

PCB Design and Prototyping of a DC-DC Converter(SELF PROJECT)

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Simulation of Buck converter in Altium :

CIRCUIT DIAGRAM

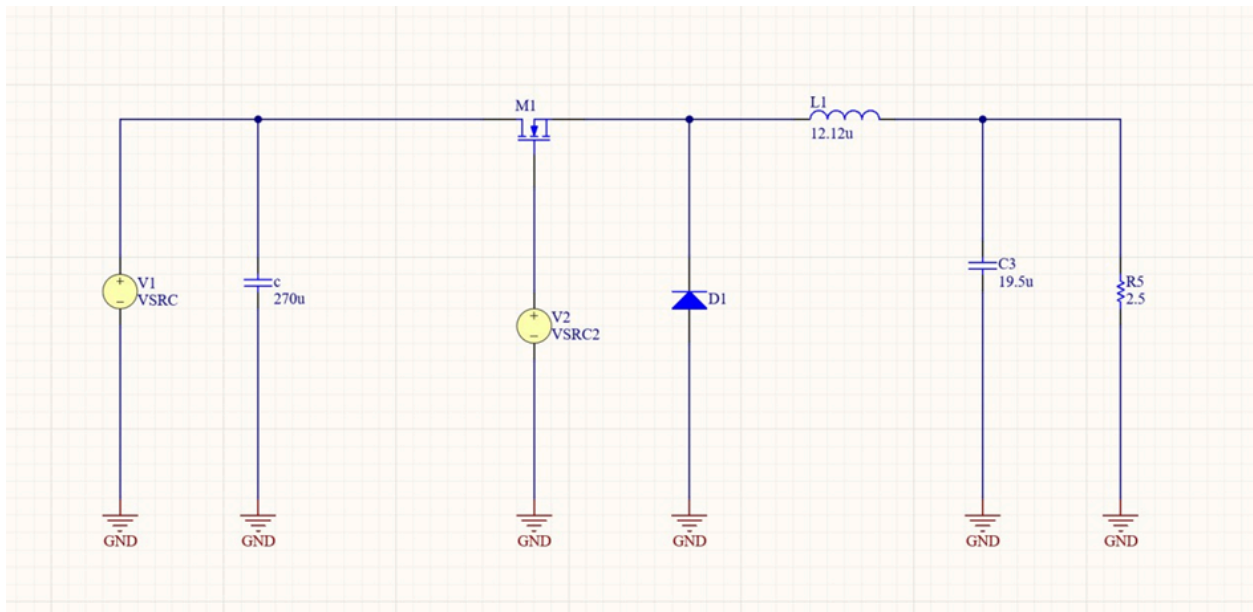


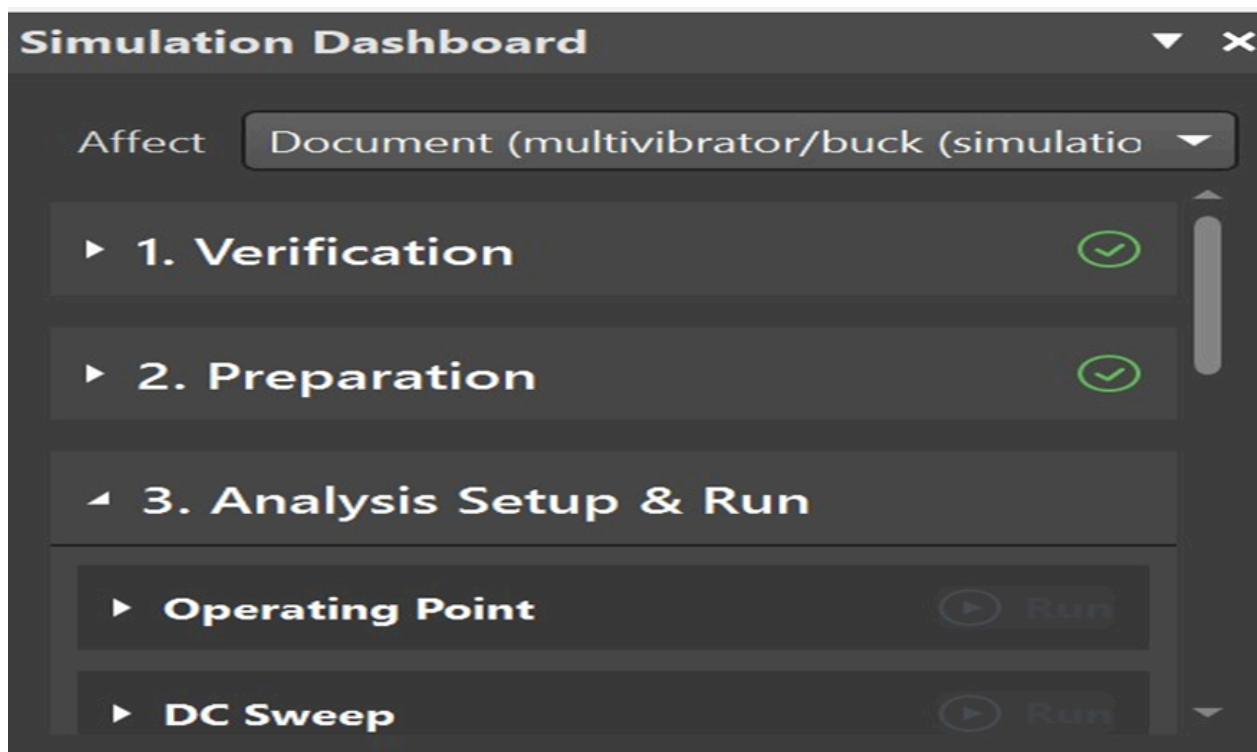
Fig:Schematic of buck converter

SCHEMATIC VERIFICATION BEFORE GETTING SIMULATION RESULTS

STEPS AND PROCEDURE

Place all the components as per the data sheet provided with values. After schematic representation, we have to do Verification check i.e.,

