Scintillator Cabling Layout for the D0 Forward Muon System

Linda Stutte

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1 Introduction

This brief note describes the scheme we have chosen for laying out the cables for the pixel detectors which are the trigger scintillation counters for the D0 Forward Muon System. Cables for A-, B- and C-layer planes are all discussed. Also included is a plan for connecting these cables to the VME crates containing the SFE's and the high voltage fan-outs located in the trusses.

2 Layout on the detector planes

Figure 1 describes the cabling scheme chosen for the pixel octants. Recall that our convention is to label octants 0-7 in counterclockwise order from the X-(East) axis. Two items about the layout are noteworthy:

- **We have chosen to group the pixels in 6 groups of 16 counters each.** This is the segmentation of the high voltage distribution, so the groups were laid out with counters of approximately the same size. Also, the front end electronics allows a single timing offset to be chosen for a group of 16 detectors. Octants 2 and 5 are shaded accordingly in the attached figure.

- **Within each octant, the cable numbering is symmetrized about the x or y axes.** The first pixel cabled is on the smallest-rapidity row and touching either the x or y axis. The numbering increases along this same rapidity row for adjoining pixels within the octant and then continues with the pixel touching either the x or y axis on the next highest rapidity row. It should be noted that for both octants 5 and 6, three pixels are missing near the mid-bottom in order to avoid a support. These 3 channels (76-78) will be un-filled in the readout.

The B-layer octants have a similar layout, as can be seen in Figure 2. There is a symmetry about the vertical axis, with octants 0 and 3 having 96 pixels, octants 1 and 2 having 95 pixels (number 76 adjacent to the vertical axis is missing), octants 4 and 7 having 94 pixels and octants 5 and 6 having only 71 pixels. The high voltage grouping is indicated on the

Type	Name	Description
VME Crates:	MSNABET	(Muon Scintillator North A and B East Top)
	MSNABEB	(Muon Scintillator North A and B East Bottom)
	MSNABWT	(Muon Scintillator North A and B West Top)
	MSNABWB	(Muon Scintillator North A and B West Bottom)
	MSSABET	(Muon Scintillator South A and B East Top)
	MSSABEB	(Muon Scintillator South A and B East Bottom)
	MSSABWT	(Muon Scintillator South A and B West Top)
	MSSABWB	(Muon Scintillator South A and B West Bottom)
HV Fan-outs:	MSNABETHV	(Muon Scintillator North A and B East Top)
	MSNABEBHV	(Muon Scintillator North A and B East Bottom)
	MSNABWTHV	(Muon Scintillator North A and B West Top)
	MSNABWBHV	(Muon Scintillator North A and B West Bottom)
	MSSABETHV	(Muon Scintillator South A and B East Top)
	MSSABEBHV	(Muon Scintillator South A and B East Bottom)
	MSSABWTHV	(Muon Scintillator South A and B West Top)
	MSSABWBHV	(Muon Scintillator South A and B West Bottom)

Table 1: A- and B-layer Crate and Fanout Names.

figure for one of each type of octant. For the bottom two octants, both groups 5 and 6 are missing pixels, enough so that these two groups will probably be combined into a single high voltage group. Also shown is the cable numbering plan for each octant type. Missing detector elements will be treated in the same manner as those in A-layer as described above - the corresponding readout channels will be un-filled.

The C-layer octant layout is shown in Figure 3. Again, there is a symmetry about the vertical axis, with octants 0 and 3 having 88 pixels, octants 1 and 2 having 85, octants 4 and 7 having 85 pixels and octants 5 and 6 having only 62 pixels. The high voltage grouping is indicated on the figure for one of each type of octant. For the bottom two octants here, group 6 is gone all-together and groups 4 and 5 are missing pixels, enough so that these two groups will probably be combined into a single high voltage group. Also shown is the cable numbering plan for each octant type. Missing detector elements will again have the corresponding readout channels un-filled.

