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Memorandum

PARAMAX
A Unisys Company

DATE: June 17, 1992
TO: J. Lohr/311
FROM: K. Sahu/7809 *KS*
SUBJECT: Radiation Report GCS/WIND/3D PLASMA Project
Part No. AD7828UQ/883B (Control No. 6303)

PPM-92-190

cc: L. Rabb/406
A. Sharma/311
✓Library/300.1

A radiation evaluation was performed on the AD7828UQ/883B 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 III and Figure 1.

The total dose testing was performed using a cobalt-60 gamma ray source. During the radiation testing, four parts were irradiated under bias (see Figure 1 for bias configuration), and one part was used as a control sample. The total dose radiation steps were scheduled for 5, 10, 15, and 20 krads*. However, after 5 krads of exposure all four parts failed catastrophically making additional exposures unnecessary. After 5 krads, the parts were annealed at 25°C for 168 hours. The dose rate for the 5 krad exposure was between 116 and 130 rads/hour (see Table II for radiation schedule). After the radiation exposure and annealing treatment, the parts were electrically tested at 25°C according to the test conditions and the specification limits listed in Table III.

All parts passed all parametric tests initially. However, after 5 krads of exposure all four parts failed catastrophically. Failure data could not be obtained because of Genrad 1731 Automated Test Equipment limitations. If the Genrad cannot locate or establish the zero reference point, then it automatically aborts testing and no data is recorded. Therefore, test data can only be recorded when the part under test continues to function. After the 5 krad exposure the parts were annealed at 25°C for 168 hours. The parts showed no signs of recovery and again data was not obtained except for the control sample.

Any further details about this evaluation can be obtained upon request. If you have any questions, please call me at (301) 731-8954.

* In this report, the term "rads" is used as an abbreviation for rads (Si).

TABLE I. Part Information

Generic Part Number:	AD7828
GGG/WIND/3D PLASMA Part Number:	AD7828UQ/883B
Control Number:	6303
Charge Number:	C23772
Manufacturer:	Analog Devices Inc.
Lot Date Code:	8918
Quantity Tested:	5
Serial Numbers of Radiation Samples:	226, 227, 228, 229
Serial Number of Control Sample:	225
Part Function:	8-Channel 8-Bit Analog to Digital Converter
Part Technology:	Linear Compatible CMOS
Package Style:	28 pin DIP
Test Engineer:	C. Nguyen

TABLE II. Radiation Schedule for AD7828UQ/883B

EVENTS	DATE
1) INITIAL (PRE-IRRADIATION) ELECTRICAL MEASUREMENT	05/06/92
2) 5 KRAD IRRADIATION (116 - 130 rads/hour)*	05/12/92
POST 5 KRAD ELECTRICAL MEASUREMENT**	05/14/92
3) 168 HOURS ANNEALING AT 25°C	05/18/92
POST 168 HOURS ELECTRICAL MEASUREMENT**	05/27/92

* Anomalous Event: The 5 krad exposure step was interrupted due to a power failure at the radiation facility. The dose rate was adjusted in order to meet the original schedule.

** Note: After the 5 krad exposure, all four parts failed catastrophically. Data could not be obtained due to Automated Test Equipment limitations. The additional scheduled radiation steps were cancelled and the parts were annealed. After annealing no data could be obtained because the parts were still failing catastrophically.

Notes:

- All parts were radiated under bias at the cobalt-60 gamma ray facility at GSFC.
- All electrical measurements were performed off-site at +25°C.
- All annealing steps were performed under bias.

Table III. Electrical Characteristics of AD7828UQ/883B

Test #	Test Name	Test Conditions	Min	Max	Unit
1	Icc+		-	20	mA
2	Unipolar Zero		-195	195	m%FS
3	Unipolar Gain		-195	195	m%FS
4	Linearity		-	195	m%FS
5	PSRR	dV = ± 5%	-	97.5	m%FS

Exceptions:

- A - Tests not performed are : Input Capacitance, Output Capacitance, Input Leakage Current (Analog), Iout, Slew Rate, Tracking and Timing Characteristics.
- B - The following tests are performed Go/No Go during parametric testing: VIH, VIL, VOH, VOL, IIH, IIL, IOH, and IOL.
- C - Parts are tested under Mode 1, no wait state, unipolar operation.
- D - Differential Non Linearity is not specified in the data sheet and the limit is arbitrarily chosen to be 1 LSB = 390 m%FS.

