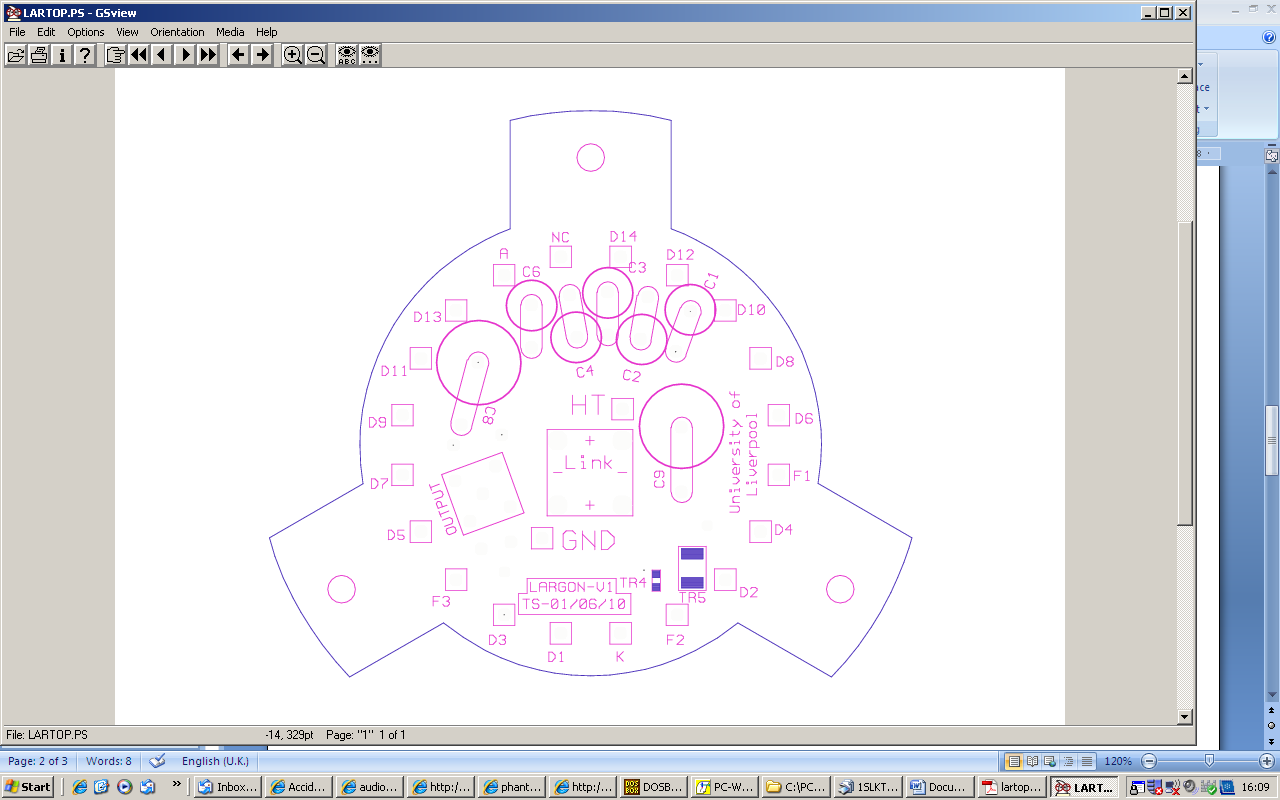
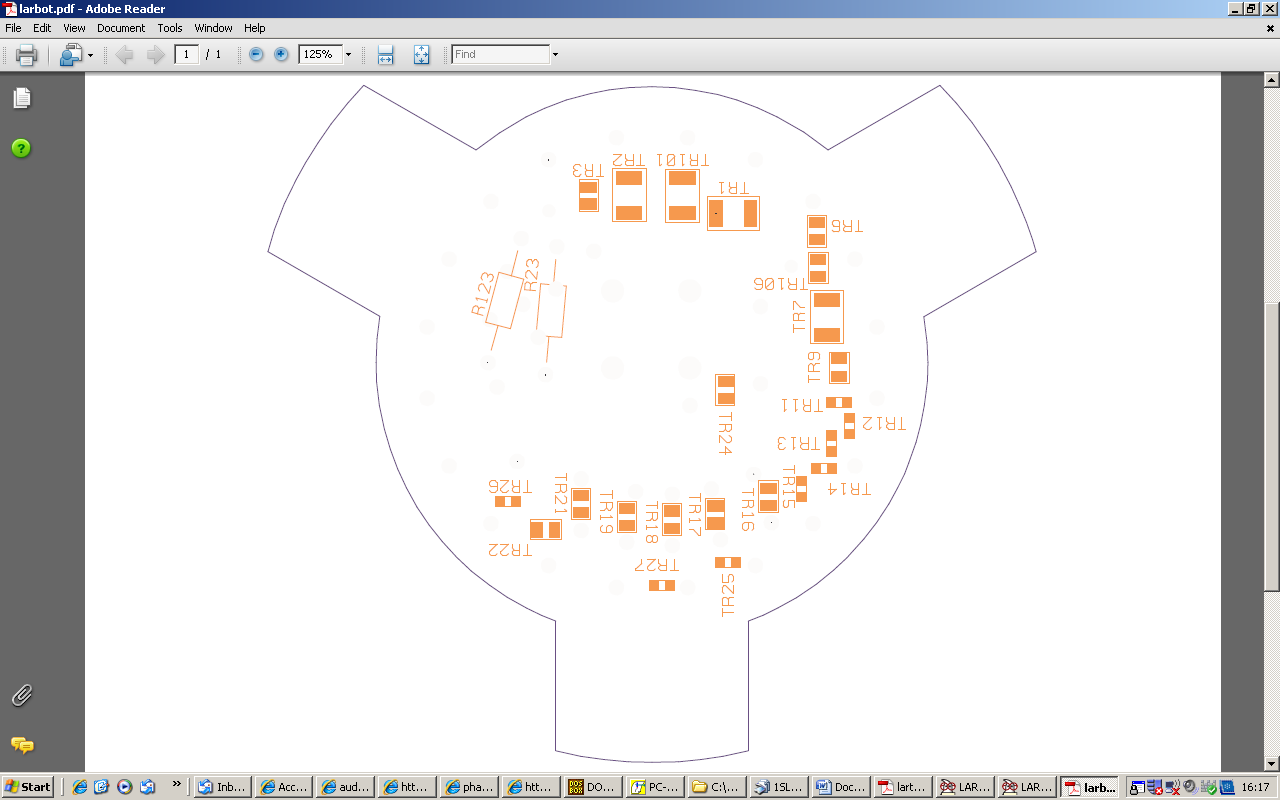
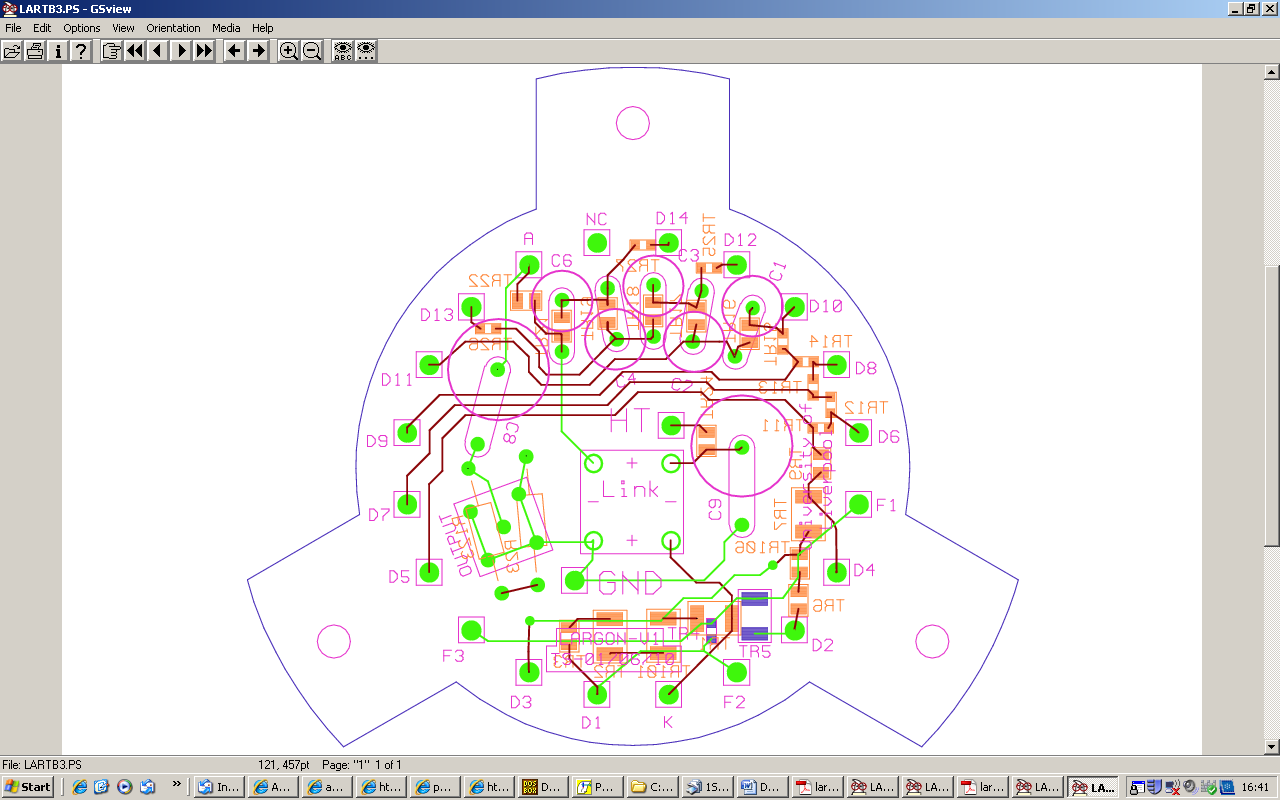
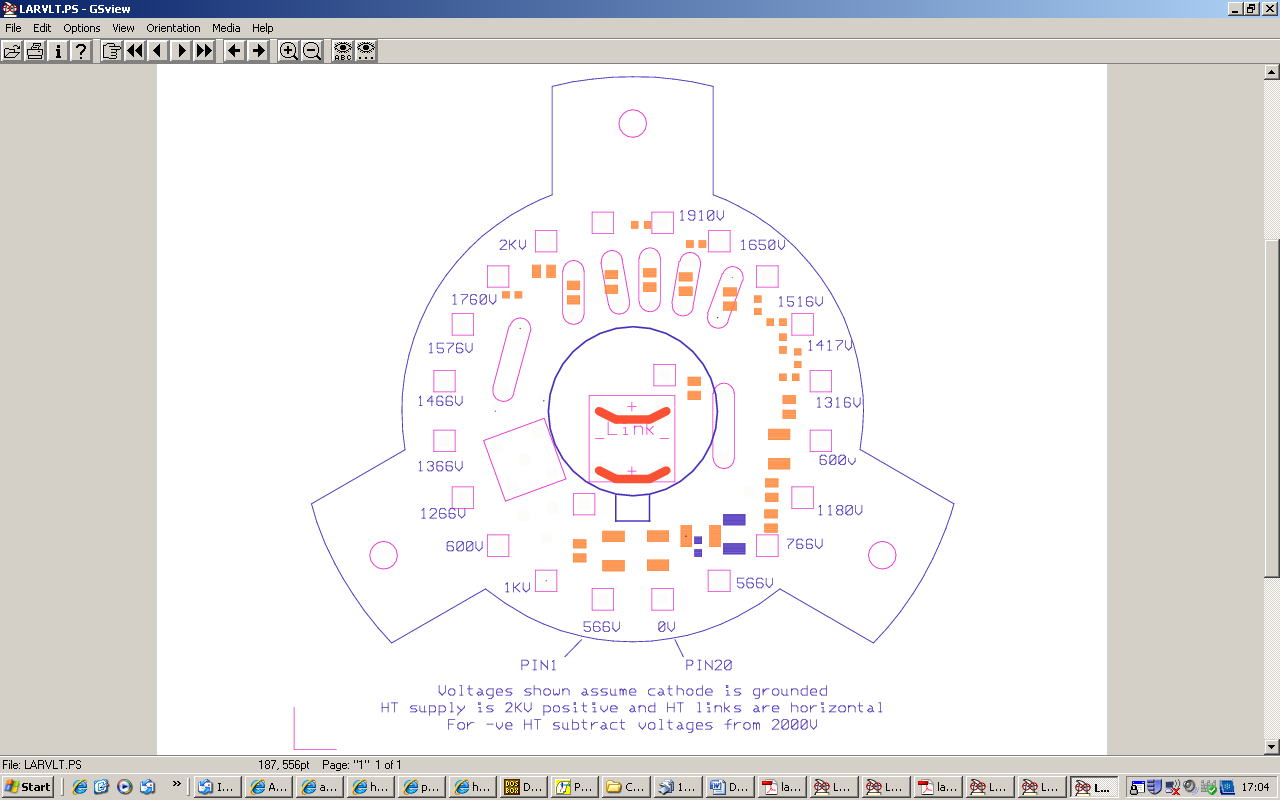
Liquid argon photomultiplier base PCB (largon.pcb)



PCB TOP SIDE AS SEEN LOOKING AT THE BOTTOM OF THE PMT



PCB BOTTOM SIDE as seen from the PMT

PCB THROUGH VIEW SHOWING TRACES

Parts list

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  | anode voltage 2KV | |  |  | VDiff from | |  |  |  |  |  |
|  |  | PIN no |  | Vmod | original | vdrop | power | package |  | Farnell no | qty |
|  | component | | value (K) |  | percent |  | (watts) | required |  |  |  |
| Cathode |  | 20 |  | 0 |  |  |  |  |  |  |  |
|  | R1 |  | 1000 | 163.2653 | 34 | 163 | 0.03 | 1206 |  | 139-9992 | 30 |
|  | R101 |  | 1000 | 326.5306 | -33 | 163 | 0.03 | 1206 |  | 139-9992 |  |
|  | R2 |  | 1000 | 489.7959 | 1 | 163 | 0.03 | 1206 |  | 139-9992 |  |
|  | R3 |  | 390 | 553.4694 | 1 | 64 | 0.01 | 0805 |  | 140-0255 | 10 |
