

Figure 0: OpenVentPK

## PORTFOLIO

My name is Shahzaib Shamim, graduated with a degree in Electrical Engineering, majors in Electronics. Skilled in hardware designs, embedded systems and control systems with hands-on experience.

I have an industry experience of more than two years in designing pcbs on altium designer, proteus, kicad, and eagle. Excels at learning new technologies and applying them to develop optimized results.

# GSM Alarm

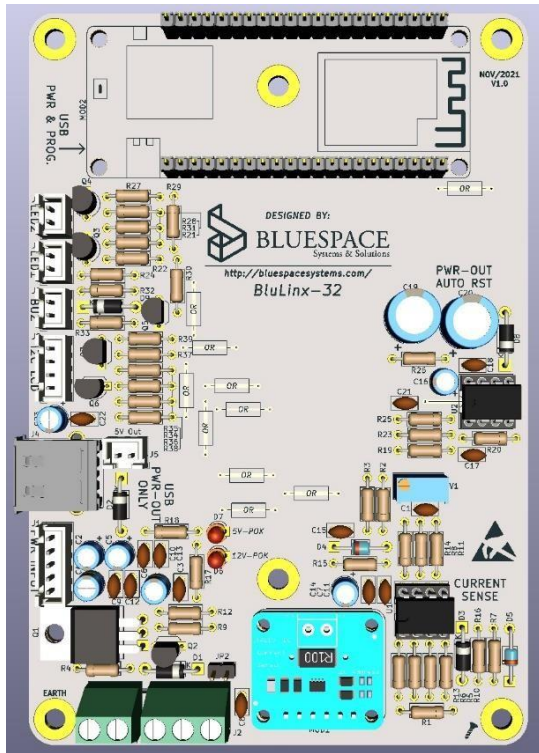


Figure 1: GSM Alarm Top

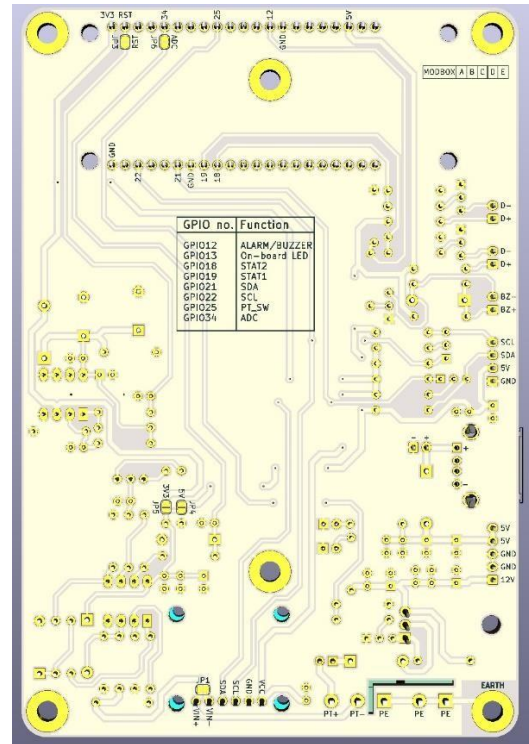


Figure 2: GSM Alarm Bottom

## Features:

- Features ESP32 to monitor pressure and send the data via GSM
- Headers to plugin other peripherals to show the current status of the system
- Monitors power to safely shut down the system
- Onboard two current sense amplifiers to detect 4-20mA current signal

