

# **MANUAL CHANGES**

-hp- MODEL 339A OPTION 001

## **DISTORTION MEASUREMENT SET**

Manual Part No. 00339-90001

**I** New or Revised Item

### **How To Use This Change Sheet.**

This change sheet, unlike most, is designed to be a supplement to your 339A Operating and Service Manual rather than a list of corrections or changes. Included is a description of Option 001 for the 339A along with specifications, performance test, replaceable parts, theory of operation, and schematics which apply to instruments with Option 001 installed.

Unless noted inside this supplement, specifications, performance test, and other data published in your Operating and Service Manual for the standard -hp- 339A will apply to Option 001 instruments.

### **Description.**

An -hp- 339A with Option 001 installed is a standard 339A Distortion Measurement Set with two additional voltmeter input ranges. These ranges are .3mV and .1mV full scale. Measurements capabilities are from .1mV rms full scale to .3mV rms full scale in a frequency range of 10Hz to 80kHz, and from .001V rms full scale to 300V rms full scale in a frequency range of 10Hz to 110kHz.

When switched to the .3mV range, the voltmeter attenuator is set to 0dB. When switched to the .1 mV range, the voltmeter attenuator remains at 0dB and 10dB of gain is added to the input amplifier. This gives the required input for full scale deflection on the front panel voltmeter.

These changes in voltmeter range have been accomplished by adding two additional positions on S4 of the Analyzer/Power Supply printed circuit assembly.

### **Specifications.**

Table 1-1a is a supplement to Table 1-1 in the standard instrument Operating and Service Manual.

### **Recommended Test Equipment.**

Equipment listed in Table 1-3 of the 339A Operating and Service Manual is also used on Option 001 instruments. In addition, to allow Full-Scale Accuracy and Frequency Response testing, the equipment listed in Table 1-3a is needed for Option 001 instruments.

**Table 1-1a. Specifications.**

Voltage Range:			
standard:	1mV rms full scale to 300V rms full scale ( - 60dB to + 50dB full scale, meter calibrated in dBV and dBm into 500 ohm).		
option 001:	.1mV rms full scale to 300 V rms full scale ( - 80dB to + 50dB full scale, meter calibrated in dBV and dBm into 600 ohm).		
Accuracy (% of range setting):			
standard:	20Hz to 20kHz	± 2%	@ INPUT RANGE .001V to 300V
	10Hz to 110kHz	± 4%	
option 001:	20Hz to 20kHz	± 2%	@ INPUT RANGE .001V to 300V
	10Hz to 110kHz	± 4%	
	20Hz to 20kHz	± 2%	@ INPUT RANGE .1mV and .3mV
	10Hz to 30kHz	± 4%	
	30kHz to 80kHz	+ 10%, - 30%	
Internal Noise Floor:			
option 001:	Filter Setting	Noise Level	
	30kHz	6uV	
	80kHz	8uV	

**Table 1-3a. Recommended Test Equipment.**

Instrument	Critical Specification	Recommended Model	Use
Resistors	100k ohm 1% metal film	-hp- Part No. 0757-0465	P
	100 ohm 1% metal film	-hp- Part No. 0757-0401	P
P = performance test			

**Operation.**

The ac voltmeter section of the Model 339A Option 001 measures the true rms value of input voltages from .1mV full scale to 300V full scale in fourteen ranges. Frequency range of the meter section is 10Hz to 80kHz for the .1mV and .3mV input ranges, and 10Hz to 110kHz for the .001V to 300V input ranges.

**Performance Test.**

All the performance test given in the standard 339A Operating and Service Manual are valid for use on instruments with Option 001. The following test is added to allow verification of Full-Scale Accuracy and Frequency Response of instruments with Option 001 installed.

**Full-Scale Accuracy and Frequency Response Test (Option 001).****Equipment Required:**

ac calibrator (-hp- Model 745A)  
100k ohm resistor (-hp- Part No. 0757-0465)  
100 ohm resistor (-hp- Part No. 0757-0401)

a. Set the 339A controls as follows:

FUNCTION.....  
FILTERS.....  
METER RESPONSE.....  
INPUT RANGE.....  
INPUT/GND SELECT.....  
(center position)

INPUT LEVEL  
OFF (out)  
VU  
.1mV  
DIS. AN/

b. Set-up the test equipment as shown in Figure 4-1a.

c. Set the AC Calibrator controls for an output of .1V @ 10Hz.

d. The 339A .1mV 10Hz meter indication should be within the Test Limits listed in Table 4-1a.

e. Using the AC Calibrator, verify the 339A Voltmeter accuracy for each .1mV Test Frequency in Table 4-1a.

f. Set the 339A controls as follows:

INPUT RANGE..... .3mV

g. Set the AC Calibrator controls for an output of .3mV @ 10Hz.

h. The 339A .3mV 10Hz meter indication should be within the Test Limits listed in Table 4-1a.

i. Using the AC Calibrator, verify the 339A Voltmeter accuracy for each .3mV Test Frequency in Table 4-1a.

Table 4-1a. Full-Scale Accuracy and Frequency Response Test Limits for Option 001.

Input Range & Input Level	FREQUENCY							
	10Hz	20Hz	100Hz	1kHz	10kHz	20kHz	30kHz	80kHz
	( $\pm 4\%$ )	TEST LIMITS ( $\pm 2\%$ )				( $\pm 4\%$ )		( $+10\%, -30\%$ )
.0001V	.000096-.000104	.000098-.000102				.000096-.000194		.000070-.00011
.0003V	.000288-.000312	.000294-.000306				.000288-.000312		.00021 -.00033

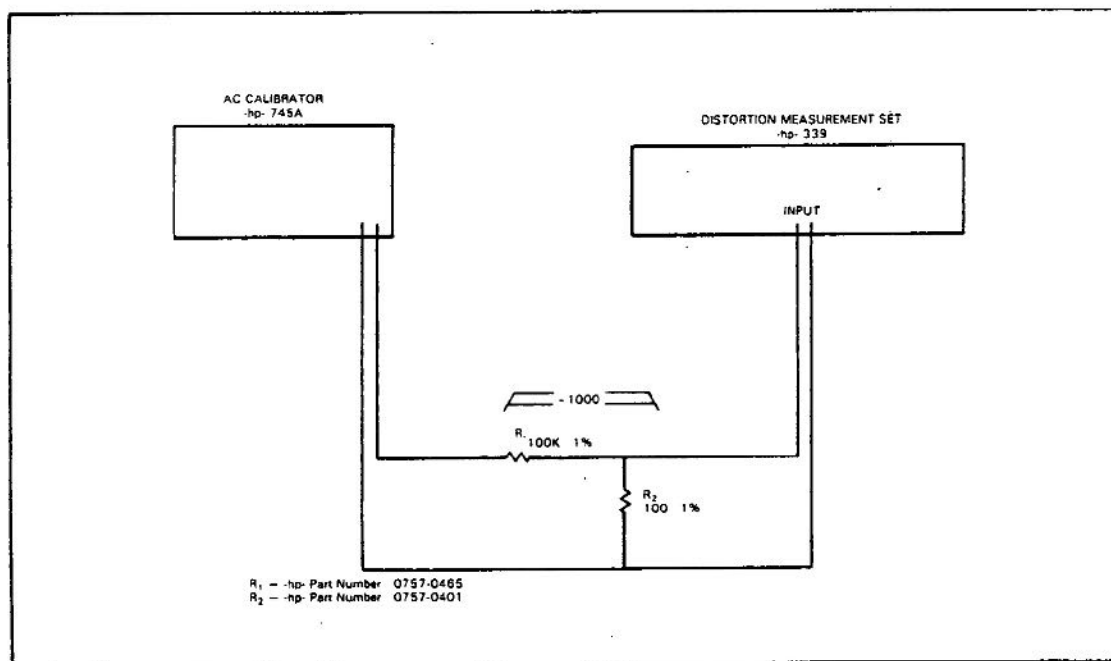


Figure 4-1a. Full-Scale Accuracy and Frequency Response Test  
Equipment Set-up For Option 001.

