

free42 Custom Unit Conversion Factors

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1 Metadata

The home for this HTML file is: <https://richmit.github.io/hp42/unit.html>

A PDF version of this file may be found here: <https://richmit.github.io/hp42/unit.pdf>

Files related to this document may be found on github: <https://github.com/richmit/hp42>

Directory contents:

src	-	The org-mode file that generated this HTML document
src_42s	-	Ready to convert source listings for 42s code in this document
docs	-	This html document
bin	-	Importable RAW program files

2 Introduction

This application has a few unit conversions for temperatures; however, the focus is on a nice way to organize and recall various conversion factors I frequently use. That is to say, I don't really want to convert "in" to "cm", instead I want to push the conversion factor to the stack.

Aside from the **TEMP** menu, all of the menus have the same structure. The first menu key is the "base" unit for that page. Pressing any menu key will push a conversion factor for the given unit to the "base" unit to the stack. For example, if the left most menu is "mm" then pressing the "in" button will push 25.4 to the stack – the value you would multiply by to convert from inches to millimeters or divide by to convert from millimeters to inches.

Some constants are little programs. In some cases these are derived conversion factors, and the programs make that explicit. More importantly in cases when the base conversion factors are exact quantities, the programs insure we obtain machine accuracy – i.e. $1/2.54$ is better than 0.3937.

3 Units

3.1 Conversion Factors

Type	Conversion	Description
Leng:mm	1.0	
Leng:Ang	1e-7	Angstrom
Leng:µm	0.001	Micron
Leng:mil	FUNC 01; 25.4; 1000; /	mil (1/1000 in)
Leng:cm	10	
Leng:in	25.4	Inch
Leng:cm	1	
Leng:in	2.54	Intl Inch
Leng:ft	FUNC 01; 2.54; 12; *	Intl Foot
Leng:m	100	
Leng:yd	FUNC 01; 2.54; 12; *; 3; *	Intl Yard
Leng:hand	FUNC 01; 2.54; 4; *	Intl hand

Continued on next page

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Type	Conversion	Description
Leng:km	1	
Leng:mi	FUNC 01; 2.54; 12; *; 5280; *; 1e5; /	Int Mile
Leng:us mi	1.60934721869	US Mile
Leng:nmi	1.852	Int Nautical mi
Leng:m	0.001	
Leng:ft	FUNC 01; 2.54; 12; *; 1e5; /	Intl Foot
Area:hector	1	hector
Area:acre	0.40468564224	Int Acre
Area:m^2	0.0001	
Area:yd^2	8.36127360001e-5	
Vol:l	1	
Vol:qt	0.946352946	US Lq Quart
Vol:gal	FUNC 01; 0.946352946; 4; *	US Lq Gal
Vol:cc	0.001	
Vol:butt	FUNC 01; 0.946352946; 4; *; 126; *	US Butt 126 US Gal
Vol:bbutt	FUNC 01; 4.54609; 108; *	UK Butt 108 UK Gal
Vol:tsp	1	Teaspoon
Vol:tbsp	3	Tablespoon
Vol:flOZ	6	fl oz
Vol:cup	48	Cup
Vol:pint	96	Pint
Vol:qt	192	Quart
Time:sec	1	
Time:min	60	
Time:hour	3600	
Time:day	86400	
Time:week	604800	
Time:year	31536000	365 day year
Time:day	1	
Time:year	365	Conventional
Time:acnt	360	Accounting
Time:greg	365.2425	Mean Gregorian
Time:julian	365.25	
Time:astro	365.256363004	Astronomical
Mass:kg	1	
Mass:lb	0.45359237	Pound Int
Mass:g	1e3	
Mass:ozWT	28e3	Ounce Food Weight
Mass:ozTr	31.1034768e3	Ounce Troy
Mass:stone	FUNC 01; 0.45359237; 14; ×	Int Stone
Mass:lb	1	
Mass:US ton	2000	US (short) Ton
Mass:UK ton	2240	UK (long) Ton
Force:N	1	
Force:kgf	9.80665	
Force:lbf	FUNC 01; 0.45359237; 9.80665; *	Int lbf
Sped:m/s	1	
Sped:mph	FUNC 01; 2.54; 12; *; 5280; *; 1e2; /; 3600; /	Int mph
Sped:kph	FUNC 01; 1000; 3600; /	
Sped:knot	FUNC 01; 1.852; 1000; *; 3600; /	Intl nmi
Pres:Pa	1	N/m^2
Pres:bar	100000	
Pres:psi	FUNC 01; 1e4; 0.45359237; *; 9.80665; *; 2.54; X^2; /	
Pres:atm	101325	Standard
Pres:mmHg	133.322	
Pres:inHg	3.386389e3	Conventional
Powr:watt	1	
Powr:BTU/h	0.2930710702	International
Powr:hp	735.49875	Metric
Powr:kcal/h	1.163	
Temp:C→F	FUNC 11; 9; ×; 5; ÷; 32; +	
Temp:F→C	FUNC 11; 32; -; 5; ×; 9; ÷	
Temp:K→C	FUNC 11; 273.15; -	
Temp:C→K	FUNC 11; 273.15; +	
□□□□		
SIPFX	Run the SIPFX application	

