Abstract

This package provides macros to display keys and menu items of some CASIO calculators (including GRAPH25, GRAPH35, GRAPH75 and others...).

Foreword

My dear English readers, I am really sorry... I had my French colleagues in mind when I wrote this package, so, once in a while, the main documentation is written in French. The document you are reading now is only a translation, and I fear that my English translation is worse than what you would have read if I had written it directly in English. Sorry. And good luck reading this...

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*This document corresponds to graph35 0.1.1, dated 2018-04-18. Home page, bug requests, etc. at http://framagit.org/spalax/graph35
1 Introduction

This document introduces the graph35 package.

1.1 Licence

This work may be distributed and/or modified under the conditions of the \LaTeX\ Project Public License, either version 1.3 of this license or (at your option) any later version.

Further information can be found in the .dtx file used to build the .sty document and the main (French) documentation, available at \url{http://ctan.org/pkg/graph35}.

1.2 Summary

Section 2 covers installation instruction. Macros and package options are introduced in section 3. Some software developed together with this package are
described in section 4. Appendixes A to D list available calculators, keys, menu items, and illustrates some options. This document does not include the implementation: it is available in the main (French) documentation.

2 Download and install

2.1 Gnu/Linux Distribution

If applicable, the easiest way to get graph35 working is by installing it by your distribution package. In Debian (and Ubuntu, and surely other distributions that inherit from Debian) it is packaged in texlive-pictures since version 2018.20180404-1. So you can install it by running:

```
sudo apt install texlive-pictures
```

2.2 \LaTeX{} distribution

This package is included both in \TeX{}Live and MiK\TeX{}. It can be installed by their respective package managers.

2.3 Manual install

- Download the archive:

  Stable version [http://mirrors.ctan.org/graphics/graph35.zip](http://mirrors.ctan.org/graphics/graph35.zip)


- Uncompress the archive.

- Compile the package: \texttt{latex graph35.ins}

- Move the several \texttt{.sty} files in a directory that is part of the \LaTeX{} path.

3 Usage

3.1 Supported calculators

**Case and keys** The macros can display case and keys of the GRAPH35 calculator only (although it can have another name in another country).

**Screen** This package implements screen items of models GRAPH25, GRAPH35, GRAPH75, FX-9860GII, FX-9750GII, and others.
3.2 Package options

This package has a single color option, which is set to color=real by default.

This option accepts two values: real and blackandwhite, defining the default key and case color. See next section for more details.

Moreover, this is not, strictly speaking, a package option, but it is possible, to make compilation faster, to add the following line before loading this package.

\texttt{\PassOptionsToPackage{draft}{pixelart}}

This line will disable pixelart images (mainly the \texttt{function} macros, see part C.2). Indeed, having a lot of those macros can make compilation very long, and adding this line can make it faster.\footnote{For instance, on my computer, adding this line to this files make compiling thirty times faster, from eight minutes to sixteen seconds.}

3.3 Colors

3.3.1 Preset colors

You can chose the case and key colors from preset profiles, or customize them. Those preset profiles are:

\begin{itemize}
  \item \texttt{real} \hspace{1cm} Realistic colors, but can be hard to read when printed in black and white.
  \item \texttt{blackandwhite} \hspace{1cm} Black and white, high contrast, that will be easier to read when printed.
\end{itemize}

3.3.2 Color choice

There are several ways to set colors.

\begin{itemize}
  \item Package argument \texttt{color} defines the default color to use (which can be later overloaded using option \texttt{color} of the macros). For instance, to make all drawing black and white, load the package using the following line.

\begin{verbatim}
\usepackage[color=blackandwhite]{graph35}
\end{verbatim}

By default, realistic color are used (color=real).

  \item Option \texttt{color} of macros \texttt{\key} and \texttt{\calculator} can have an additional value \texttt{default}. Using this explicitly uses the default color defined while loading the package.

\begin{verbatim}
\setgraphcolor{\langle color\rangle}
\end{verbatim}

At last, default color can be redefined at any time using macro \texttt{\setgraphcolor{\langle color\rangle}}. For instance, if the package was loaded with option \texttt{color=blackandwhite}, use \texttt{\setgraphcolor{real}} to use the real colors by default.
\end{itemize}
3.3.3 Custom colors

Arbitrary colors can also be used, by defining the following colors.

