

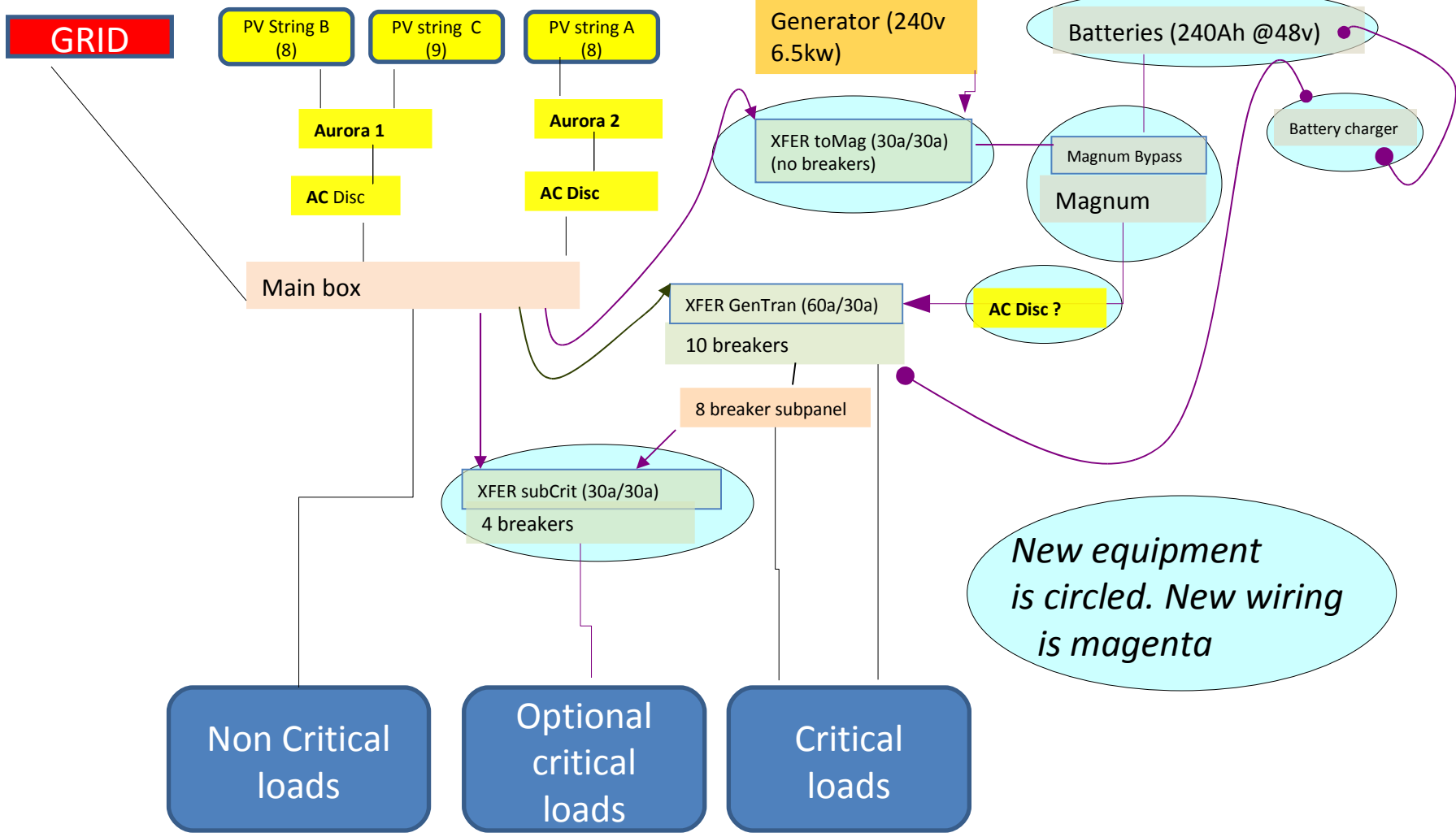
Key

- Wired connection (permanent)
- Unpowered wired connection (permanent)
- Connection to transfer switch (selectable)
- Transfer switch (or other) deselected connection
- A transfer switch (possibly with breakers): [utility amps/ gen amps]
- Loads that will be powered during outages AND given "UPS" quality backup
- Loads that can be powered during outages, but are **not** normally given "UPS" quality backup
- Wireless communication

Current wiring: 1909 Franwall (5 Oct 2013)

The 8 breaker subpanel is, functionally, part of the XFER_GenTran. It was added to meet code requirements for dual breakers on multi-branch lines.

