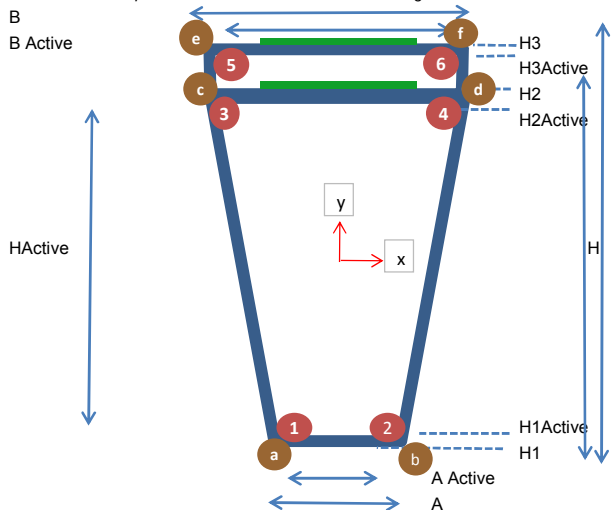


Basic parameters		Date	20/04/2015	Version	4.3
------------------	--	------	------------	---------	-----

Source: [https://twiki.cern.ch/twiki/bin/view/Atlas/NSWParameterBook#Parameter\\_book](https://twiki.cern.ch/twiki/bin/view/Atlas/NSWParameterBook#Parameter_book)

Color code	Solid assumption	Guestimate	Derived parameter
------------	------------------	------------	-------------------

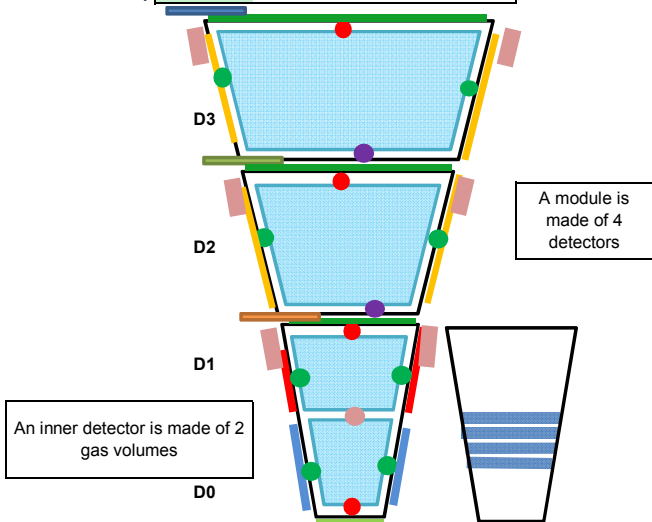
Note: width of adapters is not accounted for in detector height/width



Nlayers	4	ZBeamDispersion	200.0	mm
NLargeSectors	16	θ dispersion	0.01	rad
NSmallSectors	16	φ dispersion	0.015	rad
NTotalSectors	32	θ accuracy	0.001	rad
Bunch Crossing	40.0	Zcenter_S	7177.0	mm
TopModuleClearance	10.0	DeltaZ_SL	464.0	mm
Module23Clearance	6.4	Zcenter_NS	7409.0	mm
Module12Clearance	4.0	Zcenter_L	7641.0	mm
BottomModuleClearance	5.0	Overall η min	1.28	
HVseparation1	17.0	Overall η max	2.77	
HFramePadNoCapacitor	11.0	Overall η trigger	2.40	
HFramePadCapacitor	14.0	Envelope_MM	210.0	mm
HFrameStripTop	11.0	Envelope_Alignment	27.0	mm
HFrameStripBottom	11.0	Envelope_sTGC	70.0	mm
SideFrame Pads	21.0	Small_Large_widening	6.0	mm
SideFrame Strips	28.5	Confirmation widening	20.0	mm
SideFrame	28.5	G10 board width	2100.0	mm
Wire Adapters	6.0	G10 board height	1200.0	mm
Wire Adapters no readout	4.0	LongSupportSpacing	200.0	mm
Strip Adapters_0	22.0	LongSupportWidth	7.0	mm
Strip Adapters_1	55.0	LongSupportDead	10.0	mm
Strip Adapters_23	40.0	ButtonSpacing	110.0	mm
VMM width	50.0	ButtonWidth	7.0	mm
Cut out H large	545.3	ButtonDead	10.0	mm
Strip Width	2.7	ButtonDeadArea	0.8	cm <sup>2</sup>
Strip Gap	0.5	H for Pad Row 0	900.0	-200.0
Strip Total	3.2	Pad_H	80.0	mm
Pitch	1.8	Pad_H_minimal	25.0	mm
Shortest wire	50.0	Highest pad size	102.4	mm
<b>Trigger Combinatorial</b>		Fuzziness in η	2.5	mm
3 out of 4	35	Pad φ Modules 1	5.0	°
Sector trigger	1	Pad φ Modules 2 & 3	7.5	°
		Fuzziness in φ	2.0	mm
<b>Channels per hits</b>		Pad φ Minimal	0.25	full pad
Pads	1.03	Toy active height	400.0	mm
Wires	1.01	Toy active width	400.0	mm
Strips	4.7	Pad_W_Toy	80.0	mm
Total	6.74			

Opening

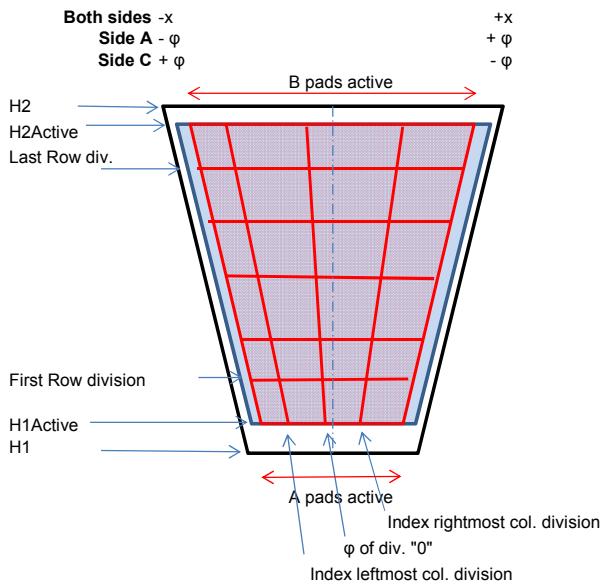
	Full in deg	Half in rad	Tan(half)	Cos(half)
Small	17	0.148353	0.149451	0.989016
Large	28	0.244346	0.249328	0.970296
Toy	0	0.000000	0.000000	1.000000



Global sizes	
Z of wedge centre Pivot	
H1 Module1	
HModule1	
HModule2	
HModule3	
H2Module3	
H3Module3	
H 1st wide support in Vol 1	
DeltaHWideSupport Vol 1	
Module Width	

	Small Pivot Conf.	Large Pivot Conf.	Toy Pivot Conf.	
	7344.0	7010.0	7474.0	7808.0
	902.2	931.0	35.0	315.0
	1325.6	1332.0	422.0	
	1191.4	1194.6		
	1005.8	1153.0		
	4445.4	4085.7		
		4631.0		
	1319.5	1319.5	1319.5	1319.5
	27.0	27.0	27.0	27.0
			457.0	

Viewed from IP



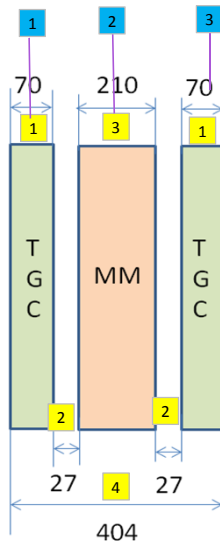
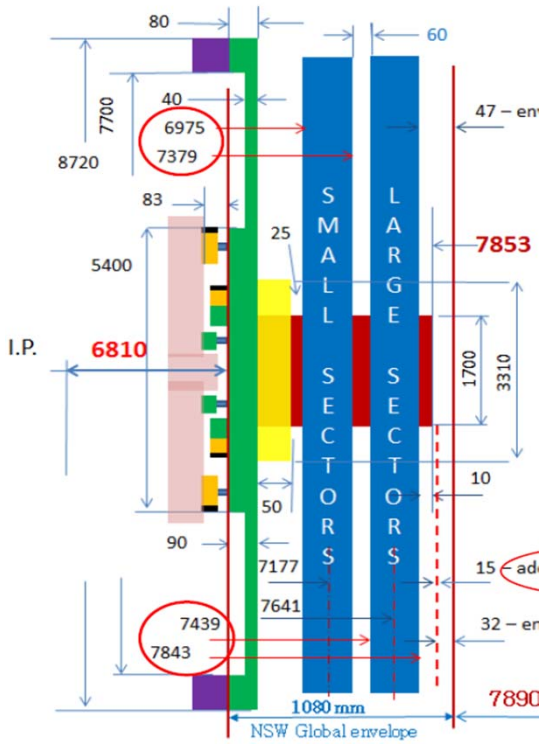
Layer	Pad η staggering	Pad φ staggering	Pad φ fuzzy	Strip staggering	Wire staggering	Wire group staggering	Toy Pad η fuzzy
	0	0	-0.5	-0.5	-0.25	-0.25	-0.75
	0	0	-0.5	-0.5	-0.25	-0.75	-0.75
	1	-1	1	-1			
	0.5	0	0.5	0			
	0	0.75	0.25	0.5			
	1	0.25	0.5	0.75			
	1	-1	1	-1			
	3	2	1	0	0	1	2
	3	2	1	0	0	1	2

Pivot (or all)				Confirmation (if != Pivot)			
1	2	3	4	1	2	3	4
0	0	-0.5	-0.5	-0.25	-0.25	-0.75	-0.75
0	0	-0.5	-0.5	-0.25	-0.75	-0.25	-0.75
1	-1	1	-1				
0.5	0	0.5	0				
0	0.75	0.25	0.5				
1	0.25	0.5	0.75				
1	-1	1	-1				
3	2	1	0	0	1	2	3
3	2	1	0	0	1	2	3

Gas Volume	Wire Grouping
0	1
20	20
20	20
20	20

- 0 SmallPivot
- 1 SmallConfirm
- 2 LargePivot
- 3 LargeConfirm
- 4 ToyPivot
- 5 ToyConfirm

Detector		First			Last		
First	Last	1	2	3	1	2	3
0	3	0	2	3	1	2	3
0	3	0	2	3	1	2	3
0	3	0	2	3	1	2	3
0	3	0	2	3	1	2	3
1	1	1			1		
1	1	1			1		



- 1 Envelope\_sTGC
- 2 Envelope\_Alignment
- 3 Envelope\_MM
- 4 Total Envelope

- mm 70
- mm 27
- mm 210
- mm 404

- 1 ZCenter of sTGC 1
- 2 ZCenter of MM
- 3 ZCenter of sTGC 2

Sector	
S	L
mm 7010	7474
mm 7177	7641
mm 7344	7808

MicroMegas

		Small		Large		
ModuleSpace	mm	0.0	H1_1	mm	895.0	923.0
VFrame	mm	30.0	A_1	mm	500.0	640.0
HFrame	mm	30.0	B_1	mm	1320.0	2008.5
N_Layers_in_multiplet		4	H_1	mm	2210.0	2310.0
N_Layers_in_wedge		8	HGap	mm	5.0	5.0
			A_2	mm	1320.0	2022.8
			B_2	mm	1820.4	2220.0
			H_2	mm	1350.0	1410.0
			Strip_pitch	mm	0.420	0.439

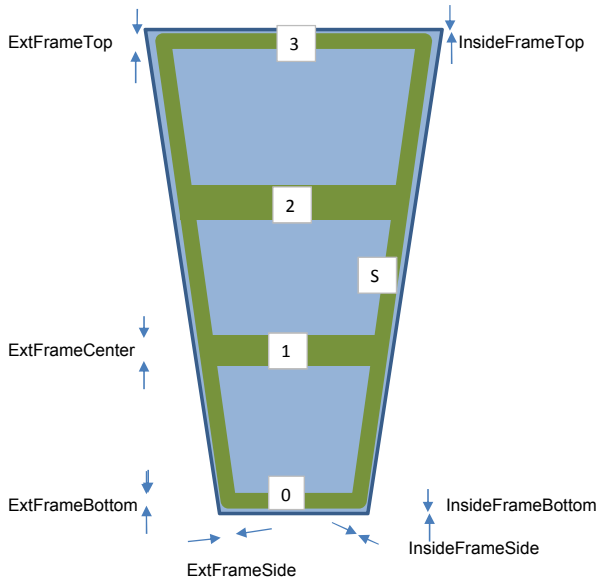
		Small Wedge		Large Wedge	
		Module 1	Module 2	Module 1	Module 2
H1	mm	895.0	3110.0	923.0	3238.0
H	mm	2210.0	1350.0	2310.0	1410.0
H2	mm	3105.0	4460.0	3233.0	4648.0
A	mm	500.0	1320.0	640.0	2022.8
B	mm	1320.0	1820.4	2008.5	2220.0
Side Opening	°	21.0	21.0	33.0	8.0
H1active	mm	925.0	3140.0	953.0	3268.0
Hactive	mm	2150.0	1290.0	2250.0	1350.0
H2active	mm	3075.0	4430.0	3203.0	4618.0
Nstrips		5120	3072	5120	3072
N VMM in R		80	48	80	48
N MMFE		10	6	10	6
Aactive	mm	440.0	1260.0	580.0	1962.8
Bactive	mm	1260.0	1760.4	1948.5	2160.0
Opening at A	°	27.3	23.0	34.9	34.4
Opening at B	°	23.5	22.8	34.9	26.8
Z_Min	mm	7072		7536	
Z_Max	mm	7282		7746	
<math>\eta_{min}</math>		1.584	1.260	1.604	1.278
<math>\eta_{min}</math>		2.746	1.565	2.779	1.585
Rate	MHz				
$\eta_{Min\_entrance}$	IP-	1.583	1.259	1.603	1.277
$\eta_{Max\_entrance}$		2.745	1.564	2.778	1.585
$\eta_{Min\_exit}$		1.610	1.284	1.628	1.300
$\eta_{Max\_exit}$		2.774	1.590	2.805	1.610
$\eta_{Min\_entrance}$	IP+	1.557	1.235	1.579	1.254
$\eta_{Max\_entrance}$		2.717	1.538	2.752	1.560
$\eta_{Min\_exit}$		1.584	1.260	1.604	1.278
$\eta_{Max\_exit}$		2.747	1.565	2.779	1.586

Big Wheel ROI

	E	F			
One chamber	7.5	15			
N ROI in Phi	4	4			
N ROI in eta	37	16			
Eta	1.9172144	2.41477	Tan	0.30053	0.18021575
	1.8931892	2.37767		0.30817	0.18714269
	1.8679438	2.34385		0.31643	0.19369845
	1.841964	2.30998		0.32518	0.20050165
	1.8153399	2.27554		0.33443	0.20767593
	1.7881582	2.24174		0.34417	0.21497391
	1.7608293	2.20696		0.35427	0.22276665
	1.732766	2.17343		0.365	0.23055935
	1.7049953	2.14106		0.37597	0.23835211
	1.6781209	2.10882		0.38694	0.24639224
	1.6523819	2.07814		0.39779	0.25430865
	1.6274287	2.04755		0.40864	0.26247251
	1.6037844	2.01663		0.41923	0.27100739
	1.5809833	1.98546		0.42974	0.27991342
	1.5590752	1.95369		0.44013	0.28931416
	1.5385115	1.92142		0.45015	0.29920973
	1.5187200	1.91629		0.46005	0.30081776
	1.4996606			0.46982	
	1.4810636			0.47959	
	1.4622303			0.48973	
	1.4427509			0.50049	
	1.4226917			0.51187	
	1.4014900			0.52424	
	1.3782523			0.53822	
	1.3528067			0.55405	
	1.3256793			0.57157	
	1.2972485			0.59068	
	1.2680563			0.61114	
	1.2384335			0.63284	
	1.2086034			0.6557	
	1.1797643			0.67883	
	1.1527667			0.70146	
	1.127457			0.72361	
	1.1036007			0.74534	
	1.0807141			0.76704	
	1.0586979			0.78873	
	1.0375038			0.81043	
	1.0333831			0.81474	

External Frames

ExtFrameMaterial	7	Fiber Glass
ExtFrameThickness	10.0	mm
ExtFrameTop	50.0	mm
ExtFrameCenter	100.0	mm
ExtFrameBottom	75.0	mm
ExtFrameSide	75.0	mm
InsideFrameTop	10.0	mm
InsideFrameBottom	10.0	mm
InsideFrameSide	10.0	mm
ExtFrameDensity	1.80	g/cm <sup>3</sup>
ExtFrameShorter	170.0	



		Small	Large
0	Length	mm 176.9	372.6
	Mass	Kg 0.24	0.50
1	Length	mm 574.6	1039.3
	Mass	Kg 1.03	1.87
2	Length	mm 934.1	1640.6
	Mass	Kg 1.68	2.95
3	Length	mm 1236.6	1945.0
	Mass	Kg 1.11	1.75
S	Length	mm 3564.4	3777.8
	Mass	Kg 4.81	5.10
<b>Total Mass</b>		<b>Kg 13.69</b>	<b>17.28</b>

Materials and Thicknesses

**Gas properties**

mole	22.41	l
np_mixture	45%	%
co2_mixture	55%	%

**Thicknesses**

	Thickness		
	Nominal	Actual	
Wire radius	0.025	0.001	mm
Ruler	1.400	1.383	mm
G10 board			
Pad D1	1.200	1.165	mm
Pad D2D3	1.100	1.065	mm
Strip D1	1.400	1.365	mm
Strip D2D3	1.300	1.265	mm
G10 cover internal			
Pad D1	0.100	0.100	mm
Pad D2D3	0.200	0.200	mm
Strip D1	0.100	0.100	mm
Strip D2D3	0.200	0.200	mm
G10 cover external			
Pad D1	0.200	0.183	mm
Pad D2D3	0.200	0.183	mm
G10 honey cover	0.200	0.183	mm
Gap	1.450	1.425	mm
Graphite	0.010		mm
Copper	0.018		mm
Copper embedded	0.010		mm
Glue	0.030	0.100	mm
External honey	5.000	4.940	mm
VolumeThickness		5.920	mm
ModuleThickness		49.080	mm
GapThickness		2.900	mm
Z Module Center		24.540	mm

**Materials**

Code	Name	X0		
		Density g/cm3	g/cm2	cm
1	CO2-np	0.00	40.0	15840
2	G10	1.86	33.0	17.74
3	Honeycomb	0.12	45.0	375.00
4	Copper	8.96	12.9	1.44
5	Graphite	2.27	42.7	18.81
6	Tungsten	19.30	6.8	0.35
7	Fiber Glass	1.80	28.5	15.83
8	Epoxy	0.90	45.0	50.00
9	Aluminium	2.70	24.0	8.89
10	Silicon	2.33	21.8	9.36
11	Stainless steel	7.90	14.0	1.77
12	Air	0.00	36.7	28333
13	Water	1.00	36.1	36.08

Layer (in Z)	Detector center vs module center			
	1	2	3	4
Z-Zcenter	-16.380	-5.460	5.460	16.380

**Elements**

1	2	3	4	5
Material	Code	Mat	Name	Thick.
G10	1	2	Ruler	1.383
	2	2	Cover	0.183
	3	2	Board pad D1	1.165
	4	2	Board pad D2D3	1.065
	5	2	Board Strip D1	1.365
	6	2	Board Strip D2D3	1.265
	7	2	Int. Cover pad D1	0.100
	8	2	Int. Cover pad D2D3	0.200
	9	2	Int. Cover Strip D1	0.100
	10	2	Int. Cover Strip D2D3	0.200
	11	2	Ext. Cover Pad D1	0.183
	12	2	Ext. Cover Pad D2D3	0.183
Copper	13	4	Copper	0.018
Graphite	14	5	Graphite	0.010
Epoxy	15	8	Glue	0.030
	16	8	Glue Wires	0.100
CO2-np	17	1	Gas Gap	1.425
Tungsten	18	6	Wire	0.050
Fiber Glass	19	7	Pasgon Frame	5.000
Honeycomb	20	3	Honeycomb	4.940

**Active area**

N	Lay.	Thick.	g/cm2	N
22		12.015	2.235	2
22		0.385	0.345	22
8		0.080	0.018	8
10		0.300	0.027	10
8		11.400	0.003	8
4		0.200	0.386	4
5		24.700	0.296	5
79		49.080	3.310	75

**Frames**

nLay.	Thick.	g/cm2	N	
2			2	
8			8	
2			2	
4			4	
4			4	
4			4	
4			4	
22			22	
8			8	
4			4	
5			5	
69		49.100	9.195	67

Active Area						
	Mat	Material	Code & Thickness D2D3		Code & Thickness D1	
Cover	4	Copper	13	0.018		
	2	G10	2	0.183		
Honeycomb	8	Epoxy	15	0.030		
	3	Honeycomb	20	4.940		
P	4	Copper	13	0.018	0.200	13 0.018 0.200
	2	G10	12	0.183		11 0.183 0.200
	4	Copper	13	0.018		13 0.018
	2	G10	4	1.065	1.100	3 1.165 1.200
	4	Copper	13	0.018		13 0.018
G	1	CO2-np	17	1.425		
	6	Tungsten	18	0.050		
S	5	Graphite	14	0.010	0.210	14 0.010 0.110
	2	G10	10	0.200		9 0.100 0.110
	4	Copper	13	0.018		13 0.018
Honeycomb	3	Honeycomb	20	4.940		
	8	Epoxy	15	0.030		
S	4	Copper	13	0.018		13 0.018
	2	G10	6	1.265	1.300	5 1.365 1.400
	4	Copper	13	0.018		13 0.018
	2	G10	10	0.200	0.210	9 0.100 0.110
G	1	CO2-np	17	1.425		
	6	Tungsten	18	0.050		
P	5	Graphite	14	0.010	0.210	14 0.010 0.110
	2	G10	8	0.200		7 0.100 0.110
	4	Copper	13	0.018		13 0.018
	2	G10	4	1.065	1.100	3 1.165 1.200
	4	Copper	13	0.018		13 0.018
Honeycomb	8	Epoxy	15	0.030		
	3	Honeycomb	20	4.940		
P	4	Copper	13	0.018	0.200	13 0.018 0.200
	2	G10	12	0.183		11 0.183 0.200
	4	Copper	13	0.018		13 0.018
	2	G10	4	1.065	1.100	3 1.165 1.200
	4	Copper	13	0.018		13 0.018
G	1	CO2-np	17	1.425		
	6	Tungsten	18	0.050		
S	5	Graphite	14	0.010	0.210	14 0.010 0.110
	2	G10	10	0.200		9 0.100 0.110
	4	Copper	13	0.018		13 0.018
Honeycomb	3	Honeycomb	20	4.940		
	8	Epoxy	15	0.030		
S	4	Copper	13	0.018		13 0.018
	2	G10	6	1.265	1.300	5 1.365 1.400
	4	Copper	13	0.018		13 0.018
	2	G10	10	0.200	0.210	9 0.100 0.110
G	1	CO2-np	17	1.425		
	6	Tungsten	18	0.050		
P	5	Graphite	14	0.010	0.210	14 0.010 0.110
	2	G10	8	0.200		7 0.100 0.110
	4	Copper	13	0.018		13 0.018
	2	G10	4	1.065	1.100	3 1.165 1.200
	4	Copper	13	0.018		13 0.018
Honeycomb	8	Epoxy	15	0.030		
	3	Honeycomb	20	4.940		
Cover	2	G10	2	0.183		
	4	Copper	13	0.018		
			<b>Total</b>	<b>49.080</b>		

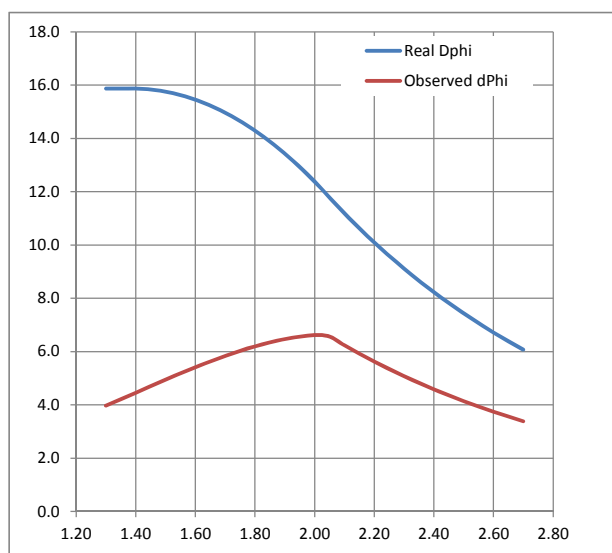
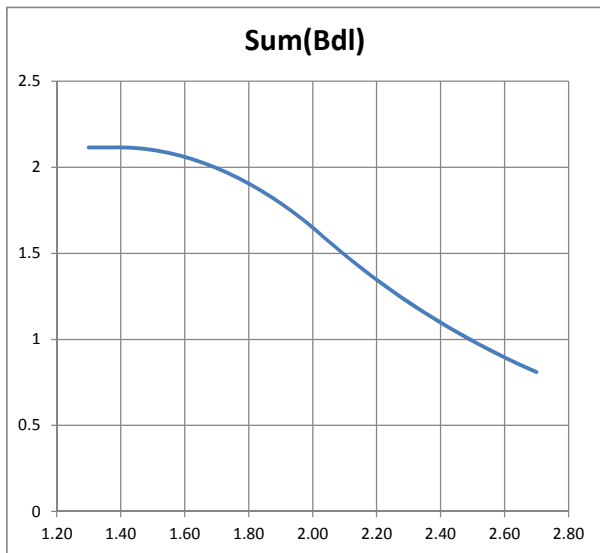
Total 49.080

Frames				
Code	Mat	Material	Thick.	
13	4	Copper	0.018	
2	2	G10	0.183	
19	7	Fiber Glass	5.000	
13	4	Copper	0.018	
12	2	G10	0.183	
13	4	Copper	0.018	
4	2	G10	1.065	
13	4	Copper	0.018	
8	2	G10	0.200	
15	8	Epoxy	0.030	
1	2	G10	1.383	
16	8	Epoxy	0.100	
1	2	G10	1.383	
15	8	Epoxy	0.030	
10	2	G10	0.200	
13	4	Copper	0.018	
6	2	G10	1.265	
13	4	Copper	0.018	
19	7	Fiber Glass	5.000	
13	4	Copper	0.018	
6	2	G10	1.265	
13	4	Copper	0.018	
10	2	G10	0.200	
15	8	Epoxy	0.030	
1	2	G10	1.383	
16	8	Epoxy	0.100	
1	2	G10	1.383	
15	8	Epoxy	0.030	
8	2	G10	0.200	
13	4	Copper	0.018	
4	2	G10	1.065	
13	4	Copper	0.018	
12	2	G10	0.183	
13	4	Copper	0.018	
19	7	Fiber Glass	5.000	
13	4	Copper	0.018	
12	2	G10	0.183	
13	4	Copper	0.018	
4	2	G10	1.065	
13	4	Copper	0.018	
8	2	G10	0.200	
15	8	Epoxy	0.030	
1	2	G10	1.383	
16	8	Epoxy	0.100	
1	2	G10	1.383	
15	8	Epoxy	0.030	
10	2	G10	0.200	
13	4	Copper	0.018	
6	2	G10	1.265	
13	4	Copper	0.018	
19	7	Fiber Glass	5.000	
13	4	Copper	0.018	
6	2	G10	1.265	
13	4	Copper	0.018	
10	2	G10	0.200	
15	8	Epoxy	0.030	
1	2	G10	1.383	
16	8	Epoxy	0.100	
1	2	G10	1.383	
15	8	Epoxy	0.030	
8	2	G10	0.200	
13	4	Copper	0.018	
4	2	G10	1.065	
13	4	Copper	0.018	
12	2	G10	0.183	
13	4	Copper	0.018	
19	7	Fiber Glass	5.000	
2	2	G10	0.183	
13	4	Copper	0.018	
			<b>Total</b>	<b>49.100</b>

Total 49.100

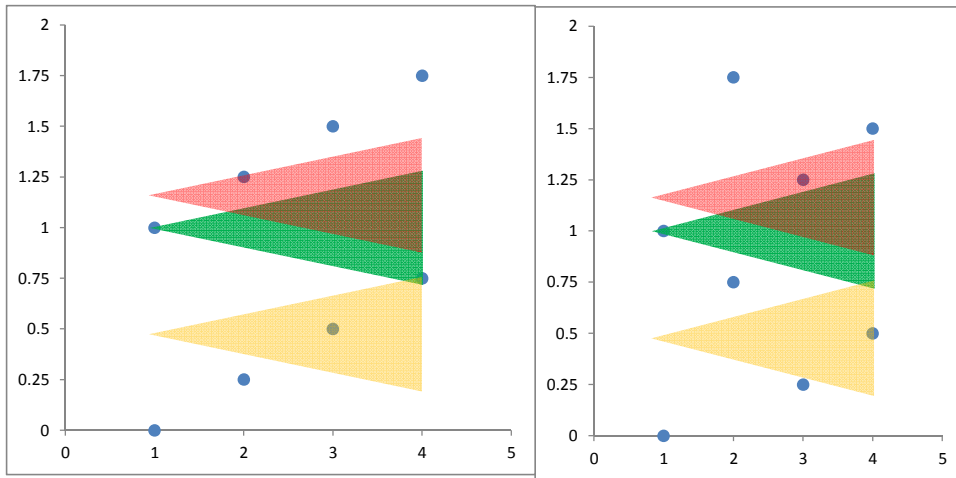
Wire Staggering and  $\varphi$  bending

pT for Bending	Gev	20								$\varphi$ bending			
			Eta	Zone	Tan $\theta$	Rd	Rt	Ze	Re	Sum(Bdl)	Real	Observed	
Bsolenoid	T	2											
RSolenoid	mm	1058	1.30	1	0.589	4225.8				1058.0	2.116	15.9	3.97
L1solenoid	mm	2000	1.35	1	0.556	3989.2				1058.0	2.116	15.9	4.21
L2solenoid	mm	4000	1.40	2	0.525	3768.8	1050.3	2014.8	1058.0	2.116	15.9	4.45	
Tan1Solenoid	mm	0.529	1.45	2	0.496	3563.1	992.9	2131.1	1058.0	2.112	15.8	4.70	
Eta1Solenoid		1.3935	1.50	2	0.470	3370.6	939.3	2252.8	1058.0	2.101	15.8	4.95	
Tan2Solenoid	mm	0.265	1.55	2	0.445	3190.3	889.0	2380.1	1058.0	2.084	15.6	5.18	
Eta2Solenoid		2.0401	1.60	2	0.421	3021.2	841.9	2513.4	1058.0	2.061	15.5	5.41	
			1.65	2	0.399	2862.3	797.6	2652.9	1058.0	2.031	15.2	5.63	
			1.70	2	0.378	2712.8	756.0	2799.1	1058.0	1.995	15.0	5.84	
			1.75	2	0.358	2572.0	716.7	2952.3	1058.0	1.954	14.7	6.03	
			1.80	2	0.340	2439.4	679.8	3112.8	1058.0	1.906	14.3	6.20	
			1.85	2	0.322	2314.2	644.9	3281.2	1058.0	1.851	13.9	6.35	
			1.90	2	0.306	2196.0	612.0	3457.7	1058.0	1.791	13.4	6.47	
			1.95	2	0.290	2084.4	580.9	3642.9	1058.0	1.724	12.9	6.56	
			2.00	2	0.276	1978.8	551.4	3837.2	1058.0	1.651	12.4	6.62	
			2.05	3	0.262	1879.0	523.6		1047.2	1.571	11.8	6.57	
			2.10	3	0.249	1784.5	497.3		994.6	1.492	11.2	6.24	
			2.15	3	0.236	1695.0	472.3		944.7	1.417	10.6	5.92	
			2.20	3	0.224	1610.2	448.7		897.4	1.346	10.1	5.63	
			2.25	3	0.213	1529.9	426.3		852.7	1.279	9.6	5.35	
			2.30	3	0.203	1453.7	405.1		810.2	1.215	9.1	5.08	
			2.35	3	0.192	1381.5	385.0		770.0	1.155	8.7	4.83	
			2.40	3	0.183	1313.0	365.9		731.8	1.098	8.2	4.59	
			2.45	3	0.174	1248.0	347.8		695.5	1.043	7.8	4.36	
			2.50	3	0.165	1186.2	330.6		661.1	0.992	7.4	4.15	
			2.55	3	0.157	1127.7	314.2		628.5	0.943	7.1	3.94	
			2.60	3	0.149	1072.0	298.7		597.5	0.896	6.7	3.75	
			2.65	3	0.142	1019.2	284.0		568.0	0.852	6.4	3.56	
			2.70	3	0.135	969.0	270.0		540.1	0.810	6.1	3.39	





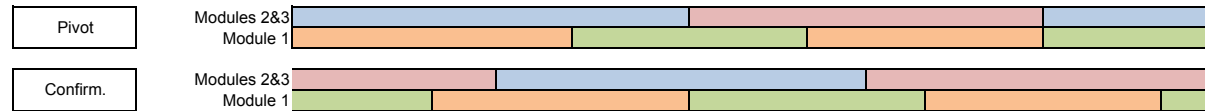
$\phi$ dispersion	rad	0.015				
Layer		1	2	3	4	
$\Delta z$	mm	0.00	10.9	21.8	32.8	
$\Delta x+$	mm	0.00	0.16	0.33	0.49	
$\Delta x-$	mm	0.00	-0.16	-0.33	-0.49	
$\Delta x+$	pitch	0.00	0.09	0.18	0.27	
$\Delta x-$	pitch	0.00	-0.09	-0.18	-0.27	
Option 1		pitch	0	0.25	0.5	0.75
		pitch	1	1.25	1.5	1.75
Option 2		pitch	0	0.75	0.25	0.5
		pitch	1	1.75	1.25	1.5



η and φ Pad Staggering

**Phi division of pads**

Layer	Pivot				Confirmation			
	1	2	3	4	1	2	3	4
	Small/Large							
φ shift D2-3	0.000	0.000	-3.750	-3.750	-1.875	-5.625	-1.875	-5.625
φ shift D1	0.000	0.000	-2.500	-2.500	-1.250	-3.750	-1.250	-3.750
	Toy							
Origin	2.0	-2.0	-38.0	-42.0	-18.0	-62.0	-18.0	-62.0
Width	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0



**R division of pads**

Layer	Small								Large								Toy							
	Pivot				Confirmation				Pivot				Confirmation				Pivot				Confirmation			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Z	7327.6	7338.5	7349.5	7360.4	6993.6	7004.5	7015.5	7026.4	7457.6	7468.5	7479.5	7490.4	7791.6	7802.5	7813.5	7824.4	18.6	29.5	40.5	51.4	298.6	309.5	320.5	331.4
Z/Zref	1.000	1.000	1.003	1.003	0.954	0.954	0.957	0.957	1.018	1.018	1.021	1.021	1.063	1.063	1.066	1.066	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Height	80.00	80.00	80.24	80.24	76.35	76.35	76.59	76.59	81.42	81.42	81.66	81.66	85.07	85.07	85.30	85.30	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00
Th. Origin	900.0	900.0	860.0	860.0	880.0	880.0	840.0	840.0	900.0	900.0	860.0	860.0	880.0	880.0	840.0	840.0	-197.5	-202.5	-237.5	-242.5	-217.5	-222.5	-257.5	-262.5
Real origin	900.0	900.0	862.6	862.6	839.9	839.9	804.2	804.2	916.0	916.0	877.8	877.8	935.7	935.7	895.7	895.7	-197.5	-202.5	-237.5	-242.5	-217.5	-222.5	-257.5	-262.5

