

How to use the etdipa-template v2.6

Simon Michael Laube 5BHET 2014/15

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Introduction

The etdipa-package provides a simple, lightweight LATEX template for the documentation of scientific projects. It is distributed as a whole working directory for an arbitrary project¹.

The motivation for this template was to reach as many users as possible at different levels of LaTeX knowledge. Nevertheless some macros are assumed as a minimum requirement and will be used without any explaination.

The current version is v2.6. It is now possible to modify several colors and the title page. Further, the manual has been translated to English. For additional information please have a look at the README file or the complete project history.

If there are any suggested improvements, feel free to write an email using the following adress: simon.laube@gmx.at. Please note that this email adress is not intended to be used as a source of information for the use of this template.

Acknowledgement

I would like to thank Prof. Mag. Dipl.-Ing. Dr. Daniel Asch and Prof. Dipl.-Ing. Dr. Wilhelm Haager for their help with TEXnical questions and the supervisory of the whole project. Further, I would like to thank everyone who helped improving the template macros and documentation.

– Simon Michael Laube, February 22, 2015 –

1. Conventions

This section is to briefly summarize the conventions made for this document.

Commands are written in typewriter-font, and within a *listings*- or *verbatim*-environment.

LATEX-terms and emphases are typeset in *italics*.

An overview of all template-specific marcos can be found in appendix B.

¹Please note that the template is optimized for the scrreprt class.

2. Structure

2.1. Directory structure

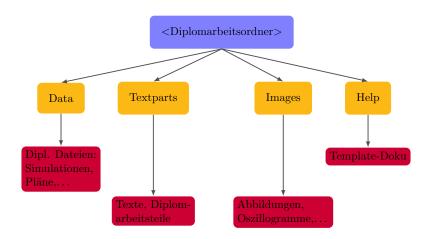


Figure 1: Predefined directory structure of the template

- master directory
- predefined subfolders
- explaination

Figure 1 shows the predefined directory structure. The user should use the master directory <Diplomarbeitsordner> as his working directory. All the additional files should be copied to *Data*, *Images* and *Textparts*. The *Help* directory contains the template documentation and additional help files.

When a school or company is using this template, the given structure should not be modified for reasons of consistency. Nevertheless the users can create subfolders within the given structure. An example is given in figure 2. To learn how to work with multiple LATEX files you should read section 2.2.

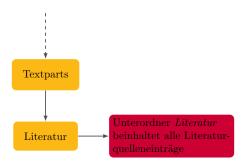


Figure 2: An example for creating subfolders within the predefined directories

- > The *Data* folder contains all the additional data that is not really needed for the documentation. This could be simulation files (e.g.: Proteus, SPICE) as well as technical drawings (e.g.: AutoCAD, TikZ) or circuit diagrams (e.g.: EPlan). One could also use this folder to create a separate presentation of the project e.g. with PowerPoint, Beamer-IATEX, Prezi or any other program.
- > The *Textparts* folder is the main working directory for your documentation files. It contains all the sub files of your master document. If you are unsure what a master document is, please read section 2.2.
- > The *Images* folder contains all the images of your documentation and work. Of course you do not have to include all the files in this folder into your document.

The master document of your documentation is located in the master directory of the template. Thus, it is possible to include all the files from your subfolders into the master document.

2.2. Working with master files

Normally a LaTeX document consists of one *.tex file. Setting up a document that way makes sense, but if the document gets longer and longer you might loose track of all the sections and textparts. There is a special technique for large documents, which is commonly used by real TeXnicians.

There are two cases:

- The LaTeX file is large, but not too large to loose track of your sections. If this is true for you, you can keep your current workflow and create only one TeX file.
- The LATEX file is very large. In this case you should split your document into separate files.

Since this template is for scientific documents, the second case is true. The following *minimal working examples* show how to work with master and sub files.

