Name

groff_mm − memorandum macros for GNU *roff*

Synopsis

groff −mm [*option* . . .] [*file* . . .]
groff −m mm [*option* . . .] [*file* . . .]

Description

The GNU implementation of the *mm* macro package is part of the *groff* document formatting system. The *mm* package is suitable for the composition of letters, memoranda, reports, and books.

Call an *mm* macro at the beginning of a document to initialize the package. A simple *mm* document might use only **P** for paragraphing. Set numbered and unnumbered section headings with **H** and **HU**, respectively. Change the style of the typeface with **B**, **I**, and **R**; you can alternate styles with **BI**, **BR**, **IB**, **IR**, **RB**, and **RI**. Several nestable list types are available via **AL**, **BL**, **BVL**, **DL**, **ML**, **RL**, and **VL**; each of these begins a list, to which **LI** adds an item and **LE** ends the (nested) list. Customized list arrangements are supported by **LB**. **DS** and **DF** start static and floating displays, respectively; either is terminated with **DE**.

groff mm is intended to be compatible with the *mm* implementation found in the AT&T Documenter's Workbench (DWB), with the following limitations.

- Omitted features include the logo and company name strings, **}Z** and **]S**, respectively; the encoded company site location addresses recognized as the third argument to the **AU** macro; the **Pv** ("private" heading) register; and the **OK** (other keywords), and **PM** (proprietary markings) macros.
- The **CS** (output cover sheet) macro is implemented only for memorandum type 4.
- The *grap* preprocessor is not explicitly supported; no **G1** and **G2** macros are defined.
- The registers **A**, **C**, **E**, **T**, and **U**, typically set from the *troff* or *nroff* command lines with DWB *mm*, are not recognized.
- When setting the registers **L** or **W** from the command line, use an explicit scaling unit to avoid surprises.
- DWB *mm*'s **nP** macro indented the second line of a paragraph to align it with the start of the text of the first (after the paragraph number); *groff mm*'s does not.
- Cut marks are not supported.

DWB *mm* supported only seven levels of heading. As a compatible extension, *groff mm* supports fourteen, introducing new registers **H8** through **H14**, and affecting the interpretation of the **HF** and **HP** strings.

Macro, register, and string descriptions in this page frequently mention each other; most cross references are to macros. Where a register or string is referenced, its type is explicitly identified. *mm*'s macro names are usually in full capitals; registers and strings tend to have mixed-case names.

Document styles

groff mm offers three different frameworks for document organization. **COVER/COVEND** is a flexible means of preparing any document requiring a cover page. **LT/LO** aids preparation of typical Anglophone correspondence (business letters, for example). The **MT** memorandum type mechanism implements a group of formal styles historically used by AT&T Bell Laboratories. Your document can select at most one of these approaches; when used, each disables the others.

Localization

groff mm is designed to be easily localized. For languages other than English, strings that can appear in output are collected in the file */usr/local/share/groff/1.23.0/tmac/*xx.*tmac*, where *xx* is an ISO 639 two-letter language identifier. Localization packages should be loaded after *mm*; for example, you might format a Swedish *mm* document with the command "**groff −mm −msv**".

This package can also be localized by site or territory; for example, */usr/local/share/groff/1.23.0/tmac/mse.tmac* illustrates how to adapt the output to a national standard using its ISO 3166 territory code. Such a package can define a string that causes a macro file */usr/local/share/groff/1.23.0/tmac/mm/*territory_*locale* to be loaded at package initialization. If this mechanism is not used, */usr/local/share/groff/1.23.0/tmac/mm/locale* is loaded instead. No diagnostic is produced if these files do not exist.

Registers and strings

Much *mm* behavior can be configured by registers and strings. A register is assigned with the **nr** request.

.nr *ident* [±]*n* [*i*]

ident is the name of the register, and *n* is the value to be assigned. *n* can be prefixed with a plus or minus sign if incrementation or decrementation (respectively) of the register's existing value by *n* is desired. If assignment of a (possibly) negative *n* is required, further prefix it with a zero or enclose it in parentheses. If *i* is specified, the register is automatically modified by *i* prior to interpolation if a plus or minus sign is included in the escape sequence as follows.

\n[±][*ident*]

i can be negative; it combines algebraically with the sign in the interpolation escape sequence.

Strings are defined with the **ds** request.

.ds *ident contents*

contents consumes everything up to the end of the line, including trailing spaces. It is a good practice to end *contents* with a comment escape sequence (**\"**) so that extraneous spaces do not intrude during document maintenance. To include leading spaces in *contents*, prefix it with a double quote. Strings are interpolated with the ***** escape sequence.

[ident***]**

Register and string name spaces are distinct, but strings and macros share a name space. Defining a string with the same name as an *mm* macro is not supported and may cause incorrect rendering, the emission of diagnostic messages, and an error exit status from *troff*.

Register format

A register is interpolated using Arabic numerals if no other format has been assigned to it. Assign a format to a register with the **af** request.

.af *R c*

R is the name of the register, and *c* is the format. If *c* is a sequence of Arabic numerals, their quantity defines a zero-padded minimum width for the interpolated register value.

Form	**Sequence**
1	0, 1, 2, 3, . . ., 10, . . .
001	000, 001, 002, 003, . . ., 1000, . . .
i	0, i, ii, iii, iv, . . .
I	0, I, II, III, IV, . . .
a	0, a, b, c, . . ., z, aa, ab, . . .
A	0, A, B, C, . . ., Z, AA, AB, . . .

Fonts

In *groff mm*, the fonts (or rather, font styles) **R** (roman), **I** (italic), and **B** (bold) are mounted at font positions **1**, **2**, and **3**, respectively. Internally, font positions are used for backward compatibility. From a practical point of view, it doesn't make a big difference—a different font family can still be selected by invoking *groff*'s **fam** request or using its **–f** command-line option. On the other hand, if you want to replace just, for example, font **I** with Zapf Chancery Medium italic (available on *groff*'s **pdf** and **ps** output devices), you have to use the **fp** request, replacing the font at position 2 with "**.fp 2 ZCMI**"). Because the cover sheet, memorandum type, and *refer*(1) integration macros explicitly request fonts named **B**, **I**, and **R**, you will also need to remap these font names with the **ftr** request, for instance with "**.ftr I ZCMI**".

Macros

An explicitly empty argument may be specified with a pair of double quotes; to call a macro **XX** with an empty second argument but non-empty first and third ones, you could input the following.

```
.XX foo "" baz
```

Macro names longer than two characters are GNU extensions; some shorter names were not part of DWB *mm*'s published interface but are documented aspects of *groff mm.*

)E *level text*
: Add heading text *text* to the table of contents with *level*, which is either 0 or in the range 1 to 7. See also **H**. This undocumented DWB *mm* macro is exposed by *groff mm* to enable customized tables of contents.

1C [**1**]
: Format page text in one column. The page is broken. A **1** argument suppresses this break; its use may cause body text and a pending footnote to overprint. See **2C**, **MC**, and **NCOL**.

2C
: Begin two-column formatting. This is a special case of **MC**. See **1C** and **NCOL**.

AE
: Abstract end; stop collecting abstract text. See **AS**.

AF [*firm-name*]
: Specify firm associated with the document. At most one can be declared; the firm name is used by memorandum types and available to cover sheets. **AF** terminates a document title started with **TL**, and can be called without an argument for that purpose. See **MT** and **COVER**.