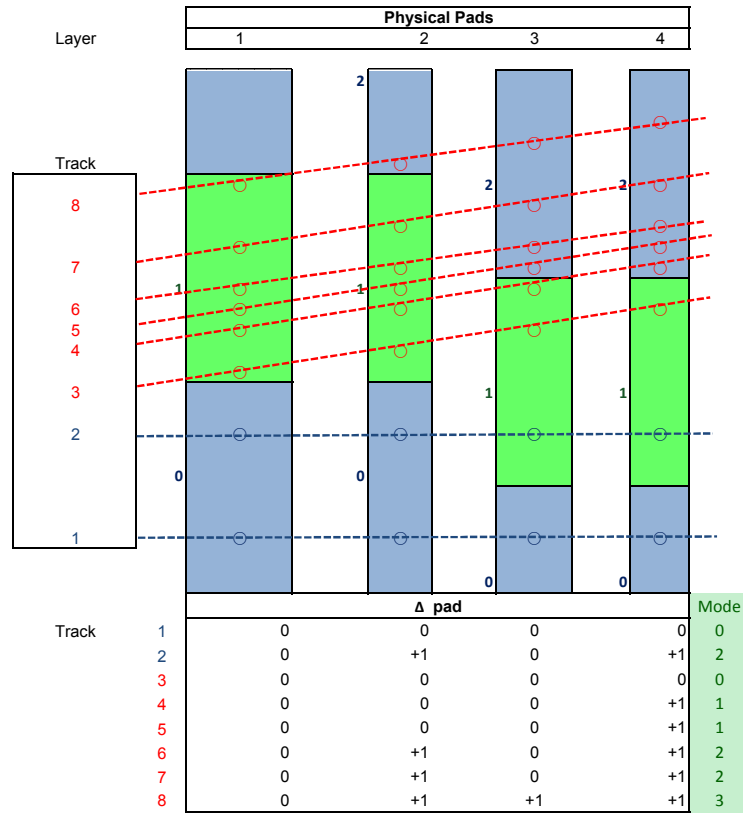
**Trigger bands**

Z average	7333.1	7354.9	6999.1	7020.9	7463.1	7484.9	7797.1	7818.9
Δ tan	0.00545473	0.00545475	0.00545454	0.00545455	0.00545480	0.00545482	0.00545498	0.00545499
Origin of tan	0.1172768	(shifted by 1/2)	0.1145494	(shifted by 1/2)	0.1172768	(shifted by 1/2)	0.1145494	(shifted by 1/2)
Average Δ tan	0.0054548							

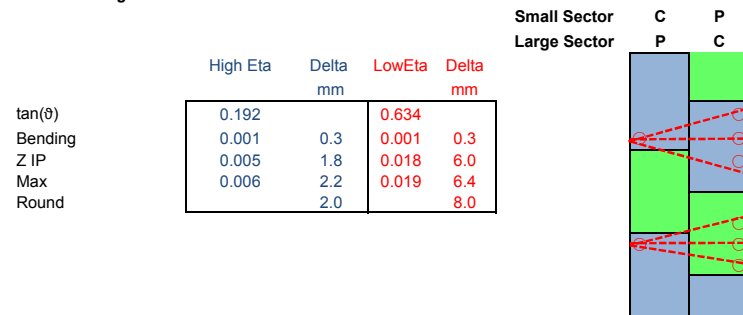
Height	40.00	40.12	38.18	38.30	40.71	40.83	42.53	42.65	40.00	40.00	40.00	40.00
strips	12.50	12.54	11.93	11.97	12.72	12.76	13.29	13.33	12.50	12.50	12.50	12.50
Number in TDS	10	10	10	10	10	10	9	9	10	10	10	10
TDS filling	125	126	120	120	128	128	120	120	125	125	125	125

**Inside a wedge**

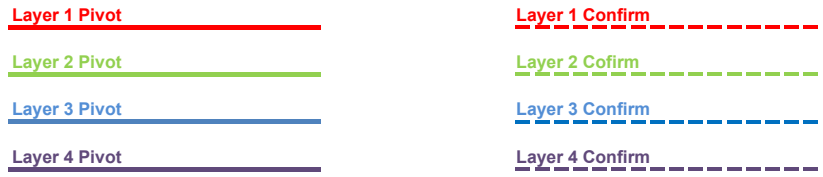
	High Eta	Delta 3-1	LowEta	Delta 3-1
		mm		mm
tan(θ)	0.123	2.7	0.634	13.8
Bending	0.001	0.0	0.001	0.0
Z IP	0.004	0.1	0.018	0.4
Max	0.127	2.8	0.653	14.3
Min	0.118	2.6	0.615	13.4
Round		0		16



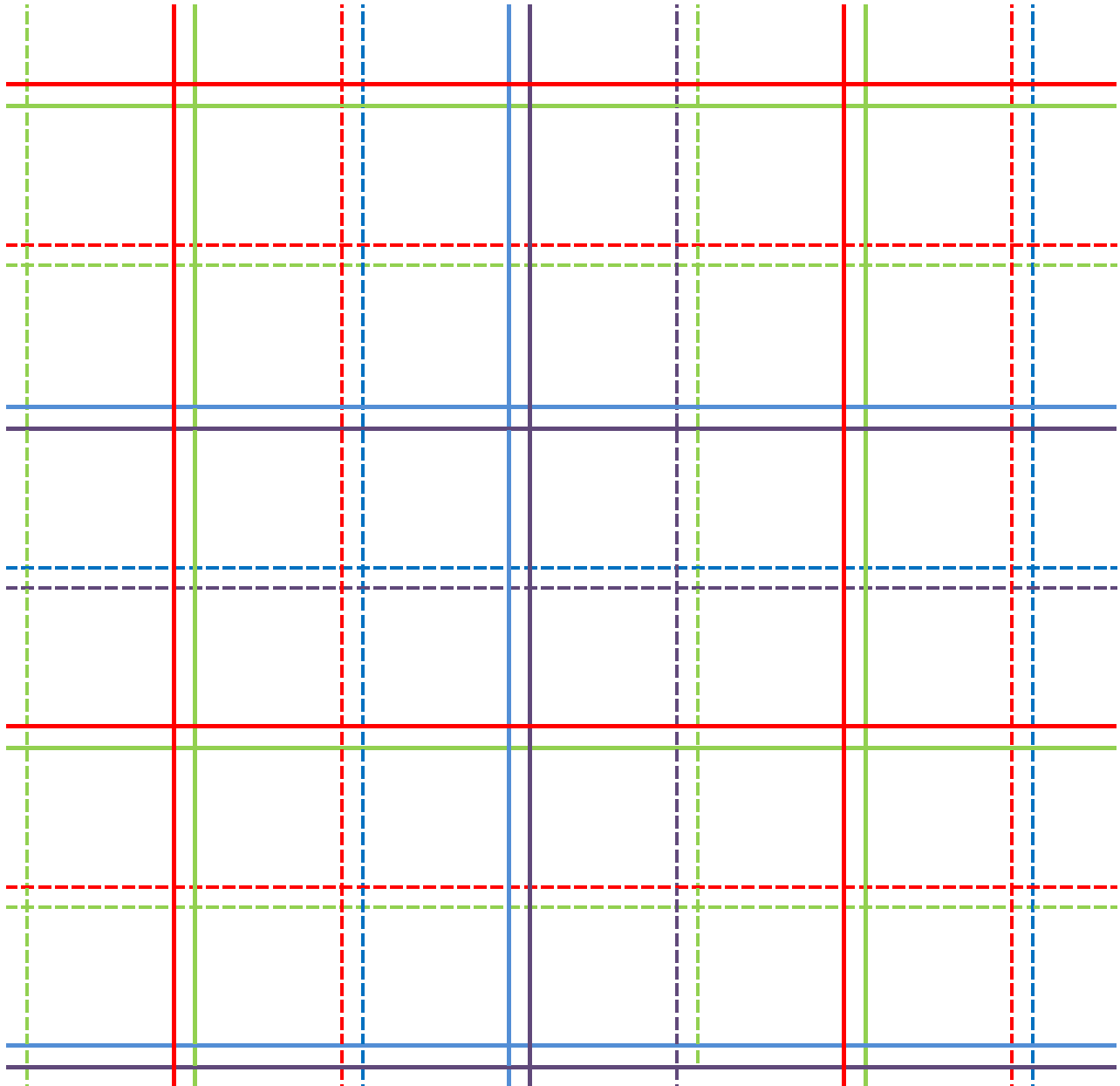
**Accross wedges**



Pad  $\eta$  and  $\varphi$  Staggering



$\eta$  "fuzziness" is achieved by lack of projectivity between layers 1 vs 2 and 3 vs 4  
Note that the Pivot and Confirm  $\phi$  staggering patterns are different







Dphi	-1	$\Delta\phi$	ROI	0	0	0	0	0	0	0	-1	42	74	98	104	106	2	2	2	2	2	42	138	162	168	170
15	3			1	2	2	2	42	74	98	104	106	38	70	98	100	102	2	2	2	2	42	138	162	168	170
14	3			1	2	1	2	38	70	98	100	102	38	70	98	100	102	2	2	2	2	42	138	162	168	170
13	3			1	2	1	2	38	70	98	100	102	38	70	98	100	102	1	2	1	2	42	74	98	104	106
12	3			1	2	1	2	38	70	98	100	102	38	70	98	100	102	1	2	1	2	38	70	98	100	102
11	2			1	1	1	2	22	70	82	84	86	22	70	82	84	86	1	2	1	2	38	70	98	100	102
10	2			1	1	1	1	21	69	81	84	85	21	69	81	84	85	1	2	1	1	38	70	98	100	102
9	2			1	1	1	1	21	69	81	84	85	21	69	81	84	85	1	1	1	1	21	69	81	84	85
8	2			1	1	1	1	21	69	81	84	85	21	69	81	84	85	1	1	1	1	21	69	81	84	85
7	1			0	1	1	1	21	5	17	20	21	21	69	81	84	85	1	1	1	1	21	69	81	84	85
6	1			0	1	0	1	17	1	17	16	17	17	1	17	16	17	0	1	1	1	21	69	81	84	85
5	1			0	1	0	1	17	1	17	16	17	17	1	17	16	17	0	1	1	1	21	5	17	20	21
4	1			0	1	0	1	17	1	17	16	17	17	1	17	16	17	0	1	1	1	17	1	17	16	17
3	0			0	0	0	1	1	1	1	0	1	0	1	1	0	1	0	1	0	1	17	1	17	16	17
2	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Missing				
All	1	2	3	4
13	67	22	16	14
10	64	19	16	11
10	64	19	16	11
10	64	19	16	11
1	55	19	7	2
0	54	18	6	2
0	54	18	6	2

Missing				
All	1	2	3	4
40	67	49	43	41
40	67	49	43	41
10	64	19	16	11
10	64	19	16	11
1	55	19	7	2
0	54	18	6	2
0	54	18	6	2

Dphi -6	Δφ	ROI	0	0	-1	-1	38	70	98	100	102	-1	-1	-1	-1	42	138	162	168	170	
15	3	1	2	1	2	1	2	38	70	98	100	102	2	2	2	2	42	138	162	168	170
14	3	1	2	1	2	1	2	38	70	98	100	102	1	2	2	2	42	74	98	104	106
13	3	1	2	1	2	1	2	38	70	98	100	102	1	2	1	2	38	70	98	100	102
12	3	1	2	1	2	1	2	38	70	98	100	102	-1	2	1	2	38	70	98	100	102
11	2	1	1	1	1	1	1	21	69	81	84	85	-1	2	1	2	38	70	98	100	102
10	2	1	1	1	1	1	1	21	69	81	84	85	-1	1	1	2	22	70	82	84	86
9	2	1	1	1	1	1	1	21	69	81	84	85	-1	1	1	1	21	69	81	84	85
8	2	1	1	1	1	1	1	21	69	81	84	85	-1	1	1	1	21	69	81	84	85
7	1	0	1	0	1	17	1	17	16	17	17	1	1	1	1	21	69	81	84	85	
6	1	0	1	0	1	17	1	17	16	17	17	0	1	1	1	21	5	17	20	21	
5	1	0	1	0	1	17	1	17	16	17	17	0	1	0	1	17	1	17	16	17	
4	1	0	1	0	1	17	1	17	16	17	17	0	1	0	1	17	1	17	16	17	
3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	17	1	17	16	17	
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Missing				
All	1	2	3	4
10	64	19	16	11
10	64	19	16	11
10	64	19	16	11
10	64	19	16	11
0	54	18	6	2
0	54	18	6	2
0	54	18	6	2

Missing				
All	1	2	3	4
40	67	49	43	41
13	67	22	16	14
10	64	19	16	11
10	64	19	16	11
10	64	19	16	11
1	55	19	7	2
0	54	18	6	2
0	54	18	6	2

Dphi -7	Δφ	ROI	0	-1	-1	-1	38	70	98	100	102	-1	-1	-1	-1	42	138	162	168	170	
15	3	1	2	1	2	1	2	38	70	98	100	102	2	2	2	2	42	138	162	168	170
14	3	1	2	1	2	1	2	38	70	98	100	102	1	2	2	2	42	74	98	104	106
13	3	1	2	1	2	1	2	38	70	98	100	102	1	2	1	2	38	70	98	100	102
12	3	1	1	1	2	22	70	82	84	86	86	-1	2	1	2	38	70	98	100	102	
11	2	1	1	1	1	21	69	81	84	85	85	-2	1	2	2	38	70	98	100	102	
10	2	1	1	1	1	21	69	81	84	85	85	-1	1	1	2	22	70	82	84	86	
9	2	1	1	1	1	21	69	81	84	85	85	-1	1	1	1	21	69	81	84	85	
8	2	1	1	1	1	21	69	81	84	85	85	-1	1	1	1	21	69	81	84	85	
7	1	0	1	0	1	17	1	17	16	17	17	1	1	1	1	21	69	81	84	85	
6	1	0	1	0	1	17	1	17	16	17	17	0	1	1	1	21	5	17	20	21	
5	1	0	1	0	1	17	1	17	16	17	17	0	1	0	1	17	1	17	16	17	
4	1	0	0	0	1	1	1	1	0	1	1	0	1	0	1	17	1	17	16	17	
3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	17	1	17	16	17	
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Missing				
All	1	2	3	4
10	64	19	16	11
10	64	19	16	11
10	64	19	16	11
1	55	19	7	2
0	54	18	6	2
0	54	18	6	2
0	54	18	6	2

Missing				
All	1	2	3	4
40	67	49	43	41
13	67	22	16	14
10	64	19	16	11
10	64	19	16	11
10	64	19	16	11
1	55	19	7	2
0	54	18	6	2
0	54	18	6	2
0	54	18	6	2



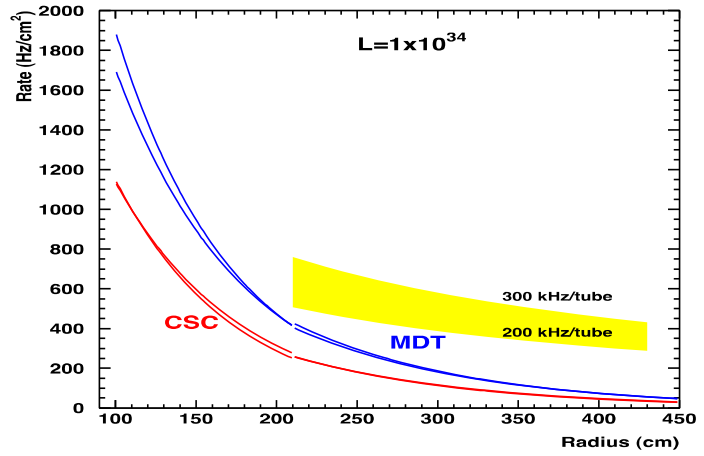
Background and noise assumptions

**Electronic noise**

Pads	1.0E-03
Wires	1.0E-04
Strips	1.0E-04

**Total background**

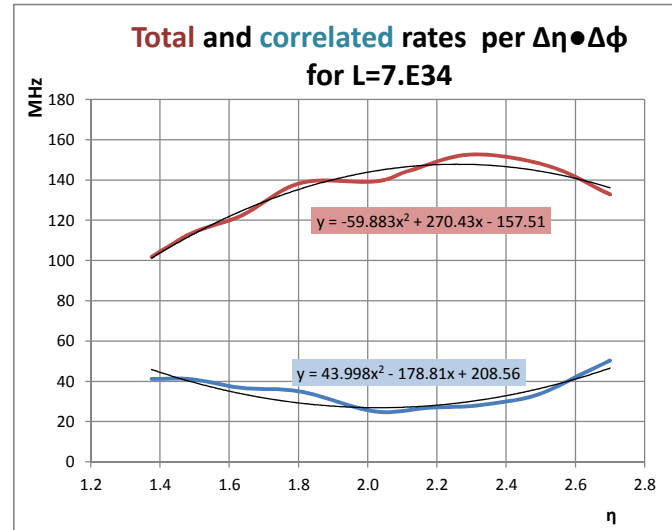
Technology		MDT		TGC	
Neutron eff.		1.0%		1.0%	
Luminosity		1.0E+34		7.0E+34	
R(mm)	$\eta$	Hz/cm <sup>2</sup>	Hz/cm <sup>2</sup>	Mhz/ $\Delta\eta\Delta\phi$	Hz/cm <sup>2</sup>
1000	2.700	1880	13160	132.79	13160
1200	2.520	1440	10080	147.04	10080
1500	2.300	950	6650	152.66	6650
1800	2.122	620	4340	144.71	4340
2000	2.020	480	3360	139.21	3360
2500	1.807	300	2100	138.52	2100
3000	1.636	180	1260	122.34	1260
3500	1.495	120	840	113.80	840
4000	1.376	80	560	101.82	560



**Correlated/Pile-up background**

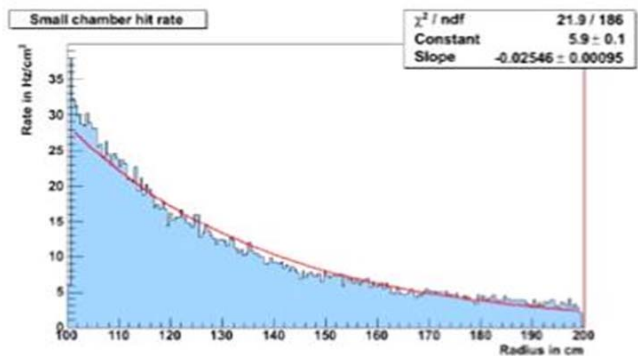
Csc/Mdt	0.5789		
LumiRatio	0.0114		
Normalized to TGC			
		Hz/cm <sup>2</sup>	Mhz/ $\Delta\eta\Delta\phi$
1000	2.700	33	4988
1100	2.606	23	3476
1200	2.520	16	2418
1300	2.441	12	1814
1500	2.300	8	1209
1700	2.178	6	907
2000	2.020	4	605
2500	1.807	3.5	529
3000	1.636	2.5	378
3500	1.495	2	302
4000	1.376	1.5	227

Fit	Total			Corr.	Uncorr
	Ndeg		2		
0	-158.37	208.84	-367.21		
1	270.77	-178.85	449.62		
2	-59.87	43.95	-103.82		



**Reconstructed and Correlated**

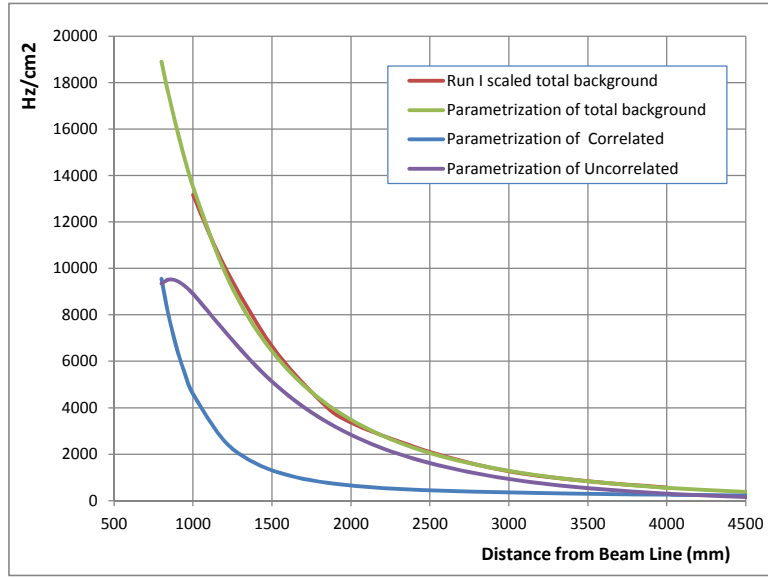
Events/BC	140	/BC
Trigger/Side for 1 pileup	0.05	/BC
IntegRated number of tracks	0.73	/side/BC
CSC triggers per corr. track	6.9%	/corr. Track
sTGC triggers per corr. track	30.0%	/corr. Track



(a) Rate for correlated hits.

**Reconstructed Rates**

R(mm)	$\eta$	Total Hz/cm <sup>2</sup>	Corr. Hz/cm <sup>2</sup>	Uncorr. Hz/cm <sup>2</sup>
800	2.922	18899	9551	9348
850	2.862	17354	7830	9524
900	2.805	15943	6490	9453
950	2.751	14662	5435	9227
1000	2.700	13501	4595	8907
1200	2.520	9856	2553	7303
1400	2.368	7374	1593	5781
1600	2.237	5641	1095	4546
1800	2.122	4398	817	3581
2000	2.020	3483	649	2834
2200	1.929	2796	542	2253
2400	1.846	2270	470	1800
2600	1.770	1861	418	1442
2800	1.700	1538	379	1159
3000	1.636	1281	349	932
3200	1.576	1073	324	749
3400	1.521	904	303	601
3600	1.469	765	284	481
3800	1.421	650	268	382
4000	1.376	554	253	301
4300	1.312	439	233	206
4400	1.293	407	227	180
4600	1.255	350	215	134



Basic properties of Small Pivot wedge

Quadruplet  
Layer  
Gas Volume

QS1P				QS2P				QS3P			
1	2	3	4	1	2	3	4	1	2	3	4
GS1P1	GS1P2	GS1P3	GS1P4	GS2P1	GS2P2	GS2P3	GS2P4	GS3P1	GS3P2	GS3P3	GS3P4

Total Wedge	3
	12

Geometry (Z, R refer to ATLAS reference system)

Opening $\phi$ of Module		17.0				17.0				17.0				
1/Cos( $\phi/2$ )		1.0111				1.0111				1.0111				
Tan( $\phi/2$ )		0.1495				0.1495				0.1495				
H1 (without adapters)	mm	900.2				2235.8				3439.6				900.2
H2 (without adapters)	mm	2225.8				3427.2				4445.4				4445.4
H3 (without adapters)	mm													
H cutoff	mm													
H (without adapters)	mm	1325.6				1191.4				1005.8				3545.2
H1 adapters	mm	896.2				2235.8				3439.6				3439.6
H2 adapters	mm	2231.8				3433.2				4451.4				4451.4
H3 adapters	mm													
H adapters	mm	1335.6				1197.4				1011.8				3555.2
A	mm	346.9				746.1				1106.0				
B	mm	743.2				1102.3				1406.6				
A adapters	mm	389.6				827.0				1186.8				
B adapters	mm	856.2				1184.9				1489.3				
Z of gas volume centre	mm	7327.6	7338.5	7349.5	7360.4	7327.6	7338.5	7349.5	7360.4	7327.6	7338.5	7349.5	7360.4	
Center of Wide support in GasVol. 1		1400.5	1373.5	1346.5	1319.5									
H1 Active	mm	914.2	1409.0	914.2	1382.0	914.2	1355.0	914.2	1328.0					914.2
H2 Active	mm	1392.0	2211.8	1365.0	2211.8	1338.0	2211.8	1311.0	2211.8					4431.4
H active	mm	477.8	802.8	450.8	829.8	423.8	856.8	396.8	883.8					
H active	mm	1297.6		1297.6		1297.6		1297.6						
$\eta$ min		2.376	1.926	2.397	1.927	2.418	1.929	2.440	1.930	1.520	1.521	1.522	1.524	1.289
$\eta$ max	IP-	2.792	2.364	2.793	2.385	2.795	2.406	2.796	2.427	1.911	1.912	1.914	1.915	1.510
$\eta$ min		2.363	1.913	2.384	1.914	2.405	1.916	2.426	1.917	1.507	1.509	1.510	1.511	1.277
$\eta$ max	IP nom.	2.778	2.351	2.780	2.372	2.781	2.392	2.783	2.414	1.898	1.899	1.901	1.902	1.498
$\eta$ min		2.349	1.900	2.370	1.901	2.391	1.903	2.413	1.904	1.495	1.496	1.498	1.499	1.265
$\eta$ max	IP+	2.765	2.338	2.766	2.358	2.768	2.379	2.769	2.400	1.885	1.886	1.888	1.889	1.485
A Active	mm	293.5	441.4	293.5	433.3	293.5	425.2	293.5	417.2					1051.6
B Active	mm	436.3	681.3	428.2	681.3	420.2	681.3	412.1	681.3					1344.8
(Bactive-Aactive)/2	mm	71.4	120.0	67.4	124.0	63.3	128.0	59.3	132.1					146.6
$\Delta\phi$ at $\eta$ min	rad	0.311	0.306	0.311	0.306	0.311	0.306	0.312	0.306					0.301
	rad									0.306				0.302
$\Delta\phi$ at $\eta$ max	rad	0.318	0.311	0.318	0.311	0.318	0.311	0.318	0.312					0.302
Gas volume active area	cm <sup>2</sup>	1743	4507	1627	4625	1512	4741	1400	4854					11752
A Pads	mm	279.3				677.6				1037.5				
B Pads	mm	667.2				1026.3				1330.6				
H2 Pads	mm	2211.8				3413.2				4431.4				

	GS1P1	GS1P2	GS1P3	GS1P4	GS2P1	GS2P2	GS2P3	GS2P4	GS3P1	GS3P2	GS3P3	GS3P4	Wedge	
<b>Supports and dead areas</b>														
Number of long supports	2	4	2	4	2	4	2	4	1	4				
Number of buttons at A	2	4	2	3	2	3	2	3	2	3				
Number of buttons at B	3	6	3	6	3	6	3	6	3	6				
Total number of buttons (2 halves)	66		62		62		56		90				106	
Dead area due to buttons	0.8%		0.8%		0.8%		0.7%		0.7%				0.7%	
Dead area due to long supports	6.0%		6.0%		6.0%		5.2%		4.3%				4.1%	
Total dead areas	6.8%		6.8%		6.8%		5.9%		5.0%				4.8%	
<b>Areas, volumes, masses and rates of gas volumes, tracklets rates</b>														
Module overall area	m <sup>2</sup>		0.72		1.10		1.26		3.09					
Module "transparent" area	m <sup>2</sup>		0.63		1.01		1.18		2.81					
Volume of one gas volume	l		1.81		2.93		3.41		32.60					
Mass frames	Kg		8.95		8.35		8.13		118.5					
Mass active area	Kg		20.70		33.44		38.90							
Total mass	Kg		29.64		41.79		47.03							
Gas volume uncorrelated rate for all η's	/BC	0.33	0.40	0.31	0.41	0.29	0.43	0.28	0.45	0.29		0.09		4.42
Gas volume uncorrelated rate for η<2.4	/BC	0.40		0.41		0.43		0.45		0.29		0.09		3.21
Gas volume correlated rate for all η's	/BC	0.13	0.09	0.13	0.10	0.12	0.10	0.12	0.11	0.10		0.08		1.59
Gas volume correlated rate for η<2.4	/BC	0.09		0.10		0.10		0.11		0.10		0.08		1.09
Gas volume total rate for all η's	/BC	0.46	0.49	0.44	0.51	0.42	0.54	0.39	0.56	0.38		0.17		6.01
Gas volume total rate for η<2.4	/BC	0.49		0.51		0.54		0.56		0.38		0.17		4.30
<b>3 out of 4 tracklets in quadruplet</b>	QS1P				QS2P				QS3P				Total	
Uncorelated max Rate in pad	/BC	1.4E-04		1.0E-04		8.2E-06		0.011						
Uncorelatedr Rate in volume	/BC	7.3E-03		3.0E-03		2.0E-04		0.397						
Correlated Rate in pad	/BC	4.3E-03		3.3E-03		2.8E-03		0.273						
Correlated Rate in gas volume	/BC	0.226		0.096		0.076		0.397						
Correlated Rate in volume for η<2.4	/BC	0.102		0.096		0.076		0.273						

**Pads**

		GS1P1	GS1P2	GS1P3	GS1P4	GS2P1	GS2P2	GS2P3	GS2P4	GS3P1	GS3P2	GS3P3	GS3P4	Wedge
Origin of pad		900.0	900.0	862.6	862.6	900.0	900.0	862.6	862.6	900.0	900.0	862.6	862.6	
Pad height		80.00	80.00	80.24	80.24	80.00	80.00	80.24	80.24	80.00	80.00	80.24	80.24	
Index of first row division		1 <sup>7</sup>	1 <sup>7</sup>	1 <sup>7</sup>	1 <sup>6</sup>	17	17	18	18	32	32	33	33	
H of first row division		wrt IP mm 980.0	wrt IP mm 980.0	wrt IP mm 942.8	wrt IP mm 942.8	2260.0	2260.0	2306.9	2306.9	3460.0	3460.0	3510.4	3510.4	
Height of first pad row		wrt A mm 65.8	wrt A mm 65.8	wrt A mm 28.6	wrt A mm 28.6	13.2	13.2	60.1	60.1	9.4	9.4	59.8	59.8	
First two rows are merged		bool				Yes	Yes			Yes	Yes			
Index of first (merged) row division		1	1	1	1	18	18	18	18	33	33	33	33	Row #
H of first (merged) row division		wrt IP mm 980.0	wrt IP mm 980.0	wrt IP mm 942.8	wrt IP mm 942.8	2340.0	2340.0	2306.9	2306.9	3540.0	3540.0	3510.4	3510.4	Min 0
Height of first (merged) row		wrt A mm 65.8	wrt A mm 65.8	wrt A mm 28.6	wrt A mm 28.6	93.2	93.2	60.1	60.1	89.4	89.4	59.8	59.8	
Index of last row division		16	16	16	16	31	31	31	31	44	44	44	44	
H of last row division		wrt IP mm 2180.0	wrt IP mm 2180.0	wrt IP mm 2146.4	wrt IP mm 2146.4	3380.0	3380.0	3350.0	3350.0	4420.0	4420.0	4393.1	4393.1	
Height of last pad row		wrt B mm 31.8	wrt B mm 31.8	wrt B mm 65.4	wrt B mm 65.4	33.2	33.2	63.2	63.2	11.4	11.4	38.3	38.3	L1 44
last two rows are merged		bool								Yes	Yes			L2 44
Index of last (merged) row division		wrt IP mm 16	wrt IP mm 16	wrt IP mm 16	wrt IP mm 16	31	31	31	31	43	43	44	44	L3 45
Height of last (merged) row		wrt B mm 31.8	wrt B mm 31.8	wrt B mm 65.4	wrt B mm 65.4	33.2	33.2	63.2	63.2	91.4	91.4	38.3	38.3	L4 45
Rows total		17	17	17	17	15	15	15	15	12	12	13	13	Max 45
Trigger band index at A		1.37	1.34	1.30	1.27	34.71	34.63	34.54	34.46	64.83	64.70	64.57	64.44	Min 1
Trigger band index at B		33.84	33.75	33.67	33.59	63.89	63.77	63.64	63.51	89.37	89.20	89.04	88.87	Max 90
N Trigger bands in height		33	33	33	33	30	30	30	30	26	26	25	25	
Location of 1st Trigger band boundary		wrt A mm 25.8	wrt A mm 25.8	wrt A mm 28.6	wrt A mm 28.6	13.2	13.2	19.9	19.9	9.4	9.4	19.7	19.7	
Trigger band index at first pad division		3.02	2.98	2.02	1.98	37.04	36.96	36.04	35.96	67.07	66.93	66.06	65.93	
Location of last Trigger band boundary		wrt B mm 31.8	wrt B mm 31.8	wrt B mm 25.3	wrt B mm 25.3	33.2	33.2	23.1	23.1	11.4	11.4	38.3	38.3	
Trigger band index at last pad division		33.04	32.96	32.04	31.96	63.06	62.94	62.06	61.94	87.08	86.92	88.08	87.92	
Column angular opening		5.0				7.5				7.5				
φ of division "0"		0.00	0.00	-2.50	-2.50	0.00	0.00	-3.75	-3.75	0.00	0.00	-3.75	-3.75	
Extra shift in +x (opposite φ)		wrt A mm 2.00	wrt A mm -2.00	wrt A mm 2.00	wrt A mm -2.00	2.00	-2.00	2.00	-2.00	2.00	-2.00	2.00	-2.00	
Index rightmost column division		-1	-1	0	0	0	0	0	0	0	0	0	0	Min -1
Index leftmost column division		1	1	1	1	0	0	1	1	0	0	1	1	Max 1
Angle of rightmost division		-5.00	-5.00	-2.50	-2.50	0.00	0.00	-3.75	-3.75	0.00	0.00	-3.75	-3.75	
Angle of leftmost division		5.00	5.00	2.50	2.50	0.00	0.00	3.75	3.75	0.00	0.00	3.75	3.75	
N cols total		4	4	3	3	2	2	3	3	2	2	3	3	
Area of one full pad, first row		cm <sup>2</sup> 45.9	cm <sup>2</sup> 45.9	cm <sup>2</sup> 26.6	cm <sup>2</sup> 26.6	322.4	322.4	138.5	138.5	470.1	470.1	209.7	209.7	
Area of one full pad, second row		cm <sup>2</sup> 55.9	cm <sup>2</sup> 55.9	cm <sup>2</sup> 74.7	cm <sup>2</sup> 74.7	276.7	276.7	185.0	185.0	420.6	420.6	281.3	281.3	
NPads		68	68	51	51	30	30	45	45	24	24	39	39	514
N Pad VMMS		2	2	2	2	1	1	1	1	1	1	1	1	16
N Pad TDSs		1	1	1	1	1	1	1	1	1	1	1	1	12
Whole gas volume pad Rate		/BC 1.05	/BC 1.05	/BC 1.03	/BC 1.03	0.42	0.42	0.44	0.44	0.20	0.20	0.21	0.21	6.71
VMM pad rate		/BC 0.53	/BC 0.52	/BC 0.52	/BC 0.52	0.42	0.42	0.44	0.44	0.20	0.20	0.21	0.21	
Prob >0 hits		/3 BCs 0.78	/3 BCs 0.78	/3 BCs 0.78	/3 BCs 0.78	0.71	0.71	0.72	0.72	0.44	0.44	0.46	0.46	
NPads for η<2.4		36	36	27	30	30	30	45	45	24	24	39	39	405
Gas volume pad Rate for η<2.4		/BC 0.54	/BC 0.57	/BC 0.58	/BC 0.61	0.42	0.42	0.44	0.44	0.20	0.20	0.21	0.21	4.84
Average pad occupancy for η<2.4		/BC 1.5%	/BC 1.6%	/BC 2.1%	/BC 2.0%	1.4%	1.4%	1.0%	1.0%	0.8%	0.8%	0.5%	0.5%	
Area of innermost pad for η<2.4		cm <sup>2</sup> 88.3	cm <sup>2</sup> 86.7	cm <sup>2</sup> 113.7	cm <sup>2</sup> 111.6	322.4	322.4	185.0	185.0	470.1	470.1	281.3	281.3	
Highest corr pad Rate for η<2.4		/BC 0.3%	/BC 0.4%	/BC 0.5%	/BC 0.5%	0.4%	0.4%	0.2%	0.2%	0.4%	0.4%	0.2%	0.2%	
Highest uncorr. pad Rate for η<2.4		/BC 1.4%	/BC 1.4%	/BC 1.8%	/BC 1.9%	1.8%	1.8%	1.1%	1.1%	0.8%	0.8%	0.5%	0.5%	
Highest total pad Rate for η<2.4		/BC 1.7%	/BC 1.7%	/BC 2.3%	/BC 2.4%	2.2%	2.2%	1.3%	1.3%	1.1%	1.1%	0.7%	0.7%	

