Programming the butterfly for idiots like me

Ajb 10/11/03

This is how I programmed the butterfly for the first time. I MAKE NO GARENTEES, NOR DO I ASSUME ANY LIABILITIES, USE THIS GUIDE AT YOUR OWN RISK, this is just how I did it.

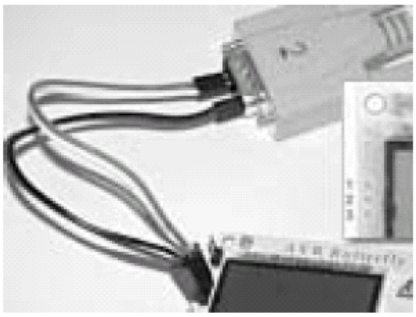
Please send pleasant comments and suggestions to aboehnlein@yahoo.com, and unpleasant ones to /dev/null

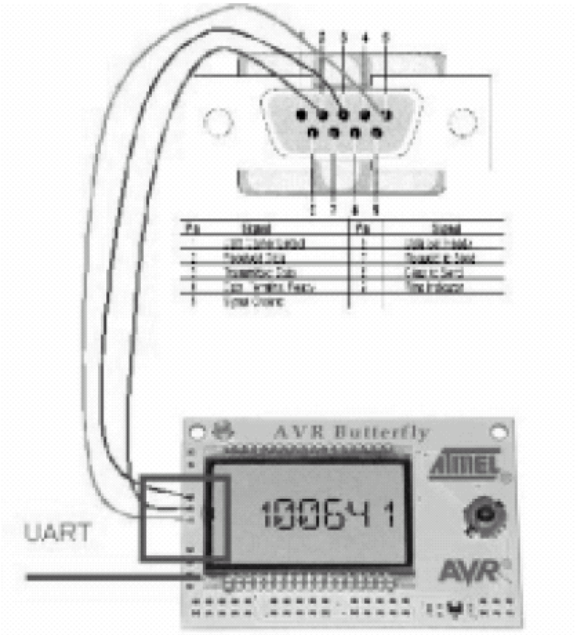
First, you need a communication cable:

Table 3-1. UART

AVR Butterfly UART	COM2
Pin 1 (RXD)	Pin 3
Pin 2 (TXD)	Pin 2
Pin 3 (GND)	Pin 5

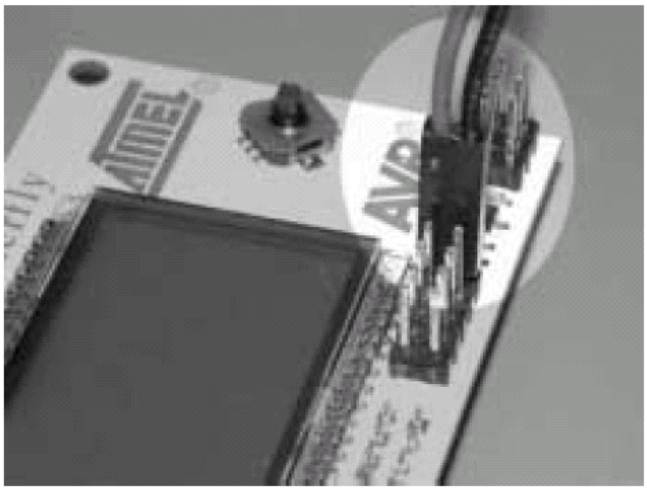
Figure 3-17. UART Connector





And a Power Cable:

Figure 3-10. External Power

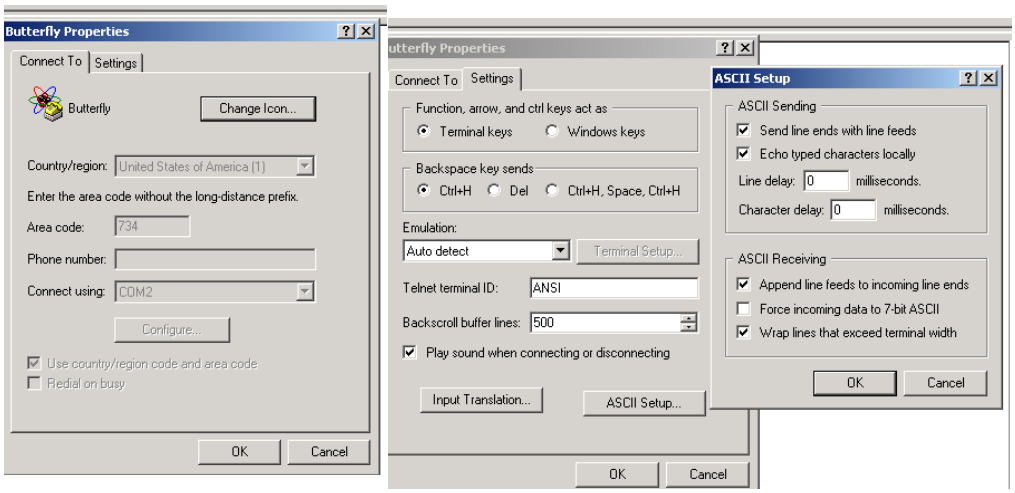


External power can be applied at pin 9 and 10 at both PORTB and PORTD, see *Figure 3-7* for the pinout.

Now test your connection to the Butterfly:

From: http://www.atmel.com/dyn/resources/prod_documents/doc4271.pdf

AVR Butterfly Evaluation Kit User Guide



Entering Your Name Using a Terminal:

Note: my computer uses com2 for this, yours may be different:

Connect a serial cable from the PC to the AVR Butterfly as described in Section 3.7 “Connect to PC”, Open a terminal on your PC (e.g. HyperTerminal) and configure the terminal to **19200 Baudrate**, **8 Databits**, **none Parity** and **one stop bit**.

Press the joystick up (“SCROLL UP”) to wake the AVR Butterfly. If “AVR BUTTERFLY” is notscrolling over the display, press the joystick to the left (“EXIT

SUB-MENU") until it does.

Press the joystick down ("SCROLL DOWN") three times, so the string "NAME" is displayed.