AL [*type* [*text-indent* [**1**]]]
: Begin an auto-incrementing numbered list. Item numbers start at one. The *type* argument assigns the register format (see above) of the list item enumerators. The default is **1**. An explicitly empty *type* also indicates the default. A *text-indent* argument overrides register **Li**. A third argument suppresses the blank line that normally precedes each list item. Use **LI** to declare list items, and **LE** to end the list.

APP [*id* [*title*]]
: Begin an appendix. If the identifier *id* is omitted, it is incremented (or initialized, if necessary). The register format used for *id* is "A". The page is broken. The register **Aph** determines whether an appendix heading is then formatted. This heading uses the string **App** followed by *id*. Appendices appear in any table of contents (see **TC**). The string **Apptxt** is set to *title* if the latter is present, and made empty otherwise.

APPSK *id n* [*title*]
: As **APP**, but increment the page number by *n*. Use this macro to "skip pages" when diagrams or other materials not formatted by *troff* are included in appendices.

AS [*placement* [*indentation*]]
: Abstract start; begin collecting abstract. Input up to the next **AE** call is included in the abstract. *placement* influences the location of the abstract on the cover sheet of a memorandum (see **MT**). **COVER**, by contrast, ignores *placement* by default, but can be customized to interpret it.

placement	**Effect**
0	The abstract appears on page 1 and cover sheet if the document is a "released paper" memorandum ("**.MT 4**"); otherwise, it appears on page 1 without a cover sheet.
1	The abstract appears only on the cover sheet ("**.MT 4**" only).

An abstract does not appear at all in external letters ("**.MT 5**"). A *placement* of **2** was supported by DWB *mm* but is not by *groff mm*.

A second argument increases the indentation by *indentation* and reduces the line length by twice this amount. A scaling unit of ens is assumed. The default is 0.

AST [*caption*]
: Set the caption above the abstract to *caption*, or clear it if there is no argument. The default is "ABSTRACT".

AT *title* ...
: Specify author's title(s). If present, **AT** must appear just after the corresponding author's **AU**. Each *title* occupies an output line beneath the author's name in the signature block used by **LT** letters (see **SG**) and in **MT** memoranda. The **ms** cover sheet style also uses it.

AU [*name* [*initials* [*loc* [*dept* [*ext* [*room* [*arg1* [*arg2* [*arg3*]]]]]]]]]
Specify author. **AU** terminates a document title started with **TL**, and can be called without arguments for that purpose. Author information is used by cover sheets, **MT** memoranda, and **SG**. Further arguments comprise initials, location, department, telephone extension, room number or name, and up to three additional items. Repeat **AU** to identify multiple authors.

Use **WA/WE** instead to identify the author for documents employing **LT**.

AV [*name* [**1**]]
Format approval lines for a handwritten signature and date. Two horizontal rules are drawn, with the specified *name* and the text of the string **Letdate** beneath them. Above these rules, the text in the string **Letapp** is formatted; a second argument replaces this text with a blank line. See **LT**.

AVL [*name*]
As **AV**, but the date, date rule, and approval notation **Letapp** are omitted.

B [*bold-text* [*previous-font-text*]] . . .
Join *bold-text* in boldface with *previous-font-text* in the previous font, without space between the arguments. If no arguments, switch font to bold style.

B1 Begin boxed, kept display. The text is indented one character, and the right margin is one character shorter. This is a GNU extension.

B2 End boxed, kept display. This is a GNU extension.

BE End bottom block; see **BS**.

BI [*bold-text* [*italic-text*]] . . .
Join *bold-text* in boldface with *italic-text* in italics, without space between the arguments.

BL [*text-indent* [**1**]]
Begin bulleted list. Items are prefixed with a bullet and a space. A *text-indent* argument overrides register **Pi**. A second argument suppresses blank lines between items. Use **LI** to declare list items, and **LE** to end the list.

BR [*bold-text* [*roman-text*]] . . .
Join *bold-text* in boldface with *roman-text* in roman style, without space between the arguments.

BS Begin bottom block. Input is collected until **BE** is called, and output between the footnote area and footer of each page.

BVL [*text-indent* [*mark-indent* [**1**]]]
Begin broken variable-item (or "tagged") list. Each item is expected to supply its own mark. The line is always broken after the mark; contrast **VL**. *text-indent* sets the indentation of the text, and *mark-indent* the distance from the current list indentation to the mark. A third argument suppresses the blank line that normally precedes each list item. Use **LI** to declare list items, and **LE** to end the list.

COVER [*style*]
Begin a cover page description. **COVER** must appear before the body text (or main matter) of a document. The argument *style* is used to construct the file name */usr/local/share/groff/1.23.0/tmac/mm/*style*.cov* and load it with the **mso** request. The default *style* is **ms**; the *ms.cov* file prepares a cover page resembling those of the *ms* package. A *.cov* file must define a **COVEND** macro, which a document must call at the end of the cover description. Use cover description macros in the following order; only **TL** and **AU** are required.

```
.COVER
.TL
.AF
.AU
.AT
.AS
```

```
.AE
.COVEND
```

COVEND
End the cover description.

DE End static or floating display begun with **DS** or **DF**.

DF [*format* [*fill* [*right-indentation*]]]
Begin floating display. A floating display is saved in a queue and output in the order entered. Arguments are handled as in **DS**. Floating displays cannot be nested. Placement of floating displays is controlled by the registers **De** and **Df**.

DL [*text-indent* [**1**]]
Begin dashed list. Items are prefixed with an em dash and a space. A *text-indent* argument overrides register **Pi**. A second argument suppresses blank lines between items. Use **LI** to declare list items, and **LE** to end the list.

DS [*format* [*fill* [*right-indentation*]]]
Begin static display. Input until **DE** is called is collected into a display. The display is output on a single page unless it is taller than the height of the page. **DS** can be nested (contrast with **DF**).

format	**Effect**
none	Do not indent the display.
L	Do not indent the display.
I	Indent text by **\n[Si]**.
C	Center each line.
CB	Center the whole display as a block.
R	Right-adjust the lines.
RB	Right-adjust the whole display as a block.

The values “L”, “I”, “C”, and “CB” can also be specified as “0”, “1”, “2”, and “3”, respectively, for compatibility with DWB *mm.*

fill	**Effect**
none	Disable filling.
N	Disable filling.
F	Enable filling.

“N” and “F” can also be specified as “0” and “1”, respectively, for compatibility with DWB *mm.*

A third argument reduces the line length by *right-indentation.*

mm normally places blank lines before and after the display. Set register **Ds** to 0 to suppress these.

EC [*title* [*override* [*flag* [*refname*]]]]
Caption an equation. The caption consists of the string **Liec** followed by an automatically incrementing counter stored in the register **Ec**, punctuation configured by the register **Of**, then *title* (if any). Use the **af** request to configure **Ec**'s number format. *override* and *flag* alter the equation number as follows. Omitting *flag* and specifying **0** in its place are equivalent.

flag	**Effect**
0	Prefix number with *override*.
1	Suffix number with *override*.
2	Replace number with *override*.

Equation captions are centered irrespective of the alignment of any enclosing display.

refname stores the equation number using **SETR**; it can be retreived with “**.GETST** *refname*”. This argument is a GNU extension.

Captioned equations are listed in a table of contents (see **TC**) if the Boolean register **Le** is true. Such a list uses the string **Le** as a heading.

EF ["'*left*'*center*'*right*'"]
Define the even-page footer, which is formatted just above the normal page footer on even-numbered pages. See **PF**. **EF** defines the string **EOPef**.

EH ["'*left*'*center*'*right*'"]
Define the even-page header, which is formatted just below the normal page header on even-numbered pages. See **PH**. **EH** defines the string **TPeh**.