Note: Tigo MMU shown for reference purposes
Junction boxes not shown



Proposed wiring : incorporating battery backup

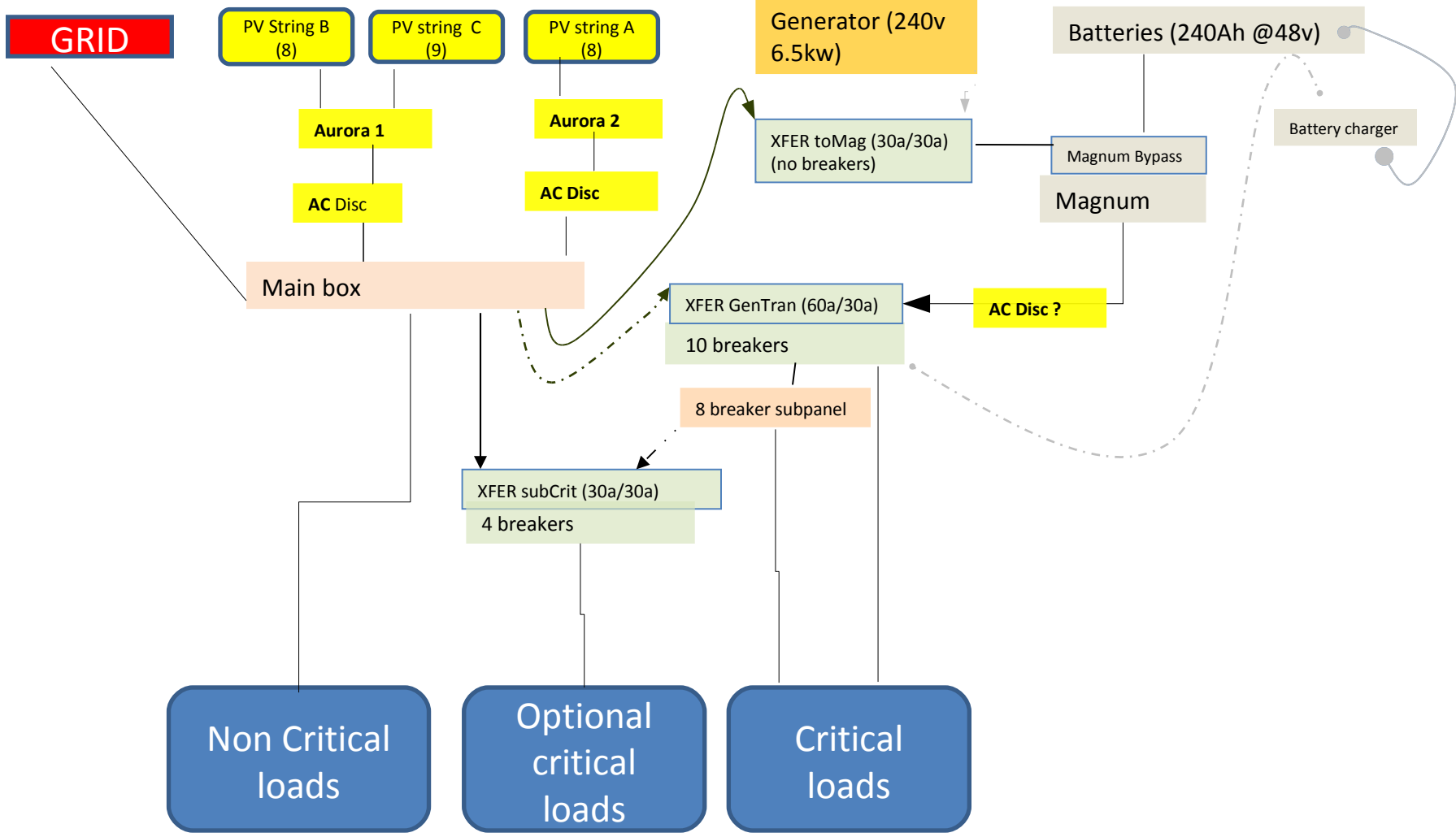
This setup maintains the current wiring, and treats the battery backup (Magnum + batteries) as the generator. A generator that is preferred to the grid!

Using the XFER_toMag, the Magnum can receive AC power from either the Main, or from a generator.

The MagnumBypass can be used to bypass the Magnum and go directly to the XFER genTran. This may be necessary if generator output is “dirty” and thereby “rejected” by the Magnum.

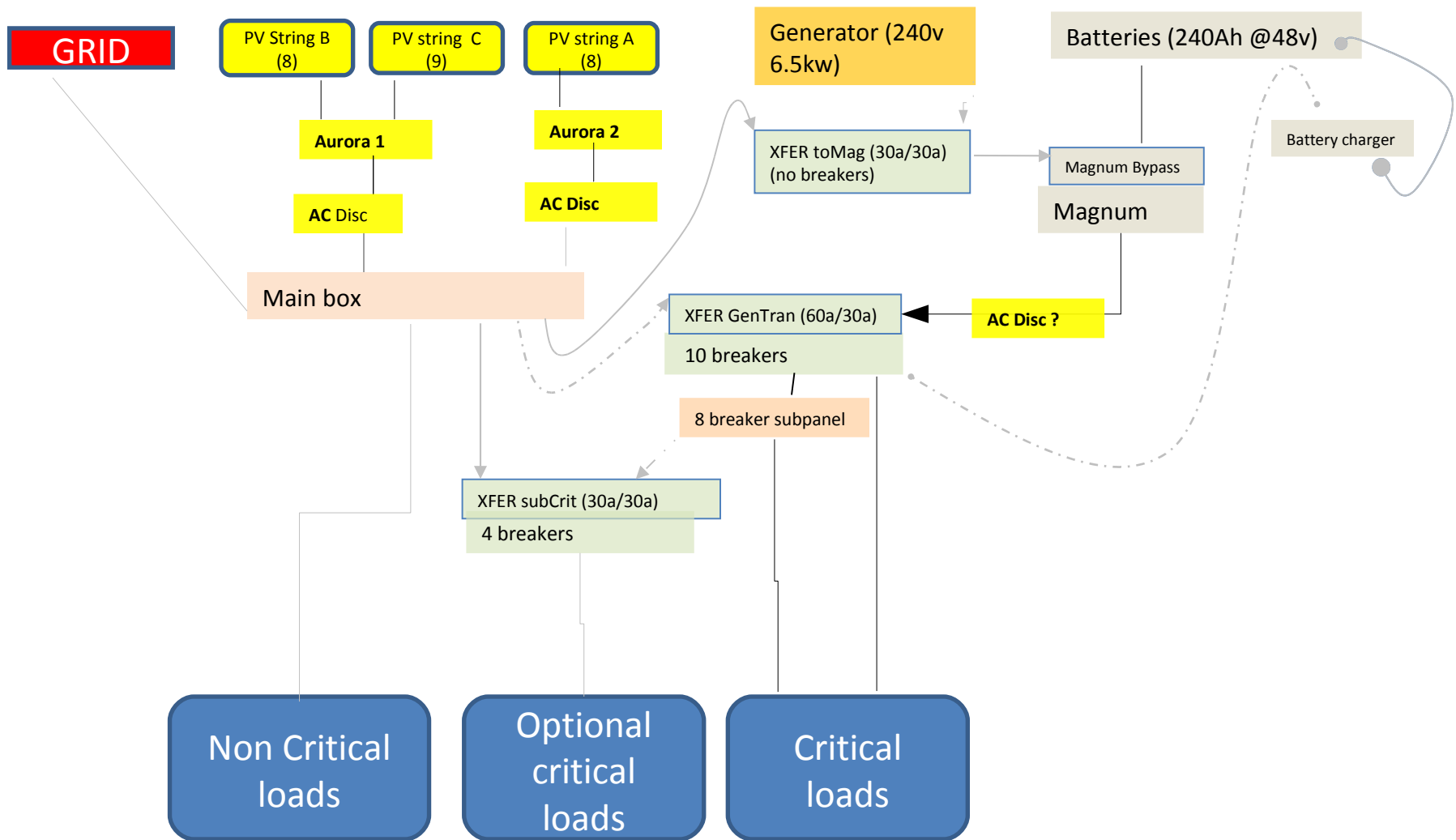
The XFER_subCrit is used to choose when “optional critical loads” (such as the microwave and toaster oven) is powered through the Magnum.

