Quick Reference Guide
for **me** & **groff** (Ver. 3)

All commands are **me** unless marked **t**. See 'man groff_me' and 'man 7 groff' for details.

Page Control

.pl N	page length [11i] **t**
.po N	page offset [po=.75i] **t**
.ll N	line length [.l=6.5i] (page width = po + ll) **t**
.bp N	new page; N=next page number
.ne N	need vertical space (conditional page feed) **t**
.pn N	set next page number **t**
.2c S N	2 columns; S=space between columns; N=num columns
.1c	1 column
.bc	start new column
.nr tp n	header, footer & title font size [10p]
.he 'L'C'R'	page header with left, centre & right parts
.fo 'L'C'R'	page footer with left, centre & right parts
.hx	suppress headers & footers on next page
.$H, **.$F**	User defined macros for headers & footers
.nr hm N	top of page to header [4v]
.nr tm N	top of page to text [7v]
.nr bm N	bottom of text to bottom of page [6v]
.nr fm N	bottom of footer to bottom of page (must be <= bm) [3v]

Paragraph Control

.pp	Paragraph with first line indent
.lp	Paragraph without indent
.ip label size	Indented paragraph - 'label' is put in margin of 'size' [ii=5n]
.np	Numbered paragraph (reset at .lp, .pp or .sh)
.bu	Bulleted list
.sh n 'title'	Section header of level 'n' with title.
.uh 'title'	Section header with no numbering
.nr pp n	paragraph font size [10p]
.nr sp n	section header font size [10p]
.nr qp n	quote font size [pp-1p]
.nr pf n	Paragraph font [1p]
.nr ii N	indent for .ip [5n]
.nr ps N	paragraph spacing [.35v]
.in n	paragraph indent [0n] **t**
.in	use previous indent **t**
.ba n	set base indent for all paras, sections & displays. No affect on headers & footers.
.ti	temporary indent - as '.in' but for one line **t**

Blocks & keeps

.(l ... **.)l**	indented, single spaced, unfilled list
.(b ... **.)b**	block - kept on one page
.(z ... **.)z**	floating keep - keep on one page
.(l F L C ... **.)l**	same but filled, left justified, centered etc
.(c ... **.)c**	centered block (not a keep)
.(f ... **.)f**	footnote
**	footnote number
.(q ... **.)q**	quotation
.(x x	start index entry under name 'x'
.)x p	end index entry. Parameter p is a reference override, the default being the page number (see .xp for printing)
.++ P	begin preliminary material
.++ B	Start bibliography
.+c 'Title'	Chapter start (starts prelim section after a .++ P)
.xp x	Print index collected under 'x' by .(x x ... .)x

Line Control

.br	start new line **t**
.hl n	'n' lines (use before .lp, .ip, .np, .bp? etc calls) [1] **t**
.fi	fill on **t**
.nf	fill off **t**
.na	right justification off **t**
.ad b	right justification on **t**
.ad l	flush left, ragged right **t**
.ad r	flush right, ragged left **t**
.ad c	centred **t**
.ad	resume previous adjustment **t**
.ce n	centre 'n' lines (n=0 stops centering) [1] **t**
.\"	comment at start of line **t**
\"	comment in the line!! **t**
.hy	hyphenation on **t**
.nh	hyphenation off **t**
.ls 2	double space **t**
.sp [1]	skip line **t**

Text Control

.q 'quote'	shorthand for left & right quote
.r word	roman
.i word	italic
.b word	bold
.bi word	bold italic
.u word	underlined
.bx word	boxed
.sm word	small
\*(lq \*(rq	left & right quote **t**

NB the remainder are **troff**

\&	nop - use at the start of line before . or '
\w*word*	Width of word
\N'xxx'	octal character e.g. xxx=163:£ (Pound)
\c	continue word (if in fill mode)
\c	break word (if in nofill mode)
\f[*font*]	change to *font*

Font variants: add R, I, B or BI:

A	AvantGarde-Book
BM	Bookman-Light
C	Courier
H	Helvetica
HN	Helvetica-Narrow
N	NewCenturySchoolBook
P	Palatino
T	TimesRoman

No variants:

ZCMI	*ZapfChanceryMediumItalic*
P	Previous font
S	Symbol
SS	Slanted Symbol
ZD	ZapfDingBats
ZDR	ZapfDingBats Reversed

.sz [±N]	font size - temporary - until macro package resets it! may not play nicely with macro packages.
\s(nn	change to (arbitrary) size \s(72
\sn or **\s**nn	change to troff constrained size \s6 \s10 \s36 (max)
\s0	change to previous size
\*(dw	Monday etc
\*(mo	January
\*(td	date: June 1, 1992
\n(dy	day of the month
\n(mo	month number
\n[year]	Y2K year e.g. "1992". Thus `\n(dy/\n(mo/\n[year]` produces 19/6/2018

Graphics & Motion (all)

Note: | makes coordinates absolute rather than the usual relative.