## VOLTMETER PERFORMANCE (Option 001).

Full-Scale Accuracy and Frequency Response Test:				
339A Input Level	339A Input Range	339A 20Hz Reading	30kHz Reading	Test Limits ( $\pm 4\%$ )
.0001	.0001			.000096-.000104
.0003	.0003			.000288-.000312

Input Level	339A Input Range	339A 20Hz Reading	339A 100Hz Reading	339A 1kHz Reading	339A 10kHz Reading	339A 20kHz Reading	Test Limits ( $\pm 2\%$ )
.0001	.0001						.000098-.000102
.0003	.0003						.000294-.000306

Input Level	339A Input Range	339A 80kHz Reading	Test Limits ( $\pm 10\%$ , $-30\%$ )
.0001	.0001		.000070-.00011
.0003	.0003		.00021 -.00033

## Replaceable Parts:

The -hp- 339A Distortion Measurement Set with option 001 installed uses an A53 Analyzer/Power Supply assembly instead of an A3 Analyzer/Power Supply. The boards are electrically the same with the following exceptions:

1. S4 has been changed to accommodate the two additional voltmeter input ranges. R127, 50.51 $\Omega$ , R126, 10k $\Omega$  and C126, 100pF are included as part of the switch assembly.
2. C323, C324, and R314 have changed values.

Table 6-3a. Replaceable Parts

Reference Designator	-hp- Part No.	Qty	Description
A53	00339-66553	1	Analyzer/Power Supply Assy.
S4	00339-61914	1	Switch Assy, Rotary
	3100-1657	1	Switch, Rotary
R126	0757-0442	1	Resistor-fxd 10k .01 1/8
C126	0160-4801	1	Capacitor-fxd 100pF 100V
R127	0699-0053	1	Resistor-fxd 50.51 $\Omega$ .25
	00339-04014	1	Knob Assy, INPUT RANGE
	1500-0580	2	Coupler, Flex
	3130-0552	1	Detent
C323	0180-0339	2	Capacitor-fxd 50uF 16V
C324	0180-0339	1	Capacitor-fxd 50uF 16V
R314	0683-1025	1	Resistor-fxd 1k .05 1/4

## Theory of Operation

The Input Amplifier operation for instruments with option 001 is the same as that of standard instruments except that two simple modifications have been added to allow for the two additional input ranges.

First, a fourteen position switch replaces the twelve position switch of the standard instrument. This allows the output attenuation to go to 0dB when either .1mV or .3mV input ranges of the voltmeter are selected.

Second, R127 (a 50.51 $\Omega$  resistor) is included as part of the fourteen position switch to add 10dB of gain to the input amplifier when the .1mV input range of the voltmeter is selected.

## Other A53 board changes:

The value of R314 decreased to 1k  $\Omega$  to reduce 120Hz pulses picked up on the .1mV scale (due to imbalance in power supply bypassing).

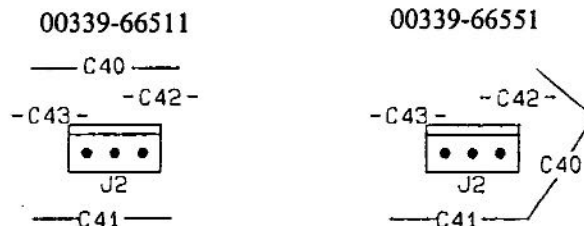
The values of C323 and C324 are increased to improve bypassing and stability in the 25kHz to 50kHz region.

C126 and R126 provide input compensation needed to prevent oscillation on the 0.1mV range with a high impedance source. They cancel the negative input impedance effects of U100.

Figure 8-2A is a simplified block diagram of the input amplifier of Option 001 instruments. The schematic is a revised version of Figure 8-13 found in the standard instrument Operating and Service Manual. It shows the electrical modifications performed to generate an -hp- 339A Option 001 instrument.

## Other board changes:

Because a different (shaft) coupler is used on the INPUT RANGE assembly, C40 on the oscillator board needs to be repositioned as per figure below. When ordering a replacement oscillator assembly for the 339A option 001, use part number 00339-66551. This part will come with C40 in the proper place.



