Title: Open loop control for BLDC motor using hall sensors.

Pre – Lab Activities:

1. Draw the flow chart for duty cycle control of BLDC motor using hall sensors.
2. Following table gives the phases that need to be energised based on the hall sensor output to rotate the motor in the clockwise direction.

Hall Sensor Output (H1 H2 H3)	Phases to be energised
0 1 1	CB
0 0 1	AB
1 0 1	AC
1 0 0	BC
1 1 0	BA
0 1 0	CA

Write the interrupt routine for the given CCS code to implement duty cycle control for BLDC motor.

Lab work:

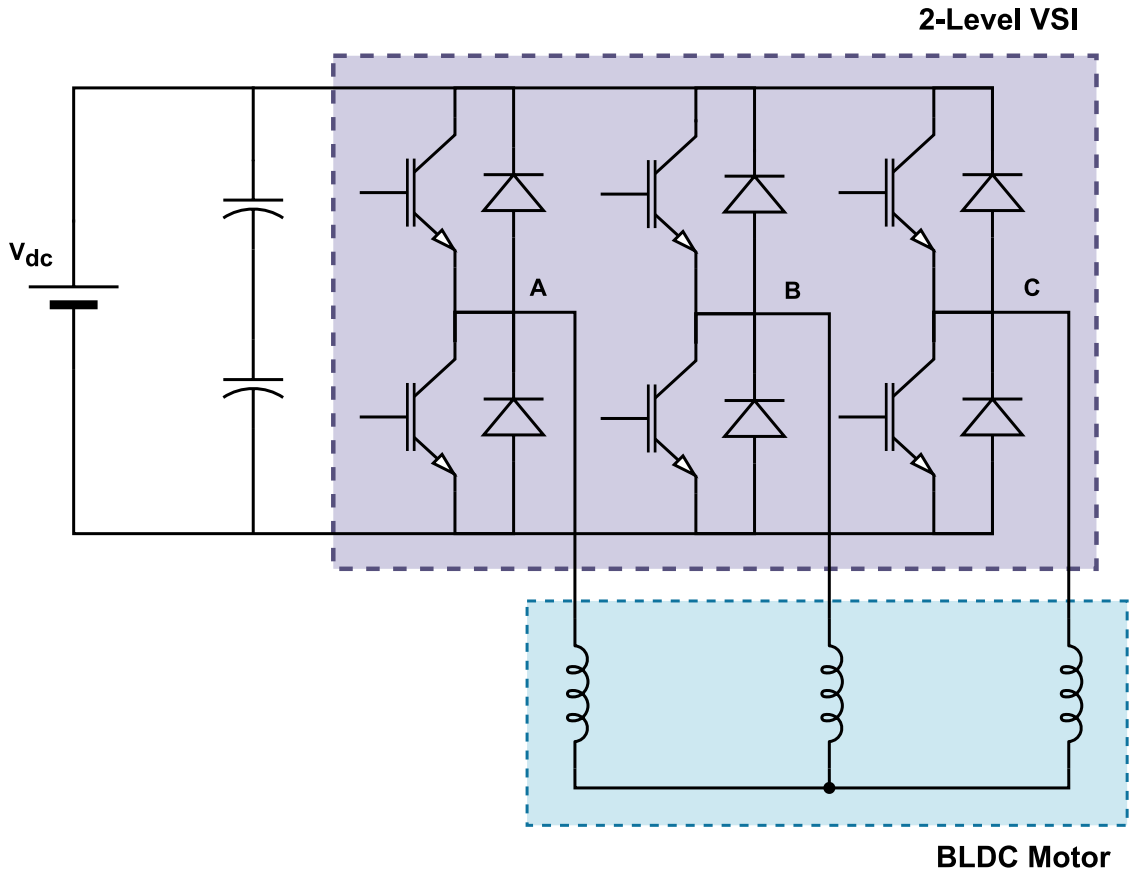
1. Run the motor in steady state for five different duty cycles (0.1, 0.2, 0.4, 0.5, 0.7). Note down the steady state speed for each case.

Post lab work:

1. Comment on the current waveforms obtained while running the motor in fixed duty cycle control.
2. Plot the speed vs duty cycle curve from the data obtained from the experiment.