\begin{itemize}
  \item \texttt{graph35ACON} : Key \texttt{ACON}.
  \item \texttt{graph35ACONBORDER} : Border of key \texttt{ACON}.
  \item \texttt{graph35ALPHA} : Key \texttt{ALPHA}.
  \item \texttt{graph35ALPHABORDER} : Border of key \texttt{ALPHA}.
  \item \texttt{graph35SHIFT} : Key \texttt{SHIFT}.
  \item \texttt{graph35SHIFTBORDER} : Border of key \texttt{SHIFT}.
  \item \texttt{graph35SCREEN} : Screen pixels.
  \item \texttt{graph35SCREENBG} : Screen background.
  \item \texttt{graph35CASE} : Case.
  \item \texttt{graph35CASEBORDER} : Case border.
  \item \texttt{graph35EXE} : Key \texttt{EXE}.
  \item \texttt{graph35EXEBORDER} : Border of key \texttt{EXE}.
  \item \texttt{graph35NUMBER} : Number keys.
  \item \texttt{graph35NUMBERBORDER} : Border of number keys.
  \item \texttt{graph35KEYTEXT} : Text on keys.
  \item \texttt{graph35ALPHATEXT} : Text \emph{alpha} above keys.
  \item \texttt{graph35SHIFTTEXT} : Text \emph{shift} above keys.
\end{itemize}

Those colors are color names as defined by package \texttt{xcolor}, and can be defined using macros from this package. For instance, to display \(7\), use the following code:

\begin{verbatim}
1 \colorlet{graph35KEYTEXT}{green}
2 \colorlet{graph35SHIFTTEXT}{orange}
3 \definecolor{graph35ALPHATEXT}{RGB}{0, 0, 255}
4 \definecolor{graph35NUMBER}{RGB}{200, 200, 200}
5 \colorlet{graph35NUMBERBORDER}{graph35NUMBER}
6
7 \key[shift, alpha]{7}
\end{verbatim}
3.4 Calculators

\begin{tikzpicture}
\begin{scope}[shift={(1,2)}, scale=.5]
\tikzcalculator{graph35+E}
\end{scope}
\end{tikzpicture}

One can include a calculator in a Ti\textit{k}Z drawing, using command \texttt{tikzcalculator\{\textit{model}\}}. This command takes a single argument \texttt{\{\textit{model}\}}, and displays a calculator around coordinates (0;0). To draw a calculator elsewhere, or with another scale, use the \texttt{scope} environment, as in the following example.

```
\begin{tikzpicture}
\begin{scope}[shift={(1,2)}, scale=.5]
\tikzcalculator{graph35+E}
\end{scope}
\end{tikzpicture}
```

Anchors are defined for each keys, case borders, and screen, to be used within your Ti\textit{k}Zfigures. See appendix B for more information.

3.5 Keys

\begin{tikzpicture}
\begin{scope}[shift={(1,2)}, scale=.5]
\tikzcalculator{graph35+E}
\end{scope}
\end{tikzpicture}

\begin{tikzpicture}
\begin{scope}[shift={(1,2)}, scale=.5]
\tikzcalculator{graph35+E}
\end{scope}
\end{tikzpicture}

To draw a calculator key, use:

\begin{tikzpicture}
\begin{scope}[shift={(1,2)}, scale=.5]
\tikzcalculator{graph35+E}
\end{scope}
\end{tikzpicture}

```
\key{\{\textit{color, prefix, suffix, scale, shift, alpha}\}}{\textit{key}}
```

For instance, \texttt{\key[color=blackandwhite]{DEL}} displays \texttt{DEL} while \texttt{\key[shift, alpha]{DEL}} displays \texttt{DEL}.

Arguments are:

- \texttt{\{\textit{key}\}} Key name to display (for instance 1 for 1, and \texttt{EXE} for \texttt{EXE}). Key name is more or less what is displayed on it. Key names are available as a list in appendix D.1 or as a calculator with captions in figure 6.
- \texttt{\{\textit{color, scale}\}} Scale and color of key. Those options have the same syntax and limitations as options of command \texttt{calculator} (see section 3.3 for colors, and 3.7 for scale).
\begin{itemize}
\item \(\langle\text{shift, alpha}\rangle\) Those options enable or disable yellow and red text describing the key meaning when pressed after the \texttt{\textless} or \texttt{\textgreater} keys. By default, those texts are hidden (equivalent to \texttt{shift=false, alpha=false}) ; to enable the, use \texttt{shift=true} and \texttt{alpha=true} or \texttt{shift} and \texttt{alpha}.
\item \(\langle\text{prefix, suffix}\rangle\) For each key, anchors are defined, allowing references to the key in \LaTeX{} pictures (for instance, they are used to draw figure \[\text{page}\] \[\text{52}\]). By default, anchor names are \texttt{key} followed by the key name (for instance \texttt{keyDEL} for the \texttt{DEL} key). The \texttt{prefix} and \texttt{suffix} options make the anchor names customizable (as used in the following pictures). With those options, two keys can have different anchors on the same figure, making it possible to use each of those keys. Those options also define anchor names for \texttt{SHIFT} et \texttt{ALPHA} texts.
\end{itemize}

\begin{tikzpicture}
\node at (0,0) {\texttt{DEL}};
\node at (1,1) {\texttt{DEL}};
\node at (0.5,0.5) {\texttt{DEL}};
\node at (0.5,0.75) {\texttt{DEL}};
\end{tikzpicture}

Without options : anchors \texttt{keyDEL, keyDELSHIFT, keyDELalpha}.

\begin{tikzpicture}
\node at (0,0) {\texttt{DEL}};
\node at (1,1) {\texttt{DEL}};
\node at (0.5,0.5) {\texttt{DEL}};
\node at (0.5,0.75) {\texttt{DEL}};
\end{tikzpicture}

With options \texttt{prefix=foo, suffix=bar} : anchors \texttt{fooDELbar, fooDELSHIFTbar, fooDELbaralpha}.

The anchor names are listed in appendixes \[\text{B.1}\] and \[\text{B.2}\].

\begin{itemize}
\item Peeking at the source code, you may see that more options are used. Those options are not described here because they are not meant to be used by final users, and might change in a later version without notice.
\end{itemize}

\texttt{\tikzkey} As with \texttt{\calculator} and \texttt{\tikzcalculator}, macro \texttt{\tikzkey} does the same as \texttt{\key}, excepted that it is meant to be called from within a \LaTeX{} environment. Its syntax is:

\begin{verbatim}
\tikzkey\{\langle\text{options}\rangle\}\{\langle\text{key}\rangle\}\{\langle\text{coordinates}\rangle\}
\end{verbatim}

Its arguments are
\begin{itemize}
\item \(\langle\text{options}\rangle\) : same options as macro \texttt{\key} ;
\item \(\langle\text{key}\rangle\) : name of the key ;
\item \(\langle\text{coordinates}\rangle\) : coordinates the key is drawn around.
\end{itemize}

\section{Screen}

Three macros can be used to draw parts of the screen: menu items, captions of function keys, battery level.
### 3.6.1 Menu

Macro \menu{(icon)}{(shortcut)} draws an icon from the main menu. For instance, \menu{RUNMAT}{A} displays \runmat. Shortcut (the character at the bottom right corner of the item) is independent from the icon, because depending of the calculator model or its version, it can change.

Appendix [C.1](#) is a list of every menu icon and shortcut.

The \tikzmenu macro draws a menu item in a TikZ environment. Its syntax is:

\[ \tikzmenu\{\langle\text{options}\rangle\}\{\langle\text{icon}\rangle\}\{\langle\text{shortcut}\rangle\}\{\langle\text{coordinates}\rangle\} \]

Its arguments are:
- \{\langle\text{icon}\rangle\} and \{\langle\text{shortcut}\rangle\}: same meaning as the corresponding \menu options;
- \{\langle\text{coordinates}\rangle\}: coordinates of the top-left corner of the menu item;
- \{\langle\text{options}\rangle\}: some options, that are passed as-is to the \bwpixelart macro (from the pixelart package). They can be used to change the scale and color of the drawing (for instance scale=.5, color=red).

### 3.6.2 Functions

\function{(function)} macro displays the caption of the keys \begin{itemize}
\item \texttt{\textasciitilde}\item \texttt{\textasciitilde}\item \texttt{\textasciitilde}\item \texttt{\textasciitilde}\item \texttt{\textasciitilde}\item \texttt{\textasciitilde}\end{itemize} (for instance \runmat). Available pixel-arts are listed in appendix [C.2](#).

