



This version (02 Jun 2021 10:54) was **approved** by [Mihail Chindris](#).
The [Previously approved version](#) (09 Mar 2021 17:31) is available.

EVAL-CN0536-ARDZ Shield Overview

Geiger counters are most commonly used by people to measure radiation levels in different specific places. This is a very popular sensor in other countries like Japan that has active nuclear power plants as their source to generate electricity. This type of sensor is sometimes deployed in different places that are linked to the cloud database to monitor dangerous radiation levels that may occur. EVAL-CN0536-ARDZ is a low-power Geiger counter radiation detector in an Arduino shield form factor that can run on 3V to 5V system supply. It has a low cost, high voltage generation power supply that is robust and adjustable voltage output from 280V to 500V output. One of the key major part of the circuit in figure 1 is to generate high voltage output using Analog Devices precision programmable oscillator that is versatile, compact and easy to use LTC6906 that can be set to run oscillate from 10kHz to 1MHz using single user defined resistor value. This reference circuit design is compatible with most of the Geiger-Muller tube sensors available in the market today with a voltage rating between 280V to 500V.

To set and regulate the high voltage output supply and capture Geiger-Muller tube distinct pulses, the circuit shown in figure 1 has Analog devices LTC1540, a nano power comparator with built in voltage reference to precisely set the user required voltage output and LTC1441 ultralow power dual comparator to translate Geiger pulse to logic level 3V or 5V.

It has also LT6994 robust built in delay block timer chip that generates the Geiger clicking sound to a regular buzzer. The LT6994 is a programmable delay block timer with a range of 1μs to 33.6 seconds. The LT6994 is part of the TimerBlox® family of versatile silicon timing devices. A single resistor, RSET, programs an internal master oscillator frequency, setting the LT6994's time base. The input-to-output delay is determined by this master oscillator and internal clock divider.

The circuit also has LEDs indicating radiation levels, reports counts per minute, microSieverts per minute via [USB UART](#) terminal display or via internet through MQTT.

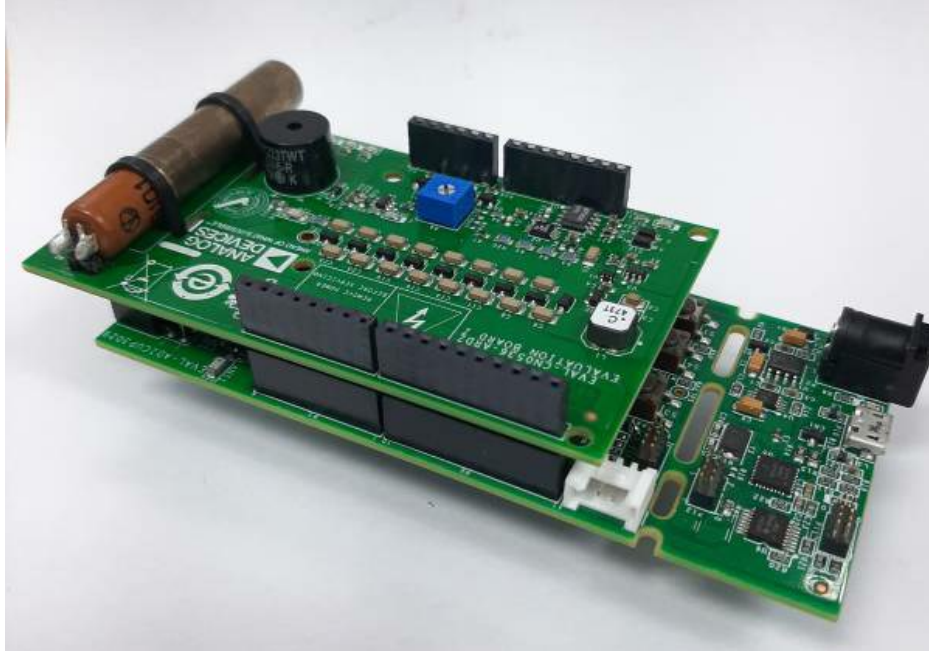
This user guide will discuss how to use the [EVAL-ADICUP3029](#) and evaluation software on how to configure and collect data from the [EVAL-CN0536-ARDZ Evaluation Board](#) (CN-0536 Board).