| DYNODE1 |  | 1 |  | 553.4694 | 1 | 0 | 0.00 |  |  |  |  |
| F2 |  | 19 |  | 553.4694 | 1 | 0 | 0.00 |  |  |  |  |
|  | R4 |  | 180 | 582.8571 | 1 | 29 | 0.00 | 0603 |  | 140-0110 | 10 |
| F1 |  | 16 |  | 582.8571 | 1 | 0 | 0.00 |  |  |  |  |
| F3 |  | 3 |  | 582.8571 | 1 | 0 | 0.00 |  |  |  |  |
|  | R5 |  | 1000 | 746.1224 | 1 | 163 | 0.03 | 1206 |  | 139-9992 |  |
| DYNODE2 |  | 18 |  | 746.1224 | 1 | 0 | 0.00 |  |  |  |  |
|  | R6 |  | 750 | 868.5714 | 13 | 122 | 0.02 | 0805 |  | 140-0262 | 20 |
|  | R106 |  | 750 | 991.0204 | 1 | 122 | 0.02 | 0805 |  | 140-0262 |  |
| DYNODE3 |  | 2 |  | 991.0204 | 1 | 0 | 0.00 |  |  |  |  |
|  | R7 |  | 1000 | 1154.286 | -5 | 163 | 0.03 | 1206 |  | 139-9992 |  |
|  | R8 |  |  | 1154.286 | 1 | 0 | 0.00 |  |  |  |  |
| DYNODE4 |  | 17 |  | 1154.286 | 1 | 0 | 0.00 |  |  |  |  |
|  | R9 |  | 510 | 1237.551 | -3 | 83 | 0.01 | 0805 |  | 140-0258 | 10 |
|  | R10 |  |  | 1237.551 | 1 | 0 | 0.00 | not used |  |  |  |
| DYNODE5 |  | 4 |  | 1237.551 | 1 | 0 | 0.00 |  |  |  |  |
