

# The **sensor** Package

Tools for Producing Redacted Documents

Steven B. Segletes  
SSegletes@verizon.net

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## 1 Introduction

The **sensor** package allows a convenient redaction/censor capability to be employed, for those who need to protect restricted information, as well as for those who are forced to work in a more inefficient environment when dealing with restricted information.

Let us assume you have a document for internal use, containing some restricted (*i.e.*, private, sensitive, proprietary or classified) information. To give a very short (fictitious) example:

RESTRICTED SOURCE: \_\_\_\_\_

The Liberty missile, with charge diameter (CD) of 80~mm,  
revealed a penetration capability of 1.30 1.19, and  
1.37~CD in three recent tests into armor steel.

RESTRICTED OUTPUT: \_\_\_\_\_

The Liberty missile, with charge diameter (CD) of 80 mm, revealed a  
penetration capability of 1.30 1.19, and 1.37 CD in three recent tests into  
armor steel.

---

Censor/redaction capabilities are desirable to sanitize the information. This would accomplish two things: allow for wider distribution of the output and/or allow a less sensitive output to be stored locally with fewer storage controls.

There are two modes in which the **sensor** package can be used: (i) when the source (.tex file) remains restricted/secure; and (ii) when the source (.tex file) is public/unsecure.

## 2 Mode I: Restricted/Secure Source (.tex file)

In this mode, you create the source in a restricted/secure environment, but would like to produce output that can be more widely distributed, or stored in a less restricted location. With the addition of `\usepackage{censor}` to your document preamble, the `\censor` command becomes accessible to block out key identifiers:

CENSORED RESTRICTED SOURCE: \_\_\_\_\_

The `\censor{Liberty}` missile, with charge diameter (CD) of `\censor{80}~mm`, revealed a penetration capability of 1.30 1.19, and 1.37~CD in three recent tests into armor steel.

CENSORED NO-LONGER-RESTRICTED OUTPUT: \_\_\_\_\_

The ██████ missile, with charge diameter (CD) of ██ mm, revealed a penetration capability of 1.30 1.19, and 1.37 CD in three recent tests into armor steel.

---

The censored version of the output is (presumably) less sensitive in its content, and may be stored in or distributed to a less sensitive environment (*e.g.*, as a hardcopy). The censored words are not part of the output document (hardcopy or electronic), even though the space allocated for the redaction is identical to the original word being redacted.

The document may also be printed out in its restricted (uncensored) form, merely with the addition of the `\StopCensoring` command at the beginning of the document:

UNCENSORED RESTRICTED SOURCE: \_\_\_\_\_

`\StopCensoring`

The `\censor{Liberty}` missile, with charge diameter (CD) of `\censor{80}~mm`, revealed a penetration capability of 1.30, 1.19, and 1.37~CD in three recent tests into armor steel.

UNCENSORED RESTRICTED OUTPUT: \_\_\_\_\_

The Liberty missile, with charge diameter (CD) of 80 mm, revealed a penetration capability of 1.30, 1.19, and 1.37 CD in three recent tests into armor steel.

As of version 3.0, the ability to censor “boxed” objects like images and/or tabular environments is made possible with the `\censorbox` command. As an example, one could use the following source:

UNCENSORED RESTRICTED SOURCE: \_\_\_\_\_

The `\censor{Liberty}` missile, with charge diameter (CD) of `\censor{80}`~mm, revealed a penetration capability into armor steel, as detailed in Table 1.

```
\begin{table}[ht]
\begin{center}
\textbf{Table 1. \censor{Liberty} Missile Test Data}\\
\censorbox{%
  \small\begin{tabular}{cc}
    Standoff & Penetration \\
    (CD) & (CD) \\
    \hline
    5.0 & 1.30 \\
    6.0 & 1.19 \\
    6.8 & 1.37 \\
  \end{tabular}%
}
\end{center}
\end{table}
```

in order to turn, what would otherwise be the following restricted output into a censored, unrestricted table.

UNCENSORED RESTRICTED OUTPUT: \_\_\_\_\_

The Liberty missile, with charge diameter (CD) of 80 mm, revealed a penetration capability into armor steel, as detailed in Table 1.

