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# Map of the trigger sectors for the muon detector

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## Abstract

In this document, we define the area read by an optical link for each station of the muon detector. We assign an unique identifier to each area named trigger sector.

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# 1 Introduction

In this document, we define the maps of the trigger sector for the muon detector. A trigger sector contains a set of logical channels. Each trigger sector is read by one optical link carrying logical channels from the muon detector to the L0 muon trigger.

The total number of trigger sectors (optical links) as a function of station and region is summarized in Table 1, for a quarter of the muon system.

Station	Region	Number of optical links per quarter of region	Number of pads per optical links	Number of horizontal strips per optical link	Number of vertical strips per optical link	Total number of logical channels per link
M1	R1	24	24			24
	R2					
	R3					
	R4					
M2 or M3	R1	12		16	12	28
	R2	24		4	12	16
	R3	12		4	24	28
	R4	12		4	24	28
M4 or M5	R1	12	24			24
	R2	12		8	6	14
	R3	12		4	6	10
	R4	12		4	6	10

**Table 1: Number of trigger sectors (optical links) as a function of station and region for a quarter of the muon system. The content of each optical link in term of logical channels is also given in the last four columns.**

In section 2, we define the numbering scheme use to identify each component of the L0 muon trigger. In section 2, we present the maps of the trigger sector and the identifier associated to each of them.

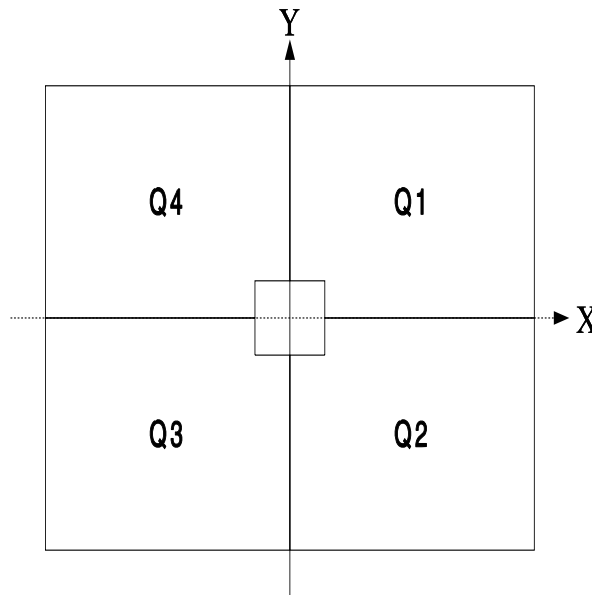
## 2 L0 muon trigger numbering scheme

The level 0 muon trigger contains many elements: logical pads; logical strips; optical links; processing units; processor boards. An element is identified by a unique number. The pattern of this identifier is the following  $Q_i M_j R_k N_x N_y$  where:

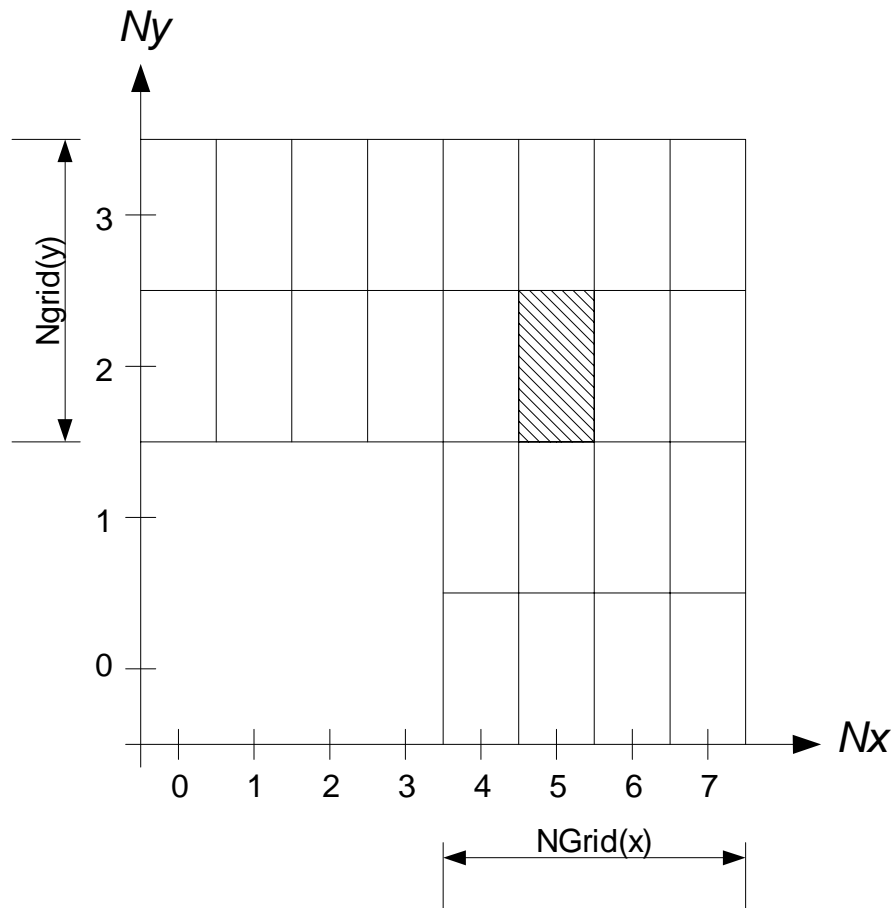
- $Q_i$  define a quarter of the muon system as shown in Figure 1;
- $M_j$  defines a station of the muon system (M1, M2, M3, M4, M5)
- $R_k$  defines a region of a station (R1, R2, R3, R4)
- $N_x$  and  $N_y$  define the position of the element within the region as shown in Figure 2.

The reference to a quarter or to a station can be dropped when they are no ambiguity. For example, the numbering scheme is the same for all quarters. Thus, the reference to the quarter can be dropped in most of the case. The numbering of the processing unit does not depend on the station. In that case, the reference to the station can be removed.

Such identifier is used in the software and as far as possible in the hardware.



**Figure 1: Cross section of the muon system showing the number for the quarter.**



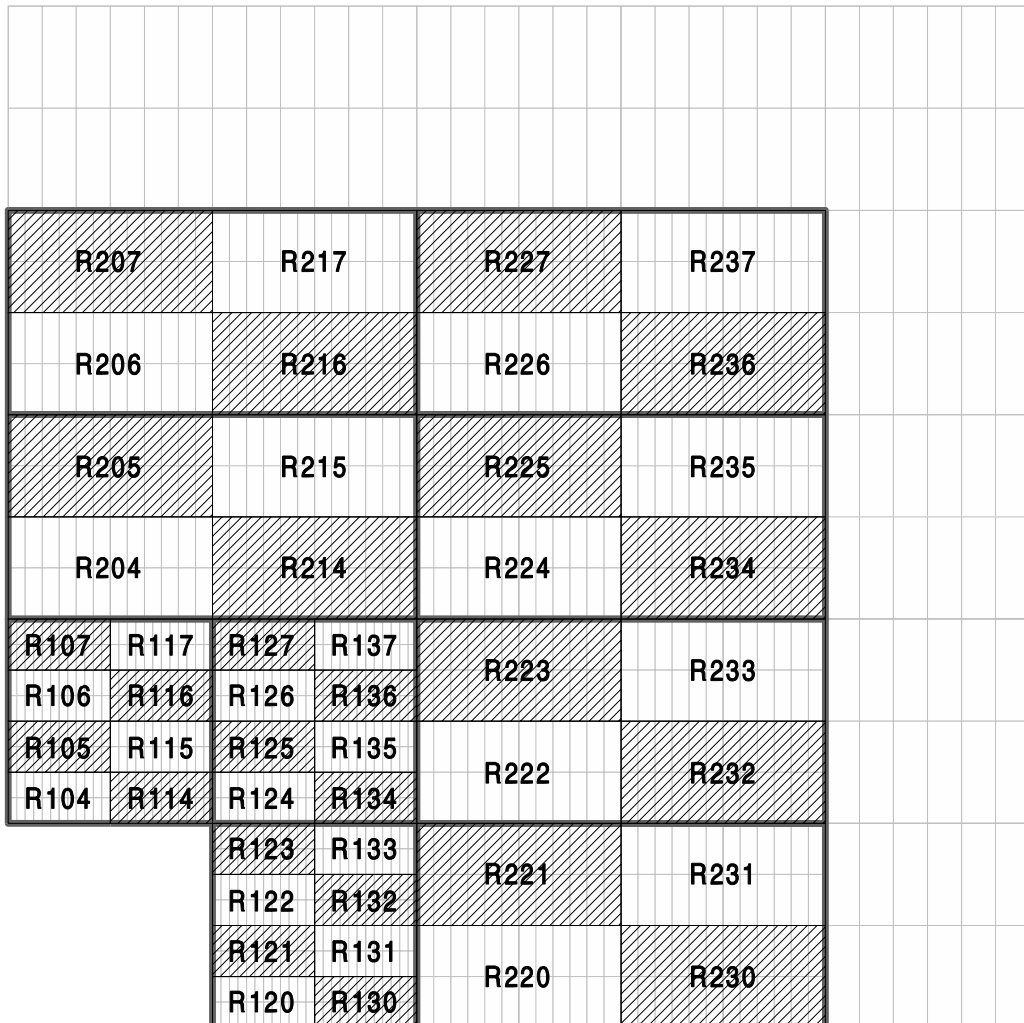
**Figure 2: The numbering of an element within a quarter of a region.**  
The values of  $N_x$  varies respectively between 0 and  $2 \cdot N_{Grid}(x) - 1$  while the value of  $N_y$  varies between 0 and  $2 \cdot N_{Grid}(y) - 1$ . In this example,  $N_{Grid}(x) = 4$  and  $N_{Grid}(y) = 2$ . The position of the hashed element is  $N_x = 5$  and  $N_y = 2$ .