Note: TIGO MMU not shown



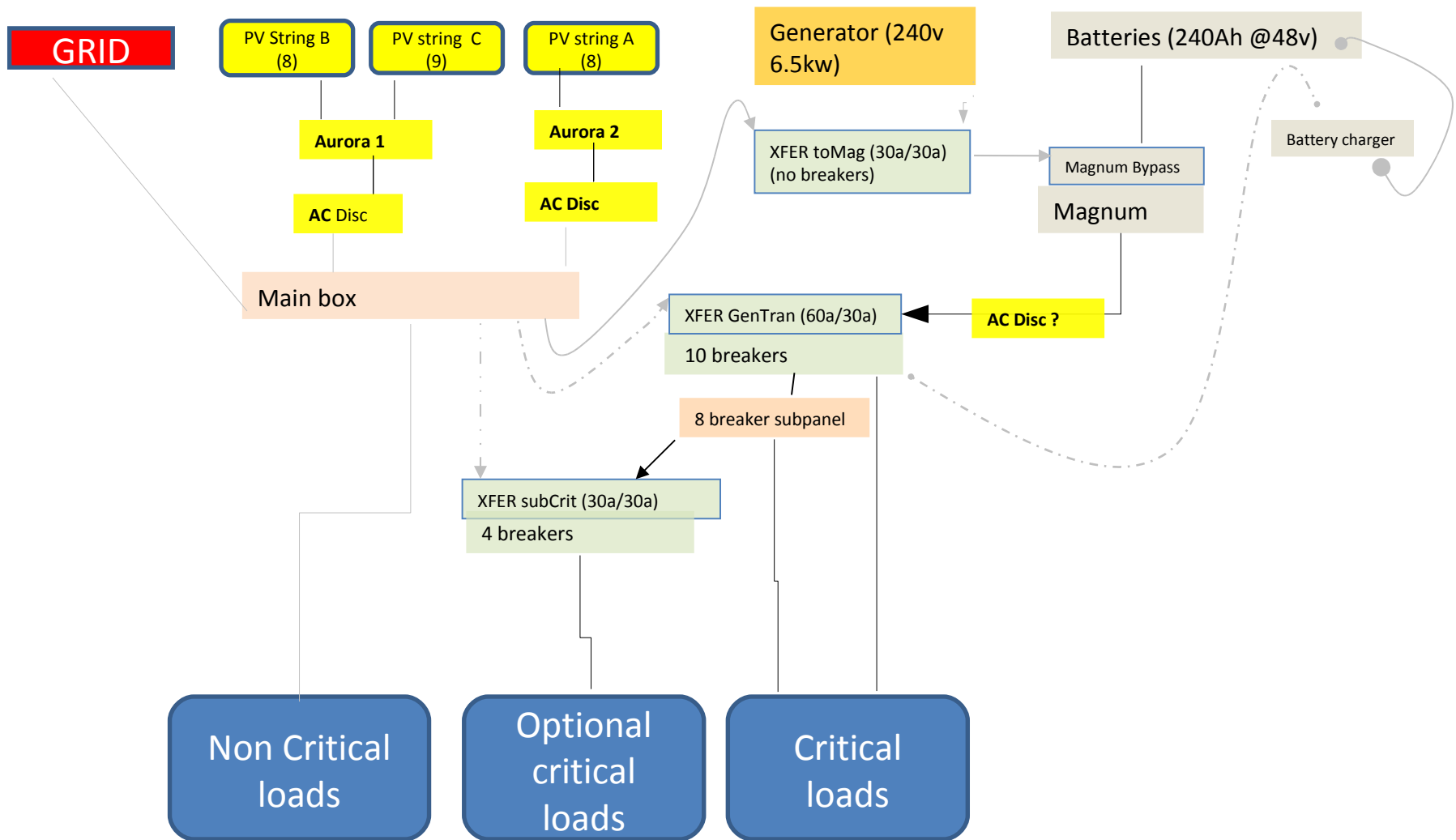
Operational settings: normal

These recommended settings will provide an UPS to critical loads (including electronics)
 Optional loads (microwave, toaster) are not covered during outages
 Under these settings, max power to critical loads is very unlikely to exceed 4.4kw.



Operational settings: short outages (same setting as “normal”)

These recommended settings will provide an UPS to critical loads (including electronics), and power during transient and short (several hour) outages. Optional loads (microwave, toaster) are not covered during short outages. Under these settings, max power to critical loads is very unlikely to exceed 4.4kw.