3 Layout in the trusses

For the A- and B-layers together, there is one VME crate and one HV fan-out located near each of the four corners of the EF steel, times two for North and South. The names for these eight crates and eight HV fan-outs are given in Table 1. Table 2 shows the layout of a VME Crate.

Signal cables from octant 0 and 1 (A- and B-layers together) will be routed to one VME

Slot	Module
1	68040
2	PlsrPwrBrd
3	x
4	SRC
5	SLP
6	x
7	SFE
8	x
9	SFE
10	x
11	SFE
12	x
13	SFE
14	x
15	SFE
16	x
17	SFE
18	x
19	SFE
20	x
21	SFE

Table 2: Slot Assignments for the Scintillator VME Crates.

Crate, as will those from octants 2 and 3, octants 4 and 5, and octants 6 and 7. Cable 0 from octant zero A-layer will connect to the first channel in slot 7, with cable 47 from octant zero A-layer connecting to the last channel in slot 7. Cable 48 from octant zero A-layer will connect to the first channel in slot 8, with cable 95 from octant zero A-layer connecting to the last channel in slot 8. Similarly, cables from octant 1 A-layer will connect to slots 11 and 13, and B-layer cables will connect to slots 15 through 21.

The HV fan-outs have 24 individual high voltages which are brought into the fan-out via 3 Reynolds cables (labelled A,B and C, respectively). These 24 individual high voltages are each fanned out 16-fold, presenting an array of 24 high by 16 wide SHV connectors. The connectors are labelled in Table 3.

HV cables from octant zero A-layer HV group 1 (counters 0-15) will be connected to A1.1 through A1.16, HV cables from octant zero A-layer HV group 2 (counters 16-31) will be connected to A2.1 through A2.16. This proceeds similarly through HV cables from octant zero A-layer HV group 6 (counters 79-95) connecting to A6.1 through A6.16. HV cables from octant one A-layer will be connected to rows A7 through B4. And similarly HV cables from the B-layer will be connected to rows B5 through C8.

For the C-layer, there will be one VME crate and one HV fan-out located on each of the East and West sides of the EMC truss, times two for North and South. The names for these

A1.1	A1.2	A1.3	A1.4	....	A1.16
A2.1	A2.2	A2.3	A2.4	....	A2.16
....					
....					
A8.1	A8.2	B8.3	B8.4	....	B8.16
B1.1	B1.2	B1.3	B1.4	....	B1.16
B2.1	B2.2	B2.3	B2.4	....	B2.16
....					
....					
B8.1	B8.2	B8.3	B8.4	....	B8.16
C1.1	C1.2	C1.3	C1.4	....	C1.16
C2.1	C2.2	C2.3	C2.4	....	C2.16
....					
....					
C8.1	C8.2	C8.3	C8.4	....	C8.16

Table 3: High Voltage Fanout Labeling.

Type	Name	Description
VME Crates:	MSNCE	(Muon Scintillator North C East)
	MSNCW	(Muon Scintillator North C West)
	MSSCE	(Muon Scintillator South C East)
	MSSCW	(Muon Scintillator South C West)
HV FAN-OUTS:	MSNCEHV	(Muon Scintillator North C East)
	MSNCWHV	(Muon Scintillator North C West)
	MSSCEHV	(Muon Scintillator South C East)
	MSSCWHV	(Muon Scintillator South C West)

Table 4: C-layer Crate and Fanout Names.

four crates and four HV fan-outs are given in Table 4.

Cabling proceeds as indicated above for A and B layers with the exception that octants 0,1,6 and 7 are grouped together as are octants 2,3,4 and 5.