Appendix

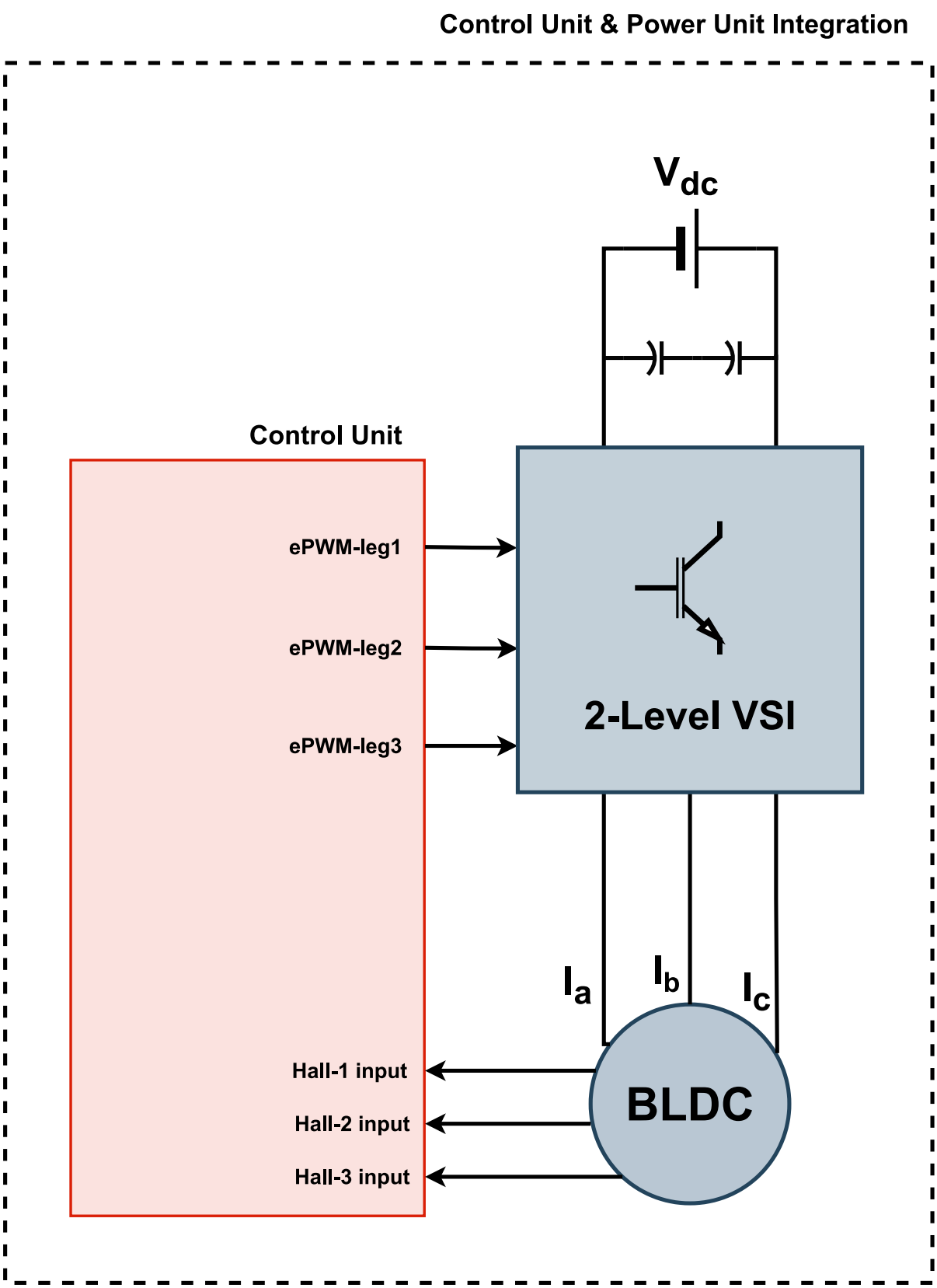
Basic connection diagram for integration of launchpad (F280049C) and BLDC motor:



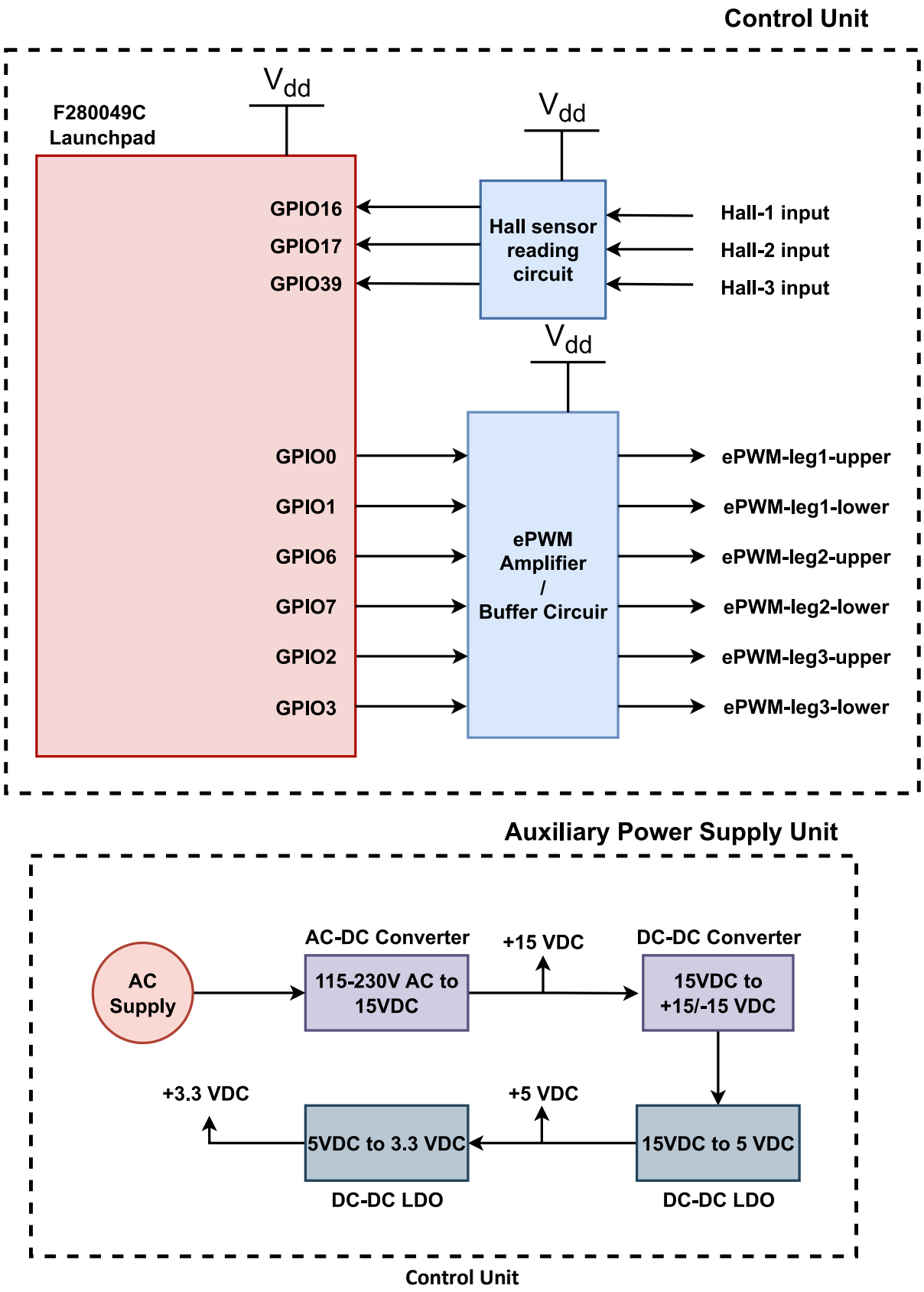
Power connections for BLDC motor & VSI

Note: Phase-A (Red for motor terminal), Phase-B (Black for motor terminal) and Phase-C (Brown for motor terminal)

For more information of hardware design please, find attached schematic diagram.



Integration between control & power unit


Control Unit
F280049C
Launchpad
Vdd
Vdd
Vdd
GPIO16
GPIO17
GPIO39
Hall sensor
reading
circuit
Hall-1 input
Hall-2 input
Hall-3 input
GPIO0
GPIO1
GPIO6
GPIO7
GPIO2
GPIO3
ePWM
Amplifier
/
Buffer Circuir
ePWM-leg1-upper
ePWM-leg1-lower
ePWM-leg2-upper
ePWM-leg2-lower
ePWM-leg3-upper
ePWM-leg3-lower
Auxiliary Power Supply Unit
AC
Supply
AC-DC Converter
115-230V AC to
15VDC
+15 VDC
DC-DC Converter
15VDC to
+15/-15 VDC
+3.3 VDC
5VDC to 3.3 VDC
DC-DC LDO
+5 VDC
15VDC to 5 VDC
DC-DC LDO
Control Unit