

FF3xGui

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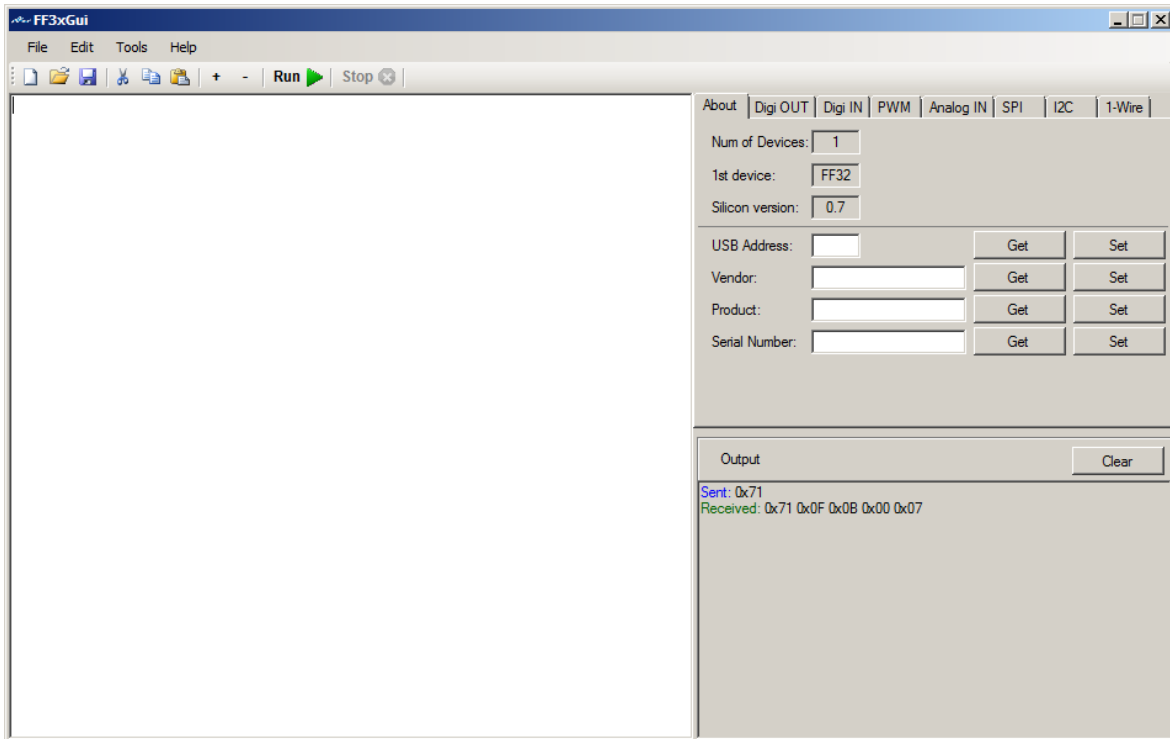
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# 1. FF32Gui

This is a GUI for Programming the FF32 chip from [FlyFish Technologies](#)

It has an editor for writing and running FF3 Script files.

The right part of the screen is for direct communication with the FF32.



## 2. The Gui

### 2.1 Menus

**File Menu ;**

**New ;** Creates a new blank file

**Open ;** Opens an existing file

**Save ;** Saves the file

**Exit ;** Exits the program

**Edit Menu ;** (right clicking in the editor window pops up this menu as well)

**Undo ;** Undo the last action in the editor

**Redo ;** Cancel the Undo action

**Cut ;** Cuts the selection in the clipboard

**Copy ;** Copies the selection to the clipboard

**Paste ;** Paste at the current cursor location

**Select All ;** Selects the entire editor window contents

**Tools Menu ;**

**Run ;** Runs the current script

**Stop ;** Stops running

**Set Font ;** Changes the Font and color of the editor window

**Create HEX File ;** Opens a new window to type hex bytes to save as a bin file, or as a hex file with HEX digits.

**Split File ;** Splits a file in multiple files of max number of bytes, small window will pop up in the editor window left above, asking for the max number of bytes in each file, numbers will be added to the original file name.

