

2 \MC – Magic Cell

\MC (magic cell) combines the facilities of \multirow and \multicolumn from the multirow package, and \makecell from the titular package. With the help of LuaLaTeX, it takes an easy-to-use cell specification and employs said commands as required. \MC will not work properly if your table is only 1 column wide (you probably don't need MC in that case anyway...). Here is the usage:

```
\MC * [cell spec] <cell format> (override multicolumn col) {contents}
```

- * This will wrap the entire command in {}. This is necessary for siunitx single-column width columns. However, the \MC command attempts to detect this automatically.

[cell spec] Any letters placed in this argument are used for cell alignment. You can use one of three: t, m, b for top, middle, bottom (vertical alignment), and/or l, c, r for horizontal alignment, in no particular order. By default, \MC will try to autodetect the horizontal alignment based on the current column. If it can't, it will be left-aligned. The default vertical alignment is top. More on this in section 2.1.

This argument can also contain two integers, separated by a comma (if two are used). C,R, C, or ,R are a valid inputs, where R=rows (int), and C=columns, (int). If you want a 1 column wide, multirow cell, you can pass ,R. These numbers can be negative (positive numbers occupy columns to the right and rows below, and negative numbers occupy columns to the left and rows above). If no spec is passed, (argument empty), \MC acts like a makecell. Additionally, you can pass + in place of C (number of columns wide), and it will make the cell width fill until the end of the current row.

Examples:

\MC[2,2] means two columns wide, two rows tall.

\MC[2,1] or \MC[2] means two columns wide, one row tall.

\MC[1,2] or \MC[,2] means one column wide, two rows tall.

\MC[+,2], if placed in the first column, occupies the entire row and is two rows tall.

\MC[+,2], if placed in the second column, occupies the second column to the end of the table and is two rows tall.

In any of these examples, you can place the alignment letters anywhere. So, \MC[l1,2b] and \MC[1,2 lb] are both left-bottom aligned (spaces are ignored).

(override multicolumn) You may want to adjust the column specification of a multicolumn cell, for example, using (@{}c@{}) to remove padding between the cell.

<cell format> You can place formatting like \bfseries here.

2.1 Defaults

The tabular[*] environment is re-defined to use Lua pattern matching to parse the column specification of the table. This is done to determine how many columns there

are, and what the current column type is, even if specifications like `r@{.}l*{3}{r}` are used. If you have defined a column that expands many, you should register it with `\setMCrep1{?}{??}` where `?` is your column and `??` is what it expands to. You can also specify default horizontal and vertical alignments (ie if alignment not passed to `\MC`) for an arbitrary column by `\setMChordef{?}{l|r|c}` and `\setMChordef{?}{t|m|b}`, where `?` is the column. To add a column that should be surrounded by brackets for `siunitx` purposes, do so with `\addMCsicol{?}`. `S` is included by default.

2.2 Examples

2.2.1 A good use for headers

<pre> 1 \begin{tabular}{ l l l }\toprule 2 \MC[+m]<\itshape>{A Decent 3 Example}\midrule 4 & \MC[2m]{Heading} \midrule↔ {2-} 5 \MC[b,-2]{Multi\\Line} & A & B \midrule↔ midrule 6 \end{tabular} </pre>	<table border="0" style="border-collapse: collapse;"> <tr><td colspan="3" style="border-top: 1px solid black; border-bottom: 1px solid black;"></td></tr> <tr><td style="border-right: 1px solid black; padding-right: 10px;"><i>A Decent Example</i></td><td colspan="2"></td></tr> <tr><td style="border-right: 1px solid black; padding-right: 10px;">Multi</td><td style="border-right: 1px solid black; padding-right: 10px;">Heading</td><td></td></tr> <tr><td style="border-right: 1px solid black; padding-right: 10px;">Line</td><td style="border-right: 1px solid black; padding-right: 10px;">A</td><td>B</td></tr> </table>				<i>A Decent Example</i>			Multi	Heading		Line	A	B
<i>A Decent Example</i>													
Multi	Heading												
Line	A	B											

2.2.2 A small example

<pre> 1 \begin{tabular}{ l l l }\midrule 2 A & \MC[mc2,2]{Lttrs} & \\ 3 B & & \\ 4 1 & A & B \\ 5 \end{tabular} </pre>	<table border="0" style="border-collapse: collapse;"> <tr><td colspan="3" style="border-top: 1px solid black;"></td></tr> <tr><td style="border-right: 1px solid black; padding-right: 10px;">A</td><td style="border-right: 1px solid black; padding-right: 10px;">Lttrs</td><td></td></tr> <tr><td style="border-right: 1px solid black; padding-right: 10px;">B</td><td style="border-right: 1px solid black; padding-right: 10px;"></td><td></td></tr> <tr><td style="border-right: 1px solid black; padding-right: 10px;">1</td><td style="border-right: 1px solid black; padding-right: 10px;">A</td><td>B</td></tr> </table>				A	Lttrs		B			1	A	B
A	Lttrs												
B													
1	A	B											

