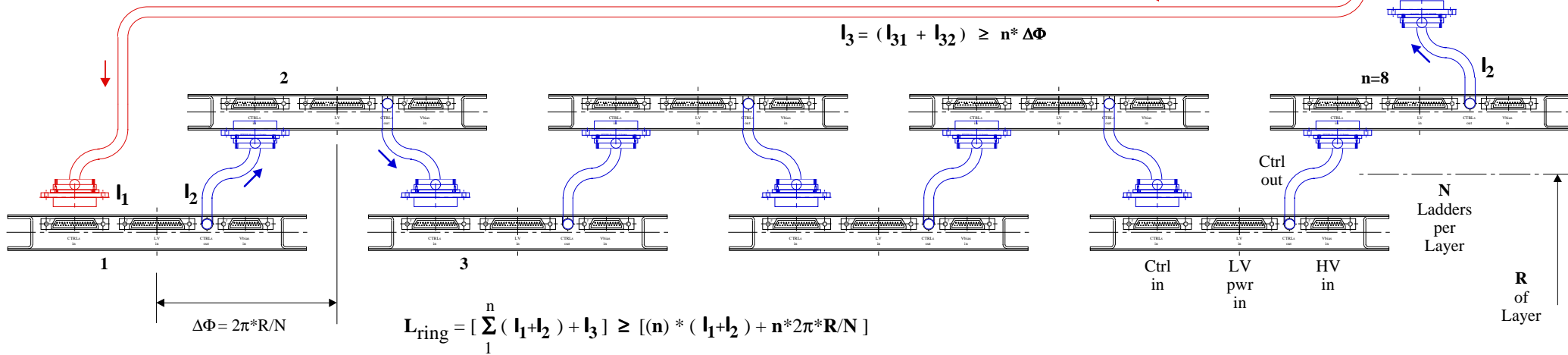
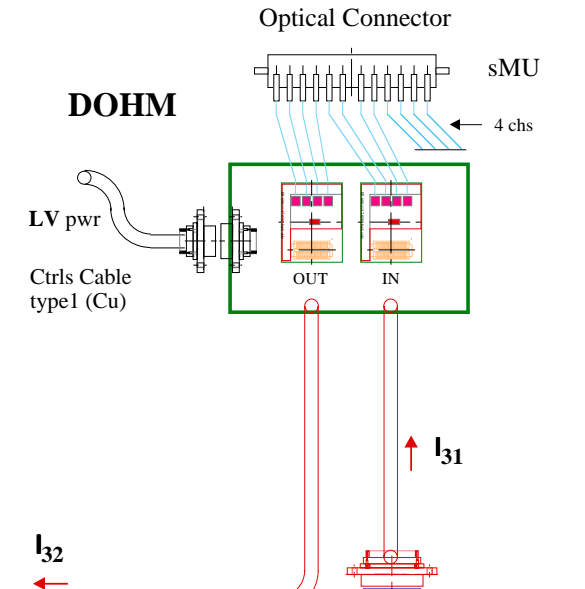


| Control's Grouping and Cable Length Calculation : | | | | | | | | len1 = 120 | Controls Power | | | | Resistance | | |
|---|------------------|-----------------------|--------------|-------------------|--------------|--------------|----------------------|------------------------|---------------------|--------------------------|--------------------------|--------------------------------------|------------------------------|--------------------|--|
| loop5 | | | | | | | | see page 2 | ccu(A) = 0.160 | lvdmux(A) = 0.080 | | [mΩ/m] | | | |
| | | | | | | | | doh(A) = 0.300 | lvdbuf(A) = 0.040 | | 18 | | | | |
| | | | | | | | | Vdd(V) = 2.500 | dcu(A) = ? | | Copper | | | | |
| TOB layer | Ladders /layer N | Radius average R (mm) | Cooling | | | Control | | Minimum Signal Paths | | I _{grp} (A/grp) | P _{grp} (W/grp) | P _{tot} (W/lay) | Ctrls Cable type1 to PP1 (m) | Resistance (W/lay) | |
| | | | has segt/lay | of which segments | has grps/seg | has grps/lay | of size (n) lads/grp | L _{ring} (mm) | l ₃ (mm) | | | | | | |
| 1 | 42 | 610 | 4 | 3 | 1 | 3 | 4 | 1725 | 365 | 1.88 | 4.70 | 44.1 | 5.0 | 28.0 | |
| | | | | 2 | 1 | 2 | 7 | 3019 | 639 | 2.84 | 7.10 | | | | |
| | | | | 2 | 1 | 2 | 8 | 3450 | 730 | 3.16 | 7.90 | | | | |
| 2 | 48 | 696 | 4 | 4 | 1 | 4 | 4 | 1725 | 364 | 1.88 | 4.70 | 50.4 | 4.9 | 35.8 | |
| | | | | 4 | 1 | 4 | 8 | 3450 | 729 | 3.16 | 7.90 | | | | |
| 3 | 54 | 782 | 3 | 1 | 2 | 2 | 7 | 3019 | 643 | 2.84 | 7.10 | 53.7 | 4.8 | 39.9 | |
| | | | | 1 | 1 | 1 | 8 | 3450 | 735 | 3.16 | 7.90 | | | | |
| | | | | 2 | 2 | 4 | 8 | 3450 | 735 | 3.16 | 7.90 | | | | |
| 4 | 60 | 868 | 3 | 2 | 2 | 4 | 7 | 3019 | 636 | 2.84 | 7.10 | 60.0 | 4.7 | 48.7 | |
| | | | | 2 | 1 | 2 | 8 | 3450 | 735 | 3.16 | 7.90 | | | | |
| | | | | 1 | 2 | 2 | 8 | 3450 | 735 | 3.16 | 7.90 | | | | |
| 5 | 66 | 965 | 4 | 2 | 1 | 2 | 5 | 2156 | 459 | 2.20 | 5.50 | 64.8 | 4.6 | 55.6 | |
| | | | | 2 | 2 | 4 | 9 | 3881 | 827 | 3.48 | 8.70 | | | | |
| | | | | 2 | 1 | 2 | 10 | 4313 | 919 | 3.80 | 9.50 | | | | |
| 6 | 74 | 1080 | 4 | 1 | 1 | 1 | 5 | 2156 | 459 | 2.20 | 5.50 | 71.2 | 4.5 | 14.3 | |
| | | | | 1 | 1 | 1 | 9 | 3881 | 825 | 3.48 | 8.70 | | | | |
| | | | | 2 | 1 | 2 | 10 | 4313 | 917 | 3.80 | 9.50 | | | | |
| | | | | 2 | 2 | 4 | 10 | 4313 | 917 | 3.80 | 9.50 | | | | |
| Optimum Nbr of Ctrl-grps per TOB-side => | | | | | | | | | | 46 | | Dissipated Power per TOB-side (W) => | | 344 + 82 | |



