Effective Prod SN 20950
1290RM

To obtain a tougher, easier to clean finish and to reduce cost, change the material used for cabinet sides, bottoms, overlays, etc. to textured aluminum (Reynold's pebble grain, 5005, H154). Change the paint from blue wrinkle to blue vinyl of approximately the same color. Paint filter housings, top rails, bottom rails and dot fasteners with blue vinyl also.

See Mod 3861, Mod 5288 and Mod 8913.

Parts Removed:

386-0770-00	Cabinet side, right
386-0736-00	Cabinet side, left
386-0597-00	Cabinet bottom
386-0767-00	Rear overlay
381-0121-00	Bar, top support
380-0008-00	Housing, air filter
122-0051-00	Bottom rail, left
122-0050-00	Bottom rail, right

Parts Added:

387-0076-00	Cabinet side, right
387-0077-00	Cabinet side, left
387-0061-00	Cabinet bottom
387-0078-00	Rear overlay
381-0149-00	Bar, top support
380-0018-00	Housing, air filter
122-0070-00	Bottom rail, left
122-0071-00	Bottom rail, right

SEMICONDUCTOR INFORMATION STANDARDIZED

Effective Prod SN not given

The following changes are to be made, as applicable:

1. All semiconductor type numbers are deleted from the chassis, leaving only the circuit designation.
2. Circuit designations of silicon diodes change from 'V' to 'D'.
3. Circuit designations of transistors change from 'V' to 'Q'.

SILVER-BEARING SOLDER PROVIDED

Effective Prod SN Not Given

The customer is provided with a spool of silver-bearing solder, mounted on the instrument, for repair purposes. A 5/32 inch hole is added in a conspicuous location and a press-in nylon spool with 3 feet of solder is installed.

Parts Added:

214-0210-00	Spool, w/solder
361-0007-00	Spacer, nylon molded, 0.063

CRT SECURING RING REPLACED TO PREVENT SLIPPAGE

Effective Prod SN 23760 1950RM

Usable in SN 20410-23759 1060-1949RM

Longitudinal slippage of the CRT inside the rotator assembly may occur during shipment. To prevent this movement, the 'hard' butyrate securing ring (between clamping ring and CRT base) is replaced with a 'soft' natural urethane ring. Physical dimensions remain the same.

The CRT rotator base is also modified, by adding a flange and hole to secure the rotator stud at the other end also. This will restrict the movement of the securing ring within the rotator base.

Part number of the rotator base is unchanged.

NOTE: Parts Replacement kit 050-0063-00 is available to facilitate the replacement of CRT securing ring 354-0078-00 in pre-modified instruments.

Parts Removed:

354-0078-00	Ring, CRT securing

Parts Added:

354-0178-00	Ring, CRT securing

product modification

050-0063-00

Instruments
See Below

CRT SECURING RING

For the following Tektronix Oscilloscopes:

502	SN	2380- 7519	535A	SN	21350-28840
503	SN	101- 2379	RM35A	SN	1230- 2739
RM503	SN	101- 1334	536	SN	1090- 2209
504	SN	101- 529	541A	SN	20470-22308
RM504	SN	101- 529	RM41A	SN	1030- 1435
507*	SN	180- 415	543	SN	1250- 3000
515A	SN	4804- 7499	543A	SN	3001- 3909
RM15**	SN	882- 2416	RM43	SN	112- 1000
516	SN	101- 1319	RM43A	SN	1001- 1044
525	SN	870- 1449	545A	SN	22060-34039
526	SN	101- 279	RM45A	SN	1200- 3009
531A	SN	20410-23759	551	SN	1820- 4199
RM31A	SN	1060- 1949	560	SN	101- 378
532	SN	6520- 7249	561	SN	101- 1618
RM32	SN	331- 559	570	SN	5200- 5369
533	SN	1470- 3000	575	SN	1620- 4928
533A	SN	3001- 3939	581	SN	440- 1089
RM33	SN	140- 1000	585	SN	741- 3049
RM33A	SN	1001- 1114	661	SN	101- 249

*507-211A SN 170- 415
**RM15-209C SN 882-1572 (approx)

New CRT securing ring, 354-0178-00, replaces 354-0078-00 previously used.

The new CRT securing ring, plus an improved CRT Rotator base, prevent CRT from rotating or sliding, thereby making adjustment more reliable.

NOTE: If the serial number of your instrument is above those listed, or if this kit has been installed, disregard the instructions as PN 354-0178-00 is a direct replacement.

PARTS INCLUDED IN PARTS REPLACEMENT KIT:

Quantity	Part Number	Description
1 ea	354-0178-00	Ring, CRT securing
1 ea	432-0022-02	Base, CRT Rotator

INSTRUCTIONS

( ) 1. Remove the CRT from the instrument.

REFER TO DRAWING OF CRT ROTATOR ASSEMBLY ON FOLLOWING PAGE.

( ) 2. Remove screws holding CRT rotator base to mounting bracket.

NOTE: Use same holes when installing new base.

( ) 3. Remove clamping ring and adjusting screw from the old assembly and install on new CRT rotator base from the kit.

( ) 4. Reinstall CRT rotator assembly on mounting bracket.

( ) 5. Install new CRT securing ring (from kit) onto assembly.

NOTE: Make certain the ears on both sides of the ring are properly positioned.

( ) 6. Install CRT and complete mechanical work as required.

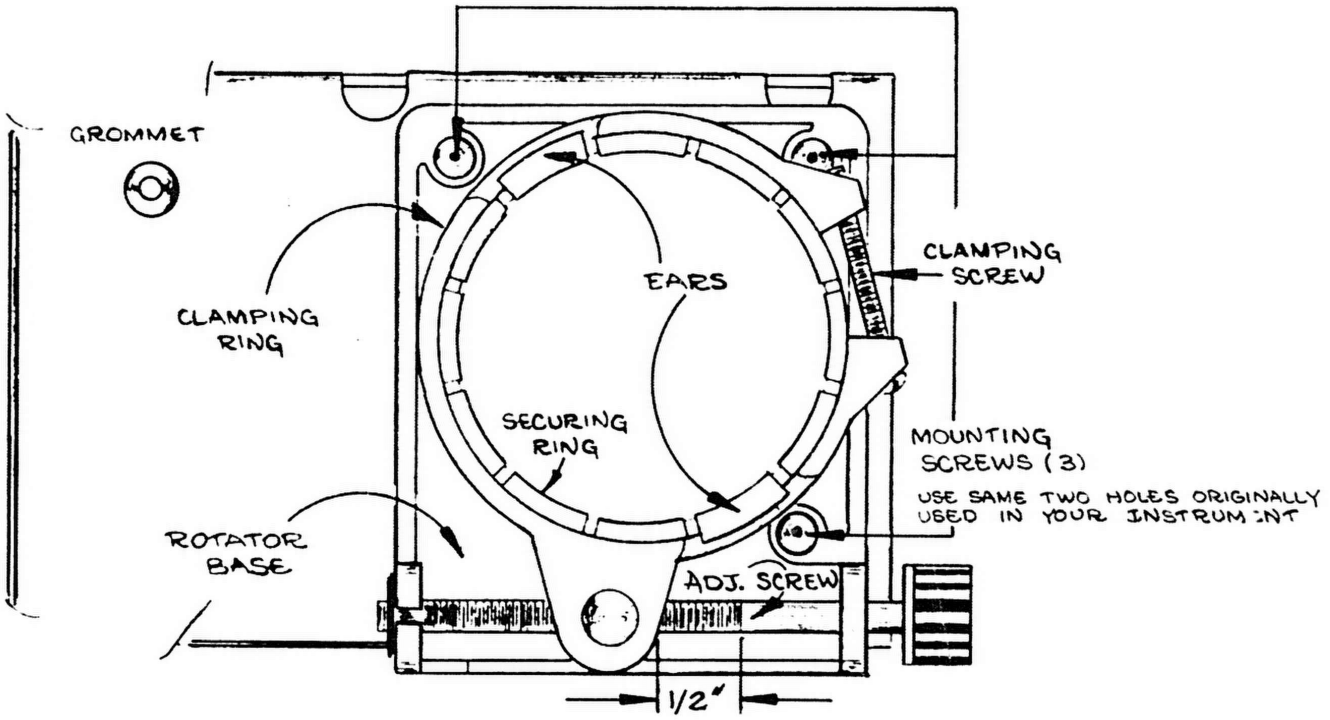
( ) Check installation for proper operation.

( ) Turn instrument on and align trace.

NOTE: After aligning trace, back off on adjustment 1/4 turn to relieve strain. If not relieved, the strain tends to cause a creeping rotation of the CRT.

TL:ls

INSTRUCTIONS (continued)



CRT ROTATOR ASSEMBLY

BOTTOM RAIL EXTRUSION CHANGED

Effective Prod SN 24060

Bottom frame rails made with extrusion 251-0067-00 are replaced by rails made with extrusion 251-0139-00. This will reduce instrument damage during handling and shipping.

Parts Removed:

122-0070-00	Bottom rail, left
122-0071-00	Bottom rail, right
381-0107-00	Bar, bottom panel support
387-0061-00	Panel, cabinet bottom
166-0105-00	Spacer, transformer support
385-0106-00	Rod, VA support

Parts Added:

122-0105-00	Bottom rail, left
122-0104-00	Bottom rail, right
387-0478-00	Panel, cabinet bottom
406-0827-00	Bracket, VA support
381-0212-00	Bar, transformer support
384-0599-00	Rod, transformer support

FRONT SUBPANEL IMPROVED

Effective Prod SN 2510RM

The subpanel is modified to reduce cost and allow easier assembly: The CAL OUT connector mounting hole is changed to receive an insulated 'D' hole connector; pem studs are added to mount the hold-down fasteners, in place of 4-40 FHS screws.

Parts Removed:

131-0279-00	Connector, BNC, cal out
386-0920-00	Subpanel, front
406-0244-00	Bracket, nylon molded

Parts Added:

131-0274-00	Connector, BNC, cal out
387-0860-00	Subpanel, front

NEON BULBS REPLACED TO STABILIZE FIRING POTENTIAL

Effective Prod SN 25550 2510RM (Mod 104 effective SN 25656) (2438RM)

Usable in SN 20001-25549 1001-2509RM

NE2 neons may not fire after they have been subjected to prolonged darkness, because of increased firing potential. They are replaced with NE23 neons, which contain a small deposit of radioactive material to aid in the ionization process.

Parts Removed:

B160W B167 B171 B347 B386 B397 B398 B536 B546	150-0002-00	NE2
B129	150-0002-00	NE2 (Mod 104 only
B849	150-0002-00	NE2 (Mod 101 only)

Parts Added:

B160W B167 B171 B347 B386 B397 B398 B536 B546	150-0027-00	NE23
B129	150-0027-00	NE23 (Mod 104 only)
B849	150-0027-00	NE23 (Mod 101 only)

INSTALLATION:

Parts Required: See 'Parts Added'.

Replace all NE2 neons with NE23 neons.

AIR FILTER REPLACED TO REDUCE COST

Effective Prod SN 25610
2510RM

Replaces the aluminum air filter with a less costly Scott foam air filter and an aluminum retaining screen.

Parts Replacement Kit 050-0123-01 is available to facilitate the replacement of air filter 378-0011-00 in premodified instruments.

Parts Removed:

378-0011-00	Filter, air, aluminum

Parts Added:

378-0023-00	Filter, air, Scott foam
378-0762-00	Screen, filter, aluminum

AIR FILTER REPLACEMENT

For the Following Tektronix Oscilloscopes:

Type	531	Serial Numbers	101-20000	(Guernsey)
Type	531A	Serial Numbers	20001-25609 and	100025-100477
Type	532	Serial Numbers	101-Up	
Type	533	Serial Numbers	101-3000	
Type	533A	Serial Numbers		100001-100778
Type	535	Serial Numbers	101-20000	
Type	535A	Serial Numbers		101250-102117
Type	536	Serial Numbers	101-2969	
Type	541	Serial Numbers	101-20000	
Type	541A	Serial Numbers	20001-Up	100166
Type	543	Serial Numbers	101-3000	
Type	543A	Serial Numbers	3001-Up	
Type	543B	Serial Numbers		100023-100128
Type	544	Serial Numbers		100013-100043
Type	545	Serial Numbers	101-20000	
Type	545A	Serial Numbers	20001-Up	
Type	545B	Serial Numbers		100057-101593
Type	546	Serial Numbers		100015-100038
Type	547	Serial Numbers		100248-100530
Type	567	Serial Numbers	101-749	
Type	581	Serial Numbers	101-Up	
Type	581A	Serial Numbers		100013-100063
Type	585	Serial Numbers	101-Up	
Type	585A	Serial Numbers		100038-100181
Type	551 Ind	Serial Numbers	101-5299 and	100001-100468
Type	555 Ind	Serial Numbers	101-4859 and	100159-100352

Type	RM31	Serial Numbers	101-1000	Type	RM41A	Serial Numbers	1001-Up
Type	RM31A	Serial Numbers	1001-2509	Type	RM43	Serial Numbers	101-1000
Type	RM32	Serial Numbers	101-Up	Type	RM43A	Serial Numbers	1001-Up
Type	RM33	Serial Numbers	101-1000	Type	RM45	Serial Numbers	101-1000
Type	RM35	Serial Numbers	101-Up	Type	RM45A	Serial Numbers	1001-Up
Type	RM41	Serial Numbers	101-1000	Type	RM567	Serial Numbers	101-239

Plastic-foam air filter 378-0023-00 replaces aluminum air filters 378-0011-00. 378-0011-01 and nylon air filter 378-0011-02 (for Guernsey).

An aluminum grille, 378-0762-00 is included to maintain clearance between the fan blade and the filter.

NOTE: If the serial number of your instrument is above those listed, or if this kit has been installed, disregard the instructions as PN 378-0023-00 is a direct replacement.

This Parts Replacement Kit replaces 050-0123-00, which replaced the air filter in the Types 551 and 555 only.

PARTS INCLUDED IN PARTS REPLACEMENT KIT:

Quantity	Part Number	Description
4 ea	213-0054-00	Screw, 6-32 x 0.312, pnh, thread-forming
1 ea	378-0023-00	Filter, air, plastic foam, 10.375 square
1 ea	378-0762-00	Grille, fan

INSTRUCTIONS

A. TO REPLACE THE FILTER ON THE FOLLOWING INSTRUMENTS BELOW SN 5000:

Types 531, 532, 535, 541 and 545

( ) 1. Remove the filter and filter housing.

( ) 2. Center the fan grille (from kit) over the fan opening in the cabinet.

( ) Mark and drill four 0.11-inch-diameter (#36) holes in the cabinet for mounting the screen.

( ) Mount the new fan grille, using the four 6-32 thread-forming screws from the kit.

( ) 3. Place the new air filter over the grille, and between the two mounting screws.

( ) 4. Replace the filter housing.

( ) Record the part numbers of the new parts in your Instruction Manual.

B. TO REPLACE THE FILTER ON ALL REMAINING INSTRUMENTS LISTED ON PAGE 1:

( ) 1. Remove the filter and filter housing.

( ) 2. Loosen the two right hand (viewing from rear) fan ring mounting screws.

( ) 3. Remove the two left hand fan ring mounting screws.

( ) 4. Install the fan grille (from kit) under the two loosened screws, using the two notches provided.

NOTE: Mount with the curved area away from fan.

( ) 5. Replace the two screws removed in step B-3.

( ) 6. Tighten all four mounting screws securing the fan ring and filter screen.

( ) 7. Place the new air filter (from kit) over the screen and between the four mounting screws.

( ) 8. Replace the filter housing.

( ) Record the part numbers of the new parts in your Instruction Manual.

JT:jj

FRONT PANEL KNOB COLOR CHANGED TO CHARCOAL

Effective Prod SN 26080
2610RM

To standardize indicator and plug-in knob colors all knobs, switch buttons, binding posts etc., on older instruments are changed to the charcoal colored ones used on the new instruments.

Parts Removed:

366-0042-00	Knob, assembly (2)
366-0033-00	Knob, assembly (4)
366-0040-00	Knob, assembly (2)
366-0046-00	Knob, assembly
366-0058-00	Knob, assembly
129-0036-00	Binding post (6)
358-0036-00	Bushing, binding post (5)
366-0060-00	Knob, assembly

Parts Added:

366-0117-00	Knob, assembly (2)
366-0148-00	Knob, assembly (4)
366-0160-00	Knob, assembly (2)
366-0159-00	Knob, assembly
366-0115-00	Knob, assembly
129-0063-00	Binding post (6)
358-0169-00	Bushing, binding post (5)
366-0144-00	Knob assembly

ACCESSORIES CHANGED TO PERMIT PATCHING WITHOUT ADAPTERS

Effective Date 2-26-65

To permit patching from BNC to BNC connectors, or from BNC to UHF (or banana jack) connectors without the use of adapters, the present patch cords and/or adapters are changed/added as indicated below.