Operational settings : longer outages

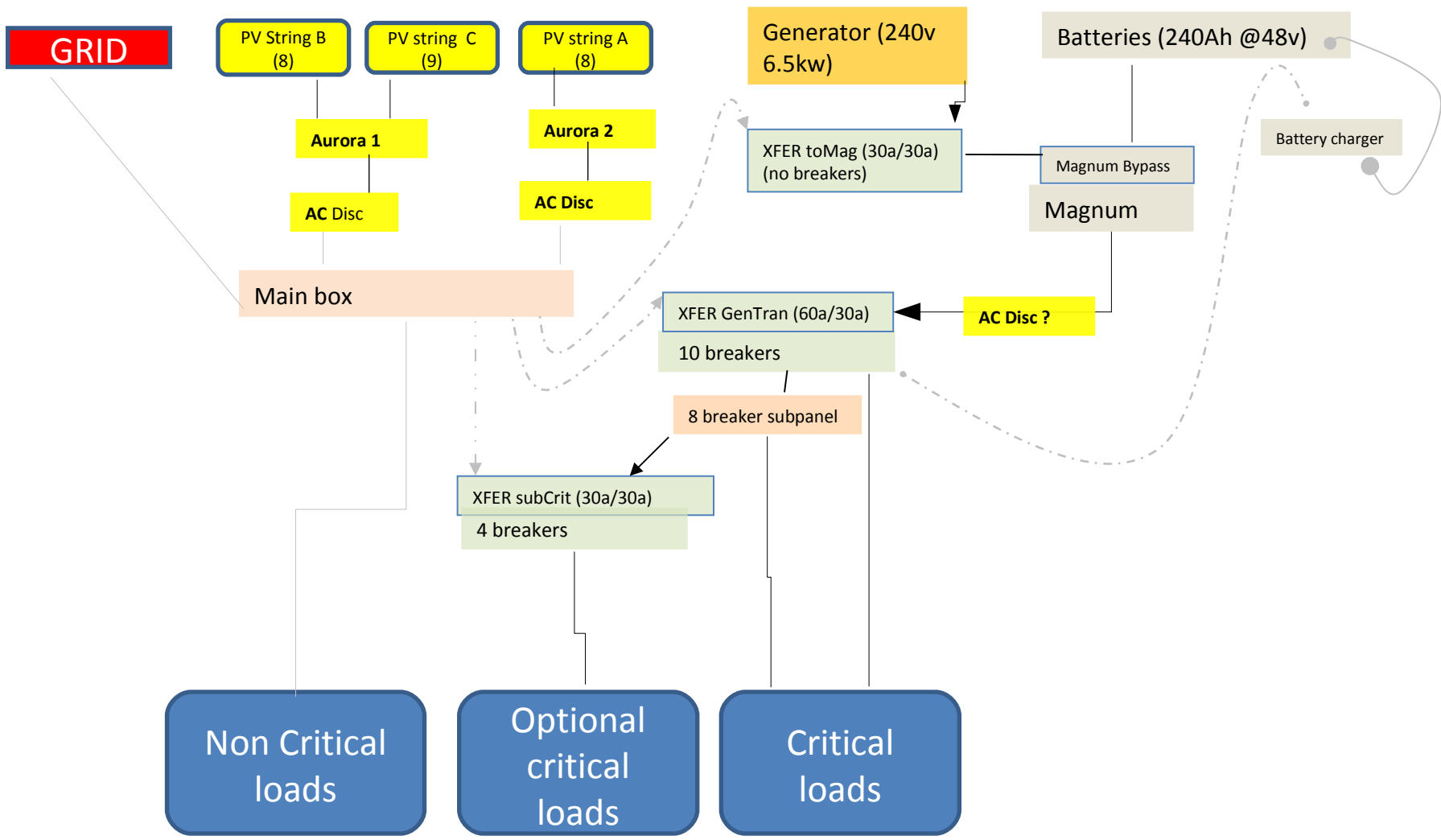
This is a modification to the recommended settings that will provide battery power to the optional critical loads (including microwave and toaster). The idea is to manually switch the XFER_subCrit to the 8breaker panel ONLY during outages, and then to be judicious in how electricity is used.

Note that using this setting during normal times is feasible, but will slightly increase the odds of “overdrawing” the Magnum.

Note that drawing more than 4.4kw on both critical and optional critical loads is likely to be infrequent.