# Motor DAQ



Figure 3: Motor DAQ Top

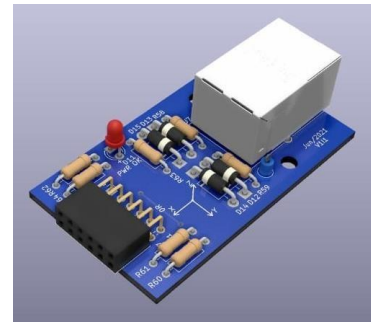


Figure 5: Sensor module Top

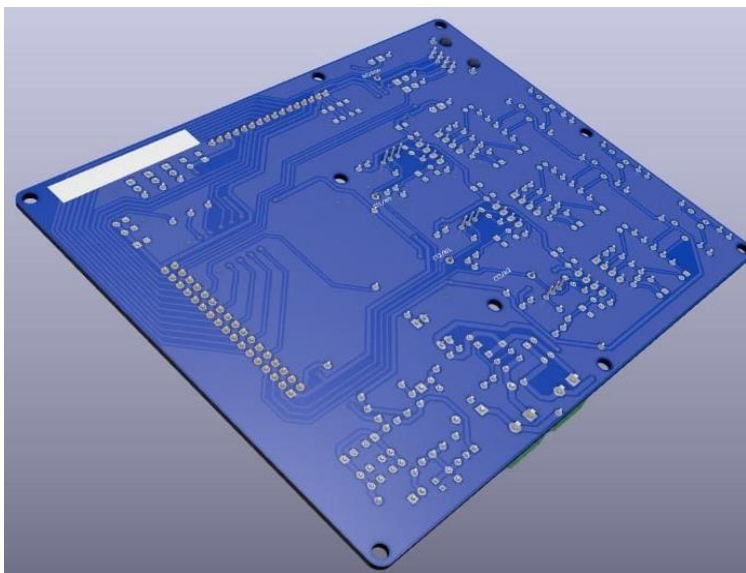


Figure 4: Motor DAQ Bottom

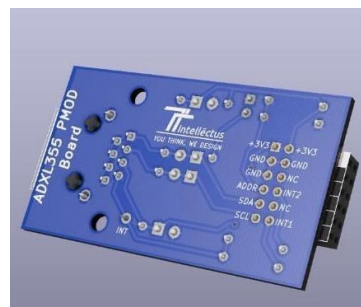


Figure 6: Sensor module Bottom

## Features:

- Custom board for National Instruments' device to monitor AC current signals
- Communicate with IMU on sensor shield board to detect vibration of the system via I2C
- Soft-switch for relay to control AC motor



# Motor Drive Controller

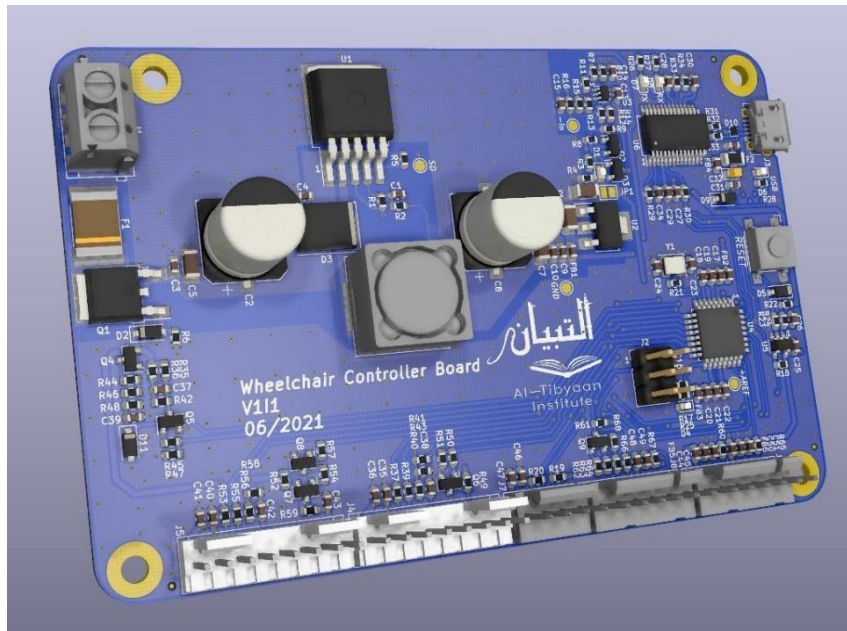
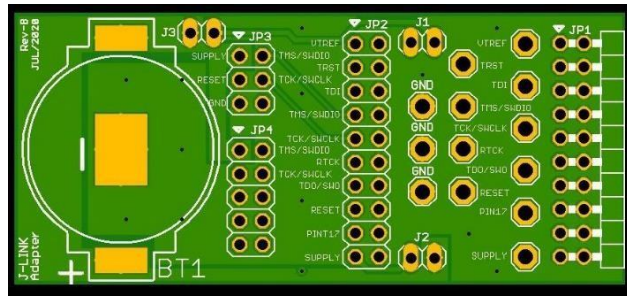


Figure 7: Motor Driver Controller

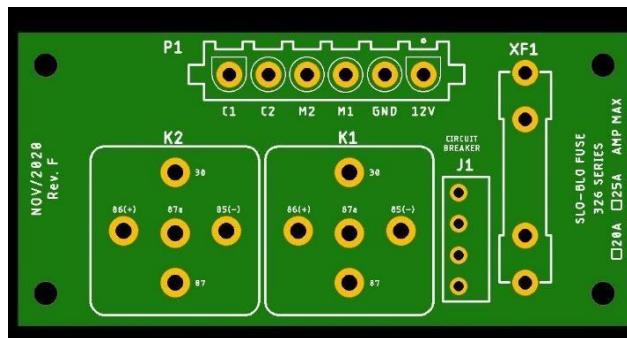
## Features:

- It reads analog data from joysticks to control motors via external motor drivers
- It monitors the battery
- BUCK converter to drive system logic
- Onboard USB to Serial bridge

## ***Breakout Boards***



*Figure 8: JTAG breakout board*



*Figure 9: Relay Card*

### ***Features of JTAG Breakout Board:***

- Converts 20-pin JTAG to 10-in and 6-pin

### ***Features of Relay Card:***

- Drive relays from external logic

## Open Source Projects

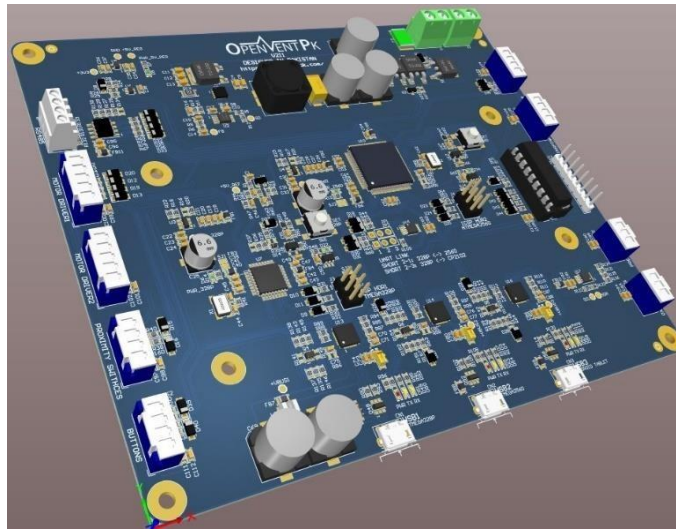


Figure 10: OpenVentPK TOP (Rev1)

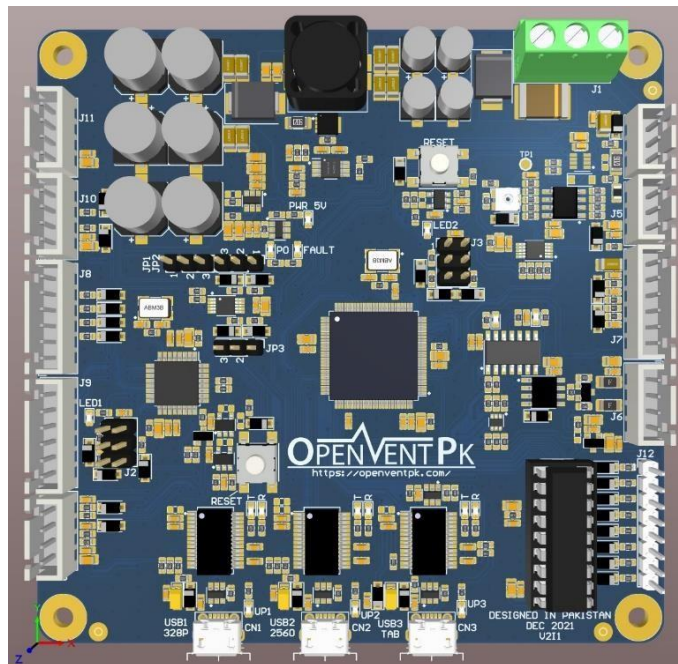
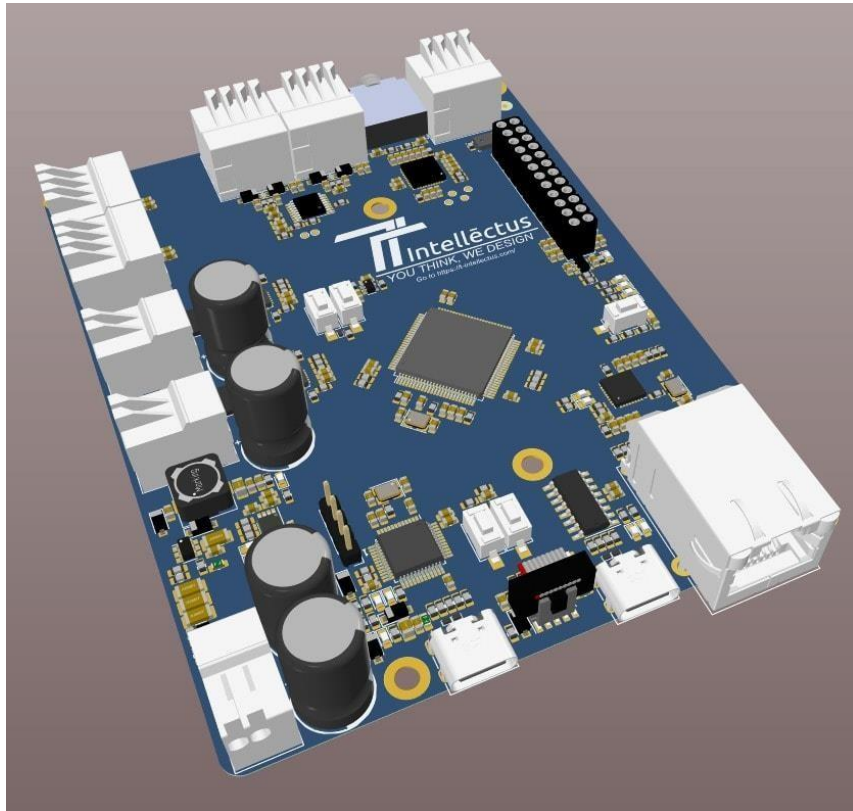


