GRID CURRENT BALANCE CIRCUITRY REMOVED AND INPUT SELECTOR SWITCHES CHANGED TO REDUCE INPUT HOOK AND TRACE SHIFT RESPECTIVELY

See SQB

M9709

Effectively Prod s/n 180

Usable in field instruments s/n 100-179

FRONT PANEL SYMPTOM: About 0.15% hook with a 200 cm signal.

PROBLEM: The hook is caused primarily by the 100 Meg Grid Current Bal potentiometer isolation resistors, R135 and R335. The Grid Current Bal pots are not needed since grid current is not a problem.

PRODUCTION CHANGE: The Grid Current Bal pots and associated components were removed as indicated in the Before and After schematics on a following page. Typical grid current without pots is about 0.2 nA.

After the Grid Current Bal circuitry was removed, it became necessary to replace the + and - INPUT switches with a make-before-brake type, to eliminate any trace shift which would occur with the absence of the Grid Current circuitry.

Parts Removed:

R136, R336	Potentiometer, comp, 25 k ±20% linear	311-0390-00
R137	Resistor, comp, 100 k 1/4 W 5%	315-0104-00
R135, R335	Resistor, 100 Meg 1/8 W 5%	317-0107-00
R106G, R306G	Resistor, 100 Ω 1/8 W 5%	321-0097-00
R105C, R305C	Resistor, 10 k 1/8 W 5%	321-0289-00
SW101B, SW301B	Switch, OUTPUT MODE	260-0652-00
	Chassis, Main	441-0608-00

Parts Added:

* SW101B, SW301B	Switch, OUTPUT MODE	260-0652-01
	Chassis, Main	441-0608-00

INSTALLATION INSTRUCTIONS:

Parts Required: See 'Parts Added' with asterisk.

Installation Procedure:

NOTE: In the following procedure, it is only necessary to replace the rear wafers of the + and - INPUT switches. Also, refer to Figs. 1 and 2 for component locations.

a) Remove the white-brown wire from terminal 10 of the +INPUT switch and cut it flush with the cable harness.

b) Remove the white-green wire from terminal 4 of the -INPUT switch and cut it flush with the cable harness.

c) Replace the rear + and - INPUT switch wafers and wire components as shown in Fig. 1.

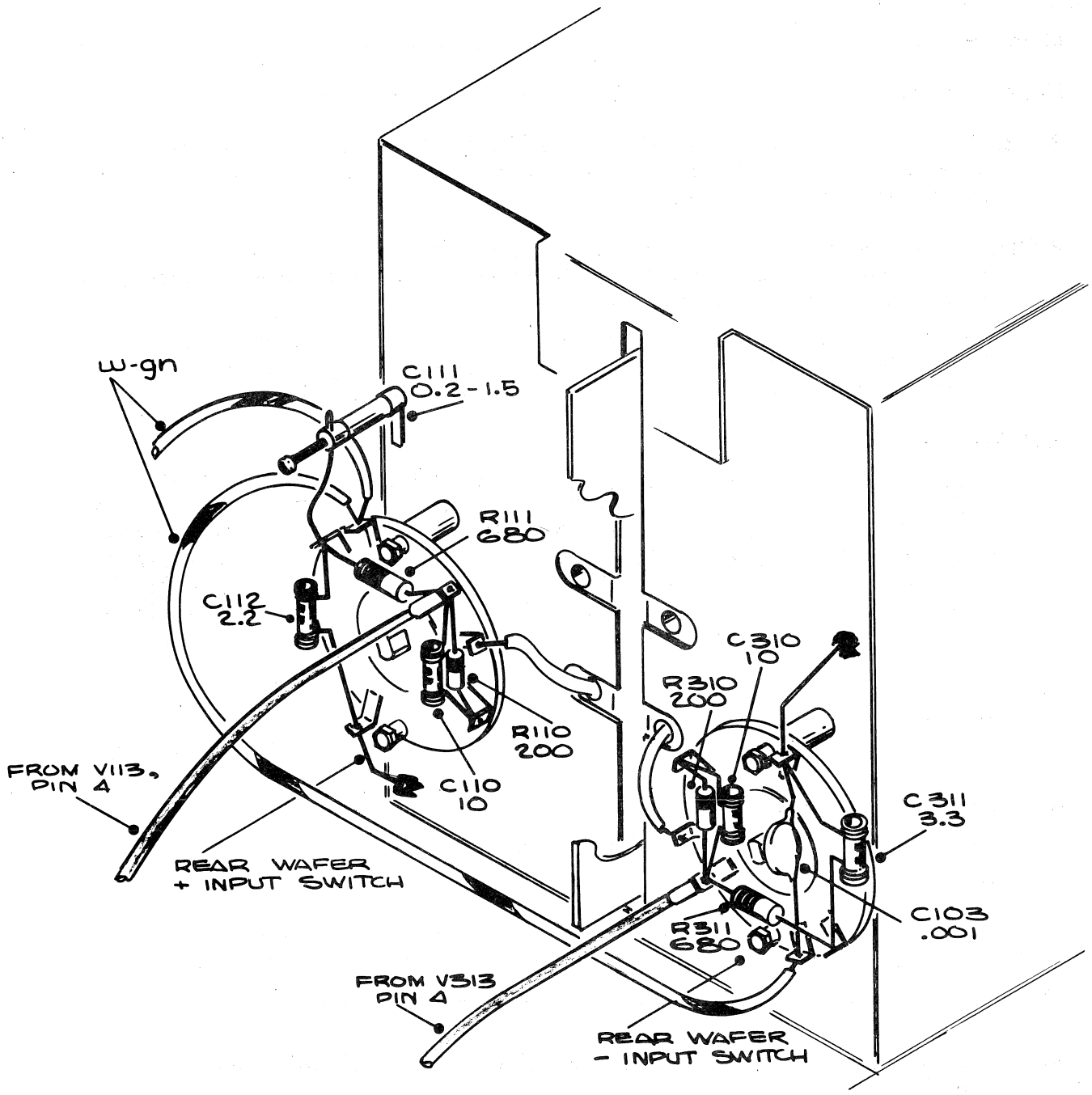
d) Replace R105C, R106G, R305C and R306G with #22 bare wire straps as shown in Fig. 2.

