

MANUAL BACKDATING CHANGES

MODEL 3400A

RMS VOLTMETER

This manual backdating sheet makes this manual applicable to earlier instruments. Instrument-component values that differ from those in the manual, yet are not listed in the backdating sheet, should be replaced using the part number given in the manual.

Instrument Serial Prefix	Make Manual Changes	Instrument Serial Prefix	Make Manual Changes
322-, 401-, 528- and 714-	1, 14 and 8 thru 12	806-07926 thru 08125	8 thru 12 and 14
322- or 401-00351 thru 00700	1 thru 5, 7 thru 12, and 14	806-08126 thru 08614	9, 10, 11, 12, 14
401-00701 thru 02125	1, 3, 4, 5, 14, and 7 thru 12	806-08615 thru 09325	10, 11, 12, 14
401-02126 thru 03025	1, 4, 5, 14, and 7 thru 12	806-09325 thru 11525	11, 12, 14
528-	1, 5, 14, and 7 thru 12	952-11526 thru 12125	12, 14
714-	1, 14, and 6 thru 12	979-12126 thru 0979A13725	13
714-06526 thru 06925	Note #1	All	15
714-06926 thru 07925	1, 14 and 8 thru 12		

CHANGE #1 Figure 6-3, and Replaceable Parts: Substitute Figure C-1 for Figure 6-3 and replace any component according to Table C-1.

Section IV, Theory of Operation:

Serials prefixed 322-, 401, 528- and 714- with chopper amplifier board 03400-66504) does not have an emitter follower stage prior to the demodulator. In Section IV delete any reference to emitter follower Q604, and change reference designator Q605 and Q606 to Q604 and Q605 respectively.

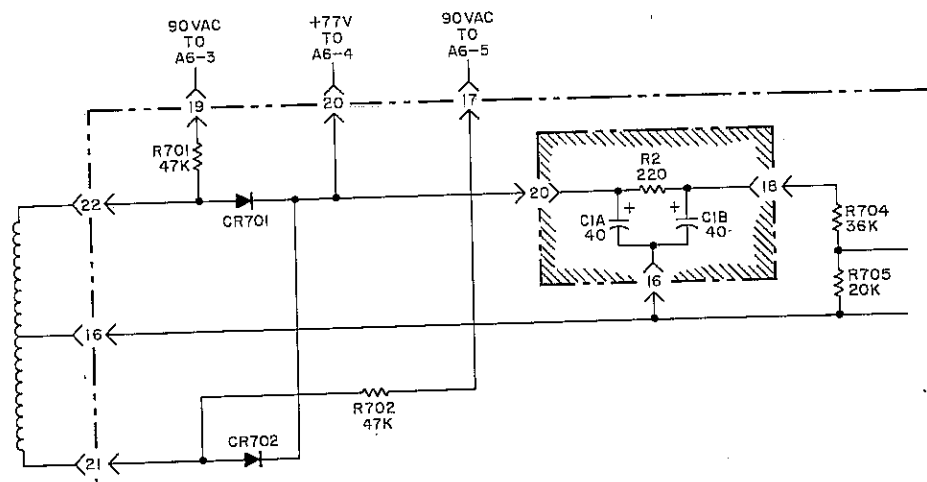
CHANGE #2 Delete C305, -hp- Part No. 0160-0763, on Figure 6-1 and in Table 7-1. Add a dashed capacitor in parallel with R301 thru R304 and R306.

REASON: This capacitance obtained by connecting a wire from R301 and C302 junction to a blank switch lug near R306 and R308 junction.

CHANGE #3 Change Q405 to -hp- Part No. 1850-0099, and CR401 to -hp- Part No. 1910-0016.

NOTE: Both Q405 and CR401 should be replaced with components listed in Table 7-1 if either component fails as bias on Q405 is a function of both.

