Walkingdog Programmer
Users Manual
Version 1.0

Introduction

Programmer is a calculator designed by and for programmers. It features RPN entry with a 67 word stack, arithmetic and logical operations, an the ability to input and display in several bases and alternate formats.

RPN

RPN (Reverse Polish Notation) is a method of specifying operations using postfix operators. RPN was made popular by early HP calculators and many engineers and programmers prefer it to the more common infix notation. In RPN operands are pushed onto a stack and then operations are performed on the top one or more items. Most operations either operate only on the top of stack or combine the top two items in some operation. Only a few stack manipulation operations probe more deeply into the stack.

To simplify things we refer to the top three operands on the stack as X, Y, and Z. X is the top of the stack. Single operand operations like NOT simply take the current X value, apply the operation, and replace X with the new value. The depth of the stack does not change.

Dual operand operations, subtraction for instance, remove the top two operands, perform the operation, and then push the result back on to the stack. The stack has one less item after the operation than it did before the operation.

Stack operations can affect the data on the stack in various ways. It can move it around, discard it, or duplicate it. Each operation will be treated in detail in the following pages.

Simple Quickstart

RPN becomes intuitive very quickly. To push a number onto the stack simply press the number keys to enter the digits then press the ENTER key. The ENTER key serves as a delimiter for entries. A new entry will push the stack before starting.

Example: to subtract 7 from 22 the you would use the following key sequence.

2 2 ENTER 7 +

The first two keys enter the number 22. The ENTER key marks the end of the entry. The next key enters the number 7. The final '+' key performs the operation leaving only the result on the stack.

Key Reference

Number keys

Number keys are black. The number keys are used to enter numbers. Only the keys that are valid for the current display base are active. Digits greater than or equal to the current base will be ignored. The decimal point key is only used to separate fields in IP notation.

Operator keys

Operator keys are colored green. Unless otherwise stated the operands are removed from the stack before the result is pushed.

Key	Result
+	X - Y
-	Y - X
*	Y * X
÷	Y ÷ X
MOD	Y % X (remainder)
AND	Y & X
OR	Y | X
XOR	Y ^ X
NOT	~X
CHS	-X
SL	Y << X
SRA	Y >> X (extending sign)
SRL	Y >> X (zero fill)
MASK	generate a mask. A positive value of X generates that number of one bits right justified. A negative value of X generates a left justified mask.
C	Clears X to zero. A second press will clear the entire stack.

Stack Operations

Stack operation keys are tan colored. They manipulate the stack much like primitives in the Forth programming language.

Key	Operation
SWAP	X = Y, Y = X
DROP	pop X from stack and discard
ROT	X = Y, Y = Z, Z = X
PICK	push the Xth element on the stack. (0 PICK will duplicate the top)

Input and Display Modes

Display mode keys are in blue. These keys change the entry and display modes of the calculator.

Key	Result
HEX	All subsequent display will be in base 16
DEC	All subsequent display will be in base 10
OCT	All subsequent display will be in base 8
BIN	All subsequent display will be in base 2
IP	All subsequent display will be in dotted decimal. This separates the decimal value of each byte by a decimal point. Entry can be done for larger than 32 bit words, but the display is limited to 32 bits. If there are significant digits beyond 32 bits an indicator appears on the display.
ASC	The current result is displayed as ASCII characters. Non-printing characters are displayed as a backslash followed by three octal digits. Entry can not be done in ASCII mode, pressing a number key will revert the display to the previous mode.

Key	Result
WSIZE	Sets the word size used for calculations to the number of bits specified by X. X is discarded.
UNSN	Toggles signed and unsigned mode. In unsigned mode the decimal display is unsigned. Hex, Octal and Binary displays are always unsigned.