# **RadFET Reader**



#### By Larry Ruckman

# What is a RadFET?

- RadFET is an acronym for Radiation Sensitive MOSFET.
- ZVN3306 is the Radiation Sensitive

MOSFET that is being used in RadFETR



# How Does It Work?



•Radiation induced a load on the silicon oxide part of the MOSFET

# Type of Data



# What is RadFETR going to be used for?



The RadFETR is going to replace the old RadFET sensors that are currently being used around the world right now.

# Block Diagram of Single Sampling Channel



# **Plot of the Bias Current**



# Voltage Drop of a +8 Volt Sample



# Voltage Drop of a +4 Volt Sample



# Voltage Drop of a Zero Volt Sample



# Voltage Drop of a +4 Volt Sample



# ...Then What is the Leakage Current???



#### **Front Panel**







•Stan

# 2 Types of Triggering

Internal Triggering
 External Triggering

# Internal Triggering

#### The Internal triggering is activated through the CPLD



# External Triggering

This LEMO connector allows the user to send an external trigger into the RadFETR. A TTL level signal between +2 to +3.3

volts is required to externally trigger the RadFETR.



# **3 Types of Readout**

FAO
Logger Output
Serial I/O

# **FAO Readout**

The FAO is a LEMO connector that allows the user to probe the channel that is selected on the front panel selected channel. The FAO can be connected to a voltmeter or even an oscilloscope. This is a great way to measure the voltage without the RadFET Display. Remember that when taking readouts with the FAO that you are only measuring one single channel that has been selected.



# Logger Output Readout

The Logger Output is a 34 pin connector that sends a signal of the voltage of the channel that is being sampled. There is a convenient ground pin next to each signal pin. This type of read out only sends a signal of the channel that being Sampled.



# Serial I/O Readout

The Serial Readout is a great way of measure all 16 channels quickly and compactly. SAO (pin 1) is the readout of pin. The amplitude of the signal is the voltage of channel. The signal goes in numerical order from channel 1 through channel 16. Timing references are provided to aid in using an external ADL. SATS1 is the enable signal which indicates that the serial output is active. SALS2 is a sample.

active. SATS2 is a sample stroke signal which may be used to initiate an ADL conversion cycle.



#### **An Example of Serial Readout**



# Serial Readout with Timing References



# RadFETR? RadFETR2

Characteristic	RadFETR	RADFETR2
Board Size	7" X 7.125"	8.25" X 7.125"
Negative Power	-10 Volts	-15 Volts
		, in the second s
5 Volt Regulator	Voltage Regulator	Made room for a
Heat Issue	was Toasty	heat sink
Voltage Rating on	16 Volts	35 Volts
Cap 2.2µF		
LM7805CK Pin	Error on pin	Fixed
Numbering	numbering	
Overall Power	$\left( \begin{array}{c} \bullet \bullet \end{array} \right)$	
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CPLD Firmware	Sampling	Fixed
	Problems	

# **RadFETR2 Schedule**

- Receive RadFETR2 by August 16, 2004
   By October 1, 2004 have 5 working boards with covers.
- By October 29, 2004 have all 10 boards working with covers.