Also, these patch cords are set up as optional accessories:

012-0085-00	6 inch red BNC to BNC
012-0089-00	6 inch red BNC to banana plug
012-0084-00	6 inch black BNC to BNC
012-0088-00	6 inch black BNC to banana plug
012-0086-00	18 inch black BNC to BNC
012-0090-00	18 inch black BNC to banana plug

Parts Removed:

012-0031-00	Cord, patch, 18 inch, red, banana plug to banana plug
103-0033-00	Adapter, BNC to binding post (2)

Parts Added:

012-0087-00	Cord, patch, 18 inch red, BNC to BNC
012-0091-00	Cord, patch, 18 inch red, BNC to banana plug
012-0092-00	Jack, BNC to post

SEPARATE RACKMOUNT SERIAL NUMBERS DISCONTINUED

Effective Prod SN 26290

NOTE: The last rackmount to be built under the separate serial number system will be SN 2649.

Prior to mod, it was necessary to schedule rackmounts separately from standard instruments before any assembly work could be done on the rackmount.

The rackmount serial number sequence was changed to include them in the standard instrument sequence. Serial numbers for the rackmounts will be ended as such and become part of the standard instrument sequence.

The rackmount rectifier assembly kit was replaced with a modified standard rectifier kit, and the standard-to-rackmount kit was replaced with a new kit. These changes allow a standard instrument to be changed to rackmount in Final Assembly.

CRT FILTER SHAPE AND COLOR STANDARDIZED

Effective Prod SN 26430

Provides a cost savings by standardizing the shape and color of CRT light filters. This was accomplished by replacing 0.060" thick green, blue and amber filters for 5" rectangular and round external graticule instruments and 0.030" thick smoke-gray filter for 5" rectangular internal graticule instruments with new 0.030" thick green, blue, amber and smoke-gray filters with configuration acceptable for both internal and external graticule use.

Also replaces 0.060" thick green, blue and amber filters for 3" CRT instruments with new 0.030" thick green, blue, amber and smoke-gray filters with same configurations. Change the configuration of internal graticule clear scratch plates (5" round and 5" rectangular) to conform to new filter configurations, thereby allowing use of common tooling.

Smoke-gray will replace green as standard filter shipped with external graticule instruments. Amber, green and blue filters in all configurations will be set up as optional filters supplied on customer demand and with special phosphors.

The recommended optional filters for various phosphors is as follows:

Smoke-gray filter	P1	P2	P20	P28	P31	P7
Blue filter	P5	P11	P14	P17	P32	
Amber filter	P12	P13	P19	P25	P26	P27 P7
No filter necessary	P15	P16	P24			

P7 phosphor requires both a smoke-gray and an amber filter

Parts Removed:

378-0514-00	Filter, green
378-0515-00	Filter, blue
378-0516-00	Filter, amber
378-0502-00	Filter, yellow

Parts Added:

378-0567-00	Filter, smoke-gray
378-0568-00	**Filter, green
378-0569-00	**Filter, blue
378-0570-00	**Filter, amber

**Optional Filters

NEON INDICATING LAMPS AND HOLDERS REPLACED

Effective Prod SN 26520

The indicating neon holders were replaced with a type which has increased wide-angle visibility and is neater in appearance. The new holders, being slightly shorter, require a type NE-2V neon bulb and a shorter mounting screw.

Parts Removed:

B160W B347 B397 B398 B536 B546	150-0027-00	Bulb, neon, NE-23
	352-0006-00	Holder, neon, double (2)
	352-0008-00	Holder, neon, single (4)
	211-0031-00	Screw, 4-40 x 1 FHS

Parts Added:

B160W B347 B397 B398 B536 B546	150-0030-00	Bulb, neon, NE-2V
	352-0064-00	Holder, neon, double
	352-0067-00	Holder, neon, single
	378-0541-00	Filter, lens, neon indicator
	211-0109-00	Screw, 4-40 x 7/8 FHS

BOTTOM FRAME ANGLES STANDARDIZED

Effective Prod SN 26520

To standardize parts, the right and left bottom frame angles were replaced by a common frame angle. The new frame angle has six 5/32 x 3/8 slots instead of the three slots in the old part.

Parts Removed:

122-0104-00	Angle, frame, right
122-0105-00	Angle, frame, left

Parts Added:

122-0138-00	Angle, frame, rail left and right (2)

3-WIRE POWER CORD GROUND CONNECTION IMPROVED

Effective Prod SN 27130 — Usable in SN 20001-27129 (531A), 1001-27129 (RM)

Inadequate ground connection between power cord and instrument motor base.

A ground spring was added to the non-current carrying ground receptacle on the female connector end of the power cord.

Parts Added:

214-0698-00	Spring, power cord ground (Subpart of power cord 161-0010-03)

INSTALLATION:

Parts Required: See 'Parts Added', or part listed below.

040-0424-01	Field Modification Kit

NOTE: Field Modification Kit includes enough springs to modify 25 power cords.

Refer to modification kit instructions.

product modification

040-0424-01
M11292

General

3-WIRE POWER CORD FEMALE GROUND CONNECTION IMPROVEMENT

For 3-Wire Power Cords
Used on TEKTRONIX® Type Instruments

Modification Kit, PN 040-0424-01, improves the non-current carrying ground contact on the 3-wire power cords, used on TEKTRONIX Type instruments, by adding a spring to the female contact.

The kit includes enough springs to modify twenty-five power cords.

6-2-71
Supersedes: April 1967 (format change)

PARTS INCLUDED IN MODIFICATION KIT:

Quantity	Part Number	Description
25 ea	214-0698-00	Spring, power cord ground

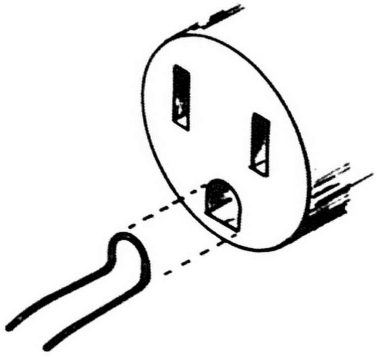
INSTRUCTIONS

( ) Insert the spring (from kit) as indicated in the drawing below, and push it in by plugging the male end of the power cord into the female end.

THIS COMPLETES THE INSTALLATION.

( ) Add the spring to the Mechanical Parts List of your Instruction Manual (if applicable).

DF:ls



MOTOR BASE CHANGED TO IMPROVE GROUND CONNECTION

Effective Prod SN 27420 Usable in SN 20001-27419 (531A)
1001-27419 (RM)

The present motor base grounding is not adequate, due to cold flow of the plastic between the ground post and the mounting plate.

The method used to attach the ground post in the motor base assemblies was changed. The new mounting eliminates plastic between the ground post and the mounting plate and provides a metal ground connection. To insure a good fit between mating parts, the size of the mounting screws was changed from #4 to #6, and the clearance holes in the mounting plate and shell were increased to #6.

To prevent corrosion between new ground post and mounting plate, the plate was changed from etched aluminum to cadmium plated steel.

Parts Removed:

131-0102-01	Motor base

Parts Added:

131-102-02	Motor base

INSTALLATION:

Parts Required: See 'Parts Added'.

Replace the motor base connector with the new type.

IDENTIFICATION TAG ADDED

Effective Prod SN 27830

Foreign customers may change the power plug and wiring color code may not agree with the U. S. wiring code.

A heat shrinkable sleeve was added to the power cord to identify the function of the individual wires.

Parts Added:

334-1206-00	Identification Sleeve

COUPLING RESTRAINTS ADDED TO SHAFTS

Effective Prod SN 28170

Backlash (wiggle) in switch/potentiometer shafts.

The wire coupler used to connect potentiometer and switch shafts with extension shafts provides a mechanical coupling which is too loose, i.e., the front panel knob feels loose and wiggles.

Plastic coupling restraints were added to the shaft and to the extension shaft.

Parts Added:

361-0233-00	Restraint, coupling, 1/8 diameter
361-0234-00	Restraint, coupling, 1/4 diameter

CERAMIC STRIPS CHANGED

Effective Prod SN 28430

All 3/4" wide ceramic strips were replaced by 7/16" wide strips for standardization.

Ceramic strips were replaced where used as follows:

Parts Removed: 3/4" ceramic strips	Notches	Parts Added: 7/16" ceramic strips
124-0100-00	1	124-0118-00
124-0086-00	2	124-0119-00
124-0087-00	3	124-0092-00
124-0088-00	4	124-0120-00
124-0089-00	7	124-0094-00
124-0090-00	9	124-0095-00
124-0091-00	11	124-0106-00

To maintain approximately the same height between the chassis and the top of the ceramic strips, replace spacers used to mount 3/4" ceramic strips with spacers listed below:

Spacer used with 3/4" strip	Height	Replacement spacer used with 7/16" strip	Height
361-0007-00	.093	361-0039-00	.406
361-0008-00	.156	361-0039-00	.406
361-0009-00	.281	361-0392-00	.593

To provide adequate stud length on the 7/16" strips for the longer replacement spacers, the 7/16" ceramic strips listed above were modified by replacing the cera-mount studs, 355-0046-00 (.777 overall length) with new longer studs, 355-0158-00 (1.108 overall length).

Beaverton Mods-Guernsey/Holland S/Nos.

TYPE 531A Page 1 of 2 November, 1972

PRODUCED BY FIELD SUPPORT, TEKTRONIX LTD. FOR FULL MOD DETAILS REFER TO MICROFICH

BEAVERTON MOD. NO.	EFFECTIVE SERIAL NUMBERS				MODIFICATION KIT PART NUMBERS
	GUERNSEY	DATE	HEERENVEEN	DATE	
M5929	1000086	7. 3.63			
M6776	No S/N	22. 4.63			040-0326-00
M5288	100091	2. 8.63			
M6625	100091	21. 8.63			
N/A	100091	3.10.63			
M6860	-	14.11.63			
M7521	No S/N	26.11.63			
M7928	100138	29. 6.64			
M6653	100160	6.10.64			
M8979	100089	6. 1.65			
M7843	No S/N	12. 2.65			
N/A	100226	23. 4.65			
M8313	No S/N	3. 5.65			
M8534	100228	17. 5.65			
M9474	100247	17. 8.65			
M9172	100288	18. 1.66			
M10189	100376	16. 6.66			
M8002	100412	12. 8.66			
M10103	100412	26. 8.66			
M11418	100428	29. 9.66			
M11409	100428	30. 9.66			
M9002	N/A	29.12.66			
M12057	100524	7. 3.67			
M11959	-	5. 4.67			
M11292	100554	2. 6.67			040-0421-01
M12345	-	15. 6.67			
M9271	100574	5.12.67			
M12876	100574	5.12.67			M1-12876
M12031	100618	13. 3.68			
M12969	100640	30. 4.68			
M12173	100721	3.12.68			
M13457	100739	14. 1.69			
M14909	100754	17. 2.69			

* COPIES OF MODIFICATION INSTRUCTIONS OR MOD KIT. INSTRUCTIONS ARE AVAILABLE FROM BEAVERTON - PLEASE ORDER BY DESCRIPTION - QUOTING 'MI' AND MOD NUMBER

Beaverton Mods–Guernsey/Holland S/Nos.

TYPE 531A Page 2 of 2

November, 19

PRODUCED BY FIELD SUPPORT, TEKTRONIX LTD. FOR FULL MOD DETAILS REFER TO MICROFICH.

BEAVERTON MOD. NO.	EFFECTIVE SERIAL NUMBERS				MODIFICATION KIT PART NUMBERS
	GUERNSEY	DATE	HEERENVEEN	DATE	
M12347-2	Not Recorded	26. 3.69			
M13208	100768	28. 5.69			
M11639	100797	29. 9.69			
M13006	100797	2.10.69			
M14165	100818	20. 1.70			
M13795	100832	4. 2.70			040-0159-00
M13863	100828	5. 2.70			
M15357	100865	1. 6.70			
	100001				040-0065-00
	100001				040-0159-00
	100001				040-0235-00
	100001				040-0231-00

* COPIES OF MODIFICATION INSTRUCTIONS OR MOD KIT. INSTRUCTIONS ARE AVAILABLE FROM BEAVERTON - PLEASE ORDER BY DESCRIPTION - QUOTING 'MI' AND MOD NUMBER

modification instructions

MI - 040-0065-00

See Below

BLANK PLUG-IN

For all Tektronix Oscilloscopes using Letter or '1' Series Plug-Ins -- including Types 581/A, 585/A, and RM585A with a Type 81 Adapter.

Modification Kit, PN 040-0065-00, with the enclosed information allows the construction of special plug-in units for the above instruments.

PARTS REQUIRED

Quantity	Tektronix Part Number	Description
1 ea	040-0065-00	Modification Kit

INSTALLATION

Installation instructions are included in the Modification Kit.

12-5-68
Supersedes: March 1968

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PARTS INCLUDED IN MODIFICATION KIT:

Quantity	Part Number	Description
1 ea	131-0017-00	Connector, amphenol, 16-pin
1 ea	210-0004-00	Lockwasher, int #4
1 ea	210-0201-00	Lug, solder, SE #4
2 ea	210-0406-00	Nut, hex, 4-40 x 3/16
1 ea	210-0812-00	Washer, fiber
2 ea	211-0097-00	Screw, 4-40 x 5/16 PHS, Phillips
4 ea	212-0043-00	Screw, 8-32 x 1/2 FHS, Phillips, 100°
4 ea	212-0008-00	Screw, 8-32 x 1/2 PHS, Pozidrive
1 ea	333-0150-00	Panel, front, special blank plug-in
1 ea	354-0025-00	Ring, retaining
1 ea	366-0125-00	Knob, retaining, gray
1 ea	384-0510-00	Rod, securing, RS53
4 ea	384-0631-00	Rod, spacer, plug-in
1 ea	386-0423-00	Plate, sub-panel, special blank plug-in
1 ea	387-0549-00	Plate, blank, FP53 special
1 ea	441-0108-00	Chassis, special blank, CH53

continued

GENERAL INFORMATION:

The following chart is intended as a guide to the voltages and signals supplied by the various oscilloscopes at the plug-in connector. It lists the approximate load current requirements necessary to keep each power supply in regulation. In addition, it lists the inputs used by the oscilloscopes.

PIN NO.	DESCRIPTION	INSTRUMENTS	VOLTAGE	MAX LOAD CURRENT	MIN LOAD CURRENT	NOTES
1 3	Vertical Signal Input	All	See *Note			
2	Ground	All				Grounded in oscilloscope
4 5	Int Trig Sig Input	544, 546 547, 555** only	(See Manual)			These pins blank in all other oscilloscopes
6	Blank Pin	All				
7	Slave Pulse Output	547 only	(See Manual)			This pin blank in all other oscilloscopes
8 16	Alt Trace Sync Pulse Output	All	(See Manual)			Pin 8 grounded by Types CA, M, etc, in Alt Trace mode.
9	-150 v Supply	All	-150 v DC	60 ma	3.8 ma	
10	+100 v Supply	All	+100 v DC	50 ma	4.5 ma	
11	-225 v Supply	All	+225 v DC	75 ma	16.0 ma	
12	+350 v Supply	All	+350 v DC	20 ma	0 ma	
13 14	Heater Supply	All	6.3 v AC	2.8 amp	0 ma	Elevated to +100 v in some oscilloscopes (see Manuals). Do not ground either pin.
15	Series Heater String Supply	All	+ 75 v DC	150 ma	150 ma	Instrument should not be operated without loading this supply.

*NOTE: Bias required at both pins is +67.5 v (±2%). Signal Amplitude limited by sensitivity of oscilloscope (100 mv/cm).

** Used on Type 555 SN 7000-up, or Type 555 modified with Field Modification Kits 040-0328-00 or 040-0328-01.

DW:jb

MODIFICATION KIT

SWEEP LOCKOUT

For the following Tektronix Oscilloscopes:

Types 531A, 541A, RM31A and RM41A
All serial numbers

DESCRIPTION

This modification provides the above instruments with the sweep lockout feature, enabling them to be used to study 'one-shot' phenomena requiring a single sweep of the CRT spot.

This is accomplished by adding a sweep-arming multivibrator to the hold-off circuit of the sweep generator. A front panel switch enables either normal or single sweep operation.

