PRODUCT: AD584SH

MASK:

RUN: DC 8540

GAMMA: 30K, 60K, 100K, 300K,

TESTED:

ANALOG DEVICES

804 WOBURN STREET • WILMINGTON, MA 01887-3642 • (617) 935-5565

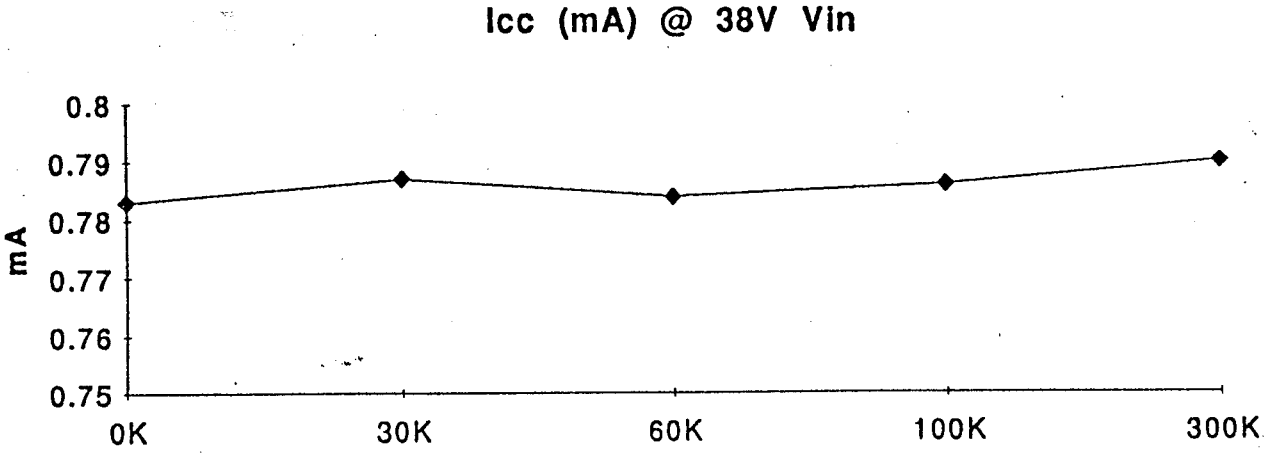
TO

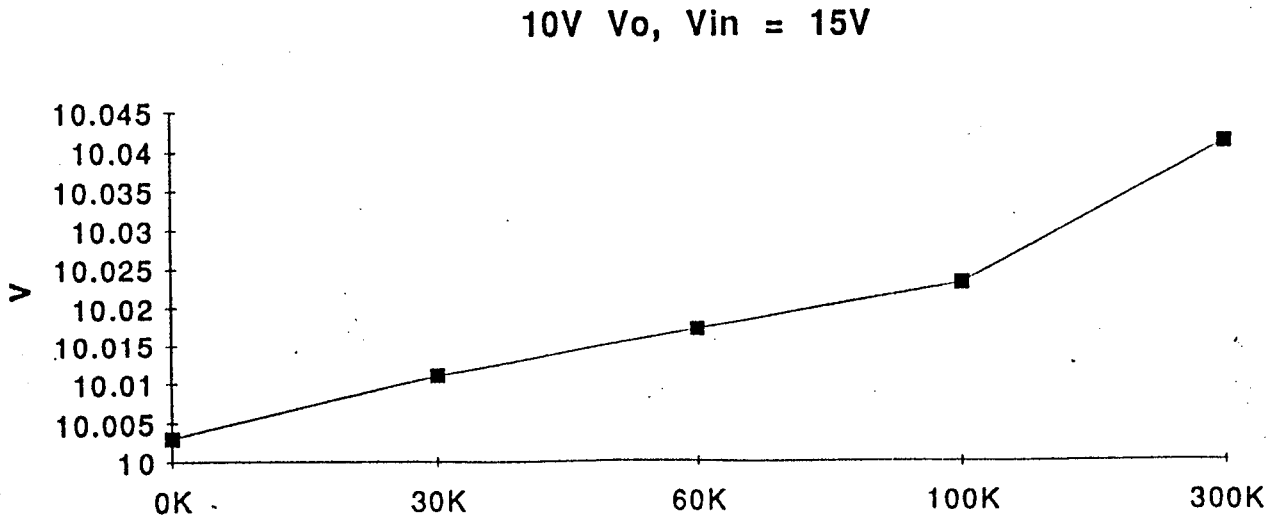
AD 584 Total Dose
DC 8450

Five devices irradiated, one control unit. The data shown is the mean for the five samples.