2.2.1. Standalone documents

Before someone starts to work with master documents, he/she normally works with standalone documents, which are basically all the text in one file. Listing 1 shows such a standalone file.

```
1 % documentclass / style
2 \documentclass{article}
3 %UTF8 encoding
4 \usepackage[utf8]{inputenc}
5 \begin{document}
6 \section{Title}
7 Here is some text.
8 \par % end of the paragraph
9 \end{document}
```

Listing 1: A normal LATEX document

2.2.2. Master and sub files

The first step for handling large documents is to create a so called *master file*. This file contains the LATEX preamble and the start and end of the document. Listing 2 shows an example of a simple master file.

Listing 2: A simple LATEX master file

The second step is to create a *sub file* that only contains text and sections, but no preamble and no start- or end-of-document command – see Listing 3. Thus, this sub file could not be compiled by T_FX!

To finally create the complete document one has to use the TEX command \input. The argument has to be the relative path of your sub file based on the absolute path of the master file.

Furthermore a PDF could be included via \includepdf[<options>]{<name>}, but the package pdfpages needs to be included for that. The problem with PDFs is that they have to be scaled when included, otherwise the header and footer will not fit the page.

```
1 % preamble
2 \documentclass{article}
3 \usepackage[utf8]{inputenc}
4 \usepackage{pdfpages}
5 % document starts here
6 \begin{document}
7 % my first text part %
8 \input{mytext.tex}
9 % my second text part % as PDF
10 \includepdf[pages=3-5]{mypdf.pdf}
11 \end{document}
12 % document ends here
```

Listing 4: LATEX master file with included subfiles

3. How to use the macros

In this section all functions and macros of the etdipa-template will be explained. The new commands are not part of the LATEX standard macros. Therefore, the user has to use the etdipa.sty package to enable the template macros.

3.1. Title page - maketitle

In LATEX the \maketitle command is used to automatically create the title page from the given information. The command was redefined for this template to get a different title page look. Thus, one can simply say \maketitle at the beginning of the document and he/she will get the template title page.

Listing 5 shows the necessary information that the template-user has to provide.

Listing 5: Setup for the title page

At the beginning of your document you should use \maketitle to create the title page. Next to that the writer should set his name into the footer via the \responsible command.

Listing 6: Possible beginning of your document

3.2. Affidavit

The affidavit can be added to your document by using a predefined environment called Eid^2 . This environment automatically adds the affidavit text to your document, the only thing a user has to add is the signature line – see listing 7. Further, it arranges the text at the vertical middle of the page.

Listing 7: How to add the affidavit

3.3. Acknowledgement

The text of your acknowledgement should be written in an external file. Again, there is a special environment for the acknowledgement called $Danksagung^3$.

```
1 %% Acknowledgement
2 \begin{Danksagung}
3
4 % We would like to thank \dots
5
6 \end{Danksagung}
```

Listing 8: How to add the acknowledgement

3.4. References

References are one of the most important things in technical documentations. They should be written in a consistent style. LaTeX offers the possibility to automatically create the reference list out of an external bibliography file, but this template does not use this option to keep things a little bit simpler.

The template uses the LaTeX bibliography environment with a little modification, so the user has to do less work. Listing 9 shows how to use the modified bibliography environment.

²German word for affidavit

³German word for acknowledgement

Listing 9: References

The bibliography entry in listing 9 results in entry number [1]. To refer to a reference one has to use the \cite command.

```
1 Text~\cite{<cite-key>}
2 % for example
3 Text~\cite{TeXbook}
```

Listing 10: How to cite a bibliography entry

3.5. Acronyms

The acronym package of Tobias Oetiker [9] was used to implement the list of acronyms. Since acronyms are not always necessary, the acronym environment was not modified for the template.

```
1 % List of acronyms
2 % Add chapter to contents
3 \addchap{Acronyms}
4 \begin{acronym}[ACRONYM]
5 % an entry:
6 %{spi}[SPI]{Serial Peripheral Interface}
7 \acro{ugs}[ugs.]{umgangssprachlich}
8 \end{acronym}\newpage
```

Listing 11: List of acronyms

The acronym can be used in the text by calling \ac{spi}. At the first use the whole expansion is shown in the text, for all other cases the macro expands to the acronym.