Table of Contents

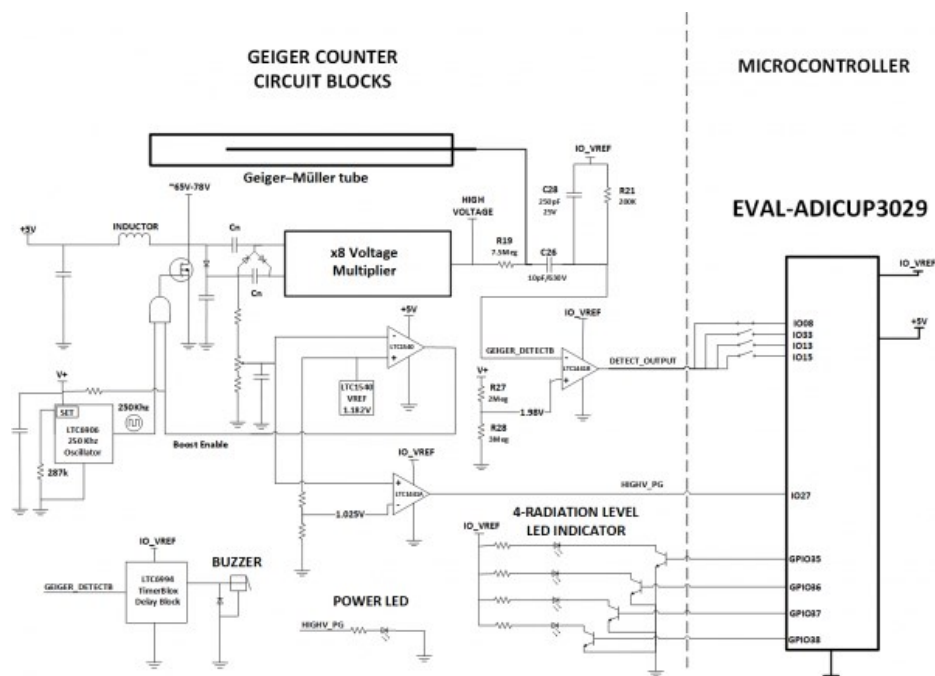
- ♦ [EVAL-CN0536-ARDZ Shield Overview](#)
- ♦ [EVAL-CN0536-ARDZ attached to EVAL-ADICUP3029](#)
- ♦ [Simplified functional block diagram](#)
- ♦ [General Setup](#)
 - ♦ [Equipment](#)
 - ♦ [Peripheral Connectors](#)
- ♦ [Schematic, PCB Layout, Bill of Materials](#)
- ♦ [Software](#)