### 3 Maps for trigger sectors

Figure 3 to 8 show the map of trigger sector for each station. They are two figures per station. The first one is devoted to region R1 and R2 while the second one is for region R4 and R5. In both cases only a quarter of the station is shown.

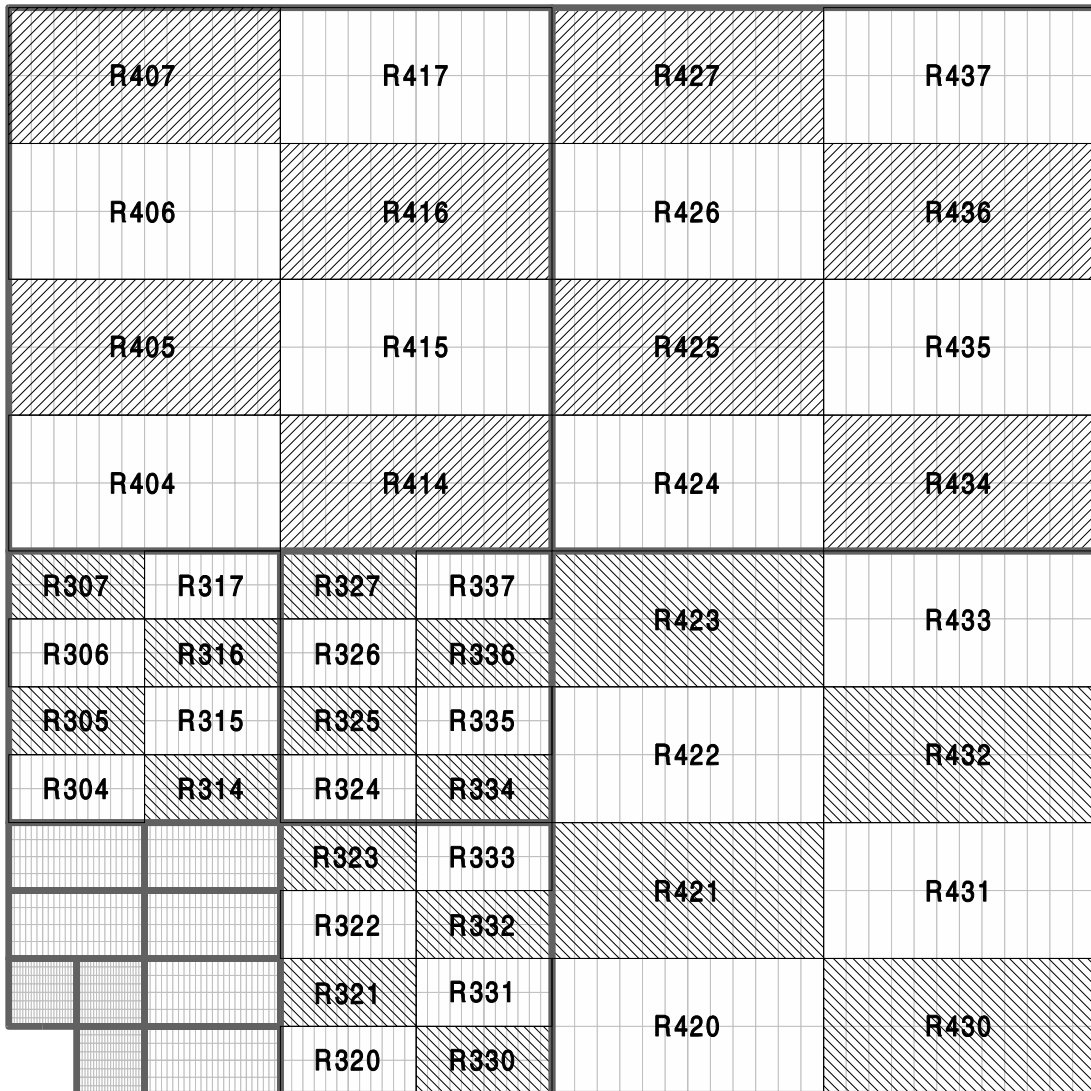
On each figure the logical pad/strip structure is shown with the boundary of the processor board. For completeness we also write the identifier of each trigger sector. The identifier is the same for the connected optical link.