3.6. Short CV - the diplomand macro



Max Mustermann

DATE OF BIRTH: 12.12.2012 in St.Pölten

ADRESS: XY-Street 14 3100 St.Pölten

CAREER: 2010–2015:

HTBLuVA St.Pölten, department for electrical engineering

2006-2010:

Lower secondary school XY

Contact details: max.muster@xy.at

Figure 3: Result of the short CV command

The short CV can be used to include a short employment and education history of yourself and every member of the project into the documentation. The design of the CV is based on the \LaTeX documentclass moderncv⁴ and was realized via \Tau ikZ.

```
\begin{Diplomandenvorstellung}
      % new CV entry
      \diplomand
3
      \{<\text{Name}>\}
4
      \{<Date of birth>\}
5
      {<Street and number>}
      {<City and Postal Code>}
      {<Education and employment>}
      \{<\text{Email}>\}
9
      {<Path of the picture>}
10
   \end{Diplomandenvorstellung}
```

Listing 12: How to create a short CV

Listing 12 shows how to use the \diplomand command. This macro uses the given data and sets up the short CV of one person. If there are more people working on the project everyone has to create a short CV. The individual CVs should be separated with \newpage, because every CV arranges itself at the vertical middle of the page. The command also automatically sets the person's name into the footer.

All short CVs must be written within this environment. As mentioned above they should be separated by \newpage. The width of the short CV picture can be changed by setting it to another value via \breite. A default value of 3 cm is already preset by the template package.

```
breite{<Wert>}
Listing 13: Changing the picture's width
```

3.6.1. Including your previous education or work

Since version v2.4 there are two new macros that offer a better possibility to add your employment or education history to the short CV. Listing 14 shows how the commands can be used.

```
1 \firma{<Period>}{<Name of your job>}
2 \schule{<Period>}{<Name of your education/school>}
Listing 14: Adding your employment/education history
```

⁴This document class can be used to create high quality CVs in different colors and designs.

Although these commands are easy to use, the chronological order of the entries must be set by the user. Listing 15 shows the source code that was used to create figure 3.

```
begin{Diplomandenvorstellung}

diplomand{Max~Mustermann}

{12.12.2012 in St.P\"olten}

{XY-Street 14}

{3100 St.P\"olten}

{\schule{2010--2015}{HTBLuVA St.P\"olten, department for electrical\\ engineering}

\schule{2006--2010}{Lower secondary school XY}}

{max.muster@xy.at}

{Images/bild}

\end{Diplomandenvorstellung}
```

Listing 15: An example for a short CV

3.7. Header and footer

For the setup of the header and footer the *KOMA-script* package scrpage2.sty is used. The style is defined in the template package etdipa and should not be modified. Do not use other header-packages than scrpage2 with etdipa, otherwise you will get warnings or errors.

If the header does not show up in your document you may not have used the \mainmatter or \frontmatter command. In this case you can get the predefined style by using \setmyheadings at the beginning of your document.

The author of a page in the project documentation should always be listed in the footer. Therefore the **\responsible** macro was defined – see listing 16.

```
1 \responsible{<Name1>, <Name2>}
Listing 16: Authors names in the footer
```

3.8. Page and chapter numeration

Mostly documentations consist of three parts. Every part has a specific page and chapter enumeration. To toggle these numeration styles some basic LATEX commands must be used.

- 1. Frontmatter, contains everything that is not part of your main text (e.g.: Contents, CV,...)
- 2. Mainmatter, contains your main text
- 3. Appendix, contains additional documents like datasheets and so on

All the necessary lists – except for the table of contents – are located after the appendix and therefore must be included after the appendix in your master document.