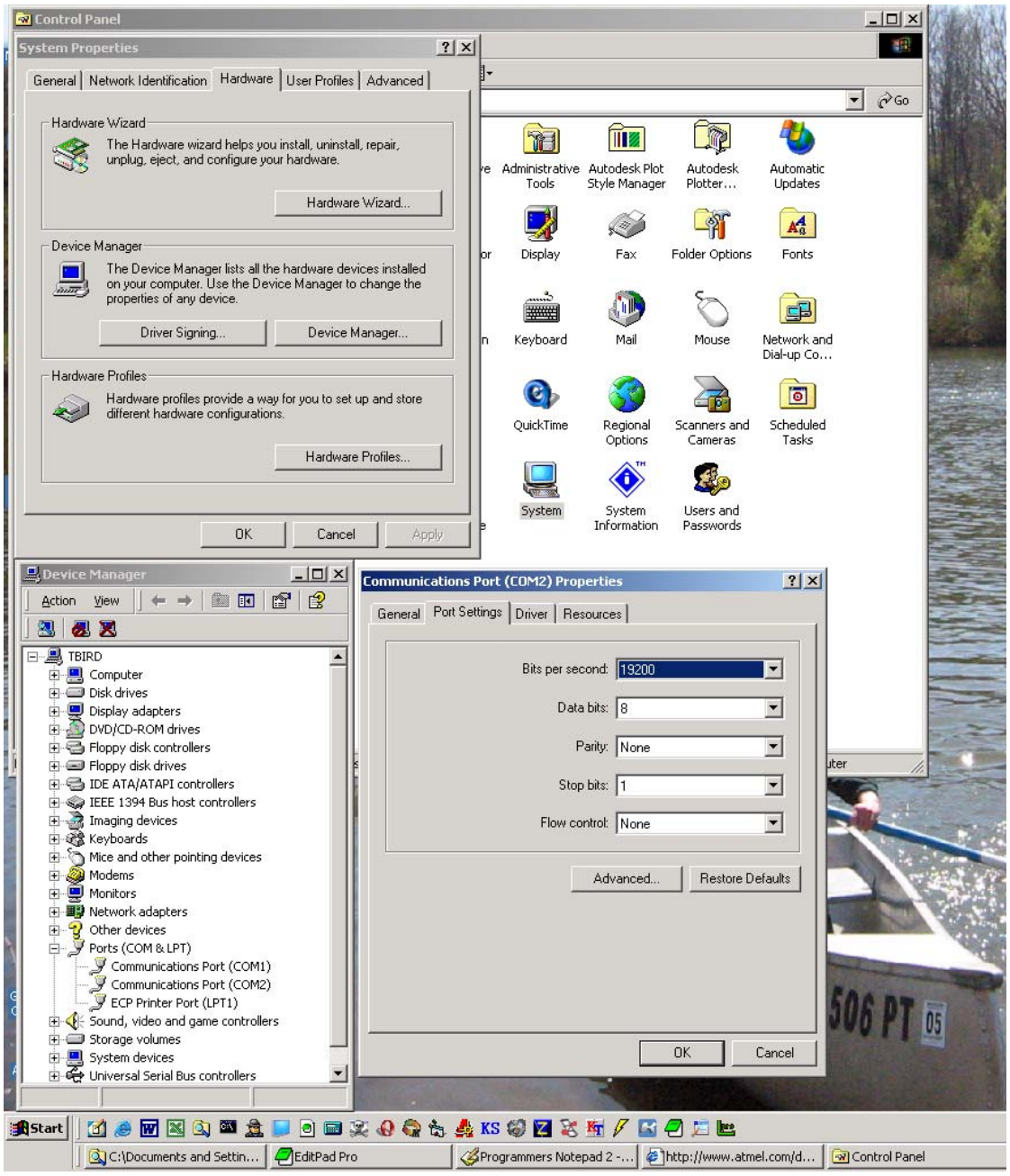
Press the joystick to the right ("ENTER SUB-MENU"). If this is the first time a name is entered, the string "ENTER NAME" will be displayed, otherwise the name already entered will be displayed and you have to press the joystick to the right ("ENTER SUB-MENU") once more.

When the "ENTER NAME" is displayed press the joystick down ("SCROLL DOWN"), and "DOWNLOAD NAME" will be displayed
4. Press **center push** ("ENTER") to activate the UART, and the text "WAITING FOR INPUT ON RS232" will be displayed.

. Type your name in the terminal window on the PC (up to 25 characters) and save the name by pressing enter on your PC-keyboard. The name you typed should now be displayed in the AVR Butterfly display.

Note: The Auto Power Off feature is default enabled. It will turn off the LCD after default 30 minutes. This timeout can be changed or turned off. To wake the AVR Butterfly from SLEEP, press the joystick in the UP-position.

Set the port using start-/-settings-/-system-/-communications port (com2)-/-port settings



To program the butterfly, first

Get the application code:

Now it’s time to get some code.