3.2 Code

```
(MJR-generate-42-menu-code "UNIT"
  0
  tbl
  0)
```



```

KEY 7 GTO 14
KEY 8 GTO 13
KEY 9 GTO 01
MENU
STOP
GTO 03
LBL 13      @@@@ Page 2 of menu Leng
CLMENU
"cm"
KEY 1 XEQ 21
"in"
KEY 2 XEQ 22
"ft"
KEY 3 XEQ 23
"m"
KEY 4 XEQ 24
"yd"
KEY 5 XEQ 25
"hand"
KEY 6 XEQ 26
KEY 7 GTO 03
KEY 8 GTO 14
KEY 9 GTO 01
MENU
STOP
GTO 13
LBL 14      @@@@ Page 3 of menu Leng
CLMENU
"km"
KEY 1 XEQ 27
"mi"
KEY 2 XEQ 28
"us mi"
KEY 3 XEQ 29
"nmi"
KEY 4 XEQ 30
"m"
KEY 5 XEQ 31
"ft"
KEY 6 XEQ 32
KEY 7 GTO 13
KEY 8 GTO 03
KEY 9 GTO 01
MENU
STOP
GTO 14
LBL 04      @@@@ Page 1 of menu Area
CLMENU
"hector"
KEY 1 XEQ 33
"acre"
KEY 2 XEQ 34
"m^2"
KEY 3 XEQ 35
"yd^2"
KEY 4 XEQ 36
KEY 9 GTO 01
MENU
STOP
GTO 04
LBL 05      @@@@ Page 1 of menu Vol
CLMENU
"l"
KEY 1 XEQ 38
"qt"
KEY 2 XEQ 39
"gal"
KEY 3 XEQ 40
"cc"
KEY 4 XEQ 41
"butt"
KEY 5 XEQ 42
"bbutt"
KEY 6 XEQ 43
KEY 7 GTO 37
KEY 8 GTO 37

```

```

KEY 9 GTO 01
MENU
STOP
GTO 05
LBL 37          @@@@ Page 2 of menu Vol
CLMENU
"tsp"
KEY 1 XEQ 44
"tbsp"
KEY 2 XEQ 45
"f10Z"
KEY 3 XEQ 46
"cup"
KEY 4 XEQ 47
"pint"
KEY 5 XEQ 48
"qt"
KEY 6 XEQ 49
KEY 7 GTO 05
KEY 8 GTO 05
KEY 9 GTO 01
MENU
STOP
GTO 37
LBL 06          @@@@ Page 1 of menu Time
CLMENU
"sec"
KEY 1 XEQ 51
"min"
KEY 2 XEQ 52
"hour"
KEY 3 XEQ 53
"day"
KEY 4 XEQ 54
"week"
KEY 5 XEQ 55
"year"
KEY 6 XEQ 56
KEY 7 GTO 50
KEY 8 GTO 50
KEY 9 GTO 01
MENU
STOP
GTO 06
LBL 50          @@@@ Page 2 of menu Time
CLMENU
"day"
KEY 1 XEQ 57
"year"
KEY 2 XEQ 58
"acnt"
KEY 3 XEQ 59
"greg"
KEY 4 XEQ 60
"julian"
KEY 5 XEQ 61
"astro"
KEY 6 XEQ 62
KEY 7 GTO 06
KEY 8 GTO 06
KEY 9 GTO 01
MENU
STOP
GTO 50
LBL 07          @@@@ Page 1 of menu Mass
CLMENU
"kg"
KEY 1 XEQ 64
"lb"
KEY 2 XEQ 65
"g"
KEY 3 XEQ 66
"ozWT"
KEY 4 XEQ 67
"ozTr"
KEY 5 XEQ 68