### 3.1 Station M1



*Figure 3: Map for the trigger sectors for station M1 region R1 and R2. The thin lines show the pad structure while the thick ones delimit the Processing Boards. The number at the center of the rectangle is the trigger sector identifier. The identifier is the same for the optical link connected to the trigger sector. Notice that the reference to the station is dropped for readability.*

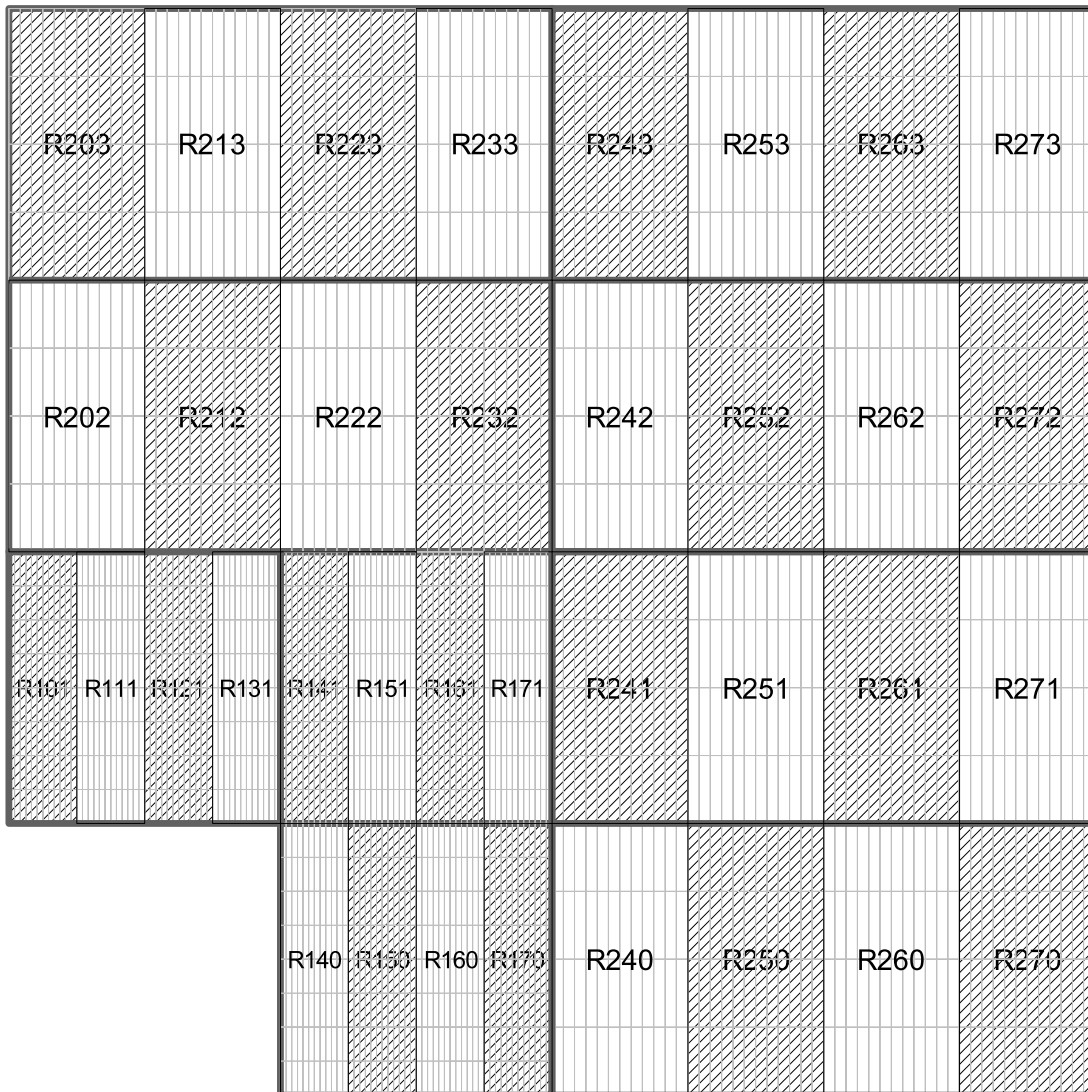




