

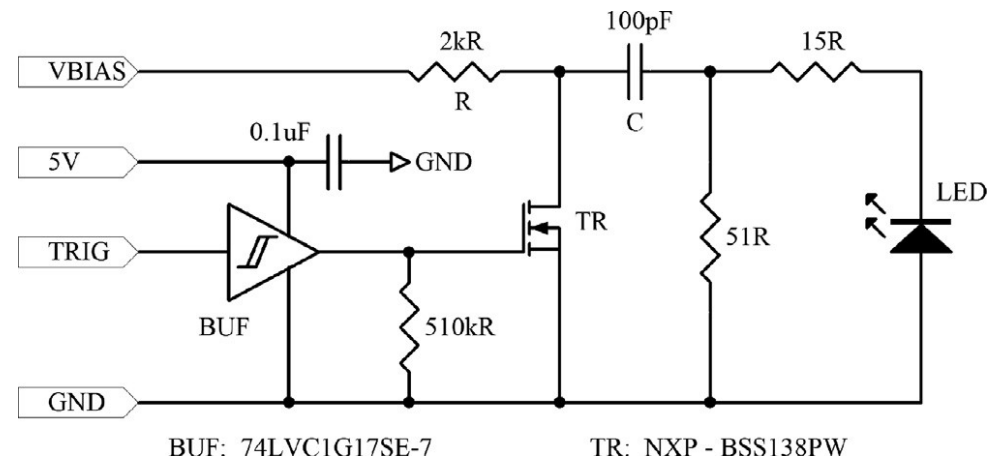
# LED control GUI

## Orlando Soto

# Introduction

In order to perform a bunch of tests on the BCAL and FCAL, dedicated LED boards were built.

Each board is controlled using a Caen VME pulser module for triggering and a Wiener MPOD Voltage module for bias and low voltage. This modules are controlled using Epics.



LED board circuit.

Figure 4, NIM A no. 738(2014), pp. 41-49

To ensure an easy control of each test a Graphical user interface was build using Control System Studio (CSS). All communication issues with the different modules and chassis are hidden.

# Scope

The interface includes LED pulsing control, voltage controls and master or control.

Three rows, one for each LED color.  
Each color has three parameters:

- Pulse width control and monitoring
  - Range 10 – 1000 ns
- Frequency control and monitoring
  - Range 0.756 Hz – 50 MHz
- Continuous mode control and monitoring
  - Continuous pulsing
  - or Number of pulses Range 0 –  $(2^{31}-1)$

MOR control includes one row consisting of

- Pulse width control and monitoring.
  - Range 10 – 1000 ns
- Delay control and monitoring.
  - Range 0 – 40950 ns

Voltage control two rows, Bias and Low voltage.  
Each row consist of:

- Voltage control and monitoring.
  - Bias range 0 – 70 V
  - Low voltage range 0 – 8 V
- Current monitoring

# Graphical user interface

The screenshot shows a graphical user interface for controlling an FCAL LED and voltage. The interface is divided into two main sections: LED pulsing control and MOR control.

**LED pulsing control:** This section allows users to configure three different LED channels: violet, blue, and green. Each channel has a color indicator, a status indicator (STOP or START), and several control parameters: Pulse width, Pulse width Setpoint, Frequency, Frequency Setpoint, Number of pulses, and Num. of pulses Setpoint. The Cont. Mode (ON/OFF) is also adjustable.

Color & status	Start/Stop pulsing	Pulse width	Pulse width Setpoint	Frequency	Frequency Setpoint	Number of pulses	Num. of pulses Setpoint	Cont. Mode ON/OFF
violet	STOP	10 (ns)	10	100.000 (Hz)	100	INF	0	ON
blue	START	50 (ns)	50	1.000 (KHz)	1,000	# 5000	5,000	OFF
green	START	200 (ns)	200	1.000 (MHz)	1,000,000	INF	0	ON

**MOR control:** This section allows users to configure the MOR width and MOR delay for the LED pulsing control.

MOR width	MOR width Setpoint	MOR delay	MOR delay Setpoint
10 (ns)	10	0 (ns)	0

**FCAL VOLTAGE CONTROL:** This section displays the voltage control parameters for two channels: BIAS and LV. The parameters include Channel Name, Measured Voltage (V), Voltage Setpoint, Voltage Setpoint Readback, ON/OFF status, Channel Status, and Measured Current (A). The Advance Settings button is also visible.