Figure 11: OpenVentPK TOP (Rev2)

### Feature:

- Open source ventilator project with two 8-bit AVR microcontrollers to monitor keypad inputs, external switches, and sensors
- Controls LCD, stepper motor drivers
- Communicate with a sensor over RS485
- Two USB to UART converters for debugging and programming, and one for UART interface for android devices

## **CortexM4 DevBoard**



*Figure 12: Development board*

### **Features:**

- Custom board for cortexM4 MCU with ST-LINK programmer/debugger
- Two motor drivers for up to 3A motors
- 24-bit ADC
- 10/100 Mbps Ethernet PHY
- CAN Bus
- Audio codec
- BUCK Converter
- GPIOs

# BLE DevKit

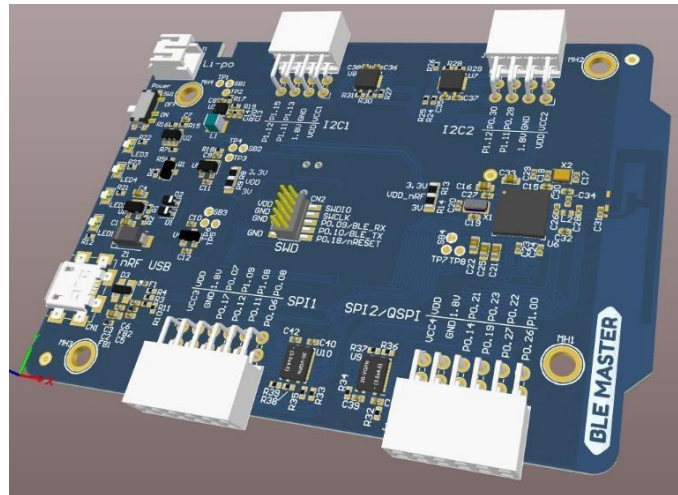


Figure 13: BLE Master Top (Rev2)

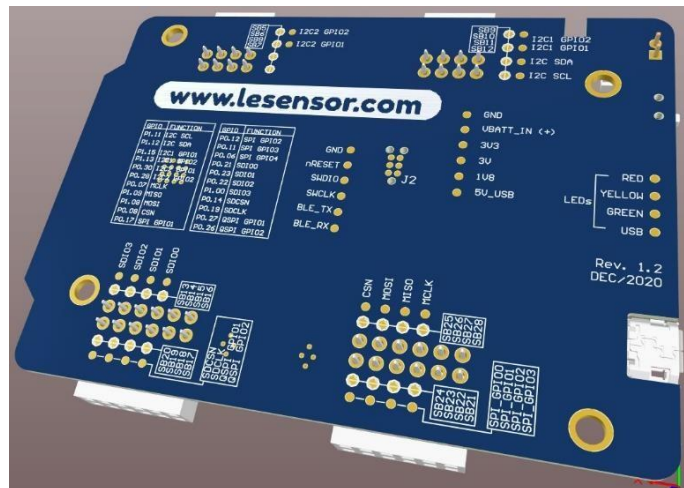
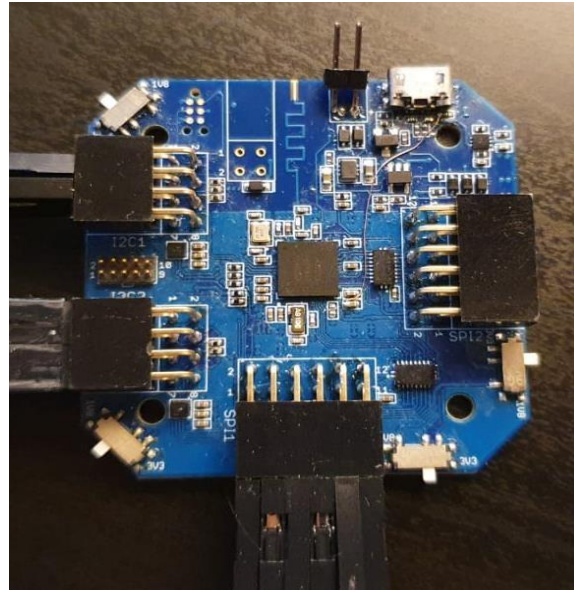