EN End equation input preprocessed by *eqn*(1); see **EQ**.

EOP If defined, this macro is called in lieu of normal page footer layout. Headers and footers are formatted in a separate environment. See **TP**.

Strings available to EOP	
EOPf	argument to **PF**
EOPef	argument to **EF**
EOPof	argument to **OF**

EPIC [**–L**] *width height* [*name*]
Draw a box with the given *width* and *height*. It also prints the text *name* or a default string if *name* is not specified. This is used to include external pictures; just give the size of the picture. **–L** left-aligns the picture; the default is to center. See **PIC**.

EQ [*label*]
Start equation input preprocessed by *eqn*(1). **EQ** and **EN** macro calls bracket an equation region. Such regions must be contained in displays (**DS/DE**), except when the region is used only to configure *eqn* and not to produce output. If present, *label* appears aligned to the right and centered vertically within the display; see register **Eq**. If multiple *eqn* regions occur within a display, only the last *label* (if any) is used.

EX [*title* [*override* [*flag* [*refname*]]]]
Caption an exhibit. Arguments are handled analogously to **EC**. The register **Ex** is the exhibit counter. The string **Liex** precedes the exhibit number and any *title.* Exhibit captions are centered irrespective of the alignment of any enclosing display.

Captioned exhibits are listed in a table of contents (see **TC**) if the Boolean register **Lx** is true. Such a list uses the string **Lx** as a heading.

FC [*closing-text*]
Output the string **Letfc**, or the specified *closing-text,* as the formal closing of a letter.

FD [*arg* [**1**]]
Configure display of footnotes. The first argument encodes enablement of automatic hyphenation, adjustment to the right margin, indentation of footnote text, and left- vs. right-alignment of the footnote label within the space allocated for it.

arg	**Hyphenate?**	**Adjust?**	**Indent?**	**Label alignment**
0	no	yes	yes	left
1	yes	yes	yes	left
2	no	no	yes	left
3	yes	no	yes	left
4	no	yes	no	left
5	yes	yes	no	left
6	no	no	no	left
7	yes	no	no	left
8	no	yes	yes	right
9	yes	yes	yes	right
10	no	no	yes	right
11	yes	no	yes	right

An *arg* greater than 11 is treated as **0**. *mm*'s default is **0**.

If a second argument, conventionally **1**, is given, footnote numbering is reset when a first-level heading is encountered. See **FS**.

FE End footnote; see **FS**.

FG [*title* [*override* [*flag* [*refname*]]]]
Caption a figure. Arguments are handled analogously to **EC**. The register **Fg** is the figure counter. The string **Lifg** precedes the figure number and any *title.* Figure captions are centered irrespective of the alignment of any enclosing display.

Captioned figures are listed in a table of contents (see **TC**) if the Boolean register **Lf** is true. Such a list uses the string **Lf** as a heading.

FS [*label*]
Start footnote. Input until **FE** is called is collected into a footnote. By default, footnotes are automatically numbered starting at 1; the number is available in register **:p** and, with a trailing period, in string **F**. This string precedes the footnote text at the bottom of the column or page. Footnotes are vertically separated by the product of registers **Fs** and **Lsp**. In *groff mm*, footnotes may be used in displays.

A *label* argument replaces the contents of the string **F**; it need not be numeric. In this event, the footnote marker in the body text must be explicitly written.

GETHN *refname* [*varname*]
Include the heading number where the corresponding "**.SETR** *refname*" was placed. This is displayed as "X.X.X." in pass 1. See **INITR**. If *varname* is used, **GETHN** sets the string *varname* to the heading number.

GETPN *refname* [*varname*]
Include the page number where the corresponding "**.SETR** *refname*" was placed. This is displayed as "9999" in pass 1. See **INITR**. If *varname* is used, **GETPN** sets the string *varname* to the page number.

GETR *refname*
Combine **GETHN** and **GETPN** with the text "chapter" and ", page". The string **Qrf** contains the text for the cross reference:

```
.ds Qrf See chapter \\*[Qrfh], page \\*[Qrfp].
```

Qrf may be changed to support other languages. Strings **Qrfh** and **Qrfp** are set by **GETR** and contain the page and heading number, respectively.

GETST *refname* [*varname*]
Include the string saved with the second argument to **.SETR**. This is a dummy string in pass 1. If *varname* is used, **GETST** sets it to the saved string. See **INITR**.

H *level* [*title* [*suffix*]]
Set a numbered section heading at *level*. *mm* produces numbered *heading marks* of the form $a.b.c\ldots$, with up to fourteen levels of nesting. Each level's number increases automatically with each **H** call and is reset to zero when a more significant *level* is specified. "**1**" is the most significant or coarsest division of the document. Text after an **H** call is formatted as a paragraph; calling **P** is unnecessary.

title specifies an optional title; it must be double-quoted if it contains spaces. *mm* appends *suffix* to *title* in the body of the document, but omits it from any table of contents (see **TC**). This facility can be used to annotate the heading title with a footnote. *suffix* should not interpolate the **F** string; specify a footnote mark explicitly. See **FS**.

Heading behavior is highly configurable. Several registers set a *threshold,* where heading levels at or below the threshold value are handled in one way, and those above it another. For example, a heading level within the threshold of register **Cl** is included in the table of contents (see **TC**).

Heading layout. Register **Ej** sets a threshold for page breaking (ejection) prior to a heading. If not preceded by a page break, a heading level below the threshold in register **Hps** is preceded by the amount of vertical space in register **Hps1**, and by the amount in **Hps2** otherwise. The **Hb** register sets a threshold below which a break occurs after the heading, and register **Hs** sets a threshold below which vertical space follows it. If the heading level is not less than both of these, a *run-in heading* is produced; paragraph text follows on the same output line. Otherwise, register **Hi** configures the indentation of text after headings. Threshold register **Hc** enables the centering of headings; a heading level below both of the **Hb** and **Hc** thresholds is centered.

Heading typeface and size. The fonts used for heading numbers and titles at each level are configured by the **HF** string. The string **HP** likewise assigns a type size to each heading level. The vertical spacing used by headings may be controlled by the user-definable macros **HX** and/or **HZ**.

Heading number format. Registers named **H1** through **H14** store counters for each heading level. Their values are printed using Arabic numerals by default; see **HM**. The heading levels are catenated with dots for formatting; to typeset only the deepest, set the **Ht** register. Heading numbers are not suffixed with a trailing dot except when only the first level is output; to omit a dot in this case as well, clear the **H1dot** register.

Customizing heading behavior. *mm* calls *hook* macros to enable further customization of headings. (DWB *mm* called these "exits".) They can be used to change the heading's *mark* (the numbered portion before any heading title), its vertical spacing, and its vertical space requirements (for instance, to require a minimum quantity of subsequent output lines). Define hook macros in expectation of the following parameters. The argument *declared-level* is the *level* argument to **H**, or **0** for unnumbered headings (see **HU**). *actual-level* is the same as *declared-level* for numbered headings, and the value of register **Hu** for unnumbered headings. *title* is the corresponding argument to **H** or **HU**.

HX *declared-level actual-level title*

mm calls **HX** before setting the heading. Your definition may alter **}0**, **}2**, and **;3**.

}0 (string)

contains the heading mark plus two spaces if *declared-level* is non-zero, and otherwise is empty.

;0 (register)

encodes a position for the text after the heading. 0 means that the heading is to be run in, 1 means that a break is to occur before the text, and 2 means that vertical space is to separate heading and text.