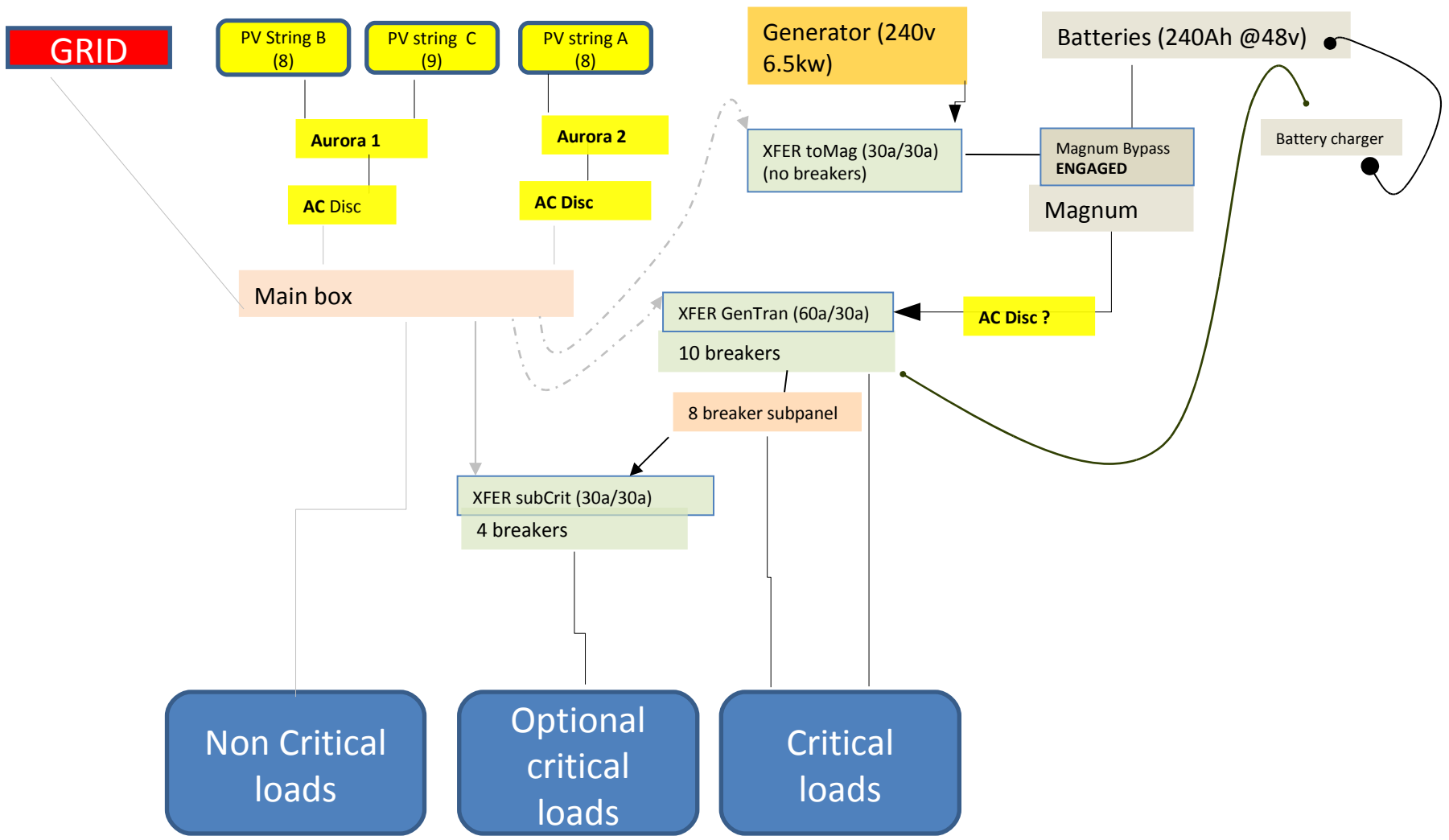
Furthermore, the Magnum tolerates several minutes of > 4.4kw draw.

Nevertheless, switching the XFER_subcrit back to Main (when an outage is over) further reduces the small possibility of overdrawing the Magnum.



Operational settings : multi day outage with good generator

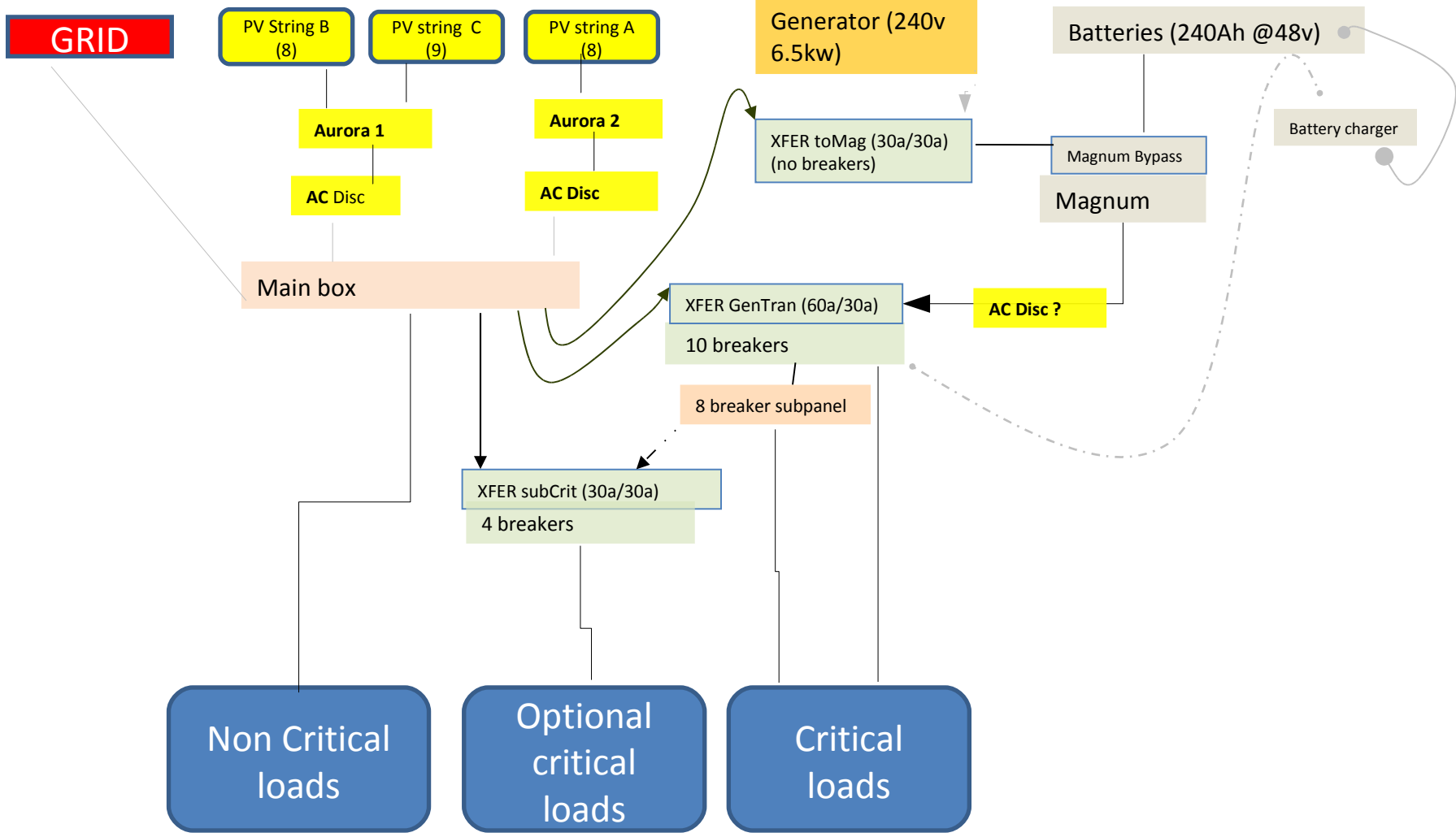
During longer outages the battery bank will be drained, at which point the generator can be used. Since generator production at 6.5kw is usually ample, the XFER_subCrit is switched to the GenTran it (and away from the Main). Generator power is used by the Magnum both to supply loads, and to charge batteries. This assumes that the quality of generator power is acceptable (that the Magnum won't reject it and use battery power)