Figure 14: BLE Master Bottom (Rev2)

## Features:

- New and improved revision
- It reads the data from different I2C and SPI sensor boards and transmits over BLE to slave devices
- NRF52840 MCU with BLE
- SWD and Tag-Connect programming headers
- I2C and SPI headers for plug-in sensor modules
- Smart logic level shifters that convert logic level according to the sensor's VDD
- Battery charge monitor





*Figure 15: BLE Master Top (Rev1)*

## ***Features:***

- Rev1 of BLE Master
- It reads the data from different I2C and SPI sensor boards and transmits over BLE to slave devices
- NRF52840 MCU with BLE
- Battery charge monitor

## Sensor Modules

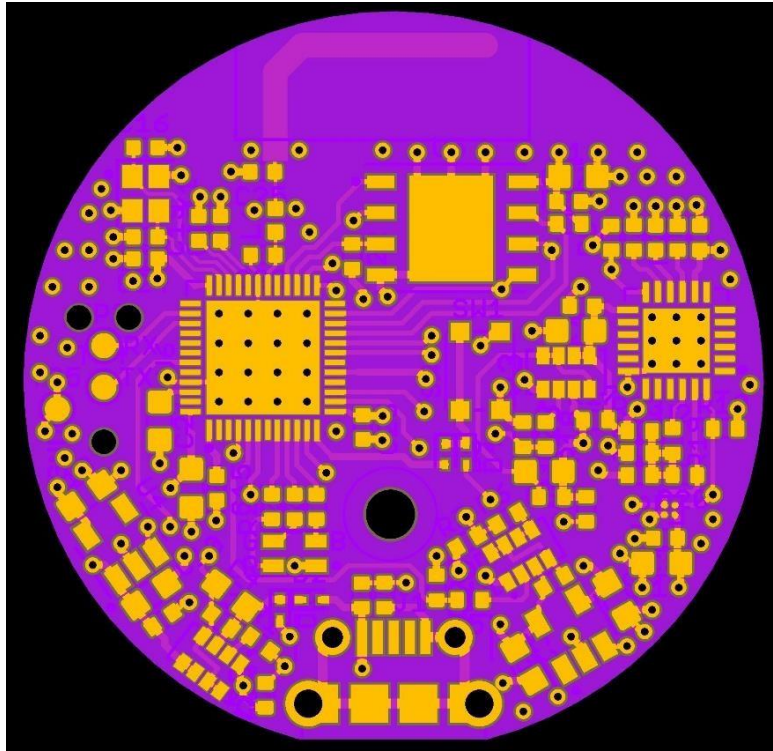


Figure 16: nrf52810 9-DoF Top

### **Features:**

- 28mm diameter Nrf52810 9-DoF reads data from IMU and magnetometer and sends it over BLE
- Battery-powered
- RGB LED and soft-switch
- Flash for data storage

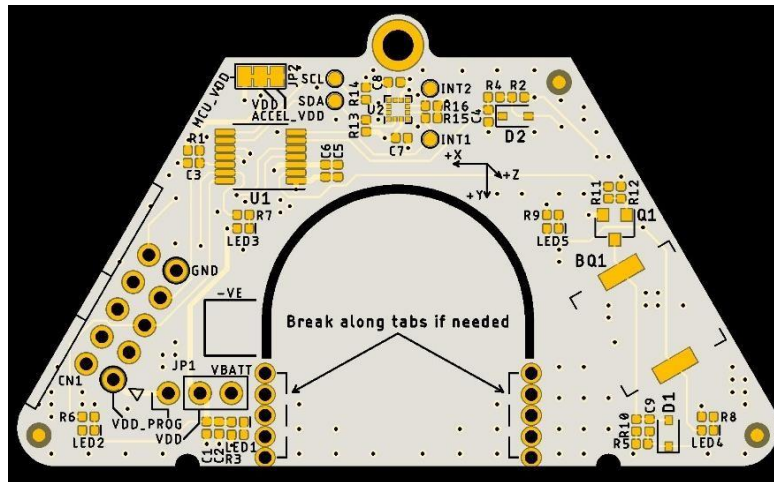


Figure 17: Dua Card Top

## Features:

- Low-cost 8-bit 8051 MCU to detect motion from IMU
- Buzzer and LED indication
- Powered from a coin cell (CR2032)