}2 (string)

is the suffix that separates a run-in heading from the text. It contains two spaces if register **;0** is 0, and otherwise is empty.

;3 (register)

contains the vertical space required for the heading to be typeset. If that amount is not available, the page is broken prior to the heading. The default is **2v**.

HY *declared-level actual-level title*

mm calls **HY** after determing the heading typeface and size. It could be used to change indentation.

HZ *declared-level actual-level title*

mm calls **HZ** after formatting the heading, just before **H** or **HU** returns. It could be used to change the page header to include a section heading.

HC [*hyphenation-character*]

Set hyphenation character. Default value is "\%". Resets to the default if called without argument. Hyphenation can be turned off by setting register **Hy** to 0 at the beginning of the file.

HM [*arg1* [*arg2* [. . . [*arg14*]]]]
Set the heading mark style. Each argument assigns the specified register format (see above) to the corresponding heading level. The default is **1** for all levels. An explicitly empty argument also indicates the default.

HU *heading-text*
Set an unnumbered section heading. Except for a heading number, it is treated as a numbered heading of the level stored in register **Hu**; see **H**.

I [*italic-text* [*previous-font-text*]] . . .
Join *italic-text* in italics with *previous-font-text* in the previous font, without space between the arguments. If no arguments, switch font to italic style.

IA [*recipient-name* [*title*]]
Specify the inside address in a letter. Input is collected into the inside address until **IE** is called, and then output. You can specify multiple recipients with empty **IA/IE** pairs; only the last address is used. The arguments give each recipient a name and title. See **LT**.

IB [*italic-text* [*bold-text*]] . . .
Join *italic-text* in italics with *bold-text* in boldface, without space between the arguments.

IE End the inside address begun with **IA**.

IND *argument* . . .
If the Boolean register **Ref** is true, write an index entry as a specially prepared *roff* comment to the standard error stream, with each *argument* separated from its predecessor by a tab character. The entry's location information is arranged as configured by the most recent **INITI** call.

INDP Output the index set up by **INITI** and populated by **IND** calls. By default, **INDP** calls **SK** and writes a centered caption interpolating the string **Index**. It then disables filling and calls **2C**; afterward, it restores filling and calls **1C**.

Define macros to customize this behavior. **INDP** calls **TXIND** before the caption, **TYIND** *instead* of writing the caption, and **TZIND** after formatting the index.

INITI *location-type file-name* [*macro*]
Initialize *groff mm*'s indexing system. Argument *location-type* selects how the location of each index entry is reported. *file-name* populates an internal string used later by **INDP**.

location-type	**Entry format**
N	page number
H	heading mark
B	page number, tab character, heading mark

If *macro* is specified, it is called for each index entry with the arguments given to **IND**.

INITR *id*
Initialize the cross reference macros. Cross references are written to the standard error stream, which should be redirected into a file named id.*qrf*. *mmroff*(1) handles this and the two formatting passes it requires. The first pass identifies cross references, and the second one includes them.

See **SETR**, **GETPN**, and **GETHN**.

IR [*italic-text* [*roman-text*]] . . .
Join *italic-text* in italics with *roman-text* in roman style, without space between the arguments.

ISODATE [**0**]
Use ISO 8601 format for the date string **DT** used by some cover sheet and memorandum types; that is, *YYYY-MM-DD*. Must be called before **ND** to be effective. If given an argument of **0,** the traditional date format for the *groff* locale is used; this is also the default.

LB *text-indent mark-indent pad type* [*mark* [*pre-item-space* [*pre-list-space*]]]
Begin list. The macros **AL**, **BL**, **BVL**, **DL**, **ML**, **RL**, and **VL** call **LB** in various ways; they are simpler to use and may be preferred if they suit the desired purpose.

The nesting level of lists is tracked by *mm;* the outermost level is 0. The text of each list item is indented by *text-indent;* the default is taken from the **Li** register (in ens). Each item's mark is indented by *mark-indent;* the default is **0n**. The mark is normally left-aligned. If *pad* is greater than zero, *mark-indent* is overridden such that *pad* ens of space follow the mark. *type* selects one of six possible ways to display the mark.

type	**Output for a mark "x"**
1	x.
2	x)
3	(x)
4	[x]
5	<x>
6	{x}

If *type* is 0 and *mark* is unspecified, the items are set with a hanging indent. Otherwise, *mark* is interpreted as a string defining the mark. If *type* is greater than zero, items are automatically numbered; *mark* is interpreted as a register format. The default *type* is **0**.

The last two arguments manage vertical space. Unless a list's nesting level is greater than the value of register **Ls**, its items are preceded by *pre-item-space* multiplied by the register **Lsp**; the default is **1**. **LB** precedes the list by *pre-list-space* multiplied by the register **Lsp**; the default is **0**.

LC [*list-level*]
Clear list state. Active lists are terminated as if with **LE**, either all (the default) or only those from the current level down to *list-level* if specified. **H** calls **LC** automatically.

LE [**1**] End list. The current list is terminated. An argument of **1** causes vertical space in the amount of register **Lsp** to follow the list.

LI [*mark* [*item-mark-mode*]]
Begin a list item. Input is collected into a list item until the current list is terminated or **LI** is called again. By default, the item's text is preceded by any mark configured by the current list. If only *mark* is specified, it replaces the configured mark. A second argument prefixes *mark* to the configured mark; an *item-mark-mode* value of 1 places an unbreakable space after *mark,* while a value of 2 does not (rendering the two adjacent). Also see register **Limsp**.

LO *option* [*value*]
Specify letter options; see **LT**. Standard options are as follows. See **IA** regarding the inside address and string **DT** regarding the date.

option	**Effect**
AT	Attention; put contents of string **LetAT** and *value* left-aligned after the inside address.
CN	Confidential; put *value,* or contents of string **LetCN**, left-aligned after the date.
RN	Reference; put contents of string **LetRN** and *value* after the confidental notation (if any) and the date, aligned with the latter.
SA	Salutation; put *value,* or contents of string **LetSA**, left-aligned after the inside address and the confidental notation (if any).
SJ	Subject; put contents of string **LetSJ** and *value* left-aligned after the inside address and the attention and salutation notations (if any). In letter type "SP", **LetSJ** is ignored and *value* is set in full capitals.

LT [*style*]
Format a letter in the designated *style,* defaulting to **BL** (see below). A letter begins with the writer's address (**WA/WE**), followed by the date (**ND**), the inside address (**IA/IE**), the body of the letter (**P** and other general-purpose *mm* macros), the formal closing (**FC**), the signature (**SG**), and notations (**NS/NE**). Any of these may be omitted. Letter options specified with **LO** add further annotations, which are extensible; see section "Internals" below.

style	**Description**
BL	Blocked: the writer's address, date, formal closing, and signature are indented to the center of the line. Everything else is left-aligned.
SB	Semi-blocked: as **BL**, but the first line of each paragraph is indented by **5m**.
FB	Fully blocked: everything begins at the left margin.
SP	Simplified: as **FB**, but a formal closing is omitted, and the signature is set in full capitals.

MC *column-width* [*gutter-width*]
: Begin multi-column layout. *groff mm* creates as many columns of *column-width* as the line length will permit. *gutter-width* is the interior spacing between columns. It defaults to *column-width*/15. **1C** returns to single-column layout. **MC** is a GNU extension. See **MULB** for an alternative.

ML *mark* [*text-indent* [**1**]]
: Start a list with the *mark* argument preceding each list item. *text-indent* overrides the default indentation of the list items set by register **Li**. If a third argument, conventionally **1**, is given, the blank line that normally precedes each list item is suppressed. Use **LI** to declare list items, and **LE** to end the list.