e) Remove R137 (100 k 1/4 W 5%) located between forward terminals of the -Grid Current Bal pot (R336) and Int DC Bal pot (R200).

f) Remove the white-brown and white-green wires connected to the Grid Current Bal pots and cut them flush with the cable harness.

g) Remove the - and + Grid Current Bal pots, R136 and R336, and their hardware from the main chassis.

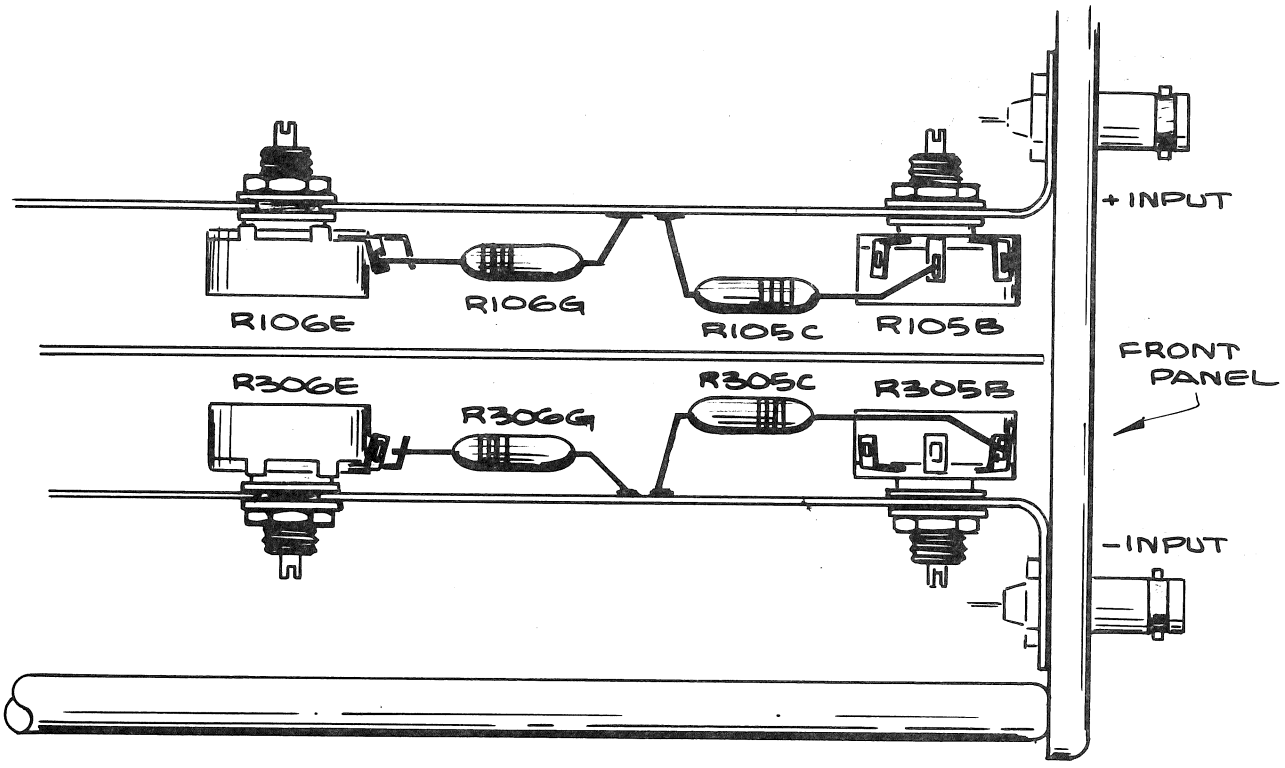
continued



AFTER MOD 9709

FIG. 1

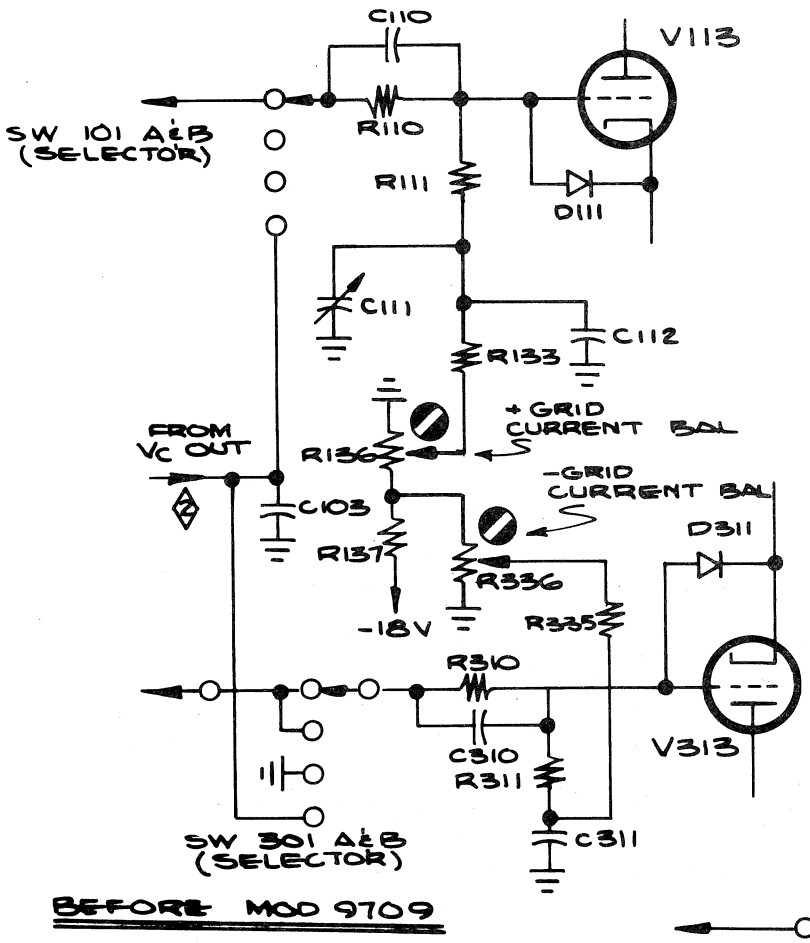
continued



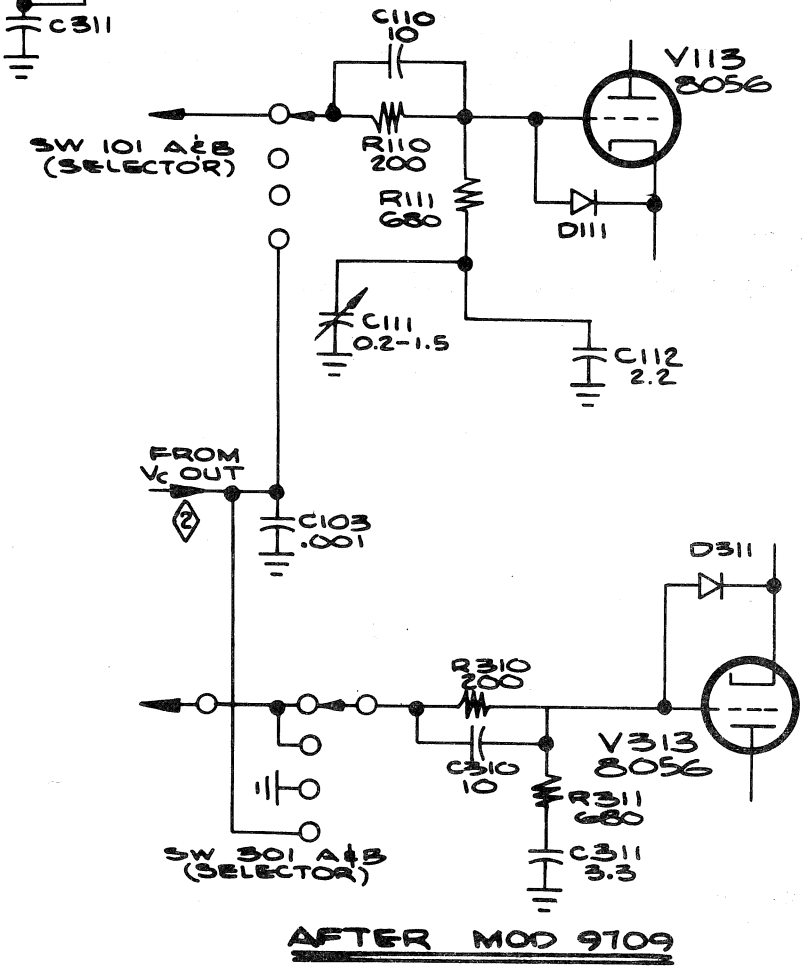
LEFT SIDE VIEW

FIG. 2

continued



BEFORE MOD 9709



AFTER MOD 9709

INPUT AMPLIFIER TRANSISTORS CHANGED TO ELIMINATE SELECTION FOR CONSISTENT OVERLOAD RECOVERY TIME

See SQB

M10640

Effective Prod SN 230

Usable in field instruments s/n 100-229