|  | R11 |  | 300 | 1286.531 | 1 | 49 | 0.01 | 0603 |  | 140-0116 | 30 |
| DYNODE6 |  | 15 |  | 1286.531 | 1 | 0 | 0.00 |  |  |  |  |
|  | R12 |  | 300 | 1335.51 | 1 | 49 | 0.01 | 0603 |  | 140-0116 |  |
| DYNODE7 |  | 5 |  | 1335.51 | 1 | 0 | 0.00 |  |  |  |  |
|  | R13 |  | 300 | 1384.49 | 1 | 49 | 0.01 | 0603 |  | 140-0116 |  |
| DYNODE8 |  | 14 |  | 1384.49 | 1 | 0 | 0.00 |  |  |  |  |
|  | R14 |  | 300 | 1433.469 | 1 | 49 | 0.01 | 0603 |  | 140-0116 |  |
| DYNODE9 |  | 6 |  | 1433.469 | 1 | 0 | 0.00 |  |  |  |  |
|  | R15 |  | 300 | 1482.449 | 1 | 49 | 0.01 | 0603 |  | 140-0116 |  |
| DYNODE10 | | 13 |  | 1482.449 | 1 | 0 | 0.00 |  |  |  |  |
|  | R16 / C1 | | 360 | 1541.224 | 1 | 59 | 0.01 | 0805 |  | 140-0254 | 10 |
|  | C1 |  |  |  |  |  |  | 20nF | 200v | 116-6835 | 20 |
| DYNODE11 | | 7 |  | 1541.224 | 1 | 0 | 0.00 |  |  |  |  |
|  | R17 / C2 | | 470 | 1617.959 | 0 | 77 | 0.01 | 0805 |  | 140-0257 | 10 |
|  | C2 |  |  |  |  |  |  | 20nF | 200v | 116-6835 |  |
