Generic Lifepo4, 6v Lead Carbon Cell Monitor and Balancer

Ver 2.003 RM Software, Wellington

Lead Carbon Bank has 8 series x 6v for 50v rail.
16 cells used on Lifepo4 bank.
Not shown: All Cell+- sense wires fused at each battery sample point
Balance load = 3.5 amps per cell.

Last Change:
12 Jan 2019, initial design.
18 Jan 2019, Cell Calibration Added
25 Jan 2019, Combined serial read and load shift registers, common data latch
23 July 2019, added i2c IO ports
15 Jan 2010, Interlock simplified, mosfet removed, mosfet array used for relay switching
30 Jan 2020, Added temperature sensor mux and current sensor inputs.

Modular Cell Monitors and Balance Loads

5 and 12v rails isolated from main bank
cell sense wires connect direct to any selected cell via 1k resistors.
1/2 battery voltage selected by 0.1% divider resistors

Batt Cell Sense Select

Serial to Parallel LED drivers

https://www.onsemi.com/pub/Collateral/CAT4016-D.PDF

Balance Loads Select

Balancing has seperate Enable input so any balance loads can be quickly turned off whenever a call voltage read is required, stops voltage drops on the balance cables affecting the cell value

Interlock to prevent Opto1 shorting to a Battery Cell
Output 0 (on) only when Cal = 1 and Read = 1

1-Wire network adapter Module

Note: Adapter has Opto Isolated IO

CPU IO

Active High
Active Low
C.1-5 pins for interrupt
Keybd Interrupt

Selected Cell Isolation Amp

Cell sense wires each have 1K in series, Adjust to 4:1 reduction
isolation amp max 2.0 v in = 8V input

16Hz filter

Isolated DC Power to Isolation Amp

supply to isolation switches and amp floats at selected battery Cell voltage

External Current Sensors

I2C Port Extender

Set Address

External Alarms and Relays

Alarm Low Volts
Alarm Over Volts
Status-Balancing
Alarm
Signal to charge controller to reduce output for balancing
12V Cooling Fan

To Ext Temp Sensors, Batt, H-Sink