

# RPC numbering scheme in O2

MT11			MT12			MT21			MT22						
OUT		IN	OUT		IN	OUT		IN	OUT		IN				
MT 11 OUT 9	44	8	MT 11 IN 9	MT 12 OUT 9	53	17	MT 12 IN 9	MT 21 OUT 9	62	26	MT 21 IN 9	MT 22 OUT 9	71	35	MT 11 IN 9
MT 11 OUT 8	43	7	MT 11 IN 8	MT 12 OUT 8	52	16	MT 12 IN 8	MT 21 OUT 8	61	25	MT 21 IN 8	MT 22 OUT 8	70	34	MT 11 IN 8
MT 11 OUT 7	42	6	MT 11 IN 7	MT 12 OUT 7	51	15	MT 12 IN 7	MT 21 OUT 7	60	24	MT 21 IN 7	MT 22 OUT 7	69	33	MT 11 IN 7
MT 11 OUT 6	41	5	MT 11 IN 6	MT 12 OUT 6	50	14	MT 12 IN 6	MT 21 OUT 6	59	23	MT 21 IN 6	MT 22 OUT 6	68	32	MT 11 IN 6
MT 11 OUT 5	40	4	MT 11 IN 5	MT 12 OUT 5	49	13	MT 12 IN 5	MT 21 OUT 5	58	22	MT 21 IN 5	MT 22 OUT 5	67	31	MT 11 IN 5
MT 11 OUT 4	39	3	MT 11 IN 4	MT 12 OUT 4	48	12	MT 12 IN 4	MT 21 OUT 4	57	21	MT 21 IN 4	MT 22 OUT 4	66	30	MT 11 IN 4
MT 11 OUT 3	38	2	MT 11 IN 3	MT 12 OUT 3	47	11	MT 12 IN 3	MT 21 OUT 3	56	20	MT 21 IN 3	MT 22 OUT 3	65	29	MT 11 IN 3
MT 11 OUT 2	37	1	MT 11 IN 2	MT 12 OUT 2	46	10	MT 12 IN 2	MT 21 OUT 2	55	19	MT 21 IN 2	MT 22 OUT 2	64	28	MT 11 IN 2
MT 11 OUT 1	36	0	MT 11 IN 1	MT 12 OUT 1	45	9	MT 12 IN 1	MT 21 OUT 1	54	18	MT 21 IN 1	MT 22 OUT 1	63	27	MT 11 IN 1

- IN and OUT can be accessed by a variable called “isRight” if true it’s inside, if false it's outside
- How to get this values:
  - Enter O2 environment
  - Enter root and type:
    - `#include "MIDBase/DetectorParameters.h"`
    - `cout << o2::mid::detparams::getDEId(isRight,plane,RPC) << endl`
    - isRight: can be true or false. If true -> RPC is inside else the RPC is outside
    - plane goes from 0 to 3 and 0 → MT11, 1 → MT12, 2 → MT21, 3 → MT22
    - RPC goes from 0 to 8 and 0 is the bottom RPC and 8 is the top one in each plane

# Local Board scheme

- Column numbering starts from the center of MID and goes outward
- Line numbering is different for each RPC depending on the segmentation
- For example in RPC 1 in there is only one line (number 0) in all columns
  - In RPC 6 instead in column 0 we have 3 lines (0,1,2) and in column 1 we have 4 (0,1,2,3)
- Examples:
  - LB 67 → column 3, line 1
  - LB 9 → column 0, line 9
  - LB172 → column 2, line 3

