



ECAL PMT Base Fabrication

a Status Report

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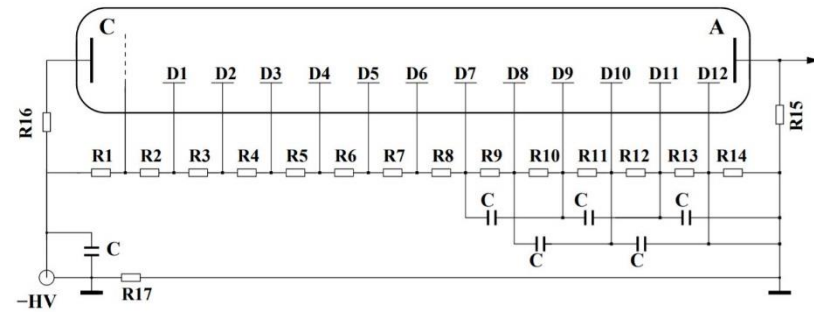
w/ many thanks to M. Jones (JLab) for delivering the talk

⊕ Reminder...

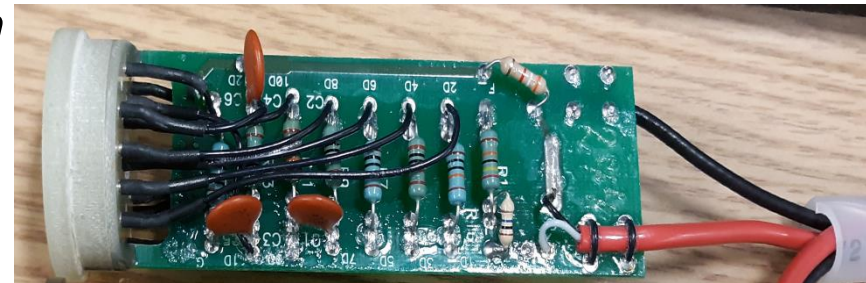
⊕ Current Status

⊕ Outlook

Reminder...



- ⊕ **Design & build ~700 bases for ECAL**
- ⊕ **... based on the design shown**

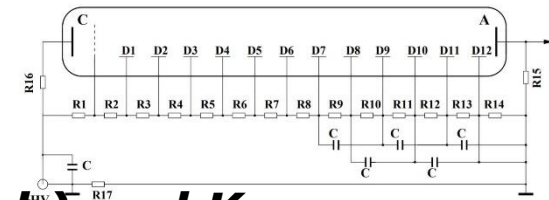


⊕ **Challenges/steps:**

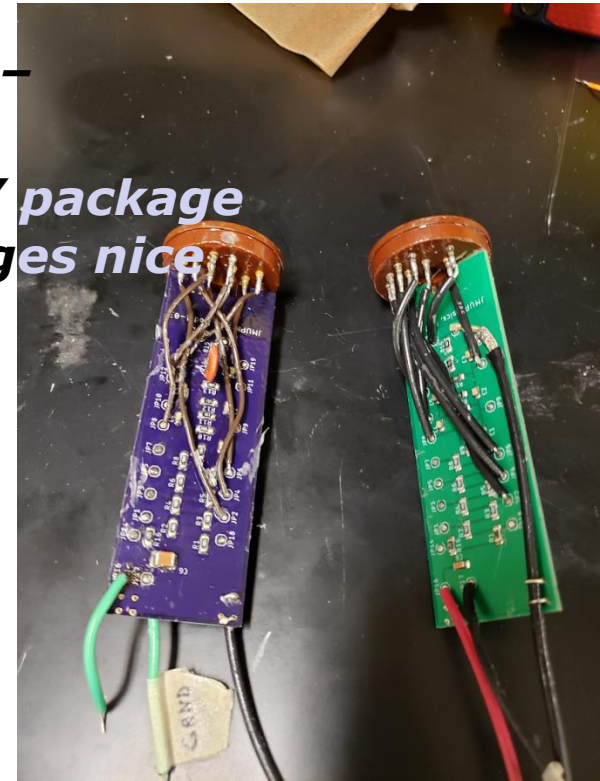
- ⊕ **Recover sockets from old Russian dividers (not available for purchase, we tried!)**
- ⊕ **Get base design validated by experts. Order a (small) set of prototypes**
- ⊕ **Solder wires, cables (and) components (if acquiring bare boards – not favored option!)**
- ⊕ **Verify that prototypes hold HV and produce signal comparable w/ existing bases.**

Work done *(since our last report)*

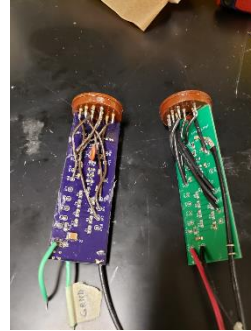
(Jorge, John)



- ⊕ **Consulted electronics experts (F. Barbosa (JLab) and K. Giovanetti (JMU)) – they did not find any obvious/glaring problems w/ the design, which is based on the schematic provided by MJ.**
- ⊕ **EagleCAD artwork was sent to two vendors (one local, C-ville, Va, one in the Far East) and a small set of boards was ordered from each. All surface-mount components.**
- ⊕ **ver. 1: Purple board – domestic (bare, rough – deburred, components soldered at JMU)**
- ⊕ **ver. 2: Green board – Far East, got a “promo” package of 5 fully stuffed boards + 5 bare for \$30! Edges nice too, no blood when handling!**



Work done ...



⊕ **ver. 1 testing:**

- ⊕ **Voltage rating of capacitors too close to spec.**
- ⊕ **(i.e. they tend to burn out – not good!)**

⊕ **ver. 2 testing :**

- ⊕ **Greatly increased the voltage rating of caps. No more burn-outs!**
- ⊕ **Boards hold up to 1500 V.**
- ⊕ **Prone to sparking due to the distance between HV soldering points (see red lines in the picture below) – In case anyone asks, we do apply conformal coating at the end and that helps, occasionally.**



Work done ...



⊕ **Based on this experience we:**

⊕ **Designed ver. 3:**

- ⊕ **Increased distance between the +/- locations on the board**
- ⊕ **Larger distance between all traces on the board**
- ⊕ **Increase overall length of the board by $\sim 0.33''$ (as per B.W. suggestion) to allow for a larger distance between the signal and HV cable stress-relieving straps (blue lines in the figure)**

⊕ **ver. 3 boards were ordered (Far East) this week. Should be here by the end of the month.**

⊕ **A back-up, through hole version of the board was laid out in EagleCAD as well.**

⊕ **We will try to build a couple of these in-house (more as a proof of principle).**



Work done ...

(James, John)

- ⊕ ***In parallel w/ the board building/testing...***
- ⊕ ***We continued the socket-harvesting program***
- ⊕ ***long, arduous, and not very rewarding (though important)***





To do List:

- ⊕ **JMU:** Wire up test ver. 3 board (3x = charm??)
- ⊕ **JMU:** Continue/finish socket desoldering task
- ⊕ **JMU:** Signal cables salvaged from old dividers as well.
- ⊕ **JLab:** If ver. 3 is OK move to ordering the full set of boards. M.J. indicated that the process will be handled by JLab .
 - ⊕ **need** to be mindful of vendor restrictions, the cost might go up depending on where the boards are ordered from.
 - ⊕ **need** HV connectors (black, bullet-type) for the boards.
- ⊕ **JMU:** once boards are received we can wire and test them all up.