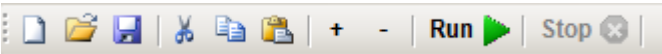
**Hex to Bin** ; Converts a file of hex digits into a binary file, only lines containing only hex digits (0-9, a-f, A-F) will be converted If a line has an odd number of characters then a zero will be inserted at the beginning of the line.  
**Intel HEX to BIN** ; Converts an Intel hex file into a binary file, data part only, addresses etc will be ignored.

**Help Menu ;**

**Help** ; Shows this help file  
**Help Index** ; Shows this help file index

## 2.2 Tools

The tools bar ;

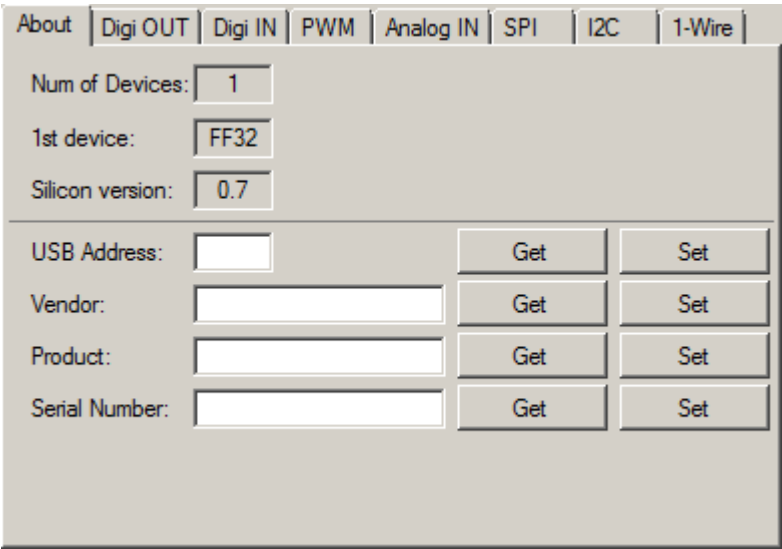


- First block is New, Open and Save
- Second block is Cut, Copy and Paste
- Third block is Zoom and Zoom out in the editor window, (makes text bigger + or smaller -)
- Fourth block is running the script.
- Last block is stopping the script

## 2.3 InterActive

The right part of the screen is the interactive part for direct communication with the FF32.  
The Output window below shows the result of the actions, the clear button clears this window.

**About ;**



Shows the number of devices connected, the 1st device and the firmware version.  
You can get and set the USB address for the device, Vendor name, Product and Serial Number.  
Can write anything you want and click on Set to Save it in the ff32

**Dig OUT ;**

AboutDigi OUTDigi INPWMAnalog INSPII2C1-Wire

Pin Name: A1Value: 0Set

Pins Block: A

Settings:

Pin	Enabled	Value
A1	<input checked="" type="checkbox"/>	1
A2	<input type="checkbox"/>	
A3	<input type="checkbox"/>	
A4	<input checked="" type="checkbox"/>	0
A5	<input type="checkbox"/>	
A6	<input checked="" type="checkbox"/>	1

Set

Here you can set pins high or low (1 or 0)  
Or set a whole block or several pins in a block (A or B) at once.  
Only the pins with Enabled checked will be affected.

Dig IN;

AboutDigi OUTDigi INPWMAnalog INSPII2C1-Wire

Pin Name: A5Value: 1Get

Pins Block: B

Settings:

Pin	Enabled	Value
B1	<input checked="" type="checkbox"/>	1
B2	<input type="checkbox"/>	
B3	<input checked="" type="checkbox"/>	1
B4	<input type="checkbox"/>	
B5	<input type="checkbox"/>	
B6	<input checked="" type="checkbox"/>	0

Get

Read the value, low or high from a pin or read more pins from a block or a whole block.  
Only pins with Enabled set will be read.