CHANGE #4 Change Figure 6-4, Power Supply Schematic, A7, to the following:



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CHANGE #4 (Cont'd) Table 7-1 Replaceable Parts:
 Change R701 and R702 to -hp- Part No. 0693-4731, 47 k Ω . Delete C711 (0160-0167), C712 (0180-0282), R712 (0687-2241), R713 (0686-2225), Q706 (1854-0022), and CR718 (1902-0046).
 Change A7 Board Assembly - Power Supply to -hp- Part No. 03400-66505.
 NOTE: -hp- Part No. 03400-66507 is directly interchangeable with 03400-66505.

CHANGE #5 Figure C-1 and Table C-1:
 Change capacitor C602 to 35 μ F (-hp- Part No. 0180-0064).
 Change resistor R630 to 100 k Ω (-hp- Part No. 0683-1045). Also, change transistors Q601 to -hp- Part No. 1850-0060, Q602 and Q603 to -hp- Part No. 1850-0062.

NOTE

To reduce meter jitter replace all of the above components with components listed in Table 7-1. It is also recommended to change resistor R606 to a 3300 Ω resistor described in Table 7-1.

CHANGE #6 Some instruments (Serial Prefixed 714-) may have a 1 μ F capacitor for C602 (Figure C-1). If C602 fails or if low frequency oscillations ($\pm 5\%$) occur on meter change C602 to 10 μ F described in Table 7-1.

Instruments with serial number between 714-06226 and 714-07525 have a 4700 Ω resistor for R606. If R606 fails or if meter jitter occurs replace R606 with 3300 Ω resistor described in Table 7-1.

NOTE #1

NOTE

Some instruments with serial number between 714-06526 and 714-06925 inclusive have a different second attenuator assembly than the one described in this manual. Check the value of resistor R301 on the second attenuator assembly. If resistor R301 is 150 Ω disregard manual changes described below. If the value of R301 is other than 150 Ω , and the Serial No. is within the range shown above, make the following manual changes: (Change #7)

CHANGE #7

Figure 6-1, Second Attenuator Schematic and Table 7-1, Replaceable Parts:
 Change value of R301 thru R311 as follows:

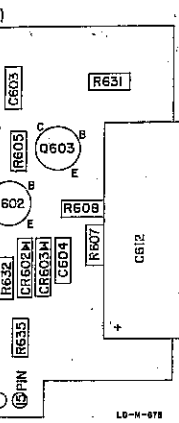
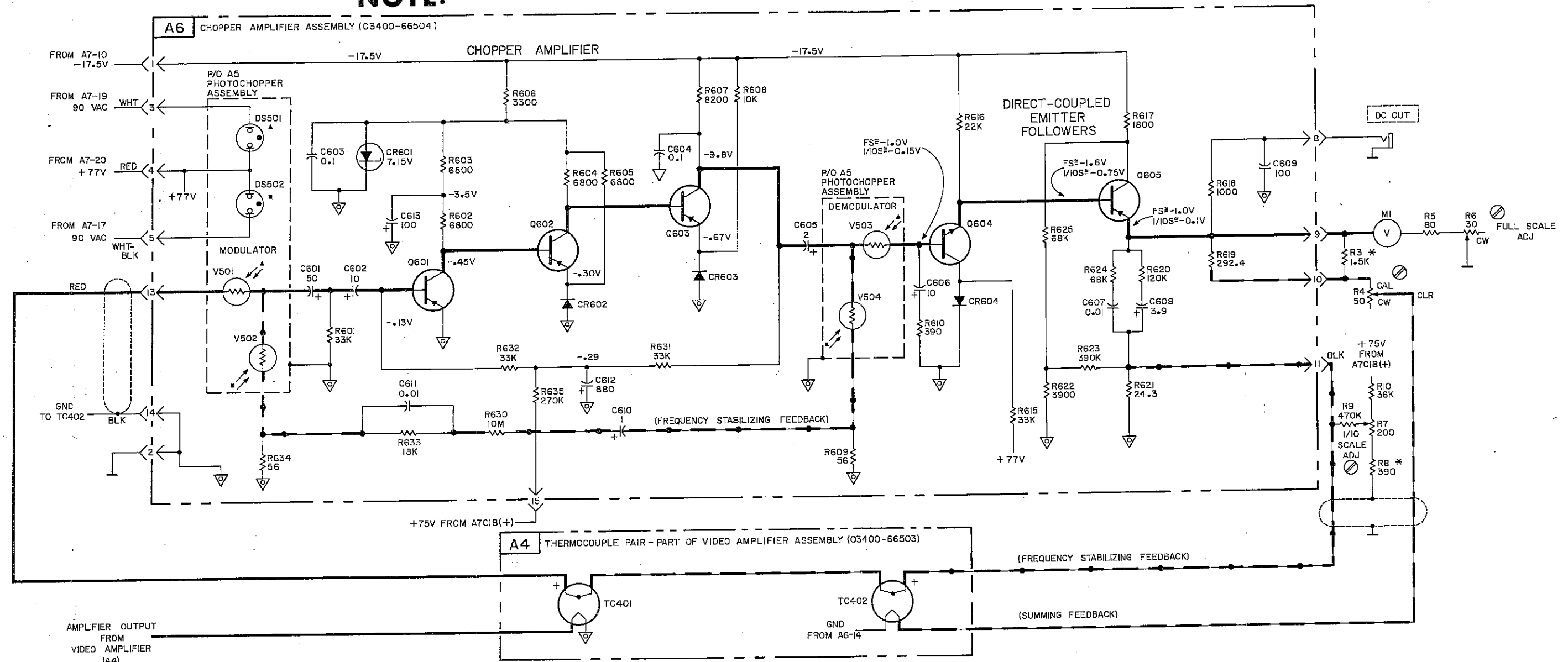
R301	to 180 Ω
R302, R304, R306, R308 and R310	to 410.27 Ω
R303, R305	to 277.0 Ω
R307, R309	to 277.7 Ω
R311	to 189.3 Ω

Add the following note to Schematic and Replaceable Parts List:

NOTE

Resistors R302 thru R311 are a matched set. A replacement set may be ordered under -hp- Part No. 03400-69502. See Service Note P-03400-69502 for additional information.

NOTE: THIS SCHEMATIC APPLIES TO SERIALS PREFIXED 322-, 401-, 528-, & 714- ONLY.



NOTES

1. PRIMARY SIGNAL PATH.
2. AC FEEDBACK PATH.
3. DC FEEDBACK PATH.
4. * OPTIMUM VALUE SELECTED AT FACTORY; AVERAGE VALUE SHOWN.
5. CABINET GROUND.
6. PRINTED CIRCUIT GROUND.
7. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS, CAPACITANCE IN MICROFARADS.
8. DENOTES REAR PANEL LOCATION.

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Figure C-1. Photochopper A5, Chopper Amplifier A6, and Thermocouple Pair (Part of A4) Schematic and Parts Location Diagram

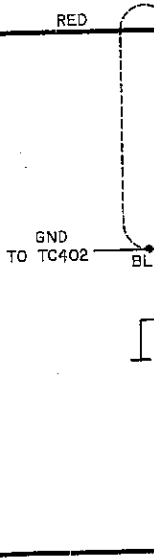
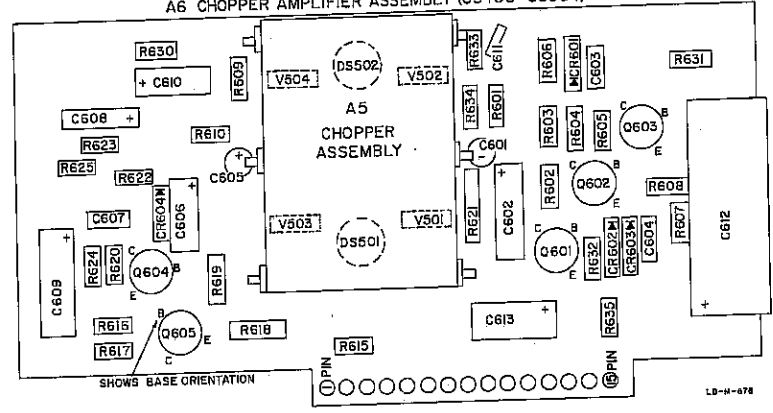
FROM A7-10
-17.5V

