

Type 1A4

PRODUCT MODIFICATION INDEX

1

CHANNEL 1 INPUT AMPLIFIER

 circuit
 section — XXX.XX
 page

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
B020180	Channel 1 changed to eliminate breakage of INPUT SELECTOR switch contacts.	Pilot-9	101.01	-----	-----
B030370	R2 and C76 changed to improve bandpass.	12817	101.02	-----	-----
B050870	C64 changed to reduce AC ripple on trace. See Mod 14478.	13043-1	101.03	3h	-----
B050870	Resistors installed to eliminate ADD mode gain change.	13043-3	101.04	-----	-----
B082910	C64 replaced with physically smaller capacitor to eliminate selecting capacitor for physical size. 283-0059-00 replaced with 283-0177-00	14478	----	-----	-----
B093230	C46 changed to more rugged and less expensive capacitor. 281-0591-00 replaced with 283-0180-00.	14669	----	-----	-----
B115420 M/4	Low signal level triggering was improved by adding ferramic suppressors L105, L106, L107 and L108 and changing C101, C102, C103 and C104 from tantalum type to ceramic plate type.	16056	101.05	-----	-----
B115870	C54, C60, C86, C93 and C94, 1000pF chassis-mounted capacitors, changed from 281-0649-00 to 281-0039-00 to improve the yield. Mounting holes were enlarged to accommodate the new capacitor.	16557	----	-----	-----
B137540	R105, R106, R107 and R108, 47 Ω , 1/8W, 317-0470-00 changed to 47 Ω 1/4W, 315-0470-00, to facilitate assembly.	18297-1	----	-----	-----

5-26-72

* series model
 ##Indicates changes made since last publication.



Page 1

DF:jcp

2

ATTENUATORS

circuit
section — XXX.XX
page

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
B050870	C7 changed to improve X10 attenuator compensation.	13043-2	102.01	-----	-----

1-9-70

* series model



Type 1A4

PRODUCT MODIFICATION INDEX

3

OUTPUT AMPLIFIER

 circuit
 section — XXX.XX
 page

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
B040565	C349 removed to eliminate 500MHz oscillation.	13010-2	103.01	-----	-----
B104040	Q384, Q394 changed from metal case type transistor to plastic type for cost saving.	15299-1	103.02	-----	-----
B104040	Small trace shift occurring under certain conditions eliminated by adding ferramic cores.	15299-2	103.03	-----	-----
B126020	ADD-MODE oscillation prevented. Four toroid transformers, T300, T310, T320 and T330 were changed and four RC networks were added to the Output Amp board.	16802	103.04	-----	-----
B136686	Transistors, Q384 and Q394, were changed from 151-0225-00 to 151-0269-00 to improve bandwidth.	16813-1	----	-----	-----
B136686	Output circuit board layout was changed to incorporate changes made per mod 16802.	16813-2	103.05	-----	-----
B137540	R347 and R357, 15Ω 1/8W, 317-0150-00, changed to 15Ω 1/4W, 315-0150-00, to facilitate assembly.	18297-2	----	-----	-----

5-26-72

* series model

##Indicates changes made since last publication.



Page 3

4

CHANNEL SWITCHING LOGIC

circuit

section — XXX.XX

page

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
B050870	Q504 changed to reduce blanking pulse switch.	13043-4	104.01	10min	-----
B061177	C447 changed to increase pulse amplitude.	13708	104.02	-----	-----

1-9-70

* series model



Type 1A4

PRODUCT MODIFICATION INDEX

5

POWER SUPPLY

circuit
section — **XXX.XX**
page

EFF. SN. S.M.*	DESCRIPTION	MOD. NO.	PAGE	LABOR TIME	KIT NO.
B040565	Q627 changed to eliminate 50MHz oscillation.	13010-1	105.01	-----	-----

1-9-70

* series model



Page 5

6 MODE SWITCHING

circuit
section — XXX.XX
page

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

1-9-70

* series model



Page 6

C1 CHANGED TO ELIMINATE BREAKAGE OF INPUT SELECTOR SWITCH CONTACTS

Effective Prod SN B020180

The leads of capacitor 285-0697-00 (C1) were too stiff and were bending and breaking contacts on the lever switch to which they were soldered. In the finaling process it is necessary to bend the capacitor lead to attach it to the BNC plug.

Capacitor 285-0697-00 was replaced by capacitor 285-0749-00 which has a softer lead.