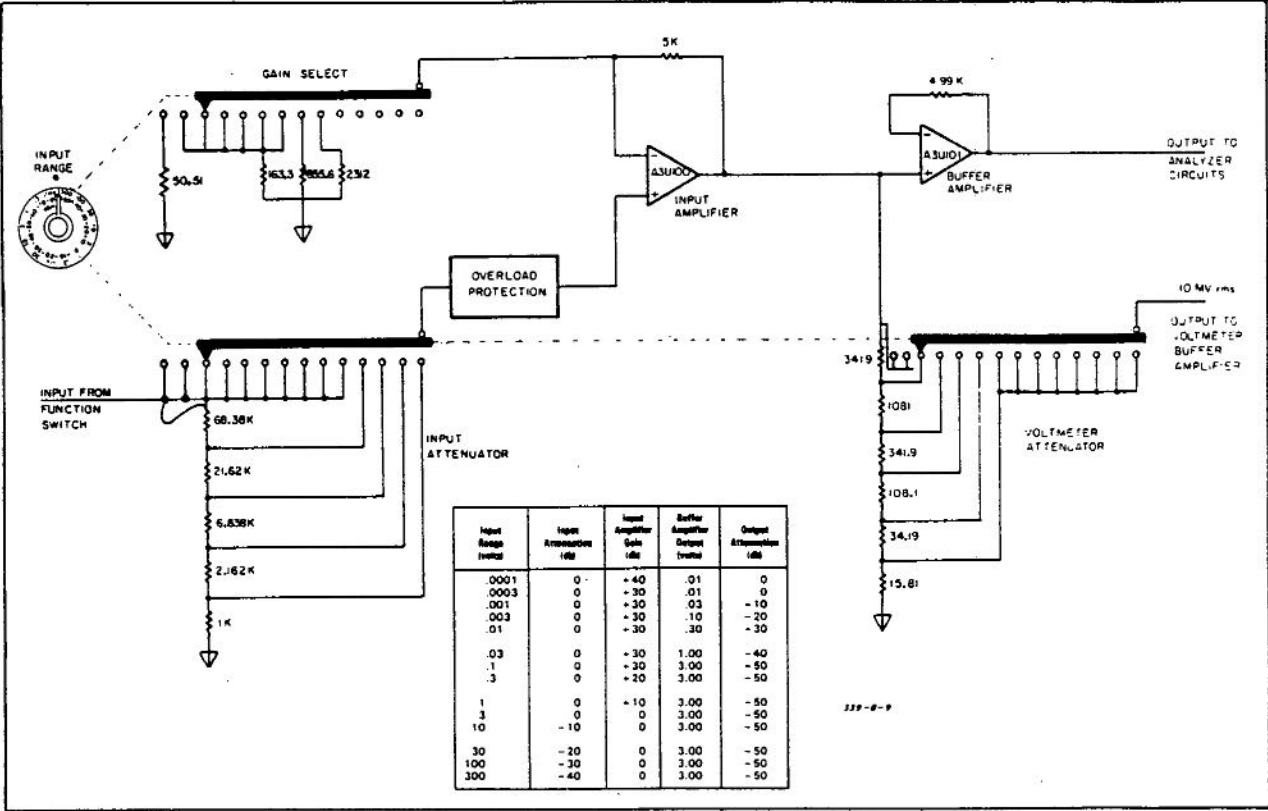
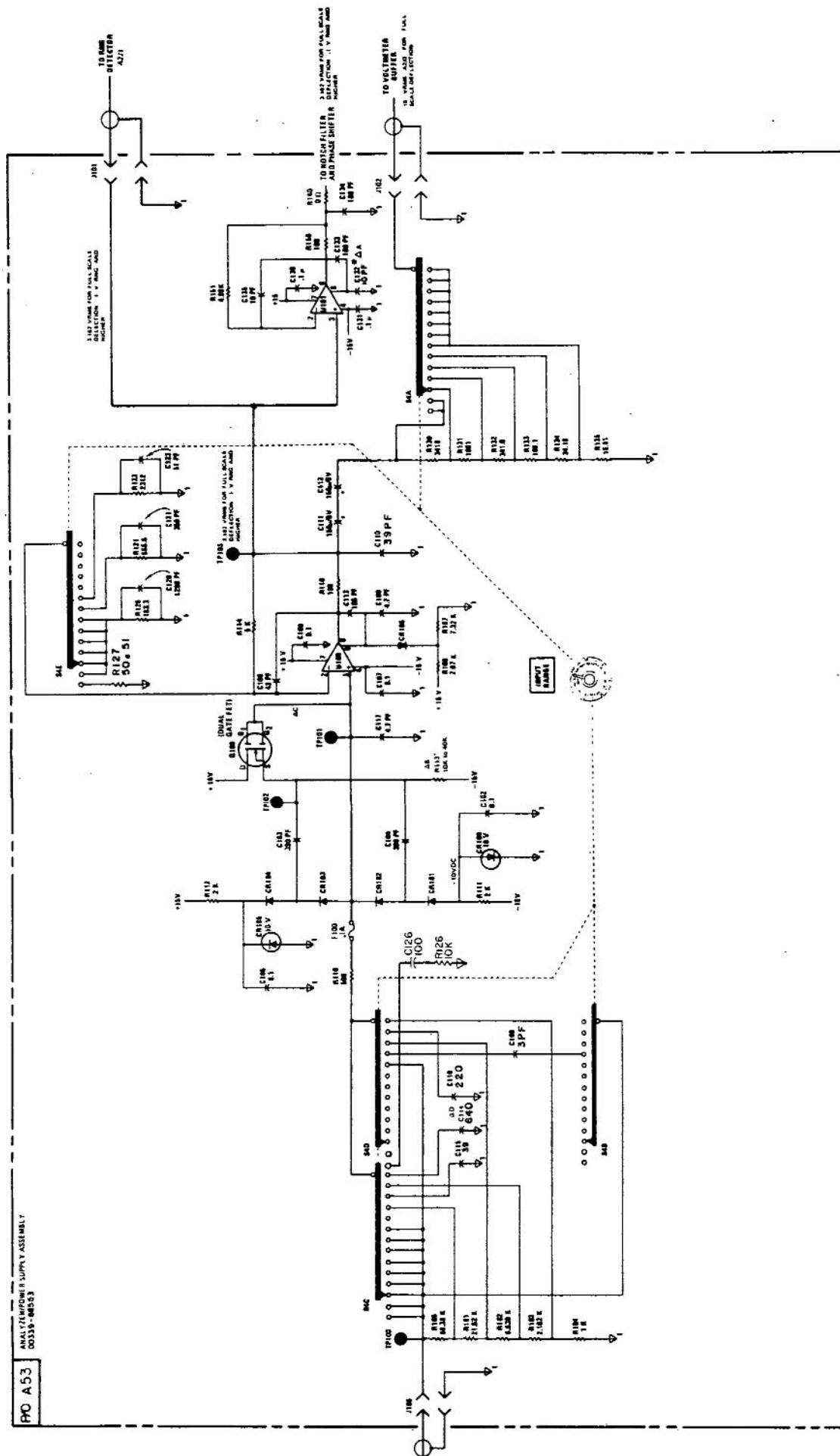


Figure 8-2a. Simplified Input Amplifier Schematic For Option 001 Instruments.



p/o Figure 8-13. Input Attenuator and Input Amplifier Option 001 Instruments.

# **MANUAL CHANGES**

-hp- MODEL 339A

## **DISTORTION MEASUREMENT SET**

Manual Part Number 00339-90001

### **New or Revised Item**

#### **ERRATA.**

Page 4-11, Figure 4-12. Change the part number of the SHIELD (item 7) from 1251-1073 to 1251-0173.

Page 4-11, Paragraph 4-25a. The INPUT RANGE should be 0.1V, not 1V.

Page 4-12, Paragraph 4-26b. The sentence should read, "Connect the equipment as shown in Figure 4-13 without the 100 k $\Omega$  series resistor."

Page 8-11/8-12, Figure 8-12. Change the value of capacitor C1 from 0.1 to .01 mfd.

**CHANGE NO. 1** (applies to instruments with serial numbers 1730A00266 and greater).

Page 6-9, Table 6-3. Delete parts A4L3 and A4L4 -hp- part number 9170-0894.

Page 6-10, Table 6-3. Add the following parts:

A4R67	0757-0407	Resistor 200 $\Omega$ 1% .125 W
A4R68	0757-0407	Resistor 200 $\Omega$ 1% .125 W

Page 8-17, Figure 8-15. Delete parts L3 and L4 from the schematic. Add resistors R67 and R68 as shown in Figure 1.

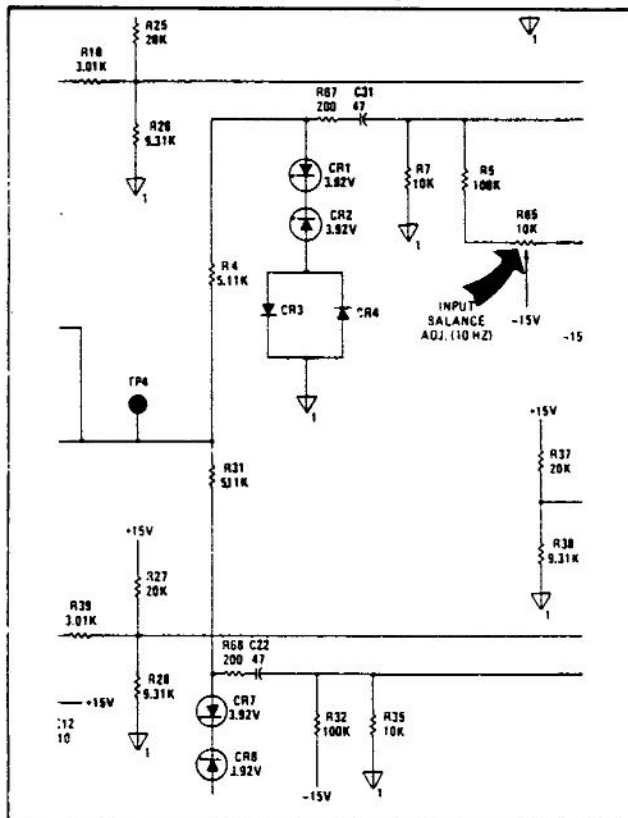


Figure 1.