FROM A7-19
90 VAC W

FROM A7-20
+77V R

FROM A7-17
90 VAC WH
E

A6 CHOPPER AMPLIFIER ASSEMBLY (03400-66504)



AMPLIFIER
FROM
VIDEO AMP
(A4)



MANUAL CHANGES

Model 3400A

RMS VOLTMETER

Manual Part No. 03400-90008

■ New or Revised Item
ERRATA:

Page 5-3, Paragraph 5-12 d and f. Change reference from 0.707 volts to 0.707 millivolts.

Page 6-5/6-6, Figure 6-2. Change value of C403 to 0.1 μ F.

Page 6-9/6-10, Figure 6-4. Change Part No. on A7 schematic to 03400-66510.

Page 7-3, Table 7-1. Change C403 to Part No. 0160-0269, C:fxd 0.1 μ F 500 V.

Page 7-4. Change C427 to a selected component, C427*.

Page 7-5. Change R403 and R404 to R403* and R404*. Change R419* to Part No. 0683-3315, R:fxd $330 \Omega \pm 5\%$ 1/4W.

Page 7-6. Change R426 and R429 to R426* and R429*.

CHANGE NO. 1: For All Serial Numbers.

Page 7-8. Add Part No. 1200-0077, Insulator:transistor mica, TQ = 3 to Miscellaneous Parts.

CHANGE NO. 2: For Serial No. 1218A14726 and Greater.

Page 7-6. Change R207 to Part No. 0757-0848.

CHANGE NO. 3: For Serial No. 1218A16126 and Greater.

Page 6-9/6-10, Figure 6-4. Change value of A7R708 to 24.

Page 7-4. Change CR704 to Part No. 1901-0701.

Page 7-5. Change Q1 to Part No. 1853-0063 Tstr:Si PNP.

Page 7-7. Change R708 to Part No. 0683-2405 R:fxd $24 \Omega \pm 5\%$ 1/4W.

CHANGE NO. 4: For Serial Numbers 1218A16126 thru 1218A16425.

C711 is 0170-0019 C:fxd 0.1 μ F 200 V R701, R702 are 0767-0852 R:fxd 47.5 K 1%.

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If C711, R701 or R702 require replacement, replace with part number listed above. If unable to obtain above part numbers, replace all three components with part numbers specified in Table 7-1. This is necessary to maintain the same oscillator frequency provided by the above component values.

CHANGE NO. 5: For Serial Numbers 1218A18576 and Greater.

Page 6-9/6-10, Fig. 6-4. Change T1 lead designation color codes as follows:

	<u>OLD</u>	<u>NEW</u>
Primary Side —	YEL(L)	BLK
	BLU	BLK/GRN
	GRN(L)	BLK/YEL
	VIO	BLK/RED

Secondary Side—RED(S) pin 16	BLU
ORN(L) pin 8	VIO

ALL OTHER SECONDARY COLOR CODES REMAIN THE SAME.

Page 7-2, Fig. 7-1. Change Index No. 6, Rear Panel, to Part No. 03400-00205.

CHANGE NO. 6 applies to serial numbers 1218A18776 and greater.

Page 7-8, Miscellaneous. Delete Insulator, 1200-0043 and 1200-0077.
Add Insulator:Transistor, 0340-0580.

CHANGE NO. 7 applies to serial numbers 1218A19076 and greater.

Page 6-3/6-4, A2 Schematic. Change A2C208 from .01 μ F to .02 μ F.