Go to: http://www.siwawi.arubi.uni-kl.de/avr_projects/

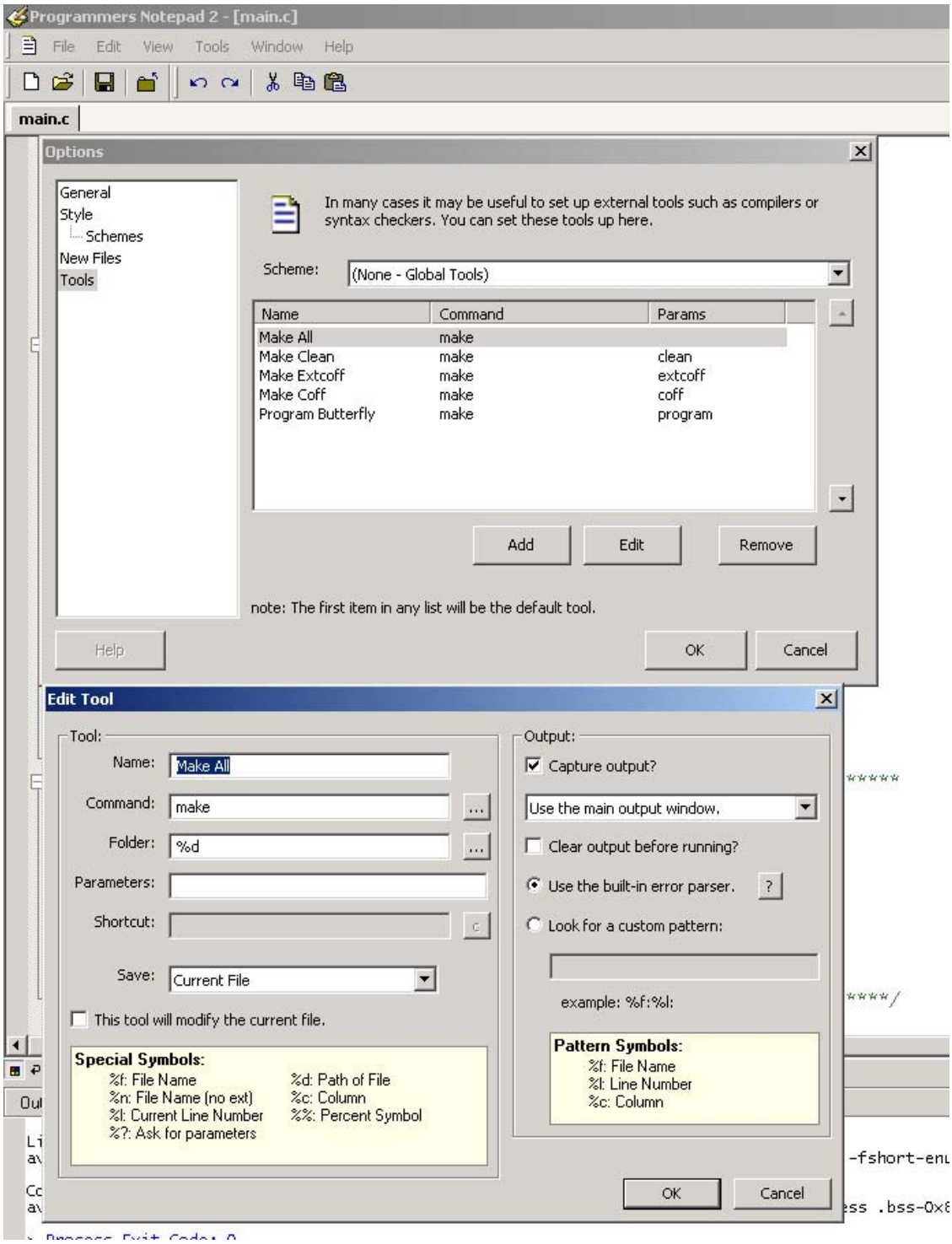
Look for something like this….

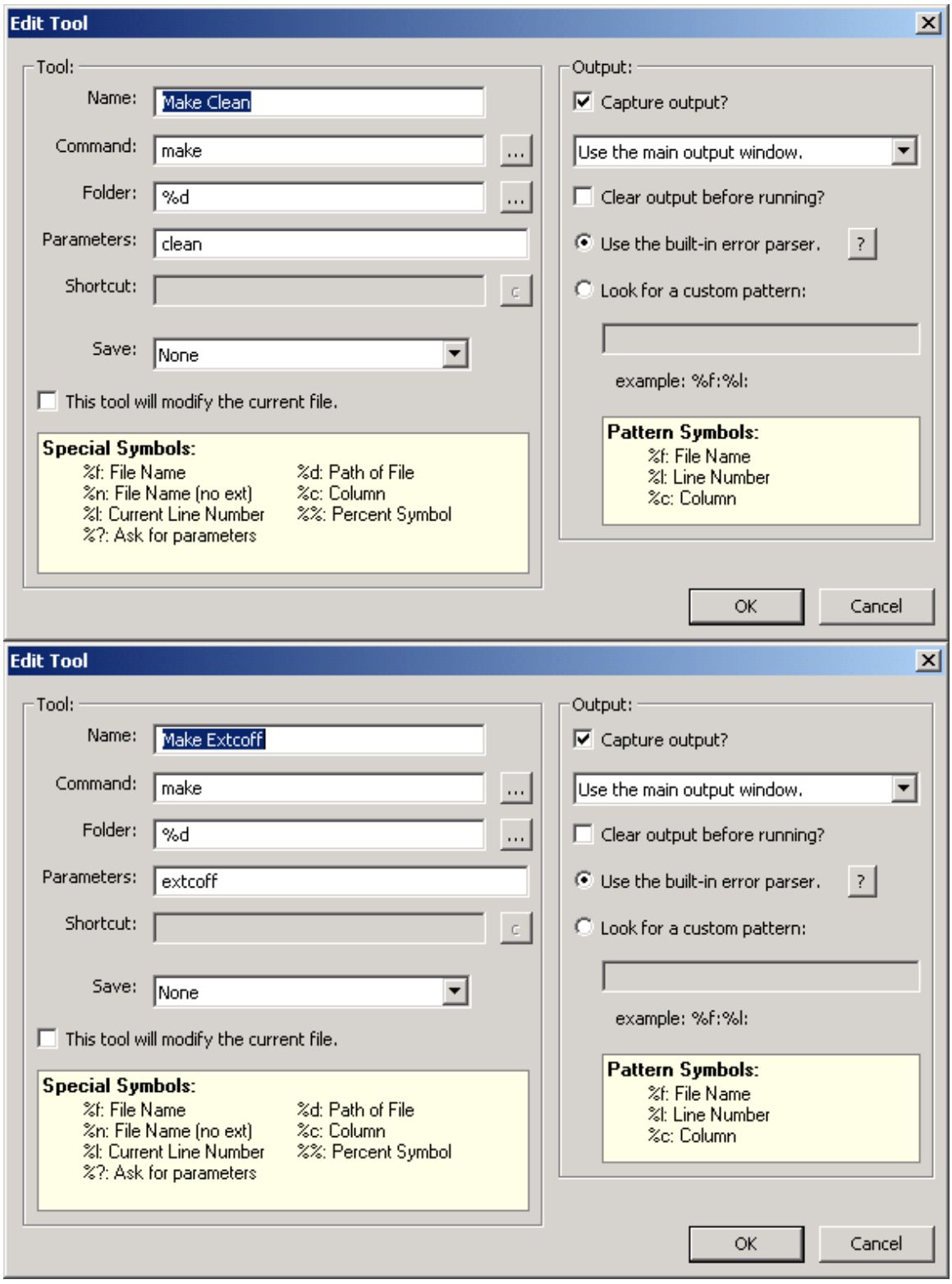
- With this acceptance the complete code (including dataflash.c/.h) is available now: Download the Source-Archive (0.6.3/20031016) (zip-format, Version 0.6.3, timestamp 20031016). I volunteer to maintain the code for a while. If you have suggestions or bug-reports feel free to send them. The code will be published at AVRFREAKS after a period of "public-"testing.
- 29.10.2003 No bug reports. Please use the latest version of the tool chain (avr-gcc 3.3.1 or newer, avr-libc 1.0 or newer, winavr Sept. 2003 or newer) to compile and link the code. Older versions will cause problems.