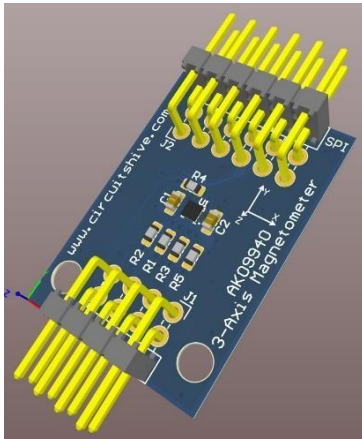


Figure 18: AK09940

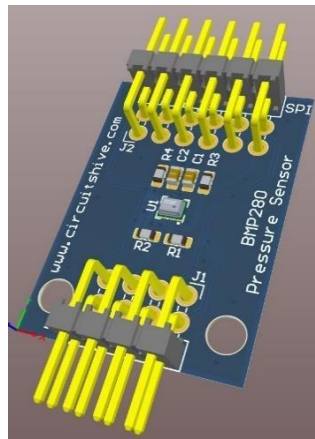


Figure 19: BMP280

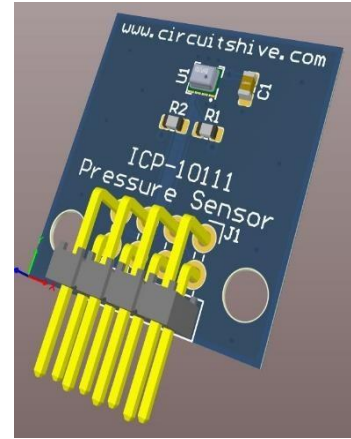


Figure 20: ICM-20602

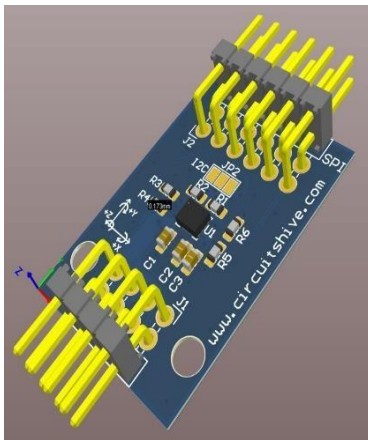


Figure 21: ICM-42688-P

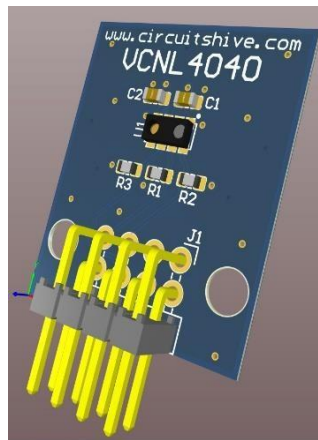


Figure 22: VCNL4040

## Features:

- Sensor modules for BLE Master Development kit
- I2C and SPI headers