The commands for toggling the enumeration are:

- $_{\scriptscriptstyle 1}$ \frontmatter %
- 2 \mainmatter %
- $_3$ \appendix %

Listing 17: Toggling the enumeration within your document

4. Basic typographical rules

Every kind of document follows some simple typographical rules. Like Till Tantau says: "keep it as simple as possible" [3, translated, page 48–52]). The readers' attention should be drawn to your text, not to a confusing layout. Thus, you should know some simple rules [2]:

```
1. Hyphenations are typeset with - (- \text{ in } \LaTeX) Domains, e.g. page numbers with "page 40–50" (-- \text{ in } \LaTeX) Dashes with – and a space before and after<sup>5</sup> (-- \text{ in } \LaTeX)
```

2. There should be a small space between a number and its unit. Units are never typeset in *italics*.

```
e.g.: I = 12 \,\mathrm{A} ($I = 12\,\mathrm{A}$)
```

- 3. Only use acronyms when they are necessary and keep it simple for the reader.
- 4. Align and numerate long equations (in LaTeX this can be obtained by the math environments displaymath, align, gather,...)
- 5. Use protected spaces that a name is never torn apart into its pieces e.g. S.~Laube
- 6. Use small spaces to make large numbers more readable e.g.: $1.782 \cdot 135 \cdot 567$ (\$1.782\,,135\,,567\$)

4.1. Labels and referencing

Cross referencing is one of the great strenghts of LaTeX. Thus, one should never write a sentence like: "Figure 1 shows...". This sentence contains two mistakes. At first, LaTeX uses so called *labels* to get the cross references right. Second, references are always typeset with a protected space between text and number. A typographically correct cross reference starts when the target element is included into the document. At that point the user has to set a unique label for this element. Further, that unique label contains the number of the included element – for example the label returns 1 if your element is the float "Figure 1".

⁵That is how it is done in Europe and the UK, the USA [1, 2] is using—without a space before and after the dash.

```
1 % Sections
2 \section{Test}\label{sec:test}
3
4 % Pictures
5 \label{pic:test}
6 % Figures / Diagrams
7 \label{fig:test}
8
9 % Tables
10 \label{tab:test}
```

Listing 18: Setting labels

All the created labels can be used within the text to refer to the desired element – see listing 19.

```
Figure \ref{pic:test} shows ...
Listing 19: Correct cross referencing
```

A. Packages

The following listing 20 shows all the packages that are by default loaded by the template. Thus, these packages need not be loaded by the user.

```
1 % style
_{2} \usepackage [scale = 0.75] {geometry}
  \usepackage [automark] { scrpage 2}
4 % encoding and fonts
5 \usepackage [ utf 8] { inputenc }
  \usepackage [T1] { fontenc }
  \usepackage { textcomp }
  % language
  \usepackage [english, naustrian] { babel}
10 % color
\usepackage [dvipsnames] { xcolor }
12 % floats
13 \usepackage { graphicx }
   \usepackage { tabularx }
15
   \usepackage { listings , scrhack }
   \usepackage [printonly used, with page] { acronym}
16
   \usepackage { array }
17
  \usepackage { float }
18
  %TikZ
19
   \usepackage [europeanresistors,
20
                 europeaninductors | { circuitikz }
21
   \usetikzlibrary { arrows, automata, positioning }
22
   \usepackage { pgfgantt }
23
  % math packages
24
  \usepackage {amsmath, amssymb}
25
  % others
  \usepackage { pdfpages }
27
   \usepackage { etdipa }
28
   \usepackage { todonotes }
30
   % hyperlinks
   \usepackage [ colorlinks=true ,
31
                 linkcolor=black,
32
                 citecolor=green,
33
                 bookmarks=true,
34
                 urlcolor=blue,
35
                 bookmarksopen=true | { hyperref }
36
```