.hl	horizontal line
\D'l x y'	Draw a line to (x, y)
\D'c D'	Draw circle radius D with left side at current position
\D'e D_1 D_1'	draw ellipse of diameters D_1 and D_2
\D'a H_1 V_1 H_2 V_2'	Draw an arc from current position to (H_1+H_2, V_1+V_2)
\D'~ H_1 V_1 H_2 V_2 ...'	Draw a spline from current position using the given tie points.

\h’x’ move horizontally to the right

\v’y’ move vertically down

\l’x’ draw horizontal line

\L’y’ draw vertical line

.mk *x*, **\k***x* Mark present vertical/horizontal position in *x*

.sp |\n*x*u **\h**’|\n*x*u’
Move back to vertical/horizontal mark *x*

TROFF (all)

groff has long names: \n[**name**]. *troff* needs 1- or 2-letter names: \n**a** or \n(**aa**.

.nr pi *n* set number register pi

\n[*name*] dereference register *name*

.ds *xx* set string

*****[*xx*] deference string *xx*

\(dg dagger => †

\(dd double dagger => ‡

\(sc section => §

\(rh right hand => ☞

\(lh left hand => ☜

\(bu bullet => •

\(sq square => □

\(14 quarter => ¼

\(12 half => ½

\(34 three-quarters = > ¾

\(de degree => °

\(rg registered => ®

\(co copyright => ©

\(eu Euro => €

\(Po Pound => £

others See `’man groff_char’`

\e backslash (actually, the current escape character)

.so file include *file*

.?? ’message’
puts *message* on stderr

.tm ’message’
puts *message* on stderr

.di ’message’
puts *message* on stderr

.ab ’message’
puts *message* on stderr and aborts

.PSPIC [-L|-R|-I n] file [width [height]]
Draw PostScript (under -Tps only). The graphic may be left or right justified (default centred) or indented by n.

Macros (all)

.de xx start macro xx

.. end macro

Grouping lines:

.if n \{
...
.\}
Beware of characters after **\}**! Use **.\}** at the start of a line.

Forms of **.if**:

.if ’string1’string2’
True if strings equal

.if !’string1’string2’
True if strings not equal

.if n|t|o|e True if nroff| troff| even page| odd page

.if \nX>0, **.if** \nX
Both true if \nX > 0

.if \nX<=0, **.if** !\nX
Both true if \nX ≤ 0

.ie [expr] If part of if...else

.el [expr] else

.ig AX ignore till .AX

\\$1 \\$2 .../etc
parameter e.g. .fx "To" "Co" "Num" etc

Tables (use groff -t ...)

```
.TS H
allbox, center, tab(;);
c s s
l l n.
Title
col1;col2;col3
.TE
```

Globals: **allbox, box, doublebox, center, expand, tab(x)**

Format modifiers:
l(eft), **r**(ight), **c**(entre), **n**(umeric), **a**(lpha), **s**(pan), ^(vertical span)

Lines: **_, =**

Formats:

fCW fI i fB b
font

p+1, p8 point size

1, 2, 10 etccolumn separation

w(1i) minimum column width

e equal width columns

u staggered column

z zero width entry

v3, v5 etc vertical spacing for text blocks

...T{ must be at end of line
text block
that can
span
several lines
T}... must be at start of line

.T& Define new data format
c s s.
data

Figures (use groff -p...)

The ’current position’ (cp) after .PS is at the centre of the page!!

attributes	**line**	**box**	**circle**	**arc**	**el**
height		•			•
width		•			•
rad			•	•	
diam			•	•	
cw				•	
right a	•			•	
left a	•			•	
up a	•			•	
down a	•			•	
to p [from q]	•			•	
at p		•	•	•	•
with c			•	•	•
by (x, y)	•				
dotted e	•	•	•	•	•
dashed e	•	•	•	•	•
<-	•			•	
->	•			•	
<->	•			•	
"text"	•	•	•	•	•
[above|below]	•	•	•	•	•
[ljust|rjust]	•	•	•	•	•

.PS [width [height]]
starts figure

.PE ends figure

.PF end figure with ’fly-back’

line right *d*, left *d*, up *d*, down *d*, to *p* [from *q*], by (*x,y*), <-, ->, <->

box height, width, at *p*

circle rad *r*, diam *d*, at *p*, with *c*

arc rad *r*, diam *d*, cw, right *d*, left *d*, up *d*, down *d*, to *p* [from *q*], at *p*, with *c*, <-, ->, <->

ellipse height, width, at *p*, with *c*

text All primitives can have "*text*" [above|below] [ljust|rjust]

dotted *e*, dashed *e*
All primitives may be dotted *e* or dashed *e*.

