1 Debugging and ATMELStudio

https://www.youtube.com/watch?v=wQZKWgnmvQ8

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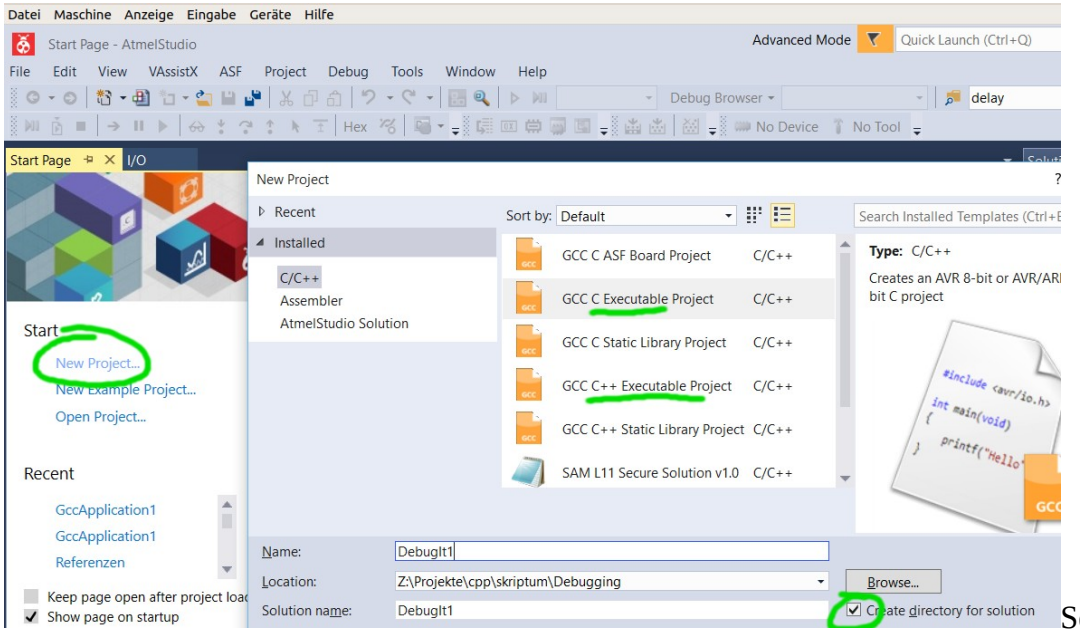
1.1 Video Tutorial

{TEXTBOX:video}

1.2 New Project

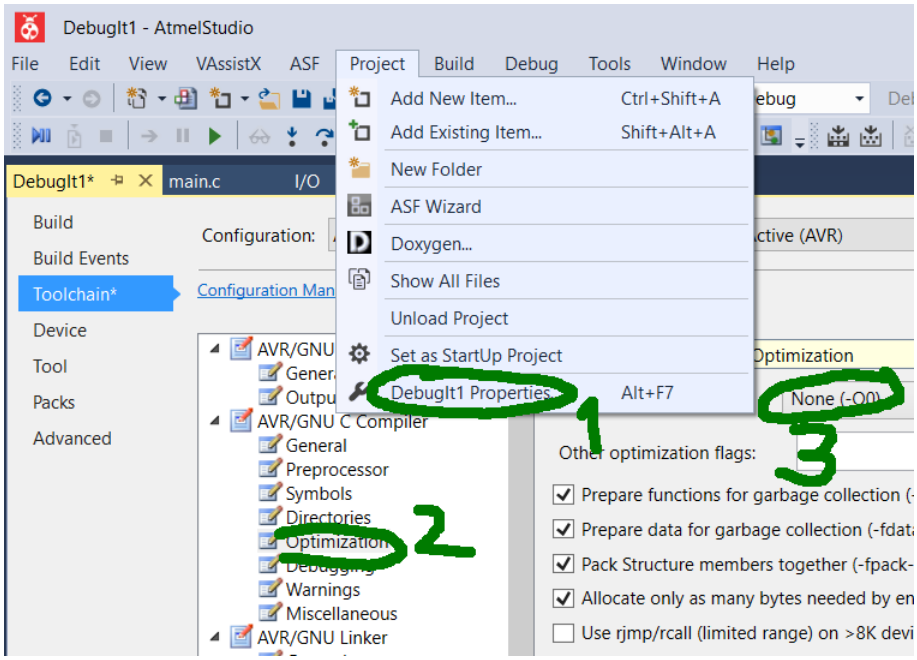


Select your Processor (e.g. Atmega328p)

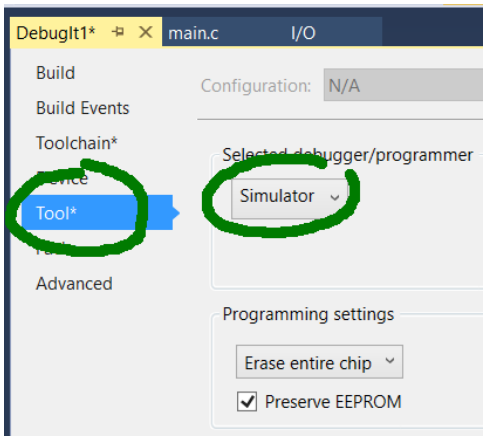
Properties

Menu //Project/Properties

Toolchain



Simulator



1.3 Debug Windows

Watch

Shows Variables, Add Watch to control value and address
Edit in Watch Window to output in various formats e.g. PINB,d to display char* text1 = "Hallo";
use text1, s in Watch window

`Val, formatString`

Format Specifier for values

The following tables show the format specifiers recognized by the debugger.