2.2.3 A small bad example

Notice that the top-aligned p-column doesn't play particularly well with the middle aligned `\MC`

<pre> 1 \begin{tabular}{ p{1cm} l }\toprule 2 hello\newline world 3 & \MC[mr]{11\\2} \\ 4 \end{tabular} </pre>	<table border="0" style="border-collapse: collapse;"> <tr><td colspan="2" style="border-top: 1px solid black;"></td></tr> <tr><td style="border-right: 1px solid black; padding-right: 10px;">hello</td><td style="padding-left: 10px;">11</td></tr> <tr><td style="border-right: 1px solid black; padding-right: 10px;">world</td><td style="padding-left: 10px;">2</td></tr> </table>			hello	11	world	2
hello	11						
world	2						

2.2.4 If you insist on vertical lines

```

1 \begin{tabular}{|c|c|c|} \hline
2 1 & 2 & 3\\\hline
3 4 & \MC[2,2cm](@{}c@{}|)%
4 <\ttfamily>{5}\\\cline{1-1}
5 & \MC[2](r|){} \\ \hline%hacky fix
6 6 & 7 & 8\\\hline
7 \end{tabular}

```

1	2	3
4	5	
6	7	8

2.2.5 A perhaps useful example

```

1 \begin{tabularx}{\linewidth}{S[table-↵
   format=2.1,table-alignment=left]X}
2 % err & ... \\% ERROR, not wrap
3 \MC{Error,}% & Comment \\% MC ↵
   helps
4 3.1 & \MC[,2]{multi-line\\comment}\\
5 10.1& \\
6 \MC[2c]{... ...} \\
7 \end{tabularx}

```

Error,%	Comment
3.1	multi-line
10.1	comment

2.2.6 A messy example

```

1 \begin{tabular}{| c | c | c | c | c | ↵
   c |}\toprule
2 \MC[2,2cm]<\ttfamily>{2,2cm} & \MC↵
   [2r]<\ttfamily>{2r} & 5 & \MC[,2b↵
   ]<\ttfamily>{,2b}\\
3 & & 3 & 4 & 5 & \\ \midrule
4 1 & 2 & \MC[21](@{}1)<\ttfamily>{21 ↵
   (\@{}1)} & 5 & 6666\\\cmidrule↵
   {3-4}
5 1 & \MC[+r]<\ttfamily>{+r} \\
6 \\
7 1 & 2 & 3 & 4 & 5 & \MC[, -2]<\↵
   ttfamily>{, -2}\\
8 \end{tabular}

```

2,2cm	3	2r	5	,2b	
1	2	21 ({}1)	5	6666	
1				+r	
1	2	3	4	5	-2

3 Some additional rules

This package also redefines the `booktabs` midrules.

`\gmidrule` is a full gray midrule.

By taking advantage of knowing how many columns there are (if you chose to redefine `tabular`), you can specify individual column numbers (for a one column wide rule), or reference with respect to the last column (blank, `+1`, `+0`, or `+` means last column, `+2` means second last column, for example) or omit the last number.

`\cmidrule` is a single partial rule, with the above features

`\gcmidrule` is a single partial gray rule, with the above features

You can add multiple `cmidrule`'s with the `(g)cmidrules` command. Separate with a comma. You can apply global trimming of the rules with the `()` optional argument, and then override it for a specific rule by placing `r` or `l` with the span specification.

`\gcmidrules` Can produce multiple, light gray partial rules

`\cmidrules` Can produce multiple black partial rules.

Here's an example:

```

1 \begin{tabular}{c c c c c c}
2 1 & 2 & 3 & 4 & 5 & 6 \\
3 \cmidrule{+1} % rule on last column
4 1 & 2 & 3 & 4 & 5 & 6 \\
5 \cmidrules{1,3-+3,+} % rule on first col, third to third last col, and last col
6 1 & 2 & 3 & 4 & 5 & 6 \\
7 \cmidrules{1,3-+3rl,+} % same as above, but trim middle
8 1 & 2 & 3 & 4 & 5 & 6 \\
9 \gcmidrules(1){1,r3-+3,+1}% trim left for all, but only trim right for middle rule
10 1 & 2 & 3 & 4 & 5 & 6 \\
11 \gcmidrule{+1} % rule on last column
12 1 & 2 & 3 & 4 & 5 & 6 \\
13 \gcmidrules{1,3-+3,+} % rule on first col, third to third last col, and last col
14 1 & 2 & 3 & 4 & 5 & 6 \\
15 \gcmidrules{1,3-+3rl,+} % same as above, but trim middle
16 1 & 2 & 3 & 4 & 5 & 6 \\
17 \gcmidrules(1){1,r3-+3,+1}% trim left for all, but only trim right for middle rule
18 \end{tabular}