FRONT PANEL SYMPTOM: None.

PROBLEM: Test found it necessary to select Q153 and Q353 to meet the overload recovery test limit. The recovery time after differential offset must be less than 0.3 µs for a return to within ±2 mV.

PRODUCTION CHANGE: The 151-0134-00 PNP transistors, located at sockets Q153 and Q353, were changed to 151-0199-00 type transistors.

Parts Removed:

Q153, Q353	Transistor, Si PNP Tek spec, similar to 2N2905	151-0134-00

Parts Added:

Q153, Q353	Transistor, Si PNP T092-plastic-MOT #MPS-3640	151-0199-00

INSTALLATION INSTRUCTIONS:

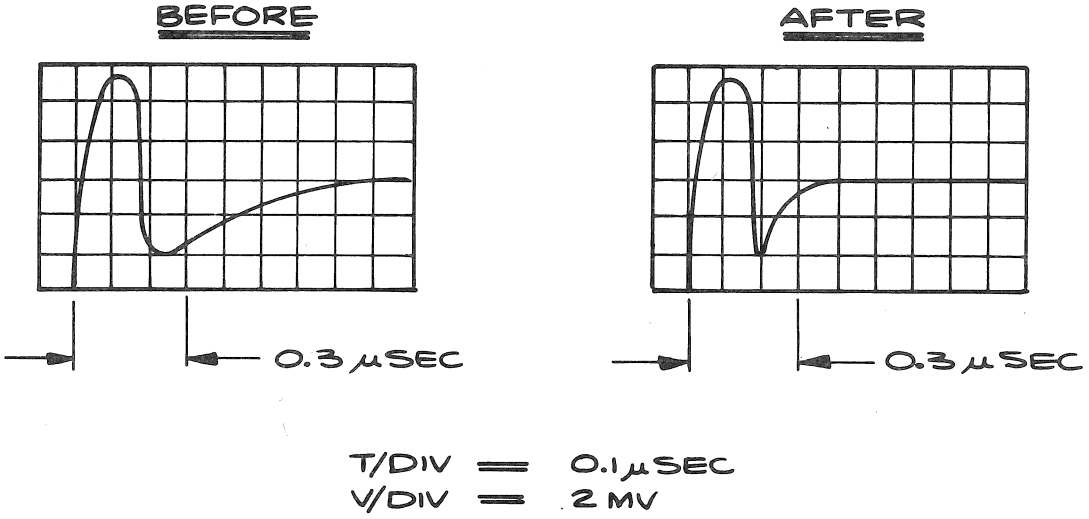
Parts Required for Field Installation:

See 'Parts Added'.

Installation Procedure:

Replace Q153 and Q353 with 151-0199-00 transistors.

NOTE: If Q153 is replaced, then Q353 must also be replaced and vice versa.



INPUT AMPLIFIER SUPPRESSORS ADDED
TO ELIMINATE 200 MHz OSCILLATION
IN "LIMITED B W" MODE

See SQB

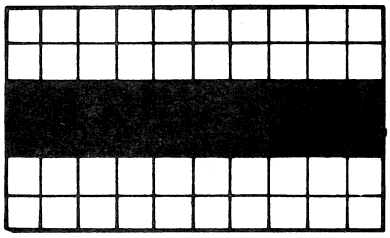
M10995

Effective Prod SN 253
w/exceptions 158, 190-1, 193, 238, 243-4, 251

Usable in field instruments SN 100-252

FRONT PANEL SYMPTOM: 200 MHz oscillations in limited bandwidth mode usually with 10A1 in RM647, sometimes in 647.

BEFORE



PROBLEM: 20 MHz oscillation in operational amplifiers Q204, Q404, Q234 and Q434.

PRODUCTION CHANGE: Ferramic suppressors (L234, L235), (L434 and L435) were added to the base leads of transistors Q234 and Q434 respectively. The circuit layout of input amplifier transistors Q204, Q234, Q404 and Q434 was changed to eliminate the 200 MHz oscillation. Also see M10995 for the Type 11B1 and RM647.