040-0235-00

Publication:
Instructions for 040-0235-00
October 1966

Supersedes:
September 1963

PARTS LIST

Quantity	Part Number	Description
(1 ea)		Assembly, circuit board, consisting of:
1 ea	136-0034-00	Socket, tube, cricuit, 9-pin
1 ea	179-0370-00	Cable harness
5 ea	210-0004-00	Lockwasher, int #4
5 ea	210-0406-00	Nut, hex, 4-40 x 3/16
5 ea	211-0097-00	Screw, 4-40 x 5/16 PHS, Phillips
1 ea	281-0503-00	Capacitor, cer, 8 pF 500 V
1 ea	281-0543-00	Capacitor, cer, 270 pF 500 V
2 ea	302-0101-00	Resistor, comp, 100 Ω 1/2 W 10%
1 ea	302-0106-00	Resistor, comp, 10 Meg 1/2 W 10%
1 ea	302-0123-00	Resistor, comp, 12 k 1/2 W 10%
1 ea	302-0223-00	Resistor, comp, 22 k 1/2 W 10%
1 ea	309-0125-00	Resistor, prec, 300 k 1/2 W 1%
1 ea	309-0128-00	Resistor, prec, 50 Ω 1/2 W 1%
1 ea	309-0161-00	Resistor, prec, 106 k 1/2 W 1%
1 ea	386-0541-00	Plate (board), circuit
1 ea	406-0147-00	Bracket, aluminum
(1 ea)		Assembly, lever switch, consisting of:
1 ea	210-0021-00	Lockwasher, int 0.472-0.480 ID
1 ea	210-0414-00	Nut, hex, 15/32-32 x 9/16
1 ea	210-0473-00	Nut, 12-sided, 15/32-32 x 9/16
1 ea	260-0190-02	Switch, lever, DPDT
1 ea	283-0001-00	Capacitor, cer, 0.005 µF 500 V discap
(1 ea)		Assembly, neon bulb, consisting of:
1 ea	150-0030-00	Bulb, neon, NE-2V
1 ea	283-0001-00	Capacitor, cer, 0.005 µF 500 V
1 ea	316-0103-00	Resistor, comp, 10 k 1/4 W 10%
1 ea	352-0064-00	Holder, double, melamine, neon
1 ea	378-0541-00	Filter, lens, neon indicator
1 ea	154-0078-00	Tube, vacuum, type 6AN8
2 ea	210-0406-00	Nut, hex, 4-40 x 3/16
1 ea	211-0109-00	Screw, 4-40 x 7/8 FHS, 100° Phillips
1 ea	214-0210-00	Spool, w/3 ft. of silver-bearing solder
1 ea	302-0821-00	Resistor, comp, 820 Ω 1/2 W 10%
1 ea	334-0822-00	Tag, RESET-SINGLE SWEEP-NORMAL
1 ea	334-0823-00	Tag, READY
1 ea	348-0004-00	Grommet, rubber, 3/8
1 ea	1-331D	Template, drilling (RM31A and RM41A)
1 ea	1-332D	Template, drilling (531A and 541A)
2 ea	1-910D	Tag, MODIFIED INSTRUMENT, gummed back

INSTRUCTIONS

IMPORTANT: When soldering to the ceramic strips, use the silver-bearing solder supplied with this kit.

A. TO DRILL THE MOUNTING HOLES:

( ) 1. Turn the TRIGGERING LEVEL control fully ccw (counter-clockwise) and carefully make a light pencil mark on the front panel corresponding to the white dot on the knob to insure exact zero of potentiometer when the knob is put back on the shaft.

( ) 2. Remove the STABILITY, TRIGGERING LEVEL, TRIGGER SLOPE, and TRIGGER MODE knobs from the instrument.

( ) 3. Select the proper template (from kit) and place it over the TRIGGERING LEVEL potentiometer shaft and the TRIGGER SLOPE switch shaft.

( ) 4. Center punch and drill holes for the ready light assembly, as indicated on the template. Countersink the 1/8 in. diameter hole from the front to accommodate a 4-40 FHS 100° screw.

( ) 5. Replace the knobs removed in Step A-2.

( ) 6. Locate the 3/8 in. hole in the subpanel directly below the TIME/CM switch (on standard instruments) or directly above the EXTERNAL HORIZ ATTENUATOR (on rackmount instruments).

( ) Cut a 1/2 in. hole in the front panel in line with the hole in the subpanel.

NOTE: One method is to drill a small pilot hole through the front panel, then enlarge this hole with a tapered reamer.

( ) 7. Remove all drill shavings from the instrument.

B. TO MOUNT THE ASSEMBLIES:

( ) 1. Mount the neon READY light assembly (from kit) with the 4-40 x 7/8 FHS screw and 4-40 nuts from the kit (see Fig. 1). (It may be necessary to slightly countersink the 9/32 in. hole, to allow for the lens.)

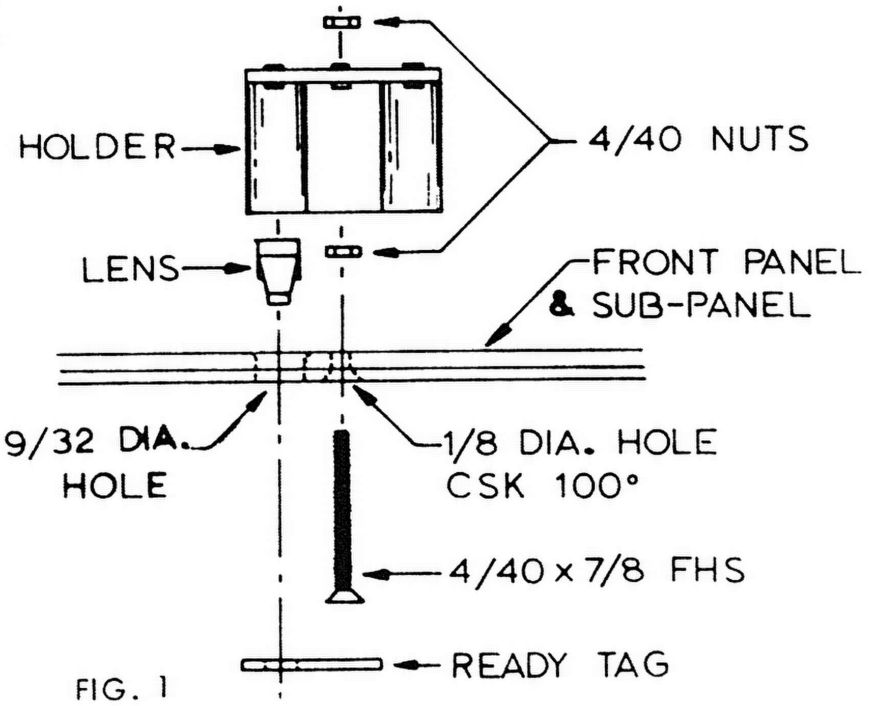


FIG. 1

INSTRUCTIONS (SECTION B cont)

( ) 2. Remove the protective paper backing from the READY tag (from kit), carefully positioning it on the front panel over the neon light opening and press firmly into place.

( ) 3. Remove the protective backing from the RESET-SINGLE SWEEP-NORMAL tag (from kit) and carefully align the hole in the tag with the hole cut in the front panel. Press firmly into place.

( ) 4. Mount the lever switch assembly (from kit) in the hole drilled in step A-6, with the locking position down. Place the lockwasher and hex nut on the inside, next to the subpanel, and the 12-sided nut on the outside.

( ) 5. Remove the EXTERNAL HORIZ ATTENUATOR knob and potentiometer mounting nut.

( ) Push the potentiometer back to allow the circuit board assembly to be mounted underneath it. Align the assembly so that the tubes, when installed, will point down.

( ) Remount the potentiometer, tighten the mounting nut, and replace the knob.

( ) 6. Insert the grommet (from kit) in the vacant 3/8 in. hole in the Sweep chassis below the TRIGGER MODE/TRIGGER SLOPE switch.

C. TO COMPLETE THE WIRING:

( ) 1. Dress the larger cable from the circuit board assembly through the grommet installed in step B-6.

( ) 2. Solder the white-violet wire from the cable to the junction of the 10k resistor and 0.005 µF capacitor on the READY lamp assembly. See Fig. 2.

( ) 3. Solder the bare wire (on READY light assembly) to the nearest ground lug.

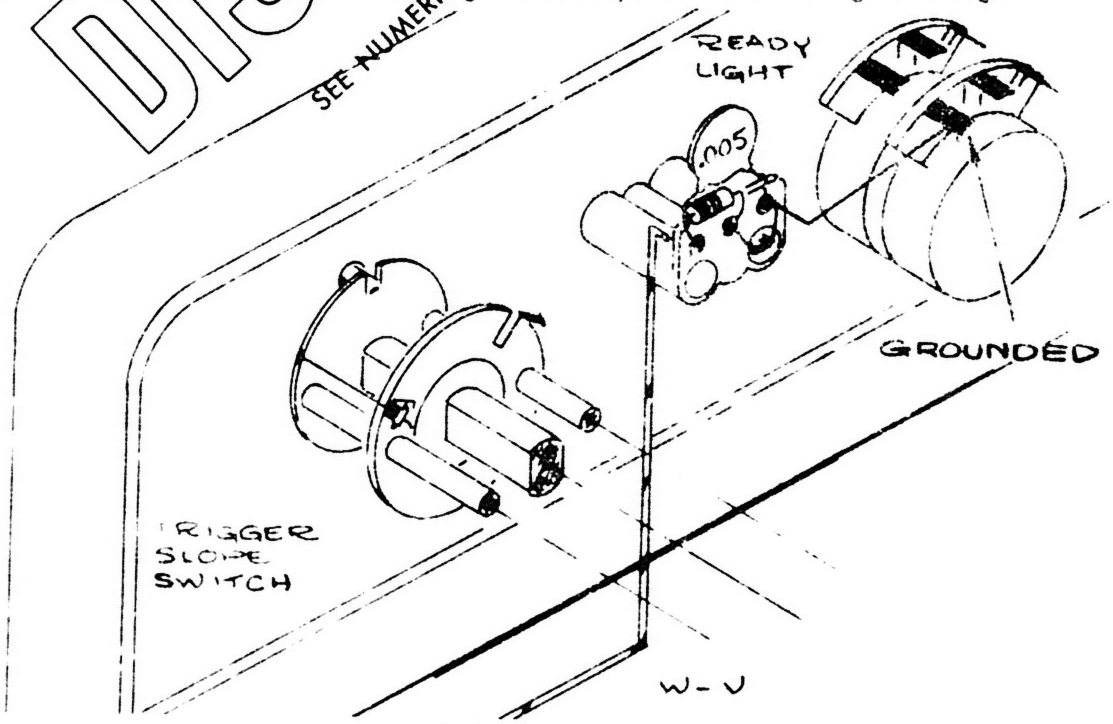


FIG. 2

INSTRUCTIONS (SECTION C cont)

REFER TO FIG. 3 WHILE PERFORMING STEPS C-4 THROUGH C-6

( ) 4. Locate the 1.5k resistor (R43) connected between CSA-11 and CSB-11.

( ) Replace the resistor with the 820Ω 1/2W resistor from the kit.

( ) 5. Locate and temporarily remove the 180k resistor (R116) connected between CSC-10 and CSD-10 (not shown in Fig. 3).

( ) Move the end of the 47Ω resistor (R121 -- other end connected to pin 2 of V133) from CSC-10 to CSD-10.

( ) Resolder the 180k resistor.

6. Solder the remaining wires from the cable as follows:

( ) white-blue-red to pin 9 of V303

( ) white-green to CSC-9

( ) black-brown-green-brown to CSD-10

( ) white-black to CSD-9

( ) white-yellow to CSD-7

( ) white-brown-black-brown to CSD-1

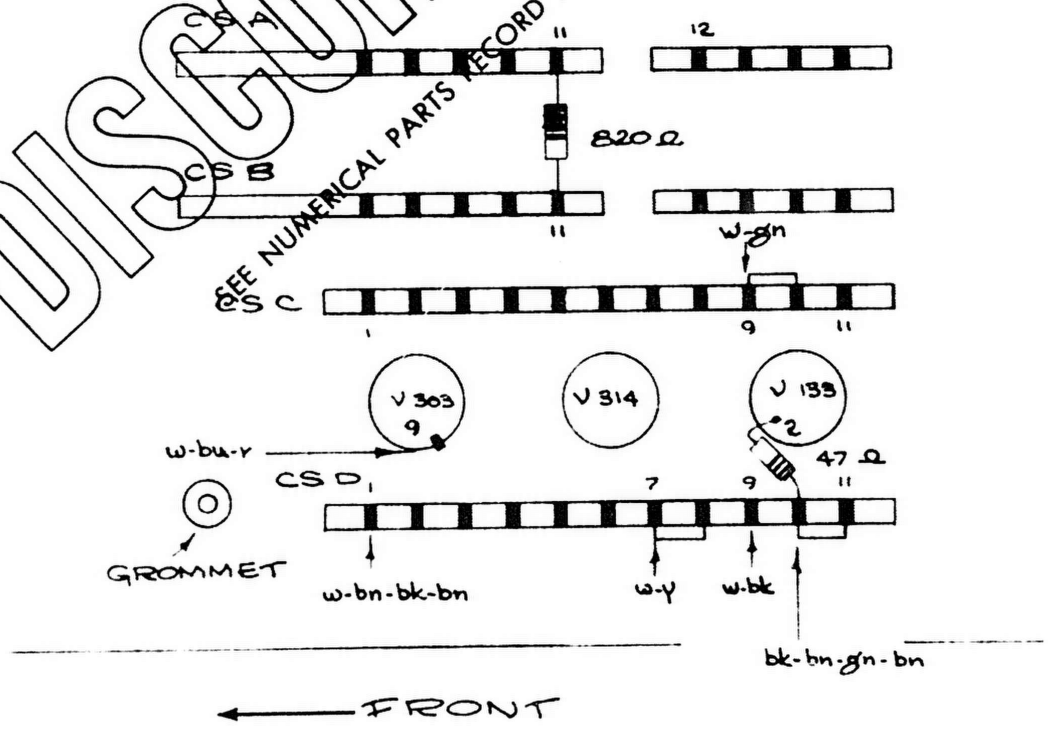


FIG. 3

INSTRUCTIONS (SECTION C cont)

( ) 7. Solder the white-violet, white-blue and white-gray wires (from assembly) to the RESET-SINGLE SWEEP-NORMAL switch, as shown in Fig. 4.

( ) 8. Install the 6AN8 tube (from kit) in the socket on the circuit board.

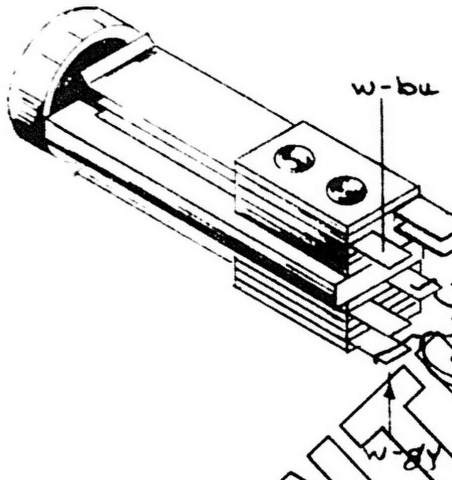


FIG. 4

THIS COMPLETES THE INSTALLATION.

( ) Check wiring for accuracy.

( ) Fasten the insert pages in the Instruction Manual.

( ) Moisten the backs of the MODIFIED INSTRUMENT tags (from kit) and attach them to the Manual schematics affected by this modification.

JT:ls

SWEEP LOCKOUT

Types 531A, 541A, RM31A and RM41A -- All serial numbers

Installed in Type _____ SN _____ Date _____

GENERAL INFORMATION

This modification provides the above instruments with the sweep lockout feature, enabling them to be used to study 'one-shot' phenomena requiring a single sweep of the CRT spot.

This is accomplished by adding a sweep-arming multivibrator to the hold-off circuit of the sweep generator. A front panel switch enables either normal or single-sweep operation.

OPERATING INSTRUCTIONS

To display a single-shot phenomenon:

1. Set the TRIGGERING MODE switch to AC SLOW or DC.
2. Set the RESET-SINGLE SWEEP-NORMAL lever switch to NORMAL.
3. Adjust the STABILITY and TRIGGERING LEVEL controls for triggered operation. To do this, display successive trail single traces of the desired waveform having similar characteristics. Alternatively, you can use the calibrator waveform for a trial display.
4. Set the rest of the front-panel controls for settings suited to the waveform to be observed.
5. Remove the signal source from the INPUT or CHANNEL connector. Set the lever switch to SINGLE SWEEP.
6. If the READY lamp is not lighted, push the lever switch to RESET. The lamp should now be lighted.
7. Connect the source of the expected signal to the INPUT or CHANNEL connector.

When a signal is received to trigger the sweep, a single sweep will occur. Following this, the READY lamp will be extinguished and subsequent signals will not trigger the sweep. The sweep circuit can be prepared for a second sweep by pushing the lever switch to RESET.

CIRCUIT DESCRIPTION

When the RESET-SINGLE SWEEP-NORMAL lever switch (SW101) is in the NORMAL position, V125A is effectively removed from the circuit. V125B is the stability cathode follower used in place of V133A. The plate current of V133A is held at cut-off because the grid is connected to -150 V.

In the SINGLE SWEEP position of the lever switch, V125A and V125B form a bi-stable Schmitt multivibrator. In the first stable state that exists after the completion of one sweep and before the lever switch is moved to RESET, V125A is conducting while V125B is cut off. Under these conditions, the divider network in the grid circuit of V125A sets the voltage level of the common-cathode circuits ofV133 and V125. This level is high enough to hold V135A from being triggered by incoming trigger pulses from the sweep trigger circuit.

Moving the lever switch to RESET connects C101 to ground through R101. A positive pulse is applied to the grid of V125B, lowering the plate voltage. The negative-going plate voltage is transferred to the grid of V125A through the divider R124 and R125. As the cathode current of V125A cuts off, the plate voltage rises and the READY lamp ignites. This action is cumulative, ending with V125B conducting and V125A cut off. The transition to the second stable state of the sweep-arming multivibrator is now complete. Capacitor C124 speeds up the transition between the two multivibrator stable states.

The common cathode voltage of V133 and V125 is now set by the STABILITY control. The grid of V135A is lowered to a point where either of two conditions exists, depending upon the setting of the STABILITY control. If the STABILITY control is set in the full right position, a new sweep is initiated. If the STABILITY control is set for triggered operation, the sweep will be initiated by the next trigger pulse from the sweep trigger circuit.