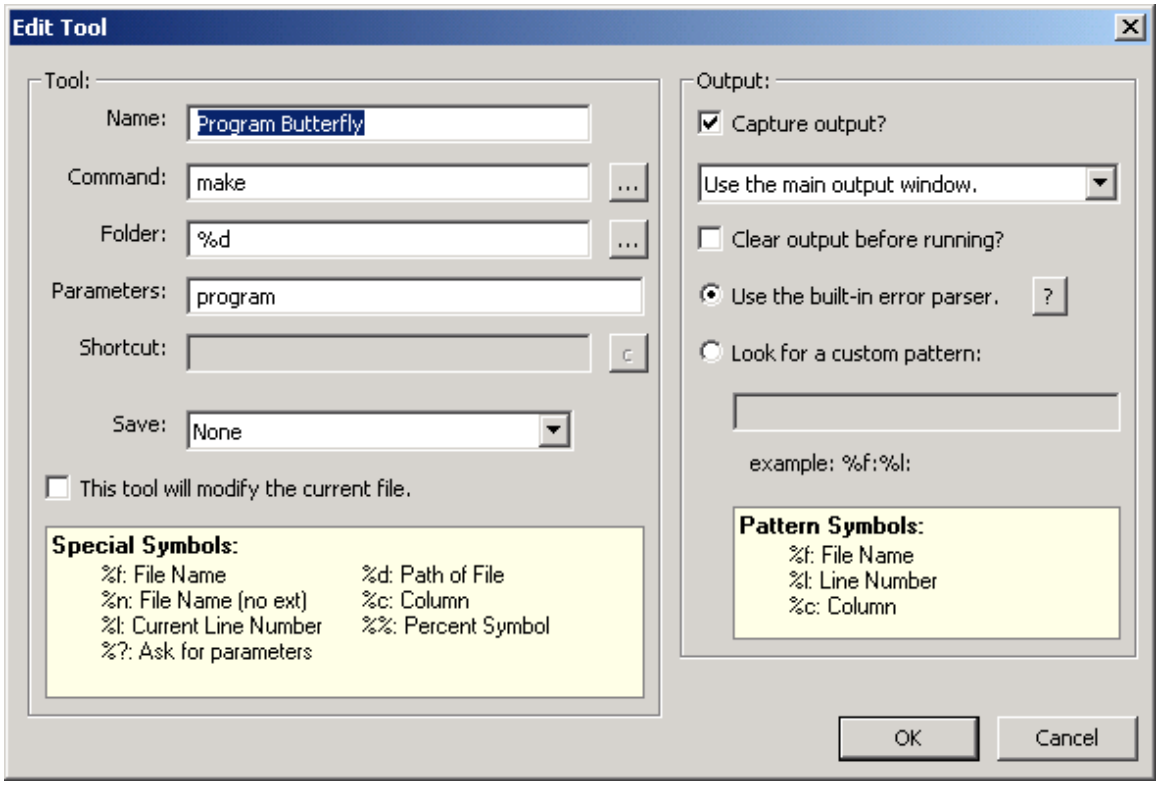
Click on the link.

