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Post-It™ brand fax transmittal memo 7671		# of pages ▶	7
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To
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From
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7809
Subject

19

*R - Margaret has quit.
Wali Beyah
is NCB
Parts
Coord.
JHX'
VE*

Radiation Report on ISTP
Non-Common Buy Part No. HA1-5320-8

Interoffice Memorandum

PPM-91-163

Date
March 15, 1991

Location
Lanham

Telephone
731-8954

Location
Lanham

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A radiation evaluation was performed on HA1-5320-8 to determine the total dose tolerance of these parts. A brief summary of the test results is provided below. For detailed information, refer to Tables I through IV and Figure 1.

The total dose testing was performed using a cobalt-60 gamma ray source. During the radiation testing, eight parts were irradiated under bias (see Figure 1 for bias configuration), and two parts were used as control samples. The total dose radiation steps were 5, 10, 20, 30, 50, 75 and 100 krads. After 100 krads, parts were annealed at 25°C for 24 and ~~12~~ hours, and then the irradiation was continued to 200 and 300 krads (cumulative). The dose rate was between 0.25 ~ 5.0 krads/hour, depending on the total dose level (see Table II for radiation schedule). After each radiation exposure and annealing treatment, parts were electrically tested according to the test conditions and the specification limits listed in Table III.

All parts passed all tests on irradiation up to 300 krads, without any significant degradation in any of the electrical parameters. Table IV provides the mean and standard deviation values for each parameter after different radiation exposures and annealing treatments.

Any further details about this evaluation can be obtained upon request. If you have any questions, please call me at 731-8954.

TABLE I. Part Information

Generic Part Number:	HA1-5320-8
ISTP Non-Common Buy Part Number:	HA1-5320-8
ISTP Non-Common Buy Control Number:	2015
Manufacturer:	Harris
Quantity Procured:	22
Lot Date Codes:	9016
Quantity Tested:	10
Serial Numbers of Radiation Samples:	52, 53, 54, 55 56, 57, 58, 59
Serial Numbers of Control Samples:	50, 51
Part Function:	Sample and Hold Amplifier
Part Technology:	Bipolar
Package Style:	14-Pin DIP

TABLE II. Radiation Schedule

EVENTS	DATE
1) Initial Electrical Measurements	01/30/91
2) 5 krads irradiation @ 250 rads/hr Post 5 krads Electrical Measurements	02/04/91 02/05/91
3) 10 krads irradiation @ 250 rads/hr Post 10 krads Electrical Measurements	02/05/91 02/06/91
4) 20 krads irradiation @ 500 rads/hr Post 20 krads Electrical Measurements	02/06/91 02/07/91
5) 30 krads irradiation @ 500 rads/hr Post 30 krads Electrical Measurements	02/07/91 02/08/91
6) 50 krads irradiation @ 294 rads/hr Post 50 krads Electrical Measurements	02/08/91 02/11/91
7) 75 krads irradiation @ 1250 rads/hr Post 75 krads Electrical Measurements	02/11/91 02/12/91
8) 100 krads irradiation @ 1250 rads/hr Post 100 krads Electrical Measurements	02/12/91 02/13/91
9) 24 hrs annealing Post 24 hr Electrical Measurements	02/13/91 02/14/91
10) 168 hrs annealing Post 168 hr Electrical Measurements	02/14/91 02/20/91
11) 200 krads irradiation @ 5000 rads/hr Post 200 krads Electrical Measurements	02/20/91 02/21/91
12) 300 krads irradiation @ 5000 rads/hr Post 300 krads Electrical Measurements	02/21/91 02/22/91

Notes:

- 1) All parts were radiated under bias at the cobalt-60 gamma ray facility at GSFC.
- 2) All electrical measurements were performed off-site at 25°C.
- 3) Annealing performed at 25°C under bias.

Table III. Electrical Characteristics of HA1-5320-8

Test -----	MIN -----	MAX -----
+ICC	1mA	13mA
-ICC	-13mA	1mA
VOS	-2mV	2mV
+IBIAS	-200nA	200nA
-IBIAS	-200nA	200nA
IOS	-100nA	100nA
+PSRR	80dB	1000dB
-PSRR	65dB	1000dB
CMRR	80dB	1000dB
DC Voltage GAIN	1E6V/V	100E6V/V
+VO	10V	15V
-VO	-15V	-10V
+IO	-100mA	10mA
-IO	10mA	100mA
VOUT sample mode	10V	15V
VOUT hold mode	10V	15V

TABLE IV: Summary of Electrical Measurements
after Total Dose Exposures and Annealing for HA1-5320-8