PWM;

AboutDigi OUTDigi INPWMAnalog INSPII2C1-Wire

Pin: A1

50%

Set

Pin: A2

50%

Set

Pin: A3

50%

Set

Pin: A4

50%

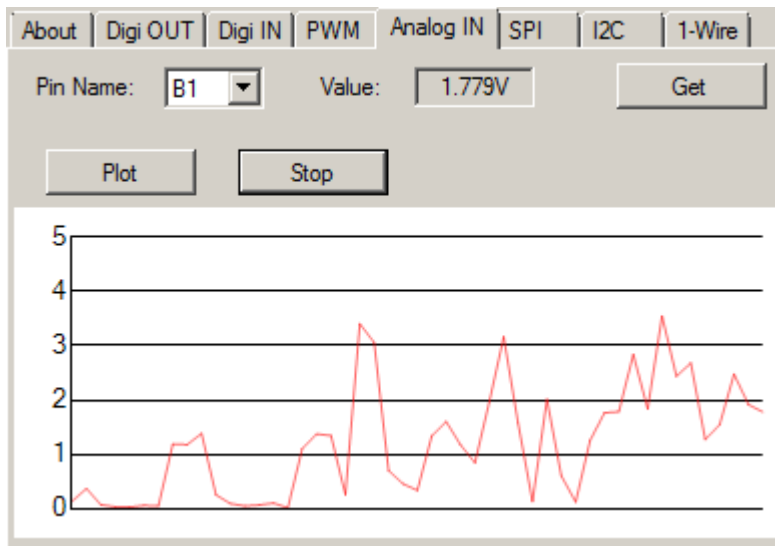
Set

Stop All

Set All

Sets one to 4 of the A block pins as PWM, from 0 to 100%  
Stop All will set all 4 to 0%, Set All will set all 4 pins at once with the specified %

Analog IN;



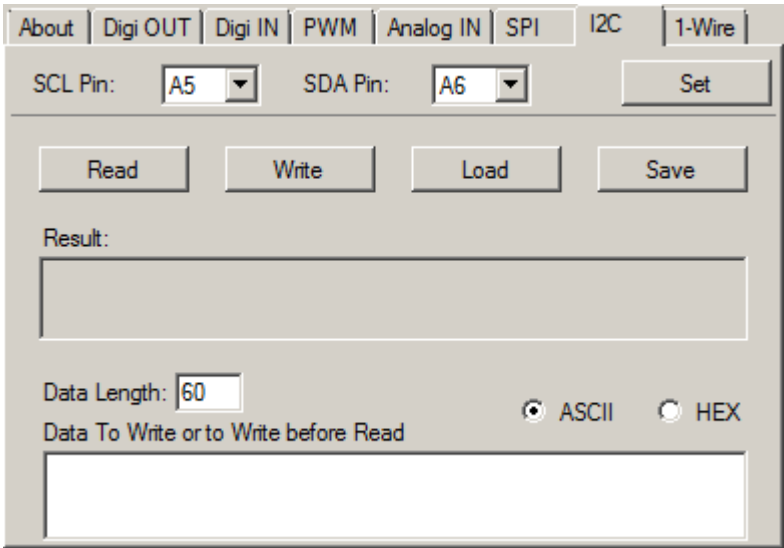
Gets the Analog input from one of the B pins.  
Plot will start sampling the pin and plots a graphical (Simple Scope)  
Stop, stops sampling and plotting.

### SPI;

The screenshot shows the 'SPI' tab of the FF3xGui software. At the top, there are tabs for 'About', 'Digi OUT', 'Digi IN', 'PWM', 'Analog IN', 'SPI', 'I2C', and '1-Wire'. Below the tabs, there are four pin selection fields: 'CS Pin:' (A1), 'SCK Pin:' (A2), 'MOSI Pin:' (A3), and 'MISO Pin:' (A4). There is a 'Set' button. Below these, there are four buttons: 'Read', 'Write', 'Load', and 'Save'. Below these buttons, there is a 'Result:' label and a text area. Below the text area, there is a 'Data Length:' field set to '60'. Below this, there is a label 'Data To Write or to Write before Read' and two radio buttons: 'ASCII' (selected) and 'HEX'. Below the radio buttons, there is a text area.