Primitives box, circle, ellipse, arc, line, arrow, spline, *text-list*

Attributes h(eight) *expr*, wid(th) *expr*, rad(ius) *expr*, diam(eter) *expr*, up *expr*, down *expr*, right *expr*, left *expr*, from *positon*, to *positon*, at *positon*, with *corner*, by *expr, expr*, then, dotted *expr*, dashed *expr*, chop *expr*, <-, ->, <->, invis, solid, fill *expr*, same

Text

Position: [center ljust rjust above below]
"*text*" *position*
sprintf(*"format", expr*) *position*

Places .n .e .w .s .ne .se .nw .sw .c .start .end top bot left right start end 1st 2nd 3rd *n*th last (*x, y*)

Built-in Variables
boxwid (.75) boxht (.5) circlerad (.25) arcrad (.25) ellipsewid (.75) ellipseht (.5) linewid (.5) lineht (.5) movewid (.5) moveht (.5) textwid (0) textht (0) arrowwid (.05) arrowht (.1) dashwd (.1) arrowhead (2) maxpsht (8.5) maxpswid (11) scale (1) fillval (.3)

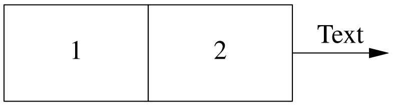
Verbs for *var* = *expr* to *expr* by *expr* do { ... }
if *expr* then { ... } else { ... }
define *name* { ... }
undef *name*

Other [...] block - names are local
{ ... } position & direction restored on exit
object-name : *elements*

example:

```
define junk {
    for i = 1 to n do {
        box sprintf("%g", i)
    }
}
n=2; Firstjunk: [junk]
arrow "Text" above  with .w \
    at Firstjunk.e
```

produces:



Equations (use groff -e)

.EQ *label* Start equation (put into a). *label* prints at right

delim *xx*|off
Delimiters for in-line equations (suggest $$)

.EN End of equation

sub, sup Sub- & super-script

~, ^ Full & half space

sqrt, **over** Simple operators

sum, **int**, **prod**, **union**, **inter**, **oppE**, **oppA**, **lim**, **max**, **min**
Operators with limits - add [**from** *x*] [**to** *x*]

left *x* ... **right** *y*
large brackets: *x*, & *y* are from (){}| **floor ceiling**

define *name* **%**size +$1 bold ->**%**
Macro invoked by *name*(1). tdefine, ndefine work for troff/nroff

mark Alignment

lineup lines up to **mark**

pile Vertical alignment

matrix { **ccol** { *x* **above** *y* ... } }

example:

```
.EQ
left ( pile { n above k} right )
~=~ n! over {k! ^ ( n - k ) !}
~=~ left ( pile { n above {n - k}}\
    right )
.EN
```

produces:

$$\left(\begin{matrix} n \\ k \end{matrix}\right) = \frac{n!}{k!\,(n-k)!} = \left(\begin{matrix} n \\ n-k \end{matrix}\right)$$

Special Characters (all)

Use with \N'xxx':

128: ,	129: «	130: »	131: •
132: ƒ	133: ⁄	134: ‰	135: †
136: ‡	137: –	138: —	139:
140: ﬁ	141: ﬂ	142:	143:
144: ı	145:	146: `	147: ˝
148: ˙	149: ˘	150: ˇ	151: ˚
152: ˛	153: “	154: ”	155: œ
156: ł	157: „	158: Œ	159: Ł
160:	161: ¡	162: ¢	163: £
164: ¤	165: ¥	166: ¦	167: §
168: ¨	169: ©	170: ª	171: ‹
172: ¬	173: –	174: ®	175: ¯
176: °	177: ±	178: ²	179: ³
180: ´	181: µ	182: ¶	183: ·
184: ¸	185: ¹	186: º	187: ›
188: ¼	189: ½	190: ¾	191: ¿
192: À	193: Á	194: Â	195: Ã
196: Ä	197: Å	198: Æ	199: Ç
200: È	201: É	202: Ê	203: Ë
204: Ì	205: Í	206: Î	207: Ï
208: Ð	209: Ñ	210: Ò	211: Ó
212: Ô	213: Õ	214: Ö	215: ×
216: Ø	217: Ù	218: Ú	219: Û
220: Ü	221: Ý	222: Þ	223: ß
224: à	225: á	226: â	227: ã
228: ä	229: å	230: æ	231: ç
232: è	233: é	234: ê	235: ë
236: ì	237: í	238: î	239: ï
240: ð	241: ñ	242: ò	243: ó
244: ô	245: õ	246: ö	247: ÷
248: ø	249: ù	250: ú	251: û
252: ü	253: ý	254: þ	255: ÿ