The at* package

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Contents

1 User guide

The at package is an attempt to remove a lot of tedious typing that ends up in LaTeX documents, by expanding the number of short command names available. The new command names begin with the '@' character, rather than the conventional '\', so you can tell them apart.

The package provides some general commands for defining @-commands, and then uses them to define some fairly simple ones which will be useful to most people.

The rules for @-command names aren't terribly complex:

- If the first character of the name is a letter, then the command name consists of all characters up to, but not including, the first nonletter. Spaces following the command name are ignored.
- If the first character of the name is a backslash, then the @-command name consists of the control sequence introduced by the backslash.

*The at package is currently at version 1.3, dated 2 May 1996.

- Otherwise, the command name consists only of that first character. Spaces following the name are not ignored, unless that character was itself a space character.

Usually, digits are not considered to be letters. However, the `at` package will consider digits to be letters if you give it the `digits` option in the `\usepackage` command. (Note that this only affects the `at` package; it won't change the characters allowed in normal command names.)

`\atallowdigits` `\atdisallowdigits`

You can enable and disable digits being considered as letters dynamically. The `\atallowdigits` command allows digits to be used as letters; `\atdisallowdigits` prevents this. Both declarations follow LaTeX's usual scoping rules. Both of these commands have corresponding environments with the same names (without the leading '\', obviously).

1.1 Defining @-commands

`\newatcommand` `\renewatcommand`

The `\newatcommand` command will define a new @-command using a syntax similar to `\newcommand`. For example, you could define

```
\newatcommand c[1]{\chapter{#1}}
```

to make `@c{`⟨*name*⟩`}` equivalent to `\chapter{`⟨*name*⟩`}`.

A `\renewatcommand` is also provided to redefine existing commands, should the need arise.

`\atdef`

For TeX hackers, the `\atdef` command defines @-commands using a syntax similar to TeX's built-in `\def`.

As an example, the following command makes `@/`⟨*text*⟩`/` write its argument ⟨*text*⟩ in italics:

```
\atdef/#1/{\textit{#1}}
```

The real implementation of the `@/.../` command is a bit more complex, and is given in the next section.

You can use all of TeX's features for defining the syntax of your command. (See chapter 20 of *The TeXbook* for more details.)

`\atlet`

Since `\atdef` is provided to behave similarly to `\def`, `at` provides `\atlet` which works similarly to `\let`. For example you can say

```
\atlet!=\index
```

to allow the short `@!` to behave exactly like `\index`.

Note that all commands defined using these commands are robust even if you use fragile commands in their definitions. Unless you start doing very strange things, @-commands never need `\protecting`.

1.2 Predefined @-commands

A small number of hopefully useful commands are provided by default. These are described in the table below:

Command	Meaning
`@@`	Typesets an '@' character.
`@/`⟨*text*⟩`/`	In text (LR or paragraph) mode, typesets its argument emphasised. In maths mode, it always chooses italics.
`@*`⟨*text*⟩`*`	Typesets its argument ⟨*text*⟩ in bold.
`@i{`⟨*text*⟩`}`	Equivalent to '`\index{`⟨*text*⟩`}`'.
`@I{`⟨*text*⟩`}`	As for `@i`, but also writes its argument to the document.

Package writers should not rely on any predefined @-commands – they're provided for users, and users should be able to redefine them without fear of messing anything up. (This includes the 'standard' commands provided by the `at` package, by the way. They're provided in the vague hope that they might be useful, and as examples.)

2 Implementation

1 ⟨*package⟩

2.1 Options handling

We need a switch to say whether digits should be allowed. Since this is a user thing, I'll avoid `\newif` and just define the thing by hand.

```
2 \def\atallowdigits{\let\ifat@digits\iftrue}
3 \def\atdisallowdigits{\let\ifat@digits\iffalse}
```

Now define the options.

```
4 \DeclareOption{digits}{\atallowdigits}
5 \DeclareOption{nodigits}{\atdisallowdigits}
6 \ExecuteOptions{nodigits}
7 \ProcessOptions
```

2.2 How the commands work

Obviously we make the '@' character active. It inspects the next character (or argument, actually – it can be enclosed in braces for longer commands, although this is a bit futile), and builds the command name from that.

The `\at` command is equivalent to the active '@' character always.

2.3 Converting command names

We need to be able to read an @-command name, and convert it to a normal TEX control sequence. First, we declare some control sequences for braces, which we need later.

```
 8 \begingroup
 9 \catcode`\<1
10 \catcode`\>2
11 \catcode`\{12
```

```
\catcode`\}12
\gdef\at@lb<{>
\gdef\at@rb<}>
\gdef\at@spc< >
\endgroup
```

I'll set up some helper routines now, to help me read the command names. The way this works is that we `\futurelet` the token into `\@let@token`. These routines will then sort out what to do next.