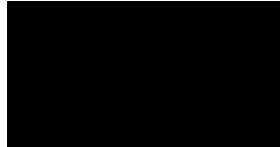
**Table 1. Liberty Missile Test Data**

Standoff (CD)	Penetration (CD)
5.0	1.30
6.0	1.19
6.8	1.37

CENSORED UNRESTRICTED OUTPUT: \_\_\_\_\_

The [REDACTED] missile, with charge diameter (CD) of [REDACTED] mm, revealed a penetration capability into armor steel, as detailed in Table 1.

Table 1. [REDACTED] Missile Test Data



---

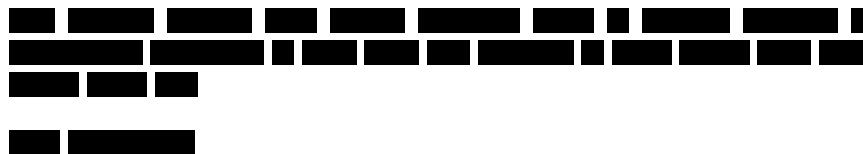
As of version 2.0, there is provided a block-censor capability, for redacting larger blocks of text. This new command is `\blackout`, and is used in the form `\blackout{Block of text}`. This nice thing about this command is that it can stretch across line and paragraph boundaries conveniently. For example,

UNCENSORED RESTRICTED SOURCE: \_\_\_\_\_

```
\blackout{
The Liberty missile, with charge diameter (CD) of 80~mm,
revealed a penetration capability of 1.30, 1.19, and 1.37~CD
in three recent tests into armor steel.}
```

New paragraph.}

CENSORED UNRESTRICTED OUTPUT: \_\_\_\_\_



---

Prior to V4.0, `\blackout` did not conveniently work across environment boundaries, such as math or tabular mode. One inconvenient option had been to `\censor` text in the `tabular`, cell by cell. Alternatively, to blackout the whole tabular environment, you should use the `\censorbox` command as has been shown. Presently, there is a third option—to censor cell-by-cell using a short-hand notation.

The `\blackout` macro now allows uncensored content to be *escaped* from its argument by delimiting it between `|...|` bars. Thus, the censoring directive

`\blackout{This |is a| test}` renders as   is a  .

```
\blackout{
|\begin{tabular}{|c|c|}
\hline
Title 1 & Title 2 \\
\hline
|a| & |bbb|\\
|cc| & dd\\
\hline
\end{tabular}|
}
```

Title 1	Title 2	Title 1	Title 2
<span style="background-color: black; color: black;"> </span>	<span style="background-color: black; color: black;"> </span>	a	bbb
<span style="background-color: black; color: black;"> </span>	dd	cc	dd

**\*\*v4.0 CHANGE\*\*:** The restriction on `\blackout` *not* ending on glue is no longer applicable.

Finally, the argument to `\blackout` can, in limited situations, process macros; However, the macros are not expanded by default. See section 4 for details on what is possible with respect to the censoring of macro content with this package.

The author received some negative feedback concerning the appearance resulting from a `\blackout` command. Generally, people did not like the fact that spaces were not blacked out. To this end, the `\xblackout` command is introduced in V3.10, which *cosmetically* blacks out the text more completely (note, however, that underneath the more complete blackout are still the word-length blackouts that otherwise compose `\blackout`).

As of v4.0 of the package, the additional blacking-out of the `\xblackout` macro is controlled by one resettable length which laps additional blacking atop the result of `\blackout`. This length is defined in the macro `\spacelap`, with a default value of 0.6ex.

During `\xblackout`, a right- and left-lapped blacking of dimension `\spacelap` is applied before and after each space character, respectively.

The blacking from `\xblackout` is intended to be less “choppy” than that of `\blackout`. However, it too has some drawbacks. The x-blackening will extend past the margin(s). It is also possible that not all margin extensions will be uniform in size. With all these caveats, it may still be found preferable to the `\blackout` macro, as shown in the example below.

$\{^\circ\}$ 

New paragraph} with open text.

New paragraph with open text.

[illegible]

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

---

### 3 Mode II: Public/Unsecure Source (.tex file)

This mode is envisioned for users who must bear a large level of inconvenience to work in a restricted/secure environment (generally meaning in a location physically removed from one's desk). Its use is envisioned to allow a large percentage of a document to be created in an public/unsecure environment, with only the restricted details being completed in a restricted/secure environment.