MT [*type* [*addressee*]]
: Select memorandum type. These correspond to formats used by AT&T Bell Laboratories, where the *mm* package was initially developed, affecting the document layout. Some of these included a cover page with a caption categorizing the document. *groff mm* uses *type* to construct the file name */usr/local/share/groff/1.23.0/tmac/mm/*type*.MT* and load it with the **mso** request. Memorandum types 0 to 5 are supported; any other value of *type* is mapped to type 6. If *type* is omitted, **0** is implied. *addressee* sets a string analogous to one used by AT&T cover sheet macros that are not implemented in *groff mm*.

type	**Description**
0	normal memorandum; no caption
1	captioned "MEMORANDUM FOR FILE"
2	captioned "PROGRAMMER'S NOTES"
3	captioned "ENGINEER'S NOTES"
4	released paper
5	external letter

: See **COVER** for a more flexible cover sheet mechanism.

MOVE *y-pos* [*x-pos* [*line-length*]]
: Move to a position, setting page offset to *x-pos*. If *line-length* is not given, the difference between current and new page offset is used. Use **PGFORM** without arguments to return to normal.

MULB *cw1 space1* [*cw2 space2*] . . . *cwn*
: Begin alternative multi-column mode. All column widths must be specified, as must the amount of space between each column pair. The arguments' default scaling unit is **n**. **MULB** uses a diversion and operates in a separate environment.

MULN Begin next column in alternative column mode.

MULE End alternative multi-column mode and emit the columns.

NCOL Move to the start of the next column (only when using **2C** or **MC**). Contrast with **MULN**.

ND [*arg*]
: Set the document's date. *mm* does not interpret *arg*; it can be a revision identifier (or empty).

NE End notation begun with **NS**; filling is enabled.

nP [*type*]
: Begin a numbered paragraph at heading level two. See **P**.

NS [*code* [**1**]]
: Declare notations, typically for letters or memoranda, of the type specified by *code*. The text corresponding to *code* is output, and filling is disabled until **NE** is called. Typically, a list of names or attachments lies within **NS/NE**. If *code* is absent or does not match one of the values listed under the **Letns** string description below, each line of notations is formatted as "Copy (*line*) to". If a second argument, conventionally **1**, is given, *code* becomes the entire notation and **NE** is not necessary. In *groff mm*, you can set up further notations to be recognized by **NS**; see the strings **Letns** and **Letnsdef** below.

OF ["'*left*'*center*'*right*'"]
: Define the odd-page footer, which is formatted just above the normal page footer on odd-numbered pages. See **PF**. **OF** defines the string **EOPof**.

OH ["'*left*'*center*'*right*'"]
: Define the odd-page header, which is formatted just below the normal page header on odd-numbered pages. See **PH**. **OH** defines the string **TPoh**.

OP
: Make sure that the following text is printed at the top of an odd-numbered page. Does not output an empty page if currently at the top of an odd page.

P [*type*]
: Begin new paragraph. If *type* is missing or 0, **P** sets the paragraph fully left−aligned. A *type* of 1 idents the first line by **\[Pi]** ens. Set the register **Pt** to select a default paragraph indentation style. The register **Ps** controls the vertical spacing between paragraphs.

PE
: Picture end; see *pic*(1).

PF ["'*left*'*center*'*right*'"]
: Define the page footer. The footer is formatted at the bottom of each page; the argument is otherwise as described in **PH**. **PF** defines the string **EOPf**. See **EF**, **OF**, and **EOP**.

PGFORM [*linelength* [*pagelength* [*pageoffset* [**1**]]]]
: Set line length, page length, and/or page offset. This macro can be used for letterheads and similar. It is normally the first macro call in a file, though it is not necessary. **PGFORM** can be used without arguments to reset everything after a **MOVE** call. A line break is done unless the fourth argument is given. This can be used to avoid the page number on the first page while setting new width and length. (It seems as if this macro sometimes doesn't work too well. Use the command-line arguments to change line length, page length, and page offset instead.)

PGNH
: Suppress header on the next page. This macro must be called before any macros that produce output to affect the layout of the first page.

PH ["'*left*'*center*'*right*'"]
: Define the page header, formatted at the top of each page, as the argument, where *left*, *center*, and *right* are aligned to the respective locations on the line. A "**%**" character in *arg* is replaced by the page number. If the argument is absent, no page header is set. The default page header is

```
"''- % -''"
```

which centers the page number between hyphens and formats nothing at the upper left and right. Header macros call **PX** (if defined) after formatting the header. **PH** defines the string **TPh**. See **EH**, **OH**, and **TP**.

PIC [**−B**] [**−C**|**−I** *n*|**−L**|**−R**] *file* [*width* [*height*]]
: Include PostScript document *file*. The optional **−B** argument draws a box around the picture. The optional **−L**, **−C**, **−R**, and **−I** *n* arguments align the picture or indent it by *n* (assuming a scaling unit of **m**). By default, the picture is left-aligned. Optional *width* and *height* arguments resize the picture. Use of this macro requires two-pass processing; see **INITR** and *mmroff*(1).

PS
: Picture start; see *pic*(1).

PY
: Picture end with flyback. Ends a *pic*(1) picture, returning the vertical position to where it was prior to the picture. This is a GNU extension.

R [*roman-text* [*previous-font-text*]] . . .
Join *roman-text* in roman style with *previous-font-text* in the previous font, without space between the arguments. If no arguments, switch font to roman style.

RB [*roman-text* [*bold-text*]] . . .
Join *roman-text* in roman style with *bold-text* in boldface, without space between the arguments.

RD [*prompt* [*diversion* [*string*]]]
Read from standard input to diversion and/or string. The text is saved in a diversion named *diversion*. Recall the text by writing the name of the diversion after a dot on an empty line. A string is also defined if *string* is given. *Diversion* and/or *prompt* can be empty ("").

RF Reference end. Ends a reference definition and returns to normal processing. See **RS**.

RI [*roman-text* [*italic-text*]] . . .
Join *roman-text* in roman style with *italic-text* in italics, without space between the arguments.

RL [*text-indent* [**1**]]
Begin reference list. Each item is preceded by an automatically incremented number between square brackets; compare **AL**. *text-indent* changes the default indentation. Use **LI** to declare list items, and **LE** to end the list. A second argument, conventionally **1**, suppresses the blank line that normally precedes each list item.

RP [*suppress-counter-reset* [*page-ejection-policy*]]
Format a reference page, listing items accumulated within **RS/RF** pairs. The reference counter is reset unless the first argument is **1**. Normally, page breaks occur before and after the references are output; the register **Rpe** configures this behavior, and a second argument overrides its value. **TC** calls **RP** automatically if references have accumulated.

References are list items, and thus are vertically separated (see **LB**). Setting register **Ls** to **0** suppresses this spacing. The string **Rp** contains the reference page caption.

RS [*reference-string*]
Begin an automatically numbered reference definition. By default, references are numbered starting at 1; the number is available in register **:R**. Interpolate the string **Rf** where the reference mark should be and write the reference between **RS/RF** on an input line after the reference mark. If *reference-string* is specified, *groff ms* also stores the reference mark in a string of that name, which can be interpolated as ***[***reference-string***]** subsequently.

S [*type-size* [*vertical-spacing*]]
Set type size and vertical spacing. Each argument is a *groff* measurement, using an appropriate scaling unit and an optional **+** or **−** prefix to increment or decrement the current value. An argument of **P** restores the previous value, **C** indicates the current value, and **D** requests the default. An empty or omitted argument is treated as **P**.