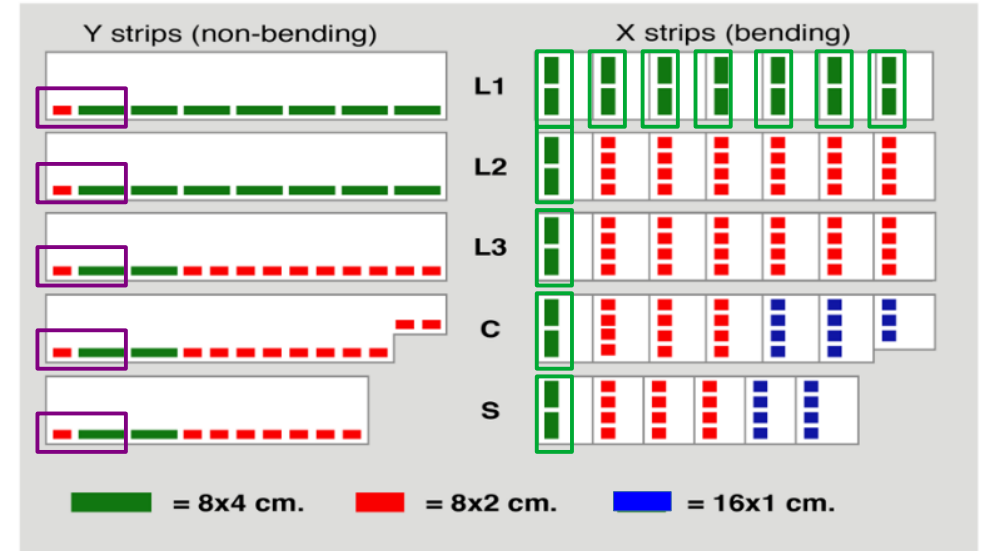
	COL7	....	COLO	COLO	....	COL7									
05 9.Out	234 LC7L9B1	225 LC6L9B1	209 LC5L9B1	193 LC4L9B1	177 LC3L9B1	155 LC2L9B1	133 LC1L9B1	16 RC1L9B1	38 RC2L9B1	60 RC3L9B1	76 RC4L9B1	92 RC5L9B1	108 RC6L9B1	117 RC7L9B1	04 9.In
06 8.Out	233 LC7L8B1	224 LC6L8B2	208 LC5L8B2	192 LC4L8B2	176 LC3L8B2	154 LC2L8B2	132 LC1L8B2	15 RC1L8B2	37 RC2L8B2	59 RC3L8B2	75 RC4L8B2	91 RC5L8B2	107 RC6L8B2	116 RC7L8B1	03 8.In
07 7.Out	232 LC7L7B1	222 LC6L7B2	206 LC5L7B2	190 LC4L7B2	174 LC3L7B2	152 LC2L7B2	130 LC1L7B1	13 RC1L7B1	35 RC2L7B2	57 RC3L7B2	73 RC4L7B2	89 RC5L7B2	105 RC6L7B2	115 RC7L7B1	02 7.In
08 6.Out	231 LC7L6B1	220 LC6L6B2	204 LC5L6B2	188 LC4L6B2	172 LC3L6B3	150 LC2L6B3	128 LC1L6B3	11 RC1L6B3	33 RC2L6B3	55 RC3L6B3	71 RC4L6B2	87 RC5L6B2	103 RC6L6B2	114 RC7L6B1	01 6.In
09 5.Out	230 LC7L5B1	219 LC6L5B1	203 LC5L5B1	187 LC4L5B1	170 LC3L5B2	148 LC2L5B2	126 LC1L5B1	9 RC1L5B1	31 RC2L5B2	53 RC3L5B2	70 RC4L5B1	86 RC5L5B1	102 RC6L5B1	113 RC7L5B1	00 5.In
10 4.Out	229 LC7L4B1	218 LC6L4B2	202 LC5L4B2	186 LC4L4B2	168 LC3L4B3	146 LC2L4B3	125 LC1L4B3	8 RC1L4B3	29 RC2L4B3	51 RC3L4B3	69 RC4L4B2	85 RC5L4B2	101 RC6L4B2	112 RC7L4B1	17 4.In
11 3.Out	228 LC7L3B1	215 LC6L3B1	199 LC5L3B1	183 LC4L3B1	163 LC3L3B2	141 LC2L3B2	123 LC1L3B1	6 RC1L3B1	24 RC2L3B2	46 RC3L3B2	66 RC4L3B1	82 RC5L3B1	98 RC6L3B1	109 RC7L3B1	16 3.In
12 2.Out	227 LC7L2B1	212 LC6L2B2	196 LC5L2B2	180 LC4L2B2	158 LC3L2B2	136 LC2L2B2	120 LC1L2B2	3 RC1L2B2	19 RC2L2B2	41 RC3L2B2	63 RC4L2B2	79 RC5L2B2	95 RC6L2B2	110 RC7L2B1	15 2.In
13 1.Out	226 LC7L1B1	210 LC6L1B1	194 LC5L1B1	178 LC4L1B1	156 LC3L1B1	134 LC2L1B1	118 LC1L1B1	1 RC1L1B1	17 RC2L1B1	39 RC3L1B1	61 RC4L1B1	77 RC5L1B1	93 RC6L1B1	109 RC7L1B1	14 1.In

□ = RPC

□ = Board

# LB and strips

- If the strip pitch is 4 cm → a LB reads 8 strips
- If the strip pitch is 2 cm → a LB reads 16 strips
- If the strip pitch is 1 cm → a LB reads 16 strips
- **Exception 1**
  - One LB reads 8 strips with 4 cm pitch + 8 strips with 2 cm pitch
- **Exception 2**
  - One LB reads 16 strips with 2 cm pitch

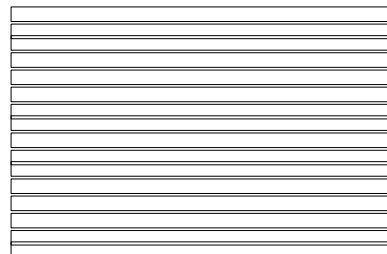


# Column data format

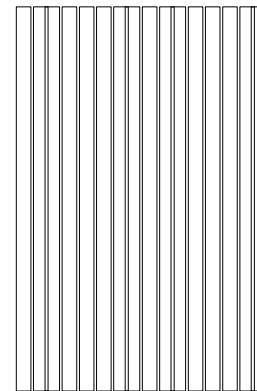
- Way in which the MID data is saved
- Stored in  
[O2 >> DataFormats >> Detectors >> MUON >> MID include >> DataFormatsMID >> ColumnData.h](#)
- What is important for us is the *pattern*
  - We also have to indicate the detector element, line and column
  - It is an `std::array` with 5 elements
  - Each element is a base 16 number (0x....)
  - The first four elements represent the bending plane strips from the bottom to the top
    - There are four elements because at most there are 4 lines (see slide 2). If in the specified detector element there are less than 4 lines, the absent lines are discarded
  - The last one the non-bending plane strips from left to right
    - If in the specified detector element there are only 8 strips one should be careful to set the values only for them

Ceiling

Bending plane



Non-bending plane



Floor

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11	33	MT11 IN 6 deld = 5
10	32	
9	31	
	30	

- LB 9 → column 0, line 0, 16 strips BP
- LB 10 → column 0, line 1, 16 strips BP
- LB 11 → column 0, line 2, 16 strips BP
- LB 30 → column 0, line 0, 16 strips BP
- LB 31 → column 0, line 1, 16 strips BP
- LB 32 → column 0, line 2, 16 strips BP
- LB 33 → column 0, line 3, 16 strips BP
- Same NBP pattern read by LBs 9,10,11
- Same NBP pattern read by LBs 30,31,32,33
- Example of pattern for LB 10 on BP:
  - 0x1FB0 → 0001 1111 1011 0000

