

2nd Car Battery for /M and /P

By G8MNY

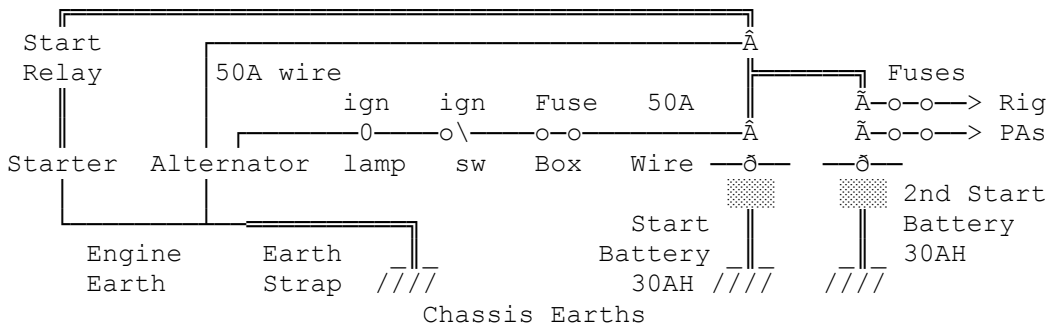
(Updated Apr 08)

(8 Bit ASCII Graphics use code page 437 or 850)

Here are 4 options to consider when adding a 2nd battery for /M or /P work etc. N.B. steering diodes for charging is not usable due to the voltage losses, unless you use 15V alternators!

1/ NON SWITCHED SYSTEM

300A start wire (e.g. 60A mains tails)



There is a problem when joining batteries, as the start battery voltage drops to 10V or less on starting, any paralleled battery & wiring must be capable of the start currents, if left connected during starting. Indeed there is some merit in just going for a cheap identical start battery as a 2nd battery...

Advantages:-

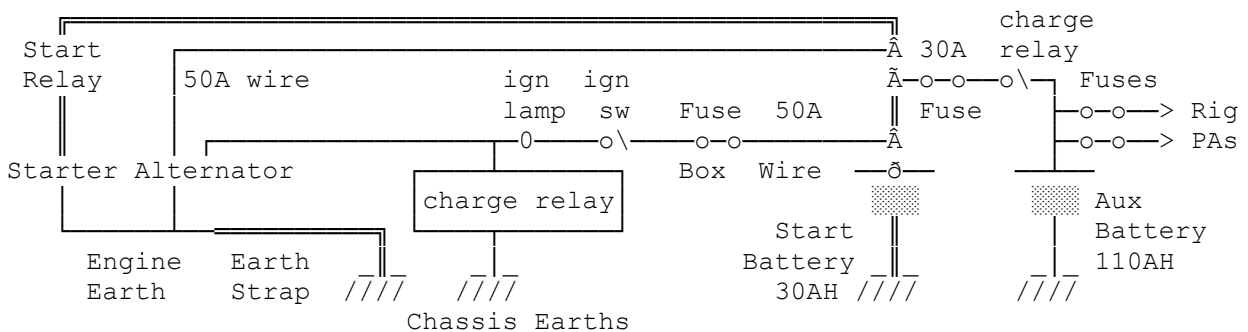
- a) Easy to replace/swap start battery as they age
- b) Doubles discharge capacity
- c) Aids starting, so both batteries can be run flatter & they will start OK
- d) Shared starting current gives much longer battery life
- e) Simple no switching
- f) Second start type battery more easily charged from alternator than a deep cycle one.

Disadvantages:-

- g) Leaving a small load on the system will eventually exhaust both batteries!
- h) Thick paralleling unfused lead needed
- i) Battery failure detection a problem

2/ CHARGING SWITCHED SYSTEM

300A start wire



This system needs a method to operate the charge relay only when the battery is being charged. Using the above circuit the alternator function needs to be checked to see if relay affects the exciting action (it should not).

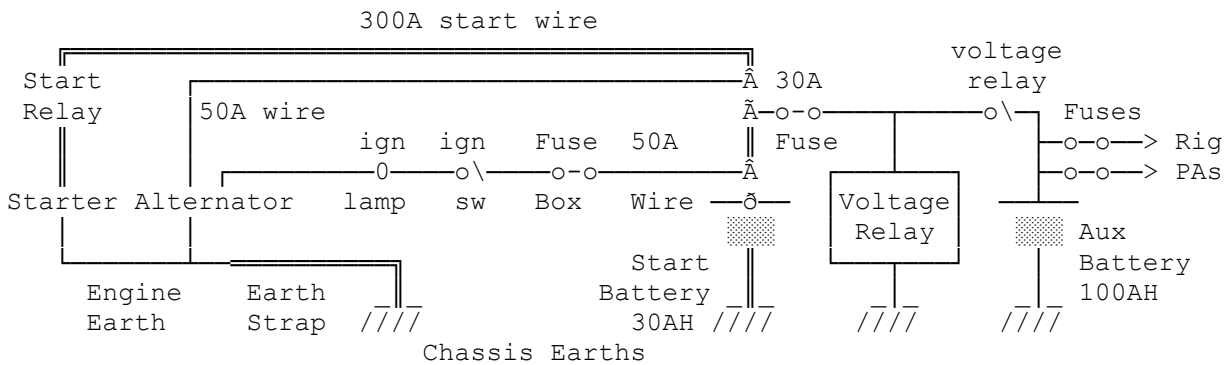
Advantages:-

- a) No high starting currents over charging lead
- b) Thinner paralleling charging lead
- c) Paralleling lead can be fused
- d) Large Deep Cycle Aux battery shown here
- e) Relay only operated once per engine start cycle

Disadvantages:-

- f) Electronic Control box may be needed if the relay upsets Alternator
- g) No starting aid, but jumper starting possible if leads are thick enough
- h) Deep cycle Aux battery will be difficult to charge up with long thin lead & may need proper long refreshing charges to maintain fully charge.

