J1a SwapForth Reference

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ANS Forth Compliance Label

J1a SwapForth is an ANS Forth System

Providing names from the **Core Extensions** word set

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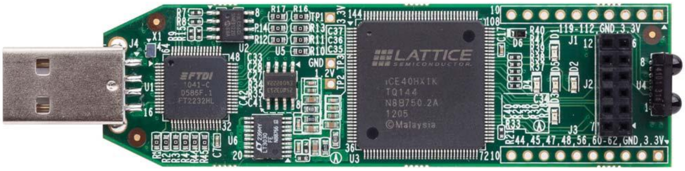
Chapter 1

Getting started



Connect to the SwapForth board using a terminal program of your choice. Set the serial parameters to:

- 115200 baud

- 8 data bits, no parity, no stop bit (often called "8N1", and often the default)

```
--------------------------------------------------------
swapForth v0.1
```

Chapter 2

Available Words

2.1 ANS Core Words

J1a SwapForth implements most, but not all, of the core ANS 94 Forth standard.

2.2 Additional Words

Chapter 3

The SwapForth Shell

3.1 Command reference

3.2 Notes on Tethered Mode

Chapter 4

Memory

4.1 RAM Types

The J1a implementation uses 8Kbytes of RAM in a split configuration.

The lower 4K is for code. This RAM is writable, and executable, but not (directly) readable. The variable `CP` (code pointer) points into this area. To read from this region, use the special word `code@`.

The upper 4K is for data. This RAM is writable and readable. The dictionary and all variables are located in this section. The variable `DP` points into this area.

4.2 Dictionary Layout

The SwapForth dictionary is a linked list; the variable `forth` holds the start of this list. Each dictionary entry contains:

- **next pointer** - address of the next dictionary entry, or zero for the last dictionary entry
- **imm** - immediate bit
- **count** - length of the name, in characters, 1-31
- **name**$_1$ **- name**$_n$ - characters in name. If the length of the name is even, then a padding byte is appended
- **xt** - execution token for the word

<table>
<tr><th>15</th><th>14</th><th>13</th><th>12</th><th>11</th><th>10</th><th>9</th><th>8</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td colspan="15">next pointer</td><td>imm</td></tr>
<tr><td colspan="8">name$_1$</td><td colspan="8">count</td></tr>
<tr><td colspan="16">...</td></tr>
<tr><td colspan="8">name$_n$</td><td colspan="8">name$_{n-1}$</td></tr>
<tr><td colspan="16">xt</td></tr>
</table>

Chapter 5

iCEstick Hardware interface

The J1a for iCEstick includes connections to the iCEstick peripherals:

- SPI flash
- LEDs
- IrDA tranceiver
- Pmod connector
- prototyping connectors
- UART

Access to peripherals is via the `io@` and `io!` words. Peripherals are port-mapped into a 16-bit IO address space.

Most ports are either read-only or write-only. For read-only ports, writing to the port has no effect. For write-only ports, reading from the port gives zero.

As an example of direct port access, this word blinks the on-board LEDs when a signal on IrDA is detected.

```
: x
  begin
    $2000 io@     \ read from input port
    8 and 0=      \ true if bit 3 (IrDA RXD) is 0
    $0004 io!     \ write to LEDS
  again
;
```

5.1 Port Map

5.1.1 $0001: Pmod data

Not yet implemented.

5.1.2 $0002: Pmod direction

Not yet implemented.

5.1.3 $0008: PIO output

Write-only port $0008 controls the flash and IrDA outputs.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
											IrDA SD	IrDA TXD	flash SCK	flash MOSI	flash CS

5.1.4 $0004: LEDs

The five on-board LEDS are controlled by write-only port at address $0004. Setting a bit to 1 lights the corresponding LED.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
											LED5	LED4	LED3	LED2	LED1

5.1.5 $1000: UART data

5.1.6 $2000: IrDA, flash and UART inputs

Read-only port $2000 contains the input signals from the IrDA receiver, SPI flash, and UART.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
												IrDA RXD	flash MISO	UART key?	UART busy