As the CRT spot moves across the screen, a rising sawtooth voltage waveform at the grid of V133B eventually causes the tube to conduct. The potential at the V133B cathode starts to rise, V125B plate current cuts off and V125A conducts. The continued rise of V133B cathode potential eventually causes V125A to cut off also. Both cathodes of V125 are now held above their grid levels for the remainder of the sweep. The READY lamp lights during this interval. The change in potential at the cathode of V133B is applied to the grid of V135A. When the potential at the grid of V135A reaches the point at which the main sweep multivibrator reverts, the sweep is terminated.

During the retrace portion of the sweep sawtooth the holdoff capacitor, C180, discharges and the potential at the cathode of V133B decreases. This decrease in potential causes V125A to conduct, the READY lamp extinguishes and thus the sweep-arming multivibrator returns to the first stable state. We have now completed one cycle of operation and successive trigger pulses cannot initiate a new sweep until the lever switch is moved to RESET.

ELECTRICAL PARTS LIST

Values fixed unless marked Variable.

BULBS

Ckt.No.	Part Number	Description	
B129	150-0030-00	Neon	NE-2V

CAPACITORS

Tolerance ±20% unless otherwise indicated.

C101	283-0001-00	0.005 µF	500 V		cer
C102	281-0543-00	270 pF	500 V		cer
C124	281-0503-00	8 pF	500 V	10%	cer
C129	283-0001-00	0.005 µF	500 V		cer

RESISTORS

Resistors are 10% composition unless otherwise indicated.

R43	302-0821-00	820 Ω	1/2 W		
R101	309-0128-00	50 Ω	1/2 W	1%	prec
R102	302-0106-00	10 Meg	1/2 W		
R104	302-0101-00	100 Ω	1/2 W		
R123	302-0223-00	22 k	1/2 W		
R124	309-0161-00	106 k	1/2 W	1%	prec
R125	309-0125-00	300 k	1/2 W	1%	prec
R127	302-0101-00	100 Ω	1/2 W		
R128	302-0123-00	12 k	1/2 W		
R129	316-0103-00	10 k	1/4 W		

SWITCHES

SW101	260-0190-02	Lever	DPDT	RESET-SINGLE SWEEP-NORMAL

TUBES

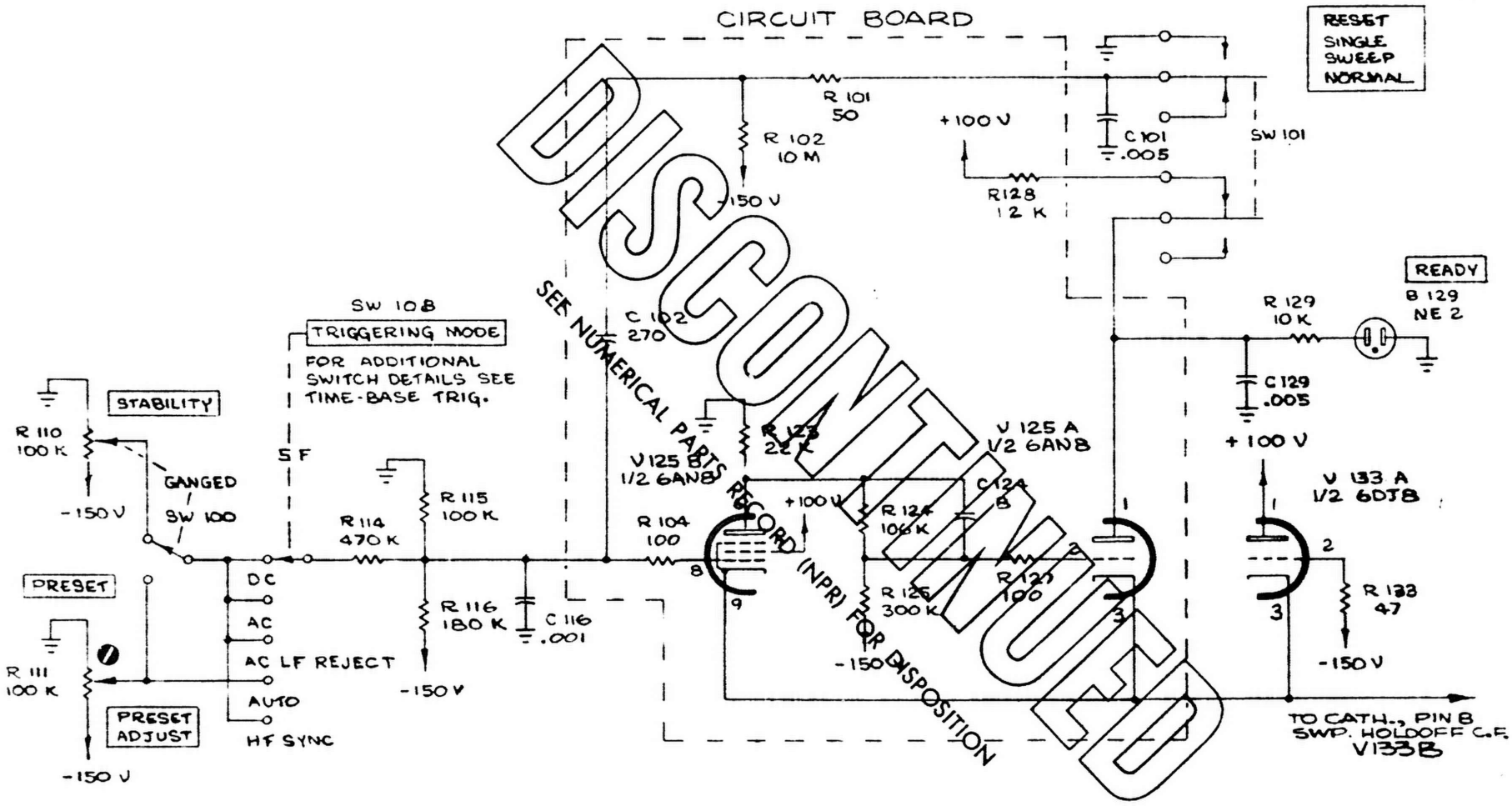
V125	154-0078-00	6AN8	Sweep-Arming Multi

DISCONTINUED

SEE NUMERICAL PARTS RECORD (NPR) FOR DISPOSITION

MECHANICAL PARTS LIST

386-0541-00	Board, circuit
406-0147-00	Bracket, aluminum
179-0370-00	Cable harness
378-0541-00	Filter, lens, neon holder
348-0004-00	Grommet, rubber, 3/8
352-0064-00	Holder, neon bulb, double
210-0004-00	Lockwasher, int #4
210-0021-00	Lockwasher, int 0.472-0.480 ID
210-0406-00	Nut, hex, 4-40 x 3/16
210-0414-00	Nut, hex, 15/32-32 x 9/16
210-0473-00	Nut, 12-sided, 15/32-32 x 9/16
211-0097-00	Screw, 4-40 x 5/16 PHS, Phillips
211-0109-00	Screw, 4-40 x 7/8 FHS 100° Phillips
136-0034-00	Socket, tube, circuit, 9-pin
334-0822-00	Tag, RESET-SINGLE SWEEP-NORMAL
334-0823-00	Tag, READY



NOTE: Change R43 to 820Ω on the Time-Base Trigger diagram.

product modification

040-0281-00

Instrument Types
See Below

CRADLE MOUNT

For the following TEKTRONIX® Type Oscilloscopes:

Type	524AD	Serial Numbers	5001-up
Type	531	Serial Numbers	5001-up
Type	531A	Serial Numbers	All Serial Numbers
Type	532	Serial Numbers	5001-up
Type	533A	Serial Numbers	All Serial Numbers
Type	535	Serial Numbers	5001-up
Type	535A	Serial Numbers	All Serial Numbers
Type	536	Serial Numbers	All Serial Numbers
Type	541	Serial Numbers	5001-up
Type	541A	Serial Numbers	All Serial Numbers
Type	543	Serial Numbers	All Serial Numbers
Type	543A	Serial Numbers	All Serial Numbers
Type	543B	Serial Numbers	All Serial Numbers
Type	544	Serial Numbers	All Serial Numbers
Type	545	Serial Numbers	5001-up
Type	545A	Serial Numbers	All Serial Numbers
Type	545B	Serial Numbers	All Serial Numbers
Type	546	Serial Numbers	All Serial Numbers
Type	547	Serial Numbers	All Serial Numbers
Type	549	Serial Numbers	All Serial Numbers
Type	570	Serial Numbers	5001-up
Type	575	Serial Numbers	All Serial Numbers
Type	581	Serial Numbers	All Serial Numbers
Type	581A	Serial Numbers	All Serial Numbers
Type	585	Serial Numbers	All Serial Numbers
Type	585A	Serial Numbers	All Serial Numbers
Type	661	Serial Numbers	All Serial Numbers

Modification Kit, PN 040-0281-00, enables the above TEKTRONIX Type instruments to be rackmounted in a standard 19 inch relay rack. A vertical front panel space of 17-1/2 inches is required.

Future instruments with the same front panel dimensions may also be used with this kit, providing they have bottom rails similar to those on the above listed instruments. This kit directly replaces 040-0182-00.

5-19-70

Supersedes: MI - 040-0281-00

PARTS INCLUDED IN MODIFICATION KIT

Quantity	Part Number	Description
1 ea.	426-0208-00	Assembly, cradle mount, oscilloscope, indluding:
2 ea.	(211-0025-00)	Screw, 4-40 x 3/8 FHS
4 ea.	(212-0023-00)	Screw, 8-32 x 3/8 PHS, Phillips
1 ea.	(381-0198-00)	Bar, stiffening, 1/4 x 5/8 x 16-5/8
2 ea.	(381-0211-00)	Bar, mounting, 1/4 x 1/2 x 8-1/8
1 ea.	105-0013-00	Stop, instrument
2 ea.	210-0008-00	Lockwasher, int #8
2 ea.	210-0409-00	Nut, hex, 8-32 x 5/16
2 ea.	210-0804-00	Washer, flat, 8S x 3/8
8 ea.	210-0833-00	Washer, cup, #10
2 ea.	210-0852-00	Washer, spacer, 3/16ID x 3/8OD x 0.091
6 ea.	211-0025-00	Screw, 4-40 x 3/8 FHS
2 ea.	212-0004-00	Screw, 8-32 x 5/16 PHS, Phillips
8 ea.	212-0008-00	Screw, 8-32 x 1/2 PHS, Phillips
8 ea.	212-0512-00	Screw, 10-32 x 1/2 OHS
1 ea.	333-0491-00	Panel, front, mask for rackmounting
2 ea.	381-0202-00	Bar (guide rail), aluminum, angle, 18 in.
2 ea.	387-0636-00	Plate (slide), BAKELITE®, 1-1/8 x 18 in.
1 ea.	406-0424-00	Bracket, hold-down

INSTRUCTIONS

( ) 1. Mount the two guide rails and BAKELITE slides (from kit) on the cradle assembly, with the rail lip on the outside (Fig. 1A). Use the threaded holes in the cradle, spaced according to the lengths listed for the kits in Fig. 1B. Mount the rails with the 4-40 x 3/8 FHS screws from the kit.

( ) 2. Fasten each side of the cradle assembly to the front flange of the relay rack, with three 8-32 x 1/2 PHS screws from the kit (see Figs. 2 and 6). Each mounting bar is fastened to the cradle by a single 4-40 screw, allowing it to be adjusted for slight variations in rack width.

NOTE: To install the cradle assembly in channel-type racks, it will be necessary to tilt the assembly sideways, while bending one side inward.

( ) 3. Remove the voltage tag on the rear right hand side of the instrument.

( ) 4. Relocate the voltage tag on the middle left hand side of the instrument, use a #43 drill (see Fig. 3).

( ) 5. Mount the hold-down bracket (from kit) on the rear panel of the instrument, as near to the vertical center line as possible (see Fig. 3).

( ) a. Drill and tap the two holes in the rear panel shown in Fig. 3. Use a #29 drill and an 8-32 tap.

CAUTION: BE CAREFUL NOT TO DRILL INTO COMPONENTS MOUNTED BEHIND THE REAR SUB-PANEL.

( ) b. Mount the hold-down bracket, using two 8-32 x 1/2 PHS screws from the kit.

BAKELITE, Reg. TM of Union Carbide Corp.

INSTRUCTIONS (cont)

( ) c. If the instrument will be subject to excessive vibration, the 8-32 nuts (from kit) should be added.

( ) 6. Place the instrument on the cradle guide rails and slide it into place.

( ) 7. Temporarily mount the mask (from kit) on the front of the relay rack, over the instrument front panel, and hold it in place with three or four of the 10-32 x 1/2 OHS screws from the kit.

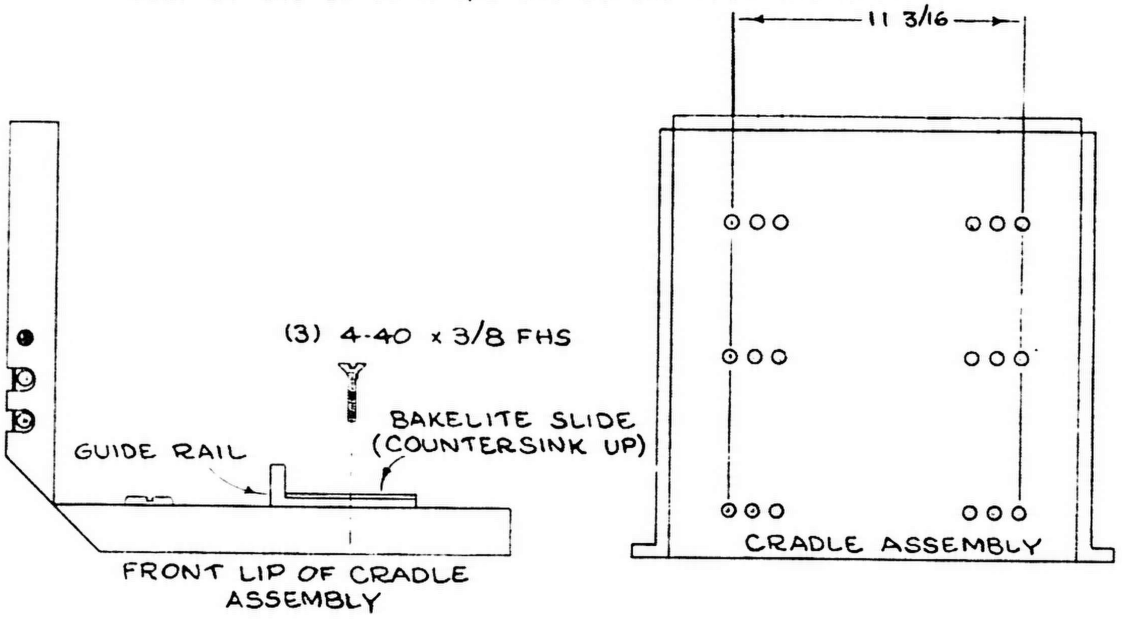


FIG. 1

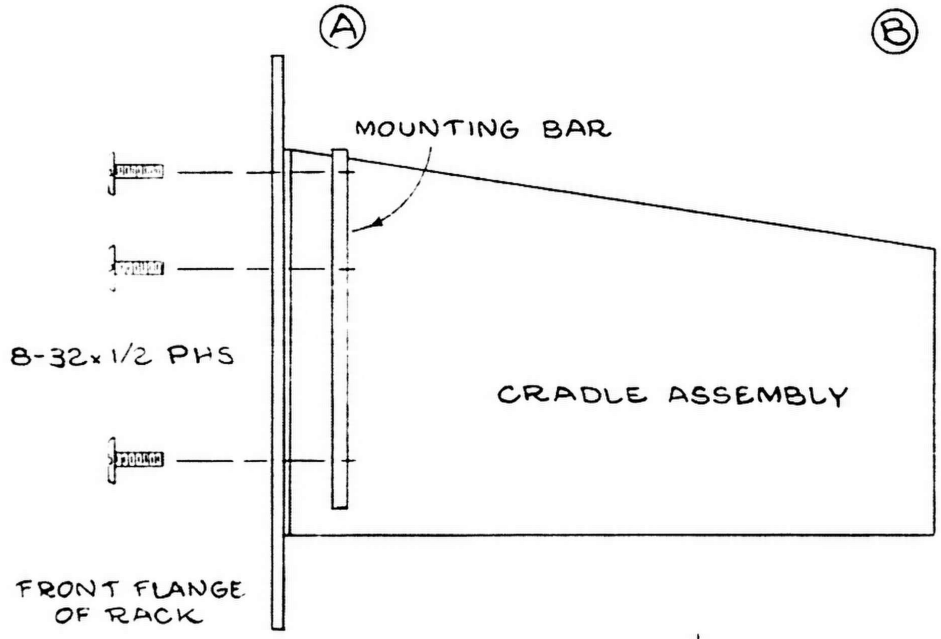


FIG. 2

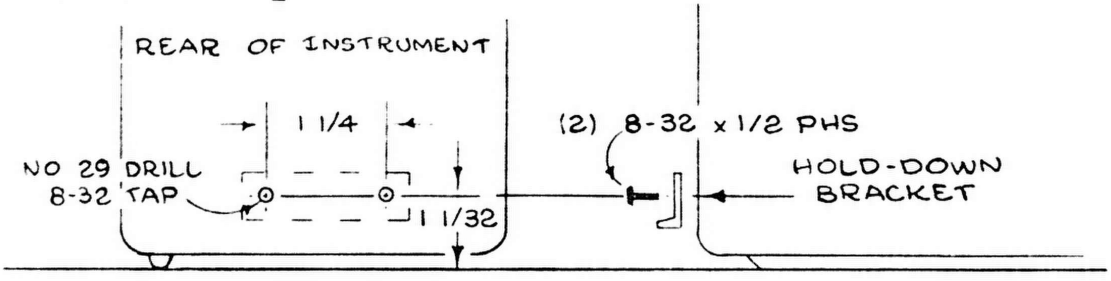


FIG. 3

INSTRUCTIONS (cont)

( ) 8. Position the instrument so that the stainless steel ring touches the mask all the way around the instrument (see Fig. 4).