Notes:

Unless otherwise specified, all tests are performed with Vdd = 5 V, Vref+ = 5 V, Vref- = GND = 0 V.

Figure 1. Radiation Bias Circuit for AD7828UQ/883B

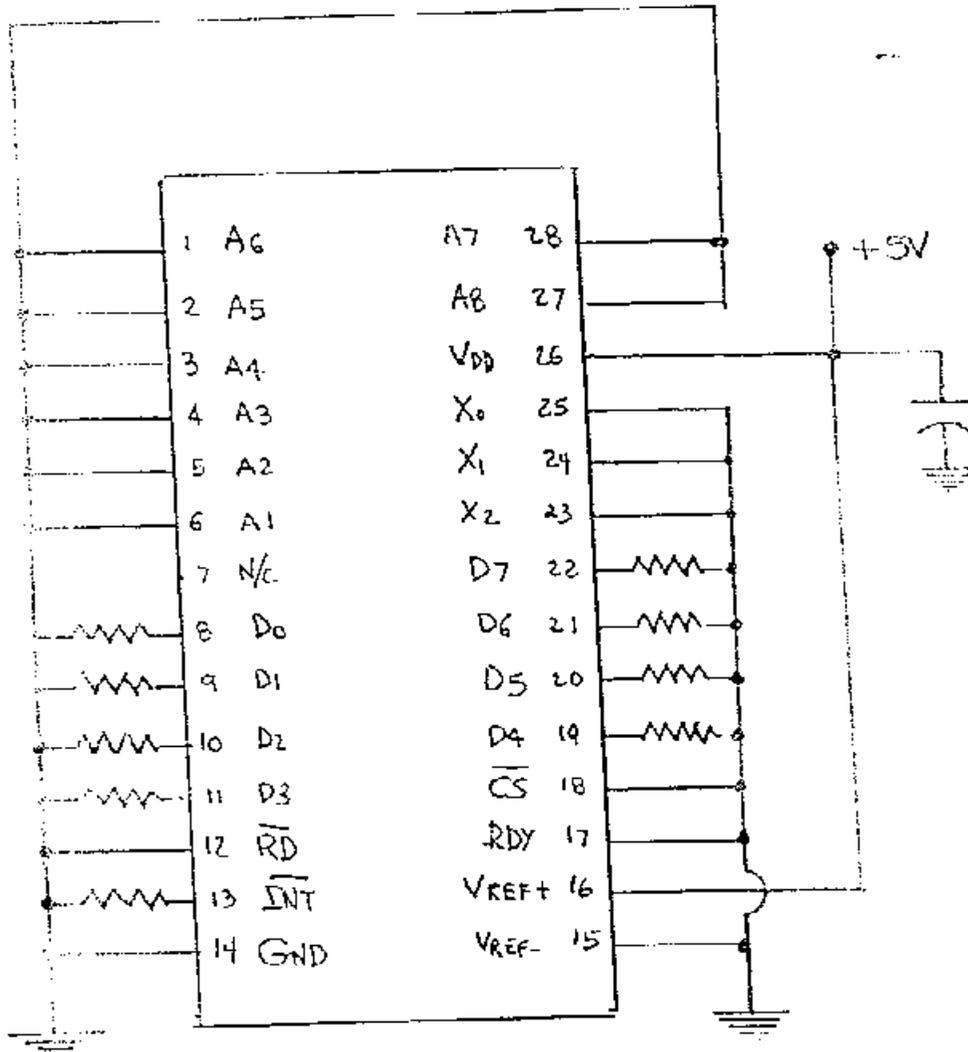


Fig #1

Radiation Bias Circuit.

ALL R = 2KΩ ¼w 50%