1/, 2/

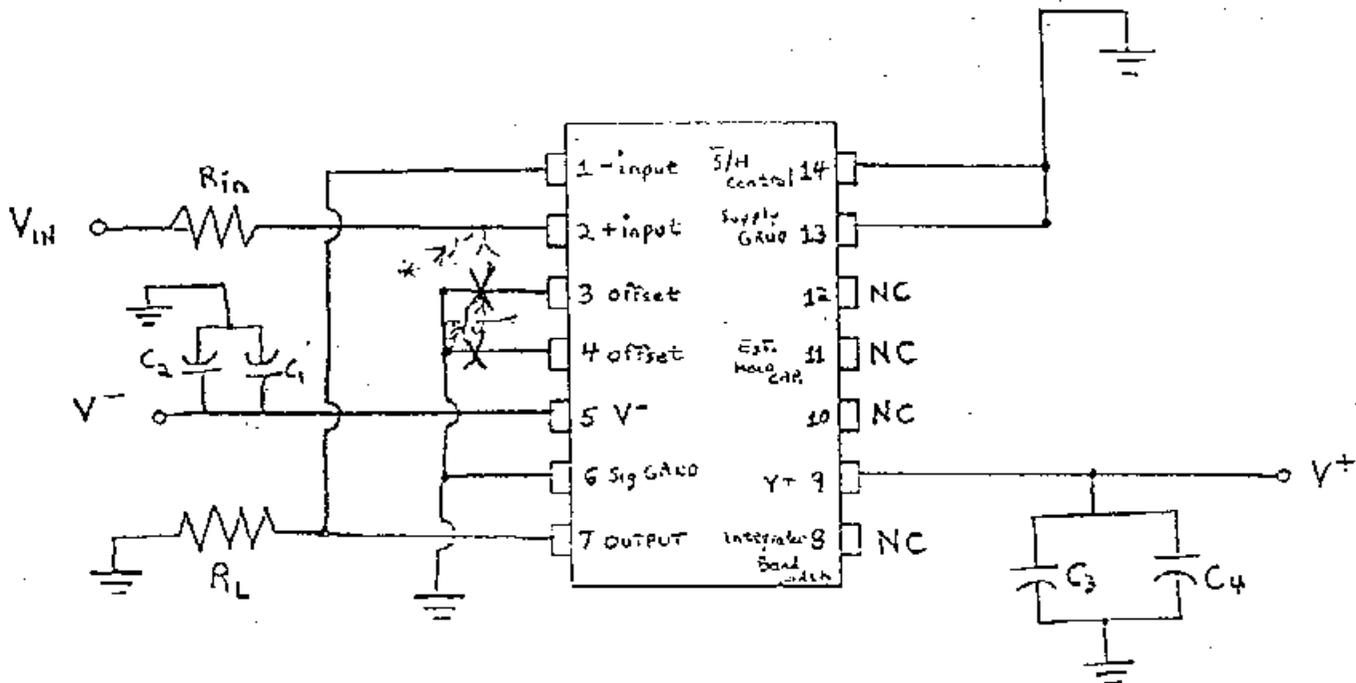
Parameters	Spec. Limits min max	Initials mean sd		Total Dose Exposure (krads)								Anneal		Total Dose (krads)					
				20		50		75		100		168 hrs		200		300			
				mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd		
+ICC	mA	1	13	10.5	0.3	10.3	0.3	10.2	0.3	10.1	0.2	10.0	0.2	10.0	0.2	9.9	0.3	9.6	0.3
-ICC	mA	-13	-1	-10.9	0.2	-10.7	0.3	-10.6	0.3	-10.5	0.4	-10.5	0.3	-10.5	0.3	-10.1	0.3	-9.9	0.4
VOS	mV	-2	2	0.3	0.2	0.4	0.2	0.4	0.2	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.3	0.2
+IBIAS	nA	-200	200	57	5	48	6	48	7	47	7	45	6	47	8	40	7	40	7
-IBIAS	nA	-200	200	-46	10	-50	13	-46	12	-42	15	-37	13	-43	10	-33	10	-34	10
IOS	nA	-100	100	2	15	5	18	5	20	4	17	5	15	4	15	7	17	9	15
+PSRR	dB	80	1000	96	3	104	7	103	10	103	10	102	10	96	6	104	10	100	8
-PSRR	dB	65	1000	85	5	85	5	86	6	89	6	94	12	86	5	85	5	79	6
CMRR	dB	80	1000	95	3	95	3	94	3	94	3	95	3	95	3	94	3	94	3
GAIN	E6V/V	1	100	2.2	0.4	1.9	0.5	1.7	0.4	2.3	0.2	2.4	0.2	2.5	0.3	2.1	0.2	2.1	0.3
+VO	V	10	15	13.9	0	13.9	0	13.8	0	13.9	0.1	13.6	0	13.9	0.1	13.8	0	13.8	0
-VO	V	-15	-10	-13.7	0	-13.7	0	-13.7	0	-13.7	0	-13.7	0	-13.7	0	-13.7	0	-13.7	0
+IO	mA	-100	-10	-57.6	0	-57.1	0	-57.1	0	-57.5	0	-57.6	0.1	-57.8	0	-57.9	0.1	-57.5	0.1
-IO	mA	10	100	65.3	0	65.0	0	65.0	0	65.1	0	65.1	0	65.3	0	65.4	0	65.1	0.1
Vout sample	V	10	15	13.9	0	13.9	0	13.9	0.1	13.9	0	13.9	0.1	13.9	0	13.8	0.1	13.8	0
Vout hold	V	10	15	13.9	0	13.9	0	13.9	0.1	13.9	0	13.9	0.1	13.9	0	13.8	0.1	13.8	0

Notes:

1/ The mean and standard deviation values were calculated over the eight parts irradiated in this testing. The control samples remained constant throughout the testing and are not included in this table.

2/ Table IV provides radiation characteristics of parts at selected total dose exposures and annealing treatments. The data at other radiation exposures and annealing treatments is available and can be obtained upon request.

Figure 1. Radiation Bias Circuit for HA1-5320-8



* Note: Pins 3 and 4 were disconnected as marked above.

$$V_{in} = -5V_{dc} \pm .5V_{dc}$$

$$V^- = -15V_{dc} \pm .5V_{dc}, -0V_{dc}$$

$$V^+ = +15V_{dc} \pm .5V_{dc}$$

$C_2 \& C_3 = 1\mu f$ 10% tantalum - every position

$C_1 \& C_4 = .1\mu f$ 10% ceramic - " "

$$R_{in} = R_L = 2K\Omega, 10\% \frac{1}{4} w$$