SA [*mode*]
Set or restore the default enablement of adjustment. Specify **0** or **1** as *mode* to set a document's default explicitly; **1** is assumed by *mm*. Adjustment can be temporarily suspended with the **na** request. When the **H** or **HU** macros are used to format a heading, or when **SA** is called without a *mode* argument, the default adjustment is restored.

SETR *refname* [*string*]
Remember the current heading and page numbers as *refname*. Saves *string* if *string* is defined. *string* is retrieved with **GETST**. See **INITR**.

SG [*arg* [**1**]]
Signature line. Prints the authors name(s) after the formal closing. The argument is appended to the reference data, printed at either the first or last author. The reference data is the location, department, and initials specified with **AU**. It is printed at the first author if the second argument is given, otherwise at the last. No reference data is printed if the author(s) is specified through **WA/WE**. See section "Internals" below.

SK [*n*] Skip *n* pages. If *n* is 0 or omitted, the page is broken unless the drawing position is already at the top of a page. Otherwise, *n* pages, blank except for any headers and footers, are printed.

SM *text* [*post*]
SM *pre text post*
Format *text* at a smaller type size, joined with any specified *pre* and *post* at normal size.

SP [*lines*]
Space vertically. *lines* can have any scaling factor, like "3i" or "8v". Several **SP** calls in a line only produces the maximum number of lines, not the sum. **SP** is ignored also until the first text line in a page. Add **\&** before a call to **SP** to avoid this.

TAB Reset tab stops to every 5 ens.

TB [*title* [*override* [*flag* [*refname*]]]]
Caption a table. Arguments are handled analogously to **EC**. The register **Tb** is the table counter. The string **Litb** precedes the table number and any *title.* Table captions are centered irrespective of the alignment of any enclosing display.

Captioned tables are listed in a table of contents (see **TC**) if the Boolean register **Lt** is true. Such a list uses the string **Lt** as a heading.

TC [*slevel* [*spacing* [*tlevel* [*tab* [*h1* [*h2* [*h3* [*h4* [*h5*]]]]]]]]]
Output table of contents. This macro is normally the last called in the document. It flushes any pending displays and, if any references are pending (see **RS**), calls **RP**. It then begins a new page with the contents caption, stored in the string **Licon**, centered at the top. The entries follow after three vees of space. Each entry is a saved section (number and) heading title (see the **Cl** register), along with its associated page number. By default, an entry is indented by an amount corresponding to its heading level and the maximum heading length encountered at that heading level; if defined, the string **Ci** overrides these indentations. Entries at heading levels up to and including *slevel* are preceded by *spacing* vees of space. Entries at heading levels up to and including *tlevel* are followed by a leader and a right-aligned page number. If the Boolean-valued *tab* argument is true, the leader is replaced with horizontal motion in the same amount. For entries above heading level *tlevel*, the page number follows the heading text after a word space. Each argument *h1*. . .*h5* appears in order on its own line, centered, above the contents caption. Page numbering restarts at 1, in register format "i". If the **Oc** register is true, numbering of these pages is suppressed.

If **TC** is called with at most four arguments, it calls the user-defined macro **TX** (if defined) prior to formatting the contents caption, and **TY** (if defined) *instead* of formatting the contents caption.

Analogous handling of lists of figures, tables, equations, and exhibits is achieved by defining **TX***xx* and **TY***xx* macros, where *xx* is "FG", "TB", "EC", or "EX", respectively. Similarly, the strings **Lifg**, **Litb**, **Liex**, and **Liec** determine captions for their respective lists.

TE Table end. See **TS**.

TH End table heading. It is repeated after page breaks within a table. See **TS**. The **N** argument supported by DWB *mm* is not implemented by *groff mm.*

TL [*charging-case-number* [*filing-case-number*]]
Begin document title. Input is collected into the title until **AF** or **AU** is called, and output as directed by the cover page. *charging-case-number* and *filing-case-number* are saved for use in memorandum types 0 and 5. See **MT**.

TM *number* . . .
Declare technical memorandum number(s) used by **MT**.

TP If defined, this macro is called in lieu of normal page header layout. Headers and footers are formatted in a separate environment. See **EOP**.

Strings available to TP	
TPh	argument to **PH**
TPeh	argument to **EH**
TPoh	argument to **OH**

TS [**H**] Table start. Argument "H" tells *mm* that the table has a heading. See **TE**, **TH**, and *tbl*(1).

VERBON [*format* [*type-size* [*font*]]]
Begin verbatim display, where characters have equal width. *format* controls several parameters. Add up the values of desired features; the default is **0**. On typesetting devices, further arguments configure the *type-size* in scaled points, and the face (*font*); the default is **CR** (Courier roman).

Value	**Effect**
1	Disable the formatter's escape character (\).
2	Vertically space before the display.
4	Vertically space after the display.
8	Number output lines; call formatter's **nm** request with arguments in string **Verbnm**.
16	Indent by the amount stored in register **Verbin**.

VERBOFF
End verbatim display.

VL [*text-indent* [*mark-indent* [**1**]]]
Begin variable-item (or "tagged") list. Each item should supply its own mark, or tag. If the mark is wider than *mark-indent,* one space separates it from subsequent text; contrast **BVL**. *text-indent* sets the indentation of the text, and *mark-indent* the distance from the current list indentation to the mark. A third argument suppresses the blank line that normally precedes each list item. Use **LI** to declare list items, and **LE** to end the list.

VM [**−T**] [*top* [*bottom*]]
Vertical margin. Increase the top and bottom margin by *top* and *bottom*, respectively. If option **−T** is specified, set those margins to *top* and *bottom*. If no argument is given, reset the margin to zero, or to the default ("7v 5v") if **−T** is used. It is highly recommended that macros **TP** and/or **EOP** are defined if using **−T** and setting top and/or bottom margin to less than the default. This undocumented DWB *mm* macro is exposed by *groff mm* to increase user control of page layout.

WA [*writer's-name* [*title*]]
Specify the writer(s) of an **LT** letter. Input is collected into the writer's address until **WA** is called, and then output. You can specify multiple writers with empty **WA/WE** pairs; only the last address is used. The arguments give each writer a name and title.

WC [*format* . . .]
Control width of footnotes and displays.

format	**Effect**
N	equivalent to "**−WF −FF −WD**" (default)
WF	set footnotes at full line length, even in two-column mode
−WF	set footnotes using column line length
FF	apply width of first footnote to encountered to subsequent ones
−FF	footnote width determined by **WF** and **−WF**
WD	set displays at full line length, even in two-column mode
−WD	set displays using column line length

WE End the writer's address begun with **WA**.

Strings

Many *mm* strings interpolate predefined, localizable text. These are presented in quotation marks.

App "APPENDIX"

Apptxt stores the *title* argument to the last **APP** call.

BU interpolates a bullet (see **BL**).

Ci is a list of indentation amounts to use for table of contents heading levels, overriding their automatic computation. Each word must be a horizontal measurement (like "**1i**") and is mapped one-to-one to heading levels 1, 2, and so on.

DT The date; set by the **ND** macro (defaults to the date the document is formatted). The format is the conventional one for the *groff* locale, but see the **ISODATE** macro and **Iso** register.

EM interpolates an em dash.

F interpolates an automatically numbered footnote marker; the number is used by the next **FS** call without an argument. In *troff* mode, the marker is superscripted; in *nroff* mode, it is surrounded by square brackets.

H1txt Updated by **.H** and **.HU** to the current heading text. Also updated in table of contents & friends.