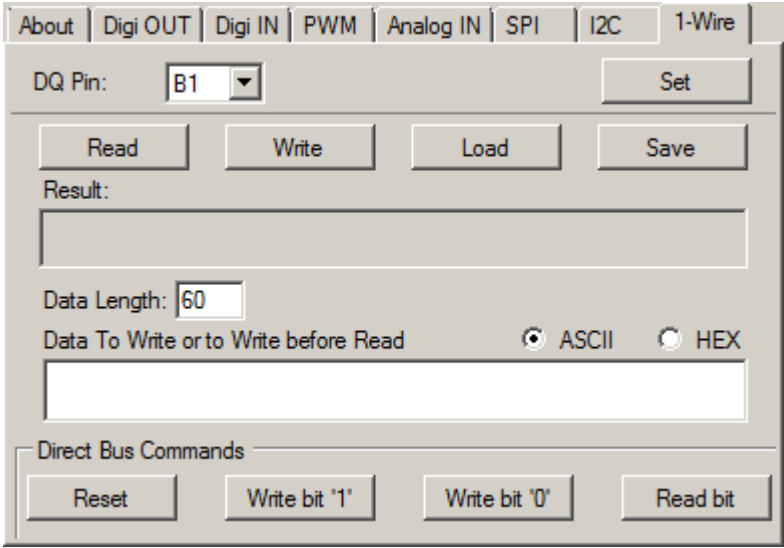
For SPI serial communication.  
First Set the pins to use for CS, SCK, MOSI and MISO.  
Read will read the SPI port (Data Length bytes), if there is data in the Data to Write or Write before Read part  
Then this data will be send out before the read starts  
Write will write out the data in the Data to Write or Write before Read part  
Load will load a file in the Data to Write or Write before Read part (max 60 bytes)  
Save will save the Data to Write or Write before Read part to disk  
Data length is the max number of bytes to read. (max 60 bytes)  
ASCII or HEX can be set to set the Data to Write or Write before Read part in ASCII or HEX mode.  
Type only HEX Digits in hex mode or data might be lost.

### I2C;



For I2C serial communication.  
First Set the pins to use for SCL and SDA  
Read will read the I2C port (Data Length bytes), if there is data in the Data to Write or Write before Read part  
Then this data will be send out before the read starts  
Write will write out the data in the Data to Write or Write before Read part  
Load will load a file in the Data to Write or Write before Read part (max 60 bytes)  
Save will save the Data to Write or Write before Read part to disk  
Data length is the max number of bytes to read. (max 60 bytes)  
ASCII or HEX can be set to set the Data to Write or Write before Read part in ASCII or HEX mode.  
Type only HEX Digits in hex mode or data might be lost.

**1-Wire;**



For 1Wire serial communication.  
First Set the pin to use for DQ  
Read will read the 1Wire port (Data Length bytes), if there is data in the Data to Write or Write before Read part  
Then this data will be send out before the read starts  
Write will write out the data in the Data to Write or Write before Read part  
Load will load a file in the Data to Write or Write before Read part (max 60 bytes)  
Save will save the Data to Write or Write before Read part to disk  
Data length is the max number of bytes to read. (max 60 bytes)  
ASCII or HEX can be set to set the Data to Write or Write before Read part in ASCII or HEX mode.  
Type only HEX Digits in hex mode or data might be lost.  
Reset will reset the port  
Write bit 1, writes a 1, Write bit 0 writes a 0 and read bit reads one bit.

## 3. Scripting

### 3.1 Introduction

FF32 Scripting is a simple scripting language to control all the ff32 functions.

It can control all the pins, as well as analog in, PWM, SPI, I2C and 1Wire

A blinking LED script looks like this;

```
do
a1 = 1
sleep
a1=0
sleep
loop
```

This will blink a LED on pin A1 every second

### 3.2 Expressions

These are just numbers and calculations

Numbers can be entered as decimal, hex and binary

Hex numbers Start with an x, like xBA4C

Binary numbers starts with an n like n1001101

Valid numbers are ; 1234545, x23FDE, xfde34, n11001, X45F, N1101 etc.