## 50 UP Pressure Chamber Motherboard

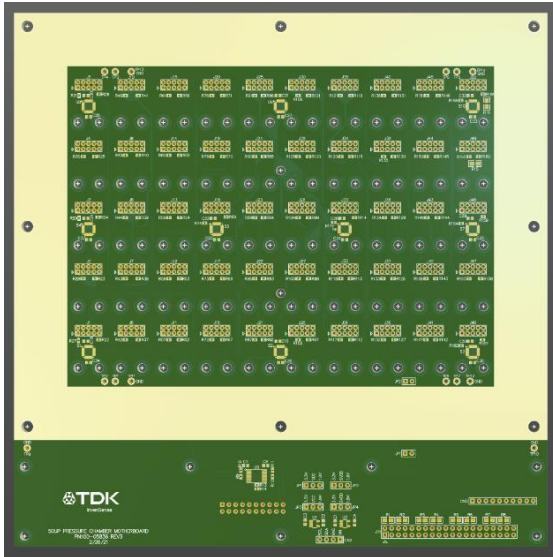


Figure 23: 50 UP Press. Chamber Motherboard Top

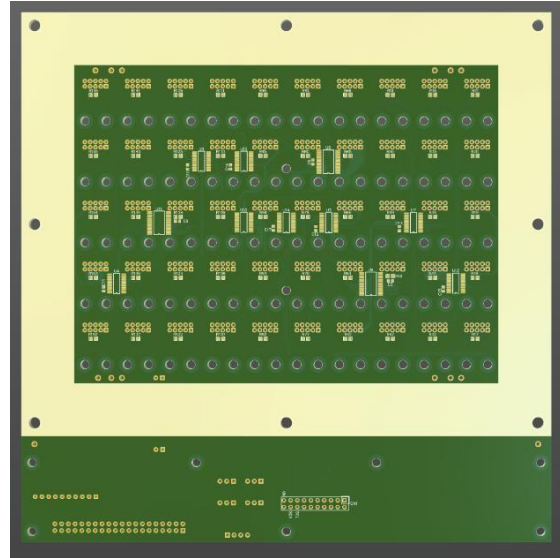
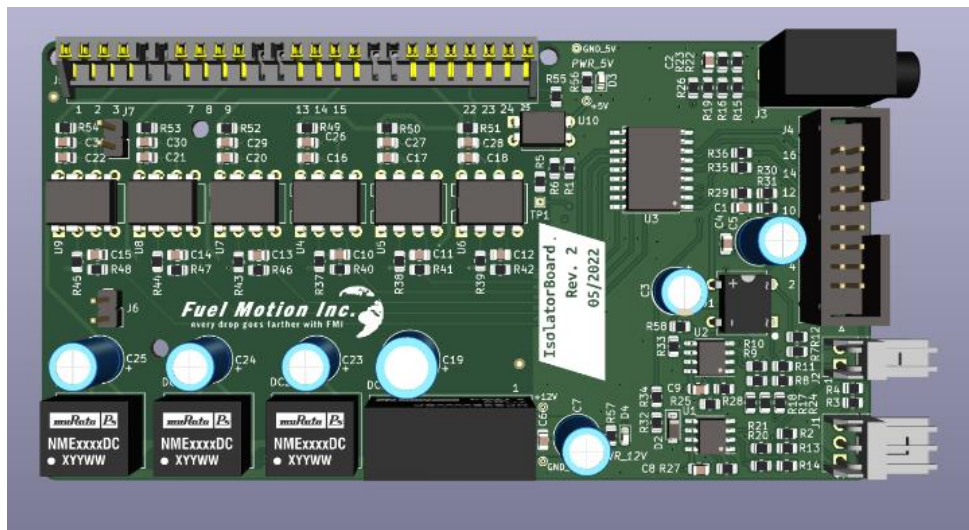


Figure 24: 50 UP Press. Chamber Motherboard Bottom

### Features:

- 50 I2C sensors on a card for TDK Invensense
- 1 to 8 channel I2C switch/multiplexer
- 8-channel voltage translation
- 6-Layers