| DYNODE12 | | 12 |  | 1617.959 | 0 | 0 | 0.00 |  |  |  |  |
|  | R18 /C3 | | 680 | 1728.98 | 0 | 111 | 0.02 | 0805 |  | 140-0261 | 10 |
|  | C3 |  |  |  |  |  |  | 20nF | 200v | 116-6835 |  |
| DYNODE13 | | 8 |  | 1728.98 | 0 | 0 | 0.00 |  |  |  |  |
|  | R19 |  | 910 | 1877.551 | -2 | 149 | 0.02 | 0805 |  | 140-0264 | 10 |
|  | R20 |  |  | 1877.551 | 0 | 0 | 0.00 | not used |  |  |  |
|  | //c4 |  |  | 1877.551 | 0 | 0 | 0.00 | 47nF | 200v | 116-6836 | 10 |
|  | //C5 |  |  | 1877.551 | 0 | 0 | 0.00 | not used |  |  |  |
| Dynode14 | | 11 |  | 1877.551 | 0 | 0 | 0.00 |  |  |  |  |
|  | R21 |  | 750 | 2000 | 0 | 122 | 0.02 | 0805 |  | 140-0262 |  |
|  | //C6 |  |  | 2000 |  |  | 0.00 | 47nF | 200v | 116-6836 |  |
|  | //C7 |  |  | 2000 |  |  | 0.00 | not used |  |  |  |
|  | R22 |  | 200 |  |  |  |  | 0805 |  | 140-0247 | 10 |
| Anode |  | 9 |  | 2000 | Power total | | 0.326531 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| unused |  | 10 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  | total chain RES | | 12250 |  |  |  |  |  |  |  |  |