SCALE 1 : 2.85
R. Hammarström/cern/ep/cmt

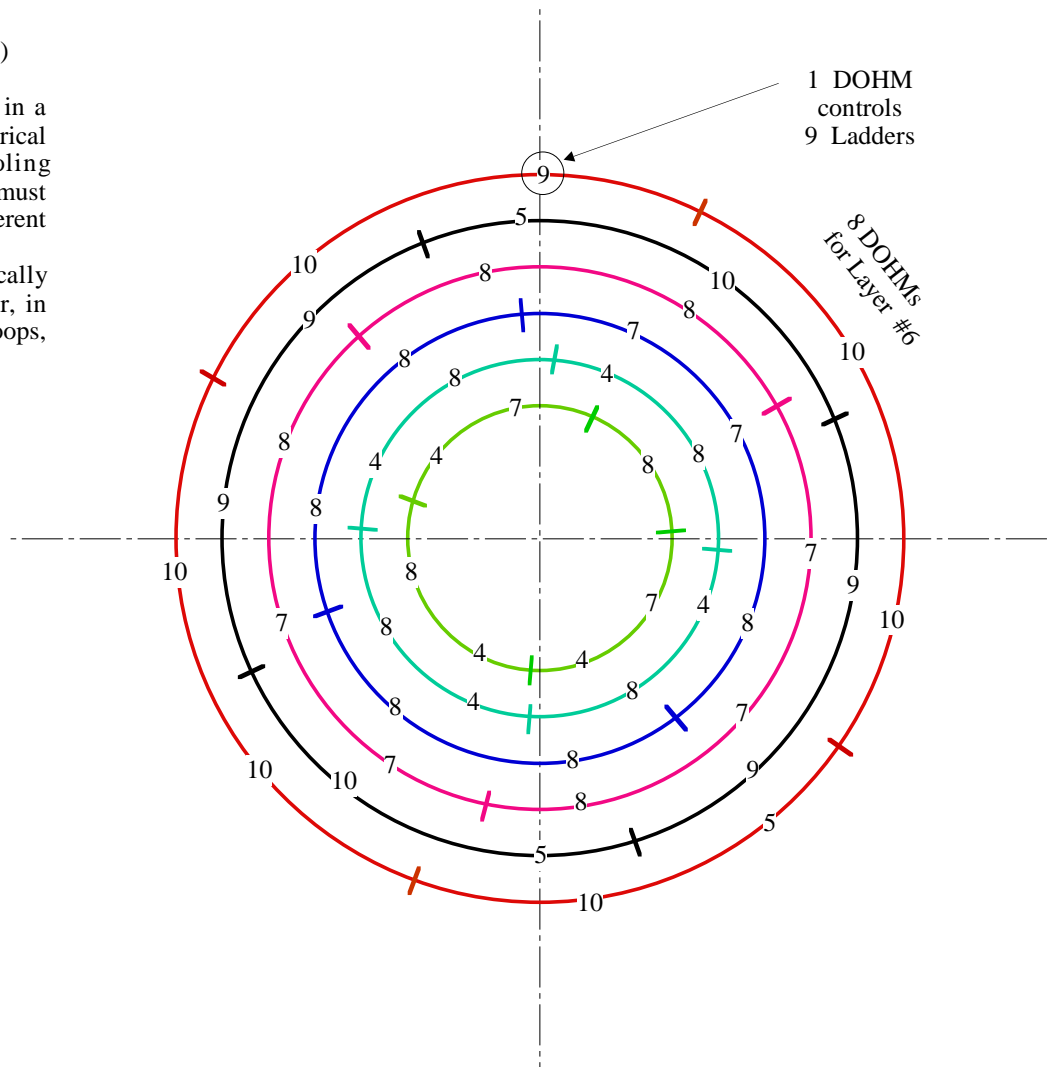
TOB External Controls Cabling

Note:

(concerning Control's grounding)

The Control's grouping is done in a way that there should be **NO** electrical bridge between adjacent Cooling Segments (Manifolds). Groups must not contain Ladders cooled by different Manifold Segments.

Cooling segments are electrically inter connected in a radial manner, in order not to create electrical loops, inside the Magnetic field.



| Layer nbr | Quantity of | | |
|--------------|-------------|-------|--------|
| | ladders | sgmts | groups |
| 1 | 42 | 4 | 7 |
| 2 | 48 | 4 | 8 |
| 3 | 54 | 3 | 7 |
| 4 | 60 | 3 | 8 |
| 5 | 66 | 4 | 8 |
| 6 | 74 | 4 | 8 |