`\at@test` Given an `\if...` test, does its first or second argument.

```
\def\at@test#1\then{%
  #1\expandafter\@firstoftwo\else\expandafter\@secondoftwo\fi%
}
```

`\at@ifcat` Checks the category code of the current character. If it matches the argument, it does its second argument, otherwise it does the third.

```
\def\at@ifcat#1{\at@test\ifcat#1\noexpand\@let@token\then}
```

`\at@ifletter` This routine tests the token to see if it's a letter, and if so adds it to the token list and does the first argument; otherwise it does the second argument. It accepts digits as letters if the switch is turned on.

There's some fun later, so I'll describe this slowly. First, we compare the category code to a letter, and if we have a match, we know we're done; we need to pick up the letter as an argument. If the catcode is 'other', we must compare with numbers to see if it's in range.

```
\def\at@ifletter#1#2{%
  \at@ifcat x%
    {\at@ifletter@ii{#1}}%
    {\at@ifcat 0%
      {\at@ifletter@i{#1}{#2}}%
      {#2}%
    }%
}
```

Right. It's 'other' (so it's safe to handle as a macro argument) and we need to know if it's a digit. This is a little tricky: I use `\if` to compare two characters. The first character is '1' or '0' depending on the 'digit' switch; the second is '1' or 'x' depending on whether it's actually a digit. They'll only match if everything's worked out OK.

```
\def\at@ifletter@i#1#2#3{%
  \at@test\if%
    \ifat@digits1\else0\fi%
    \ifnum`#3<`0x\else\ifnum`#3>`9x\else1\fi\fi%
  \then%
    {\at@ifletter@ii{#1}{#3}}%
    {#2#3}%
}
```

Right; we have the character, so add it to the list and carry on.

```
\def\at@ifletter@ii#1#2{\toks@\expandafter{\the\toks@#2}#1}
```

Now we define the command name reading routines. We have *almost* the same behaviour as TEX, although we can't support '%' characters for reasons to do with TEX's tokenising algorithm.

`\at@read@name` The routine which actually reads the command name works as follows:

1. Have a peek at the next character. If it's a left or right brace, then use the appropriate character.
2. If the character is not a letter, just use the character (or whole control sequence.
3. Finally, if it's a letter, keep reading letters until we find one that wasn't.

First, we do some setting up and read the first character

```
\def\at@read@name#1{%
  \let\at@next=#1%
  \toks@{}%
  \futurelet\@let@token\at@rn@i%
}
```

Next, sort out what to do, based on the category code.

```
\def\at@rn@i{%
  \def\@tempa{\afterassignment\at@rn@iv\let\@let@token= }%
  \at@ifletter%
    {\futurelet\@let@token\at@rn@iii}%
    {\at@ifcat\bgroup%
      {\toks@\expandafter{\at@lb}\@tempa}%
      {\at@ifcat\egroup%
        {\toks@\expandafter{\at@rb}\@tempa}%
        {\at@ifcat\at@spc%
          {\toks@{ }\@tempa}%
          {\at@rn@ii}%
        }%
      }%
    }%
}
```

Most types of tokens can be fiddled using `\string`.

```
\def\at@rn@ii#1{%
  \toks@\expandafter{\string#1}%
  \at@rn@iv%
}
```

We've found a letter, so we should check for another one.

```
\def\at@rn@iii{%
  \at@ifletter%
    {\futurelet\@let@token\at@rn@iii}%
    {\@ifnextchar.\at@rn@iv\at@rn@iv}%
}
```

Finally, we need to pass the real string, as an argument, to the macro. We make `\@let@token` relax, since it might be something which will upset TEX later, e.g., a # character.

```
\def\at@rn@iv{%
  \let\@let@token\relax%
  \expandafter\at@next\csname at.\the\toks@\endcsname%
}
```

`\at@cmdname` Given a control sequence, work out which @-command it came from.

```
\def\at@cmdname#1{\expandafter\at@cmdname@i\string#1\@@foo}
```

Now extract the trailing bits.

```
\def\at@cmdname@i#1.#2\@@foo{#2}
```

`\at@decode` The `\at@decode` macro takes an extracted @-command name, and tries to execute the correct control sequence derived from it.

```
\def\at@decode#1{%
  \at@test\ifx#1\relax\then{%
    \PackageError{at}{Unknown @-command `@\at@cmdname#1'}{%
      The @-command you typed wasn't recognised, so I've ignored it.
    }%
  }{%
    #1%
  }%
}
```