Listing 20: Packages loaded by the template

B. Template-specific macros

```
1 % version number
    _2 \ETdipaversion
   3 % puts the author in
   4 % the footer
    5 \responsible{#1}
    6 % header and footer
                  \setmyheadings
   8 % title page
   9 \dokumenttyp{#1}
10 \and
11 \professor{#1}
12 \schuljahr{#1}
13 \place{#1}
14 % affidavit
\unterschrift{#1}
_{16} % short CV
17 \quad \mathbf{17} \quad
19 \diplomand{#1}{#2}{#3}{#4}{#5}{#6}{#7}
^{20} \breite{#1}
21 % colors
22 \dipacolor{#1}
23 ETred
24 IForange
25 ELyellow
26 MBblue
27 WIgreen
\frac{28}{3} % name variables
29 \dipvorname
                  \dankname
31 \eidname
32 % affidavit text
33 \@@eid@text
34 % environments
35 \begin{Diplomandenvorstellung}
36 \end{Diplomandenvorstellung}
                  \begin{Eid}
                 \end{Eid}
39 \begin{Danksagung}
40 \end{Danksagung}
41 \begin{Literatur}
42 \end{Literatur}
43 %'zero' environments by Prof. Haager
44 \begin{zeroitemize} % auch mit description und enumerate
45 \end{zeroitemize}
46 % lists
```

```
47 \dipalistoffigures
48 \dipalistoftables
49 % additional commands
50 \TikZ
51 \Masse % GND Symbol (TikZ)
52 \S % Y-connection symbol
53 \D % delta connection symbol
54 \DS % delta-Y connection symb.
55 \SD % Y-delta connection symb.
56 % TabularX-extension by Prof. Haager
57 L / C / R % as column-type
```

Listing 21: List of all template-specific macros

C. Additional information for teachers

This section is for teachers or supervisors of projects who use this template. Please read this section before you introduce the template to your students/colleagues.

The preparation of every part of the documentation is very essential and should be done carefully.

C.1. Design setup

At first you should think about the look of the design you want to use. It is also possible to change the look every year or two.

You can either save your setup as a TEX file which is then included on top of the documentation – see section 2.2, or you help your students/colleagues setting up the document rules.

C.1.1. Document type

On top of your document – or better: in the preamble – you need to specify the type of your documentation, for example "project documentation" or "final exam project" or something other that fits your project.

The standard document type is set to the German word DIPLOMARBEIT, but it can easily be changed – listing 22 shows how.

Listing 22: Changing the document type

```
1 %% Set document type
2 \dokumenttyp{DIPLOMARBEIT}% or
3 \dokumenttyp{PROJECT DOCUMENTATION}% or
4 \dokumenttyp{BIOLOGY PROJECT}% anything is possible
```

C.1.2. Title page

A very critical part in your document is the title page. Since it is only possible to replace the title picture with the current version v2.6 of this template, you will have to have a look at the LaTeX titlepage environment and the maketitle command, if you want to completely change the title page look.

The whole document is licensed with the LaTeX Project Public License, so you are allowed to modify everything – including the documentation – to meet your own needs.

C.1.3. Colors

The color of the short CV is another thing supervisors have to worry about. This template was originally written for the upper secondary school HTL St.Pölten in Lower Austria. Thus, the five department colors of the school are predefined by the template:

- > ETred
- > ELyellow
- > MBblue
- > IForange
- > WIgreen

If you do not want to use one of the predefined colors, you could easily define your own one, like it is shown in listing 23.

```
1 % Color definition
2 \definecolor{ETred}{RGB}{255,0,0}
3
4 % Set the color for your CV
5 \dipacolor{ETred}
```

Listing 23: Defining your own color

C.1.4. Name variables

Name variables are an essential feature of the template, since the standard names are in German. The English translation for every name variable is automatically set, if the babel option 'english' is used. Furthermore the name variables can be changed manually – see listing 24.

```
% Short CV
dipvorname{Short student introduction}
% Acknowledgement
dankname{Acknowledgement}
% Affidavit
eidname{Affidavit}
```

Listing 24: Changing name variables

C.1.5. Printing

In Austria most of the final year project documentations are printed in a one-side format. Nevertheless the twoside option is supported by the template and can be used if necessary. In case you do not know how two change this option, please have a look at listing 25.

```
% twoside option enabled

documentclass[twoside,paper=a4,12pt]{scrreprt}

twoside option disabled

documentclass[paper=a4,12pt]{scrreprt}

Listing 25: The twoside option
```

C.1.6. Fonts

The font for sans-serif texts was changed to be *Helvetica*. All the other ones are still the LaTeX default fonts.