**Wires**

		GS1P1	GS1P2	GS1P3	GS1P4	GS2P1	GS2P2	GS2P3	GS2P4	GS3P1	GS3P2	GS3P3	GS3P4	Total				
Minimum Width loss at B base	mm	7.5								7.5				7.5				
Location of central wire (index 0)	mm	0	0	1.35	1.35	0.45	0.45	0.9	0.9	0	1.35	0.45	0.9	0	1.35	0.45	0.9	
Index of leftmost wire (x<0)		-117	-185	-115	-185	-112	-185	-110	-185	-284	-285	-285	-285	-369	-370	-369	-369	
Location	mm	-210.6	-333.0	-205.7	-331.7	-201.2	-332.6	-197.1	-332.1	-511.2	-511.7	-512.6	-512.1	-664.2	-664.7	-663.8	-663.3	
Actual loss	mm	5.7	5.9	6.7	7.2	7.1	6.3	7.1	6.8	7.2	6.8	5.9	6.3	6.4	5.9	6.8	7.3	
Wire length	mm	50.5	51.3	56.6	60.3	59.7	54.3	59.8	57.3	60.3	57.3	51.3	54.3	54.8	51.8	57.8	60.8	
Index of rightmost wire (x>0)		117	185	114	184	112	184	109	184	284	284	284	284	369	368	369	368	
Location	mm	210.6	333.0	206.6	332.6	202.1	331.7	197.1	332.1	511.2	512.6	511.7	512.1	664.2	663.8	664.7	663.3	
Actual loss	mm	5.7	5.9	5.8	6.3	6.2	7.2	7.1	6.8	7.2	5.9	6.8	6.3	6.4	6.8	5.9	7.3	
Wire length	mm	50.5	51.3	50.6	54.3	53.7	60.3	59.8	57.3	60.3	51.3	57.3	54.3	54.8	57.8	51.8	60.8	
N Wires one (half) gas volume		235	371	230	370	225	370	220	370	569	570	570	570	739	739	739	738	
Index of leftmost full length wire		-81	-122	-82	-121	-81	-118	-82	-116	-192	-192	-192	-192	-292	-292	-292	-292	
Index of rightmost full length wire		81	122	80	119	81	117	81	115	192	191	191	191	292	291	291	291	
Wires of full length		163	245	163	241	163	236	164	232	385	384	384	384	585	584	584	584	
Wires of partial length		72	126	67	129	62	134	56	138	184	186	186	186	154	155	155	154	
Group width	wires	20	20	20	20	20	20	20	20	20				20				
Area of standard group	cm <sup>2</sup>	172.0	289.0	162.3	298.7	152.6	308.4	142.8	318.2	419.9				353.1				
Width of 1st group	wires	45	20	45	5	45	10	40	15	20	5	10	15	20	5	10	15	
Area of first group	cm <sup>2</sup>	213.8	153.5	202.8	39.6	191.9	81.6	160.8	126.1	219.0	54.7	109.5	164.2	185.5	46.4	92.8	139.2	
Width of last group	wires	45	11	45	5	45	20	40	15	9	5	20	15	19	14	9	3	
Area of last group	cm <sup>2</sup>	213.8	84.4	202.8	39.6	191.9	163.2	160.8	126.1	98.5	54.7	219.0	164.2	176.3	129.9	83.5	27.8	
<b>N Wire groups</b>		<b>10</b>	<b>19</b>	<b>9</b>	<b>20</b>	<b>9</b>	<b>19</b>	<b>9</b>	<b>19</b>	<b>29</b>	<b>30</b>	<b>29</b>	<b>29</b>	<b>37</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>All</b>
N Wire groups partial length		2	8	2	8	2	8	2	8	11	12	11	10	8	10	10	10	r/o
N Wire groups full length		8	11	7	12	7	11	7	11	18	18	18	19	29	28	28	28	no r/o
Wire VMIs		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12
Wire ROC		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12
Group opening angle at top	mmrad	16.28		16.28		16.28		16.28		10.55				8.12				
Group opening angle at bottom	mmrad	25.55		26.05		26.57		27.11		16.02				10.43				
Gas volume wire Rate	MHz	20.0		20.8		21.7		22.7		15.5	15.5	15.5	15.5	7.0	7.0	7.0	7.0	175.21
Per BC	/BC	0.50		0.52		0.54		0.57		0.39	0.39	0.39	0.39	0.17	0.17	0.17	0.17	4.38
>0 hits prob.	/3 BCs	0.78		0.79		0.80		0.82		0.69	0.69	0.69	0.69	0.41	0.41	0.41	0.41	
VMM Hit rate /3 BCs	Mhit/s	0.60		0.63		0.65		0.68		0.47	0.47	0.47	0.47	0.21	0.21	0.21	0.21	5.26
Average wire Rate	KHz	1050.4		1042.3		1144.4		1192.8		534.7	517.0	534.7	534.7	189.0	184.1	184.1	184.1	
	/BC	2.6%		2.6%		2.9%		3.0%		1.3%	1.3%	1.3%	1.3%	0.5%	0.5%	0.5%	0.5%	
Highest wire Rate	KHz	1507.9		1501.0		1653.4		1729.0		764.2	738.9	764.2	764.2	262.7	255.9	255.9	255.9	
	/BC	3.8%		3.8%		4.1%		4.3%		1.9%	1.8%	1.9%	1.9%	0.7%	0.6%	0.6%	0.6%	

**Strips**

	GS1P1	GS1P2	GS1P3	GS1P4	GS2P1	GS2P2	GS2P3	GS2P4	GS3P1	GS3P2	GS3P3	GS3P4	Total
Staggering	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	
Width of first strip at A	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	
Loss of Height due to supports	59.0	59.0	59.0	52.0	35.0	35.0	35.0	35.0	28.0	35.0	35.0	35.0	
N strips theoretical	149.3	250.9	140.9	259.3	132.4	267.8	124.0	276.2					
N strips theoretical			405.5			364.5				306.5			
N strips			406			365				307			1078
N strips ( $\eta < 2.4$ )			264			365				307			936
N strips one module			1624			1460				1228			4312
N strips VMM one module			28			24				20			72
Channel Rate (Bkg + noise) /BC			4.52			1.83				0.83			28.7
Channel Rate for $\eta < 2.4$ /BC			2.50			1.79				0.80			20.3
Average strip occupancy for $\eta < 2.4$ /BC			0.9%			0.5%				0.3%			
Highest strip Rate for $\eta < 2.4$ /BC			2.7%			1.6%				0.8%			
N strip VMMs			7			6				5			72
Strips in Trigger band	12.50	12.50	12.54	12.54	12.50	12.50	12.54	12.54	12.50	12.50	12.54	12.54	
Strips to TDS	384	384	384	384	365	365	365	365	307	307	307	307	4224
N strip TDSs	3	3	3	3	3	3	3	3	3	3	3	3	144

Bottom strip				1		1		1	
Top strip				22		45		51	
$\eta$ at bottom strip	VMM1			2.777		1.899		1.499	
$\eta$ at top strip				2.707		1.841		1.458	
Hits	/BC			0.35		0.30		0.17	
>0 hits prob.	/3 BCs			0.20		0.18		0.11	
Bottom strip				23		46		52	
Top strip				86		109		115	
$\eta$ at bottom strip	VMM2			2.704		1.840		1.457	
$\eta$ at top strip				2.520		1.763		1.409	
Hits	/BC			0.95		0.39		0.20	
>0 hits prob.	/3 BCs			0.46		0.23		0.13	
Bottom strip				87		110		116	
Top strip				150		173		179	
$\eta$ at bottom strip	VMM3			2.517		1.762		1.408	
$\eta$ at top strip				2.364		1.692		1.363	
Hits	/BC			0.83		0.34		0.18	
>0 hits prob.	/3 BCs			0.42		0.21		0.12	
Bottom strip				151		174		180	
Top strip				214		237		243	
$\eta$ at bottom strip	VMM4			2.361		1.691		1.362	
$\eta$ at top strip				2.229		1.626		1.319	
Hits	/BC			0.72		0.30		0.16	
>0 hits prob.	/3 BCs			0.38		0.19		0.11	
Bottom strip				215		238		244	
Top strip				278		301		307	
$\eta$ at bottom strip	VMM5			2.227		1.625		1.319	
$\eta$ at top strip				2.112		1.565		1.279	
Hits	/BC			0.63		0.27		0.14	
>0 hits prob.	/3 BCs			0.34		0.17		0.10	
Bottom strip				279		302			
Top strip				342		365			
$\eta$ at bottom strip	VMM6			2.110		1.565			
$\eta$ at top strip				2.008		1.509			

Hits	/BC	0.55	0.24	
>0 hits prob.	/3 BCs	0.31	0.16	
Bottom strip		343		
Top strip		406		
$\eta$ at bottom strip	VMM7	2.006		
$\eta$ at top strip		1.914		
Hits	/BC	0.49		
>0 hits prob.	/3 BCs	0.28		
<u>Sum of hits</u>	/BC	4.30	1.85	0.84



Basic properties of Small Confirm wedge												Total Wedge	
Quadruplet Layer	QS1C				QS2C				QS3C				3
	1	2	3	4	1	2	3	4	1	2	3	4	
Gas Volume	GS1C1	GS1C2	GS1C3	GS1C4	GS2C1	GS2C2	GS2C3	GS2C4	GS3C1	GS3C2	GS3C3	GS3C4	12

**Geometry (Z, R refer to ATLAS reference system)**

Opening $\phi$ of Module	17.0				17.0				17.0					
1/Cos( $\phi/2$ )	1.0111				1.0111				1.0111					
Tan( $\phi/2$ )	0.1495				0.1495				0.1495					
H1 (without adapters)	mm	900.2				2235.8				3439.6				900.2
H2 (without adapters)	mm	2225.8				3427.2				4445.4				4445.4
H3 (without adapters)	mm													
H (without adapters)	mm	1325.6				1191.4				1005.8				3545.2
H1 adapters	mm	896.2				2235.8				3439.6				3439.6
H2 adapters	mm	2231.8				3433.2				4451.4				4451.4
H3 adapters	mm													
H adapters	mm	1335.6				1197.4				1011.8				3555.2
A	mm	346.9				746.1				1106.0				
B	mm	743.2				1102.3				1406.6				
A adapters	mm	389.6				827.0				1186.8				
B adapters	mm	856.2				1184.9				1489.3				
Z of gas volume centre	mm	6993.6	7004.5	7015.5	7026.4	6993.6	7004.5	7015.5	7026.4	6993.6	7004.5	7015.5	7026.4	
Center of Wide support in GasVol. 1		1319.5	1346.5	1373.5	1400.5									
H1 Active	mm	914.2	1328.0	914.2	1355.0	914.2	1382.0	914.2	1409.0					914.2
H2 Active	mm	1311.0	2211.8	1338.0	2211.8	1365.0	2211.8	1392.0	2211.8					4431.4
H active	mm	396.8	883.8	423.8	856.8	450.8	829.8	477.8	802.8					
H active	mm	1297.6		1297.6		1297.6		1297.6						
$\eta$ min	IP-	2.390	1.882	2.371	1.883	2.353	1.885	2.336	1.886	1.478	1.479	1.481	1.482	1.249
$\eta$ max	IP-	2.746	2.377	2.748	2.359	2.749	2.341	2.751	2.324	1.867	1.868	1.870	1.871	1.468
$\eta$ min	IP nom.	2.376	1.868	2.358	1.870	2.339	1.871	2.322	1.873	1.465	1.467	1.468	1.470	1.237
$\eta$ max	IP nom.	2.732	2.363	2.734	2.345	2.735	2.327	2.737	2.310	1.853	1.855	1.856	1.858	1.456
$\eta$ min	IP+	2.362	1.855	2.343	1.856	2.325	1.858	2.308	1.859	1.452	1.454	1.455	1.457	1.225
$\eta$ max	IP+	2.718	2.349	2.719	2.331	2.721	2.313	2.723	2.296	1.840	1.841	1.843	1.844	1.443
A Active	mm	293.5	417.2	293.5	425.2	293.5	433.3	293.5	441.4					
B Active	mm	412.1	681.3	420.2	681.3	428.2	681.3	436.3	681.3	691.8				1051.6
(Bactive-Aactive)/2	mm	59.3	132.1	63.3	128.0	67.4	124.0	71.4	120.0	1040.4				1344.8
$\Delta\phi$ at $\eta$ min	rad	0.312	0.306	0.311	0.306	0.311	0.306	0.311	0.306	174.3				146.6
	rad									0.302				0.301
$\Delta\phi$ at $\eta$ max	rad	0.318	0.312	0.318	0.311	0.318	0.311	0.318	0.311	0.306				0.302
Gas volume active area	cm <sup>2</sup>	1400	4854	1512	4741	1627	4625	1743	4507	10102				11752
A Pads	mm	293.5				691.8				1051.6				
B Pads	mm	681.3				1040.4				1344.8				
H2 Pads	mm	2211.8				3413.2				4431.4				

	GS1C1	GS1C2	GS1C3	GS1C4	GS2C1	GS2C2	GS2C3	GS2C4	GS3C1	GS3C2	GS3C3	GS3C4	Wedge
--	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

**Supports and dead areas**

Number of long supports	1	4	2	4	2	4	2	4	5	4			
Number of buttons at A	2	3	2	3	2	3	2	4	6	9			
Number of buttons at B	3	6	3	6	3	6	3	6	9	12			
Total number of buttons (2 halves)	56		62		62		66		90		106		
Dead area due to buttons	%	0.7%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.7%	0.7%			
Dead area due to long supports	%	5.2%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	4.3%	4.1%			
Total dead areas	%	5.9%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	5.0%	4.8%			

**Areas, volumes, masses and rates of gas volumes, tracklets rates**

Module overall area	m <sup>2</sup>	0.72				1.10				1.26				3.09
Module "transparent" area	m <sup>2</sup>	0.63				1.01				1.18				2.81
Volume of one gas volume	l	1.81				2.93				3.41				32.60
Mass frames	Kg	8.95				8.35				8.13				
Mass active area	Kg	20.70				33.44				38.90				
Total mass	Kg	29.64				41.79				47.03				118.5
Gas volume uncorrelated rate for all η's	/BC	0.29	0.45	0.31	0.43	0.32	0.41	0.34	0.40	0.27				4.35
Gas volume uncorrelated rate for η<2.4	/BC	0.45		0.43		0.41		0.40		0.27				3.09
Gas volume correlated rate for all η's	/BC	0.11	0.11	0.12	0.10	0.12	0.10	0.12	0.09	0.10				1.58
Gas volume correlated rate for η<2.4	/BC	0.11		0.10		0.10		0.09		0.10				1.11
Gas volume total rate for all η's	/BC	0.40	0.55	0.42	0.53	0.44	0.51	0.47	0.49	0.37				5.93
Gas volume total rate for η<2.4	/BC	0.55		0.53		0.51		0.49		0.37				4.21
<b>3 out of 4 tracklets in quadruplet</b>		<b>QS1C</b>				<b>QS2C</b>				<b>QS3C</b>				<b>Total</b>
Uncorelated max Rate in pad	/BC	8.7E-05				4.5E-05				3.0E-06				
Uncorelatedr Rate in volume	/BC	5.9E-03				2.0E-03				1.2E-04				0.008
Correlated Rate in pad	/BC	3.3E-03				2.5E-03				2.1E-03				
Correlated Rate in gas volume	/BC	0.218				0.099				0.079				0.396
Correlated Rate in volume for η<2.4	/BC	0.100				0.099				0.079				0.278

**Pads**

		GS1C1	GS1C2	GS1C3	GS1C4	GS2C1	GS2C2	GS2C3	GS2C4	GS3C1	GS3C2	GS3C3	GS3C4	Wedge
Origin of pad		839.9	839.9	804.2	804.2	839.9	839.9	804.2	804.2	839.9	839.9	804.2	804.2	
Pad height		76.35	76.35	76.59	76.59	76.35	76.35	76.59	76.59	76.35	76.35	76.59	76.59	
Index of first row division		1 7	1 7	2 8	2 8	19	19	19	19	35	35	35	35	
H of first row division		916.2	916.2	957.4	957.4	2290.6	2290.6	2259.5	2259.5	3512.3	3512.3	3484.9	3484.9	
Height of first pad row		wrt A mm 2.0	wrt A mm 2.0	43.2	43.2	43.8	43.8	12.7	12.7	61.7	61.7	34.3	34.3	
First two rows are merged		bool Yes	bool Yes					Yes	Yes					
Index of first (merged) row division		2	2	2	2	19	19	20	20	35	35	35	35	Row # 1
H of first (merged) row division		wrt IP mm 992.6	wrt IP mm 992.6	957.4	957.4	2290.6	2290.6	2336.1	2336.1	3512.3	3512.3	3484.9	3484.9	Min 1
Height of first (merged) row		wrt A mm 78.4	wrt A mm 78.4	43.2	43.2	43.8	43.8	89.3	89.3	61.7	61.7	34.3	34.3	
Index of last row division		17	17	18	18	33	33	34	34	47	47	47	47	
H of last row division		wrt IP mm 2137.9	wrt IP mm 2137.9	2182.9	2182.9	3359.6	3359.6	3408.3	3408.3	4428.5	4428.5	4404.0	4404.0	
Height of last pad row		wrt B mm 73.9	wrt B mm 73.9	28.9	28.9	53.6	53.6	4.9	4.9	2.9	2.9	27.4	27.4	L1 46
last two rows are merged		bool						Yes	Yes	Yes	Yes			L2 46
Index of last (merged) row division		wrt IP mm 17	wrt IP mm 17	18	18	33	33	33	33	46	46	47	47	L3 47
Height of last (merged) row		wrt B mm 73.9	wrt B mm 73.9	28.9	28.9	53.6	53.6	81.4	81.4	79.2	79.2	27.4	27.4	L4 47
Rows total		17	17	18	18	16	16	15	15	13	13	14	14	Max 47
Trigger band index at A		2.96	2.93	2.89	2.85	37.90	37.80	37.71	37.62	69.45	69.31	69.17	69.03	Min 2
Trigger band index at B		36.48	36.39	36.30	36.21	68.47	68.33	68.19	68.05	95.16	94.98	94.80	94.62	Max 96
N Trigger bands in height		34	34	35	35	32	32	32	32	27	26	25	26	
Location of 1st Trigger band boundary		wrt A mm 2.0	wrt A mm 2.0	4.9	4.9	5.6	5.6	12.7	12.7	23.5	23.5	34.3	34.3	
Trigger band index at first pad division		5.02	4.98	4.02	3.98	39.04	38.95	40.05	39.95	71.07	70.92	70.07	69.93	
Location of last Trigger band boundary		wrt B mm 35.7	wrt B mm 35.7	28.9	28.9	15.5	15.5	4.9	4.9	2.9	2.9	27.4	27.4	
Trigger band index at last pad division		35.04	34.95	36.04	35.95	67.07	66.93	66.06	65.93	93.08	92.91	94.09	93.91	
Column angular opening		5.0				7.5				7.5				
φ of division "0"		° -1.25	° -3.75	° -1.25	° -3.75	° -1.88	° -5.63	° -1.88	° -5.63	° -1.88	° -5.63	° -1.88	° -5.63	
Extra shift in +x (opposite φ)		mm 2.00	mm -2.00	mm 2.00	mm -2.00	mm 2.00	mm -2.00	mm 2.00	mm -2.00	mm 2.00	mm -2.00	mm 2.00	mm -2.00	
Index rightmost column division		-1	0	-1	0	0	0	0	0	0	0	0	0	Min -1
Index leftmost column division		1	2	1	2	1	1	1	1	1	1	1	1	Max 2
Angle of rightmost division		° -6.25	° -3.75	° -6.25	° -3.75	° -1.88	° -5.63	° -1.88	° -5.63	° -1.88	° -5.63	° -1.88	° -5.63	
Angle of leftmost division		° 3.75	° 6.25	° 3.75	° 6.25	° 5.63	° 1.88	° 5.63	° 1.88	° 5.63	° 1.88	° 5.63	° 1.88	
N cols total		4	4	4	4	3	3	3	3	3	3	3	3	
Area of one full pad, first row		cm <sup>2</sup> 57.5	cm <sup>2</sup> 57.5	cm <sup>2</sup> 31.7	cm <sup>2</sup> 31.7	cm <sup>2</sup> 101.0	cm <sup>2</sup> 101.0	cm <sup>2</sup> 205.8	cm <sup>2</sup> 205.8	cm <sup>2</sup> 216.1	cm <sup>2</sup> 216.1	cm <sup>2</sup> 120.4	cm <sup>2</sup> 120.4	
Area of one full pad, second row		cm <sup>2</sup> 56.0	cm <sup>2</sup> 56.0	cm <sup>2</sup> 56.2	cm <sup>2</sup> 56.2	cm <sup>2</sup> 176.1	cm <sup>2</sup> 176.1	cm <sup>2</sup> 176.6	cm <sup>2</sup> 176.6	cm <sup>2</sup> 267.6	cm <sup>2</sup> 267.6	cm <sup>2</sup> 268.5	cm <sup>2</sup> 268.5	
NPads		68	68	72	72	48	48	45	45	39	39	42	42	628
N Pad VMMs		2	2	2	2	1	1	1	1	1	1	1	1	16
N Pad TDSs		1	1	1	1	1	1	1	1	1	1	1	1	12
Whole gas volume pad Rate		/BC 1.05	/BC 1.05	/BC 1.05	/BC 1.05	/BC 0.43	/BC 0.43	/BC 0.43	/BC 0.43	/BC 0.20	/BC 0.20	/BC 0.21	/BC 0.21	6.74
VMM pad rate		/BC 0.52	/BC 0.52	/BC 0.53	/BC 0.53	/BC 0.43	/BC 0.43	/BC 0.43	/BC 0.43	/BC 0.20	/BC 0.20	/BC 0.21	/BC 0.21	
Prob >0 hits		/3 BCs 0.78	/3 BCs 0.78	/3 BCs 0.79	/3 BCs 0.79	/3 BCs 0.71	/3 BCs 0.71	/3 BCs 0.71	/3 BCs 0.71	/3 BCs 0.45	/3 BCs 0.45	/3 BCs 0.46	/3 BCs 0.46	
NPads for η<2.4		40	40	40	40	48	48	45	45	39	39	42	42	508
Gas volume pad Rate for η<2.4		/BC 0.61	/BC 0.59	/BC 0.57	/BC 0.54	/BC 0.43	/BC 0.43	/BC 0.43	/BC 0.43	/BC 0.20	/BC 0.20	/BC 0.21	/BC 0.21	4.84
Average pad occupancy for η<2.4		/BC 1.5%	/BC 1.5%	/BC 1.4%	/BC 1.4%	/BC 0.9%	/BC 0.9%	/BC 0.9%	/BC 0.9%	/BC 0.5%	/BC 0.5%	/BC 0.5%	/BC 0.5%	
Area of innermost pad for η<2.4		cm <sup>2</sup> 79.6	cm <sup>2</sup> 81.2	cm <sup>2</sup> 83.0	cm <sup>2</sup> 84.5	cm <sup>2</sup> 176.1	cm <sup>2</sup> 176.1	cm <sup>2</sup> 205.8	cm <sup>2</sup> 205.8	cm <sup>2</sup> 267.6	cm <sup>2</sup> 267.6	cm <sup>2</sup> 268.5	cm <sup>2</sup> 268.5	
Highest corr pad Rate for η<2.4		/BC 0.4%	/BC 0.3%	/BC 0.3%	/BC 0.3%	/BC 0.2%	/BC 0.2%	/BC 0.3%	/BC 0.3%	/BC 0.2%	/BC 0.2%	/BC 0.2%	/BC 0.2%	
Highest uncorr. pad Rate for η<2.4		/BC 1.4%	/BC 1.4%	/BC 1.3%	/BC 1.3%	/BC 1.0%	/BC 1.0%	/BC 1.2%	/BC 1.2%	/BC 0.4%	/BC 0.4%	/BC 0.4%	/BC 0.4%	
Highest total pad Rate for η<2.4		/BC 1.7%	/BC 1.7%	/BC 1.7%	/BC 1.6%	/BC 1.2%	/BC 1.2%	/BC 1.4%	/BC 1.4%	/BC 0.6%	/BC 0.6%	/BC 0.7%	/BC 0.7%	

**Wires**

		GS1C1	GS1C2	GS1C3	GS1C4	GS2C1	GS2C2	GS2C3	GS2C4	GS3C1	GS3C2	GS3C3	GS3C4	Total				
Minimum Width loss at B base	mm	7.5								7.5				7.5				
Location of central wire (index 0)	mm	0	0	1.35	1.35	0.45	0.45	0.9	0.9	0	1.35	0.45	0.9	0	1.35	0.45	0.9	
Index of leftmost wire (x<0)		-110	-185	-113	-185	-115	-185	-117	-185	-284	-285	-285	-285	-369	-370	-369	-369	
Location	mm	-198.0	-333.0	-202.1	-331.7	-206.6	-332.6	-209.7	-332.1	-511.2	-511.7	-512.6	-512.1	-664.2	-664.7	-663.8	-663.3	
Actual loss	mm	6.2	5.9	6.2	7.2	5.8	6.3	6.6	6.8	7.2	6.8	5.9	6.3	6.4	5.9	6.8	7.3	
Wire length	mm	53.8	51.3	53.7	60.3	50.6	54.3	56.5	57.3	60.3	57.3	51.3	54.3	54.8	51.8	57.8	60.8	
Index of rightmost wire (x>0)		110	185	111	184	114	184	116	184	284	284	284	284	369	368	369	368	
Location	mm	198.0	333.0	201.2	332.6	205.7	331.7	209.7	332.1	511.2	512.6	511.7	512.1	664.2	663.8	664.7	663.3	
Actual loss	mm	6.2	5.9	7.1	6.3	6.7	7.2	6.6	6.8	7.2	5.9	6.8	6.3	6.4	6.8	5.9	7.3	
Wire length	mm	53.8	51.3	59.7	54.3	56.6	60.3	56.5	57.3	60.3	51.3	57.3	54.3	54.8	57.8	51.8	60.8	
N Wires one (half) gas volume		221	371	225	370	230	370	234	370	569	570	570	570	739	739	739	738	
Index of leftmost full length wire		-81	-115	-82	-118	-81	-120	-82	-123	-192	-192	-192	-192	-292	-292	-292	-292	
Index of rightmost full length wire		81	115	80	117	81	120	81	122	192	191	191	191	292	291	291	291	
Wires of full length		163	231	163	236	163	241	164	246	385	384	384	384	585	584	584	584	
Wires of partial length		58	140	62	134	67	129	70	124	184	186	186	186	154	155	155	154	
Group width	wires	20	20	20	20	20	20	20	20	20				20				
Area of standard group	cm <sup>2</sup>	142.8	318.2	152.6	308.4	162.3	298.7	172.0	289.0	419.9				353.1				
Width of 1st group	wires	40	20	45	5	45	10	45	15	20	5	10	15	20	5	10	15	
Area of first group	cm <sup>2</sup>	160.8	168.1	191.9	40.8	202.8	79.2	213.8	115.1	219.0	54.7	109.5	164.2	185.5	46.4	92.8	139.2	
Width of last group	wires	40	11	45	5	45	20	45	15	9	5	20	15	19	14	9	3	
Area of last group	cm <sup>2</sup>	160.8	92.4	191.9	40.8	202.8	158.4	213.8	115.1	98.5	54.7	219.0	164.2	176.3	129.9	83.5	27.8	
<b>N Wire groups</b>		<b>10</b>	<b>19</b>	<b>9</b>	<b>20</b>	<b>9</b>	<b>19</b>	<b>10</b>	<b>19</b>	<b>29</b>	<b>30</b>	<b>29</b>	<b>29</b>	<b>37</b>	<b>38</b>	<b>38</b>	<b>38</b>	
N Wire groups partial length		2	8	2	10	2	8	2	8	11	12	11	10	8	10	10	10	
N Wire groups full length		8	11	7	10	7	11	8	11	18	18	18	19	29	28	28	28	
Wire VMMS		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Wire ROC		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Group opening angle at top	mmrad	16.28		16.28		16.28		16.28		10.55				8.12				
Group opening angle at bottom	mmrad	27.11		26.57		26.05		25.55		16.02				10.43				
Gas volume wire Rate	MHz	22.5		21.6		20.7		19.8		15.1	15.1	15.1	15.1	6.6	6.6	6.6	6.6	
Per BC	/BC	0.56		0.54		0.52		0.50		0.38	0.38	0.38	0.38	0.17	0.17	0.17	0.17	
>0 hits prob.	/3 BCs	0.81		0.80		0.79		0.77		0.68	0.68	0.68	0.68	0.39	0.39	0.39	0.39	
VMM Hit rate /3 BCs	Mhit/s	0.67		0.65		0.62		0.59		0.45	0.45	0.45	0.45	0.20	0.20	0.20	0.20	
Average wire Rate	KHz	1183.6		1079.1		1088.7		1042.6		519.1	501.9	519.1	519.1	179.1	174.5	174.5	174.5	
	/BC	3.0%		2.7%		2.7%		2.6%		1.3%	1.3%	1.3%	1.3%	0.4%	0.4%	0.4%	0.4%	
Highest wire Rate	KHz	1715.7		1559.0		1567.8		1496.8		741.9	717.4	741.9	741.9	249.0	242.6	242.6	242.6	
	/BC	4.3%		3.9%		3.9%		3.7%		1.9%	1.8%	1.9%	1.9%	0.6%	0.6%	0.6%	0.6%	
														All			383	
														r/o			345	
														no r/o			38	
																	12	
																	12	
																	171.31	
																	4.28	
																	5.14	

**Strips**

	GS1C1	GS1C2	GS1C3	GS1C4	GS2C1	GS2C2	GS2C3	GS2C4	GS3C1	GS3C2	GS3C3	GS3C4	Total
Staggering	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	
Width of first strip at A	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	
Loss of Height due to supports	52.0	59.0	59.0	59.0	35.0	35.0	35.0	35.0	28.0	35.0	35.0	35.0	
N strips theoretical	124.0	276.2	132.4	267.8	140.9	259.3	149.3	250.9					
N strips theoretical			405.5			364.5				306.5			
N strips			406			365				307			1078
N strips ( $\eta < 2.4$ )			264			365				307			936
N strips one module			1624			1460				1228			4312
N strips VMM one module			28			24				20			72
Channel Rate (Bkg + noise) /BC			4.5			1.8				0.8			28.3
Channel Rate for $\eta < 2.4$ /BC			2.48			1.74				0.75			19.9
Average strip occupancy for $\eta < 2.4$ /BC			0.9%			0.5%				0.2%			
Highest strip Rate for $\eta < 2.4$ /BC			2.8%			1.5%				0.8%			
N strip VMMs			7			6				5			72
Strips in Trigger band	11.93	11.93	11.97	11.97	11.93	11.93	11.97	11.97	11.93	11.93	11.97	11.97	
Strips to TDS	384	384	384	384	365	365	365	365	307	307	307	307	4224
N strip TDSs	3	3	3	3	3	3	3	3	3	3	3	3	144

	VMM1	VMM2	VMM3	VMM4	VMM5	VMM6
Bottom strip						
Top strip						
$\eta$ at bottom strip	2.731	2.658	2.472	2.316	2.182	2.065
$\eta$ at top strip	2.661	2.474	2.318	2.184	2.067	1.963
Hits /BC	0.35	0.96	0.83	0.72	0.63	
>0 hits prob. /3 BCs	0.21	0.47	0.42	0.38	0.34	
Bottom strip						
Top strip						
$\eta$ at bottom strip	2.731	2.658	2.472	2.316	2.182	2.065
$\eta$ at top strip	2.661	2.474	2.318	2.184	2.067	1.963
Hits /BC	0.35	0.96	0.83	0.72	0.63	
>0 hits prob. /3 BCs	0.21	0.47	0.42	0.38	0.34	
Bottom strip						
Top strip						
$\eta$ at bottom strip	2.731	2.658	2.472	2.316	2.182	2.065
$\eta$ at top strip	2.661	2.474	2.318	2.184	2.067	1.963
Hits /BC	0.35	0.96	0.83	0.72	0.63	
>0 hits prob. /3 BCs	0.21	0.47	0.42	0.38	0.34	
Bottom strip						
Top strip						
$\eta$ at bottom strip	2.731	2.658	2.472	2.316	2.182	2.065
$\eta$ at top strip	2.661	2.474	2.318	2.184	2.067	1.963
Hits /BC	0.35	0.96	0.83	0.72	0.63	
>0 hits prob. /3 BCs	0.21	0.47	0.42	0.38	0.34	
Bottom strip						
Top strip						
$\eta$ at bottom strip	2.731	2.658	2.472	2.316	2.182	2.065
$\eta$ at top strip	2.661	2.474	2.318	2.184	2.067	1.963
Hits /BC	0.35	0.96	0.83	0.72	0.63	
>0 hits prob. /3 BCs	0.21	0.47	0.42	0.38	0.34	

Hits	/BC	0.55	0.23	
>0 hits prob.	/3 BCs	0.30	0.15	
Bottom strip		343		
Top strip		406		
$\eta$ at bottom strip	VMM7	1.961		
$\eta$ at top strip		1.870		
Hits	/BC	0.48		
>0 hits prob.	/3 BCs	0.27		
<u>Sum of hits</u>	/BC	4.31	1.79	0.80

Basic properties of Large Pivot wedge												Total Wedge					
Quadruplet	QL1P								QL2P				QL3P				3
Layer	1	2	3	4	1	2	3	4	1	2	3	4					
Gas Volume	GL1P1	GL1P2	GL1P3	GL1P4	GL2P1	GL2P2	GL2P3	GL2P4	GL3P1	GL3P2	GL3P3	GL3P4					12

