Design of the CLAS Region III High Voltage Translator Boards

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The region III drift chamber endplate is partitioned into 48 high voltage boards, 24 axial boards and 24 stereo boards. Each board supplies voltage to 48 sense wires, 112 field wires, and 16 guard wires.

Each HVTB is designed to supply voltage to three sense rows, seven field rows, and one guard row.

The sense, field, and guard connections each have an RC filter network and current limiting resistor. 220 uF capacitors and 1 mega ohm resistors are used for filtering and current limiting.

Teflon coated jumper wires connect the RC filter network to the appropriate feedthru hole. Lines on the silkscreen layer show these connections as well as the best path for the jumper wire. The Teflon wire has an outside diameter of 60 mils and consists of 20 strands of tinned copper wire. The same jumper wire is used to jumper sense wire busses between board pairs.

Using jumper wires between boards, all sense, field, and guard wires for a two board section are supplied voltage. Note, any given HVTB has six sense wire bus layers of which only three are supplied voltage directly from the board.

The six sense wire busses have jumper posts along one edge of the board. Teflon coated jumper wires are used to connect a given board with the adjacent board on the same superlayer. The boards supply voltage to alternate busses, combining to provide voltage to all sense wires.

Field wires are grouped into fourteen horizontal layers on the endplate. The field wires are bussed on the endplate in groups of sixteen wires. Each HVTB supplies voltage to only seven of the fourteen field wire layers. An adjacent board supplies the remaining seven layers. Guard wires have two horizontal layers and are also bussed in groups of sixteen wires. Each HVTB supplies voltage to one layer with the adjacent board supplying the other layer.

High voltage cable for each board mounts at the edge of the HVTB where holes facilitate the mounting. After securing the main cable, the individual cables fan to solder terminals. These terminals are forked to make soldering and unsoldering less tedious.

Silkscreen labels are provided for each terminal to reduce the chance for incorrect connections.

The high voltage cable for each axial board crosses at least one stereo board and must be secured at an additional point along the bottom of a stereo board. Holes along the bottom of each stereo board help secure the high voltage cable. After mounting the boards the hole allowing for the best cable routing may be selected.

There are four mounting holes per HVTB. Two holes are 0.200 mil diameter with the other two measuring 0.283 mil diameter. A ground plane is poured along the top edge of both the component and solder sides of each board which encompass the top mounting holes. Stereo boards are grounded by the mounting screws only, while the axial boards have the solder side ground plane exposed to allow contact with the copper channel to provide good grounding.

The HVTB's have been cut to allow for 60 mil spacing between adjacent HVTB's. There is a minimum of 100 mil spacing between stereo and axial HVTB's. The HVTB's have been cut 600 mils past the mounting holes so as to minimize unused space and to allow more room for the high voltage cables. The boards will be 125 mils thick FR-4 substrate and will be double sided.

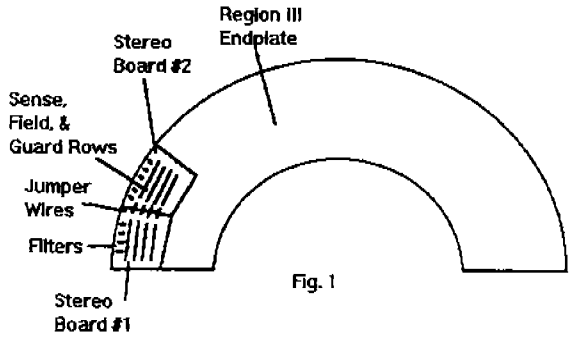

Fig. 1