Vin = 15V unless otherwise noted.

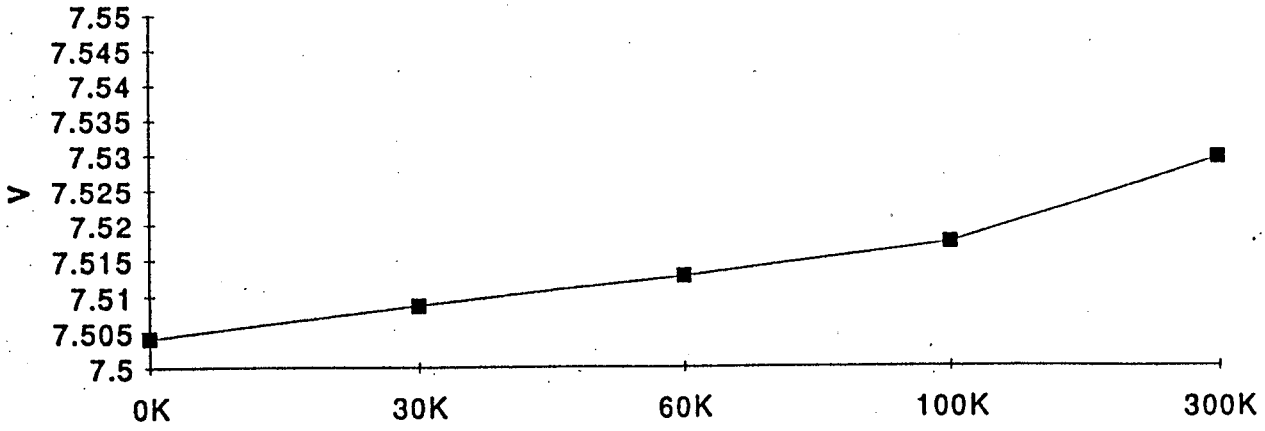
	Cumulative dose, rad (Si)				
Parameter	0K	30K	60K	100K	300K
Icc (mA) @ Vin =38V Vo-10V	0.783	0.787	0.784	0.786	0.79
Vo (10V)	10.003	10.011	10.017	10.023	10.041
Vo (7.5V)	7.5041	7.5087	7.5127	7.5173	7.5296
Vo (5.0V)	5.0022	5.0119	5.0076	5.0102	5.0161
Vo (2.5V)	2.5012	2.5004	2.5014	2.5022	2.5022