**Geometry (Z, R refer to ATLAS reference system)**

Opening $\phi$ of Module	28.0				28.0				28.0					
1/Cos( $\phi/2$ )	1.0306				1.0306				1.0306					
Tan( $\phi/2$ )	0.2493				0.2493				0.2493					
H1 (without adapters)	mm	929.0				2271.0				3478.0				929.0
H2 (without adapters)	mm	2261.0				3465.6				4078.6				4078.6
H3 (without adapters)	mm									4631.0				4631.0
H cutoff	mm									552.4				
H (without adapters)	mm	1332.0				1194.6				1153.0				3702.0
H1 adapters	mm	925.0				2271.0				3478.0				3478.0
H2 adapters	mm	2267.0				3471.6				4068.6				4068.6
H3 adapters	mm									4637.0				4637.0
H adapters	mm	1342.0				1200.6				590.6				3712.0
A	mm	542.6				1211.8				1813.7				
B	mm	1206.8				1807.5				2115.0				
A adapters	mm	585.0				1294.3				1896.1				
B adapters	mm	1323.2				1892.9				2195.0				
Z of gas volume centre	mm	7457.6	7468.5	7479.5	7490.4	7457.6	7468.5	7479.5	7490.4	7457.6	7468.5	7479.5	7490.4	
Center of Wide support in GasVol. 1		1400.5	1373.5	1346.5	1319.5									
H1 Active	mm	943.0	1409.0	943.0	1382.0	943.0	1355.0	943.0	1328.0					943.0
H2 Active	mm	1392.0	2247.0	1365.0	2247.0	1338.0	2247.0	1311.0	2247.0	2282.0			3489.0	4085.7
H3 Active	mm									3451.6			4085.7	4617.0
H active	mm	449.0	838.0	422.0	865.0	395.0	892.0	368.0	919.0				1128.0	
H active	mm	1304.0		1304.0		1304.0		1304.0		1169.6				
$\eta$ min		2.393	1.928	2.414	1.929	2.435	1.930	2.457	1.932	1.525	1.527	1.528	1.529	1.268
$\eta$ max	IP-	2.778	2.381	2.780	2.402	2.781	2.423	2.783	2.444	1.913	1.914	1.915	1.917	1.516
$\eta$ min		2.380	1.915	2.401	1.916	2.422	1.918	2.444	1.919	1.513	1.515	1.516	1.517	1.257
$\eta$ intermediate	IP nom.													
$\eta$ max		2.765	2.368	2.766	2.389	2.768	2.410	2.769	2.431	1.900	1.901	1.903	1.904	1.503
$\eta$ min	IP+	2.367	1.902	2.388	1.903	2.409	1.905	2.430	1.906	1.501	1.502	1.504	1.505	1.246
$\eta$ max		2.752	2.355	2.753	2.376	2.755	2.396	2.756	2.418	1.887	1.888	1.890	1.891	1.491
A Active	mm	490.8	723.2	490.8	709.8	490.8	696.3	490.8	682.8	1158.5			1760.4	
B Active	mm	714.7	1141.1	701.3	1141.1	687.8	1141.1	674.4	1141.1	1741.8			2058.0	
(Bactive-Aactive)/2	mm	111.9	208.9	105.2	215.7	98.5	222.4	91.8	229.1	291.6			148.8	
$\Delta\phi$ at $\eta$ min	rad	0.503	0.497	0.503	0.497	0.503	0.497	0.503	0.497	0.494			0.439	
$\Delta\phi$ at $\eta$ intermediate	rad												0.493	
$\Delta\phi$ at $\eta$ max	rad	0.509	0.502	0.509	0.503	0.509	0.503	0.509	0.503	0.497			0.494	
Gas volume active area	cm <sup>2</sup>	2707	7811	2515	8005	2328	8195	2144	8381	16961			21536	196073
A Pads	mm	476.4				1144.1				1746.0				
B Pads	mm	1126.7				1727.3				2058.0				
H2 Pads	mm	2247.0				3451.6				4114.6				

	GL1P1	GL1P2	GL1P3	GL1P4	GL2P1	GL2P2	GL2P3	GL2P4	GL3P1	GL3P2	GL3P3	GL3P4	Wedge
--	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

**Supports and dead areas**

Number of long supports	2	4	2	4	1	4	1	4	5	5			
Number of buttons at A	4	6	4	6	4	6	4	6	10	16			
Number of buttons at B	6	10	6	10	6	10	6	10	15	18			
Total number of buttons (2 halves)	110	110	100	100	150	150	150	150	204	204			
Dead area due to buttons	% 0.8%	% 0.8%	% 0.7%	% 0.7%	% 0.7%	% 0.7%	% 0.7%	% 0.7%	% 0.7%	% 0.7%			
Dead area due to long supports	% 6.0%	% 6.0%	% 5.2%	% 5.2%	% 4.3%	% 4.3%	% 4.3%	% 4.3%	% 4.4%	% 4.4%			
Total dead areas	% 6.8%	% 6.8%	% 6.0%	% 6.0%	% 5.0%	% 5.0%	% 5.0%	% 5.0%	% 5.2%	% 5.2%			

**Areas, volumes, masses and rates of gas volumes, tracklets rates**

Module overall area	m <sup>2</sup>	1.17				1.80				2.26				5.23
Module "transparent" area	m <sup>2</sup>	1.05				1.70				2.15				4.90
Volume of one gas volume	l	3.05				4.92				6.25				56.86
Mass frames	Kg	10.39				9.87				10.23				
Mass active area	Kg	34.83				56.14				71.29				
Total mass	Kg	45.22				66.01				81.52				192.7
Gas volume uncorrelated rate for all η's	/BC	0.49	0.67	0.46	0.70	0.44	0.72	0.41	0.75	0.46	0.16	0.16	7.14	
Gas volume uncorrelated rate for η<2.4	/BC	0.67		0.70		0.72		0.75		0.46	0.16	0.16	5.34	
Gas volume correlated rate for all η's	/BC	0.20	0.16	0.19	0.17	0.18	0.18	0.17	0.18	0.15	0.14	0.14	2.58	
Gas volume correlated rate for η<2.4	/BC	0.16		0.17		0.18		0.18		0.15	0.14	0.14	1.85	
Gas volume total rate for all η's	/BC	0.69	0.83	0.65	0.86	0.62	0.90	0.58	0.93	0.62	0.30	0.30	9.72	
Gas volume total rate for η<2.4	/BC	0.83		0.86		0.90		0.93		0.62	0.30	0.30	7.19	
<b>3 out of 4 tracklets in quadruplet</b>		QL1P				QL2P				QL3P				Total
Uncorelated max Rate in pad	/BC	1.0E-04				8.0E-05				5.8E-06				
Uncorelatedr Rate in volume	/BC	1.0E-02				4.5E-03				3.5E-04				0.015
Correlated Rate in pad	/BC	3.8E-03				3.0E-03				2.4E-03				
Correlated Rate in gas volume	/BC	0.355				0.154				0.136				0.646
Correlated Rate in volume for η<2.4	/BC	0.171				0.154				0.136				0.462



**Pads**

		GL1P1	GL1P2	GL1P3	GL1P4	GL2P1	GL2P2	GL2P3	GL2P4	GL3P1	GL3P2	GL3P3	GL3P4	Wedge
Origin of pad		916.0	916.0	877.8	877.8	916.0	916.0	877.8	877.8	916.0	916.0	877.8	877.8	
Pad height		81.42	81.42	81.66	81.66	81.42	81.42	81.66	81.66	81.42	81.42	81.66	81.66	
Index of first row division		1 7	1 6	1 6	1 6	17	17	18	18	32	32	32	32	
H of first row division		wrt IP mm 997.4	wrt IP mm 997.4	wrt IP mm 959.5	wrt IP mm 959.5	2300.1	2300.1	2347.7	2347.7	3521.4	3521.4	3490.9	3490.9	
Height of first pad row		wrt A mm 54.4	wrt A mm 54.4	wrt A mm 16.5	wrt A mm 16.5	18.1	18.1	65.7	65.7	32.4	32.4	1.9	1.9	
First two rows are merged				Yes	Yes	Yes	Yes					Yes	Yes	
Index of first (merged) row division		1	1	2	2	18	18	18	18	32	32	33	33	Row #
H of first (merged) row division		wrt IP mm 997.4	wrt IP mm 997.4	wrt IP mm 1041.1	wrt IP mm 1041.1	2381.5	2381.5	2347.7	2347.7	3521.4	3521.4	3572.5	3572.5	Min 0
Height of first (merged) row		wrt A mm 54.4	wrt A mm 54.4	wrt A mm 98.1	wrt A mm 98.1	99.5	99.5	65.7	65.7	32.4	32.4	83.5	83.5	
Index of last row division		16	16	16	16	31	31	31	31	45	45	45	45	
H of last row division		wrt IP mm 2218.7	wrt IP mm 2218.7	wrt IP mm 2184.3	wrt IP mm 2184.3	3440.0	3440.0	3409.2	3409.2	4579.8	4579.8	4552.4	4552.4	
Height of last pad row		wrt B mm 28.3	wrt B mm 28.3	wrt B mm 62.7	wrt B mm 62.7	11.6	11.6	42.4	42.4	37.2	37.2	64.6	64.6	L1 46
last two rows are merged						Yes	Yes							L2 46
Index of last (merged) row division		wrt IP mm 16	wrt IP mm 16	wrt IP mm 16	wrt IP mm 16	30	30	31	31	45	45	45	45	L3 45
Height of last (merged) row		wrt B mm 28.3	wrt B mm 28.3	wrt B mm 62.7	wrt B mm 62.7	93.1	93.1	42.4	42.4	37.2	37.2	64.6	64.6	L4 45
Rows total		17	17	16	16	14	14	15	15	15	15	14	14	Max 46
Trigger band index at A		1.68	1.65	1.61	1.58	34.60	34.52	34.43	34.35	64.27	64.14	64.02	63.89	Min 1
Trigger band index at B		33.74	33.66	33.58	33.50	63.35	63.22	63.10	62.98	92.00	91.83	91.67	91.50	Max 92
N Trigger bands in height		33	33	33	33	30	30	30	29	28	28	28	29	
Location of 1st Trigger band boundary		wrt A mm 13.7	wrt A mm 13.7	wrt A mm 16.5	wrt A mm 16.5	18.1	18.1	24.8	24.8	32.4	32.4	1.9	1.9	
Trigger band index at first pad division		3.02	2.98	4.02	3.98	37.04	36.96	36.04	35.96	65.06	64.94	66.06	65.94	
Location of last Trigger band boundary		wrt B mm 28.3	wrt B mm 28.3	wrt B mm 21.8	wrt B mm 21.8	11.6	11.6	1.6	1.6	37.2	37.2	23.8	23.8	
Trigger band index at last pad division		33.04	32.96	32.04	31.96	61.06	60.94	62.06	61.94	91.08	90.92	90.08	89.92	
Column angular opening		5.0				7.5				7.5				
φ of division "0"		0.00	0.00	-2.50	-2.50	0.00	0.00	-3.75	-3.75	0.00	0.00	-3.75	-3.75	
Extra shift in +x (opposite φ)		wrt A mm 2.00	wrt A mm -2.00	wrt A mm 2.00	wrt A mm -2.00	2.00	-2.00	2.00	-2.00	2.00	-2.00	2.00	-2.00	
Index rightmost column division		-2	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1	Min -2
Index leftmost column division		2	2	3	3	1	1	2	2	1	1	2	2	Max 3
Angle of rightmost division		-10.00	-10.00	-12.50	-12.50	-7.50	-7.50	-11.25	-11.25	-7.50	-7.50	-11.25	-11.25	
Angle of leftmost division		10.00	10.00	12.50	12.50	7.50	7.50	11.25	11.25	7.50	7.50	11.25	11.25	
N cols total		6	6	7	7	4	4	5	5	4	4	5	5	
Area of one full pad, first row		cm <sup>2</sup> 43.2	cm <sup>2</sup> 43.2	cm <sup>2</sup> 66.8	cm <sup>2</sup> 66.8	288.2	288.2	152.1	152.1	142.5	142.5	294.1	294.1	
Area of one full pad, second row		cm <sup>2</sup> 64.6	cm <sup>2</sup> 64.6	cm <sup>2</sup> 55.6	cm <sup>2</sup> 55.6	235.8	235.8	189.2	189.2	358.3	358.3	287.5	287.5	
NPads		102	102	112	112	56	56	75	75	60	60	70	70	950
N Pad VMMs		2	2	2	2	1	1	2	2	1	1	2	2	20
N Pad TDSs		1	1	1	1	1	1	1	1	1	1	1	1	12
Whole gas volume pad Rate		/BC 1.66	/BC 1.66	/BC 1.67	/BC 1.67	0.69	0.69	0.71	0.71	0.37	0.37	0.38	0.38	10.96
VMM pad rate		/BC 0.83	/BC 0.83	/BC 0.84	/BC 0.84	0.69	0.69	0.35	0.35	0.37	0.37	0.19	0.19	
Prob >0 hits		/3 BCs 0.91	/3 BCs 0.91	/3 BCs 0.91	/3 BCs 0.91	0.87	0.87	0.65	0.65	0.66	0.66	0.43	0.43	
NPads for η<2.4		54	60	70	70	56	56	75	75	60	60	70	70	776
Gas volume pad Rate for η<2.4		/BC 0.91	/BC 0.95	/BC 1.00	/BC 1.03	0.69	0.69	0.71	0.71	0.37	0.37	0.38	0.38	8.18
Average pad occupancy for η<2.4		/BC 1.7%	/BC 1.6%	/BC 1.4%	/BC 1.5%	1.2%	1.2%	0.9%	0.9%	0.6%	0.6%	0.5%	0.5%	
Area of innermost pad for η<2.4		cm <sup>2</sup> 98.1	cm <sup>2</sup> 96.3	cm <sup>2</sup> 81.2	cm <sup>2</sup> 79.7	288.2	288.2	189.2	189.2	358.3	358.3	294.1	294.1	
Highest corr pad Rate for η<2.4		/BC 0.4%	/BC 0.4%	/BC 0.4%	/BC 0.4%	0.4%	0.4%	0.2%	0.2%	0.3%	0.3%	0.2%	0.2%	
Highest uncorr. pad Rate for η<2.4		/BC 1.5%	/BC 1.5%	/BC 1.3%	/BC 1.3%	1.6%	1.6%	1.1%	1.1%	0.6%	0.6%	0.5%	0.5%	
Highest total pad Rate for η<2.4		/BC 1.9%	/BC 1.9%	/BC 1.7%	/BC 1.7%	2.0%	2.0%	1.3%	1.3%	0.9%	0.9%	0.7%	0.7%	

**Wires**

		GL1P1	GL1P2	GL1P3	GL1P4	GL2P1	GL2P2	GL2P3	GL2P4	GL3P1	GL3P2	GL3P3	GL3P4	Total				
Minimum Width loss at B base	mm	12.5								12.5				1.8				
Location of central wire (index 0)	mm	0	0	1.35	1.35	0.45	0.45	0.9	0.9	0	1.35	0.45	0.9					
Index of leftmost wire (x<0)		-191	-310	-188	-310	-184	-310	-180	-310	-476	-477	-477	-477					
Location	mm	-343.8	-558.0	-337.1	-556.7	-330.8	-557.6	-323.1	-557.1	-856.8	-857.3	-858.2	-857.7	-570				
Actual loss	mm	11.8	10.7	11.8	12.1	11.4	11.2	12.3	11.6	12.3	11.8	10.9	11.4	-1026.0				
Wire length	mm	54.4	50.3	54.5	55.7	52.8	52.1	56.5	53.9	56.5	54.7	51.1	52.9	-1025.6				
Index of rightmost wire (x>0)		191	310	187	309	183	309	179	309	476	476	476	476	570				
Location	mm	343.8	558.0	338.0	557.6	329.9	556.7	323.1	557.1	856.8	858.2	857.3	857.7	569				
Actual loss	mm	11.8	10.7	10.9	11.2	12.3	12.1	12.3	11.6	12.3	10.9	11.8	11.4	570				
Wire length	mm	54.4	50.3	50.9	52.1	56.4	55.7	56.5	53.9	56.5	51.1	54.7	52.9	570				
N Wires one (half) gas volume		383	621	376	620	368	620	360	620	953	954	954	954	1141				
Index of leftmost full length wire		-136	-200	-137	-197	-136	-193	-136	-190	-321	-322	-322	-322	-489				
Index of rightmost full length wire		136	200	135	196	136	193	135	189	321	321	321	321	489				
Wires of full length		273	401	273	394	273	387	272	380	643	644	644	644	978				
Wires of partial length		110	220	103	226	95	233	88	240	310	310	310	310	164				
Group width	wires	20	20	20	20	20	20	20	20	20				20				
Area of standard group	cm <sup>2</sup>	161.6	301.7	151.9	311.4	142.2	321.1	132.5	330.8	421.1				406.1				
Width of 1st group	wires	70	20	65	5	60	10	60	15	20	5	10	15	20				
Area of first group	cm <sup>2</sup>	314.4	159.8	276.1	41.2	240.3	84.8	225.7	130.8	219.5	54.9	109.8	164.6	212.0				
Width of last group	wires	70	1	65	15	60	10	60	5	13	9	4	19	1				
Area of last group	cm <sup>2</sup>	314.4	8.0	276.1	123.5	240.3	84.8	225.7	43.6	142.7	98.8	43.9	208.6	10.6				
<b>N Wire groups</b>		<b>15</b>	<b>32</b>	<b>15</b>	<b>32</b>	<b>15</b>	<b>32</b>	<b>14</b>	<b>32</b>	<b>48</b>	<b>49</b>	<b>49</b>	<b>48</b>	<b>58</b>				
N Wire groups partial length		2	13	2	13	2	14	2	14	17	18	18	16	10				
N Wire groups full length		13	19	13	19	13	18	12	18	31	31	31	32	48				
Wire VMIs		1	1	1	1	1	1	1	1	1	1	1	1	1				
Wire ROC		1	1	1	1	1	1	1	1	1	1	1	1	1				
Group opening angle at top	mrad	16.02	16.02	16.02	16.02	16.02	16.02	16.02	16.02	10.43				8.81				
Group opening angle at bottom	mrad	25.55	26.05	26.05	26.57	26.57	27.11	27.11	27.11	15.78				10.32				
Gas volume wire Rate	MHz	33.5	35.0	36.4	37.9	25.1	25.1	25.1	25.1	12.4	12.4	12.4	12.4	292.68				
Per BC	/BC	0.84	0.87	0.91	0.95	0.63	0.63	0.63	0.63	0.31	0.31	0.31	0.31	7.32				
>0 hits prob.	/3 BCs	0.92	0.93	0.93	0.94	0.85	0.85	0.85	0.85	0.60	0.60	0.60	0.60					
VMM Hit rate /3 BCs	Mhit/s	1.01	1.05	1.09	1.14	0.75	0.75	0.75	0.75	0.37	0.37	0.37	0.37	8.78				
Average wire Rate	KHz	1048.0	1092.6	1138.1	1184.4	522.8	512.2	512.2	522.8	213.3	213.3	213.3	213.3					
	/BC	2.6%	2.7%	2.8%	3.0%	1.3%	1.3%	1.3%	1.3%	0.5%	0.5%	0.5%	0.5%					
Highest wire Rate	KHz	1510.2	1579.5	1650.6	1723.5	747.2	732.0	732.0	747.2	291.9	291.9	291.9	291.9					
	/BC	3.8%	3.9%	4.1%	4.3%	1.9%	1.8%	1.8%	1.9%	0.7%	0.7%	0.7%	0.7%					

<b>All</b>	<b>613</b>
r/o	554
no r/o	59
	12
	12

**Strips**

	GL1P1	GL1P2	GL1P3	GL1P4	GL2P1	GL2P2	GL2P3	GL2P4	GL3P1	GL3P2	GL3P3	GL3P4	Total
Staggering	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	
Width of first strip at A	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	
Loss of Height due to supports	59.0	59.0	52.0	52.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	
N strips theoretical	140.3	261.9	131.9	270.3	123.4	278.8	115.0	287.2					
N strips theoretical	407.5				365.5				352.5				
N strips	408				366				353				1127
N strips ( $\eta < 2.4$ )	275				366				353				994
N strips one module	1632				1464				1412				4508
N strips VMM one module	28				24				24				76
Channel Rate (Bkg + noise) /BC	7.2				2.9				1.4				46.1
Channel Rate for $\eta < 2.4$ /BC	4.17				2.90				1.41				33.9
Average strip occupancy for $\eta < 2.4$ /BC	1.5%				0.8%				0.4%				
Highest strip Rate for $\eta < 2.4$ /BC	4.3%				2.5%				1.3%				
N strip VMMs	7				6				6				76
Strips in Trigger band	12.72	12.72	12.76	12.76	12.72	12.72	12.76	12.76	12.72	12.72	12.76	12.76	
Strips to TDS	384	384	384	384	366	366	366	366	353	353	353	353	4412
N strip TDSs	3	3	3	3	3	3	3	3	3	3	3	3	144

	VMM1	VMM2	VMM3	VMM4	VMM5	VMM6
Bottom strip						
Top strip						
$\eta$ at bottom strip	2.764	2.686	2.506	2.354	2.223	2.108
$\eta$ at top strip	2.690	2.509	2.356	2.225	2.110	2.008
Hits /BC	0.59	1.49	1.30	1.13	0.99	0.81
>0 hits prob. /3 BCs	0.32	0.62	0.57	0.52	0.48	0.41
Bottom strip	25	89	153	217	281	344
Top strip	88	152	216	280	344	408
$\eta$ at bottom strip	1.841	1.765	1.694	1.631	1.571	1.515
$\eta$ at top strip	1.766	1.695	1.631	1.571	1.515	1.459
Hits /BC	0.61	0.54	0.48	0.43	0.39	0.35
>0 hits prob. /3 BCs	0.33	0.30	0.28	0.25	0.23	0.21
Bottom strip	47	111	175	239	303	366
Top strip	110	174	238	302	366	430
$\eta$ at bottom strip	1.478	1.428	1.382	1.339	1.297	1.259
$\eta$ at top strip	1.429	1.382	1.339	1.297	1.259	1.221
Hits /BC	0.32	0.29	0.26	0.23	0.21	0.19
>0 hits prob. /3 BCs	0.20	0.18	0.16	0.15	0.14	0.13
Bottom strip	34	98	162	226	290	353
Top strip	97	161	225	289	353	417
$\eta$ at bottom strip	1.505	1.428	1.382	1.339	1.297	1.259
$\eta$ at top strip	1.479	1.382	1.339	1.297	1.259	1.221
Hits /BC	0.18	0.29	0.26	0.23	0.21	0.19
>0 hits prob. /3 BCs	0.11	0.18	0.16	0.15	0.14	0.13
Bottom strip	1	175	302	430	567	704
Top strip	46	302	430	567	704	841
$\eta$ at bottom strip	1.901	1.630	1.571	1.515	1.459	1.403
$\eta$ at top strip	1.842	1.630	1.571	1.515	1.459	1.403
Hits /BC	0.48	0.43	0.39	0.35	0.31	0.27
>0 hits prob. /3 BCs	0.27	0.25	0.23	0.21	0.19	0.17

Hits	/BC	0.87	0.39	0.21
>0 hits prob.	/3 BCs	0.43	0.23	0.14
Bottom strip		345		
Top strip		408		
$\eta$ at bottom strip	VMM7	2.006		
$\eta$ at top strip		1.916		
Hits	/BC	0.77		
>0 hits prob.	/3 BCs	0.40		
<u>Sum of hits</u>	/BC	6.77	2.93	1.49

Basic properties of Large Confirm wedge												Total Wedge					
Quadruplet	QL1C								QL2C				QL3C				3
Layer	1	2	3	4	1	2	3	4	1	2	3	4					
Gas Volume	GL1C1	GL1C2	GL1C3	GL1C4	GL2C1	GL2C2	GL2C3	GL2C4	GL3C1	GL3C2	GL3C3	GL3C4	12				

**Geometry (Z, R refer to ATLAS reference system)**

Opening $\phi$ of Module	28.0				28.0				28.0								
1/Cos( $\phi/2$ )	1.0306				1.0306				1.0306								
Tan( $\phi/2$ )	0.2493				0.2493				0.2493								
H1 (without adapters)	mm	929.0				2271.0				3478.0				929.0			
H2 (without adapters)	mm	2261.0				3465.6				4078.6				4078.6			
H3 (without adapters)	mm									4631.0				4631.0			
H cutoff	mm									552.4							
H (without adapters)	mm	1332.0				1194.6				1153.0				3702.0			
H1 adapters	mm	925.0				2271.0				3478.0				3478.0			
H2 adapters	mm	2267.0				3471.6				4068.6				4068.6			
H3 adapters	mm									4637.0				4637.0			
H adapters	mm	1342.0				1200.6				590.6				3712.0			
A	mm	542.6				1211.8				1813.7							
B	mm	1206.8				1807.5				2115.0							
A adapters	mm	585.0				1294.3				1896.1							
B adapters	mm	1323.2				1892.9				2195.0							
Z of gas volume centre	mm	7791.6	7802.5	7813.5	7824.4	7791.6	7802.5	7813.5	7824.4	7791.6	7802.5	7813.5	7824.4				
Center of Wide support in GasVol. 1		1319.5	1346.5	1373.5	1400.5												
H1 Active	mm	943.0	1328.0	943.0	1355.0	943.0	1382.0	943.0	1409.0	2282.0		3489.0		943.0			
H2 Active	mm	1311.0	2247.0	1338.0	2247.0	1365.0	2247.0	1392.0	2247.0	3451.6		4085.7		4085.7			
H3 Active	mm											4617.0		4617.0			
H active	mm	368.0	919.0	395.0	892.0	422.0	865.0	449.0	838.0	1169.6		1128.0					
H active	mm	1304.0	1304.0	1304.0	1304.0	1304.0	1304.0	1304.0	1304.0								
$\eta$ min		2.495	1.969	2.476	1.970	2.458	1.972	2.440	1.973	1.565	1.566	1.567	1.569	1.306	1.307	1.308	1.309
$\eta$ max	IP-	2.821	2.482	2.823	2.464	2.824	2.446	2.825	2.428	1.954	1.956	1.957	1.958	1.555	1.556	1.557	1.559
$\eta$ min		2.482	1.957	2.464	1.958	2.445	1.959	2.427	1.961	1.553	1.554	1.556	1.557	1.295	1.296	1.297	1.298
$\eta$ intermediate	IP nom.	2.401	1.403	1.404	1.405	1.401	1.403	1.404	1.405	1.543	1.545	1.546	1.547	1.401	1.403	1.404	1.405
$\eta$ max		2.809	2.470	2.810	2.451	2.811	2.433	2.813	2.416	1.942	1.943	1.945	1.946	1.543	1.545	1.546	1.547
$\eta$ min		2.470	1.944	2.451	1.946	2.433	1.947	2.415	1.948	1.541	1.543	1.544	1.545	1.283	1.285	1.286	1.287
$\eta$ max	IP+	2.796	2.457	2.797	2.439	2.799	2.421	2.800	2.403	1.930	1.931	1.932	1.934	1.532	1.533	1.534	1.535
A Active	mm	490.8	682.8	490.8	696.3	490.8	709.8	490.8	723.2	1158.5		1760.4					
B Active	mm	674.4	1141.1	687.8	1141.1	701.3	1141.1	714.7	1141.1	1741.8		2058.0					
(Bactive-Aactive)/2	mm	91.8	229.1	98.5	222.4	105.2	215.7	111.9	208.9	291.6		148.8					
$\Delta\phi$ at $\eta$ min	rad	0.503	0.497	0.503	0.497	0.503	0.497	0.503	0.497	0.494		0.439					
$\Delta\phi$ at $\eta$ intermediate	rad											0.493					
$\Delta\phi$ at $\eta$ max	rad	0.509	0.503	0.509	0.503	0.509	0.503	0.509	0.502	0.497		0.494					
Gas volume active area	cm <sup>2</sup>	2144	8381	2328	8195	2515	8005	2707	7811	16961		21536		196073			
A Pads	mm	490.8				1158.5				1760.4							
B Pads	mm	1141.1				1741.8				2058.0							
H2 Pads	mm	2247.0				3451.6				4085.7							

	GL1C1	GL1C2	GL1C3	GL1C4	GL2C1	GL2C2	GL2C3	GL2C4	GL3C1	GL3C2	GL3C3	GL3C4	Wedge	
<b>Supports and dead areas</b>														
Number of long supports	1	4	1	4	2	4	2	4	5	5				
Number of buttons at A	4	6	4	6	4	6	4	6	10	16				
Number of buttons at B	6	10	6	10	6	10	6	10	15	18				
Total number of buttons (2 halves)	100	100	110	110	150				204					
Dead area due to buttons	0.7%	0.7%	0.8%	0.8%	0.7%				0.7%					
Dead area due to long supports	5.2%	5.2%	6.0%	6.0%	4.3%				4.4%					
Total dead areas	6.0%	6.0%	6.8%	6.8%	5.0%				5.2%					
<b>Areas, volumes, masses and rates of gas volumes, tracklets rates</b>														
Module overall area	m <sup>2</sup>			1.17	1.80				2.26				5.23	
Module "transparent" area	m <sup>2</sup>			1.05	1.70				2.15				4.90	
Volume of one gas volume	l			3.05	4.92				6.25				56.86	
Mass frames	Kg			10.39	9.87				10.23					
Mass active area	Kg			34.83	56.14				71.29					
Total mass	Kg			45.22	66.01				81.52				192.7	
Gas volume uncorrelated rate for all η's	/BC	0.39	0.75	0.42	0.72	0.45	0.70	0.47	0.67	0.48				7.23
Gas volume uncorrelated rate for η<2.4	/BC	0.75		0.72		0.70		0.67		0.48				5.51
Gas volume correlated rate for all η's	/BC	0.18	0.19	0.19	0.18	0.20	0.17	0.21	0.16	0.15				2.60
Gas volume correlated rate for η<2.4	/BC	0.19		0.18		0.17		0.16		0.15				1.82
Gas volume total rate for all η's	/BC	0.57	0.94	0.61	0.90	0.64	0.87	0.68	0.83	0.63				9.83
Gas volume total rate for η<2.4	/BC	0.94		0.90		0.87		0.83		0.63				7.33
<b>3 out of 4 tracklets in quadruplet</b>		QL1C			QL2C				QL3C				Total	
Uncorelated max Rate in pad	/BC	1.3E-04			1.2E-04				1.0E-05					
Uncorelatedr Rate in volume	/BC	1.3E-02			6.8E-03				5.2E-04				0.020	
Correlated Rate in pad	/BC	4.5E-03			3.4E-03				2.6E-03					
Correlated Rate in gas volume	/BC	0.369			0.150				0.131				0.650	
Correlated Rate in volume for η<2.4	/BC	0.175			0.150				0.131				0.456	

**Pads**

		GL1C1	GL1C2	GL1C3	GL1C4	GL2C1	GL2C2	GL2C3	GL2C4	GL3C1	GL3C2	GL3C3	GL3C4	Wedge
Origin of pad		935.7	935.7	895.7	895.7	935.7	935.7	895.7	895.7	935.7	935.7	895.7	895.7	
Pad height		85.07	85.07	85.30	85.30	85.07	85.07	85.30	85.30	85.07	85.07	85.30	85.30	
Index of first row division		1 5	1 5	1 6	1 7	16 16	17 17			31 31	31 31			
H of first row division		1020.8	1020.8	981.0	981.0	2296.8	2296.8	2345.9	2345.9	3572.8	3572.8	3540.1	3540.1	
Height of first pad row		wrt A mm 77.8	wrt A mm 77.8	38.0	38.0	14.8	14.8	63.9	63.9	83.8	83.8	51.1	51.1	
First two rows are merged		bool				Yes	Yes							
Index of first (merged) row division		1	1	1	1	17	17	17	17	31	31	31	31	Row #
H of first (merged) row division		wrt IP mm 1020.8	wrt IP mm 1020.8	981.0	981.0	2381.8	2381.8	2345.9	2345.9	3572.8	3572.8	3540.1	3540.1	Min 0
Height of first (merged) row		wrt A mm 77.8	wrt A mm 77.8	38.0	38.0	99.8	99.8	63.9	63.9	83.8	83.8	51.1	51.1	
Index of last row division		15	15	15	15	29	29	29	29	43	43	43	43	
H of last row division		wrt IP mm 2211.7	wrt IP mm 2211.7	2175.3	2175.3	3402.6	3402.6	3369.5	3369.5	4593.6	4593.6	4563.8	4563.8	
Height of last pad row		wrt B mm 35.3	wrt B mm 35.3	71.7	71.7	49.0	49.0	82.1	82.1	23.4	23.4	53.2	53.2	L1 43
last two rows are merged		bool								Yes	Yes			L2 43
Index of last (merged) row division		wrt IP mm 15	wrt IP mm 15	15	15	29	29	29	29	42	42	43	43	L3 44
Height of last (merged) row		wrt B mm 35.3	wrt B mm 35.3	71.7	71.7	49.0	49.0	82.1	82.1	108.5	108.5	53.2	53.2	L4 44
Rows total		16	16	16	16	14	14	14	14	13	13	14	14	Max 44
Trigger band index at A		1.19	1.16	1.13	1.09	32.69	32.62	32.54	32.47	61.09	60.98	60.86	60.75	Min 1
Trigger band index at B		31.37	31.29	31.22	31.15	60.21	60.10	59.98	59.87	87.63	87.48	87.33	87.18	Max 88
N Trigger bands in height		31	31	31	31	29	29	28	27	27	28	28	28	
Location of 1st Trigger band boundary		wrt A mm 35.3	wrt A mm 35.3	38.0	38.0	14.8	14.8	21.2	21.2	41.2	41.2	8.5	8.5	
Trigger band index at first pad division		3.02	2.98	2.02	1.99	35.04	34.96	34.04	33.96	63.06	62.94	62.06	61.95	
Location of last Trigger band boundary		wrt B mm 35.3	wrt B mm 35.3	29.1	29.1	6.4	6.4	39.4	39.4	23.4	23.4	10.6	10.6	
Trigger band index at last pad division		31.04	30.97	30.04	29.97	59.06	58.95	58.06	57.95	85.08	84.93	86.08	85.93	
Column angular opening		5.0				7.5				7.5				
φ of division "0"		° -1.25	° -3.75	° -1.25	° -3.75	° -1.88	° -5.63	° -1.88	° -5.63	° -1.88	° -5.63	° -1.88	° -5.63	
Extra shift in +x (opposite φ)		mm 2.00	mm -2.00	mm 2.00	mm -2.00	mm 2.00	mm -2.00	mm 2.00	mm -2.00	mm 2.00	mm -2.00	mm 2.00	mm -2.00	
Index rightmost column division		-2	-1	-2	-1	-1	0	-1	0	-1	0	-1	0	Min -2
Index leftmost column division		2	3	2	3	1	2	1	2	1	2	1	2	Max 3
Angle of rightmost division		° -11.25	° -8.75	° -11.25	° -8.75	° -9.38	° -5.63	° -9.38	° -5.63	° -9.38	° -5.63	° -9.38	° -5.63	
Angle of leftmost division		° 8.75	° 11.25	° 8.75	° 11.25	° 5.63	° 9.38	° 5.63	° 9.38	° 5.63	° 9.38	° 5.63	° 9.38	
N cols total		6	6	6	6	4	4	4	4	4	4	4	4	
Area of one full pad, first row		cm <sup>2</sup> 63.6	cm <sup>2</sup> 63.6	cm <sup>2</sup> 31.1	cm <sup>2</sup> 31.1	cm <sup>2</sup> 289.2	cm <sup>2</sup> 289.2	cm <sup>2</sup> 185.0	cm <sup>2</sup> 185.0	cm <sup>2</sup> 368.6	cm <sup>2</sup> 368.6	cm <sup>2</sup> 225.0	cm <sup>2</sup> 225.0	
Area of one full pad, second row		cm <sup>2</sup> 69.6	cm <sup>2</sup> 69.6	cm <sup>2</sup> 69.8	cm <sup>2</sup> 69.8	cm <sup>2</sup> 246.4	cm <sup>2</sup> 246.4	cm <sup>2</sup> 247.1	cm <sup>2</sup> 247.1	cm <sup>2</sup> 374.4	cm <sup>2</sup> 374.4	cm <sup>2</sup> 375.4	cm <sup>2</sup> 375.4	
NPads		96	96	96	96	56	56	56	56	52	52	56	56	824
N Pad VMMs		2	2	2	2	1	1	1	1	1	1	1	1	16
N Pad TDSs		1	1	1	1	1	1	1	1	1	1	1	1	12
Whole gas volume pad Rate		/BC 1.65	/BC 1.65	/BC 1.65	/BC 1.65	/BC 0.71	/BC 0.71	/BC 0.71	/BC 0.71	/BC 0.38	/BC 0.38	/BC 0.38	/BC 0.38	10.95
VMM pad rate		/BC 0.83	/BC 0.83	/BC 0.83	/BC 0.83	/BC 0.71	/BC 0.71	/BC 0.71	/BC 0.71	/BC 0.38	/BC 0.38	/BC 0.38	/BC 0.38	
Prob >0 hits		/3 BCs 0.91	/3 BCs 0.91	/3 BCs 0.91	/3 BCs 0.91	/3 BCs 0.87	/3 BCs 0.87	/3 BCs 0.87	/3 BCs 0.87	/3 BCs 0.67	/3 BCs 0.67	/3 BCs 0.67	/3 BCs 0.67	
NPads for η<2.4		60	60	54	48	56	56	56	56	52	52	56	56	662
Gas volume pad Rate for η<2.4		/BC 1.03	/BC 0.99	/BC 0.95	/BC 0.91	/BC 0.71	/BC 0.71	/BC 0.71	/BC 0.71	/BC 0.38	/BC 0.38	/BC 0.38	/BC 0.38	8.21
Average pad occupancy for η<2.4		/BC 1.7%	/BC 1.6%	/BC 1.8%	/BC 1.9%	/BC 1.3%	/BC 1.3%	/BC 1.3%	/BC 1.3%	/BC 0.7%	/BC 0.7%	/BC 0.7%	/BC 0.7%	
Area of innermost pad for η<2.4		cm <sup>2</sup> 96.8	cm <sup>2</sup> 98.7	cm <sup>2</sup> 100.9	cm <sup>2</sup> 102.8	cm <sup>2</sup> 289.2	cm <sup>2</sup> 289.2	cm <sup>2</sup> 247.1	cm <sup>2</sup> 247.1	cm <sup>2</sup> 374.4	cm <sup>2</sup> 374.4	cm <sup>2</sup> 375.4	cm <sup>2</sup> 375.4	
Highest corr pad Rate for η<2.4		/BC 0.5%	/BC 0.5%	/BC 0.4%	/BC 0.4%	/BC 0.4%	/BC 0.4%	/BC 0.3%	/BC 0.3%	/BC 0.3%	/BC 0.3%	/BC 0.3%	/BC 0.3%	
Highest uncorr. pad Rate for η<2.4		/BC 1.6%	/BC 1.6%	/BC 1.6%	/BC 1.5%	/BC 1.6%	/BC 1.6%	/BC 1.4%	/BC 1.4%	/BC 0.7%	/BC 0.7%	/BC 0.7%	/BC 0.7%	
Highest total pad Rate for η<2.4		/BC 2.1%	/BC 2.0%	/BC 2.0%	/BC 2.0%	/BC 2.0%	/BC 2.0%	/BC 1.7%	/BC 1.7%	/BC 0.9%	/BC 0.9%	/BC 0.9%	/BC 0.9%	