```

```

"stone"
KEY 6 XEQ 69
KEY 7 GTO 63
KEY 8 GTO 63
KEY 9 GTO 01
MENU
STOP
GTO 07
LBL 63          @@@@ Page 2 of menu Mass
CLMENU
"lb"
KEY 1 XEQ 70
"US ton"
KEY 2 XEQ 71
"UK ton"
KEY 3 XEQ 72
KEY 7 GTO 07
KEY 8 GTO 07
KEY 9 GTO 01
MENU
STOP
GTO 63
LBL 08          @@@@ Page 1 of menu Force
CLMENU
"N"
KEY 1 XEQ 73
"kgf"
KEY 2 XEQ 74
"lbf"
KEY 3 XEQ 75
KEY 9 GTO 01
MENU
STOP
GTO 08
LBL 09          @@@@ Page 1 of menu Sped
CLMENU
"m/s"
KEY 1 XEQ 76
"mph"
KEY 2 XEQ 77
"kph"
KEY 3 XEQ 78
"knot"
KEY 4 XEQ 79
KEY 9 GTO 02
MENU
STOP
GTO 09
LBL 10          @@@@ Page 1 of menu Pres
CLMENU
"Pa"
KEY 1 XEQ 80
"bar"
KEY 2 XEQ 81
"psi"
KEY 3 XEQ 82
"atm"
KEY 4 XEQ 83
"mmHg"
KEY 5 XEQ 84
"inHg"
KEY 6 XEQ 85
KEY 9 GTO 02
MENU
STOP
GTO 10
LBL 11          @@@@ Page 1 of menu Powr
CLMENU
"watt"
KEY 1 XEQ 86
"BTU/h"
KEY 2 XEQ 87
"hp"
KEY 3 XEQ 88
"kcal/h"
KEY 4 XEQ 89

```

```

KEY 9 GTO 02
MENU
STOP
GTO 11
LBL 12          @@@@ Page 1 of menu Temp
CLMENU
"C-F"
KEY 1 XEQ 90
"F-C"
KEY 2 XEQ 91
"K-C"
KEY 3 XEQ 92
"C-K"
KEY 4 XEQ 93
KEY 9 GTO 02
MENU
STOP
GTO 12
LBL 00 @@@@ Application Exit
EXITALL
RTN
LBL 15          @@@@ Action for menu key mm
1.0
RTN
LBL 16          @@@@ Action for menu key Ang
1e-07
"Angstrom"
AVIEW
RTN
LBL 17          @@@@ Action for menu key μm
0.001
"Micron"
AVIEW
RTN
LBL 18          @@@@ Action for menu key mil
FUNC 01
25.4
1000
/
"mil (1/1000 in)"
└─"
AVIEW
RTN
LBL 19          @@@@ Action for menu key cm
10
RTN
LBL 20          @@@@ Action for menu key in
25.4
"Inch"
AVIEW
RTN
LBL 21          @@@@ Action for menu key cm
1
RTN
LBL 22          @@@@ Action for menu key in
2.54
"Intl Inch"
AVIEW
RTN
LBL 23          @@@@ Action for menu key ft
FUNC 01
2.54
12
*
"Intl Foot"
AVIEW
RTN
LBL 24          @@@@ Action for menu key m
100
RTN
LBL 25          @@@@ Action for menu key yd
FUNC 01
2.54
12
*
3