Operational settings : multi day outage with mediocre generator

During longer outages the battery bank will be drained, at which point the generator can be used. Since generator production at 6.5kw is usually ample, the XFER_subCrit is switched to the GenTran (and away from the Main). Mediocre generator power will not be “accepted” by the Magnum. Thus, to use generator power (rather than batteries), the Magnum bypass is engaged. This means AC power (from generator) bypasses the Magnum, going directly to the GenTran (the Magnum sees no loads).

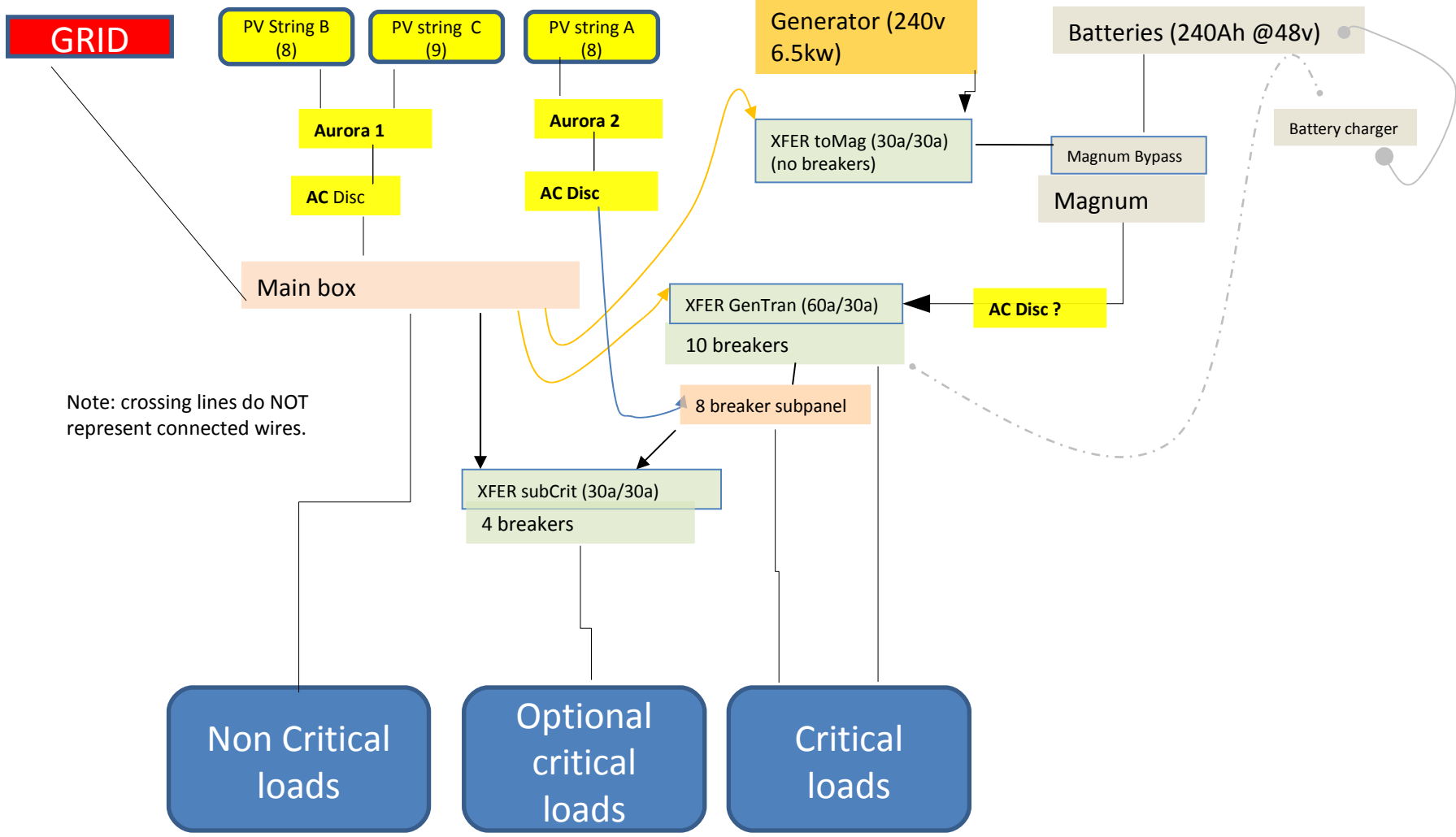
While running the generator, the 1kw battery charger can be use to charge batteries. Note that this is the ONLY time the battery charger would be used – the Magnum would normally charge the batteries. Reiterating: when the Magnum is being used during normal times or outages, the battery charger should be turned off (or unplugged).