Resistor R67 and R68 have replaced L3 and L4 for the prevention of high frequency oscillation.

**CHANGE NO. 2** (applies to instruments with serial numbers 1730A00409 and greater).

Page 6-5, Table 6-3. Change A2R22 from 2100-0568 Resistor Trimmer 100  $\Omega$  10% to 2100-3212 Resistor Trimmer 200  $\Omega$  10%.

Page 6-6, Table 6-3. Add the following part:

A2R43	0757-0400	Resistor 90.9 $\Omega$ 1% .125 W TC=0+-100
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Page 8-19/8-20, Figure 8-16. Change the value of resistor R22 from 100  $\Omega$  to 200  $\Omega$  on the schematic diagram. Add resistor R43 as shown in Figure 2.

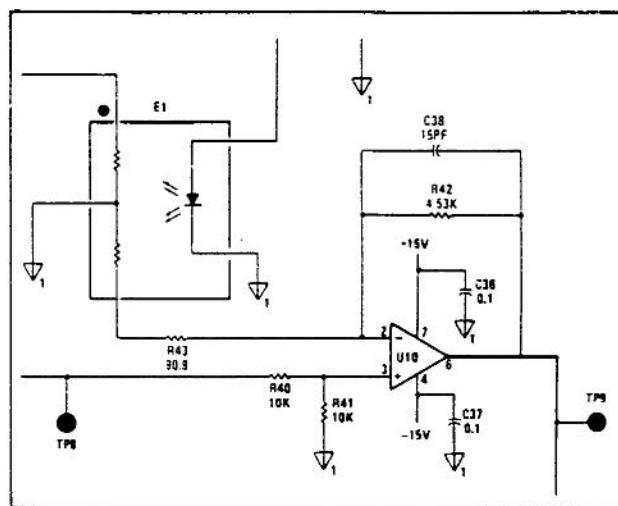


Figure 2.

Resistor R43 has been added and the value of R22 has been changed to compensate for possible tracking errors of the photo-resistors in photo-module E1.

#### **NOTE**

*Not all replacement photo-modules will work properly in instruments which do not have this modification.*

**CHANGE NO. 3** (applies to all instruments).

Page 6-8, Table 6-3. Change R113 to \*R113 (selected component). Add the following padding list for \*R113:

0757-0442	Resistor 10 K	1%	.125 W F TC=0 $\pm$ 100
0757-0449	Resistor 20 K	1%	.125 W F TC=0 $\pm$ 100
0757-0453	Resistor 30.1 K	1%	.125 W F TC=0 $\pm$ 100
0698-3499	Resistor 40.2 K	1%	.125 W F TC=0 $\pm$ 100

Page 8-13/8-14, Figure 8-13. Change R113 to \*R113 and change the nominal value from 10 k $\Omega$  to 30.1 k $\Omega$  on the schematic diagram.

This change has been made to permit compensation for differences in the dynamic characteristics of FET's used for Q100. The value of \*R113 is selected to minimize distortion introduced by the input amplifier stage.

#### CHANGE NO. 4 (applies to all instruments).

Page 6-10, Table 6-3. Change A4R23 from 0698-3445 Resistor 348  $\Omega$  1% to 0698-4450 Resistor 324  $\Omega$  1%. Change A4R55 from 0698-4453 Resistor 402  $\Omega$  1% to 0698-3445 Resistor 348  $\Omega$  1%.

Page 8-17, Figure 8-15. Change the value of R23 from 348  $\Omega$  to 324  $\Omega$  and the value of R55 from 402  $\Omega$  to 348  $\Omega$  on the schematic diagram.

These changes have been made to insure that the proper current is available to drive photo-modules A3E1 and A3E2.

#### CHANGE NO. 5 (applies to instruments with serial numbers 1730A00451 and greater).

Page 6-7, Table 6-3. Change capacitor A3C302 from 0160-2628 (.03 mfd.) to 0150-0052 (.05 mfd.).

Page 6-8, Table 6-3. Add the following resistor:

A3R314 0683-1035 Resistor 10 k $\Omega$  5% 1/4 W

Page 8-23/8-24. Change the Power Supply schematic diagram as shown in Figure 3.

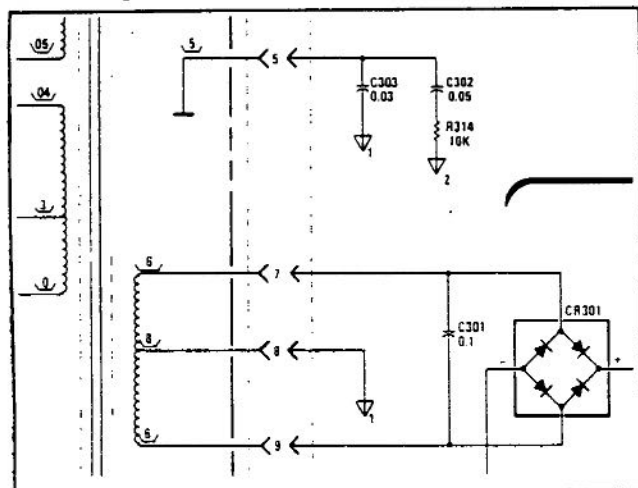


Figure 3.

#### CHANGE NO. 6 (applies to all instruments).

Page 6-10, Table 6-3. Change the part number and value of A4R59 from 0757-0407, 200 $\Omega$  to 0757-0410, 301 $\Omega$ . Change the part number and value of reference designator A4R60 from 0757-0407, 200 $\Omega$  to 0757-0401, 100 $\Omega$ .

Page 8-17, Figure 8-15. Change the schematic value of R59 from 200 $\Omega$  to 301 $\Omega$  and the value of R60 from 200 $\Omega$  to 100 $\Omega$ . Change the voltage level at the junction of R59 and R60 from +0.7 to +0.5 volts.

This change establishes a new reference for A4U6C to insure that the "HI" frequency indicator is extinguished when the proper range is selected.

#### NOTE

*If it is necessary to change photo-module A3E1 be certain that A4R59 and A4R60 are the new values listed in this change.*

#### CHANGE NO. 7. (applies to all instruments.)

Page 1-2, Table 1-1. Changed Fundamental Rejection specification for frequency range 50KHz to 110 KHz from >86 dB to >83 dB

Page 4-10, Table 4-8. Change table as shown.

Table 4-8. Fundamental Rejection and Induced Distortion Test

Test Frequency	Fundamental Rejection Specification	Induced Distortion Specification
10 Hz 100 Hz 1kHz 10kHz 20 kHz	>-100 dB	>-95 dB
30kHz		>-90 dB
50kHz	>-90 dB	>-85 dB
110kHz	>-83 dB	>-70 dB

Page 4-18. Change "Fundamental Rejection and Induced Distortion Test" form as shown.

#### Fundamental Rejection and Induced Distortion Test:

Test Frequency	339A Fundamental Rejection	Test Limit	339 Induced Distortion	Test Limit
10Hz	_____		_____	
100Hz	_____		_____	
1kHz	_____	-100 dB	_____	-95 dB
10kHz	_____		_____	
20kHz	_____		_____	
30kHz	_____		_____	-90 dB
50kHz	_____	-90 dB	_____	-85 dB
110 kHz	_____	-83 dB	_____	-70 dB

#### CHANGE NO. 8 (applies to all instruments).

Page 6-14, Table 6-3. Change miscellaneous part MP12 part number to 00339-04111. Change miscellaneous part MP13 part number to 00339-04102. Add part number 5041-3155, quantity 10, description "SHAFT EXTENDER".