`\@at` We'd like a measure of compatibility with amsmath. The @-commands provided by amsmath work only in maths mode, so this gives us a way of distinguishing. If the control sequence `\Iat` is defined, and we're in maths mode, we'll call that instead of doing our own thing.

```
\def\@at{%
  \def\@tempa{\at@read@name\at@decode}%
  \ifmmode\ifx\Iat\not@@defined\else%
    \let\@tempa\Iat%
  \fi\fi%
  \@tempa%
}
```

2.4 Defining new commands

`\at@buildcmd` First, we define a command to build these other commands:

```
\def\at@buildcmd#1#2{%
  \expandafter\def\csname\expandafter
    \@gobble\string#1@decode\endcsname##1{#2##1}%
  \edef#1{%
    \noexpand\at@read@name%
    \expandafter\noexpand%
      \csname\expandafter\@gobble\string#1@decode\endcsname%
  }%
}
```

`\newatcommand` `\renewatcommand` `\provideatcommand` `\atdef` `\atshow` Now we define the various operations on @-commands.

```
\at@buildcmd\newatcommand\newcommand
\at@buildcmd\renewatcommand\renewcommand
\at@buildcmd\provideatcommand\providecommand
```

```
\at@buildcmd\atdef\def
\at@buildcmd\atshow\show
```

\atlet `\atlet` is rather harder than the others, because we want to allow people to say things like `\atlet`⟨*name*⟩`=@`⟨*name*⟩. The following hacking does the trick. I'm trying very hard to duplicate `\let`'s behaviour with respect to space tokens here, to avoid any surprises, although there probably will be some differences. In particular, `\afterassignment` won't work in any sensible way.

First, we read the name of the @-command we're defining. We also open a group, to stop messing other people up, and make '@' into an 'other' token, so that it doesn't irritatingly look like its meaning as a control sequence.

```
\def\atlet{%
  \begingroup%
  \@makeother\@%
  \at@read@name\atlet@i%
}
```

Put the name into a scratch macro for later use. Now see if there's an equals sign up ahead. If not, this will gobble any spaces in between the @-command name and the argument.

```
\def\atlet@i#1{%
  \def\at@temp{#1}%
  \@ifnextchar=\atlet@ii{\atlet@ii=}%
}
```

Now we gobble the equals sign (whatever catcode it is), and peek at the next token up ahead using `\let` with no following space.

```
\def\atlet@ii#1{\afterassignment\atlet@iii\global\let\at@gnext=}
```

The control sequence `\at@gnext` is now `\let` to be whatever we want the @-command to be, unless it's picked up an '@' sign. If it has, we've eaten the `@` token, so just read the name and pass it on. Otherwise, we can `\let` the @-command directly to `\at@gnext`. There's some nastiness here to make `\the\toks@` expand before we close the group and restore its previous definition.

```
\def\atlet@iii{%
  \if @\noexpand\at@gnext%
    \expandafter\at@read@name\expandafter\atlet@iv%
  \else%
    \expandafter\endgroup%
    \expandafter\let\at@temp= \at@gnext%
  \fi%
}
```

We've read the source @-command name, so just copy the definitions over.

```
\def\atlet@iv#1{%
  \expandafter\endgroup%
  \expandafter\let\at@temp=#1%
}
```

2.5 Robustness of @-commands

We want all @-commands to be robust. We could leave them all being fragile, although making robust @-commands would then be almost impossible. There are two problems which we must face:

- The '\@at' command which scans the @-command name is (very) fragile. I could have used \DeclareRobustCommand for it (and in fact I did in an earlier version), but that doesn't help the other problem at all.
- The 'name' of the @-command may contain active characters or control sequences, which will be expanded at the wrong time unless we do something about it now.

We must also be careful not to introduce extra space characters into any files written, because spaces are significant in @-commands. Finally, we have a minor problem in that most auxiliary files are read in with the '@' character set to be a letter.

