SIMPLEX R-256

Specifications &
Programming Guide

v1.2001

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Display

- 16x8 monochrome LCD
- Mapped to memory

Memory

- 256 bytes total
- Memory is addressable in 2-byte (16 bit) segments. 128 possible addresses.
- 128 bytes of PROM
- 128 bytes of read & write memory

Instructions

- 16 bits long
- 8 possible instructions

Binary	Instruction
000	Null
001	Add
010	Sub
011	Goto
100	Copy
101	CopyWord
110	JumpNextIfLessThan
111	JumpNextIfEqual

Null - 000

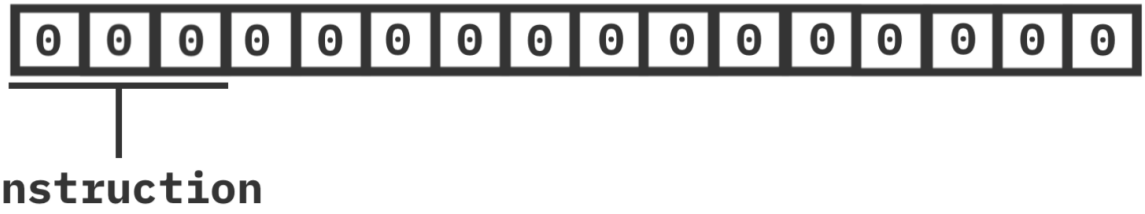
Syntax

- Null()

Description

- Does nothing

Layout



Add - 001

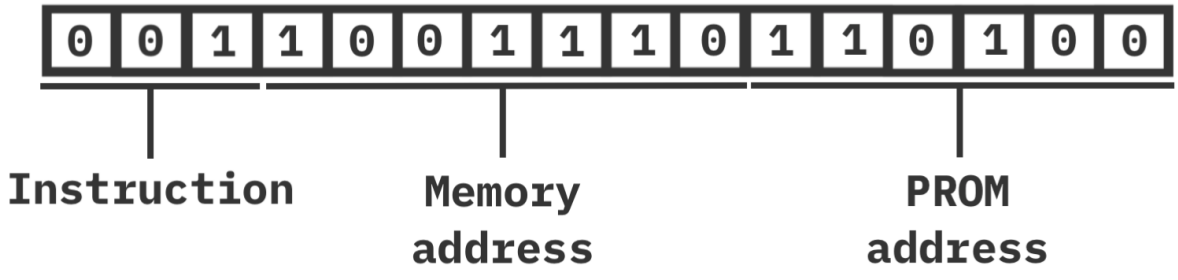
Syntax

- Add(Addr, pAddr)

Description

- Adds the contents of Addr to pAddr, and saves the result in pAddr
- In this context, Addr represents a 7-bit address referring to anything in the device memory. pAddr refers to a 6-bit address only in PROM.

Layout



Sub - 010

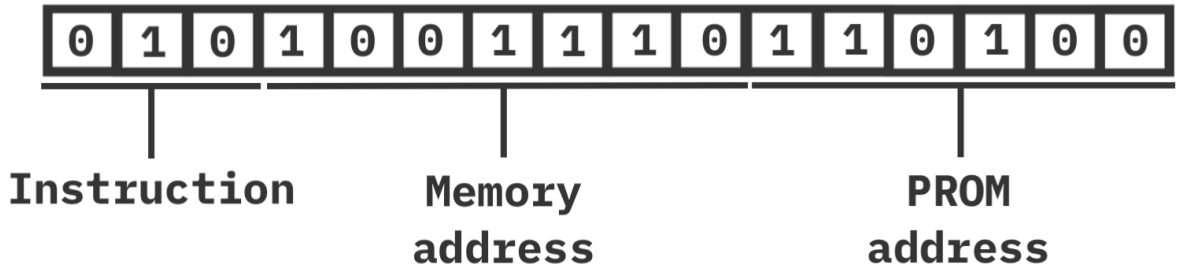
Syntax

- Sub(Addr, pAddr)

Description

- Adds the contents of Addr to pAddr, and the saves the result in pAddr.
- In this context, Addr represents a 7-bit address referring to anything in the device memory. pAddr refers to a 6-bit address only in PROM.

Layout



Goto - 011

Syntax

- Goto(pAddr)

Description

- Jumps to the specified address in PROM.

Layout

Copy - 100

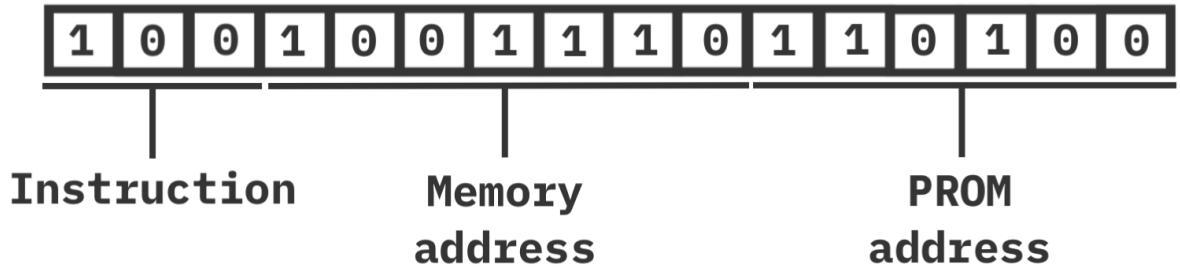
Syntax

- Copy(Addr, pAddr)

Description

- Copies the contents of an address in PROM to an address.
- In this context, Addr represents a 7-bit address referring to anything in the device memory. pAddr refers to a 6-bit address only in PROM.