#### CHANGE NO. 9 (applies to all instruments).

Page 6-9, Table 6-3. Change the part number of A4C25 from 0180-2338 to 0180-2927. The new part is the same value but with a leakage specification of 0.6 uA maximum after 2 minutes @ 9 VDC.



**CHANGE NO. 10 (applies to all instruments).**

Page 6-3, Table 6-3. Add the following list of part numbers and values to A1C47\*:

0160-0356	CAPACITOR-FXD 18pF
0160-2306	CAPACITOR-FXD 27pF
0160-0204	CAPACITOR-FXD 47pF
0160-0376	CAPACITOR-FXD 68pF
0140-0193	CAPACITOR-FXD 82pF
0140-0194	CAPACITOR-FXD 110pF
0140-0198	CAPACITOR-FXD 200pF

Note that the value most often installed by the factory will be 200pF. The other values are possible alternatives. Selection of this value will optimize the high frequency (> 100kHz) distortion.

Page 8-21/8-22, Figure 8-17. Change the value listed on the schematic for C47\* from 510pF to 200pF.

**CHANGE NO. 11 (effective on serial numbers 1730A01162 to 1730A01958).**

Page 6-9, Table 6-3. Add A4C32\* and the following list of part numbers and values:

0160-2248	CAPACITOR-FXD 4.3pF
0160-2249	CAPACITOR-FXD 4.7pF
0160-2250	CAPACITOR-FXD 5.1pF
0160-2251	CAPACITOR-FXD 5.6pF
0160-2252	CAPACITOR-FXD 6.2pF

Note that the value most often installed by the factory will be 5.1pF. The other values are possible alternatives.

Page 8-17, Figure 8-15. Add capacitor C32\* in parallel with R2. The value of C32\* should be listed as 5.1pF.

This addition will provide phase shift at 110 kHz which will improve the fundamental rejection at that frequency.

(applies to all instruments)  
(effective on serial number 1730A01958 and above)

The installed value for C32\* is 6.2pF. Since the above list already includes this value a schematic change is all that is necessary.

**CHANGE NO. 12 (applies to all instruments)  
(effective on serial number 1730A00596 and above).**

Page 6-5, Table 6-3. Change the part number of A2C23 from 0180-1746 to 0180-2944. The new part is the same value but has a leakage specification of 0.05 uA maximum @ 14 VDC.

C23 is used to slow the response time of the rms detector U5, which consequently slows the meter response in the NORMAL mode. In the VU mode C23 is switched out of the circuit. If the dc leakage through C23 exceeds .05uA a dc voltage offset occurs at pin 4 of U5 causing an erroneous meter reading.

Page 6-7, Table 6-3. Change the part number and value of A3C324 from 0180-0374, 10uF to 0180-0374, 15uF.

Page 8-23/8-24, Figure 8-18. Change the schematic value of C324 from 10uF to 15uF.

Raising the value of this capacitor will lower the ac impedance of the -15V power supply to the A2 board. This will improve the operation of the 80 kHz filter.

**CHANGE NO. 13 (applies to all instruments) (effective on Serial Number 1730A00776 and above).**

Page 6-3, Table 6-3. Change the part number and value of A1C21 from 0180-1745, 1.5uF to 0180-0197, 2.2uF.

Page 8-21/8-22, Figure 8-17. Change the schematic value of C21 from 1.0uF to 2.2uF.

This change reduces the 10Hz ripple in the amplitude control circuits. A large ripple voltage at TP4 can cause CR4 to turn on which causes harmonic distortion.

Page 6-5, Table 6-3. Delete all information on A2C21.

Page 8-19/8-20, Figure 8-16. Delete C21 from the schematic.

This part has been deleted because the newer rms detectors (A2U5) do not require its use.

(effective on serial numbers 1730A00776 to 2025A02646)

Page 6-4, Table 6-3. Change the part number and value of A2C13 from 0160-2244, 3pF to 0160-2236, 1pF.

Page 8-19/8-20, Figure 8-16. Change the schematic value of C13 from 3pF to 1pF.

This change has come about to increase the bandwidth of A2U4. The old rms detector, A2U5, had a peak in the response at 110kHz which compensated for the reduced bandwidth of A2U4. The new detectors (marked AD536AJ) don't have this peak in their frequency response.

(applies to all instruments)  
(effective on serial numbers 2025A02646 and above)

Page 6-4, Table 6-3. Delete all information on reference designators A2C11 and A2C13.

Page 8-19/8-20, Figure 8-16. Delete schematic symbols, values, and designators for C11 and C13.

(effective on serial numbers 1730A00776 to 2025A02228)

Page 6-6, Table 6-3. Change the part number and value for A3C114 from 0160-0363, 620pF to 0160-2209, 360pF.

Page 8-13/8-14, Figure 8-13. Change the schematic value of C114 from 620pF to 360pF.

(applies to all instruments)  
(effective on serial number 2025A02228 and above)

Page 6-6, Table 6-3. Change the part number and value of reference designator A3C114 from 0160-2209, 360 pF to 0160-0341 640pF.

Page 8-13/8-14, Figure 8-13. Change the schematic value of C114 from 360pF to 640pF.

**CHANGE NO. 14 (applies to all instruments)  
(effective on serial number 1730A00844 and above).**

Page 6-10, Table 6-3. Change the part number and value for A4R48 and A4R52 from 0698-4435, 2.49kΩ to 0698-3515, 5.9kΩ.

Page 8-17, Figure 8-15. Change the schematic values of R48 and R52 from 2.49kΩ to 5.9kΩ.

This change is being done to decrease the lock-in time of the notch. Low level 120Hz line signals could beat with the fundamental when the 339 is tuned to 100Hz causing "out of specification" distortion readings at 100Hz.



**CHANGE NO. 15 (applies to all instruments)**  
(effective on serial number 1730A00918 and above).

Page 6-8, Table 6-3. Change the part number and value of A3C132\* from 0160-2249, 4.7pF to the following list:

0160-2251	CAPACITOR-FXD 5.6pF
0160-2253	CAPACITOR-FXD 6.8pF
0160-2254	CAPACITOR-FXD 7.5pF
0160-2255	CAPACITOR-FXD 8.2pF
0160-2256	CAPACITOR-FXD 9.1pF
0160-2257	CAPACITOR-FXD 10pF
0160-2259	CAPACITOR-FXD 12pF
0160-2261	CAPACITOR-FXD 15pF

Note that the value most often installed by the factory is 10pF. This change is to prevent U101 from oscillating.

Page 8-13/8-14, Figure 8-13. Change the schematic value of C132\* from 4.7pF to 10pF.

The two gates of Q100 should be connected to pin 3 of U100 instead of pin 2 as shown. On the schematic break the line between the gates common point and the feedback loop of U100 and draw a new line straight down to TP101 and pin 3 of U100.

Source-follower Q100 keeps the voltage across the input protection diodes constant. Prior to this change the bootstrap voltage came from the feedback network of U100 (pin 2) rather than the input signal, causing distortion at higher frequencies due to the delay in the feedback signal.

**CHANGE NO. 16 (effective on serial numbers 1730A00918 to 1730A02436).**

Page 6-8, Table 6-3. Add A3R60, part number 2100-3210, value 10KΩ.

Page 8-15/8-16, Figure 8-14. Add R60, a 10k variable resistor, in series with A3E1 photoresistor.

