

ConTeXt basics for users: Table macros II

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Abstract

This article explains some of the basic features of `table` macros in ConTeXt.

1 Introduction

In the last article, I presented some basic features of the `table` macros in ConTeXt. In this article I will present additional features of these macros. These two articles cover the most frequently used features. There are other hooks for more advanced tweaking; some are covered in the ConTeXt beginner's manual [2]; others require reading `core-tab.tex` [3]. A future article in this series may touch upon those features.

2 Specifying font style and color of columns

Sometimes you want the entire column to be set in a particular font. For example, suppose we want to produce the following table:

Year	Production (in 1,000 units)
1990	20
1991	50

One way to do this is to mark the first column in each row by `\bf`. This is time consuming and difficult to change. ConTeXt tables support an `f` key that can be used in the table preamble to set the font for the entire column. The preamble of the previous example was

```
\starttable[|lf{\bf}|c|]
```

Here `f{\bf}` tells ConTeXt to typeset the first column of the table with font style `\bf`. You can use any font style command with the `f` key. Some of the more frequently used font commands have been given a key of their own. These are:

B	Bold	equivalent to <code>f{\bf}</code>
I	Italic	equivalent to <code>f{\it}</code>
S	Slanted	equivalent to <code>f{\sl}</code>
R	Roman	equivalent to <code>f{\rm}</code>
T	Teletype	equivalent to <code>f{\tt}</code>

So, we could also have written the preamble of the previous example as `\starttable[|lB|c|]`.

3 Changing the formatting of a cell

In some tables, the header (first row of the table)

needs to be bold and center aligned, while the rest of the rows are left aligned. For example

Name	Position
Someone	An important person
Someone else	A really important person

The input for this table is:

```
\starttable[|l|l|]
\NC \REF[cB]{...} \NC \REF[cB]{...} \NC \AR
\HL
\NC ... \NC ... \NC \AR
\NC ... \NC ... \NC \AR
\stoptable
```

Notice that the table preamble says `|l|l|`, that is, both columns should be left aligned. In the first row we say `\REF[cB]{...}`, which changes the formatting of that cell to `cB`, that is, center aligned and bold. `\REF` is a short form of `\ReFormat`; both macros can be used for changing the format of the current cell. The general syntax of the command is `\REF[keys]{column content}` where `keys` can be any of the valid formatting keys accepted in the table preamble.

To change only the alignment of the current cell, you can use `\JustCenter`, `\JustLeft`, and `\JustRight`, which stand for ‘justify center’, ‘justify left’, and ‘justify right’, respectively.¹

4 Columns containing math

Suppose we want an entire column to be in math mode. For example,

Constant	Series	Value
π	$3 \sum_{n=0}^{\infty} \frac{(2n)!}{n!^2(2n+1)16^n}$	3.1415926...
e	$\sum_{n=0}^{\infty} \frac{1}{n!}$	2.7182818...

In this case, the first two columns are in math mode

¹ Most macros in ConTeXt use the word ‘align’. These macros come from the `TABLE` package, which uses the word ‘justify’.

(The second is actually in display math mode). We can manually surround each entry by $\$$; however, ConTeXt provides two ‘math column’ keys: `m` sets the column in inline math mode, and `M` sets the column in display math mode. The above example was thus keyed in as

```
\starttable[|cm|cM|l|]
  \NC \REF[c]{Constant} \NC \REF[c]{Series}
  \NC \REF[c]{Value} \NC \AR
  \HL
  \NC \pi \NC 3 \sum_{n=0}^{\infty}
    \frac {(2n)!}{n!^2 (2n+1) 16^n}
  \NC 3.1415926\dots \NC \AR
  %
  \NC e \NC \sum_{n=0}^{\infty}
    \frac 1{n!}
  \NC 2.7182818\dots \NC \AR
\stoptable
```

The first column is in inline math mode (`m` key), and the second column is in display math mode (`M` key). Notice that I have used `\REF[c]{...}` in the first row, so the headings are not in math mode.

5 Numeric columns

Tables containing statistical data need the data to be aligned at the decimal place. ConTeXt provides two keys for this: `n` displays the column in text mode, while `N` displays it in math mode. Both keys take a space-delimited argument of the form `x.y` where `x` is the number of digits before the decimal and `y` is the number of digits after the decimal. For example, to get the following table (adapted from Tobias Oetiker’s “The not so short introduction to L^AT_EX”):

Pi expression	Value
π	3.1416
π^π	36.46
$(\pi^\pi)^\pi$	80,662.7

I keyed in

```
\starttable[|cm|n5.4 |]
  \NC \REF[c]{Pi expression}
  \NC \REF[c]{Value} \NC \AR
  \HL
  \NC \pi \NC 3.1416 \NC \AR
  \NC \pi^{\pi} \NC 36.46 \NC \AR
  \NC (\pi^{\pi})^{\pi} \NC 80,662.7 \NC \AR
  \HL
\stoptable
```

The key `|n5.4 |` (notice the space at the end) means that we want five digits before the decimal and four digits after the decimal.