Unzip it into a directory

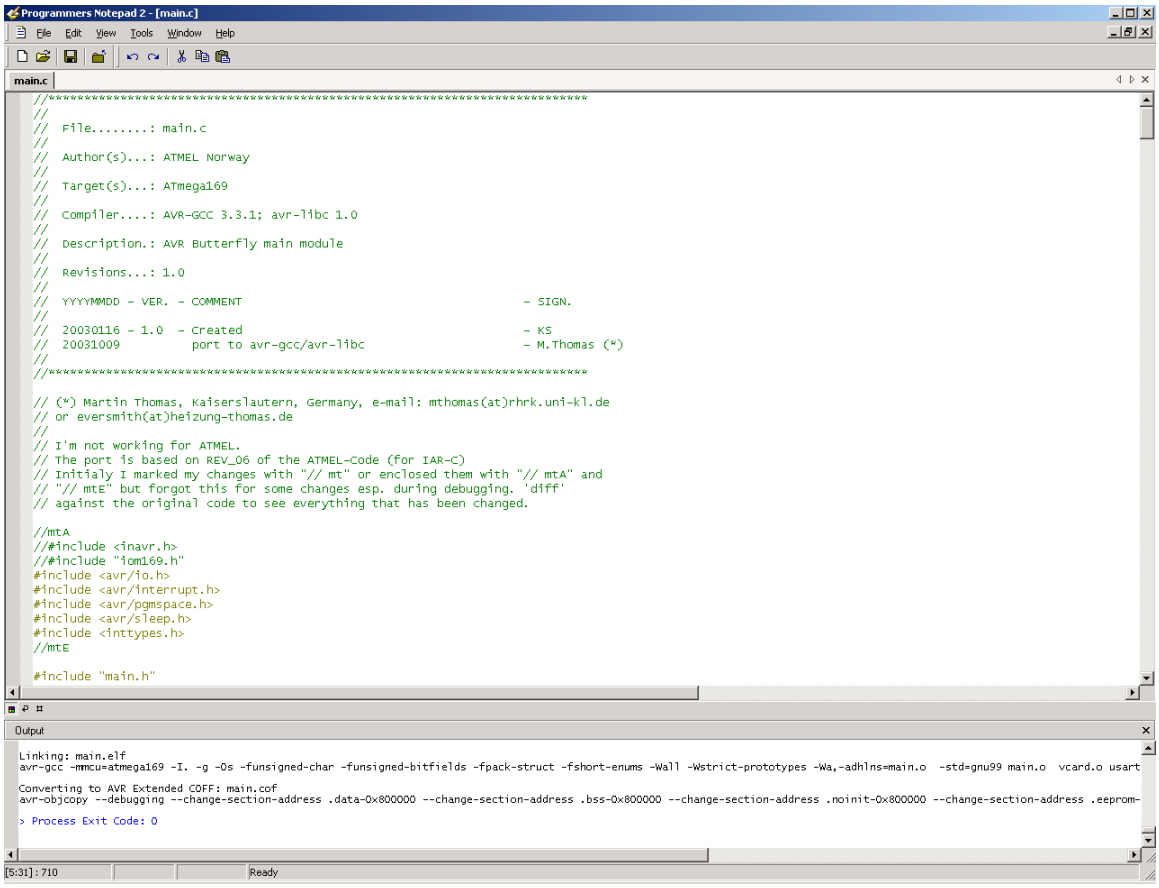
Setup Programmers Notepad



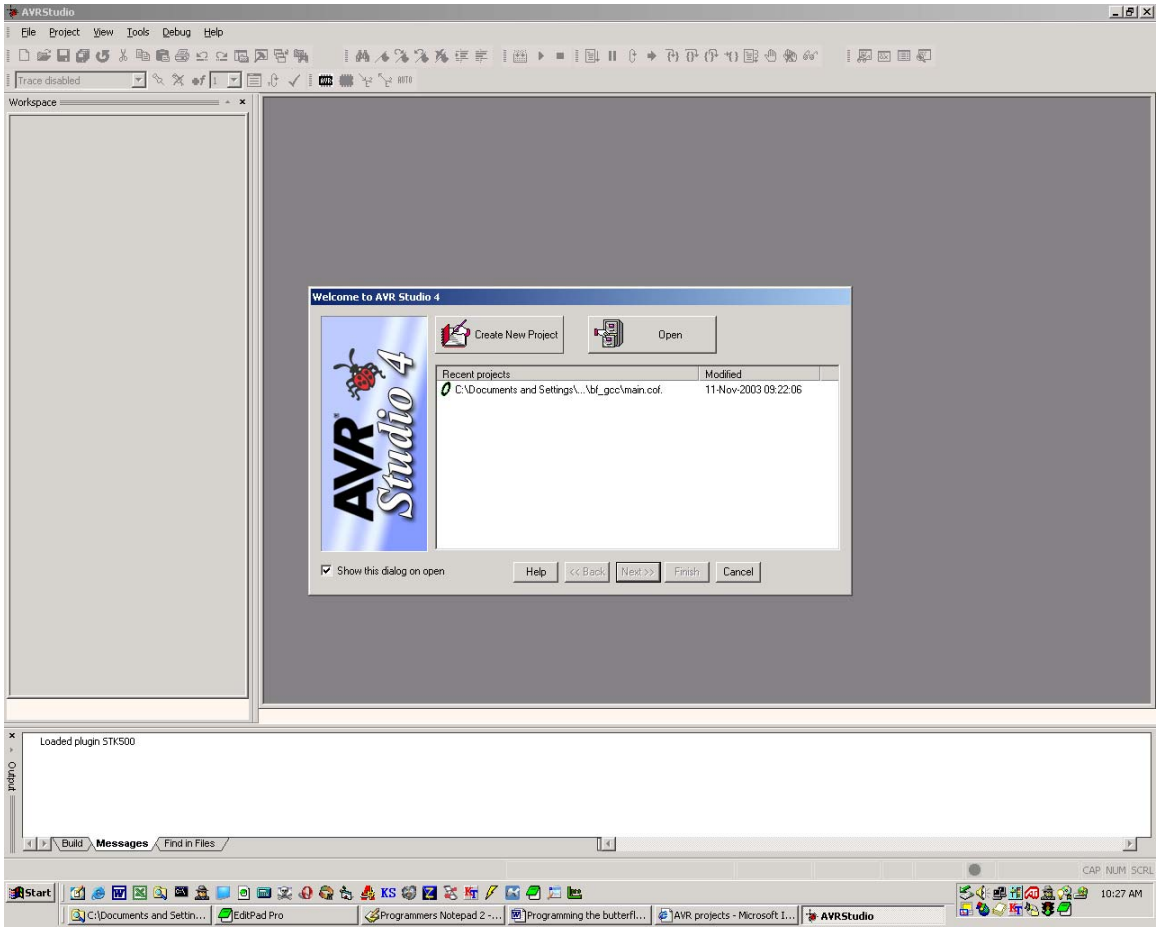

Edit Tool
Tool:
Name:
Make Clean
Command:
make
Folder:
%d
Parameters:
clean
Shortcut:
Save:
None
This tool will modify the current file.
Special Symbols:
%f: File Name
%n: File Name (no ext)
%l: Current Line Number
%?: Ask for parameters
%d: Path of File
%c: Column
%%: Percent Symbol
Output:
Capture output?
Use the main output window.
Clear output before running?
Use the built-in error parser.
Look for a custom pattern:
example: %f:%l:
Pattern Symbols:
%f: File Name
%l: Line Number
%c: Column
OK
Cancel
Edit Tool
Tool:
Name:
Make Extcoff
Command:
make
Folder:
%d
Parameters:
extcoff
Shortcut:
Save:
None
This tool will modify the current file.
Special Symbols:
%f: File Name
%n: File Name (no ext)
%l: Current Line Number
%?: Ask for parameters
%d: Path of File
%c: Column
%%: Percent Symbol
Output:
Capture output?
Use the main output window.
Clear output before running?
Use the built-in error parser.
Look for a custom pattern:
example: %f:%l:
Pattern Symbols:
%f: File Name
%l: Line Number
%c: Column
OK
Cancel