The \tikzfunction macro is the same as \function, but from within a TikZ environment. The \{\langle\text{function}\rangle\} argument is the same as for macro \function; see macro \tikzmenu for the meaning of arguments \{\langle\text{options}\rangle\} and \{\langle\text{coordinates}\rangle\}.

### 3.6.3 Battery

Macro \battery{(state)} displays the state of charge of the battery (for instance \batterymax or \batterymin). Available pixel-arts (and arguments) are listed in appendix [C.3](#).

The \tikzbattery macro is identical to macro \battery, but from within a TikZ environment. Its \{\langle\text{state}\rangle\} argument is the same as for \battery; see macro \tikzmenu for the meaning of arguments \{\langle\text{options}\rangle\} and \{\langle\text{coordinates}\rangle\}.

### 3.7 Scaling

Option \texttt{scale} used to set size of calculators and keys does not change line width or border radius. The unexpected result is the following drawing of a calculator at a \(\frac{1}{10}\) scale: the case border (green) is too big, and the screen is almost an ellipse (among other flaws).
There are several solutions to fix this, but none of them is perfect, which is why they are not implemented.

- Get used to those flaws. Indeed, for small scale changes, they are barely noticeable.

- Embed the drawing in a \scalebox or \resizebox macro: command \resizebox{.1}{\textwidth}{\texttt{calculator{graph35+E}}} gives the following drawing.

- Use option transform canvas from the \texttt{pgf} package (for instance: \texttt{\begin{tikzpicture}[scale=.1, transform canvas={scale=.1}]…}. Line width and border radius will be correctly scaled, but the bounding box will not be changed, neither will be the coordinates (thus anchors will be useless).

At last, when including drawings in a \texttt{tikzpicture} environment using the \texttt{scale} option, do not forget to add option \texttt{transform shape}, so that bounding box is also changed.

4 Binaries

A few Python3 software are maintained together with this \LaTeX{} package. They are not distributed with it, so they have to be downloaded directly from the code repository. They are specialized enough to share this package repository, but if you were to use them for something else, good for you!

Most of those handle .pxl files. This is a custom file format, coding a pixel-art picture as lines of 0s and 1s. Each menu, battery, function icon is stored as one of those files, and converted to \LaTeX{} code before being included in this package.

catpxl Display a .pxl file to the terminal.

completefunctionchars Each function icon has its readable characters associated to it (it is used in appendix C.2). This software look for function icons without such characters, and asks user for them.

generate.keys and generate.pixelart Generate the \LaTeX{} files generating the pixel-art and keys, from the source files in this repository.

screenshot2pixelart Parse a calculator screenshot to find new function and menu icons.
A Calculators

Here is the list of available calculators, together with their keyword (used as argument for macros \calculator and \tikzcalculator).

- graph35+E: figure 1

B Anchors

Anchors of keys, shift and alpha texts, screen, etc.

B.1 Anchors of keys

Each key defines the anchors shown in figure 2

B.2 Anchors of key REPLAY

The REPLAY key defines some additional anchors, for each of its arrows. They are illustrated in figure 3

B.3 Screen anchors

Anchors of the screen are illustrated in figure 4
\key{[shift, alpha]DEL}

Figure 2: Key anchors

\key{REPLAY}

Figure 3: REPLAY key anchors
B.4 Case anchors

Anchors of the case are illustrated in figure 4.

C Pixel art

C.1 Menu

Two special icons and shortcuts are available: black, which produces a black pixel-art; and blank, which produces nothing.

C.1.1 Icons

- \text{menu\{black\}\{black\}}
- \text{menu\{blank\}\{black\}}
- \text{menu\{CONICS\}\{black\}}
- \text{menu\{DYNA\}\{black\}}
- \text{menu\{eACT\}\{black\}}
- \text{menu\{ECON2\}\{black\}}
- \text{menu\{eCON3\}\{black\}}
- \text{menu\{EQUA\}\{black\}}
- \text{menu\{GEOM\}\{black\}}
- \text{menu\{GRAPH\}\{black\}}
- \text{menu\{LINK\}\{black\}}
- \text{menu\{MEMORY\}\{black\}}
- \text{menu\{PRGM\}\{black\}}
- \text{menu\{RECUR\}\{black\}}
- \text{menu\{RUN\}\{black\}}
- \text{menu\{RUNMAT\}\{black\}}
- \text{menu\{SSHT\}\{black\}}
- \text{menu\{STAT\}\{black\}}
Figure 5: Case anchors
C.1.2 Shortcuts

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- A
- B
- C
- D
- E
- F
- G
- H

C.2 Functions

Available pixel arts are sorted according to the visible characters (latin letters and figures). To find the keyword corresponding to the picture you want, look at its visible characters, and find your picture in the corresponding part of this index.