Channel Name	Measured Voltage (V)	Voltage Setpoint	Voltage Setpoint Readback	ON/OFF	Channel Status	Measured Current (A)
BIAS	19.988	0	20.000	ON	On	0.030
LV	4.999	0	5.000	ON	On	0.026

Annotations:

- LED pulsing control: Points to the LED pulsing control section.
- MOR control: Points to the MOR control section.
- Voltage control: Points to the FCAL VOLTAGE CONTROL section.

# Description (1)

Status indicator.  
Connected to  
pulser channel  
status.

Color & status	Start/Stop pulsing
violet	STOP
blue	START
green	START

Start/Stop Button

Monitoring.  
Connected to pulser  
register.

Pulse width	Pulse width Setpoint
10 (ns)	10
50 (ns)	50
200 (ns)	200

Setpoint.  
Arrow keys step: 10 ns  
Page keys: 100 ns

# Description (2)

Monitoring.  
Connected to pulser register.

Frequency	Frequency Setpoint
100.000 (Hz)	100
1.000 (KHz)	1,000
1.000 (MHz)	1,000,000

Setpoint.  
Arrow keys step: 100 Hz  
Page keys: 10 KHz

Monitoring.  
Connected to pulser register.  
If continuous mode on "INF"

Number of pulses	Num. of pulses Setpoint	Cont. Mode ON/OFF
INF	0	ON <input checked="" type="checkbox"/>
# 5000	5,000	OFF <input type="checkbox"/>
INF	0	ON <input checked="" type="checkbox"/>

Setpoint.  
Arrow keys step: 10  
Page keys: 100

Continuous mode on/off

Box turn orange when continuous mode is off

# Description (3)

MOR width	MOR width Setpoint	MOR delay	MOR delay Setpoint
10 (ns)	10	0 (ns)	0

Setpoint.  
Arrow keys step: 10 ns  
Page keys step: 100 ns

Monitoring.  
Connected to epics process variable .

Setpoint.  
Arrow keys step: 10 ns  
Page keys step: 100 ns

Monitoring.  
Connected to pulser register.

## FCAL VOLTAGE CONTROL

Channel Name	Measured Voltage (V)	Voltage Setpoint	Voltage Setpoint Readback	ON/OFF	Channel Status	Measured Current (A)
BIAS	19.988	0	20.000	<input checked="" type="checkbox"/>	On	0.030
LV	4.999	0	5.000	<input checked="" type="checkbox"/>	On	0.026

Get Advance setting menu

Monitoring.  
Connected to epics process variable

Setpoint.  
Arrow keys step: 0.01 V  
Page keys step: 0.1 V

Setpoint.  
Arrow keys step: 1 V  
Page keys step: 5 V

Voltage On/Off

# Description (4)

Advance setting menu  
for Bias Voltage. Similar  
for Low Voltage

Channel Name	Crate Slot Channel #	Measured Voltage	Voltage Setpoint	Voltage Setpoint Readback	LV ON/OFF	Channel Status	Measured Current	Max Current Setpoint	Max Current Readback	Trip Current Setpoint	Trip Current Readback	Max Voltage Setpoint	Max Term Voltage Readback	Ramp Up Rate Setpoint	Ramp Up Rate Readback	Ramp Down Rate Setpoint	Ramp Down Rate Readback	Clear Events and Turn Off
BIAS	he:D2-5-MID:100	19.988	0	20.000		On	0.030	0	2.500	0	2.525	0	30.030	0	100	0	100	



# Future Work

- This LED GUI can easily be modified to perform the BCAL tests.
- Questions and Suggestions...?