HF assigns font identifiers, separated by spaces, to heading levels in one-to-one correspondence. Each identifier may be a font mounting position, font name, or style name. Omitted values are assumed to be 1. The default is "**2 2 2 2 2 2 2 2 2 2 2 2 2**", which places all headings in italics. DWB *mm*'s default was "**3 3 2 2 2 2 2**".

HP assigns type sizes, separated by spaces, to heading levels in one-to-one correspondence. Each size is interpreted in scaled points; zero values are translated to **10**. Omitted values are assumed to be 0 (and are translated accordingly). The default is "**0 0 0 0 0 0 0 0 0 0 0 0 0**".

Index "INDEX"

Le "LIST OF EQUATIONS"

Letfc "Yours very truly," (see **FC**)

Letapp "APPROVED:" (see **AV**)

LetAT "ATTENTION:" (see **LO**)

LetCN "CONFIDENTIAL" (see **LO**)

Letdate
"Date" (see **AV**)

Letns is a group of strings structuring the notations produced by **NS**. If the *code* argument to **NS** has no corresponding string, the notation is included between parentheses, prefixed with **Letns!copy**, and suffixed with **Letns!to**. Observe the spaces after "Copy" and before "to".

NS code	String	Contents
0	Letns!0	Copy to
1	Letns!1	Copy (with att.) to
2	Letns!2	Copy (without att.) to
3	Letns!3	Att.
4	Letns!4	Atts.
5	Letns!5	Enc.
6	Letns!6	Encs.
7	Letns!7	Under separate cover
8	Letns!8	Letter to
9	Letns!9	Memorandum to
10	Letns!10	Copy (with atts.) to
11	Letns!11	Copy (without atts.) to

12	Letns!12	Abstract Only to
13	Letns!13	Complete Memorandum to
14	Letns!14	CC
—	Letns!copy	Copy *(with trailing space)*
—	Letns!to	to *(note leading space)*

Letnsdef
Select the notation format used by **NS** when it is given no argument. The default is "**0**".

LetRN "In reference to:" (see **LO**)

LetSA "To Whom It May Concern:" (see **LO**)

LetSJ "SUBJECT:" (see **LO**)

Lf "LIST OF FIGURES"

Licon "CONTENTS"

Liec "Equation"

Liex "Exhibit"

Lifg "Figure"

Litb "TABLE"

Lt "LIST OF TABLES"

Lx "LIST OF EXHIBITS"

MO1 . . . **MO12**
"January" through "December"

Qrf "See chapter *[Qrfh], page \\n[Qrfp]."

Rf interpolates an automatically numbered reference mark; the number is used by the next **RS** call. In *troff* mode, the marker is superscripted; in *nroff* mode, it is surrounded by square brackets.

Rp "REFERENCES"

Sm interpolates the service mark sign.

Tcst interpolates an indicator of the **TC** macro's processing status. If **TC** is not operating, it is empty. User-defined **TP** or **EOP** macros might condition page headers or footers on its contents.

Value	**Meaning**
co	Table of contents
fg	List of figures
tb	List of tables
ec	List of equations
ex	List of exhibits
ap	Appendix

Tm interpolates ™, the trade mark sign.

Verbnm
supplies argument(s) to the **nm** request employed by the **VERBON** macro. The default is "1".

Registers

Default register values, where meaningful, are shown in parentheses. Many are also marked as Boolean-valued, meaning that they are considered "true" (on, enabled) when they have a positive value, and "false" (off, disabled) otherwise.

.mgm indicates that *groff mm* is in use (Boolean-valued; **1**).

:p is an auto-incrementing footnote counter; see **FS**.

:R is an auto-incrementing reference counter; see **RS**.

Aph formats an appendix heading (and title, if supplied); see **APP** (Boolean-valued; **1**).

Au includes supplemental author information (the third and subsequent arguments to **AU**) in memorandum "from" information; see **COVER** and **MT** (Boolean-valued; **1**).

Cl sets the threshold for inclusion of headings in a table of contents. Headings at levels above this value are excluded; see **H** and **TC** (**2**). The **Cl** register controls whether a heading is *saved* for output in the table of contents at the time **H** or **HU** is called; if you change **Cl**'s value immediately prior to calling **TC**, you are unlikely to get the result you want.

Cp suppresses page breaks before lists of captioned equations, exhibits, figures, and tables, and before an index; see **EC**, **EX**, **FG**, **TB**, and **INDP** (Boolean-valued; **0**).

D produces debugging information for the *mm* package on the standard error stream. A value of 0 outputs nothing; 1 reports formatting progress. Higher values communicate internal state information of increasing verbosity (**0**).

De causes a page break after a floating display is output; see **DF** (Boolean-valued; **0**).

Df configures the behavior of **DF**. The following values are recognized; 4 and 5 do not override the **De** register (**5**).

Value	Effect
0	Flush pending displays at the end of each section when section-page numbering is active, otherwise at the end of the document.
1	Flush a pending display on the current page or column if there is enough space, otherwise at the end of the document.
2	Flush one pending display at the top of each page or column.
3	Flush a pending display on the current page or column if there is enough space, otherwise at the top of the next.
4	Flush as many pending displays as possible in a new page or column.
5	Fill columns or pages with flushed displays until none remain.

Ds puts vertical space in the amount of register **Dsp** (if defined) or **Lsp** before and after each static display; see **DS** (Boolean-valued; **1**).

Dsp configures the amount of vertical space placed before and after static displays; see **DS** and register **Ds** (*undefined*).

Ec is an auto-incrementing equation counter; see **EC**.

Ej sets the threshold for page breaks (ejection) prior to the format of headings. Headings at levels above this value are set on the same page and column if possible; see **H** (**0**).

Eq aligns an equation label to the left of a display instead of the right (Boolean-valued; **0**).

Ex is an auto-incrementing exhibit counter; see **EX**.

Fg is an auto-incrementing figure counter; see **FG**.

Fs is multiplied by register **Lsp** to vertically separate footnotes; see **FS** (**1**).

H1 . . . **H14**
are auto-incrementing counters corresponding to each heading level; see **H**.

H1dot appends a period to the number of a level one heading; see **H** (Boolean-valued; **1**).

H1h is a copy of A copy of register register **H1**, but it is incremented just before a page break. This can be useful in user-defined macros; see **H** and **HX**.

Hb sets the threshold for breaking the line after formatting a heading. Text after headings at levels above this value are set on the same output line if possible; see **H** (**2**).

Hc sets the threshold for centering a heading. Headings at levels above this value use the prevailing alignment (that is, they are not centered); see **H** (**0**).

Hi configures the indentation of text after headings. It does not affect "run-in" headings. The following values are recognized; see **H** and **P** (**1**).

Value	Effect
0	no indentation
1	indent per the paragraph type
2	indent to align with heading title

Hps sets the heading level threshold for application of preceding vertical space; see **H**. Headings at levels above the value in register **Hps** use the amount of space in register **Hps1**; otherwise that in **Hps2**. The value of **Hps** should be strictly greater than that of **Ej** (**1**).

Hps1 configures the amount of vertical space preceding a heading above the **Hps** threshold; see **H** (*troff* devices: **0.5v**; *nroff* devices: **1v**).

Hps2 configures the amount of vertical space preceding a heading at or below the **Hps** threshold; see **H** (*troff* devices: **1v**; *nroff* devices: **2v**).

Hs sets the heading level threshold for application of succeeding vertical space. If the heading level is greater than **Hs**, the heading is followed by vertical space in the amount of register **Hss**; see **H** (**2**).