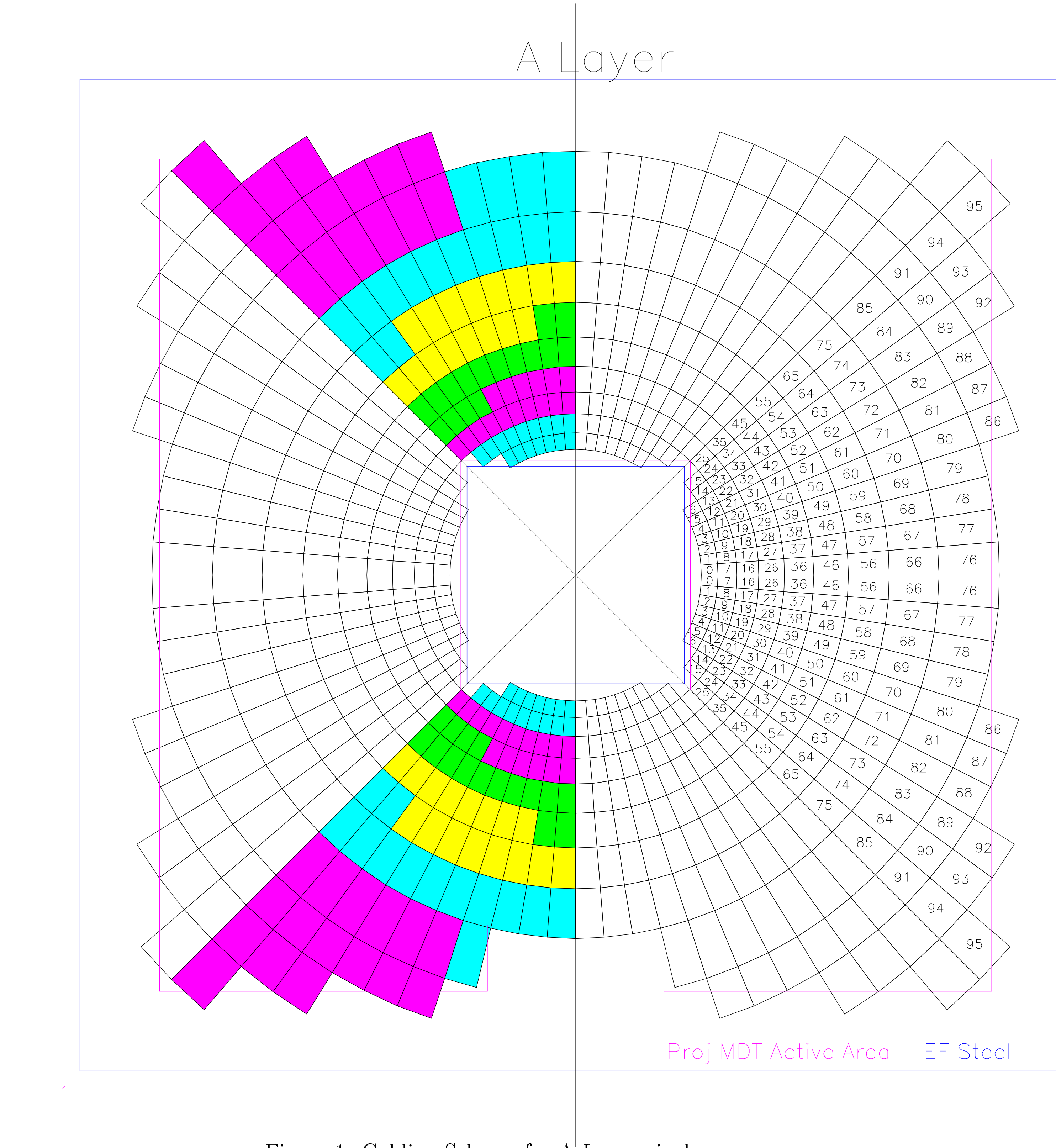

Figure 1: Cabling Scheme for A-Layer pixels