C.1.7. Affidavit

To keep things simple for the user the text for the affidavit is predefined in the etdipa package. If one would like to change the text⁶ he or she has to copy the LATEX source code from listing 26 into the target document's preamble and add the new text for the affidavit.

Listing 26: Changing the text of the affidavit

⁶since this is an English manual you will have to, because the original text is written in German

C.1.8. Leave a note

There is one thing I want you to do: If your school or company is using my template officially, please let me know. Just write an email with the name and city of your institution. I am not going to publish the information I get from your institution – the purpose of this question is to get a personal list of schools/companies that use the template. Thank you in advance.

C.2. T_EXnical additions

C.2.1. Definition of various dimensions

The following paragraphs explain the internal dimensions that were used to create the short CV macro \diplomand. An optical representation of the dimensions can be seen in figure 4.

Width of the whole CV. The value of this dimension is set to be about two thirds of \textwidth, namely 0.6\textwidth. This value should be appropriate for page margins up to 30% – therefore the scaling factor of the page could be lowered to scale = 0.7.

```
 \begin{array}{ll} & \mbox{ \  \  } \\ & \m
```

Listing 27: Width of the whole short CV

Distance between picture and frame. Another new dimension is the distance between the picture and the surrounding frame. The default distance is 1 mm and the default line width is TikZ's internal default value.

```
1 %Distance picture <-> frame
2 \newlength {\@sep@dp1}
3 \setlength {\@sep@dp1} { lmm}
```

Listing 28: Dimension of the frame-picture distance

Default width of the picture. To enable any user of this template to change the picture's width the \breite⁷ macro was defined. Listing 29 shows how the commands and dimensions related to the picture's width were defined and how the width could be set by a user.

⁷German word for width

```
1 % macro definition make the
2 % width dimension accessible
3 \let\@breite\relax
4 \providecommand{\breite}[1]{\gdef\@breite{#1}}
5
6 % defining a default value for the width
7 \newlength{\@default@breite}
8 \setlength{\@default@breite}{3cm}
9 % set the value
10 \breite{\@default@breite}
```

Listing 29: Definition of the picture's width

C.2.2. Dimensions of the short CV

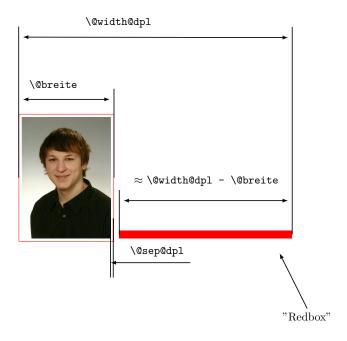


Figure 4: Dimensions within the short CV

Note: Figure 4 is to demonstrate the relations between the different dimensions. As you may notice, there is a \approx sign in there. That is because even the figure does not describe the dimensions as they really are, but it is more likely to understand the things this way.

References

- [1] **Donald E. Knuth:** *The T_EXbook.* 1986, Addison-Wesley, ISBN-13: 978-0-201-13447-6
- [2] Klaus Braune, Joachim & Marion Lammarsch:

 #TEX-Basissystem, Layout, Formelsatz. 2006, Springer Verlag,
 ISBN-13: 978-3-540-00718-0
- [3] **Till Tantau:** TikZ and PGF-Manual for version 1.18. 2007, GNU Free Documentation License, Version 1.2
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 TU Munich, October 2011
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- [8] **Tanja Richter:** Fußnoten, Kopf- und Fußzeilen in LaTeX. May 2004
- [9] Tobias Oetiker: An Acronym Environment for $\LaTeX 2\varepsilon$. October 2010
- [10] **Public forums:** www.latex-community.org, www.mrunix.de, www.golatex.de, www.tex.stackexchange.com, www.texample.net

The references above contain all the sources I used to create and document the etdipa-template. Furthermore they could be useful for any user of this template.