|  | Current (mA) | | 0.16327 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| other components | | |  |  |  |  |  |  |  |  |  |
|  | R23 |  |  | 1M0 |  | HV |  | wire-end | 1.6kv | 110-0281 | 20 |
|  | R123 |  |  | 1M0 |  |  |  | wire-end | 1.6kv | 110-0281 |  |
|  | R24 |  |  | 10K |  | pulse proof | | 0805 |  | 140-0212 | 10 |
|  | R25 |  |  | 51R |  | pulse proof | | 0603 |  | 140-0013 | 20 |
|  | R26 |  |  | 51R |  | pulse proof | | 0603 |  | 140-0013 |  |
|  | R27 |  |  | 51R |  | pulse proof | | 0603 |  | 140-0013 |  |
|  | C8 |  |  |  |  |  |  | 10nF | 2KV | 141-3940 | 10 |
|  | C9 |  |  |  |  |  |  | 10nF | 2KV | 141-3940 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| link pins |  |  |  |  |  |  |  |  |  | 149-319 | 25 |
| links |  |  |  |  |  |  |  |  |  | 149-313 | 20 |
| red loops |  |  |  |  |  |  |  |  |  | 873-1209 | 1 |
| green loops | |  |  |  |  |  |  |  |  | 873-1217 | 1 |