After including the `\usepackage{censor}` command in the document preamble, the `\censor*` and `\censorbox*` commands becomes accessible. The way this author envisions its use is as follows:

CENSORED UNRESTRICTED SOURCE: \_\_\_\_\_

```
% KEYWORD IDENTIFIERS:
\def\Missile{\censor*{7}}
\def\Size{\censor*{2}}
\def\TableOne{\censorbox*{\small}{26}{5}{3.5}}

The \Missile{} missile, with charge diameter (CD) of
\Size~mm, revealed a penetration capability ranging from
1.19--1.37~CD in three recent tests into armor steel, as
detailed in Table 1.

\begin{table}[ht]
\begin{center}
\textbf{Table 1. \Missile{} Missile Test Data}\\
\TableOne{}
\end{center}
\end{table}
```

CENSORED UNRESTRICTED OUTPUT: \_\_\_\_\_

The ██████ missile, with charge diameter (CD) of ██ mm, revealed a penetration capability ranging from 1.19–1.37 CD in three recent tests into armor steel, as detailed in Table 1.

**Table 1. ██████ Missile Test Data**

<div style="background-color: black; width: 100%; height: 100%;"></div>
---

In this way, the source (.tex file) contains no restricted information, and may thus be prepared in an unrestricted environment. The argument to the `\censor*` command is a number representing the approximate width of the redaction (in ex's). In the case of the `\censorbox*` command, it has three mandatory arguments and one optional argument (note that the unstarred form of the `\censorbox` command has not three, but one, mandatory arguments). The mandatory arguments to `\censorbox*` are box width (in ex's), box height (in multiples of `\baselineskip`) and finally the depth below the baseline where the bottom of the box should be (in multiples of `\baselineskip`). The optional argument can include commands that you want in force for the `\censorbox` command, most typically fontsize commands, which will affect the size of the an ex and `\baselineskip`.

Because the redaction width is only approximate, it is possible that the censored and uncensored originals might have differing text justification. In the text, the curly braces may be added after the keyword identifiers so as to produce the proper interaction with the surrounding whitespace and punctuation.

Because the source (.tex) file contains no restricted information, the use of `\StopCensoring` cannot (in and of itself) produce the restricted document. Rather it will produce the following:

UNCENSORED UNRESTRICTED OUTPUT: \_\_\_\_\_

The \_\_\_\_\_ missile, with charge diameter (CD) of \_\_ mm, revealed a penetration capability ranging from 1.19–1.37 CD in three recent tests into armor steel, as detailed in Table 1.

**Table 1. \_\_\_\_\_ Missile Test Data**

--

---

In order to produce the uncensored, restricted output, the unrestricted source file must be moved into the restricted/secure environment and be subject to a small amount of additional editing. Once in the restricted environment, the source (.tex file) may be edited such that the censored keyword identifiers are filled in with their restricted values and, in the process, changing the `\censor*` and `\censorbox*` commands to `\censor` and `\censorbox`, respectively. This and the addition of the `\StopCensoring` command to the file will produce the uncensored, restricted result:



UNCENSORED NO-LONGER-UNRESTRICTED SOURCE: \_\_\_\_\_

```
\StopCensoring
\def\Missile{\censor{Liberty}}
\def\Size{\censor{80}}
\def\TableOne{\censorbox{%
  \begin{tabular}{cc}
    Standoff & Penetration \\
    (CD) & (CD) \\
    \hline
    5.0 & 1.30 \\
    6.0 & 1.19 \\
    6.8 & 1.37 \\
  \end{tabular}%
}}
```

The {\Missile} missile, with charge diameter (CD) of {\Size}~mm, revealed a penetration capability ranging from 1.19--1.37~CD in three recent tests into armor steel, as detailed in Table 1.

```
\begin{table}[ht]
\begin{center}
\textbf{Table 1. {\Missile} Missile Test Data}\\
{\TableOne}
\end{center}
\end{table}
```

UNCENSORED RESTRICTED OUTPUT: \_\_\_\_\_

The Liberty missile, with charge diameter (CD) of 80 mm, revealed a penetration capability ranging from 1.19–1.37 CD in three recent tests into armor steel, as detailed in Table 1.