( ) 9. Place the instrument stop (from kit) on the cradle so that it meshes with the hold-down bracket on the instrument (see Fig. 5). If necessary, the hold-down bracket may be adjusted up or down.

( ) Mark the exact location of the stop on the cradle.

( )10. Remove the mask and the instrument.

( )11. Place the instrument stop in the location marked in step 7. Select two of the tapped holes in the stop, and mark and drill 11/64in. holes in the cradle at these points.

( )12. Mount the stop, using the 8-32 x 5/16 PHS screws, flat washers and lock-washers from the kit (see Fig. 5).

( )13. Replace the instrument. Make sure the hold-down bracket and instrument stop come together properly.

( )14. Replace the mask, using the 10-32 x 1/2 OHS screws, the #10 cup washers, and the two spacer washers from the kit (see Fig. 6).

THIS COMPLETES THE INSTALLATION

JT:ls

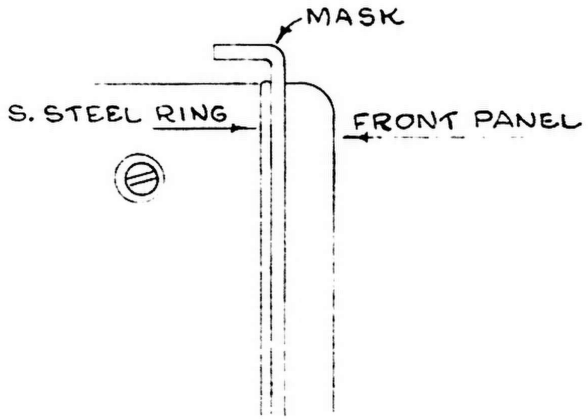


FIG. 4

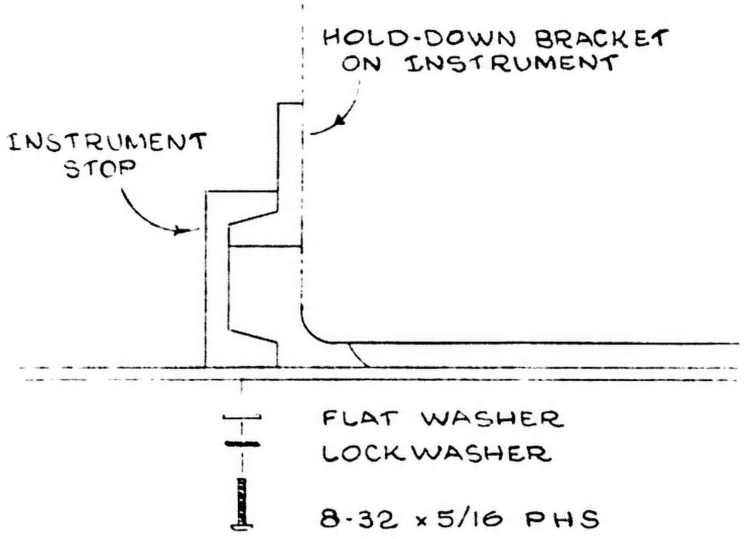
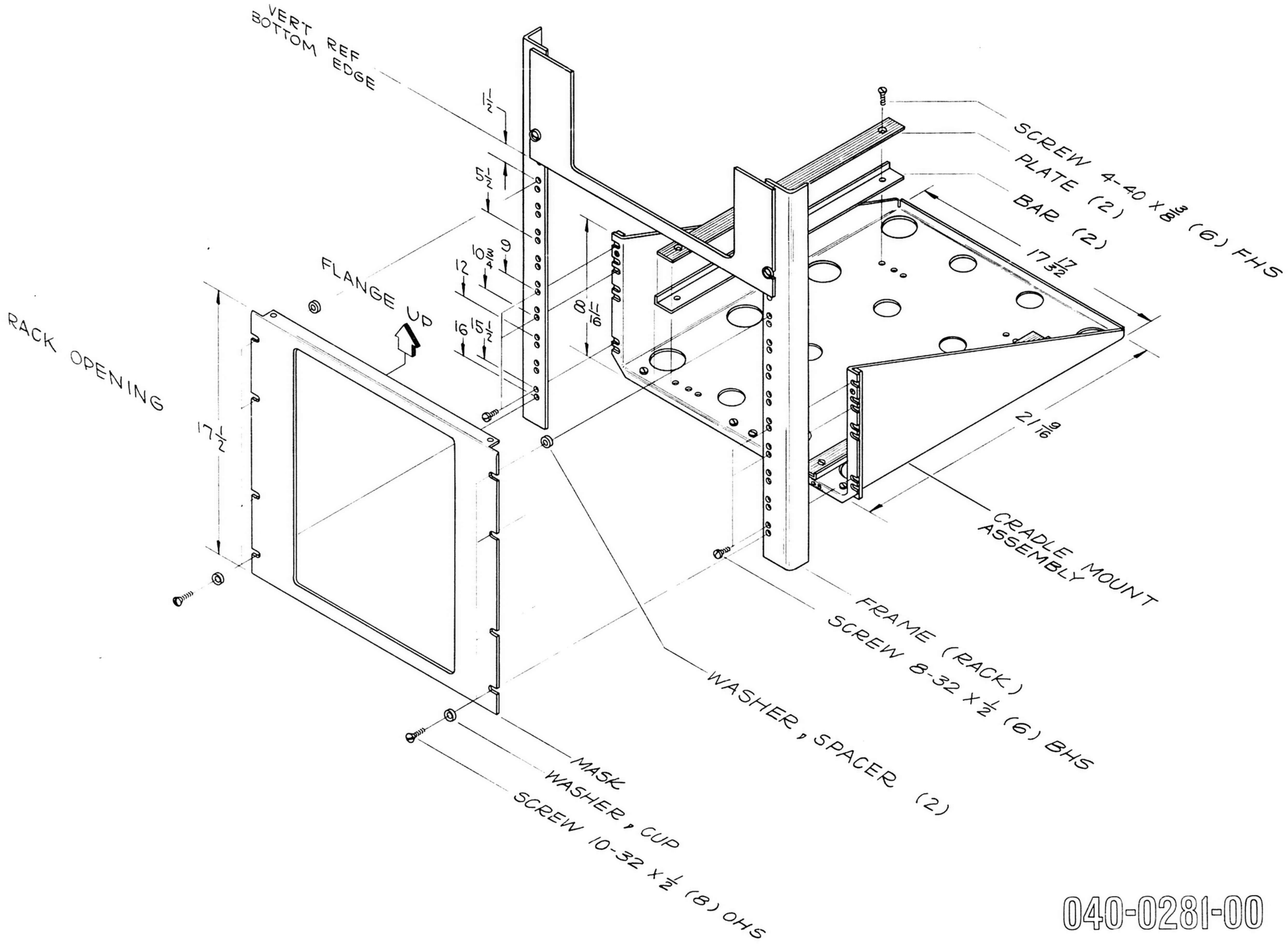


FIG. 5



040-0281-00

FIG. 6

MODIFICATION KIT

DISCONTINUED

SEE NUMERICAL PARTS RECORD (NPR)

DC FAN MOTOR

040-231

For the following Tektronix Oscilloscopes:

Types	531A	s/n 20001-22073
	535A	s/n 20001-24849
	541A	s/n 20001-21454
	545A	s/n 20001-27729
	RM31A	s/n 1001- 1579
	RM35A	s/n 1001- 1850
	RM41A	s/n 1001- 1189
	RM45A	s/n 1001- 1893

DESCRIPTION

This modification enables the above listed instruments to operate on 50 to 400 cycle power lines. This is accomplished by the installation of a DC Fan Motor, thermal time-delay relay and DC power supply relay.

NOTE: If your instrument has the DC Relay Mod (040-258) installed, use Field Mod 040-233.

Publication:
Instructions for 040-231
January 1964

Supersedes:
January 1963

Quantity	Description	Part Number
1 ea.	Assembly, transformer and rectifier, consisting of:	
1 ea.	Transformer, 50-400 cycles	120-084
2 ea.	Strip, cer, 3/4 x 7 notches, clip-mounted	124-089
4 ea.	Diode, silicon, 500 ma 400 PIV	152-047
1 ea.	Cable harness, special transformer	179-552
5 ea.	Lockwasher, int. #6	210-006
2 ea.	Lug, solder, #6	210-202
1 ea.	Washer, #6	210-803
1 ea.	Screw, 6-32 x 1/4 BHS	211-504
1 ea.	Screw, 6-32 x 3/8 BHS	211-510
4 ea.	Screw, 6-32 x 1-1/4 Truss HS	211-545
1 ea.	Capacitor, EMT, 6.25 μf 300 v	290-000
1 ea.	Clamp, cable, 3/16	343-002
1 ea.	Ring, polyethylene, securing	354-068
4 ea.	Spacer, nylon molded, 0.281	361-009
4 ea.	Rod, spacing, hex, 1/4 x 9/16	384-519
1 ea.	Chassis, rectifier mounting	441-268
1 ea.	Assembly, DC Fan, consisting of:	
1 ea.	Motor, DC Fan	147-016
3 ea.	Lockwasher, int. #8	210-008
3 ea.	Nut, hex, 8-32 x 5/16	210-409
2 ea.	Screw, 8-32 x 5/16 BHS	212-004
3 ea.	Shockmount, rubber	348-008
1 ea.	Bracket, fan mounting (large)	406-327
1 ea.	Bracket, fan mounting (small)	406-328
1 ea.	Assembly, neon bulb, consisting of:	
1 ea.	Bulb, neon, NE-2	150-002
4 in.	Wire, #20 solid, bare	(176-004)
1 ea.	Relay, Clare	148-005
1 ea.	Relay, 45 sec delay	148-006
3 ea.	Lockwasher, int. #8	210-008
1 ea.	Lug, solder, SE-6	210-202
3 ea.	Nut, hex, 8-32 x 5/16	210-409
4 ea.	Screw, 6-32 x 3/8 PHS 100°	211-559
1 ea.	Capacitor, cer, 0.01 μf 2 kv discap	283-011
1 ea.	Resistor, comp, 1 meg 1/2 w 10%	302-105
1 ea.	Tag, 50-400 cycles	334-615
1 ea.	Tag, 117 v (50-400 cycles)	334-661
2 ea.	Tag, MODIFIED INSTRUMENT, gummed back	
4 in.	Wire, #20 solid, bare	(176-004)
24 in.	Wire, solder, silver-bearing	

INSTRUCTIONS

IMPORTANT: When soldering to the ceramic strips, use the silver-bearing solder supplied with this kit.

( ) 1. Remove the two side panels and the bottom panel from the instrument. (For RM's, remove the instrument from the cabinet.)

( ) 2. Remove the rear overlay; this will involve the following (For RM's, perform ONLY steps "a", "f" and "g"):

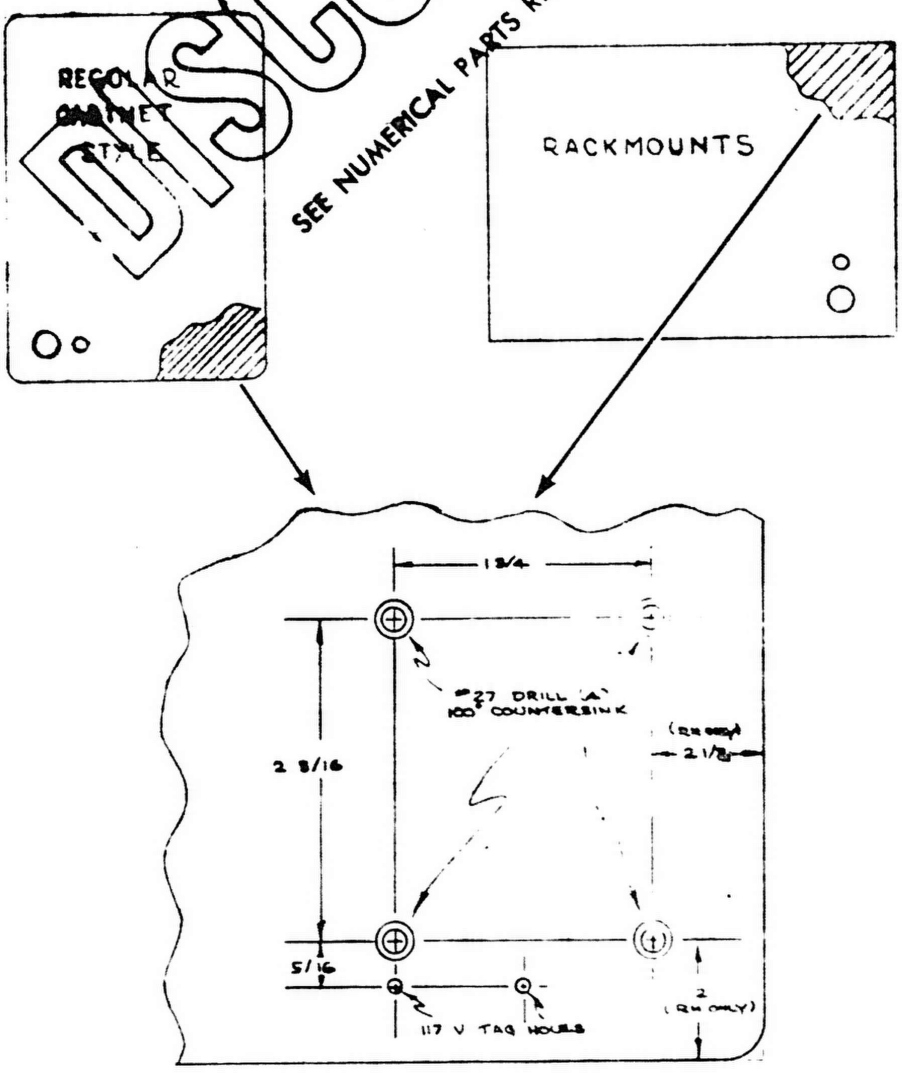
a. Remove air filter.
b. Remove HV shield (337-148).
c. Remove GND post and EXTERNAL CRT CATHODE post.

Step 2 (con'd)

d. Remove nut which secures the rear toggle switch.
e. Unsolder and remove the fuseholder.
f. Remove the line voltage tag plate. (RM's tag mounted on back of cabinet.)
g. Unsolder and remove the fan assembly.
h. Remove all remaining screws holding the rear overlay in place.

( ) 3. Drill and countersink four #27 holes at the points indicated in the drilling instructions.