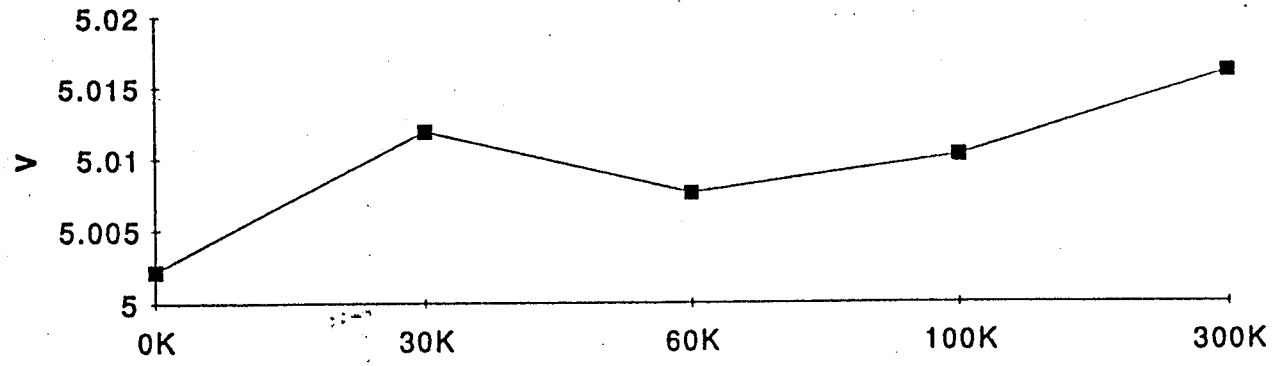


AD 584 Total Dose
DC 8450

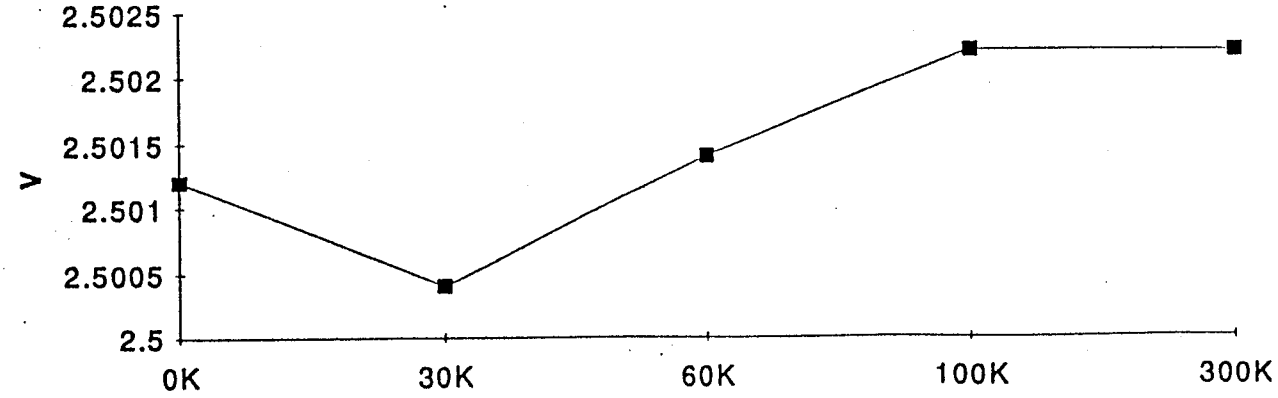
7.5V Vo, Vin = 15V



5V Vo, Vin = 15V



2.5V Vo, Vin = 15V



AD584 Total Dose from April 1989.

								288
	Initial	5Krad	10Krad	15Krad	20Krad	30Krad	50Krad	Hrs anneal
Vout								
8820	4.4575	4.4577	4.4582	4.4585	4.4588	4.4595	4.4603	4.4600
8852	4.4999	4.5009	4.5022	4.5260	4.5034	4.5046	4.5063	4.5061
Icc								
8820	0.719	0.72	0.72	0.72	0.73	0.73	0.73	
8852	0.806	0.81	0.81	0.81	0.81	0.81	0.82	

(A)