**Table 1. Liberty Missile Test Data**

Standoff (CD)	Penetration (CD)
5.0	1.30
6.0	1.19
6.8	1.37

---

The only changes required of the document were at the very beginning, among the keyword identifiers. The primary text of the source document remained un-

altered. Note also that the censored, unrestricted output may also be obtained from the no-longer-unrestricted source by removing the `\StopCensoring` command at the beginning of the file.

It is not envisioned that the `\blackout` or `\xblackout` commands, discussed in the prior section, are used in this mode, where the source file is in an unsecure environment.

## 4 Can I Censor Control Sequences?

In general, the `sensor` package is designed to operate on literal text. This is especially true if you are using the `\censor` macro, which is designed for use on a single word, rather than extended text. However, it is also clear that an extended text passage may contain various macro markup, for example, italic phrases.

The `\blackout` and `\xblackout` macros can at least digest control sequences in the input-text stream. How the sequences are handled will require some user intervention. By default, these macros will be echoed into the output stream in a literal (unexpanded) form.

Consider the following line of  $\text{\LaTeX}$  code:

```
This is \textit{italic text}
This is italic text
■■■■
```

It would normally render as in the 2nd line. When included as part of the `\blackout` argument, it renders as the 3rd line. The `\textit` is still part of the blackout rendering, but the *input* to `\textit` has been censored and the censor rule does not change its presented shape under the influence of `\textit`.

Some macros, however, expand to literal text. Because they are, by default, carried literally into the output, they will only expand into text *after* the censoring has been applied. Consider the following line of  $\text{\LaTeX}$  code:

```
Today's date is \today.
Today's date is December 23, 2021.
■■■■ December 23, 2021■■
```

If the macro is expandable (and not all are), the `\blackout` and `\xblackout` macros are set up to intercept callouts to the primitive `\expanded` and act upon them prior to censoring. Therefore, with one small change to the above example, the problem can be remedied:

Today's date is `\expanded{\today}`.

Today's date is December 23, 2021.

██████████

If a control sequence is not expandable, then there is no way to censor its *output*. Therefore, you have two options: you can remove it (and its arguments) from the blackout altogether, or else you can leave it (and its arguments) in the blackout, but “escape” them between | escape character delimiters. In either case, however, the output of the unexpandable macro will be visible to the reader, as in the example below, where the macro `\ref` and its argument are escaped from the blackout.

In Section `|\ref{S:A}|`, we discuss censored macros

In Section 4, we discuss censored macros

██████████ 4 ██████████

## 5 Censor Marks

The censor (blacking) mark is a `\rule` which has a depth  $-0.3ex$  (*i.e.*, below the baseline), and a height of  $2.1ex$ , by default. The characteristics of that rule may be changed by setting the following two lengths.

```
\censorruledepth=length
\censorruleheight=length
```

When using `\blackout` and `\xblackout`, periods are now censored by default. If, however, you wish the prior approach of not censoring periods, you may redefine `\censordot` to something else, for example,

```
\renewcommand\censordot{.}
```

to make them visible in the censored document.

## 6 Usage Summary

The complete set of commands available to the `sensor` package, to bring about text redaction, are:

```
\censor{text}
\censor*{width multiplier}
\censorbox[pre-commands]{object box}
\censorbox*[pre-commands]{width mult.}{height mult.}{depth mult.}
```

```

\blackout{extended text passage}
\xblackout{extended text passage}
\StopCensoring
\RestartCensoring
\censorruledepth=length
\censorruleheight=length
\renewcommand\spacelap{length}
\renewcommand\censordot{token or instruction}

```

The star (\*) version of the commands is envisioned when the source document is being created in an unsecure environment, whereas, the unstarred version is when the document source may be created in a secure environment. In the star (\*) commands, width multipliers are given in ex's, whereas height and depth multipliers are given in multiples of `\baselineskip`. The depth indicates the distance below the baseline where the bottom of a boxed object is to be placed (this command has a more direct effect for inline use, whereas use within environments is often overridden by the environment). The use of pre-commands will typically be fontsize commands, so that measurements of ex's and `\baselineskip` are done in a relevant fontsize.