3/ VOLTAGE SWITCHED SYSTEM



The relay here has an electronic voltage detector that operates it when the 1st battery is @ 13V & also releases it below 13V! e.g. there must be no hysteresis.

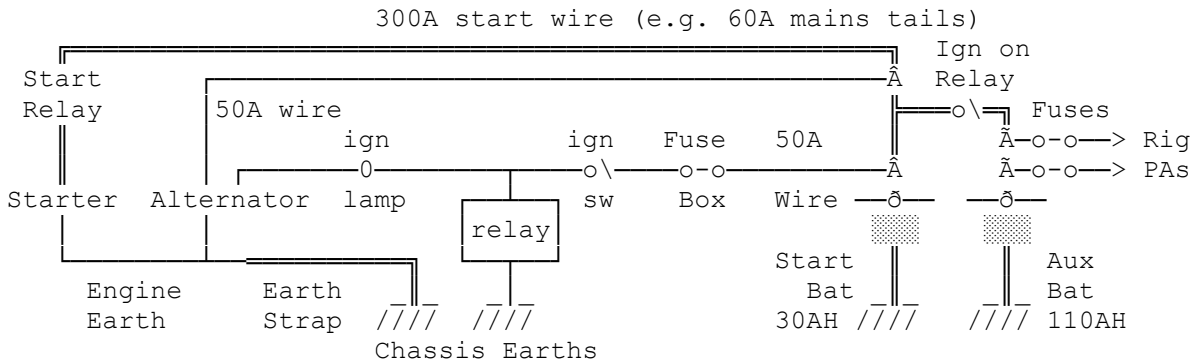
Advantages:-

- a) Very simple to connect
- b) No high starting currents over charging lead
- c) Thinner paralleling charging lead can be fused
- d) Deep Cycle Aux battery

Disadvantages:-

- e) Electronic Control box is needed to drive relay, with special attention to the problem of relay oscillation when the Aux battery is connected.
- f) No starting aid, but jumper starting possible if leads are thick enough.
- g) Deep cycle Aux battery can be difficult to charge up on long thin lead & may need proper long refreshing charges to maintain full charge.
- h) Relay prone to pitting as it will often be switching current.

4/ IGNITION SWITCHED SYSTEM



This system has some of the advantages of the above ones:-

Advantages:-

- a) Aids starting, so both batteries can be run flatter & still start.
- b) Shared starting gives longer start battery life.
- c) Fairly simple high current contactor switching.
- d) Second battery slightly easier to charge from alternator (less lead loss)
- e) Large capacity deep cycle aux battery can still aid starting OK.

Disadvantages:-

- f) Thick paralleling unfused lead.
- g) High current contactor type relay needed (200A peak rated)
- h) Start battery failure detection a slight problem.

REFRESH CHARGING

With the switched battery systems if the vehicle is not used a lot, & if the second battery is a deep cycle type, then occasional charging with a regulated mains charger for at least 24 hours is recommended to keep the batteries tip top. Check acid specific gravity with a battery hydrometer to see condition of the batteries.

SAFETY

- a) Make sure the battery polarity is correct!
- b) Disconnect battery earth first to make +ve connections, as this is safer if using spanners in confined areas where they are liable to short out.  
Reprogram car radio e.g. make sure U have security Numbers before you start!  
The same goes for some type of engine management systems, read handbook.
- c) For your garage, put a sign by the car battery that there is a 2nd battery!
- d) Use short runs of suitable gauge wire, remember @ 12V volts are easily lost.
- e) Protect wire though bulkheads from chafing damage with suitable grommets.
- f) Use suitable fuses. (no nails/ally foil).
- g) Make sure 2nd battery fastenings are secure (e.g. in case of accident).
- h) Be aware of explosive hydrogen build up on batteries, always "BLOW AWAY" gases before risk of sparks from connecting leads & crock clips etc!
- i) Acid makes holes in clothes, wash any splashes immediately. In eyes wash immediately & seek medical help.
- j) 12V Electrical fires are best stopped with a pair of cutters!
- k) Molten copper is HOT & stays hot. Use water on red hot leads.
- l) Use RCDs protected mains on outdoor leads for charging/soldering etc.
- m) Take extra precaution if gas soldering leads/connectors on/near vehicles!
- o) If you are wiring -ve directly to battery then fusing the -ve to rig protects against faulty battery earth straps!

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73 De John, G8MNY @ GB7CIP