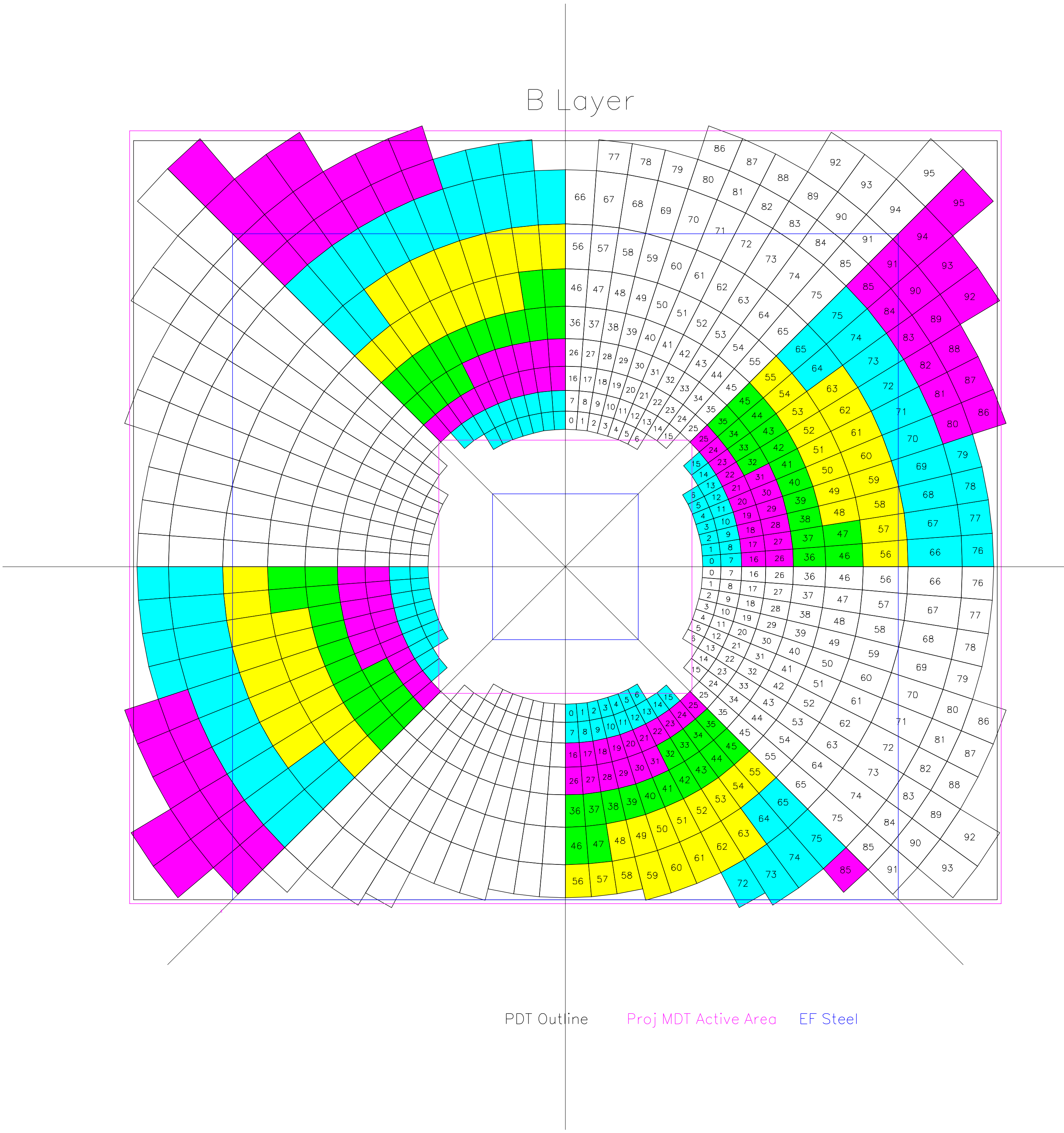

Figure 2: Cabling Scheme for B-Layer pixels