\at Following the example of LaTeX's 'short' command handling, we'll define \at to decide what to do depending on what \protect looks like. If we're typesetting, we just call \@at (above) and expect it to cope. Otherwise we call \at@protect, which scoops up the \fi and the \@at, and inserts other magic.

```
\def\at{\ifx\protect\@typeset@protect\else\at@protect\fi\@at}
```

\at@protect Since we gobbled the \fi from the above, we must put that back. We then need to do things which are more complicated. If \protect is behaving like \string, then we do one sort of protection. Otherwise, we assume that \protect is being like \noexpand.

```
\def\at@protect\fi#1{%
  \fi%
  \ifx\protect\string%
    \expandafter\at@protect@string%
  \else%
    \expandafter\at@protect@noexpand%
  \fi%
}
```

\at@protect@string When \protect is \string, we don't need to be able to recover the original text particularly accurately – it's for the user to look at. Therefore, we just output a $\texttt{@}_{11}$ and use \string on the next token. This must be sufficient, since we only allow multi-token command names if the first token is a letter (code 11).

```
\def\at@protect@string{@\string}
```

\at@protect@noexpand This is a little more complex, since we're still expecting to be executed properly at some stage. However, there's a cheeky dodge we can employ since the \at command is thoroughly robustified (or at least it will be by the time we've finished this). All \@unexpandable@protect does is confer repeated robustness on a fragile command. Since our command is robust, we don't need this and we can get away with just using a single \noexpand, both for the \@at@ command and the following token (which we must robustify, because no-one else can do it for us – if anyone tries, they end up using the @\protect command which is rather embarassing).

I'll give the definition, and then examine how this expands in various cases.

```
\def\at@protect@noexpand{\noexpand\@at@ @\noexpand}
\def\@at@#1{\at}
```

A few points, before we go into the main examination of the protection. I've inserted a $\texttt{@}_{11}$ token, which is gobbled by `\@at@` when the thing is finally expanded fully. This prevents following space tokens in an `\input` file from being swallowed because they follow a control sequence. (I can't use the normal $\texttt{@}_{13}$ token, because when files like the `.aux` file are read in, `@` is given code 11 by `\makeatletter`.)

Now for a description of why this works. When `\at` is expanded, it works out that `\protect` is either `\noexpand` or `\@unexpandable@protect`, and becomes `\at@protect@noexpand`. Because of the `\noexpand` tokens, this stops being expanded once it reaches `@at@` $\texttt{@}_{11}\,x$ (where x is the token immediately following the $\texttt{@}_{13}$ character). If this is expanded again, for example in another `\edef`, or in a `\write` or a `\mark`, the `\@at@` wakes up, gobbles the following `@` (whatever catcode it is – there may be intervening `\write` and `\input` commands) and becomes `\at`, and the whole thing can start over again.

2.6 Enabling and disabling @-commands

`\aton` We define the `\aton` command to enable all of our magic. We store the old catcode in the `\atoff` command, make '@' active, and make it do the stuff.

```
\def\aton{%
  \ifnum\catcode`\@=\active\else%
    \edef\atoff{\catcode`\noexpand\@\the\catcode`\@}%
    \catcode`\@\active%
    \lccode`\~`\@%
    \lowercase{\let~\at}%
  \fi%
}
```

`\atoff` The `\atoff` command makes '@' do the stuff it's meant to. We remember the old catcode and revert to it. This is largely unnecessary.

```
\def\atoff{\catcode`\@12}
```

`\makeatother` Now we make our active '@' the default outside of package files.

```
\let\makeatother\aton
```

And we must make sure that the user can use all of our nice commands. Once the document starts, we allow @-commands.

```
\AtBeginDocument{\aton}
```

`\dospecials` `\@sanitize` We must add the '@' character to the various specials lists.

```
\expandafter\def\expandafter\dospecials\expandafter{\dospecials\do\@}
\expandafter\def\expandafter\@sanitize\expandafter{%
  \@sanitize\@makeother\@}
```

2.7 Default @-commands

We define some trivial examples to get the user going.

```
\expandafter\chardef\csname at.@\endcsname=`\@
\atdef*#1*{\ifmmode\mathbf{#1}\else\textbf{#1}\fi}
\atdef/#1/{\ifmmode\mathit{#1}\else\emph{#1}\fi}
\atlet i=\index
\atdef I#1{#1\index{#1}}
⟨/package⟩
```

Appendix

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A.3 Appendix: How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the program's name and a brief idea of what it does.>
Copyright (C) 19yy  <name of author>

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it under the terms of the GNU General Public License as published by
the Free Software Foundation; either version 2 of the License, or
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Foundation, Inc., 675 Mass Ave, Cambridge, MA 02139, USA.
```

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) 19yy name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type ‘show w’.
This is free software, and you are welcome to redistribute it
under certain conditions; type ‘show c’ for details.
```

The hypothetical commands ‘show w’ and ‘show c’ should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than ‘show w’ and ‘show c’; they could even be mouse-clicks or menu items–whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
'Gnomovision' (which makes passes at compilers) written by James Hacker.

<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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Numbers written in italic refer to the page where the corresponding entry is described, the ones underlined to the code line of the definition, the rest to the code lines where the entry is used.