Parts Added:

L234, L235 L434, L435	Core, ferramic suppressor	276-0507-00
	Lug, solder 1/4"	210-0223-00

INSTALLATION INSTRUCTIONS:

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

R217 22k 1/4 W 5% 315-0223-00

Installation Procedure: Refer to drawing for steps (a) through (i).

a) Remove R217 (22k 1/4 W 5%) between base pin of Q234 and CSB-17.

b) Replace the #22 bare wire between base pin of Q234 and collector pin of Q204 with a new wire, between CSA-17 and collector pin of Q204.

c) Replace the #22 bare wire, between collector pin Q404 and base pin Q434,with a new wire, between collector pin Q404 and CSB-19.

d) Remove the #22 bare wire, between base pin of Q234 and CSB-18.

e) Solder a #22 bare wire to base pin of Q234. Add ferramic cores L234 and L235 to the wire, soldering the free end to CSA-17.

continued

f) Unsolder the CSB-19 end of a #22 bare wire connected to the base pin of Q434.

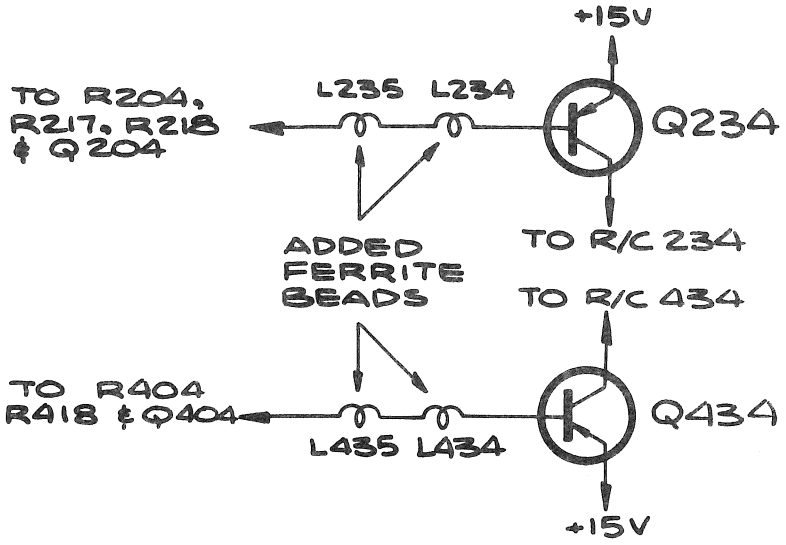
g) Add ferramic cores L434 and L435 on the unsoldered wire (step f). Resolder the wire to CSB-19.

h) Add a #22 bare wire, between CSA-17 and CSB-18.

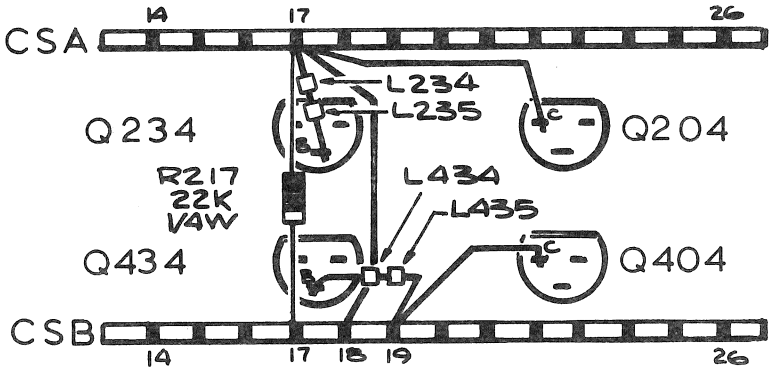
i) Add a new 22k 1/4W 5% resistor (R217), between CSA-17 and CSB-17.

k) Add a 1/4" solder lug between flat washer and top of chassis on potentiometer R215 (Var Atten Bal) position toward front of plug-in and tighten nut.

l) Solder a #22 bare wire, between solder lug in near by metal shield on the VOLTS/CM AND Vc RANGE switch SW710.



INPUT AMPLIFIER 10A1 (PARTIAL)



FERRITE CORE REPLACED WITH MORE READILY AVAILABLE TYPE AND TO REDUCE COST

INFORMATION ONLY

M10297

Effective Prod SN 310

FRONT PANEL SYMPTOM: None.

PROBLEM: The 0.7 μH ferrite core is not available in sufficient quantity and is replaceable with a 0.6 μH ferrite core at a cost saving.

PRODUCTION CHANGE: The 0.7 μH ferrite cores, L184, L202, L364, L402, L502, L504, L602, L604, L676, L679 were replaced by a 0.6 μH ferrite core.