(applies to all instruments)  
(effective on serial number 1730A02436 and above)

Page 6-8, Table 6-3. Delete all information on A3R60.

Page 8-15/8-16, Figure 8-14. Remove R60 and replace with a wire jumper.

This was installed to insure that phase control (which runs the error lights) would not pull down to as low a bridge resistance as the amplitude control and the LO frequency lamp always lights to signal when the frequency is too low. It was later removed because it was seldom used.

**CHANGE NO. 17 (applies to all instruments) (effective on serial numbers 1730A00850 to 1730A00858 and 1730A00986 and above).**

Page 6-8, Table 6-3. Add reference designator A3C28, part number 0160-2264, value 20pF.

Page 6-8, Table 6-3. Change the part number and value for the following reference designators:

A3R42	from 0698-3161 38.3kΩ	to 0757-0454 33.2kΩ
A3R43	from 0757-0451 24.3kΩ	to 0698-3158 23.7kΩ
A3R48	from 0757-0446 15kΩ	to 0757-0452 27.4kΩ
A3R49	from 0698-3152 3.48kΩ	to 0757-0439 6.81kΩ

Page 8-15/8-16, Figure 8-14. Change the schematic values of the resistors above as shown. Add C28, value 20pF in parallel with R49.

The addition of C28 and the change in value of R49 is to eliminate a 5MHz oscillation in A3U3. The other resistor changes allow the

photocells A3E1 and A3E2 to pull the notch in through a wider range of frequencies. Prior to this change, photocells which met specifications but were at the limits would not work.

**CHANGE NO. 18 (applies to all instruments)**  
(effective on serial number 1730A01488 and above)

Page 6-12, Table 6-3. Change the part number of reference designator F2 from 2110-0384 to 2110-0612.

The old fuse caused 3rd order harmonic distortion at low frequencies due to its thermal properties.

**CHANGE NO. 19 (effective on serial numbers 1730A01758 to 2025A03427)**

Page 6-8, Table 6-3. Change the part number and value of A3C100 from 0160-2251, 5.6pF to 0140-0209, 5pF.

Page 8-13/8-14, Figure 8-13. Change the value of C100 from 5.6pF to 5pF.

This change eliminates the possibility of a short from 10V to ground.

(applies to all instruments)  
(effective on serial number 2025A03427 and above)

Page 6-8, Table 6-3. Change the part number and value of A3C100 from 0140-0209, 5pF to 0160-2244, 3pF.

Page 8-13/8-14, Figure 8-13. Change the value of C100 from 5pF to 3pF.

**CHANGE NO. 20 (applies to all instruments)**  
(effective on serial number 2025A02226 and above)

Page 6-8, Table 6-3. Change the part number and value of the following reference designators as shown below:

A3C115	from 0160-2263 18pF	to 0140-0190 39pF
A3C116	from 0140-0195 130pF	to 0160-0134 220pF

Page 8-13/8-14, Figure 8-13. Change the value of C115 from 18pF to 39pF and of C116 from 130pF to 220pF.

Page 6-5, Table 6-3. Add A2C50 and A2C51 whose part numbers are 0160-4571 and values are .1uF.

Page 6-6, Table 6-3. Add reference designators A2R50 and A2R51 whose part numbers are 0757-0401 and values are 100Ω.

Page 8-19/8-20, Figure 8-18. Add R50, R51, C50, and C51 to the schematic as shown in Figure 4.

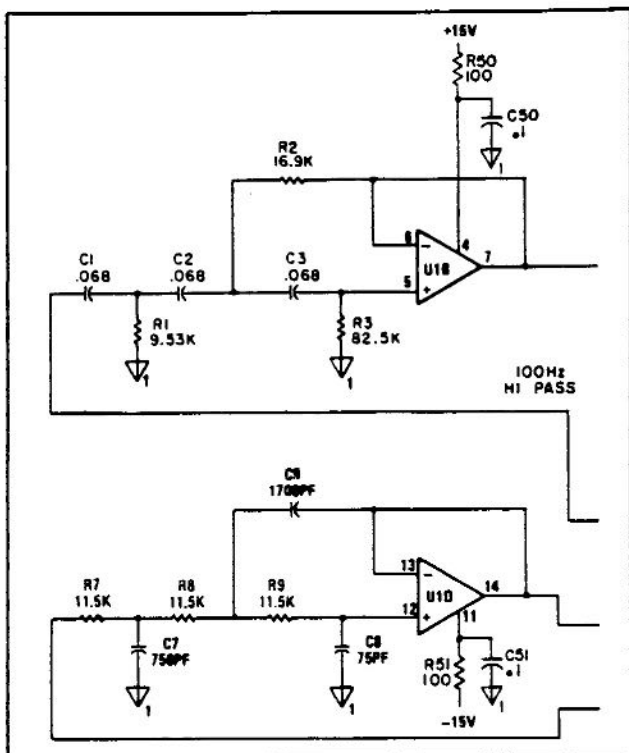


Figure 4

This change is to decouple power supplies on A2U1 to reduce the affect of internal oscillation on the 80kHz filter response. The values of C114, C115 and C116 are changed to compensate for the stray capacitance in the new 00339-26513 printed circuit board. (See change no. 13 for information on C114).

(effective on on serial number 2025A02228 to 2025A02436)

Page 8-9, Table 8-3. Change the part number of A3U200 from 1826-0109 to 1826-0413.

(effective from serial number 2025A02228 to 2025A02788)

Page 8-7, Table 8-3. Change the part number and value of A3C205 from 0160-2264, 20pF to 0160-2200, 43pF.

Page 8-15/8-16, Figure 8-14. Change the value of C205 from 20pF to 43pF.

(effective on serial number 2025A02436 to 2025A02788)

Page 8-9, Table 8-3. Change the part number for A3U200 from 1826-0413 to 1826-0081.

(applies to all instruments)  
(effective on serial number 2025A02788 and above)

Page 8-9, Table 8-3. Change the part number for A3U200 from 1826-0081 to 1826-0413.

Page 8-7, Table 8-3. Change the part number and value of A3C205 from 0160-2200, 43pF to 0160-2198, 20pF.

Page 8-15/8-16, Figure 8-14. Change the value of C205 from 43pF to 20pF.

These changes reduce noise in the Analyzer Mode due to the LM-318 Op Amp. Meter readings at 1kHz with a clean source are typically -94dB. With the HA 2605 the meter typically reads -96dB.

CHANGE NO. 21 (applies to all instruments)  
(effective on serial number 2022A02156 and above).

Page 8-14, Table 8-3. Change the part numbers for the following miscellaneous parts:

MP9 from 00339-00603 to 00339-00613  
MP10 from 00339-00601 to 00339-00611  
MP11 from 00339-00602 to 00339-00612  
MP14 from 00339-00604 to 00339-00614  
MP15 from 00339-00605 to 00339-00615

(effective on SN 1730A02156 and above)

Page 8-13, Table 8-3. Add part number 00339-23201, Qty 5, Coupler, Shaft.

CHANGE NO. 22 (applies to all instruments)  
(effective on serial number 2025A02296 and above).

Page 8-4, Table 8-3. Change the part number of A1U2 from 1826-0315 to 1826-0557.

Page 8-6, Table 8-3. Change the part number of A2U8 from 1826-0315 to 1826-0557.

Page 8-7, Table 8-3. Delete all information on A3J2.

Page 8-10, Table 8-3. Change the part number of A4U3, A4U5, and A4U6 from 1826-0315 to 1826-0557.