```

1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6

3.1 Midrule every Xth row

`\midruleX` With this command, you can place a rule every X rows. To use, place `@{\midruleX}` at the end of the tabular column spec, eg. `\begin{tabular}{l@{\midruleX}}`... You can configure the step size and what kind of midrule you prefer with the following key-val syntax, with default values below:

```
\setmidruleX{step=5,rule=midrule,reset=false,resetnum=0,cntr=0}
```

`step` is the number of rows (X) before applying the rule set by `rule`.

Concerning longtables: If `reset` is set to `true`, `\midruleX` will also add a unique `\label{}` on each row, and if the row starts on a newpage, resets the row counter to `resetnum`, to ensure you have the same X number of rows after the header of each page of a longtable.

The starred version of first reverts the settings to default, then loads your inputted settings, which the non-starred version only overwrites the settings specified. `\setmidruleX*{}` will restore to default. Use optional parameter `\setmidruleX*[o|n|f]{}` to control expansion of the key-val settings (`[n]` for not expanded is default). Before you want counting to begin, you should apply `\resetmidruleX` to avoid header rows being counted. Use `\noalign{\resetmidruleX}` if you need place a rule on the same line the reset takes place, or in a cell before `\\`. Note that `\resetmidruleX` resets the row counter to 0, and is in effect, a short-cut for `\setmidruleX{}` or `\setmidruleX{cntr=0}`

```

1 \setmidruleX{step=3,rule=gmidrule}
2 \begin{tabular}{rcl@{\midruleX}}
3           % ^^^ inject midrule
4 \toprule
5 Num & . & & . & . & \\
6 \midrule\resetmidruleX
7 % reset so header dont count
8 1 & & & & & \\
9 2 & & & & & \\
10 3 & & & & & \\
11 4 & & & & & \\
12 5 & & & & & \\
13 6 & & & & & \\
14 7 & & & & & \\
15 8 & & & & & \\
16 9 & & & & & \\
17 10 & & & & & \\
18 11 & & & & & \\
19 \resetmidruleX % reset
20 % so no bottom gray rule
21 12 & & & & & \\
22 \bottomrule
23 \end{tabular}

```

Num	. . .
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

Here's an example with long table. Notice the gray rules reliably appear 3 rows after each header.

```

\setmidruleX{reset=true,resetnum=0,rule="\gcmidrules{1r,2-}"}
\def\tblhead{\toprule No & Name & Place & other\\\midrule}
\def\tblcontinued{\MC[+1]{Continued...}\\\}
\def\tblcontinues\MC[+r]{...Continues}\\\}
\begin{longtable}{rclc@{\midruleX}}
  \tblhead\endfirsthead
  \tblcontinued\thead\endthead % all the lines above this will be repeated on every page
  \tblcontinues\endfoot
  \bottomrule End.\endlastfoot
  \resetmidruleX
1      &      &      &      & \\
2      &      &      &      & \\
3      &      &      &      & \\
4      &      &      &      & \\
5      &      &      &      & \\
6      &      &      &      & \\
7      &      &      &      & \\
8      &      &      &      & \\
9      &      &      &      & \\
10     &      &      &      & \\
11     &      &      &      & \\
12     &      &      &      & \\
13     &      &      &      & \\
14     &      &      &      & \\
15     &      &      &      & \\
16     &      &      &      & \\
17     &      &      &      & \\
18     &      &      &      & \\
19     &      &      &      & \\
\end{longtable}

```

No	Name	Place	other
1			
2			
3			
4			
5			
6			
7			
			...Continues

Continued...

No	Name	Place	other
8			
9			
10			
11			
12			
13			
14			
15			

...Continues

Continued...

No	Name	Place	other
16			
17			
18			
19			

End.

No	Name	Place	other
1			
2			

...Continues

Continued...

No	Name	Place	other
3			
4			
5			

...Continues

Continued...

No	Name	Place	other
6			
7			
8			
9			
10			

...Continues

Continued...

No	Name	Place	other
11			
12			
13			
14			
15			

...Continues

Continued...

No	Name	Place	other
16			
17			
18			
19			

End.