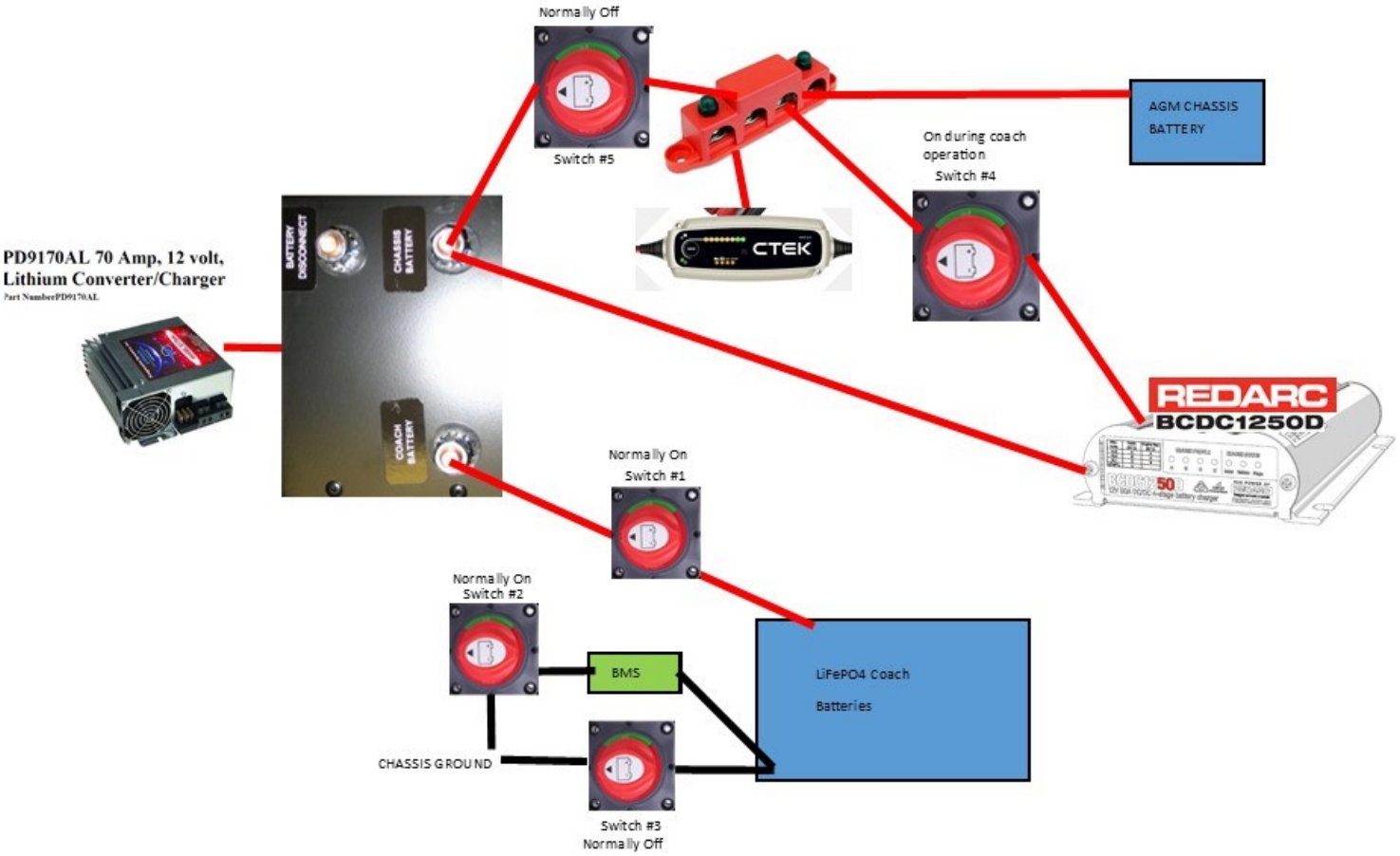
Normally Off
Switch #5
AGM CHASSIS BATTERY
On during coach operation
Switch #4
PD9170AL 70 Amp, 12 volt, Lithium Converter/Charger
Part NumberPD9170AL
BATTERY DISCONNECT
CHASSIS BATTERY
COACH BATTERY
CTEK
REDARC
BCDC1250D
Normally On
Switch #1
Normally On
Switch #2
BMS
LiFePO4 Coach Batteries
CHASSIS GROUND
Switch #3
Normally Off

Please note: I'm not an engineer of any sort. So what I have written is my best understanding of how things work and what I did which was all learned and figured out over about 2+ years of reading, researching and painfully sorting through sometimes scarce and sometimes contradictory information. And several re-dos / reconfigurations.

So please don't crucify me.