```

```

*
"Intl Yard"
AVIEW
RTN
LBL 26      @@@@ Action for menu key hand
FUNC 01
2.54
4
*
"Intl hand"
AVIEW
RTN
LBL 27      @@@@ Action for menu key km
1
RTN
LBL 28      @@@@ Action for menu key mi
FUNC 01
2.54
12
*
5280
*
1e5
/
"Int Mile"
AVIEW
RTN
LBL 29      @@@@ Action for menu key us mi
1.60934721869
"US Mile"
AVIEW
RTN
LBL 30      @@@@ Action for menu key nmi
1.852
"Int Nautical mi"
└─"
AVIEW
RTN
LBL 31      @@@@ Action for menu key m
0.001
RTN
LBL 32      @@@@ Action for menu key ft
FUNC 01
2.54
12
*
1e5
/
"Intl Foot"
AVIEW
RTN
LBL 33      @@@@ Action for menu key hector
1
"hector"
AVIEW
RTN
LBL 34      @@@@ Action for menu key acre
0.40468564224
"Int Acre"
AVIEW
RTN
LBL 35      @@@@ Action for menu key m^2
0.0001
RTN
LBL 36      @@@@ Action for menu key yd^2
8.36127360001e-05
RTN
LBL 38      @@@@ Action for menu key l
1
RTN
LBL 39      @@@@ Action for menu key qt
0.946352946
"US Lq Quart"
AVIEW
RTN
LBL 40      @@@@ Action for menu key gal

```



```

FUNC 01
0.946352946
4
*
"US Lq Gal"
AVIEW
RTN
LBL 41      @@@@ Action for menu key cc
0.001
RTN
LBL 42      @@@@ Action for menu key butt
FUNC 01
0.946352946
4
*
126
*
"US Butt 126 US "
└─"Gal"
AVIEW
RTN
LBL 43      @@@@ Action for menu key bbutt
FUNC 01
4.54609
108
*
"UK Butt 108 UK "
└─"Gal"
AVIEW
RTN
LBL 44      @@@@ Action for menu key tsp
1
"Teaspoon"
AVIEW
RTN
LBL 45      @@@@ Action for menu key tbsp
3
"Tablespoon"
AVIEW
RTN
LBL 46      @@@@ Action for menu key flOZ
6
"fl oz"
AVIEW
RTN
LBL 47      @@@@ Action for menu key cup
48
"Cup"
AVIEW
RTN
LBL 48      @@@@ Action for menu key pint
96
"Pint"
AVIEW
RTN
LBL 49      @@@@ Action for menu key qt
192
"Quart"
AVIEW
RTN
LBL 51      @@@@ Action for menu key sec
1
RTN
LBL 52      @@@@ Action for menu key min
60
RTN
LBL 53      @@@@ Action for menu key hour
3600
RTN
LBL 54      @@@@ Action for menu key day
86400
RTN
LBL 55      @@@@ Action for menu key week
604800
RTN
LBL 56      @@@@ Action for menu key year

```

```

31536000
"365 day year"
AVIEW
RTN
LBL 57      @@@@ Action for menu key day
1
RTN
LBL 58      @@@@ Action for menu key year
365
"Conventional"
AVIEW
RTN
LBL 59      @@@@ Action for menu key acnt
360
"Accounting"
AVIEW
RTN
LBL 60      @@@@ Action for menu key greg
365.2425
"Mean Gregorian"
AVIEW
RTN
LBL 61      @@@@ Action for menu key julian
365.25
RTN
LBL 62      @@@@ Action for menu key astro
365.256363004
"Astronomical"
AVIEW
RTN
LBL 64      @@@@ Action for menu key kg
1
RTN
LBL 65      @@@@ Action for menu key lb
0.45359237
"Pound Int"
AVIEW
RTN
LBL 66      @@@@ Action for menu key g
1000.0
RTN
LBL 67      @@@@ Action for menu key ozWT
28000.0
"Ounce Food Weig"
└─"ht"
AVIEW
RTN
LBL 68      @@@@ Action for menu key ozTr
31103.4768
"Ounce Troy"
AVIEW
RTN
LBL 69      @@@@ Action for menu key stone
FUNC 01
0.45359237
14
x
"Int Stone"
AVIEW
RTN
LBL 70      @@@@ Action for menu key lb
1
RTN
LBL 71      @@@@ Action for menu key US ton
2000
"US (short) Ton"
AVIEW
RTN
LBL 72      @@@@ Action for menu key UK ton
2240
"UK (long) Ton"
AVIEW
RTN
LBL 73      @@@@ Action for menu key N
1
RTN