Operational settings : disable battery backup – 14.4kw to critical loads

If there is any issue with sufficient power to all loads, the Magnum can be deselected, with 14.4kw power to the GenTran directly from the Main. This is unlikely to be necessary.

Note that the Magnum will still be connected to the Main (via the XFER toMag), but the Magnum will see no loads. Battery charging can still occur.



Enhanced proposed wiring – FOR FUTURE CONSIDRATION: battery backup with AC coupling

There are questions as to whether the wiring is sufficiently large to meet the 125% code: 8 panels @ 260a STC is 2kw output, or 8.3a @240v. But 25% of 30a = 7.5a. Ignoring this, note that if the generator is being used, the Aurora 2 should be disconnected (via the breaker) from the 8breaker subpanel – so as to avoid damaging the generator from backfed power.

Current equipment



Proposed equipment

(yellow background denotes new equipment, not showing new wiring, locations subject to change)



Aurora 1

DC junction

Xfer toMag

Main panel

GenTran

Aurora 2

From AC disc

Magnum OGI on Mounting plate

subpanel

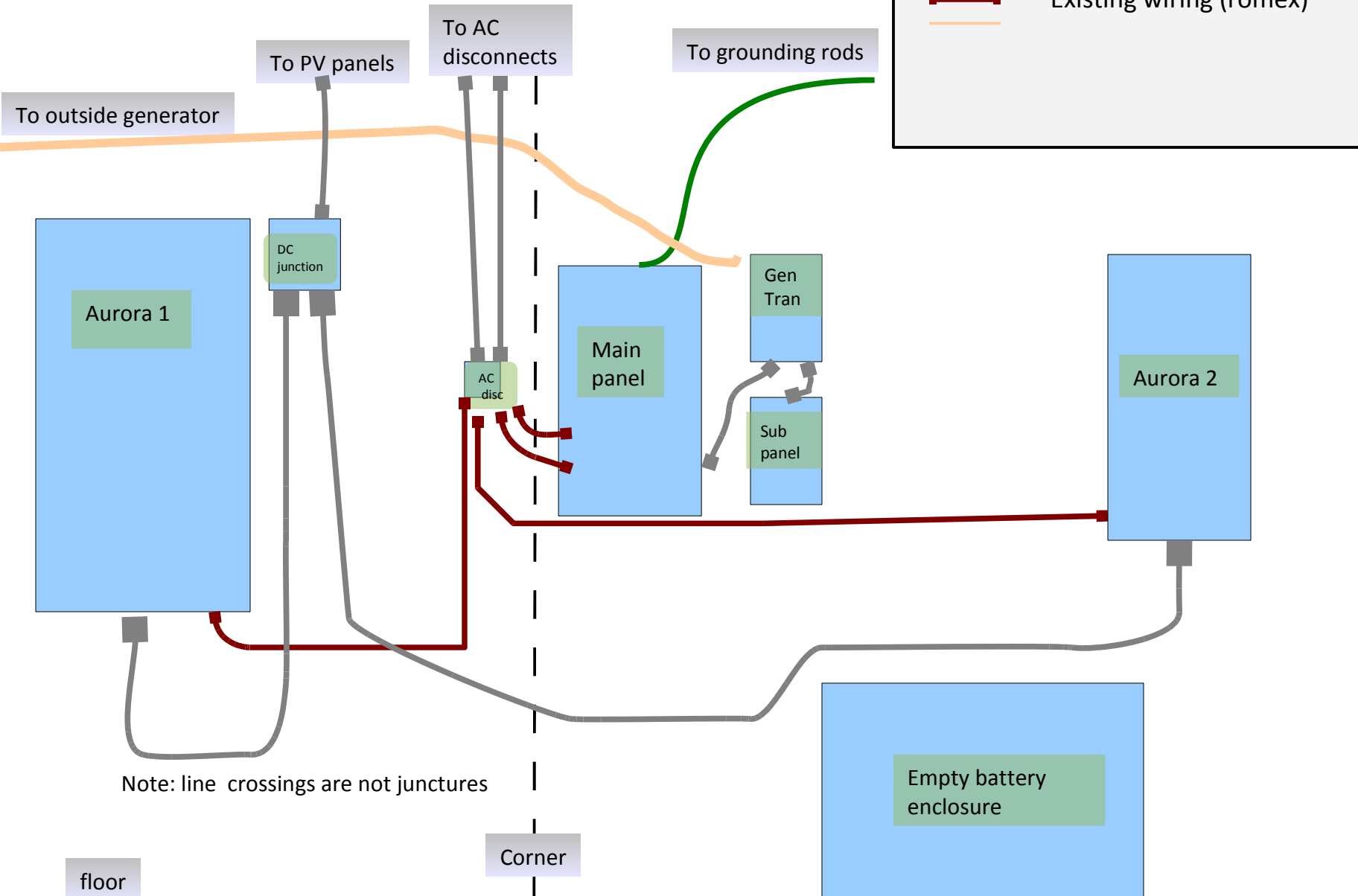
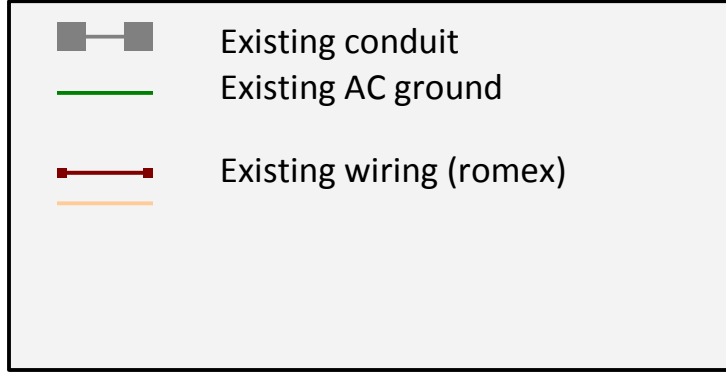
AC charger

