

# CONVERTER PLUS TEMPLATES

This document is about templates and designing them in Converter Plus app for iPhone, iPod and iPad.

## TEMPLATES

Converter Plus for iPhone/iPad includes more than 70 different templates for different categories of units and calculations. Each **template** defines a set of **items** (that hold numeric values) and mathematical **rules** between them.

For example: **Temperature template** defines temperature units (°C, °F, K...) and mathematical rules:

$$[\text{Value in } ^\circ\text{F}] = 1.8 * [\text{Value in } ^\circ\text{C}] + 32$$

$$[\text{Value in K}] = [\text{Value in } ^\circ\text{C}] + 273.15$$

Every page in Converter Plus is based on one template. You can have multiple pages of a same template. Changes in template apply to pages automatically.

There are two types of templates:

**Converter template:** Items are usually units or currencies. Every item's value can be calculated from any other item's value via one or multiple rules. User can enter value in any item.

**Calculator template:** Items are of two types: **input items** where values are entered by the user, **output items** where values are calculated based on rules.

You can add and edit templates in Converter Plus version 1.5 or later. To do so, either:

- Tap Info button (i) at the bottom of a page.
- Tap Add button (+) from Home screen, tap Edit button on the template listing then selecting a template.
- Tap Add button (+) from Home screen, scroll to the end of the template listing then select Design a template.



## ITEMS

Each item in a template is defined with followings:

- **Identifier (ID):** short name to identify the item, displayed on the left side in the user interface. In one template, each item's identifier must be unique. It must not contains square brackets [ ] characters.
- **Title:** longer description of the item, displayed beneath the item value in the user interface.

- **Default:** optional numeric value to prefill the item when a page is created. This is usually used in calculator templates for *input items* (for example in Tip calculator, tip percentage has default value of 15).
- **Format:** presentation style of the item's value, can be of 3 styles:
  - o **Decimal:** decimal format
  - o **Currency:** currency format (fixed 2 digit after the decimal point)
  - o **Compound:** split value format (see below)

A compound formatted item can have up to 4 split values. To define a Compound format, enter the following in Compound format row:

`#<p> <n1>#<p1> <n2>#<p2> <n3>#<p3>`

Where:

`<p>`, `<p1>`, `<p2>` and `<p3>` are postfixes of the split values.

`<n1>`, `<n2>` and `<n3>` are fraction numbers (integer). Fraction number

`<n>` means the current value is equal to a fraction of `<n>` to the preceding value.

For example:

Feet and inches compound can be defined as `#feet 12#inches`

Hours, minutes and seconds compound can be defined as `#h 60#m 60#s`



Items of compound format are evaluated at the highest split value level. For example `1feet 6inches` has decimal value of 1.5.

## RULES

A rule defines how an item value is calculated from another item (or items). Converter Plus may use multiple rules to calculate an item value. For example it can use *Feet to Inch* rule, then *Inch to Centimeter* rule to calculate Centimeter from Feet.

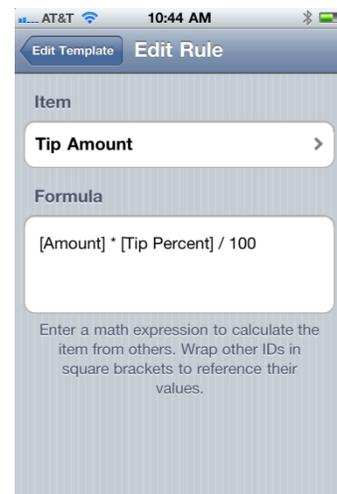
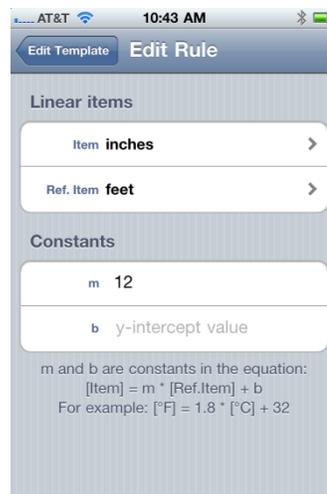
There are two types of Rules:

**Linear rule:** Define a linear math relation between 2 items, presentable in this expression:  $[item\ 1] = m * [item\ 2] + b$ . Linear rules are automatically 2 ways (*item 1* value can be calculated from *item 2* and vice versa).

**Formula rule:** Define a freestyle math expression to calculate 1 item from other items. In the formula, other items are referenced by their ID wrapped in square brackets. Formula rules are one way. In

converter template, you usually need to define a pair of formula rules to convert one unit to another and reverse.

In formula rule, you can use any combination of math operators and functions listed in the next section of this document.



## SUPPORTED OPERATORS AND FUNCTIONS IN MATH EXPRESSIONS

### Operators:

+	Addition
-	Subtraction
*	Multiplication
/	Division
^	Power
\	Modulation
!	Factory
<sup>2</sup>	Square
<sup>3</sup>	Cube
&	Bit wise AND
	Bit wise OR
#	Bit wise XOR
~	Bit wise NOT
>	Greeter than, return 0 if false, -1 if true
<	Less than, return 0 if false, -1 if true
=	Equal, return 0 if false, -1 if true

### Functions:

iif(c, x1, x2)	Return x1 if c is non-zero, x2 if c is zero
err	Return immediately and display Error
abs(x)	Return absolute of x
round(x)	Return round of x
rand	Return a random number between 0 and 1.
sqrt(n)	Square root of n
e	Return value of e constant (Euler's number)
lg(x)	Return decimal logarithm n of x
pi	Return value of pi constant
sin(x)	Return sine of x
cos(x)	Return cosine of x
tan(x)	Return tangent of x
asin(x)	Return arc sine of x
acos(x)	Return arc cosine of x
atan(x)	Return arc tangent of x
sinh(x)	Return sine hyperbolic of x
cosh(x)	Return cosine hyperbolic of x
tanh(x)	Return tangent hyperbolic of x