Layout



CopyWord - 101

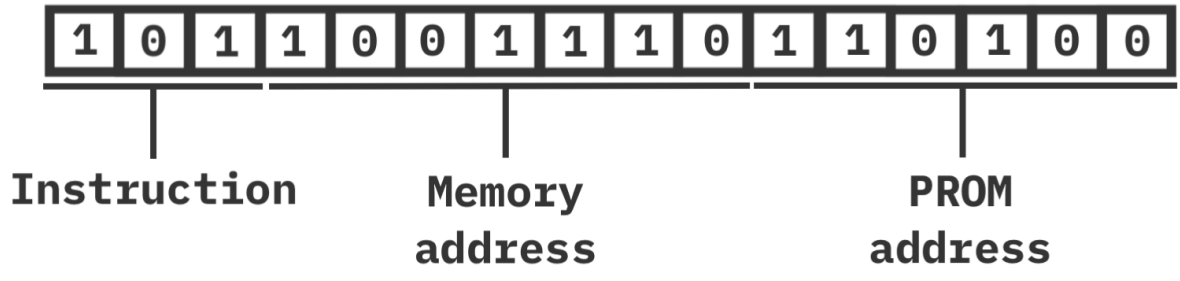
Syntax

- CopyWord(Addr, pAddr)

Description

- Copies the contents of an address, plus the next address, to an address in PROM.
- A word is 32 (4 bytes) long.
- In this context, Addr represents a 7-bit address referring to anything in the device memory. pAddr refers to a 6-bit address only in PROM.

Layout



JumpNextIfLessThan - 110

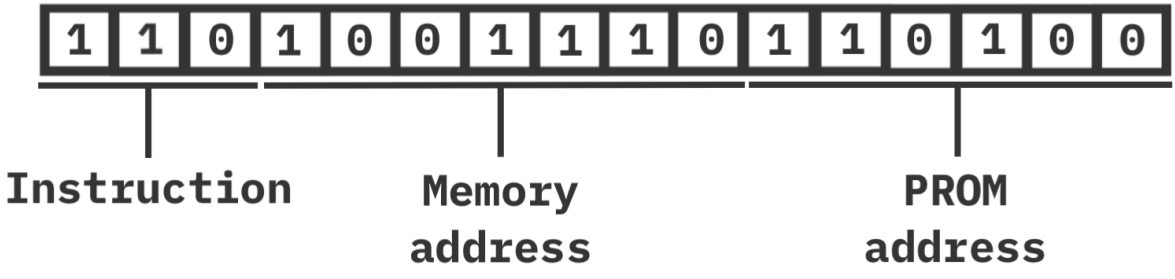
Syntax

- JumpNextIfLessThan(Addr, pAddr)

Description

- Compares the contents of Addr to pAddr. If <Addr> is less than <pAddr>, it will skip the instruction that immediately procedes it.
- In this context, Addr represents a 7-bit address referring to anything in the device memory. pAddr refers to a 6-bit address only in PROM.

Layout



JumpNextIfEqual - 111

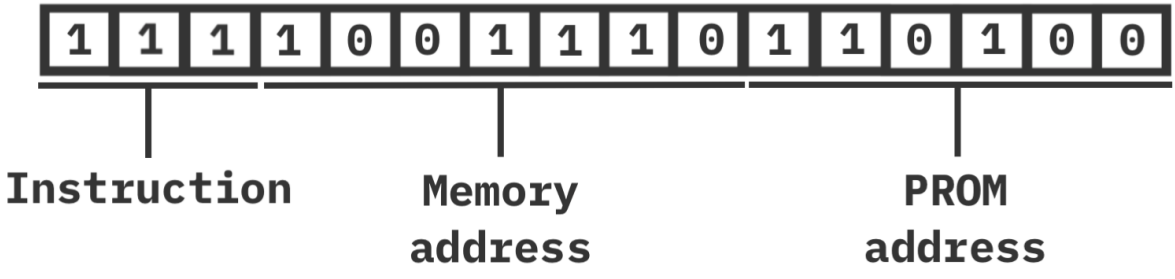
Syntax

- JumpNextIfEqual(Addr, pAddr)

Description

- Compares the contents of Addr to pAddr. If they are equal, it will skip the instruction that immediately procedes it.
- In this context, Addr represents a 7-bit address referring to anything in the device memory. pAddr refers to a 6-bit address only in PROM.

Layout



Error codes

01 - Invalid instruction length
Lines in the .prog file must be 16 bits long.

02 - Invalid program length
.prog files must have 128 lines.

03 - Integer overflow
Integers cannot exceed 65536 (2^16).

04 - Invalid instruction
Instructions must begin with 3 binary digits indicating which instruction they are.

05 - Out of bounds of memory
7-bit addresses can only access locations 0-128 in memory.

06 - Out of bounds of PROM
6-bit addresses can only access locations 0-64 (PROM).

Memory Mapping

Certain addresses are predesignated for hardware functions.

0 - 63
: Program read-only memory (PROM)

64 - 128
: Read/write dynamic variable space

115 - 118
: F1-F4 function buttons

119
: Program counter (PC)

120 - 127
: Display

  See the attached spreadsheet for how the display is mapped to memory.