CIRC – A Package to Typeset Block Schematics

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Abstract

The CIRC package is a tool for typesetting circuit diagrams. It defines several electrical symbols such as resistors, capacitors, transistors, etc. These symbols can be connected with wires in a very easy way.

To use CIRC, you only need METAFONT and LaTeX 2_ε. You do not need PostScript or any drawing tool. You can expand CIRC easily with your own symbols, written in METAFONT.

I started developing CIRC in order to have a tool for drawing electrical circuit diagrams; however, the use of CIRC has shown that it is a useful package for creation of a large range of block schematics.

The problem of drawing block schematics can be divided into drawing the symbols and drawing the connections between them. Macros exist for both parts in CIRC. As is common in TeX, the diagram should be described in an abstract and generic way.

Step by step, I worked out macros so that you never have to deal with distances when describing a diagram. Distances are necessary only to determine spaces between symbols.

The main building blocks of CIRC are so-called pins which mark points for referencing.

Most block schematic diagrams consist of symbols connected at determined points at or around the symbols. These are called pins. Every pin gets a name within CIRC that is composed of the name of the symbol, a number given to the symbol in the current diagram, and a short pin name. The last is a specific abbreviation for the pin.

The following example will explain the ideas.
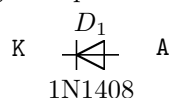
One pin is called cathode, the other anode. The short pin names are K and A. (Cathode is abbreviated as in German with a K.) The diode has the abbreviation D, and in the above example it is numbered with 1. So the pin names for this diode are D1K and D1A.

Using CIRC, you draw in a 7 pt (≈ 2.5 mm) grid.

A current drawing position exists and the drawing direction is specified with every symbol.

To get the example you have to type in: `\D1 {1N1408} K r`. The last two letters are specific for the drawing direction. They mean: draw the cathode (**K**) at the current drawing position and the symbol to the **r**ight. After drawing, the position is changed to the anode.

More or less, all symbols are drawn in the same manner.

If you have to draw larger diagrams, it is necessary to change the position to that of a specific pin. This is easily done with `\frompin` *pin name*.

As you can imagine, this moves the position to the given pin. With `\_` you can change by amounts of the grid. The position will be moved by two units of the grid **d**ownwards by `\_ 2 d`.

Mostly you have to connect the symbols with solid lines. Up to this point, only horizontal and vertical lines can be drawn with CIRC. With the command `\-` you can draw a solid line with a given length.

For example: `\- 3 u` will draw a line of 3 units of the grid **u**pwards. But this method of drawing with a given distance should only be used to draw lines that give space between symbols. The more generic way is to use `\htopin` or `\vtopin`.

After both of these commands, a pin name is expected. These commands draw a line from the current position to the position of the given pin. The command `\htopin` uses only the x-part of the given position and draws a horizontal line; `\vtopin` does the same vertically.

Now you have an overview of the commands in CIRC. Please note that all parameters are seperated by spaces, and empty lines are like spaces.

The complete syntax and all available symbols with their names may be obtained from the documentation. CIRC and the accompanying documentation is stored on CTAN in the directory `macros/ generic/diagrams/circ`.

As of this issue of *TUGboat*, I have had no time to update CIRC on CTAN, and hope I can do it in February of 1998.
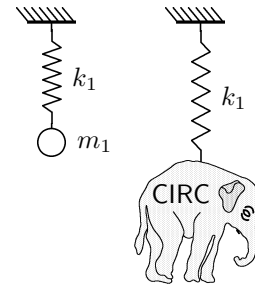
Finally other examples.
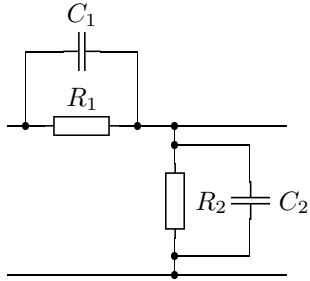
Produced by:

```
\begin{circuit}0 \P1
\- 1 r \.1 \- 1 r \R1 {} r
\- 1 r \.2 \- 2 r \.3
\- 1 d \.4 \- 1 d \R2 {} d
\- 1 d \.5 \- 1 d \.6
\htopin P1
\frompin .1 \- 4 u \hcenterto R1 \C1 {} r
\htopin .2 \vtopin .2
\frompin C1l \htopin .1
\frompin .4 \- 4 r
\vcenterto R2 \C2 {} d
\vtopin .5 \htopin .5
\frompin C2t \vtopin .4
\frompin .3 \- 6 r \P2
\frompin .6 \htopin P2
\end{circuit}
```

As described in the opening paragraph, you can draw more than electric circuit diagrams with CIRC.

A small library with symbols for vacuum techniques and commands for drawing flowcharts is also available. Andreas Tille has also written a library for optics.