DRILLING INSTRUCTIONS



WIRING DIAGRAM FOR DELAY TIME RELAY

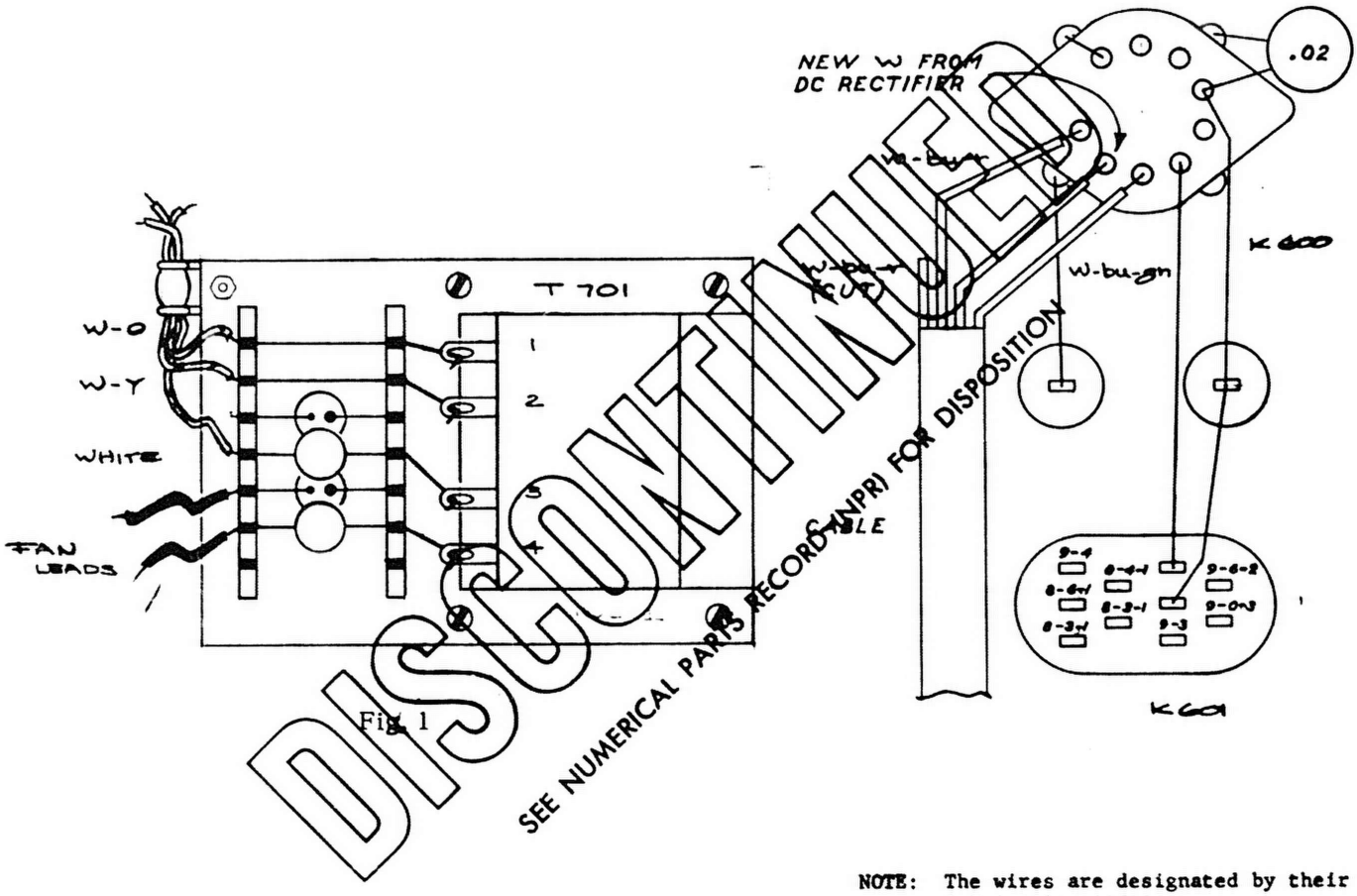


Fig. 1

NOTE: The wires are designated by their R M A color codes

Fig. 3

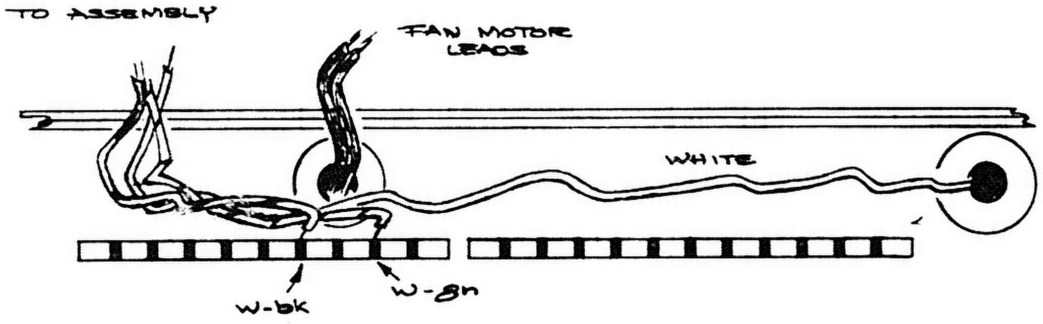


Fig. 2

INSTRUCTIONS (Con'd)

( ) 4. Using four 6-32 x 3/8 FHS screws (from kit), mount the transformer assembly as shown in Fig. 1.

NOTE: The diodes shown are not necessarily the same as those used.

( ) 5. Solder the white-green and white-black wires to the points indicated in Fig. 2.

( ) 6. Dress the solid white wire through the main power cable grommet and along the cable to relay K600. Solder this wire to pin 8 of K600 (see Fig. 3).

( ) 7. Remove the mounting ring from the fan assembly (which was removed in step 2-g).

( ) 8. Install the ring on the new DC fan assembly supplied with the kit.

( ) 9. Install the old fan blade on the new DC fan.

( ) 10. Replace the rear overlay and all parts which were removed in step 2. (Use new fan assembly and tag*, from kit).

*A "117 V" tag is supplied with kit. If your instrument is wired for any other voltage, order proper tag from Customer Service at no charge.

110V Tag,	50-400 cycle	334-660
124V Tag,	50-400 cycle	334-662
220V Tag,	50-400 cycle	334-663
234V Tag,	50-400 cycle	334-664
248V Tag,	50-400 cycle	334-665

( ) 11. Solder the fan motor leads to the points indicated in Fig. 1.

( ) 12. Unsolder all wires from contacts and coil of relay K601.

NOTE: For ease in wiring, bare #20 wire (soldered at three points) may be cut at coil terminal and later replaced with bare wire (from kit).

( ) 13. Remove K601 shield (if used on instrument) and relay.

( ) 14. Install the new 800 Ω relay and old shield (removed in step 13).

( ) 15. Resolder all wires (removed from old K601 relay) to corresponding terminals on new relay (see Fig. 3).

( ) 16. Unsolder and remove 12 Ω, 1 w resistor from contacts 1 and 7 of K600.

( ) 17. With a short length of #20 bare wire (from kit), ground pin 1 of K600.

( ) 18. Locate the two white-blue-red wires soldered to pin 9 of K600.

( ) Unsolder both wires and determine with an ohmmeter which one connects to terminal 12 of the power transformer.

( ) Cut this wire where it joins the cable.

( ) Solder the other wire back to pin 9 (see Fig. 3).

( ) 19. Locate the two white-blue-red wires (gauge #18 and #22) soldered to terminal 12 of the power transformer.

( ) Unsolder the #22 wire (smaller diameter of the two) and cut it off where it joins the cable. This is the other end of the wire cut in step 18.

( ) 20. Replace thermal time delay relay K601 with the delay relay (from kit).

( ) 21. Remove the front mounting nut from the POWER ON switch.

( ) Install the tag (50-400 cycles, from kit) on the switch and replace the mounting nut.

NOTE: Allowance for the tag thickness may be made by adjusting the inside mounting nut.

( ) 22. Temporarily remove the high voltage shield at the top of the instrument above the CRT.

REFER TO FIG. 4 WHILE PERFORMING STEPS 23 THROUGH 27.

( ) 23. Remove the bare wire (not shown) between CSA-1 and CSB-3.

( ) 24. Unsolder the white-brown wire at CSB-3 and move the wire to CSB-2.

( ) 25. Mount the solder lug (from kit) under the CRT mounting bracket screw (on instrument). Place the solder lug between the screw head and the flat washer.

( ) 26. Mount the 0.01 μf discap (from kit) parallel to the chassis and about 1/4 in. below the 2w resistors. Solder one lead to the solder lug and the other lead to CSB-2.

( ) 27. Solder the 1 meg resistor (from kit) between CSA-2 and CSB-2.

( ) 28. Lay the neon bulb assembly over the two 1 meg resistors, as in Fig. 5. Solder the leads at CSA-2, CSB-2 and CSB-3. Do not cut the lead attached to CSA-2. Dress the leads so they do not touch the resistors.

( ) 29. Bend the lead extending beyond CSA-2 and solder to CSA-1 (see Fig. 5).

THIS COMPLETES THE INSTALLATION

( ) Check wiring for accuracy.

( ) Turn oscilloscope power on and check to see that the fan operates and the thermal time delay closes 15 to 45 seconds after the power switch is turned on.

( ) Replace the high voltage shield.

( ) Fasten the insert pages in your Instruction Manual.

( ) Moisten the back of the MODIFIED INSTRUMENT tags (from kit) and place them on the manual schematic pages affected by this modification.

GG:cc

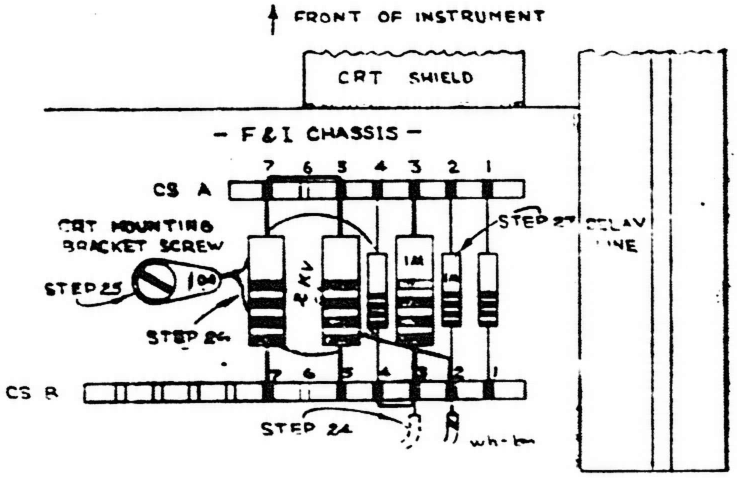


Fig. 4

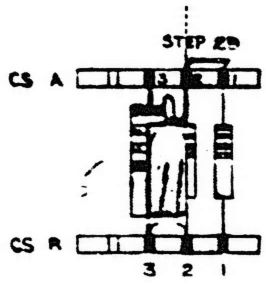


Fig. 5

DC FAN MOTOR

Types	531A	s/n 20001-22073	Types	RM31A	s/n 1001-1579
	535A	s/n 20001-24349		RM35A	s/n 1001-1850
	541A	s/n 20001-21454		RM41A	s/n 1001-1189
	545A	s/n 20001-27729		RM45A	s/n 1001-1892

GENERAL INFORMATION

This modification enables the above listed instruments to operate on 50 to 400 cycle power lines. This is accomplished by the installation of a DC Fan Motor, thermal time-delay relay and DC power supply relay.

ELECTRICAL PARTS LIST

Values fixed unless marked variable. Only new parts listed.

BULBS

Ckt. No.	Part Number	Description		
B849	150-002	Neon	NE-2	

CAPACITORS

C701	290-000	6.25 μf	300 v	EMT
C849	283-011	0.01 μf	2 kv	cer

DIODES

D701A,B,C,D	152-047	500 ma	400 PIV	

MOTORS

	147-016	DC Fan		

RELAYS

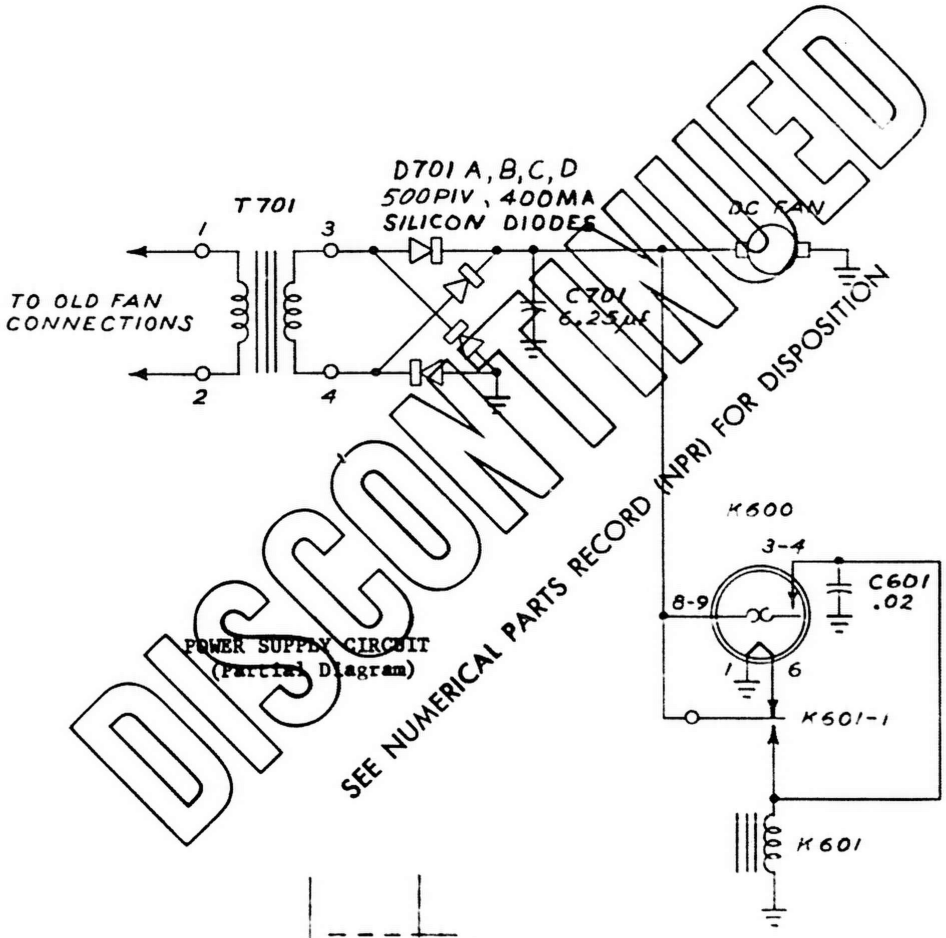
K600	148-006	26 v	45 sec	Time Delay
K601	148-005	32 v	800 Ω	Clare

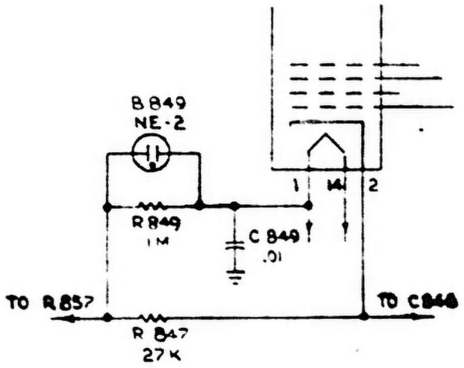
RESISTORS

R849	302-105	1 meg	1/2 w	comp	10%

TRANSFORMERS

T701	120-084		50-400 cycles





CRT CIRCUIT
(Partial Diagram)

file 040-233

date March 15, 1961
(revised 5/19/65)

DC FAN MOTOR

For the following Tektronix Oscilloscopes:
Types 531A s/n 22074-up; 535A s/n 24350-up; 533A s/n 3001-up;
541A s/n 21455-up; 545A s/n 27730-up; 543A s/n 3001-up;
RM31A s/n 1580-up; RM35A s/n 1851-up; RM33A s/n 1001-up;
RM41A s/n 1190-up; RM45A s/n 1893-up; RM43A s/n 1001-up.

INTRODUCTION

Installation of this modification enables the above listed instruments to operate on 50-400 cycle power lines. This is accomplished by the installation of a DC fan motor.

NOTE: This mod is also for instruments which have the DC Relay Mod (040-258) installed.

KIT LIST

Quantity	Description	Part Number
1 ea.	Assembly, transformer and rectifier, consisting of:	
1 ea.	Transformer, 50-400 cycles	120-084
2 ea.	Strip, cer, 3/4 x 7 notches, clip-mounted	124-089
4 ea.	Diode, silicon 500 ma 400 PIV	152-047
1 ea.	Cable harness, special transformer	179-555
2 ea.	Lug, solder #6	210-202
1 ea.	Washer, #6	210-803
1 ea.	Screw, 6-32 x 1/4 BHS	211-504
1 ea.	Screw, 6-32 x 3/8 BHS	211-510
4 ea.	Screw, 6-32 x 1-1/4 Truss HS, Phillips	211-545
1 ea.	Capacitor, EMT 6.25 µf, 300 v	290-000
1 ea.	Clamp, cable 3/16	343-002
1 ea.	Ring, polyethylene	354-068
4 ea.	Spacer, nylon molded, .313	361-009
4 ea.	Rod, spacing, hex, 1/4 x 9/16	384-519
1 ea.	Chassis, rectifier mounting	441-268

* * *

PART LIST: (continued)

1 ea.	Assembly, DC Fan, consisting of:	
1 ea.	Motor, DC Fan	147-016
3 ea.	Lockwasher, int #8	210-008
3 ea.	Nut, hex, 8-32 x 5/16	210-409
2 ea.	Screw, 8-32 x 5/16 BHS	212-004
3 ea.	Shockmount, rubber	348-008
1 ea.	Bracket, fan mounting (large)	406-327
1 ea.	Bracket, fan mounting (small)	406-328
1 ea.	Assembly, neon bulb, consisting of:	
1 ea.	Bulb, neon, NE-2	150-002
1 ea.	Wire, #20 solid, 4 in. bare	
5 ea.	Lockwasher, int #6	210-006
3 ea.	Lockwasher, int #8	210-008
1 ea.	Lug, solder, SE6	210-202
3 ea.	Nut, hex, 8-32 x 5/16	210-409
4 ea.	Screw, 6-32 x 3/8 PHS 100°	211-559
1 ea.	Capacitor, cer, .01 µf 2 kv disc	283-011
1 ea.	Resistor, comp, 1 meg 1/2 w 10%	302-105
1 ea.	Tag, 50-400 cycles	334-615
1 ea.	Tag, 117 v (50-400 cycles)	334-661
2 ea.	Tag, MODIFIED INSTRUMENT, gummed back	
1 ea.	Wire, solder, silver-bearing 24 in.	