Negative numbers like -23 are not allowed, because you work with bytes most and so is xFF 255 or -1, so it will always be 255

Calculations can result in negative numbers, like 1-2 results in -1, and they can be stored in the S variables, but when used they will be converted to positive with many of the commands that use bytes.

#### Calculations

There are a few math calculations;

- + Plus, adding
- minus, subtraction
- \* Multiply
- / Division
- % Mod
- ^ Power
- & Bitwise And
- | Bitwise Or

Valid numerical calculations are ; 12 + 56 / 7, xFF \* 3, n101 + xB, n11 ^ 2, nFF & 3 | A1 etc. (A1 is pin A1 on the FF32)

#### String Expressions

String expressions consist of strings and/or numeric expressions, separated by a , (comma)

String go between "

"Hello ",1234," world" will give a string as 'Hello 1234 World'

"hello ",xBAB will result in 'Hello 2987'

"Port A1 is ; ",A1 will give 'Port A1 is ; <value of port A1, 1 or 0>'

"abc", 5 \* 10 , "def" will be 'abc50def'



## HEX Strings

Hex digits can be entered between [] like [a34bc3f] or [34DEF6CD]

These are separate strings and cannot be used in calculations and string expressions

Internally they are converted to binary when used, when the length is odd, a zero will be inserted at front.

## Compare Expressions (Conditions)

A comparison consists of 2 numeric expressions and one compare instruction between {} like {5 = 6}

They return false or true and can only be used with the IF and LOOP UNTIL commands

Only 3 compare instructions are available;

- = Equal (if is the same)
- < Less than (if smaller)
- > Greater than (if bigger)

Some examples are; (A1=1) (34 > 67) (3\*6+1 = 56) etc.

# 3.3 Variables

Most imported are the port pins as variables, these are A1 .. A6 and B1 .. B12

These are 1 bit variables, are only 1 or 0, they can be set like A1=<numeric expression>

When the result of the numeric expression is not 1 or zero, then it will be compared to the half of the voltage, so when powered with 5 volts, the pin will be set to zero if the result is below 2.5, when the power is 3.3 volt, then zero is below 1.5

When used in expressions, they will return the state of the pin, always 1 or 0.

Examples ;

```
A1=0
B10 = 1
a3 = a3 | a1
b12 = 5 * 6
```

Then there are 2 special block variables, AB and BB, they set or read a whole block.

When set they need 2 numeric expressions, the mask and the data, when read they need only the mask.

Like AB=<mask> <data> Ports where the mask is 0 will not be affected.

Examples ;

AB = 3 1	Will set A1 to 1 and A2 to zero
BB = n101 n100	Will set B3 to one and B1 to zero
BBn1010	Will return the pins of B2 and B4, when both are low it returns zero, when both are high it returns 10 (decimal)

Then there are 12 analog pin variables, BA1 .. BA12, they are read only and return the voltage from the pin.

Examples ;

BA10	Returns the voltage on pin B10
ba9 * 10	Returns the voltage on pin B9 multiplied by 10
BA1 / 100	Returns the voltage from pin 1 divided by 100

There are 9 predefined (double) variables, S1 .. S9

They can be written and read and can contain negative numbers as well as result of an

expression.

But -1 be converted to 1 when used as byte and not 255

Examples ;

```
S4 = 12.7
s1 = 5 / 2
S2 = S1 * S4
```

Then there are 4 buffers of 60 bytes, Buffa .. Buffb

They can be filled with a string expression or with a HEX string.  
They can be used in string expressions as well.

And they can be accessed by index like BUFFA(4)

Examples ;

```
BUFFA = [45def45ab]
buffb = "Port B12 is ; ",b12
Buffd = "Buffa = ",buffa
buffa(5)=12
BUFFD(4) = BUFFA(5)
```

And then there is a read only variable V, which contains the power, 5 or 3.3

## 3.4 Commands

Case don't matter, can be uppercase or lowercase or combination.

' is the remark symbol, a line beginning with ' will be ignored.