```

```

LBL 74      @@@@ Action for menu key kgf
9.80665
RTN
LBL 75      @@@@ Action for menu key lbf
FUNC 01
0.45359237
9.80665
*
"Int lbf"
AVIEW
RTN
LBL 76      @@@@ Action for menu key m/s
1
RTN
LBL 77      @@@@ Action for menu key mph
FUNC 01
2.54
12
*
5280
*
1e2
/
3600
/
"Int mph"
AVIEW
RTN
LBL 78      @@@@ Action for menu key kph
FUNC 01
1000
3600
/
RTN
LBL 79      @@@@ Action for menu key knot
FUNC 01
1.852
1000
*
3600
/
"Intl nmi"
AVIEW
RTN
LBL 80      @@@@ Action for menu key Pa
1
"N/m^2"
AVIEW
RTN
LBL 81      @@@@ Action for menu key bar
100000
RTN
LBL 82      @@@@ Action for menu key psi
FUNC 01
1e4
0.45359237
*
9.80665
*
2.54
X^2
/
RTN
LBL 83      @@@@ Action for menu key atm
101325
"Standard"
AVIEW
RTN
LBL 84      @@@@ Action for menu key mmHg
133.322
RTN
LBL 85      @@@@ Action for menu key inHg
3386.389
"Conventional"
AVIEW
RTN

```



```

KEY 4 XEQ 19
"pebi"
KEY 5 XEQ 20
"exbi"
KEY 6 XEQ 21
KEY 7 GTO 02
KEY 8 GTO 01
KEY 9 GTO 00
MENU
STOP
GTO 03
LBL 00 @@@@ Application Exit
EXITALL
RTN
LBL 04      @@@@ Action for menu key centi
0.01
FS? 64
÷
FC? 64
×
"centi (c)"
RTN
LBL 05      @@@@ Action for menu key milli
0.001
FS? 64
÷
FC? 64
×
"milli (m)"
RTN
LBL 06      @@@@ Action for menu key micro
1e-06
FS? 64
÷
FC? 64
×
"micro (μ)"
RTN
LBL 07      @@@@ Action for menu key nano
1e-09
FS? 64
÷
FC? 64
×
"nano (n)"
RTN
LBL 08      @@@@ Action for menu key pico
1e-12
FS? 64
÷
FC? 64
×
"pico (p)"
RTN
LBL 09      @@@@ Action for menu key femto
1e-15
FS? 64
÷
FC? 64
×
"femto (f)"
RTN
LBL 10      @@@@ Action for menu key kilo
1000.0
FS? 64
÷
FC? 64
×
"kilo (k)"
RTN
LBL 11      @@@@ Action for menu key mega
1000000.0
FS? 64
÷
FC? 64
×

```

```

"mega (M)"
RTN
LBL 12      @@@@ Action for menu key giga
1000000000.0
FS? 64
÷
FC? 64
×
"giga (G)"
RTN
LBL 13      @@@@ Action for menu key tera
1000000000000.0
FS? 64
÷
FC? 64
×
"tera (T)"
RTN
LBL 14      @@@@ Action for menu key peta
1e+15
FS? 64
÷
FC? 64
×
"peta (P)"
RTN
LBL 15      @@@@ Action for menu key exa
1e+18
FS? 64
÷
FC? 64
×
"exa (E)"
RTN
LBL 16      @@@@ Action for menu key kibi
1024
FS? 64
÷
FC? 64
×
"kibi (Ki)"
RTN
LBL 17      @@@@ Action for menu key mebi
1048576
FS? 64
÷
FC? 64
×
"mebi (Mi)"
RTN
LBL 18      @@@@ Action for menu key gibi
1073741824
FS? 64
÷
FC? 64
×
"gibi (Gi)"
RTN
LBL 19      @@@@ Action for menu key tebi
1099511627776
FS? 64
÷
FC? 64
×
"tebi (Ti)"
RTN
LBL 20      @@@@ Action for menu key pebi
1125899906842624
FS? 64
÷
FC? 64
×
"pebi (Pi)"
RTN
LBL 21      @@@@ Action for menu key exbi
1152921504606846976

```

```
FS? 64
÷
FC? 64
×
"exbi (Ei)"
RTN
@@@ Free labels start at: 22
END
```

5 EOF