Censoring may be dynamically turned off and on in a document with the use of the `\StopCensoring` and `\RestartCensoring` commands, respectively. The default is censoring 'on.'

## 6.1 *Caveat Emptor*

Here is some added information that users of the package should know.

- As of package version v4.0, the token-cycling pseudo-environments of the `tokcycle` package were used to process the tokens of the `\blackout` and `\xblackout` macros. While the syntax of these macros is unchanged, one has the additional option of invoking them using the pseudo-environment syntax of `tokcycle` as

```

\blackoutenv Text to blackout\endblackoutenv:
■■■■ and
\xblackoutenv Text to blackout\endxblackoutenv:
■■■■.

```

- Because `\blackout` and `\xblackout` use `tokcycle`-package environments to perform their actions, the macro `\settcEscapechar` can be used to reset the escape character to something other than `|`, in accordance with the documented `tokcycle`-package commands.
- I have found that, in certain cases (for example, with captions created

using the `boxhandler` package), the `sensorbox` command needs to be protected by way of `\protect\blackout{...}`.

- It is preferable not to apply `\sensor` to whitespace, or text justification could be adversely affected. If one wishes to censor a multi-word phrase, such as “Little Bo Peep,” it is recommended to do it as follows:

```
\xblackout{Little Bo Peep}
```

If such a phrase is to be used repeatedly through a document, it is most convenient to place it as a macro:

```
\def\Name{\xblackout{Little Bo Peep}}
```

such that subsequent reference is done indirectly:

```
We examine the life of \Name{} in this report,  
assured that \Name{} line breaks.
```

We examine the life of XXXXXXXXXX in this report, assured that XXXXXXXXXX line breaks.

(Even so, it should be noted that censoring can still affect text justification, because censored words are never hyphenated across line boundaries, whereas the original text may have been.)

- Users have asked for color support in the package. I do not wish to hard-wire color into the package—however, if the `xcolor` package is loaded, the following preamble definition will force censoring to be in the selected color (in this example, red):

```
\def\sensorcolor{red}  
\let\svsensorrule\sensorrule  
\renewcommand\sensorrule[1]{%  
  \textcolor{\sensorcolor}{\svsensorrule{#1}}}
```

Let’s see if it works:

Is this blacked out text censored in red?  
XXXXXXXXXX

This technique can be used at the user’s discretion to provide color censoring. The value of `\sensorcolor` can be redefined on the fly to change the color of the censoring.

## 7 Source Code

The source code for `sensor` is so short as to be included below:

```
% sensor.sty  
\def\sensorversionnumber{4.0}  
\ProvidesPackage{sensor}  
[2021/12/23 \sensorversionnumber
```

```

Provides capability for redaction of sensitive information]

%
% 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.
% The latest version of this license is in
%   http://www.latex-project.org/lppl.txt
% and version 1.3 or later is part of all distributions of LaTeX
% version 2005/12/01 or later.
%
% This work has the LPPL maintenance status 'maintained'.
%
% The Current Maintainer of this work is Steven B. Segletes.

% VERSION:
% 1.00 - Initial release
% 2.00 - Added \blackout
% 2.10 - Allowed \blackout to cross paragraph boundaries with use of
%       \bpar. Stopped censoring periods, in order to preserve
%       end-of-sentence spacing, which differs from inter-word spacing.
% 3.00 - \censorbox introduced to handle figures, tables, etc.
% 3.10 - Made \blackout work with \par in argument. Introduced
%       \xblackout
% 3.20 - Specify depth/height of censor rule. Introduced \def\censordot{}
% 3.21 - Fixed bug regarding \xblackout rules remaining after a
%       \StopCensoring
% 3.22 - changed '\if to \ifx in definition of \bl@t, to handle macros like \%
% 4.0   - Recast \blackout and \xblackout in terms of tokcycle environments
%       - Introduced \blackoutenv...\endblackoutenv and
%       \xblackoutenv...\endxblackoutenv
\usepackage{pbox}

\newlength\censorruledepth
\newlength\censorruleheight

\censorruledepth=-0.3ex% -0.3ex DEFAULT
\censorruleheight=2.1ex% 2.1ex DEFAULT
\def\censordot{\censor{.}}% versus \def\censordot{ }%

\newcommand\censorrule[1]{\protect\rule[\censorruledepth]{#1}{\censorruleheight}}

\newcommand\censor{\@ifstar{\@cenlen}{\@cenword}}
\newcommand\@cenlen[1]{\censorrule{#1 ex}}
\newcommand\@cenword[1]{\censorrule{\widthofpbox{#1}}}