RADIATION TEST REPORTS

AD 584

TOTAL DOSE

DOSE RATE

NEUTRONS

TABLE 3/2

VOLTAGE REFERENCE DEVICES (TEMPERATURE COMPENSATED) - TOTAL GAMMA DOSE DATA

No.	TOTAL GAMMA DOSE Gy	VREF, V @ IZ1 mean	VREF, V @ IZ1 max change	VREF, V @ IZ1 S.D.	VREF, V @ IZ2 mean	VREF, V @ IZ2 max change	VREF, V @ IZ2 S.D.	SLOPE RESISTANCE VREF/IZ, OHMS @ IZ1 mean	SLOPE RESISTANCE VREF/IZ, OHMS @ IZ1 max change	SLOPE RESISTANCE VREF/IZ, OHMS @ IZ1 S.D.	SLOPE RESISTANCE VREF/IZ, OHMS @ IZ2 mean	SLOPE RESISTANCE VREF/IZ, OHMS @ IZ2 max change	SLOPE RESISTANCE VREF/IZ, OHMS @ IZ2 S.D.	QUANTITY	TEST CONDITION:
16	170	1 Gy = 100 Rad												2	LINAC irradiatio Both pass.
17	60													3	LINAC
	170													1	irradiated all pass
18															

TABLE 3/1.

VOLTAGE REFERENCE DEVICES (TEMPERATURE COMPENSATED) - GAMMA DOSE RATE DATA

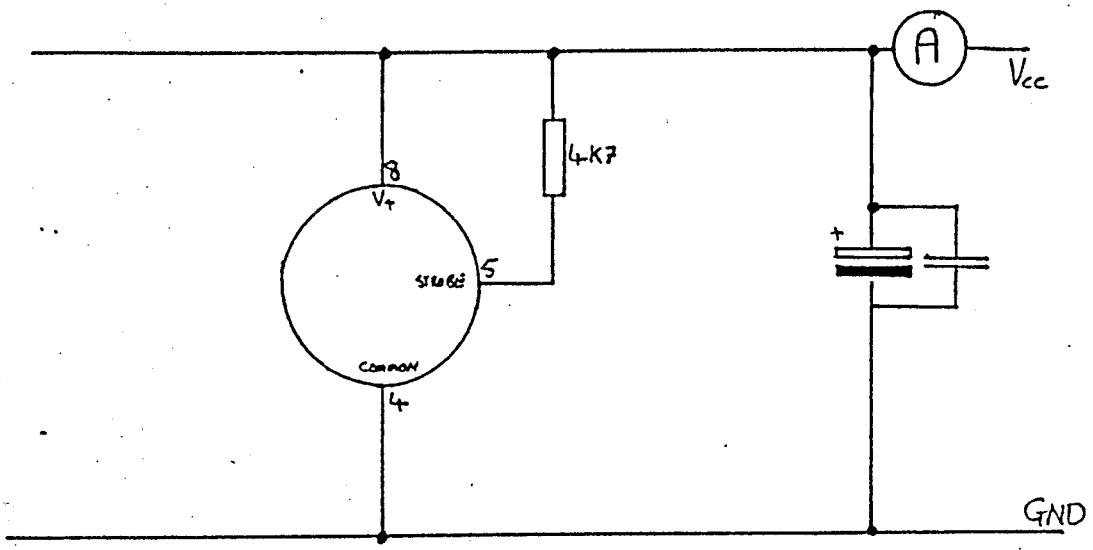
No.	DEVICE NUMBER (MANUF)	V_{REF} V	PEAK DOSE RATE Gy/s	PULSE WIDTH s	Ipp @ V_{REF} A	QUANTITY	MINORITY CARRIER LIFETIME s	POWER W	
16	AD580UH (Analog Devices) (8306)	2.5	2.0+07 3.3+07	1.0-06 1.0-06	0.07 0.07	2, 2			V_{Supply} = 5V
17	AD581 (Analog Devices) (076355325)	10	1.0+07 4.0+07	1.0-06 1.0-06	0.14 0.24	3 2			Supply = 15V
18	AD 584 (Analog Devices) (8343)	5	4.0+06 1.0+07 3.2+07	1.0-07 1.0-07 1.0-07	0.07 0.10 0.19	3 3 3			V_{Supply} = 15V Output voltage programmed for +5V