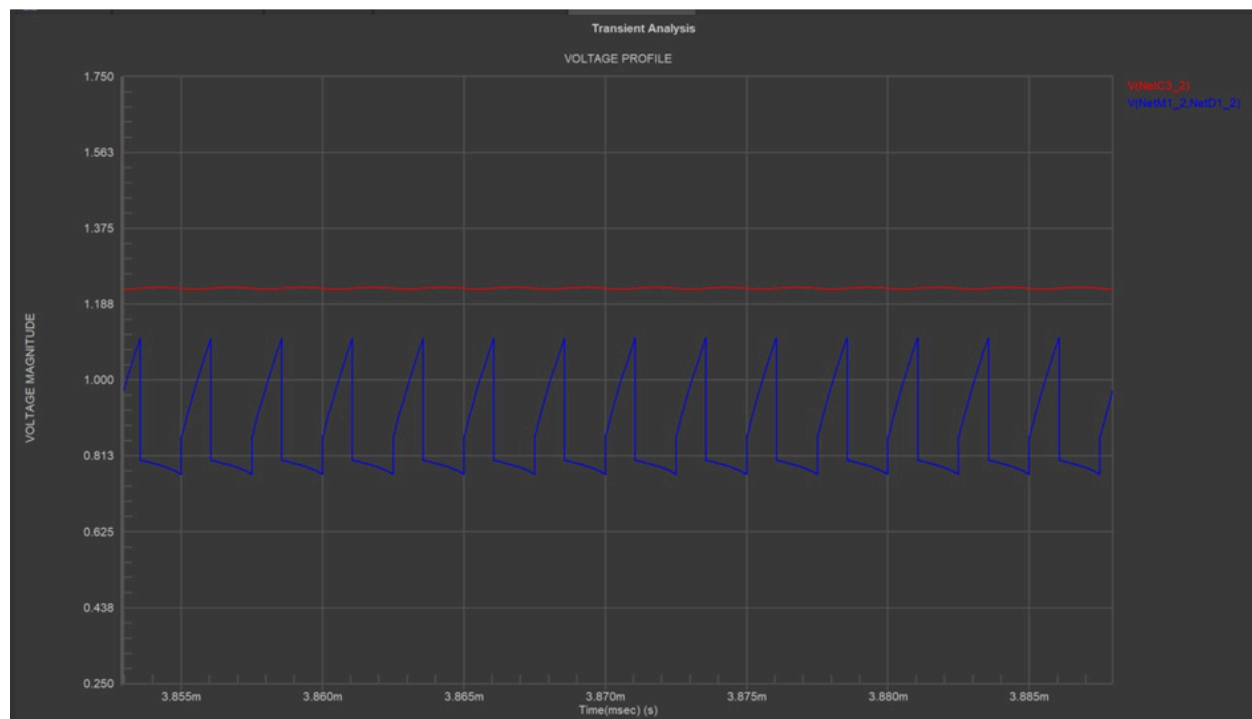
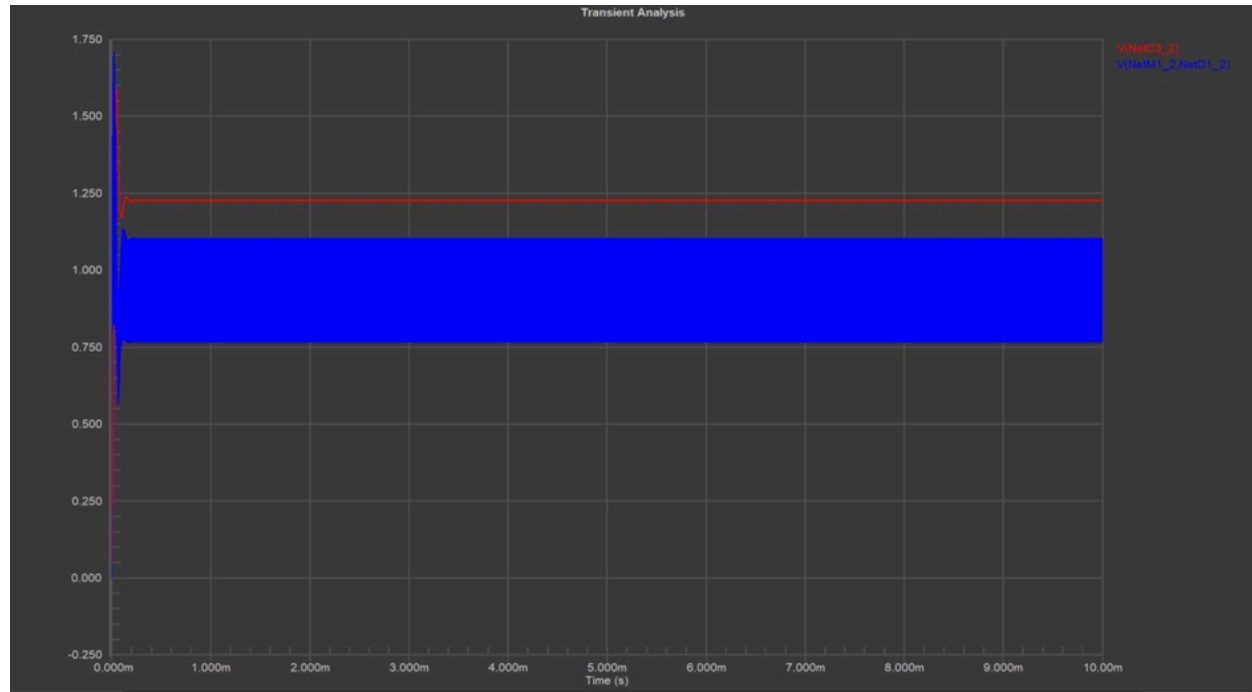
Open Simulate>Simulation_Dashboard>Start Verification



After successful verification of Electrical Rule check and Simulation model Next Go to Analysis Setup &

Run> Transient > Set Time period 1msec to 100nsec > run

Results:



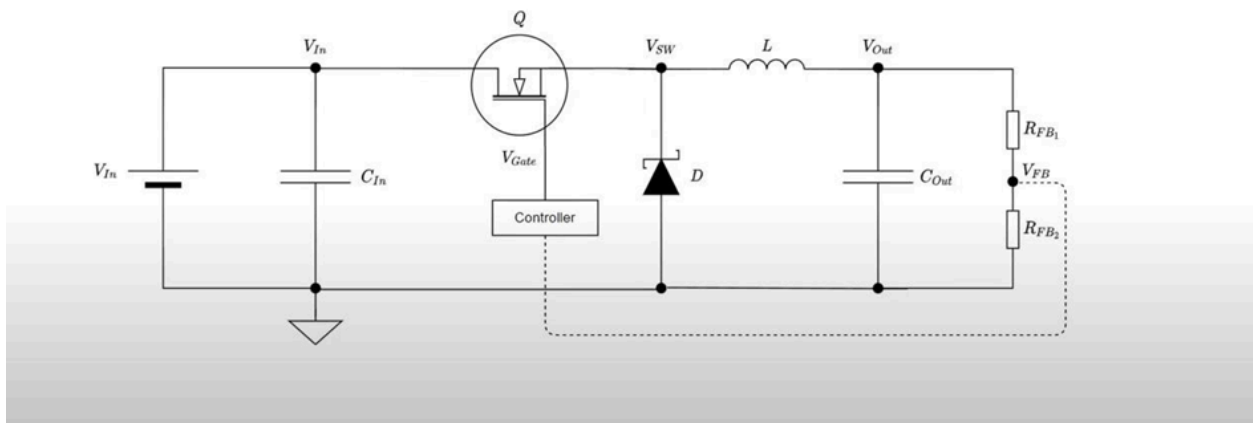
Blue Colour-Voltage across Switch.

Red Colour -Output Voltage.

Drive document: <https://drive.google.com/file/d/1mA1iPQQgpS3Nfb-AqffbJzySsP0CKuUP/view>