The whole system seems to be functioning as I intended, no fires have started, nothing has blown up or fried and no fuses have popped.

This is on a Forest River Georgetown 351DS with a residential fridge that is the only thing plugged into the OEM Xantrex ProWatt SW 2000 inverter.

My LiFePO4 bank is: 400 Amp Hours /8 Cells (8P4S = 8 cells in parallel 4 cells in series)

My goals were:
1) Have the LiFePO4 receive correct charging profile when on shore power and from alternator
2) Protect alternator from burning up trying to charge significantly discharged LiFePO4 bank
3) Have chassis AGM receive correct charging profile when in storage
4) Retain full functionality of the BCC (Battery Control Center)
5) Retain functionality of the Battery Boost System for starting engine if chassis AGM dead

How I did it:
1) Replaced OEM converter / charger with Progressive Dynamics Intelli-power PD9170AL 70 Amp, 12 volt, Lithium Converter/Charger
2) Installed Redarc BCDC 1250D Battery to Battery Charger between chassis AGM Battery and LiFePO4 Battery
3) In storage I plug in the CTEK 40-206 MXS 5.0 charger to charge AGM, leaving switches #4 and #5 off.
4) BCC functions as normal with the exception of having to manually do the procedure noted in "5)" below
5) Battery Boost Function: If attempting Battery Boost Procedure it is important that the BMS Ground is disconnected via Switch 2 and the LiFePO4 batteries are direct grounded to the chassis via Switch 3 because battery boost / attempting vehicle start will draw too much amperage through the BMS which will fry it.
So, prior to engaging Battery Boost, Switch #2 (BMS to Ground) must be off; Switch #3 (LiFePO4 to Ground) must be on; Switch #4 off; Switch #5 on (this creates the direct connection from LiFePO4 to AGM via the BCC).

If I want to charge the LiFePO4 from shore power I just make sure switch #1 is on. If I don't want them to receive shore power charge then switch #1 off.

One bit of weirdness: In order for the rearview camera system to receive power the BCC must see 12 volts on its chassis battery post. If the coach has been in storage with all disconnect switches off, prior to starting the coach, switching on #4 then #1 (in that order) seems to do the trick. If the rear view camera monitor still does not receive power after ignition switch is in on position then switching on #5 momentarily seems to do the trick.

HERE'S WHAT I KNOW ABOUT THE BATTERY CONTROL CENTER (BCC)

When engine is running the charging source for all batteries is the engine alternator. The BCC looks at voltage on ignition switch circuit. At 13.2 volts or greater, the BCC interconnect closes after a 15 second delay allowing a connection between the chassis and coach batteries via the BTB charger (if switch 4 in on position) and/or via direct wire connection (if switch 5 is in on position). If sensed voltage drops below 12.7 volts the interconnect relay opens after a 15 second delay.

When coach is on shore or generator power the BCC looks at voltage on coach batteries. At 13.2 volts or greater, the interconnect relay closes after a 15 second delay allowing the connection between the coach and chassis batteries via switches 4 & 5 as noted above. If sensed voltage drops below 12.7 volts the interconnect relay opens after a 15 second delay.

The BTB charger prevents charge flow from coach batteries to chassis battery via Switch #4. <u>Switch #5 must be ON in order for the coach batteries to charge the chassis battery. Remember the LiFePO4 Converter/Charger does NOT output the ideal charging profile for the chassis AGM battery.</u>

In order for the review camera system to receive power the BCC must see 12 volts on its chassis battery post. If the coach has been in storage with all disconnect switches off, prior to starting the coach, switching on #4 then #2 (in that order) seems to do the trick. If the rear view camera monitor does not receive power after ignition switch is in on position then swith on #5 momentarily. This seems to do the trick.

HERE IS WHAT I KNOW ABOUT THE BMS (Battery Monitoring System—for the LiFePO4)

The BMS is basically a switch that allows the LiFePO4 battery pack to be active and connected when the BMS's sensors readings fall within certain parameters for charge state and temperature.

It has small sensor wires attached to each of the four LiFePO4 cells.

The BMA switch operates via the main grounding cable coming off the LiFePO4 battery pack. When the switch is closed it allows the connection to ground. When open it disconnects the connection to ground.

If attempting Battery Boost Procedure it is important that the BMS Ground is disconnected via Switch 2 and the LiFePO4 batteries are direct grounded to the chassis via Switch 3 because battery boost / attempting vehicle start will draw too much amperage through the BMS which will fry it.

The BMS also monitors the 4 cell pair state of charge and the pack temperature. If any any readings fall outside the set safetly parameters the BMS disconnects, shutting down the LiFePO4 pack.

The BMS also attempts to maintain balance between the cell pairs by bleeding/transferring charge between them via the small sensor wires to keep them all as close to equal charge states as possible.