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# Progress towards Module 0 SEDR/ORC

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2x2 Electronics & Installation Meeting  
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# Road map

- Current: safety reviews for module 0 “QA/QC”
  - ▶ Only covers powering things on in MINOS garage.  
(Rack builds/cabling need to be reviewed again to run in LArTF, underground!)
  - ▶ Completed previously during Igor/Livio visit week:
    - Initial checkout of slow control
  - ▶ Light readout – VGA/DAC/Tinker – SEDR documentation almost there
  - ▶ In progress: charge readout (Docs done Wed. Review Fri. or Mon.? )
- Future: 2x2 in LArTF, then eventually MINOS...
  - ▶ Much of documentation for Module 0 can be reused if we don't retrofit it...
  - ▶ Haven't started rack builds yet (hard to design to moving target)

# “What's taking so long?”

- Electrical safety reviews require specific information

Focus on power distribution. (Prevent fires!)

We have to assemble AC, DC distribution block diagrams

- ▶ Every wire or PCB trace has to be rated for the maximum current it could be forced to handle if something went wrong in the circuit (i.e. what's it fused at?)
- ▶ Systems have to be fused to prevent overload. e.g.: with power supply remote sensing, the sense leads have to be independently fused (or capable of handing full current) in case of a short in the load
- ▶ Grounding scheme

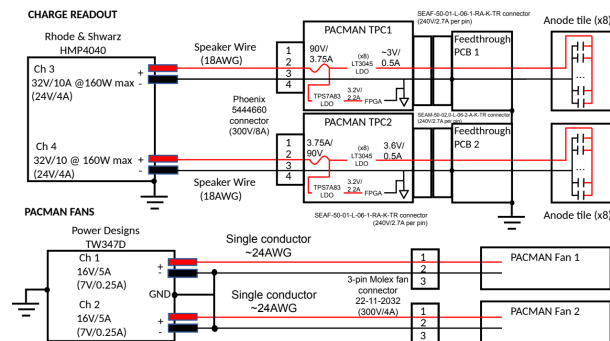
- Documents we try to collect (in DocDB!) in order to make sure we can answer reviewer questions:

(n.b.: negotiable for “patent pending” situations if experts help us)

- ▶ Engineering note
- ▶ Bills of materials for components
- ▶ Schematics, artwork/layout of any PCBs
- ▶ Sample of subsystem elements

- We've been collecting docs:

- ▶ Slow control (almost), other monitoring?
- ▶ Light system: “E” board ✓, VGA (almost), ADC ✓, Tinker ✓, DAC box (almost), feedthrough (partial)
- ▶ Charge system: PACMANs ✓, PACMAN fans ✓, Feedthrough PCB ✓, Anode tiles ✓
- ▶ HV: (partial)



# Current status: charge readout

- We are done collecting the info for the charge readout system
  - ▶ Thanks to Armin Karcher (LBNL) for helping us get the info we need
- We hit one (small) snafu: PACMAN fans and leads from power supply both arrived with female connectors on them
  - ▶ We ordered new male connectors (couldn't scrounge any up around the lab)
  - ▶ Arrived & installed Wed. Nov. 3.
- We are hoping to have safety review Fri. Nov. 5 or following Monday – depends on reviewer availability
- Subsequent checkout of PACMANs next week



PACMAN & re-terminated fan line

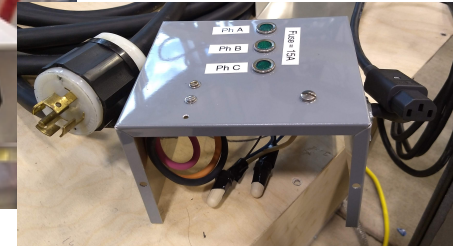
# Module 0 power supplies: tradeoffs

- Module 0's “bespoke” power configuration (vs. full Modules 1–3) introduces some hurdles:
  - ▶ Module 0's dedicated DAC box has standard C13/C14 socket, but requires 220V AC 1-phase. Building power is 208V 3-phase. We have converter box (has been modified to have the right plug for DAC).
  - ▶ VGA power supply (EMS 20–50) requires extra work from us
    - Also needs 220V single-phase AC. Need to build converter box (we only have the one above)
    - Supply (max 50A?!) is via exposed bus bars: need to design some kind of safety shield
    - Only single channel, so both VGAs are wired in parallel on the bus bars (reviewers: )
    - Other options:
      - Use old MINOS Wiener model power supply. Still needs 220V → converter box, but has two channels
      - Buy another power supply that runs on 110V (e.g.: another R&S?)
- If Module 0 gets retrofitted to use the Modules 1–3 power distribution (e.g. ADC from VME crates), this becomes moot

DAC box



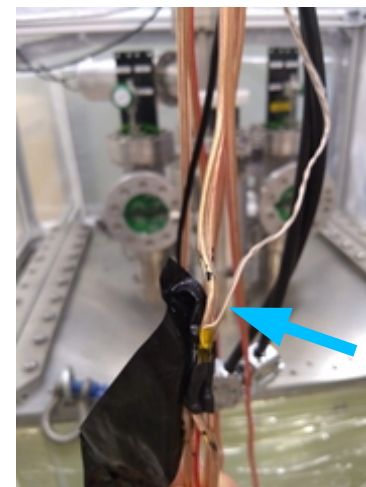
3phase->1phase converter



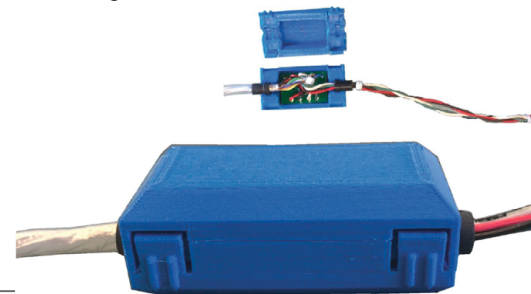
exposed bus on EMS

# Other Module 0 decisions

- VGA PS remote sensing leads are currently spliced into main power delivery leads.  
Won't pass review: remote sensing needs dedicated fusing
  - ▶ Linda has dedicated fuse boards that can be used for this.
  - ▶ We could also just not use remote sensing, but we calculate that with these leads, expect ~10% voltage drop at the load. Probably not good... (can VGAs run ok at 4.5V instead of 5?...)
  - ▶ We propose to splice Linda's boards into the sense lines



- Sensing board cover





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