For example, no character is visible on \(\text{Σ} \) or \(\text{Α} \) (indeed, letters of \(\text{Α} \) are greek letters, not latin ones); on \(\text{Σ} \), letters \(\text{acn} \) are visible; on \(\text{Δ} \), only the letter \(\text{r} \) is visible; and so on.

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Crcl-b

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DAYS-b

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DISP-b

ddb

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dela

DELA-b

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Det-b

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dsz

Dsz-b

data

DATA-b
dx Idx Idx-b
dyna DYNA-b Dyna-b
e e-b Exa-b
edf Edf-b
edit EDIT EDIT-b
eff EFF-b tEFF
e else Else-b
end End-b
eng ENGshiftleft ENGshiftright
unger ENGY-b
entr
Iden-b
lend
IEnd-b
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If-b
imp
Imp-b
in
IN
init
INIT
inpt
INPT-b
input
INPUT
ins
INS
INS-b
int
INT
INT-b
Int-b
Intdiv-b
SINT
SINT-b
intg
INTG
Intg-b
intr
IN
INTR-b
inv
Inv
Inv-b
invb
InvB
invf
InvC
invg
InvD
invh
InvE
invn
InvF
invp
InvG
invp
InvH
inrr
InvI

isct
ISCT
isz
Isz-b
join
Join-b
jump
JUMP-b
k
kilo-b
lang
LANG-b
lbl
Lbl-b
lcm
LCM-b
lcte
Lcte-b
left
Left-b
len
Len-b
leng
LENG-b
lgst
Lgst
Lgst-b
line

list

lm

lmem

load

log

logab

logic

lpw

lwr

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or
- Or-b

orig
- ORIG

out
- OUT

p
- P
  - p-b
  - Peta-b
  - phat-b
  - pico-b
  - Psnd-b

p1
- phat1-b

p2
- phat2-b

pa
- pa-b

pab
- pab-b

parm
- PARM
  - parm
  - Parm

pb
- pb-b

pbeb
- PBP
  - PBP-b

pcd
- Pcd

pen
- PEN

pgdn
- PgDn
  - PgDn-b

pgup
- PgUp
  - PgUp-b

phas
- PHAS
  - PHAS-b

phase
- Phase-b

pie
- Pie-b
  - Pie-b-b

pitch
- Pitch-b
  - Pitch-b-b

pixl
- PIXL-b
  - PIXL-b-b

plct
- PlChg
  - PlChg-b

plchg
- PlChg

ploff
- PlOff
  - PlOff-b

plot
- Plot
  - Plot-b

poisn
- POISN
  - POISN-b

pol
- POL
  - POL-b

poly
- POLY
  - POLY-b

ppd
- Ppd
  - Ppd-b

prec
- PRC
  - PRC-b

prd
- PRD
  - PRD-b

pre
- PRE

pres
- PRES
  - PRES-b

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Var-b  while  x2
vct  Who1e-b  Sx2-b
VCT-b  x2
velo  WIZ-b  x2-b
VELO-b  xbar2-b
ver  x1  xpower2-b
VER-b  x2Inv-b
vert  x3
Vert  X3
Vert-b  x3-b
vlum  txlt  xpower3-b
VLUM-b  x4
vnlk  X-b4
X-b  x4
VNLK-b  xpower4-b
vrnr  X-b3  xcal
VRNR-b  XCAL
vwin  X-xcal-b  xfct
VWIN-b  Xfct-b
VWin-b  Xinv
wake  xhat-b  xor
WAKE-b  Xor-b
web  x1  xrw
WEB  X1-b  XRw
Web-b  XRwplus
wend  x1inv  xt
WEnd-b  x1Inv-b  X-t-b
C.3 Battery

List of status of battery charge.

- \texttt{\textbackslash battery\{empty\}}
- \texttt{\textbackslash battery\{low\}}
- \texttt{\textbackslash battery\{high\}}
- \texttt{\textbackslash battery\{medium\}}

D Keys

D.1 List of keys

Sorting order is arbitrary. To find them on a calculator, see figure [ ]
Figure 6: Keywords of keys
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