Parts Removed:

C1	285-0697-00	Capacitor, 0.1 μ F 600V
----	-------------	-----------------------------

Parts Added:

C1	285-0749-00	Capacitor, 0.1 μ F 600V
----	-------------	-----------------------------

*Pilot-9 designate modifications installed in Pilot Production that were not assigned a standard mod number.

R2 AND C76 CHANGED TO IMPROVE BANDPASS

Effective Prod SN B030370

Difficulty in meeting bandpass transient response specifications in test.

Parasitic suppressor resistor R2 was changed from 56Ω to 22Ω and paraphase amplifier high frequency peaking capacitor C76 was increased in value from 6.8pF to 10pF.

Parts Removed:

SW25	644-0016-00	Assembly, Attenuator switch
------	-------------	-----------------------------

Parts Added:

SW25	644-0016-01	*Assembly, Attenuator switch
------	-------------	------------------------------

*New assembly is identical to old except as follows:

Removed:	610-0198-00	Attenuator chassis, wired
----------	-------------	---------------------------

Added:	610-0198-01	**Attenuator chassis, wired
--------	-------------	-----------------------------

**New chassis is identical to old except as follows:

Removed:

R2	317-0560-00	Resistor, comp., 56Ω 1/8W 5%
C76	281-0616-00	Capacitor, cer., 6.8pF 200V

Added:

R2	317-0220-00	Resistor, comp., 22Ω 1/8W 5%
C76	281-0613-00	Capacitor, cer., 10pF 200V

C64 CHANGED TO REDUCE AC RIPPLE ON TRACE

Effective Prod SN B050870

Usable in SN B010100-B040869

Trigger Card, Model 2

Model 1 Trigger Cards

AC hum on CRT trace. Condition is worse in ADDED mode.

Ripple on the -15V supply is getting into the gate of Q53B.

C64 was increased in value from 0.001 μ F to 1 μ F, and a 3/8" buss wire was installed on the back side of the Logic board to decrease the resistance of the charging current path. See Mod 14478 (Index only).

Parts Removed:

C64	283-0000-00	Capacitor, ceramic, 0.001 μ F 500V	(4)
-----	-------------	--	-----

Parts Added:

C64	283-0059-00	Capacitor, ceramic, 1 μ F 25V	(4)
-----	-------------	-----------------------------------	-----

INSTALLATION:

Parts Required:

C64	283-0177-00	Capacitor, ceramic, 1 μ F 25V	(4)
-----	-------------	-----------------------------------	-----

Replace C64 in all channels with 1 μ F 25V capacitors. C64 is a 0.001 μ F discap located between pin 7 of Q53 and ground.

Solder a short piece of #22 bare wire between the anodes of D602B and D602D. Refer to Manual Maintenance Section (top view of logic board) for location.

RESISTORS INSTALLED TO ELIMINATE ADD MODE GAIN CHANGE

Effective Prod SN B050870

Indication of gain changing in ADD mode of operation when selecting different trigger sources.

The input resistance to the trigger amplifier varies between when it is connected to the trigger and when it is not connected. This variation in resistance results in a slight changing of the Gm of the Input Amplifier's input FET.

To reduce variations in the Trigger Amplifier input resistance, 47 Ω resistors were installed in the signal path and the Trigger Selector Balance circuit was moved to the source circuit of Q53B. The voltage to the Trigger Balance potentiometers was changed from -15V to +12.1V.

Parts Removed:

179-1106-00	Chassis, cable
-------------	----------------

Parts Added:

R105	179-1106-01	Chassis, cable
R106		
R107	317-0470-00	Resistor, comp., 47 Ω 1/8W 5%
R108		

Continued.

LOW SIGNAL LEVEL TRIGGERING IMPROVED

Effective Prod SN B115420/M4

Damped oscillations (25-30MHz) appearing on trigger output waveform prevented triggering on low level signals.

Ferramic suppressors were added on the leads of the four diodes, D105, D106, D107 and D108. C101, C102, C103 and C104 were changed from .22 μ F tantalum type to .2 μ F ceramic plate type.

Parts Removed:

C101		
C102		
C103	290-0269-00	Capacitor, .22 μ F 35V 5% tantalum EMT
C104		

Parts Added:

C101		
C102		
C103	283-0026-00	Capacitor, .2 μ F 25V ceramic plate
C104		
L105		
L106		
L107	276-0507-00	Ferramic suppressors
L108		

INSTALLATION:

Parts Required: See 'Parts Added'.