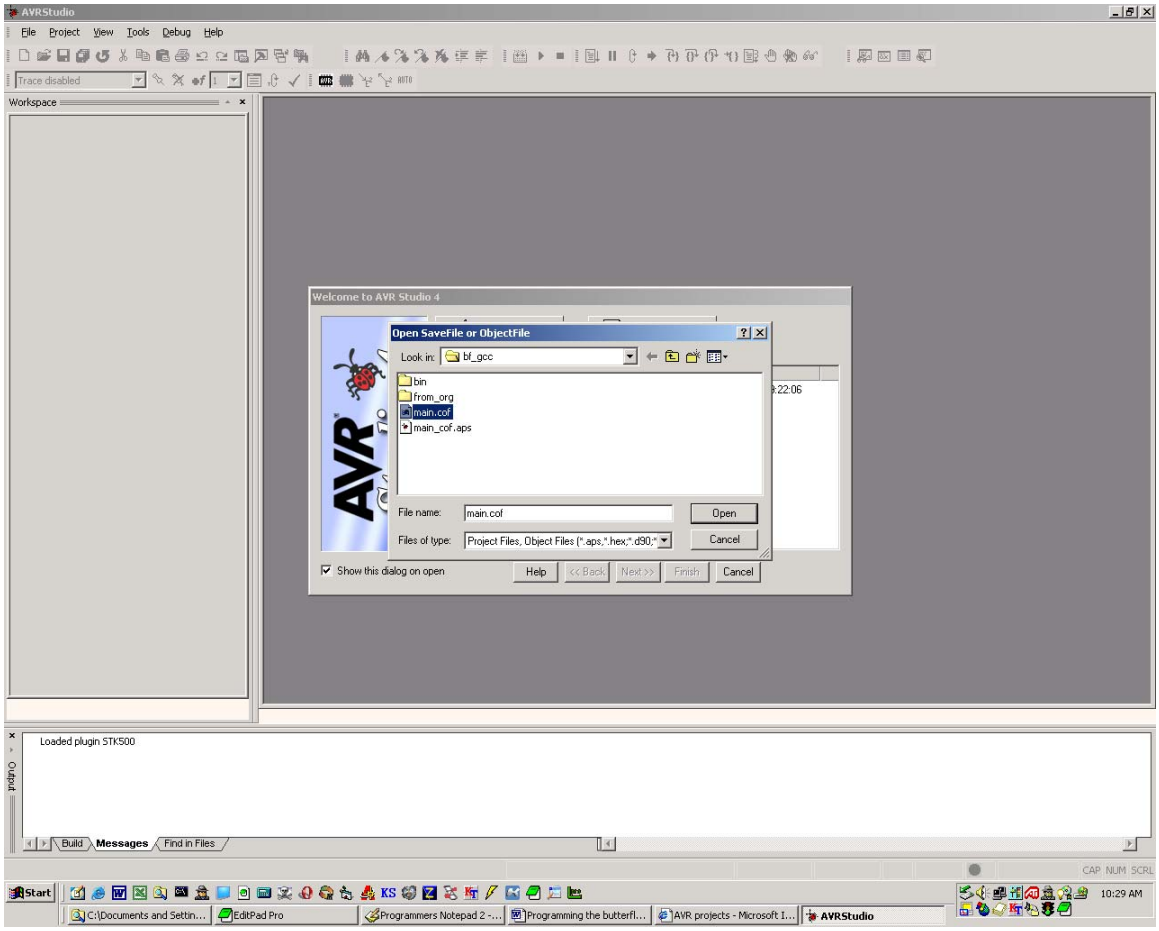

Edit Tool
Tool:
Name:
Program Butterfly
Command:
make
Folder:
%d
Parameters:
program
Shortcut:
Save:
None
This tool will modify the current file.
Special Symbols:
%f: File Name
%n: File Name (no ext)
%l: Current Line Number
%?: Ask for parameters
%d: Path of File
%c: Column
%%: Percent Symbol
Output:
Capture output?
Use the main output window.
Clear output before running?
Use the built-in error parser.
?
Look for a custom pattern:
example: %f:%l:
Pattern Symbols:
%f: File Name
%l: Line Number
%c: Column
OK
Cancel

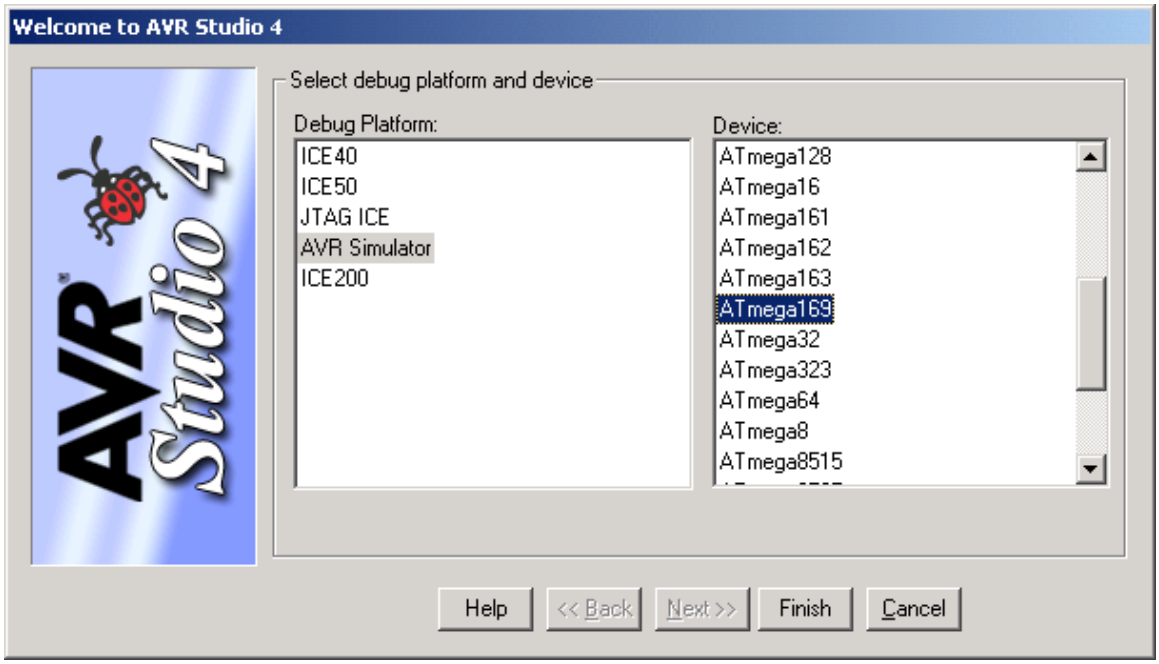
Open up main.c with programmers notepad and click tools-/-make extcoff
It should look like this….