(effective on serial numbers 1730A02156 to 2025A03718)

Page 8-6, Table 8-3. Change the part number for A2U1 from 1826-0315 to 1826-0557.

The change of IC part numbers is to a ceramic part to prevent field failures due to phosphorus contamination.

(applies to all instruments)  
(effective on Serial Number 2025A03718 and above)

Page 8-8, Table 8-3. Change the part number of A2U1 from 1826-0557 to 1826-0323.

CHANGE NO. 23 (applies to all instruments)  
(effective on serial number 2025A02366 and above).

Page 8-11, Table 8-3. Add part number 00339-00616, "SHIELD, PCB".

CHANGE NO. 24 (applies to all instruments)  
(effective on serial number 1730A02436 and above).

Page 8-7, Table 8-3. Change the part number and value for A3F100 from 2110-0011, .062A to 2110-0236, .1A.

Page 8-13/8-14, Figure 8-13. Change the value of F100 from .062A to .1A.

**CHANGE NO. 25 (effective on serial numbers 2025A02436 to 2025A02786).**

Page 6-7, Table 6-3. Delete all information on A3C202, A3C203, A3C204, A3CR200, and A3CR201.

Page 6-15/8-16, Figure 8-14. Delete schematic symbols, values, and designators for C202, C203, C204, CR200, and CR201.

(applies to all instruments)  
(effective on serial number 2025A02786 and above)

Page 6-7, Table 6-3. Add the following reference designators, part numbers, and values:

A3C204 0160-2201 51pF  
A3CR200 1901-0040 Diode  
A3CR201 1901-0040 Diode

Page 6-15/8-16, Figure 8-14. Replace C204, CR200 and CR201 where they were in the schematic originally.

The end result is to delete C202 and C203.

**CHANGE NO. 26 (applies to all instruments).**

Page 6-13, Table 6-3. Change the description of part number 00339-04004 from "KNOB, TENS" to "KNOB, UNITS". Change the description of part number 00339-04005 from "KNOB, UNITS" to "KNOB, TENS".

**CHANGE NO. 27 (applies to all instruments)  
(effective on serial number 1730A02716 and above).**

Page 6-12, Table 6-3. Just above the listing of W4 add part number 00339-61915, "SWITCH ASSY." and move the reference designator W4 up to the new listing. Just above the listing of W5 add part number 00339-61916, "SWITCH ASSY." and move the reference designator W5 up to the new listing.

Page 6-13, Table 6-3. Just above the listing of W10 add part number 00339-61917, "SWITCH ASSY." and move the reference designator W10 up to the new listing.

**CHANGE NO. 28 (effective on serial numbers 2025A02646 to 2025A03716).**

Page 6-4, Table 6-3. Change the part number and value of the reference designators below as listed:

A2C4 from 0160-0341 640pF to 0160-2940 470pF  
A2C5 from 0160-2201 51pF to 0140-0192 68pF

Page 6-19/8-20, Figure 8-16. Change the value of C4 from 640pF to 470pF and that of C5 from 51pF to 68pF.

(applies to all instruments)  
(effective on serial number 2025A03716 and above)

Page 6-4, Table 6-3. Change the part number and value of the reference designators below as listed:

A2C4 0160-2940 470pF to 0140-0234 500pF  
A2C5 0140-0192 68pF to 0160-3083 62pF

Page 6-19/8-20, Figure 8-16. Change the value of C4 from 470pF to 500pF and that of C5 from 68pF to 62pF.

This change improves, 1) gain above 100kHz, and 2) 80kHz filter response. Changing A2R6 is part of this update. See change no. 29.

(applies to all instruments)  
(effective on serial number 2025A02646 and above)

Page 6-4, Table 6-3. Change the part number and value of A2C15 from 0160-2201 51pF to 0160-2204 100pF.

Page 6-19/8-20, Figure 8-16. Change the value of C15 from 51pF to 100pF.

Page 6-13, Table 6-3. Change the part numbers and descriptions of the following items:

from 2110-0465 to 2110-0564 FUSEHOLDER  
from 2110-0467 to 2110-0565 CAP, FUSEHOLDER  
from 2110-0470 to 2110-0569 NUT, FUSEHOLDER

**CHANGE NO. 29 (applies to all instruments)  
(effective on serial number 2025A03716 and above).**

Page 6-13, Table 6-3. Change the part number of W7 from 00339-61607 to 00339-61612 and that of W7S10 from 3101-1656 to 3101-2216. The description for W7S10 should read "SWITCH POWER". Below that listing delete all information on part number 5040-5932 and add 8120-0593, "CABLE SHIELD".

Page 6-14, Table 6-3. Change the part number of MP1 from 00339-00201 to 00339-00211 and that of MP2 from 00339-00202 to 00339-00212.

Page 6-5, Table 6-3. Change the part number and value for A2R6 from 0698-4445, 5.76k $\Omega$  to 0698-3382, 5.49k $\Omega$ .

Page 6-19/8-20, Figure 8-16. Change the value of R6 from 5.76k $\Omega$  to 5.49k $\Omega$ .

This is part of the change to improve, 1) gain above 100kHz, and 2) 80kHz filter response. See change no. 28.

**CHANGE NO. 30 (applies to all instruments)  
(effective on serial number 2025A03786 and above).**

Page 6-11, Table 6-3. Change the part number 3100-3423 to 3100-1663.

When PN 3100-3423 went from hill-and-valley to a unidex indexer it was necessary to change part numbers. The new and old PNs are completely interchangeable.

**CHANGE NO. 31 (applies to all instruments)  
(effective on serial number 2025A02716 and above).**

Page 6-6, Table 6-3. Change the part number and value of A3C110 from 0140-0192, 68pF to 0140-0190, 39pF.

Page 6-9, Table 6-3. Add cable assy 00339-61613 at the end of the listings for the A3 board.

Page 6-13/8-14, Figure 8-13. Change the value of C110 from 68pF to 39pF.

These changes improve range-to-range accuracy.

Page 6-14, Table 6-3. Add part number 5041-3124, PUSH ROD.

**CHANGE NO. 32 (applies to all instruments).**

Page 6-7, Table 6-3. Change the part number of A3Q100 from 1855-0360 to 1855-0458.

This change is being made because PN 1855-0360 is being discontinued by the vendor.

Page 6-8, Table 6-3. Add "SOCKET, 14 PIN IC", part number 1200-0638 to the replaceable parts list at the end of the listings for the A2 board.

Page 6-5, Table 6-3. Add "HOLD DOWN SPRING", part number 1460-1581 to the replaceable parts list after the listing of A2K1.

Prior to this change this part could only be ordered as part of the relay.

**CHANGE NO. 33 (applies to all instruments)**  
(effective on serial number 2025A03571 and above).

Page 6-10, Table 6-3. Change the part number of A4U2 and A4U4 from 1820-0427 to 1826-0934.

A separate PN for Signetics part was established because PN 1820-0427 will no longer give the fundamental rejection required by the 339A.

**CHANGE NO. 34 (applies to all instruments).**

Page 6-8, Table 6-3. Change the part number of A3C16 and A3C17 from 0160-3622 to 0150-0084. The value does not change.

Change the part number and value of A2R35 from 2100-0567, 2kΩ to 2100-3252, 5kΩ.

**CHANGE NO. 35 (applies to all instruments).**

Page 6-3, Table 6-3. Change the part number of A1 from 00339-66501 to 00339-66511.