INSTRUCTIONS

IMPORTANT: When soldering to the ceramic strips, use the silver-bearing solder supplied with this kit.

( ) 1. Remove the two side panels and the bottom panel from the instrument. (For RM's, remove the instrument from the cabinet).

( ) 2. Remove the rear overlay; this will involve the following (For RM's, perform only steps "a", "f" and "g").

a. Remove air filter.
b. Remove HV shield (337-148).
c. Remove GND post and EXTERNAL CRT CATHODE post.
d. Remove nut which secures the rear toggle switch.
e. Unsolder and remove the fuseholder.
f. Remove the line voltage tag plate. (RM's, tag mounted on back of cabinet)
g. Unsolder and remove the fan assembly.
h. Remove all remaining screws holding the rear overlay in place.

( ) 3. Drill and countersink four #27 holes at the points indicated on Fig. 3 on page 7.

* * *

INSTRUCTIONS: (continued)

( ) 4. Using four 6-32 x 3/8 FHS screws (from kit), mount the transformer assembly as shown in the photograph on page 5.

NOTE: The diodes shown in the photo are not necessarily the same as those used.

The photo also shows a long wire (connected to the rectifier assembly) which should be disregarded for this particular kit.

( ) 5. Solder the white-green and white-black wires to the points indicated in the photograph.

( ) 6. Remove the mounting ring from the fan assembly (which was removed in Step 2-g).

( ) 7. Install the ring on the new DC fan assembly supplied with the kit.

( ) 8. Install the old fan blade on the new DC fan.

( ) 9. Replace the rear overlay and all parts which were removed in Step 2. (Use new fan assembly and tag*, from kit).

( ) 10. Solder the fan motor leads to the points indicated in the photograph.

( ) 11. Remove the front mounting nut from the POWER ON switch.

( ) Install the tag (50-400 cycles, from kit) on the switch and replace the mounting nut.

NOTE: Allowance for the tag thickness may be made by adjusting the inside mounting nut.

( ) 12. Temporarily remove the high voltage shield at the top of the instrument above the CRT.

( ) 13. Remove the bare wire (not shown) between CSA-1 and CSB-3. (See Fig. 1.)

( ) 14. Unsolder the white-brown wire at CSB-3 and move the wire to CSB-2 (Fig. 1, Step 14).

* A "117V" tag is supplied with kit. If your instrument is set for any other voltage, order the proper tag from Customer Service at no charge.

110V Tag,	50-400 Cycles	334-660
124V Tag,	50-400 Cycles	334-662
220V Tag,	50-400 Cycles	334-663
234V Tag,	50-400 Cycles	334-664
248V Tag,	50-400 Cycles	334-665

* * *

INSTRUCTIONS: (continued)

( ) 15. Mount the solder lug (from kit) under the CRT mounting bracket screw (on instrument). Place the solder lug between the screw head and the flat washer (Fig. 1, Step 15).

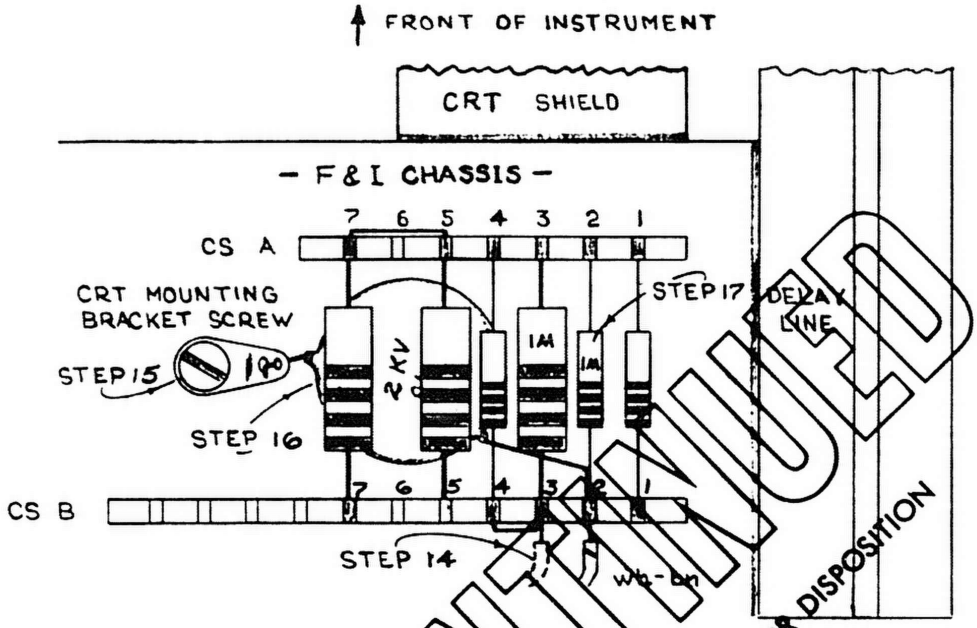


FIG. 1

NOTE

Locations on ceramic strips will be identified by:

Letter (strip)
Number (notch)

( ) 16. Mount the .01 µf discap (from kit) parallel to the chassis and about 1/4 in. below the 2 w resistors. Solder one (1) lead to the solder lug and the other lead to CSB-2 (Fig. 1, Step 16).

( ) 17. Solder the 1 meg resistors (from kit) between CSA-2 and CSB-2 (Fig. 1, Step 17).

( ) 18. Lay the neon bulb assembly over the two 1 meg resistors, as in Fig. 2. Solder the leads at CSA-2, CSB-2 and CSB-3. Do not cut the lead attached to CSA-2. Dress the leads so they do not touch the resistors.

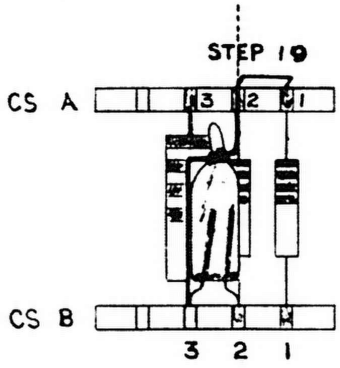
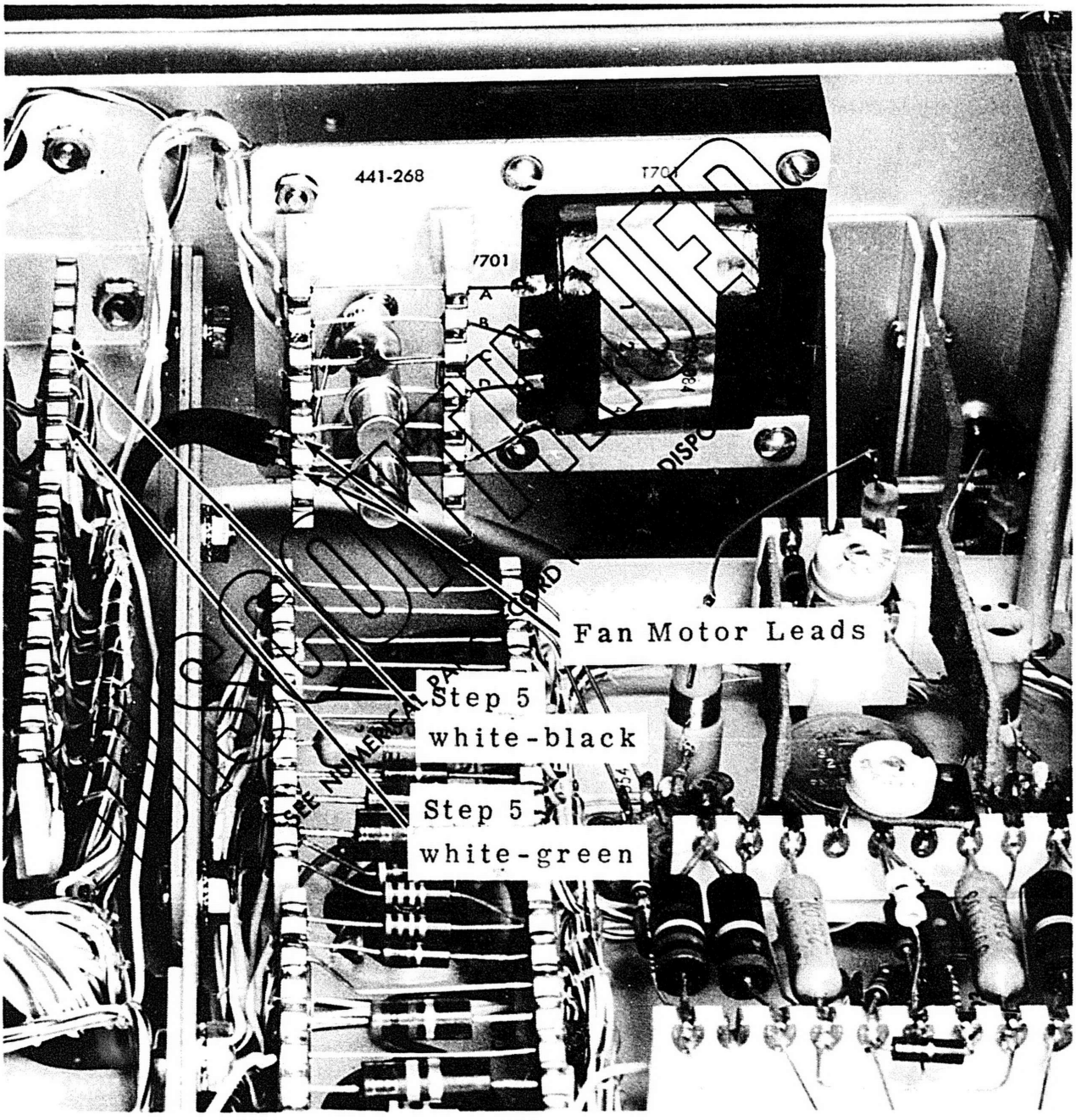


FIG. 2

NOTE

The #20 wire connects CSA-2 and CSB-3

* * *



INSTRUCTIONS: (continued)

( ) 19. Bend the lead extending beyond CSA-2 and solder this lead to CSA-1 also (Fig. 2, Step 19).

THIS COMPLETES THE INSTALLATION. Check wiring for accuracy.

Turn oscilloscope power on and check to see that the fan operates properly.

Install the insert pages in your Instruction Manual.

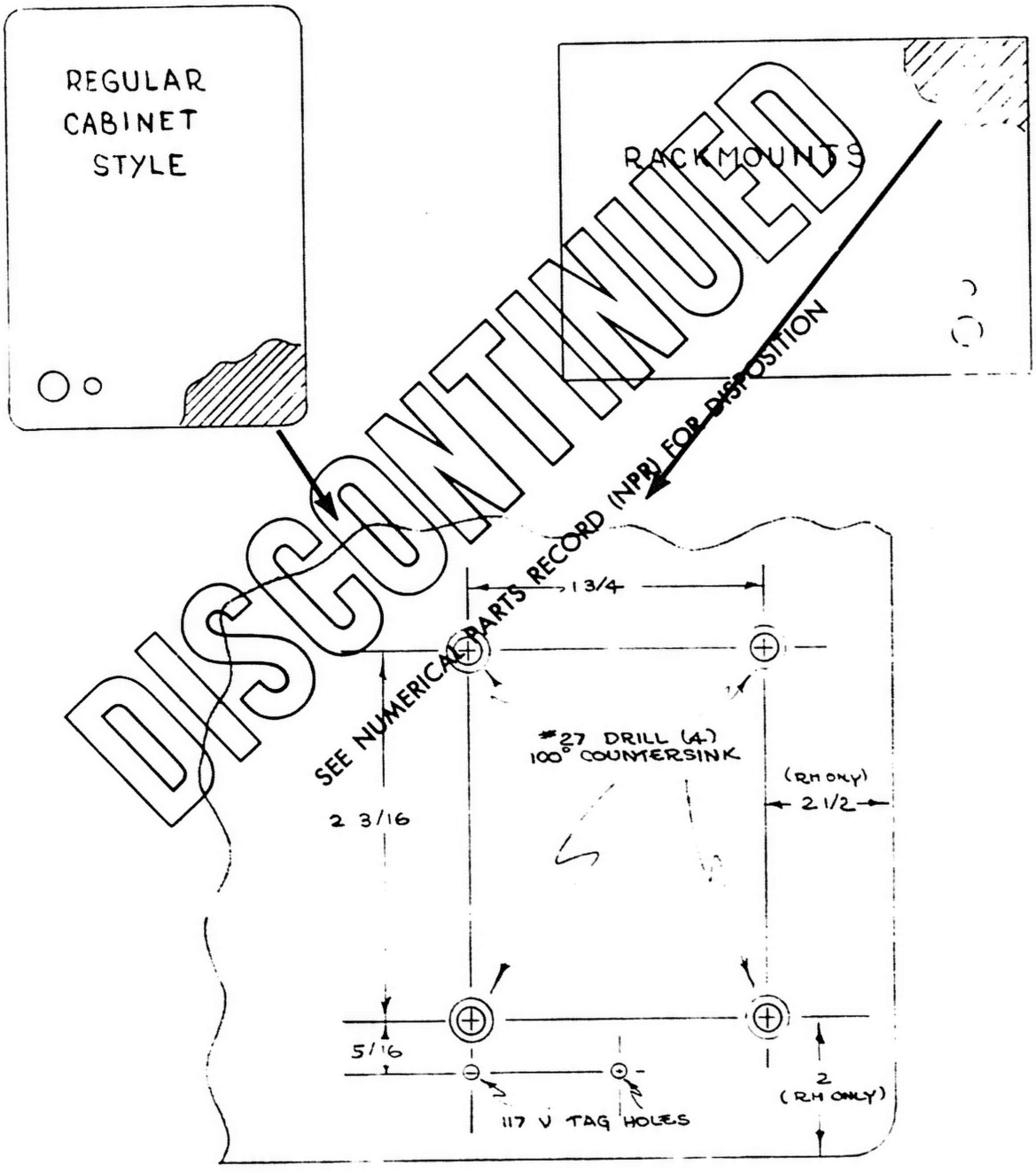
Moisten the back of the MODIFIED INSTRUMENT tags (from kit) and place them on the manual schematic pages affected by this modification.

* * *

DRILLING INSTRUCTIONS

FOR THE MOUNTING OF THE

TRANSFORMER AND RECTIFIER ASSEMBLY



DC FAN MOTOR

For the following Tektronix Oscilloscopes:

Types 531A s/n 22074-up; 535A s/n 24350-up; 533A s/n 3001-up;
541A s/n 21455-up; 545A s/n 27730-up; 543A s/n 3001-up;
RM31A s/n 1580-up; RM35A s/n 1851-up; RM33A s/n 1001-up;
RM41A s/n 1190-up; RM45A s/n 1893-up; RM43A s/n 1001-up.

GENERAL INFORMATION

Installation of this modification enables the above listed instruments to operate on 50 to 400 cycle power lines. This is accomplished by the installation of a DC fan motor.