Xfer subcrit

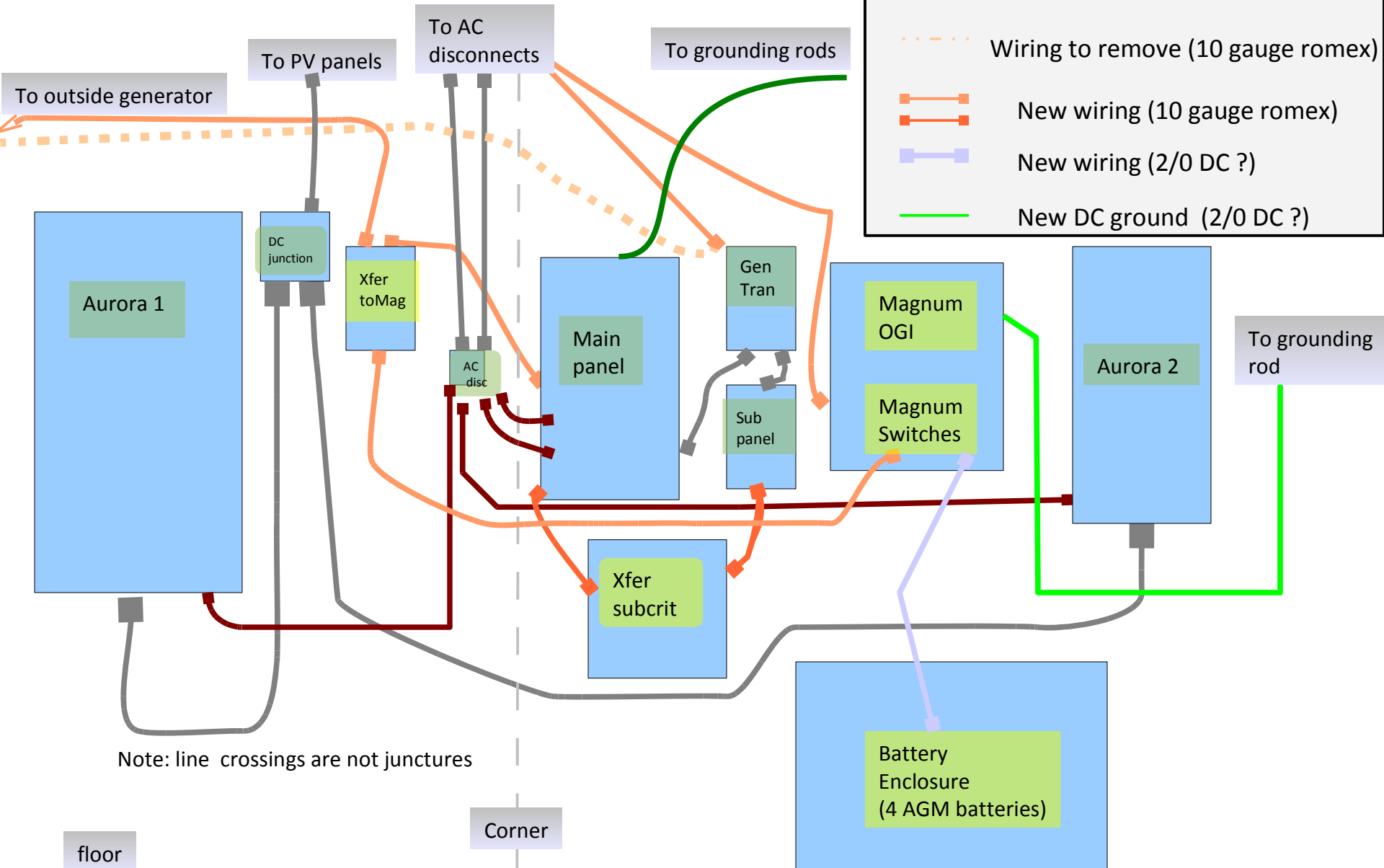
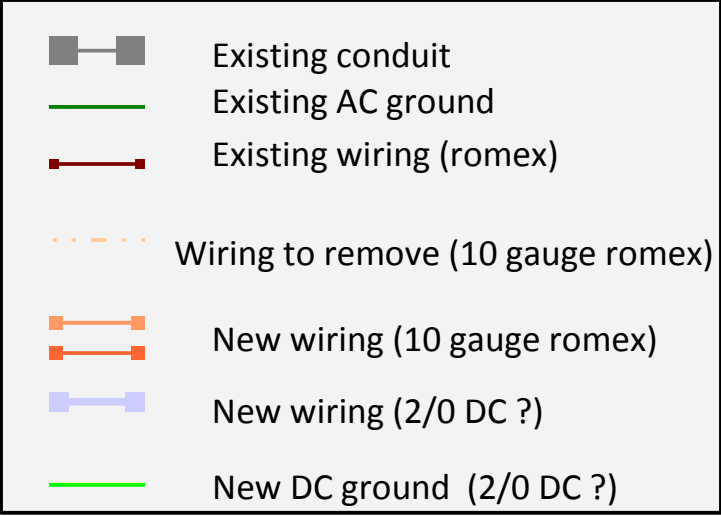
Battery Enclosure (4 AGM batteries)

2013/10/05

Existing equipment & wiring (approximate scale, loads not show)










Proposed equipment & wiring (approximate scale, loads not show)



Note: line crossings are not junctures

Proposed equipment & wiring (approximate scale, loads not show)

-  Existing conduit
-  Existing AC ground
-  Existing wiring (romex)
-  Wiring to remove (10 gauge romex)
-  New wiring (10 gauge romex)
-  New wiring (2/0 DC ?)
-  New DC ground (2/0 DC ?)