Parts Removed:		
L184, L202, L384, L402, L502, L504, L602, L604, L676, L679	0.7 μH ferrite core	376-0532-00
Parts Added:		
L184, L202, L384, L402, L502, L504, L602, L604, L676, L679	0.6 μH ferrite core	276-0507-00

TRANSISTOR SOCKETS CHANGED TO ELIMINATE NEED TO BEND TRANSISTOR LEADS

INFORMATION ONLY

M10765

Effective Prod SN 340

FRONT PANEL SYMPTOM: None.

PROBLEM: M10640 changed transistors to a type with in-line pins and as a result, assembly has to bend the pins of Q153 and Q353 to insert in their sockets.

PRODUCTION CHANGE: Sockets for Q153 and Q353 were changed from 3-pin to 4-pin type. The new sockets mount and wire in the same manner as the old, except a strap must be added between the base and the shield pins (pin 2 and pin 5).

Parts Removed:			
	Socket, transistor 3-pin	(2)	136-0181-00
Parts Added:			
	Socket, transistor 4-pin	(2)	136-0182-00

BE:fb

DECOUPLING CAPACITORS ADDED TO
+100 V, -75 V & +15 V POWER SUPPLIES TO ELIMINATE ABERRATIONS ON TRACE

See SQB

M12098

Effective Prod SN 410

Usable in field instruments SN 100-409

FRONT PANEL SYMPTOM: Aberrations on the trace at 1 mVOLTS/CM vertical sensitivity and fast sweep speeds.

PROBLEM: Insufficient power supply decoupling allows sweep start transients to be coupled into the vertical circuitry.

PRODUCTION CHANGE: Additional power supply decoupling was provided with the addition of C266, C268 and C680 capacitors.

Parts Removed: None.

Parts Added:

C266, C268, C680	Capacitor, cer 0.001 μF discap 500 V	283-0000-00
	Lug, solder DE-6	210-0204-00
	Nut, Keps 6-32 x 5/16	210-0457-00
	Screw, 6-32 x 1/4 PHS	210-0504-00

INSTALLATION INSTRUCTIONS:

See MI - 12098

+ AND - INPUT CAPACITORS CHANGED TO PROVIDE PRODUCTION ECONOMY AND LOWER REPLACEMENT PART PRICE

INFORMATION ONLY

M10715

Effective Prod SN 430

FRONT PANEL SYMPTOM: None.

PROBLEM: Stocking two identical capacitors when one will adequately serve present demands was eliminated by deleting 295-0077-00. Also, capacitors 285-0635-00, 285-0657-01, 285-0662-00 and 285-0672-00 were originally manufactured with a tolerance of +5% -15% to limit the physical size of the capacitors. It was later found that there was not problem in limiting the capacitors physical size with a more standard ±10% tolerance.

PRODUCTION CHANGE: The + and - Input capacitors C102 and C302 were replaced with a matched pair of 295-0081-00 capacitors to eliminate a parts duplication.

Parts Removed:

C102, C302	Capacitor, checked assy. of (2) 285-0657-00 matched within 1% spread of each other	295-0077-00

Parts Added:

C102, C302	Capacitor, MT (2) 285-0610-00 matched within 1%	295-0081-00

INPUT AMPLIFIER CAPACITOR VALUE CHANGED TO IMPROVE 1 mV/CM TRANSIENT RESPONSE

INFORMATION ONLY

M13087

Effective Prod SN 470

FRONT PANEL SYMPTOM: 1 mV aberrations.

PROBLEM: Difficult to meet test specifications for 1 mV/CM transient response.

PRODUCTION CHANGE: C409 was made a selectable part with a nominal installed value of 27 pF.

Parts Removed:

C409	Capacitor, ceramic 68 pF 500 V	281-0549-00

Parts Added:

C409	Capacitor, ceramic 27 pF 500 V	281-0512-00

COMPARISON VOLTAGE VARIABLE POT
R595 REPLACED TO ELIMINATE SELECTING OF PART BY TEST

INFORMATION ONLY

M11143

Effective Prod SN 480

FRONT PANEL SYMPTOM: None.

PROBLEM: Extra time and material used to select pot with minimum resistance of less than 2Ω between ccw position and center post to meet instrument performance specs.

PRODUCTION CHANGE: COMPARISON VOLTAGE variable 10 turn pot R595, located on the Comparison switch, is replaced with a new pot which is selected by the vendor to provide less than 2Ω end resistance between the ccw and center terminals.

Parts Removed:

R595	Potentiometer, comp 5k ±3% lin 10 turn	311-0360-00

Parts Added:

R595	Potentiometer, comp 5k ±3% lin 10 turn selected to max of 2Ω at ccw position	311-0360-02

BE:pm

MODIFICATION INSTRUCTIONS

MI - 12098

Type 10A1 Plug-in Unit

Serial numbers 100-409

POWER SUPPLY DECOUPLING IMPROVED TO REDUCE TRACE ABERRATIONS

Additional power supply decoupling is provided by this modification to reduce the amount of sweep start transients being coupled into the vertical circuitry. These transients can cause objectionable vertical aberrations to appear on the trace, particularly at 1 mV/CM vertical sensitivity and fast sweep speeds.