TABLE 3/3
VOLTAGE REFERENCE DEVICES (TEMPERATURE COMPENSATED) - NEUTRON DATA

No.	Φ n/mm²	VREF, V @ IZ1 mean	VREF, V @ IZ1 max change	VREF, V @ IZ1 S.D.	VREF, V @ IZ2 mean	VREF, V @ IZ2 max change	VREF, V @ IZ2 S.D.	SLOPE RESISTANCE VREF/IZ, OHMS @ IZ1 mean	@ IZ1 max change	@ IZ1 S.D.	@ IZ2 mean	@ IZ2 max change	@ IZ2 S.D.	QUANTITY	TEST CONDITIONS
16	X10² ↓														
17	0	10.001	-	0.0015											
	3.2+10	10.036	+0.041	0.0035				24.3	Mean S/C O/P current (mA)					7	Supply = +15V
AD581	1.0+11	10.081	+0.090	0.0097				20.1	Mean S/C O/P current (mA)					7	Load = 10kΩ
								14.0	Mean S/C O/P current (mA)					7	to +15V
18	0	10.0023	-	1.1-03	5.0013	-	7.8-04	Output short circuit current							Programmed
	9.3+09	10.0085	8.1-03	1.5-03	5.0039	3.4-03	9.4-04	15.0		2.73				7	for I_{ZI}, = 10V,
AD584	2.0+10	10.0182	1.8-02	2.3-03	5.0084	8.0-03	1.7-03	14.1		2.64					I_{Z2} = 5V
	4.9+10	10.0361	4.1-02	5.0-03	5.0178	1.9-02	2.1-03	13.5		2.82					Supply = 5V
	1.7+11	10.596	7.6-02	1.5-02	5.0352	4.2-02	6.3-03	10.6		2.54					
								4.7		1.39					
19	0	2.494	Note 1	0.002	2.494	Note 1	0.002	-	-	-	-	-	-	6	I_{Z1} = no load
	1.6+10	2.491	Note 1	0.001	2.490	Note 1	0.001							6	I_{Z2} = 100μA
	7.4+10	2.438	Note 1	0.004	2.438	Note 1	0.003							6	Note 1. Measured
															at 0°C
	0	2.497	Note 2	0.001	2.497	Note 2	0.001	-	-	-	-	-	-	6	Note 2. Measured
	1.6+10	2.496	Note 2	0.002	2.492	Note 2	0.001							6	at +20°C
	7.4+10	2.435	Note 2	0.004	2.434	Note 2	0.005							6	
	0	2.502	Note 3	0.002	2.501	Note 3	0.001	-	-	-	-	-	-	6	Note 3. Measured
	1.6+10	2.496	Note 3	0.001	2.496	Note 3	0.001							6	at +70°C
	7.4+10	2.438	Note 3	0.005	2.436	Note 3	0.005							6	Trial date 8/84
20	0	1.278	Note 1	0.0087	1.280	Note 2	0.0088	-	-	-	-	-	-	12	Herald irrad.
	2.0+10	1.279	+0.002	0.0087	1.281	+0.002	0.0090	-	-	-	-	-	-	12	(including 40.Gy gamma). Notes. With 430Ω in series with supply of (1) 4V, (2) 6V

3.10 AD584 Pin Programmable Voltage Reference

FIGURE 18 : AD584 TEST CIRCUIT



Two samples were tested, on both the British Aerospace Laser and at AWE LINAC. Dose rates were between 5.2E8 and 1.0E10 Rads(Si)/sec. For the design application Vcc was set to +12V with a 4k 7 Ohm resistor to pin 5. For worst case, Vcc was set to +30V and the resistor removed.