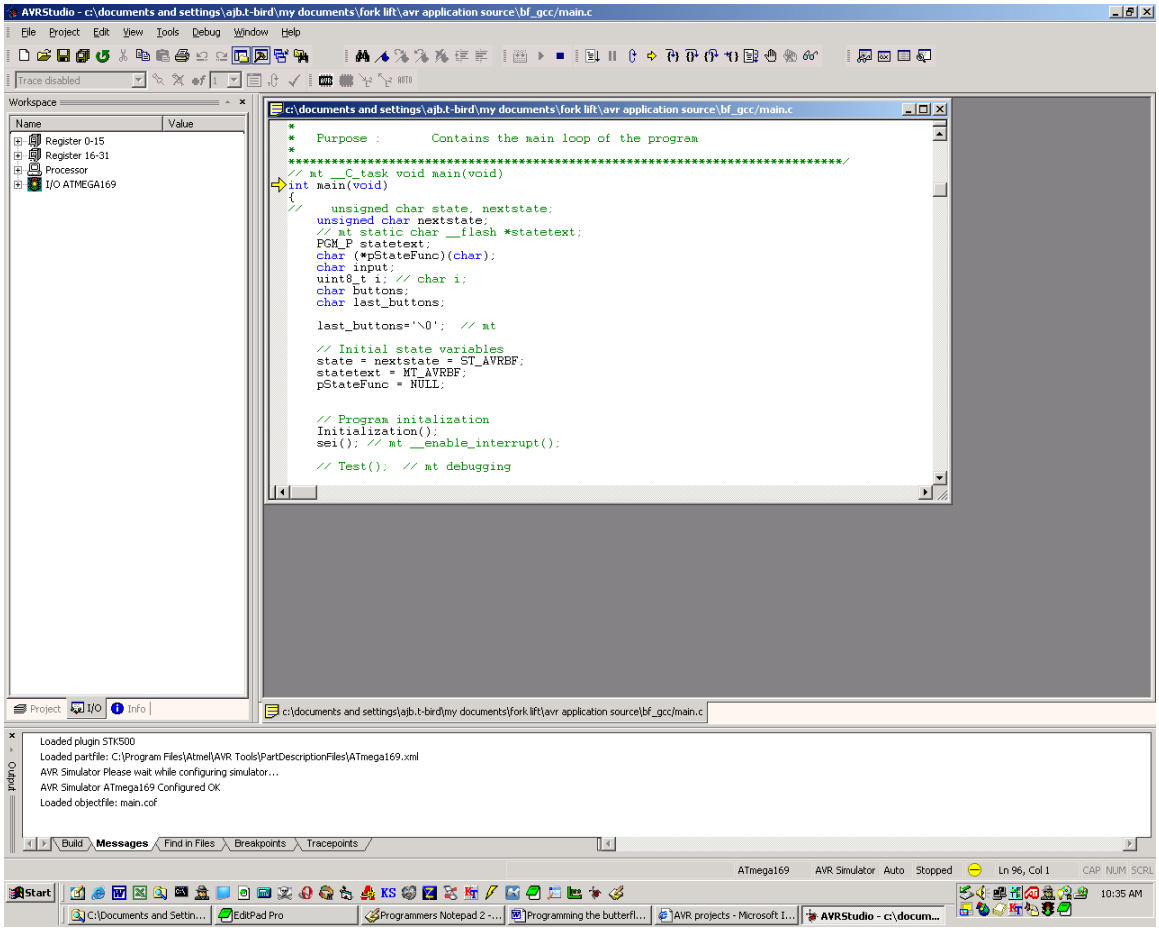


Open AVRStudio and click on open….


AVRStudio
File Project View Tools Debug Help
Trace disabled
Workspace
Welcome to AVR Studio 4
Create New Project
Open
Recent projects
Modified
C:\Documents and Settings\...\bl_gcc\main.cof.
11-Nov-2003 09:22:06
Show this dialog on open
Help
<< Back
Next >>
Finish
Cancel
Loaded plugin STK500
Output
Build
Messages
Find in Files
CAP NUM SCRL
Start
10:27 AM
C:\Documents and Settin...
EditPad Pro
Programmers Notepad 2 -...
Programming the butterfl...
AVR projects - Microsoft I...
AVRStudio


AVRStudio
File Project View Tools Debug Help
Trace disabled
Workspace
Welcome to AVR Studio 4
Open SaveFile or ObjectFile
Look in: bf_gcc
bin
from_org
main.cof
main_cof.aps
File name: main.cof
Open
Files of type: Project Files, Object Files (*.aps,*.hex,*.d90,*
Cancel
Show this dialog on open
Help
<< Back
Next >>
Finish
Cancel
Loaded plugin STK500
Output
Build
Messages
Find in Files
CAP NUM SCRL
Start
10:29 AM
C:\Documents and Settin...
EditPad Pro
Programmers Notepad 2 -...
Programming the butterfl...
AVR projects - Microsoft I...
AVRStudio


Welcome to AVR Studio 4
AVR Studio 4
Select debug platform and device
Debug Platform:
ICE40
ICE50
JTAG ICE
AVR Simulator
ICE200
Device:
ATmega128
ATmega16
ATmega161
ATmega162
ATmega163
ATmega169
ATmega32
ATmega323
ATmega64
ATmega8
ATmega8515
Help
<< Back
Next >>
Finish
Cancel



Put butterfly in boot-loader mode

A jump to the boot section can be done with the joy stick, “Options>Boot loader> Jump to Boot loader”, , or just reset the ATmega169 by shortcut pin 5 and 6 on J403 the ISP connector, (after a reset the ATmega169 will start in the boot section).