Some European countries use a comma as a decimal separator. This can be done using the `q` and `Q`

keys. They take a space-delimited argument of the form `x,y` which has the same meaning as the argument of `n` and `N` keys. So, to get this table

Pi expression	Value
π	3,1416
π^π	36,46
$(\pi^\pi)^\pi$	80.662,7

I keyed in

```
\starttable[|cm|q5,4 |]
  \NC \REF[c]{Pi expression}
  \NC \REF[c]{Value} \NC \AR
  \HL
  \NC \pi \NC 3,1416 \NC \AR
  \NC \pi^{\pi} \NC 36,46 \NC \AR
  \NC (\pi^{\pi})^{\pi} \NC 80.662,7 \NC \AR
  \HL
\stoptable
```

An `n` or `N` column must contain a dot; a `q` or `Q` column must contain a comma. For cells that do not contain a dot or comma (for example, the headings of the table) we can use `\REF` to change the formatting. The TeX primitive `\omit` can be used to leave the cell empty.

6 Spanning multiple columns and rows

In table heads, one often needs a cell spanning multiple columns. ConTeXt provides the `\use` macro to do this. This macro takes an argument specifying the number of columns to span. For example, to use five columns, we can use `\use{5}`. The macros `\TWO`, `\THREE`, `\FOUR`, `\FIVE`, `\SIX` are shortcuts to span the corresponding number of columns.

By default, when spanning multiple columns, the formatting keys of the last spanned column are in effect. We can use `\REF` to change the formatting. ConTeXt also provides `\Use` (note the uppercase `U`) to span multiple columns and also set the formatting: to span three columns and make the content center aligned we can use `\Use{3}[c]{content}`.

The support for spanning multiple rows is more limited. There are two commands `\Lower` and `\Raise` that can lower or raise the contents of the cell. There are two forms of these commands: `\Raise{5}{content}` which raises the content by 5 times 1/12th of the line height; and `\Raise(dimen){content}` which raises the content by `dimen` (which can be any valid TeX dimension).

The most common usage of spanning multiple rows is spanning two rows in table heads. For that, we can use `\LOW`, which lowers the current cell by half of the line height, making it visually centered between the two rows.

Here is a table showing both column and row spanning (example adapted from Andy Roberts' L^AT_EX tutorial [4]):

Team Sheet		
Goal Keeper	GK	Paul Robinson
Defenders	LB	Lucus Radebe
	DC	Michael Duberry
	DC	Dominic Matteo
	RB	Didier Domi

This was typed as

```
\starttable[|1|1|1|]
  \HL
  \VL \Use{3}[c]{Team Sheet}      \VL \AR
  \HL
  \VL Goal Keeper \VL GK
      \VL Paul Robinson \VL \AR
  \HL
  \VL \Lower(1.5\lineheight){Defenders} \VL
    LB \VL Lucus Radebe \VL \AR \VL \VL
    DC \VL Michael Duberry \VL \AR \VL \VL
    DC \VL Dominic Matteo \VL \AR \VL \VL
    RB \VL Didier Domi \VL \AR
  \HL
\stoptable
```

In the first row we use `\Use{3}[c]{...}` to span three columns and make the cell center aligned. In the first column of the third row, we use `\Lower(1.5\lineheight){...}` to lower the cell so that it appears to be visually centered in the last four rows.

7 Controlling space between columns

By default, there is a 0.5 em (usually about half the current font size) space between the columns. We can change this using the `o` and the `s` keys. The `o` key changes the space on the right of the current column; the `s` key changes the space of all the following columns until the next `o` or `s` key.

There are two ways of specifying the parameters of the `o` and `s` keys. The first is in integer multiples of 0.5 em: `s{n}` makes the space equal to `n` times 0.5 em. So, to get a space of 1.5 em between columns we can use `\starttable[s{3}|1|1|]`. The second way is to specify the distance as an arbitrary T_EX dimension. So, we could also have used `\starttable[s(1.5em)|1|1|]`. Notice that in the first case, the argument is given in curly brackets;² in the second, the argument is given in parentheses.

It is also possible to add padding (kerning) to the left and/or right of each column. The key `i` adds padding to the left, `j` adds padding to the right, and

`k` adds padding to both the right and the left.³ The amount of padding is specified in the same way as in the `o` and the `s` keys: either in multiples of 0.5 em, or as arbitrary dimensions.