Wires																		
		GL1C1	GL1C2	GL1C3	GL1C4	GL2C1	GL2C2	GL2C3	GL2C4	GL3C1	GL3C2	GL3C3	GL3C4	Total				
Minimum Width loss at B base	mm	12.5								12.5				1.8				
Location of central wire (index 0)	mm	0	0	1.35	1.35	0.45	0.45	0.9	0.9	0	1.35	0.45	0.9	0	1.35	0.45	0.9	
Index of leftmost wire (x<0)		-180	-310	-184	-310	-188	-310	-192	-310	-476	-477	-477	-477	-570	-571	-570	-571	
Location	mm	-324.0	-558.0	-329.9	-556.7	-338.0	-557.6	-344.7	-557.1	-856.8	-857.3	-858.2	-857.7	-1026.0	-1026.5	-1025.6	-1026.9	
Actual loss	mm	11.4	10.7	12.3	12.1	10.9	11.2	10.9	11.6	12.3	11.8	10.9	11.4	1.2	0.7	1.6	0.3	
Wire length	mm	52.8	50.3	56.4	55.7	50.9	52.1	50.8	53.9	56.5	54.7	51.1	52.9	543.3	541.5	545.1	539.7	
Index of rightmost wire (x>0)		180	310	183	309	187	309	191	309	476	476	476	476	570	569	570	570	
Location	mm	324.0	558.0	330.8	557.6	337.1	556.7	344.7	557.1	856.8	858.2	857.3	857.7	1026.0	1025.6	1026.5	1026.9	
Actual loss	mm	11.4	10.7	11.4	11.2	11.8	12.1	10.9	11.6	12.3	10.9	11.8	11.4	1.2	1.6	0.7	0.3	
Wire length	mm	52.8	50.3	52.8	52.1	54.5	55.7	50.8	53.9	56.5	51.1	54.7	52.9	543.3	545.1	541.5	539.7	
N Wires one (half) gas volume		361	621	368	620	376	620	384	620	953	954	954	954	1141	1141	1141	1142	
Index of leftmost full length wire		-136	-189	-137	-194	-136	-197	-136	-201	-321	-322	-322	-322	-489	-489	-489	-489	
Index of rightmost full length wire		136	189	135	192	136	196	135	200	321	321	321	321	489	488	488	488	
Wires of full length		273	379	273	387	273	394	272	402	643	644	644	644	979	978	978	978	
Wires of partial length		88	242	95	233	103	226	112	218	310	310	310	310	162	163	163	164	
Group width	wires	20	20	20	20	20	20	20	20	20				20				
Area of standard group	cm <sup>2</sup>	132.5	330.8	142.2	321.1	151.9	311.4	161.6	301.7	421.1				406.1				
Width of 1st group	wires	60	20	60	5	65	10	70	15	20	5	10	15	20	5	10	15	
Area of first group	cm <sup>2</sup>	225.7	174.4	240.3	42.4	276.1	82.4	314.4	119.9	219.5	54.9	109.8	164.6	212.0	53.0	106.0	159.0	
Width of last group	wires	60	1	60	15	65	10	70	5	13	9	4	19	1	16	11	7	
Area of last group	cm <sup>2</sup>	225.7	8.7	240.3	127.2	276.1	82.4	314.4	40.0	142.7	98.8	43.9	208.6	10.6	169.6	116.6	74.2	
<b>N Wire groups</b>		<b>15</b>	<b>32</b>	<b>15</b>	<b>32</b>	<b>15</b>	<b>32</b>	<b>15</b>	<b>32</b>	<b>48</b>	<b>49</b>	<b>49</b>	<b>48</b>	<b>58</b>	<b>58</b>	<b>58</b>	<b>58</b>	<b>All</b>
N Wire groups partial length		2	14	2	14	2	14	2	13	17	18	18	16	10	10	10	10	r/o
N Wire groups full length		13	18	13	18	13	18	13	19	31	31	31	32	48	48	48	48	no r/o
Wire VMMS		1		1		1		1		1	1	1	1	1	1	1	1	12
Wire ROC		1		1		1		1		1	1	1	1	1	1	1	1	12
Group opening angle at top	mrad	16.02		16.02		16.02		16.02		10.43				8.81				
Group opening angle at bottom	mrad	27.11		26.57		26.05		25.55		15.78				10.32				
Gas volume wire Rate	MHz	38.1		36.6		35.2		33.7		25.7				13.0				298.36
Per BC	/BC	0.95		0.91		0.88		0.84		0.64				0.32				7.46
>0 hits prob.	/3 BCs	0.94		0.94		0.93		0.92		0.85				0.62				
VMM Hit rate /3 BCs	Mhit/s	1.14		1.10		1.05		1.01		0.77				0.39				8.95
Average wire Rate	KHz	1189.2		1143.5		1098.6		1054.5		536.2				223.6				
	/BC	3.0%		2.9%		2.7%		2.6%		1.3%				0.6%				
Highest wire Rate	KHz	1730.5		1658.4		1588.1		1519.5		766.2				306.0				
	/BC	4.3%		4.1%		4.0%		3.8%		1.9%				0.8%				



**Strips**

	GL1C1	GL1C2	GL1C3	GL1C4	GL2C1	GL2C2	GL2C3	GL2C4	GL3C1	GL3C2	GL3C3	GL3C4	Total
Staggering	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	
Width of first strip at A	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	
Loss of Height due to supports	52.0	52.0	59.0	59.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	
N strips theoretical	115.0	287.2	123.4	278.8	131.9	270.3	140.3	261.9					
N strips theoretical			407.5								352.5		
N strips			408								353		1127
N strips ( $\eta < 2.4$ )			275								353		994
N strips one module			1632								1412		4508
N strips VMM one module			28								24		76
Channel Rate (Bkg + noise)	/BC		7.1								1.5		46.7
Channel Rate for $\eta < 2.4$	/BC		4.19								1.48		34.6
Average strip occupancy for $\eta < 2.4$	/BC		1.5%								0.4%		
Highest strip Rate for $\eta < 2.4$	/BC		4.5%								1.3%		
N strip VMMs			7								6		76
Strips in Trigger band	13.29	13.29	13.33	13.33	13.29	13.29	13.33	13.33	13.29	13.29	13.33	13.33	
Strips to TDS	384	384	384	384	366	366	366	366	353	353	353	353	4412
N strip TDSs	3	3	3	3	3	3	3	3	3	3	3	3	144

	VMM1	VMM2	VMM3	VMM4	VMM5	VMM6
Bottom strip						
Top strip						
$\eta$ at bottom strip	2.807	2.730	2.549	2.397	2.266	2.151
$\eta$ at top strip	2.733	2.552	2.399	2.268	2.153	2.050
Hits	0.58	1.47	1.29	1.13	1.00	0.48
>0 hits prob.	0.31	0.61	0.57	0.52	0.48	0.26
Bottom strip						
Top strip						
$\eta$ at bottom strip	2.807	2.730	2.549	2.397	2.266	2.151
$\eta$ at top strip	2.733	2.552	2.399	2.268	2.153	2.050
Hits	0.58	1.47	1.29	1.13	1.00	0.48
>0 hits prob.	0.31	0.61	0.57	0.52	0.48	0.26
Bottom strip						
Top strip						
$\eta$ at bottom strip	2.807	2.730	2.549	2.397	2.266	2.151
$\eta$ at top strip	2.733	2.552	2.399	2.268	2.153	2.050
Hits	0.58	1.47	1.29	1.13	1.00	0.48
>0 hits prob.	0.31	0.61	0.57	0.52	0.48	0.26
Bottom strip						
Top strip						
$\eta$ at bottom strip	2.807	2.730	2.549	2.397	2.266	2.151
$\eta$ at top strip	2.733	2.552	2.399	2.268	2.153	2.050
Hits	0.58	1.47	1.29	1.13	1.00	0.48
>0 hits prob.	0.31	0.61	0.57	0.52	0.48	0.26
Bottom strip						
Top strip						
$\eta$ at bottom strip	2.807	2.730	2.549	2.397	2.266	2.151
$\eta$ at top strip	2.733	2.552	2.399	2.268	2.153	2.050
Hits	0.58	1.47	1.29	1.13	1.00	0.48
>0 hits prob.	0.31	0.61	0.57	0.52	0.48	0.26

Hits	/BC	0.88	0.40	0.22
>0 hits prob.	/3 BCs	0.44	0.24	0.14
Bottom strip		345		
Top strip		408		
$\eta$ at bottom strip	VMM7	2.049		
$\eta$ at top strip		1.958		
Hits	/BC	0.78		
>0 hits prob.	/3 BCs	0.40		
<i>Sum of hits</i>	/BC	6.75	3.01	1.56

Summary										
Small Wedges			Large Wedges			Total				
Pivot	Confirm	Sector	Pivot	Confirm	Sector	1 octant	1 side	2 sides		
<b>Large assemblies</b>										
Gas Volumes	3	3	6	3	3	6	12	96	192	
Detectors	12	12	24	12	12	24	48	384	768	
Quadruplets (modules)	3	3	6	3	3	6	12	96	192	
<b>Areas, volumes and masses</b>										
Active area Module 1	m <sup>2</sup>	2.50	2.50	5.00	4.21	4.21	8.42	13.4	107.4	214.7
Active area Module 2	m <sup>2</sup>	4.04	4.04	8.08	6.78	6.78	13.57	21.7	173.2	346.4
Active area Module 3	m <sup>2</sup>	4.70	4.70	9.40	8.61	8.61	17.23	26.6	213.0	426.1
<b>Total active area</b>	m <sup>2</sup>	<b>11.24</b>	<b>11.24</b>	<b>22.49</b>	<b>19.61</b>	<b>19.61</b>	<b>39.21</b>	<b>61.7</b>	<b>493.6</b>	<b>987.2</b>
"Transparent" wedge area	m <sup>2</sup>	2.81	2.81	5.62	4.90	4.90	9.80	15.42	123.4	246.8
Total wedge area	m <sup>2</sup>	3.09	3.09	6.17	5.23	5.23	10.47	16.64	133.1	266.3
<b>Gas Volume in wedge</b>	l	<b>32.6</b>	<b>32.6</b>	<b>65.2</b>	<b>56.9</b>	<b>56.9</b>	<b>113.7</b>	<b>178.9</b>	<b>1431.4</b>	<b>2862.9</b>
Mass of quadruplets	Kg	118.5	118.5	236.9	192.7	192.7	385.5	622.4	4979.4	9958.7
Mass of external frames	Kg	27.4	27.4	54.8	34.6	34.6	69.1	123.9	991.0	1982.0
<b>Total Mass of Wedge</b>	Kg	<b>145.8</b>	<b>145.8</b>	<b>291.7</b>	<b>227.3</b>	<b>227.3</b>	<b>454.6</b>	<b>746.3</b>	<b>5970.4</b>	<b>11940.7</b>
<b>Pad division</b>										
First row		0	1	0	0	0	0	0	0	
Last row		45	47	46	44	47	44	47	44	
Rgihmost column		-1	-1	-2	-2	-2	-2	-2	-2	
Leftmost column		2	3	4	4	4	4	4	4	
Smallest Trigger Band		1	2	1	1	1	1	1	1	
Largest Trigger Band		90	96	92	88	96	88	96	88	
<b>Electronic Channels</b>										
<b>Wire Groups</b>										
D0 (no readout)		37	38	75	59	60	119	194	1552	3104
D1		77	77	154	128	128	256	410	3280	6560
D2		117	117	234	194	194	388	622	4976	9952
D3		151	151	302	232	232	464	766	6128	12256
<b>Total read out</b>		<b>345</b>	<b>345</b>	<b>690</b>	<b>554</b>	<b>554</b>	<b>1108</b>	<b>1798</b>	<b>14384</b>	<b>28768</b>
Total, read out or not		382	383	765	613	614	1227	1992	15936	31872
<b>Strips</b>										
D1		1624	1624	3248	1632	1632	3264	6512	52096	104192
D2		1460	1460	2920	1464	1464	2928	5848	46784	93568
D3		1228	1228	2456	1412	1412	2824	5280	42240	84480
<b>Total read out</b>		<b>4312</b>	<b>4312</b>	<b>8624</b>	<b>4508</b>	<b>4508</b>	<b>9016</b>	<b>17640</b>	<b>141120</b>	<b>282240</b>
<b>Pads</b>										
D1		238	280	518	428	384	812	1330	10640	21280
D2		150	186	336	262	224	486	822	6576	13152
D3		126	162	288	260	216	476	764	6112	12224
<b>Total read out</b>		<b>514</b>	<b>628</b>	<b>1142</b>	<b>950</b>	<b>824</b>	<b>1774</b>	<b>2916</b>	<b>23328</b>	<b>46656</b>
Triggering		405	508	913	776	662	1438	2351	18808	37616
<b>All channels</b>										
D1		1939	1981	3920	2188	2144	4332	8252	66016	132032
D2		1727	1763	3490	1920	1882	3802	7292	58336	116672
D3		1505	1541	3046	1904	1860	3764	6810	54480	108960
<b>Total</b>		<b>5171</b>	<b>5285</b>	<b>10456</b>	<b>6012</b>	<b>5886</b>	<b>11898</b>	<b>22354</b>	<b>178832</b>	<b>357664</b>

Readout elements and format, Rates, bandwidth

**FEBoards**

Boards in detector	1	1
TDS in FEBoard	1	3
ROC in FEBoard	1	1
VMM in FEBoard	3	7

**BandWidth (in Mb/s)**

Max rate in HIB	1	640	Mb/s
Rate in e-link	2	80	Mb/s
Max rate in fiber	3	3.2	Gb/s
Bit coding		1.25	8b/10b

**Elements**

P+W GBTperSuperLayer	1
S GBTperSuperLayer	1
Pad trigger GBT link /sector	2
E-link conf per FEBoard	1
Channels in VMM	64
Channels in TDS	128
Channels in ROC	512
VMM per ROC	8
Max capacity per GBT	41
Max links per GBT	8
FELIX per sector	1
FELIX data channels	23

**Hit**

Neighbour flag	1
error flag	1
Channel address	6
Amplitude	10
VMM Id	3
Relative Bcid	3
Time	8
Bits Per hit	32

**Hit from VMM**

Bits Per VMM hit	40
------------------	----

**FELIX input header**

E-link SOP	2,3
Stream Id	8
Flags	4
Length	12
E-link L1ID	16
E-link BCID	12
(reserved)	4
Checksum	16
(reserved)	8
Total length	88

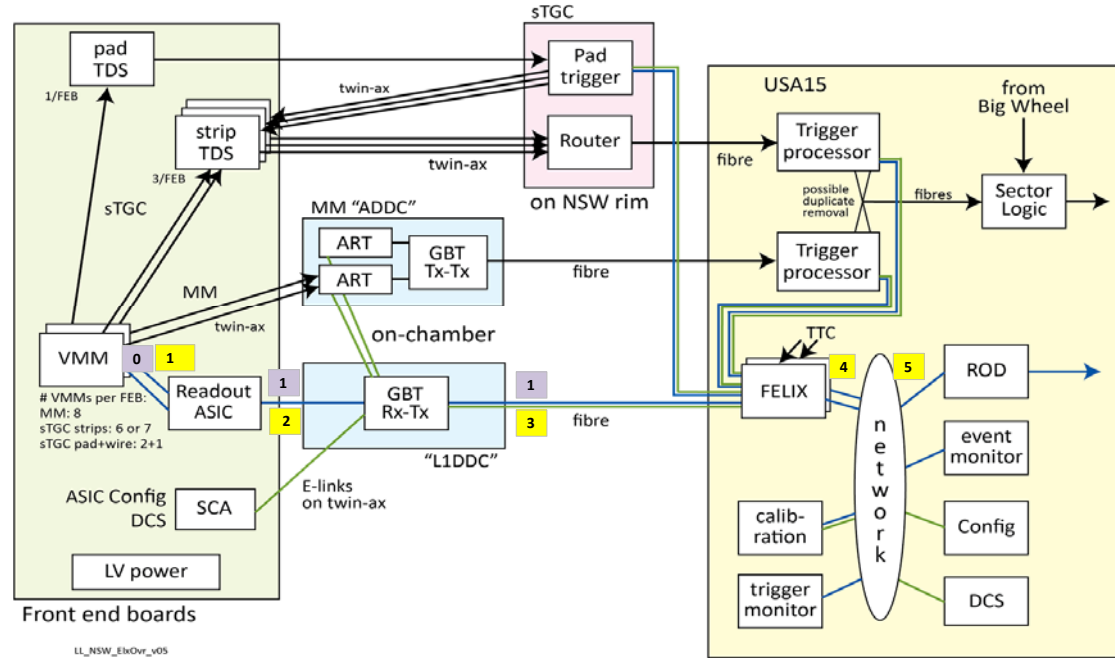
**FELIX output header**

Packet length	4
Status/Error f	16
GBT Id	26
E-link Id	6
Header length	128

**Rates and latencies**

Level 0 Rate	1000	KHz
Level 1 Rate	400	KHz
Level 0 Latency	10	us
Level 1 Latency	60	us
VMM dead time	0.2	us
#BC's read out	3	
Max BC in VMM	8	
<b>L1 pipelining</b>		
Required Depth	60.0	
Actual Depth	128	

NSW Electronics Trigger & DAQ dataflow



**Detector, channels, boards and links**

	Small Sector											Large Sector											Total					
	Pivot (1 plane)				Confirm (1 plane)				Sector 4+4 pl.	Pivot (1 plane)				Confirm (1 plane)				Sector 4+4 pl.	1 Side	2 Sides								
	D1	D2	D3	Total	D1	D2	D3	Total		D1	D2	D3	Total	D1	D2	D3	Total											
<b>Detector Hit Rates</b>																												
Total /BC	0.95	0.38	0.17	1.50	0.95	0.37	0.16	1.48	11.95	1.51	0.62	0.30	2.43	1.51	0.63	0.32	2.46	19.55	252.0	504.0								
<b>ELX Channel Rates</b>																												
Pads /BC	1.04	0.43	0.21	1.7	1.05	0.43	0.21	1.7	13.4	1.67	0.70	0.37	2.7	1.65	0.71	0.38	2.7	21.9	282.9	565.8								
Wires /BC	0.53	0.39	0.17	1.1	0.53	0.38	0.17	1.1	8.7	0.89	0.63	0.31	1.8	0.90	0.64	0.32	1.9	14.8	187.5	375.0								
Strips /BC	4.52	1.83	0.83	7.2	4.52	1.77	0.78	7.1	57.0	7.15	2.93	1.45	11.5	7.14	3.01	1.52	11.7	92.8	1198.6	2397.1								
Total /BC	6.1	2.6	1.2	9.9	6.1	2.6	1.2	9.8	79.1	9.7	4.3	2.1	16.1	9.7	4.4	2.2	16.3	129.5	1669.0	3338.0								
<b>FEBoards</b>																												
Pads+Wires	1	1	1	3	1	1	1	3	24	1	1	1	3	1	1	1	3	24	384	768								
Strips	1	1	1	3	1	1	1	3	24	1	1	1	3	1	1	1	3	24	384	768								
Total	2	2	2	6	2	2	2	6	48	2	2	2	6	2	2	2	6	48	768	1536								
<b>VMM in FEBoards</b>																												
Pads+Wires	3	3	3	9	3	3	3	9	72	3	3	3	9	3	3	3	9	72	1152	2304								
Strips	7	7	7	21	7	7	7	21	168	7	7	7	21	7	7	7	21	168	2688	5376								
Total	10	10	10	30	10	10	10	30	240	10	10	10	30	10	10	10	30	240	3840	7680								
<b>TDS</b>																												
Pads	1	1	1	3	1	1	1	3	24	1	1	1	3	1	1	1	3	24	384	768								
Strips	3	3	3	9	3	3	3	9	72	3	3	3	9	3	3	3	9	72	1152	2304								
Total	4	4	4	12	4	4	4	12	96	4	4	4	12	4	4	4	12	96	1536	3072								
<b>Readout Controllers (ROC)</b>																												
Pads+Wires	1	1	1	3	1	1	1	3	24	1	1	1	3	1	1	1	3	24	384	768								
Strips	1	1	1	3	1	1	1	3	24	1	1	1	3	1	1	1	3	24	384	768								
Total	2	2	2	6	2	2	2	6	48	2	2	2	6	2	2	2	6	48	768	1536								
<b>Number of GBTs</b>																												
Pads+Wires				1				1	8				1				1	8	128	256								
Strips				1				1	8				1				1	8	128	256								
Pad Trigger								2	2								2	2	32	64								
Total				2				2	18				2				2	18	288	576								
<b>E links to GBT</b>																												
	2		Pad + Wire GBT, Large or Small, Pivot or Confirm										Strip GBT, Large or Small, Pivot or Confirm										Wedge S or L		1 Side		2 Sides	
	D1	D2	D3	Total	Pool assignment					D1	D2	D3	Total	Pool assignment														
					1	2	3	4	5	1	2	3	4	5														
Conf @ 80 Mb/s	1	1	1	3	3					3																		
Data @ 160 Mb/s	0	2	2	4		2	2																					
Data @ 320 Mb/s	2	0	0	2				1	1			2	2	2														
Total links	3	3	3	9						5	3	3	11						160	2560	5120							

VMM

	Small Sector										Large Sector										Total	
	Pivot (1 plane)				Confirm (1 plane)				Sector 4+4 pl.	Pivot (1 plane)				Confirm (1 plane)				Sector 4+4 pl.	1 Side	2 Sides		
	D1	D2	D3	Total	D1	D2	D3	Total		D1	D2	D3	Total	D1	D2	D3	Total					
<b>Connected VMMs</b>																						
Pads	2	1	1	4	2	1	1	4	32	2	1.5	1.5	5	2	1	1	4	36	544	1088		
Strips	7	6	5	18	7	6	5	18	144	7	6	6	19	7	6	6	19	152	2368	4736		
Wires	1	1	1	3	1	1	1	3	24	1	1	1	3	1	1	1	3	24	384	768		
Total	10	8	7	25	10	8	7	25	200	10	8.5	8.5	27	10	8	8	26	212	3296	6592		
<b>Hits in VMM</b>																						
Pads VMM 1 /BC	0.52	0.43	0.21	1.68	0.53	0.43	0.21	1.69	13.4	0.83	0.52	0.28	2.47	0.83	0.71	0.38	2.74	20.8				
Pads VMM 2 /BC	0.52				0.53					0.83				0.83								
Wires /BC	0.53	0.39	0.17	1.10	0.53	0.39	0.17	1.10	8.8	0.89	0.63	0.31	1.83	0.89	0.63	0.31	1.83	14.6				
Strip VMM 1 /BC	0.35	0.30	0.17	7.20	0.35	0.29	0.16	7.11	57.2	0.59	0.48	0.18	11.56	0.58	0.49	0.18	11.69	93.0				
Strip VMM 2 /BC	0.95	0.39	0.20		0.96	0.38	0.19			1.49	0.61	0.32		1.47	0.62	0.33						
Strip VMM 3 /BC	0.83	0.34	0.18		0.83	0.33	0.17			1.30	0.54	0.29		1.29	0.55	0.30						
Strip VMM 4 /BC	0.72	0.30	0.16		0.72	0.30	0.15			1.13	0.48	0.26		1.13	0.50	0.27						
Strip VMM 5 /BC	0.63	0.27	0.14		0.63	0.26	0.13			0.99	0.43	0.23		1.00	0.44	0.25						
Strip VMM 6 /BC	0.55	0.24			0.55	0.23				0.87	0.39	0.21		0.88	0.40	0.22						
Strip VMM 7 /BC	0.49				0.48					0.77				0.78								
Total	6.1	2.7	1.2	10.0	6.1	2.6	1.2	9.9	79.4	9.7	4.1	15.9	9.7	4.3	2.2	16.3	128.5	1663.1	3326.2			
<b>Probability &gt;0 hit in VMM for 3 BCs</b>																						
Pads VMM 1	0.78	0.71	0.45	0.78	0.71	0.45	0.91	0.76	0.54	0.91	0.87	0.67										
Pads VMM 2	0.78			0.78			0.91			0.91												
Wires	0.80	0.69	0.41	0.80	0.69	0.41	0.93	0.85	0.60	0.93	0.85	0.60										
Strip VMM 1	0.20	0.18	0.11	0.21	0.18	0.11	0.32	0.27	0.11	0.31	0.28	0.12										
Strip VMM 2	0.46	0.23	0.13	0.47	0.23	0.13	0.62	0.33	0.20	0.61	0.34	0.20										
Strip VMM 3	0.42	0.21	0.12	0.42	0.20	0.11	0.57	0.30	0.18	0.57	0.31	0.19										
Strip VMM 4	0.38	0.19	0.11	0.38	0.18	0.10	0.52	0.28	0.16	0.52	0.28	0.17										
Strip VMM 5	0.34	0.17	0.10	0.34	0.17	0.10	0.48	0.25	0.15	0.48	0.26	0.16										
Strip VMM 6	0.31	0.16		0.30	0.15		0.43	0.23	0.14	0.44	0.24	0.14										
Strip VMM 7	0.28			0.27			0.40			0.40												
<b>ln(Probability 0 hit) in VMM for 3 BCs</b>																						
Pads VMM 1	-1.52	-1.26	-0.60	-1.54	-1.25	-0.60	-2.43	-1.41	-0.78	-2.41	-2.06	-1.11										
Pads VMM 2	-1.52			-1.54			-2.43			-2.41												
Wires	-1.59	-1.16	-0.52	-1.59	-1.16	-0.52	-2.67	-1.88	-0.93	-2.67	-1.88	-0.93										
Strip VMM 1	-0.23	-0.20	-0.12	-0.23	-0.20	-0.12	-0.39	-0.32	-0.12	-0.38	-0.32	-0.12										
Strip VMM 2	-0.62	-0.26	-0.14	-0.63	-0.26	-0.13	-0.96	-0.40	-0.22	-0.95	-0.41	-0.23										
Strip VMM 3	-0.54	-0.23	-0.13	-0.55	-0.23	-0.12	-0.84	-0.36	-0.20	-0.84	-0.37	-0.21										
Strip VMM 4	-0.48	-0.21	-0.12	-0.47	-0.20	-0.11	-0.74	-0.32	-0.18	-0.74	-0.33	-0.19										
Strip VMM 5	-0.42	-0.19	-0.11	-0.41	-0.18	-0.10	-0.65	-0.29	-0.16	-0.65	-0.30	-0.17										
Strip VMM 6	-0.37	-0.17		-0.36	-0.16		-0.57	-0.26	-0.15	-0.58	-0.27	-0.16										
Strip VMM 7	-0.32			-0.32			-0.50			-0.51												

**Data rate in HIB**

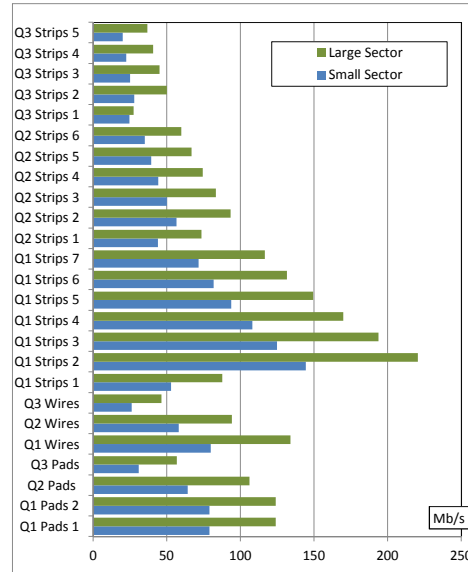
	1	max			max			max			max								
Pads VMM 1	Mb/s	78.1	64.5	30.9	78.1	78.9	64.1	30.9	78.9	Mb/s	125.0	78.4	41.9	125.0	123.9	106.1	56.8	123.9	
Pads VMM 2	Mb/s	78.1				78.9				Mb/s	125.0				123.9				123.9
Wires	Mb/s	79.9	58.2	26.2	79.9	79.9	58.2	26.2	79.9	Mb/s	133.9	94.1	46.4	133.9	133.9	94.1	46.4	133.9	
Strip VMM 1	Mb/s	52.0	44.8	25.7		52.9	43.9	24.6		Mb/s	89.2	72.4	26.5		87.5	73.6	27.5		
Strip VMM 2	Mb/s	142.6	57.8	29.3		144.3	56.5	28.0		Mb/s	223.2	91.4	48.1		220.5	93.3	50.1		
Strip VMM 3	Mb/s	124.2	51.3	26.3		124.8	49.9	25.0		Mb/s	194.7	81.2	43.2		193.7	83.2	45.1		
Strip VMM 4	Mb/s	108.1	45.7	23.7	142.6	108.0	44.3	22.4	144.3	Mb/s	169.9	72.4	38.8	223.2	169.9	74.4	40.7	220.5	
Strip VMM 5	Mb/s	94.4	40.8	21.3		93.8	39.3	20.0		Mb/s	148.6	64.6	34.9		149.3	66.7	36.8		
Strip VMM 6	Mb/s	82.7	36.4			81.8	35.0			Mb/s	130.5	57.8	31.4		131.6	59.9	33.2		
Strip VMM 7	Mb/s	72.8				71.6				Mb/s	115.0				116.4				
					max				max		max				max			max	

**VMM FIFO**

Depth	Worst
Memory per channel	Kb
Total Memory	Kb

**VMM data rate**

	S	L
Q1 Pads 1	78.9	123.9
Q1 Pads 2	78.9	123.9
Q2 Pads	64.1	106.1
Q3 Pads	30.9	56.8
Q1 Wires	79.9	133.9
Q2 Wires	58.2	94.1
Q3 Wires	26.2	46.4
Q1 Strips 1	52.9	87.5
Q1 Strips 2	144.3	220.5
Q1 Strips 3	124.8	193.7
Q1 Strips 4	108.0	169.9
Q1 Strips 5	93.8	149.3
Q1 Strips 6	81.8	131.6
Q1 Strips 7	71.6	116.4
Q2 Strips 1	43.9	73.6
Q2 Strips 2	56.5	93.3
Q2 Strips 3	49.9	83.2
Q2 Strips 4	44.3	74.4
Q2 Strips 5	39.3	66.7
Q2 Strips 6	35.0	59.9
Q3 Strips 1	24.6	27.5
Q3 Strips 2	28.0	50.1
Q3 Strips 3	25.0	45.1
Q3 Strips 4	22.4	40.7
Q3 Strips 5	20.0	36.8