TABLE 11 : AD584 TEST RESULTS

SAMPLE	DOSE RATE RADS(Si)/ SEC	Iph (A)	Vcc (V)	SIMULATOR	COMMENTS
1	5.2E8	0.02	12	Laser	
	8.0E9	0.21	30		No Latch, No Burnout
2	8.0E9	0.22			
1	8.1E9	0.30	12	LINAC	
	7.0E8	0.05			
2	7.0E8	0.063			
	1.0E10	0.350			No Latch, No Burnout

Both samples survived dose rates up to 8.1E9 Rads(Si)/sec with no latch-up when Vcc was set to + 12V. No latch occurred either when Vcc was set to + 30V.

REC'D JUN 07 1989

AD584 Total Dose

AD584 Radiation Test Procedure
3/21/89

Equipment needed: +7V, +5V, -5V; Keithley 619 electrometer, oscilloscope.

1.) Switch the two toggles to "R". Connect power to the test circuit. Connect the electrometer to TP3. Record the lot number of the AD584 at this location. Adjust the voltage at TP3 to 4.5000V. In subsequent testing, do not re-adjust this voltage; simply record its value. Record the lot number and voltage of the device at TP4.

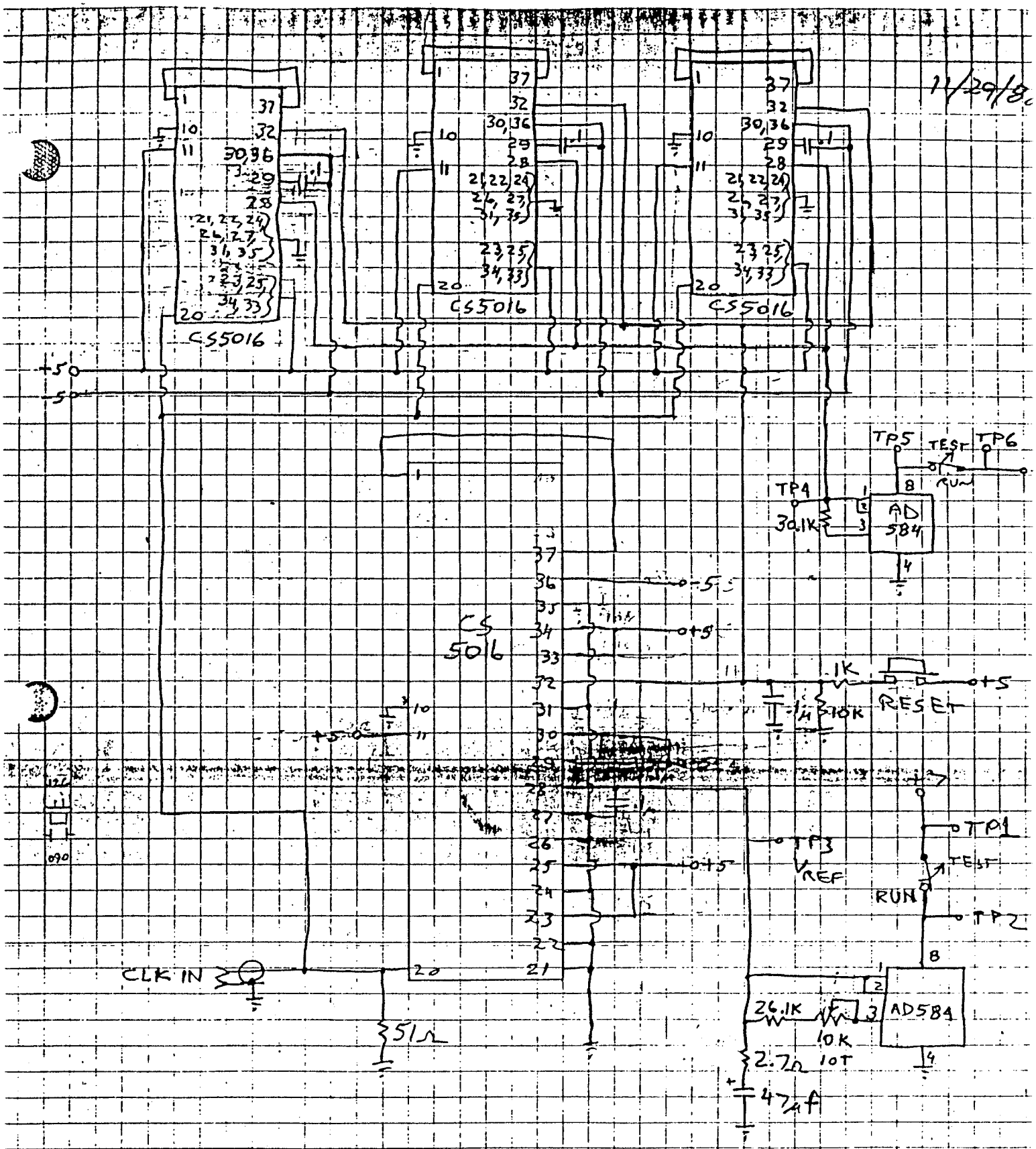
2.) In the ammeter mode, connect the electometer across TP1 and TP2. Switch the toggle to "T" and record the current. Switch back to "R". Repeat for the other toggle with the electrometer at TP5 and TP6.