Commands are ;

**WRITE** (filename) BUFFx

Writes a buffer, BUFFA .. BUFFD, to a file (filename)

Filename can be a string expression as well

```
write (test.txt) buffa
```

```
write ("test",s1,".txt") buffb
```

**READ** (filename) BUFFx

Reads a file into a buffer, BUFFA .. BUFFD

Filename can be a string expression as well

If the file exists it reads max 60 bytes

```
read (test.txt) buffa
```

```
read ("test",s1,".txt") buffb
```

**PRINT** <D/S/X/N> (string expression) or (numeric expression)

Prints a string expression or numeric expression to the output screen on the right below.

<D/S/X/N> is optional, only one of them, no combinations

If D then it will force to print decimal > print d 5 \* 10 > 50

If S it will force to print as a string > print s "hello world" > hello world

If X it will force to print as HEX > print x 255 > FF

if N Then it will print the result as binary > print n xa > 1010

Default is decimal or string, depending on the expression to print.

**SLEEP** <numeric expression>

Sleeps for 1 second default, or when numeric expression is present, it sleeps for the result of the expression in milliseconds.

sleep > sleeps one second

sleep 500 > sleeps 500 milliseconds

**WAIT** pin= 0/1 <numeric expression>

wait (sleeps) until the pin goes high or low, numeric expression is optimal en is the max milliseconds to wait.

wait b1 = 0 > waits until pin b1 becomes zero.

wait a1 = 1 500 > waits until pin a1 goes high or 500 milliseconds, whatever comes first.

**PWM** pinA numeric expression

Sets the PWM on one of the A pins (A1 .. A6)

Numeric expression is the percentage (0 .. 100%)

Greater than 100 will always be 100

pwm a2 50 . sets PWM on a2 at 50%

pwm a1 50 / 2 > sets PWM on pin a1 at 25%

**SPI SET** pin1 pin2 pin3 pin4 (CS,SCK,MOSI,MISO)

Sets the pins used for SPI, can be any pin (A1 .. A6, B1 .. B12)

pin1 - CS, pin2 - SCK, pin3 - MOSI and pin4 - MISO

spi set a1 a2 a3 a4 > sets SPI pins (a1 .. a4) resp (CS,SCK,MOSI,MISO)

**SPI WRITE** (string expression) or (HEX String)

Writes the string expression or hex string (max 60 bytes) to the SPI port

spi write "hello world" > sends hello world out on SPI

spi write [f3ad56eb] > writes an hex string to the SPI port as binary

**SPI READ** len BUFFx <(string expression) or (HEX String)>

Reads len number of bytes from SPI in one of the buffers (BUFFA .. BUFFD)

len is a numeric expression max 60 If higher it will be 60

When the string expression or hex string is present, then this will be written before reading (max 60 bytes)

spi read 10 buffa > reads 10 bytes from SPI in buffa

spi read 20 buffb "hello" > writes hello to SPI and then reads 20 bytes in buffb

spi read 60 buffc [abcdef09] > writes the hex string as binary to SPI and then reads 60 bytes in buffc

**I2C SET** pin1 pin2 (SCL,SDA)

Sets the pins used for I2C, can be any pin (A1 .. A6, B1 .. B12)

pin1 - SCL and pin2 - SDA

i2c set a1 a2 > sets SPI pins (a1 .. a2) resp (SCL,SDA)

**I2C WRITE** (string expression) or (HEX String)

Writes the string expression or hex string (max 60 bytes) to the I2C port

i2c write "hello world" > sends hello world out on I2C

i2c write [f3ad56eb] > writes an hex string to the I2C port as binary

**I2C READ** len BUFFx <(string expression) or (HEX String)>

Reads len number of bytes from I2C in one of the buffers (BUFFA .. BUFFD)

len is a numeric expression max 60 If higher it will be 60

When the string expression or hex string is present, then this will be written before reading (max 60 bytes)

i2c read 10 buffa > reads 10 bytes from I2C in buffa

i2c read 20 buffb "hello" > writes hello to I2C and then reads 20 bytes in buffb

i2c read 60 buffc [abcdef09] > writes the hex string as binary to I2C and then reads 60 bytes in buffc