**Readout Controllers (ROC) and Sub-Controllers (SROC)**

	Small Sector										Large Sector										Total	
	Pivot (1 plane)				Confirm (1 plane)				Sector 4+4 pl.	Pivot (1 plane)				Confirm (1 plane)				Sector 4+4 pl.	1 Side	2 Sides		
	D1	D2	D3	Total	D1	D2	D3	Total		D1	D2	D3	Total	D1	D2	D3	Total					
<b>VMM Mapping to SROC</b>																						
Pads VMM 1	P	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
Pads VMM 2		1			1			1				1				1						
Wires	W	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
Strip VMM 1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
Strip VMM 2		2	1	1	1	2	1	1	2	1	1	2	1	1	2	1	1					
Strip VMM 3		3	1	2	2	3	1	2	3	1	1	3	1	1	3	1	1					
Strip VMM 4		4	2	2	2	4	2	2	4	2	2	4	2	2	4	2	2					
Strip VMM 5		4	2	2	2	4	2	2	4	2	2	4	2	2	4	2	2					
Strip VMM 6		3	2			3	2		3	2		3	2		3	2						
Strip VMM 7		1				1			1			1			1							
<b>SROC Hit rate</b>																						
SROC-P1	/BC	1.04	0.43	0.21	1.05	0.43	0.21	1.67	0.52	0.28	1.65	0.71	0.38	0.89	0.63	0.31						
SROC-W1	/BC	0.53	0.39	0.17	0.53	0.39	0.17	0.89	0.63	0.31	0.89	0.63	0.31									
SROC-S1	/BC	0.83	1.03	0.37	0.83	1.00	0.35	1.36	1.63	0.78	1.36	1.67	0.82	1.49	1.34	0.74						
SROC-S2	/BC	0.95	0.82	0.48	0.96	0.79	0.45	1.49	1.30	0.70	1.47	1.34	0.74									
SROC-S3	/BC	1.38			1.38			2.17			2.17											
SROC-S4	/BC	1.35			1.35			2.12			2.13											
<b>Probability &gt;0 hit in SROC for 3 BCs</b>																						
SROC-P1		0.95	0.71	0.45	0.95	0.71	0.45	0.99	0.76	0.54	0.99	0.87	0.67	0.93	0.85	0.60						
SROC-W1		0.80	0.69	0.41	0.80	0.69	0.41	0.93	0.85	0.60	0.93	0.85	0.60									
SROC-S1		0.42	0.50	0.23	0.42	0.49	0.22	0.59	0.66	0.42	0.59	0.67	0.43	0.62	0.58	0.39						
SROC-S2		0.46	0.43	0.29	0.47	0.42	0.28	0.62	0.58	0.39	0.61	0.59	0.40									
SROC-S3		0.60			0.60			0.76			0.76											
SROC-S4		0.59			0.59			0.75			0.75											
<b>SROC Data rates</b>																						
<b>2 in FELIX Input Format</b>																						
SROC-P1	Mb/s	89.7	50.9	29.1	302.3	90.3	50.7	29.1	302.7	120.7	57.0	36.5	402.3	120.1	70.7	46.5	425.4					
SROC-W1	Mb/s	59.2	47.7	25.7		59.2	47.7	25.7		81.8	65.8	40.5		81.8	65.8	40.5						
SROC-S1	Mb/s	57.2	69.7	27.1		57.1	68.2	25.9		89.1	105.0	54.7		89.1	106.9	56.8						
SROC-S2	Mb/s	64.5	57.0	34.9		65.2	55.2	33.2		96.3	85.9	49.5		95.3	88.3	51.9						
SROC-S3	Mb/s	90.4			489.4	90.2			483.4	134.1			746.5	134.2			754.5					
SROC-S4	Mb/s	88.7				88.4				131.7				132.0								
Total	Mb/s				791.7				786.1				6311.5				1179.9					
														9314.9	125.0	250.0						
														Mb/s	Gb/s	Gb/s						
<b>Memory needed in SROC/ROC</b>																						
SROC-P1	Kb	28.7	16.3	9.3	28.9	16.2	9.3	38.6	18.2	11.7	38.4	22.6	14.9	26.2	21.1	13.0						
SROC-W1	Kb	18.9	15.3	8.2	18.9	15.3	8.2	26.2	21.1	13.0	26.2	21.1	13.0									
SROC-S1	Kb	18.3	22.3	8.7	18.3	21.8	8.3	28.5	33.6	17.5	28.5	34.2	18.2	30.8	27.5	15.9						
SROC-S2	Kb	20.6	18.3	11.2	20.9	17.7	10.6	30.8	27.5	15.9	30.5	28.3	16.6	42.9	0.0	0.0						
SROC-S3	Kb	28.9	0.0	0.0	28.9	0.0	0.0	42.9	0.0	0.0	42.9	0.0	0.0									
SROC-S4	Kb	28.4			28.3			42.2			42.2											
Max per SROC	Kb	28.9	22.3	11.2	28.9	21.8	10.6	42.9	33.6	17.5	42.9	34.2	18.2				42.9					



E-links

Small Sector										Large Sector							Total	
Pivot (1 plane)				Confirm (1 plane)				Sector 4+4 pl.	Pivot (1 plane)				Confirm (1 plane)			Sector 4+4 pl.	1 Side	2 Sides
D1	D2	D3	Total	D1	D2	D3	Total		D1	D2	D3	Total	D1	D2	D3			

E-link capacity

2

SROC-P1	Mb/s	4	2	2	16	4	2	2	16	4	2	2	16	4	2	2	16
SROC-W1	Mb/s	4	2	2		4	2	2		4	2	2		4	2	2	
SROC-S1	Mb/s	4	4	4	32	4	4	4	32	4	4	4	32	4	4	4	32
SROC-S2	Mb/s	4	4	4		4	4	4		4	4	4		4	4		
SROC-S3	Mb/s	4			32	4			32	4			32	4			32
SROC-S4	Mb/s	4				4				4				4			

E-links load

2

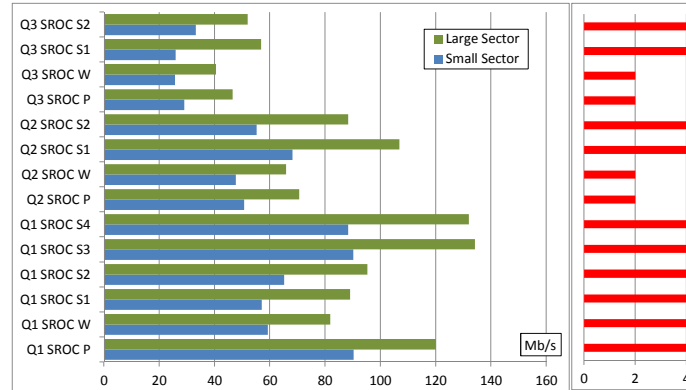
SROC-P1	%	28.0	31.8	18.2	28.2	31.7	18.2	37.7	35.6	22.8	37.5	44.2	29.1
SROC-W1	%	18.5	29.8	16.1	18.5	29.8	16.1	25.6	41.1	25.3	25.6	41.1	25.3
SROC-S1	%	17.9	21.8	8.5	17.8	21.3	8.1	27.8	32.8	17.1	27.8	33.4	17.7
SROC-S2	%	20.1	17.8	10.9	20.4	17.3	10.4	30.1	26.9	15.5	29.8	27.6	16.2
SROC-S3	%	28.2			28.2			41.9			41.9		
SROC-S4	%	27.7			27.6			41.2			41.2		
Max	%	28.2			28.2			41.9			41.9		

41.9

E-link data rate

S L Cap.

Q1 SROC P	90.3	120.1	4
Q1 SROC W	59.2	81.8	4
Q1 SROC S1	57.1	89.1	4
Q1 SROC S2	65.2	95.3	4
Q1 SROC S3	90.2	134.2	4
Q1 SROC S4	88.4	132.0	4
Q2 SROC P	50.7	70.7	2
Q2 SROC W	47.7	65.8	2
Q2 SROC S1	68.2	106.9	4
Q2 SROC S2	55.2	88.3	4
Q3 SROC P	29.1	46.5	2
Q3 SROC W	25.7	40.5	2
Q3 SROC S1	25.9	56.8	4
Q3 SROC S2	33.2	51.9	4



**GBT & FELIX**

**GBT in/out data Rate** 3,4

Pads+Wires	Mb/s	302.3	302.7	402.3	425.4	125.0	250.0
Strips	Mb/s	489.4	483.4	746.5	754.5		
						Gb/s	Gb/s

**SROC Contribution** 5 **in FELIX output format**

SROC-P1	Mb/s	86.6	51.9	30.4	304.6	87.1	51.7	30.3	304.9	112.1	57.4	37.7	394.9	111.5	70.2	47.7	417.2	
SROC-W1	Mb/s	59.8	48.9	27.0		59.8	48.9	27.0		80.0	65.9	41.8		80.0	65.9	41.8		
SROC-S1	Mb/s	52.4	63.6	25.3		52.3	62.3	24.2		80.5	94.3	50.3		80.4	96.0	52.1		
SROC-S2	Mb/s	58.8	52.4	32.6		59.4	50.8	31.0		86.7	77.9	45.7		85.8	79.9	47.9		
SROC-S3	Mb/s	81.6			446.8	81.5			441.4	119.1			671.7	119.2			678.7	
SROC-S4	Mb/s	80.2				79.9				117.1				117.3				
Total	Mb/s				751.3				746.2				5990.2				1095.8	
														8649.6			117.1	234.2
																	Gb/s	Gb/s

**FELIX**

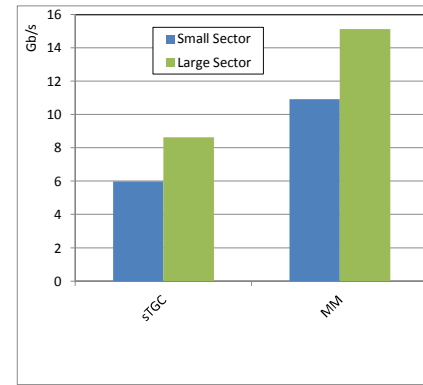
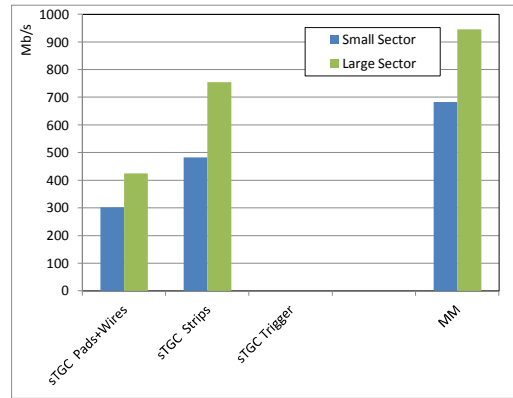
Number		1	18	32
Input links from GBT		1	18	32
Input data rate		6311.5	9314.9	288
Output Rate to ROD		5990.2	8649.6	576
				117.1
				234.2
				Gb/s

**GBT data rate**

	S	L
sTGC Pads+Wires	302.7	425.4
sTGC Strips	483.4	754.5
sTGC Trigger	0.0	0.0
MM	683.4	946.3

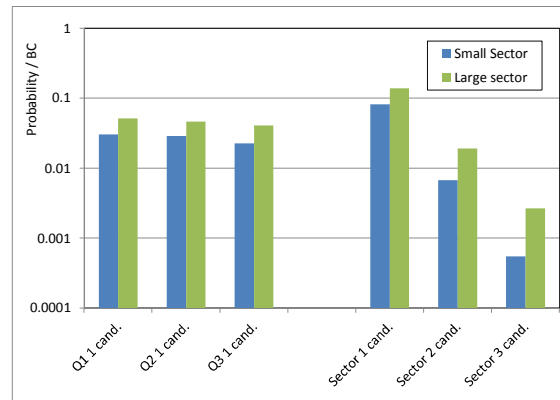
**Felix output Rate**

	S	L	
sTGC	6.0	8.6	GHz
MM	10.9	15.1	GHz



**Probability of 1, 2, 3 trigger candidates due to correlated background**

	S	L
Q1 1 cand.	0.031	0.051
Q2 1 cand.	0.029	0.046
Q3 1 cand.	0.023	0.041
Sector 1 cand.	8.2E-02	1.4E-01
Sector 2 cand.	6.7E-03	1.9E-02
Sector 3 cand.	5.5E-04	2.7E-03





1.697	48	13		173	13		173	13		173	12		173	85.9	12		110	110	11		110	110	12		110	110	12		110	110	81.5
1.711	47	12			12			12			12			84.7	12	110	110	12		12		12		12		12		12		80.4	
1.725	46	12			13			13			13			83.5	12	109	109	12		12		12		12		12		12		79.2	
1.739	45	13			12			12			12			82.3	12			12		12		12		12		12		12		78.1	
1.753	44	12	110	110	13	110	110	12	110	110	12	110	110	81.1	12			12		12		12		12		12		12		76.9	
1.767	43	13	109	109	12	109	109	13	109	109	13	109	109	79.9	12			12		12		12		12		12		12		75.8	
1.782	42	12			13			12			12			78.7	12			12	46	12	46	12	46	12	46	12	46	12	46	74.6	
1.797	41	13			12			13			13			77.5	11			12	45	12	45	12	45	12	45	12	45	12	45	73.5	
1.812	40	12			13			12			13			76.3	12			12		12		12		12		12		12		72.4	
1.828	39	13		46	12		46	13		46	12		46	75.1	12			12		12		12		12		11		12		71.2	
1.844	38	12		45	13		45	12		45	13		45	73.9	12			12		12		12		12		12		12		70.1	
1.860	37	13			12			13			12			72.7	2	1	1	2	1	1	2	1	1	4	1	1	5	1	1	69.4	
1.876	36	12			13			12			13			71.5	12			11		11		11		10		10		9		67.7	
1.893	35	13			12			13			12			70.3	12	406	406	12		12		12		12		12		12		66.6	
1.910	34	4	1	1	5	1	1	6	1	1	7	1	1	69.5	12			12		12		12		12		12		12		65.5	
1.928	33	10	406	406	10	406	406	8	406	406	8	406	406	67.8	11			12		12		12		12		12		12		64.4	
1.945	32	13			12			13			12			66.7	12			12		12		12		12		12		12		63.2	
1.964	31	12			13			12			13			65.5	12		343	12		12		12		12		12		12		62.1	
1.982	30	13			12			13			12			64.3	12		342	12		12		12		12		12		12		60.9	
2.001	29	12		343	13		343	13		343	12		343	63.1	12			12		12		12		12		12		12		59.8	
2.020	28	13		342	12		342	12		342	13		342	61.9	12			12		12		12		12		12		12		58.6	
2.040	27	12			13			12			13			60.7	12			12		12		12		12		12		12		57.5	
2.060	26	13			12			13			12			59.5	12	279	279	12	279	279	12	279	279	12	279	279	12	279	279	56.3	
2.081	25	12			13			13			12			58.4	12	278	278	11	278	278	12	278	278	12	278	278	12	278	278	55.2	
2.060	24	13	279	279	13	279	279	13	279	279	12	279	279	57.1	12			12		12		12		12		12		12		54.1	
2.123	23	12	278	278	12	278	278	13	278	278	12	278	278	55.9	12			12		12		12		12		12		12		52.9	
2.145	22	13			13			12			13			54.8	12			12		12		12		12		12		12		51.8	
2.168	21	12			12			13			12			53.6	11		215	12		12		12		12		12		12		50.6	
2.191	20	13			13			12			13			52.4	12		214	12		12		12		12		12		12		49.5	
2.215	19	12			12			13			12			51.2	12			12		12		12		12		12		12		48.4	
2.240	18	13		215	13		215	12		215	12		215	50.0	12			12		12		12		12		12		12		47.2	
2.265	17	12		214	12		214	13		214	12		214	48.8	12			12		12		12		12		12		12		46.1	
2.290	16	13			13			12			13			47.6	12			12		12		12		12		12		12		44.9	
2.317	15	12			12			13			12			46.4	12	151	151	12	151	151	12	151	151	12	151	151	12	151	151	43.8	
2.344	14	13			13			12			13			45.2	12	150	150	12	150	150	12	150	150	11	150	150	12	150	150	42.6	
2.372	13	12	151	151	12	151	151	13	151	151	12	151	151	44.0	12			12		12		12		12		12		12		41.5	
2.401	12	13	150	150	13	150	150	12	150	150	12	150	150	42.8	12			12		12		12		12		12		12		40.3	
2.431	11	12			12			13			12			41.6	12			12		12		12		12		12		12		39.2	
2.462	10	13			13			12			13			40.4	12		87	12		12		12		11		12		12		38.1	
2.494	9	12			12			13			12			39.2	12		86	11		11		12		12		12		12		36.9	
2.526	8	13		87	13		87	13		87	12		87	38.0	11			12		12		12		12		12		12		35.8	
2.561	7	12		86	12		86	12		86	13		86	36.8	12			12		12		12		12		12		12		34.7	
2.596	6	13			13			12			13			35.6	12			12		12		12		12		12		12		33.5	
2.632	5	12			12			13			12			34.4	12			12		12		12		12		12		12		32.4	
2.671	4	13			13			12			13			33.2	12	23	23	12	23	23	12	23	23	12	23	23	12	23	23	31.2	
2.710	3	12	23	23	12	23	23	12	23	23	12	23	23	32.0	12			12		12		12		12		12		12		30.1	
2.752	2	13		22	13		22	13		22	12		22	30.8	1			1		1		1		2		1		2		29.5	
2.795	1	8		1	8		1	9		1	9		1	29.8																	
2.840	0																														

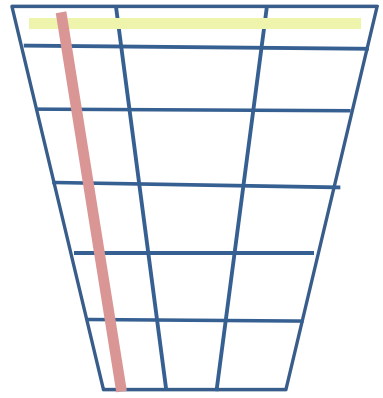


1.775	42	12	111	111	13	111	111	13	111	111	12	111	111	132.2	13			13			137.0
1.790	41	13	110	110	12	110	110	13	110	110	13	110	110	130.2	13			13			134.9
1.805	40	13			13			13			13			128.2	13	111	111	13	111	111	132.8
1.820	39	13			13			13			13	110	110	126.1	14	110	110	13	110	110	130.6
1.836	38	12			13			13			12			124.1	13			13			128.5
1.852	37	13		47	12		47	13		47	13		47	122.1	13			14			126.4
1.868	36	13		46	13		46	13		46	13		46	120.0	13			13			124.2
1.885	35	12			13			12			13			118.0	13		47	13		47	122.1
1.902	34	6	1	1	6	1	1	8	1	1	8	1	1	116.5	13		46	14		46	120.0
1.919	33	9	408	408	9	408	408	7	408	408	7	408	408	113.6	13			13			117.9
1.936	32	13			13			13			13			111.9	13	1	1	5	1	1	116.4
1.954	31	13			13			12			12			109.9	12	408	408	11	408	408	113.4
1.973	30	12			13			13			13			107.9	13			13			111.5
1.991	29	13			13			12			13			105.8	13			14			109.4
2.010	28	13		345	13		345	13		345	13		345	103.8	13			13			107.3
2.030	27	13		344	12		344	13		344	12		344	101.7	14			13			105.1
2.010	26	12			13			13			13			99.7	13		345	13		345	103.0
2.070	25	13			13			12			13			97.7	13		344	13		344	100.9
2.091	24	13			12			13			13			95.7	14			13			98.8
2.112	23	12	281	281	13	281	281	13	281	281	12	281	281	93.6	13			13			96.7
2.134	22	13	280	280	13	280	280	13	280	280	13	280	280	91.6	13	281	281	14	281	281	94.5
2.157	21	13			13			12			13			89.6	13	280	280	13	280	280	92.4
2.180	20	13			12			13			13			87.5	14			13			90.3
2.203	19	12			13			13			13			85.5	13			13			88.2
2.227	18	13		217	13		217	13		217	12		217	83.4	13			14			86.0
2.252	17	13		216	13		216	12		216	13		216	81.4	13		217	13		217	83.9
2.277	16	12			12			13			13			79.4	14		216	13		216	81.8
2.304	15	13			13			13			13			77.4	13			13			79.6
2.330	14	13			13			13			12			75.3	13			13			77.5
2.358	13	13	153	153	12	153	153	12	153	153	13	153	153	73.3	13			13			75.4
2.387	12	12	152	152	13	152	152	13	152	152	13	152	152	71.3	13	153	153	14	153	153	73.3
2.416	11	13			13			13			13			69.2	13	152	152	13	152	152	71.1
2.446	10	13			13			13			12			67.2	13			13			69.1
2.478	9	12			12			12			13			65.2	14			14			66.9
2.510	8	13		89	13		89	13		89	13		89	63.2	13			13			64.8
2.543	7	13		88	13		88	13		88	13		88	61.1	13		89	13		89	62.7
2.578	6	13			13			13			13			59.0	14		88	14		88	60.5
2.614	5	12			12			12			12			57.0	13			13			58.4
2.651	4	13			13			13			13			55.0	13			13			56.3
2.690	3	13	25	25	13	25	25	13	25	25	13	25	25	52.9	13	25	25	14	25	25	54.2
2.731	2	12		24	13		24	13		24	13		24	50.9	14		24	13		24	52.0
2.773	1	5		1	4		1	5		1	5		1	49.5	11		1	11		1	50.0
2.817	0	1127			1127			1127			1127				1127			1127			



Sketch of pad grouping in TDS

		Small Sector						Large Sector									
		Pivot			Confirm			Pivot			Confirm						
		1st doublet		2n doublet		1st doublet		2n doublet		1st doublet		2n doublet		1st doublet		2n doublet	
		Col.	Rows	nG	Col.	Rows	nG	Col.	Rows	nG	Col.	Rows	nG	Col.	Rows	nG	
Q1 all $n < 2.4$		4	17	8	3	17	6	4	17	8	4	18	8	6	17	6	
		2	15	8	3	15	6	3	16	6	3	15	6	4	14	8	
		2	12	8	3	13	8	3	13	6	3	14	6	6	16	6	
		4	10	8	4	10	8	6	17	6	7	16	7	6	16	6	
		4	14	8	5	15	10	4	14	8	4	14	8	4	14	8	
		4	15	8	5	14	10	4	15	8	4	13	8	4	14	8	





MicroMegas rates and bandwidth

Strips in PCB	1024	N_PCB_1	5	GBT / super L.	2
Channels in MMFE	512	N_PCB_2	3	BC read out	5
MMFE per PCB	2	N_PCB	8		
VMM in MMFE	8				

**Boards: number of readout elements**

	per		Module (1 lay)				Sector	Total	
	MMFE	PCB	1	2	Super Layer	GBT		1 side	2 sides
Strips	512	1024	5120	3072	8192	4096	65536	1048576	2097152
VMM	8	16	80	48	128	64	1024	16384	32768
ROC		2	10	6	16	8	128	2048	4096
MM FE		2	10	6	16	8	128	2048	4096
E-links @ 80 MB/s			10	6	16	8	128	2048	4096
E-links @ 160 MB/s			4	6	10	5	80	1280	2560
E-links @ 320 MB/s			6	0	6	3	48	768	1536
E-links total			20	12	32	16	256	4096	8192
GBT					2		16	256	512

GBT pool assignment				
1	2	3	4	5
8				
	2	3		
			2	1

**Rates and bandwidth in MMFE ROCS**

**MMFE rates**

Module	PCB	MMFE	Capacity	Strips per hit
1	1	1	4	4.9
		2	4	5.2
	2	3	4	5.8
		4	4	6.4
	3	5	4	7.2
		6	4	7.9
	4	7	2	8.6
		8	2	9.2
	5	9	2	9.8
		10	2	10.2
2	6	11	2	10.4
		12	2	10.7
	7	13	2	10.8
		14	2	10.0
	8	15	2	9.5
16		2	8.9	

Maximum 8.3

Total  
One GBT

**Small Sector**

MMFE 1 layer										
$\eta_{max}$	H/H <sub>max</sub>	$\phi_{down}$	$\mu$ rate	Prob >0	Hits	Data rate				
						To Felix	/e-link	ToRod		
			/BC	/5BC	/BC	Mbps	%	Mbps		
2.746	0.050	27.07	0.34	0.82	1.66	165.0	51.5	144.7		
2.539	0.150	26.69	0.29	0.76	1.50	149.9	46.8	131.8		
2.369	0.250	26.31	0.24	0.71	1.42	141.1	44.1	123.9		
2.225	0.350	25.93	0.21	0.65	1.33	131.8	41.2	115.5		
2.100	0.450	25.55	0.18	0.59	1.28	125.2	39.1	109.4		
1.990	0.550	25.18	0.15	0.53	1.20	117.0	36.5	101.9		
1.892	0.650	24.80	0.13	0.48	1.13	108.8	68.0	94.5		
1.804	0.750	24.42	0.11	0.43	1.04	99.9	62.5	86.7		
1.724	0.850	24.04	0.10	0.39	0.96	91.7	57.3	79.4		
1.651	0.950	23.67	0.09	0.35	0.87	82.6	51.6	71.5		
1.584	1.050	23.29	0.07	0.31	0.77	73.3	45.8	63.5		
1.522	1.150	22.91	0.06	0.28	0.69	65.6	41.0	56.8		
1.465	1.250	22.53	0.06	0.24	0.61	57.8	36.1	50.1		
1.412	1.350	22.16	0.05	0.22	0.49	47.5	29.7	41.4		
1.362	1.450	21.78	0.04	0.19	0.41	39.9	24.9	34.9		
1.316	1.550	21.40	0.08	0.33	0.71	69.4	43.4	60.6		
			0.34	0.82	1.66	165.0	68.0	144.7		

2.20

16.05 1566.5

1366.7  
683.4

**Large Sector**

MMFE 1 layer										
$\eta_{max}$	H/H <sub>max</sub>	$\phi_{down}$	$\mu$ rate	Prob >0	Hits	Data rate				
						To Felix	/e-link	ToRod		
			/BC	/5BC	/BC	Mbps	%	Mbps		
2.779	0.050	34.87	0.44	0.89	2.15	206.2	64.4	178.8		
2.569	0.150	34.87	0.38	0.85	1.97	190.7	59.6	165.8		
2.396	0.250	34.87	0.33	0.81	1.90	182.9	57.2	158.9		
2.250	0.350	34.87	0.28	0.76	1.81	174.0	54.4	151.0		
2.124	0.450	34.86	0.25	0.71	1.77	168.6	52.7	145.9		
2.013	0.550	34.86	0.21	0.66	1.69	160.4	50.1	138.6		
1.914	0.650	34.86	0.19	0.61	1.61	152.0	95.0	131.1		
1.826	0.750	34.86	0.16	0.56	1.51	142.3	88.9	122.6		
1.745	0.850	34.86	0.14	0.52	1.42	133.0	83.1	114.5		
1.671	0.950	34.86	0.13	0.47	1.30	122.2	76.3	105.1		
1.604	1.050	34.85	0.11	0.43	1.18	110.4	69.0	95.1		
1.542	1.150	34.85	0.10	0.39	1.07	100.7	62.9	86.7		
1.484	1.250	34.85	0.09	0.36	0.96	90.4	56.5	78.0		
1.430	1.350	34.85	0.08	0.33	0.79	75.7	47.3	65.7		
1.380	1.450	34.85	0.07	0.30	0.67	64.8	40.5	56.5		
1.334	1.550	34.85	0.13	0.49	1.18	113.3	70.8	98.3		
			0.44	0.89	2.15	206.2	95.0	178.8		

3.10

22.99 2187.6

1892.5  
946.3

**Rates and bandwidth in MM VMMs**

Mod	PCB	VMM	Strips / hit	One VMM in small sector								One VMM in large sector									
				$\eta_{max}$	$\eta_{min}$	H/H <sub>max</sub>	$\langle\phi\rangle$	$\mu$ rate /BC	Hits /5BC	Rate /5BC	Hits /8BC	P(0 hit) /8BC	$\eta_{max}$	$\eta_{min}$	H/H <sub>max</sub>	$\langle\phi\rangle$	$\mu$ rate /BC	Hits /5BC	Rate Mbps /8BC	Hits /8BC	P(0 hit) /8BC
0		1	4.8	2.746	2.718	0.006	27.23	0.045	1.078	53.9	1.72	0.696	2.779	2.750	0.006	34.87	0.058	1.383	69.1	2.21	0.628
			4.8	2.718	2.690	0.019	27.18	0.045	1.066	53.3	1.71	0.700	2.750	2.722	0.019	34.87	0.057	1.371	68.5	2.19	0.632
			4.8	2.690	2.663	0.031	27.14	0.044	1.053	52.7	1.69	0.705	2.722	2.695	0.031	34.87	0.056	1.358	67.9	2.17	0.637
			4.9	2.663	2.637	0.044	27.09	0.043	1.041	52.0	1.67	0.710	2.695	2.668	0.044	34.87	0.055	1.345	67.3	2.15	0.642
			4.9	2.637	2.612	0.056	27.04	0.042	1.036	51.8	1.66	0.715	2.668	2.642	0.056	34.87	0.054	1.342	67.1	2.15	0.647
			5.0	2.612	2.587	0.069	26.99	0.041	1.023	51.2	1.64	0.720	2.642	2.617	0.069	34.87	0.053	1.328	66.4	2.13	0.652
			5.0	2.587	2.563	0.081	26.95	0.040	1.010	50.5	1.62	0.724	2.617	2.593	0.081	34.87	0.052	1.314	65.7	2.10	0.657
			5.1	2.563	2.539	0.094	26.90	0.039	0.997	49.9	1.60	0.729	2.593	2.569	0.094	34.87	0.051	1.300	65.0	2.08	0.662
			5.1	2.539	2.516	0.106	26.85	0.039	0.984	49.2	1.57	0.734	2.569	2.545	0.106	34.87	0.051	1.286	64.3	2.06	0.667
			5.1	2.516	2.494	0.119	26.81	0.038	0.971	48.6	1.55	0.738	2.545	2.523	0.119	34.87	0.050	1.272	63.6	2.04	0.672
			5.2	2.494	2.472	0.131	26.76	0.037	0.958	47.9	1.53	0.743	2.523	2.500	0.131	34.87	0.049	1.258	62.9	2.01	0.677
			5.2	2.472	2.450	0.144	26.71	0.036	0.946	47.3	1.51	0.748	2.500	2.479	0.144	34.87	0.048	1.244	62.2	1.99	0.682
			5.3	2.450	2.429	0.156	26.66	0.036	0.940	47.0	1.50	0.752	2.479	2.457	0.156	34.87	0.047	1.238	61.9	1.98	0.687
			5.4	2.429	2.409	0.169	26.62	0.035	0.934	46.7	1.49	0.756	2.457	2.437	0.169	34.87	0.046	1.233	61.6	1.97	0.692
			5.4	2.409	2.389	0.181	26.57	0.034	0.927	46.4	1.48	0.761	2.437	2.416	0.181	34.87	0.045	1.227	61.4	1.96	0.696
		5.5	2.389	2.369	0.194	26.52	0.033	0.921	46.0	1.47	0.765	2.416	2.396	0.194	34.87	0.044	1.221	61.1	1.95	0.701	
		2	5.6	2.369	2.350	0.206	26.48	0.033	0.914	45.7	1.46	0.769	2.396	2.377	0.206	34.87	0.044	1.215	60.8	1.94	0.706
			5.7	2.350	2.331	0.219	26.43	0.032	0.908	45.4	1.45	0.773	2.377	2.358	0.219	34.87	0.043	1.209	60.4	1.93	0.710
			5.7	2.331	2.312	0.231	26.38	0.031	0.901	45.1	1.44	0.777	2.358	2.339	0.231	34.87	0.042	1.203	60.1	1.92	0.715
			5.8	2.312	2.294	0.244	26.33	0.031	0.895	44.7	1.43	0.781	2.339	2.321	0.244	34.87	0.041	1.196	59.8	1.91	0.719
			5.9	2.294	2.276	0.256	26.29	0.030	0.888	44.4	1.42	0.785	2.321	2.303	0.256	34.87	0.040	1.190	59.5	1.90	0.723
			6.0	2.276	2.259	0.269	26.24	0.030	0.881	44.1	1.41	0.789	2.303	2.285	0.269	34.87	0.040	1.183	59.1	1.89	0.728
			6.0	2.259	2.242	0.281	26.19	0.029	0.874	43.7	1.40	0.793	2.285	2.268	0.281	34.87	0.039	1.176	58.8	1.88	0.732
			6.1	2.242	2.225	0.294	26.14	0.028	0.867	43.4	1.39	0.797	2.268	2.250	0.294	34.87	0.038	1.169	58.5	1.87	0.736
			6.2	2.225	2.208	0.306	26.10	0.028	0.860	43.0	1.38	0.800	2.250	2.234	0.306	34.87	0.038	1.162	58.1	1.86	0.740
			6.3	2.208	2.192	0.319	26.05	0.027	0.854	42.7	1.37	0.804	2.234	2.217	0.319	34.87	0.037	1.155	57.8	1.85	0.744
			6.3	2.192	2.176	0.331	26.00	0.027	0.847	42.3	1.35	0.807	2.217	2.201	0.331	34.87	0.036	1.148	57.4	1.84	0.748
			6.4	2.176	2.160	0.344	25.96	0.026	0.840	42.0	1.34	0.811	2.201	2.185	0.344	34.87	0.036	1.141	57.1	1.83	0.752
			6.5	2.160	2.145	0.356	25.91	0.026	0.836	41.8	1.34	0.814	2.185	2.170	0.356	34.86	0.035	1.138	56.9	1.82	0.756
			6.6	2.145	2.129	0.369	25.86	0.025	0.832	41.6	1.33	0.817	2.170	2.154	0.369	34.86	0.034	1.135	56.8	1.82	0.759
			6.7	2.129	2.114	0.381	25.81	0.025	0.828	41.4	1.32	0.821	2.154	2.139	0.381	34.86	0.034	1.132	56.6	1.81	0.763
		6.8	2.114	2.100	0.394	25.77	0.024	0.824	41.2	1.32	0.824	2.139	2.124	0.394	34.86	0.033	1.129	56.4	1.81	0.767	
		3	6.9	2.100	2.085	0.406	25.72	0.024	0.820	41.0	1.31	0.827	2.124	2.110	0.406	34.86	0.033	1.125	56.3	1.80	0.770
			7.0	2.085	2.071	0.419	25.67	0.023	0.816	40.8	1.30	0.830	2.110	2.095	0.419	34.86	0.032	1.122	56.1	1.79	0.774
			7.1	2.071	2.057	0.431	25.63	0.023	0.811	40.6	1.30	0.833	2.095	2.081	0.431	34.86	0.031	1.118	55.9	1.79	0.777
			7.2	2.057	2.043	0.444	25.58	0.022	0.807	40.3	1.29	0.836	2.081	2.067	0.444	34.86	0.031	1.114	55.7	1.78	0.781
			7.3	2.043	2.029	0.456	25.53	0.022	0.801	40.0	1.28	0.839	2.067	2.053	0.456	34.86	0.030	1.108	55.4	1.77	0.784
			7.4	2.029	2.016	0.469	25.48	0.022	0.795	39.7	1.27	0.842	2.053	2.040	0.469	34.86	0.030	1.102	55.1	1.76	0.787
			7.5	2.016	2.003	0.481	25.44	0.021	0.789	39.4	1.26	0.844	2.040	2.026	0.481	34.86	0.029	1.096	54.8	1.75	0.791
			7.6	2.003	1.990	0.494	25.39	0.021	0.783	39.1	1.25	0.847	2.026	2.013	0.494	34.86	0.029	1.090	54.5	1.74	0.794
			7.6	1.990	1.977	0.506	25.34	0.020	0.777	38.8	1.24	0.850	2.013	2.000	0.506	34.86	0.028	1.084	54.2	1.73	0.797
			7.7	1.977	1.964	0.519	25.29	0.020	0.771	38.5	1.23	0.852	2.000	1.988	0.519	34.86	0.028	1.078	53.9	1.72	0.800
			7.8	1.964	1.952	0.531	25.25	0.020	0.765	38.2	1.22	0.855	1.988	1.975	0.531	34.86	0.027	1.072	53.6	1.71	0.803
			7.9	1.952	1.939	0.544	25.20	0.019	0.759	37.9	1.21	0.858	1.975	1.962	0.544	34.86	0.027	1.065	53.3	1.70	0.806
			8.0	1.939	1.927	0.556	25.15	0.019	0.753	37.6	1.20	0.860	1.962	1.950	0.556	34.86	0.027	1.059	52.9	1.69	0.809
			8.1	1.927	1.915	0.569	25.11	0.018	0.747	37.3	1.19	0.862	1.950	1.938	0.569	34.86	0.026	1.053	52.6	1.68	0.812
			8.2	1.915	1.903	0.581	25.06	0.018	0.741	37.0	1.19	0.865	1.938	1.926	0.581	34.86	0.026	1.046	52.3	1.67	0.815
		8.3	1.903	1.892	0.594	25.01	0.018	0.735	36.7	1.18	0.867	1.926	1.914	0.594	34.86	0.025	1.040	52.0	1.66	0.817	
		8.3	1.892	1.880	0.606	24.96	0.017	0.729	36.4	1.17	0.869	1.914	1.903	0.606	34.86	0.025	1.034	51.7	1.65	0.820	
		8.4	1.880	1.869	0.619	24.92	0.017	0.723	36.1	1.16	0.872	1.903	1.891	0.619	34.86	0.024	1.027	51.4	1.64	0.823	
8.5	1.869	1.858	0.631	24.87	0.017	0.717	35.8	1.15	0.874	1.891	1.880	0.631	34.86	0.024	1.021	51.0	1.63	0.825			