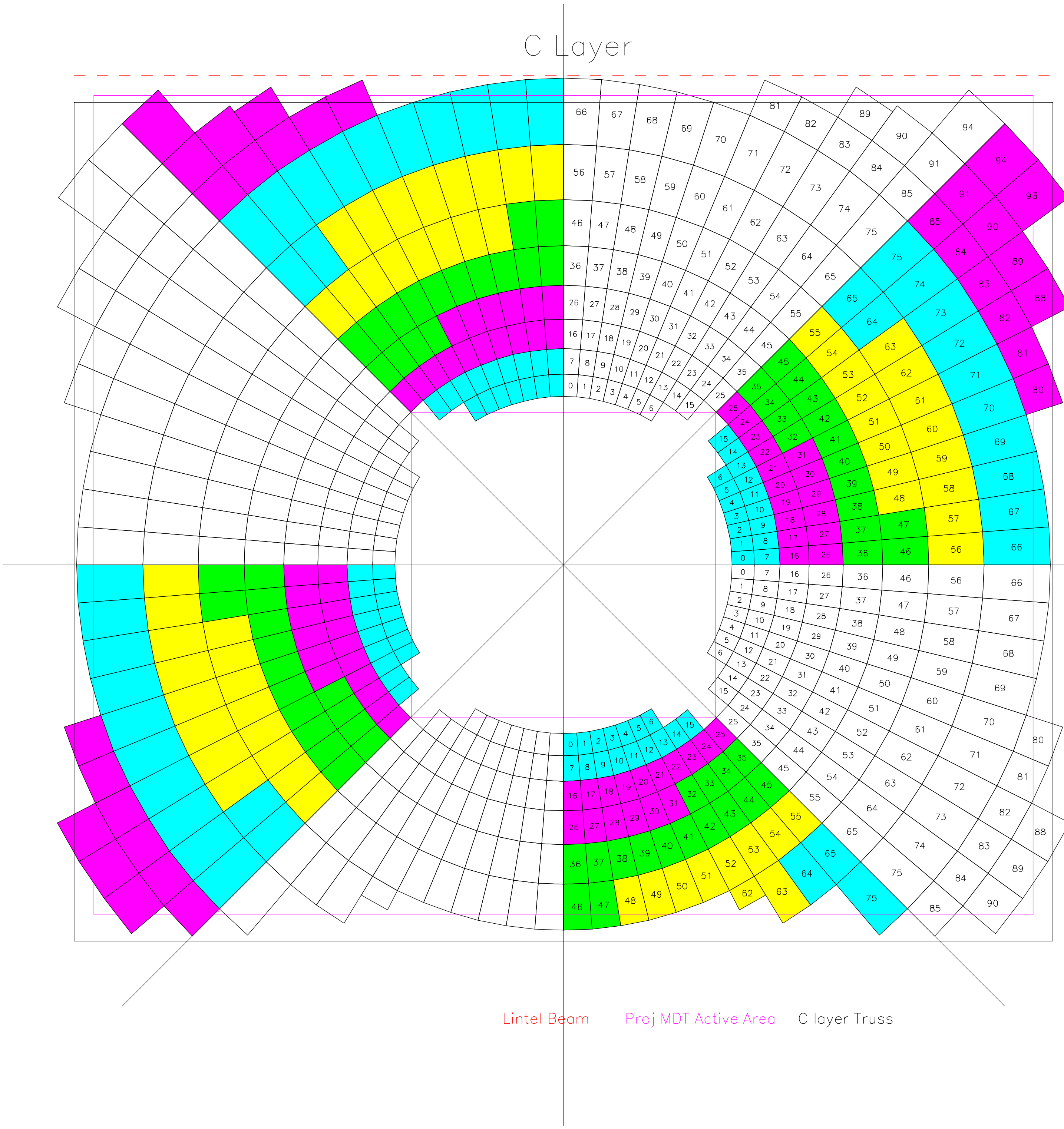

Figure 3: Cabling Scheme for C-Layer pixels