

THIS CIRCUIT ALLOWS LIBCM TO TURN OFF ENTIRE 5V RAIL (INCLUDING ITSELF) UNTIL THE NEXT KEY ON EVENT.  
INTENDED USE: PREVENT DRAIN ON DISCHARGED IMA BATTERY.

## ARDUINO MEGA2560

The Battery Current Sensor (BCS) injects current into the +5V rail (proportional to the battery current).  
If the sum of all loads on the +5V rail is less than the current injected by the BCS, then the single-quadrant 12V->5V DCDC converter will fall out of regulation, thus causing the voltage on +5V to rise.  
Enabling this circuit guarantees the above condition will not occur. Enable this circuit when key is on.

## OEM BCM A+B CONNECTORS

## MOUNTING HOLES (NPTH)

- Hole\_4.2mm H1
- Hole\_4.2mm H2
- Hole\_4.2mm H4
- Hole\_4.2mm H5
- Hole\_4.2mm H6
- Hole\_4.2mm H7

The output voltage is ratiometric to +5V rail. Therefore ADC should reference +5V rail.

BATT\_CURRENT\_SCALED is 1.660 volts with no battery current. ASSIST causes OUTPUT voltage to increase. REGEN causes OUTPUT voltage to decrease.

The voltage measured on BATT\_CURRENT\_SCALED is:  $(BATT\_CURRENT\_I2V) * 2.29 - 4.07 = BATT\_CURRENT\_SCALED$

Examples:  
140 A Assist: 4.939 volts  
100 A Assist: 4.002 volts  
050 A Assist: 2.832 volts  
010 A Assist: 1.890 volts  
001 A Assist: 1.683 volts  
000 A (IDLE): 1.660 volts  
001 A Regen: 1.638 volts  
010 A Regen: 1.427 volts  
050 A Regen: 0.491 volts  
070 A Regen: 0.023 volts

The overall equation is:  
 $(2.5 + 41 * Battery\_Current\_RAW * 250E-6) * 2.29 - 4.07 = BATT\_CURRENT\_SCALED$

Which reduces to:  
 $BATT\_CURRENT\_RAW * 23.473E-3 + 1.655 = BATT\_CURRENT\_SCALED$   
(BATT\_CURRENT\_RAW is negative during regen)

MEGA2560's 10 bit ADC limits current resolution to 208 mA per count, which is sufficient for coulomb counting.