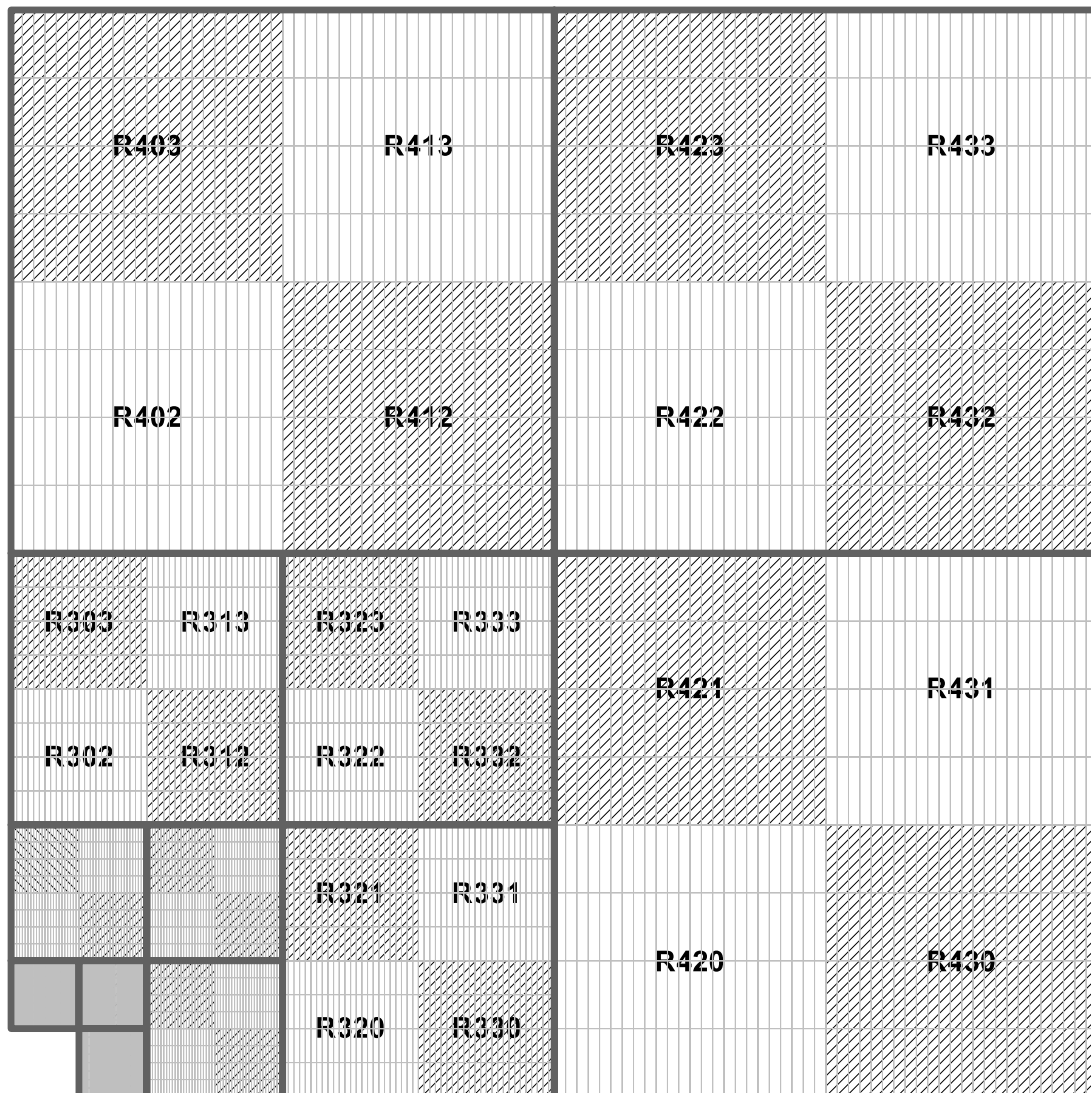
**Figure 4: Map for the trigger sectors for station M1 region R3 and R4. The thin lines show the pad structure while the thick ones delimit the Processing Boards. The number at the center of the rectangle is the trigger sector identifier. The identifier is the same for the optical link connected to the trigger sector. Notice that the reference to the station is dropped for readability.**