Page 7-3, Table 7-1. Change the -hp- Part Number and description of C208 to 0150-0024, 0.02 μ F.

CHANGE NO. 8 applies to all serial numbers.

Page 1-0, Table 1-1. Change the POWER specification to: 115 or 230 V ac $\pm 10\%$, 48 to 66 Hz, 15 VA max.

Page 6-5/6-6, Figure 6-2. Change R433 from 24 K to 24.9 K.

Page 6-7/6-8, Figure 6-3. Change R617 from 1800 to 1.82 K and R3* from 1200 to 1210.

Supplement A for 03400-90008

Page 6-9/6-10, Figure 6-4. Change R704 from 36 K to 36.5 K.

Page 7-5 and 7-7, Table 7-1. Change the -hp- Part Numbers and descriptions as shown in Table MC-1.

Table MC-1.

R3*	0757-0734	1.21 k Ω \pm 1%
R433	0698-3217	24.9 k Ω \pm 1% 1/4W
R434, R435	0757-0739	2000 Ω \pm 1% 1/4W
R617	0757-0738	1.82 k Ω \pm 1%
R703	0757-0765	36.5 k Ω \pm 1%

CHANGE NO. 9 applies to all serial numbers.

Page 1-1. Add the following new paragraphs.

1-16. OPTIONS AVAILABLE.

1-17. Option 910. An additional Operating and Service Manual may be ordered, part number 03400-90008.

CHANGE NO. 10 applies to Serial Number 1218A20341 and greater.

Page 7-5, Table 7-1. Change the part number of Q401, 402, 403 and 405 to 1853-0288.

Change the part number of Q404 and 406 to 1854-0354.

Page 7-6 and 7-7. Show the following reference designators as starred value components.

R403*
R404*
R426*
R429*

CHANGE NO. 11 applies to all serial numbers.

Delete all "RMS" designations throughout the entire manual.

CHANGE NO. 12 (09-14504) applies to all serial numbers.

Page 1-1, Table 1-2. Change item number 1 under IDENTIFICATION NUMBER from 10110A to 10110B.

CHANGE NO. 13 (09-14494) applies to serial numbers 1218A21041 and greater.

Page 7-3, Table 7-1. Change part number of C201 from 0170-0019 to 0160-2671.

CHANGE NO. 14 (09-14530) applies to all serial numbers.

Page 7-6, Table 7-1. Change part number of R104 from 2100-0128 to 5061-1101.

CHANGE NO. 15 (09-14840) applies to serial numbers 1218A21121 and greater.

Page 7-3, Table 7-1.

Delete: P.C. Assy - ATTEN 03400-66501 1 ea.

Add: P.C. Assy - ATTEN 03400-66511 1 ea;

The P.C. assemblies are completely interchangeable.

CHANGE NO. 16 (09-14845) applies to serial numbers 1218A21281 and greater.

Page 7-5.

Delete: Q2, Q3 XSTR-GE SP1822 1850-0038 2 ea.

Add: Q2, Q3 XSTR PNP 2N5875 1853-0305 2 ea.

Page 7-8, Table 7-1.

Delete: R731 R-F 5360 OHM .01 0698-3258 1 ea.

R730 R-F 11.3 K OHM .01 0698-4121 1 ea.

Add: R730 R-F 10.5 K OHM .01 0698-4477 1 ea.

R731 R-F 5620 OHM .01 0757-0200 1 ea.

Page 7-4, Table 7-1.

Delete: CR706 DIO-S1 1910-0025 1 ea.

Add: CR706 DIODE-SILICON 1910-0701 1 ea.