EVAL-CN0536-ARDZ attached to EVAL-ADICUP3029



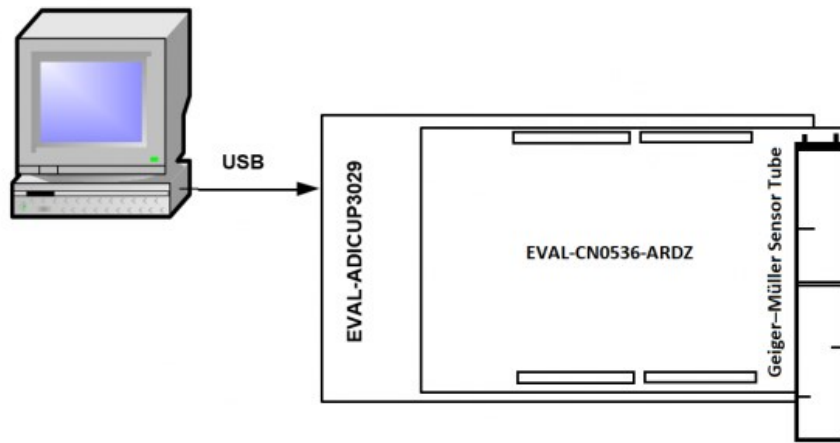
Simplified functional block diagram



General Setup

Equipment

- [EVAL-CN0536-ARDZ Evaluation Board](#)
- [EVAL-ADICUP3029 Base Board](#)
- PC with a [USB](#) port and Windows 10 (32-bit) or higher
- +6V DC Power Supply or equivalent bench supply
- [USB](#) type A to micro [USB](#) type A cable
- CN0536 Evaluation Software
- Small Philips screwdriver to adjust high voltage potentiometer



Peripheral Connectors

All connector pinouts for the EVAL-CN0536-ARDZ are described in the table below.

Connector	Pin No.	Pin Name	ADuCM3029 Pin Function	CN0536 Pin Function
Arduino DIO High	1	SCL	I2C0_SCL/GPIO04	NC
	2	SDA	I2C0_SDA/GPIO05	NC
	3	AREF	VREF+	NC
	4	AGND	AGND (Analog ground)	DGND
	5	SCLK	SPI0_CLK/SPT0_BCLK/GPIO00	NC
	6	MISO	SPI0_MISO/SPT0_BD0/GPIO02	NC
	7	MOSI	SPI0_MOSI/SPT0_BFS/GPIO01	NC
	8	CS	SPI0_CS1/SYS_CLKIN/SPI1_CS3/GPIO26	NC
	9	RDY	SPI0_RDY/GPIO30	NC
	10	IO28	GPIO28	NC
Arduino DIO Low	1	IO08	BPR0_TONE_N/GPIO08	NC (FOR TESTING)
	2	IO27	TMR1_OUT/GPIO27	HV POWER GOOD
	3	IO33	XINT0_WAKE3/TMR2_OUT/GPIO33	GEIGER DETECT SIGNAL
	4	IO09	BPR0_TONE_P/SPI2_CS1/GPIO09	
	5	IO13	XINT0_WAKE2/GPIO13	
	6	IO15	XINT0_WAKE0/GPIO15	NC
	7	TX	UART0_TX/GPIO10	NC
	8	RX	UART0_RX/GPIO11	NC
Arduino Analog	1	AIN0	ADC0_VIN0/GPIO35	LED1
	2	AIN1	ADC0_VIN1/GPIO36	LED2
	3	AIN2	ADC0_VIN2/GPIO37	LED3
	4	AIN3	ADC0_VIN3/GPIO38	LED4
	5	AIN4	ADC0_VIN4/SPI2_CS3/GPIO39	NC
	6	AIN5	ADC0_VIN5/SPI0_CS2/GPIO40	NC (FOR TESTING ONLY)
Arduino Power	1	NC	- not connected -	NC
	2	IOREF	+3.3V	IO_VREF (+3V3)
	3	RESET	SYS_HWRST_N	NC
	4	3.3V	+3.3V	NC
	5	5V	+5V	5V
	6	GND	DGND (Digital Ground)	GND
	7	GND	DGND (Digital Ground)	GND
	8	Vin	DC Barrel Jack Power +7V to +12V	+7.5V

More Information and Useful Links

- [CN0418 Evaluation Software](#)
- [CN0536 Circuit Note Page](#)
- [CN0536 Design Support Package](#)
- [LT6906 Product Page](#)
- [LTC6994 Product Page](#)
- [LTC1540 Product Page](#)
- [LTC1441 Product Page](#)

Schematic, PCB Layout, Bill of Materials

▶ [EVAL-CN0536-ARDZ Design & Integration Files](#)

- Schematics



- PCB Layout
- Bill of Materials
- Allegro Project

Software

- [ADICUP3029 + CN0536 Demo](#)

End of Document

resources/eval/user-guides/circuits-from-the-lab/cn0536.txt · Last modified: 02 Jun 2021 10:54 by  [Mihail Chindris](#)