### 3.2 Station M2 and M3

The organization of the trigger sectors is identical for station M2 and M3.



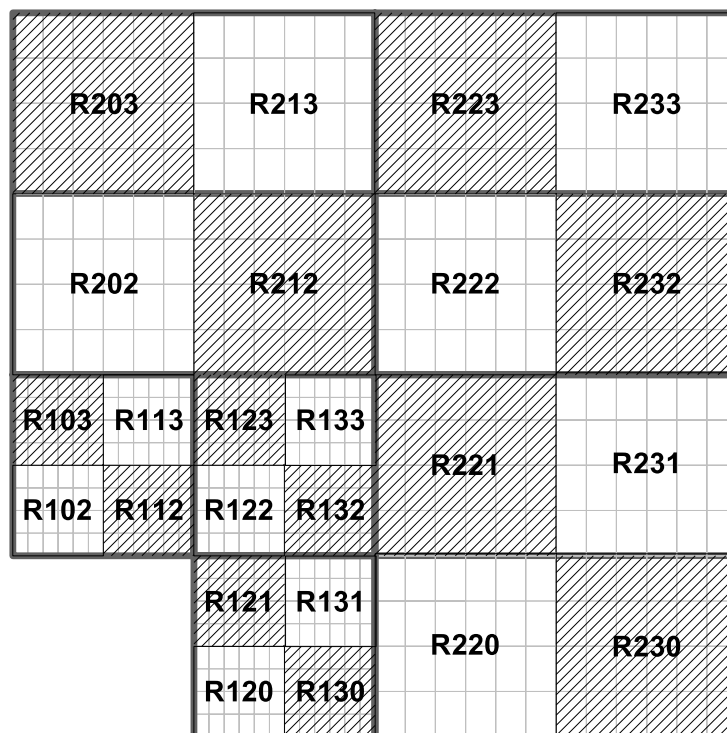
**Figure 5: Map for the trigger sectors for station M2 (M3) region R1 and R2. The thin lines show the strip structure while the thick ones delimit the Processing Boards. The number at the center of the rectangle is the trigger sector identifier. The identifier is the same for the optical link connected to the trigger sector. Notice that the reference to the station is dropped for readability.**