- a) Add ferramic suppressors L105, L106, L107 and L108 to the cathode leads of D105, D106, D107 and D108 respectively.
- b) Change C101, C102, C103, and C104 from .22 μ F 35V tantalum EMT to .2 μ F 25V ceramic plate. Capacitors are located on the Trigger Card connector, J140, between terminals M, N, P, and R respectively, and the slots in the connector mounting bracket. The lead at the bracket will have to be bent 90° for slot insertion.

C7 CHANGED TO IMPROVE X10 COMPENSATION

Effective Prod SN B050870

Variable compensating capacitor does not adjust near the center of its range.

C7 was reduced in value from 6.2pF to 5.6pF.

Parts Removed:

C7	281-0658-00	Capacitor, ceramic, 6.2pF 500V
----	-------------	--------------------------------

Parts Added:

C7	281-0544-00	Capacitor, ceramic, 5.6pF 500V
----	-------------	--------------------------------

C349 REMOVED TO ELIMINATE 500MHz OSCILLATION

Effective Prod SN B040565

Ground currents and capacitive coupling allow the output amplifier to oscillate.

C349 was removed to eliminate a loop and allow some degeneration.

Parts Removed:

C349	283-0002-00	Capacitor, ceramic, 0.01 μ F 500V
------	-------------	---------------------------------------

Q384, Q394 CHANGED FROM METAL CASE TYPE
TRANSISTOR TO PLASTIC TYPE FOR COST SAVING

Effective Prod SN B104040

Cost savings.

Transistors Q384 and Q394 were changed from metal case type 151-0138-00 to plastic type 151-0225-00. Transistor sockets were changed from four pin to three pin type. The new transistor also has slightly lower f_t which helps to reduce front corner aberrations.

Parts Removed:

Q384	151-0138-00	Transistor, 2N2857
Q394	136-0219-00	Socket, transistor 4 pin

Parts Added:

Q384	151-0225-00	Transistor, 2N3563
Q394	136-0225-00	Socket, transistor 3 pin

TRACE SHIFT ELIMINATED

Effective Prod SN B104040

A 200MHz oscillation occurs in the output of the input amplifier when that input is not turned on by the channel switching circuit and its variable sensitivity control is at minimum. For CHANNEL 1, the oscillation is most easily seen at pin A of the output board with CHANNEL 1 and 2 MODE switch in CHANNEL 2 and DISPLAY switch in CHANNEL 3 and 4. Similar set up for other channels. Adjustment of VARIABLE control in one channel causes small trace shift (1/4 to 1-1/2mm) in adjacent channels when in CHOPPED mode. A ferramic bead was added to one lead of peaking capacitors C301, C311, C321 and C331 to suppress the oscillation.

Parts Added:

L301		
L311		
L321	276-0507-00	Core ferramic suppressor
L331		

NOTE: Originally this mod incorrectly called out C302, C312, C322 and C331 being paralleled by L302, L312, L322 and L332. The Instruction Manual schematic was also incorrect.

ADD-MODE OSCILLATION PREVENTED

Effective Prod SN B126020

Oscillations could occur when using the VARIABLE VOLTS/CM control with all four channels in the ADD-MODE.

To prevent this, T300, T310, T320 and T330 were changed and four RC networks were added to the Output Amp board.

Parts Removed:

670-0125-00	Circuit Board, Output Amp
-------------	---------------------------

Parts Added:

*670-0125-01	Circuit Board, Output Amp
--------------	---------------------------

New Output Amp circuit board is the same as the old except for the following:

Parts Removed:

T300	120-0482-00	Transformer Toroid 2T
T310		
T320		
T330		

Parts Added:

C341,C344	*281-0651-00	Capacitor, fixed ceramic diel 47pF $\pm 5\%$ tubular
C351,C354		
R341,R344	*317-0150-00	Resistor, fixed, 15 Ω 1/8W 5%
R351,R354		
T300,T310	*120-0269-00	Transformer, Toroid 4 Turn
T320,T330		