The additional decoupling is provided in the +100 V, -75 V, and +15 V supplies.

PARTS REQUIRED

Quantity	Tektronix Part Number	Description
3 ea	283-0000-00	Capacitor, ceramic, 0.001 µF 500 V
1 ea	210-0204-00	Lug, solder, DE-6
1 ea	210-0457-00	Nut, Keps, 6-32 x 5/16
1 ea	211-0504-00	Screw, 6-32 x 1/4 PHS

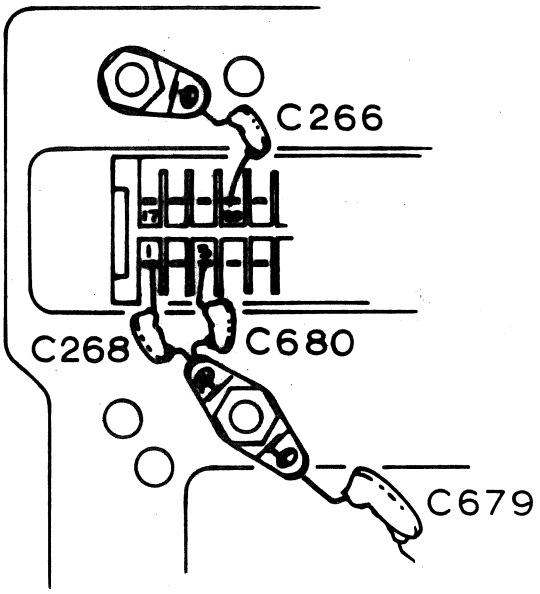
INSTALLATION

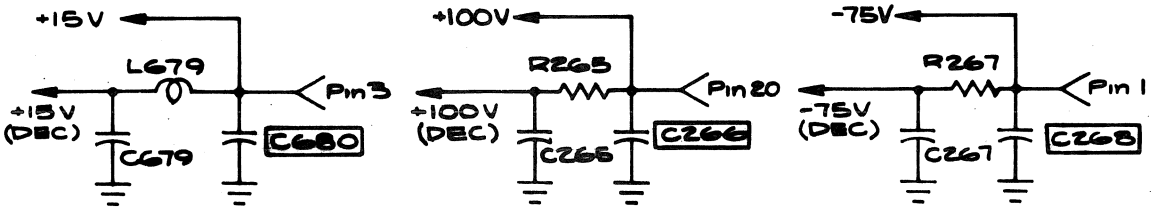
1) Unsolder the lead of C679 going to ground solder lug near pin 1 of the amphenol connector.

2) Remove the ground solder lug and relocate it near pin 17 of the amphenol connector, as shown in the illustration.

3) Install a double-end ground solder lug (210-0204-00) in the location shown in the illustration, using a 6-32 x 1/4 PHS screw and a 6-32 x 5/16 Keps nut.

4) Install C266, C268, C680, and the lead of C679 removed in step 1, as indicated in the illustration.