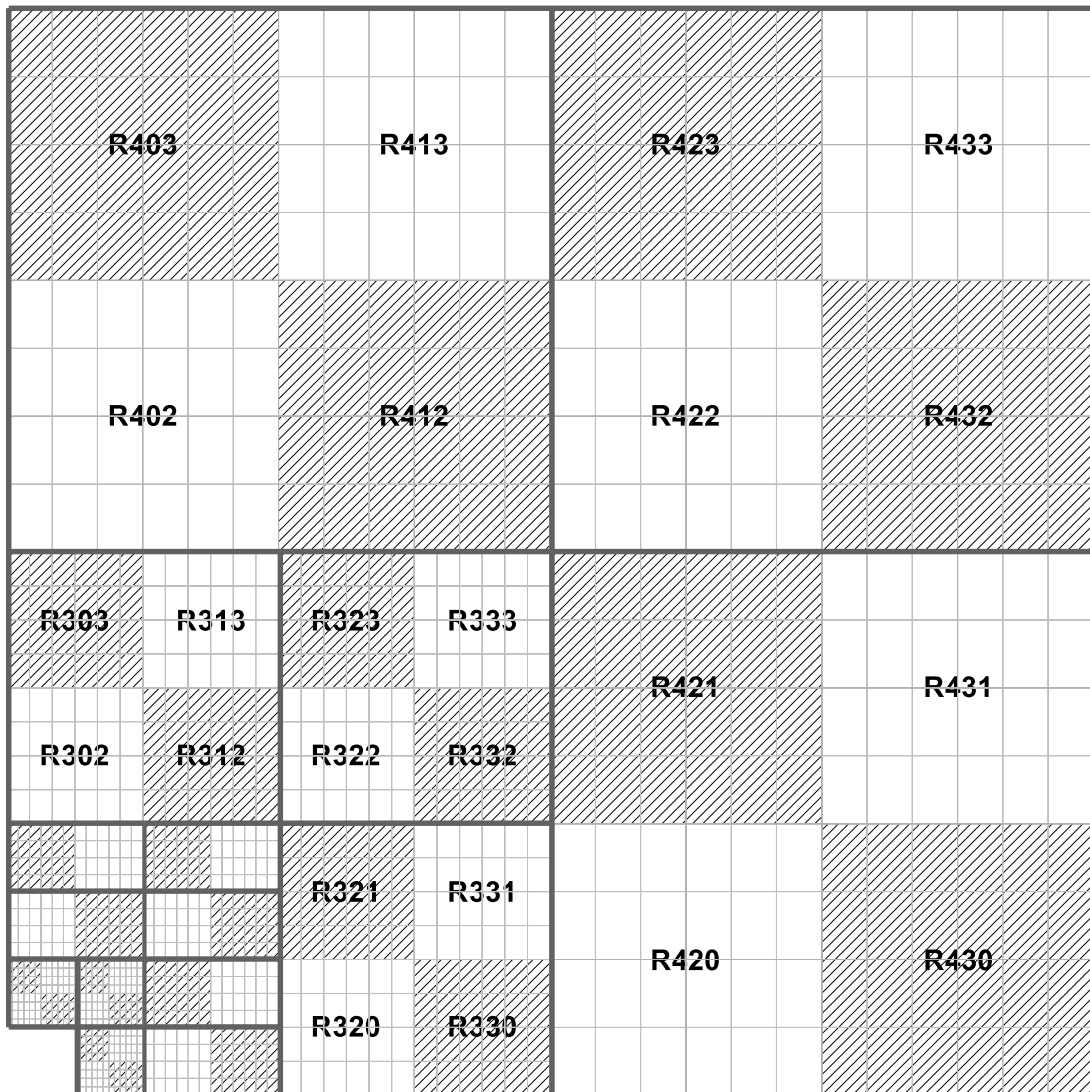
**Figure 6: Map for the trigger sectors for station M2 (M3) region R3 and R4. The thin lines show the strip structure while the thick ones delimit the Processing Boards. The number at the center of the rectangle is the trigger sector identifier. The identifier is the same for the optical link connected to the trigger sector. Notice that the reference to the station is dropped for readability.**

### 3.3 Station M4 and M5

The organization of the trigger sectors is identical for station M4 and M5.



*Figure 7: Map for the trigger sectors for station M4 (M5) region R1 and R2. The thin lines show the pad/strip structure while the thick ones delimit the Processing Boards. The number at the center of the rectangle is the trigger sector identifier. The identifier is the same for the optical link connected to the trigger sector. Notice that the reference to the station is dropped for readability.*



**Figure 8:** Map for the trigger sectors for station M4 (M5) region R3 and R4. The thin lines show the pad/strip structure while the thick ones delimit the Processing Boards. The number at the center of the rectangle is the trigger sector identifier. The identifier is the same for the optical link connected to the trigger sector. Notice that the reference to the station is dropped for readability.