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Table C-1. Replaceable Parts

REFERENCE DESIGNATION	-hp- PART NO.	DESCRIPTION
NOTE		
This table applies to instruments with serials prefixed 322-, 401-, 528-, and 714-, with chopper amplifier board 03400-66504. If a 03400-66508 chopper amplifier board is installed use Table 7-1 and Figure 6-3.		
A6 A5	03400-66504 1990-0017	Assembly: chopper amplifier board Assembly: photoconductor chopper part of A6 Note Matched neon subassembly (DS501 and DS502) available under -hp- Part No. 1990-0206
C601 C602 C603 and C604 C605 C606	0180-0081 0180-0032 0150-0084 0180-0111 0180-0224	50 μ F +20% -15% 10 vdcw 10 μ F +75% -10% 12 vdcw 0.1 μ F -20% +80% 50 vdcw 2 μ F 25 vdcw 10 μ F 10 vdcw
C607 C608 C609 C610 C611	0150-0093 0180-0022 0180-0039 0180-0119 0150-0093	0.01 μ F -20% +80% 100 vdcw 3.9 μ F 35 vdcw 100 μ F 12 vdcw 1 μ F -10% +100% 25 vdcw 0.01 μ F -20% +80% 100 vdcw
C612 C613	0180-0156 0180-0039	880 μ F -10% +100% 1 vdcw 100 μ F 12 vdcw
CR601 CR602 CR603 and CR604	1902-0046 1910-0016 1901-0025	Diode breakdown 7.15 V \pm 10% Diode germanium 60 piv Diode silicon 100 piv
Q601 thru Q603 Q604 Q605	1853-0036 1854-0033 1853-0016	Transistor silicon PNP 2N3906 Transistor silicon NPN 2N3391 Transistor silicon PNP 2N3638
R601 R602 thru R605 R606 R607 R608 R609 R610 R611 thru R614 R615	0683-3335 0683-6825 0683-3325 0683-8225 0683-1035 0683-5605 0683-3915 Not assigned 0683-3335	33 k Ω \pm 5% 1/4 W 6800 Ω \pm 5% 1/4 W 3300 Ω \pm 5% 1/4 W 8200 Ω \pm 5% 1/4 W 10 k Ω \pm 5% 1/4 W 56 Ω \pm 5% 1/4 W 390 Ω \pm 5% 1/4 W 33 k Ω \pm 5% 1/4 W
R616 R617 R618 R619	0683-2235 0758-0043 0727-0100 0727-0063	22 k Ω \pm 5% 1/4 W 1800 Ω \pm 5% 1/4 W 1000 Ω \pm 1% 1/2 W 292.4 Ω \pm 1% 1/2 W

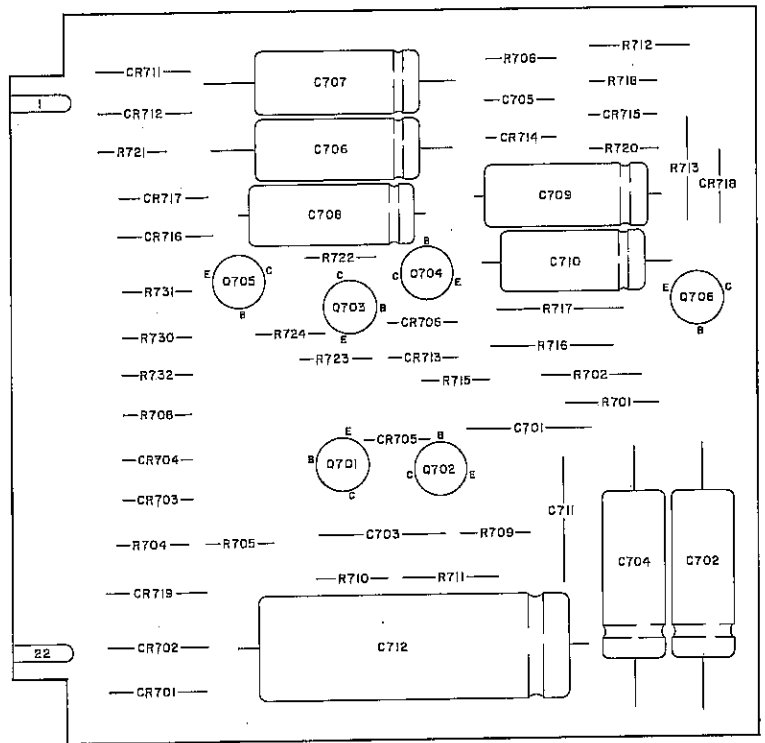
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Table C-1. Replaceable Parts (Cont'd)