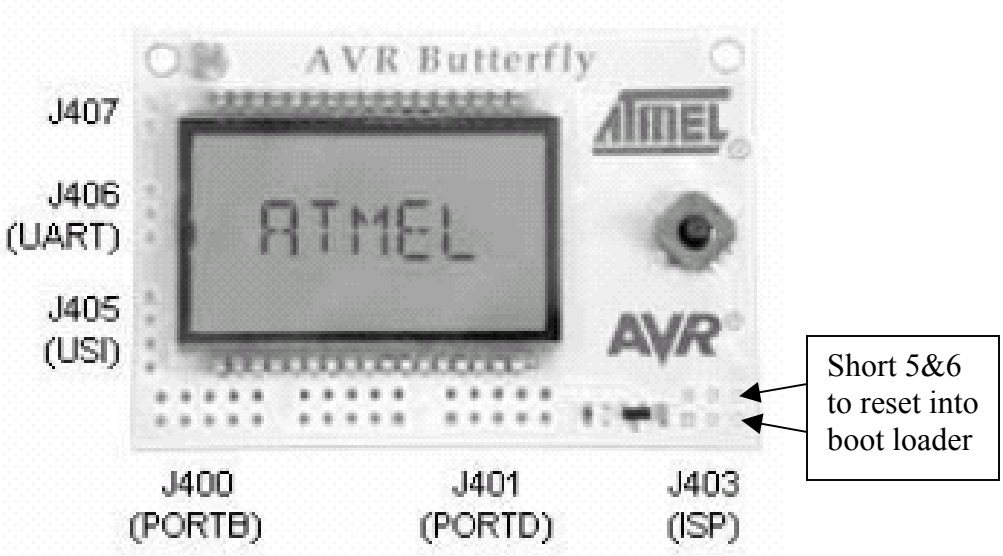
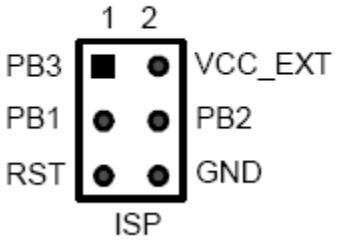
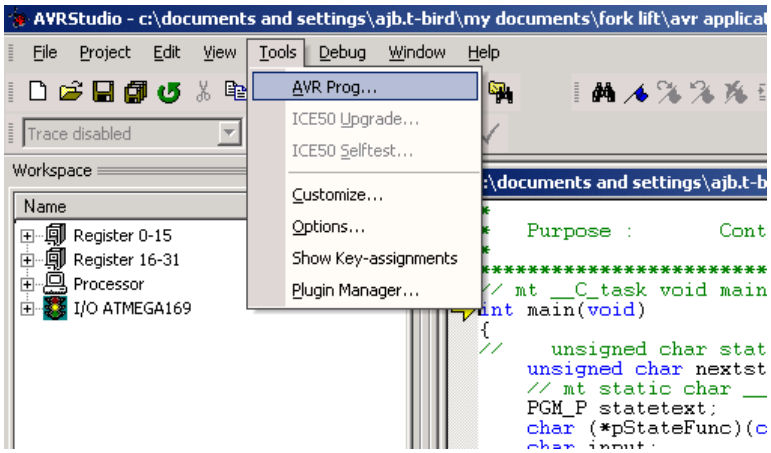


Figure 3-3. ISP Connector, J403

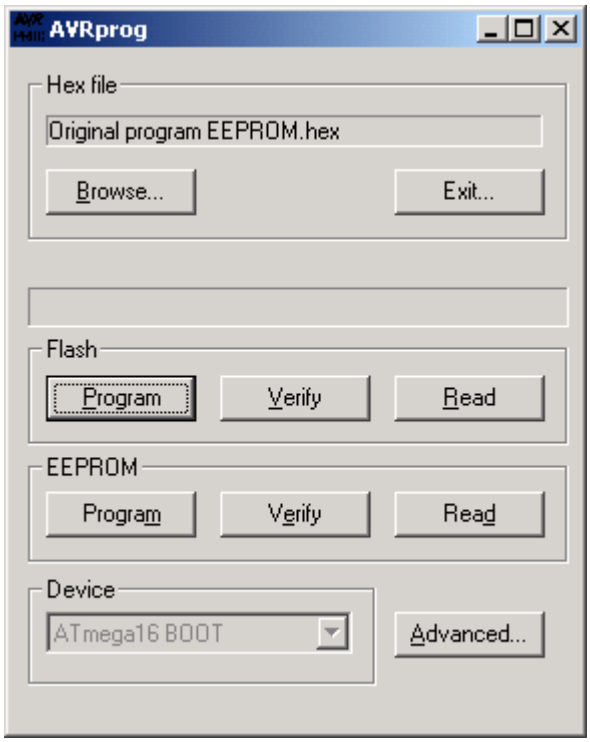


See Figure 3-3 for the pinout of the ISP-connector. Nothing will be displayed on the LCD while in boot section.

Press and hold the joystick ENTER(press down) while starting AVR Prog.



When AVR Prog… starts, release the joystick.



Find the *.hex file you want to program with the “Browse” button, and press “Program”. See that “Erasing Device”, “Programming” and “Verifying” goes “OK”, this is done automatically. After upgrading the application, **press the “Exit”-button** in AVR Prog in order to leave programming mode in the ATmega169 boot loader.

Cycle the power (remove battery and power) and the startup display should now read “AVR BUTTERFLY GCC”

Congratulations, you have just programmed the butterfly

Butterfly port assignments
ajb 11/12/2003
Yellow I don't want to mess with
Green I can use

Port	Bit	Function		Connector	Connector
A	0	LCD	COM0	JTAG 8	
	1	LCD	COM1		
	2	LCD	COM2		
	3	LCD	COM3		
	4	LCD			

	5	LCD			
	6	LCD			
	7	LCD			
B	0		SS		PORT B 1
	1	Data Flash	SCK	ISP 3	PORT B 2
	2	Data Flash	MOSI	ISP 4	PORT B 3
	3	Data Flash	MISO	ISP 1	PORT B 4
	4	joy stick	OC0		PORT B 5
	5	piezo	OC1A		PORT B 6
	6	joy stick	OC1B		PORT B 7
	7	joy stick	OC2		PORT B 8
C	0	LCD			
	1	LCD			
	2	LCD			
	3	LCD			
	4	LCD			
	5	LCD			
	6	LCD			
	7	LCD			
D	0	LCD			PORT D
	1	LCD			PORT D
	2	LCD			PORT D
	3	LCD			PORT D
	4	LCD			PORT D
	5	LCD			PORT D
	6	LCD			PORT D
	7	LCD			PORT D
E	0	AVR_RxD	RDX	UART 1	
	1	AVR_TxD	TXD	UART 2	
	2	joy stick	AIN0/XCK		
	3	joy stick	AIN1		
	4		SCL/USCK	USI 1	
	5		SDA/DI	USI 2	
	6		D0	USI 3	
	7		RST_FLASH		
F	0	temp	ADC0		
	1	volts	ADC1	Voltage Reader 1	
	2	Light	ADC2		
	3	VCP	ADC3		
	4		ADC4	JTAG 1	
	5		ADC4	JTAG 5	
	6		ADC6	JTAG 3	
	7		ADC7	JTAG 9	
G	0	LCD			
	1	LCD			
	2	LCD			
	3	LCD			
	4	LCD			