## ***Isolator Board***

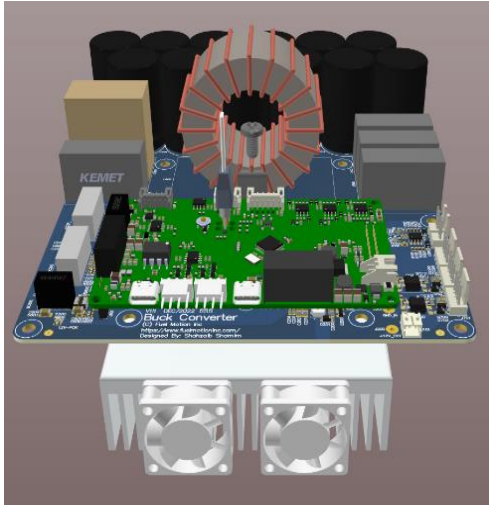


*Figure 25: Isolator Board for IGBT Module*

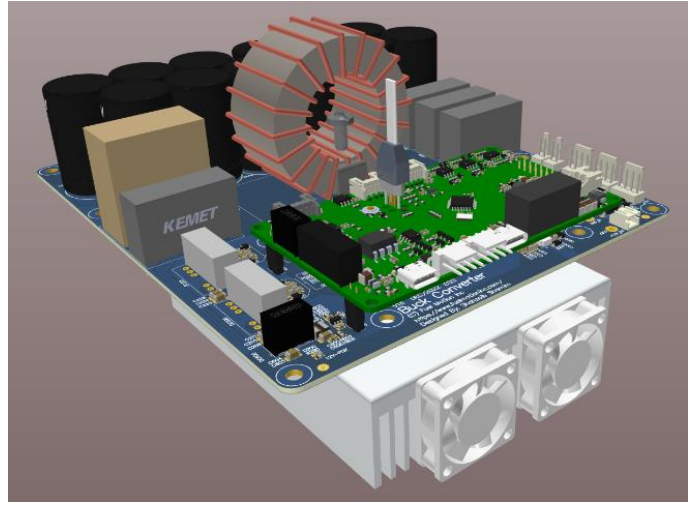
### ***Features:***

- Temperature, current, voltage analog out
- Isolated PWM signals
- 6-channel to control IGBT
- 4-Layers

## ***Buck Converter***



*Figure 26: Buck Converter*

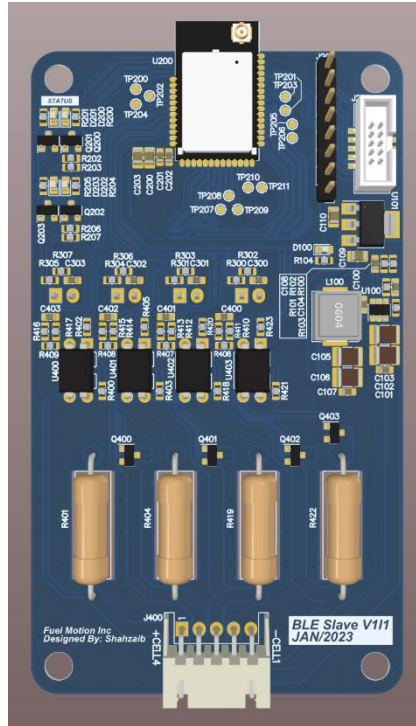


*Figure 27: Buck Converter*

### ***Features:***

- DC High Voltage and Current Sensing
- Isolated Power Supply
- Stackable design to connect to master card
- Double sided assembly
- 4-Layers

## ***BLE Carrier Board***



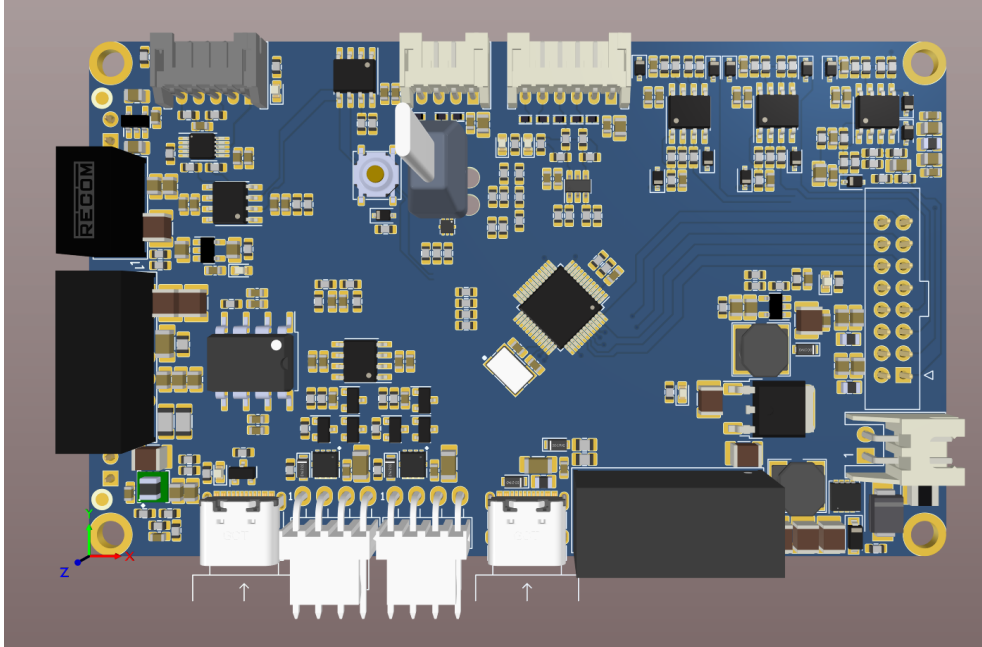
*Figure 27: BLE Carrier Board*

### ***Features:***

- Temperature, voltage measurement
- Cell balancer
- 2-Layers



## ***Inverter Controller***



*Figure 28: Inverter Controller*

### ***Features:***

- CAN communication
- DC High Voltage sensing
- Isolated PWM signal interface
- AC coupled and buffers for analog measurements
- Isolated power supply
- 4-Layers