3.) Monitor TP3 with the scope to see if there is any oscillation or undue noise.

(B)

NASA GODDARD SPACE
FLIGHT CENTER

11/29/8



CS5016 / AD584 RADIATION CIRCUIT

All ICs are Socketed

AD584RAD.DTA

AD584 RADIATION TEST DATA

DATE: 4/13/89

DOSE: 0

AD584 LOT #	8820	8852
1.) Voltage	4.4575	4.4999
2.) Current	.719	.806
3.) osc/noise	NO OSC; ROLM PHONES - spikes @ 38.7KHz rep rate	

AD584 RAD.DTA

AD584 RADIATION TEST DATA

DATE: 4/18/89

DOSE: 5.3K

AD584 LOT #		8820	8852
1.)	Voltage	4.4577	4.5009
2.)	Current	.72	.81
3.)	osc/noise	none	none

AD584 RADIATION TEST DATA

DATE: 4/19/89

DOSE: 10.2 K

AD584 LOT #	8820	8852
1.) Voltage	4.4582	4.5022
2.) Current	.72	.81
3.) osc/noise	none	none

AD584 RADIATION TEST DATA

DATE: 4/20/89

DOSE: 15.0K

AD584 LOT #	8820	8852
1.) Voltage	4.4585	4.5026
2.) Current	.72	.81
3.) osc/noise	ROLM @ 37.7KHz	

AD584 RADIATION TEST DATA

DATE: 4/21/89

DOSE: 19.8K

AD584 LOT #	8820	8852
1.) Voltage	4.4588	4.5034
2.) Current	.73	.81
3.) osc/noise	Slight ROLM noise on 8820.	

AD584 RAD.DTA

AD584 RADIATION TEST DATA

DATE: 4/24/89

DOSE: 29.7K'

AD584 LOT #	8820	8852
1.) Voltage	4.4595	4.5046
2.) Current	.73	.81
3.) osc/noise	none	slight ROLM (37.8kHz)

AD711 RAD. DATA

AD584 RADIATION TEST DATA

DATE: 4/25/89

DOSE: 50.K

AD584 LOT #	8820	8852
1.) Voltage	4.4603	4.5063
2.) Current	.73	.82
3.) osc/noise		small spikes @ 37.7 kHz

AD584 RAD.DTA

AD584 RADIATION TEST DATA

DATE: 5/9/89

DOSE: 50.0K

AD584 LOT #	8820	8852
1.) Voltage	4.4600	4.5061
2.) Current		
3.) osc/noise		

Bias off since 5/1/89

(213) 214-5558

AD584

per telephone call from Ben Shimizu, TRW, they show the AD584 to be greater than 100K RAD(Si) per their testing.

John Hartman
8/12/88