

# BackEnd housekeeping

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## STEPS:

1. Ensure all switches are in off position
2. Switch on battery power, measure voltage, record.
3. Switch off battery
4. Plug in charger to mains
5. Plug in Black and red wires to charger, and to batteries. Ensure all connections are tight
6. Switch on the battery (note it's a three-way switch, so all the way down is on) — i.e. charge and run in the battery on position. Middle position is not connected
7. Ensure that charger settings are set to 24 V and smallest circle (slow charge setting 0)
8. You can move to speed 1 after 1.5 to 2 hours and at max to speed 2 after one more hour on speed 1.
9. Switch on red flip switch and black flip switch on charger.
10. The final voltage on the battery should be measured about 15 minutes after charger switch off, giving some settling down time.
11. Switch off process : turn the charging speed back to position 0 step by step from whichever position it was charging in.
12. Turn off black switch, then red switch.
13. Switch off battery power on the back end.
14. Turn off mains.

## GENERAL NOTES AND NUMBERS:

1. Lead acid battery 101 : When we recharge a lead acid battery, we reverse the chemical process and breakdown the sulphates on the electrodes to regenerate sulphuric acid in the electrolyte. The battery is comprised of a series of cells each with ~2.1V. Lead acid battery doesn't store charge, it is the active chemical reaction that generates voltage when the circuit is completed.
2. For our set we have a series parallel combination : voltage at terminals after run (unloaded) is 24.2 V.
3. After deep discharge, it's best to start with minimum current first for one or two hours, then ramp up to next level for one more hour. Maximum we go to level 3. In lab conditions level 3 is not recommended, field no choice.
4. Deep discharge is risky due to chances of fire! Don't do it too often.
5. To check the values at the terminals after charging, wait for 15-20 minutes of
6. After full night run when we charge (at max level 2) can go up to 27 V after charging for 2 days, with no load.
7. Voltage drops by 0.5 V after configuration.
8. 24.2 V (absolute minimum end being 23.9 V) is the minimum value with load (configured FPGA) is the threshold below which the DC-DC can fail and FPGA switched.
9. We remove the charging cables typically during observations. Red to red, black to black.
10. Charger should be off. First connect the charging cables to the charger, then connect to the battery.
11. Better to have one person oversee the battery charging process going over the checklist sheet and reading out as another person does the steps.
12. In the lab, after observation / run, give it half an hour cooldown (heat reasons) and then start charging.

13. After we observe for about 8 hours, the battery voltage drops by 0.8 to 1 V.
14. The peak charged voltage is seen to gradually drops even after the same amount of charging. When this happens, give one additional night break.
15. 15 minutes after switching off charger, we would need at least 25.8V at terminals before configuration, for a full night run 8 hours - for EXIDE set. AMARON numbers will change.
16. Be extremely alert when doing all battery related processes. There have been accidents and fires!!!

\*\* multiple file generation happens after a few nights, could be battery related (charge) or file fragmentation on disk.

When observing, unplug the charger cables from batteries (that runs to charger) to avoid stray fields and RFI pick up on power / charger lines.