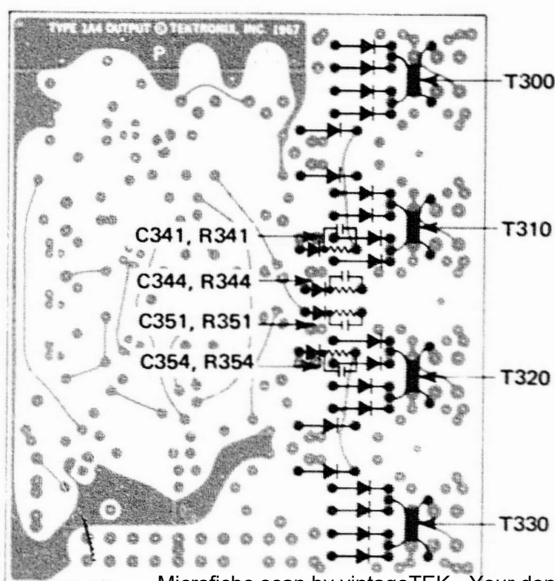
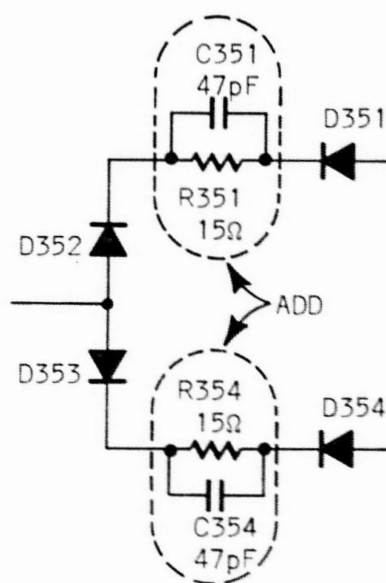
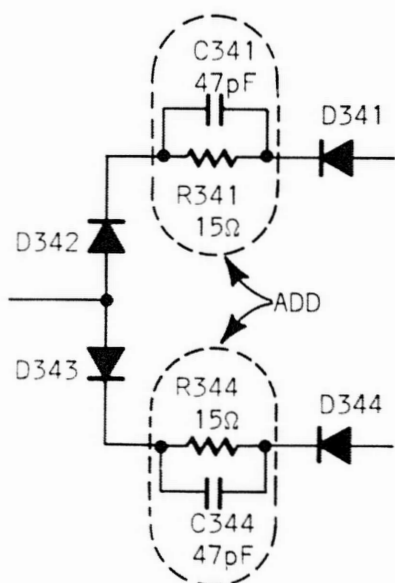
Continued.

INSTALLATION:

Parts Required: See 'Parts Added' with asterisk.

Refer to the drawing and modify the Output Amp board as follows:

- Change T300, T310, T320, and T330 from 120-0482-00 to 120-0269-00.
- Add C341/R341, C344/R344, C351/R351, and C354/R354, 47pF/15Ω networks to the cathode circuits of D341, D344, D351 and D354 respectively. Follow mounting detail carefully.



OUTPUT CIRCUIT BOARD LAYOUT CHANGED

Effective Prod SN B136686

The Output circuit board layout was changed to accommodate components added by Mod 16802. Due to new layout, all of the components added by Mod 16802 are not needed. Previous layout of components and connecting points required adding (4) 47pF capacitors and (4) 15 Ω resistors to eliminate oscillation. The new layout requires only (2) 150pF capacitors and (2) 15 Ω resistors.

Parts Removed:

C341		
C344		
C351	281-0651-00	Capacitor, fixed 47pF
C354		

R341		
R344		
R351	317-0150-00	Resistor, fixed comp., 15 Ω 1/8W 5%
R354		

Parts Added:

C347		
C357	281-0524-00	Capacitor, 150pF

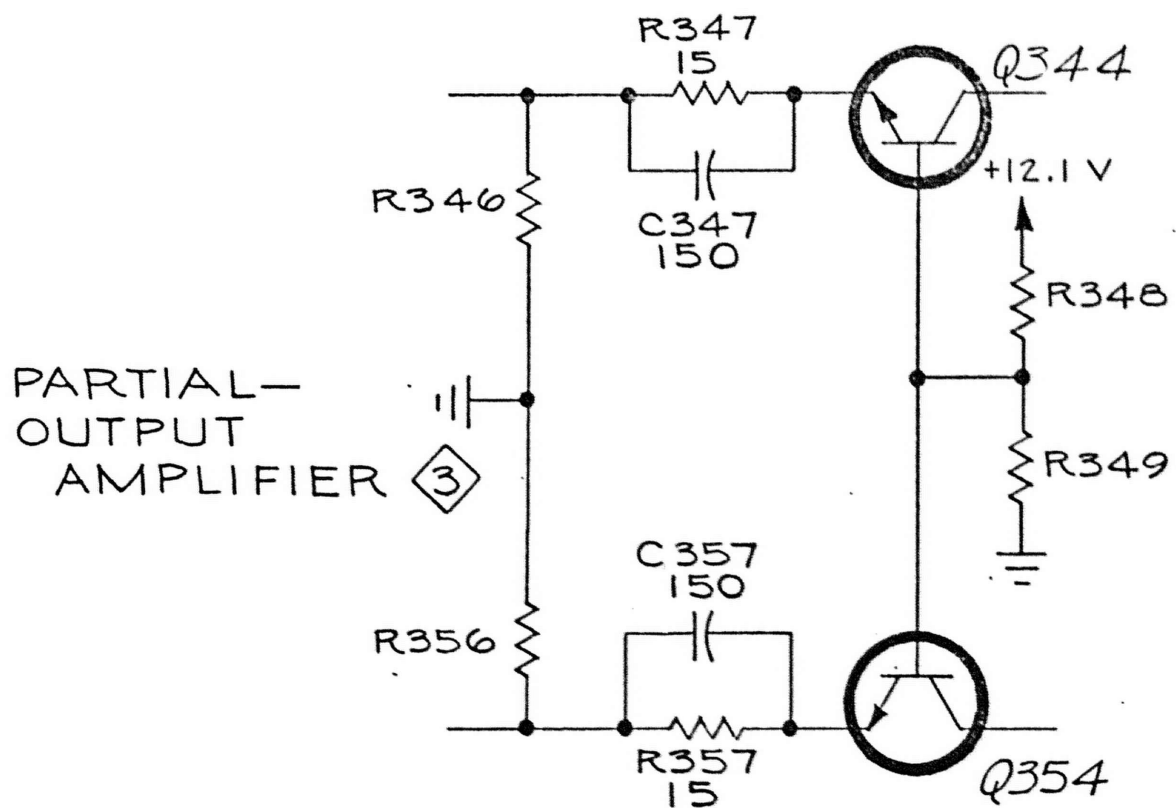
R347		
R357	317-0150-00	Resistor, fixed, comp., 15 Ω 1/8W 5%

Continued.

Indicates change since last publication.

M16813-2 (Continued)

Type 1A4



Q504 CHANGED TO REDUCE BLANKING PULSE SWITCH

Effective Prod SN B050870

Usable in SN B010100-B040869

The base spreading resistance of the transistor type used as Q504 was too large causing a long pulse width.

Q504 was changed from a 151-0192-00 to a 151-0190-00.

Parts Removed:

Q504	151-0192-00	Transistor, silicon
------	-------------	---------------------

Parts Added:

Q504	151-0190-00	Transistor, silicon
------	-------------	---------------------

INSTALLATION:

Parts Required: See 'Parts Added'.

Replace Q504 with a 151-0190-00 transistor.

C447 CHANGED TO INCREASE PULSE AMPLITUDE

Effective Prod SN B061177

Instrument will not alternate between Channel 1 and 2, and Channel 3 and 4.

C447 (180pF, 500V) is of too small a value to permit the full amplitude of the gating pulse to be applied to Q435 or Q445. Increasing the value of C447 to 270pF, 1000V will provide enough amplitude to turn off Q435 (or Q445, which ever is saturated) and insure proper "ALTERNATE MODE" operation.

C447 was changed from 180pF, 500V to 270pF, 1000V.

Parts Removed:

C447	283-0103-00	Capacitor, ceramic disc 180pF 5% 500V
------	-------------	---------------------------------------

Parts Added:

C447	283-0084-00	Capacitor, ceramic disc 270pF 5% 1000V
------	-------------	--

Q627 CHANGED TO ELIMINATE 50MHz OSCILLATION

Effective Prod SN B040565

Approximately 1 to 2 millimeters of 50 MHz oscillation on trace when operating in ADDED mode.

Due to the high frequency transistors in the $\pm 12.1V$ regulator circuit, there is sufficient phase shift present to cause oscillation when the Type 1A4 receives the alternate sync pulse.

Q627 was changed to a 151-0150-00 which has a much lower frequency rating than the type previously used.

Parts Removed:

Q627	151-0136-00	Transistor, silicon
------	-------------	---------------------

Parts Added:

Q627	151-0150-00	Transistor, silicon
------	-------------	---------------------