Microcontroller based circuit diagram of buck converter

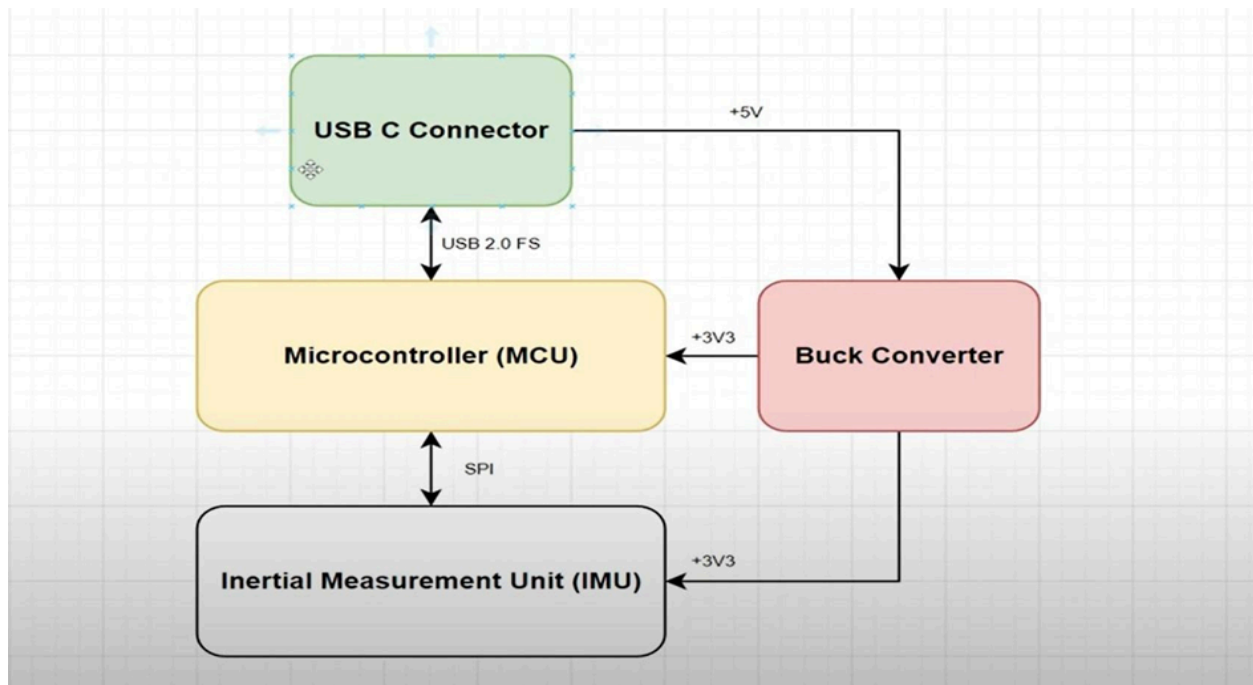
Circuit Diagram of Buck Converter



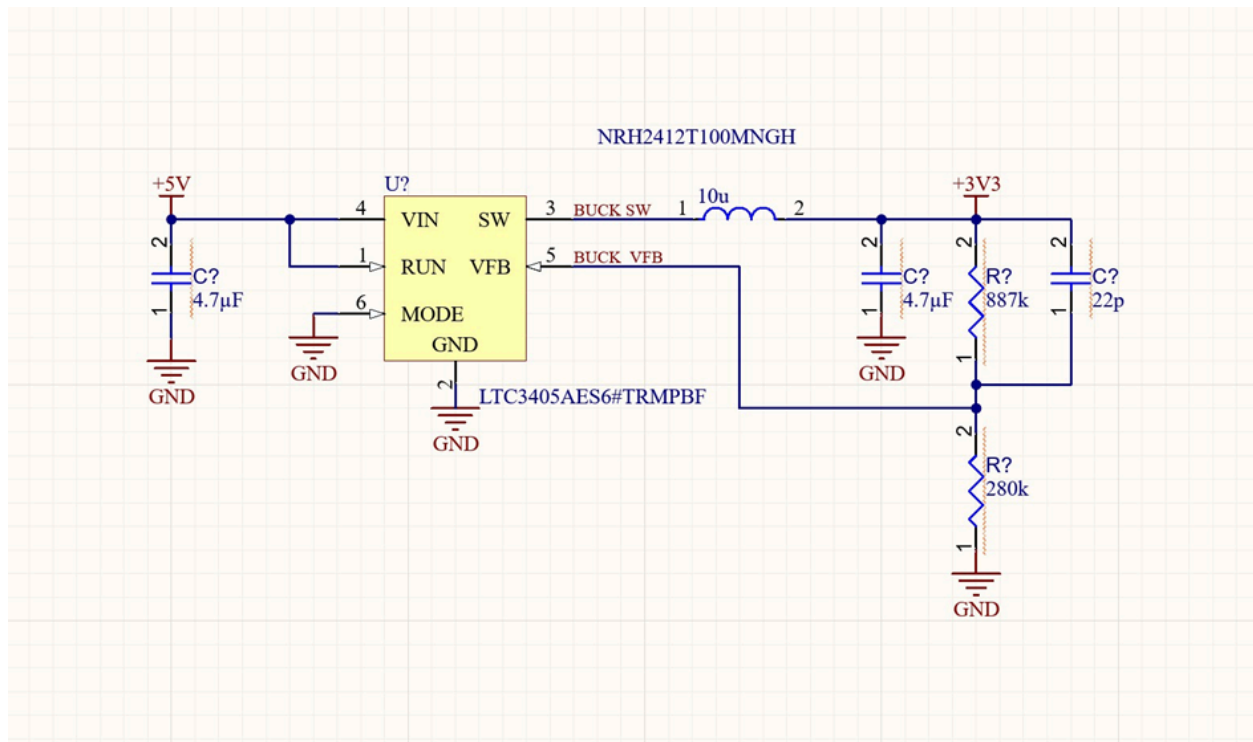
Micro-controller: STM32F0422G6U6

USB-C Connector: To Supply power i/p and Connect to microcontroller.

Basic block diagram of interconnection of elements:



Microcontroller based Buck Converter:



Link for Data Sheet of Microcontroller:

<https://www.st.com/resource/en/datasheet/stm32f042t6.pdf>

Link for Data Sheet of Switching Regulator:

<https://www.analog.com/media/en/technical-documentation/data-sheets/3405afa.pdf>

Link for Data Sheet of Inductor:

<https://www.mouser.in/ProductDetail/TAIYO-YUDEN/NRH2412T100MNGH?qs=CNQs48zzdnr qx0tE%252BgVC6w%3D%3D&srsId=AfmBOor0vEXebx6fAj6soMOupcZiT u5nCjBRLJ9xWlqlrvjvAjCBzgDu>

Link for Data Sheet of Switching Regulator:

CAPACITOR: CAPC0805(2012)145_L

RESISTOR: RES_0603

Link for Data Sheet of USB_C (USB4105-GF-A):

<https://ww1.microchip.com/downloads/en/appnotes/00001953a.pdf>