

# THE *UBAR* PACKAGE FOR LATEX2E

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## Abstract

This article describes the **ubar.sty** package for use with L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>. The package defines a single macro, `\ubar`, for putting a bar (or other accent) under a math character.

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TeX does not have a good way to position accents under a variable, such as in  $\underline{f}$ ,  $\underline{\theta}$ ,  $\underline{\Psi}$ , or  $\underline{M}$ . The best workaround is to avoid accents under variables! Such accents lead to cluttered notation and confusion about whether an accent lies underneath a variable or above a variable on the line below.

However, when underlined symbols are absolutely necessary, the **ubar** package implements a fairly good workaround, `\ubar`, for the most common case: a simple bar under a single variable. The four examples in the previous paragraph were made with this code:

```
\ubar{f} \ubar{\theta} \ubar[up]{\Psi} \ubar{M}
```

The `\ubar` command uses a narrow accent for narrow variables and a wider accent for wider variables. The narrow version uses the same accent as the math accent `\bar` does, so that they match; the wider version either uses the `\wbar` accent from the MathTime Pro2 fonts (if available) or it draws its own. Compare  $\underline{\gamma}$  and  $\bar{\gamma}$ , as well as  $\underline{M}$  and  $\bar{M}$ .

TeX's font metrics do not provide precise information for positioning an accent under a glyph: `\ubar` does some guessing and it can sometimes get things wrong. Hence there are several options that allow you to tweak the output; these are included as `key=val` pairs in an optional argument within square brackets.

The most common problem is that upright uppercase Greek letters often come from a slanted math italic font and `\ubar` will inappropriately try to compensate for the slant of the font. For example, `\ubar{\Psi}` yields  $\underline{\Psi}$ . Use the `up` option to tell `\ubar` that the variable is not slanted; `\ubar[up]{\Psi}` gets it right:  $\underline{\Psi}$ .

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TABLE 1. Options for the `\ubar` command.

Key	Values	Effect	Default
<b>wide</b>	<b>auto</b>	Use the wide accent according to <b>limit</b> .	<b>auto</b>
	<b>true</b>	Always use the wide accent.	
	<b>false</b>	Always use the narrow accent.	
<b>limit</b>	dim	Use wide accent when the variable’s width exceeds dim.	<b>0.75\uem</b>
<b>sep</b>	dim	Place the accent distance dim below the variable.	<b>0.14\uem</b>
<b>up</b>	bool	Don’t correct for the slant of the font.	<b>false</b>
<b>shift</b>	dim	Shift the accent dim to the right.	<b>0pt</b>
<b>rule</b>	bool	Draw a rule (line) rather than use the <code>\bar</code> or <code>\wbar</code> accent. <sup>a</sup>	<b>false</b>
<b>width</b>	dim	When drawing a rule: set width of narrow accent to dim.	<b>0.4\uem</b>
<b>widewidth</b>	dim	When drawing a rule: set width of wide accent to dim.	<b>0.67\uem</b>
<b>thickness</b>	dim	When drawing a rule: set thickness to dim.	<b>0.05\uem</b>
<b>depth</b>	<b>thickness</b>	Impute a vertical size of <b>thickness</b> to the narrow accent.	<b>thickness</b>
	dim	Impute a vertical size of dim to the narrow accent.	
	<b>auto</b>	Use the narrow accent’s actual vertical size.	
<b>widewidth</b>	<b>thickness</b>	Impute a vertical size of <b>thickness</b> to the wide accent.	<b>thickness</b>
	dim	Impute a vertical size of dim to the wide accent.	
	<b>auto</b>	Use the wide accent’s actual vertical size.	
<b>accent</b>	<code>{}</code>	Use <code>\bar</code> or a rule for the narrow accent.	<code>{}</code>
	<code>\cmd</code>	Use <code>\cmd</code> to draw the narrow accent.	
<b>wideaccent</b>	<code>{}</code>	Use <code>\wbar</code> or a rule for the wide accent.	<code>{}</code>
	<code>\cmd</code>	Use <code>\cmd</code> to draw the wide accent.	

a. Even when `rule=false`, a rule is drawn if `\ubar` cannot determine that the MathTime Pro2 `\wbar` accent is defined.

Other options are shown in Table 1. If you want to change the default values, use for example

```
\setkeys{ubar}{limit=0.7\uem,sep=0.11\uem}
```

Note the use of the unit `\uem` rather than, say, `0.7em` or `6pt`. The value of `\uem` will be set, during the construction of the accent, to the length of 1em (a “quad”, or roughly the width of the uppercase M) for the font from which the accented character is drawn. This is important if you want your settings to work for different math styles or font sizes.

The `accent` and `wideaccent` keys allow you to use any accents rather than `\bar` and `\wbar`, or you can even attempt some nonaccent command that draws a symbol of the right size. Here are some examples:

```
\newcommand{\utilde}{\ubar[accent=\tilde,wideaccent=\wtilde]}
 $\$ \utilde{\pi} \$ \utilde{Z} \$ \utilde{up}{\Delta} \$ \ubar[accent=\dot]{t} \$$ 
 $\pi \tilde{Z} \tilde{\Delta} \dot{t}$ 
```

The reason that the default value of `depth` and `widewidth` is not `auto` is that typically `\ubar` cannot determine the true vertical size of an accent.