```

```

\newcommand\un@ensor{\@ifstar{\un@cenlen}{\un@cenword}}
\newcommand\un@cenlen[1]{\protect\underline{\hspace{#1 ex}}}
\newcommand\un@cenword[1]{#1}

\newcommand\StopCensoring{%
    \let\ensor\un@ensor%
    \let\ensorbox\un@ensorbox%
    \renewcommand\censpace{ }%
}
\newcommand\RestartCensoring{%
    \renewcommand\ensor{\@ifstar{\@cenlen}{\@cenword}}%
    \renewcommand\ensorbox{\@ifstar{\ensor@dim}{\ensor@box}}%
    \let\censpace\sv@censpace%
}

%%%%%%%%%%

\usepackage{tokcycle}[2021/03/10]

\def\@dump#1{\addcytoks[1]{\expandafter\ensor\expandafter{#1}}\def#1{}}
\def\@append#1#2{\tc@defx#1{#1#2}}

\def\spacelap{0.6ex}
\def\censpace{\rlap{\censorrule{\spacelap}} \llap{\censorrule{\spacelap}}}
\let\sv@censpace\censpace

\long\def\blackout#1{\blackoutenv#1\endblackoutenv}
\long\def\xblackout#1{\xblackoutenv#1\endxblackoutenv}

\newif\ifexpandarg

\xtokcycleenvironment\xblackoutenv
{\ifx.##1\@dump\censored@word\addcytoks[1]{\censordot}\else
    \@append\censored@word{##1}%
    \tcpeek\@next\ifx\@next\@tcEscapeptr\@dump\censored@word\fi\fi}
{\tctestifcon\ifexpandarg{\expandafter\processtoks\expandafter{\expanded{##1}}}%
    {\processtoks{##1}}\@dump\censored@word\expandargfalse}
{\@dump\censored@word\tctestifx{~##1}{\@append\censored@word{##1}}%
    {\tctestifx{\expanded{##1}}{\expandargtrue}{\addcytoks{##1}}}}
{\@dump\censored@word\addcytoks{\censpace}}
{\def\censored@word{}}
{\@dump\censored@word}
\xtokcycleenvironment\blackoutenv
{\ifx.##1\@dump\censored@word\addcytoks[1]{\censordot}\else
    \@append\censored@word{##1}%

```

```

\tcpeek\@next\ifx\@next\@tcEscapeptr\@dump\censored@word\fi\fi}
{\tctestifcon\ifexpandarg{\expandafter\processtoks\expandafter{\expanded{##1}}}%
{\processtoks{##1}}\@dump\censored@word\expandargfalse}
{\@dump\censored@word\tctestifx{~##1}{\@append\censored@word{##1}}%
{\tctestifx{\expanded##1}{\expandargtrue}{\addcytoks{##1}}}}
{\@dump\censored@word\addcytoks{##1}}
{\def\censored@word{}}
{\@dump\censored@word}

%%%%%%%%%%%%%%

\newcommand\censorbox{\@ifstar{\censor@dim}{\censor@box}}
\newcommand\censor@dim[4][]{\{#1%
\rule[-#4\baselineskip]{#2ex}{#3\baselineskip}}
\newcommand\censor@box[2][]{\{#1\setbox0\hbox{#2}%
\rule[-\the\dp0]{\the\wd0}{\the\ht0+\the\dp0}}

\newcommand\un@censorbox{\@ifstar{\un@censor@dim}{\un@censor@box}}
\newcommand\un@censor@dim[4][]{\{#1%
\fbbox{\rule[-#4\baselineskip]{0ex}{#3\baselineskip}
\rule{#2ex}{0ex}}}}
\newcommand\un@censor@box[2][]{\{#1#2}

% NOTE: A \protect\censorbox{} MAY BE REQUIRED INSIDE SOME ENVIRONMENTS
\endinput

```