Table 1. Debug Format Specifiers for Values

Specifier	Format	Expression	Value Displayed
d,i	Signed decimal integer	0xF000F065, d	-268373915
u	Unsigned decimal integer	0x0065, u	101
b	Unsigned binary number	0xaa,b2	0b10101010
o	Unsigned octal integer	0xF065, o	0170145
x,X	Hexadecimal integer	61541, x	0x0000F065
1,2,4,8	As a suffix specifying number of bytes for: d, i, u, o, x, X.	00406042,x2	0x0c22
s	String	0x2000, s	'Hello World'
f	Signed floating point	(3./2.), f	1.500000
e	Signed scientific notation	(3./2.), e	1.500000e+000
g	Signed floating point or signed scientific notation, whichever is shorter	(3./2.), g	1.5
c	Single character	0x0065, c	101 'e'

IO

Shows IO Devices
Add multiple IO devices by CTRL+Click

Processor Status

Shows Registers and Processor Cycles/Stopwatch
Dialog to control simulation clock frequency
Reset stopwatch/cycle counter (right click)

Memory

Display and Edit Memory Content

Disassembly

Display OpCode

1.4 Debug Commands

- Run
  run to next break point

- Step Over
  step functions as one line of code
- Step Into
  step into functions
- Step Out
  step one level up
- Reset
  like hardware reset
- Break
  break to later continue
- Stop
  stop simulation (source code changed)

1.5 Breakpoints and Tracepoints

Breakpoint

Start Debugging and Break
Breakpoint/Insert Breakpoint/Toggle Breakpoint or Double Click on left gray window frame

Conditional Breakpoint

set a condition and display a message when breakpoint was hit
stop execution

Tracepoint

set a message when tracepoint was hit
continue execution; needed to trace program execution (wherever I've been)

Data Breakpoint

use a static variable (heap address) and monitor its state; control number of hits of this breakpoint by right click on the databreakpoint

1.6 Stimulifile

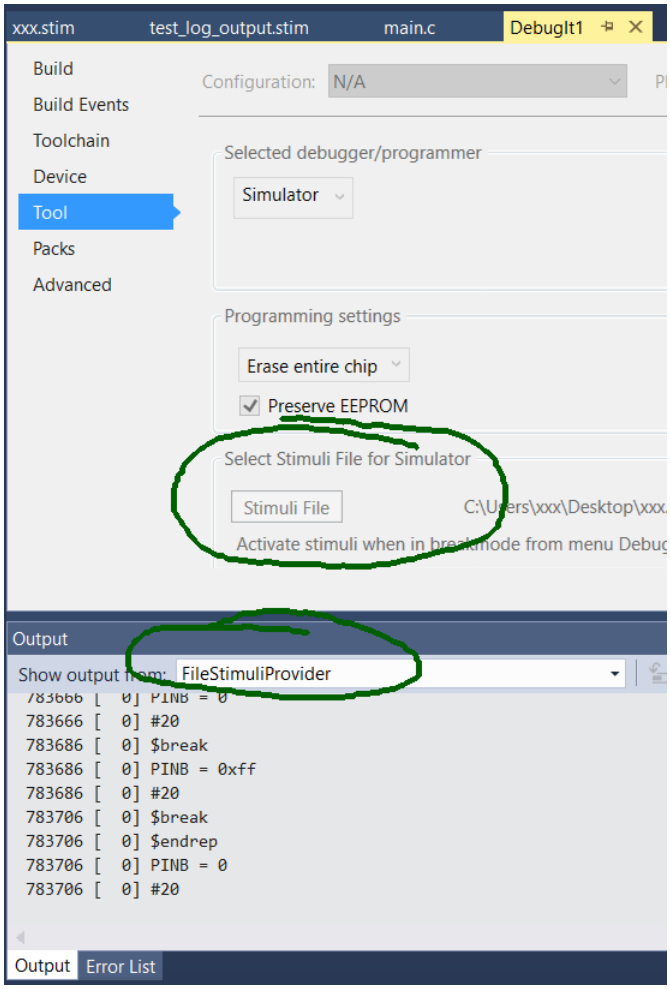
A stimuli file (name.stim) is used to change PIN inputs, log information und stop execution automatically.

Set Stimulus File and execute it

1. Set Stimulus File in Project/Preferences

2. //Debug/Start Debugging and Break

3. //Debug/Execute Stimulifile



Stimulifile example

Example 1

//sets port B, waits 20 cycle and stops execution – resum it

```
$repeat 2000000
    PINB = 0
    #20
      $break
    PINB = 0xff
    #20
      $break
$endrep
```

Example 2

write a **logfile**

```
$log PORTB
$log PINB
$log SP
$startlog logfile.stim
$reset
```

```
PINB = 0x55
#10
PORTB = 0x99
#10
$break
PORTB |= 0xFF
#10
$stoplog
$break
```

1.7 Conditional Compiling

Another method for debugging is the use of a display/serial port and conditional compiling. The symbol DEBUG is set automatically when in Debug perspective.

```
#ifdef DEBUG
    Serial.write(x);
#endif
```