**1WIRE SET** pin

Sets the pin used for 1Wire (DQ), can be any pin (A1 .. A6, B1 .. B12)

1wire set b1 > sets b1 to be uses as DQ pin for 1Wire

**1WIRE WRITE** (string expression) or (HEX String)

Writes the string expression or hex string (max 60 bytes) to the 1Wire port

1wire write "hello world" > sends hello world out on 1Wire

1wire write [f3ad56eb] > writes an hex string to the 1Wire port as binary

**1WIRE WRITEB** numeric expression

Writes one bit (1 or 0) out to the 1Wire port

When the result of the numeric expression is not 1 or zero, then it will be compared to the half of the voltage, so when powered with 5 volts, the pin will be set to zero if the result is below 2.5, when the power is 3.3 volt, then zero is below 1.5

1wire writeb 0 > send a zero out to 1Wire

**1WIRE READ** len BUFFx <(string expression) or (HEX String)>

Reads len number of bytes from 1Wire in one of the buffers (BUFFA .. BUFFD)

len is a numeric expression max 60 If higher it will be 60

When the string expression or hex string is present, then this will be written before reading (max 60 bytes)

1wire read 10 buffa > reads 10 bytes from 1Wire in buffa

1wire read 20 buffb "hello" > writes hello to 1Wire and then reads 20 bytes in buffb

1wire read 60 buffc [abcdef09] > writes the hex string as binary to 1Wire and then reads 60 bytes in buffc

**1WIRE READB** Sx

Reads one bit (0 or 1) from the 1Wire port in a Sx variable (S1 .. S9)

1wire readb s3 > reads one bit from the one wire port in s3

**1WIRE RESET**

Resets the 1Wire port

**IF** {compare expression} statement

The statement will be executed when the compare expression returns true

if {a1 =0} print "A1 is low" > will print A1 is low when pin a1 is 0

if {a1 =1} print "A1 is high" > will print A1 is high when pin a1 is 1

**DO**

Starts a loop, defines where a loop jumps back to, if there is no LOOP, it will just do nothing.

do > Defines the do location

**LOOP** <numeric expression>

End of a loop, jumps back to just after the DO

When numeric expression is present then it will jump result of expression times.

loop > jumps back to the line after DO

loop 10 > loops 10 times. and then continues with the following lines

**LOOP UNTIL** {compare expression}

Loops back to DO when the compare expression returns false

loop until {a3 = 0} Jumps back to the line after DO when pin a3 is 1, else it just continues.

**Nested loops are not implemented, LOOP will jump back to the last encountered DO**

**END**

If used inside a loop, it will end the loop and jump to the line after the loop

if used outside a loop it will end (stops) the script.

## 4. Examples

### 4.1 Blinky

Connect a LED on A1 and on A2 with a resistor, a pull up resistor and a switch to gnd on B1

Run this script and the leds start blinking until you push the switch.

< EM>

*' blink 2 LEDs on A1 and A2 until B1 = 1*

*do*

*a1=1*

*a2=0*

*sleep*

*a1=0*

*a2=1*

*sleep*

*loop until {b1= 1}*

### 4.2 Temperture

Reads the temperature from a DS18B20 by 1wire on pin B1.

It keeps looping, so press stop to stop it

*' reads temp from 1wire device DS18B20 on pin B1*

*s2 = 1-2*

*1wire set b1*

*do*

*1wire write [cc44]*

*sleep*

*1wire read 9 buffa [ccbe]*

*s1 = buffa(1)) \* 256 + buffa(0)*

*if {buffa(1) > 127} s1 = 65536 - s1*

*s1 = s1 / 16*

```
if {buffa(1) > 127} s1 = s1 * s2  
print s1  
loop
```

## 4.3 Servo

*This controls a servo via pin B1 with a potentiometer, The servo sits on pin A1*

```
' control a servo on pin A1 with a potentiometer on B1  
do  
s2 = 100 / v  
s1 = ba1 * s2  
pwm a1 s1  
loop
```