4	51	8.6	1.858	1.847	0.644	24.82	0.017	0.711	35.5	1.14	0.876	1.880	1.869	0.644	34.86	0.024	1.014	50.7	1.62	0.828		
	52	8.7	1.847	1.836	0.656	24.78	0.016	0.704	35.2	1.13	0.878	1.869	1.858	0.656	34.86	0.023	1.007	50.3	1.61	0.831		
	53	8.8	1.836	1.825	0.669	24.73	0.016	0.697	34.8	1.12	0.880	1.858	1.847	0.669	34.86	0.023	0.999	49.9	1.60	0.833		
	54	8.8	1.825	1.814	0.681	24.68	0.016	0.690	34.5	1.10	0.882	1.847	1.836	0.681	34.86	0.022	0.991	49.5	1.59	0.836		
	55	8.9	1.814	1.804	0.694	24.63	0.015	0.683	34.2	1.09	0.884	1.836	1.826	0.694	34.86	0.022	0.983	49.2	1.57	0.838		
	56	9.0	1.804	1.793	0.706	24.59	0.015	0.676	33.8	1.08	0.886	1.826	1.815	0.706	34.86	0.022	0.975	48.8	1.56	0.840		
	57	9.1	1.793	1.783	0.719	24.54	0.015	0.670	33.5	1.07	0.888	1.815	1.805	0.719	34.86	0.021	0.968	48.4	1.55	0.843		
	58	9.1	1.783	1.773	0.731	24.49	0.015	0.663	33.2	1.06	0.890	1.805	1.794	0.731	34.86	0.021	0.960	48.0	1.54	0.845		
	59	9.2	1.773	1.763	0.744	24.45	0.014	0.656	32.8	1.05	0.892	1.794	1.784	0.744	34.86	0.021	0.953	47.6	1.52	0.847		
	60	9.3	1.763	1.753	0.756	24.40	0.014	0.650	32.5	1.04	0.894	1.784	1.774	0.756	34.86	0.020	0.945	47.3	1.51	0.850		
	61	9.4	1.753	1.743	0.769	24.35	0.014	0.643	32.2	1.03	0.896	1.774	1.764	0.769	34.86	0.020	0.938	46.9	1.50	0.852		
	62	9.4	1.743	1.733	0.781	24.30	0.014	0.637	31.8	1.02	0.898	1.764	1.755	0.781	34.86	0.020	0.930	46.5	1.49	0.854		
	63	9.5	1.733	1.724	0.794	24.26	0.013	0.630	31.5	1.01	0.899	1.755	1.745	0.794	34.86	0.019	0.923	46.1	1.48	0.856		
	5	64	9.6	1.724	1.714	0.806	24.21	0.013	0.624	31.2	1.00	0.901	1.745	1.735	0.806	34.86	0.019	0.915	45.8	1.46	0.858	
		65	9.7	1.714	1.705	0.819	24.16	0.013	0.618	30.9	0.99	0.903	1.735	1.726	0.819	34.86	0.019	0.908	45.4	1.45	0.860	
		66	9.7	1.705	1.696	0.831	24.11	0.013	0.611	30.6	0.98	0.904	1.726	1.717	0.831	34.86	0.019	0.901	45.0	1.44	0.862	
		67	9.8	1.696	1.686	0.844	24.07	0.012	0.605	30.3	0.97	0.906	1.717	1.707	0.844	34.86	0.018	0.893	44.7	1.43	0.864	
		68	9.9	1.686	1.677	0.856	24.02	0.012	0.598	29.9	0.96	0.908	1.707	1.698	0.856	34.86	0.018	0.884	44.2	1.41	0.866	
		69	9.9	1.677	1.668	0.869	23.97	0.012	0.590	29.5	0.94	0.909	1.698	1.689	0.869	34.86	0.018	0.875	43.7	1.40	0.868	
		70	10.0	1.668	1.660	0.881	23.93	0.012	0.582	29.1	0.93	0.911	1.689	1.680	0.881	34.86	0.017	0.865	43.3	1.38	0.870	
		71	10.0	1.660	1.651	0.894	23.88	0.012	0.575	28.8	0.92	0.912	1.680	1.671	0.894	34.86	0.017	0.856	42.8	1.37	0.872	
		72	10.1	1.651	1.642	0.906	23.83	0.011	0.568	28.4	0.91	0.914	1.671	1.663	0.906	34.86	0.017	0.847	42.4	1.36	0.874	
		73	10.1	1.642	1.633	0.919	23.78	0.011	0.561	28.0	0.90	0.915	1.663	1.654	0.919	34.86	0.017	0.838	41.9	1.34	0.876	
		74	10.2	1.633	1.625	0.931	23.74	0.011	0.553	27.7	0.89	0.916	1.654	1.645	0.931	34.86	0.016	0.829	41.5	1.33	0.877	
		75	10.2	1.625	1.617	0.944	23.69	0.011	0.546	27.3	0.87	0.918	1.645	1.637	0.944	34.86	0.016	0.821	41.0	1.31	0.879	
		76	10.2	1.617	1.608	0.956	23.64	0.011	0.538	26.9	0.86	0.919	1.637	1.629	0.956	34.86	0.016	0.810	40.5	1.30	0.881	
		77	10.3	1.608	1.600	0.969	23.60	0.010	0.530	26.5	0.85	0.921	1.629	1.620	0.969	34.86	0.016	0.800	40.0	1.28	0.883	
		78	10.3	1.600	1.592	0.981	23.55	0.010	0.522	26.1	0.84	0.922	1.620	1.612	0.981	34.86	0.015	0.789	39.5	1.26	0.884	
		79	10.3	1.592	1.584	0.994	23.50	0.010	0.514	25.7	0.82	0.923	1.612	1.604	0.994	34.86	0.015	0.779	39.0	1.25	0.886	
		6	80	10.3	1.584	1.575	1.006	23.45	0.009	0.506	25.3	0.80	0.924	1.584	1.575	1.006	34.86	0.014	0.770	38.5	1.23	0.888
	81		10.4	1.575	1.549	0.031	22.98	0.009	0.472	23.6	0.76	0.930	1.585	1.578	0.010	34.87	0.014	0.743	37.1	1.19	0.891	
	82		10.4	1.549	1.541	0.052	22.98	0.009	0.466	23.3	0.75	0.931	1.578	1.570	0.031	34.87	0.014	0.733	36.7	1.17	0.893	
	83		10.4	1.541	1.534	0.073	22.98	0.009	0.460	23.0	0.74	0.932	1.570	1.562	0.052	34.87	0.014	0.724	36.2	1.16	0.894	
	84		10.4	1.534	1.526	0.094	22.97	0.009	0.454	22.7	0.73	0.933	1.562	1.554	0.073	34.87	0.014	0.715	35.7	1.14	0.896	
	85		10.5	1.526	1.519	0.115	22.97	0.009	0.449	22.4	0.72	0.934	1.554	1.547	0.094	34.87	0.014	0.707	35.3	1.13	0.897	
	86		10.5	1.519	1.511	0.135	22.96	0.008	0.444	22.2	0.71	0.935	1.547	1.539	0.115	34.87	0.013	0.699	34.9	1.12	0.899	
	87		10.6	1.511	1.504	0.156	22.96	0.008	0.438	21.9	0.70	0.936	1.539	1.532	0.135	34.87	0.013	0.690	34.5	1.10	0.900	
	88		10.6	1.504	1.497	0.177	22.95	0.008	0.433	21.7	0.69	0.937	1.532	1.524	0.156	34.87	0.013	0.683	34.1	1.09	0.902	
	89		10.6	1.497	1.490	0.198	22.95	0.008	0.428	21.4	0.68	0.938	1.524	1.517	0.177	34.87	0.013	0.675	33.7	1.08	0.903	
	90		10.7	1.490	1.483	0.219	22.94	0.008	0.423	21.2	0.68	0.938	1.517	1.510	0.198	34.87	0.013	0.667	33.4	1.07	0.904	
	91		10.7	1.483	1.476	0.240	22.94	0.008	0.418	20.9	0.67	0.939	1.510	1.503	0.219	34.87	0.012	0.659	33.0	1.06	0.906	
	92		10.7	1.476	1.469	0.260	22.93	0.008	0.412	20.6	0.66	0.940	1.503	1.496	0.240	34.87	0.012	0.652	32.6	1.04	0.907	
	93		10.7	1.469	1.462	0.281	22.93	0.008	0.406	20.3	0.65	0.941	1.496	1.489	0.260	34.87	0.012	0.643	32.1	1.03	0.908	
	94		10.7	1.462	1.455	0.302	22.92	0.007	0.401	20.0	0.64	0.942	1.489	1.482	0.281	34.87	0.012	0.634	31.7	1.01	0.910	
	95		10.8	1.455	1.448	0.323	22.92	0.007	0.395	19.7	0.63	0.943	1.482	1.475	0.302	34.87	0.012	0.626	31.3	1.00	0.911	
	7		96	10.8	1.448	1.442	0.344	22.91	0.007	0.389	19.5	0.62	0.944	1.475	1.468	0.323	34.87	0.011	0.617	30.8	0.99	0.912
			97	10.8	1.442	1.435	0.365	22.91	0.007	0.384	19.2	0.61	0.945	1.468	1.461	0.344	34.87	0.011	0.609	30.4	0.97	0.914
			98	10.8	1.435	1.428	0.385	22.91	0.007	0.379	18.9	0.61	0.945	1.461	1.455	0.365	34.86	0.011	0.600	30.0	0.96	0.915
			99	10.8	1.428	1.422	0.406	22.90	0.007	0.373	18.7	0.60	0.946	1.455	1.448	0.385	34.86	0.011	0.592	29.6	0.95	0.916
		100	10.7	1.422	1.415	0.427	22.90	0.007	0.364	18.2	0.58	0.947	1.448	1.441	0.406	34.86	0.011	0.584	29.2	0.93	0.917	
		101	10.6	1.415	1.409	0.448	22.89	0.007	0.355	17.8	0.57	0.948	1.441	1.435	0.427	34.86	0.011	0.570	28.5	0.91	0.918	
		102	10.5	1.409	1.403	0.469	22.89	0.007	0.347	17.3	0.55	0.949	1.435	1.428	0.448	34.86	0.011	0.557	27.8	0.89	0.919	
		103	10.4	1.403	1.396	0.490	22.88	0.007	0.338	16.9	0.54	0.949	1.428	1.422	0.469	34.86	0.010	0.543	27.2	0.87	0.921	
		104	10.3	1.396	1.390	0.510	22.88	0.006	0.330	16.5	0.53	0.950	1.422	1.415	0.490	34.86	0.010	0.530	26.5	0.85	0.922	
		105	10.2	1.390	1.384	0.531	22.87	0.006	0.322	16.1	0.51	0.951	1.415	1.409	0.510	34.86	0.010	0.517	25.9	0.83	0.923	
		106	10.1	1.384	1.378	0.552	22.87	0.006	0.314	15.7	0.50	0.951	1.409	1.403	0.531	34.86	0.010	0.505	25.2	0.81	0.924	
		107	10.0	1.378	1.372	0.573	22.86	0.006	0.306	15.3	0.49	0.952	1.403	1.397	0.552	34.86	0.010	0.493	24.6	0.79	0.925	
													1.397	1.391	0.573	34.86	0.010	0.481	24.0	0.77	0.926	

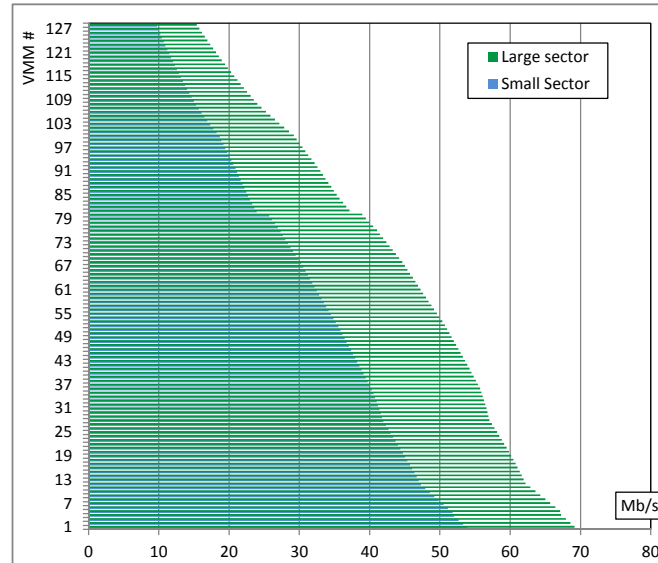
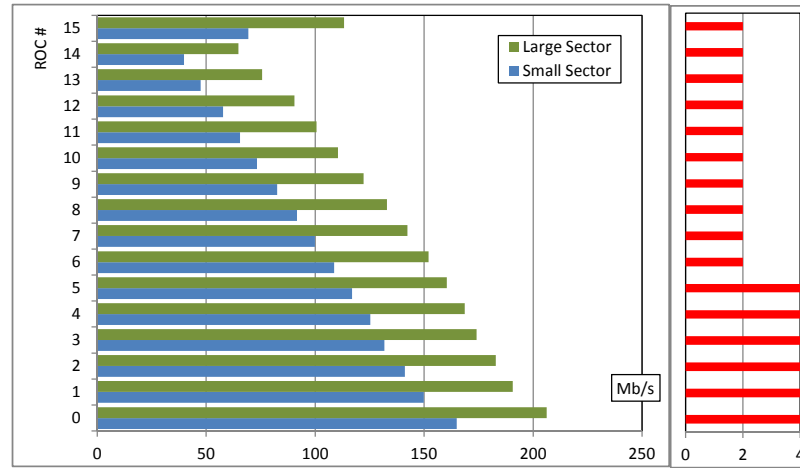
8	108	9.9	1.372	1.365	0.594	22.86	0.006	0.300	15.0	0.48	0.953	1.391	1.384	0.594	34.86	0.009	0.471	23.5	0.75	0.927
	109	9.9	1.365	1.359	0.615	22.85	0.006	0.293	14.7	0.47	0.954	1.384	1.378	0.615	34.86	0.009	0.461	23.0	0.74	0.928
	110	9.8	1.359	1.354	0.635	22.85	0.006	0.287	14.4	0.46	0.954	1.378	1.372	0.635	34.86	0.009	0.451	22.6	0.72	0.929
	111	9.8	1.354	1.348	0.656	22.85	0.006	0.281	14.0	0.45	0.955	1.372	1.366	0.656	34.86	0.009	0.442	22.1	0.71	0.930
	112	9.7	1.348	1.342	0.677	22.84	0.006	0.275	13.8	0.44	0.956	1.366	1.361	0.677	34.86	0.009	0.433	21.6	0.69	0.931
	113	9.6	1.342	1.336	0.698	22.84	0.006	0.269	13.5	0.43	0.956	1.361	1.355	0.698	34.86	0.009	0.424	21.2	0.68	0.932
	114	9.6	1.336	1.330	0.719	22.83	0.006	0.263	13.2	0.42	0.957	1.355	1.349	0.719	34.86	0.009	0.415	20.7	0.66	0.933
	115	9.5	1.330	1.325	0.740	22.83	0.005	0.258	12.9	0.41	0.958	1.349	1.343	0.740	34.86	0.009	0.406	20.3	0.65	0.934
	116	9.4	1.325	1.319	0.760	22.82	0.005	0.252	12.6	0.40	0.958	1.343	1.337	0.760	34.86	0.008	0.397	19.8	0.64	0.935
	117	9.4	1.319	1.313	0.781	22.82	0.005	0.246	12.3	0.39	0.959	1.337	1.332	0.781	34.86	0.008	0.388	19.4	0.62	0.936
	118	9.3	1.313	1.308	0.802	22.81	0.005	0.241	12.0	0.38	0.959	1.332	1.326	0.802	34.86	0.008	0.379	19.0	0.61	0.937
	119	9.2	1.308	1.302	0.823	22.81	0.005	0.235	11.8	0.38	0.960	1.326	1.321	0.823	34.86	0.008	0.371	18.5	0.59	0.938
	120	9.1	1.302	1.297	0.844	22.80	0.005	0.230	11.5	0.37	0.961	1.321	1.315	0.844	34.86	0.008	0.362	18.1	0.58	0.938
	121	9.1	1.297	1.291	0.865	22.80	0.005	0.224	11.2	0.36	0.961	1.315	1.310	0.865	34.86	0.008	0.354	17.7	0.57	0.939
	122	9.0	1.291	1.286	0.885	22.79	0.005	0.219	11.0	0.35	0.962	1.310	1.304	0.885	34.86	0.008	0.346	17.3	0.55	0.940
	123	8.9	1.286	1.281	0.906	22.79	0.005	0.214	10.7	0.34	0.962	1.304	1.299	0.906	34.86	0.008	0.338	16.9	0.54	0.941
	124	8.8	1.281	1.275	0.927	22.78	0.005	0.209	10.5	0.33	0.963	1.299	1.293	0.927	34.86	0.007	0.331	16.5	0.53	0.942
	125	8.8	1.275	1.270	0.948	22.78	0.005	0.204	10.2	0.33	0.963	1.293	1.288	0.948	34.86	0.007	0.323	16.2	0.52	0.943
	126	8.7	1.270	1.265	0.969	22.78	0.005	0.200	10.0	0.32	0.964	1.288	1.283	0.969	34.86	0.007	0.316	15.8	0.51	0.943
	127	8.6	1.265	1.260	0.990	22.77	0.005	0.195	9.7	0.31	0.964	1.283	1.278	0.990	34.86	0.007	0.308	15.4	0.49	0.944

**Bandwith**

		Small 1 lay. 8 Lay.	Large 1 lay. 8 Lay.	Total 1 side 2 sides
GBT to ROD	1 GBT	Mb/s 683.4	946.3	
	All GBTs	Mb/s 1366.7 10933.9	1892.5 15140.1	Gb/s 208.6 417.2

ROC ioutput rate

ROC	S	L	Cap.
0	165.0	206.2	4
1	149.9	190.7	4
2	141.1	182.9	4
3	131.8	174.0	4
4	125.2	168.6	4
5	117.0	160.4	4
6	108.8	152.0	2
7	99.9	142.3	2
8	91.7	133.0	2
9	82.6	122.2	2
10	73.3	110.4	2
11	65.6	100.7	2
12	57.8	90.4	2
13	47.5	75.7	2
14	39.9	64.8	2
15	69.4	113.3	2



GBT

80 Mb/s  
160 Mb/s  
320 Mb/s

sTGC P+W			sTGC Strip			MM even			MM odd			L1DDC connector	
	Rate (Mb/s)			Rate (Mb/s)		Config ART0A	Rate (Mb/s)		Config ART1A	Rate (Mb/s)		EC	ADDC
	Small	Large		Small	Large		Small	Large		Small	Large		
Config_Det 3			Config_Det 3			Config_FE 0			Config_FE 1			0	1
Config_Det 2			Config_Det 2			Config_FE 2			Config_FE 3			1	2
Config_Det 1			Config_Det 1			Config_FE 4			Config_FE 5			2	3
						Config_FE 6			Config_FE 7			3	4
						Config_FE 8			Config_FE 9			4	5
						Config_FE 10			Config_FE 11			5	6
						Config_FE 12			Config_FE 13			6	7
						Config_FE 14			Config_FE 15			7	8
Wire D3	25.7	40.5	Strip3 D3	0.0	0.0	Strip FE 14	39.9	64.8	Strip FE 15	69.4	113.3	0	1
			Strip2 D3	34.9	51.9	Config ART0B			Config ART1B			2	ADDC
Pad D3	29.1	46.5	Strip1 D3	27.1	56.8	Strip FE 12	57.8	90.4	Strip FE 13	47.5	75.7	1	4
												6	2
Wire D2	47.7	65.8	Strip3 D2	0.0	0.0	Strip FE 10	73.3	110.4	Strip FE 11	65.6	100.7	0	3
			Strip2 D2	57.0	88.3							2	3
Pad D2	50.7	70.7	Strip1 D2	69.7	106.9	Strip FE 8	91.7	133.0	Strip FE 9	82.6	122.2	4	4
												6	4
			Strip4 D1	88.7	132.0	Strip FE 6	108.8	152.0	Strip FE 7	99.9	142.3	0	5
			Strip3 D1	90.4	134.2	Strip FE 4	125.2	168.6	Strip FE 5	117.0	160.4	4	6
Wire D1	59.2	81.8	Strip2 D1	64.5	95.3	Strip FE 2	141.1	182.9	Strip FE 3	131.8	174.0	0	7
			Strip1 D1	57.2	89.1	Strip FE 0	165.0	206.2	Strip FE 1	149.9	190.7	4	8
Pad D1	90.3	120.1											
# of E-links	9	302.7 425.4	13	489.4 754.5		17	802.8 ####		17	763.7 ####			

MM Bank 3 could be configured for 320Mb/s if needed  
 Note that for sTGC D2 and D3 strips, the second E-link on the connector is used. Two x 320 could be used for D2, but the bank for D3, bank 1 is forced to 160Mb/s if it must provide the second ART ASIC configuration E-link.  
 The third E-link for Strip D2 and D3 must come on a separate cable.

η Coverage

			Small		Large	
			IP-	IP+	IP-	IP+
sTGC front	L1	D3 min	1.249	1.225	1.268	1.246
		D3 max	1.468	1.443	1.516	1.491
		D2 min	1.478	1.452	1.525	1.501
		D2 max	1.867	1.840	1.913	1.887
		D1 min	1.882	1.855	1.928	1.902
		D1 max	2.746	2.718	2.778	2.752
	L2	D3 min	1.251	1.227	1.270	1.247
		D3 max	1.470	1.444	1.517	1.493
		D2 min	1.479	1.454	1.527	1.502
		D2 max	1.868	1.841	1.914	1.888
		D1 min	1.883	1.856	1.929	1.903
		D1 max	2.748	2.719	2.780	2.753
	L3	D3 min	1.252	1.228	1.271	1.248
		D3 max	1.471	1.445	1.518	1.494
		D2 min	1.481	1.455	1.528	1.504
		D2 max	1.870	1.843	1.915	1.890
D1 min		1.883	1.856	1.929	1.903	
D1 max		2.748	2.719	2.780	2.753	
L4	D3 min	1.253	1.229	1.272	1.249	
	D3 max	1.472	1.447	1.519	1.495	
	D2 min	1.482	1.457	1.529	1.505	
	D2 max	1.871	1.844	1.917	1.891	
	D1 min	1.885	1.858	1.930	1.905	
	D1 max	2.749	2.721	2.781	2.755	
Micromegas	In	M2 min	1.259	1.235	1.277	1.254
		M2 max	1.564	1.538	1.585	1.560
		M1 min	1.583	1.557	1.603	1.579
		M1 max	2.745	2.717	2.778	2.752
	Out	M2 min	1.284	1.260	1.300	1.278
		M1 max	1.590	1.565	1.610	1.586
sTGC pivot	L1	D3 min	1.289	1.265	1.306	1.283
		D3 max	1.510	1.485	1.555	1.532
		D2 min	1.520	1.495	1.565	1.541
		D2 max	1.911	1.885	1.954	1.930
		D1 min	1.926	1.900	1.969	1.944
		D1 max	2.792	2.765	2.821	2.796
	L2	D3 min	1.290	1.267	1.307	1.285
		D3 max	1.511	1.487	1.556	1.533
		D2 min	1.521	1.496	1.566	1.543
		D2 max	1.912	1.886	1.956	1.931
		D1 min	1.927	1.901	1.970	1.946
		D1 max	2.793	2.766	2.823	2.797
	L3	D3 min	1.291	1.268	1.308	1.286
		D3 max	1.513	1.488	1.557	1.534
		D2 min	1.522	1.498	1.567	1.544
		D2 max	1.914	1.888	1.957	1.932
		D1 min	1.927	1.901	1.970	1.946
		D1 max	2.793	2.766	2.823	2.797
	L4	D3 min	1.292	1.269	1.309	1.287
		D3 max	1.514	1.489	1.559	1.535
		D2 min	1.524	1.499	1.569	1.545
		D2 max	1.915	1.889	1.958	1.934
		D1 min	1.929	1.903	1.972	1.947
		D1 max	2.795	2.768	2.824	2.799

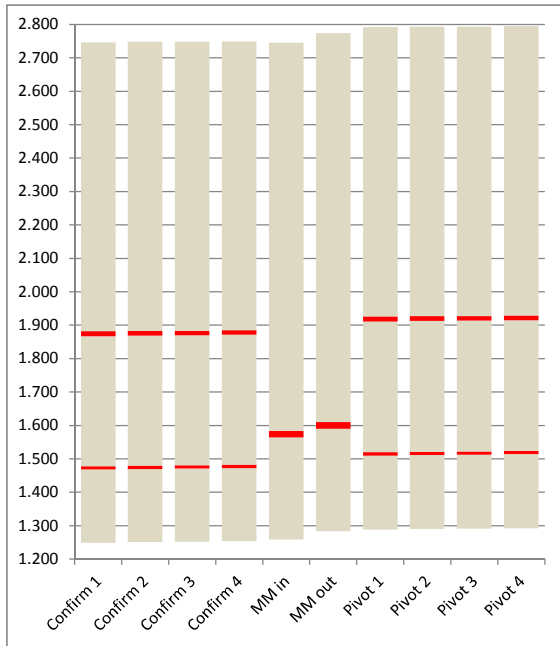
Small IP -	Base	1	2	3	4	5
Confirm 1	1.249	0.2189	0.0098	0.3889	0.0150	0.8642
Confirm 2	1.251	0.2190	0.0098	0.3890	0.0150	0.8642
Confirm 3	1.252	0.2191	0.0098	0.3891	0.0135	0.8642
Confirm 4	1.253	0.2191	0.0098	0.3892	0.0135	0.8643
MM in	1.259	0.305	0.019	1.162	0	0
MM out	1.284	0.307	0.019	1.164	0	0
Pivot 1	1.289	0.2212	0.0099	0.3912	0.0150	0.8658
Pivot 2	1.290	0.2213	0.0099	0.3913	0.0150	0.8659
Pivot 3	1.291	0.2213	0.0099	0.3914	0.0136	0.8659
Pivot 4	1.292	0.2214	0.0099	0.3914	0.0136	0.8659

Small IP +	Base	1	2	3	4	5
Confirm 1	1.225	0.2174	0.0098	0.3874	0.0149	0.8631
Confirm 2	1.227	0.2175	0.0098	0.3875	0.0149	0.8631
Confirm 3	1.228	0.2176	0.0098	0.3876	0.0134	0.8631
Confirm 4	1.229	0.2177	0.0098	0.3876	0.0134	0.8632
MM in	1.235	0.303	0.019	1.160	0	0
MM out	1.260	0.305	0.019	1.162	0	0
Pivot 1	1.265	0.2199	0.0098	0.3899	0.0150	0.8649
Pivot 2	1.267	0.2199	0.0098	0.3900	0.0150	0.8649
Pivot 3	1.268	0.2200	0.0098	0.3900	0.0136	0.8649
Pivot 4	1.269	0.2201	0.0099	0.3901	0.0136	0.8650

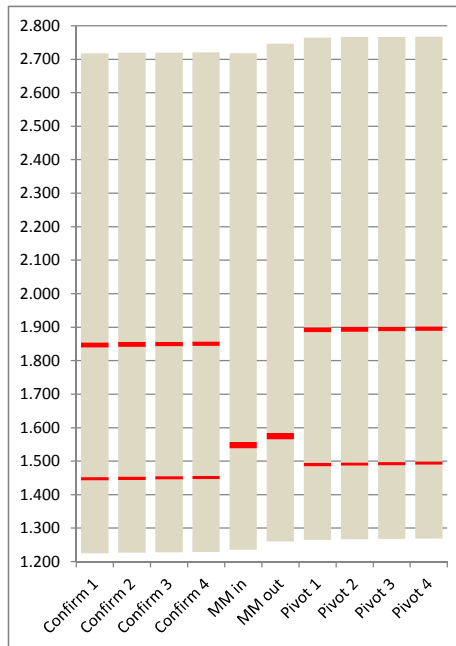
Large IP -	Base	1	2	3	4	5
Pivot 1	1.268	0.2472	0.0098	0.3874	0.0148	0.8508
Pivot 2	1.270	0.2472	0.0098	0.3874	0.0148	0.8508
Pivot 3	1.271	0.2473	0.0098	0.3875	0.0134	0.8508
Pivot 4	1.272	0.2474	0.0098	0.3876	0.0134	0.8509
MM in	1.277	0.308	0.018	1.175	0	0
MM out	1.300	0.309	0.019	1.177	0	0
Confirm 1	1.306	0.2495	0.0099	0.3893	0.0149	0.8522
Confirm 2	1.307	0.2495	0.0099	0.3894	0.0149	0.8522
Confirm 3	1.308	0.2496	0.0099	0.3895	0.0135	0.8522
Confirm 4	1.309	0.2497	0.0099	0.3895	0.0135	0.8522

Large IP +	Base	1	2	3	4	5
Pivot 1	1.246	0.2457	0.0097	0.3860	0.0148	0.8498
Pivot 2	1.247	0.2458	0.0098	0.3861	0.0148	0.8499
Pivot 3	1.248	0.2458	0.0098	0.3862	0.0134	0.8499
Pivot 4	1.249	0.2459	0.0098	0.3863	0.0134	0.8499
MM in	1.254	0.306	0.018	1.173	0	0
MM out	1.278	0.308	0.019	1.175	0	0
Confirm 1	1.283	0.2481	0.0098	0.3882	0.0148	0.8513
Confirm 2	1.285	0.2482	0.0098	0.3882	0.0148	0.8514
Confirm 3	1.286	0.2483	0.0098	0.3883	0.0135	0.8514
Confirm 4	1.287	0.2483	0.0098	0.3884	0.0135	0.8514

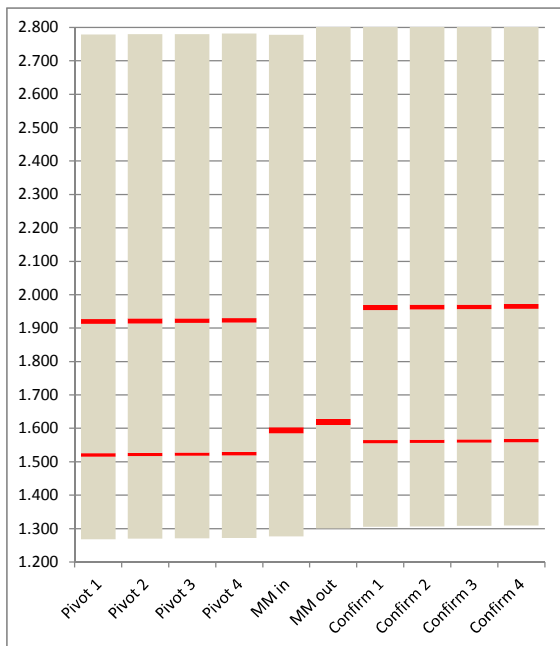
**Dead areas projectivity between STGC and MM**



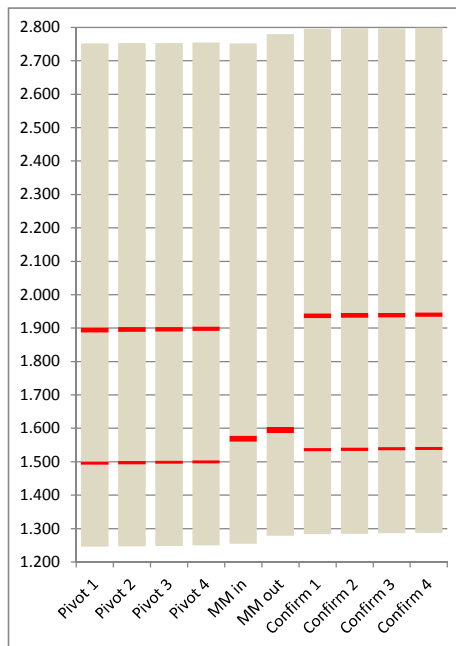
**Small Sector from IP -10cm**



**Small Sector from IP +10cm**



**Large Sector from IP -10cm**



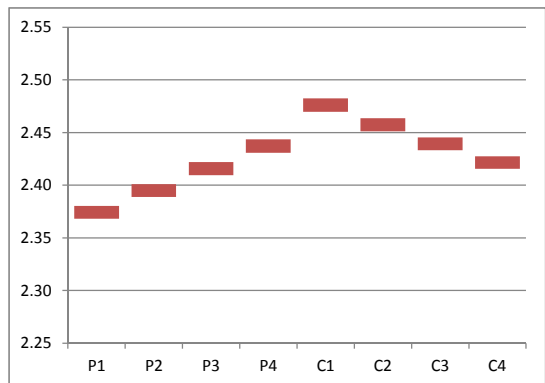
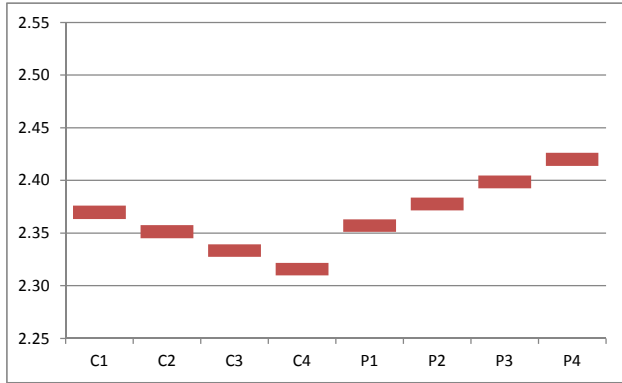
**Large Sector from IP +10cm**



**Dead areas between D0 and D1**

Layer	Small Sector				Pivot			
	Confirm	C2	C3	C4	P1	P2	P3	P4
$\eta$ min	2.363	2.345	2.327	2.310	2.351	2.372	2.392	2.414
$\Delta\eta$	0.013	0.012	0.012	0.012	0.012	0.012	0.012	0.013
$\eta$ max	2.376	2.358	2.339	2.322	2.363	2.384	2.405	2.426
$\eta$ overlap	0.005	0.006	0.000	0.000	0.006	0.005	0.000	0.000
$\Sigma \eta$ overlap	0.011				0.011			