PARTS LIST *

BULBS

B849	Neon	NE-2				150-002

CAPACITORS

C701	6.25 µf	300 v	fixed	EMT		290-000
C849	.01 µf	2 kv	fixed	cer		283-011

DIODES

D701A,B,C,D		500 ma	400 PIV			152-047

MOTORS

	DC Fan					147-016

RESISTORS

R849	1 meg	1/2 w	fixed	comp	10%	302-105

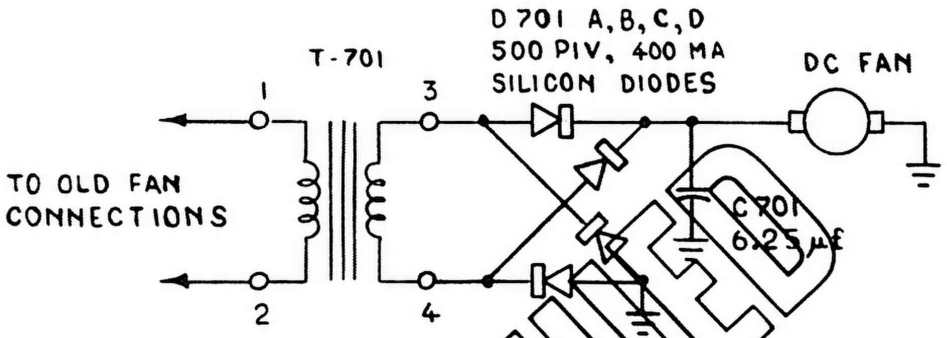
TRANSFORMERS

T701	50-400 cycles					120-084

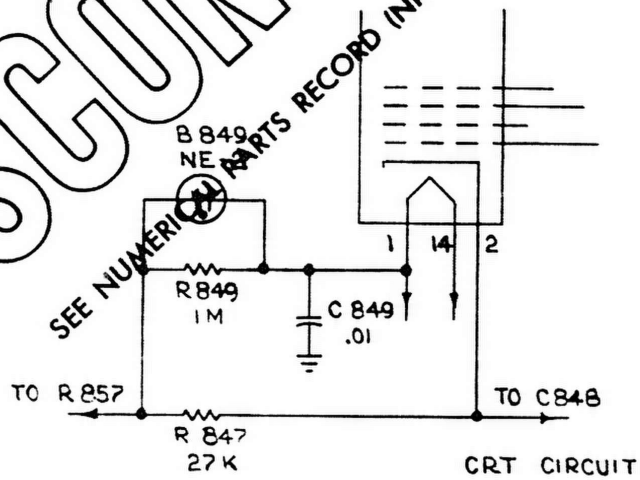
* only new parts listed

040-233
1/14/63

1 of 2



POWER SUPPLY CIRCUIT
(Partial Diagram)



CRT CIRCUIT
(Partial Diagram)

040-233
1/14/63

2 of 2

product modification

040-0292-01
M2311,M2312,
M2314,M2325
Instrument Type
See Below

CRT SCREW ALIGNMENT

For the following TEKTRONIX® Type Oscilloscopes:

Type	531	Serial Number	5791-20000
Type	531A	Serial Number	20001-20409
Type	532	Serial Number	5341- 6519
Type	533	Serial Number	101- 1469
Type	535	Serial Number	5985-20000
Type	535A	Serial Number	20001-21349
Type	536	Serial Number	101- 1089
Type	541	Serial Number	5500-20000
Type	541A	Serial Number	20001-20469
Type	543	Serial Number	101- 1249
Type	545	Serial Number	6075-20000
Type	545A	Serial Number	20001-22059

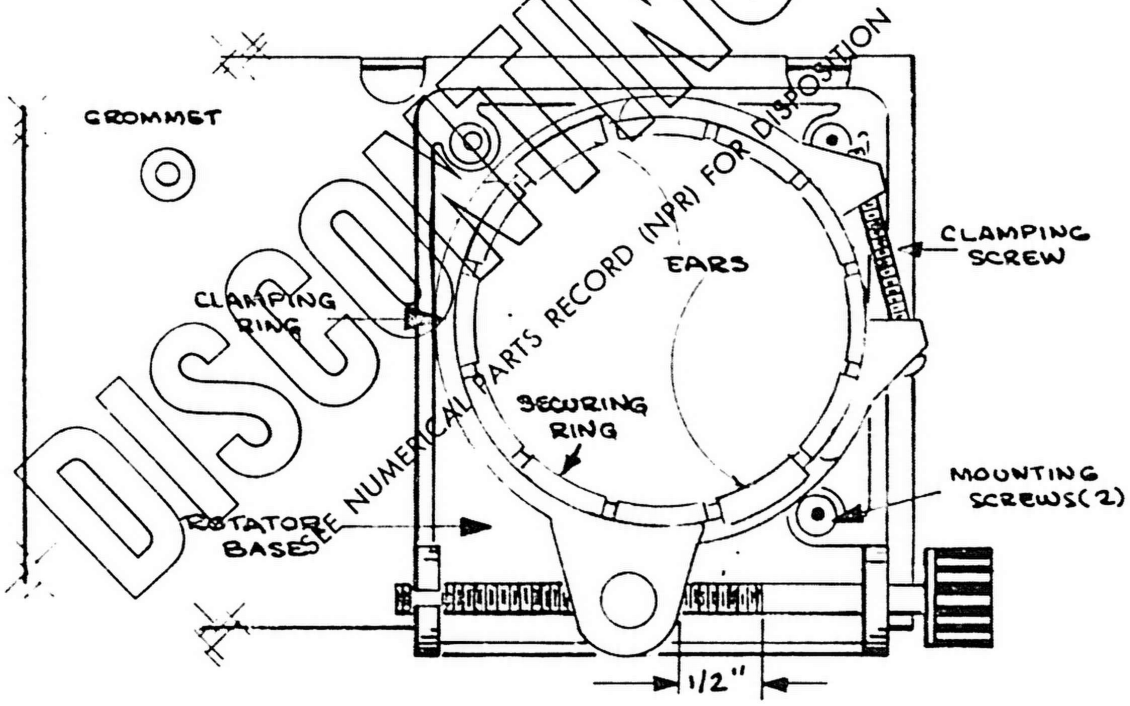
Modification Kit, PN 040-0292-01, provides a more satisfactory means of CRT alignment. The entire support bracket and clamp assembly at the base of the CRT is replaced by a new bracket, rotator and clamp assembly.

The main feature of this new assembly is a finger-operated screw adjustment for easy and precise rotation of the CRT. The CRT rotator assembly permits lateral and vertical adjustment of the socket end of the CRT -- adjustments which are needed because the long axis of the CRT is seldom found to have an angle of precisely 90° with respect to the faceplate. If the angle is not precisely 90° the faceplate will not touch the graticule at all points around its circumference unless adjustments are provided.

1-7-71
Supersedes: 6-9-69

PARTS INCLUDED IN MODIFICATION KIT:

	Quantity	Part Number	Description
	1 ea		Assembly, CRT support, consisting of:
	2 ea	006-0531-00	Tie, nylon cable, blue
	1 ea	210-0407-00	Nut, hex, 6-32 x 1/4
	1 ea	210-0503-00	Nut, securing, double 6-32
	1 ea	211-0560-00	Screw, 6-32 x 1 RHS
	2 ea	211-0561-00	Screw, 6-32 x 3/8 hex socket, FH cap
	1 ea	348-0002-00	Grommet, rubber, 1/4
	1 ea	354-0103-00	Ring, clamping, DELRIN®
	1 ea	354-0178-00	Ring, securing
	1 ea	355-0049-00	Stud (screw), CRT rotator
	1 ea	366-0032-00	Knob, red, small
	1 ea	406-0251-00	Bracket, CRT support
##	1 ea	432-0022-02	Base, CRT rotator



== Indicates change since last publication.

DELRIN, Reg. TM of The DuPont Co.

INSTRUCTIONS:

( ) 1. Carefully remove the CRT from the instrument. Be sure to disconnect the high voltage anode lead.

( ) 2. Remove (cut if necessary) the molded nylon rotating handle on the CRT socket.

NOTE: Some earlier instruments will not have this handle.

( ) 3. Remove the old CRT support bracket and clamp. It is held with five screws, two on the rectifier bulkhead, two on the small chassis above, and one at the bottom rear of the CRT shield. SAVE SCREWS AND WASHERS.

NOTE: On some instruments there is a wire which passes through a grommet in the bracket. Unsolder this wire from the CRT Cathode Selector switch (on rear panel) before removing the bracket.

TO INSTALL NEW CRT ALIGNMENT ASSEMBLY:

( ) 4. Loosen the clamping screw on the CRT support assembly (from kit) to allow the CRT base to slide easily through the securing ring (see drawing).

( ) 5. Set the rotator screw so that about 1/8 in. of thread shows (see drawing).

( ) 6. Check to see that the securing ring is properly seated. The two "ears" on one side should fit in the notches in the clamping ring (see drawing). On the other side, one of the two shorter "ears" on the securing ring should fit inside the hollow formed by the double nut.

NOTE: Do not remove blue nylon ties (which hold securing ring in place) until CRT is installed.

( ) 7. Install the CRT support assembly (from kit) in the place of the old bracket and clamp removed in step 3. USE OLD HARDWARE.

( ) If the wire to the CRT Cathode Selector switch was disconnected in step 3, dress this wire through the grommet as before, and resolder the wire to the switch.

( ) 8. Slide the CRT back in place and reconnect all wires except for the high voltage anode lead. Replace the graticule and cover.

TO ALIGN CRT IN CLAMP:

( ) 9. Center the CRT anode terminal in the CRT shield anode opening (older instruments) or the hole in the insulated anode connector plate (newer instruments). Push the CRT face against the graticule.

( ) Tighten the clamping screw until the CRT base is firmly clamped in the rotator.

( )10. Reinstall the CRT high voltage anode lead.

INSTRUCTIONS (cont)

THIS COMPLETES THE INSTALLATION

( ) Check that the CRT does not slip within the securing ring while turning the red rotator knob.

TO ALIGN TRACE WITH GRATICULE LINES:

( ) Turn the instrument on. With no signal into the Vertical Amplifier and the sweep free-running, set the FOCUS, ASTIGMATISM, and INTENSITY controls for a fine horizontal trace.

( ) By turning the red knob on the rotator screw, align the trace with the horizontal graticule lines.

NOTE: The CRT can be positioned slightly to minimize parallax between the phosphor surface and the graticule, by loosening the mounting screws (see drawing). Be sure to tighten these screws securely.

DF:ls

MODIFICATION KIT

CRT SCREW ALIGNMENT

040-0293-00

DISCONTINUED

SEE NUMERICAL PARTS RECORD (NPR) FOR DISPOSITION

For the following Tektronix Oscilloscopes:

Type RM31 s/n 101-1000
Type RM31A s/n 1001-1059
Type RM32 s/n 101- 330
Type RM33 s/n 101- 139
Type RM35 s/n 101-1000
Type RM35A s/n 1001-1229
Type RM41 s/n 101-1000
Type RM41A s/n 1001-1029
Type RM43 s/n 101- 111
Type RM45 s/n 101-1000
Type RM45A s/n 1001-1199

DESCRIPTION

This modification provides a more satisfactory means of CRT alignment. The entire support bracket and clamp assembly at the base of the CRT is replaced by a new bracket, rotator and clamp assembly.

The main feature of this new assembly is a finger-operated screw adjustment for easy and precise rotation of the CRT. The CRT rotator assembly also permits lateral and vertical adjustment of the socket end of the CRT--adjustments which are needed because the long axis of the CRT is seldom found to have an angle of precisely 90° with respect to the faceplate. If the angle is not precisely 90°, the faceplate will not touch the graticule at all points around its circumference unless adjustments are provided.

Publication:
Instructions for 040-0293-00
May 1965

Supersedes:
June 1963

PARTS LIST

Quantity	Description	Part Number
1 ea.	Assembly, CRT support, consisting of:	
2 ea.	Tie, nylon cable, blue	006-0531-00
1 ea.	Nut, hex, 6-32 x 1/4	210-0407-00
1 ea.	Nut, securing, double 6-32	210-0503-00
1 ea.	Screw, 6-32 x 1 RHS	211-0560-00
2 ea.	Screw, 6-32 x 3/8 hex socket, FH cap	211-0561-00
1 ea.	Grommet, rubber, 1/4	348-0002-00
1 ea.	Ring, clamping, delrin	354-0103-00
1 ea.	Ring, securing	354-0178-00
1 ea.	Stud (screw), CRT rotator	355-0049-00
1 ea.	Knob, red, small	366-0032-00
1 ea.	Bracket, CRT support	406-0306-00
1 ea.	Base, CRT rotator	432-0022-00

INSTRUCTIONS

TO REMOVE OLD SUPPORT BRACKET AND CLAMP:

( ) 1. Carefully remove the CRT from the instrument. Be sure to disconnect the high voltage anode lead.

( ) 2. Remove (cut if necessary) the molded nylon rotating handle on the CRT socket.

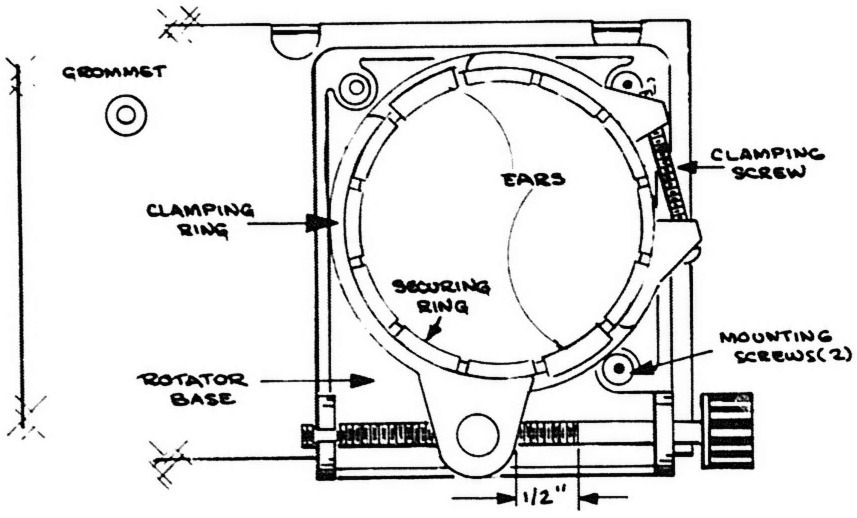
NOTE: Some earlier instruments will not have this handle.

( ) 3. Remove the old CRT support bracket and clamp. It is held by five (5) screws, two (2) on the rectifier bulkhead, two (2) on the small chassis to the side, and one (1) at the rear of the CRT shield. SAVE SCREWS AND WASHERS.

NOTE: On some instruments there is a wire which passes through a grommet in the bracket. Unsolder this wire from the CRT Cathode Selector switch (on rear panel) before removing the bracket.

TO INSTALL NEW CRT ALIGNMENT ASSEMBLY:

( ) 4. Loosen the clamping screw on the CRT support assembly (from kit) to allow the CRT base to slide easily through the securing ring. (See drawing.)



INSTRUCTIONS (con'd)

( ) 5. Set the rotator screw so that about 1/2 in. of thread shows. (See drawing.)

( ) 6. Check to see that the securing ring is properly seated. The two (2) "ears" on one side should fit in the notches in the clamping ring (see drawing). On the other side, one of the two shorter "ears" on the securing ring should fit inside the hollow formed by the double nut.

IMPORTANT: Do not remove blue nylon ties (which hold securing ring in place) until CRT is installed.

( ) 7. Install the CRT support assembly (from kit) in place of the old bracket and clamp removed in step 3. USE OLD HARDWARE.

( ) If the wire to the CRT Cathode Selector switch was disconnected in step 3, dress this wire through the grommet as before, and resolder the wire to the switch.

( ) 8. Slide the CRT back in place and reconnect all wires except for the high voltage anode lead. Replace the graticule and cover.

TO ALIGN CRT IN CLAMP:

( ) 9. Center the CRT anode terminal in the CRT shield anode opening (older instruments) or the hole in the insulated anode connector plate (newer instruments). Push the CRT face against the graticule.

( ) Tighten the clamping screw until the CRT base is firmly clamped in the rotator.

( ) 10. Re-install the CRT high voltage anode lead.

THIS COMPLETES THE INSTALLATION

( ) Check that the CRT does not slip within the securing ring while turning the red rotator knob.

TO ALIGN TRACE WITH GRATICULE LINES:

( ) 11. Turn the instrument on. With no signal into the Vertical Amplifier and the sweep free-running, set the FOCUS, ASTIGMATISM, and INTENSITY controls for a fine horizontal trace.

( ) By turning the red knob on the rotator screw, align the trace with the horizontal graticule lines.

NOTE: The CRT can be positioned slightly to minimize parallax between the phosphor surface and the graticule, by loosening the mounting screws (see drawing). Be sure to tighten these screws securely.

CH:ceb

PARTS REPLACEMENT KIT

HV CAPACITORS

050-199

For the following Tektronix Oscilloscopes:

Types 531/531A	s/n 101-20649
Types RM31/RM31A	s/n 101- 1259
Type 532	s/n 101- 6629
Type RM32	s/n 101- 359
Type 533	s/n 101- 1659
Type RM33	s/n 101- 149
Types 535/535A	s/n 101-21979
Types RM35/RM35A	s/n 101- 1479
Types 541/541A	s/n 101-20679
Types RM41/RM41A	s/n 101- 1119
Type 543	s/n 101- 1429
Type RM43	s/n 101- 121
Types 545/545A	s/n 101-23289
Types RM45/RM45A	s/n 101- 1399

DESCRIPTION

High voltage ceramic capacitor 283-011 replaces the oil-filled high voltage capacitor 285-513 previously used.

The new ceramic capacitor offers greater reliability and longer life.

Additional circuitry is added to prevent disturbances in unblanking.

NOTE: If the s/n of your instrument is above those listed, or if this kit has already been installed, disregard the instructions as P/N 283-011 is a direct replacement.

Publication:
Instructions for 050-199
January 1965

PARTS LIST

Quantity	Description			Part Number
5 ea.	Capacitor, ceramic,	0.01 μf	2kv	283-011
1 ea.	Resistor, comp,	33k	1/2w 10%	302-333
1 ea.	Wire, solder, silver-bearing	12in.		

INSTRUCTIONS

IMPORTANT: When soldering to the ceramic strips, use the silver-bearing solder supplied with this kit.

( ) 1. Replace the four 0.015μf 3kv PTM capacitors on the F and I chassis with 0.01 μf 2kv ceramic capacitors from the kit. Note that one of these PTM capacitors is replaced by two of the ceramic capacitors (see drawing).

( ) 2. Replace the 100k 1/2w 10% resistor between CSB-8 and CSB-11 with the 33k 1/2w 10% resistor from the kit.

NOTE: On some early instruments, CSA is an 11-notch ceramic strip, with the 100k resistor located between CSA and CSB.

THIS COMPLETES THE INSTALLATION

( ) Check wiring for accuracy.

( ) Make the following corrections in your Instruction Manual (circuit numbers in parentheses are for 532, RM32, 533, RM33, 543, and RM43):

Change C821, C827, C845, and C848 (C832, C884, C856, and C857) to 0.01 μf 2kv ceramic 283-011.

Add C828 (C885) 0.01 μf 2kv ceramic 283-011. On schematics, show this capacitor in parallel with C827 (C834).

Change R827 (R834) to 33k 1/2w 10% 302-333.

CR/JB:ceb