C266
C268
C680
C679


+15V
L679
Pin 3
+15V (DEC)
C679
C680
+100V
R265
Pin 20
+100V (DEC)
C266
C266
-75V
R267
Pin 1
-75V (DEC)
C267
C268

ADDED

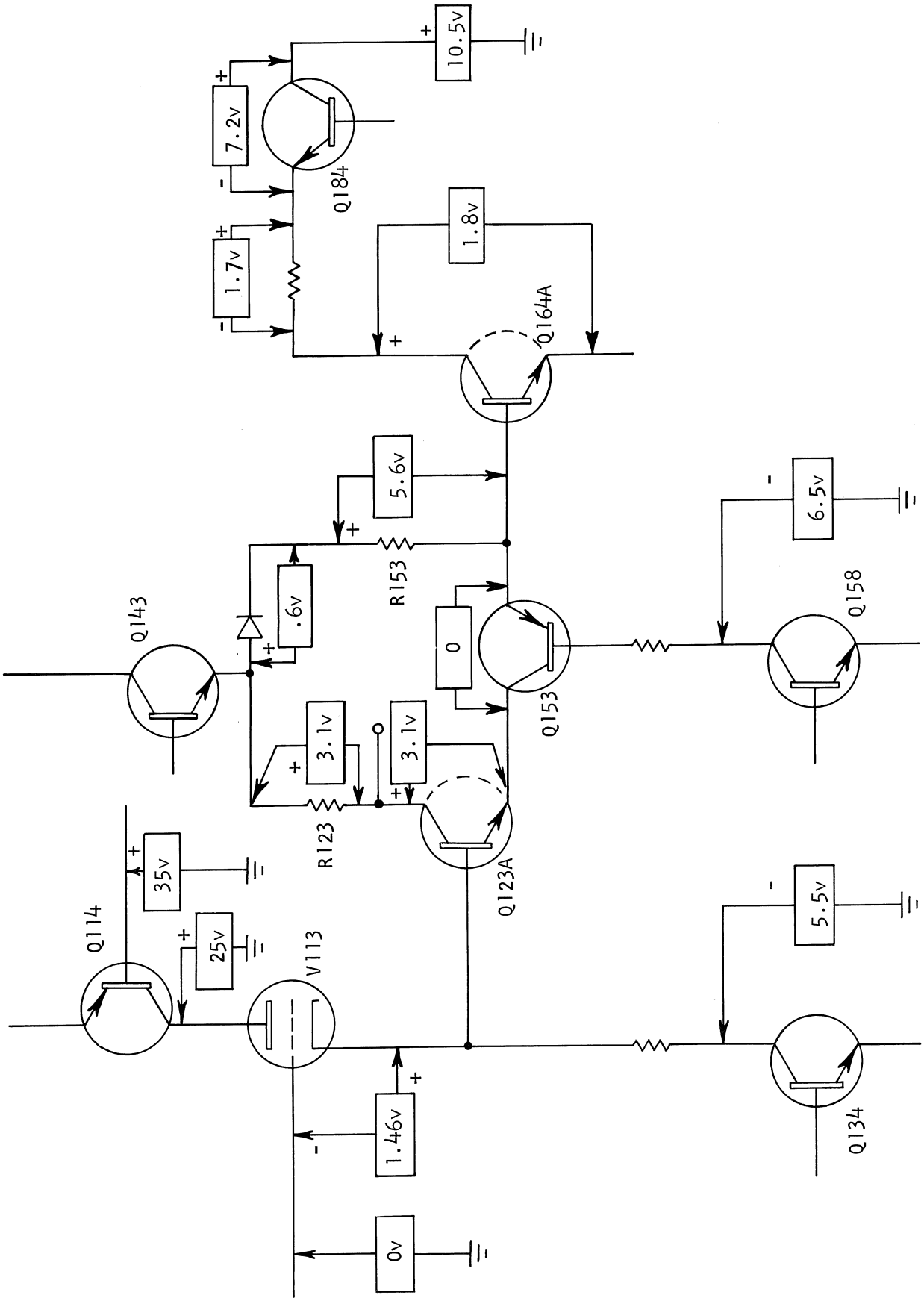

10.5v
7.2v
Q184
1.7v
1.8v
Q164A
5.6v
R153
.6v
Q143
0
Q153
6.5v
Q158
3.1v
3.1v
R123
Q123A
35v
25v
Q114
V113
5.5v
1.46v
Q134
0v

FIGURE 4-1

VOLTS/CM POTENTIOMETER LOCKING SOLDERLUG ELIMINATED — INFORMATION ONLY — PILOT-2

Effective Prod s/n 123

DESCRIPTION:

The VARIABLE VOLTS/CM potentiometer is secured by a panel hole for the key, thereby eliminating the need for the lockwasher.

Parts Removed:		Parts Added:
Lug, solder, 1/4 in.	210-0223-00	

BANDWIDTH LIMITING CAPACITOR INCREASED TO ASSURE MEETING OF 1 MHz BANDWIDTH LIMIT — INFORMATION ONLY — M9620

Effective Prod s/n 120
w/exceptions 100, 101, 104, 107, 112, 115, 116 and 118

FRONT PANEL SYMPTOM: None.

PROBLEM: The 1 MHz bandwidth was running consistantly near the upper limit.

PRODUCTION CHANGE: The bandwidth limiting capacitor was effectively increased in value by adding a 47 pF capacitor (C252) in parallel with C253.

Parts Added:

C252	Capacitor, ceramic, 47 pF 500 V	281-0519-00

COMMON MODE REJECTION
AND TRANSIENT RESPONSE
CAPACITORS REPLACED TO PROVIDE
MORE STABLE MOUNTING

INFORMATION ONLY

M9578

Effective Prod s/n 130

FRONT PANEL SYMPTOM: None.

PROBLEM: The contacts on C713A, C715 and C723 were not wide enough to insure stable mounting when the capacitor is adjusted.

PRODUCTION CHANGE:

Capacitors C713A, C715 and C723 were changed from etched circuit board mounting type to type with wider mounting contacts. See drawings below.

Parts Removed:

C715	Capacitor, var, air 1.5-9.1 pF, EC brd mtg	281-0079-00
C713A, C723	Capacitor, var, air 1.8-13 pF, EC brd mtg	281-0081-00

Parts Added:

C715	Capacitor, var, air 1.5-9.1 pF, w/2-hole mtg	281-0101-00
C713A, C723	Capacitor, var, air 1.8-13 pF, w/2-hole mtg	281-0103-00