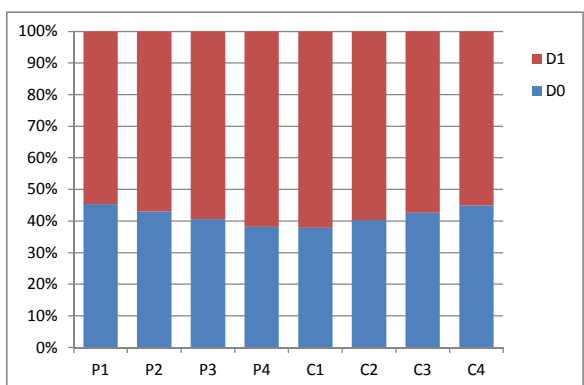
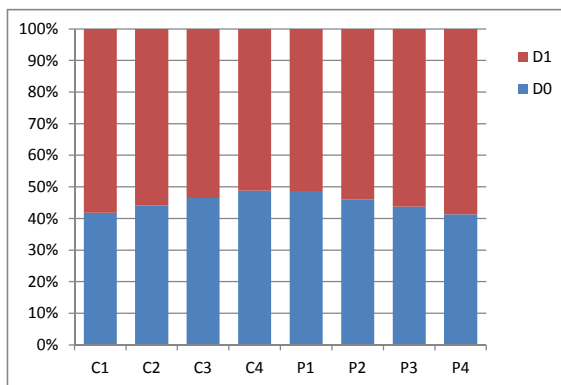
Layer	Large Sector				Confirm			
	P1	P2	P3	P4	C1	C2	C3	C4
$\eta$ min	2.368	2.389	2.410	2.431	2.470	2.451	2.433	2.416
$\Delta\eta$	0.012	0.012	0.012	0.013	0.013	0.012	0.012	0.012
$\eta$ max	2.380	2.401	2.422	2.444	2.482	2.464	2.445	2.427
$\eta$ overlap	0.000	0.000	0.007	0.010	0.000	0.000	0.010	0.007
$\Sigma \eta$ overlap	0.017				0.017			



**Rate balance between D0 and D1**

Layer	Small Sector				Pivot			
	Confirm	C2	C3	C4	P1	P2	P3	P4
D0	0.40	0.42	0.44	0.47	0.46	0.44	0.42	0.39
D1	0.55	0.53	0.51	0.49	0.49	0.51	0.54	0.56

Layer	Large Sector				Confirm			
	P1	P2	P3	P4	C1	C2	C3	C4
D0	0.69	0.65	0.62	0.58	0.57	0.61	0.64	0.68
D1	0.83	0.86	0.90	0.93	0.94	0.90	0.87	0.83



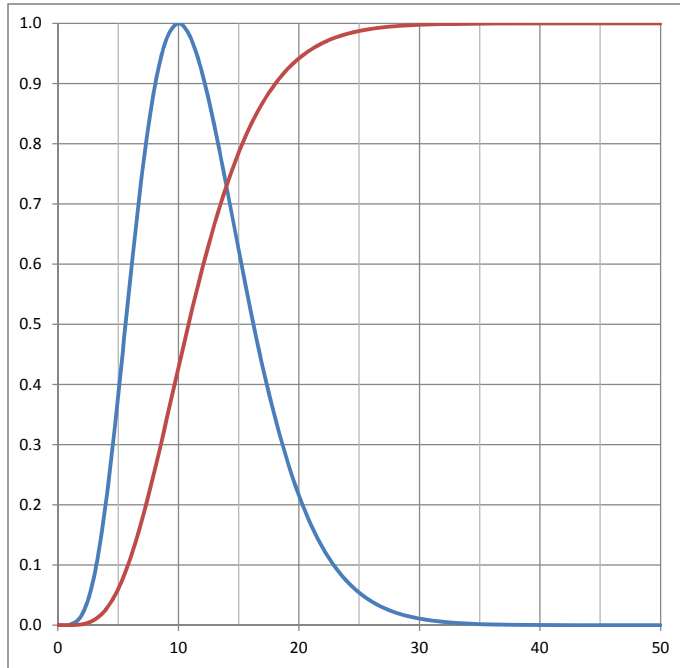
Timing and efficiencies

A model of avalanche jitter

Pad signal velocity 0.6  
 Wire signal velocity 1.0  
 Strip signal velocity 0.6

N<sub>AvalancheJitter</sub> 51  
 Time step 1.0 ns  
 Time constant 2 ns  
 Exponent 5

	Value	Norm.	Sum
0	0.00	0.000	0.000
1	0.02	0.001	0.000
2	0.37	0.017	0.002
3	1.69	0.080	0.009
4	4.33	0.206	0.027
5	8.02	0.381	0.060
6	12.10	0.575	0.111
7	15.86	0.753	0.177
8	18.76	0.891	0.255
9	20.50	0.974	0.340
10	21.06	1.000	0.428
11	20.57	0.977	0.514
12	19.27	0.915	0.594
13	17.44	0.828	0.667
14	15.33	0.728	0.730
15	13.12	0.623	0.785
16	10.99	0.522	0.831
17	9.03	0.429	0.869
18	7.29	0.346	0.899
19	5.79	0.275	0.923
20	4.54	0.216	0.942
21	3.51	0.167	0.957
22	2.69	0.128	0.968
23	2.04	0.097	0.976
24	1.53	0.073	0.983
25	1.14	0.054	0.987
26	0.84	0.040	0.991
27	0.61	0.029	0.993
28	0.45	0.021	0.995
29	0.32	0.015	0.997
30	0.23	0.011	0.998
31	0.17	0.008	0.998
32	0.12	0.006	0.999
33	0.08	0.004	0.999
34	0.06	0.003	0.999
35	0.04	0.002	1.000
36	0.03	0.001	1.000
37	0.02	0.001	1.000
38	0.01	0.001	1.000
39	0.01	0.000	1.000
40	0.01	0.000	1.000
41	0.00	0.000	1.000
42	0.00	0.000	1.000
43	0.00	0.000	1.000
44	0.00	0.000	1.000
45	0.00	0.000	1.000
46	0.00	0.000	1.000
47	0.00	0.000	1.000
48	0.00	0.000	1.000
49	0.00	0.000	1.000
50	0.00	0.000	1.000

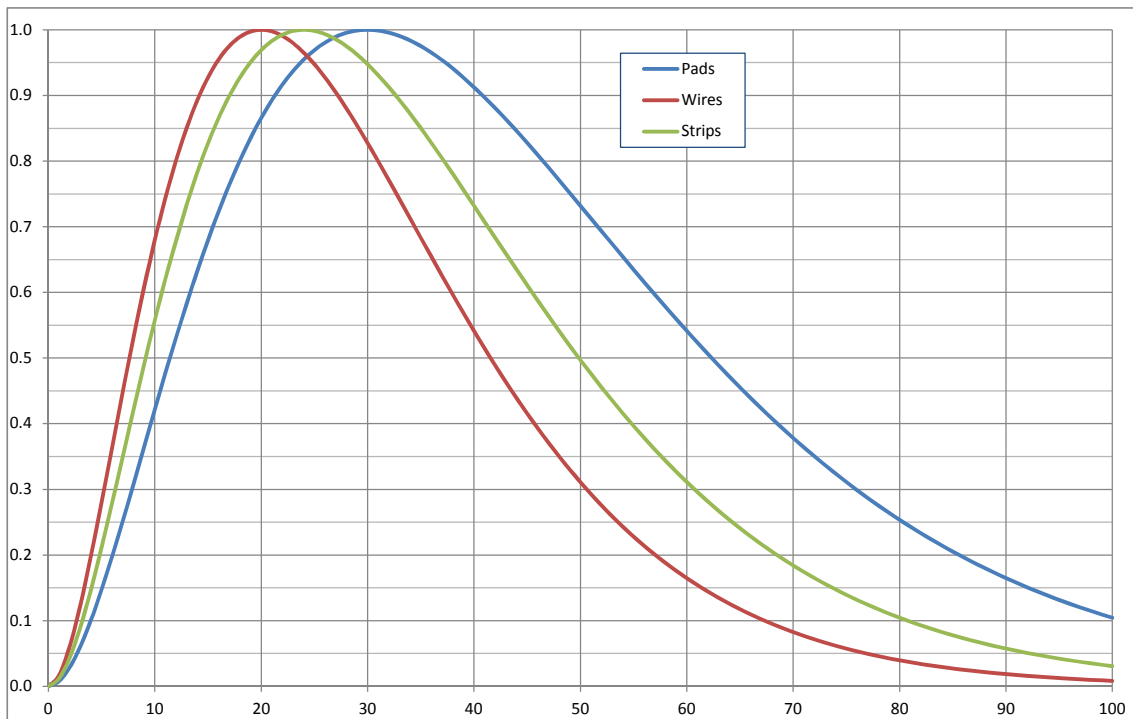


**A model of pulse shape**

Time step 1 ns  
 Npulses 101

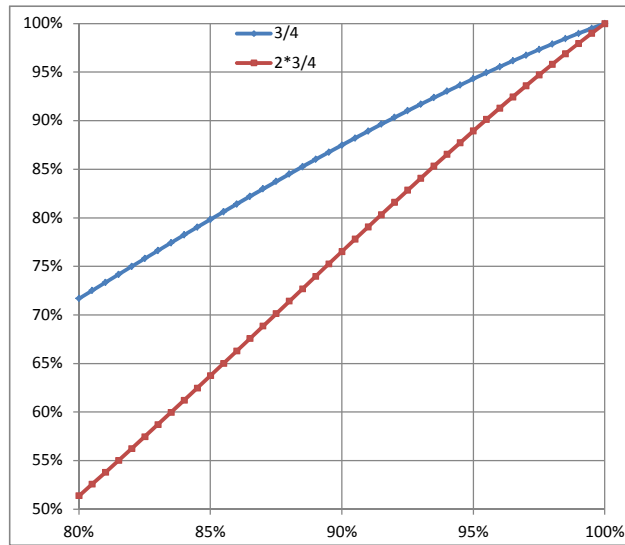
	Pads		Wires		Strips	
	Value	Norm.	Value	Norm.	Value	Norm.
Time constant	15 ns		10 ns		12 ns	
Exponent	2		2		2	
0	0.000	0.000	0.000	0.000	0.000	0.000
1	0.004	0.008	0.009	0.017	0.006	0.012
2	0.016	0.029	0.033	0.060	0.024	0.043
3	0.033	0.060	0.067	0.123	0.049	0.090
4	0.054	0.101	0.107	0.198	0.080	0.147
5	0.080	0.147	0.152	0.280	0.114	0.211
6	0.107	0.198	0.198	0.365	0.152	0.280
7	0.137	0.252	0.243	0.449	0.190	0.351
8	0.167	0.308	0.288	0.531	0.228	0.422
9	0.198	0.365	0.329	0.608	0.266	0.491
10	0.228	0.422	0.368	0.680	0.302	0.558
11	0.258	0.477	0.403	0.744	0.336	0.621
12	0.288	0.531	0.434	0.801	0.368	0.680
13	0.316	0.583	0.461	0.851	0.397	0.734
14	0.343	0.633	0.483	0.893	0.424	0.783
15	0.368	0.680	0.502	0.927	0.448	0.827
16	0.392	0.723	0.517	0.955	0.469	0.866
17	0.414	0.764	0.528	0.975	0.487	0.899
18	0.434	0.801	0.536	0.989	0.502	0.927
19	0.452	0.835	0.540	0.997	0.515	0.951
20	0.469	0.866	0.541	1.000	0.525	0.969
21	0.483	0.893	0.540	0.998	0.532	0.983
22	0.496	0.917	0.536	0.991	0.537	0.993
23	0.507	0.937	0.530	0.980	0.540	0.998
24	0.517	0.955	0.523	0.965	0.541	1.000
25	0.525	0.969	0.513	0.948	0.540	0.998
26	0.531	0.981	0.502	0.927	0.538	0.993
27	0.536	0.989	0.490	0.905	0.534	0.986
28	0.539	0.995	0.477	0.881	0.528	0.975
29	0.541	0.999	0.463	0.855	0.521	0.963
30	0.541	1.000	0.448	0.828	0.513	0.948
31	0.541	0.999	0.433	0.800	0.504	0.931
32	0.539	0.996	0.417	0.771	0.494	0.913
33	0.536	0.991	0.402	0.742	0.483	0.893
34	0.533	0.984	0.386	0.713	0.472	0.872
35	0.528	0.975	0.370	0.683	0.460	0.850
36	0.523	0.965	0.354	0.654	0.448	0.828
37	0.516	0.954	0.338	0.625	0.435	0.804
38	0.510	0.941	0.323	0.597	0.423	0.781
39	0.502	0.927	0.308	0.569	0.410	0.757
40	0.494	0.913	0.293	0.541	0.396	0.732
41	0.486	0.897	0.279	0.515	0.383	0.708
42	0.477	0.881	0.265	0.489	0.370	0.683
43	0.467	0.864	0.251	0.463	0.357	0.659
44	0.458	0.846	0.238	0.439	0.344	0.635
45	0.448	0.828	0.225	0.416	0.331	0.611
46	0.438	0.809	0.213	0.393	0.318	0.587
47	0.428	0.790	0.201	0.371	0.305	0.564
48	0.417	0.771	0.190	0.350	0.293	0.541
49	0.407	0.752	0.179	0.330	0.281	0.519
50	0.396	0.732	0.168	0.311	0.269	0.497
51	0.386	0.713	0.159	0.293	0.258	0.476
52	0.375	0.693	0.149	0.276	0.246	0.455
53	0.365	0.674	0.140	0.259	0.236	0.435
54	0.354	0.654	0.132	0.243	0.225	0.416
55	0.344	0.635	0.124	0.228	0.215	0.397
56	0.333	0.616	0.116	0.214	0.205	0.378
57	0.323	0.597	0.109	0.201	0.195	0.361
58	0.313	0.578	0.102	0.188	0.186	0.344
59	0.303	0.560	0.095	0.176	0.177	0.327
60	0.293	0.541	0.089	0.165	0.168	0.311
61	0.283	0.523	0.083	0.154	0.160	0.296
62	0.274	0.506	0.078	0.144	0.152	0.281
63	0.265	0.489	0.073	0.135	0.145	0.267
64	0.255	0.472	0.068	0.126	0.137	0.254
65	0.246	0.455	0.064	0.117	0.130	0.241
66	0.238	0.439	0.059	0.109	0.124	0.228
67	0.229	0.423	0.055	0.102	0.117	0.217

68	0.221	0.408	0.052	0.095	0.111	0.205
69	0.213	0.393	0.048	0.089	0.105	0.194
70	0.205	0.378	0.045	0.083	0.100	0.184
71	0.197	0.364	0.042	0.077	0.094	0.174
72	0.190	0.350	0.039	0.071	0.089	0.165
73	0.182	0.337	0.036	0.067	0.084	0.156
74	0.175	0.324	0.033	0.062	0.080	0.147
75	0.168	0.311	0.031	0.057	0.075	0.139
76	0.162	0.299	0.029	0.053	0.071	0.132
77	0.155	0.287	0.027	0.050	0.067	0.124
78	0.149	0.276	0.025	0.046	0.064	0.117
79	0.143	0.264	0.023	0.043	0.060	0.111
80	0.137	0.254	0.021	0.040	0.057	0.104
81	0.132	0.243	0.020	0.037	0.053	0.099
82	0.126	0.233	0.018	0.034	0.050	0.093
83	0.121	0.224	0.017	0.032	0.047	0.088
84	0.116	0.214	0.016	0.029	0.045	0.083
85	0.111	0.205	0.015	0.027	0.042	0.078
86	0.106	0.197	0.014	0.025	0.040	0.073
87	0.102	0.188	0.013	0.023	0.037	0.069
88	0.097	0.180	0.012	0.022	0.035	0.065
89	0.093	0.172	0.011	0.020	0.033	0.061
90	0.089	0.165	0.010	0.018	0.031	0.057
91	0.085	0.158	0.009	0.017	0.029	0.054
92	0.082	0.151	0.009	0.016	0.028	0.051
93	0.078	0.144	0.008	0.015	0.026	0.048
94	0.075	0.138	0.007	0.014	0.024	0.045
95	0.071	0.132	0.007	0.012	0.023	0.042
96	0.068	0.126	0.006	0.012	0.021	0.040
97	0.065	0.120	0.006	0.011	0.020	0.037
98	0.062	0.115	0.005	0.010	0.019	0.035
99	0.059	0.109	0.005	0.009	0.018	0.033
100	0.057	0.104	0.005	0.008	0.017	0.031

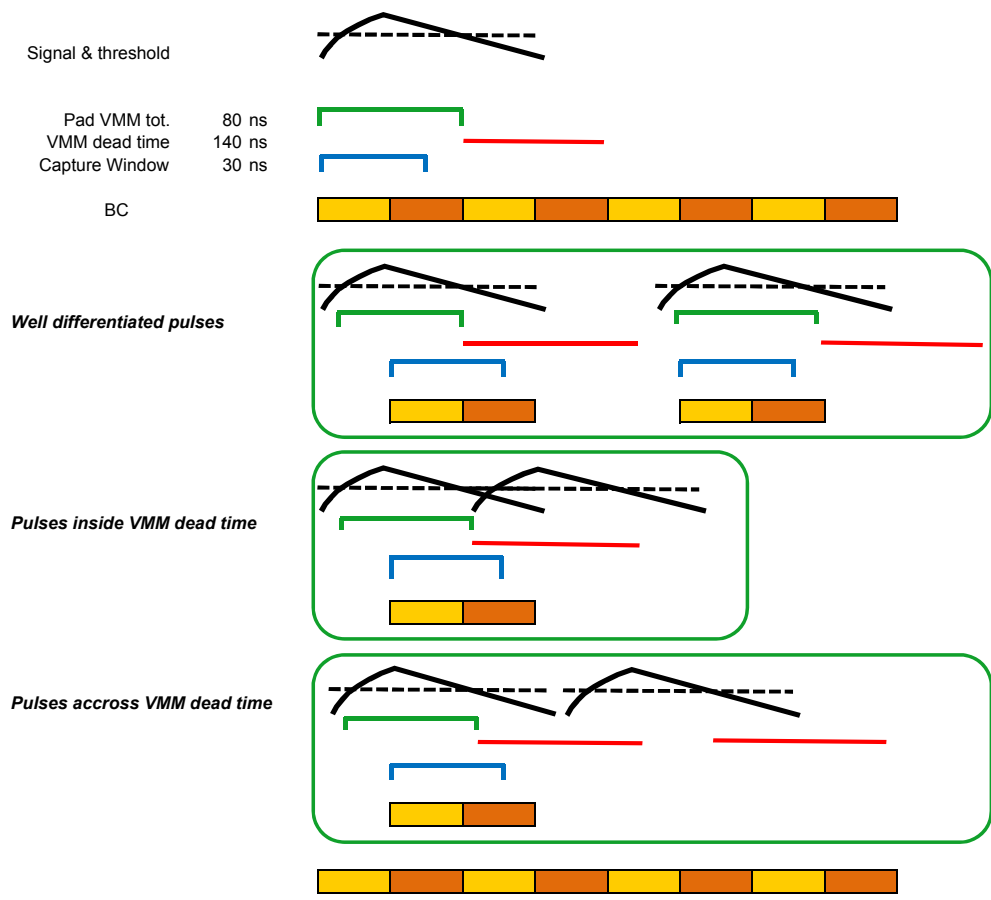


**Basic efficiency calculations**

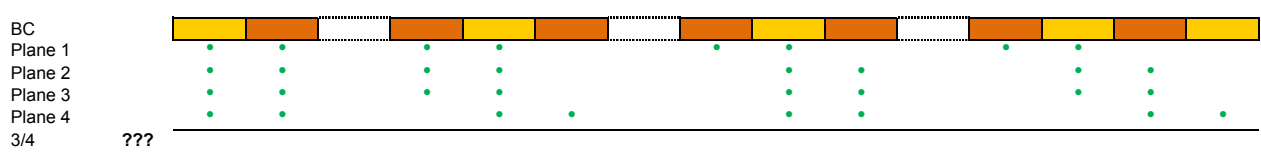
One plane	3/4	2*3/4
1.000	1.000	1.000
0.995	0.995	0.990
0.990	0.990	0.980
0.985	0.984	0.969
0.980	0.979	0.958
0.975	0.973	0.947
0.970	0.967	0.936
0.965	0.962	0.925
0.960	0.956	0.913
0.955	0.949	0.901
0.950	0.943	0.889
0.945	0.937	0.877
0.940	0.930	0.865
0.935	0.924	0.853
0.930	0.917	0.841
0.925	0.910	0.828
0.920	0.903	0.816
0.915	0.896	0.803
0.910	0.889	0.791
0.905	0.882	0.778
0.900	0.875	0.765
0.895	0.867	0.753
0.890	0.860	0.740
0.885	0.853	0.727
0.880	0.845	0.714
0.875	0.837	0.701
0.870	0.830	0.688
0.865	0.822	0.676
0.860	0.814	0.663
0.855	0.806	0.650
0.850	0.798	0.637
0.845	0.790	0.625
0.840	0.782	0.612
0.835	0.774	0.600
0.830	0.766	0.587
0.825	0.758	0.575
0.820	0.750	0.562
0.815	0.742	0.550
0.810	0.733	0.538
0.805	0.725	0.526
0.800	0.717	0.514



**A model of VMM output and dead time**



**A model of the 3/4 BC assignment**



Tolerances ( $\sigma$ ) per independent quadruplet for 1 mrad  $\theta$  accuracy

**Constants for calculations**

Delta Z Pivot-Confirm	mm	334.0	334.0	334.0	334.0	334.0	334.0	
tan $\theta$ at bottom		0.192	0.321	0.493	0.189	0.306	0.468	
tan $\theta$ at top		0.316	0.488	0.634	0.301	0.463	0.619	
Height	mm	1297.6	1166.4	980.8	1304.0	1169.6	1128.0	
Largest height of trigger band	mm	40.1	40.1	40.1	42.7	42.7	42.7	
Largest Width	mm	681.3	1040.4	1344.8	1141.1	1741.8	2058.0	
Width of largest half (staggered) pad	mm	96.5	223.2	289.8	98.0	225.7	302.0	
Sqrt(12)		3.464	3.464	3.464	3.464	3.464	3.464	
Preferred		Small Sector			Large Sector			Worst
Possible		D1	D2	D3	D1	D2	D3	case
Ideal								

**1: Tolerance in H Positioning**

No correction	mm	0.2	0.2	0.2	0.2	0.2	0.2	0.2 mm
Correction: one global offset		fully corrected			fully corrected			n.a.

**2: Tolerance in Z Positioning**

No correction	mm	0.7	0.5	0.4	0.8	0.5	0.4	0.4 mm
Correction: one offset per detector	mm	7	5	6	7	5	5	5 mm
Correction: one offset per 1/4 detector		26	20	23	29	21	22	20 mm

**3: Tolerance in  $\alpha$ : tilt such Z depends on H**

No correction (detector wide)	mm	2.0	1.4	1.3	2.1	1.5	1.2	1.2 mm
Correction: one offset per 1/4 detector	mm	8	6	5	8	6	5	5 mm
Correction: one offset per trigger band	mm	64	42	32	64	41	31	31 mm

**4: Tolerance in  $\beta$ : tilt such Z depends on  $\phi$**

No correction	mm	3.8	1.6	1.0	2.4	1.0	0.6	0.6 mm
Correction according to 1/4 detector	mm	15.2	6.4	3.8	9.5	4.1	2.6	2.6 mm
Correction according to 1/2 pad $\phi$	mm	27	8	4	28	8	4	4 mm

**5: Tolerance in  $\gamma$ : tilt such H depends on  $\phi$**

No correction	mm	1.2	0.8	0.6	0.7	0.5	0.4	0.4 mm
Correction according to 1/4 detector	mm	4.8	3.1	2.4	2.9	1.9	1.6	1.6 mm
Correction according to 1/2 pad $\phi$	mm	8	4	3	8	4	3	3 mm

**Construction**

Pad board holes	Φ(mm)	#	Strip board holes	Φ(mm)	#
Pins in HV rulers	3	6	Pins in cover rulers	3	6
Pins in HV rulers	1.5	1	Balls	1.5	2
			Brass pins	1.5	4

Small Sector						Large Sector						Total
Module 1		Module 2		Module 3		Module 1		Module 2		Module 3		
P	C	P	C	P	C	P	C	P	C	P	C	

**Module production**

Regular	16	16	16	16	16	16	16	16	16	16	16	192
Spare	2	2	2	2	2	2	2	2	2	2	2	24
Canada												72
Chile	36											36
China			36									36
Israel								36			36	72
Overall	36		36		36		36		36		36	216

**Cathode boards**

Pads	A	mm	331.8	731.0	1090.8	527.1	1196.3	1798.2	864
	B	mm	728.0	1087.1	1391.4	1191.4	1792.0	2108.2	
	H	mm	1325.6	1191.4	1005.8	1332.0	1194.6	1153.0	
	Qty		144	144	144	144	144	144	
Strips	A	mm	347.8	746.1	1106.0	544.1	1211.8	1813.7	864
	B	mm	742.3	1101.4	1405.7	1205.3	1806.0	2122.2	
	H	mm	1319.6	1188.4	1002.8	1326.0	1191.6	1150.0	
	Qty		144	144	144	144	144	144	

**Winding machine**

Table width	mm	1600.0	1400.0	1400.0	1600.0	1400.0	1400.0	432
Table thickness	mm	100.0	100.0	100.0	100.0	100.0	100.0	
N wires		371	569	739	621	953	1141	1008.0
Spool length for 2	m	1261.4	1707.0	2217.0	2111.4	2859.0	3423.0	
Rounded	m	1300	1750	2300	2200	2950	3500	432
		72	72	72	72	72	72	
Total length		93.6	126.0	165.6	158.4	212.4	252.0	1008.0

**Small parts**

Buttons in module	246	360	424	420	600	816	103176
Buttons total	8856	12960	15264	15120	21600	29376	

**Honeycomb**

Thickness	4.94	mm					
Number per quadruplet	5						
Inside base	0.0	mm					
Inside sides	0.0	mm					
Small Base	346.9	mm	746.1	1106.0	542.6	1211.8	1813.7
Large Base	743.2	mm	1102.3	1406.6	1206.8	1807.5	2115.0
Height	1325.6	mm	1191.4	1005.8	1332.0	1194.6	1153.0
Trapeze area	0.72	m <sup>2</sup>	1.10	1.26	1.17	1.80	2.26
Quantity	180		180	180	180	180	180
Total length	238.6	m	214.5	181.0	239.8	215.0	207.5
Total rectangle area	177.3	m <sup>2</sup>	236.4	254.7	289.3	388.7	438.9





**Part name (example)**

Drawing number	Host type	Part name
4748.00-73	GS3PC24	Strips plate

**Drawing number:** Project number (one per quadruplet type) and part number in the assembly drawing  
**Host Type:** In this example, Gas volumes of type Small 3, both Pivot and Confirm, Layers 2& 4  
**Part name:** Should be unique inside a given host type

**MTF codes**

20MNS	ettt	l0pnn
5	4	5

20M	ATL Muon
MS	NSW/STGC

e	Equipment
W	Wedge
Q	Quadruplet
D	Doublet
G	Gas volume
P	Pad board
S	Strip board

ttt
S0P
S0C
L0P
L0C
S1P
S2P
S3P
S1C
S2C
S3C
L1P
L2P
L3P
L1C
L2C
L3C

l	layer
---	-------

p	preseries
0	regular
1	module -1

**Objects with a code letter and a serial number (nn is the serial number, running from 01 to 16++)**

Wedge			Quadruplet			Doublet		Gas Volume		Pad Board		Strip Board	
Obj.	Types 4	Obj. 64	Obj.	Types 12	Obj. 216	Types 24	Obj. 432	Types 48	Obj. 864	Types 24	Obj. 864	Types 24	Obj. 864
16	SP	WS0P00nn	18	QS1P	QS1P00pnn	DS1P12	DS1P10pnn	GS1P1	GS1P10pnn	PS1P12	PS1P10pnn	SS1PC13	SS1P10pnn
			18	QS2P	QS2P00pnn	DS1P34	DS1P20pnn	GS1P2	GS1P20pnn	PS1P34	PS1P20pnn	SS1PC24	SS1P20pnn
			18	QS3P	QS3P00pnn	DS2P12	DS2P10pnn	GS1P3	GS1P30pnn	PS2P12	PS2P10pnn	SS2PC13	SS2P10pnn
16	SC	WS0C00nn	18	QS1C	QS1C00pnn	DS2P34	DS2P20pnn	GS1P4	GS1P40pnn	PS2P34	PS2P20pnn	SS1PC24	SS2P20pnn
			18	QS2P	QS2P00pnn	DS3P12	DS3P10pnn	GS2P1	GS2P10pnn	PS3P12	PS3P10pnn	SS3PC13	SS3P10pnn
			18	QS3C	QS3C00pnn	DS3P34	DS3P20pnn	GS2P2	GS2P20pnn	PS3P34	PS3P20pnn	SS1PC24	SS3P20pnn
16	LP	WL0P00nn	18	QL1P	QL1P00pnn	DS1C12	DS1C10pnn	GS2P3	GS2P30pnn	PS1C12	PS1C10pnn	SS1CC13	SS1C10pnn
			18	QL2P	QL2P00pnn	DS1C34	DS1C20pnn	GS2P4	GS2P40pnn	PS1C34	PS1C20pnn	SS1PC24	SS1C20pnn
			18	QL3P	QL3P00pnn	DS2P12	DS2P10pnn	GS3P1	GS3P10pnn	PS2P12	PS2P10pnn	SS2PC13	SS2P10pnn
16	LC	WL0C00nn	18	QL1C	QL1C00pnn	DS2P34	DS2P20pnn	GS3P2	GS3P20pnn	PS2P34	PS2P20pnn	SS1PC24	SS2P20pnn
			18	QL2P	QL2P00pnn	DS3C12	DS3C10pnn	GS3P3	GS3P30pnn	PS3P12	PS3P10pnn	SS3CC13	SS3C10pnn
			18	QL3C	QL3C00pnn	DS3C34	DS3C20pnn	GS3P4	GS3P40pnn	PS3P34	PS3P20pnn	SS1PC24	SS3C20pnn

Sanity checks				
Small Sector		Large Sector		Overall
Pivot	Confirm	Pivot	Confirm	

**General rules**

Consistency in active area/frame thickness	No	No
--	----	----

**Rules for whole Wedge**

First row number >= 0	Yes	Yes	Yes	Yes
Same row number at D0-D1 HVseparation	No	Yes	No	No

**Rules across modules**

	1↔2 2↔3	1↔2 2↔3	1↔2 2↔3	1↔2 2↔3	
No pad row spanning across modules	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes
No hole in pad row number across module	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes

**Rules inside modules**

	1 2 3	1 2 3	1 2 3	1 2 3	
Pad boards <1200*2100	Yes Yes Yes	Yes Yes Yes	Yes Yes No	Yes Yes Yes	No
Strip boards <1200*2100	Yes Yes Yes	Yes Yes Yes	No Yes No	Yes Yes Yes	No
Number of strips half integer	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes
Only 1 Wire VMM per layer	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes

Naming of \*.XML tags and \*.h variables

*.XML	Variable name *.h	Meaning	Unit	Drawing
STGC_WIRE_PITCH	WIRE_PITCH	Wire pitch	mm	
STGC_STRIP_PITCH	STRIP_PITCH	Strip witch	mm	1
STGC_Q_TCK	QUADRUPLET_THICKNESS	Overall thickness of a wedge	mm	
STGC_LAYERS_DELTA_Z		ZCenter of 4 layers wrt center	mm	
	STGC_OPENING	Overall opening angle	°	8
R_Z		Position of center of detector	mm	0
sWidth		Total width at small base	mm	1
lWidth		Total width at large base	mm	2
Length		Detector Height	mm	3
xFrame		Width of side frame	mm	4
ysFrame		Width of frame at small base	mm	5
yFrame		Width of frame at large base	mm	6
yCutout		Cut out at large large base	mm	7
fristStrip	FIRST_STRIP_WIDTH	Height of strip at small base	mm	2
fristTriggerBand	FIRST_PAD_ROW_DIVISION	Index of first trigger band	1	3
nTriggerBands		Number of trigger bands	band	4
frist strip in trigger		Index of first strip	strip	5
Strips in Bands		Number of strps in each band	strip	6
padH	PAD_HEIGHT	Height of pads for each layer	mm	1
nPadX		Number of pads columns	1	
nPady		Number of pads rows	1	
anglePadX	PAD_PHI_DIVISION	Opening angle of pad columns	°	2
fristPadPhi	PAD_COL_PHI0	Angle of 1st pad column division	°	3
PadPhiShift	PAD_PHI_FUZZY	Shift	mm	4
nPadH		Number of pad rows	1	
fristPadH		Height of first pad	mm	5
	H_PAD_ROW_0	Border of 1sd pad wrt IP	mm	6
sWidth		Pad area width at small base	mm	
lWidth		Par area width at large base	mm	
nWires	N_WIRES	Number of wires	1	
fristWire	WIRE_0_LOCATION	X location of 1st wire	mm	5
wireGroupWidth	WIRE_GROUP	Number of wires in a group	1	
nWireGroups	N_WIRE_GROUPS	Number of wire groups	1	
fristWireGroup	FIRST_WIRE_GROUPS	Number of wires in first group	1	
	N_STRIPS	Number of strips		
	N_STRIP_VMMS	Number of strip VMMS		
	N_STRIPS_IN_VMM	Number of strips in each VMM		
	FIRST_WIRE_INDEX	Index of first wire (left most)		
	LOST_WIRE_LEFT	Left wires of the left side		
	LOST_WIRE_RIGHT	Left wires of the right side		
	LAST_PAD_ROW_DIVISION	Index of first trigger band		1
	INDEX_LEFTMOST_COL			2
	INDEX_RIGHTMOST_COL			
	VMM_WIDTH	Width of VMM board on side	mm	
	TRIGGER_BAND_ORIGIN	$\tan(\theta)$ of 1st trigger band		
	TRIGGER_BAND_STEP	$\Delta \tan(\theta)$ of each trigger band		
	Z_CENTER_STGC_QUADRUPLET	Z of center of quadruplets		
	FIRST_SUB_GAS_VOLUME	Index of first gas sub volume		1
	LAST_SUB_GAS_VOLUME	Index of last gas sub volume		2
	STGC_WHICH_QUADRUPLET	Reverse table		
	H1_ADAPTERS			4
	H1_QUADRUPLET			
	H1_SUB_GAS_VOLUME			
	H2_ADAPTERS			5
	H2_PADS			
	H2_QUADRUPLET			
	H2_SUB_GAS_VOLUME			
	H3_ADAPTERS			6
	H3_QUADRUPLET			
	H3_SUB_GAS_VOLUME			
	A_QUADRUPLET			
	A_PADS			
	A_ADAPTERS			
	A_SUB_GAS_VOLUME			
	B_QUADRUPLET			
	B_PADS			
	B_ADAPTERS			
	B_SUB_GAS_VOLUME			