Hss is multiplied by register **Lsp** to produce vertical space after headings above the threshold in register **Hs**; see **H** (**1**).

Ht suppresses output of heading level counters above the lowest when the heading is formatted; see **H** (Boolean-valued; **0**).

Hu sets the heading level used by unnumbered headings; see **HU** (**2**).

Hy enables automatic hyphenation of words (Boolean-valued; **0**).

Iso configures the use of ISO 8601 date format if specified (with any value) on the command line; see **ISODATE**. The default is determined by localization files.

L defines the page length for the document, and must be set from the command line. A scaling unit should be appended. The default is that of the selected *groff* output device.

Le
Lf
Lt
Lx configure the report of lists of equation, figure, table, and exhibit captions, respectively, after a table of contents; see **TC** (Boolean-valued; **Le**: **0**; **Lf**, **Lt**, **Lx**: **1**).

Letwam
sets the maximum number of input lines permitted in a writer's address; see **WA** and **WE** (**14**).

Li configures the amount of indentation in ens applied to list items; see **LI** (**6**).

Limsp inserts a space between the prefix and the mark in automatically numbered lists; see **AL** (Boolean-valued; **1**).

Ls sets a threshold for placement of vertical space before list items. If the list nesting level is greater than this value, no such spacing occurs; see **LI** (**99**).

Lsp configures the base amount of vertical space used for separation in the document. *mm* applies this spacing to many contexts, sometimes with multipliers; see **DS**, **FS**, **H**, **LI**, and **P** (*troff* devices: **0.5v**; *nroff* devices: **1v**).

N configures the header and footer placements used by **PH**. The default footer is empty. If "section-page" numbering is selected, the default header becomes empty and the default footer becomes "*x*-*y*", where *x* is is the section number (the number of the current first-level heading) and *y* the page number within the section. The following values are recognized; for finer control, see **PH**, **PF**, **EH**, **EF**, **OH**, and **OF**, and registers **Sectf** and **Sectp**. Value 5 is a GNU extension (**0**).

Value	Effect
0	Set header on all pages.
1	Move header to footer on page 1.
2	Omit header on page 1.
3	Use "section-page" numbering style on all pages.
4	Omit header on all pages.
5	Use "section-page" and "section-figure" numbering style on all pages.

Np causes paragraphs after first-level headings (only) to be numbered in the format *s*.*p*, where *s* is is the section number (the number of the current first-level heading) and *p* is the paragraph number, starting at 1; see **H** and **P** (Boolean-valued; **0**).

O defines the page offset of the document, and must be set from the command line. A scaling unit should be appended. The default is **.75i** on terminal devices. On typesetters, it is **.963i** or set to **1i** by the *papersize.tmac* package; see *groff_tmac*(5).

Oc suppresses the appearance of page numbers in the table of contents; see **TC** (Boolean-valued; **0**).

Of selects a separator format within equation, exhibit, figure, and table captions; see **EC**, **EX**, **FG**, and **TB**. The following values are recognized; the spaces shown are unpaddable (**0**).

Value	Effect
0	". "
1	" — "

P interpolates the current page number; it is the same as register **%** except when "section-page" numbering is enabled.

Pi configures the amount of indentation in ens applied to the first line of a paragraph; see **P** (**5**).

Pgps causes the type size and vertical spacing set by **S** to apply to headers and footers, overriding the **HP** string. If not set, **S** calls affect headers and footers only when followed by **PH**, **PF**, **OH**, **EH**, **OF**, or **OE** calls (Boolean-valued; **1**).

Ps is multiplied by register **Lsp** to vertically separate paragraphs; see **P** (**1**).

Pt determines when a first-line indentation is applied to a paragraph; see **P** (**0**).

Value	Effect
0	never
1	always
2	always, except immediately after **H**, **DE**, or **LE**

Ref is used internally to control *mmroff* (1)'s two-pass approach to index and reference management; see **INITI** and **RS** (Boolean-valued; **0**).

Rpe configures the default page ejection policy for reference pages; see **RP** (**0**).

Value	Effect
0	Break the page before and after the list of references.
1	Suppress page break after the list.
2	Suppress page break before the list.
3	Suppress page breaks before and after the list.

S defines the type size for the document, and must be set from the command line. A scaling unit should be appended; **p** is typical (**10p**).

Sectf selects the "section-figure" numbering style. Its default is **0** unless register **N** is set to **5** at the command line (Boolean-valued).

Sectp selects the "section-page" numbering style. Its default is **0** unless register **N** is set to **3** or **5** at the command line (Boolean-valued).

Si configures the amount of display indentation in ens; see **DS** (**5**).

Tb is an auto-incrementing table counter; see **TB**.

V defines the vertical spacing for the document, and must be set from the command line. A scaling unit should be appended; **p** is typical. The default vertical spacing is 120% of the type size.

Verbin configures the amount of indentation for verbatim displays when indentation is selected; see **VERBON** (**5n**).

W defines the "width" of the document (that is, the length of an output line with no indentation); it must be set from the command line. A scaling unit should be appended. The default is **6i** or assigned by the *papersize.tmac* package; see *groff_tmac*(5).

Internals

The **LT** letter macros call further macros depending on the letter type, with which they are suffixed. It is therefore possible to define additional letter types, either in the territory-specific macro file, or as local additions. **LT** sets the registers **Pt** and **Pi** to 0 and 5, respectively. The following macros must be defined to support a new letter type.

let@init_*type*
LT calls this macro to initialize any registers and other data needed by the letter type.

let@head_*type*
formats the letterhead; it is called instead of the usual page header macro. Its definition should remove the alias **let@header** unless the letterhead is desired on subsequent pages.

let@sg_*type name title n is-final* [*SG-arg* ...]
SG calls this macro only for letters; **MT** memoranda have their own signature processing. *name* and *title* are specified through **WA/WE**. *n* is the index of the *n*th writer, and *is-final* is true for the last writer to be listed. Further **SG** arguments are appended to the signature line.

let@fc_*type closing*
This macro is called by **FC**, and has the formal closing as the argument.

LO implements letter options. It requires that a string named **Let***type* be defined, where *type* is the letter type. **LO** then assigns its second argument (*value*) to the string **let*lo-***type*.

Files

/usr/local/share/groff/1.23.0/tmac/m.tmac
is the *groff* implementation of the memorandum macros.

/usr/local/share/groff/1.23.0/tmac/mm.tmac
is wrapper to load *m.tmac*.

/usr/local/share/groff/1.23.0/tmac/refer-mm.tmac
implements *refer*(1) support for *mm*.

/usr/local/share/groff/1.23.0/tmac/mm/ms.cov
implements an *ms*-like cover sheet.

/usr/local/share/groff/1.23.0/tmac/mm/0.MT
implements memorandum types 0–3 and 6.

/usr/local/share/groff/1.23.0/tmac/mm/4.MT
implements memorandum type 4.

/usr/local/share/groff/1.23.0/tmac/mm/5.MT
implements memorandum type 5.

/usr/local/share/groff/1.23.0/tmac/mm/locale
performs any (further) desired necessary localization; empty by default.

Authors

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See also

MM − A Macro Package for Generating Documents ⟨https://tkurtbond.github.io/troff/mm−all.pdf⟩, the DWB 3.3 *mm* manual, introduces the package but does not document GNU extensions.

Groff: The GNU Implementation of troff, by Trent A. Fisher and Werner Lemberg, is the primary *groff* manual. You can browse it interactively with "info groff".

groff(1), *troff*(1), *tbl*(1), *pic*(1), *eqn*(1), *refer*(1), *groff_mmse*(7)