A combination of these keys can be used to force the `table` macros to produce tables as recommended by the `booktabs` package [1]. For example

```
\setuptables[rulethickness=0.03em]
\starttable[s0|i1|i2|i2r|]
\HL[3]
\NC \Use2[c]{Item}          \NC          \NC \AR
\DL[2]                      \DC          \DR
\NC Animal \NC Description \NC Price (\$)\NC \AR
\HL[2]
\NC Gnat   \NC per gram   \NC 13.65   \NC \AR
\NC       \NC each       \NC 0.01    \NC \AR
\NC Gnu    \NC stuffed    \NC 92.50   \NC \AR
\NC Emu    \NC stuffed    \NC 33.33   \NC \AR
\HL[3]
\stoptable
```

gives

Item		
Animal	Description	Price (\$)
Gnat	per gram	13.65
	each	0.01
Gnu	stuffed	92.50
Emu	stuffed	33.33

Notice that in this case, the horizontal lines do not extend beyond the table. The half line⁴ after the first row extends only until the end of the second column. Compare this with the table that we get from `\starttable[|1|1|r|]`:

Item		
Animal	Description	Price (\$)
Gnat	per gram	13.65
	each	0.01
Gnu	stuffed	92.50
Emu	stuffed	33.33

We will not go into the details of coaxing and beating `table` macros into producing tables like the `booktabs` package: they were never designed for that task. We can achieve the simpler parts of

² Actually, this is one argument according to T_EX's parsing rule. So, for single digit arguments, we can omit the curly brackets.

³ We are really running out of letters of the alphabet!

⁴ In these articles, I have only talked about `\HL` and not explained how to get *division lines* between rows. This is explained in the ConTeXt manual [2].

the `booktabs` recommendation, but for more complicated things such as `\cmidrule`, the `table` macros do not have enough hooks.

To achieve lines that get trimmed at the edge of the table, we can use `\starttable[o0|1|1|ro0]`,⁵ which gives:

Item		
Animal	Description	Price (\$)
Gnat	per gram	13.65
	each	0.01
Gnu	stuffed	92.50
Emu	stuffed	33.33

The division line in this case extends to the middle of the second column. If the table does not have division lines, adding `o0` in the beginning and the end of the table preamble is usually sufficient.

8 Controlling space between rows

The `table` macros do not provide much control over space between rows of the table. You can have loose or tight tables by changing the `distance` option of `\setuptables`. The `distance` option takes four values: `none`, `small`, `medium`, and `big`. The default is `medium`. For example, let's reconsider the table of Section 6. With `\setuptables[distance=none]`, we get

Team Sheet		
Goal Keeper	GK	Paul Robinson
Defenders	LB	Lucus Radebe
	DC	Michael Duberry
	DC	Dominic Matteo
	RB	Didier Domi

while with `\setuptables[distance=big]` we get

Team Sheet		
Goal Keeper	GK	Paul Robinson
Defenders	LB	Lucus Radebe
	DC	Michael Duberry
	DC	Dominic Matteo
	RB	Didier Domi

Play around with these values to find out what value of `distance` you prefer. It is possible to get more control using the `\OpenUp` macro of the `TABLE` package, but there is no interface for that. See the discussion on the mailing list [5] for an example.

9 Remembering preambles

Often one has several tables which need to have similar formatting. Repeating the table preamble in each case is error-prone. ConTeXt provides `\definetabletemplate` which can be used to specify a table preamble which can be reused later. For example, we can say

```
\definetabletemplate[booktabs][o0|1|1|ro0]
```

Then we can invoke this preamble by

```
\starttable[booktabs]
```

10 Other features

When I started writing these articles on the `table` macros, I thought that one article would be enough. About halfway through the first article I realized that I would need more than one article. Now I find that even two are not enough. There are lots of things that I have not even touched; using color in tables and breaking the table across pages are the most important omissions. These will have to wait for a later article in this series. Next issue, we will look at something different.

11 References

- [1] Simon Fear and Danie Els, "Publication quality tables in L^AT_EX", <http://www.ctan.org/tex-archive/macros/latex/contrib/booktabs>
- [2] Hans Hagen, ConTeXt: an excursion. <http://www.pragma-ade.com/show-man-1.htm>
- [3] Hans Hagen, ConTeXt core macros — TABLE embedding. http://www.logosrl.it/context/modules/current/singles/core-tab_ebook.pdf
- [4] Andy Roberts, L^AT_EX Tutorials — Tables. <http://www.andy-roberts.net/misc/latex/latextutorial4.html>
- [5] Discussion on the ConTeXt mailing list, <http://archive.contextgarden.net/message/20070806.011325.5a938ae7.en.html>

⁵ Wait a minute! To which column does the first `o0` correspond? The table consists of a virtual column at the left edge, typically for drawing a vertical line there. The key `o0` in the beginning of the preamble sets the width of this virtual column to be zero.