REFERENCE DESIGNATION	-hp- PART NO.	DESCRIPTION
R620	0683-1245	120 k Ω \pm 5% 1/4 W
R621	0727-0013	24.3 Ω \pm 1% 1/2 W
R622	0683-3925	3900 Ω \pm 5% 1/4 W
R623	0683-3945	390 k Ω \pm 5% 1/4 W
R624	0683-6835	68 k Ω \pm 5% 1/4 W
R625	0758-0076	68 k Ω \pm 5% 1/4 W (met film)
R626 thru R629	Not assigned	
R630*	0683-1065	10 M Ω \pm 5% 1/4 W
R631 and R632	0683-3335	33 k Ω \pm 5% 1/4 W
R633	0683-1835	18 k Ω \pm 5% 1/4 W
R634	0683-5605	56 Ω \pm 5% 1/4 W
R635	0683-2745	270 k Ω \pm 5% 1/4 W

- CHANGE #8 Table 7-1, Replaceable Parts:
Change Part No. for transformer T1 to 9100-0344. Note: Color of leads given on schematic does not apply to 9100-0344 transformer.
- CHANGE #9 Figure 6-4, Power Supply Schematic, and Table 7-1, Replaceable Parts:
Change value and Part No. of following components:
R701 to 56 k Ω , -hp- Part No. 0687-5631
R702 to 56 k Ω , -hp- Part No. 0687-5631
R709 to 330 Ω , -hp- Part No. 0683-3315
C703 to 0.022 μ F, -hp- Part No. 0170-0024
- CHANGE #10 Page 6-9/6-10 and Table 7-1:
Change following components:
R718 to 75 k Ω , -hp- Part No. 0683-7535
R730 to 11 k Ω , -hp- Part No. 0683-1135
R731 to 6.2 k Ω , -hp- Part No. 0683-6225
- CHANGE #11 Page 6-9.
C3A and C3B were .01 μ F
Page 7-2.
Change rear panel Part No. to 03400-00202
Page 7-3.
Preferred replacement for C3 is shown.
Page 7-5.
Change J3 to Part No. 1251-0148
Page 7-8.
Change W1 to Part No. 8120-0078
- CHANGE #12 Page 6-7.
Some instruments have a separate green wire from + 77 V to DS502 (on A5).
Page 6-9.
Substitute the below parts locator for A7.
Page 7-3.
Change A7 to -hp- Part No. 03400-66507.
- CHANGE #13 Page 6-9.
Substitute the below parts locator for A7.

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A7
(hp PART NO. 03400-66507)

- CHANGE #14** Page 6-9.
 Delete CR720. Delete C705. Add C705 (.01 μ F) in series with R706 (47 k) from the base of Q704 to A7 Pin 3.
- Page 7-5.
 Delete CR720. Change Q701, 702 to 1850-0062. Change Q703, 704 to 1850-0040. Change Q705 to 1851-0017 (2N1304).
- Page 7-7.
 Add R706, 0683-4735, R: fxd comp 47 k 5% 1/4 W.
- Page 7-8.
 Change R731 to 0757-0290 R: fxd met flm 6.19 k 1% 1/8 W.

- CHANGE #15** Page 7-2.
 The -hp- Part No.'s listed on page 7-2 of this manual are for brown instruments. The part numbers for blue instruments are listed below:

INDEX NO.	DESCRIPTION	-hp- PART NO.
1	Front Panel	03400-00201
3	Side Cover 6 x 11 sm	5000-0703
5	Top Cover (with Handle)	03400-64102
7	Bottom Cover 5 x 11 sm	5000-0711
9	Spacer 1/3 module	5020-5388