Page 6-4, Table 6-3. Change the part numbers of the components listed below:

A1S6 from 00339-61902 to 00339-61906  
A1S7 from 00339-61903 to 00339-61907  
A1S8 from 00339-61904 to 00339-61908  
A2 from 00339-66502 to 00339-66512

Add to the description of part number 3100-3421 (under A1S6) "MULTIPLIER". Change the description of A1S7 from "UNITS" to "TENTHS". Add to the description of part number 3100-3422 (under A1S7) "TENTHS". Change the description of A1S8 from "TENTHS" to "UNITS".

Page 6-5, Table 6-3. Change the part number of A3 from 00339-66503 to 00339-66513.

Page 6-9, Table 6-3. Change the part numbers of the components listed below:

A3S1 from 00339-61905 to 00339-61901  
A3S2 from 00339-61906 to 00339-61902  
A3S3 from 00339-61907 to 00339-61903  
A3S4 from 00339-61908 to 00339-61904  
A3S5 from 00339-61909 to 00339-61905

Page 6-11, Table 6-3. Change the part number for A5S9 from 00339-61901 to 00339-61909.

Page 6-13, Table 6-3. Delete the part number 0370-2990 KNOB, RND W/BAR.

Page 6-14, Table 6-3. Change the part number of MP16 from 00339-00606 to 00339-00616. Add the part number 5041-0531, KEY CAP.

**CHANGE NO. 36 (applies to all instruments)**  
(effective on serial number 1730A01956 and above).

Page 6-9, Table 6-3. Change the part number and value of A4R2 from 0757-0472, 200kΩ to 0698-4211, 158kΩ.

At the bottom of the page, change the note to read "with serial numbers 1730A00196 to 1730A00266."

Page 6-17, Figure 8-15. Change the value of R2 (feedback on U1) from 200k to 158k.

Page 6-10, Table 6-3. Change the following part numbers and values:

A4R21 from 0698-4486 24.9k to 0698-3243 178k  
A4R22 from 0698-4486 24.9k to 0698-3243 178k  
A4R49 from 0757-0447 16.2k to 0698-3228 49.9k  
A4R51 from 0757-0447 16.2k to 0698-3228 49.9k  
A4R53 from 0757-0280 1.0k to 0757-0273 3.01k

Page 6-17, Figure 8-15. Change the values on the schematic as listed above.

These changes were made to reduce internally generated 2nd harmonic distortion. These changes slow down the 339A response as shown below:

Frequency	Pull-in Time	
	Before Change	After Change
10Hz	10 sec.	12 sec.
1Hz	4 sec.	9 sec.
100kHz	3 sec.	6 sec.

**CHANGE NO. 37 (applies to all instruments)**  
(effective on serial number 2025A03556 and above).

Page 6-13, Table 6-3. Change the following part numbers as listed:

Old	New	
00339-04001	00339-04007	KNOB, DISTORTION RANGE
00339-04002	00339-04008	KNOB, INPUT RANGE
00339-04003	00339-04009	KNOB, OSC LEVEL
00339-04004	00339-04010	KNOB, UNITS
00339-04005	00339-04011	KNOB, TENTHS
00339-04006	00339-04013	KNOB, MULTIPLIER
0370-1099	0370-3054	KNOB, POINTER
0370-2994	0370-3055	KNOB, POINTER

**CHANGE NO. 38 (applies to all instruments).**

In Section V, Adjustments, make the following changes:

Page 5-2. Add paragraph 5-14d to read, "Set the frequency multiplier control to each range and verify that the voltage level at A1TP8 remains negative."

Paragraph 5-17. Under Equipment Required, Low Distortion Oscillator, (-hp- Model 339A) should read "(-hp- Model 239A).".

Page 5-3, Paragraph 5-17b. On the listing INPUT RANGE...3V, the "3V" should have listed beside it, "(+10dBV)".

Paragraph 5-17c should read, "Set the controls of the 239A signal source to obtain a 1kHz (1.0 x 1k) signal. Adjust the output level for a full scale meter indication of 0 dBV on the instrument under test."

Add a paragraph between 5-17g and 5-17h that reads, "Set the 239A level controls for a -10dB indication on the 3571A."

Page 5-4. Paragraph 5-17k should read, "Adjust the output of the 239A for a full scale meter indication on the unit under test."

Paragraph 5-17a should read, "Set the frequency of the 239A to 10Hz (1.0 x 10). Adjust the output level for a full scale meter indication on the instrument under test."

Paragraph 5-17u should have added to the end of it, "This reading must be >-95dB."

Paragraph 5-18. Under Equipment Required, Low Distortion Oscillator, (-hp-Model 339A) should read "(-hp- Model 239A)".

Paragraph 5-18c should read, "Adjust the 239A signal source to provide a 10kHz, 1V signal."

Page 5-7/5-8, Figure 5-3. Switch the part designators and adjustment descriptions on A2R37 and A2R17 shown in the lower left corner of the drawing.

#### CHANGE NO. 39

(effective on serial numbers 2025A04006 thru 2025A04160)

Page 6-7, Table 6-3. Change the part number of A3Q100 from 1855-0458 to 1855-0269.

This change was made because the vendor discontinued the part.

#### CHANGE NO. 40 (applies to all instruments)

(effective on serial numbers 2025A04161 and above)

Page 6-7, Table 6-3. Change the part number of A3Q100 from 1855-0269 to 1855-0230.

This change was made because the input circuit has better distortion performance with a depletion mode MOSFET. This part should be used in all instruments.

Page 6-5, Table 6-3. Change the part number and value of A2R16 from 0757-0422, 909 ohms to 0757-0420, 750 ohms. Change the part number and value of A2R17 from 2100-3212, 200 ohms to 2100-0554, 500 ohms.

Page 8-19/8-20, Figure 8-16. Change the schematic value of R16 from 909 to 750 and that of R17 from 200 to 500.

This change was made to give control over a larger percentage of full scale deflection of the meter. This allows meters to be used from the full range of the meter specification.

#### CHANGE NO. 41 (applies to all instruments)

Page 6-5, Table 6-3. Under A2K1, change HOLD DOWN SPRING 1460-1581 to RELAY HIDDNSP 1460-1612.

Page 1-3, Table 1-1. In the OSCILLATOR section under *Distortion*, change the table of specifications to read as below:

10 Hz to 20 kHz	< -93 dB (0.0022%)THD
20 kHz to 30 kHz	< -85 dB (0.0056%)THD
30 kHz to 50 kHz	< -80 dB (0.01%)THD
50 kHz to 80 kHz	< -70 dB (0.032%)THD
80 kHz to 110 kHz	< -65 dB (0.056%)THD

Page 4-8, Table 4-5. Change the table to read as below.

339A Frequency	THD Specification
10 Hz	< -93 dB
100 Hz	< -93 dB
1 kHz	< -93 dB
10 kHz	< -93 dB
20 kHz	< -93 dB
30 kHz	< -85 dB
50 kHz	< -80 dB
80 kHz	< -70 dB
109 kHz	< -65 dB

Note: The change to this table reflects the specification change and a change in relative symbols which was an error in the original manuscript (-94 dB is less than, not >, -93 dB).

Page 4-10, Table 4-6. Change all "greater than" signs to "<". (See note above.)

Page 4-15, Performance Test Record, Oscillator Total Harmonic Distortion Test: Change the table to read as below:

339A Output Frequency	Calculated THD	Test Limit
10 Hz		-93 dB
100 Hz		-93 dB
1 kHz		-93 dB
10 kHz		-93 dB
20 kHz		-93 dB
30 kHz		-85 dB
50 kHz		-80 dB
80 kHz		-70 dB
109 kHz		-65 dB